Global Innovation Index 2021

14th Edition

Tracking Innovation through the COVID-19 Crisis

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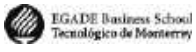

Global Innovation Index 2021

14th Edition

Tracking Innovation through the COVID-19 Crisis

Soumitra Dutta, **Bruno Lanvin**,
Lorena Rivera León and **Sacha Wunsch-Vincent**
Editors

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Foreword

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It is my great pleasure to introduce this year's *Global Innovation Index* (GII), now in its 14th edition, presenting the worldwide innovation landscape and annual performance rankings of some 130 economies.

This year's edition is being released in the middle of a continuing COVID-19 pandemic, which has taken a grim toll on lives and livelihoods, but also given us many examples of human ingenuity, resilience and adaptability. Indeed, the GII 2021 finds that the innovative sectors of the global economy have remained strong, despite severe disruptions.

To overcome the pandemic and build back better, we will need to continue supporting the translation of great ideas into game-changing products. How do we do this? This is the ultimate goal of the GII: to discover what works best in producing an ecosystem where people can achieve their highest potential, innovating and creating to improve lives everywhere.

The GII 2021 finds that governments and enterprises in many parts of the world have scaled up their investments in innovation during the COVID-19 pandemic. Meantime, scientific output, expenditures in research and development, intellectual property filings and venture capital deals continued to grow in 2020, building on strong peak pre-crisis performance.

But much more effort will be needed to vanquish the pandemic – and the GII can help. The GII's overall formula for measuring an economy's innovative capacity and output provides clarity for decision-makers in government, business and elsewhere as they look forward to creating policies that enable their people to invent and create more efficiently. That's key to overcoming the pandemic and building back better.

In the last decade and a half since its inception, the GII has supported countries around the globe as they improve their innovation investments and related policies. Dozens of countries from all regions and income groups already actively use the GII framework in the construction of their pro-innovation policies. It has charted the rising understanding of how important innovation is to growth in an interconnected but competitive worldwide economy.

As we look toward the exit of the current crisis, let us focus on using innovation to deepen the transformation of our economies and societies for the good of all. The pandemic has already accelerated digital ways of working, living and playing, while boosting technology trends all over the world. In this future world where technology, innovation and creativity are even more important for the global economy, it is my hope that the GII will continue to help guide policymakers and others so that we can build back better.

Daren Tang
Director General,
World Intellectual Property Organization (WIPO)

Acknowledgments

The *Global Innovation Index 2021* was prepared under the general direction of Daren Tang, Director General, in WIPO's IP and Innovation Ecosystems Sector led by Marco Alemán, Assistant Director General, and in the Department of Economics and Data Analytics led by Carsten Fink, Chief Economist.

The report and rankings are produced by a core team managed by Sacha Wunsch-Vincent, Head of Section, comprising Vanessa Behrens, Project Manager, Jack Gregory, Innovation Data Analyst, and Lorena Rivera León, Economist, from the WIPO Composite Indicator Research Section, and the following consultants: William Becker, Rafael Escalona Reynoso and Antanina Garanasvili.

Soumitra Dutta (Cornell University and Portulans Institute), Bruno Lanvin (Institut Européen d'Administration des Affaires, INSEAD and Portulans Institute), Lorena Rivera León (WIPO) and Sacha Wunsch-Vincent (WIPO) serve as co-editors of the GII.

The following WIPO colleagues provided substantive inputs: Hao Zhou, Director of Statistics, and Kyle Bergquist, Data Analyst, from the Statistics and Data Analytics Division, as well as colleagues from the External Relations Division, the Information and Digital Outreach Division, the IP and Innovation Ecosystems Sector, the Language Division, the News and Media Division, the Printing Plant, the Regional and National Development Sector, the WIPO Office in New York and China, WIPO's External Offices, as well as WIPO's Special Representative on the UN Sustainable Development Goals (SDGs).

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Advisory Board

In 2011, an Advisory Board was established to advise on the strategic direction of the GII, to help emphasize the role played by innovation in economic and social development, and to assist with the dissemination of GII results. The Advisory Board is a select group of international policymakers, thought-leaders and corporate executives. Members are drawn from diverse geographical and institutional backgrounds and participate in a personal capacity. We extend our gratitude to all Advisory Board members for their continued support and collaboration.

As departing members of the Advisory Board, we thank Dongmin Chen, Yuko Harayama, Beethika Khan, Chuan Poh Lim, Mary O'Kane and Sibusiso Sibisi for their contribution to previous editions of the GII.

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The GII Partners

Foreword

Soumitra Dutta and Bruno Lanvin
Co-editors of the *Global Innovation Index*
Co-founders of the Portulans Institute

In more than one respect, the year that has elapsed between the 2020 edition of the *Global Innovation Index* (GII) and the present one has been eventful and disruptive. The sudden outbreak of the COVID-19 pandemic has fundamentally altered the ways in which the world lives, works and learns. Innovation is changing in the post-pandemic era and the GII will continue to seek data-based validation of these changes.

As recovery packages continue to be deployed across major world economies, the fields of health, green and digital technology are attracting increased attention and funding. Advances and innovations can be expected in critical areas, such as health (for example, genetic engineering), pharmaceuticals (especially vaccines), energy production (with a focus on renewables), logistics and urban design, all powered by breakthroughs in artificial intelligence and quantum computing. The last edition of the GII laid out specific needs for entrepreneurship financing and measures to integrate innovation into post-crisis strategies. However, the jury is still out on the adequacy and effectiveness of the recovery packages and economic stimulus measures recently announced.

It is likely that innovation divides will be accentuated in the coming years, across economies, sectors and companies. Innovation ecosystems in many emerging economies have become fragile and will need to be supported by targeted policies. While sectors such as ICT, software and pharmaceuticals have increased spending on R&D in 2020, others such as hospitality and automobiles, have reduced their R&D investments over the same period. This imbalance will need to be corrected as the future winners in all sectors will have to be innovative in terms of both new technologies and business models.

The GII report is now published by WIPO in partnership with the Portulans Institute, with the support of our corporate network partners, the Confederation of Indian Industry (CII), Brazilian National Confederation of Industry (CNI), Ecopetrol Group (Colombia) and the Turkish Exporters Assembly (TIM). The GII will continue to provide factual evidence and reliable data to inform the many essential debates around innovation. Indeed, the 2021 edition of the GII proposes the use of a novel GII Global Innovation Tracker to monitor some of the issues mentioned above. This new effort is fully in line with the GII's goal of advancing a data-based understanding of innovation.

An important new element of the GII ecosystem this year is the creation of an Academic Network comprising nine important global academic institutions: American University in Cairo (Egypt), Cornell University (United States of America), EGADE Business School (Mexico), Higher School of Economics (Russian Federation), INSEAD (France/ Singapore), Lagos Business School (Nigeria), Peking University (China), Universidad de Los Andes (Colombia) and University of São Paulo (Brazil). The GII Academic Network will play a key role in creating new innovation programs for faculties and students globally.

We look forward to a fruitful collaboration in growing the global impact of the GII under the new leadership of WIPO's Director General, Daren Tang, and creating new programs that focus on corporate innovation and young entrepreneurs.

Corporate Network

Chandrajit Banerjee
Director General
Confederation of Indian Industry (CII)

Innovation in a new world: Lives, livelihoods and an economic reboot

The unprecedented global crisis that resulted from the outbreak of COVID-19 has propelled us into reinvigorating the important dimension of innovation in order to mitigate the pandemic's profound adverse effects on the economy and restore growth, calling for nations to embrace innovation as never before. While the crisis has naturally stimulated interest in innovative health-care solutions, it has also catalyzed other areas, such as remote working, distance learning, e-commerce and mobility solutions.

India is well known for its close relationship with innovation, from developing low-cost vaccines to frugal space programmes, and safeguarding millions of lives through the development of effective warning systems for cyclones. In these challenging times, the Confederation of Indian Industry (CII) has been working around the clock alongside the Indian Government and industry to combat the impact of the pandemic through policy advocacy, production and dissemination of appropriate technology by industry, creation and augmentation of medical infrastructure, and numerous other interventions.

Over the years, the *Global Innovation Index* (GII) has been instrumental in allowing India to shape its policies and design an actionable agenda for innovation excellence. It is indeed both a privilege and an honour for the CII to host the Indian launch of the GII every year and the historic global launch in 2019. The GII launch is a clear indicator of the phenomenal recognition of India's standing in innovation.

As nations formulate appropriate strategies for saving lives and design economic growth trajectories, the GII 2021 report will provide a significant reference point, allowing countries to assess their innovation capabilities, potential, readiness and resilience, not only to fight the current and future crises, but also to seek economic recovery and to create business models that will survive and thrive in the new post-pandemic world.

I appreciate the tireless efforts of the GII team in producing this latest edition of the Index during the crisis. The CII is privileged to have been associated with the GII since its inception and we believe it will continue to aid the global innovation journey.

I congratulate the GII team and wish them all the very best.

Robson Braga de Andrade
President
Brazilian National Confederation of industry (CNI)

Innovation: A vaccine to boost Brazil's competitiveness

The COVID-19 pandemic has triggered severe health and economic crises that will have lasting impacts. Vaccine research and scientific investigation to prevent the spread of coronavirus have increased awareness of the pivotal role of science, technology and innovation (STI) in economic and social development.

Brazil has yet to put STI at the heart of its long-term development strategy. The necessity of prioritizing the provision of public services is often used to justify a lack of focus on STI spending. Difficulties in public budget management, combined with deep-seated structural economic problems and a lack of long-term vision further exacerbate this situation.

The Entrepreneurial Mobilization for Innovation (MEI), a group coordinated by the Brazilian National Confederation of Industry (CNI), comprising 300 of the top business leaders in the country, advocates that innovation is fundamental in promoting sustainable growth and addressing chronic problems, including the provision of basic services. MEI operates as a space for public–private dialogue, allowing public policy proposals to improve the national innovation ecosystem to be presented and debated.

MEI has many achievements to show for its 13 years of existence, yet much still remains to be done. For Brazil to become a truly innovative economy, we need to be among the top 30 economies in the *Global Innovation Index* (GII) and the government's policy, launched in 2020, pledges to make concerted efforts toward achieving this goal.

MEI contributes to this national endeavor by means of specific agendas on STI policy and governance; regulatory framework; financing; strategic human resources; open innovation; sustainability; and digital transformation. The GII and other international benchmark studies are fundamental inputs on these fronts, providing an understanding of our strengths and identifying gaps.

CNI believes that the GII provides an important annual reference on innovation progress in different nations and, as such, offers excellent guidance to policymakers and companies in Brazil, contributing to the national debate, informing public–private dialogue and strengthening joint efforts toward a globally competitive Brazilian innovation ecosystem.

Have a great read!

Felipe Bayón Pardo
Chief Executive Officer
Ecopetrol Group

Committed to "making the impossible possible"

Ecopetrol began three years ago an unprecedented reinvention process. Digital transformation has played a fundamental role in making the Company what it is today: more efficient, more solid and more resilient to crises. In response to the energy transition, we have based our strategy on sustainability. In fact, at Ecopetrol we talk about TESG, whereby technology and innovation act as catalysts for the environmental, social and governance dimensions (ESG). We define TESG as making a long-term contribution and being a value generation model that aims for responsible, safe and efficient operations, harmonizing relations with the environment and our stakeholders under a transparent and ethical governance framework and using technology to develop innovative solutions to current and future challenges. In this way, we put technology and innovation at the heart of sustainability.

As an integrated business group, Ecopetrol is addressing the energy transition in four ways: i) by increasing the *competitiveness* of existing assets, ii) by *diversifying* into low-emissions businesses, iii) by accelerating *decarbonization* to achieve the goal of net zero carbon emissions by 2050, and iv) by deepening our *TESG* agenda. This is underpinned by the development of talent, knowledge and innovation. A key principle of our corporate culture is "Making the impossible possible, implementing innovative solutions with anticipation and technology," thereby enhancing Ecopetrol's goal of becoming the energy that transforms Colombia.

Our 2021–2023 Business Plan includes investments in technology and innovation of between US$100 and US$150 million. For this financial year, around US$20 million has been allocated to the research and development of technologies for energy transition and carbon neutrality.

We at Ecopetrol are aware that we cannot do it all on our own, which is why we have been strengthening our working in partnership with both public and private entities, including Microsoft, IHS Markit, Plug and Play, Israel's Innovation Authority, Colombia's Ministry of Science, Technology and Innovation, and iNNpulsa Colombia. We have also created strategic alliances with young entrepreneurs to better face the multiple challenges that confront our industry.

We also require disruptive solutions. This is why we joined the *Global Innovation Index*'s (GII) Corporate Network. We are convinced that by working jointly with the best, we can continue to make the impossible possible for the benefit of the company, its stakeholders and an innovative Colombia.

İsmail Gülle
Chair
Turkish Exporters Assembly (TİM)

Innovation: A crucial indicator for Turkey's value-added export

Innovation is an instrument of development that plays an increasingly important role in global trade. Particularly over the past two decades, the arena of global trade has been changing, with economies of scale gradually being replaced by an innovation economy focused on high value-added products and services.

This shift in focus is why Turkey attributes great importance to innovation programs and monitoring tools, such as the *Global Innovation Index* (GII). Turkish exporters are making rapid progress toward their goal of becoming pioneers of innovation in every field. Over 100,000 exporting companies want to add innovation to their products and services.

The Turkish Exporters Assembly (TİM) is maintaining its support for innovation programs like InoSuit, to strengthen university–industry cooperation, InovaLEAGUE, designed to identify innovation champions, InovaTİM, which educates students from 176 universities on the subject of innovation, and TİM-TEB Global House, which empowers 20 percent of all tech startups in Turkey and has raised more than 1,200 entrepreneurs. Additionally, we organize annual innovation events, such as Turkey Innovation Week – the largest gathering of the innovation ecosystem, coordinated by the Ministry of Commerce. Thanks to these programs, the number of Turkish exporters, specifically those with high value-added products, is gradually increasing.

With these long-established initiatives, TİM aims to improve Turkey's GII ranking and to realize the goals set out in the Turkish Global Innovation Index 2023 Roadmap, generated by TİM and the Ministry of Industry and Technology under the auspices of the Presidency of the Republic of Turkey. Inspired by the GII, a digital platform reports the monthly developments of 24 institutions for 69 GII indicators, and eight separate GII working committees have been set up to create medium- and long-term actions for the national roadmap. In this context, I would also like to thank the TİM Innovation Committee for their GII-focused efforts.

We wholeheartedly believe that, with the vital contribution of the GII, Turkey will continue in its endeavors to increase exports of innovative, high value-added products and services in a sustainable fashion.

Corporate Network Partners

Since its inception in 2007, the GII has been supported by Knowledge Partners drawn from the private sector; more specifically, firms, consultancies, or industry associations keen to promote innovation and spur competitiveness. Their contribution is an important source of influence for the GII – firms and private sector entities are, after all, at the heart of innovation. As of 2021, these partners constitute the GII's Corporate Network, supported by the Portulans Institute. In 2021, the GII Corporate Network comprises the Confederation of Indian Industry (the longest-standing corporate partner since 2008), the Brazilian National Confederation of Industry (a partner since 2017), as well as the Turkish Exporters Assembly and Ecopetrol Group, which both joined this year. We extend our gratitude to all corporate partners for their invaluable support.

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Turkish Exporters Assembly (TİM)
İsmail Gülle, Chair; Kutlu Karavelioğlu, Deputy Chair; and the following Innovation Committee Members: Orhan Sabuncu, Birol Celep, Melisa Tokgöz Mutlu, Hüseyin Memişoğlu, Feyyaz Ünal, Jak Eskinazi, Ahmet Şişman, Mustafa Ertekin. Belma Ünal, Corporate Communication Director; Senem Sanal Sezerer, Deputy Secretary General; Kübra Ulutaş, Deputy Secretary General; Meltem Demirtaş, Chief; Gökhan Ezgin, Chief; and the following experts: Gülçin Yekin, Çağrı Köse, Burak Günaydin, Nebile Mercan.

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Academic Network partners

In 2021, an Academic Network was established to engage world-leading universities – faculty members and graduate students included – in GII research and support the dissemination of GII results within the academic community. The Academic Network welcomes the contribution of researchers and institutions active in diverse fields, including business management, law, public policy and science. We extend our gratitude to all Academic Network partners for their support.

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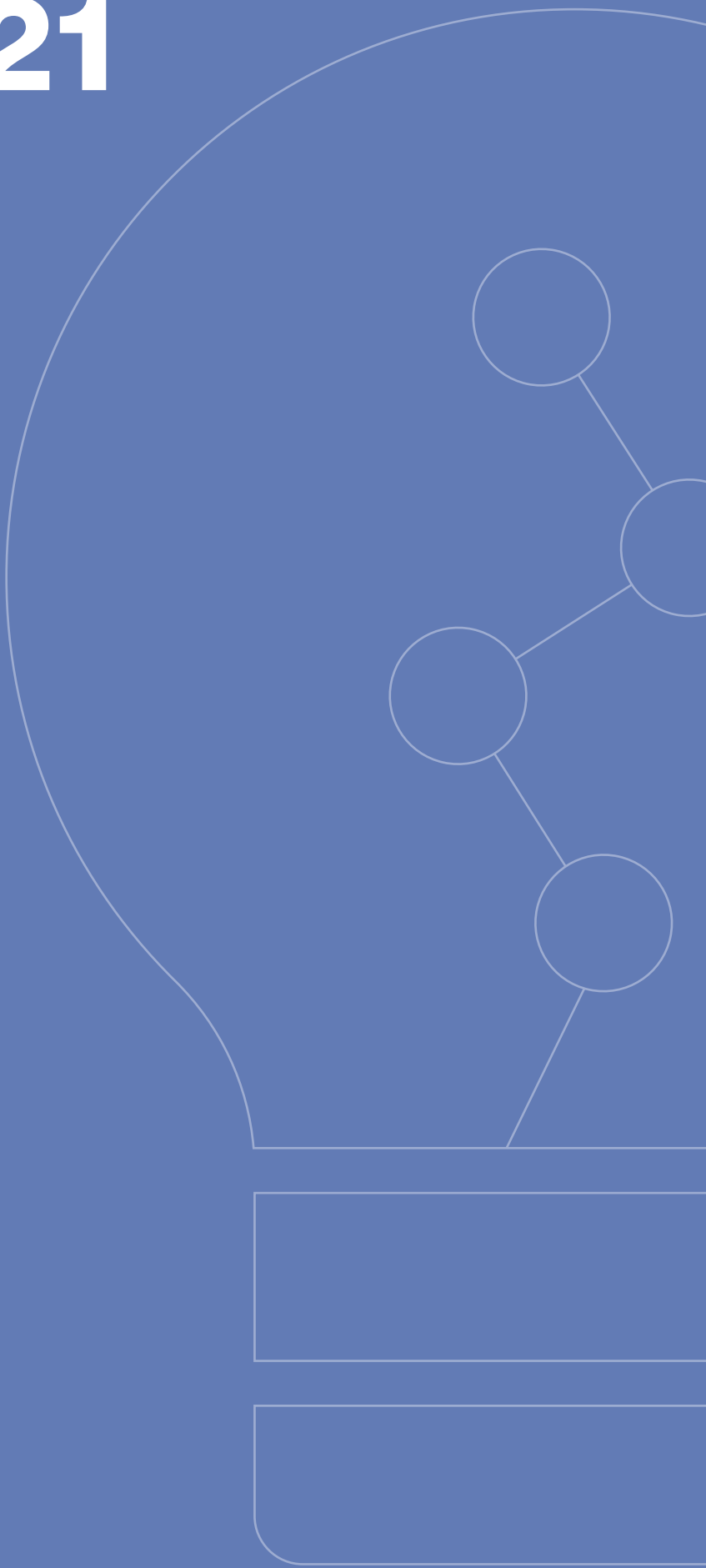
GII 2021



GII 2021 at a glance

The Global Innovation Index 2021 captures the innovation ecosystem performance of 132 economies and tracks the most recent global innovation trends.

Global leaders in innovation, 2021

Top three innovation economies by region

Top three innovation economies by income group

High-income	Upper middle-income	Lower middle-income	Low-income
1. Switzerland	1. China	1. Viet Nam	1. Rwanda ↑
2. Sweden	2. Bulgaria ↑	2. India ↑	2. Tajikistan ☆
3. United States of America	3. Malaysia ↓	3. Ukraine ↓	3. Malawi ☆

↑↓ Indicates the movement of rank within the top three, relative to 2020, and

☆ indicates a new entrant into the top three in 2021.

† 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 Turkey (4th).

* Top three in sub-Saharan Africa (SSA) – excluding island economies. The top five in the region comprise Mauritius (1st), South Africa (2nd), Kenya (3rd), Cabo Verde (4th) and the United Republic of Tanzania (5th).

Source: Global Innovation Index Database, WIPO, 2021.

Notes: World Bank Income Group Classification (June 2020). Year-on-year GII rank changes are influenced by performance and methodological considerations; some economy data are incomplete (see Appendix I).

Global Innovation Index 2021 rankings

GII rank	Economy	Score	Income group rank	Region rank
1	Switzerland	65.5	1	1
2	Sweden	63.1	2	2
3	United States of America	61.3	3	1
4	United Kingdom	59.8	4	3
5	Republic of Korea	59.3	5	1
6	Netherlands	58.6	6	4
7	Finland	58.4	7	5
8	Singapore	57.8	8	2
9	Denmark	57.3	9	6
10	Germany	57.3	10	7
11	France	55.0	11	8
12	China	54.8	1	3
13	Japan	54.5	12	4
14	Hong Kong, China	53.7	13	5
15	Israel	53.4	14	1
16	Canada	53.1	15	2
17	Iceland	51.8	16	9
18	Austria	50.9	17	10
19	Ireland	50.7	18	11
20	Norway	50.4	19	12
21	Estonia	49.9	20	13
22	Belgium	49.2	21	14
23	Luxembourg	49.0	22	15
24	Czech Republic	49.0	23	16
25	Australia	48.3	24	6
26	New Zealand	47.5	25	7
27	Malta	47.1	26	17
28	Cyprus	46.7	27	2
29	Italy	45.7	28	18
30	Spain	45.4	29	19
31	Portugal	44.2	30	20
32	Slovenia	44.1	31	21
33	United Arab Emirates	43.0	32	3
34	Hungary	42.7	33	22
35	Bulgaria	42.4	2	23
36	Malaysia	41.9	3	8
37	Slovakia	40.2	34	24
38	Latvia	40.0	35	25
39	Lithuania	39.9	36	26
40	Poland	39.9	37	27
41	Turkey	38.3	4	4
42	Croatia	37.3	38	28
43	Thailand	37.2	5	9
44	Viet Nam	37.0	1	10
45	Russian Federation	36.6	6	29
46	India	36.4	2	1
47	Greece	36.3	39	30
48	Romania	35.6	40	31
49	Ukraine	35.6	3	32
50	Montenegro	35.4	7	33
51	Philippines	35.3	4	11
52	Mauritius	35.2	41	1
53	Chile	35.1	42	1
54	Serbia	35.0	8	34
55	Mexico	34.5	9	2
56	Costa Rica	34.5	10	3
57	Brazil	34.2	11	4
58	Mongolia	34.2	5	12
59	North Macedonia	34.1	12	35
60	Iran (Islamic Republic of)	32.9	13	2
61	South Africa	32.7	14	2
62	Belarus	32.6	15	36
63	Georgia	32.4	16	5
64	Republic of Moldova	32.3	6	37
65	Uruguay	32.2	43	5
66	Saudi Arabia	31.8	44	6
67	Colombia	31.7	17	6
68	Qatar	31.5	45	7
69	Armenia	31.4	18	8
70	Peru	31.2	19	7
71	Tunisia	30.7	7	9
72	Kuwait	29.9	46	10
73	Argentina	29.8	20	8
74	Jamaica	29.6	21	9
75	Bosnia and Herzegovina	29.6	22	38
76	Oman	29.4	47	11
77	Morocco	29.3	8	12
78	Bahrain	28.8	48	13
79	Kazakhstan	28.6	23	3
80	Azerbaijan	28.4	24	14
81	Jordan	28.3	25	15
82	Brunei Darussalam	28.2	49	13
83	Panama	28.0	50	10
84	Albania	28.0	26	39
85	Kenya	27.5	9	3
86	Uzbekistan	27.4	10	4
87	Indonesia	27.1	27	14
88	Paraguay	26.4	28	11
89	Cabo Verde	25.7	11	4
90	United Republic of Tanzania	25.6	12	5
91	Ecuador	25.4	29	12
92	Lebanon	25.1	30	16
93	Dominican Republic	25.1	31	13
94	Egypt	25.1	13	17
95	Sri Lanka	25.1	14	5
96	El Salvador	25.0	15	14
97	Trinidad and Tobago	24.8	51	15
98	Kyrgyzstan	24.5	16	6
99	Pakistan	24.4	17	7
100	Namibia	24.3	32	6
101	Guatemala	24.1	33	16
102	Rwanda	23.9	1	7
103	Tajikistan	23.9	2	8
104	Bolivia (Plurinational State of)	23.4	18	17
105	Senegal	23.3	19	8
106	Botswana	22.9	34	9
107	Malawi	22.9	3	10
108	Honduras	22.8	20	18
109	Cambodia	22.8	21	15
110	Madagascar	22.5	4	11
111	Nepal	22.5	22	9
112	Ghana	22.3	23	12
113	Zimbabwe	21.9	24	13
114	Côte d'Ivoire	21.0	25	14
115	Burkina Faso	20.5	5	15
116	Bangladesh	20.2	26	10
117	Lao People's Democratic Republic	20.2	27	16
118	Nigeria	20.1	28	16
119	Uganda	20.0	6	17
120	Algeria	19.9	29	18
121	Zambia	19.8	30	18
122	Mozambique	19.7	7	19
123	Cameroon	19.7	31	20
124	Mali	19.5	8	21
125	Togo	19.3	9	22
126	Ethiopia	18.6	10	23
127	Myanmar	18.4	32	17
128	Benin	18.0	33	24
129	Niger	17.8	11	25
130	Guinea	16.7	12	26
131	Yemen	15.4	13	19
132	Angola	15.0	34	27

Source: Global Innovation Index Database, WIPO, 2021.

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

Income group rank: High-income; Uper middle-income; Lower middle-income; Low-income

Region rank: Europe; Northern America; Latin America and the Caribbean; South East Asia, East Asia, and Oceania; Central and Southern Asia; Northern Africa and Western Asia; Sub-Saharan Africa

Innovation performance at different income levels, 2021

	High-income group	Upper middle-income group	Lower middle-income group	Low-income group
Performance above expectations for level of development	Switzerland	China	Viet Nam	Rwanda
	Sweden	Bulgaria	India	Malawi
	United States of America	Thailand	Ukraine	Madagascar
	United Kingdom	Brazil	Philippines	Tajikistan
	Republic of Korea	Iran (Islamic Republic of)	Mongolia	Burkina Faso
	Netherlands	South Africa	Republic of Moldova	Uganda
	Finland	Peru	Tunisia	Mozambique
	Singapore	Malaysia	Morocco	Mali
	Denmark	Turkey	Kenya	Togo
	Germany	Russian Federation	United Republic of Tanzania	Niger
	France	Montenegro	Uzbekistan	Ethiopia
	Japan	Serbia	Cabo Verde	Guinea
	Hong Kong, China	Mexico	El Salvador	Yemen
	Israel	Costa Rica	Kyrgyzstan	
	Canada	North Macedonia	Pakistan	
	Iceland	Belarus	Bolivia (Plurinational State of)	
	Austria	Georgia	Senegal	
	Ireland	Colombia	Honduras	
	Norway	Armenia	Cambodia	
	Estonia	Jamaica	Nepal	
	Belgium	Bosnia and Herzegovina	Ghana	
	Luxembourg	Azerbaijan	Zimbabwe	
	Czech Republic	Jordan	Zambia	
	Australia	Albania	Egypt	
Performance in line with level of development	New Zealand	Indonesia	Sri Lanka	
	Malta	Paraguay	Côte d'Ivoire	
	Cyprus	Ecuador	Bangladesh	
	Italy	Namibia	Lao People's Democratic Republic	
	Spain	Guatemala		
	Portugal	Argentina	Nigeria	
	Slovenia	Kazakhstan	Algeria	
	Hungary	Lebanon	Cameroon	
	Slovakia	Dominican Republic	Myanmar	
	Latvia	Botswana	Benin	
	Poland		Angola	
	Croatia			
	Mauritius			
	Chile			
	Uruguay			
All other economies	United Arab Emirates			
	Lithuania			
	Greece			
	Romania			
	Saudi Arabia			
	Qatar			
	Kuwait			
	Oman			
	Bahrain			
	Brunei Darussalam			
	Panama			
	Trinidad and Tobago			

Source: Global Innovation Index Database, WIPO, 2021.

Key takeaways

The state of innovation throughout the COVID-19 crisis

1. The GII 2021 finds that investment in innovation has shown great resilience during the COVID-19 pandemic, often reaching new peaks, but that it varies across sectors and regions

Investment in innovation reached an all-time high prior to the pandemic, with research and development (R&D) having grown an exceptional 8.5 percent in 2019.

When the pandemic hit, the big question was what its effect on innovation would be. Historical evidence suggested a severe cutback in innovation investments.

However, despite the human toll and the economic shock resulting from the pandemic, scientific output, R&D expenditure, IP filings and venture capital (VC) deals continued to grow in 2020, building on peak pre-crisis performance:

- Publication of scientific articles worldwide grew by 7.6 percent in 2020.
- Government budget allocations for the top R&D spending economies that have already disclosed their R&D budgets continued to grow in 2020. The top global corporate R&D spenders, for which data is available, grew overall R&D expenditure by around 10 percent in 2020, with 60 percent of R&D-intensive firms reporting an increase.
- International patent filings via WIPO reached a new all-time high in 2020. An increase of 3.5 percent was driven by medical technology, pharmaceuticals and biotechnology.
- VC deals grew by 5.8 percent in 2020, exceeding the average growth rate for the past 10 years. Strong growth in the Asia Pacific region more than compensated for declines in Northern America and Europe. Africa and Latin America and the Caribbean also registered double-digit increases. First quarter figures suggest VC activity will be even more vibrant in 2021.

Firms whose innovation was at the heart of measures to contain the pandemic and its fallout – notably (i) software and information and communication technology (ICT) services, (ii) ICT hardware and electrical equipment and (iii) pharmaceuticals and biotechnology – amplified their investments in innovation. Firms in sectors heavily hit by the pandemic's containment measures – such as transport and travel – cut back their innovation outlays.

However, despite such cutbacks, available data suggest that innovation investments overall proved resilient in the face of the pandemic; and especially so when compared to the depth of the economic downturn.

2. Technological progress at the frontier holds substantial promise

The rapid development of COVID-19 vaccines powerfully fulfills the promise of technological progress. Progress also continues apace in other technology fields – for example, ICT and renewable energy – with the potential to raise living standards, improve human health and protect the environment.

Results of the Global Innovation Index 2021

3. Only a few economies have consistently delivered peak innovation performance

- Switzerland, Sweden, the U.S., and the U.K. have all ranked among the top 5 in the past three years, while the Republic of Korea joins the top 5 of the GII for the first time in 2021.
- The majority of the GII top 25 most innovative economies continue to be from Europe.
- Five Asian economies feature among the top 15 – the Republic of Korea (5th) and Singapore (8th) are in the top 10, followed by China (12th), Japan (13th) and Hong Kong, China (14th).

4. Selected middle-income economies are changing the innovation landscape, starting with China, Turkey, Viet Nam, India and the Philippines are now pulling their weight

- China remains the only middle-income economy among the top 30 most innovative economies globally. Few other middle-income economies have managed to catch-up in innovation.
- Turkey (41st), Thailand (43rd), Viet Nam (44th), the Russia Federation (45th), India (46th), Ukraine (49th) and Montenegro (50th) make it into the GII top 50 this year.
- The TVIP economies alone (Turkey, Viet Nam, India and the Philippines) are systematically catching up. Beyond China, these four particularly large economies together have the potential to change the global innovation landscape for good.

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

- India, Kenya, the Republic of Moldova, and Viet Nam hold the record for overperforming on innovation relative to their level of development for the 11th year in a row.
- Brazil, the Islamic Republic of Iran and Peru overperformed in 2021 for the first time ever.
- Sub-Saharan Africa is the region with the largest number of overperforming economies.

6. The geography of global innovation is changing unevenly

- Northern America and Europe continue to lead far in front of other regions for innovation.
- The innovation performance of South East Asia, East Asia, and Oceania (SEAO) has been the most dynamic in the past decade, and is the only region closing the gap.
- Northern Africa and Western Asia, Latin America and the Caribbean, Central and Southern Asia, and sub-Saharan Africa then follow in that order, albeit – despite strong performances by the Islamic Republic of Iran, Chile, the United Arab Emirates and South Africa – they remain stubbornly a long distance behind.
- In Latin America and the Caribbean, only Chile, Mexico, Costa Rica and Brazil rank among the top 60. Except for Mexico, few economies in this region have managed consistently to up their ranking over the past 10 years.
- In sub-Saharan Africa, only Mauritius and South Africa rank in the top 65; and only Kenya and the United Republic of Tanzania have remained firmly in the top 100 and improved their performance over time. Rwanda regained the lead position among low-income economies in this year's edition of the GII.

7. New science and technology (S&T) clusters are emerging, with the majority located in only a handful of countries

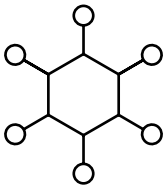
- Tokyo–Yokohama is the top performing S&T cluster once again, followed by Shenzhen–Hong Kong–Guangzhou, Beijing, Seoul and San Jose–San Francisco.
- The U.S. continues to host the highest number of clusters, followed by China, Germany, and Japan. Clusters in China recorded the largest increases in S&T output.
- Brazil, China, India, the Islamic Republic of Iran, Turkey, and the Russian Federation are all middle-income economies hosting top S&T clusters, with big growth seen in Delhi, Mumbai and Istanbul.

Global Innovation Tracker

What is the global state of innovation? Has the pandemic slowed or accelerated investments in innovation? How fast is the rate of technological progress? How do new technologies change the world?

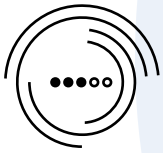
This new segment of the GII provides a perspective on global innovation performance, drawing on a select set of indicators.

Global Innovation Tracker
Dashboard



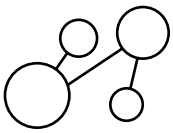
Science and innovation investments

	Scientific publications	R&D expenditures: Total	R&D expenditures: Business	International patent filings	Venture capital deals
Short term	7.6% 2019 → 2020	8.5% 2018 → 2019	7.2% 2018 → 2019	3.5% 2019 → 2020	5.8% 2019 → 2020
Long term	5.4% 2010 → 2020 (annual growth)	4.9% 2009 → 2019 (annual growth)	5.2% 2009 → 2019 (annual growth)	5.3% 2010 → 2020 (annual growth)	3.6% 2010 → 2020 (annual growth)



Technological progress

	Microchip transistor count	Costs of renewable energy: Solar photovoltaic	Costs of renewable energy: Onshore wind	Drug approvals
Short term	90.5% 2018 → 2019	–13.1% 2018 → 2019	–9.2% 2018 → 2019	10.4% 2019 → 2020
Long term	32.3% 2009 → 2019 (annual growth)	–6.9% 2010 → 2019 (annual growth)	–3.7% 2010 → 2019 (annual growth)	9.7% 2010 → 2020 (annual growth)



Socioeconomic impact

	Labor productivity	Life expectancy	Carbon dioxide emissions
Short term	4.0% 2019 → 2020	0.2% 2018 → 2020	0.06% 2018 → 2020
Long term	2.2% 2010 → 2020 (annual growth)	0.3% 2009 → 2019 (annual growth)	1.48% 2009 → 2019 (annual growth)

Notes: See the Data notes section below for a definition of indicators and their data sources. Long-term annual growth refers to the compound annual growth rate (CAGR) over the indicated period.

Monitoring the pulse of innovation is no easy task. Transforming an idea into a new good or service can take months, if not years. It takes even longer for technological advances to be widely adopted, create new jobs, enhance economic productivity and improve people's health and well-being. Today's progress is the result of past innovations; today's innovations, in turn, sow the seeds for progress in the years to come.

No single indicator captures the full spectrum of innovation performance from idea inception to impact. This is precisely why the GII relies on a wide set of indicators to measure the innovation performance of economies. Similarly, to capture key innovation trends, the Global Innovation Tracker looks at a variety of data points. It does so for three broad stages of the innovation journey: science and innovation investments; technological progress; and socioeconomic impact.

Science and innovation investments

The global pandemic has had a profound effect on economic activity. Global output declined by 3.3 percent in 2020, as containment measures to tackle the pandemic caused overall demand to decline and supply chains to fail (IMF, 2021). Financial market uncertainty soared. Historical experience would suggest that such adverse conditions would prompt a cutback in innovation investments. In many ways, however, this crisis differs from previous macroeconomic crises. Certain sectors – from personal protective equipment and consumer electronics to bicycles and home delivery services – actually experienced increased demand. Innovation, in turn, has been at the center of the fight to combat the pandemic and contain its impact.

The key indicators of global science and innovation investments – scientific publications, research and development (R&D) expenditures, international patent filings and venture capital deals – reflect this mixed impact of the pandemic.

Scientific publications

The pandemic has left no obvious mark on overall scientific output. The publication of scientific articles worldwide grew by 7.6 percent in 2020 – lower than the 2019 growth rate, but faster than the 10-year average growth rate (see Dashboard). The top five origins of scientific output – China, the United States, the United Kingdom, Germany and India – all saw lower growth in 2020 than in 2019, bearing in mind that the 2019 growth rates were exceptionally high.

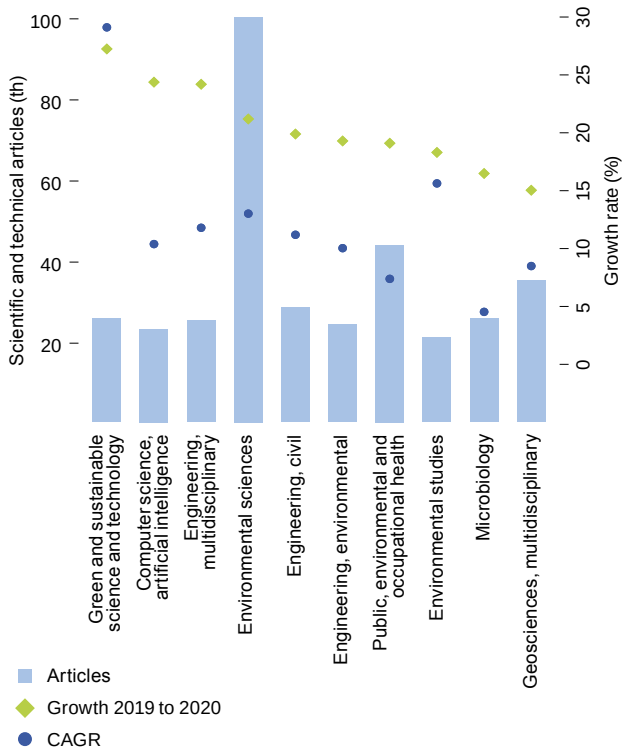
The top five fields of scientific publishing in 2020 remained the same as in 2019: multidisciplinary materials science, environmental sciences, electrical and electronic engineering, multidisciplinary chemistry and applied physics.

Looking at the fastest growing scientific fields, some influence of the pandemic appears visible. Health and, in particular, the field of *public, environmental and occupational health* saw record growth in 2020 (19.1 percent, Figure 1). The latter field covers topics such as virus transmission and measures to prevent the spread of diseases, as well as the psychological distress resulting from the pandemic. That said, other non-pandemic related fields, such as cancer research, also contributed to the fast growth in health-related scientific output.

Overall, environmental topics continue to register fast growth in scientific output (see Figure 1). Environmental sciences grew by 21.2 percent in 2020, overtaking electrical and electronic engineering as the second most active publication field. Twenty years ago, less than 1.8 percent of scientific publications related to environmental sciences, compared to around 5.1 percent in 2020. Artificial intelligence stands out as another field showing strong growth in 2020.

Figure 1

Fastest growing significant research fields by number of publications, 2020



Source: Web of Science (Clarivate) (WoS) articles published in the Social Sciences Citation Index (SSCI) and Science Citation Index Expanded (SCIE), restricted to science and technology fields and fields with more than 20,000 publications in 2020 (so all the fields in the top 30 percent). Fields represent the WoS categories [accessed on April 16, 2021].

Notes: CAGR values are computed using 2010 as the base year. If an article is published in more than one field (i.e., under more than one WoS category), then the article is counted once in each field. Hence, summing all fields would result in some double counting.

R&D expenditures

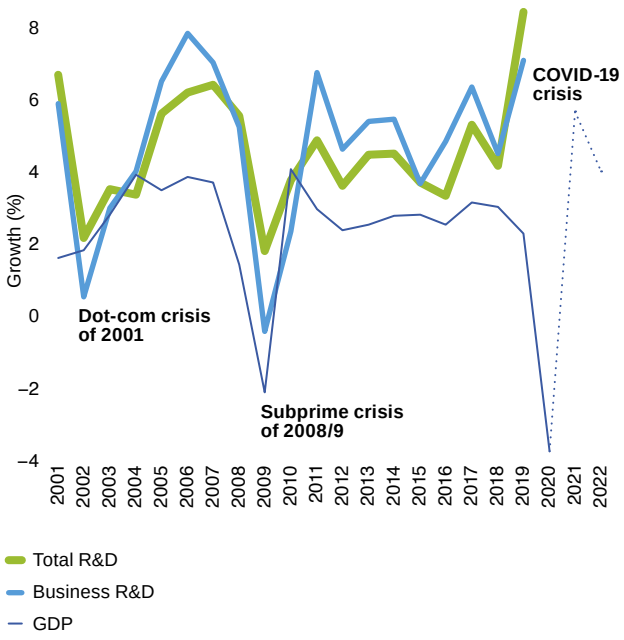
Over the past decades, investments in R&D have consistently grown faster than economic output. They reached an all-time high before the onset of the pandemic, growing at an exceptionally high rate of 8.5 percent in 2019 (see Dashboard). In comparison, global GDP grew by only 2.4 percent that year. With already high growth in R&D expenditures in 2017 and 2018, the pre-pandemic years have seen one of the most pronounced increases in the world economy's R&D intensity on record.[1]

The top five R&D spending economies in 2019 were the United States (+10.9 percent), followed by China (+11.1 percent), Japan (–0.4 percent), Germany (+2.3 percent) and the Republic of Korea (+4.8 percent). These five economies have consistently been the world's major R&D spenders since 2011. Business R&D expenditure – the largest component of total global R&D – grew by 7.2 percent in 2019, up from 4.6 percent in 2018.

How did R&D expenditure fare in 2020, as the pandemic upended economies around the world? Unfortunately, 2020 data do not yet exist. Given the delays in R&D reporting, nationwide data documenting any pandemic effect will not be available until 2022. Historically, R&D expenditures have moved in parallel with GDP, slowing markedly during the economic downturns of the early 1990s, early 2000s and late 2000s (Figure 2). Revenue declines, cash flow shortages, cost-cutting measures, falling tax revenues and increased risk aversion are some of the key transmission channels through which falling output reduces R&D investments.

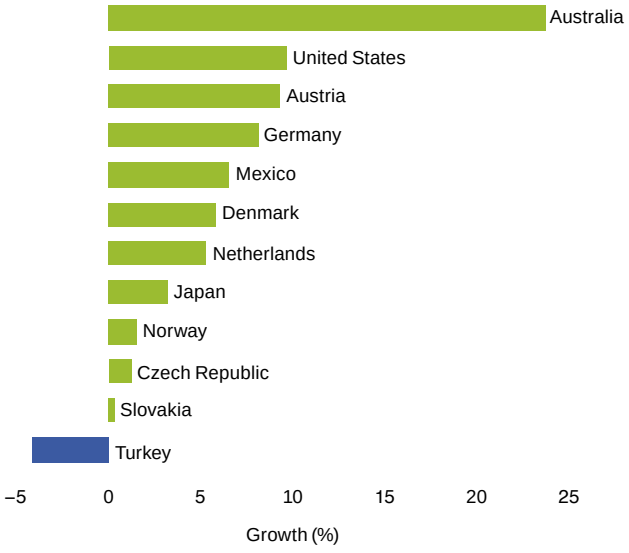
If the pandemic's impact were to mirror historical experience, 2020 R&D expenditure growth would be hard hit – possibly declining by as much as 2.8 percent.[2] However, there are reasons to be optimistic that R&D expenditures will have turned out be more resilient over the course of the pandemic. The first reason for such optimism is the nature of the crisis itself: as pointed out above, the impact of the crisis has been highly uneven across industries and innovation was at the heart of the response to the pandemic. Second, the limited available R&D data points for 2020 do not suggest pronounced declines. In particular, government budget allocations for the top R&D spending economies that have already disclosed their R&D budgets continued to grow in 2020 (see Figure 3).[3]

Figure 2
R&D and GDP growth, 2001–2022



Sources: Authors' estimates based on the UNESCO Institute for Statistics database, OECD Main Science and Technology Indicators, Eurostat, and the IMF World Economic Outlook.

Figure 3
Government budget allocations for R&D, growth in 2020



Source: Joint OECD–Eurostat data collection on resources devoted to R&D.

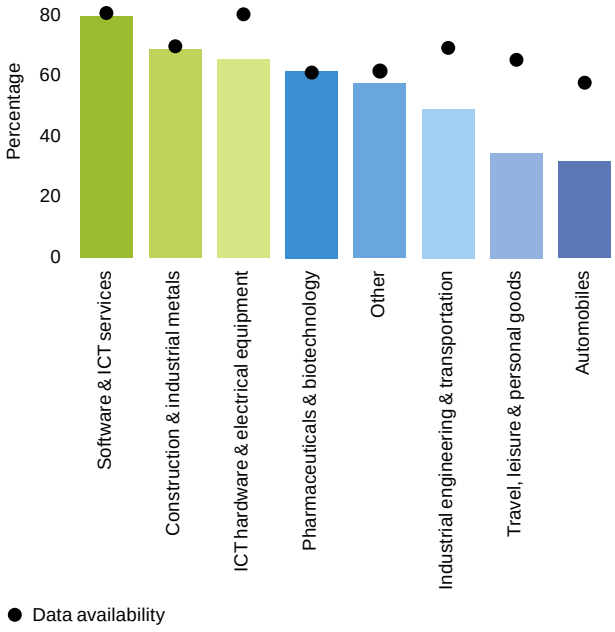
On the corporate side, some information is available from companies' financial reporting. R&D investment data are available for 1,707 of the top 2,500 largest corporate R&D spenders worldwide. Overall, this sample of firms increased their R&D expenditures by around 10 percent in 2020, with 60 percent of companies reporting an increase.

Interesting patterns emerge across industries. In the pharmaceuticals and biotechnology industry, around 62 percent of companies reported an increase in R&D spending. This share rises to 65 percent within the ICT hardware and electrical equipment industry and to 80 percent within software and ICT. The industries with a majority of companies reporting R&D investment declines include the automobile as well as the travel, leisure and personal goods industries, with shares of 68 percent and 65 percent, respectively (see Figure 4).

These cross-industry patterns broadly correspond to the differential impact of the crisis. This is also borne out when looking at the R&D performance of individual companies. Generally, companies which stood to gain from pandemic-induced shifts in demand increased their R&D efforts. These include Alibaba, Netflix, Nintendo, Nividia and many of the large pharmaceutical companies (see Figure 5). In contrast, those companies whose business models rely on in-person activities or travel decreased expenditures, including Trip.com, Airbus, Boeing, Uber, Lyft and most automobile manufacturers.

A fuller assessment of corporate R&D performance in light of the crisis will need to await the availability of more complete data, including data from small and medium-sized enterprises that may have experienced more curtailed access to finance in 2020. However, the data available so far indicate that 2020 R&D expenditures were more resilient in the face of the economic downturn than historical experience would suggest.

Figure 4
Share of firms reporting R&D expenditure increases, 2020

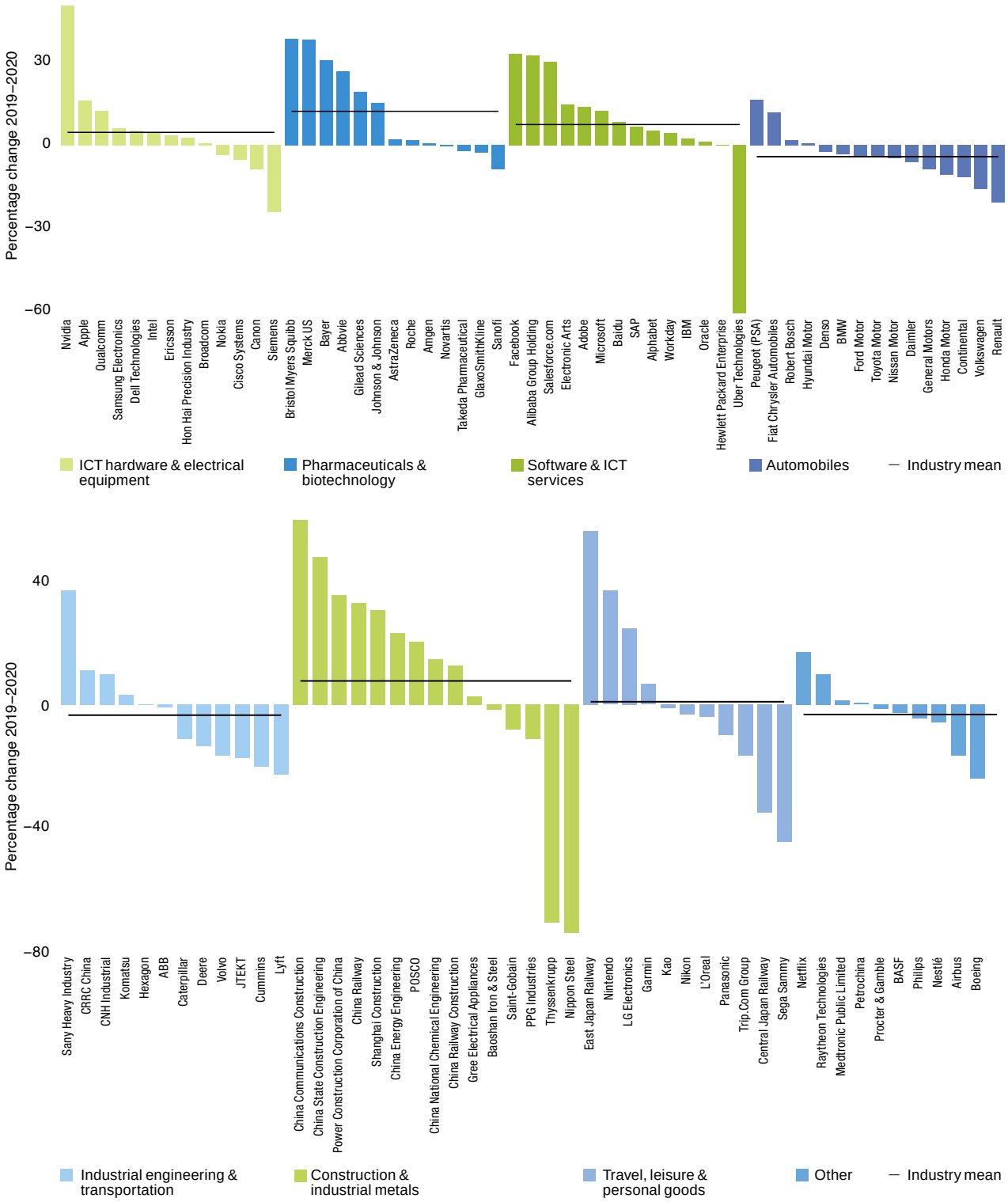


Source: Data sourced from the Bureau van Dijk Orbis database, where annual 2019 and 2020 data were utilized.

Note: Percentage changes were calculated as the difference between the 2020 and 2019 financial results over the 2019 results.

Figure 5

Corporate R&D expenditure, selected top R&D spenders worldwide, 2020 growth



Source: Data sourced from the Bureau van Dijk Orbis database, where the most recent eight-quarter period in local currency was utilized.

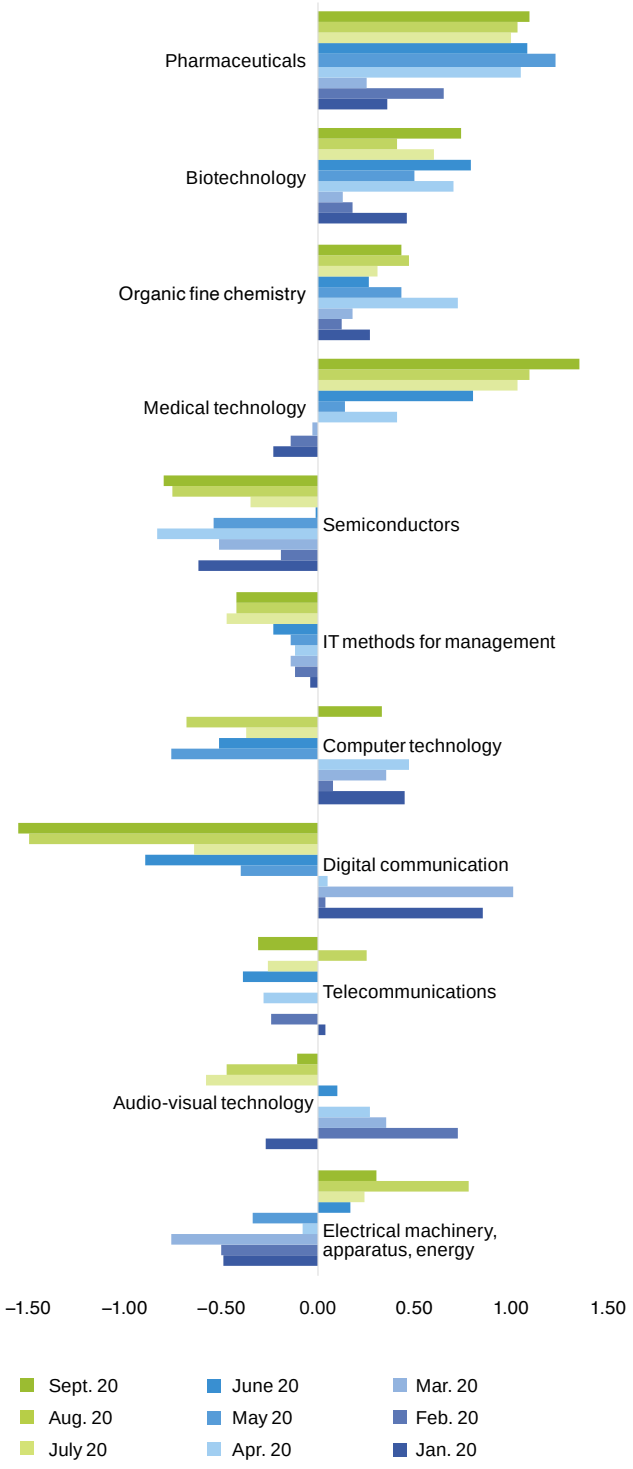
Note: Percentage changes were calculated as the difference between the most recent four-quarter period (t0) and the next most recent (t-1) over the next most recent (t-1). Thus, results in Figure 5 are not directly comparable to those from Figure 4.

International patent filings

Notwithstanding the decline in global output, international patent filings reached a new all-time high in 2020. They increased by 3.5 percent, fueled by particularly fast growth from China (16 percent). The Republic of Korea and the United States also saw solid growth, whereas Japan and most European economies registered declines.

The most dynamic technology fields in 2020 were medical technology, pharmaceuticals and biotechnology. This contrasts with previous years when digital communications, computer technology and audiovisual technology were the fastest growing fields. Most of the inventions underlying international patent filings in 2020 predate the pandemic. The strong patenting performance of health-related technologies does not, therefore, reflect an invention response to the crisis. Rather, it indicates that the pandemic has led innovators in the health-care sector to upgrade the commercial potential of their recent inventions.

Figure 6
Percentage point changes in share of PCT applications in 2020

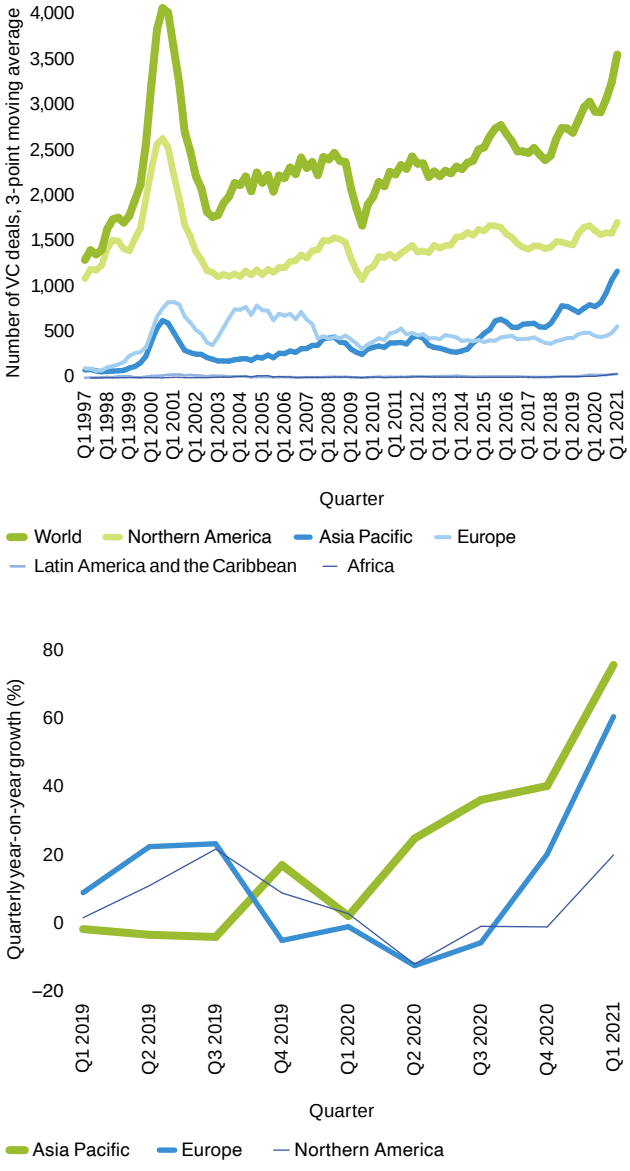


Source: WIPO, 2021.

Note: The percentage point changes are relative to the corresponding months in 2019.

Figure 7

Number of VC deals by region, three-point moving average, 1997–2021 (top), and growth in VC deals, by region, 2019–2021 (bottom)



Source: Refinitiv, Eikon (private equity screener), accessed May 20, 2021.

Note: Africa and Latin America and the Caribbean are omitted from the growth charts because low numbers caused high volatility.

Venture capital deals

The number of venture capital (VC) deals grew by 5.8 percent in 2020, exceeding the indicator's 10-year average growth rate of 3.6 percent (see Dashboard). The exceptional resilience of innovation financing is even more remarkable considering the fact that VC deals declined in Europe and Northern America in the second quarter of 2020 when overall financial market uncertainty soared (see Figure 7). Strong growth in the Asia Pacific region more than compensated for this decline.

Aside from the rapid growth of VC deals in the Asia Pacific region (+26.6 percent), both Africa and Latin America and the Caribbean also registered double-digit increases (+82.7 percent and +12.1 percent, respectively) – albeit from significantly lower levels (see Figure 7). Northern America and Europe ended the year with declines of –3.1 percent and –0.7 percent, respectively.

First quarter figures for 2021 suggest even more vibrant VC activity this year, with the Asia Pacific region reaching an all-time high with 1,260 deals. In funding terms, first quarter 2021 VC activity in all regions already equates to nearly half of total funding in 2020, setting a strong pace for the rest of the year.

Technological progress

Technological progress usually occurs gradually over a number of years. The development of the COVID-19 vaccines has defied this pattern. They were developed, clinically tested and manufactured at unprecedented speed. As of July 2021 – within 16 months of the pandemic's onset – more than 3.5 billion people worldwide had already received at least one jab. Much remains to be done to achieve equitable access to vaccines worldwide but the achievements so far arguably rank among the most spectacular episodes of technological progress.

Fully tracking the speed of progress across all areas of technology is not possible. However, monitoring progress in a few important areas, such as those detailed below, does provide useful insights.

Microchip transistor count

One popular way of tracking progress in digital technologies is to count the number of transistors on cutting-edge microchips. Moore's law famously holds that this number doubles every two years – a prediction that has proved roughly true since the 1970s. The transistor counts for the latest microchips commercialized in 2019 – AMD's Epyc and IBM's Power9 – continue to follow Moore's exponential growth path. They contain more than twice the number of transistors of the cutting-edge 2017 models. Since 2009, microchip capacity has increased by more than 30 percent per year.

Costs of renewable energy

Technological progress has prompted dramatic falls in the cost of renewable energy. Between 2010 and 2019, the cost of solar photovoltaic energy declined by 6.9 percent per year and that of onshore wind energy by 3.7 percent per year. The 2018–2019 trends show even faster declines in cost of 13.1 percent and 9.2 percent, respectively. Importantly, in most places, power from renewable energy sources is now cheaper than power from fossil fuels. This marks a significant milestone in the drive toward cheaper energy that supports the achievement of CO_2 reduction targets.

Drug approvals

Beyond the COVID-19 vaccines, there is broader progress in finding treatments for various diseases. After experiencing a decline in the 2000s, the number of new drug approvals has been trending upward. It has grown by 9.7 percent over the past 10 years. The latest 2020 data are in line with this trend. These figures only concern the U.S. economy, which spends the most on pharmaceutical R&D. In addition, the health impact of newly approved drugs varies. Nonetheless, the upward trend in drug approval mirrors broader optimism about advances in the biosciences to further improve human health (*The Economist*, 2021). One example is the recent publication of promising clinical trial results for a vaccine against malaria, following many years of failed efforts (Datoo *et al*., 2021).

Socioeconomic impact

What impact does innovation have on people's daily lives? Historically, technological progress has been a key force behind sustaining economic growth, improving living standards and offering better health outcomes. Even though innovation's track record on the environment is mixed, new technologies have also contributed to lowering pollution levels and promoting greater sustainability.

What do the latest data tell us about the socioeconomic impact of innovation?

Labor productivity

The impact of the pandemic on labor productivity has been mixed. Output per hour worked jumped by 4 percent in 2020. This increase mainly reflects the curtailment of economic activities with low productivity, often as a direct result of the containment measures introduced to tackle the pandemic. By contrast, output per worker actually decreased by 0.9 percent, as companies retained their workforce on furlough schemes, often with government support (The Conference Board, 2021).

Between 2010 and 2020, labor productivity grew by 2.2 percent per year – a slower pace compared to previous decades. Other measures of productivity – notably, total factor productivity – show similar long-term declines, especially in developed economies (Moss *et al.*, 2020). This has prompted economists to ask whether the ability of technological innovation to raise productivity and foster long-term economic growth has diminished. While this remains an open question, other factors besides technological progress may explain slower productivity growth – notably, demographic change, a growing share of services in economic output and stagnating levels of educational attainment. In addition, productivity trends could well change, as economies adopt the latest technologies.

Life expectancy

Life expectancy in the world stood at 72.7 years in 2019, up from 70.2 years in 2009 and 52.6 years in 1960. Technology has been a key contributor to longer life spans. Scientific advances have promoted healthier lifestyles; medical and pharmaceutical innovations have led to more effective treatments against a wide range of diseases.

Worldwide life expectancy data for 2020 are not yet available. In the United States, preliminary data for 2020 suggest that excess mortality due to COVID-19 has caused life expectancy to fall by one whole year (Arias *et al.*, 2021). Similar declines have been reported for the United Kingdom (Public Health England, 2021). It is important to note that these declines do not mean that a newborn baby can expect to have fewer years of life. They mainly capture the current – and hopefully temporary – increase in mortality rates.

Carbon dioxide emissions

Steps to limit global warming rely on the reduction of greenhouse gas emissions. Global carbon dioxide (CO_2) emissions – accounting for more than half of all greenhouse gases – continued to increase up to 2019. For 2020, CO_2 emissions are projected to fall, as the COVID-19 pandemic slowed the social and economic activities that are responsible for such emissions.[4] As those activities have started to rebound in 2021, CO_2 emissions are set to rise again. Technological progress – particularly the falling costs of renewable energy (see above) – has already enabled the reduction of CO_2 and other greenhouse gases. Future innovation is bound to expand this potential. At the same time, harnessing the potential of technology requires coordinated policies and long-term investments.

Conclusion

The GII Global Innovation Tracker provides a data-driven perspective on the latest innovation trends. It offers the following insights:

- Overall, investments in science and innovation have been remarkably resilient in the face of the greatest economic downturn for decades. Scientific output, R&D expenditures, international patent filings and venture capital deals continued to grow in 2020, building on already strong pre-crisis performance.
- Nonetheless, the global pandemic has left its mark on the global innovation landscape. Sectors which saw collapsing demand – such as transport and travel – had to cut back their innovation outlays. By contrast, companies whose innovations were at the center of measures to contain the pandemic and its fallout – notably, pharmaceuticals and ICTs – redoubled their investments in innovation.
- The pandemic has accelerated the long-term geographical shift of innovation activities toward Asia, even if Northern America and Europe continue to host some of the world's leading innovators.
- Technological progress at the frontier holds substantial promise. The rapid development of COVID-19 vaccines powerfully demonstrates this promise. There is also continued progress in other technology fields – such as ICTs and renewable energy – that has the potential to raise standards of living, improve human health and protect the environment.

Notes

1 This result mirrors findings for industrialized countries covered by the Organisation for Economic Co-operation and Development (OECD). See the latest data, published on March 18, 2021, in the OECD Main Science and Technology Indicators (MSTI) database, https://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB. For a more in-depth analysis of COVID-19 and innovation, see Paunov and Planes-Satorra (2021).

2 The estimate of a 2.8 percent decline is based on the assumption that R&D to GDP ratios at the country level stay the same as in 2019, so that the 2020 GDP decline is passed on to R&D expenditures in full.

3 Government R&D budget indicators for the OECD area present the amounts that governments agree to allocate to R&D as part of their budgetary processes, rather than actual expenditure reported by R&D performers.

4 For further details, see the Carbon Monitor, https://carbonmonitor.org.

Data notes

Scientific publications captures the number of peer-reviewed articles published in the Social Sciences Citation Index (SSCI) and Science Citation Index Expanded (SCIE). Source: Web of Science (Clarivate), https://apps.webofknowledge.com.

R&D expenditures captures R&D expenditures worldwide in PPP-adjusted constant 2015 prices. The 2019 values were calculated using available real data of gross expenditure on R&D (GERD) and business enterprise expenditure on R&D (BERD) at the country level from the UNESCO Institute for Statistics (UIS) online database, the OECD's Main Science and Technology Indicators (MSTI) database (March 2021 update) and Eurostat. For those countries for which data were not available for 2019, the 2019 data were estimated using the last observation carried forward (LOCF) method.

International patent filings refers to the total number of patent applications filed through the WIPO-administered Patent Cooperation Treaty. Source: WIPO IP Statistics Data Center, https://www3.wipo.int/ipstats.

Venture capital deals refers to the absolute number of VC deals received by companies located in the region. Source: Refinitiv, Eikon data on private equity and venture capital, https://www.refinitiv.com/en/products/eikon-trading-software/private-equity-data.

Microchip transistor count refers to the number of transistors on the most advanced commercially available microchips in a given year. Source: Karl Rupp, data available at https://github.com/karlrupp/microprocessor-trend-data.

Costs of renewable energy captures the global weighted average levelized electricity cost of solar photovoltaics and onshore wind. Source: International Renewable Energy Agency (IRENA), https://www.irena.org/publications/2020/Jun/Renewable-Power-Costs-in-2019.

Drug approvals refers to the number of new drug approved by the US Federal Drug Administration (FDA). The data include both small molecule drugs and biologics. Source: FDA, https://www.fda.gov/media/135307/download.

Labor productivity refers to the world total of output per hour worked, as estimated by The Conference Board. Source: The Conference Board Total Economy Database™, https://conference-board.org/data/economydatabase.

Life expectancy refers to the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life. Source: World Development Indicators, https://databank.worldbank.org/source/world-development-indicators.

Carbon dioxide emissions refers to fossil emissions, excluding carbonation, for the world, measured in billion tons of CO_2 per year. Source: The Global Carbon Budget 2020, https://doi.org/10.18160/gcp-2020.

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GII 2021 results

The GII helps create an environment that evaluates innovation factors continuously.

In 2021, it provides detailed innovation metrics for 132 economies.

The following sections present the results of the GII 2021. Appendix I provides details on how to interpret and analyze the results, in particular regarding year-on-year comparison of the GII ranks, which requires cautious interpretation.[1]

The GII 2021 innovation leaders

Only a few economies have consistently delivered peak innovation performance.

Only Switzerland and Sweden have remained in the top three of the innovation ranking for more than a decade. Switzerland, Sweden, the United States of America and the United Kingdom have ranked in the top five for the past three years, while the Republic of Korea joins the top five of the GII for the first time in 2021 (Figure 8).

The top 25 of the most innovative economies are mainly from Europe, with France (11th) and Estonia (21st) making notable progress. Five Asian economies shine in the top 15 – the Republic of Korea (5th) and Singapore (8th) in the top 10, with China (12th), Japan (13th) and Hong Kong, China (14th) following. Singapore has been among the top 10 most innovative economies consistently for the past 14 years.

China is still the only middle-income economy to make it into the top 30. China reaches the top three in the South East Asia, East Asia, and Oceania (SEAO) region for the first time and remains top of the upper middle-income group (Figure 9).

Bulgaria (35th) and Malaysia (36th) are the only other middle-income economies close to the top 30 of the GII (see Table 5), but with no consistent increase in rank over time. Indeed, Malaysia has been hovering close to the top 30 for the past 11 years but has not yet reached the mark.

Japan ranks 13th, up from 16th in 2020. The United Arab Emirates (UAE) (33rd) remains in the top 35 this year and moves up one place. The UAE has been moving up the rankings since 2018, when it ranked 38th. Turkey (41st) makes a big jump into the top 50 and Brazil (57th) moves closer.

Since 2013, China has moved up the GII ranks consistently and steadily, establishing itself as a global innovation leader and getting closer to the top 10 every year. The performance of China is at the frontier of achievement, notably in innovation outputs. For instance, China's levels of patents by origin, scaled by GDP, are higher than those of Japan, Germany and the United States, and are even more impressive when considered in absolute terms. The same is true with regard to the levels of Trademarks and Industrial designs by origin as a percentage of GDP. However, China is still behind, relative to Germany and the United States, in Human capital and research and in indicators such as Researchers (45th) and Tertiary enrolment (57th). China also trails the United States in Market sophistication and Business sophistication, and is even further behind in Institutions (61st).

The Republic of Korea (5th) made notable advances in the Innovation Output Sub-Index (5th) and, in particular, in the indicators Trademarks by origin (8th), Global brand value (5th) and Cultural and creative services exports (40th). It also ranks 3rd worldwide in the new GII output indicator Production and export complexity. In terms of innovation inputs, the Republic of Korea moved up the rankings in two pillars: Institutions (28th) and Infrastructure (12th). It also comes top in the sub-pillar ICTs (1st) and, notably, in Government's online service and E-participation.

A changing global innovation landscape

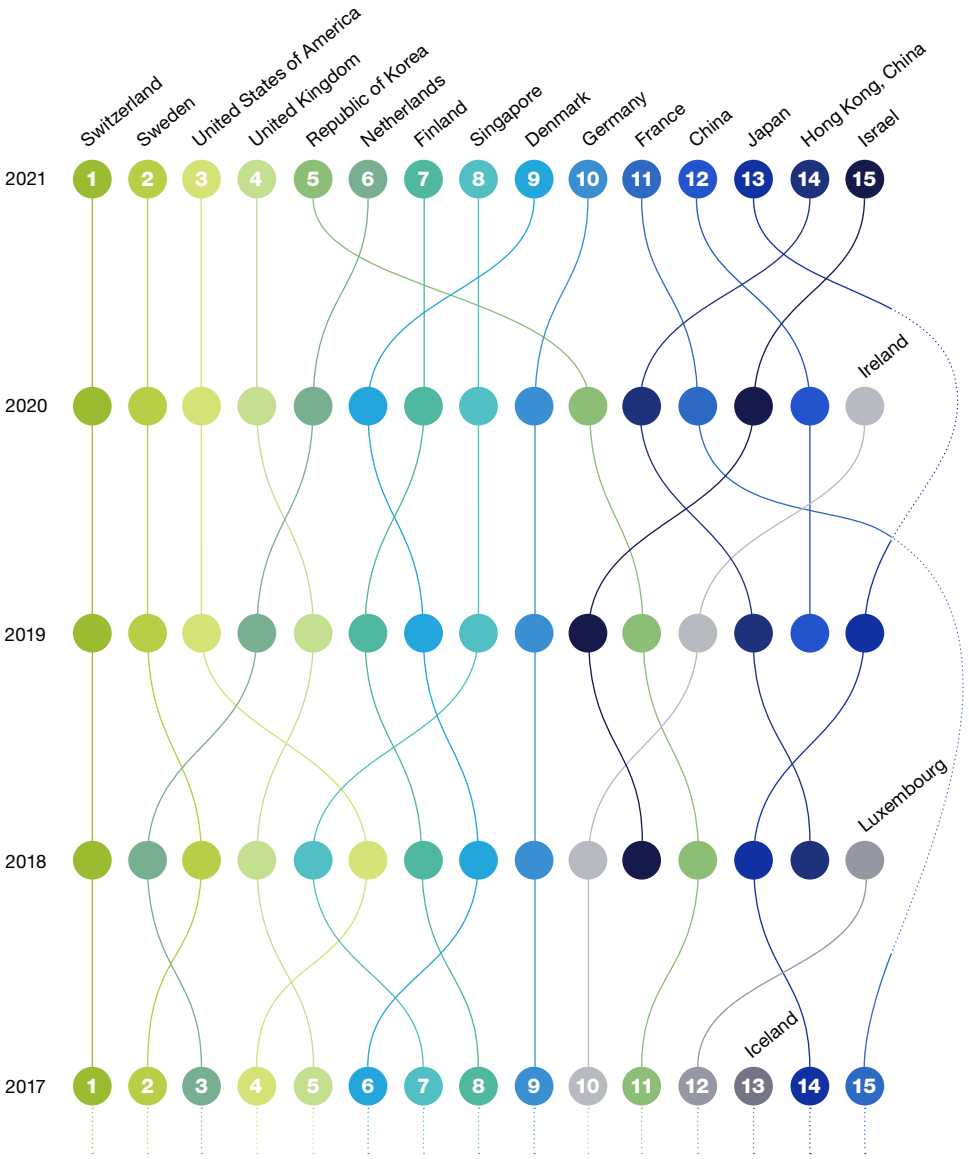
Selected middle-income economies are changing the innovation landscape, starting with China, Turkey, Viet Nam, India and the Philippines are now pulling their weight.

It is challenging for emerging economies to consistently improve their innovation performance and systems to match high-income, more prosperous economies. Only a limited number of middle-income economies have managed to catch up in innovation, by complementing successful domestic innovation with international technology transfer.

In addition to China, Bulgaria and Malaysia, which lead the middle-income group rankings, only Turkey (41st), Thailand (43rd), Viet Nam (44th), the Russian Federation (45th), India (46th), Ukraine (49th) and Montenegro (50th) make it into the top 50.

However, besides China, only the TVIPs (Turkey, Viet Nam, India and the Philippines) are systematically catching up. All four Asian economies have romped up the ranks by an average of 22 positions in the past decade: Turkey from

Figure 8
Movement in the GII top 15, 2017–2021



The Republic of Korea enters the top five in 2021. Turkey jumps into the top 50 at 41st place.

France breaks into the top 15 and ranks 11th in 2021. India and the Philippines reach the top 50.

China breaks into the top 15 in 2019; it is 12th in 2021. Israel makes it to top 10.

Sweden has been in the top 3 from 2011 up to 2021. Chile moves into the top 50.

Switzerland has ranked first from 2011 up to 2021. Malaysia gets closer to the top 35.

Source: Global Innovation Index Database, WIPO, 2021.

Note: Year-on-year comparisons of the GII ranks are influenced by changes in the GII model and data availability.

Figure 9
Global innovation leaders, 2021

Top three innovation economies by region

Europe
1. Switzerland
2. Sweden
3. United Kingdom

Northern America
1. United States of America
2. Canada

Latin America and the Caribbean
1. Chile
2. Mexico
3. Costa Rica

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

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. Turkey ☆

Sub-Saharan Africa*
1. South Africa
2. Kenya
3. United Republic of Tanzania

Top three innovation economies by income group

High-income
1. Switzerland
2. Sweden
3. United States of America

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

Lower middle-income
1. Viet Nam
2. India ↑
3. Ukraine ↓

Low-income
1. Rwanda ↑
2. Tajikistan ☆
3. Malawi ☆

↑↓ Indicates the movement of rank within the top three, relative to 2020, and

☆ indicates a new entrant into the top three in 2021.

† 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 Turkey (4th).

* Top three in sub-Saharan Africa (SSA) – excluding island economies. The top five in the region comprise Mauritius (1st), South Africa (2nd), Kenya (3rd), Cabo Verde (4th) and the United Republic of Tanzania (5th).

Source: Global Innovation Index Database, WIPO, 2021.

Notes: World Bank Income Group Classification (June 2020). Year-on-year GII rank changes are influenced by performance and methodological considerations; some economy data are incomplete (see Appendix I).

65th in 2011 to 41st in 2021; Viet Nam from 76th in 2012 to 44th this year; India from 62nd to 46th; and the Philippines from 91st to 51st. It is noteworthy that these are particularly large economies, which have the potential to radically change the global innovation landscape for good.

Turkey makes it into the top 50, gaining 10 ranks this year to reach the 41st position. Viet Nam is overtaken by Thailand, as it declines by two ranks, from 42nd to 44th. This is nevertheless a considerable improvement on its average rank of 68th during the period 2013–2015. Viet Nam continues to lead the lower middle-income group (Table 1).

India (46th) moves further ahead, by two spots (48th in GII 2020), after making it into the top 50 last year. It takes 2nd place in the lower middle-income group. India held the 3rd position in its income group in 2019 and 2020 having entered the top three in 2019. India has also been portrayed as successful in developing sophisticated services that are technologically dynamic and can be traded internationally (Aghion *et al.*, 2021). It continues to lead the world in the ICT services exports indicator (1st) and holds top ranks in other indicators, such as Domestic industry diversification (12th) and Graduates in science and engineering (12th).

Aside from the TVIPs, there are other economies that move up the rankings this year. Among the most notable movers are the Islamic Republic of Iran (60th), Oman (76th), Uzbekistan (86th), Paraguay (88th), Cabo Verde (89th) and Sri Lanka (95th).

Outside the top 100, Guatemala (101st), Tajikistan (103rd), Madagascar (110th) and Zimbabwe (113th) have made the most progress through the ranks, improving by between five and seven positions overall.

Rwanda (102nd) regains the 1st position in the low-income group after being 2nd in 2020. It ranked 1st in 2019, 2016 and 2015 and has been consistently in the top three of its income group since 2014.

Tajikistan (103rd) and Malawi (107th) make it into the top three in the low-income economies group (see Table 1).

Table 1
10 best-ranked economies by income group

Rank	Global Innovation Index 2021
High-income economies (51 in total)	
1	Switzerland (1)
2	Sweden (2)
3	United States (3)
4	United Kingdom (4)
5	Republic of Korea (5)
6	Netherlands (6)
7	Finland (7)
8	Singapore (8)
9	Denmark (9)
10	Germany (10)

Rank	Global Innovation Index 2021
Upper middle-income economies (34 in total)	
1	China (12)
2	Bulgaria (35)
3	Malaysia (36)
4	Turkey (41)
5	Thailand (43)
6	Russian Federation (45)
7	Montenegro (50)
8	Serbia (54)
9	Mexico (55)
10	Costa Rica (56)

Lower middle-income economies (34 in total)	
1	Viet Nam (44)
2	India (46)
3	Ukraine (49)
4	Philippines (51)
5	Mongolia (58)
6	Republic of Moldova (64)
7	Tunisia (71)
8	Morocco (77)
9	Kenya (85)
10	Uzbekistan (86)

Low-income economies (13 in total)	
1	Rwanda (102)
2	Tajikistan (103)
3	Malawi (107)
4	Madagascar (110)
5	Burkina Faso (115)
6	Uganda (119)
7	Mozambique (122)
8	Mali (124)
9	Togo (125)
10	Ethiopia (126)

Source: Global Innovation Index Database, WIPO, 2021.

Note: The overall Global Innovation Index rank is reported in brackets next to the economy.

Innovation overperformers

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

For several years, the GII has demonstrated the positive relationship between innovation and economic development: the more developed an economy is, the more it innovates, and vice versa (Figure 10). However, some economies break out of this pattern. Some perform above or below expectations, relative to their predicted performance and level of development.

In the GII 2021, 19 economies are performing above expectations relative to their level of development – termed innovation achievers (Table 2).

India, Kenya, the Republic of Moldova and Viet Nam are still record holders for being innovation achievers for 11 consecutive years. India's innovation performance is above the average for the upper middle-income group in five of the seven innovation pillars (it scores below average in the pillars of Infrastructure and Creative outputs). Kenya keeps its 3rd place in sub-Saharan Africa and scores above its income group in Institutions, Market and Business sophistication and Knowledge and technology outputs. It also scores above the average for its region in Human capital and research and Creative outputs. Viet Nam continues to score above the lower middle-income group average in all pillars and scores even above the average of the upper middle-income group in Market and Business sophistication, as well as in both output pillars.

However, there is change too this year. Brazil (57th), the Islamic Republic of Iran (60th) and Peru (70th) are innovation achievers in 2021 for the first time ever. In the case of Brazil, this distinction coincides with an upward move in the rankings to gain the 57th place.

Sub-Saharan Africa is the region with the highest number of economies performing above expectations (six in total). South East Asia, East Asia, and Oceania is 2nd (with four economies), Europe is 3rd (three economies), and Northern Africa and Western Asia, Latin America and the Caribbean, and Central and Southern Asia tie in 4th place (with two innovation achievers each).[2]

Conversely, 31 economies are performing below expectations on innovation. In the high-income group, three are European Union economies – Greece, Lithuania and Romania. In the upper middle-income group, there are two Latin American and Caribbean economies – Argentina and the Dominican Republic. In the lower middle-income group, 11 economies are performing below expectations for their level of development, notably five from sub-Saharan Africa – Angola, Benin, Côte d'Ivoire, Cameroon and Nigeria.[3]

Relative to 2020, 30 economies changed performance groups. Fifteen economies changed their performance status from below expectations to matching expectations. The majority of these cases (six economies) are from Latin America and the Caribbean – the Plurinational State of Bolivia, Chile, Ecuador, Guatemala, Paraguay and Uruguay.

The persistent regional innovation divide

The geography of innovation is changing unevenly. South East Asia, East Asia, and Oceania is closing the global innovation divide with Northern America and Europe.

Despite some innovation "catch-up," divides still exist with respect to national innovation performance in the world regions. This year, there are no changes in terms of which world regions perform best in innovation. Northern America and Europe continue to lead, followed by South East Asia, East Asia, and Oceania (SEAO), and, more distantly, by Northern Africa and Western Asia, Latin America and the Caribbean, Central and Southern Asia, and sub-Saharan Africa, respectively.

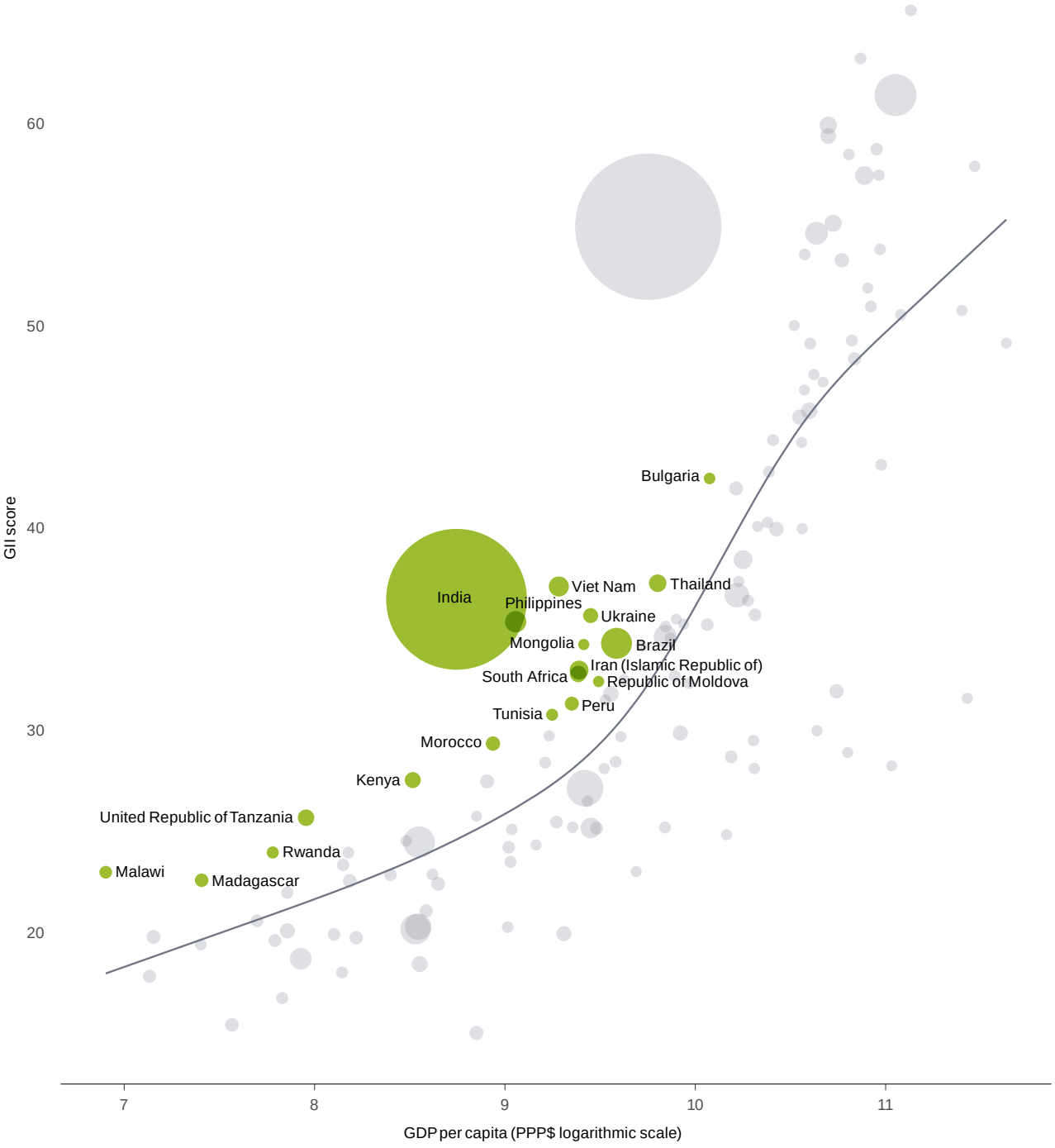
Northern America

Northern America, composed of the United States and Canada, is the most innovative world region. The United States keeps its 3rd place in the GII ranking, and Canada goes up one spot to reach the 16th place. The region is the highest performer in all GII pillars compared to all other world regions. The United States performs best in Business sophistication (2nd) and Knowledge and technology outputs (3rd), while Canada comes top in Market sophistication (1st) and fifth in Institutions.

Europe

Europe is still the second most innovative region in the world. It hosts a large number of innovative economies: 16 European economies are innovation leaders (i.e., in the top 25). A total of 10 economies move up the ranks this year: France (11th), Iceland (17th), Austria (18th), Estonia (21st), Hungary (34th), Bulgaria (35th), Slovakia (37th), Lithuania (39th), the Russian Federation (45th) and Belarus (62nd).

Figure 10
The positive relationship between innovation and development



Performing above expectations for level of development

Source: Global Innovation Index Database, WIPO, 2021.
Note: Bubbles sized by population.

Table 2
Innovation achievers in 2021, their 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, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021 (11)
Kenya	Lower-middle income	Sub-Saharan Africa	2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021 (11)
Republic of Moldova	Lower-middle income	Europe	2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021 (11)
Viet Nam	Lower-middle income	South East Asia, East Asia, and Oceania	2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021 (11)
Malawi	Low-income	Sub-Saharan Africa	2012, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021 (9)
Mongolia	Lower-middle income	South East Asia, East Asia, and Oceania	2011, 2012, 2013, 2014, 2015, 2018, 2019, 2020, 2021 (9)
Rwanda	Low-income	Sub-Saharan Africa	2012, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021 (9)
Ukraine	Lower-middle income	Europe	2012, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021 (9)
Thailand	Upper-middle income	South East Asia, East Asia, and Oceania	2011, 2014, 2015, 2018, 2019, 2020, 2021 (7)
Bulgaria	Upper-middle income	Europe	2015, 2017, 2018, 2020, 2021 (5)
Madagascar	Low-income	Sub-Saharan Africa	2016, 2017, 2018, 2020, 2021 (5)
South Africa	Upper-middle income	Sub-Saharan Africa	2018, 2019, 2020, 2021 (4)
Morocco	Lower-middle income	Northern Africa and Western Asia	2015, 2020, 2021 (3)
Philippines	Lower-middle income	South East Asia, East Asia, and Oceania	2019, 2020, 2021 (3)
Tunisia	Lower-middle income	Northern Africa and Western Asia	2018, 2020, 2021 (3)
United Republic of Tanzania	Lower-middle income	Sub-Saharan Africa	2017, 2020, 2021 (3)
Brazil	Upper-middle income	Latin America and the Caribbean	2021 (1)
Iran (Islamic Republic of)	Upper-middle income	Central and Southern Asia	2021 (1)
Peru	Upper-middle income	Latin America and the Caribbean	2021 (1)

Source: Global Innovation Index Database, WIPO, 2021.

Notes: Income group classification follows the World Bank Income Group Classification (June, 2020). Geographic regions correspond to the United Nations publication on standard country or area codes for statistical use (M49).

On average, Europe is the second best performer worldwide, behind Northern America, in all GII pillars, except for Market sophistication, where it is also behind the average of the SEAO region. Finland has the most highly performing Institutions in the region (2nd worldwide). Sweden leads in Human capital and research (2nd) and Business sophistication (1st), Norway comes top in Infrastructure worldwide (1st), while the United Kingdom leads in Market sophistication (4th). Switzerland is the regional leader in innovation outputs: it ranks 1st worldwide in Knowledge and technology outputs and 2nd in Creative outputs.

South East Asia, East Asia, and Oceania (SEAO)

The innovation performance of the SEAO region has been the most dynamic in the past decade, closing the gap with Northern America and Europe. Five SEAO economies are world innovation leaders: the Republic of Korea (5th), Singapore (8th), China (12th), Japan (13th), and Hong Kong, China (14th). Among these leaders, China, the Republic of Korea and Japan have made the greatest advances up the rankings in the past 10 years (see Table 3).

Thailand (43rd), Viet Nam (44th), the Philippines (51st) and Indonesia (87th) have moved up between 5 and 40 GII ranks over the past decade. Thailand and Viet Nam rank among the top 30 worldwide in Market sophistication, as does the Philippines in Knowledge and technology outputs. They are now leaders in key innovation indicators, too. For instance, Thailand ranks 1st in R&D financed by business; and Viet Nam and the Philippines are world leaders in High-tech exports.

Northern Africa and Western Asia

In Northern Africa and Western Asia, the United Arab Emirates (UAE) remains in the top 35 and moves up to achieve the 33rd rank. Turkey makes a big jump into the top 50, reaching the 41st spot. An additional eight economies in the region move up the ranks, including Egypt (94th) and Algeria (120th).

Cyprus is the regional leader in Institutions (26th) and Creative outputs (20th), while Israel leads in Knowledge and technology outputs (6th), Market sophistication (8th), Business sophistication (8th) and Human capital and research (19th). The UAE tops the region in Infrastructure (14th).

The United States leads in several key innovation indicators. Hong Kong (China), Israel and Singapore follow

The economies at the top of the rankings are world leaders in key innovation indicators. This year, the United States is the absolute leader in this regard; holding first place in 13 indicators out of the 81 used, including metrics such as Global corporate R&D investors, venture capital deals received, the quality of its universities, the quality and impact of its scientific publications (H-index), the number of patents by origin and E-participation.

Hong Kong, China follows the United States in 2nd place, with world-topping performances in indicators such as New businesses, High-tech imports and Global brand value. Israel and Singapore tie in 3rd place, attaining the top rank in R&D expenditures and Regulatory quality, respectively. They are followed by China and the Republic of Korea in joint 5th place, leading on High-tech exports and Researchers, among other indicators. Luxembourg comes 7th with the top performance in Knowledge-intensive employment; and Switzerland and Japan are equal 8th, leading in Patent families, and Production and export complexity.

Economies with the most top-ranked GII indicators, 2021

	Innovation indicators in which economies score best worldwide		
Economy	Inputs	Outputs	Total
United States of America	6	7	13
Hong Kong, China	7	4	11
Israel	6	4	10
Singapore	6	4	10
China	3	6	9
Republic of Korea	5	4	9
Luxembourg	6	2	8
Switzerland	2	4	6
Japan	2	4	6

Source: Global Innovation Index Database, WIPO, 2021.

Note: The GII methodology allows multiple economies to rank first in an indicator; see Economy profiles and Appendix I.

Table 3
GII 2021 rankings in Asia (excluding Western Asia)

Rank	Top 15	Rank	Top 50	Rank	Top 60	Rank	Top 100	Rank	Top 130
5	Republic of Korea	36	Malaysia	51	Philippines	79	Kazakhstan	103	Tajikistan
8	Singapore	43	Thailand	58	Mongolia	82	Brunei Darussalam	109	Cambodia
12	China	44	Viet Nam	60	Iran (Islamic Republic of)	86	Uzbekistan	111	Nepal
13	Japan	46	India			87	Indonesia	116	Bangladesh
14	Hong Kong, China					95	Sri Lanka	117	Lao People's Democratic Republic
						98	Kyrgyzstan		
						99	Pakistan	127	Myanmar

Source: Global Innovation Index Database, WIPO, 2021

Table 4
GII 2021 rankings in Latin America and the Caribbean

Rank	Top 60	Rank	Top 80	Rank	Top 100	Rank	Top 110
53	Chile	65	Uruguay	83	Panama	101	Guatemala
55	Mexico	67	Colombia	88	Paraguay	104	Bolivia (Plurinational State of)
56	Costa Rica	70	Peru	91	Ecuador	108	Honduras
57	Brazil	73	Argentina	93	Dominican Republic		
		74	Jamaica	96	El Salvador		
				97	Trinidad and Tobago		

Source: Global Innovation Index Database, WIPO, 2021

Latin America and the Caribbean

In Latin America and the Caribbean, no economy makes it into the top 50. Chile (53rd), Mexico (55th), Costa Rica (56th) and Brazil (57th) are the only economies in the region in the top 60 (see Table 4). Moreover, with the exception of Mexico, these Latin American innovation pockets have not improved their rankings consistently over the past 10 years. However, Brazil makes a strong advance this year, improving by five positions and achieving its best rank since 2012.

Chile has the most balanced innovation system, ranking highest in the region in Institutions (40th) and Infrastructure (47th) (Table 5). Conversely, and relative to their performance in all GII pillars, Mexico is still behind in Institutions (77th) and Infrastructure (67th), while Costa Rica and Brazil are lagging in Infrastructure and Market sophistication. Brazil is the only economy in the region for which expenditures on R&D are above 1 percent of GDP and comparable to some European economies, such as Croatia and Luxembourg. Brazil also ranks highest in the region in the indicator Global corporate R&D investors (26th), above Mexico (31st) and Argentina (36th).

In the top 80, Uruguay (65th), Colombia (67th), Peru (70th) and Argentina (73rd) all moved up the ranks in 2021. Over the past 10 years, Colombia and Peru have improved their rankings, but not at a steady pace and with some difficulty.

Colombia still has a relatively unbalanced innovation system, performing less well in Human capital and research (78th) and in the innovation outputs pillars, in contrast to its relatively good performance in Market sophistication (42nd) and Business sophistication (50th). Peru achieves its best ranking this year in Market and Business sophistication (38th and 37th, respectively), but still struggles to translate its innovation inputs into outputs. It is also an innovation achiever for the first time this year, highlighting its potential for further improvements in the future (see Table 2).

Central and Southern Asia

In Central and Southern Asia, India leads in 46th position, having consistently risen up the ranks since 2015, when it ranked 81st. The Islamic Republic of Iran is 2nd in the region, going up to 60th place. Kazakhstan ranks 3rd at the 79th position (see Table 3). Uzbekistan continues to move upward, by seven places, and achieves the 86th rank in 2021. The innovation performance of Kazakhstan (79th) and Tajikistan (103rd) improved in 2021 but has been less steady over the past years.

Table 5
GII 2021 rankings overall and by pillar

Country/Economy	Overall GII	Institutions	Human capital and research	Infrastructure	Market sophistication	Business sophistication	Knowledge and technology outputs	Creative outputs
Switzerland	1	13	6	2	6	4	1	2
Sweden	2	9	2	3	11	1	2	5
United States of America	3	12	11	23	2	2	3	12
United Kingdom	4	15	10	10	4	21	10	4
Republic of Korea	5	28	1	12	18	7	8	8
Netherlands	6	6	14	16	31	5	7	7
Finland	7	2	4	11	19	6	5	16
Singapore	8	1	9	15	5	3	13	17
Denmark	9	8	5	5	7	11	14	13
Germany	10	17	3	21	20	12	9	11
France	11	19	15	17	17	19	16	6
China	12	61	21	24	16	13	4	14
Japan	13	7	20	9	15	10	11	18
Hong Kong, China	14	11	25	6	3	24	62	1
Israel	15	34	19	40	8	8	6	30
Canada	16	5	18	30	1	20	23	19
Iceland	17	14	23	25	25	18	25	10
Austria	18	16	7	7	40	15	19	27
Ireland	19	18	27	4	48	17	15	29
Norway	20	3	13	1	21	23	28	25
Estonia	21	22	34	8	10	29	22	15
Belgium	22	23	8	35	33	16	17	36
Luxembourg	23	27	40	33	53	9	38	3
Czech Republic	24	32	33	19	50	25	12	22
Australia	25	10	12	20	9	26	42	24
New Zealand	26	4	17	22	14	30	39	23
Malta	27	37	41	18	63	14	44	9
Cyprus	28	26	42	28	46	28	21	20
Italy	29	36	31	26	43	32	18	34
Spain	30	31	30	13	32	35	26	32
Portugal	31	25	24	31	56	41	34	26
Slovenia	32	20	28	27	71	27	32	38
United Arab Emirates	33	30	22	14	26	22	59	40
Hungary	34	42	36	32	65	31	20	47
Bulgaria	35	47	65	36	72	42	27	21
Malaysia	36	41	39	51	30	39	31	37
Slovakia	37	39	58	39	73	43	30	43
Latvia	38	29	46	55	45	40	45	39
Lithuania	39	33	43	42	35	45	49	41
Poland	40	38	37	41	60	38	36	50
Turkey	41	93	26	48	49	46	50	35
Croatia	42	46	47	29	67	55	47	54
Thailand	43	64	63	61	27	36	40	55
Viet Nam	44	83	79	79	22	47	41	42
Russian Federation	45	67	29	63	61	44	48	56
India	46	62	54	81	28	52	29	68
Greece	47	51	16	45	70	60	52	69
Romania	48	53	76	37	76	54	35	72
Ukraine	49	91	44	94	88	53	33	48
Montenegro	50	48	59	60	41	67	78	33
Philippines	51	90	80	86	86	33	24	65
Mauritius	52	21	71	65	29	111	93	31
Chile	53	40	51	47	66	48	58	60
Serbia	54	50	62	44	58	63	43	76
Mexico	55	77	56	67	55	56	53	52
Costa Rica	56	66	61	71	85	49	56	45
Brazil	57	78	48	69	75	34	51	66
Mongolia	58	76	81	91	13	71	85	28
North Macedonia	59	52	73	49	12	65	57	83
Iran (Islamic Republic of)	60	124	49	70	82	115	46	46
South Africa	61	55	67	83	23	51	61	79
Belarus	62	85	38	59	101	69	37	93
Georgia	63	35	60	85	34	61	75	74
Republic of Moldova	64	81	77	82	74	87	54	53
Uruguay	65	44	64	53	108	81	63	64
Saudi Arabia	66	101	32	54	39	89	69	78
Colombia	67	56	78	57	42	50	72	82
Qatar	68	57	75	34	83	96	79	63
Armenia	69	65	94	80	99	98	64	49
Peru	70	70	53	78	38	37	87	77

Table 5
GII 2021 rankings overall and by pillar (continued)

Country/Economy	Overall GII	Institutions	Human capital and research	Infrastructure	Market sophistication	Business sophistication	Knowledge and technology outputs	Creative outputs
Tunisia	71	75	35	89	98	114	55	80
Kuwait	72	86	69	43	94	100	60	89
Argentina	73	102	50	64	110	57	73	73
Jamaica	74	43	86	104	116	58	95	51
Bosnia and Herzegovina	75	82	68	52	51	99	66	99
Oman	76	71	45	56	84	94	107	71
Morocco	77	74	82	84	91	105	67	70
Bahrain	78	49	83	38	78	90	82	106
Kazakhstan	79	45	66	58	80	78	86	110
Azerbaijan	80	58	89	88	36	92	115	67
Jordan	81	63	84	102	47	85	76	88
Brunei Darussalam	82	24	52	46	106	84	130	85
Panama	83	69	99	50	97	103	113	58
Albania	84	60	90	62	79	68	103	81
Kenya	85	80	92	114	54	77	65	95
Uzbekistan	86	94	72	72	24	123	77	113
Indonesia	87	107	91	68	57	110	74	91
Paraguay	88	110	98	77	89	66	117	62
Cabo Verde	89	88	95	66	128	74	122	59
United Republic of Tanzania	90	103	125	105	109	119	100	44
Ecuador	91	126	97	74	44	97	97	86
Lebanon	92	112	87	100	90	64	91	92
Dominican Republic	93	96	102	75	104	86	108	84
Egypt	94	114	93	92	96	106	70	104
Sri Lanka	95	119	118	73	118	62	68	100
El Salvador	96	98	106	99	105	80	124	57
Trinidad and Tobago	97	72	100	90	119	104	83	103
Kyrgyzstan	98	95	70	87	52	107	102	120
Pakistan	99	99	117	117	120	88	71	87
Namibia	100	73	57	112	92	112	119	105
Guatemala	101	117	120	122	77	79	90	75
Rwanda	102	54	114	101	93	82	96	117
Tajikistan	103	118	85	126	37	129	80	107
Bolivia (Plurinational State of)	104	131	55	106	59	75	112	111
Senegal	105	68	104	108	107	131	88	109
Botswana	106	59	130	93	113	73	101	112
Malawi	107	105	122	127	81	95	84	97
Honduras	108	121	96	116	62	72	118	102
Cambodia	109	111	109	107	69	117	111	98
Madagascar	110	108	116	132	122	125	99	61
Nepal	111	115	115	98	68	59	121	108
Ghana	112	120	101	97	115	108	104	94
Zimbabwe	113	129	88	128	64	101	109	101
Côte d'Ivoire	114	79	124	109	117	91	110	121
Burkina Faso	115	92	103	111	114	120	106	129
Bangladesh	116	122	128	95	95	122	92	123
Lao People's Democratic Republic	117	130	113	123	103	70	127	90
Nigeria	118	109	121	120	102	76	123	116
Uganda	119	89	131	103	111	118	105	126
Algeria	120	104	74	96	132	124	125	118
Zambia	121	125	107	119	87	83	120	125
Mozambique	122	127	112	76	126	127	116	115
Cameroon	123	113	105	115	129	93	98	124
Mali	124	106	123	124	121	109	94	122
Togo	125	87	110	110	112	128	128	119
Ethiopia	126	116	126	121	130	126	81	127
Myanmar	127	123	108	113	124	132	89	131
Benin	128	84	111	118	123	113	131	128
Niger	129	97	129	130	100	116	114	132
Guinea	130	100	132	131	131	121	132	96
Yemen	131	132	127	129	125	102	126	114
Angola	132	128	119	125	127	130	129	130

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, 2021.

Overall, the region performs best in Market sophistication. In terms of innovation inputs, Kazakhstan leads the region in Institutions (45th rank overall) and Infrastructure (58th), the Islamic Republic of Iran leads in Human capital and research (49th), Uzbekistan in Market sophistication (24th) and India in Business sophistication (52nd). India is also at the top of the region in the Knowledge and technology outputs pillar (29th), while the Islamic Republic of Iran comes top in Creative outputs (46th).

Sub-Saharan Africa

In sub-Saharan Africa, only Mauritius (52nd) and South Africa (61st) rank in the top 65; and only Kenya (85th) and the United Republic of Tanzania (90th) have remained firmly within the top 100 and have improved their performance over the past five years. No economy has steadily improved its rankings over time. A total of 10 economies in the region move up the GII ranks this year, including Kenya (85th), Namibia (100th), Malawi (107th), Madagascar (110th), Zimbabwe (113th) and Burkina Faso (115th). Cabo Verde reaches 89th place this year, a considerable increase from its position at 103rd place in 2013.

On average, the region performs best in Institutions, even ranking above the average of the Central and Southern Asia region. Mauritius ranks highest in the region in Institutions (21st), Infrastructure (65th) and Creative outputs (31st). Namibia comes top in Human capital and research (57th), and South Africa in Market sophistication (23rd), Business sophistication (51st) and Knowledge and technology outputs (61st).

Creating balanced and efficient innovation ecosystems

Innovation leaders have balanced and high-performing innovation systems. However, efficiency in translating innovation inputs into outputs is still eluding several high-income economies

Innovation leaders and the economies that have consistently advanced up the GII ranks over the past decade have dynamic innovation systems and combine efficiency in translating innovation inputs into outputs with a balanced and strong performance across all GII pillars.

Translating an economy's investments in innovation – in the form of R&D, education, and solid infrastructure and institutions supporting innovative activities – into innovation outputs is not an easy feat.

Some economies excel in efficiently converting innovation inputs into outputs. Among the high-income group economies, Switzerland (1st) produces considerably higher levels of outputs than other high-income economies, such as Sweden (2nd), the United States (3rd) and Singapore (8th), at comparable levels of innovation inputs (Figure 11). The Czech Republic (24th) produces the same levels of outputs as Japan (13th) or Singapore (8th) at much lower levels of innovation inputs.

Among the upper middle-income group economies, China (12th) ranks 7th overall in the Innovation Output Sub-Index, and its levels of outputs are comparable to those of high-income economies like the United Kingdom (4th), the Netherlands (6th) and Germany (10th), even though its overall level of innovation inputs is lower. Bulgaria (35th) has outputs comparable to high-income economies, such as Norway (20th) and Italy (29th), with fewer inputs.

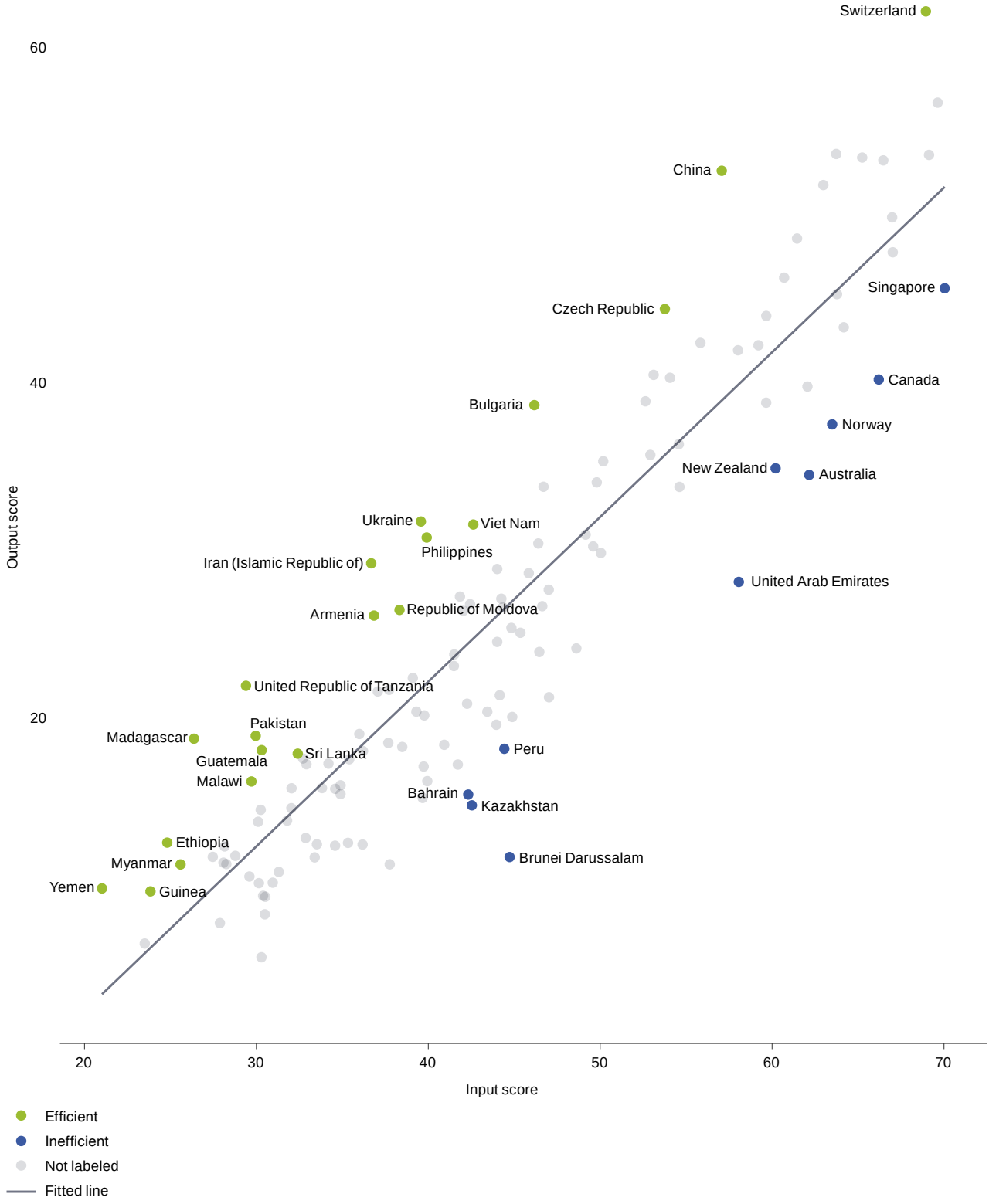
The United Republic of Tanzania (90th), among the lower middle-income group economies, performs on innovation outputs at levels comparable to high-income Latin American economies Chile (53rd) and Uruguay (65th). In addition, Viet Nam (44th) and the Philippines (51st) do the same, relative to other high-income European Union economies, such as Latvia (38th), Lithuania (39th) and Poland (40th), with a lower level of innovation inputs.

Low-income sub-Saharan Africa economies Malawi (107th), Madagascar (110th), Ethiopia (126th) and Guinea (130th) are also efficiently transforming their limited innovation inputs and resources into innovation outputs.

However, there are also several high-income economies that struggle to obtain a better balance between their level of investments and their level of innovation results, to the detriment of their overall innovation performance and GII ranking. This group includes, notably, oil and natural gas producers and exporters Canada (16th), Norway (20th), the United Arab Emirates (UAE) (33rd), Bahrain (78th) and Brunei Darussalam (82nd). All these economies rank considerably lower in the Innovation Output Sub-Index, relative to their ranking in the Innovation Input Sub-Index. For instance, the UAE ranks 23rd in innovation inputs overall, and 47th in outputs. The economy's ranking in innovation outputs has, however, improved this year relative to 2020, moving in the right direction to achieve greater balance in the innovation system.

Peru (70th), despite being an innovation achiever, it is also struggling to effectively utilize its innovation inputs (ranked 52nd in the Innovation Input Sub-Index) into innovation results (82nd) and more effort is needed to achieve a better balance in the innovation system.

Figure 11
Innovation input to output performance, 2021



Moreover, innovation leaders have complementarity and balance across the different areas of their innovation system. A successful innovation system balances knowledge creation, exploration and investments – the innovation inputs – with the production of ideas and technologies toward application, exploitation and impact – the innovation outputs.

A balanced and strong performance across all seven pillars is most clearly evident among the innovation leaders (top 25). Only 15 economies – including Switzerland, Sweden, the United States, Singapore and France, or 11 percent of all economies ranked this year, have strong performances across all seven GII pillars (Table 5).

However, certain economies that are ranked lower overall in the GII are also leaders in specific areas. Examples include Turkey, highly ranked in Human capital and research (26th); Thailand, Viet Nam and Uzbekistan, with their relatively high ranking in Market sophistication (27th, 22nd and 24th, respectively); and Mongolia, ranked in the top 30 in Creative outputs (28th). These discrepancies in performance within economies also hint at innovation systems that are changing and dynamic with the potential for increased overall performance in the future.

Table 6
Top S&T cluster of each economy or cross-border region, 2021

Rank	Cluster name	Economy	Rank change
1	Tokyo–Yokohama	JP	0
2	Shenzhen–Hong Kong–Guangzhou	CN/HK	0
3	Beijing	CN	1
4	Seoul	KR	–1
5	San Jose–San Francisco, CA	US	0
10	Paris	FR	0
15	London	GB	0
19	Amsterdam–Rotterdam	NL	–1
20	Cologne	DE	–1
27	Tel Aviv–Jerusalem	IL	–3
28	Taipei–Hsinchu	TW	–1
29	Singapore	SG	–1
31	Melbourne	AU	4
32	Moscow	RU	0
35	Stockholm	SE	–2
36	Eindhoven	BE/NL	–2
40	Toronto, ON	CA	–1
41	Tehran	IR	2
43	Brussels	BE	–2
46	Madrid	ES	–1
48	Milan	IT	0
49	Istanbul	TR	2
50	Zürich	CH/DE	–1
56	Copenhagen	DK	–2
62	Bengaluru	IN	–2
66	São Paulo	BR	–5
71	Vienna	AT	–1
74	Helsinki	FI	–6
92	Lausanne	CH/FR	–3
100	Warsaw	PL	–1

Source: WIPO Statistics Database, April 2021.

The GII top science and technology clusters

New science and technology (S&T) clusters are emerging. Clusters in China made the most consistent rank improvements. Delhi, Mumbai and Istanbul also advanced strongly this year.

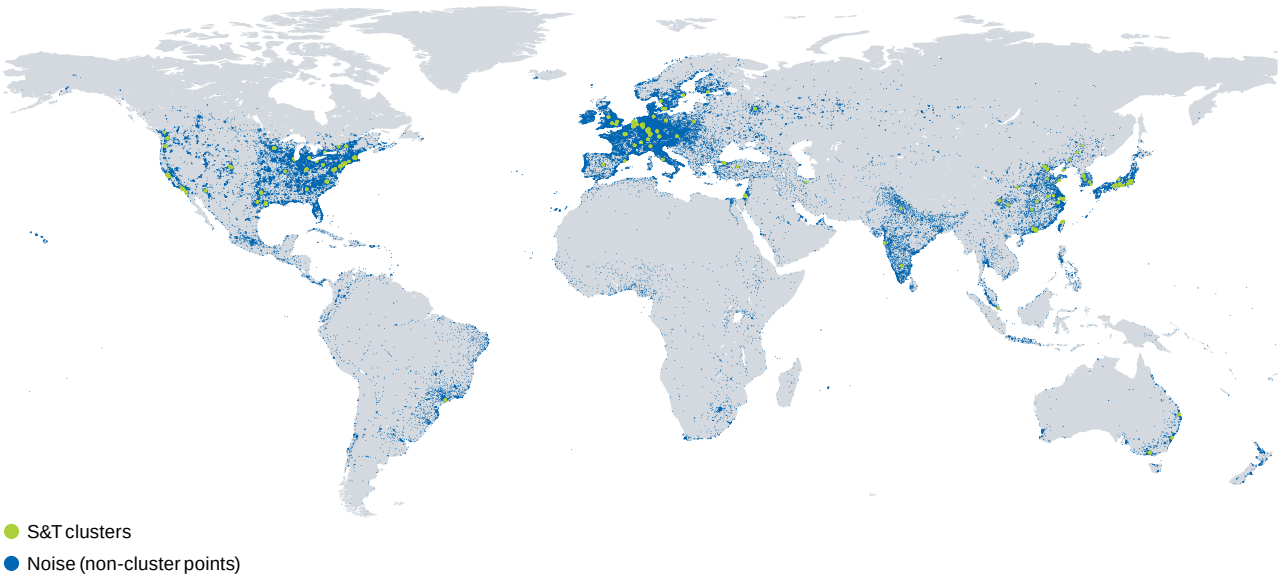
Divides also exist in the ranking of the global science and technology (S&T) clusters. The top 100 S&T clusters are hosted by 26 economies, of which six – Brazil, China, India, the Islamic Republic of Iran, Turkey and the Russian Federation – are middle-income economies (Table 6).

Tokyo-Yokohama is the top-performing cluster again, followed by Shenzhen–Hong Kong–Guangzhou, Beijing, Seoul and San Jose–San Francisco (see Annex Table 3, Top 100 clusters). The top 10 clusters remain the same as last year with only minor shifts. Beijing overtook Seoul to occupy the 3rd spot, and Shanghai switched with New York City, NY in 8th position. The largest increases in rank came from three Chinese clusters – Qingdao (+16 positions), Shenyang (+14) and Dalian (+13). Shenyang and Dalian, along with the Korean cluster Daegu, make up the three new entrants into this year's top 100 clusters (Map 1).

The United States continues to host the largest number of clusters (24), followed by China (19), Germany (9) and Japan (5). Chinese clusters experienced the largest increases in S&T output, with the median increase equating to +14.4 percent, and China hosts the fastest growing clusters with Qingdao (+33.1 percent) and Suzhou (+21.7 percent).[4] Other middle-income clusters besides China also experienced strong growth, including Delhi (+6.6 percent), Mumbai (+6.3 percent) and Istanbul (+5.5 percent). High-income economy clusters grew at a slower pace than clusters in middle-income economies. A decline within clusters in the United States accounted for most of this slower growth. There were some notable exceptions, namely Kanazawa (+12.1 percent) in Japan, Daejon (+9.0 percent) in the Republic of Korea and Melbourne (+7.8 percent) in Australia.

Many European and U.S. clusters show more intense S&T activity than their Asian counterparts do. The United States has nine clusters in the top 25 by S&T intensity, followed by Germany and Sweden (with three each). Cambridge in the United Kingdom and Eindhoven in the Netherlands/Belgium, emerge as the most S&T-intensive clusters. Ann Arbor, Michigan (United States), Oxford (United Kingdom) and San Jose–San Francisco, CA (United States) follow (see Annex Table 4, Ranking of S&T intensity, 2015–2019). As was the case in the previous year's ranking, S&T intensity was higher if patenting activity drove a cluster's output, with 15 out of the top 25 clusters deriving the majority of their output from patents.

Map 1
Top 100 clusters worldwide



Source: WIPO Statistic Database, April 2021.

Note: Noise refers to all inventor/author locations not classified as being in a cluster.

Conclusion

In conclusion, the GII continues to support and foster innovation through changing times. The aim of the GII is to provide insightful data on innovation and, in turn, to assist policymakers in evaluating their innovation performance and making informed innovation policy decisions. The 2021 edition of the GII – with its informed conclusions on innovation developments both generally and in the context of the COVID-19 pandemic – makes a significant contribution to this end.

Two key insights emerge from this year's report.

- The global innovation landscape is changing too slowly. The GII has been warning of this for several years now, as high-income economies, notably from Northern America and Europe, continue to lead the GII ranks and have the strongest and most balanced innovation systems. There is an urgent need for this to change, particularly in the context of the COVID-19 crisis. Confronted with an unprecedented crisis, it is important to fully leverage the power of innovation to collectively build a cohesive, dynamic and sustainable recovery. The short-term and longer term impacts of the pandemic on science and innovation systems have to be monitored and findings acted up on.
- There are a few middle-income economies, notably the TVIPs, that are catching up with the leaders. However, the pandemic's effects on R&D investment – the uneven reduction of R&D expenditures in some sectors and the fact that governments have not made innovation and R&D a priority in current stimulus packages – will hamper convergence. It is therefore crucial that support for innovation becomes broader and that it is conducted in a countercyclical way (i.e., as business innovation expenditures slump, governments strive to counteract that effect with their own expenditure boosts to innovation, even in the face of higher public debt).

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

Notes

1 It is important to remember that various factors, including changes to the methodology for the calculation of indicators, data availability and changes to the GII model and measurement framework, influence the year-on-year comparisons of GII ranking. See Appendix I for more details.

2 Nine economies are no longer innovation achievers in 2021, relative to 2020: three economies from Europe (North Macedonia, Montenegro and Serbia); two from Latin America and the Caribbean (Costa Rica and Jamaica); two from Northern Africa and Western Asia (Armenia and Georgia); and two from sub-Saharan Africa (Mozambique and Niger).

3 Angola (132nd) rejoins the innovation ranking in 2021, thanks to improved availability of innovation data. The last time Angola was included in the GII was in 2015.

4 S&T output growth refers to the net S&T output over time, which is the difference in total patents and publications for each cluster, for all points that were located inside the same cluster compared to the previous year.

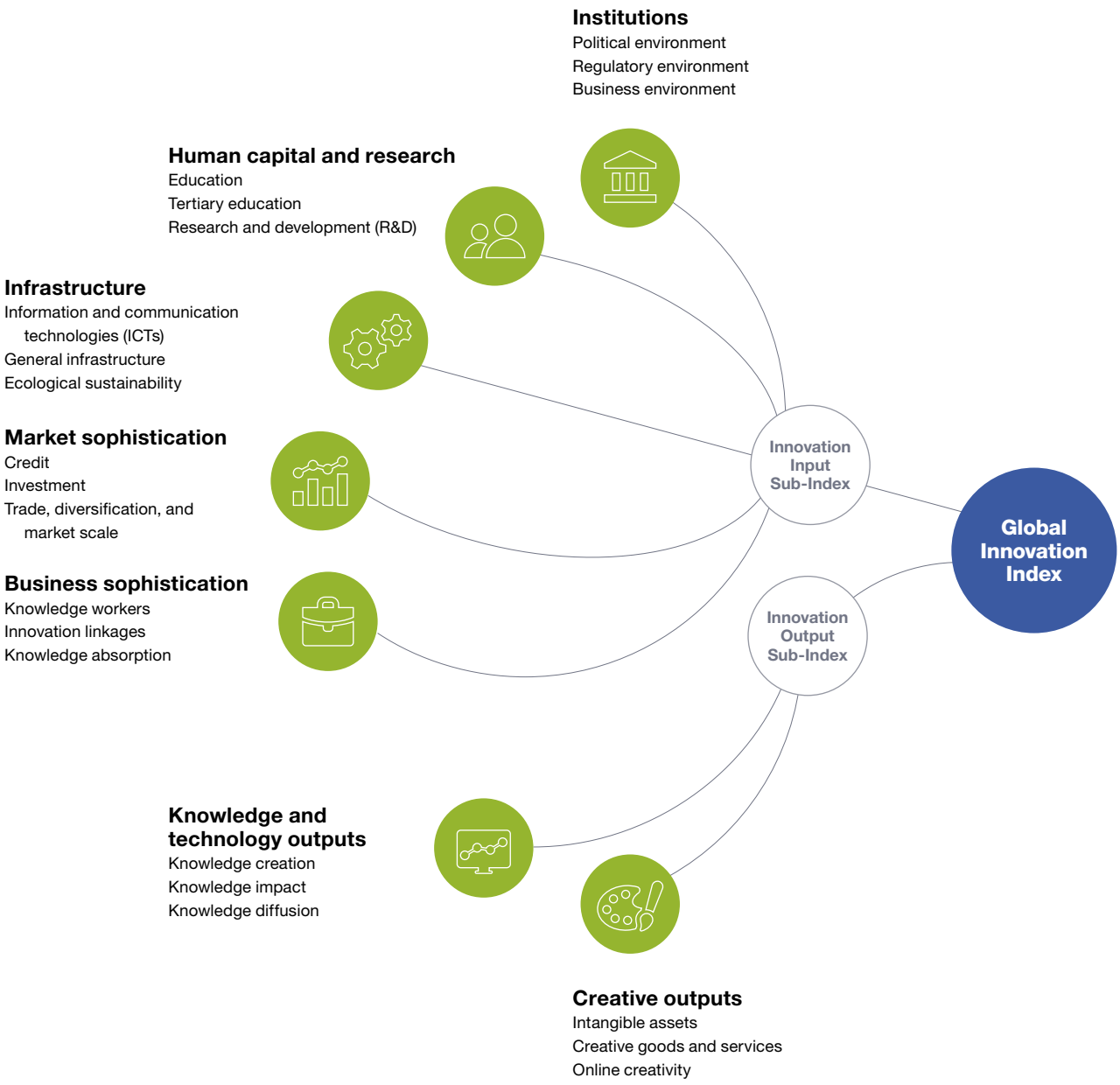
Reference

Aghion P., C. Antonin and S. Bunel (2021). *The Power of Creative Destruction: Economic Upheaval and the Wealth of Nations*. Cambridge, MA: The Belknap Press of Harvard University Press.

GII 2021 Economy profiles

The following tables provide detailed profiles for 132 economies

Framework of the Global Innovation Index 2021



Source: Global Innovation Index 2021, WIPO.

How to read the Economy profiles

The following tables provide detailed profiles for each of the 132 economies in the Global Innovation Index 2021. They are composed of four sections.

1 The top section provides the overall Global Innovation Index (GII) rank for each economy.

2 The next section provides eight key metrics at the beginning of each profile that are intended to put the economy into context. They present the Innovation Output Sub-Index rank, Innovation Input Sub-Index rank, the income group to which the economy belongs, its geographical region,[1] population in millions,[2] GDP in billion US$ PPP, and GDP per capita in US$ PPP.[3] The last metric provides the GII 2020 rank for the economy.

Because economies may drop out of or enter the GII, and due to adjustments made to the GII framework every year and other technical factors not directly related to actual performance (missing data, updates of data, etc.), the GII rankings are not directly comparable from one year to the next. Please refer to Appendix I for details.

The Innovation Input Sub-Index rank is computed based on the simple average of the scores in the first five pillars, while the Innovation Output Sub-Index rank is computed based on the simple average of the scores in the last two pillars. Scores are normalized values to fall within the 0–100 range.

3 Pillars are identified by an illustrative icon, sub-pillars by two-digit numbers and indicators by three-digit numbers. For example, indicator 1.3.1, ease of starting a business appears under sub-pillar 1.3, Business environment, which in turn appears under the pillar, Institutions 🏛.

The 2021 GII includes 81 indicators and three types of data. Composite (or index) indicators are identified with an asterisk (*), survey questions are identified with a dagger (†), and the remaining indicators are all hard data series.

As far as possible, we provide the original value of the indicators (frequently scaled in our index). This has been achievable for all hard data (with the exception of indicators in sub-pillar 7.3, for which the raw data were provided on condition that only the normalized scores were published), meaning that 56 indicators are reported as values. Normalized scores in the 0–100 range are provided for the 25 other indicators (which often consist of survey data or indices) as well as for the overall index, sub-pillars and pillars.

When data are either not available or out of date, "n/a" is used with a cutoff year of 2011, with a few exceptions. To the right of the indicator name, a clock symbol is used to indicate that the economy's data for that indicator are older than the base year. For information on data exceptions and limitations and a detailed explanation of the GII framework, see Appendix I. For further details on the indicators' sources and definitions, see Appendix III.

4 On the far right-hand side of each column, strengths of the economy in question are indicated by a solid circle ● and weaknesses by a hollow circle ○. Strengths within the economy's income group are indicated by a solid diamond ◆ and weaknesses by a hollow diamond ◇. The only exceptions to the income group strengths and weaknesses are the top 25 high-income economies, whose strengths and weaknesses are computed within the top 25 group.[4]

All rankings of 1, 2 and 3 are highlighted as strengths, except in particular instances at the sub-pillar level where strengths and weaknesses are not signaled when the desired data minimum coverage (DMC) is not met for that sub-pillar.[5] For the remaining indicators, strengths and weaknesses of a particular economy are based on the percentage of economies with scores that fall above or below its own score (i.e., percent ranks).

For a given economy, strengths ● are those scores with percent ranks greater than the 10th largest percent rank among the 81 indicators in that economy.

For that same economy, weaknesses ○ are those scores with percent ranks lower than the 10th smallest percent rank among the 81 indicators in that economy.

Similarly, for a given economy, income group strengths ◆ are those scores that are above the income group average plus the standard deviation within the group.

For that same economy, income group weaknesses ◇ are those scores that are below the income group average minus the standard deviation within the group.

In addition, economies with a sub-pillar that does not meet the DMC requirement will show the score for that sub-pillar within square brackets. Those that have more than one sub-pillar that fails to meet the DMC requirement in the same pillar will also show the ranks of the pillar where these are located within square brackets. For these pillars and sub-pillars, strengths/weaknesses are not signaled.

Notes

1 Economies are classified according to the World Bank Income Group Classification (June 2020). Geographic regions correspond to the United Nations publication on standard country or area codes for statistical use (M49), as follows: EUR = Europe; NAC = Northern America; LCN = Latin America and the Caribbean; CSA = Central and Southern Asia; SEAO = South East Asia, East Asia, and Oceania; NAWA = Northern Africa and Western Asia; SSF = Sub-Saharan Africa.

2 Data are from the United Nations, Department of Economic and Social Affairs, Population Division, World Population Prospects: The 2019 Revision.

3 Data for GDP and GDP per capita are from the International Monetary Fund's World Economic Outlook 2020 database.

4 As the only economy in the top 25 that does not fall within the high-income group, China's income group strengths and weaknesses are computed within the non-top 25 group.

5 Data stringency requirements are used in the attribution of strengths and weaknesses at the sub-pillar level. These levels were revised in 2019. When economies do not meet a DMC requirement at the sub-pillar level (for sub-pillars with two indicators, the DMC is 2; for three it is 2; for four it is 3; and for five it is 4), no strength or weakness is attributed to them at the sub-pillar level. Furthermore, if the economy in question does not meet the DMC requirements at the sub-pillar level, but it still obtains a ranking higher than or equal to 10, or a ranking equal to or lower than 100 at the sub-pillar level, for the sake of caution this rank is shown in brackets. This is to ensure that incomplete data coverage does not lead to erroneous conclusions being drawn about strengths or weaknesses, or, particularly, about strong or weak sub-pillar rankings.

Albania

GII 2021 rank **84**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
92	**71**	**Upper middle**	**EUR**	**2.9**	**39.1**	**13,651**	**83**

		Score/ Value	Rank	
Institutions		**64.9**	**60**	
1.1	**Political environment**	**56.1**	**71**	
1.1.1	Political and operational stability*	69.6	60	
1.1.2	Government effectiveness*	49.3	76	
1.2	**Regulatory environment**	**58.9**	**82**	
1.2.1	Regulatory quality*	50.7	58	
1.2.2	Rule of law*	35.9	85	
1.2.3	Cost of redundancy dismissal	20.8	90	
1.3	**Business environment**	**79.7**	**34**	● ◆
1.3.1	Ease of starting a business*	91.8	47	
1.3.2	Ease of resolving insolvency*	67.7	36	●
Human capital and research		**22.7**	**90**	
2.1	**Education**	**39.8**	**95**	
2.1.1	Expenditure on education, % GDP	3.6	79	
2.1.2	Government funding/pupil, secondary, % GDP/cap	8.0	96	○ ◇
2.1.3	School life expectancy, years	14.8	57	
2.1.4	PISA scales in reading, maths and science	419.8	56	
2.1.5	Pupil-teacher ratio, secondary	10.7	36	
2.2	**Tertiary education**	**28.3**	**79**	
2.2.1	Tertiary enrolment, % gross	59.8	51	
2.2.2	Graduates in science and engineering, %	18.8	81	
2.2.3	Tertiary inbound mobility, %	1.6	81	
2.3	**Research and development (R&D)**	**0.0**	**[123]**	
2.3.1	Researchers, FTE/mn pop.	n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP	n/a	n/a	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**43.0**	**62**	
3.1	**Information and communication technologies (ICTs)**	**66.6**	**66**	
3.1.1	ICT access*	45.4	98	◇
3.1.2	ICT use*	52.3	77	
3.1.3	Government's online service*	84.1	31	●
3.1.4	E-participation*	84.5	36	
3.2	**General infrastructure**	**23.4**	**91**	
3.2.1	Electricity output, GWh/mn pop.	2,984.3	66	
3.2.2	Logistics performance*	28.5	86	
3.2.3	Gross capital formation, % GDP	22.6	61	
3.3	**Ecological sustainability**	**38.9**	**38**	
3.3.1	GDP/unit of energy use	16.1	16	● ◆
3.3.2	Environmental performance*	49.0	59	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	3.6	25	●
Market sophistication		**44.1**	**79**	
4.1	**Credit**	**34.6**	**89**	
4.1.1	Ease of getting credit*	70.0	44	
4.1.2	Domestic credit to private sector, % GDP	34.4	90	
4.1.3	Microfinance gross loans, % GDP ◴	0.5	37	
4.2	**Investment**	**27.2**	**[75]**	
4.2.1	Ease of protecting minority investors*	46.0	97	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP ◴	0.0	51	
4.3	**Trade, diversification, and market scale**	**70.6**	**61**	
4.3.1	Applied tariff rate, weighted avg., %	1.0	12	●
4.3.2	Domestic industry diversification	93.7	36	
4.3.3	Domestic market scale, bn PPP$	39.1	112	◇

		Score/ Value	Rank	
Business sophistication		**25.0**	**68**	
5.1	**Knowledge workers**	**40.3**	**[42]**	
5.1.1	Knowledge-intensive employment, %	18.4	85	
5.1.2	Firms offering formal training, %	46.2	22	●
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, %	12.9	55	
5.2	**Innovation linkages**	**16.4**	**101**	
5.2.1	University-industry R&D collaboration†	49.0	41	
5.2.2	State of cluster development and depth†	25.9	127	○ ◇
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP ◴	0.0	67	
5.2.5	Patent families/bn PPP$ GDP	0.0	100	○ ◇
5.3	**Knowledge absorption**	**18.3**	**100**	
5.3.1	Intellectual property payments, % total trade	0.4	73	
5.3.2	High-tech imports, % total trade ◴	2.0	130	○ ◇
5.3.3	ICT services imports, % total trade	1.4	52	
5.3.4	FDI net inflows, % GDP	7.9	11	● ◆
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**12.0**	**103**	
6.1	**Knowledge creation**	**3.4**	**120**	
6.1.1	Patents by origin/bn PPP$ GDP	0.1	106	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	86	
6.1.3	Utility models by origin/bn PPP$ GDP ◴	0.0	66	
6.1.4	Scientific and technical articles/bn PPP$ GDP	7.2	100	
6.1.5	Citable documents H-index	2.9	123	○
6.2	**Knowledge impact**	**19.8**	**106**	
6.2.1	Labor productivity growth, %	–1.2	89	
6.2.2	New businesses/th pop. 15–64	1.5	66	
6.2.3	Software spending, % GDP	0.1	86	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	8.9	30	●
6.2.5	High-tech manufacturing, %	4.1	103	○ ◇
6.3	**Knowledge diffusion**	**12.7**	**79**	
6.3.1	Intellectual property receipts, % total trade	0.3	35	◆
6.3.2	Production and export complexity	36.5	75	
6.3.3	High-tech exports, % total trade ◴	0.0	130	○
6.3.4	ICT services exports, % total trade	1.9	59	
Creative outputs		**20.3**	**81**	
7.1	**Intangible assets**	**19.5**	**103**	
7.1.1	Trademarks by origin/bn PPP$ GDP	34.5	65	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP ◴	0.5	87	
7.1.4	ICTs and organizational model creation†	39.5	114	◇
7.2	**Creative goods and services**	**19.5**	**57**	
7.2.1	Cultural and creative services exports, % total trade	1.2	21	●
7.2.2	National feature films/mn pop. 15–69 ◴	3.3	56	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	2.5	8	● ◆
7.2.5	Creative goods exports, % total trade ◴	0.2	83	
7.3	**Online creativity**	**22.5**	**53**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	6.8	48	
7.3.2	Country-code TLDs/th pop. 15–69	3.3	61	
7.3.3	Wikipedia edits/mn pop. 15–69	56.6	56	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Algeria

GII 2021 rank
120

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
128	**109**	**Lower middle**	**NAWA**	**43.9**	**488.3**	**11,041**	**121**

		Score/ Value	Rank	
Institutions		**52.5**	**104**	
1.1	**Political environment**	**44.6**	**106**	
1.1.1	Political and operational stability*	55.4	112	
1.1.2	Government effectiveness*	39.2	100	
1.2	**Regulatory environment**	**49.4**	**108**	
1.2.1	Regulatory quality*	9.4	129	◇
1.2.2	Rule of law*	25.2	113	
1.2.3	Cost of redundancy dismissal	17.3	69	
1.3	**Business environment**	**63.6**	**92**	
1.3.1	Ease of starting a business*	78.0	114	
1.3.2	Ease of resolving insolvency*	49.2	73	
Human capital and research		**29.8**	**74**	
2.1	**Education**	**41.2**	**[91]**	
2.1.1	Expenditure on education, % GDP	n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years ⏲	14.3	64	◆
2.1.4	PISA scales in reading, maths and science ⏲	361.7	77	
2.1.5	Pupil-teacher ratio, secondary	n/a	n/a	
2.2	**Tertiary education**	**43.2**	**31**	● ◆
2.2.1	Tertiary enrolment, % gross	52.6	59	● ◆
2.2.2	Graduates in science and engineering, %	34.2	8	● ◆
2.2.3	Tertiary inbound mobility, %	0.5	95	
2.3	**Research and development (R&D)**	**5.1**	**76**	
2.3.1	Researchers, FTE/mn pop. ⏲	819.3	54	●
2.3.2	Gross expenditure on R&D, % GDP ⏲	0.5	62	●
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**31.8**	**96**	
3.1	**Information and communication technologies (ICTs)**	**39.1**	**112**	
3.1.1	ICT access*	60.2	75	◆
3.1.2	ICT use*	53.0	76	◆
3.1.3	Government's online service*	27.6	127	◇
3.1.4	E-participation*	15.5	131	○ ◇
3.2	**General infrastructure**	**32.4**	**50**	●
3.2.1	Electricity output, GWh/mn pop.	1,815.5	86	
3.2.2	Logistics performance*	18.6	109	
3.2.3	Gross capital formation, % GDP	37.5	10	● ◆
3.3	**Ecological sustainability**	**24.1**	**83**	
3.3.1	GDP/unit of energy use	10.2	64	●
3.3.2	Environmental performance*	44.8	74	◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.3	99	
Market sophistication		**23.7**	**132**	○ ◇
4.1	**Credit**	**9.4**	**129**	◇
4.1.1	Ease of getting credit*	10.0	129	○ ◇
4.1.2	Domestic credit to private sector, % GDP	25.9	102	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**10.0**	**[131]**	
4.2.1	Ease of protecting minority investors*	20.0	130	○ ◇
4.2.2	Market capitalization, % GDP ⏲	0.2	75	○ ◇
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**51.7**	**115**	
4.3.1	Applied tariff rate, weighted avg., %	10.0	117	
4.3.2	Domestic industry diversification ⏲	45.8	108	◇
4.3.3	Domestic market scale, bn PPP$	488.3	42	●

		Score/ Value	Rank	
Business sophistication		**14.7**	**124**	◇
5.1	**Knowledge workers**	**13.3**	**116**	◇
5.1.1	Knowledge-intensive employment, % ⏲	17.9	88	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP ⏲	0.0	78	
5.1.4	GERD financed by business, % ⏲	6.7	82	
5.1.5	Females employed w/advanced degrees, % ⏲	8.1	78	
5.2	**Innovation linkages**	**15.2**	**107**	
5.2.1	University-industry R&D collaboration† ⏲	37.1	93	
5.2.2	State of cluster development and depth† ⏲	48.3	57	●
5.2.3	GERD financed by abroad, % GDP ⏲	0.0	101	○
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	119	
5.2.5	Patent families/bn PPP$ GDP	0.0	100	○ ◇
5.3	**Knowledge absorption**	**15.6**	**115**	
5.3.1	Intellectual property payments, % total trade	0.3	85	
5.3.2	High-tech imports, % total trade ⏲	8.9	49	●
5.3.3	ICT services imports, % total trade	0.6	97	
5.3.4	FDI net inflows, % GDP	0.8	112	
5.3.5	Research talent, % in businesses ⏲	0.5	82	
Knowledge and technology outputs		**8.1**	**125**	
6.1	**Knowledge creation**	**7.4**	**94**	
6.1.1	Patents by origin/bn PPP$ GDP	0.2	96	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	83	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	9.3	89	
6.1.5	Citable documents H-index	10.2	76	
6.2	**Knowledge impact**	**13.7**	**119**	
6.2.1	Labor productivity growth, %	–0.6	76	
6.2.2	New businesses/th pop. 15–64	0.4	105	
6.2.3	Software spending, % GDP	0.0	123	◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.2	103	
6.2.5	High-tech manufacturing, % ⏲	4.1	104	◇
6.3	**Knowledge diffusion**	**3.3**	**125**	
6.3.1	Intellectual property receipts, % total trade	0.0	112	
6.3.2	Production and export complexity	13.6	115	◇
6.3.3	High-tech exports, % total trade ⏲	0.0	129	○
6.3.4	ICT services exports, % total trade	0.4	106	
Creative outputs		**10.3**	**118**	
7.1	**Intangible assets**	**16.6**	**113**	
7.1.1	Trademarks by origin/bn PPP$ GDP ⏲	14.3	101	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	2.7	40	●
7.1.4	ICTs and organizational model creation†	41.3	111	
7.2	**Creative goods and services**	**1.0**	**128**	◇
7.2.1	Cultural and creative services exports, % total trade	0.0	104	
7.2.2	National feature films/mn pop. 15–69	0.4	99	
7.2.3	Entertainment and media market/th pop. 15–69	1.3	56	
7.2.4	Printing and other media, % manufacturing ⏲	0.3	99	
7.2.5	Creative goods exports, % total trade ⏲	0.0	124	
7.3	**Online creativity**	**7.1**	**114**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.5	108	
7.3.2	Country-code TLDs/th pop. 15–69	0.1	116	
7.3.3	Wikipedia edits/mn pop. 15–69	30.4	103	
7.3.4	Mobile app creation/bn PPP$ GDP ⏲	0.0	100	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Angola

GII 2021 rank
132

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
131	**131**	**Lower middle**	**SSF**	**32.9**	**216.6**	**6,978**	**n/a**

		Score/ Value	Rank	
Institutions		**42.2**	**128**	◇
1.1	**Political environment**	**36.9**	**126**	◇
1.1.1	Political and operational stability*	58.9	100	
1.1.2	Government effectiveness*	25.8	128	◇
1.2	**Regulatory environment**	**50.0**	**105**	
1.2.1	Regulatory quality*	20.1	124	
1.2.2	Rule of law*	18.9	125	◇
1.2.3	Cost of redundancy dismissal	17.9	75 ●	
1.3	**Business environment**	**39.7**	**131**	○ ◇
1.3.1	Ease of starting a business*	79.4	111	
1.3.2	Ease of resolving insolvency*	0.0	129	○ ◇
Human capital and research		**12.3**	**119**	◇
2.1	**Education**	**29.9**	**[113]**	
2.1.1	Expenditure on education, % GDP	3.4	88 ●	
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	9.6	109	◇
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	26.8	111	◇
2.2	**Tertiary education**	**6.7**	**119**	◇
2.2.1	Tertiary enrolment, % gross	9.3	116	
2.2.2	Graduates in science and engineering, %	12.0	103	◇
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research and development (R&D)**	**0.1**	**119**	
2.3.1	Researchers, FTE/mn pop.	18.8	106	
2.3.2	Gross expenditure on R&D, % GDP	0.0	113	◇
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**22.3**	**125**	◇
3.1	**Information and communication technologies (ICTs)**	**33.0**	**121**	◇
3.1.1	ICT access*	26.1	125	◇
3.1.2	ICT use*	12.0	126	◇
3.1.3	Government's online service*	48.8	109	
3.1.4	E-participation*	45.2	108	
3.2	**General infrastructure**	**13.0**	**123**	◇
3.2.1	Electricity output, GWh/mn pop.	380.9	113	
3.2.2	Logistics performance*	0.0	125	○ ◇
3.2.3	Gross capital formation, % GDP	21.5	74 ●	
3.3	**Ecological sustainability**	**20.9**	**94** ●	
3.3.1	GDP/unit of energy use	12.2	47 ●	
3.3.2	Environmental performance*	29.7	121	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.1	129	
Market sophistication		**27.6**	**127**	◇
4.1	**Credit**	**3.5**	**131**	○ ◇
4.1.1	Ease of getting credit*	5.0	131	○ ◇
4.1.2	Domestic credit to private sector, % GDP	14.4	120	
4.1.3	Microfinance gross loans, % GDP	0.0	72	
4.2	**Investment**	**32.0**	**[63]**	
4.2.1	Ease of protecting minority investors*	32.0	120	◇
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**47.3**	**119**	
4.3.1	Applied tariff rate, weighted avg., %	6.5	96 ●	
4.3.2	Domestic industry diversification	33.3	110	◇
4.3.3	Domestic market scale, bn PPP$	216.6	62 ●	

		Score/ Value	Rank	
Business sophistication		**13.1**	**130**	◇
5.1	**Knowledge workers**	**15.9**	**[109]**	
5.1.1	Knowledge-intensive employment, %	11.1	107	
5.1.2	Firms offering formal training, %	23.5	66 ●	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, %	1.6	108	
5.2	**Innovation linkages**	**11.0**	**127**	◇
5.2.1	University-industry R&D collaboration†	17.4	126	○ ◇
5.2.2	State of cluster development and depth†	27.1	125	◇
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	106	
5.2.5	Patent families/bn PPP$ GDP	0.0	100	○ ◇
5.3	**Knowledge absorption**	**12.5**	**129**	◇
5.3.1	Intellectual property payments, % total trade	0.6	62 ●	
5.3.2	High-tech imports, % total trade	2.9	125	◇
5.3.3	ICT services imports, % total trade	0.5	103	
5.3.4	FDI net inflows, % GDP	–5.7	128	◇
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**4.7**	**129**	◇
6.1	**Knowledge creation**	**0.4**	**132**	○ ◇
6.1.1	Patents by origin/bn PPP$ GDP	0.0	127	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	98	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	71	
6.1.4	Scientific and technical articles/bn PPP$ GDP	0.4	131	○ ◇
6.1.5	Citable documents H-index	1.3	130	◇
6.2	**Knowledge impact**	**12.4**	**[121]**	
6.2.1	Labor productivity growth, %	–4.1	116	◇
6.2.2	New businesses/th pop. 15–64	n/a	n/a	
6.2.3	Software spending, % GDP	n/a	n/a	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.4	127	
6.2.5	High-tech manufacturing, %	3.4	105	◇
6.3	**Knowledge diffusion**	**1.3**	**130**	
6.3.1	Intellectual property receipts, % total trade	0.0	83 ●	
6.3.2	Production and export complexity	4.4	120	◇
6.3.3	High-tech exports, % total trade	0.2	108	
6.3.4	ICT services exports, % total trade	0.1	127	
Creative outputs		**8.1**	**[130]**	
7.1	**Intangible assets**	**8.1**	**[131]**	
7.1.1	Trademarks by origin/bn PPP$ GDP	11.7	108	
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	n/a	n/a	
7.1.4	ICTs and organizational model creation†	n/a	n/a	
7.2	**Creative goods and services**	**11.4**	**[75]**	
7.2.1	Cultural and creative services exports, % total trade	n/a	n/a	
7.2.2	National feature films/mn pop. 15–69	0.3	103	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	2.3	10 ● ◆	
7.2.5	Creative goods exports, % total trade	0.0	127	
7.3	**Online creativity**	**5.1**	**124**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.0	132	○ ◇
7.3.2	Country-code TLDs/th pop. 15–69	0.0	128	
7.3.3	Wikipedia edits/mn pop. 15–69	19.5	124	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Argentina

GII 2021 rank

73

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
71	**77**	**Upper middle**	**LCN**	**45.2**	**924.5**	**20,370**	**80**

		Score/ Value	Rank	
Institutions		**52.8**	**102**	◇
1.1	**Political environment**	**53.9**	**81**	
1.1.1	Political and operational stability*	64.3	80	
1.1.2	Government effectiveness*	48.7	79	
1.2	**Regulatory environment**	**44.4**	**117**	○ ◇
1.2.1	Regulatory quality*	30.6	103	◇
1.2.2	Rule of law*	35.4	89	
1.2.3	Cost of redundancy dismissal	30.3	119	○ ◇
1.3	**Business environment**	**60.2**	**106**	
1.3.1	Ease of starting a business*	80.4	109	
1.3.2	Ease of resolving insolvency*	40.0	97	
Human capital and research		**37.0**	**50**	
2.1	**Education**	**48.3**	**71**	
2.1.1	Expenditure on education, % GDP	4.9	43	
2.1.2	Government funding/pupil, secondary, % GDP/cap	17.5	63	
2.1.3	School life expectancy, years	17.7	14	● ◆
2.1.4	PISA scales in reading, maths and science	395.0	69	○
2.1.5	Pupil-teacher ratio, secondary	n/a	n/a	
2.2	**Tertiary education**	**34.8**	**62**	
2.2.1	Tertiary enrolment, % gross	91.6	6	● ◆
2.2.2	Graduates in science and engineering, %	16.0	94	
2.2.3	Tertiary inbound mobility, %	2.8	68	
2.3	**Research and development (R&D)**	**28.0**	**39**	◆
2.3.1	Researchers, FTE/mn pop.	1,210.5	49	
2.3.2	Gross expenditure on R&D, % GDP	0.6	61	
2.3.3	Global corporate R&D investors, top 3, mn US$	44.0	36	◆
2.3.4	QS university ranking, top 3*	42.8	29	● ◆
Infrastructure		**42.5**	**64**	
3.1	**Information and communication technologies (ICTs)**	**75.8**	**46**	
3.1.1	ICT access*	70.3	60	
3.1.2	ICT use*	62.6	59	
3.1.3	Government's online service*	84.7	30	●
3.1.4	E-participation*	85.7	29	●
3.2	**General infrastructure**	**21.7**	**100**	
3.2.1	Electricity output, GWh/mn pop.	3,096.3	65	
3.2.2	Logistics performance*	39.0	60	
3.2.3	Gross capital formation, % GDP	17.3	102	
3.3	**Ecological sustainability**	**29.9**	**60**	
3.3.1	GDP/unit of energy use	10.8	62	
3.3.2	Environmental performance*	52.2	52	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.5	56	
Market sophistication		**37.5**	**110**	◇
4.1	**Credit**	**21.8**	**121**	○ ◇
4.1.1	Ease of getting credit*	50.0	94	◇
4.1.2	Domestic credit to private sector, % GDP	16.0	117	○ ◇
4.1.3	Microfinance gross loans, % GDP	0.0	75	○
4.2	**Investment**	**17.1**	**124**	○ ◇
4.2.1	Ease of protecting minority investors*	62.0	60	
4.2.2	Market capitalization, % GDP	11.5	67	○
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	82	○
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	86	○
4.3	**Trade, diversification, and market scale**	**73.6**	**50**	
4.3.1	Applied tariff rate, weighted avg., %	7.3	99	
4.3.2	Domestic industry diversification	86.6	64	
4.3.3	Domestic market scale, bn PPP$	924.5	28	●

		Score/ Value	Rank	
Business sophistication		**26.7**	**57**	
5.1	**Knowledge workers**	**29.4**	**71**	
5.1.1	Knowledge-intensive employment, %	24.6	60	
5.1.2	Firms offering formal training, %	40.2	28	
5.1.3	GERD performed by business, % GDP	0.2	57	
5.1.4	GERD financed by business, %	17.8	69	
5.1.5	Females employed w/advanced degrees, %	15.2	49	
5.2	**Innovation linkages**	**15.7**	**105**	
5.2.1	University-industry R&D collaboration†	37.6	91	
5.2.2	State of cluster development and depth†	41.0	98	
5.2.3	GERD financed by abroad, % GDP	0.1	52	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	109	○
5.2.5	Patent families/bn PPP$ GDP	0.1	63	
5.3	**Knowledge absorption**	**35.1**	**41**	
5.3.1	Intellectual property payments, % total trade	2.6	9	● ◆
5.3.2	High-tech imports, % total trade	9.0	45	
5.3.3	ICT services imports, % total trade	1.8	38	◆
5.3.4	FDI net inflows, % GDP	1.9	82	
5.3.5	Research talent, % in businesses	9.7	63	
Knowledge and technology outputs		**18.7**	**73**	
6.1	**Knowledge creation**	**12.7**	**70**	
6.1.1	Patents by origin/bn PPP$ GDP	0.4	82	
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP	0.1	52	
6.1.4	Scientific and technical articles/bn PPP$ GDP	11.2	76	
6.1.5	Citable documents H-index	27.5	36	
6.2	**Knowledge impact**	**26.1**	**82**	
6.2.1	Labor productivity growth, %	–2.2	105	○
6.2.2	New businesses/th pop. 15–64	0.2	111	○
6.2.3	Software spending, % GDP	0.2	63	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	6.4	44	
6.2.5	High-tech manufacturing, %	28.1	45	
6.3	**Knowledge diffusion**	**17.2**	**65**	
6.3.1	Intellectual property receipts, % total trade	0.4	28	● ◆
6.3.2	Production and export complexity	39.0	72	
6.3.3	High-tech exports, % total trade	0.8	80	
6.3.4	ICT services exports, % total trade	2.7	42	
Creative outputs		**21.9**	**73**	
7.1	**Intangible assets**	**27.4**	**76**	
7.1.1	Trademarks by origin/bn PPP$ GDP	47.5	47	
7.1.2	Global brand value, top 5,000, % GDP	12.3	56	
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.0	68	
7.1.4	ICTs and organizational model creation†	50.6	80	
7.2	**Creative goods and services**	**14.2**	**66**	
7.2.1	Cultural and creative services exports, % total trade	1.2	22	●
7.2.2	National feature films/mn pop. 15–69	7.4	26	● ◆
7.2.3	Entertainment and media market/th pop. 15–69	5.2	46	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.3	72	
7.3	**Online creativity**	**18.5**	**63**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	3.0	62	
7.3.2	Country-code TLDs/th pop. 15–69	6.3	46	
7.3.3	Wikipedia edits/mn pop. 15–69	55.6	57	
7.3.4	Mobile app creation/bn PPP$ GDP	8.4	52	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Armenia

GII 2021 rank
69

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
56	**85**	**Upper middle**	**NAWA**	**3.0**	**40.8**	**13,735**	**61**

		Score/ Value	Rank	
Institutions		**64.1**	**65**	
1.1	**Political environment**	**53.6**	**82**	
1.1.1	Political and operational stability*	62.5	89	
1.1.2	Government effectiveness*	49.2	77	
1.2	**Regulatory environment**	**68.4**	**56**	
1.2.1	Regulatory quality*	50.0	59	
1.2.2	Rule of law*	43.3	70	
1.2.3	Cost of redundancy dismissal	13.0	40	
1.3	**Business environment**	**70.3**	**70**	
1.3.1	Ease of starting a business*	96.1	10	● ◆
1.3.2	Ease of resolving insolvency*	44.6	86	
Human capital and research		**21.7**	**94**	
2.1	**Education**	**37.6**	**98**	
2.1.1	Expenditure on education, % GDP	2.7	104	○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap ⏲	14.6	78	
2.1.3	School life expectancy, years	13.1	81	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	9.9	27	●
2.2	**Tertiary education**	**26.2**	**82**	
2.2.1	Tertiary enrolment, % gross	51.5	61	
2.2.2	Graduates in science and engineering, %	17.1	89	
2.2.3	Tertiary inbound mobility, %	5.5	42	
2.3	**Research and development (R&D)**	**1.2**	**103**	
2.3.1	Researchers, FTE/mn pop.	n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP ⏲	0.2	92	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**38.1**	**80**	
3.1	**Information and communication technologies (ICTs)**	**68.0**	**63**	
3.1.1	ICT access*	69.4	61	
3.1.2	ICT use*	57.5	67	
3.1.3	Government's online service*	70.0	69	
3.1.4	E-participation*	75.0	57	
3.2	**General infrastructure**	**21.0**	**104**	
3.2.1	Electricity output, GWh/mn pop.	2,639.2	72	
3.2.2	Logistics performance*	26.0	88	
3.2.3	Gross capital formation, % GDP	20.9	80	
3.3	**Ecological sustainability**	**25.2**	**80**	
3.3.1	GDP/unit of energy use	9.4	75	
3.3.2	Environmental performance*	52.3	51	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.1	130	○
Market sophistication		**40.4**	**99**	◇
4.1	**Credit**	**39.4**	**73**	
4.1.1	Ease of getting credit*	70.0	44	
4.1.2	Domestic credit to private sector, % GDP	59.9	55	
4.1.3	Microfinance gross loans, % GDP	0.6	33	
4.2	**Investment**	**23.5**	**[97]**	
4.2.1	Ease of protecting minority investors*	42.0	102	◇
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP ⏲	0.0	58	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**58.4**	**98**	
4.3.1	Applied tariff rate, weighted avg., %	4.1	75	
4.3.2	Domestic industry diversification	71.5	95	○ ◇
4.3.3	Domestic market scale, bn PPP$	40.8	110	○ ◇

		Score/ Value	Rank	
Business sophistication		**19.9**	**98**	
5.1	**Knowledge workers**	**30.1**	**69**	
5.1.1	Knowledge-intensive employment, %	29.5	51	
5.1.2	Firms offering formal training, %	27.5	56	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	16.7	71	
5.1.5	Females employed w/advanced degrees, %	6.3	86	◇
5.2	**Innovation linkages**	**14.9**	**109**	
5.2.1	University-industry R&D collaboration†	35.7	96	
5.2.2	State of cluster development and depth†	43.6	82	
5.2.3	GERD financed by abroad, % GDP	0.0	78	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	100	
5.2.5	Patent families/bn PPP$ GDP	0.1	62	
5.3	**Knowledge absorption**	**14.7**	**119**	○ ◇
5.3.1	Intellectual property payments, % total trade ⏲	0.0	123	○ ◇
5.3.2	High-tech imports, % total trade	5.9	98	
5.3.3	ICT services imports, % total trade	0.6	100	
5.3.4	FDI net inflows, % GDP	2.0	77	
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**21.4**	**64**	
6.1	**Knowledge creation**	**19.6**	**53**	
6.1.1	Patents by origin/bn PPP$ GDP	2.8	28	●
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	64	
6.1.3	Utility models by origin/bn PPP$ GDP	0.9	25	●
6.1.4	Scientific and technical articles/bn PPP$ GDP	21.3	43	
6.1.5	Citable documents H-index	11.0	70	
6.2	**Knowledge impact**	**22.0**	**94**	
6.2.1	Labor productivity growth, %	3.1	15	● ◆
6.2.2	New businesses/th pop. 15–64	3.1	47	
6.2.3	Software spending, % GDP	0.1	82	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.8	114	○
6.2.5	High-tech manufacturing, %	4.7	102	○ ◇
6.3	**Knowledge diffusion**	**22.6**	**50**	
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	Production and export complexity	34.8	78	
6.3.3	High-tech exports, % total trade	0.8	81	
6.3.4	ICT services exports, % total trade	4.2	21	● ◆
Creative outputs		**30.6**	**49**	
7.1	**Intangible assets**	**37.9**	**44**	
7.1.1	Trademarks by origin/bn PPP$ GDP	92.9	11	● ◆
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.9	73	
7.1.4	ICTs and organizational model creation†	52.8	67	
7.2	**Creative goods and services**	**19.9**	**54**	
7.2.1	Cultural and creative services exports, % total trade	0.4	55	
7.2.2	National feature films/mn pop. 15–69	13.2	12	● ◆
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.4	29	●
7.2.5	Creative goods exports, % total trade	0.8	53	
7.3	**Online creativity**	**26.7**	**44**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	3.0	63	
7.3.2	Country-code TLDs/th pop. 15–69	5.2	54	
7.3.3	Wikipedia edits/mn pop. 15–69	88.9	2	● ◆
7.3.4	Mobile app creation/bn PPP$ GDP	4.4	58	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Australia

GII 2021 rank

25

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
33	**15**	**High**	**SEAO**	**25.5**	**1,307.9**	**50,845**	**23**

		Score/ Value	Rank
Institutions		**88.3**	**10**
1.1	**Political environment**	**85.0**	**15**
1.1.1	Political and operational stability*	83.9	13
1.1.2	Government effectiveness*	85.6	14
1.2	**Regulatory environment**	**92.3**	**10**
1.2.1	Regulatory quality*	92.5	4 ●
1.2.2	Rule of law*	92.4	13
1.2.3	Cost of redundancy dismissal	12.0	38
1.3	**Business environment**	**87.7**	**11**
1.3.1	Ease of starting a business*	96.6	7 ●
1.3.2	Ease of resolving insolvency*	78.9	19
Human capital and research		**57.4**	**12**
2.1	**Education**	**59.6**	**29**
2.1.1	Expenditure on education, % GDP	5.1	35
2.1.2	Government funding/pupil, secondary, % GDP/cap	15.4	74 ○ ◇
2.1.3	School life expectancy, years	20.5	1 ● ◆
2.1.4	PISA scales in reading, maths and science	499.0	20
2.1.5	Pupil-teacher ratio, secondary	n/a	n/a
2.2	**Tertiary education**	**54.3**	**6 ● ◆**
2.2.1	Tertiary enrolment, % gross	107.8	3 ● ◆
2.2.2	Graduates in science and engineering, %	17.4	88 ○ ◇
2.2.3	Tertiary inbound mobility, %	26.5	4 ● ◆
2.3	**Research and development (R&D)**	**58.3**	**17**
2.3.1	Researchers, FTE/mn pop.	4,532.4	21
2.3.2	Gross expenditure on R&D, % GDP	1.8	20
2.3.3	Global corporate R&D investors, top 3, mn US$	65.3	18
2.3.4	QS university ranking, top 3*	77.9	7 ●
Infrastructure		**55.7**	**20**
3.1	**Information and communication technologies (ICTs)**	**88.3**	**13**
3.1.1	ICT access*	80.6	29
3.1.2	ICT use*	81.5	20
3.1.3	Government's online service*	94.7	7 ●
3.1.4	E-participation*	96.4	9
3.2	**General infrastructure**	**42.4**	**22**
3.2.1	Electricity output, GWh/mn pop.	10,435.2	13
3.2.2	Logistics performance*	79.1	18
3.2.3	Gross capital formation, % GDP	22.0	66 ○
3.3	**Ecological sustainability**	**36.4**	**41**
3.3.1	GDP/unit of energy use	9.3	77 ○
3.3.2	Environmental performance*	74.9	13
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.9	47
Market sophistication		**66.4**	**9 ●**
4.1	**Credit**	**75.8**	**5 ● ◆**
4.1.1	Ease of getting credit*	95.0	4 ● ◆
4.1.2	Domestic credit to private sector, % GDP	135.8	13
4.1.3	Microfinance gross loans, % GDP	n/a	n/a
4.2	**Investment**	**38.2**	**39**
4.2.1	Ease of protecting minority investors*	64.0	56
4.2.2	Market capitalization, % GDP	102.7	12
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.1	23
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.1	19
4.3	**Trade, diversification, and market scale**	**85.2**	**13**
4.3.1	Applied tariff rate, weighted avg., %	0.8	8 ●
4.3.2	Domestic industry diversification	94.0	35
4.3.3	Domestic market scale, bn PPP$	1,307.9	18

		Score/ Value	Rank
Business sophistication		**43.0**	**26 ◇**
5.1	**Knowledge workers**	**52.2**	**[24]**
5.1.1	Knowledge-intensive employment, %	46.1	17
5.1.2	Firms offering formal training, %	n/a	n/a
5.1.3	GERD performed by business, % GDP	0.9	22
5.1.4	GERD financed by business, %	n/a	n/a
5.1.5	Females employed w/advanced degrees, %	22.6	22
5.2	**Innovation linkages**	**44.6**	**19**
5.2.1	University-industry R&D collaboration†	53.4	33 ◇
5.2.2	State of cluster development and depth†	55.3	34
5.2.3	GERD financed by abroad, % GDP	n/a	n/a
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.2	10
5.2.5	Patent families/bn PPP$ GDP	1.0	27 ◇
5.3	**Knowledge absorption**	**32.2**	**52 ◇**
5.3.1	Intellectual property payments, % total trade	1.1	33
5.3.2	High-tech imports, % total trade	10.2	30
5.3.3	ICT services imports, % total trade	1.1	67 ○ ◇
5.3.4	FDI net inflows, % GDP	3.6	37
5.3.5	Research talent, % in businesses	27.9	43 ◇
Knowledge and technology outputs		**29.1**	**42 ◇**
6.1	**Knowledge creation**	**42.9**	**20**
6.1.1	Patents by origin/bn PPP$ GDP	2.0	38 ◇
6.1.2	PCT patents by origin/bn PPP$ GDP	1.3	25 ◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.7	28
6.1.4	Scientific and technical articles/bn PPP$ GDP	52.2	6 ●
6.1.5	Citable documents H-index	66.6	9 ●
6.2	**Knowledge impact**	**31.6**	**59 ◇**
6.2.1	Labor productivity growth, %	–1.2	87 ○
6.2.2	New businesses/th pop. 15–64	14.5	9
6.2.3	Software spending, % GDP	0.2	61
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	5.7	49
6.2.5	High-tech manufacturing, %	24.6	50 ◇
6.3	**Knowledge diffusion**	**12.8**	**78 ○ ◇**
6.3.1	Intellectual property receipts, % total trade	0.3	29 ◇
6.3.2	Production and export complexity	31.6	86 ○ ◇
6.3.3	High-tech exports, % total trade	2.0	58 ◇
6.3.4	ICT services exports, % total trade	1.1	78 ○
Creative outputs		**39.6**	**24**
7.1	**Intangible assets**	**41.7**	**37**
7.1.1	Trademarks by origin/bn PPP$ GDP	58.2	38
7.1.2	Global brand value, top 5,000, % GDP	77.1	26
7.1.3	Industrial designs by origin/bn PPP$ GDP	2.3	43
7.1.4	ICTs and organizational model creation†	67.3	25 ◇
7.2	**Creative goods and services**	**22.4**	**43 ◇**
7.2.1	Cultural and creative services exports, % total trade	0.3	66 ○
7.2.2	National feature films/mn pop. 15–69	3.2	58 ○
7.2.3	Entertainment and media market/th pop. 15–69	62.4	6
7.2.4	Printing and other media, % manufacturing	2.0	15
7.2.5	Creative goods exports, % total trade	0.7	57
7.3	**Online creativity**	**52.9**	**17**
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	62.3	9 ●
7.3.2	Country-code TLDs/th pop. 15–69	54.6	15
7.3.3	Wikipedia edits/mn pop. 15–69	75.8	21
7.3.4	Mobile app creation/bn PPP$ GDP	15.1	33

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Austria

GII 2021 rank **18**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
24	**16**	**High**	**EUR**	**9.0**	**493.2**	**55,406**	**19**

		Score/ Value	Rank
Institutions		**86.2**	**16**
1.1	**Political environment**	**83.8**	**17**
1.1.1	Political and operational stability*	83.9	13
1.1.2	Government effectiveness*	83.8	16
1.2	**Regulatory environment**	**94.5**	**6** ●
1.2.1	Regulatory quality*	81.6	17
1.2.2	Rule of law*	96.3	7 ●
1.2.3	Cost of redundancy dismissal	8.0	1 ● ◆
1.3	**Business environment**	**80.3**	**32**
1.3.1	Ease of starting a business*	83.2	98 ○ ◇
1.3.2	Ease of resolving insolvency*	77.4	21
Human capital and research		**59.9**	**7** ●
2.1	**Education**	**62.5**	**19**
2.1.1	Expenditure on education, % GDP	5.4	26
2.1.2	Government funding/pupil, secondary, % GDP/cap	27.1	12 ◆
2.1.3	School life expectancy, years	16.1	35
2.1.4	PISA scales in reading, maths and science	491.0	27
2.1.5	Pupil-teacher ratio, secondary ◴	9.3	22 ◆
2.2	**Tertiary education**	**58.8**	**4** ● ◆
2.2.1	Tertiary enrolment, % gross	86.7	14
2.2.2	Graduates in science and engineering, %	31.0	14 ◆
2.2.3	Tertiary inbound mobility, %	17.5	10
2.3	**Research and development (R&D)**	**58.3**	**16**
2.3.1	Researchers, FTE/mn pop.	5,868.6	8 ●
2.3.2	Gross expenditure on R&D, % GDP	3.2	5 ●
2.3.3	Global corporate R&D investors, top 3, mn US$	55.5	25
2.3.4	QS university ranking, top 3*	43.5	25
Infrastructure		**60.0**	**7** ●
3.1	**Information and communication technologies (ICTs)**	**89.5**	**11**
3.1.1	ICT access*	87.3	14
3.1.2	ICT use*	78.2	26
3.1.3	Government's online service*	94.7	7 ●
3.1.4	E-participation*	97.6	6 ●
3.2	**General infrastructure**	**46.8**	**14**
3.2.1	Electricity output, GWh/mn pop.	7,979.3	23
3.2.2	Logistics performance*	91.9	4 ●
3.2.3	Gross capital formation, % GDP	26.2	38
3.3	**Ecological sustainability**	**43.8**	**26**
3.3.1	GDP/unit of energy use	14.2	30
3.3.2	Environmental performance*	79.6	6 ●
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.0	40
Market sophistication		**51.9**	**40** ◇
4.1	**Credit**	**44.9**	**50**
4.1.1	Ease of getting credit*	55.0	88 ○
4.1.2	Domestic credit to private sector, % GDP	85.8	35
4.1.3	Microfinance gross loans, % GDP	n/a	n/a
4.2	**Investment**	**28.5**	**71** ○ ◇
4.2.1	Ease of protecting minority investors*	70.0	36
4.2.2	Market capitalization, % GDP	30.6	46 ○ ◇
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.1	28 ◇
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	41 ○ ◇
4.3	**Trade, diversification, and market scale**	**82.2**	**22**
4.3.1	Applied tariff rate, weighted avg., %	1.8	25
4.3.2	Domestic industry diversification ◴	99.2	5 ●
4.3.3	Domestic market scale, bn PPP$	493.2	41

		Score/ Value	Rank
Business sophistication		**52.3**	**15**
5.1	**Knowledge workers**	**60.4**	**17**
5.1.1	Knowledge-intensive employment, %	42.0	24
5.1.2	Firms offering formal training, %	n/a	n/a
5.1.3	GERD performed by business, % GDP	2.2	7
5.1.4	GERD financed by business, %	53.6	22
5.1.5	Females employed w/advanced degrees, %	17.7	37 ◇
5.2	**Innovation linkages**	**54.7**	**11**
5.2.1	University-industry R&D collaboration†	62.7	17
5.2.2	State of cluster development and depth†	65.0	14
5.2.3	GERD financed by abroad, % GDP	0.5	4 ● ◆
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	43 ◇
5.2.5	Patent families/bn PPP$ GDP	3.8	11
5.3	**Knowledge absorption**	**41.9**	**25**
5.3.1	Intellectual property payments, % total trade	0.8	47
5.3.2	High-tech imports, % total trade	7.8	61 ○
5.3.3	ICT services imports, % total trade	2.7	13
5.3.4	FDI net inflows, % GDP	–1.6	126 ○
5.3.5	Research talent, % in businesses	63.0	7
Knowledge and technology outputs		**40.3**	**19**
6.1	**Knowledge creation**	**46.5**	**18**
6.1.1	Patents by origin/bn PPP$ GDP	8.5	12
6.1.2	PCT patents by origin/bn PPP$ GDP	3.1	11
6.1.3	Utility models by origin/bn PPP$ GDP	0.6	34 ○
6.1.4	Scientific and technical articles/bn PPP$ GDP	37.1	24
6.1.5	Citable documents H-index	44.1	18
6.2	**Knowledge impact**	**38.5**	**29**
6.2.1	Labor productivity growth, %	–1.3	91 ○
6.2.2	New businesses/th pop. 15–64	0.6	91 ○ ◇
6.2.3	Software spending, % GDP	0.5	16
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	6.5	43
6.2.5	High-tech manufacturing, %	45.4	16
6.3	**Knowledge diffusion**	**36.0**	**26**
6.3.1	Intellectual property receipts, % total trade	0.6	25
6.3.2	Production and export complexity	85.7	6 ●
6.3.3	High-tech exports, % total trade	6.7	26
6.3.4	ICT services exports, % total trade	3.3	26
Creative outputs		**39.0**	**27** ◇
7.1	**Intangible assets**	**41.1**	**38**
7.1.1	Trademarks by origin/bn PPP$ GDP	53.7	41
7.1.2	Global brand value, top 5,000, % GDP	52.6	35 ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP ◴	7.4	17
7.1.4	ICTs and organizational model creation†	64.9	29 ◇
7.2	**Creative goods and services**	**26.2**	**34**
7.2.1	Cultural and creative services exports, % total trade	1.2	23
7.2.2	National feature films/mn pop. 15–69	7.0	30
7.2.3	Entertainment and media market/th pop. 15–69	61.8	7
7.2.4	Printing and other media, % manufacturing	1.0	52 ○
7.2.5	Creative goods exports, % total trade	0.9	48
7.3	**Online creativity**	**47.3**	**24**
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	35.5	19
7.3.2	Country-code TLDs/th pop. 15–69	63.3	11
7.3.3	Wikipedia edits/mn pop. 15–69	73.8	26
7.3.4	Mobile app creation/bn PPP$ GDP	13.4	40

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Azerbaijan

GII 2021 rank
80

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
91	**74**	**Upper middle**	**NAWA**	**10.1**	**146.5**	**14,499**	**82**

		Score/ Value	Rank
Institutions		**65.5**	**58**
1.1	**Political environment**	**54.9**	**77**
1.1.1	Political and operational stability*	69.6	60
1.1.2	Government effectiveness*	47.6	83
1.2	**Regulatory environment**	**61.6**	**77**
1.2.1	Regulatory quality*	37.6	89
1.2.2	Rule of law*	31.5	100
1.2.3	Cost of redundancy dismissal	13.7	51
1.3	**Business environment**	**79.8**	**33** ● ◆
1.3.1	Ease of starting a business*	96.2	9 ● ◆
1.3.2	Ease of resolving insolvency*	63.5	43
Human capital and research		**24.2**	**89**
2.1	**Education**	**42.7**	**84**
2.1.1	Expenditure on education, % GDP	2.5	106 ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a
2.1.3	School life expectancy, years	13.5	78
2.1.4	PISA scales in reading, maths and science	402.2	65
2.1.5	Pupil-teacher ratio, secondary	7.8	8 ● ◆
2.2	**Tertiary education**	**28.7**	**76**
2.2.1	Tertiary enrolment, % gross	31.5	83
2.2.2	Graduates in science and engineering, %	25.9	35 ●
2.2.3	Tertiary inbound mobility, %	2.2	74
2.3	**Research and development (R&D)**	**1.2**	**104**
2.3.1	Researchers, FTE/mn pop.	n/a	n/a
2.3.2	Gross expenditure on R&D, % GDP ⏲	0.2	93
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41 ○ ◇
2.3.4	QS university ranking, top 3*	0.0	74 ○ ◇
Infrastructure		**35.1**	**88**
3.1	**Information and communication technologies (ICTs)**	**66.6**	**67**
3.1.1	ICT access*	68.6	64
3.1.2	ICT use*	58.0	65
3.1.3	Government's online service*	70.6	65
3.1.4	E-participation*	69.0	73
3.2	**General infrastructure**	**12.0**	**127** ○ ◇
3.2.1	Electricity output, GWh/mn pop.	2,537.6	73
3.2.2	Logistics performance*	n/a	n/a
3.2.3	Gross capital formation, % GDP	14.4	118 ○ ◇
3.3	**Ecological sustainability**	**26.8**	**75**
3.3.1	GDP/unit of energy use	11.8	51
3.3.2	Environmental performance*	46.5	66
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.4	90
Market sophistication		**53.2**	**36** ●
4.1	**Credit**	**49.7**	**33** ● ◆
4.1.1	Ease of getting credit*	100.0	1 ● ◆
4.1.2	Domestic credit to private sector, % GDP	23.1	110 ◇
4.1.3	Microfinance gross loans, % GDP	1.9	13 ●
4.2	**Investment**	**50.0**	**[19]**
4.2.1	Ease of protecting minority investors*	50.0	92
4.2.2	Market capitalization, % GDP	n/a	n/a
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a
4.3	**Trade, diversification, and market scale**	**59.8**	**95**
4.3.1	Applied tariff rate, weighted avg., %	12.0	125 ○ ◇
4.3.2	Domestic industry diversification ⏲	83.8	71
4.3.3	Domestic market scale, bn PPP$	146.5	73

		Score/ Value	Rank
Business sophistication		**20.7**	**92**
5.1	**Knowledge workers**	**29.0**	**75**
5.1.1	Knowledge-intensive employment, %	23.1	67
5.1.2	Firms offering formal training, %	33.9	43
5.1.3	GERD performed by business, % GDP ⏲	0.0	85 ○
5.1.4	GERD financed by business, %	30.8	58
5.1.5	Females employed w/advanced degrees, % ⏲	12.9	56
5.2	**Innovation linkages**	**20.6**	**66**
5.2.1	University-industry R&D collaboration† ⏲	59.5	23 ● ◆
5.2.2	State of cluster development and depth† ⏲	58.3	27 ● ◆
5.2.3	GERD financed by abroad, % GDP ⏲	0.0	100 ○
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	87
5.2.5	Patent families/bn PPP$ GDP	0.0	81
5.3	**Knowledge absorption**	**12.6**	**128** ○ ◇
5.3.1	Intellectual property payments, % total trade ⏲	0.0	124 ○ ◇
5.3.2	High-tech imports, % total trade	3.9	118
5.3.3	ICT services imports, % total trade	0.5	109
5.3.4	FDI net inflows, % GDP	4.4	25 ●
5.3.5	Research talent, % in businesses	n/a	n/a
Knowledge and technology outputs		**10.5**	**115** ◇
6.1	**Knowledge creation**	**7.5**	**92**
6.1.1	Patents by origin/bn PPP$ GDP	1.3	56
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	76
6.1.3	Utility models by origin/bn PPP$ GDP	0.4	39
6.1.4	Scientific and technical articles/bn PPP$ GDP	5.9	106
6.1.5	Citable documents H-index	5.6	97
6.2	**Knowledge impact**	**21.0**	**99**
6.2.1	Labor productivity growth, %	0.9	47
6.2.2	New businesses/th pop. 15–64	1.7	62
6.2.3	Software spending, % GDP	0.1	96
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.6	94
6.2.5	High-tech manufacturing, %	15.1	74
6.3	**Knowledge diffusion**	**3.0**	**126** ○ ◇
6.3.1	Intellectual property receipts, % total trade ⏲	0.0	113 ○ ◇
6.3.2	Production and export complexity	12.3	117 ○ ◇
6.3.3	High-tech exports, % total trade	0.1	114
6.3.4	ICT services exports, % total trade	0.3	112
Creative outputs		**23.5**	**67**
7.1	**Intangible assets**	**34.3**	**54**
7.1.1	Trademarks by origin/bn PPP$ GDP	26.0	80
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.9	74
7.1.4	ICTs and organizational model creation†	63.4	35 ● ◆
7.2	**Creative goods and services**	**9.4**	**83**
7.2.1	Cultural and creative services exports, % total trade	0.1	86
7.2.2	National feature films/mn pop. 15–69	7.4	27 ●
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a
7.2.4	Printing and other media, % manufacturing	1.1	49
7.2.5	Creative goods exports, % total trade	0.0	122 ○
7.3	**Online creativity**	**15.7**	**72**
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.9	96
7.3.2	Country-code TLDs/th pop. 15–69	1.4	77
7.3.3	Wikipedia edits/mn pop. 15–69	59.3	53
7.3.4	Mobile app creation/bn PPP$ GDP	0.0	96

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Bahrain

GII 2021 rank
78

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
99	**63**	**High**	**NAWA**	**1.7**	**74.2**	**49,057**	**79**

		Score/ Value	Rank	
Institutions		**69.4**	**49**	
1.1	**Political environment**	**60.8**	**56**	◇
1.1.1	Political and operational stability*	67.9	71	◇
1.1.2	Government effectiveness*	57.3	55	◇
1.2	**Regulatory environment**	**73.4**	**40**	
1.2.1	Regulatory quality*	56.2	51	◇
1.2.2	Rule of law*	59.7	45	
1.2.3	Cost of redundancy dismissal	13.6	49	
1.3	**Business environment**	**73.9**	**56**	
1.3.1	Ease of starting a business*	89.6	57	
1.3.2	Ease of resolving insolvency*	58.2	55	
Human capital and research		**26.3**	**83**	◇
2.1	**Education**	**44.1**	**81**	◇
2.1.1	Expenditure on education, % GDP	2.3	108	○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap ◴	17.5	62	
2.1.3	School life expectancy, years	16.3	28	●
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	10.4	32	●
2.2	**Tertiary education**	**30.5**	**73**	◇
2.2.1	Tertiary enrolment, % gross	55.6	53	
2.2.2	Graduates in science and engineering, %	15.6	96	◇
2.2.3	Tertiary inbound mobility, %	14.2	12	●
2.3	**Research and development (R&D)**	**4.2**	**82**	◇
2.3.1	Researchers, FTE/mn pop. ◴	369.0	73	◇
2.3.2	Gross expenditure on R&D, % GDP ◴	0.1	105	○ ◇
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	10.9	64	
Infrastructure		**50.5**	**38**	
3.1	**Information and communication technologies (ICTs)**	**77.7**	**41**	
3.1.1	ICT access*	83.4	23	●
3.1.2	ICT use*	71.3	45	
3.1.3	Government's online service*	78.8	45	
3.1.4	E-participation*	77.4	51	
3.2	**General infrastructure**	**50.3**	**10**	● ◆
3.2.1	Electricity output, GWh/mn pop.	18,831.1	3	● ◆
3.2.2	Logistics performance*	41.2	58	◇
3.2.3	Gross capital formation, % GDP	33.6	15	● ◆
3.3	**Ecological sustainability**	**23.5**	**84**	◇
3.3.1	GDP/unit of energy use	4.9	116	○ ◇
3.3.2	Environmental performance*	51.0	54	◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.8	48	
Market sophistication		**44.3**	**78**	
4.1	**Credit**	**42.3**	**58**	
4.1.1	Ease of getting credit*	55.0	88	
4.1.2	Domestic credit to private sector, % GDP ◴	73.9	44	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**29.3**	**70**	
4.2.1	Ease of protecting minority investors*	66.0	50	
4.2.2	Market capitalization, % GDP	63.0	25	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.1	33	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	40	
4.3	**Trade, diversification, and market scale**	**61.4**	**88**	◇
4.3.1	Applied tariff rate, weighted avg., %	3.5	68	
4.3.2	Domestic industry diversification	70.9	96	
4.3.3	Domestic market scale, bn PPP$	74.2	92	

		Score/ Value	Rank	
Business sophistication		**21.1**	**90**	◇
5.1	**Knowledge workers**	**19.9**	**[101]**	
5.1.1	Knowledge-intensive employment, % ◴	21.9	72	◇
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP ◴	0.0	82	○ ◇
5.1.4	GERD financed by business, % ◴	21.8	65	◇
5.1.5	Females employed w/advanced degrees, %	n/a	n/a	
5.2	**Innovation linkages**	**30.5**	**33**	●
5.2.1	University-industry R&D collaboration†	38.2	87	◇
5.2.2	State of cluster development and depth†	56.3	33	●
5.2.3	GERD financed by abroad, % GDP ◴	0.0	74	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.2	9	● ◆
5.2.5	Patent families/bn PPP$ GDP	0.0	76	
5.3	**Knowledge absorption**	**12.9**	**126**	○ ◇
5.3.1	Intellectual property payments, % total trade	n/a	n/a	
5.3.2	High-tech imports, % total trade ◴	5.2	109	
5.3.3	ICT services imports, % total trade	0.4	113	◇
5.3.4	FDI net inflows, % GDP	1.4	98	
5.3.5	Research talent, % in businesses ◴	0.4	83	○ ◇
Knowledge and technology outputs		**15.8**	**82**	◇
6.1	**Knowledge creation**	**3.4**	**121**	○ ◇
6.1.1	Patents by origin/bn PPP$ GDP	0.1	113	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	85	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	4.7	113	◇
6.1.5	Citable documents H-index	4.4	112	◇
6.2	**Knowledge impact**	**26.2**	**80**	◇
6.2.1	Labor productivity growth, %	−0.2	71	
6.2.2	New businesses/th pop. 15–64	3.1	44	
6.2.3	Software spending, % GDP	0.3	30	●
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	5.7	48	
6.2.5	High-tech manufacturing, %	9.8	89	◇
6.3	**Knowledge diffusion**	**17.8**	**61**	
6.3.1	Intellectual property receipts, % total trade ◴	0.0	114	○ ◇
6.3.2	Production and export complexity	50.9	48	
6.3.3	High-tech exports, % total trade ◴	0.4	94	◇
6.3.4	ICT services exports, % total trade	3.1	33	●
Creative outputs		**14.8**	**106**	◇
7.1	**Intangible assets**	**18.8**	**107**	◇
7.1.1	Trademarks by origin/bn PPP$ GDP	4.5	125	○ ◇
7.1.2	Global brand value, top 5,000, % GDP	17.0	51	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.1	110	○
7.1.4	ICTs and organizational model creation†	58.2	51	
7.2	**Creative goods and services**	**6.7**	**[95]**	
7.2.1	Cultural and creative services exports, % total trade ◴	0.0	113	○ ◇
7.2.2	National feature films/mn pop. 15–69	n/a	n/a	
7.2.3	Entertainment and media market/th pop. 15–69	8.1	39	◇
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade ◴	0.8	50	
7.3	**Online creativity**	**14.9**	**74**	◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	4.2	57	
7.3.2	Country-code TLDs/th pop. 15–69	0.4	101	◇
7.3.3	Wikipedia edits/mn pop. 15–69	54.5	58	◇
7.3.4	Mobile app creation/bn PPP$ GDP	0.0	93	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Bangladesh

GII 2021 rank
116

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
113	**121**	**Lower middle**	**CSA**	**164.7**	**864.9**	**5,139**	**116**

		Score/ Value	Rank	
Institutions		**45.5**	**122**	
1.1	**Political environment**	**41.9**	**111**	
1.1.1	Political and operational stability*	57.1	106	
1.1.2	Government effectiveness*	34.2	113	
1.2	**Regulatory environment**	**39.5**	**122**	
1.2.1	Regulatory quality*	19.2	125	◇
1.2.2	Rule of law*	30.0	104	
1.2.3	Cost of redundancy dismissal	31.0	121	
1.3	**Business environment**	**55.3**	**117**	
1.3.1	Ease of starting a business*	82.4	101	
1.3.2	Ease of resolving insolvency*	28.1	123	
Human capital and research		**10.1**	**128**	○ ◇
2.1	**Education**	**15.2**	**129**	○ ◇
2.1.1	Expenditure on education, % GDP	1.3	114	○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	8.6	94	
2.1.3	School life expectancy, years	12.0	92	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	38.6	122	○ ◇
2.2	**Tertiary education**	**10.7**	**112**	
2.2.1	Tertiary enrolment, % gross	24.0	93	
2.2.2	Graduates in science and engineering, %	11.1	106	○ ◇
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research and development (R&D)**	**4.4**	**[80]**	
2.3.1	Researchers, FTE/mn pop.	n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP	n/a	n/a	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	8.8	67	●
Infrastructure		**32.0**	**95**	
3.1	**Information and communication technologies (ICTs)**	**46.3**	**97**	
3.1.1	ICT access*	42.1	103	
3.1.2	ICT use*	24.7	108	
3.1.3	Government's online service*	61.2	86	
3.1.4	E-participation*	57.1	91	
3.2	**General infrastructure**	**24.5**	**86**	
3.2.1	Electricity output, GWh/mn pop.	487.2	109	
3.2.2	Logistics performance*	24.6	96	
3.2.3	Gross capital formation, % GDP	27.7	29	●
3.3	**Ecological sustainability**	**25.1**	**81**	
3.3.1	GDP/unit of energy use	16.0	17	● ◆
3.3.2	Environmental performance*	29.0	124	◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	109	
Market sophistication		**40.9**	**95**	
4.1	**Credit**	**30.0**	**106**	
4.1.1	Ease of getting credit*	45.0	101	
4.1.2	Domestic credit to private sector, % GDP	45.3	76	
4.1.3	Microfinance gross loans, % GDP	1.4	22	●
4.2	**Investment**	**23.7**	**96**	
4.2.1	Ease of protecting minority investors*	60.0	71	●
4.2.2	Market capitalization, % GDP ⏲	31.5	44	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	91	○ ◇
4.3	**Trade, diversification, and market scale**	**69.1**	**65**	●
4.3.1	Applied tariff rate, weighted avg., %	8.6	108	
4.3.2	Domestic industry diversification	79.9	80	
4.3.3	Domestic market scale, bn PPP$	864.9	30	● ◆

		Score/ Value	Rank	
Business sophistication		**15.4**	**122**	
5.1	**Knowledge workers**	**12.9**	**[119]**	
5.1.1	Knowledge-intensive employment, % ⏲	8.3	113	
5.1.2	Firms offering formal training, % ⏲	21.9	70	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, % ⏲	1.3	112	
5.2	**Innovation linkages**	**17.0**	**96**	
5.2.1	University-industry R&D collaboration†	25.9	123	○ ◇
5.2.2	State of cluster development and depth†	42.4	91	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	86	
5.2.5	Patent families/bn PPP$ GDP	0.0	100	○ ◇
5.3	**Knowledge absorption**	**16.3**	**109**	
5.3.1	Intellectual property payments, % total trade	0.1	107	
5.3.2	High-tech imports, % total trade ⏲	8.1	59	●
5.3.3	ICT services imports, % total trade	0.2	128	○ ◇
5.3.4	FDI net inflows, % GDP	0.7	113	
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**13.7**	**92**	
6.1	**Knowledge creation**	**6.3**	**[99]**	
6.1.1	Patents by origin/bn PPP$ GDP	0.1	115	
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	4.7	112	
6.1.5	Citable documents H-index	11.8	65	●
6.2	**Knowledge impact**	**27.8**	**71**	●
6.2.1	Labor productivity growth, %	6.9	2	● ◆
6.2.2	New businesses/th pop. 15–64	0.0	120	○
6.2.3	Software spending, % GDP	0.2	74	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.7	117	
6.2.5	High-tech manufacturing, % ⏲	9.4	91	
6.3	**Knowledge diffusion**	**7.0**	**111**	
6.3.1	Intellectual property receipts, % total trade	0.0	104	
6.3.2	Production and export complexity	23.5	105	
6.3.3	High-tech exports, % total trade ⏲	0.2	105	
6.3.4	ICT services exports, % total trade	1.0	83	
Creative outputs		**9.6**	**123**	◇
7.1	**Intangible assets**	**15.0**	**119**	
7.1.1	Trademarks by origin/bn PPP$ GDP	9.3	114	
7.1.2	Global brand value, top 5,000, % GDP	1.0	79	
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.7	51	●
7.1.4	ICTs and organizational model creation†	42.1	108	
7.2	**Creative goods and services**	**1.6**	**121**	◇
7.2.1	Cultural and creative services exports, % total trade	0.2	73	
7.2.2	National feature films/mn pop. 15–69	0.3	102	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	0.2	101	○
7.2.5	Creative goods exports, % total trade ⏲	0.1	108	
7.3	**Online creativity**	**6.9**	**115**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.4	113	
7.3.2	Country-code TLDs/th pop. 15–69	0.0	122	
7.3.3	Wikipedia edits/mn pop. 15–69	29.4	107	
7.3.4	Mobile app creation/bn PPP$ GDP	0.7	76	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Belarus

GII 2021 rank
62

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
62	**68**	**Upper middle**	**EUR**	**9.4**	**185.9**	**19,759**	**64**

		Score/ Value	Rank	
Institutions		**57.8**	**85**	
1.1	**Political environment**	**50.1**	**89**	
1.1.1	Political and operational stability*	57.1	106	○
1.1.2	Government effectiveness*	46.6	85	
1.2	**Regulatory environment**	**50.2**	**103**	
1.2.1	Regulatory quality*	29.3	104	◇
1.2.2	Rule of law*	25.8	112	○ ◇
1.2.3	Cost of redundancy dismissal	21.7	93	
1.3	**Business environment**	**73.2**	**58**	
1.3.1	Ease of starting a business*	93.5	28	
1.3.2	Ease of resolving insolvency*	52.9	68	
Human capital and research		**42.1**	**38**	◆
2.1	**Education**	**63.2**	**16**	● ◆
2.1.1	Expenditure on education, % GDP	4.8	47	
2.1.2	Government funding/pupil, secondary, % GDP/cap	35.7	5	● ◆
2.1.3	School life expectancy, years	15.4	46	
2.1.4	PISA scales in reading, maths and science	472.3	36	◆
2.1.5	Pupil-teacher ratio, secondary ◴	8.6	17	● ◆
2.2	**Tertiary education**	**54.0**	**7**	● ◆
2.2.1	Tertiary enrolment, % gross	87.4	12	● ◆
2.2.2	Graduates in science and engineering, % ◴	33.2	11	● ◆
2.2.3	Tertiary inbound mobility, %	4.3	55	
2.3	**Research and development (R&D)**	**9.1**	**64**	
2.3.1	Researchers, FTE/mn pop.	n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP ◴	0.6	57	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	15.3	58	
Infrastructure		**43.4**	**59**	
3.1	**Information and communication technologies (ICTs)**	**77.1**	**44**	◆
3.1.1	ICT access*	86.5	16	● ◆
3.1.2	ICT use*	76.3	33	◆
3.1.3	Government's online service*	70.6	65	
3.1.4	E-participation*	75.0	57	
3.2	**General infrastructure**	**26.6**	**74**	
3.2.1	Electricity output, GWh/mn pop.	4,110.3	55	
3.2.2	Logistics performance*	24.5	99	◇
3.2.3	Gross capital formation, % GDP	26.3	37	
3.3	**Ecological sustainability**	**26.5**	**77**	
3.3.1	GDP/unit of energy use	6.7	103	○ ◇
3.3.2	Environmental performance*	53.0	47	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.0	41	
Market sophistication		**39.8**	**101**	◇
4.1	**Credit**	**24.1**	**118**	○ ◇
4.1.1	Ease of getting credit*	50.0	94	◇
4.1.2	Domestic credit to private sector, % GDP	29.4	96	
4.1.3	Microfinance gross loans, % GDP	0.0	83	○ ◇
4.2	**Investment**	**20.6**	**112**	○
4.2.1	Ease of protecting minority investors*	58.0	77	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	86	○
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	69	
4.3	**Trade, diversification, and market scale**	**74.7**	**45**	
4.3.1	Applied tariff rate, weighted avg., %	2.8	60	
4.3.2	Domestic industry diversification	93.1	41	
4.3.3	Domestic market scale, bn PPP$	185.9	67	

		Score/ Value	Rank	
Business sophistication		**24.4**	**69**	
5.1	**Knowledge workers**	**47.7**	**28**	◆
5.1.1	Knowledge-intensive employment, %	40.6	26	◆
5.1.2	Firms offering formal training, % ◴	31.5	49	
5.1.3	GERD performed by business, % GDP ◴	0.4	42	
5.1.4	GERD financed by business, %	45.0	34	
5.1.5	Females employed w/advanced degrees, % ◴	32.6	1	● ◆
5.2	**Innovation linkages**	**5.3**	**[128]**	
5.2.1	University-industry R&D collaboration†	n/a	n/a	
5.2.2	State of cluster development and depth†	n/a	n/a	
5.2.3	GERD financed by abroad, % GDP	0.1	44	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	111	○
5.2.5	Patent families/bn PPP$ GDP	0.1	52	
5.3	**Knowledge absorption**	**20.2**	**91**	
5.3.1	Intellectual property payments, % total trade	0.4	74	
5.3.2	High-tech imports, % total trade	6.4	91	
5.3.3	ICT services imports, % total trade	1.0	81	
5.3.4	FDI net inflows, % GDP	2.2	73	
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**30.3**	**37**	
6.1	**Knowledge creation**	**16.9**	**61**	
6.1.1	Patents by origin/bn PPP$ GDP	2.2	33	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	70	
6.1.3	Utility models by origin/bn PPP$ GDP	1.5	16	●
6.1.4	Scientific and technical articles/bn PPP$ GDP	7.0	102	
6.1.5	Citable documents H-index	10.6	72	
6.2	**Knowledge impact**	**43.6**	**16**	● ◆
6.2.1	Labor productivity growth, %	1.2	38	
6.2.2	New businesses/th pop. 15–64	1.3	74	
6.2.3	Software spending, % GDP	0.0	103	◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	34.1	3	● ◆
6.2.5	High-tech manufacturing, %	28.4	44	
6.3	**Knowledge diffusion**	**30.3**	**34**	◆
6.3.1	Intellectual property receipts, % total trade	0.2	44	
6.3.2	Production and export complexity	64.4	29	◆
6.3.3	High-tech exports, % total trade	1.8	62	
6.3.4	ICT services exports, % total trade	5.7	11	● ◆
Creative outputs		**17.0**	**93**	
7.1	**Intangible assets**	**9.8**	**129**	○ ◇
7.1.1	Trademarks by origin/bn PPP$ GDP	26.1	79	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.7	52	
7.1.4	ICTs and organizational model creation†	n/a	n/a	
7.2	**Creative goods and services**	**6.0**	**100**	
7.2.1	Cultural and creative services exports, % total trade	0.4	56	
7.2.2	National feature films/mn pop. 15–69 ◴	0.1	106	○ ◇
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	0.5	90	○ ◇
7.2.5	Creative goods exports, % total trade	0.5	62	
7.3	**Online creativity**	**42.6**	**26**	◆
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	1.7	83	
7.3.2	Country-code TLDs/th pop. 15–69	5.8	49	
7.3.3	Wikipedia edits/mn pop. 15–69	61.4	49	
7.3.4	Mobile app creation/bn PPP$ GDP	100.0	1	● ◆

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Belgium

GII 2021 rank **22**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
26	**21**	**High**	**EUR**	**11.6**	**575.8**	**50,114**	**22**

		Score/ Value	Rank	
Institutions		**80.8**	**23**	
1.1	**Political environment**	**75.8**	**32**	◇
1.1.1	Political and operational stability*	80.4	29	
1.1.2	Government effectiveness*	73.6	31	◇
1.2	**Regulatory environment**	**78.4**	**32**	
1.2.1	Regulatory quality*	77.2	22	
1.2.2	Rule of law*	82.7	21	
1.2.3	Cost of redundancy dismissal	19.7	83	○
1.3	**Business environment**	**88.2**	**8**	●
1.3.1	Ease of starting a business*	92.3	44	
1.3.2	Ease of resolving insolvency*	84.1	9	●
Human capital and research		**59.7**	**8**	●
2.1	**Education**	**82.0**	**2**	● ◆
2.1.1	Expenditure on education, % GDP	6.4	9	●
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	19.6	4	● ◆
2.1.4	PISA scales in reading, maths and science	499.9	19	
2.1.5	Pupil-teacher ratio, secondary ⏲	8.9	20	◆
2.2	**Tertiary education**	**36.6**	**52**	
2.2.1	Tertiary enrolment, % gross	78.9	22	
2.2.2	Graduates in science and engineering, %	17.0	90	○ ◇
2.2.3	Tertiary inbound mobility, %	10.5	20	
2.3	**Research and development (R&D)**	**60.4**	**13**	
2.3.1	Researchers, FTE/mn pop.	5,425.4	12	
2.3.2	Gross expenditure on R&D, % GDP	2.9	10	●
2.3.3	Global corporate R&D investors, top 3, mn US$	65.6	17	
2.3.4	QS university ranking, top 3*	53.2	17	
Infrastructure		**52.0**	**35**	◇
3.1	**Information and communication technologies (ICTs)**	**74.0**	**51**	◇
3.1.1	ICT access*	83.3	25	
3.1.2	ICT use*	81.2	23	
3.1.3	Government's online service*	65.9	76	○ ◇
3.1.4	E-participation*	65.5	77	○ ◇
3.2	**General infrastructure**	**45.8**	**17**	
3.2.1	Electricity output, GWh/mn pop.	8,089.5	21	
3.2.2	Logistics performance*	92.5	3	●
3.2.3	Gross capital formation, % GDP	24.7	50	
3.3	**Ecological sustainability**	**36.2**	**44**	
3.3.1	GDP/unit of energy use	10.0	68	
3.3.2	Environmental performance*	73.3	15	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.6	53	
Market sophistication		**54.1**	**33**	
4.1	**Credit**	**46.5**	**45**	
4.1.1	Ease of getting credit*	65.0	61	○
4.1.2	Domestic credit to private sector, % GDP	70.1	47	◇
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**35.4**	**48**	
4.2.1	Ease of protecting minority investors*	68.0	44	
4.2.2	Market capitalization, % GDP ⏲	75.2	22	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.1	24	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.1	26	
4.3	**Trade, diversification, and market scale**	**80.3**	**27**	
4.3.1	Applied tariff rate, weighted avg., %	1.8	25	
4.3.2	Domestic industry diversification ⏲	93.0	42	
4.3.3	Domestic market scale, bn PPP$	575.8	36	

		Score/ Value	Rank	
Business sophistication		**51.7**	**16**	
5.1	**Knowledge workers**	**69.3**	**6**	●
5.1.1	Knowledge-intensive employment, %	47.6	13	
5.1.2	Firms offering formal training, %	57.8	9	●
5.1.3	GERD performed by business, % GDP	2.0	9	
5.1.4	GERD financed by business, % ⏲	63.5	9	●
5.1.5	Females employed w/advanced degrees, %	25.4	14	
5.2	**Innovation linkages**	**47.1**	**16**	
5.2.1	University-industry R&D collaboration†	70.1	7	●
5.2.2	State of cluster development and depth†	64.3	16	
5.2.3	GERD financed by abroad, % GDP ⏲	0.3	7	●
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.1	27	
5.2.5	Patent families/bn PPP$ GDP	2.5	14	
5.3	**Knowledge absorption**	**38.7**	**31**	
5.3.1	Intellectual property payments, % total trade	0.8	51	
5.3.2	High-tech imports, % total trade	9.0	44	
5.3.3	ICT services imports, % total trade	2.4	24	
5.3.4	FDI net inflows, % GDP	–6.9	129	○ ◇
5.3.5	Research talent, % in businesses	56.7	17	
Knowledge and technology outputs		**42.3**	**17**	
6.1	**Knowledge creation**	**50.5**	**15**	
6.1.1	Patents by origin/bn PPP$ GDP	5.3	17	
6.1.2	PCT patents by origin/bn PPP$ GDP	2.3	17	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	40.0	19	
6.1.5	Citable documents H-index	53.8	14	
6.2	**Knowledge impact**	**37.1**	**34**	
6.2.1	Labor productivity growth, %	–2.0	100	○
6.2.2	New businesses/th pop. 15–64	3.4	40	
6.2.3	Software spending, % GDP	0.5	6	●
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	4.9	56	
6.2.5	High-tech manufacturing, %	40.4	26	
6.3	**Knowledge diffusion**	**39.2**	**22**	
6.3.1	Intellectual property receipts, % total trade	1.0	20	
6.3.2	Production and export complexity	71.1	21	
6.3.3	High-tech exports, % total trade	9.5	16	
6.3.4	ICT services exports, % total trade	3.3	27	
Creative outputs		**35.1**	**36**	◇
7.1	**Intangible assets**	**34.5**	**52**	◇
7.1.1	Trademarks by origin/bn PPP$ GDP	32.3	72	○
7.1.2	Global brand value, top 5,000, % GDP	54.6	33	
7.1.3	Industrial designs by origin/bn PPP$ GDP	2.2	44	
7.1.4	ICTs and organizational model creation†	72.2	16	
7.2	**Creative goods and services**	**29.0**	**27**	
7.2.1	Cultural and creative services exports, % total trade	1.3	19	
7.2.2	National feature films/mn pop. 15–69	10.9	16	
7.2.3	Entertainment and media market/th pop. 15–69	51.7	15	
7.2.4	Printing and other media, % manufacturing	0.9	59	○
7.2.5	Creative goods exports, % total trade	1.5	36	
7.3	**Online creativity**	**42.2**	**27**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	21.1	27	
7.3.2	Country-code TLDs/th pop. 15–69	63.1	12	
7.3.3	Wikipedia edits/mn pop. 15–69	78.0	14	
7.3.4	Mobile app creation/bn PPP$ GDP	2.8	66	○ ◇

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Benin

GII 2021 rank
128

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
132	**113**	**Lower middle**	**SSF**	**12.1**	**41.8**	**3,443**	**126**

		Score/ Value	Rank	
Institutions		**58.5**	**84**	
1.1	**Political environment**	**47.5**	**96**	
1.1.1	Political and operational stability*	60.7	97	
1.1.2	Government effectiveness*	40.9	96	
1.2	**Regulatory environment**	**62.1**	**76** ●	
1.2.1	Regulatory quality*	33.7	97	
1.2.2	Rule of law*	29.2	106	
1.2.3	Cost of redundancy dismissal	11.6	37 ●	
1.3	**Business environment**	**65.8**	**81** ●	
1.3.1	Ease of starting a business*	90.6	55 ●	
1.3.2	Ease of resolving insolvency*	41.0	95	
Human capital and research		**17.3**	**111**	
2.1	**Education**	**33.1**	**109**	
2.1.1	Expenditure on education, % GDP	2.9	99	
2.1.2	Government funding/pupil, secondary, % GDP/cap ◴	7.9	97	◇
2.1.3	School life expectancy, years ◴	12.6	86	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary ◴	11.0	39 ● ◆	
2.2	**Tertiary education**	**19.0**	**97**	
2.2.1	Tertiary enrolment, % gross	12.5	109	
2.2.2	Graduates in science and engineering, %	20.9	68 ●	
2.2.3	Tertiary inbound mobility, %	4.5	52 ● ◆	
2.3	**Research and development (R&D)**	**0.0**	**[123]**	
2.3.1	Researchers, FTE/mn pop.	n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP	n/a	n/a	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41 ○ ◇	
2.3.4	QS university ranking, top 3*	0.0	74 ○ ◇	
Infrastructure		**25.1**	**118**	
3.1	**Information and communication technologies (ICTs)**	**37.4**	**114**	
3.1.1	ICT access*	31.6	122	◇
3.1.2	ICT use*	12.0	127	◇
3.1.3	Government's online service*	51.2	104	
3.1.4	E-participation*	54.8	94	
3.2	**General infrastructure**	**25.1**	**81** ●	
3.2.1	Electricity output, GWh/mn pop.	17.6	124 ○ ◇	
3.2.2	Logistics performance*	32.7	75 ●	
3.2.3	Gross capital formation, % GDP	26.6	36 ●	
3.3	**Ecological sustainability**	**13.0**	**131** ○ ◇	
3.3.1	GDP/unit of energy use	5.0	115	◇
3.3.2	Environmental performance*	30.0	120	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.1	126	
Market sophistication		**33.6**	**123**	
4.1	**Credit**	**19.5**	**124**	◇
4.1.1	Ease of getting credit*	30.0	122	◇
4.1.2	Domestic credit to private sector, % GDP	17.6	116	
4.1.3	Microfinance gross loans, % GDP	1.5	19 ●	
4.2	**Investment**	**42.0**	**[28]**	
4.2.1	Ease of protecting minority investors*	42.0	102	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**39.2**	**126**	◇
4.3.1	Applied tariff rate, weighted avg., %	9.9	116	
4.3.2	Domestic industry diversification	n/a	n/a	
4.3.3	Domestic market scale, bn PPP$	41.8	107	

		Score/ Value	Rank	
Business sophistication		**17.0**	**113**	
5.1	**Knowledge workers**	**13.5**	**[115]**	
5.1.1	Knowledge-intensive employment, %	n/a	n/a	
5.1.2	Firms offering formal training, % ◴	20.0	78	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, % ◴	0.8	116	
5.2	**Innovation linkages**	**17.7**	**89**	
5.2.1	University-industry R&D collaboration†	39.0	83	
5.2.2	State of cluster development and depth†	38.8	106	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP ◴	0.0	95	
5.2.5	Patent families/bn PPP$ GDP	0.0	100 ○ ◇	
5.3	**Knowledge absorption**	**19.7**	**93**	
5.3.1	Intellectual property payments, % total trade	0.0	121 ○ ◇	
5.3.2	High-tech imports, % total trade	3.3	123	
5.3.3	ICT services imports, % total trade	2.9	10 ● ◆	
5.3.4	FDI net inflows, % GDP	1.5	93	
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**2.7**	**131** ○ ◇	
6.1	**Knowledge creation**	**4.8**	**113**	
6.1.1	Patents by origin/bn PPP$ GDP	0.1	104	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	87	
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	76 ○ ◇	
6.1.4	Scientific and technical articles/bn PPP$ GDP	10.5	82 ●	
6.1.5	Citable documents H-index	4.7	109	
6.2	**Knowledge impact**	**3.1**	**[130]**	
6.2.1	Labor productivity growth, %	n/a	n/a	
6.2.2	New businesses/th pop. 15–64	0.5	94	
6.2.3	Software spending, % GDP	0.1	98	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.1	104	
6.2.5	High-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**0.3**	**132** ○ ◇	
6.3.1	Intellectual property receipts, % total trade	0.0	100	
6.3.2	Production and export complexity	n/a	n/a	
6.3.3	High-tech exports, % total trade	0.0	127 ○	
6.3.4	ICT services exports, % total trade	0.1	128 ○	
Creative outputs		**8.5**	**128** ○ ◇	
7.1	**Intangible assets**	**11.9**	**127**	◇
7.1.1	Trademarks by origin/bn PPP$ GDP	5.0	122	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80 ○ ◇	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.0	117	
7.1.4	ICTs and organizational model creation†	39.2	115	
7.2	**Creative goods and services**	**0.3**	**[131]**	
7.2.1	Cultural and creative services exports, % total trade ◴	0.0	98	
7.2.2	National feature films/mn pop. 15–69	n/a	n/a	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.0	130 ○	
7.3	**Online creativity**	**9.8**	**94**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.6	103	
7.3.2	Country-code TLDs/th pop. 15–69	0.0	126	
7.3.3	Wikipedia edits/mn pop. 15–69	31.5	99	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Bolivia (Plurinational State of)

GII 2021 rank **104**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
111	**95**	**Lower middle**	**LCN**	**11.7**	**97.8**	**8,342**	**105**

		Score/ Value	Rank	
Institutions		**37.8**	**131**	○ ◇
1.1	**Political environment**	**40.1**	**119**	
1.1.1	Political and operational stability*	50.0	123	○ ◇
1.1.2	Government effectiveness*	35.1	112	
1.2	**Regulatory environment**	**17.4**	**132**	○ ◇
1.2.1	Regulatory quality*	17.5	127	○ ◇
1.2.2	Rule of law*	17.2	128	○ ◇
1.2.3	Cost of redundancy dismissal	n/a	n/a	
1.3	**Business environment**	**55.8**	**116**	
1.3.1	Ease of starting a business*	69.4	126	○ ◇
1.3.2	Ease of resolving insolvency*	42.3	92	
Human capital and research		**34.0**	**[55]**	
2.1	**Education**	**67.5**	**[10]**	
2.1.1	Expenditure on education, % GDP	n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	n/a	n/a	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary ⏲	18.5	90	
2.2	**Tertiary education**	**n/a**	**[n/a]**	
2.2.1	Tertiary enrolment, % gross	n/a	n/a	
2.2.2	Graduates in science and engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research and development (R&D)**	**0.6**	**110**	
2.3.1	Researchers, FTE/mn pop. ⏲	163.8	82	
2.3.2	Gross expenditure on R&D, % GDP	n/a	n/a	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**29.1**	**106**	
3.1	**Information and communication technologies (ICTs)**	**51.6**	**94**	
3.1.1	ICT access*	42.4	101	
3.1.2	ICT use*	46.0	89	
3.1.3	Government's online service*	58.2	90	
3.1.4	E-participation*	59.5	87	
3.2	**General infrastructure**	**12.5**	**126**	○ ◇
3.2.1	Electricity output, GWh/mn pop.	870.5	101	
3.2.2	Logistics performance*	14.5	117	
3.2.3	Gross capital formation, % GDP	16.0	110	◇
3.3	**Ecological sustainability**	**23.1**	**85**	
3.3.1	GDP/unit of energy use	9.0	81	
3.3.2	Environmental performance*	44.3	77	◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.5	83	
Market sophistication		**48.4**	**59**	●
4.1	**Credit**	**45.4**	**47**	●
4.1.1	Ease of getting credit*	35.0	118	◇
4.1.2	Domestic credit to private sector, % GDP	71.2	46	●
4.1.3	Microfinance gross loans, % GDP	28.5	1	● ◆
4.2	**Investment**	**38.0**	**[40]**	
4.2.1	Ease of protecting minority investors*	38.0	115	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**61.7**	**87**	
4.3.1	Applied tariff rate, weighted avg., %	4.7	81	
4.3.2	Domestic industry diversification ⏲	72.3	93	
4.3.3	Domestic market scale, bn PPP$	97.8	85	

		Score/ Value	Rank	
Business sophistication		**23.7**	**75**	
5.1	**Knowledge workers**	**37.4**	**[48]**	
5.1.1	Knowledge-intensive employment, %	15.8	92	
5.1.2	Firms offering formal training, % ⏲	49.9	18	● ◆
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, %	7.7	81	
5.2	**Innovation linkages**	**13.4**	**117**	
5.2.1	University-industry R&D collaboration†	24.1	125	○ ◇
5.2.2	State of cluster development and depth†	32.0	120	◇
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	107	
5.2.5	Patent families/bn PPP$ GDP	0.0	100	○ ◇
5.3	**Knowledge absorption**	**20.3**	**90**	
5.3.1	Intellectual property payments, % total trade	0.8	60	●
5.3.2	High-tech imports, % total trade ⏲	10.8	24	●
5.3.3	ICT services imports, % total trade	0.7	91	
5.3.4	FDI net inflows, % GDP	0.7	116	
5.3.5	Research talent, % in businesses ⏲	0.4	84	○
Knowledge and technology outputs		**11.1**	**112**	
6.1	**Knowledge creation**	**4.6**	**114**	
6.1.1	Patents by origin/bn PPP$ GDP ⏲	0.6	76	
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP ⏲	0.1	54	
6.1.4	Scientific and technical articles/bn PPP$ GDP	3.1	121	
6.1.5	Citable documents H-index	6.7	93	
6.2	**Knowledge impact**	**22.0**	**93**	
6.2.1	Labor productivity growth, %	0.5	57	●
6.2.2	New businesses/th pop. 15–64	0.5	98	
6.2.3	Software spending, % GDP	0.3	44	●
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	2.2	86	
6.2.5	High-tech manufacturing, % ⏲	7.7	94	
6.3	**Knowledge diffusion**	**6.6**	**112**	
6.3.1	Intellectual property receipts, % total trade	0.1	51	●
6.3.2	Production and export complexity	19.8	111	
6.3.3	High-tech exports, % total trade ⏲	0.4	93	
6.3.4	ICT services exports, % total trade	0.8	88	
Creative outputs		**13.4**	**111**	
7.1	**Intangible assets**	**17.7**	**110**	
7.1.1	Trademarks by origin/bn PPP$ GDP ⏲	37.0	63	●
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP ⏲	0.2	105	
7.1.4	ICTs and organizational model creation†	31.7	122	○ ◇
7.2	**Creative goods and services**	**9.5**	**82**	
7.2.1	Cultural and creative services exports, % total trade	0.2	72	
7.2.2	National feature films/mn pop. 15–69	0.8	88	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing ⏲	1.0	54	
7.2.5	Creative goods exports, % total trade ⏲	1.0	44	●
7.3	**Online creativity**	**8.8**	**102**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	1.8	82	
7.3.2	Country-code TLDs/th pop. 15–69	0.5	98	
7.3.3	Wikipedia edits/mn pop. 15–69	35.1	93	
7.3.4	Mobile app creation/bn PPP$ GDP	0.0	95	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Bosnia and Herzegovina

GII 2021 rank **75**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
80	**70**	**Upper middle**	**EUR**	**3.3**	**48.8**	**14,895**	**74**

		Score/ Value	Rank	
Institutions		**59.5**	**82**	
1.1	**Political environment**	**45.8**	**102**	◇
1.1.1	Political and operational stability*	64.3	80	
1.1.2	Government effectiveness*	36.6	106	◇
1.2	**Regulatory environment**	**68.5**	**54**	
1.2.1	Regulatory quality*	38.4	84	
1.2.2	Rule of law*	40.6	74	
1.2.3	Cost of redundancy dismissal	9.2	24	●
1.3	**Business environment**	**64.1**	**88**	
1.3.1	Ease of starting a business*	60.0	131	○ ◇
1.3.2	Ease of resolving insolvency*	68.2	34	●
Human capital and research		**31.4**	**68**	
2.1	**Education**	**60.7**	**[25]**	
2.1.1	Expenditure on education, % GDP	n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	n/a	n/a	
2.1.4	PISA scales in reading, maths and science	402.6	63	
2.1.5	Pupil-teacher ratio, secondary	8.8	18	●
2.2	**Tertiary education**	**31.2**	**71**	
2.2.1	Tertiary enrolment, % gross	40.2	74	
2.2.2	Graduates in science and engineering, %	23.5	49	
2.2.3	Tertiary inbound mobility, %	7.1	36	● ◆
2.3	**Research and development (R&D)**	**2.2**	**91**	
2.3.1	Researchers, FTE/mn pop.	460.2	71	
2.3.2	Gross expenditure on R&D, % GDP	0.2	91	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**45.7**	**52**	
3.1	**Information and communication technologies (ICTs)**	**59.3**	**84**	
3.1.1	ICT access*	71.3	58	
3.1.2	ICT use*	51.6	79	
3.1.3	Government's online service*	53.5	97	◇
3.1.4	E-participation*	60.7	85	
3.2	**General infrastructure**	**25.3**	**78**	
3.2.1	Electricity output, GWh/mn pop.	5,733.8	38	● ◆
3.2.2	Logistics performance*	35.4	71	
3.2.3	Gross capital formation, % GDP	19.8	88	
3.3	**Ecological sustainability**	**52.4**	**5**	● ◆
3.3.1	GDP/unit of energy use	6.0	106	○ ◇
3.3.2	Environmental performance*	45.4	70	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	16.2	1	● ◆
Market sophistication		**49.3**	**51**	
4.1	**Credit**	**37.6**	**79**	
4.1.1	Ease of getting credit*	65.0	61	
4.1.2	Domestic credit to private sector, % GDP	58.1	59	
4.1.3	Microfinance gross loans, % GDP	0.7	29	
4.2	**Investment**	**56.0**	**[15]**	
4.2.1	Ease of protecting minority investors*	56.0	82	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**54.3**	**110**	◇
4.3.1	Applied tariff rate, weighted avg., %	17.9	132	○ ◇
4.3.2	Domestic industry diversification	97.7	13	●
4.3.3	Domestic market scale, bn PPP$	48.8	103	

		Score/ Value	Rank	
Business sophistication		**18.8**	**99**	◇
5.1	**Knowledge workers**	**29.2**	**74**	
5.1.1	Knowledge-intensive employment, %	21.8	73	
5.1.2	Firms offering formal training, %	37.9	34	
5.1.3	GERD performed by business, % GDP	0.1	65	
5.1.4	GERD financed by business, %	36.1	53	
5.1.5	Females employed w/advanced degrees, %	6.2	89	◇
5.2	**Innovation linkages**	**12.4**	**122**	○ ◇
5.2.1	University-industry R&D collaboration†	26.8	119	○ ◇
5.2.2	State of cluster development and depth†	35.4	114	○ ◇
5.2.3	GERD financed by abroad, % GDP	0.0	72	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	83	
5.2.5	Patent families/bn PPP$ GDP	0.0	82	
5.3	**Knowledge absorption**	**14.9**	**118**	○ ◇
5.3.1	Intellectual property payments, % total trade	0.1	104	
5.3.2	High-tech imports, % total trade	5.6	104	
5.3.3	ICT services imports, % total trade	0.5	108	
5.3.4	FDI net inflows, % GDP	2.6	68	
5.3.5	Research talent, % in businesses	12.0	61	
Knowledge and technology outputs		**20.7**	**66**	
6.1	**Knowledge creation**	**9.3**	**83**	
6.1.1	Patents by origin/bn PPP$ GDP	0.9	68	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	58	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	13.1	67	
6.1.5	Citable documents H-index	5.0	105	
6.2	**Knowledge impact**	**33.4**	**50**	
6.2.1	Labor productivity growth, %	–0.8	78	
6.2.2	New businesses/th pop. 15–64	1.1	83	
6.2.3	Software spending, % GDP	0.1	92	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	27.0	5	● ◆
6.2.5	High-tech manufacturing, %	14.2	77	
6.3	**Knowledge diffusion**	**19.3**	**56**	
6.3.1	Intellectual property receipts, % total trade	0.2	39	◆
6.3.2	Production and export complexity	59.4	37	●
6.3.3	High-tech exports, % total trade	2.6	51	
6.3.4	ICT services exports, % total trade	1.7	65	
Creative outputs		**15.9**	**99**	◇
7.1	**Intangible assets**	**16.4**	**115**	○ ◇
7.1.1	Trademarks by origin/bn PPP$ GDP	19.1	93	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.6	53	
7.1.4	ICTs and organizational model creation†	39.0	116	○ ◇
7.2	**Creative goods and services**	**12.2**	**73**	
7.2.1	Cultural and creative services exports, % total trade	0.1	75	
7.2.2	National feature films/mn pop. 15–69	8.4	24	● ◆
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.1	44	
7.2.5	Creative goods exports, % total trade	0.4	66	
7.3	**Online creativity**	**18.6**	**61**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	2.8	68	
7.3.2	Country-code TLDs/th pop. 15–69	2.9	62	
7.3.3	Wikipedia edits/mn pop. 15–69	66.5	43	◆
7.3.4	Mobile app creation/bn PPP$ GDP	0.1	88	○

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⊘ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Botswana

GII 2021 rank
106

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
109	**98**	**Upper middle**	**SSF**	**2.4**	**39.1**	**16,153**	**89**

		Score/ Value	Rank
Institutions		**65.1**	**59**
1.1	**Political environment**	**66.9**	**44** ● ◆
1.1.1	Political and operational stability*	80.4	29 ● ◆
1.1.2	Government effectiveness*	60.2	47
1.2	**Regulatory environment**	**66.1**	**62**
1.2.1	Regulatory quality*	53.2	54
1.2.2	Rule of law*	59.9	44 ● ◆
1.2.3	Cost of redundancy dismissal	20.3	86
1.3	**Business environment**	**62.2**	**95**
1.3.1	Ease of starting a business*	76.2	117
1.3.2	Ease of resolving insolvency*	48.2	76
Human capital and research		**8.3**	**130** ○ ◇
2.1	**Education**	**n/a**	**[n/a]**
2.1.1	Expenditure on education, % GDP	n/a	n/a
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a
2.1.3	School life expectancy, years	n/a	n/a
2.1.4	PISA scales in reading, maths and science	n/a	n/a
2.1.5	Pupil-teacher ratio, secondary	n/a	n/a
2.2	**Tertiary education**	**13.5**	**107** ◇
2.2.1	Tertiary enrolment, % gross	25.1	91 ◇
2.2.2	Graduates in science and engineering, %	n/a	n/a
2.2.3	Tertiary inbound mobility, %	2.3	73
2.3	**Research and development (R&D)**	**3.2**	**86**
2.3.1	Researchers, FTE/mn pop. ◴	185.2	81
2.3.2	Gross expenditure on R&D, % GDP ◴	0.5	63
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41 ○ ◇
2.3.4	QS university ranking, top 3*	0.0	74 ○ ◇
Infrastructure		**33.4**	**93** ◇
3.1	**Information and communication technologies (ICTs)**	**43.3**	**103** ◇
3.1.1	ICT access*	55.2	85
3.1.2	ICT use*	44.5	93
3.1.3	Government's online service*	36.5	119 ◇
3.1.4	E-participation*	36.9	116 ◇
3.2	**General infrastructure**	**29.9**	**62**
3.2.1	Electricity output, GWh/mn pop.	1,401.1	92 ◇
3.2.2	Logistics performance*	n/a	n/a
3.2.3	Gross capital formation, % GDP	31.7	22 ● ◆
3.3	**Ecological sustainability**	**26.9**	**73**
3.3.1	GDP/unit of energy use	14.0	31 ●
3.3.2	Environmental performance*	40.4	87 ◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.3	101
Market sophistication		**36.8**	**113** ◇
4.1	**Credit**	**35.9**	**82**
4.1.1	Ease of getting credit*	60.0	74
4.1.2	Domestic credit to private sector, % GDP	32.8	93
4.1.3	Microfinance gross loans, % GDP	n/a	n/a
4.2	**Investment**	**32.5**	**[59]**
4.2.1	Ease of protecting minority investors*	60.0	71
4.2.2	Market capitalization, % GDP	n/a	n/a
4.2.3	Venture capital investors, deals/bn PPP$ GDP ◴	0.0	59
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a
4.3	**Trade, diversification, and market scale**	**42.1**	**123** ○ ◇
4.3.1	Applied tariff rate, weighted avg., %	1.0	10 ●
4.3.2	Domestic industry diversification	22.3	111 ○ ◇
4.3.3	Domestic market scale, bn PPP$	39.1	113 ◇

		Score/ Value	Rank
Business sophistication		**24.0**	**73**
5.1	**Knowledge workers**	**33.7**	**59**
5.1.1	Knowledge-intensive employment, %	24.2	63
5.1.2	Firms offering formal training, % ◴	51.9	16 ●
5.1.3	GERD performed by business, % GDP ◴	0.1	64
5.1.4	GERD financed by business, % ◴	17.7	70
5.1.5	Females employed w/advanced degrees, %	18.8	35 ●
5.2	**Innovation linkages**	**18.5**	**77**
5.2.1	University-industry R&D collaboration†	40.0	76
5.2.2	State of cluster development and depth†	39.1	103
5.2.3	GERD financed by abroad, % GDP ◴	0.1	36 ● ◆
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	61
5.2.5	Patent families/bn PPP$ GDP	0.0	100 ○ ◇
5.3	**Knowledge absorption**	**19.9**	**92**
5.3.1	Intellectual property payments, % total trade	1.5	24 ●
5.3.2	High-tech imports, % total trade	6.0	96
5.3.3	ICT services imports, % total trade	0.6	99
5.3.4	FDI net inflows, % GDP	1.5	94
5.3.5	Research talent, % in businesses ◴	1.0	79 ◇
Knowledge and technology outputs		**12.1**	**101**
6.1	**Knowledge creation**	**7.5**	**93**
6.1.1	Patents by origin/bn PPP$ GDP	0.0	121 ○
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	98 ○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.4	40
6.1.4	Scientific and technical articles/bn PPP$ GDP	12.4	69
6.1.5	Citable documents H-index	5.4	100
6.2	**Knowledge impact**	**22.2**	**92**
6.2.1	Labor productivity growth, %	–4.4	118 ○ ◇
6.2.2	New businesses/th pop. 15–64 ◴	20.1	3 ● ◆
6.2.3	Software spending, % GDP	0.1	85
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.4	126 ○
6.2.5	High-tech manufacturing, %	n/a	n/a
6.3	**Knowledge diffusion**	**6.5**	**113**
6.3.1	Intellectual property receipts, % total trade	0.0	96
6.3.2	Production and export complexity	32.7	83
6.3.3	High-tech exports, % total trade	0.3	100
6.3.4	ICT services exports, % total trade	0.2	121 ○
Creative outputs		**12.6**	**112** ◇
7.1	**Intangible assets**	**15.1**	**118** ◇
7.1.1	Trademarks by origin/bn PPP$ GDP	14.2	102 ◇
7.1.2	Global brand value, top 5,000, % GDP	0.0	80 ○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP ◴	0.4	94
7.1.4	ICTs and organizational model creation†	41.9	109 ◇
7.2	**Creative goods and services**	**1.7**	**[120]**
7.2.1	Cultural and creative services exports, % total trade ◴	0.1	93
7.2.2	National feature films/mn pop. 15–69	n/a	n/a
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a
7.2.4	Printing and other media, % manufacturing	n/a	n/a
7.2.5	Creative goods exports, % total trade	0.2	87
7.3	**Online creativity**	**18.6**	**62**
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	1.1	94
7.3.2	Country-code TLDs/th pop. 15–69	1.3	80
7.3.3	Wikipedia edits/mn pop. 15–69	53.0	60
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Brazil

GII 2021 rank
57

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
59	**56**	**Upper middle**	**LCN**	**212.6**	**3,078.9**	**14,563**	**62**

		Score/ Value	Rank	
Institutions		**60.6**	**78**	
1.1	**Political environment**	**53.0**	**85**	
1.1.1	Political and operational stability*	66.1	74	
1.1.2	Government effectiveness*	46.5	86	
1.2	**Regulatory environment**	**62.8**	**74**	
1.2.1	Regulatory quality*	38.9	82	
1.2.2	Rule of law*	42.0	72	
1.2.3	Cost of redundancy dismissal	15.4	60	
1.3	**Business environment**	**65.9**	**80**	
1.3.1	Ease of starting a business*	81.3	106 ○	
1.3.2	Ease of resolving insolvency*	50.4	69	
Human capital and research		**37.5**	**48**	
2.1	**Education**	**55.4**	**48**	
2.1.1	Expenditure on education, % GDP	6.3	11 ● ◆	
2.1.2	Government funding/pupil, secondary, % GDP/cap	21.8	35	
2.1.3	School life expectancy, years	15.7	42	
2.1.4	PISA scales in reading, maths and science	400.0	68 ○	
2.1.5	Pupil-teacher ratio, secondary ◴	16.6	81	
2.2	**Tertiary education**	**25.1**	**85**	
2.2.1	Tertiary enrolment, % gross	53.3	58	
2.2.2	Graduates in science and engineering, %	18.4	83 ○	
2.2.3	Tertiary inbound mobility, %	0.2	104 ○ ◇	
2.3	**Research and development (R&D)**	**31.9**	**36** ◆	
2.3.1	Researchers, FTE/mn pop. ◴	887.7	53	
2.3.2	Gross expenditure on R&D, % GDP ◴	1.2	34 ◆	
2.3.3	Global corporate R&D investors, top 3, mn US$	52.7	26 ● ◆	
2.3.4	QS university ranking, top 3*	40.9	31 ◆	
Infrastructure		**41.2**	**69**	
3.1	**Information and communication technologies (ICTs)**	**74.5**	**49**	
3.1.1	ICT access*	58.9	77	
3.1.2	ICT use*	61.5	60	
3.1.3	Government's online service*	87.1	20 ● ◆	
3.1.4	E-participation*	90.5	18 ● ◆	
3.2	**General infrastructure**	**20.5**	**107** ○	
3.2.1	Electricity output, GWh/mn pop.	2,967.7	67	
3.2.2	Logistics performance*	43.6	55	
3.2.3	Gross capital formation, % GDP	14.7	116 ○ ◇	
3.3	**Ecological sustainability**	**28.6**	**64**	
3.3.1	GDP/unit of energy use	11.1	56	
3.3.2	Environmental performance*	51.2	53	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.9	68	
Market sophistication		**44.9**	**75**	
4.1	**Credit**	**30.5**	**103** ○ ◇	
4.1.1	Ease of getting credit*	50.0	94 ○ ◇	
4.1.2	Domestic credit to private sector, % GDP	63.7	53	
4.1.3	Microfinance gross loans, % GDP	0.1	58	
4.2	**Investment**	**23.2**	**99** ○	
4.2.1	Ease of protecting minority investors*	62.0	60	
4.2.2	Market capitalization, % GDP	53.1	33	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	57	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	55	
4.3	**Trade, diversification, and market scale**	**80.8**	**26** ●	
4.3.1	Applied tariff rate, weighted avg., %	8.0	102 ○	
4.3.2	Domestic industry diversification	94.8	28	
4.3.3	Domestic market scale, bn PPP$	3,078.9	8 ● ◆	

		Score/ Value	Rank	
Business sophistication		**36.0**	**34**	◆
5.1	**Knowledge workers**	**46.1**	**[30]**	
5.1.1	Knowledge-intensive employment, %	25.2	58	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	43.5	35	
5.1.5	Females employed w/advanced degrees, %	15.3	46	
5.2	**Innovation linkages**	**21.4**	**61**	
5.2.1	University-industry R&D collaboration†	39.0	81	
5.2.2	State of cluster development and depth†	49.4	49	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	89 ○	
5.2.5	Patent families/bn PPP$ GDP	0.1	56	
5.3	**Knowledge absorption**	**40.4**	**28** ● ◆	
5.3.1	Intellectual property payments, % total trade	2.1	14 ● ◆	
5.3.2	High-tech imports, % total trade	10.5	28 ●	
5.3.3	ICT services imports, % total trade	2.2	30 ● ◆	
5.3.4	FDI net inflows, % GDP	3.7	34	
5.3.5	Research talent, % in businesses ◴	26.6	46	
Knowledge and technology outputs		**25.3**	**51**	
6.1	**Knowledge creation**	**23.0**	**46**	
6.1.1	Patents by origin/bn PPP$ GDP	1.7	41	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.2	47	
6.1.3	Utility models by origin/bn PPP$ GDP	0.9	26	
6.1.4	Scientific and technical articles/bn PPP$ GDP	18.8	47	
6.1.5	Citable documents H-index	37.6	24 ● ◆	
6.2	**Knowledge impact**	**35.5**	**40**	
6.2.1	Labor productivity growth, %	1.3	35	
6.2.2	New businesses/th pop. 15–64	1.3	76	
6.2.3	Software spending, % GDP	0.3	29	◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	5.6	54	
6.2.5	High-tech manufacturing, %	36.3	32	
6.3	**Knowledge diffusion**	**17.4**	**62**	
6.3.1	Intellectual property receipts, % total trade	0.3	33	◆
6.3.2	Production and export complexity	48.8	49	
6.3.3	High-tech exports, % total trade	3.7	44	
6.3.4	ICT services exports, % total trade	1.0	82	
Creative outputs		**23.5**	**66**	
7.1	**Intangible assets**	**35.3**	**51**	
7.1.1	Trademarks by origin/bn PPP$ GDP	67.9	27 ●	
7.1.2	Global brand value, top 5,000, % GDP	36.1	41	
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.3	59	
7.1.4	ICTs and organizational model creation†	52.6	69	
7.2	**Creative goods and services**	**6.8**	**94** ○	
7.2.1	Cultural and creative services exports, % total trade	0.5	48	
7.2.2	National feature films/mn pop. 15–69	1.1	84 ○	
7.2.3	Entertainment and media market/th pop. 15–69	7.8	40	
7.2.4	Printing and other media, % manufacturing	0.5	86 ○	
7.2.5	Creative goods exports, % total trade	0.3	70	
7.3	**Online creativity**	**16.7**	**69**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	1.6	87	
7.3.2	Country-code TLDs/th pop. 15–69	8.6	42	
7.3.3	Wikipedia edits/mn pop. 15–69	42.8	81	
7.3.4	Mobile app creation/bn PPP$ GDP	15.0	37	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Brunei Darussalam

GII 2021 rank
82

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
115	**51**	**High**	**SEAO**	**0.4**	**28.5**	**61,816**	**71**

		Score/ Value	Rank
Institutions		**80.7**	**24**
1.1	**Political environment**	**84.8**	**16** ●
1.1.1	Political and operational stability*	94.6	2 ● ◆
1.1.2	Government effectiveness*	79.9	23
1.2	**Regulatory environment**	**80.7**	**30**
1.2.1	Regulatory quality*	60.1	42
1.2.2	Rule of law*	62.9	38
1.2.3	Cost of redundancy dismissal	8.0	1 ● ◆
1.3	**Business environment**	**76.6**	**43**
1.3.1	Ease of starting a business*	94.9	15 ●
1.3.2	Ease of resolving insolvency*	58.2	54
Human capital and research		**35.2**	**52**
2.1	**Education**	**50.7**	**66**
2.1.1	Expenditure on education, % GDP ⏲	4.4	59
2.1.2	Government funding/pupil, secondary, % GDP/cap ⏲	23.6	21
2.1.3	School life expectancy, years	14.1	71 ◇
2.1.4	PISA scales in reading, maths and science	423.1	53 ◇
2.1.5	Pupil-teacher ratio, secondary	8.2	11 ● ◆
2.2	**Tertiary education**	**45.6**	**20** ●
2.2.1	Tertiary enrolment, % gross	31.5	84 ◇
2.2.2	Graduates in science and engineering, %	40.1	4 ● ◆
2.2.3	Tertiary inbound mobility, %	3.4	64
2.3	**Research and development (R&D)**	**9.4**	**62** ◇
2.3.1	Researchers, FTE/mn pop.	n/a	n/a
2.3.2	Gross expenditure on R&D, % GDP ⏲	0.3	84 ◇
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41 ○ ◇
2.3.4	QS university ranking, top 3*	22.8	46
Infrastructure		**48.0**	**46**
3.1	**Information and communication technologies (ICTs)**	**64.9**	**70** ◇
3.1.1	ICT access*	69.4	62 ◇
3.1.2	ICT use*	71.9	43
3.1.3	Government's online service*	63.5	80 ◇
3.1.4	E-participation*	54.8	94 ◇
3.2	**General infrastructure**	**51.9**	**8** ● ◆
3.2.1	Electricity output, GWh/mn pop.	10,009.3	14 ●
3.2.2	Logistics performance*	30.6	79 ◇
3.2.3	Gross capital formation, % GDP	48.4	3 ● ◆
3.3	**Ecological sustainability**	**27.1**	**70** ◇
3.3.1	GDP/unit of energy use	8.9	82
3.3.2	Environmental performance*	54.8	44
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.9	70
Market sophistication		**37.8**	**106** ◇
4.1	**Credit**	**56.5**	**21** ●
4.1.1	Ease of getting credit*	100.0	1 ● ◆
4.1.2	Domestic credit to private sector, % GDP	35.7	87 ◇
4.1.3	Microfinance gross loans, % GDP	n/a	n/a
4.2	**Investment**	**23.9**	**[94]**
4.2.1	Ease of protecting minority investors*	40.0	110 ◇
4.2.2	Market capitalization, % GDP	n/a	n/a
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	46
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a
4.3	**Trade, diversification, and market scale**	**32.8**	**130** ○ ◇
4.3.1	Applied tariff rate, weighted avg., %	0.0	2 ● ◆
4.3.2	Domestic industry diversification ⏲	0.0	112 ○ ◇
4.3.3	Domestic market scale, bn PPP$	28.5	123 ○ ◇

		Score/ Value	Rank
Business sophistication		**22.0**	**84** ◇
5.1	**Knowledge workers**	**32.4**	**[63]**
5.1.1	Knowledge-intensive employment, %	38.6	30
5.1.2	Firms offering formal training, %	n/a	n/a
5.1.3	GERD performed by business, % GDP	n/a	n/a
5.1.4	GERD financed by business, %	0.0	102 ○ ◇
5.1.5	Females employed w/advanced degrees, %	12.8	58
5.2	**Innovation linkages**	**17.4**	**92** ◇
5.2.1	University-industry R&D collaboration† ⏲	39.4	80 ◇
5.2.2	State of cluster development and depth† ⏲	44.2	80 ◇
5.2.3	GERD financed by abroad, % GDP	0.0	96 ○ ◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	42
5.2.5	Patent families/bn PPP$ GDP	0.1	57
5.3	**Knowledge absorption**	**16.0**	**114** ◇
5.3.1	Intellectual property payments, % total trade	0.3	78
5.3.2	High-tech imports, % total trade	3.4	121 ○ ◇
5.3.3	ICT services imports, % total trade	1.0	77
5.3.4	FDI net inflows, % GDP	3.5	40
5.3.5	Research talent, % in businesses	n/a	n/a
Knowledge and technology outputs		**4.5**	**[130]**
6.1	**Knowledge creation**	**6.4**	**98** ◇
6.1.1	Patents by origin/bn PPP$ GDP	0.2	90
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	78
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a
6.1.4	Scientific and technical articles/bn PPP$ GDP	11.1	78 ◇
6.1.5	Citable documents H-index	3.6	117 ◇
6.2	**Knowledge impact**	**5.7**	**[126]**
6.2.1	Labor productivity growth, %	n/a	n/a
6.2.2	New businesses/th pop. 15–64	2.4	53
6.2.3	Software spending, % GDP	n/a	n/a
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	3.0	77
6.2.5	High-tech manufacturing, % ⏲	3.3	107 ○ ◇
6.3	**Knowledge diffusion**	**1.4**	**[129]**
6.3.1	Intellectual property receipts, % total trade	n/a	n/a
6.3.2	Production and export complexity	n/a	n/a
6.3.3	High-tech exports, % total trade	0.7	85
6.3.4	ICT services exports, % total trade	0.0	130 ○ ◇
Creative outputs		**18.7**	**85** ◇
7.1	**Intangible assets**	**21.5**	**94** ◇
7.1.1	Trademarks by origin/bn PPP$ GDP	9.5	113 ◇
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a
7.1.3	Industrial designs by origin/bn PPP$ GDP ⏲	0.0	115 ○
7.1.4	ICTs and organizational model creation†	47.5	90 ◇
7.2	**Creative goods and services**	**2.6**	**[114]**
7.2.1	Cultural and creative services exports, % total trade	0.0	110 ○ ◇
7.2.2	National feature films/mn pop. 15–69	n/a	n/a
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a
7.2.4	Printing and other media, % manufacturing ⏲	0.5	88
7.2.5	Creative goods exports, % total trade ⏲	0.1	90
7.3	**Online creativity**	**29.2**	**36**
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	7.3	45
7.3.2	Country-code TLDs/th pop. 15–69	0.9	88 ◇
7.3.3	Wikipedia edits/mn pop. 15–69	75.8	22 ●
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Bulgaria

GII 2021 rank **35**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
27	46	Upper middle	EUR	6.9	164.1	23,741	37

		Score/ Value	Rank	
Institutions		**69.8**	**47**	◆
1.1	**Political environment**	**62.0**	**53**	
1.1.1	Political and operational stability*	69.6	60	
1.1.2	Government effectiveness*	58.2	53	
1.2	**Regulatory environment**	**75.7**	**36**	◆
1.2.1	Regulatory quality*	57.4	46	◆
1.2.2	Rule of law*	47.7	62	
1.2.3	Cost of redundancy dismissal	8.6	16	●
1.3	**Business environment**	**71.6**	**64**	
1.3.1	Ease of starting a business*	85.4	86	○
1.3.2	Ease of resolving insolvency*	57.8	56	
Human capital and research		**31.7**	**65**	
2.1	**Education**	**47.4**	**74**	
2.1.1	Expenditure on education, % GDP	4.1	65	
2.1.2	Government funding/pupil, secondary, % GDP/cap	21.6	36	
2.1.3	School life expectancy, years	14.2	69	○
2.1.4	PISA scales in reading, maths and science	426.7	50	○
2.1.5	Pupil-teacher ratio, secondary	12.6	54	
2.2	**Tertiary education**	**34.8**	**61**	
2.2.1	Tertiary enrolment, % gross	71.5	28	
2.2.2	Graduates in science and engineering, %	19.3	77	○
2.2.3	Tertiary inbound mobility, %	6.4	38	
2.3	**Research and development (R&D)**	**12.9**	**52**	
2.3.1	Researchers, FTE/mn pop.	2,420.0	35	◆
2.3.2	Gross expenditure on R&D, % GDP	0.8	43	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	6.2	70	
Infrastructure		**51.7**	**36**	◆
3.1	**Information and communication technologies (ICTs)**	**77.4**	**42**	◆
3.1.1	ICT access*	71.4	57	
3.1.2	ICT use*	72.0	42	◆
3.1.3	Government's online service*	77.1	47	
3.1.4	E-participation*	89.3	23	◆
3.2	**General infrastructure**	**27.5**	**69**	
3.2.1	Electricity output, GWh/mn pop.	6,282.1	32	◆
3.2.2	Logistics performance*	45.8	51	
3.2.3	Gross capital formation, % GDP	18.7	97	○
3.3	**Ecological sustainability**	**50.2**	**15**	● ◆
3.3.1	GDP/unit of energy use	7.8	92	○
3.3.2	Environmental performance*	57.0	39	◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	12.2	2	● ◆
Market sophistication		**45.1**	**72**	
4.1	**Credit**	**33.7**	**93**	○
4.1.1	Ease of getting credit*	65.0	61	
4.1.2	Domestic credit to private sector, % GDP	49.8	71	
4.1.3	Microfinance gross loans, % GDP	0.0	82	○
4.2	**Investment**	**24.6**	**86**	○
4.2.1	Ease of protecting minority investors*	74.0	24	
4.2.2	Market capitalization, % GDP	14.5	63	○
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	43	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	45	
4.3	**Trade, diversification, and market scale**	**76.9**	**38**	
4.3.1	Applied tariff rate, weighted avg., %	1.8	25	
4.3.2	Domestic industry diversification	97.1	15	●
4.3.3	Domestic market scale, bn PPP$	164.1	71	

		Score/ Value	Rank	
Business sophistication		**32.6**	**42**	
5.1	**Knowledge workers**	**36.1**	**54**	
5.1.1	Knowledge-intensive employment, %	31.1	45	
5.1.2	Firms offering formal training, %	20.0	78	○
5.1.3	GERD performed by business, % GDP	0.6	37	
5.1.4	GERD financed by business, %	43.1	36	
5.1.5	Females employed w/advanced degrees, %	18.8	34	
5.2	**Innovation linkages**	**29.1**	**36**	◆
5.2.1	University-industry R&D collaboration†	46.4	51	
5.2.2	State of cluster development and depth†	55.3	35	
5.2.3	GERD financed by abroad, % GDP	0.3	13	● ◆
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	41	◆
5.2.5	Patent families/bn PPP$ GDP	0.3	39	
5.3	**Knowledge absorption**	**32.7**	**49**	
5.3.1	Intellectual property payments, % total trade	0.5	68	
5.3.2	High-tech imports, % total trade	7.2	73	
5.3.3	ICT services imports, % total trade	1.3	59	
5.3.4	FDI net inflows, % GDP	2.9	55	
5.3.5	Research talent, % in businesses	50.1	23	◆
Knowledge and technology outputs		**36.0**	**27**	◆
6.1	**Knowledge creation**	**27.1**	**36**	
6.1.1	Patents by origin/bn PPP$ GDP	1.3	57	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.3	40	
6.1.3	Utility models by origin/bn PPP$ GDP	2.7	7	● ◆
6.1.4	Scientific and technical articles/bn PPP$ GDP	15.4	55	
6.1.5	Citable documents H-index	15.9	52	
6.2	**Knowledge impact**	**51.4**	**6**	● ◆
6.2.1	Labor productivity growth, %	1.6	33	
6.2.2	New businesses/th pop. 15–64	10.1	14	● ◆
6.2.3	Software spending, % GDP	0.2	68	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	38.0	1	● ◆
6.2.5	High-tech manufacturing, %	22.9	56	
6.3	**Knowledge diffusion**	**29.5**	**36**	
6.3.1	Intellectual property receipts, % total trade	0.2	40	◆
6.3.2	Production and export complexity	56.7	41	
6.3.3	High-tech exports, % total trade	5.0	37	
6.3.4	ICT services exports, % total trade	4.2	20	◆
Creative outputs		**41.1**	**21**	◆
7.1	**Intangible assets**	**57.9**	**7**	● ◆
7.1.1	Trademarks by origin/bn PPP$ GDP	84.8	18	● ◆
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	8.5	13	● ◆
7.1.4	ICTs and organizational model creation†	53.7	64	
7.2	**Creative goods and services**	**21.7**	**46**	
7.2.1	Cultural and creative services exports, % total trade	1.7	13	● ◆
7.2.2	National feature films/mn pop. 15–69	4.7	45	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.1	43	
7.2.5	Creative goods exports, % total trade	1.0	42	
7.3	**Online creativity**	**26.8**	**43**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	23.7	24	◆
7.3.2	Country-code TLDs/th pop. 15–69	3.8	59	
7.3.3	Wikipedia edits/mn pop. 15–69	69.5	39	◆
7.3.4	Mobile app creation/bn PPP$ GDP	7.3	53	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Burkina Faso

GII 2021 rank **115**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
123	**108**	**Low**	**SSF**	**20.9**	**46.1**	**2,203**	**118**

		Score/ Value	Rank	
Institutions		**56.2**	**92**	
1.1	**Political environment**	**39.2**	**121**	
1.1.1	Political and operational stability*	50.0	123	○
1.1.2	Government effectiveness*	33.8	115	
1.2	**Regulatory environment**	**64.8**	**66**	●
1.2.1	Regulatory quality*	33.7	98	
1.2.2	Rule of law*	35.5	88	
1.2.3	Cost of redundancy dismissal	10.5	33	●
1.3	**Business environment**	**64.5**	**85**	
1.3.1	Ease of starting a business*	88.2	71	●
1.3.2	Ease of resolving insolvency*	40.8	96	
Human capital and research		**18.4**	**103**	
2.1	**Education**	**36.7**	**100**	
2.1.1	Expenditure on education, % GDP	5.4	24	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	15.7	71	
2.1.3	School life expectancy, years	9.3	110	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	22.2	102	
2.2	**Tertiary education**	**15.4**	**101**	
2.2.1	Tertiary enrolment, % gross	7.1	120	
2.2.2	Graduates in science and engineering, %	20.3	71	
2.2.3	Tertiary inbound mobility, %	2.3	72	
2.3	**Research and development (R&D)**	**3.1**	**87**	◆
2.3.1	Researchers, FTE/mn pop.	47.6	95	
2.3.2	Gross expenditure on R&D, % GDP	0.6	56	● ◆
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**27.4**	**111**	
3.1	**Information and communication technologies (ICTs)**	**36.6**	**117**	
3.1.1	ICT access*	33.0	120	
3.1.2	ICT use*	15.9	119	
3.1.3	Government's online service*	46.5	111	
3.1.4	E-participation*	51.2	99	
3.2	**General infrastructure**	**26.1**	**76**	●
3.2.1	Electricity output, GWh/mn pop.	n/a	n/a	
3.2.2	Logistics performance*	26.7	87	
3.2.3	Gross capital formation, % GDP	21.8	71	●
3.3	**Ecological sustainability**	**19.4**	**104**	
3.3.1	GDP/unit of energy use	n/a	n/a	
3.3.2	Environmental performance*	38.3	93	◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.1	125	○
Market sophistication		**36.8**	**114**	
4.1	**Credit**	**21.1**	**122**	
4.1.1	Ease of getting credit*	30.0	122	○
4.1.2	Domestic credit to private sector, % GDP	28.4	98	◆
4.1.3	Microfinance gross loans, % GDP	1.5	21	●
4.2	**Investment**	**42.0**	**[28]**	
4.2.1	Ease of protecting minority investors*	42.0	102	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**47.3**	**118**	
4.3.1	Applied tariff rate, weighted avg., %	5.8	94	
4.3.2	Domestic industry diversification	n/a	n/a	
4.3.3	Domestic market scale, bn PPP$	46.1	105	

		Score/ Value	Rank	
Business sophistication		**16.0**	**120**	
5.1	**Knowledge workers**	**12.2**	**[121]**	
5.1.1	Knowledge-intensive employment, %	13.3	99	◆
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, %	0.8	115	
5.2	**Innovation linkages**	**14.2**	**111**	
5.2.1	University-industry R&D collaboration†	30.2	111	
5.2.2	State of cluster development and depth†	28.7	124	○ ◇
5.2.3	GERD financed by abroad, % GDP	0.0	60	●
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	117	
5.2.5	Patent families/bn PPP$ GDP	n/a	n/a	
5.3	**Knowledge absorption**	**21.5**	**83**	
5.3.1	Intellectual property payments, % total trade	0.0	118	
5.3.2	High-tech imports, % total trade	7.0	80	
5.3.3	ICT services imports, % total trade	2.1	32	● ◆
5.3.4	FDI net inflows, % GDP	1.0	107	
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**11.8**	**106**	
6.1	**Knowledge creation**	**5.1**	**111**	
6.1.1	Patents by origin/bn PPP$ GDP	0.0	128	○ ◇
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	98	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.1	55	
6.1.4	Scientific and technical articles/bn PPP$ GDP	10.2	85	
6.1.5	Citable documents H-index	5.6	98	
6.2	**Knowledge impact**	**20.6**	**102**	
6.2.1	Labor productivity growth, %	1.8	29	●
6.2.2	New businesses/th pop. 15–64	0.3	107	
6.2.3	Software spending, % GDP	0.0	110	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.6	118	
6.2.5	High-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**9.7**	**95**	
6.3.1	Intellectual property receipts, % total trade	0.0	89	
6.3.2	Production and export complexity	31.2	87	◆
6.3.3	High-tech exports, % total trade	0.7	82	◆
6.3.4	ICT services exports, % total trade	1.2	75	●
Creative outputs		**8.3**	**129**	○
7.1	**Intangible assets**	**12.0**	**125**	○
7.1.1	Trademarks by origin/bn PPP$ GDP	4.5	123	○
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.3	100	
7.1.4	ICTs and organizational model creation†	39.5	113	
7.2	**Creative goods and services**	**2.1**	**[118]**	
7.2.1	Cultural and creative services exports, % total trade	0.2	69	
7.2.2	National feature films/mn pop. 15–69	0.5	98	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.0	117	
7.3	**Online creativity**	**7.1**	**113**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.1	126	○
7.3.2	Country-code TLDs/th pop. 15–69	0.0	124	
7.3.3	Wikipedia edits/mn pop. 15–69	24.7	114	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Cabo Verde

GII 2021 rank **89**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
88	96	Lower middle	SSF	0.6	3.9	6,980	100

		Score/ Value	Rank	
Institutions		**57.0**	**88**	
1.1	**Political environment**	**63.7**	**49**	◆
1.1.1	Political and operational stability*	76.8	37	● ◆
1.1.2	Government effectiveness*	57.2	56	◆
1.2	**Regulatory environment**	**65.2**	**64**	◆
1.2.1	Regulatory quality*	37.6	87	
1.2.2	Rule of law*	60.3	43	● ◆
1.2.3	Cost of redundancy dismissal	17.4	73	
1.3	**Business environment**	**42.2**	**130**	○ ◇
1.3.1	Ease of starting a business*	84.5	93	
1.3.2	Ease of resolving insolvency*	0.0	129	○ ◇
Human capital and research		**21.1**	**95**	
2.1	**Education**	**47.9**	**73**	
2.1.1	Expenditure on education, % GDP	5.2	31	●
2.1.2	Government funding/pupil, secondary, % GDP/cap	19.7	49	
2.1.3	School life expectancy, years	12.7	84	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	15.4	75	
2.2	**Tertiary education**	**14.9**	**102**	
2.2.1	Tertiary enrolment, % gross	23.6	95	
2.2.2	Graduates in science and engineering, %	16.1	93	
2.2.3	Tertiary inbound mobility, %	1.4	82	
2.3	**Research and development (R&D)**	**0.6**	**108**	
2.3.1	Researchers, FTE/mn pop.	123.5	85	
2.3.2	Gross expenditure on R&D, % GDP	0.1	109	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**42.3**	**66**	◆
3.1	**Information and communication technologies (ICTs)**	**49.0**	**95**	
3.1.1	ICT access*	57.9	80	◆
3.1.2	ICT use*	46.5	85	
3.1.3	Government's online service*	50.0	106	
3.1.4	E-participation*	41.7	111	
3.2	**General infrastructure**	**60.0**	**[4]**	
3.2.1	Electricity output, GWh/mn pop.	n/a	n/a	
3.2.2	Logistics performance*	n/a	n/a	
3.2.3	Gross capital formation, % GDP	42.2	5	● ◆
3.3	**Ecological sustainability**	**17.8**	**113**	
3.3.1	GDP/unit of energy use	n/a	n/a	
3.3.2	Environmental performance*	32.8	112	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.5	87	
Market sophistication		**26.6**	**128**	○ ◇
4.1	**Credit**	**29.0**	**111**	
4.1.1	Ease of getting credit*	35.0	118	◇
4.1.2	Domestic credit to private sector, % GDP	58.7	58	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**24.0**	**[91]**	
4.2.1	Ease of protecting minority investors*	24.0	128	○ ◇
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**26.7**	**132**	○ ◇
4.3.1	Applied tariff rate, weighted avg., %	11.6	124	◇
4.3.2	Domestic industry diversification	49.2	107	○ ◇
4.3.3	Domestic market scale, bn PPP$	3.9	132	○ ◇

		Score/ Value	Rank	
Business sophistication		**23.9**	**[74]**	
5.1	**Knowledge workers**	**23.6**	**[89]**	
5.1.1	Knowledge-intensive employment, %	17.1	89	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, %	7.6	83	
5.2	**Innovation linkages**	**26.7**	**[40]**	
5.2.1	University-industry R&D collaboration†	41.1	72	
5.2.2	State of cluster development and depth†	46.3	67	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	n/a	n/a	
5.2.5	Patent families/bn PPP$ GDP	0.0	100	○ ◇
5.3	**Knowledge absorption**	**21.4**	**84**	
5.3.1	Intellectual property payments, % total trade	0.8	50	
5.3.2	High-tech imports, % total trade	3.0	124	○ ◇
5.3.3	ICT services imports, % total trade	1.4	55	
5.3.4	FDI net inflows, % GDP	5.7	17	●
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**8.6**	**[122]**	
6.1	**Knowledge creation**	**9.2**	**[85]**	
6.1.1	Patents by origin/bn PPP$ GDP	0.8	70	
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	14.4	59	
6.1.5	Citable documents H-index	0.0	132	○ ◇
6.2	**Knowledge impact**	**13.7**	**[118]**	
6.2.1	Labor productivity growth, %	n/a	n/a	
6.2.2	New businesses/th pop. 15–64	4.0	36	● ◆
6.2.3	Software spending, % GDP	n/a	n/a	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	7.5	36	● ◆
6.2.5	High-tech manufacturing, %	7.2	97	
6.3	**Knowledge diffusion**	**2.9**	**127**	○
6.3.1	Intellectual property receipts, % total trade	0.0	98	
6.3.2	Production and export complexity	n/a	n/a	
6.3.3	High-tech exports, % total trade	0.0	131	○ ◇
6.3.4	ICT services exports, % total trade	0.9	86	
Creative outputs		**25.7**	**59**	
7.1	**Intangible assets**	**32.5**	**59**	
7.1.1	Trademarks by origin/bn PPP$ GDP	22.1	90	
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	8.1	16	● ◆
7.1.4	ICTs and organizational model creation†	44.6	98	
7.2	**Creative goods and services**	**11.0**	**[77]**	
7.2.1	Cultural and creative services exports, % total trade	0.3	61	
7.2.2	National feature films/mn pop. 15–69	n/a	n/a	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.8	20	●
7.2.5	Creative goods exports, % total trade	0.1	110	
7.3	**Online creativity**	**26.8**	**42**	● ◆
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	1.9	79	
7.3.2	Country-code TLDs/th pop. 15–69	2.0	71	◆
7.3.3	Wikipedia edits/mn pop. 15–69	73.3	28	● ◆
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Cambodia

GII 2021 rank
109

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
104	**106**	**Lower middle**	**SEAO**	**16.7**	**74.3**	**4,441**	**110**

		Score/ Value	Rank
Institutions		**50.5**	**111**
1.1	**Political environment**	**49.6**	**91**
1.1.1	Political and operational stability*	73.2	44 ● ◆
1.1.2	Government effectiveness*	37.8	103
1.2	**Regulatory environment**	**51.4**	**102**
1.2.1	Regulatory quality*	28.6	106
1.2.2	Rule of law*	22.1	118
1.2.3	Cost of redundancy dismissal	19.4	82
1.3	**Business environment**	**50.5**	**127** ○ ◇
1.3.1	Ease of starting a business*	52.4	132 ○ ◇
1.3.2	Ease of resolving insolvency*	48.5	74
Human capital and research		**17.6**	**109**
2.1	**Education**	**27.6**	**[120]**
2.1.1	Expenditure on education, % GDP	2.2	110 ○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a
2.1.3	School life expectancy, years	n/a	n/a
2.1.4	PISA scales in reading, maths and science	n/a	n/a
2.1.5	Pupil-teacher ratio, secondary	21.7	100
2.2	**Tertiary education**	**24.6**	**86**
2.2.1	Tertiary enrolment, % gross	14.7	102
2.2.2	Graduates in science and engineering, %	23.2	52
2.2.3	Tertiary inbound mobility, %	n/a	n/a
2.3	**Research and development (R&D)**	**0.6**	**112**
2.3.1	Researchers, FTE/mn pop. ◴	30.4	101 ○
2.3.2	Gross expenditure on R&D, % GDP ◴	0.1	102
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41 ○ ◇
2.3.4	QS university ranking, top 3*	0.0	74 ○ ◇
Infrastructure		**28.9**	**107**
3.1	**Information and communication technologies (ICTs)**	**44.9**	**100**
3.1.1	ICT access*	46.5	94
3.1.2	ICT use*	46.3	86
3.1.3	Government's online service*	45.3	113
3.1.4	E-participation*	41.7	111
3.2	**General infrastructure**	**23.6**	**89**
3.2.1	Electricity output, GWh/mn pop.	502.9	107
3.2.2	Logistics performance*	24.7	94
3.2.3	Gross capital formation, % GDP	26.6	35 ●
3.3	**Ecological sustainability**	**18.2**	**112**
3.3.1	GDP/unit of energy use	8.2	89
3.3.2	Environmental performance*	33.6	108
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.3	94
Market sophistication		**45.8**	**69**
4.1	**Credit**	**70.9**	**6** ● ◆
4.1.1	Ease of getting credit*	80.0	23 ●
4.1.2	Domestic credit to private sector, % GDP	114.2	19 ● ◆
4.1.3	Microfinance gross loans, % GDP	38.4	1 ● ◆
4.2	**Investment**	**23.2**	**100**
4.2.1	Ease of protecting minority investors*	40.0	110
4.2.2	Market capitalization, % GDP	n/a	n/a
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.1	39 ◆
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	32 ● ◆
4.3	**Trade, diversification, and market scale**	**43.3**	**122** ○ ◇
4.3.1	Applied tariff rate, weighted avg., % ◴	9.8	115
4.3.2	Domestic industry diversification	n/a	n/a
4.3.3	Domestic market scale, bn PPP$	74.3	91

		Score/ Value	Rank
Business sophistication		**16.2**	**117**
5.1	**Knowledge workers**	**11.9**	**122** ○ ◇
5.1.1	Knowledge-intensive employment, % ◴	5.5	117 ○ ◇
5.1.2	Firms offering formal training, % ◴	22.2	68
5.1.3	GERD performed by business, % GDP ◴	0.0	84 ○
5.1.4	GERD financed by business, % ◴	19.4	66
5.1.5	Females employed w/advanced degrees, % ◴	2.2	105
5.2	**Innovation linkages**	**24.0**	**51** ● ◆
5.2.1	University-industry R&D collaboration†	39.0	82
5.2.2	State of cluster development and depth†	45.7	70
5.2.3	GERD financed by abroad, % GDP ◴	0.0	56
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	39 ● ◆
5.2.5	Patent families/bn PPP$ GDP	n/a	n/a
5.3	**Knowledge absorption**	**12.6**	**127** ○ ◇
5.3.1	Intellectual property payments, % total trade	0.1	105
5.3.2	High-tech imports, % total trade	2.4	129 ○ ◇
5.3.3	ICT services imports, % total trade	0.6	95
5.3.4	FDI net inflows, % GDP	13.1	7 ● ◆
5.3.5	Research talent, % in businesses ◴	4.3	73
Knowledge and technology outputs		**11.2**	**111**
6.1	**Knowledge creation**	**3.6**	**117**
6.1.1	Patents by origin/bn PPP$ GDP ◴	0.1	120 ○
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	94
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a
6.1.4	Scientific and technical articles/bn PPP$ GDP	4.7	111
6.1.5	Citable documents H-index	5.6	98
6.2	**Knowledge impact**	**22.6**	**90**
6.2.1	Labor productivity growth, %	2.7	19 ●
6.2.2	New businesses/th pop. 15–64	0.7	90
6.2.3	Software spending, % GDP	0.0	109 ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.1	107
6.2.5	High-tech manufacturing, %	n/a	n/a
6.3	**Knowledge diffusion**	**7.4**	**106**
6.3.1	Intellectual property receipts, % total trade	0.0	90
6.3.2	Production and export complexity	30.9	89
6.3.3	High-tech exports, % total trade	0.7	83
6.3.4	ICT services exports, % total trade	0.4	103
Creative outputs		**16.3**	**98**
7.1	**Intangible assets**	**26.5**	**82**
7.1.1	Trademarks by origin/bn PPP$ GDP	39.5	59
7.1.2	Global brand value, top 5,000, % GDP	0.0	80 ○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP ◴	0.2	104
7.1.4	ICTs and organizational model creation†	60.6	41 ● ◆
7.2	**Creative goods and services**	**6.2**	**[99]**
7.2.1	Cultural and creative services exports, % total trade	n/a	n/a
7.2.2	National feature films/mn pop. 15–69	3.2	57
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a
7.2.4	Printing and other media, % manufacturing	n/a	n/a
7.2.5	Creative goods exports, % total trade	0.4	69
7.3	**Online creativity**	**6.0**	**117**
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.8	100
7.3.2	Country-code TLDs/th pop. 15–69	0.1	118
7.3.3	Wikipedia edits/mn pop. 15–69	25.0	113
7.3.4	Mobile app creation/bn PPP$ GDP	1.7	71

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Cameroon

GII 2021 rank
123

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
117	**124**	**Lower middle**	**SSF**	**26.5**	**97.0**	**3,710**	**119**

		Score/ Value	Rank	
Institutions		**49.9**	**113**	
1.1	**Political environment**	**40.2**	**118**	
1.1.1	Political and operational stability*	55.4	112	
1.1.2	Government effectiveness*	32.6	119	
1.2	**Regulatory environment**	**48.0**	**110**	
1.2.1	Regulatory quality*	21.9	120	
1.2.2	Rule of law*	17.2	127 ○ ◇	
1.2.3	Cost of redundancy dismissal	19.9	84	
1.3	**Business environment**	**61.4**	**103**	
1.3.1	Ease of starting a business*	86.3	80	
1.3.2	Ease of resolving insolvency*	36.6	110	
Human capital and research		**18.2**	**105**	
2.1	**Education**	**35.7**	**103**	
2.1.1	Expenditure on education, % GDP	3.1	93	
2.1.2	Government funding/pupil, secondary, % GDP/cap ◴	17.8	60 ●	
2.1.3	School life expectancy, years ◴	12.1	91	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary ◴	19.3	94	
2.2	**Tertiary education**	**19.0**	**96**	
2.2.1	Tertiary enrolment, % gross	14.3	104	
2.2.2	Graduates in science and engineering, % ◴	21.3	66	
2.2.3	Tertiary inbound mobility, %	2.8	69	
2.3	**Research and development (R&D)**	**0.0**	**[123]**	
2.3.1	Researchers, FTE/mn pop.	n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP	n/a	n/a	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41 ○ ◇	
2.3.4	QS university ranking, top 3*	0.0	74 ○ ◇	
Infrastructure		**25.8**	**115**	
3.1	**Information and communication technologies (ICTs)**	**34.2**	**120**	◇
3.1.1	ICT access*	34.4	117	
3.1.2	ICT use*	13.5	124 ○ ◇	
3.1.3	Government's online service*	47.1	110	
3.1.4	E-participation*	41.7	111	
3.2	**General infrastructure**	**24.1**	**87**	
3.2.1	Electricity output, GWh/mn pop.	342.1	114	
3.2.2	Logistics performance*	25.5	91	
3.2.3	Gross capital formation, % GDP	27.2	32 ●	
3.3	**Ecological sustainability**	**19.2**	**108**	
3.3.1	GDP/unit of energy use	9.4	76	
3.3.2	Environmental performance*	33.6	108	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	118	
Market sophistication		**26.1**	**129**	○ ◇
4.1	**Credit**	**28.2**	**112**	
4.1.1	Ease of getting credit*	60.0	74	
4.1.2	Domestic credit to private sector, % GDP ◴	15.2	119	
4.1.3	Microfinance gross loans, % GDP	0.7	28 ●	
4.2	**Investment**	**15.6**	**[127]**	
4.2.1	Ease of protecting minority investors*	28.0	124 ○ ◇	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	73	
4.3	**Trade, diversification, and market scale**	**34.5**	**128**	○ ◇
4.3.1	Applied tariff rate, weighted avg., %	15.5	131 ○ ◇	
4.3.2	Domestic industry diversification	n/a	n/a	
4.3.3	Domestic market scale, bn PPP$	97.0	86	

		Score/ Value	Rank	
Business sophistication		**20.4**	**93**	
5.1	**Knowledge workers**	**23.7**	**[88]**	
5.1.1	Knowledge-intensive employment, % ◴	10.9	108	
5.1.2	Firms offering formal training, % ◴	37.6	35 ●	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, % ◴	2.0	106	
5.2	**Innovation linkages**	**18.6**	**76** ●	
5.2.1	University-industry R&D collaboration†	40.0	75	
5.2.2	State of cluster development and depth†	42.0	96	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP ◴	0.0	102	
5.2.5	Patent families/bn PPP$ GDP	0.0	91	
5.3	**Knowledge absorption**	**18.8**	**99**	
5.3.1	Intellectual property payments, % total trade	0.0	117 ○	
5.3.2	High-tech imports, % total trade ◴	5.7	102	
5.3.3	ICT services imports, % total trade	1.6	45 ●	
5.3.4	FDI net inflows, % GDP	2.3	71 ●	
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**12.9**	**98**	
6.1	**Knowledge creation**	**7.2**	**95**	
6.1.1	Patents by origin/bn PPP$ GDP	0.3	85	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	90	
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	62	
6.1.4	Scientific and technical articles/bn PPP$ GDP	14.3	61 ●	
6.1.5	Citable documents H-index	7.4	89	
6.2	**Knowledge impact**	**26.1**	**[81]**	
6.2.1	Labor productivity growth, %	1.3	37 ●	
6.2.2	New businesses/th pop. 15–64	n/a	n/a	
6.2.3	Software spending, % GDP	0.1	81	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.7	116	
6.2.5	High-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**5.5**	**118**	
6.3.1	Intellectual property receipts, % total trade	0.0	71	
6.3.2	Production and export complexity	6.8	119 ○ ◇	
6.3.3	High-tech exports, % total trade ◴	0.2	107	
6.3.4	ICT services exports, % total trade	1.3	70 ●	
Creative outputs		**9.6**	**124**	○ ◇
7.1	**Intangible assets**	**13.3**	**122**	
7.1.1	Trademarks by origin/bn PPP$ GDP	6.3	118 ○	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80 ○ ◇	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.4	93	
7.1.4	ICTs and organizational model creation†	42.4	107	
7.2	**Creative goods and services**	**5.3**	**[103]**	
7.2.1	Cultural and creative services exports, % total trade	0.6	45 ●	
7.2.2	National feature films/mn pop. 15–69	n/a	n/a	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade ◴	0.0	121	
7.3	**Online creativity**	**6.2**	**116**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.2	119	
7.3.2	Country-code TLDs/th pop. 15–69	1.2	81	
7.3.3	Wikipedia edits/mn pop. 15–69	21.2	118	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Canada

GII 2021 rank
16

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
23	**8**	**High**	**NAC**	**37.7**	**1,809.0**	**47,569**	**17**

		Score/ Value	Rank
Institutions		**90.1**	**5** ●
1.1	**Political environment**	**87.4**	**10** ●
1.1.1	Political and operational stability*	83.9	13
1.1.2	Government effectiveness*	89.1	10 ●
1.2	**Regulatory environment**	**93.4**	**8** ●
1.2.1	Regulatory quality*	88.4	10 ●
1.2.2	Rule of law*	93.1	12
1.2.3	Cost of redundancy dismissal	10.0	29
1.3	**Business environment**	**89.6**	**4** ●
1.3.1	Ease of starting a business*	98.2	3 ● ◆
1.3.2	Ease of resolving insolvency*	81.0	12
Human capital and research		**52.4**	**18**
2.1	**Education**	**58.9**	**33**
2.1.1	Expenditure on education, % GDP ⏲	5.3	29
2.1.2	Government funding/pupil, secondary, % GDP/cap ⏲	18.3	58 ○
2.1.3	School life expectancy, years	16.2	32
2.1.4	PISA scales in reading, maths and science	516.7	7
2.1.5	Pupil-teacher ratio, secondary ⏲	9.9	28
2.2	**Tertiary education**	**42.1**	**35**
2.2.1	Tertiary enrolment, % gross	70.1	34
2.2.2	Graduates in science and engineering, %	22.4	56
2.2.3	Tertiary inbound mobility, %	13.8	14
2.3	**Research and development (R&D)**	**56.2**	**18**
2.3.1	Researchers, FTE/mn pop. ⏲	4,325.6	23
2.3.2	Gross expenditure on R&D, % GDP	1.5	23
2.3.3	Global corporate R&D investors, top 3, mn US$	63.4	21
2.3.4	QS university ranking, top 3*	79.2	6 ●
Infrastructure		**53.7**	**30** ◇
3.1	**Information and communication technologies (ICTs)**	**84.9**	**21**
3.1.1	ICT access*	80.3	31
3.1.2	ICT use*	81.1	24
3.1.3	Government's online service*	84.1	31
3.1.4	E-participation*	94.0	16
3.2	**General infrastructure**	**48.1**	**13**
3.2.1	Electricity output, GWh/mn pop.	17,655.8	5 ● ◆
3.2.2	Logistics performance*	78.0	20
3.2.3	Gross capital formation, % GDP	21.4	75 ○
3.3	**Ecological sustainability**	**28.1**	**66** ◇
3.3.1	GDP/unit of energy use	5.7	111 ○ ◇
3.3.2	Environmental performance*	71.0	20
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.4	89 ○ ◇
Market sophistication		**84.7**	**1** ● ◆
4.1	**Credit**	**85.0**	**[3]**
4.1.1	Ease of getting credit*	85.0	14 ◆
4.1.2	Domestic credit to private sector, % GDP	n/a	n/a
4.1.3	Microfinance gross loans, % GDP	n/a	n/a
4.2	**Investment**	**81.9**	**3** ● ◆
4.2.1	Ease of protecting minority investors*	84.0	7 ◆
4.2.2	Market capitalization, % GDP ⏲	128.9	7
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.4	1 ● ◆
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.3	1 ● ◆
4.3	**Trade, diversification, and market scale**	**87.2**	**9** ●
4.3.1	Applied tariff rate, weighted avg., %	1.5	18
4.3.2	Domestic industry diversification	97.9	11
4.3.3	Domestic market scale, bn PPP$	1,809.0	15

		Score/ Value	Rank
Business sophistication		**50.1**	**20**
5.1	**Knowledge workers**	**48.0**	**27** ◇
5.1.1	Knowledge-intensive employment, % ⏲	43.7	21
5.1.2	Firms offering formal training, %	n/a	n/a
5.1.3	GERD performed by business, % GDP	0.8	30 ◇
5.1.4	GERD financed by business, %	41.0	42 ◇
5.1.5	Females employed w/advanced degrees, %	19.0	33
5.2	**Innovation linkages**	**56.1**	**9** ●
5.2.1	University-industry R&D collaboration†	67.9	10
5.2.2	State of cluster development and depth†	62.5	22
5.2.3	GERD financed by abroad, % GDP	0.2	30
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.4	1 ● ◆
5.2.5	Patent families/bn PPP$ GDP	2.0	21
5.3	**Knowledge absorption**	**46.1**	**19**
5.3.1	Intellectual property payments, % total trade	2.1	13
5.3.2	High-tech imports, % total trade	10.6	27
5.3.3	ICT services imports, % total trade	1.0	72 ○ ◇
5.3.4	FDI net inflows, % GDP	2.2	74 ○
5.3.5	Research talent, % in businesses ⏲	56.7	18
Knowledge and technology outputs		**38.3**	**23**
6.1	**Knowledge creation**	**48.7**	**16**
6.1.1	Patents by origin/bn PPP$ GDP	2.2	32 ◇
6.1.2	PCT patents by origin/bn PPP$ GDP	1.4	23 ◇
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a
6.1.4	Scientific and technical articles/bn PPP$ GDP	39.6	20
6.1.5	Citable documents H-index	79.8	4 ● ◆
6.2	**Knowledge impact**	**37.8**	**32**
6.2.1	Labor productivity growth, %	0.2	61
6.2.2	New businesses/th pop. 15–64	0.2	113 ○ ◇
6.2.3	Software spending, % GDP	0.6	5 ●
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	2.4	82 ○ ◇
6.2.5	High-tech manufacturing, %	37.6	31
6.3	**Knowledge diffusion**	**28.3**	**41**
6.3.1	Intellectual property receipts, % total trade	0.9	21
6.3.2	Production and export complexity	58.8	39 ◇
6.3.3	High-tech exports, % total trade	6.6	28
6.3.4	ICT services exports, % total trade	1.6	67 ○
Creative outputs		**41.9**	**19**
7.1	**Intangible assets**	**46.3**	**24**
7.1.1	Trademarks by origin/bn PPP$ GDP	47.8	46
7.1.2	Global brand value, top 5,000, % GDP	138.2	13
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.4	92 ○
7.1.4	ICTs and organizational model creation†	77.0	11
7.2	**Creative goods and services**	**24.1**	**40** ◇
7.2.1	Cultural and creative services exports, % total trade	1.0	29
7.2.2	National feature films/mn pop. 15–69	3.4	54
7.2.3	Entertainment and media market/th pop. 15–69	59.1	9
7.2.4	Printing and other media, % manufacturing	1.4	32
7.2.5	Creative goods exports, % total trade	1.0	45
7.3	**Online creativity**	**50.8**	**20**
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	78.6	6 ● ◆
7.3.2	Country-code TLDs/th pop. 15–69	33.2	21
7.3.3	Wikipedia edits/mn pop. 15–69	73.2	29
7.3.4	Mobile app creation/bn PPP$ GDP	15.0	36

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Chile

GII 2021 rank

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Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
61	**44**	**High**	**LCN**	**19.1**	**456.4**	**23,455**	**54**

		Score/ Value	Rank	
Institutions		**72.7**	**40**	
1.1	**Political environment**	**73.9**	**35**	
1.1.1	Political and operational stability*	73.2	44	
1.1.2	Government effectiveness*	74.2	29	
1.2	**Regulatory environment**	**68.4**	**55**	◇
1.2.1	Regulatory quality*	75.5	25	●
1.2.2	Rule of law*	75.0	26	
1.2.3	Cost of redundancy dismissal	27.4	110	○ ◇
1.3	**Business environment**	**75.7**	**46**	
1.3.1	Ease of starting a business*	91.4	50	
1.3.2	Ease of resolving insolvency*	60.1	48	
Human capital and research		**35.2**	**51**	
2.1	**Education**	**53.5**	**55**	
2.1.1	Expenditure on education, % GDP	5.4	22	●
2.1.2	Government funding/pupil, secondary, % GDP/cap	18.7	57	
2.1.3	School life expectancy, years	16.6	22	●
2.1.4	PISA scales in reading, maths and science	437.8	46	◇
2.1.5	Pupil-teacher ratio, secondary ◴	18.0	87	○ ◇
2.2	**Tertiary education**	**38.8**	**44**	
2.2.1	Tertiary enrolment, % gross	90.9	8	●
2.2.2	Graduates in science and engineering, %	20.9	67	
2.2.3	Tertiary inbound mobility, %	0.5	100	○ ◇
2.3	**Research and development (R&D)**	**13.4**	**51**	◇
2.3.1	Researchers, FTE/mn pop. ◴	491.5	68	◇
2.3.2	Gross expenditure on R&D, % GDP ◴	0.3	76	◇
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	41.0	30	
Infrastructure		**47.4**	**47**	◇
3.1	**Information and communication technologies (ICTs)**	**78.3**	**37**	
3.1.1	ICT access*	72.3	56	◇
3.1.2	ICT use*	70.0	46	
3.1.3	Government's online service*	85.3	24	
3.1.4	E-participation*	85.7	29	
3.2	**General infrastructure**	**31.9**	**53**	
3.2.1	Electricity output, GWh/mn pop.	4,385.3	51	
3.2.2	Logistics performance*	59.0	33	
3.2.3	Gross capital formation, % GDP	22.1	64	
3.3	**Ecological sustainability**	**31.9**	**52**	
3.3.1	GDP/unit of energy use	10.9	60	
3.3.2	Environmental performance*	55.3	42	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.0	43	
Market sophistication		**46.4**	**66**	
4.1	**Credit**	**45.1**	**48**	
4.1.1	Ease of getting credit*	55.0	88	○
4.1.2	Domestic credit to private sector, % GDP	122.5	16	●
4.1.3	Microfinance gross loans, % GDP	0.8	26	◆
4.2	**Investment**	**25.9**	**82**	
4.2.1	Ease of protecting minority investors*	66.0	50	
4.2.2	Market capitalization, % GDP	87.5	16	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	61	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	67	○
4.3	**Trade, diversification, and market scale**	**68.3**	**68**	
4.3.1	Applied tariff rate, weighted avg., %	0.4	4	●
4.3.2	Domestic industry diversification	61.4	103	○ ◇
4.3.3	Domestic market scale, bn PPP$	456.4	43	

		Score/ Value	Rank	
Business sophistication		**30.6**	**48**	
5.1	**Knowledge workers**	**39.5**	**43**	
5.1.1	Knowledge-intensive employment, %	31.9	44	
5.1.2	Firms offering formal training, % ◴	57.5	10	● ◆
5.1.3	GERD performed by business, % GDP ◴	0.1	60	◇
5.1.4	GERD financed by business, %	29.9	62	
5.1.5	Females employed w/advanced degrees, %	11.9	63	◇
5.2	**Innovation linkages**	**17.4**	**93**	○ ◇
5.2.1	University-industry R&D collaboration†	39.7	77	◇
5.2.2	State of cluster development and depth†	44.8	78	◇
5.2.3	GERD financed by abroad, % GDP	0.0	70	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	60	
5.2.5	Patent families/bn PPP$ GDP	0.2	43	
5.3	**Knowledge absorption**	**34.8**	**43**	
5.3.1	Intellectual property payments, % total trade	2.2	12	●
5.3.2	High-tech imports, % total trade	8.5	56	
5.3.3	ICT services imports, % total trade	0.7	88	◇
5.3.4	FDI net inflows, % GDP	3.0	51	
5.3.5	Research talent, % in businesses ◴	27.5	44	
Knowledge and technology outputs		**22.3**	**58**	
6.1	**Knowledge creation**	**17.4**	**58**	
6.1.1	Patents by origin/bn PPP$ GDP	0.9	67	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.6	33	
6.1.3	Utility models by origin/bn PPP$ GDP	0.2	45	
6.1.4	Scientific and technical articles/bn PPP$ GDP	23.6	39	
6.1.5	Citable documents H-index	24.3	37	
6.2	**Knowledge impact**	**39.9**	**24**	●
6.2.1	Labor productivity growth, %	1.4	34	◆
6.2.2	New businesses/th pop. 15–64	10.3	12	●
6.2.3	Software spending, % GDP	0.5	7	●
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	6.8	40	
6.2.5	High-tech manufacturing, % ◴	23.9	54	
6.3	**Knowledge diffusion**	**9.6**	**96**	○ ◇
6.3.1	Intellectual property receipts, % total trade	0.1	67	
6.3.2	Production and export complexity	39.7	71	◇
6.3.3	High-tech exports, % total trade	0.8	76	
6.3.4	ICT services exports, % total trade	0.6	100	○
Creative outputs		**25.3**	**60**	◇
7.1	**Intangible assets**	**36.5**	**47**	
7.1.1	Trademarks by origin/bn PPP$ GDP	68.7	25	
7.1.2	Global brand value, top 5,000, % GDP	39.1	40	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.1	108	○
7.1.4	ICTs and organizational model creation†	57.8	54	
7.2	**Creative goods and services**	**8.1**	**89**	◇
7.2.1	Cultural and creative services exports, % total trade ◴	0.3	63	
7.2.2	National feature films/mn pop. 15–69	3.7	51	
7.2.3	Entertainment and media market/th pop. 15–69	13.8	32	◇
7.2.4	Printing and other media, % manufacturing ◴	0.7	78	○
7.2.5	Creative goods exports, % total trade	0.1	92	○
7.3	**Online creativity**	**20.2**	**57**	◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	2.1	76	◇
7.3.2	Country-code TLDs/th pop. 15–69	14.7	33	
7.3.3	Wikipedia edits/mn pop. 15–69	60.4	51	
7.3.4	Mobile app creation/bn PPP$ GDP	2.3	68	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

China

GII 2021 rank
12

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
7	**25**	**Upper middle**	**SEAO**	**1,439.3**	**24,162.4**	**17,206**	**14**

		Score/ Value	Rank	
Institutions		**64.4**	**61**	◆
1.1	**Political environment**	**65.3**	**47**	◆
1.1.1	Political and operational stability*	71.4	54	
1.1.2	Government effectiveness*	62.2	43	◆
1.2	**Regulatory environment**	**49.9**	**106**	○
1.2.1	Regulatory quality*	37.1	91	
1.2.2	Rule of law*	39.5	77	
1.2.3	Cost of redundancy dismissal	27.4	110	○
1.3	**Business environment**	**78.1**	**39**	
1.3.1	Ease of starting a business*	94.1	25	◆
1.3.2	Ease of resolving insolvency*	62.1	46	
Human capital and research		**50.6**	**21**	◆
2.1	**Education**	**66.7**	**[12]**	
2.1.1	Expenditure on education, % GDP	n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years ⏲	12.4	88	○ ◇
2.1.4	PISA scales in reading, maths and science	579.0	1	● ◆
2.1.5	Pupil-teacher ratio, secondary	13.3	56	
2.2	**Tertiary education**	**25.2**	**83**	
2.2.1	Tertiary enrolment, % gross	53.8	57	
2.2.2	Graduates in science and engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	0.4	101	○
2.3	**Research and development (R&D)**	**59.8**	**14**	◆
2.3.1	Researchers, FTE/mn pop.	1,471.3	45	
2.3.2	Gross expenditure on R&D, % GDP	2.2	13	◆
2.3.3	Global corporate R&D investors, top 3, mn US$	92.5	3	● ◆
2.3.4	QS university ranking, top 3*	84.2	3	● ◆
Infrastructure		**54.6**	**24**	◆
3.1	**Information and communication technologies (ICTs)**	**79.4**	**34**	◆
3.1.1	ICT access*	63.0	71	
3.1.2	ICT use*	67.7	52	◆
3.1.3	Government's online service*	90.6	12	◆
3.1.4	E-participation*	96.4	9	◆
3.2	**General infrastructure**	**54.4**	**5**	◆
3.2.1	Electricity output, GWh/mn pop.	5,332.3	40	◆
3.2.2	Logistics performance*	72.3	26	◆
3.2.3	Gross capital formation, % GDP	43.9	4	● ◆
3.3	**Ecological sustainability**	**29.9**	**59**	
3.3.1	GDP/unit of energy use	7.5	97	○
3.3.2	Environmental performance*	37.3	98	○ ◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	5.8	17	
Market sophistication		**61.5**	**16**	◆
4.1	**Credit**	**51.7**	**26**	◆
4.1.1	Ease of getting credit*	60.0	74	
4.1.2	Domestic credit to private sector, % GDP	164.7	5	◆
4.1.3	Microfinance gross loans, % GDP	0.0	74	○
4.2	**Investment**	**35.9**	**44**	
4.2.1	Ease of protecting minority investors*	72.0	27	
4.2.2	Market capitalization, % GDP	58.6	28	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.1	29	◆
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.1	17	◆
4.3	**Trade, diversification, and market scale**	**96.9**	**1**	● ◆
4.3.1	Applied tariff rate, weighted avg., %	2.5	58	
4.3.2	Domestic industry diversification	99.4	2	●
4.3.3	Domestic market scale, bn PPP$	24,162.4	1	● ◆

		Score/ Value	Rank	
Business sophistication		**54.3**	**13**	◆
5.1	**Knowledge workers**	**77.7**	**[2]**	
5.1.1	Knowledge-intensive employment, %	n/a	n/a	
5.1.2	Firms offering formal training, % ⏲	79.2	1	● ◆
5.1.3	GERD performed by business, % GDP	1.7	12	◆
5.1.4	GERD financed by business, %	76.3	4	◆
5.1.5	Females employed w/advanced degrees, %	n/a	n/a	
5.2	**Innovation linkages**	**31.3**	**32**	◆
5.2.1	University-industry R&D collaboration†	70.5	6	◆
5.2.2	State of cluster development and depth†	73.1	3	● ◆
5.2.3	GERD financed by abroad, % GDP	0.0	94	○
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	63	
5.2.5	Patent families/bn PPP$ GDP	1.4	26	◆
5.3	**Knowledge absorption**	**53.9**	**9**	◆
5.3.1	Intellectual property payments, % total trade	1.3	29	
5.3.2	High-tech imports, % total trade	22.8	5	◆
5.3.3	ICT services imports, % total trade	1.0	73	
5.3.4	FDI net inflows, % GDP	1.4	101	○
5.3.5	Research talent, % in businesses	57.7	15	◆
Knowledge and technology outputs		**58.5**	**4**	● ◆
6.1	**Knowledge creation**	**70.5**	**4**	● ◆
6.1.1	Patents by origin/bn PPP$ GDP	53.2	1	● ◆
6.1.2	PCT patents by origin/bn PPP$ GDP	2.8	13	◆
6.1.3	Utility models by origin/bn PPP$ GDP	96.6	1	● ◆
6.1.4	Scientific and technical articles/bn PPP$ GDP	21.3	42	
6.1.5	Citable documents H-index	58.6	13	◆
6.2	**Knowledge impact**	**52.2**	**5**	◆
6.2.1	Labor productivity growth, %	5.2	6	◆
6.2.2	New businesses/th pop. 15–64	n/a	n/a	
6.2.3	Software spending, % GDP	0.3	39	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	12.0	24	
6.2.5	High-tech manufacturing, %	48.5	14	◆
6.3	**Knowledge diffusion**	**52.9**	**9**	◆
6.3.1	Intellectual property receipts, % total trade	0.2	36	◆
6.3.2	Production and export complexity	74.9	18	◆
6.3.3	High-tech exports, % total trade	27.8	1	● ◆
6.3.4	ICT services exports, % total trade	2.1	53	
Creative outputs		**46.5**	**14**	◆
7.1	**Intangible assets**	**70.9**	**2**	● ◆
7.1.1	Trademarks by origin/bn PPP$ GDP	324.1	1	● ◆
7.1.2	Global brand value, top 5,000, % GDP	118.0	16	◆
7.1.3	Industrial designs by origin/bn PPP$ GDP	29.6	1	● ◆
7.1.4	ICTs and organizational model creation†	59.7	46	
7.2	**Creative goods and services**	**40.0**	**11**	◆
7.2.1	Cultural and creative services exports, % total trade	0.5	46	
7.2.2	National feature films/mn pop. 15–69	0.8	91	○
7.2.3	Entertainment and media market/th pop. 15–69	10.4	37	◆
7.2.4	Printing and other media, % manufacturing	0.7	76	○
7.2.5	Creative goods exports, % total trade	11.2	1	● ◆
7.3	**Online creativity**	**4.3**	**[125]**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	2.2	74	
7.3.2	Country-code TLDs/th pop. 15–69	6.3	47	
7.3.3	Wikipedia edits/mn pop. 15–69	n/a	n/a	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Colombia

GII 2021 rank
67

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
75	**58**	**Upper middle**	**LCN**	**50.9**	**719.3**	**14,137**	**68**

		Score/ Value	Rank	
Institutions		**66.2**	**56**	
1.1	**Political environment**	**55.7**	**72**	
1.1.1	Political and operational stability*	62.5	89	○
1.1.2	Government effectiveness*	52.2	67	
1.2	**Regulatory environment**	**63.8**	**70**	
1.2.1	Regulatory quality*	53.9	53	
1.2.2	Rule of law*	35.7	86	
1.2.3	Cost of redundancy dismissal	16.7	65	
1.3	**Business environment**	**79.2**	**36**	
1.3.1	Ease of starting a business*	87.0	74	
1.3.2	Ease of resolving insolvency*	71.4	30	◆
Human capital and research		**28.4**	**78**	
2.1	**Education**	**42.4**	**87**	
2.1.1	Expenditure on education, % GDP	4.5	58	
2.1.2	Government funding/pupil, secondary, % GDP/cap	19.1	56	
2.1.3	School life expectancy, years	14.5	62	
2.1.4	PISA scales in reading, maths and science	405.5	62	○
2.1.5	Pupil-teacher ratio, secondary	26.1	107	○ ◇
2.2	**Tertiary education**	**32.7**	**67**	
2.2.1	Tertiary enrolment, % gross	55.0	55	
2.2.2	Graduates in science and engineering, %	24.6	41	
2.2.3	Tertiary inbound mobility, %	0.2	106	○ ◇
2.3	**Research and development (R&D)**	**10.2**	**59**	
2.3.1	Researchers, FTE/mn pop.	88.0	91	○ ◇
2.3.2	Gross expenditure on R&D, % GDP	0.3	82	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	34.4	35	
Infrastructure		**44.9**	**57**	
3.1	**Information and communication technologies (ICTs)**	**68.3**	**61**	
3.1.1	ICT access*	60.9	74	
3.1.2	ICT use*	48.9	82	
3.1.3	Government's online service*	76.5	49	
3.1.4	E-participation*	86.9	27	
3.2	**General infrastructure**	**23.0**	**93**	
3.2.1	Electricity output, GWh/mn pop.	1,610.6	89	
3.2.2	Logistics performance*	41.5	57	
3.2.3	Gross capital formation, % GDP	19.7	90	
3.3	**Ecological sustainability**	**43.4**	**27**	● ◆
3.3.1	GDP/unit of energy use	18.2	11	● ◆
3.3.2	Environmental performance*	52.9	48	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	4.0	23	●
Market sophistication		**50.8**	**42**	
4.1	**Credit**	**50.4**	**32**	◆
4.1.1	Ease of getting credit*	90.0	10	● ◆
4.1.2	Domestic credit to private sector, % GDP	51.5	66	
4.1.3	Microfinance gross loans, % GDP	1.8	15	●
4.2	**Investment**	**24.1**	**90**	
4.2.1	Ease of protecting minority investors*	80.0	13	● ◆
4.2.2	Market capitalization, % GDP	37.0	41	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	84	○
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	72	○
4.3	**Trade, diversification, and market scale**	**78.0**	**35**	
4.3.1	Applied tariff rate, weighted avg., %	2.9	61	
4.3.2	Domestic industry diversification	88.0	60	
4.3.3	Domestic market scale, bn PPP$	719.2	31	

		Score/ Value	Rank	
Business sophistication		**29.4**	**50**	
5.1	**Knowledge workers**	**44.4**	**36**	
5.1.1	Knowledge-intensive employment, %	n/a	n/a	
5.1.2	Firms offering formal training, %	63.0	7	● ◆
5.1.3	GERD performed by business, % GDP	0.1	61	
5.1.4	GERD financed by business, %	43.0	37	
5.1.5	Females employed w/advanced degrees, %	14.4	52	
5.2	**Innovation linkages**	**16.8**	**98**	○
5.2.1	University-industry R&D collaboration†	45.2	53	
5.2.2	State of cluster development and depth†	45.0	77	
5.2.3	GERD financed by abroad, % GDP	0.0	69	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	84	
5.2.5	Patent families/bn PPP$ GDP	0.1	61	
5.3	**Knowledge absorption**	**27.0**	**64**	
5.3.1	Intellectual property payments, % total trade	0.8	55	
5.3.2	High-tech imports, % total trade	13.9	15	●
5.3.3	ICT services imports, % total trade	1.4	54	
5.3.4	FDI net inflows, % GDP	4.1	27	●
5.3.5	Research talent, % in businesses	2.4	75	○ ◇
Knowledge and technology outputs		**19.2**	**72**	
6.1	**Knowledge creation**	**9.6**	**80**	
6.1.1	Patents by origin/bn PPP$ GDP	0.5	78	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.2	53	
6.1.3	Utility models by origin/bn PPP$ GDP	0.2	49	
6.1.4	Scientific and technical articles/bn PPP$ GDP	9.8	87	
6.1.5	Citable documents H-index	17.8	45	
6.2	**Knowledge impact**	**35.5**	**39**	
6.2.1	Labor productivity growth, %	3.6	13	● ◆
6.2.2	New businesses/th pop. 15–64	2.0	55	
6.2.3	Software spending, % GDP	0.2	70	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	13.5	21	●
6.2.5	High-tech manufacturing, %	20.0	63	
6.3	**Knowledge diffusion**	**12.4**	**82**	
6.3.1	Intellectual property receipts, % total trade	0.2	45	
6.3.2	Production and export complexity	46.2	56	
6.3.3	High-tech exports, % total trade	1.3	69	
6.3.4	ICT services exports, % total trade	0.7	90	
Creative outputs		**19.8**	**82**	
7.1	**Intangible assets**	**27.1**	**78**	
7.1.1	Trademarks by origin/bn PPP$ GDP	36.8	64	
7.1.2	Global brand value, top 5,000, % GDP	30.2	43	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.4	89	○
7.1.4	ICTs and organizational model creation†	54.5	62	
7.2	**Creative goods and services**	**7.7**	**90**	
7.2.1	Cultural and creative services exports, % total trade	0.2	70	
7.2.2	National feature films/mn pop. 15–69	1.4	76	
7.2.3	Entertainment and media market/th pop. 15–69	7.5	42	
7.2.4	Printing and other media, % manufacturing	1.2	35	
7.2.5	Creative goods exports, % total trade	0.2	74	
7.3	**Online creativity**	**17.2**	**66**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	2.8	66	
7.3.2	Country-code TLDs/th pop. 15–69	21.7	29	
7.3.3	Wikipedia edits/mn pop. 15–69	43.1	80	
7.3.4	Mobile app creation/bn PPP$ GDP	2.0	70	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Costa Rica

GII 2021 rank
56

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
49	**66**	**Upper middle**	**LCN**	**5.1**	**99.0**	**19,309**	**56**

		Score/ Value	Rank	
Institutions		**63.1**	**66**	
1.1	**Political environment**	**63.2**	**51**	
1.1.1	Political and operational stability*	69.6	60	
1.1.2	Government effectiveness*	60.1	48	
1.2	**Regulatory environment**	**68.8**	**52**	
1.2.1	Regulatory quality*	56.5	50	◆
1.2.2	Rule of law*	61.1	42	◆
1.2.3	Cost of redundancy dismissal	18.7	77	
1.3	**Business environment**	**57.3**	**112**	○ ◇
1.3.1	Ease of starting a business*	79.9	110	○
1.3.2	Ease of resolving insolvency*	34.6	114	○ ◇
Human capital and research		**32.4**	**61**	
2.1	**Education**	**62.5**	**18**	● ◆
2.1.1	Expenditure on education, % GDP	7.0	6	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	24.1	19	◆
2.1.3	School life expectancy, years	16.5	24	◆
2.1.4	PISA scales in reading, maths and science	414.8	59	
2.1.5	Pupil-teacher ratio, secondary	13.3	58	
2.2	**Tertiary education**	**28.2**	**80**	
2.2.1	Tertiary enrolment, % gross	57.7	52	
2.2.2	Graduates in science and engineering, %	15.1	99	○
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research and development (R&D)**	**6.6**	**72**	
2.3.1	Researchers, FTE/mn pop.	345.0	74	
2.3.2	Gross expenditure on R&D, % GDP	0.4	72	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	15.1	59	
Infrastructure		**40.7**	**71**	
3.1	**Information and communication technologies (ICTs)**	**67.7**	**64**	
3.1.1	ICT access*	69.4	63	
3.1.2	ICT use*	67.8	51	◆
3.1.3	Government's online service*	68.2	72	
3.1.4	E-participation*	65.5	77	
3.2	**General infrastructure**	**18.2**	**115**	○
3.2.1	Electricity output, GWh/mn pop.	2,268.5	77	
3.2.2	Logistics performance*	34.6	72	
3.2.3	Gross capital formation, % GDP	15.4	114	○
3.3	**Ecological sustainability**	**36.3**	**43**	
3.3.1	GDP/unit of energy use	17.2	14	● ◆
3.3.2	Environmental performance*	52.5	50	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.1	65	
Market sophistication		**43.0**	**85**	
4.1	**Credit**	**43.5**	**54**	
4.1.1	Ease of getting credit*	85.0	14	●
4.1.2	Domestic credit to private sector, % GDP	58.8	57	
4.1.3	Microfinance gross loans, % GDP	0.1	64	
4.2	**Investment**	**17.0**	**125**	○ ◇
4.2.1	Ease of protecting minority investors*	48.0	96	
4.2.2	Market capitalization, % GDP	4.4	72	○
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	73	○
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**68.4**	**67**	
4.3.1	Applied tariff rate, weighted avg., %	1.6	20	●
4.3.2	Domestic industry diversification	80.2	77	
4.3.3	Domestic market scale, bn PPP$	99.0	84	

		Score/ Value	Rank	
Business sophistication		**30.0**	**49**	
5.1	**Knowledge workers**	**29.3**	**73**	
5.1.1	Knowledge-intensive employment, %	27.4	56	
5.1.2	Firms offering formal training, %	54.7	12	●
5.1.3	GERD performed by business, % GDP	0.1	58	
5.1.4	GERD financed by business, %	1.3	93	○ ◇
5.1.5	Females employed w/advanced degrees, %	12.2	62	
5.2	**Innovation linkages**	**16.9**	**97**	
5.2.1	University-industry R&D collaboration†	42.3	68	
5.2.2	State of cluster development and depth†	49.2	51	
5.2.3	GERD financed by abroad, % GDP	0.0	81	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	85	
5.2.5	Patent families/bn PPP$ GDP	0.0	83	
5.3	**Knowledge absorption**	**43.7**	**22**	● ◆
5.3.1	Intellectual property payments, % total trade	2.8	7	● ◆
5.3.2	High-tech imports, % total trade	8.9	46	
5.3.3	ICT services imports, % total trade	1.3	58	
5.3.4	FDI net inflows, % GDP	4.5	24	
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**22.9**	**56**	
6.1	**Knowledge creation**	**6.1**	**100**	
6.1.1	Patents by origin/bn PPP$ GDP	0.2	101	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	63	
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	63	
6.1.4	Scientific and technical articles/bn PPP$ GDP	9.0	92	
6.1.5	Citable documents H-index	10.8	71	
6.2	**Knowledge impact**	**27.4**	**73**	
6.2.1	Labor productivity growth, %	1.6	32	
6.2.2	New businesses/th pop. 15–64	2.6	50	
6.2.3	Software spending, % GDP	0.3	31	◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	2.8	78	
6.2.5	High-tech manufacturing, %	13.3	83	
6.3	**Knowledge diffusion**	**35.3**	**27**	◆
6.3.1	Intellectual property receipts, % total trade	0.0	79	
6.3.2	Production and export complexity	51.6	47	
6.3.3	High-tech exports, % total trade	5.7	32	
6.3.4	ICT services exports, % total trade	6.6	7	● ◆
Creative outputs		**31.3**	**45**	
7.1	**Intangible assets**	**38.5**	**42**	
7.1.1	Trademarks by origin/bn PPP$ GDP	85.8	16	● ◆
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.1	109	○
7.1.4	ICTs and organizational model creation†	63.0	36	◆
7.2	**Creative goods and services**	**31.3**	**22**	● ◆
7.2.1	Cultural and creative services exports, % total trade	5.1	1	● ◆
7.2.2	National feature films/mn pop. 15–69	3.6	52	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	2.2	13	● ◆
7.2.5	Creative goods exports, % total trade	0.1	93	
7.3	**Online creativity**	**17.0**	**67**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	11.2	37	◆
7.3.2	Country-code TLDs/th pop. 15–69	1.5	76	
7.3.3	Wikipedia edits/mn pop. 15–69	51.0	63	
7.3.4	Mobile app creation/bn PPP$ GDP	4.1	60	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Côte d'Ivoire

GII 2021 rank
114

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
121	**107**	**Lower middle**	**SSF**	**26.4**	**144.5**	**5,360**	**112**

		Score/ Value	Rank	
Institutions		**60.6**	**79**	◆
1.1	**Political environment**	**48.6**	**93**	
1.1.1	Political and operational stability*	66.1	74	
1.1.2	Government effectiveness*	39.9	98	
1.2	**Regulatory environment**	**62.2**	**75**	
1.2.1	Regulatory quality*	37.1	90	
1.2.2	Rule of law*	31.8	99	
1.2.3	Cost of redundancy dismissal	13.1	46	●
1.3	**Business environment**	**70.8**	**69**	●
1.3.1	Ease of starting a business*	93.7	27	● ◆
1.3.2	Ease of resolving insolvency*	47.9	77	
Human capital and research		**11.1**	**124**	○ ◇
2.1	**Education**	**26.7**	**122**	○ ◇
2.1.1	Expenditure on education, % GDP	3.3	89	
2.1.2	Government funding/pupil, secondary, % GDP/cap	13.6	80	
2.1.3	School life expectancy, years	10.5	104	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	28.9	116	○ ◇
2.2	**Tertiary education**	**6.3**	**121**	○ ◇
2.2.1	Tertiary enrolment, % gross	10.0	115	
2.2.2	Graduates in science and engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, % ◴	2.2	76	
2.3	**Research and development (R&D)**	**0.4**	**114**	
2.3.1	Researchers, FTE/mn pop.	n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP ◴	0.1	110	○ ◇
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**28.0**	**109**	
3.1	**Information and communication technologies (ICTs)**	**40.0**	**110**	
3.1.1	ICT access*	39.4	107	
3.1.2	ICT use*	34.7	102	
3.1.3	Government's online service*	45.3	113	
3.1.4	E-participation*	40.5	115	
3.2	**General infrastructure**	**26.9**	**73**	●
3.2.1	Electricity output, GWh/mn pop.	401.3	112	
3.2.2	Logistics performance*	48.1	49	● ◆
3.2.3	Gross capital formation, % GDP	23.7	55	●
3.3	**Ecological sustainability**	**17.1**	**114**	
3.3.1	GDP/unit of energy use	9.6	72	
3.3.2	Environmental performance*	25.8	129	○ ◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.3	100	
Market sophistication		**36.0**	**117**	
4.1	**Credit**	**31.1**	**101**	
4.1.1	Ease of getting credit*	70.0	44	●
4.1.2	Domestic credit to private sector, % GDP	19.6	114	
4.1.3	Microfinance gross loans, % GDP	0.2	49	
4.2	**Investment**	**25.1**	**[83]**	
4.2.1	Ease of protecting minority investors*	42.0	102	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP ◴	0.0	53	
4.3	**Trade, diversification, and market scale**	**51.7**	**114**	
4.3.1	Applied tariff rate, weighted avg., %	7.7	101	
4.3.2	Domestic industry diversification	n/a	n/a	
4.3.3	Domestic market scale, bn PPP$	144.5	74	●

		Score/ Value	Rank	
Business sophistication		**20.9**	**91**	
5.1	**Knowledge workers**	**21.7**	**[98]**	
5.1.1	Knowledge-intensive employment, % ◴	10.3	110	
5.1.2	Firms offering formal training, % ◴	35.5	41	●
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, % ◴	1.3	111	
5.2	**Innovation linkages**	**18.3**	**81**	
5.2.1	University-industry R&D collaboration†	38.1	89	
5.2.2	State of cluster development and depth†	43.8	81	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	123	○
5.2.5	Patent families/bn PPP$ GDP	0.0	100	○ ◇
5.3	**Knowledge absorption**	**22.6**	**78**	
5.3.1	Intellectual property payments, % total trade	0.1	111	
5.3.2	High-tech imports, % total trade	5.9	99	
5.3.3	ICT services imports, % total trade	2.6	15	● ◆
5.3.4	FDI net inflows, % GDP	1.6	92	
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**11.5**	**110**	
6.1	**Knowledge creation**	**2.6**	**124**	○
6.1.1	Patents by origin/bn PPP$ GDP	0.1	109	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	98	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	70	
6.1.4	Scientific and technical articles/bn PPP$ GDP	3.1	120	
6.1.5	Citable documents H-index	6.1	95	
6.2	**Knowledge impact**	**23.3**	**88**	
6.2.1	Labor productivity growth, %	3.1	16	●
6.2.2	New businesses/th pop. 15–64	0.7	89	
6.2.3	Software spending, % GDP	0.0	119	○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.6	95	
6.2.5	High-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**8.6**	**100**	
6.3.1	Intellectual property receipts, % total trade	0.0	92	
6.3.2	Production and export complexity	21.7	107	
6.3.3	High-tech exports, % total trade	1.1	71	●
6.3.4	ICT services exports, % total trade	1.2	74	
Creative outputs		**9.9**	**121**	
7.1	**Intangible assets**	**16.1**	**116**	
7.1.1	Trademarks by origin/bn PPP$ GDP	6.7	117	○
7.1.2	Global brand value, top 5,000, % GDP	3.6	71	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.5	88	
7.1.4	ICTs and organizational model creation†	50.3	81	
7.2	**Creative goods and services**	**1.4**	**[123]**	
7.2.1	Cultural and creative services exports, % total trade	0.1	77	
7.2.2	National feature films/mn pop. 15–69	n/a	n/a	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.0	118	
7.3	**Online creativity**	**5.9**	**118**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.4	112	
7.3.2	Country-code TLDs/th pop. 15–69	0.2	113	
7.3.3	Wikipedia edits/mn pop. 15–69	21.1	119	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Croatia

GII 2021 rank
42

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
48	**41**	**High**	**EUR**	**4.1**	**112.0**	**27,681**	**41**

		Score/ Value	Rank	
Institutions		**69.8**	**46**	
1.1	**Political environment**	**66.6**	**45**	
1.1.1	Political and operational stability*	80.4	29	
1.1.2	Government effectiveness*	59.8	49	◇
1.2	**Regulatory environment**	**71.8**	**45**	
1.2.1	Regulatory quality*	58.9	44	
1.2.2	Rule of law*	56.4	48	◇
1.2.3	Cost of redundancy dismissal	15.1	59	
1.3	**Business environment**	**70.9**	**68**	
1.3.1	Ease of starting a business*	85.3	87	○ ◇
1.3.2	Ease of resolving insolvency*	56.5	58	
Human capital and research		**37.6**	**47**	
2.1	**Education**	**59.1**	**32**	
2.1.1	Expenditure on education, % GDP	3.9	71	
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	15.2	48	
2.1.4	PISA scales in reading, maths and science	471.9	37	
2.1.5	Pupil-teacher ratio, secondary	6.4	1	● ◆
2.2	**Tertiary education**	**39.8**	**40**	
2.2.1	Tertiary enrolment, % gross	67.7	37	
2.2.2	Graduates in science and engineering, %	26.3	32	
2.2.3	Tertiary inbound mobility, %	3.0	66	
2.3	**Research and development (R&D)**	**14.0**	**50**	
2.3.1	Researchers, FTE/mn pop.	2,135.4	38	
2.3.2	Gross expenditure on R&D, % GDP	1.1	35	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	8.4	68	◇
Infrastructure		**53.8**	**29**	●
3.1	**Information and communication technologies (ICTs)**	**78.2**	**39**	
3.1.1	ICT access*	79.0	38	
3.1.2	ICT use*	69.3	48	◇
3.1.3	Government's online service*	75.3	52	
3.1.4	E-participation*	89.3	23	●
3.2	**General infrastructure**	**30.8**	**58**	
3.2.1	Electricity output, GWh/mn pop.	3,109.1	63	
3.2.2	Logistics performance*	49.1	48	
3.2.3	Gross capital formation, % GDP	25.2	45	
3.3	**Ecological sustainability**	**52.3**	**6**	● ◆
3.3.1	GDP/unit of energy use	12.5	43	
3.3.2	Environmental performance*	63.1	34	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	9.8	6	● ◆
Market sophistication		**46.1**	**67**	
4.1	**Credit**	**35.6**	**86**	
4.1.1	Ease of getting credit*	50.0	94	○
4.1.2	Domestic credit to private sector, % GDP	54.4	60	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**28.0**	**73**	
4.2.1	Ease of protecting minority investors*	70.0	36	
4.2.2	Market capitalization, % GDP	37.1	40	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	76	○ ◇
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**74.8**	**43**	
4.3.1	Applied tariff rate, weighted avg., %	1.8	25	
4.3.2	Domestic industry diversification	95.8	23	●
4.3.3	Domestic market scale, bn PPP$	112.0	79	

		Score/ Value	Rank	
Business sophistication		**27.7**	**55**	
5.1	**Knowledge workers**	**37.0**	**53**	
5.1.1	Knowledge-intensive employment, %	37.1	33	
5.1.2	Firms offering formal training, %	26.2	60	
5.1.3	GERD performed by business, % GDP	0.5	38	
5.1.4	GERD financed by business, %	33.2	56	
5.1.5	Females employed w/advanced degrees, %	17.6	38	
5.2	**Innovation linkages**	**18.3**	**80**	◇
5.2.1	University-industry R&D collaboration†	29.4	113	○ ◇
5.2.2	State of cluster development and depth†	30.2	123	○ ◇
5.2.3	GERD financed by abroad, % GDP	0.2	21	●
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	59	
5.2.5	Patent families/bn PPP$ GDP	0.1	53	
5.3	**Knowledge absorption**	**27.8**	**62**	
5.3.1	Intellectual property payments, % total trade	1.1	37	
5.3.2	High-tech imports, % total trade	6.4	89	○
5.3.3	ICT services imports, % total trade	1.6	46	
5.3.4	FDI net inflows, % GDP	1.6	90	○
5.3.5	Research talent, % in businesses	24.8	51	
Knowledge and technology outputs		**26.9**	**47**	
6.1	**Knowledge creation**	**22.5**	**48**	
6.1.1	Patents by origin/bn PPP$ GDP	1.8	40	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.2	52	
6.1.3	Utility models by origin/bn PPP$ GDP	0.5	37	
6.1.4	Scientific and technical articles/bn PPP$ GDP	37.4	23	●
6.1.5	Citable documents H-index	17.3	49	
6.2	**Knowledge impact**	**33.5**	**49**	
6.2.1	Labor productivity growth, %	–2.4	108	○ ◇
6.2.2	New businesses/th pop. 15–64	5.9	28	●
6.2.3	Software spending, % GDP	0.1	97	○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	22.4	6	● ◆
6.2.5	High-tech manufacturing, %	26.2	47	
6.3	**Knowledge diffusion**	**24.7**	**48**	
6.3.1	Intellectual property receipts, % total trade	0.2	37	
6.3.2	Production and export complexity	64.0	30	
6.3.3	High-tech exports, % total trade	3.0	48	
6.3.4	ICT services exports, % total trade	3.1	34	
Creative outputs		**28.2**	**54**	
7.1	**Intangible assets**	**30.2**	**69**	
7.1.1	Trademarks by origin/bn PPP$ GDP	52.2	44	
7.1.2	Global brand value, top 5,000, % GDP	8.5	62	
7.1.3	Industrial designs by origin/bn PPP$ GDP	3.4	31	
7.1.4	ICTs and organizational model creation†	51.9	73	◇
7.2	**Creative goods and services**	**25.2**	**38**	
7.2.1	Cultural and creative services exports, % total trade	1.7	15	●
7.2.2	National feature films/mn pop. 15–69	2.0	67	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	2.7	5	● ◆
7.2.5	Creative goods exports, % total trade	0.8	51	
7.3	**Online creativity**	**27.2**	**41**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	14.8	32	
7.3.2	Country-code TLDs/th pop. 15–69	11.5	39	
7.3.3	Wikipedia edits/mn pop. 15–69	70.5	35	
7.3.4	Mobile app creation/bn PPP$ GDP	9.2	49	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Cyprus

GII 2021 rank **28**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
21	31	High	NAWA	1.2	34.6	39,079	29

		Score/ Value	Rank	
Institutions		**80.4**	**26**	
1.1	**Political environment**	**74.7**	**33**	
1.1.1	Political and operational stability*	78.6	34	
1.1.2	Government effectiveness*	72.7	34	
1.2	**Regulatory environment**	**84.2**	**22**	
1.2.1	Regulatory quality*	70.0	32	
1.2.2	Rule of law*	66.7	35	
1.2.3	Cost of redundancy dismissal	8.0	1	● ◆
1.3	**Business environment**	**82.3**	**26**	
1.3.1	Ease of starting a business*	92.0	45	
1.3.2	Ease of resolving insolvency*	72.5	29	
Human capital and research		**38.7**	**42**	
2.1	**Education**	**65.9**	**14**	
2.1.1	Expenditure on education, % GDP	5.8	18	
2.1.2	Government funding/pupil, secondary, % GDP/cap	37.4	3	● ◆
2.1.3	School life expectancy, years	15.4	47	
2.1.4	PISA scales in reading, maths and science	438.0	45	◇
2.1.5	Pupil-teacher ratio, secondary ◴	8.1	10	◆
2.2	**Tertiary education**	**42.8**	**34**	
2.2.1	Tertiary enrolment, % gross	81.3	19	
2.2.2	Graduates in science and engineering, %	15.1	98	○ ◇
2.2.3	Tertiary inbound mobility, %	23.9	5	● ◆
2.3	**Research and development (R&D)**	**7.4**	**66**	◇
2.3.1	Researchers, FTE/mn pop.	1,432.8	47	◇
2.3.2	Gross expenditure on R&D, % GDP	0.6	55	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**53.9**	**28**	
3.1	**Information and communication technologies (ICTs)**	**88.3**	**14**	
3.1.1	ICT access*	87.9	11	
3.1.2	ICT use*	83.0	14	
3.1.3	Government's online service*	87.1	20	
3.1.4	E-participation*	95.2	14	
3.2	**General infrastructure**	**26.3**	**75**	◇
3.2.1	Electricity output, GWh/mn pop.	5,842.0	36	
3.2.2	Logistics performance*	51.3	44	
3.2.3	Gross capital formation, % GDP	16.2	109	○ ◇
3.3	**Ecological sustainability**	**47.0**	**21**	
3.3.1	GDP/unit of energy use	13.9	32	
3.3.2	Environmental performance*	64.8	31	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	6.2	16	
Market sophistication		**50.0**	**46**	
4.1	**Credit**	**53.2**	**22**	
4.1.1	Ease of getting credit*	60.0	74	
4.1.2	Domestic credit to private sector, % GDP	112.3	20	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**33.0**	**56**	
4.2.1	Ease of protecting minority investors*	76.0	21	
4.2.2	Market capitalization, % GDP	14.2	64	○
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.1	36	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.1	14	
4.3	**Trade, diversification, and market scale**	**63.8**	**79**	
4.3.1	Applied tariff rate, weighted avg., %	1.8	25	
4.3.2	Domestic industry diversification	80.3	76	
4.3.3	Domestic market scale, bn PPP$	34.6	117	○ ◇

		Score/ Value	Rank	
Business sophistication		**42.6**	**28**	
5.1	**Knowledge workers**	**42.2**	**40**	
5.1.1	Knowledge-intensive employment, %	35.5	38	
5.1.2	Firms offering formal training, %	39.7	30	
5.1.3	GERD performed by business, % GDP	0.3	50	
5.1.4	GERD financed by business, %	34.8	55	
5.1.5	Females employed w/advanced degrees, %	25.5	13	
5.2	**Innovation linkages**	**39.9**	**25**	
5.2.1	University-industry R&D collaboration†	43.9	59	
5.2.2	State of cluster development and depth†	49.1	54	
5.2.3	GERD financed by abroad, % GDP	0.2	28	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.2	14	
5.2.5	Patent families/bn PPP$ GDP	2.0	19	
5.3	**Knowledge absorption**	**45.6**	**20**	
5.3.1	Intellectual property payments, % total trade	1.5	26	
5.3.2	High-tech imports, % total trade	3.6	120	○ ◇
5.3.3	ICT services imports, % total trade	11.1	1	● ◆
5.3.4	FDI net inflows, % GDP	44.2	1	● ◆
5.3.5	Research talent, % in businesses	33.5	39	
Knowledge and technology outputs		**39.4**	**21**	
6.1	**Knowledge creation**	**32.2**	**30**	
6.1.1	Patents by origin/bn PPP$ GDP	1.4	53	
6.1.2	PCT patents by origin/bn PPP$ GDP	1.2	26	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	51.1	8	● ◆
6.1.5	Citable documents H-index	12.4	62	
6.2	**Knowledge impact**	**38.6**	**27**	
6.2.1	Labor productivity growth, %	–1.6	95	○
6.2.2	New businesses/th pop. 15–64	17.6	5	● ◆
6.2.3	Software spending, % GDP	0.2	75	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	21.4	9	◆
6.2.5	High-tech manufacturing, %	19.2	64	
6.3	**Knowledge diffusion**	**47.3**	**17**	
6.3.1	Intellectual property receipts, % total trade	0.9	22	
6.3.2	Production and export complexity	48.1	50	
6.3.3	High-tech exports, % total trade	0.9	72	
6.3.4	ICT services exports, % total trade	16.3	1	● ◆
Creative outputs		**41.3**	**20**	
7.1	**Intangible assets**	**45.4**	**27**	
7.1.1	Trademarks by origin/bn PPP$ GDP	89.6	13	◆
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	15.3	7	● ◆
7.1.4	ICTs and organizational model creation†	47.3	93	○ ◇
7.2	**Creative goods and services**	**14.4**	**65**	
7.2.1	Cultural and creative services exports, % total trade	0.2	68	
7.2.2	National feature films/mn pop. 15–69	6.9	32	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.9	16	
7.2.5	Creative goods exports, % total trade	0.2	75	
7.3	**Online creativity**	**60.1**	**8**	● ◆
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	72.3	8	● ◆
7.3.2	Country-code TLDs/th pop. 15–69	5.8	51	
7.3.3	Wikipedia edits/mn pop. 15–69	60.8	50	
7.3.4	Mobile app creation/bn PPP$ GDP	100.0	1	● ◆

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Czech Republic

GII 2021 rank
24

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
15	**30**	**High**	**EUR**	**10.7**	**430.9**	**40,293**	**24**

		Score/ Value	Rank	
Institutions		**76.9**	**32**	◇
1.1	**Political environment**	**74.3**	**34**	◇
1.1.1	Political and operational stability*	82.1	24	
1.1.2	Government effectiveness*	70.3	35	◇
1.2	**Regulatory environment**	**75.5**	**37**	
1.2.1	Regulatory quality*	76.0	24	
1.2.2	Rule of law*	74.3	28	◇
1.2.3	Cost of redundancy dismissal	20.2	85 ○	
1.3	**Business environment**	**81.1**	**29**	
1.3.1	Ease of starting a business*	82.1	103 ○	◇
1.3.2	Ease of resolving insolvency*	80.1	15 ●	
Human capital and research		**43.0**	**33**	◇
2.1	**Education**	**55.1**	**49**	
2.1.1	Expenditure on education, % GDP	3.9	72 ○	
2.1.2	Government funding/pupil, secondary, % GDP/cap	23.5	23	
2.1.3	School life expectancy, years	16.3	30	
2.1.4	PISA scales in reading, maths and science	495.5	23	
2.1.5	Pupil-teacher ratio, secondary ⏲	11.5	45	
2.2	**Tertiary education**	**44.5**	**22**	
2.2.1	Tertiary enrolment, % gross	63.8	44	
2.2.2	Graduates in science and engineering, %	26.1	33	
2.2.3	Tertiary inbound mobility, %	13.6	15	
2.3	**Research and development (R&D)**	**29.5**	**37**	◇
2.3.1	Researchers, FTE/mn pop.	3,976.0	26	
2.3.2	Gross expenditure on R&D, % GDP	1.9	18	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41 ○	◇
2.3.4	QS university ranking, top 3*	31.5	38	◇
Infrastructure		**56.0**	**19**	
3.1	**Information and communication technologies (ICTs)**	**73.9**	**53**	◇
3.1.1	ICT access*	73.2	53	◇
3.1.2	ICT use*	77.2	29	◇
3.1.3	Government's online service*	72.4	61	◇
3.1.4	E-participation*	72.6	65	◇
3.2	**General infrastructure**	**42.6**	**21**	
3.2.1	Electricity output, GWh/mn pop.	8,047.2	22	
3.2.2	Logistics performance*	75.8	22	
3.2.3	Gross capital formation, % GDP	25.9	40	
3.3	**Ecological sustainability**	**51.4**	**13** ●	
3.3.1	GDP/unit of energy use	9.4	74 ○	
3.3.2	Environmental performance*	71.0	20	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	9.7	7 ● ◆	
Market sophistication		**49.5**	**50**	◇
4.1	**Credit**	**44.8**	**51**	
4.1.1	Ease of getting credit*	70.0	44	
4.1.2	Domestic credit to private sector, % GDP	50.6	68	◇
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**24.2**	**89** ○	◇
4.2.1	Ease of protecting minority investors*	62.0	60 ○	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	44	◇
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	82 ○	◇
4.3	**Trade, diversification, and market scale**	**79.4**	**30**	
4.3.1	Applied tariff rate, weighted avg., %	1.8	25	
4.3.2	Domestic industry diversification	93.6	37	
4.3.3	Domestic market scale, bn PPP$	430.9	46	

		Score/ Value	Rank	
Business sophistication		**43.5**	**25**	◇
5.1	**Knowledge workers**	**45.4**	**31**	◇
5.1.1	Knowledge-intensive employment, %	37.7	31	◇
5.1.2	Firms offering formal training, %	43.6	24	
5.1.3	GERD performed by business, % GDP	1.2	17	
5.1.4	GERD financed by business, %	38.2	47	◇
5.1.5	Females employed w/advanced degrees, %	12.3	61	◇
5.2	**Innovation linkages**	**36.4**	**26**	◇
5.2.1	University-industry R&D collaboration†	53.7	32	◇
5.2.2	State of cluster development and depth†	47.3	62	◇
5.2.3	GERD financed by abroad, % GDP	0.5	3 ● ◆	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	77 ○	◇
5.2.5	Patent families/bn PPP$ GDP	0.6	30	◇
5.3	**Knowledge absorption**	**48.5**	**15** ●	
5.3.1	Intellectual property payments, % total trade	0.8	53	
5.3.2	High-tech imports, % total trade	20.7	8 ● ◆	
5.3.3	ICT services imports, % total trade	1.3	57	
5.3.4	FDI net inflows, % GDP	4.1	28	
5.3.5	Research talent, % in businesses	51.1	22	
Knowledge and technology outputs		**48.2**	**12** ●	
6.1	**Knowledge creation**	**39.4**	**22**	
6.1.1	Patents by origin/bn PPP$ GDP	2.1	34	◇
6.1.2	PCT patents by origin/bn PPP$ GDP	0.5	35	◇
6.1.3	Utility models by origin/bn PPP$ GDP	2.8	6 ● ◆	
6.1.4	Scientific and technical articles/bn PPP$ GDP	35.1	25	
6.1.5	Citable documents H-index	30.3	31	
6.2	**Knowledge impact**	**53.1**	**4** ● ◆	
6.2.1	Labor productivity growth, %	−0.1	65 ○	
6.2.2	New businesses/th pop. 15–64	4.4	34	
6.2.3	Software spending, % GDP	0.2	54	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	27.4	4 ● ◆	
6.2.5	High-tech manufacturing, %	61.1	3 ● ◆	
6.3	**Knowledge diffusion**	**52.2**	**10** ●	
6.3.1	Intellectual property receipts, % total trade	0.3	30	◇
6.3.2	Production and export complexity	85.6	7 ●	
6.3.3	High-tech exports, % total trade	21.0	7 ● ◆	
6.3.4	ICT services exports, % total trade	2.6	44	
Creative outputs		**40.3**	**22**	
7.1	**Intangible assets**	**36.2**	**49**	◇
7.1.1	Trademarks by origin/bn PPP$ GDP	53.7	42	
7.1.2	Global brand value, top 5,000, % GDP	26.0	47	◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	3.3	33	
7.1.4	ICTs and organizational model creation†	66.3	26	◇
7.2	**Creative goods and services**	**46.7**	**4** ● ◆	
7.2.1	Cultural and creative services exports, % total trade	0.6	44	
7.2.2	National feature films/mn pop. 15–69	7.0	29	
7.2.3	Entertainment and media market/th pop. 15–69	25.6	26	◇
7.2.4	Printing and other media, % manufacturing	0.9	63 ○	
7.2.5	Creative goods exports, % total trade	11.0	1 ● ◆	
7.3	**Online creativity**	**42.1**	**28**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	16.8	30	◇
7.3.2	Country-code TLDs/th pop. 15–69	54.2	16	
7.3.3	Wikipedia edits/mn pop. 15–69	76.4	18	
7.3.4	Mobile app creation/bn PPP$ GDP	17.3	29	

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Denmark

GII 2021 rank **9**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
11	**5**	**High**	**EUR**	**5.8**	**335.8**	**57,781**	**6**

		Score/ Value	Rank
Institutions		**88.8**	**8**
1.1	**Political environment**	**92.8**	**2 ● ◆**
1.1.1	Political and operational stability*	91.1	5 ● ◆
1.1.2	Government effectiveness*	93.7	3 ● ◆
1.2	**Regulatory environment**	**84.6**	**20**
1.2.1	Regulatory quality*	84.4	16
1.2.2	Rule of law*	96.7	5 ●
1.2.3	Cost of redundancy dismissal	18.8	78 ○
1.3	**Business environment**	**88.9**	**6**
1.3.1	Ease of starting a business*	92.7	42
1.3.2	Ease of resolving insolvency*	85.1	6
Human capital and research		**62.3**	**5 ● ◆**
2.1	**Education**	**74.2**	**5 ● ◆**
2.1.1	Expenditure on education, % GDP	7.8	3 ● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	22.9	27
2.1.3	School life expectancy, years	18.8	9
2.1.4	PISA scales in reading, maths and science	501.1	17
2.1.5	Pupil-teacher ratio, secondary ◴	9.9	26
2.2	**Tertiary education**	**43.3**	**30**
2.2.1	Tertiary enrolment, % gross	81.2	20
2.2.2	Graduates in science and engineering, %	22.2	58 ○
2.2.3	Tertiary inbound mobility, %	10.7	19
2.3	**Research and development (R&D)**	**69.5**	**7**
2.3.1	Researchers, FTE/mn pop.	7,739.4	2 ● ◆
2.3.2	Gross expenditure on R&D, % GDP	2.9	9
2.3.3	Global corporate R&D investors, top 3, mn US$	69.1	16
2.3.4	QS university ranking, top 3*	58.1	15
Infrastructure		**60.8**	**5 ●**
3.1	**Information and communication technologies (ICTs)**	**91.0**	**3 ●**
3.1.1	ICT access*	80.2	32
3.1.2	ICT use*	90.4	2 ● ◆
3.1.3	Government's online service*	97.1	3 ● ◆
3.1.4	E-participation*	96.4	9
3.2	**General infrastructure**	**39.6**	**31**
3.2.1	Electricity output, GWh/mn pop.	5,073.2	42
3.2.2	Logistics performance*	90.3	8
3.2.3	Gross capital formation, % GDP	21.2	77 ○
3.3	**Ecological sustainability**	**51.7**	**11**
3.3.1	GDP/unit of energy use	18.6	10
3.3.2	Environmental performance*	82.5	1 ●
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	3.0	28
Market sophistication		**68.0**	**7**
4.1	**Credit**	**68.5**	**8**
4.1.1	Ease of getting credit*	70.0	44 ○
4.1.2	Domestic credit to private sector, % GDP	159.7	7
4.1.3	Microfinance gross loans, % GDP	n/a	n/a
4.2	**Investment**	**58.6**	**13**
4.2.1	Ease of protecting minority investors*	72.0	27
4.2.2	Market capitalization, % GDP	n/a	n/a
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.3	11
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.1	11
4.3	**Trade, diversification, and market scale**	**76.9**	**37**
4.3.1	Applied tariff rate, weighted avg., %	1.8	25
4.3.2	Domestic industry diversification	90.0	50
4.3.3	Domestic market scale, bn PPP$	335.8	51

		Score/ Value	Rank
Business sophistication		**55.2**	**11**
5.1	**Knowledge workers**	**65.8**	**8**
5.1.1	Knowledge-intensive employment, %	48.8	11
5.1.2	Firms offering formal training, %	n/a	n/a
5.1.3	GERD performed by business, % GDP	1.8	11
5.1.4	GERD financed by business, % ◴	60.4	13
5.1.5	Females employed w/advanced degrees, %	22.9	21
5.2	**Innovation linkages**	**58.6**	**7**
5.2.1	University-industry R&D collaboration†	66.3	12
5.2.2	State of cluster development and depth†	63.1	20
5.2.3	GERD financed by abroad, % GDP ◴	0.3	9
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.2	16
5.2.5	Patent families/bn PPP$ GDP	4.8	9
5.3	**Knowledge absorption**	**41.1**	**26**
5.3.1	Intellectual property payments, % total trade	0.9	43
5.3.2	High-tech imports, % total trade	5.8	100 ○
5.3.3	ICT services imports, % total trade	3.4	6
5.3.4	FDI net inflows, % GDP	0.4	120 ○
5.3.5	Research talent, % in businesses	58.5	13
Knowledge and technology outputs		**47.6**	**14**
6.1	**Knowledge creation**	**61.5**	**10**
6.1.1	Patents by origin/bn PPP$ GDP	10.8	9
6.1.2	PCT patents by origin/bn PPP$ GDP	4.6	7
6.1.3	Utility models by origin/bn PPP$ GDP	0.2	46 ○
6.1.4	Scientific and technical articles/bn PPP$ GDP	62.2	2 ● ◆
6.1.5	Citable documents H-index	51.0	15
6.2	**Knowledge impact**	**45.1**	**13**
6.2.1	Labor productivity growth, %	−0.1	69 ○
6.2.2	New businesses/th pop. 15–64	10.0	16
6.2.3	Software spending, % GDP	0.5	13
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	7.2	38
6.2.5	High-tech manufacturing, %	48.8	13
6.3	**Knowledge diffusion**	**36.2**	**24**
6.3.1	Intellectual property receipts, % total trade	1.9	13
6.3.2	Production and export complexity	69.2	24
6.3.3	High-tech exports, % total trade	5.2	34
6.3.4	ICT services exports, % total trade	2.8	39
Creative outputs		**47.7**	**13**
7.1	**Intangible assets**	**47.2**	**23**
7.1.1	Trademarks by origin/bn PPP$ GDP	34.0	67 ○
7.1.2	Global brand value, top 5,000, % GDP	131.7	15
7.1.3	Industrial designs by origin/bn PPP$ GDP	6.8	20
7.1.4	ICTs and organizational model creation†	78.9	7
7.2	**Creative goods and services**	**32.1**	**21**
7.2.1	Cultural and creative services exports, % total trade	0.8	36
7.2.2	National feature films/mn pop. 15–69	13.4	10
7.2.3	Entertainment and media market/th pop. 15–69	76.5	4
7.2.4	Printing and other media, % manufacturing	0.9	60 ○
7.2.5	Creative goods exports, % total trade	1.5	35
7.3	**Online creativity**	**64.3**	**6**
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	49.9	16
7.3.2	Country-code TLDs/th pop. 15–69	100.0	1 ● ◆
7.3.3	Wikipedia edits/mn pop. 15–69	72.0	32
7.3.4	Mobile app creation/bn PPP$ GDP	32.1	16

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Dominican Republic

GII 2021 rank
93

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
98	**93**	**Upper middle**	**LCN**	**10.8**	**196.5**	**18,783**	**90**

		Score/ Value	Rank	
Institutions		**55.1**	**96**	
1.1	**Political environment**	**51.7**	**88**	
1.1.1	Political and operational stability*	69.6	60	
1.1.2	Government effectiveness*	42.7	91	
1.2	**Regulatory environment**	**51.9**	**101**	
1.2.1	Regulatory quality*	42.1	74	
1.2.2	Rule of law*	37.6	83	
1.2.3	Cost of redundancy dismissal	26.2	106	
1.3	**Business environment**	**61.7**	**99**	
1.3.1	Ease of starting a business*	85.4	85	
1.3.2	Ease of resolving insolvency*	38.0	108	◇
Human capital and research		**18.5**	**102**	◇
2.1	**Education**	**35.4**	**105**	◇
2.1.1	Expenditure on education, % GDP	n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap	13.1	82	
2.1.3	School life expectancy, years ⏲	14.2	68	
2.1.4	PISA scales in reading, maths and science	334.1	79	○ ◇
2.1.5	Pupil-teacher ratio, secondary	17.7	86	
2.2	**Tertiary education**	**20.1**	**94**	
2.2.1	Tertiary enrolment, % gross ⏲	59.9	50	●
2.2.2	Graduates in science and engineering, % ⏲	11.6	104	○ ◇
2.2.3	Tertiary inbound mobility, % ⏲	1.7	79	
2.3	**Research and development (R&D)**	**0.0**	**[123]**	
2.3.1	Researchers, FTE/mn pop.	n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP	n/a	n/a	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**39.6**	**75**	
3.1	**Information and communication technologies (ICTs)**	**63.1**	**76**	
3.1.1	ICT access*	46.3	95	◇
3.1.2	ICT use*	52.3	78	
3.1.3	Government's online service*	76.5	49	●
3.1.4	E-participation*	77.4	51	●
3.2	**General infrastructure**	**20.9**	**105**	
3.2.1	Electricity output, GWh/mn pop.	1,849.2	84	
3.2.2	Logistics performance*	28.6	85	
3.2.3	Gross capital formation, % GDP	20.9	81	
3.3	**Ecological sustainability**	**34.6**	**47**	●
3.3.1	GDP/unit of energy use	19.4	9	● ◆
3.3.2	Environmental performance*	46.3	68	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	121	
Market sophistication		**39.5**	**104**	◇
4.1	**Credit**	**24.2**	**117**	◇
4.1.1	Ease of getting credit*	45.0	101	◇
4.1.2	Domestic credit to private sector, % GDP	28.2	99	
4.1.3	Microfinance gross loans, % GDP	0.6	31	●
4.2	**Investment**	**34.0**	**[53]**	
4.2.1	Ease of protecting minority investors*	34.0	118	◇
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**60.3**	**94**	
4.3.1	Applied tariff rate, weighted avg., % ⏲	4.2	77	
4.3.2	Domestic industry diversification	n/a	n/a	
4.3.3	Domestic market scale, bn PPP$	196.5	65	

		Score/ Value	Rank	
Business sophistication		**21.8**	**86**	
5.1	**Knowledge workers**	**24.7**	**[86]**	
5.1.1	Knowledge-intensive employment, %	16.7	91	
5.1.2	Firms offering formal training, % ⏲	23.4	67	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, %	9.5	73	
5.2	**Innovation linkages**	**19.4**	**73**	
5.2.1	University-industry R&D collaboration†	33.0	102	
5.2.2	State of cluster development and depth†	50.0	47	●
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	125	○
5.2.5	Patent families/bn PPP$ GDP	0.0	79	
5.3	**Knowledge absorption**	**21.4**	**85**	
5.3.1	Intellectual property payments, % total trade	0.8	48	●
5.3.2	High-tech imports, % total trade ⏲	6.5	87	
5.3.3	ICT services imports, % total trade	0.3	120	◇
5.3.4	FDI net inflows, % GDP	3.6	35	●
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**11.7**	**108**	
6.1	**Knowledge creation**	**1.6**	**128**	○ ◇
6.1.1	Patents by origin/bn PPP$ GDP	0.1	111	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	75	
6.1.3	Utility models by origin/bn PPP$ GDP	0.1	56	
6.1.4	Scientific and technical articles/bn PPP$ GDP	1.1	130	○ ◇
6.1.5	Citable documents H-index	2.8	124	○
6.2	**Knowledge impact**	**21.3**	**96**	
6.2.1	Labor productivity growth, %	1.9	28	●
6.2.2	New businesses/th pop. 15–64	1.5	69	
6.2.3	Software spending, % GDP	0.0	116	○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.0	109	
6.2.5	High-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**12.2**	**83**	
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	Production and export complexity	39.7	69	
6.3.3	High-tech exports, % total trade ⏲	1.8	63	
6.3.4	ICT services exports, % total trade	0.4	104	
Creative outputs		**19.0**	**84**	
7.1	**Intangible assets**	**23.1**	**90**	
7.1.1	Trademarks by origin/bn PPP$ GDP	38.3	60	
7.1.2	Global brand value, top 5,000, % GDP	3.2	73	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.0	118	○
7.1.4	ICTs and organizational model creation†	48.9	85	
7.2	**Creative goods and services**	**20.8**	**[49]**	
7.2.1	Cultural and creative services exports, % total trade	n/a	n/a	
7.2.2	National feature films/mn pop. 15–69	3.5	53	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade ⏲	2.2	28	●
7.3	**Online creativity**	**8.8**	**103**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	2.4	73	
7.3.2	Country-code TLDs/th pop. 15–69	1.3	78	
7.3.3	Wikipedia edits/mn pop. 15–69	33.8	95	◇
7.3.4	Mobile app creation/bn PPP$ GDP	0.0	98	○

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Ecuador

GII 2021 rank
91

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
94	**92**	**Upper middle**	**LCN**	**17.6**	**185.9**	**10,617**	**99**

		Score/ Value	Rank	
Institutions		**44.1**	**126**	○ ◇
1.1	**Political environment**	**45.1**	**103**	◇
1.1.1	Political and operational stability*	51.8	119	◇
1.1.2	Government effectiveness*	41.8	94	◇
1.2	**Regulatory environment**	**39.8**	**121**	◇
1.2.1	Regulatory quality*	22.0	119	◇
1.2.2	Rule of law*	31.5	101	
1.2.3	Cost of redundancy dismissal	31.8	122	○ ◇
1.3	**Business environment**	**47.3**	**128**	○ ◇
1.3.1	Ease of starting a business*	69.1	128	○ ◇
1.3.2	Ease of resolving insolvency*	25.5	126	○ ◇
Human capital and research		**20.5**	**97**	◇
2.1	**Education**	**41.6**	**89**	
2.1.1	Expenditure on education, % GDP	5.0	39	●
2.1.2	Government funding/pupil, secondary, % GDP/cap	6.7	100	○ ◇
2.1.3	School life expectancy, years	14.8	56	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	20.6	97	
2.2	**Tertiary education**	**13.6**	**106**	◇
2.2.1	Tertiary enrolment, % gross	47.6	66	
2.2.2	Graduates in science and engineering, %	9.4	110	○ ◇
2.2.3	Tertiary inbound mobility, %	0.8	93	
2.3	**Research and development (R&D)**	**6.4**	**73**	
2.3.1	Researchers, FTE/mn pop.	399.5	72	
2.3.2	Gross expenditure on R&D, % GDP	0.4	70	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	12.4	62	●
Infrastructure		**39.6**	**74**	
3.1	**Information and communication technologies (ICTs)**	**63.7**	**73**	
3.1.1	ICT access*	51.3	90	
3.1.2	ICT use*	42.6	97	◇
3.1.3	Government's online service*	81.2	40	●
3.1.4	E-participation*	79.8	49	●
3.2	**General infrastructure**	**24.8**	**85**	
3.2.1	Electricity output, GWh/mn pop.	1,859.1	83	
3.2.2	Logistics performance*	38.8	61	
3.2.3	Gross capital formation, % GDP	22.4	63	
3.3	**Ecological sustainability**	**30.3**	**57**	●
3.3.1	GDP/unit of energy use	13.0	38	●
3.3.2	Environmental performance*	51.0	54	●
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.8	72	
Market sophistication		**50.3**	**44**	●
4.1	**Credit**	**44.5**	**52**	●
4.1.1	Ease of getting credit*	45.0	101	◇
4.1.2	Domestic credit to private sector, % GDP	42.8	78	
4.1.3	Microfinance gross loans, % GDP	6.1	1	● ◆
4.2	**Investment**	**44.0**	**[26]**	
4.2.1	Ease of protecting minority investors*	44.0	98	◇
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**62.6**	**85**	
4.3.1	Applied tariff rate, weighted avg., %	8.1	104	
4.3.2	Domestic industry diversification	77.5	85	
4.3.3	Domestic market scale, bn PPP$	185.9	66	

		Score/ Value	Rank	
Business sophistication		**19.9**	**97**	
5.1	**Knowledge workers**	**28.5**	**78**	
5.1.1	Knowledge-intensive employment, %	13.9	95	◇
5.1.2	Firms offering formal training, %	73.7	2	● ◆
5.1.3	GERD performed by business, % GDP	0.2	55	
5.1.4	GERD financed by business, %	0.1	99	○ ◇
5.1.5	Females employed w/advanced degrees, %	8.7	76	
5.2	**Innovation linkages**	**13.0**	**118**	◇
5.2.1	University-industry R&D collaboration†	31.3	108	◇
5.2.2	State of cluster development and depth†	39.7	102	
5.2.3	GERD financed by abroad, % GDP	0.0	77	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	121	○
5.2.5	Patent families/bn PPP$ GDP	0.0	84	
5.3	**Knowledge absorption**	**18.2**	**101**	
5.3.1	Intellectual property payments, % total trade	0.5	67	
5.3.2	High-tech imports, % total trade	6.4	90	
5.3.3	ICT services imports, % total trade	0.4	112	◇
5.3.4	FDI net inflows, % GDP	0.9	108	
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**13.2**	**97**	
6.1	**Knowledge creation**	**7.6**	**91**	
6.1.1	Patents by origin/bn PPP$ GDP	0.1	107	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	89	
6.1.3	Utility models by origin/bn PPP$ GDP	0.2	44	
6.1.4	Scientific and technical articles/bn PPP$ GDP	11.6	72	
6.1.5	Citable documents H-index	9.3	81	
6.2	**Knowledge impact**	**27.2**	**75**	
6.2.1	Labor productivity growth, %	0.2	62	
6.2.2	New businesses/th pop. 15–64	n/a	n/a	
6.2.3	Software spending, % GDP	0.2	64	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	5.6	52	●
6.2.5	High-tech manufacturing, %	13.3	82	
6.3	**Knowledge diffusion**	**4.8**	**121**	◇
6.3.1	Intellectual property receipts, % total trade	0.0	73	
6.3.2	Production and export complexity	21.4	109	◇
6.3.3	High-tech exports, % total trade	0.3	104	
6.3.4	ICT services exports, % total trade	0.2	117	
Creative outputs		**18.5**	**86**	
7.1	**Intangible assets**	**29.4**	**74**	
7.1.1	Trademarks by origin/bn PPP$ GDP	59.6	36	●
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.4	91	
7.1.4	ICTs and organizational model creation†	52.9	66	
7.2	**Creative goods and services**	**4.6**	**108**	
7.2.1	Cultural and creative services exports, % total trade	0.0	109	○
7.2.2	National feature films/mn pop. 15–69	2.1	64	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	0.9	62	
7.2.5	Creative goods exports, % total trade	0.0	114	
7.3	**Online creativity**	**10.7**	**90**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	1.9	78	
7.3.2	Country-code TLDs/th pop. 15–69	1.1	84	
7.3.3	Wikipedia edits/mn pop. 15–69	40.9	83	
7.3.4	Mobile app creation/bn PPP$ GDP	0.2	86	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Egypt

GII 2021 rank
94

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
86	**102**	**Lower middle**	**NAWA**	**102.3**	**1,292.5**	**12,719**	**96**

		Score/ Value	Rank	
Institutions		**49.3**	**114**	
1.1	**Political environment**	**47.1**	**99**	
1.1.1	Political and operational stability*	58.9	100	
1.1.2	Government effectiveness*	41.2	95	
1.2	**Regulatory environment**	**35.8**	**124**	○ ◇
1.2.1	Regulatory quality*	21.9	121	○
1.2.2	Rule of law*	35.6	87	
1.2.3	Cost of redundancy dismissal	36.8	125	○ ◇
1.3	**Business environment**	**65.0**	**84**	
1.3.1	Ease of starting a business*	87.8	72	
1.3.2	Ease of resolving insolvency*	42.2	93	
Human capital and research		**21.8**	**93**	
2.1	**Education**	**40.7**	**[93]**	
2.1.1	Expenditure on education, % GDP	n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap	11.8	85	
2.1.3	School life expectancy, years	13.6	75	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	15.8	78	
2.2	**Tertiary education**	**13.9**	**105**	
2.2.1	Tertiary enrolment, % gross	38.9	76	
2.2.2	Graduates in science and engineering, %	11.2	105	○ ◇
2.2.3	Tertiary inbound mobility, %	1.8	78	
2.3	**Research and development (R&D)**	**10.7**	**55**	◆
2.3.1	Researchers, FTE/mn pop.	686.7	60	
2.3.2	Gross expenditure on R&D, % GDP	0.7	49	◆
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	20.4	52	● ◆
Infrastructure		**33.5**	**92**	
3.1	**Information and communication technologies (ICTs)**	**52.5**	**92**	
3.1.1	ICT access*	58.8	78	◆
3.1.2	ICT use*	43.1	95	
3.1.3	Government's online service*	57.1	94	
3.1.4	E-participation*	51.2	99	
3.2	**General infrastructure**	**21.4**	**102**	
3.2.1	Electricity output, GWh/mn pop.	1,971.8	81	
3.2.2	Logistics performance*	36.1	66	
3.2.3	Gross capital formation, % GDP	19.0	96	
3.3	**Ecological sustainability**	**26.7**	**76**	◆
3.3.1	GDP/unit of energy use	12.1	48	●
3.3.2	Environmental performance*	43.3	81	◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.8	73	
Market sophistication		**40.9**	**96**	
4.1	**Credit**	**29.5**	**108**	
4.1.1	Ease of getting credit*	65.0	61	
4.1.2	Domestic credit to private sector, % GDP	24.0	109	
4.1.3	Microfinance gross loans, % GDP	0.1	62	
4.2	**Investment**	**19.6**	**117**	○
4.2.1	Ease of protecting minority investors*	64.0	56	
4.2.2	Market capitalization, % GDP	17.0	62	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	67	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	60	
4.3	**Trade, diversification, and market scale**	**73.6**	**49**	●
4.3.1	Applied tariff rate, weighted avg., %	10.4	119	○
4.3.2	Domestic industry diversification	92.2	45	●
4.3.3	Domestic market scale, bn PPP$	1,292.5	19	● ◆

		Score/ Value	Rank	
Business sophistication		**18.0**	**106**	
5.1	**Knowledge workers**	**13.9**	**113**	
5.1.1	Knowledge-intensive employment, %	29.6	50	◆
5.1.2	Firms offering formal training, %	7.9	96	○ ◇
5.1.3	GERD performed by business, % GDP	0.0	79	○
5.1.4	GERD financed by business, %	3.9	86	
5.1.5	Females employed w/advanced degrees, %	5.8	92	
5.2	**Innovation linkages**	**20.7**	**65**	
5.2.1	University-industry R&D collaboration†	44.3	56	
5.2.2	State of cluster development and depth†	67.2	12	● ◆
5.2.3	GERD financed by abroad, % GDP	0.0	87	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	101	
5.2.5	Patent families/bn PPP$ GDP	0.0	95	
5.3	**Knowledge absorption**	**19.6**	**96**	
5.3.1	Intellectual property payments, % total trade	0.3	80	
5.3.2	High-tech imports, % total trade	9.3	40	●
5.3.3	ICT services imports, % total trade	1.0	80	
5.3.4	FDI net inflows, % GDP	3.1	44	●
5.3.5	Research talent, % in businesses	6.3	68	
Knowledge and technology outputs		**19.4**	**70**	
6.1	**Knowledge creation**	**13.8**	**68**	
6.1.1	Patents by origin/bn PPP$ GDP	0.8	69	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	77	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	15.9	54	
6.1.5	Citable documents H-index	17.7	46	● ◆
6.2	**Knowledge impact**	**33.0**	**53**	● ◆
6.2.1	Labor productivity growth, %	4.5	9	●
6.2.2	New businesses/th pop. 15–64	n/a	n/a	
6.2.3	Software spending, % GDP	0.2	72	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.9	90	
6.2.5	High-tech manufacturing, %	21.8	58	
6.3	**Knowledge diffusion**	**11.3**	**90**	
6.3.1	Intellectual property receipts, % total trade	0.0	99	
6.3.2	Production and export complexity	42.5	66	
6.3.3	High-tech exports, % total trade	0.5	90	
6.3.4	ICT services exports, % total trade	1.2	73	
Creative outputs		**15.5**	**104**	
7.1	**Intangible assets**	**21.3**	**95**	
7.1.1	Trademarks by origin/bn PPP$ GDP	18.7	95	
7.1.2	Global brand value, top 5,000, % GDP	3.1	75	
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.4	58	
7.1.4	ICTs and organizational model creation†	56.0	57	
7.2	**Creative goods and services**	**8.2**	**87**	
7.2.1	Cultural and creative services exports, % total trade	n/a	n/a	
7.2.2	National feature films/mn pop. 15–69	0.6	94	○
7.2.3	Entertainment and media market/th pop. 15–69	0.8	61	○
7.2.4	Printing and other media, % manufacturing	0.5	84	
7.2.5	Creative goods exports, % total trade	1.3	40	●
7.3	**Online creativity**	**11.4**	**87**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	1.2	92	
7.3.2	Country-code TLDs/th pop. 15–69	0.0	123	○
7.3.3	Wikipedia edits/mn pop. 15–69	45.1	76	◆
7.3.4	Mobile app creation/bn PPP$ GDP	0.2	85	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

El Salvador

GII 2021 rank
96

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
89	**100**	**Lower middle**	**LCN**	**6.5**	**54.5**	**8,401**	**92**

		Score/ Value	Rank	
Institutions		**54.5**	**98**	
1.1	**Political environment**	**48.3**	**94**	
1.1.1	Political and operational stability*	64.3	80	
1.1.2	Government effectiveness*	40.3	97	
1.2	**Regulatory environment**	**53.0**	**99**	
1.2.1	Regulatory quality*	44.1	69	◆
1.2.2	Rule of law*	26.6	111	
1.2.3	Cost of redundancy dismissal	22.9	97	
1.3	**Business environment**	**62.1**	**96**	
1.3.1	Ease of starting a business*	78.6	112	
1.3.2	Ease of resolving insolvency*	45.6	83	
Human capital and research		**18.1**	**106**	
2.1	**Education**	**31.2**	**112**	
2.1.1	Expenditure on education, % GDP	3.6	80	
2.1.2	Government funding/pupil, secondary, % GDP/cap	14.2	79	
2.1.3	School life expectancy, years	11.6	94	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	27.6	113	◇
2.2	**Tertiary education**	**22.0**	**92**	
2.2.1	Tertiary enrolment, % gross	29.4	86	
2.2.2	Graduates in science and engineering, %	21.4	64	
2.2.3	Tertiary inbound mobility, %	0.5	96	
2.3	**Research and development (R&D)**	**0.9**	**105**	
2.3.1	Researchers, FTE/mn pop.	71.2	92	
2.3.2	Gross expenditure on R&D, % GDP	0.2	94	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**30.5**	**99**	
3.1	**Information and communication technologies (ICTs)**	**52.1**	**93**	
3.1.1	ICT access*	49.4	91	
3.1.2	ICT use*	33.7	103	
3.1.3	Government's online service*	57.6	93	
3.1.4	E-participation*	67.9	75	
3.2	**General infrastructure**	**14.0**	**121**	○
3.2.1	Electricity output, GWh/mn pop.	941.9	98	
3.2.2	Logistics performance*	24.6	97	
3.2.3	Gross capital formation, % GDP	14.7	115	◇
3.3	**Ecological sustainability**	**25.3**	**79**	
3.3.1	GDP/unit of energy use	11.7	53	●
3.3.2	Environmental performance*	43.1	82	◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.3	93	
Market sophistication		**39.1**	**105**	
4.1	**Credit**	**42.0**	**61**	
4.1.1	Ease of getting credit*	80.0	23	●
4.1.2	Domestic credit to private sector, % GDP	54.0	61	
4.1.3	Microfinance gross loans, % GDP	0.4	38	
4.2	**Investment**	**19.9**	**[115]**	
4.2.1	Ease of protecting minority investors*	36.0	116	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	62	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**55.6**	**107**	
4.3.1	Applied tariff rate, weighted avg., %	2.0	56	● ◆
4.3.2	Domestic industry diversification	n/a	n/a	
4.3.3	Domestic market scale, bn PPP$	54.5	101	

		Score/ Value	Rank	
Business sophistication		**22.4**	**80**	
5.1	**Knowledge workers**	**29.3**	**72**	
5.1.1	Knowledge-intensive employment, %	12.3	103	
5.1.2	Firms offering formal training, %	53.8	13	● ◆
5.1.3	GERD performed by business, % GDP	0.1	71	
5.1.4	GERD financed by business, %	35.2	54	
5.1.5	Females employed w/advanced degrees, %	4.3	97	
5.2	**Innovation linkages**	**11.0**	**126**	○ ◇
5.2.1	University-industry R&D collaboration†	26.2	121	○ ◇
5.2.2	State of cluster development and depth†	33.9	116	○ ◇
5.2.3	GERD financed by abroad, % GDP	0.0	80	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	124	○
5.2.5	Patent families/bn PPP$ GDP	0.0	88	
5.3	**Knowledge absorption**	**26.9**	**66**	
5.3.1	Intellectual property payments, % total trade	1.1	35	● ◆
5.3.2	High-tech imports, % total trade	8.9	47	●
5.3.3	ICT services imports, % total trade	0.5	102	
5.3.4	FDI net inflows, % GDP	2.1	76	
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**8.3**	**124**	○
6.1	**Knowledge creation**	**1.3**	**131**	○ ◇
6.1.1	Patents by origin/bn PPP$ GDP	0.0	126	○
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	91	
6.1.3	Utility models by origin/bn PPP$ GDP	0.1	58	
6.1.4	Scientific and technical articles/bn PPP$ GDP	1.1	129	○ ◇
6.1.5	Citable documents H-index	2.6	125	○
6.2	**Knowledge impact**	**4.6**	**[128]**	
6.2.1	Labor productivity growth, %	n/a	n/a	
6.2.2	New businesses/th pop. 15–64	0.6	93	
6.2.3	Software spending, % GDP	0.0	100	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	2.7	80	
6.2.5	High-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**18.9**	**57**	
6.3.1	Intellectual property receipts, % total trade	0.3	34	● ◆
6.3.2	Production and export complexity	47.0	53	◆
6.3.3	High-tech exports, % total trade	2.2	53	●
6.3.4	ICT services exports, % total trade	2.4	47	●
Creative outputs		**26.0**	**57**	◆
7.1	**Intangible assets**	**44.6**	**31**	● ◆
7.1.1	Trademarks by origin/bn PPP$ GDP	82.3	20	● ◆
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.1	107	
7.1.4	ICTs and organizational model creation†	42.7	103	
7.2	**Creative goods and services**	**4.9**	**[106]**	
7.2.1	Cultural and creative services exports, % total trade	0.0	106	○
7.2.2	National feature films/mn pop. 15–69	n/a	n/a	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.6	58	
7.3	**Online creativity**	**9.9**	**93**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	2.5	72	◆
7.3.2	Country-code TLDs/th pop. 15–69	0.6	96	
7.3.3	Wikipedia edits/mn pop. 15–69	38.2	87	
7.3.4	Mobile app creation/bn PPP$ GDP	0.0	101	○

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Estonia

GII 2021 rank
21

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
20	**24**	**High**	**EUR**	**1.3**	**49.1**	**37,033**	**25**

		Score/ Value	Rank	
Institutions		**81.1**	**22**	
1.1	**Political environment**	**79.1**	**23**	
1.1.1	Political and operational stability*	83.9	13	
1.1.2	Government effectiveness*	76.8	25	
1.2	**Regulatory environment**	**86.5**	**16**	
1.2.1	Regulatory quality*	85.1	15	
1.2.2	Rule of law*	80.5	22	
1.2.3	Cost of redundancy dismissal	12.9	39	
1.3	**Business environment**	**77.7**	**41**	◇
1.3.1	Ease of starting a business*	95.4	13	
1.3.2	Ease of resolving insolvency*	60.1	49	◇
Human capital and research		**42.9**	**34**	◇
2.1	**Education**	**58.2**	**36**	
2.1.1	Expenditure on education, % GDP	5.0	40	
2.1.2	Government funding/pupil, secondary, % GDP/cap ⏲	19.1	54	○
2.1.3	School life expectancy, years	15.9	38	
2.1.4	PISA scales in reading, maths and science	525.5	4	●
2.1.5	Pupil-teacher ratio, secondary ⏲	9.7	24	
2.2	**Tertiary education**	**45.9**	**19**	
2.2.1	Tertiary enrolment, % gross	70.4	32	
2.2.2	Graduates in science and engineering, %	27.7	26	
2.2.3	Tertiary inbound mobility, %	9.6	24	
2.3	**Research and development (R&D)**	**24.6**	**42**	◇
2.3.1	Researchers, FTE/mn pop.	3,765.7	28	◇
2.3.2	Gross expenditure on R&D, % GDP	1.6	22	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	21.3	48	◇
Infrastructure		**59.8**	**8**	
3.1	**Information and communication technologies (ICTs)**	**90.7**	**5**	●
3.1.1	ICT access*	82.1	26	
3.1.2	ICT use*	81.3	21	
3.1.3	Government's online service*	99.4	2	● ◆
3.1.4	E-participation*	100.0	1	●
3.2	**General infrastructure**	**39.0**	**33**	
3.2.1	Electricity output, GWh/mn pop.	9,370.7	16	
3.2.2	Logistics performance*	58.7	35	◇
3.2.3	Gross capital formation, % GDP	25.2	44	
3.3	**Ecological sustainability**	**49.7**	**16**	
3.3.1	GDP/unit of energy use	8.8	83	○
3.3.2	Environmental performance*	65.3	30	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	10.1	4	● ◆
Market sophistication		**66.4**	**10**	
4.1	**Credit**	**46.6**	**44**	
4.1.1	Ease of getting credit*	70.0	44	
4.1.2	Domestic credit to private sector, % GDP	59.0	56	◇
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**80.6**	**4**	● ◆
4.2.1	Ease of protecting minority investors*	58.0	77	○ ◇
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.4	8	◆
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.2	5	● ◆
4.3	**Trade, diversification, and market scale**	**71.9**	**56**	
4.3.1	Applied tariff rate, weighted avg., %	1.8	25	
4.3.2	Domestic industry diversification ⏲	96.9	18	
4.3.3	Domestic market scale, bn PPP$	49.1	102	○ ◇

		Score/ Value	Rank	
Business sophistication		**39.9**	**29**	◇
5.1	**Knowledge workers**	**52.0**	**25**	◇
5.1.1	Knowledge-intensive employment, %	46.6	14	
5.1.2	Firms offering formal training, %	40.7	27	
5.1.3	GERD performed by business, % GDP	0.9	25	
5.1.4	GERD financed by business, %	40.8	43	◇
5.1.5	Females employed w/advanced degrees, %	27.0	7	●
5.2	**Innovation linkages**	**32.9**	**29**	◇
5.2.1	University-industry R&D collaboration†	48.8	43	◇
5.2.2	State of cluster development and depth†	46.4	65	○ ◇
5.2.3	GERD financed by abroad, % GDP	0.2	20	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.1	20	
5.2.5	Patent families/bn PPP$ GDP	0.9	28	◇
5.3	**Knowledge absorption**	**34.8**	**42**	◇
5.3.1	Intellectual property payments, % total trade	0.3	82	○ ◇
5.3.2	High-tech imports, % total trade	8.5	53	
5.3.3	ICT services imports, % total trade	2.8	11	
5.3.4	FDI net inflows, % GDP	6.6	15	
5.3.5	Research talent, % in businesses	39.1	33	◇
Knowledge and technology outputs		**38.4**	**22**	
6.1	**Knowledge creation**	**30.9**	**32**	◇
6.1.1	Patents by origin/bn PPP$ GDP	1.6	46	◇
6.1.2	PCT patents by origin/bn PPP$ GDP	1.1	27	◇
6.1.3	Utility models by origin/bn PPP$ GDP	1.3	19	
6.1.4	Scientific and technical articles/bn PPP$ GDP	43.5	14	
6.1.5	Citable documents H-index	17.4	47	◇
6.2	**Knowledge impact**	**48.1**	**9**	
6.2.1	Labor productivity growth, %	2.2	25	◆
6.2.2	New businesses/th pop. 15–64	23.6	2	● ◆
6.2.3	Software spending, % GDP	0.1	78	○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	19.5	13	◆
6.2.5	High-tech manufacturing, %	32.2	40	
6.3	**Knowledge diffusion**	**36.0**	**25**	
6.3.1	Intellectual property receipts, % total trade	0.1	61	○ ◇
6.3.2	Production and export complexity	66.2	28	
6.3.3	High-tech exports, % total trade	8.4	21	
6.3.4	ICT services exports, % total trade	4.6	19	
Creative outputs		**45.3**	**15**	
7.1	**Intangible assets**	**44.3**	**33**	
7.1.1	Trademarks by origin/bn PPP$ GDP	80.7	21	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	3.5	30	
7.1.4	ICTs and organizational model creation†	79.3	5	●
7.2	**Creative goods and services**	**36.5**	**17**	
7.2.1	Cultural and creative services exports, % total trade	2.0	7	
7.2.2	National feature films/mn pop. 15–69	19.5	5	● ◆
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.9	17	
7.2.5	Creative goods exports, % total trade	1.0	43	
7.3	**Online creativity**	**56.1**	**14**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	10.4	39	◇
7.3.2	Country-code TLDs/th pop. 15–69	44.0	17	
7.3.3	Wikipedia edits/mn pop. 15–69	88.7	3	● ◆
7.3.4	Mobile app creation/bn PPP$ GDP	75.8	8	◆

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Ethiopia

GII 2021 rank
126

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
107	**129**	**Low**	**SSF**	**115.0**	**272.0**	**2,772**	**127**

Institutions — 48.4 — 116

		Score/ Value	Rank	
1.1	**Political environment**	**41.6**	**113**	
1.1.1	Political and operational stability*	51.8	119	
1.1.2	Government effectiveness*	36.5	107	
1.2	**Regulatory environment**	**52.6**	**100**	
1.2.1	Regulatory quality*	20.3	123	
1.2.2	Rule of law*	34.2	93	
1.2.3	Cost of redundancy dismissal	19.1	81	
1.3	**Business environment**	**51.0**	**126**	◇
1.3.1	Ease of starting a business*	71.7	122	◇
1.3.2	Ease of resolving insolvency*	30.3	119	◇

Human capital and research — 10.5 — 126

		Score/ Value	Rank	
2.1	**Education**	**24.8**	**124**	
2.1.1	Expenditure on education, % GDP ◴	4.7	49	●
2.1.2	Government funding/pupil, secondary, % GDP/cap ◴	16.8	67	
2.1.3	School life expectancy, years ◴	8.4	116	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary ◴	43.7	123	○ ◇
2.2	**Tertiary education**	**5.1**	**[125]**	
2.2.1	Tertiary enrolment, % gross ◴	8.1	118	
2.2.2	Graduates in science and engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research and development (R&D)**	**1.6**	**100**	
2.3.1	Researchers, FTE/mn pop. ◴	90.5	89	◆
2.3.2	Gross expenditure on R&D, % GDP ◴	0.3	85	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇

Infrastructure — 24.6 — 121

		Score/ Value	Rank	
3.1	**Information and communication technologies (ICTs)**	**25.6**	**127**	
3.1.1	ICT access*	21.7	132	○ ◇
3.1.2	ICT use*	10.9	129	
3.1.3	Government's online service*	36.5	119	
3.1.4	E-participation*	33.3	120	
3.2	**General infrastructure**	**34.0**	**43**	●
3.2.1	Electricity output, GWh/mn pop.	124.3	121	
3.2.2	Logistics performance*	n/a	n/a	
3.2.3	Gross capital formation, % GDP	36.7	11	●
3.3	**Ecological sustainability**	**14.1**	**127**	
3.3.1	GDP/unit of energy use	4.8	118	
3.3.2	Environmental performance*	34.4	105	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.0	132	○ ◇

Market sophistication — 26.1 — 130 — ◇

		Score/ Value	Rank	
4.1	**Credit**	**10.1**	**128**	
4.1.1	Ease of getting credit*	15.0	127	◇
4.1.2	Domestic credit to private sector, % GDP	n/a	n/a	
4.1.3	Microfinance gross loans, % GDP	0.0	66	
4.2	**Investment**	**4.0**	**132**	○ ◇
4.2.1	Ease of protecting minority investors*	10.0	132	○ ◇
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	87	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	87	◇
4.3	**Trade, diversification, and market scale**	**64.3**	**76**	◆
4.3.1	Applied tariff rate, weighted avg., % ◴	12.1	126	◇
4.3.2	Domestic industry diversification ◴	89.1	54	●
4.3.3	Domestic market scale, bn PPP$	272.0	58	● ◆

Business sophistication — 14.5 — 126

		Score/ Value	Rank	
5.1	**Knowledge workers**	**5.4**	**130**	◇
5.1.1	Knowledge-intensive employment, % ◴	4.5	119	
5.1.2	Firms offering formal training, % ◴	20.8	74	
5.1.3	GERD performed by business, % GDP ◴	0.0	88	
5.1.4	GERD financed by business, % ◴	1.5	92	
5.1.5	Females employed w/advanced degrees, % ◴	0.3	123	
5.2	**Innovation linkages**	**15.0**	**108**	
5.2.1	University-industry R&D collaboration† ◴	39.6	78	
5.2.2	State of cluster development and depth† ◴	37.7	110	
5.2.3	GERD financed by abroad, % GDP ◴	0.1	51	●
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	105	
5.2.5	Patent families/bn PPP$ GDP	0.0	100	○ ◇
5.3	**Knowledge absorption**	**23.1**	**75**	
5.3.1	Intellectual property payments, % total trade	0.1	103	
5.3.2	High-tech imports, % total trade ◴	15.2	12	● ◆
5.3.3	ICT services imports, % total trade	0.9	83	
5.3.4	FDI net inflows, % GDP	3.8	30	●
5.3.5	Research talent, % in businesses ◴	2.2	76	

Knowledge and technology outputs — 16.2 — 81 — ◆

		Score/ Value	Rank	
6.1	**Knowledge creation**	**18.0**	**57**	● ◆
6.1.1	Patents by origin/bn PPP$ GDP ◴	0.1	119	
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP ◴	1.7	13	●
6.1.4	Scientific and technical articles/bn PPP$ GDP	13.0	68	
6.1.5	Citable documents H-index	8.6	84	◆
6.2	**Knowledge impact**	**23.5**	**87**	
6.2.1	Labor productivity growth, %	5.3	5	● ◆
6.2.2	New businesses/th pop. 15–64	0.5	97	
6.2.3	Software spending, % GDP	0.0	125	○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.2	130	
6.2.5	High-tech manufacturing, % ◴	13.6	79	
6.3	**Knowledge diffusion**	**7.1**	**109**	
6.3.1	Intellectual property receipts, % total trade	0.0	78	
6.3.2	Production and export complexity	28.7	96	
6.3.3	High-tech exports, % total trade ◴	0.3	97	
6.3.4	ICT services exports, % total trade	0.6	97	

Creative outputs — 8.7 — 127

		Score/ Value	Rank	
7.1	**Intangible assets**	**13.0**	**124**	
7.1.1	Trademarks by origin/bn PPP$ GDP ◴	2.3	127	○ ◇
7.1.2	Global brand value, top 5,000, % GDP	2.9	76	
7.1.3	Industrial designs by origin/bn PPP$ GDP	n/a	n/a	
7.1.4	ICTs and organizational model creation†	38.2	117	
7.2	**Creative goods and services**	**8.7**	**[85]**	
7.2.1	Cultural and creative services exports, % total trade	0.0	105	
7.2.2	National feature films/mn pop. 15–69	n/a	n/a	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing ◴	1.8	21	●
7.2.5	Creative goods exports, % total trade ◴	0.0	116	
7.3	**Online creativity**	**0.0**	**132**	○ ◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.0	130	
7.3.2	Country-code TLDs/th pop. 15–69	0.0	131	
7.3.3	Wikipedia edits/mn pop. 15–69	6.1	131	○ ◇
7.3.4	Mobile app creation/bn PPP$ GDP ◴	0.0	104	○ ◇

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Finland

GII 2021 rank **7**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
9	**6**	**High**	**EUR**	**5.5**	**272.7**	**49,334**	**7**

		Score/ Value	Rank
Institutions		**93.3**	**2** ● ◆
1.1	**Political environment**	**90.9**	**5** ●
1.1.1	Political and operational stability*	85.7	11
1.1.2	Government effectiveness*	93.5	4 ● ◆
1.2	**Regulatory environment**	**95.9**	**5** ●
1.2.1	Regulatory quality*	91.9	6
1.2.2	Rule of law*	100.0	1 ● ◆
1.2.3	Cost of redundancy dismissal	10.1	31
1.3	**Business environment**	**93.1**	**1** ● ◆
1.3.1	Ease of starting a business*	93.5	29
1.3.2	Ease of resolving insolvency*	92.7	1 ● ◆
Human capital and research		**62.4**	**4** ● ◆
2.1	**Education**	**69.6**	**9**
2.1.1	Expenditure on education, % GDP	6.4	10
2.1.2	Government funding/pupil, secondary, % GDP/cap	22.7	32
2.1.3	School life expectancy, years	19.5	6 ◆
2.1.4	PISA scales in reading, maths and science	516.4	8
2.1.5	Pupil-teacher ratio, secondary ⏲	13.8	65 ○
2.2	**Tertiary education**	**51.1**	**12**
2.2.1	Tertiary enrolment, % gross	90.3	9
2.2.2	Graduates in science and engineering, %	28.1	22
2.2.3	Tertiary inbound mobility, %	8.1	30
2.3	**Research and development (R&D)**	**66.6**	**10**
2.3.1	Researchers, FTE/mn pop.	7,227.6	4 ● ◆
2.3.2	Gross expenditure on R&D, % GDP	2.8	11
2.3.3	Global corporate R&D investors, top 3, mn US$	75.5	11
2.3.4	QS university ranking, top 3*	48.7	20
Infrastructure		**59.5**	**11**
3.1	**Information and communication technologies (ICTs)**	**86.8**	**17**
3.1.1	ICT access*	73.6	50 ◇
3.1.2	ICT use*	81.2	22
3.1.3	Government's online service*	97.1	3 ● ◆
3.1.4	E-participation*	95.2	14
3.2	**General infrastructure**	**48.8**	**12**
3.2.1	Electricity output, GWh/mn pop.	12,435.1	10
3.2.2	Logistics performance*	89.2	10
3.2.3	Gross capital formation, % GDP	24.6	51
3.3	**Ecological sustainability**	**42.9**	**30**
3.3.1	GDP/unit of energy use	7.5	99 ○
3.3.2	Environmental performance*	78.9	7
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	5.4	20
Market sophistication		**58.7**	**19**
4.1	**Credit**	**49.4**	**34**
4.1.1	Ease of getting credit*	60.0	74 ○
4.1.2	Domestic credit to private sector, % GDP	95.1	26
4.1.3	Microfinance gross loans, % GDP	n/a	n/a
4.2	**Investment**	**48.2**	**22**
4.2.1	Ease of protecting minority investors*	62.0	60 ○
4.2.2	Market capitalization, % GDP	n/a	n/a
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.2	18
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.1	10
4.3	**Trade, diversification, and market scale**	**78.5**	**32**
4.3.1	Applied tariff rate, weighted avg., %	1.8	25
4.3.2	Domestic industry diversification	96.0	21
4.3.3	Domestic market scale, bn PPP$	272.7	57 ○

		Score/ Value	Rank
Business sophistication		**61.0**	**6**
5.1	**Knowledge workers**	**66.0**	**7**
5.1.1	Knowledge-intensive employment, %	48.8	10
5.1.2	Firms offering formal training, %	n/a	n/a
5.1.3	GERD performed by business, % GDP	1.8	10
5.1.4	GERD financed by business, %	54.3	21
5.1.5	Females employed w/advanced degrees, %	28.0	4 ● ◆
5.2	**Innovation linkages**	**70.1**	**3** ● ◆
5.2.1	University-industry R&D collaboration†	72.5	4 ●
5.2.2	State of cluster development and depth†	63.1	19
5.2.3	GERD financed by abroad, % GDP	0.4	5
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.2	11
5.2.5	Patent families/bn PPP$ GDP	5.7	1 ● ◆
5.3	**Knowledge absorption**	**46.7**	**17**
5.3.1	Intellectual property payments, % total trade	1.0	39
5.3.2	High-tech imports, % total trade	7.2	74 ○
5.3.3	ICT services imports, % total trade	4.4	3 ● ◆
5.3.4	FDI net inflows, % GDP	2.9	54
5.3.5	Research talent, % in businesses	57.2	16
Knowledge and technology outputs		**56.5**	**5** ●
6.1	**Knowledge creation**	**62.5**	**9**
6.1.1	Patents by origin/bn PPP$ GDP	10.8	10
6.1.2	PCT patents by origin/bn PPP$ GDP	6.1	1 ● ◆
6.1.3	Utility models by origin/bn PPP$ GDP	1.0	23
6.1.4	Scientific and technical articles/bn PPP$ GDP	52.1	7
6.1.5	Citable documents H-index	43.2	19
6.2	**Knowledge impact**	**39.2**	**26**
6.2.1	Labor productivity growth, %	–1.0	82 ○
6.2.2	New businesses/th pop. 15–64	4.3	35
6.2.3	Software spending, % GDP	0.4	21
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	9.4	29
6.2.5	High-tech manufacturing, %	40.4	25
6.3	**Knowledge diffusion**	**67.9**	**3** ● ◆
6.3.1	Intellectual property receipts, % total trade	3.3	1 ● ◆
6.3.2	Production and export complexity	79.6	12
6.3.3	High-tech exports, % total trade	4.3	38
6.3.4	ICT services exports, % total trade	11.3	5 ● ◆
Creative outputs		**42.9**	**16**
7.1	**Intangible assets**	**44.4**	**32**
7.1.1	Trademarks by origin/bn PPP$ GDP	38.2	62 ○
7.1.2	Global brand value, top 5,000, % GDP	111.4	18
7.1.3	Industrial designs by origin/bn PPP$ GDP	3.4	32
7.1.4	ICTs and organizational model creation†	80.4	3 ● ◆
7.2	**Creative goods and services**	**24.1**	**41** ◇
7.2.1	Cultural and creative services exports, % total trade	0.9	33
7.2.2	National feature films/mn pop. 15–69	10.7	17
7.2.3	Entertainment and media market/th pop. 15–69	54.8	11
7.2.4	Printing and other media, % manufacturing	0.9	56 ○
7.2.5	Creative goods exports, % total trade	0.5	61 ○
7.3	**Online creativity**	**58.8**	**11**
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	29.2	21
7.3.2	Country-code TLDs/th pop. 15–69	40.0	18
7.3.3	Wikipedia edits/mn pop. 15–69	83.8	7
7.3.4	Mobile app creation/bn PPP$ GDP	77.7	7 ◆

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

France

GII 2021 rank **11**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
10	**17**	**High**	**EUR**	**65.3**	**2,954.2**	**45,454**	**12**

		Score/ Value	Rank	
Institutions		**83.4**	**19**	
1.1	**Political environment**	**79.9**	**22**	
1.1.1	Political and operational stability*	76.8	37	◇
1.1.2	Government effectiveness*	81.4	19	
1.2	**Regulatory environment**	**86.3**	**17**	
1.2.1	Regulatory quality*	81.1	18	
1.2.2	Rule of law*	83.9	19	
1.2.3	Cost of redundancy dismissal	13.0	40	
1.3	**Business environment**	**83.9**	**22**	
1.3.1	Ease of starting a business*	93.1	35	
1.3.2	Ease of resolving insolvency*	74.6	24	
Human capital and research		**55.4**	**15**	
2.1	**Education**	**60.5**	**26**	
2.1.1	Expenditure on education, % GDP	5.5	20	
2.1.2	Government funding/pupil, secondary, % GDP/cap	25.9	15	◆
2.1.3	School life expectancy, years	15.8	39	
2.1.4	PISA scales in reading, maths and science	493.7	25	
2.1.5	Pupil-teacher ratio, secondary ◴	13.3	59	○
2.2	**Tertiary education**	**42.0**	**38**	
2.2.1	Tertiary enrolment, % gross	67.6	38	
2.2.2	Graduates in science and engineering, %	25.4	36	
2.2.3	Tertiary inbound mobility, %	8.8	28	
2.3	**Research and development (R&D)**	**63.7**	**12**	
2.3.1	Researchers, FTE/mn pop.	4,687.2	20	
2.3.2	Gross expenditure on R&D, % GDP	2.2	14	
2.3.3	Global corporate R&D investors, top 3, mn US$	86.1	7	●
2.3.4	QS university ranking, top 3*	68.8	11	
Infrastructure		**57.1**	**17**	
3.1	**Information and communication technologies (ICTs)**	**87.7**	**16**	
3.1.1	ICT access*	86.5	17	
3.1.2	ICT use*	85.5	10	●
3.1.3	Government's online service*	88.2	18	
3.1.4	E-participation*	90.5	18	
3.2	**General infrastructure**	**42.2**	**23**	
3.2.1	Electricity output, GWh/mn pop.	8,392.9	18	
3.2.2	Logistics performance*	83.4	16	
3.2.3	Gross capital formation, % GDP	22.7	60	○
3.3	**Ecological sustainability**	**41.4**	**33**	
3.3.1	GDP/unit of energy use	12.0	49	○
3.3.2	Environmental performance*	80.0	5	●
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.0	42	
Market sophistication		**61.0**	**17**	
4.1	**Credit**	**47.2**	**43**	
4.1.1	Ease of getting credit*	50.0	94	○
4.1.2	Domestic credit to private sector, % GDP	107.6	21	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**48.2**	**21**	
4.2.1	Ease of protecting minority investors*	68.0	44	
4.2.2	Market capitalization, % GDP ◴	92.7	14	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.2	17	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.1	9	
4.3	**Trade, diversification, and market scale**	**87.6**	**8**	●
4.3.1	Applied tariff rate, weighted avg., %	1.8	25	○
4.3.2	Domestic industry diversification	95.0	25	
4.3.3	Domestic market scale, bn PPP$	2,954.2	10	●

		Score/ Value	Rank	
Business sophistication		**50.4**	**19**	
5.1	**Knowledge workers**	**61.0**	**16**	
5.1.1	Knowledge-intensive employment, %	46.4	15	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	1.4	16	
5.1.4	GERD financed by business, %	56.7	16	
5.1.5	Females employed w/advanced degrees, %	23.4	19	
5.2	**Innovation linkages**	**40.9**	**23**	
5.2.1	University-industry R&D collaboration†	54.1	31	◇
5.2.2	State of cluster development and depth†	58.2	28	
5.2.3	GERD financed by abroad, % GDP	0.2	25	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.1	29	
5.2.5	Patent families/bn PPP$ GDP	3.2	13	
5.3	**Knowledge absorption**	**49.3**	**13**	
5.3.1	Intellectual property payments, % total trade	1.7	17	
5.3.2	High-tech imports, % total trade	9.9	35	
5.3.3	ICT services imports, % total trade	2.5	18	
5.3.4	FDI net inflows, % GDP	1.9	80	○
5.3.5	Research talent, % in businesses	62.8	8	
Knowledge and technology outputs		**44.3**	**16**	
6.1	**Knowledge creation**	**44.8**	**19**	
6.1.1	Patents by origin/bn PPP$ GDP	7.5	13	
6.1.2	PCT patents by origin/bn PPP$ GDP	2.7	14	
6.1.3	Utility models by origin/bn PPP$ GDP	0.1	57	○ ◇
6.1.4	Scientific and technical articles/bn PPP$ GDP	25.9	36	
6.1.5	Citable documents H-index	78.9	5	● ◆
6.2	**Knowledge impact**	**41.5**	**22**	
6.2.1	Labor productivity growth, %	–2.0	103	○ ◇
6.2.2	New businesses/th pop. 15–64	4.8	31	
6.2.3	Software spending, % GDP	0.5	9	●
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	6.7	41	
6.2.5	High-tech manufacturing, %	51.4	10	
6.3	**Knowledge diffusion**	**46.7**	**18**	
6.3.1	Intellectual property receipts, % total trade	1.8	14	
6.3.2	Production and export complexity	75.6	16	
6.3.3	High-tech exports, % total trade	13.4	10	●
6.3.4	ICT services exports, % total trade	2.1	50	○
Creative outputs		**52.6**	**6**	●
7.1	**Intangible assets**	**68.9**	**3**	● ◆
7.1.1	Trademarks by origin/bn PPP$ GDP	99.4	7	● ◆
7.1.2	Global brand value, top 5,000, % GDP	171.1	6	●
7.1.3	Industrial designs by origin/bn PPP$ GDP	13.0	8	● ◆
7.1.4	ICTs and organizational model creation†	70.9	19	
7.2	**Creative goods and services**	**27.5**	**30**	
7.2.1	Cultural and creative services exports, % total trade	1.1	26	
7.2.2	National feature films/mn pop. 15–69	6.8	33	
7.2.3	Entertainment and media market/th pop. 15–69	49.5	17	
7.2.4	Printing and other media, % manufacturing	1.0	53	○
7.2.5	Creative goods exports, % total trade	1.8	31	
7.3	**Online creativity**	**45.3**	**25**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	41.2	18	
7.3.2	Country-code TLDs/th pop. 15–69	24.9	27	
7.3.3	Wikipedia edits/mn pop. 15–69	78.8	12	
7.3.4	Mobile app creation/bn PPP$ GDP	32.2	15	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Georgia

GII 2021 rank
63

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
74	**49**	**Upper middle**	**NAWA**	**4.0**	**56.1**	**15,142**	**63**

		Score/ Value	Rank	
Institutions		**76.2**	**35**	◆
1.1	**Political environment**	**69.3**	**40**	◆
1.1.1	Political and operational stability*	69.6	60	
1.1.2	Government effectiveness*	69.1	38	◆
1.2	**Regulatory environment**	**81.3**	**28**	◆
1.2.1	Regulatory quality*	72.8	28	◆
1.2.2	Rule of law*	54.9	51	◆
1.2.3	Cost of redundancy dismissal	8.6	16	●
1.3	**Business environment**	**77.9**	**40**	
1.3.1	Ease of starting a business*	99.6	2	● ◆
1.3.2	Ease of resolving insolvency*	56.2	59	
Human capital and research		**32.5**	**60**	
2.1	**Education**	**52.0**	**60**	
2.1.1	Expenditure on education, % GDP	3.5	85	
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	15.6	44	
2.1.4	PISA scales in reading, maths and science	386.7	70	○
2.1.5	Pupil-teacher ratio, secondary	7.2	3	● ◆
2.2	**Tertiary education**	**39.6**	**43**	
2.2.1	Tertiary enrolment, % gross	63.9	43	
2.2.2	Graduates in science and engineering, %	24.6	42	
2.2.3	Tertiary inbound mobility, %	8.1	29	◆
2.3	**Research and development (R&D)**	**5.7**	**75**	
2.3.1	Researchers, FTE/mn pop.	1,463.8	46	
2.3.2	Gross expenditure on R&D, % GDP	0.3	83	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**36.3**	**85**	
3.1	**Information and communication technologies (ICTs)**	**64.0**	**72**	
3.1.1	ICT access*	70.4	59	
3.1.2	ICT use*	62.7	58	
3.1.3	Government's online service*	58.8	88	
3.1.4	E-participation*	64.3	80	
3.2	**General infrastructure**	**23.5**	**90**	
3.2.1	Electricity output, GWh/mn pop.	3,256.2	62	
3.2.2	Logistics performance*	18.4	111	○ ◇
3.2.3	Gross capital formation, % GDP	25.4	42	
3.3	**Ecological sustainability**	**21.3**	**92**	◇
3.3.1	GDP/unit of energy use	8.7	84	
3.3.2	Environmental performance*	41.3	86	◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.3	102	○
Market sophistication		**53.9**	**34**	
4.1	**Credit**	**50.6**	**29**	◆
4.1.1	Ease of getting credit*	85.0	14	●
4.1.2	Domestic credit to private sector, % GDP	67.7	48	
4.1.3	Microfinance gross loans, % GDP	1.6	17	
4.2	**Investment**	**44.8**	**[24]**	
4.2.1	Ease of protecting minority investors*	84.0	7	● ◆
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	50	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**66.4**	**73**	
4.3.1	Applied tariff rate, weighted avg., %	0.7	5	●
4.3.2	Domestic industry diversification	78.4	82	
4.3.3	Domestic market scale, bn PPP$	56.1	99	

		Score/ Value	Rank	
Business sophistication		**25.6**	**61**	
5.1	**Knowledge workers**	**35.7**	**56**	
5.1.1	Knowledge-intensive employment, %	33.6	43	◆
5.1.2	Firms offering formal training, %	32.0	46	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	1.7	89	○ ◇
5.1.5	Females employed w/advanced degrees, %	22.5	23	● ◆
5.2	**Innovation linkages**	**20.2**	**68**	
5.2.1	University-industry R&D collaboration†	40.4	73	
5.2.2	State of cluster development and depth†	49.3	50	
5.2.3	GERD financed by abroad, % GDP	0.0	61	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.1	32	◆
5.2.5	Patent families/bn PPP$ GDP	0.0	67	
5.3	**Knowledge absorption**	**20.9**	**88**	
5.3.1	Intellectual property payments, % total trade	0.3	77	
5.3.2	High-tech imports, % total trade	6.2	94	
5.3.3	ICT services imports, % total trade	0.8	86	
5.3.4	FDI net inflows, % GDP	8.9	9	● ◆
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**18.1**	**75**	
6.1	**Knowledge creation**	**17.4**	**59**	
6.1.1	Patents by origin/bn PPP$ GDP	1.5	51	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	62	
6.1.3	Utility models by origin/bn PPP$ GDP	1.3	18	
6.1.4	Scientific and technical articles/bn PPP$ GDP	15.1	58	
6.1.5	Citable documents H-index	10.6	72	
6.2	**Knowledge impact**	**25.5**	**83**	
6.2.1	Labor productivity growth, %	2.2	24	●
6.2.2	New businesses/th pop. 15–64	10.4	11	● ◆
6.2.3	Software spending, % GDP	0.1	90	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	3.1	74	
6.2.5	High-tech manufacturing, %	9.8	90	○ ◇
6.3	**Knowledge diffusion**	**11.4**	**88**	
6.3.1	Intellectual property receipts, % total trade	0.0	97	○ ◇
6.3.2	Production and export complexity	43.0	65	
6.3.3	High-tech exports, % total trade	0.8	79	
6.3.4	ICT services exports, % total trade	1.1	80	
Creative outputs		**21.8**	**74**	
7.1	**Intangible assets**	**27.3**	**77**	
7.1.1	Trademarks by origin/bn PPP$ GDP	51.0	45	
7.1.2	Global brand value, top 5,000, % GDP	8.3	63	
7.1.3	Industrial designs by origin/bn PPP$ GDP	3.2	34	
7.1.4	ICTs and organizational model creation†	43.6	101	○ ◇
7.2	**Creative goods and services**	**11.3**	**76**	
7.2.1	Cultural and creative services exports, % total trade	0.1	80	
7.2.2	National feature films/mn pop. 15–69	6.7	34	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.5	26	
7.2.5	Creative goods exports, % total trade	0.1	104	○
7.3	**Online creativity**	**21.1**	**55**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	1.7	84	
7.3.2	Country-code TLDs/th pop. 15–69	4.5	56	
7.3.3	Wikipedia edits/mn pop. 15–69	73.1	30	◆
7.3.4	Mobile app creation/bn PPP$ GDP	2.1	69	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Germany

GII 2021 rank **10**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
8	14	High	EUR	83.8	4,454.5	53,571	9

		Score/ Value	Rank
Institutions		**84.3**	**17**
1.1	**Political environment**	**85.2**	**14**
1.1.1	Political and operational stability*	83.9	13
1.1.2	Government effectiveness*	85.9	13
1.2	**Regulatory environment**	**81.1**	**29**
1.2.1	Regulatory quality*	88.5	9
1.2.2	Rule of law*	89.4	14
1.2.3	Cost of redundancy dismissal	21.6	91 ○ ◇
1.3	**Business environment**	**86.7**	**14**
1.3.1	Ease of starting a business*	83.7	96 ○ ◇
1.3.2	Ease of resolving insolvency*	89.8	4 ● ◆
Human capital and research		**62.7**	**3 ● ◆**
2.1	**Education**	**60.1**	**27**
2.1.1	Expenditure on education, % GDP	4.9	44
2.1.2	Government funding/pupil, secondary, % GDP/cap	23.4	25
2.1.3	School life expectancy, years	16.9	18
2.1.4	PISA scales in reading, maths and science	500.4	18
2.1.5	Pupil-teacher ratio, secondary ◴	11.8	49
2.2	**Tertiary education**	**54.7**	**5 ● ◆**
2.2.1	Tertiary enrolment, % gross	70.3	33
2.2.2	Graduates in science and engineering, %	35.3	6 ◆
2.2.3	Tertiary inbound mobility, %	10.0	21
2.3	**Research and development (R&D)**	**73.2**	**6 ●**
2.3.1	Researchers, FTE/mn pop.	5,381.7	13
2.3.2	Gross expenditure on R&D, % GDP	3.2	6
2.3.3	Global corporate R&D investors, top 3, mn US$	94.1	2 ● ◆
2.3.4	QS university ranking, top 3*	70.4	10
Infrastructure		**55.6**	**21**
3.1	**Information and communication technologies (ICTs)**	**80.2**	**32**
3.1.1	ICT access*	90.8	6 ●
3.1.2	ICT use*	81.5	19
3.1.3	Government's online service*	73.5	59 ◇
3.1.4	E-participation*	75.0	57 ○ ◇
3.2	**General infrastructure**	**44.2**	**20**
3.2.1	Electricity output, GWh/mn pop.	7,259.6	28
3.2.2	Logistics performance*	100.0	1 ● ◆
3.2.3	Gross capital formation, % GDP	21.4	76 ○
3.3	**Ecological sustainability**	**42.3**	**32**
3.3.1	GDP/unit of energy use	13.8	34
3.3.2	Environmental performance*	77.2	10
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.9	44
Market sophistication		**57.8**	**20**
4.1	**Credit**	**51.2**	**27**
4.1.1	Ease of getting credit*	70.0	44 ○
4.1.2	Domestic credit to private sector, % GDP	80.2	37
4.1.3	Microfinance gross loans, % GDP	n/a	n/a
4.2	**Investment**	**32.5**	**60 ○ ◇**
4.2.1	Ease of protecting minority investors*	62.0	60 ○
4.2.2	Market capitalization, % GDP	53.4	32
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.1	25
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.1	24
4.3	**Trade, diversification, and market scale**	**89.8**	**2 ● ◆**
4.3.1	Applied tariff rate, weighted avg., %	1.8	25
4.3.2	Domestic industry diversification	96.5	19
4.3.3	Domestic market scale, bn PPP$	4,454.5	5 ● ◆

		Score/ Value	Rank
Business sophistication		**54.5**	**12**
5.1	**Knowledge workers**	**65.0**	**12**
5.1.1	Knowledge-intensive employment, %	46.1	16
5.1.2	Firms offering formal training, %	n/a	n/a
5.1.3	GERD performed by business, % GDP	2.2	8
5.1.4	GERD financed by business, %	66.0	7
5.1.5	Females employed w/advanced degrees, %	14.0	53 ◇
5.2	**Innovation linkages**	**54.2**	**12**
5.2.1	University-industry R&D collaboration†	68.5	9
5.2.2	State of cluster development and depth†	69.9	5 ● ◆
5.2.3	GERD financed by abroad, % GDP	0.2	23
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.1	31
5.2.5	Patent families/bn PPP$ GDP	5.5	6 ◆
5.3	**Knowledge absorption**	**44.3**	**21**
5.3.1	Intellectual property payments, % total trade	0.9	41
5.3.2	High-tech imports, % total trade	10.0	33
5.3.3	ICT services imports, % total trade	2.5	19
5.3.4	FDI net inflows, % GDP	3.1	45
5.3.5	Research talent, % in businesses	60.7	12
Knowledge and technology outputs		**53.3**	**9**
6.1	**Knowledge creation**	**69.5**	**5 ●**
6.1.1	Patents by origin/bn PPP$ GDP	15.7	1 ● ◆
6.1.2	PCT patents by origin/bn PPP$ GDP	4.2	9
6.1.3	Utility models by origin/bn PPP$ GDP	1.8	12
6.1.4	Scientific and technical articles/bn PPP$ GDP	25.9	35
6.1.5	Citable documents H-index	87.0	3 ● ◆
6.2	**Knowledge impact**	**43.8**	**15**
6.2.1	Labor productivity growth, %	–1.4	94 ○
6.2.2	New businesses/th pop. 15–64	1.4	73 ○
6.2.3	Software spending, % GDP	0.5	19
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	11.0	26
6.2.5	High-tech manufacturing, %	57.1	7
6.3	**Knowledge diffusion**	**46.5**	**19**
6.3.1	Intellectual property receipts, % total trade	1.4	16
6.3.2	Production and export complexity	92.1	4 ● ◆
6.3.3	High-tech exports, % total trade	12.3	12
6.3.4	ICT services exports, % total trade	2.5	45
Creative outputs		**50.0**	**11**
7.1	**Intangible assets**	**58.4**	**6 ●**
7.1.1	Trademarks by origin/bn PPP$ GDP	60.5	34
7.1.2	Global brand value, top 5,000, % GDP	145.9	12
7.1.3	Industrial designs by origin/bn PPP$ GDP	12.0	11 ◆
7.1.4	ICTs and organizational model creation†	78.0	8
7.2	**Creative goods and services**	**25.6**	**36**
7.2.1	Cultural and creative services exports, % total trade	0.9	31
7.2.2	National feature films/mn pop. 15–69	4.0	49 ○
7.2.3	Entertainment and media market/th pop. 15–69	52.8	12
7.2.4	Printing and other media, % manufacturing	0.9	66 ○
7.2.5	Creative goods exports, % total trade	2.1	29
7.3	**Online creativity**	**57.9**	**13**
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	52.1	14
7.3.2	Country-code TLDs/th pop. 15–69	84.8	6 ● ◆
7.3.3	Wikipedia edits/mn pop. 15–69	77.5	15
7.3.4	Mobile app creation/bn PPP$ GDP	13.3	41

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Ghana

GII 2021 rank
112

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
103	**114**	**Lower middle**	**SSF**	**31.1**	**175.6**	**5,707**	**108**

		Score/ Value	Rank	
Institutions		**46.2**	**120**	
1.1	**Political environment**	**52.7**	**87**	
1.1.1	Political and operational stability*	66.1	74	
1.1.2	Government effectiveness*	46.0	88	
1.2	**Regulatory environment**	**30.8**	**128**	○ ◇
1.2.1	Regulatory quality*	40.6	78	◆
1.2.2	Rule of law*	48.0	61	◆
1.2.3	Cost of redundancy dismissal	49.8	127	○ ◇
1.3	**Business environment**	**55.2**	**118**	
1.3.1	Ease of starting a business*	85.0	89	
1.3.2	Ease of resolving insolvency*	25.4	127	○
Human capital and research		**18.9**	**101**	
2.1	**Education**	**41.2**	**92**	
2.1.1	Expenditure on education, % GDP	4.0	68	
2.1.2	Government funding/pupil, secondary, % GDP/cap	19.3	52	
2.1.3	School life expectancy, years	11.9	93	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	15.2	73	
2.2	**Tertiary education**	**13.4**	**108**	
2.2.1	Tertiary enrolment, % gross	17.2	101	
2.2.2	Graduates in science and engineering, %	16.4	92	
2.2.3	Tertiary inbound mobility, %	1.4	84	
2.3	**Research and development (R&D)**	**2.1**	**93**	
2.3.1	Researchers, FTE/mn pop.	89.1	90	
2.3.2	Gross expenditure on R&D, % GDP	0.4	73	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**31.7**	**97**	
3.1	**Information and communication technologies (ICTs)**	**53.7**	**91**	
3.1.1	ICT access*	42.2	102	
3.1.2	ICT use*	46.0	90	
3.1.3	Government's online service*	63.5	80	
3.1.4	E-participation*	63.1	82	
3.2	**General infrastructure**	**19.2**	**114**	
3.2.1	Electricity output, GWh/mn pop.	411.9	111	
3.2.2	Logistics performance*	24.1	101	
3.2.3	Gross capital formation, % GDP	21.7	72	
3.3	**Ecological sustainability**	**22.1**	**86**	
3.3.1	GDP/unit of energy use	13.6	36	●
3.3.2	Environmental performance*	27.6	125	○ ◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.3	98	
Market sophistication		**36.7**	**115**	
4.1	**Credit**	**27.2**	**115**	
4.1.1	Ease of getting credit*	60.0	74	
4.1.2	Domestic credit to private sector, % GDP	12.4	123	
4.1.3	Microfinance gross loans, % GDP	0.6	32	●
4.2	**Investment**	**18.4**	**119**	
4.2.1	Ease of protecting minority investors*	60.0	71	
4.2.2	Market capitalization, % GDP	8.5	70	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	75	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	48	
4.3	**Trade, diversification, and market scale**	**64.5**	**75**	
4.3.1	Applied tariff rate, weighted avg., %	10.0	118	
4.3.2	Domestic industry diversification	88.2	58	
4.3.3	Domestic market scale, bn PPP$	175.6	69	

		Score/ Value	Rank	
Business sophistication		**17.8**	**108**	
5.1	**Knowledge workers**	**19.2**	**103**	
5.1.1	Knowledge-intensive employment, %	12.2	104	
5.1.2	Firms offering formal training, %	40.1	29	●
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	0.1	100	○ ◇
5.1.5	Females employed w/advanced degrees, %	3.5	99	
5.2	**Innovation linkages**	**21.9**	**60**	
5.2.1	University-industry R&D collaboration†	47.6	45	● ◆
5.2.2	State of cluster development and depth†	51.7	42	●
5.2.3	GERD financed by abroad, % GDP	0.1	35	●
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	69	
5.2.5	Patent families/bn PPP$ GDP	0.0	100	○ ◇
5.3	**Knowledge absorption**	**12.2**	**[130]**	
5.3.1	Intellectual property payments, % total trade	n/a	n/a	
5.3.2	High-tech imports, % total trade	2.9	126	○ ◇
5.3.3	ICT services imports, % total trade	n/a	n/a	
5.3.4	FDI net inflows, % GDP	5.3	19	●
5.3.5	Research talent, % in businesses	1.0	80	
Knowledge and technology outputs		**11.9**	**104**	
6.1	**Knowledge creation**	**6.0**	**102**	
6.1.1	Patents by origin/bn PPP$ GDP	0.1	114	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	98	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	72	
6.1.4	Scientific and technical articles/bn PPP$ GDP	11.6	73	
6.1.5	Citable documents H-index	8.9	83	
6.2	**Knowledge impact**	**21.2**	**97**	
6.2.1	Labor productivity growth, %	3.8	11	●
6.2.2	New businesses/th pop. 15–64	0.9	85	
6.2.3	Software spending, % GDP	0.0	122	○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.5	124	
6.2.5	High-tech manufacturing, %	11.0	86	
6.3	**Knowledge diffusion**	**8.6**	**[101]**	
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	Production and export complexity	25.4	102	
6.3.3	High-tech exports, % total trade	0.0	125	
6.3.4	ICT services exports, % total trade	n/a	n/a	
Creative outputs		**16.9**	**94**	
7.1	**Intangible assets**	**25.8**	**85**	
7.1.1	Trademarks by origin/bn PPP$ GDP	5.3	120	
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	5.0	24	●
7.1.4	ICTs and organizational model creation†	49.7	84	
7.2	**Creative goods and services**	**10.2**	**[78]**	
7.2.1	Cultural and creative services exports, % total trade	n/a	n/a	
7.2.2	National feature films/mn pop. 15–69	n/a	n/a	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.6	25	●
7.2.5	Creative goods exports, % total trade	0.0	120	
7.3	**Online creativity**	**5.8**	**119**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.6	105	
7.3.2	Country-code TLDs/th pop. 15–69	0.1	121	
7.3.3	Wikipedia edits/mn pop. 15–69	20.7	120	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Greece

GII 2021 rank **47**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
60	39	High	EUR	10.4	310.7	29,045	43

		Score/ Value	Rank	
Institutions		**69.2**	**51**	
1.1	**Political environment**	**63.6**	**50**	◇
1.1.1	Political and operational stability*	71.4	54	◇
1.1.2	Government effectiveness*	59.7	50	◇
1.2	**Regulatory environment**	**69.5**	**51**	
1.2.1	Regulatory quality*	57.3	47	◇
1.2.2	Rule of law*	52.0	54	◇
1.2.3	Cost of redundancy dismissal	15.9	64	
1.3	**Business environment**	**74.6**	**53**	
1.3.1	Ease of starting a business*	96.0	11	● ◆
1.3.2	Ease of resolving insolvency*	53.1	66	
Human capital and research		**54.3**	**16**	●
2.1	**Education**	**66.2**	**13**	●
2.1.1	Expenditure on education, % GDP	n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap	21.5	37	
2.1.3	School life expectancy, years	19.5	5	● ◆
2.1.4	PISA scales in reading, maths and science	453.5	43	
2.1.5	Pupil-teacher ratio, secondary ◴	8.5	15	● ◆
2.2	**Tertiary education**	**63.4**	**1**	● ◆
2.2.1	Tertiary enrolment, % gross	142.9	1	● ◆
2.2.2	Graduates in science and engineering, %	28.3	21	
2.2.3	Tertiary inbound mobility, %	3.4	63	
2.3	**Research and development (R&D)**	**33.4**	**34**	
2.3.1	Researchers, FTE/mn pop.	3,827.2	27	
2.3.2	Gross expenditure on R&D, % GDP	1.3	30	
2.3.3	Global corporate R&D investors, top 3, mn US$	41.4	37	
2.3.4	QS university ranking, top 3*	21.2	49	
Infrastructure		**48.5**	**45**	
3.1	**Information and communication technologies (ICTs)**	**77.4**	**43**	
3.1.1	ICT access*	84.2	21	●
3.1.2	ICT use*	76.3	35	
3.1.3	Government's online service*	70.6	65	◇
3.1.4	E-participation*	78.6	50	
3.2	**General infrastructure**	**22.5**	**94**	◇
3.2.1	Electricity output, GWh/mn pop.	4,961.0	44	
3.2.2	Logistics performance*	53.7	41	
3.2.3	Gross capital formation, % GDP	11.9	121	○ ◇
3.3	**Ecological sustainability**	**45.4**	**23**	
3.3.1	GDP/unit of energy use	13.8	35	
3.3.2	Environmental performance*	69.1	25	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	4.7	21	●
Market sophistication		**45.2**	**70**	
4.1	**Credit**	**38.5**	**76**	
4.1.1	Ease of getting credit*	45.0	101	○ ◇
4.1.2	Domestic credit to private sector, % GDP	79.2	38	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**21.7**	**104**	○
4.2.1	Ease of protecting minority investors*	70.0	36	
4.2.2	Market capitalization, % GDP	22.7	56	○
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	48	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	81	○
4.3	**Trade, diversification, and market scale**	**75.4**	**42**	
4.3.1	Applied tariff rate, weighted avg., %	1.8	25	
4.3.2	Domestic industry diversification	87.0	63	
4.3.3	Domestic market scale, bn PPP$	310.7	53	

		Score/ Value	Rank	
Business sophistication		**25.9**	**60**	◇
5.1	**Knowledge workers**	**35.7**	**55**	
5.1.1	Knowledge-intensive employment, %	30.1	47	
5.1.2	Firms offering formal training, % ◴	21.6	73	
5.1.3	GERD performed by business, % GDP	0.6	36	
5.1.4	GERD financed by business, %	41.6	40	
5.1.5	Females employed w/advanced degrees, %	18.3	36	
5.2	**Innovation linkages**	**20.1**	**69**	◇
5.2.1	University-industry R&D collaboration†	31.0	110	○ ◇
5.2.2	State of cluster development and depth†	32.8	118	○ ◇
5.2.3	GERD financed by abroad, % GDP	0.2	22	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	51	
5.2.5	Patent families/bn PPP$ GDP	0.3	38	
5.3	**Knowledge absorption**	**21.8**	**80**	◇
5.3.1	Intellectual property payments, % total trade	0.4	72	
5.3.2	High-tech imports, % total trade	5.1	110	○
5.3.3	ICT services imports, % total trade	1.0	74	
5.3.4	FDI net inflows, % GDP	2.0	79	
5.3.5	Research talent, % in businesses	25.6	49	
Knowledge and technology outputs		**25.2**	**52**	
6.1	**Knowledge creation**	**23.7**	**41**	
6.1.1	Patents by origin/bn PPP$ GDP	1.5	50	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.3	39	
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	61	○
6.1.4	Scientific and technical articles/bn PPP$ GDP	38.0	21	●
6.1.5	Citable documents H-index	33.2	29	
6.2	**Knowledge impact**	**36.3**	**37**	
6.2.1	Labor productivity growth, %	–2.1	104	○ ◇
6.2.2	New businesses/th pop. 15–64	1.4	71	
6.2.3	Software spending, % GDP	0.5	10	●
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	19.4	14	● ◆
6.2.5	High-tech manufacturing, %	14.1	78	◇
6.3	**Knowledge diffusion**	**15.5**	**69**	
6.3.1	Intellectual property receipts, % total trade	0.1	57	
6.3.2	Production and export complexity	46.4	55	
6.3.3	High-tech exports, % total trade	2.2	55	
6.3.4	ICT services exports, % total trade	1.5	69	
Creative outputs		**22.9**	**69**	◇
7.1	**Intangible assets**	**21.1**	**96**	◇
7.1.1	Trademarks by origin/bn PPP$ GDP	n/a	n/a	
7.1.2	Global brand value, top 5,000, % GDP	4.9	68	◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	2.8	38	
7.1.4	ICTs and organizational model creation†	44.6	97	○ ◇
7.2	**Creative goods and services**	**21.8**	**45**	
7.2.1	Cultural and creative services exports, % total trade	0.7	38	
7.2.2	National feature films/mn pop. 15–69	11.5	14	●
7.2.3	Entertainment and media market/th pop. 15–69	24.2	27	
7.2.4	Printing and other media, % manufacturing	1.1	50	
7.2.5	Creative goods exports, % total trade	1.3	41	
7.3	**Online creativity**	**27.5**	**40**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	13.2	34	
7.3.2	Country-code TLDs/th pop. 15–69	19.8	30	
7.3.3	Wikipedia edits/mn pop. 15–69	70.5	34	
7.3.4	Mobile app creation/bn PPP$ GDP	3.8	62	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Guatemala

GII 2021 rank
101

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
83	**112**	**Upper middle**	**LCN**	**17.9**	**148.6**	**8,267**	**106**

		Score/ Value	Rank	
Institutions		**48.3**	**117**	◇
1.1	**Political environment**	**42.2**	**109**	◇
1.1.1	Political and operational stability*	55.4	112	◇
1.1.2	Government effectiveness*	35.6	109	◇
1.2	**Regulatory environment**	**45.4**	**115**	◇
1.2.1	Regulatory quality*	37.6	88	
1.2.2	Rule of law*	19.0	124	◇
1.2.3	Cost of redundancy dismissal	27.0	107	
1.3	**Business environment**	**57.2**	**113**	◇
1.3.1	Ease of starting a business*	86.8	77	
1.3.2	Ease of resolving insolvency*	27.6	124	◇
Human capital and research		**12.2**	**120**	◇
2.1	**Education**	**28.5**	**119**	◇
2.1.1	Expenditure on education, % GDP	3.2	90	
2.1.2	Government funding/pupil, secondary, % GDP/cap	5.5	102 ○	◇
2.1.3	School life expectancy, years ◴	10.8	101	◇
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	12.2	51 ●	
2.2	**Tertiary education**	**7.9**	**116**	◇
2.2.1	Tertiary enrolment, % gross ◴	21.8	96	◇
2.2.2	Graduates in science and engineering, % ◴	9.8	107 ○	◇
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research and development (R&D)**	**0.1**	**120**	
2.3.1	Researchers, FTE/mn pop. ◴	12.9	108 ○	◇
2.3.2	Gross expenditure on R&D, % GDP ◴	0.0	115 ○	◇
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41 ○	◇
2.3.4	QS university ranking, top 3*	0.0	74 ○	◇
Infrastructure		**23.7**	**122**	◇
3.1	**Information and communication technologies (ICTs)**	**42.5**	**105**	◇
3.1.1	ICT access*	48.1	93	◇
3.1.2	ICT use*	20.8	114	◇
3.1.3	Government's online service*	51.2	104	◇
3.1.4	E-participation*	50.0	103	◇
3.2	**General infrastructure**	**9.4**	**130** ○	◇
3.2.1	Electricity output, GWh/mn pop.	818.8	102	◇
3.2.2	Logistics performance*	17.1	114	◇
3.2.3	Gross capital formation, % GDP	11.6	122	◇
3.3	**Ecological sustainability**	**19.2**	**107**	◇
3.3.1	GDP/unit of energy use	9.9	70	
3.3.2	Environmental performance*	31.8	115	◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	113	
Market sophistication		**44.4**	**77**	
4.1	**Credit**	**39.7**	**72**	
4.1.1	Ease of getting credit*	85.0	14 ●	
4.1.2	Domestic credit to private sector, % GDP	34.3	91	
4.1.3	Microfinance gross loans, % GDP	0.2	48	
4.2	**Investment**	**30.0**	**[69]**	
4.2.1	Ease of protecting minority investors*	30.0	122	◇
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**63.6**	**80**	
4.3.1	Applied tariff rate, weighted avg., % ◴	1.4	16 ●	
4.3.2	Domestic industry diversification	n/a	n/a	
4.3.3	Domestic market scale, bn PPP$	148.6	72	

		Score/ Value	Rank	
Business sophistication		**22.9**	**79**	
5.1	**Knowledge workers**	**27.9**	**79**	
5.1.1	Knowledge-intensive employment, %	9.3	111	◇
5.1.2	Firms offering formal training, % ◴	55.7	11 ●	◆
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	12.5	74	
5.1.5	Females employed w/advanced degrees, %	2.7	102	◇
5.2	**Innovation linkages**	**14.8**	**110**	
5.2.1	University-industry R&D collaboration†	37.3	92	
5.2.2	State of cluster development and depth†	47.3	61	
5.2.3	GERD financed by abroad, % GDP	0.0	102 ○	◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP ◴	0.0	126 ○	
5.2.5	Patent families/bn PPP$ GDP	0.0	100 ○	◇
5.3	**Knowledge absorption**	**26.1**	**67**	
5.3.1	Intellectual property payments, % total trade	1.3	30 ●	
5.3.2	High-tech imports, % total trade	10.2	31 ●	
5.3.3	ICT services imports, % total trade	1.8	36 ●	◆
5.3.4	FDI net inflows, % GDP	1.3	102	
5.3.5	Research talent, % in businesses ◴	1.4	78	◇
Knowledge and technology outputs		**14.2**	**90**	
6.1	**Knowledge creation**	**1.9**	**127**	◇
6.1.1	Patents by origin/bn PPP$ GDP	0.0	122	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	93	
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	60	
6.1.4	Scientific and technical articles/bn PPP$ GDP	1.8	127	◇
6.1.5	Citable documents H-index	4.5	111	
6.2	**Knowledge impact**	**22.3**	**91**	
6.2.1	Labor productivity growth, %	2.6	20 ●	
6.2.2	New businesses/th pop. 15–64	0.5	96	
6.2.3	Software spending, % GDP	0.0	120	◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.5	98	
6.2.5	High-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**18.4**	**59**	
6.3.1	Intellectual property receipts, % total trade	0.1	59	
6.3.2	Production and export complexity	33.4	81	
6.3.3	High-tech exports, % total trade	1.4	67	
6.3.4	ICT services exports, % total trade	3.7	22 ●	◆
Creative outputs		**21.7**	**75**	
7.1	**Intangible assets**	**38.0**	**43** ●	
7.1.1	Trademarks by origin/bn PPP$ GDP	46.7	50 ●	
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.0	116	
7.1.4	ICTs and organizational model creation†	57.0	56	
7.2	**Creative goods and services**	**2.8**	**[111]**	
7.2.1	Cultural and creative services exports, % total trade	0.1	88	
7.2.2	National feature films/mn pop. 15–69 ◴	1.2	80	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.2	76	
7.3	**Online creativity**	**8.1**	**108**	◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	4.0	59	
7.3.2	Country-code TLDs/th pop. 15–69	0.6	97	
7.3.3	Wikipedia edits/mn pop. 15–69	30.5	102	◇
7.3.4	Mobile app creation/bn PPP$ GDP ◴	0.0	102 ○	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Guinea

GII 2021 rank **130**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
126	130	Low	SSF	13.1	35.1	2,516	130

		Score/ Value	Rank
Institutions		**53.6**	**100**
1.1	**Political environment**	**41.9**	**110**
1.1.1	Political and operational stability*	58.9	100
1.1.2	Government effectiveness*	33.3	116
1.2	**Regulatory environment**	**57.5**	**88** ●
1.2.1	Regulatory quality*	23.4	118
1.2.2	Rule of law*	14.9	129
1.2.3	Cost of redundancy dismissal	10.1	30 ●
1.3	**Business environment**	**61.5**	**102**
1.3.1	Ease of starting a business*	84.5	94 ●
1.3.2	Ease of resolving insolvency*	38.6	103
Human capital and research		**7.0**	**132** ○ ◇
2.1	**Education**	**15.0**	**130** ○ ◇
2.1.1	Expenditure on education, % GDP	2.3	109 ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap ◴	8.2	95 ◇
2.1.3	School life expectancy, years ◴	9.0	113
2.1.4	PISA scales in reading, maths and science	n/a	n/a
2.1.5	Pupil-teacher ratio, secondary ◴	33.1	120
2.2	**Tertiary education**	**5.9**	**122**
2.2.1	Tertiary enrolment, % gross ◴	11.6	110
2.2.2	Graduates in science and engineering, %	n/a	n/a
2.2.3	Tertiary inbound mobility, % ◴	0.9	90
2.3	**Research and development (R&D)**	**0.0**	**[123]**
2.3.1	Researchers, FTE/mn pop.	n/a	n/a
2.3.2	Gross expenditure on R&D, % GDP	n/a	n/a
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41 ○ ◇
2.3.4	QS university ranking, top 3*	0.0	74 ○ ◇
Infrastructure		**17.8**	**131** ○ ◇
3.1	**Information and communication technologies (ICTs)**	**25.2**	**129**
3.1.1	ICT access*	33.3	119
3.1.2	ICT use*	15.0	121
3.1.3	Government's online service*	21.8	130 ○ ◇
3.1.4	E-participation*	31.0	124
3.2	**General infrastructure**	**14.3**	**119**
3.2.1	Electricity output, GWh/mn pop.	n/a	n/a
3.2.2	Logistics performance*	7.2	122 ◇
3.2.3	Gross capital formation, % GDP	17.1	103
3.3	**Ecological sustainability**	**13.7**	**130** ○
3.3.1	GDP/unit of energy use	n/a	n/a
3.3.2	Environmental performance*	26.4	128 ○ ◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	111
Market sophistication		**25.1**	**131** ○ ◇
4.1	**Credit**	**13.3**	**127**
4.1.1	Ease of getting credit*	30.0	122
4.1.2	Domestic credit to private sector, % GDP ◴	9.0	129 ○
4.1.3	Microfinance gross loans, % GDP ◴	0.2	51 ●
4.2	**Investment**	**26.0**	**[80]**
4.2.1	Ease of protecting minority investors*	26.0	126
4.2.2	Market capitalization, % GDP	n/a	n/a
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a
4.3	**Trade, diversification, and market scale**	**36.0**	**127** ◇
4.3.1	Applied tariff rate, weighted avg., %	10.9	121 ◇
4.3.2	Domestic industry diversification	n/a	n/a
4.3.3	Domestic market scale, bn PPP$	35.1	115

		Score/ Value	Rank
Business sophistication		**15.8**	**[121]**
5.1	**Knowledge workers**	**9.6**	**[125]**
5.1.1	Knowledge-intensive employment, %	7.4	114
5.1.2	Firms offering formal training, % ◴	16.0	89
5.1.3	GERD performed by business, % GDP	n/a	n/a
5.1.4	GERD financed by business, %	n/a	n/a
5.1.5	Females employed w/advanced degrees, %	2.2	104
5.2	**Innovation linkages**	**26.3**	**[44]**
5.2.1	University-industry R&D collaboration†	46.9	48 ● ◆
5.2.2	State of cluster development and depth†	42.2	93
5.2.3	GERD financed by abroad, % GDP	n/a	n/a
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	n/a	n/a
5.2.5	Patent families/bn PPP$ GDP	0.0	100 ○ ◇
5.3	**Knowledge absorption**	**11.4**	**132** ○ ◇
5.3.1	Intellectual property payments, % total trade ◴	0.0	114
5.3.2	High-tech imports, % total trade ◴	2.4	128 ◇
5.3.3	ICT services imports, % total trade	0.7	92 ●
5.3.4	FDI net inflows, % GDP	3.1	47 ●
5.3.5	Research talent, % in businesses	n/a	n/a
Knowledge and technology outputs		**2.5**	**132** ○ ◇
6.1	**Knowledge creation**	**1.3**	**130** ○ ◇
6.1.1	Patents by origin/bn PPP$ GDP	0.0	128 ○ ◇
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	98 ○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	76 ○ ◇
6.1.4	Scientific and technical articles/bn PPP$ GDP	2.9	122
6.1.5	Citable documents H-index	2.3	128
6.2	**Knowledge impact**	**1.8**	**[132]**
6.2.1	Labor productivity growth, %	n/a	n/a
6.2.2	New businesses/th pop. 15–64	0.4	102
6.2.3	Software spending, % GDP	0.0	106
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.4	125
6.2.5	High-tech manufacturing, %	n/a	n/a
6.3	**Knowledge diffusion**	**4.4**	**122**
6.3.1	Intellectual property receipts, % total trade	n/a	n/a
6.3.2	Production and export complexity	10.8	118 ◇
6.3.3	High-tech exports, % total trade ◴	0.0	128 ◇
6.3.4	ICT services exports, % total trade	0.7	93 ●
Creative outputs		**16.6**	**96**
7.1	**Intangible assets**	**27.1**	**79** ●
7.1.1	Trademarks by origin/bn PPP$ GDP	7.2	116
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.4	57 ●
7.1.4	ICTs and organizational model creation†	60.0	45 ● ◆
7.2	**Creative goods and services**	**2.8**	**[112]**
7.2.1	Cultural and creative services exports, % total trade ◴	0.3	65 ●
7.2.2	National feature films/mn pop. 15–69 ◴	0.9	86
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a
7.2.4	Printing and other media, % manufacturing	n/a	n/a
7.2.5	Creative goods exports, % total trade ◴	0.0	129 ○
7.3	**Online creativity**	**9.3**	**99**
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.1	125
7.3.2	Country-code TLDs/th pop. 15–69	0.0	132 ○ ◇
7.3.3	Wikipedia edits/mn pop. 15–69	30.6	101
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Honduras

GII 2021 rank
108

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
106	**101**	**Lower middle**	**LCN**	**9.9**	**55.1**	**5,538**	**103**

		Score/ Value	Rank	
Institutions		**45.8**	**121**	
1.1	**Political environment**	**44.9**	**104**	
1.1.1	Political and operational stability*	60.7	97	
1.1.2	Government effectiveness*	37.1	105	
1.2	**Regulatory environment**	**40.6**	**120**	
1.2.1	Regulatory quality*	30.6	102	
1.2.2	Rule of law*	20.1	121	◇
1.2.3	Cost of redundancy dismissal	30.3	119	
1.3	**Business environment**	**52.0**	**123**	○
1.3.1	Ease of starting a business*	71.4	124	○ ◇
1.3.2	Ease of resolving insolvency*	32.6	116	
Human capital and research		**20.7**	**96**	
2.1	**Education**	**47.3**	**75**	
2.1.1	Expenditure on education, % GDP	6.1	15	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap ⏲	20.3	48	
2.1.3	School life expectancy, years	10.3	106	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	14.6	70	
2.2	**Tertiary education**	**14.7**	**103**	
2.2.1	Tertiary enrolment, % gross	25.5	90	
2.2.2	Graduates in science and engineering, %	15.7	95	
2.2.3	Tertiary inbound mobility, %	0.9	88	
2.3	**Research and development (R&D)**	**0.2**	**116**	
2.3.1	Researchers, FTE/mn pop. ⏲	34.7	98	
2.3.2	Gross expenditure on R&D, % GDP ⏲	0.0	112	○ ◇
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**25.8**	**116**	
3.1	**Information and communication technologies (ICTs)**	**41.2**	**107**	
3.1.1	ICT access*	39.2	108	
3.1.2	ICT use*	30.2	104	
3.1.3	Government's online service*	46.5	111	
3.1.4	E-participation*	48.8	105	
3.2	**General infrastructure**	**16.1**	**117**	
3.2.1	Electricity output, GWh/mn pop.	993.5	97	
3.2.2	Logistics performance*	25.9	89	
3.2.3	Gross capital formation, % GDP	16.9	104	
3.3	**Ecological sustainability**	**20.0**	**100**	
3.3.1	GDP/unit of energy use	7.8	93	
3.3.2	Environmental performance*	37.8	96	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.7	74	
Market sophistication		**47.9**	**62**	
4.1	**Credit**	**48.7**	**38**	●
4.1.1	Ease of getting credit*	80.0	23	●
4.1.2	Domestic credit to private sector, % GDP	63.9	52	●
4.1.3	Microfinance gross loans, % GDP	1.9	14	●
4.2	**Investment**	**42.0**	**[28]**	
4.2.1	Ease of protecting minority investors*	42.0	102	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**53.1**	**112**	
4.3.1	Applied tariff rate, weighted avg., % ⏲	3.4	66	
4.3.2	Domestic industry diversification	n/a	n/a	
4.3.3	Domestic market scale, bn PPP$	55.1	100	

		Score/ Value	Rank	
Business sophistication		**24.0**	**72**	
5.1	**Knowledge workers**	**27.3**	**81**	
5.1.1	Knowledge-intensive employment, %	13.9	96	
5.1.2	Firms offering formal training, % ⏲	47.7	20	● ◆
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, % ⏲	10.4	76	
5.1.5	Females employed w/advanced degrees, %	4.9	95	
5.2	**Innovation linkages**	**14.0**	**113**	
5.2.1	University-industry R&D collaboration†	27.6	118	◇
5.2.2	State of cluster development and depth†	42.6	89	
5.2.3	GERD financed by abroad, % GDP ⏲	0.0	95	○
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP ⏲	0.0	71	
5.2.5	Patent families/bn PPP$ GDP	0.0	86	
5.3	**Knowledge absorption**	**30.9**	**54**	
5.3.1	Intellectual property payments, % total trade	1.1	36	● ◆
5.3.2	High-tech imports, % total trade	7.7	65	
5.3.3	ICT services imports, % total trade	1.8	41	● ◆
5.3.4	FDI net inflows, % GDP	4.6	22	●
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**9.8**	**118**	
6.1	**Knowledge creation**	**1.5**	**129**	○ ◇
6.1.1	Patents by origin/bn PPP$ GDP	0.0	128	○ ◇
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	98	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	76	○ ◇
6.1.4	Scientific and technical articles/bn PPP$ GDP	3.2	118	
6.1.5	Citable documents H-index	2.4	126	○
6.2	**Knowledge impact**	**15.3**	**[116]**	
6.2.1	Labor productivity growth, %	n/a	n/a	
6.2.2	New businesses/th pop. 15–64	n/a	n/a	
6.2.3	Software spending, % GDP	0.3	47	●
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	3.0	76	
6.2.5	High-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**12.7**	**80**	
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	Production and export complexity	28.5	97	
6.3.3	High-tech exports, % total trade	0.1	115	
6.3.4	ICT services exports, % total trade	2.0	57	
Creative outputs		**15.6**	**102**	
7.1	**Intangible assets**	**26.6**	**81**	
7.1.1	Trademarks by origin/bn PPP$ GDP	46.1	51	●
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP ⏲	0.1	112	
7.1.4	ICTs and organizational model creation†	55.3	59	
7.2	**Creative goods and services**	**1.8**	**[119]**	
7.2.1	Cultural and creative services exports, % total trade ⏲	0.0	102	
7.2.2	National feature films/mn pop. 15–69	2.0	68	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.0	119	
7.3	**Online creativity**	**7.6**	**110**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.5	107	
7.3.2	Country-code TLDs/th pop. 15–69	0.4	103	
7.3.3	Wikipedia edits/mn pop. 15–69	32.0	97	
7.3.4	Mobile app creation/bn PPP$ GDP	0.1	89	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Hong Kong, China

GII 2021 rank
14

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
17	**10**	**High**	**SEAO**	**7.5**	**439.5**	**58,165**	**11**

		Score/ Value	Rank	
Institutions		**88.1**	**11**	
1.1	**Political environment**	**86.3**	**12**	
1.1.1	Political and operational stability*	80.4	29	
1.1.2	Government effectiveness*	89.3	8	
1.2	**Regulatory environment**	**96.1**	**4**	
1.2.1	Regulatory quality*	95.3	2	● ◆
1.2.2	Rule of law*	89.0	15	
1.2.3	Cost of redundancy dismissal	8.0	1	● ◆
1.3	**Business environment**	**81.9**	**28**	
1.3.1	Ease of starting a business*	98.2	5	◆
1.3.2	Ease of resolving insolvency*	65.7	41	◇
Human capital and research		**48.6**	**25**	
2.1	**Education**	**58.1**	**37**	
2.1.1	Expenditure on education, % GDP	3.8	76	○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	22.7	30	
2.1.3	School life expectancy, years	17.2	17	
2.1.4	PISA scales in reading, maths and science	530.7	3	● ◆
2.1.5	Pupil-teacher ratio, secondary	11.0	40	
2.2	**Tertiary education**	**51.1**	**11**	
2.2.1	Tertiary enrolment, % gross	81.0	21	
2.2.2	Graduates in science and engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	14.3	11	
2.3	**Research and development (R&D)**	**36.4**	**30**	◇
2.3.1	Researchers, FTE/mn pop.	4,026.6	25	
2.3.2	Gross expenditure on R&D, % GDP	0.9	42	◇
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	80.5	5	
Infrastructure		**60.3**	**6**	
3.1	**Information and communication technologies (ICTs)**	**89.6**	**[10]**	
3.1.1	ICT access*	94.3	2	● ◆
3.1.2	ICT use*	84.9	11	
3.1.3	Government's online service*	n/a	n/a	
3.1.4	E-participation*	n/a	n/a	
3.2	**General infrastructure**	**35.4**	**39**	◇
3.2.1	Electricity output, GWh/mn pop.	4,905.9	45	
3.2.2	Logistics performance*	86.9	12	
3.2.3	Gross capital formation, % GDP	17.4	101	○ ◇
3.3	**Ecological sustainability**	**55.7**	**4**	◆
3.3.1	GDP/unit of energy use	32.2	1	● ◆
3.3.2	Environmental performance*	n/a	n/a	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.9	46	
Market sophistication		**78.7**	**3**	● ◆
4.1	**Credit**	**87.5**	**2**	● ◆
4.1.1	Ease of getting credit*	75.0	34	
4.1.2	Domestic credit to private sector, % GDP	235.7	1	● ◆
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**75.2**	**6**	◆
4.2.1	Ease of protecting minority investors*	84.0	7	◆
4.2.2	Market capitalization, % GDP	1,223.5	1	● ◆
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.7	1	● ◆
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	33	
4.3	**Trade, diversification, and market scale**	**73.5**	**51**	
4.3.1	Applied tariff rate, weighted avg., %	0.0	1	●
4.3.2	Domestic industry diversification	73.6	92	○ ◇
4.3.3	Domestic market scale, bn PPP$	439.5	45	

		Score/ Value	Rank	
Business sophistication		**45.2**	**24**	◇
5.1	**Knowledge workers**	**44.6**	**35**	◇
5.1.1	Knowledge-intensive employment, %	39.0	29	◇
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	0.4	43	◇
5.1.4	GERD financed by business, %	49.2	29	
5.1.5	Females employed w/advanced degrees, %	15.9	44	◇
5.2	**Innovation linkages**	**40.8**	**24**	
5.2.1	University-industry R&D collaboration†	61.3	21	
5.2.2	State of cluster development and depth†	68.3	10	
5.2.3	GERD financed by abroad, % GDP	0.0	58	◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.2	7	
5.2.5	Patent families/bn PPP$ GDP	0.8	29	◇
5.3	**Knowledge absorption**	**50.1**	**12**	
5.3.1	Intellectual property payments, % total trade	0.3	81	○ ◇
5.3.2	High-tech imports, % total trade	51.6	1	● ◆
5.3.3	ICT services imports, % total trade	0.3	119	○ ◇
5.3.4	FDI net inflows, % GDP	26.1	4	◆
5.3.5	Research talent, % in businesses	35.6	37	◇
Knowledge and technology outputs		**21.6**	**62**	◇
6.1	**Knowledge creation**	**24.2**	**[40]**	
6.1.1	Patents by origin/bn PPP$ GDP	0.7	72	◇
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP	1.1	21	
6.1.4	Scientific and technical articles/bn PPP$ GDP	n/a	n/a	
6.1.5	Citable documents H-index	37.3	25	
6.2	**Knowledge impact**	**38.4**	**31**	
6.2.1	Labor productivity growth, %	−0.3	74	○
6.2.2	New businesses/th pop. 15–64	28.6	1	● ◆
6.2.3	Software spending, % GDP	0.4	25	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	4.6	57	
6.2.5	High-tech manufacturing, %	18.1	66	◇
6.3	**Knowledge diffusion**	**2.3**	**128**	○ ◇
6.3.1	Intellectual property receipts, % total trade	0.1	54	◇
6.3.2	Production and export complexity	n/a	n/a	
6.3.3	High-tech exports, % total trade	0.1	121	○ ◇
6.3.4	ICT services exports, % total trade	0.4	102	○
Creative outputs		**64.7**	**1**	● ◆
7.1	**Intangible assets**	**64.7**	**4**	◆
7.1.1	Trademarks by origin/bn PPP$ GDP	62.3	32	
7.1.2	Global brand value, top 5,000, % GDP	307.2	1	● ◆
7.1.3	Industrial designs by origin/bn PPP$ GDP	3.2	35	
7.1.4	ICTs and organizational model creation†	67.6	23	
7.2	**Creative goods and services**	**63.7**	**1**	● ◆
7.2.1	Cultural and creative services exports, % total trade	0.1	78	○ ◇
7.2.2	National feature films/mn pop. 15–69	9.3	22	
7.2.3	Entertainment and media market/th pop. 15–69	47.1	19	
7.2.4	Printing and other media, % manufacturing	5.0	1	● ◆
7.2.5	Creative goods exports, % total trade	11.0	1	● ◆
7.3	**Online creativity**	**65.7**	**5**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	74.0	7	
7.3.2	Country-code TLDs/th pop. 15–69	12.2	37	◇
7.3.3	Wikipedia edits/mn pop. 15–69	86.8	4	◆
7.3.4	Mobile app creation/bn PPP$ GDP	84.9	6	◆

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Hungary

GII 2021 rank
34

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
31	**34**	**High**	**EUR**	**9.7**	**316.3**	**32,434**	**35**

		Score/ Value	Rank	
Institutions		**71.7**	**42**	
1.1	**Political environment**	**69.1**	**42**	
1.1.1	Political and operational stability*	83.9	13	
1.1.2	Government effectiveness*	61.7	45	◇
1.2	**Regulatory environment**	**74.4**	**38**	
1.2.1	Regulatory quality*	59.3	43	
1.2.2	Rule of law*	59.7	46	
1.2.3	Cost of redundancy dismissal	13.4	48	
1.3	**Business environment**	**71.6**	**63**	
1.3.1	Ease of starting a business*	88.2	70	
1.3.2	Ease of resolving insolvency*	55.0	61	
Human capital and research		**42.5**	**36**	
2.1	**Education**	**54.3**	**51**	
2.1.1	Expenditure on education, % GDP	4.7	53	
2.1.2	Government funding/pupil, secondary, % GDP/cap	21.1	42	
2.1.3	School life expectancy, years	15.1	49	
2.1.4	PISA scales in reading, maths and science	479.3	33	
2.1.5	Pupil-teacher ratio, secondary	10.0	29	
2.2	**Tertiary education**	**35.4**	**59**	
2.2.1	Tertiary enrolment, % gross	50.3	63	
2.2.2	Graduates in science and engineering, %	22.5	55	
2.2.3	Tertiary inbound mobility, %	11.4	17	
2.3	**Research and development (R&D)**	**37.8**	**29**	
2.3.1	Researchers, FTE/mn pop.	4,057.4	24	
2.3.2	Gross expenditure on R&D, % GDP	1.5	24	
2.3.3	Global corporate R&D investors, top 3, mn US$	51.6	28	
2.3.4	QS university ranking, top 3*	21.6	47	
Infrastructure		**52.6**	**32**	
3.1	**Information and communication technologies (ICTs)**	**72.6**	**55**	◇
3.1.1	ICT access*	79.0	39	
3.1.2	ICT use*	69.1	49	◇
3.1.3	Government's online service*	74.7	55	
3.1.4	E-participation*	67.9	75	○ ◇
3.2	**General infrastructure**	**37.4**	**35**	
3.2.1	Electricity output, GWh/mn pop.	3,495.8	59	
3.2.2	Logistics performance*	63.7	30	
3.2.3	Gross capital formation, % GDP	28.3	25	
3.3	**Ecological sustainability**	**47.6**	**19**	●
3.3.1	GDP/unit of energy use	11.6	55	
3.3.2	Environmental performance*	63.7	33	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	7.9	11	● ◆
Market sophistication		**46.6**	**65**	
4.1	**Credit**	**43.5**	**53**	
4.1.1	Ease of getting credit*	75.0	34	
4.1.2	Domestic credit to private sector, % GDP	33.5	92	○ ◇
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**17.7**	**122**	○ ◇
4.2.1	Ease of protecting minority investors*	54.0	88	○ ◇
4.2.2	Market capitalization, % GDP	20.1	59	○
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	56	○
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	65	○
4.3	**Trade, diversification, and market scale**	**78.5**	**33**	
4.3.1	Applied tariff rate, weighted avg., %	1.8	25	
4.3.2	Domestic industry diversification	94.5	31	
4.3.3	Domestic market scale, bn PPP$	316.3	52	

		Score/ Value	Rank	
Business sophistication		**37.5**	**31**	
5.1	**Knowledge workers**	**44.7**	**33**	
5.1.1	Knowledge-intensive employment, %	35.1	39	
5.1.2	Firms offering formal training, %	29.3	53	
5.1.3	GERD performed by business, % GDP	1.1	21	
5.1.4	GERD financed by business, %	52.4	25	
5.1.5	Females employed w/advanced degrees, %	15.7	45	
5.2	**Innovation linkages**	**24.4**	**48**	
5.2.1	University-industry R&D collaboration†	44.1	57	
5.2.2	State of cluster development and depth†	45.6	71	
5.2.3	GERD financed by abroad, % GDP	0.2	17	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	81	○
5.2.5	Patent families/bn PPP$ GDP	0.3	34	
5.3	**Knowledge absorption**	**43.5**	**23**	
5.3.1	Intellectual property payments, % total trade	1.2	31	
5.3.2	High-tech imports, % total trade	15.0	13	● ◆
5.3.3	ICT services imports, % total trade	1.4	53	
5.3.4	FDI net inflows, % GDP	–9.8	130	○ ◇
5.3.5	Research talent, % in businesses	58.0	14	
Knowledge and technology outputs		**39.5**	**20**	
6.1	**Knowledge creation**	**23.0**	**45**	
6.1.1	Patents by origin/bn PPP$ GDP	1.6	44	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.4	36	
6.1.3	Utility models by origin/bn PPP$ GDP	0.7	29	
6.1.4	Scientific and technical articles/bn PPP$ GDP	25.7	38	
6.1.5	Citable documents H-index	29.4	33	
6.2	**Knowledge impact**	**49.8**	**7**	● ◆
6.2.1	Labor productivity growth, %	1.2	40	◆
6.2.2	New businesses/th pop. 15–64	3.7	38	
6.2.3	Software spending, % GDP	0.2	53	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	21.7	8	● ◆
6.2.5	High-tech manufacturing, %	56.7	8	● ◆
6.3	**Knowledge diffusion**	**45.7**	**20**	
6.3.1	Intellectual property receipts, % total trade	1.3	17	●
6.3.2	Production and export complexity	82.3	9	●
6.3.3	High-tech exports, % total trade	14.1	9	● ◆
6.3.4	ICT services exports, % total trade	2.1	54	
Creative outputs		**30.9**	**47**	
7.1	**Intangible assets**	**25.9**	**84**	○ ◇
7.1.1	Trademarks by origin/bn PPP$ GDP	28.3	76	○
7.1.2	Global brand value, top 5,000, % GDP	9.5	61	
7.1.3	Industrial designs by origin/bn PPP$ GDP	2.1	47	
7.1.4	ICTs and organizational model creation†	60.3	42	
7.2	**Creative goods and services**	**39.0**	**12**	●
7.2.1	Cultural and creative services exports, % total trade	0.9	35	
7.2.2	National feature films/mn pop. 15–69	5.2	43	
7.2.3	Entertainment and media market/th pop. 15–69	14.3	31	◇
7.2.4	Printing and other media, % manufacturing	0.8	70	○
7.2.5	Creative goods exports, % total trade	7.2	7	● ◆
7.3	**Online creativity**	**32.6**	**33**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	10.4	40	
7.3.2	Country-code TLDs/th pop. 15–69	34.5	19	●
7.3.3	Wikipedia edits/mn pop. 15–69	76.1	19	●
7.3.4	Mobile app creation/bn PPP$ GDP	5.8	55	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Iceland

GII 2021 rank **17**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
16	20	High	EUR	0.3	19.8	54,482	21

		Score/ Value	Rank	
Institutions		**86.8**	**14**	
1.1	**Political environment**	**86.0**	**13**	
1.1.1	Political and operational stability*	89.3	6	
1.1.2	Government effectiveness*	84.4	15	
1.2	**Regulatory environment**	**88.2**	**15**	
1.2.1	Regulatory quality*	79.4	19	
1.2.2	Rule of law*	93.3	11	
1.2.3	Cost of redundancy dismissal	13.0	40	
1.3	**Business environment**	**86.3**	**15**	
1.3.1	Ease of starting a business*	90.6	54	
1.3.2	Ease of resolving insolvency*	82.0	11	
Human capital and research		**49.7**	**23**	
2.1	**Education**	**72.2**	**7**	◆
2.1.1	Expenditure on education, % GDP	7.7	4	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	20.6	46	
2.1.3	School life expectancy, years	19.2	7	◆
2.1.4	PISA scales in reading, maths and science	481.4	30	◇
2.1.5	Pupil-teacher ratio, secondary	9.4	23	
2.2	**Tertiary education**	**35.4**	**58**	
2.2.1	Tertiary enrolment, % gross	73.1	26	
2.2.2	Graduates in science and engineering, %	18.6	82	○ ◇
2.2.3	Tertiary inbound mobility, %	8.0	32	
2.3	**Research and development (R&D)**	**41.6**	**24**	◇
2.3.1	Researchers, FTE/mn pop.	6,088.3	7	
2.3.2	Gross expenditure on R&D, % GDP	2.4	12	
2.3.3	Global corporate R&D investors, top 3, mn US$	46.6	33	
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**54.5**	**25**	
3.1	**Information and communication technologies (ICTs)**	**84.7**	**23**	
3.1.1	ICT access*	92.8	4	● ◆
3.1.2	ICT use*	89.2	4	● ◆
3.1.3	Government's online service*	79.4	42	
3.1.4	E-participation*	77.4	51	◇
3.2	**General infrastructure**	**50.8**	**9**	
3.2.1	Electricity output, GWh/mn pop.	56,175.6	1	● ◆
3.2.2	Logistics performance*	54.7	39	◇
3.2.3	Gross capital formation, % GDP	20.9	82	
3.3	**Ecological sustainability**	**27.9**	**67**	◇
3.3.1	GDP/unit of energy use	3.1	123	○ ◇
3.3.2	Environmental performance*	72.3	17	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.5	57	
Market sophistication		**56.8**	**25**	
4.1	**Credit**	**46.0**	**46**	
4.1.1	Ease of getting credit*	55.0	88	○
4.1.2	Domestic credit to private sector, % GDP	90.6	29	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**64.8**	**12**	
4.2.1	Ease of protecting minority investors*	72.0	27	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.2	14	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.2	6	
4.3	**Trade, diversification, and market scale**	**59.7**	**96**	○ ◇
4.3.1	Applied tariff rate, weighted avg., %	1.5	19	
4.3.2	Domestic industry diversification	75.6	88	○ ◇
4.3.3	Domestic market scale, bn PPP$	19.8	129	○ ◇

		Score/ Value	Rank	
Business sophistication		**50.4**	**18**	
5.1	**Knowledge workers**	**58.9**	**19**	
5.1.1	Knowledge-intensive employment, %	50.4	8	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	1.6	13	
5.1.4	GERD financed by business, %	38.9	45	◇
5.1.5	Females employed w/advanced degrees, %	25.9	11	
5.2	**Innovation linkages**	**58.5**	**8**	
5.2.1	University-industry R&D collaboration†	58.8	26	
5.2.2	State of cluster development and depth†	50.3	45	◇
5.2.3	GERD financed by abroad, % GDP	0.7	1	● ◆
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.2	17	
5.2.5	Patent families/bn PPP$ GDP	2.3	16	
5.3	**Knowledge absorption**	**33.9**	**46**	◇
5.3.1	Intellectual property payments, % total trade	1.1	34	
5.3.2	High-tech imports, % total trade	5.8	101	○
5.3.3	ICT services imports, % total trade	3.1	8	
5.3.4	FDI net inflows, % GDP	–11.0	131	○ ◇
5.3.5	Research talent, % in businesses	42.7	31	
Knowledge and technology outputs		**37.0**	**25**	
6.1	**Knowledge creation**	**50.9**	**13**	
6.1.1	Patents by origin/bn PPP$ GDP	4.6	19	
6.1.2	PCT patents by origin/bn PPP$ GDP	2.6	15	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	65.0	1	● ◆
6.1.5	Citable documents H-index	19.8	42	◇
6.2	**Knowledge impact**	**28.4**	**69**	◇
6.2.1	Labor productivity growth, %	0.5	55	
6.2.2	New businesses/th pop. 15–64	9.9	17	
6.2.3	Software spending, % GDP	0.3	48	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	3.4	69	
6.2.5	High-tech manufacturing, %	15.0	75	○ ◇
6.3	**Knowledge diffusion**	**31.8**	**30**	
6.3.1	Intellectual property receipts, % total trade	2.4	10	
6.3.2	Production and export complexity	n/a	n/a	
6.3.3	High-tech exports, % total trade	2.9	49	
6.3.4	ICT services exports, % total trade	3.6	24	
Creative outputs		**50.7**	**10**	
7.1	**Intangible assets**	**51.3**	**17**	
7.1.1	Trademarks by origin/bn PPP$ GDP	61.9	33	
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.8	76	
7.1.4	ICTs and organizational model creation†	75.5	13	
7.2	**Creative goods and services**	**27.6**	**29**	
7.2.1	Cultural and creative services exports, % total trade	0.4	54	
7.2.2	National feature films/mn pop. 15–69	55.3	1	● ◆
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.3	33	
7.2.5	Creative goods exports, % total trade	0.1	105	○
7.3	**Online creativity**	**72.5**	**1**	● ◆
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	100.0	1	● ◆
7.3.2	Country-code TLDs/th pop. 15–69	94.5	5	● ◆
7.3.3	Wikipedia edits/mn pop. 15–69	85.5	5	● ◆
7.3.4	Mobile app creation/bn PPP$ GDP	5.0	56	◇

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

India

GII 2021 rank

46

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
45	**57**	**Lower middle**	**CSA**	**1,380.0**	**8,681.3**	**6,284**	**48**

		Score/ Value	Rank	
Institutions		**64.4**	**62**	◆
1.1	**Political environment**	**57.7**	**66**	◆
1.1.1	Political and operational stability*	64.3	80	
1.1.2	Government effectiveness*	54.5	60	◆
1.2	**Regulatory environment**	**63.6**	**71**	◆
1.2.1	Regulatory quality*	39.3	81	
1.2.2	Rule of law*	45.9	65	◆
1.2.3	Cost of redundancy dismissal	15.8	61	
1.3	**Business environment**	**71.8**	**62**	◆
1.3.1	Ease of starting a business*	81.6	105	
1.3.2	Ease of resolving insolvency*	62.0	47	◆
Human capital and research		**34.1**	**54**	◆
2.1	**Education**	**35.9**	**102**	
2.1.1	Expenditure on education, % GDP	3.8	74	
2.1.2	Government funding/pupil, secondary, % GDP/cap	16.9	66	
2.1.3	School life expectancy, years	11.5	95 ○	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	21.5	99 ○	
2.2	**Tertiary education**	**33.8**	**64**	◆
2.2.1	Tertiary enrolment, % gross	28.6	88	
2.2.2	Graduates in science and engineering, %	32.2	12 ● ◆	
2.2.3	Tertiary inbound mobility, %	0.1	108 ○	
2.3	**Research and development (R&D)**	**32.5**	**35**	◆
2.3.1	Researchers, FTE/mn pop.	252.7	78	
2.3.2	Gross expenditure on R&D, % GDP	0.7	52	◆
2.3.3	Global corporate R&D investors, top 3, mn US$	69.2	15 ● ◆	
2.3.4	QS university ranking, top 3*	44.9	23 ● ◆	
Infrastructure		**36.8**	**81**	◆
3.1	**Information and communication technologies (ICTs)**	**58.1**	**86**	
3.1.1	ICT access*	38.2	111 ○	
3.1.2	ICT use*	23.2	110 ○	
3.1.3	Government's online service*	85.3	24	◆
3.1.4	E-participation*	85.7	29	◆
3.2	**General infrastructure**	**32.1**	**52**	
3.2.1	Electricity output, GWh/mn pop.	1,198.1	94	
3.2.2	Logistics performance*	52.4	43	◆
3.2.3	Gross capital formation, % GDP	27.8	28	
3.3	**Ecological sustainability**	**20.3**	**98**	
3.3.1	GDP/unit of energy use	10.8	63	
3.3.2	Environmental performance*	27.6	125 ○ ◇	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.9	69	
Market sophistication		**55.5**	**28**	◆
4.1	**Credit**	**43.1**	**56**	
4.1.1	Ease of getting credit*	80.0	23	
4.1.2	Domestic credit to private sector, % GDP	50.2	69	
4.1.3	Microfinance gross loans, % GDP	0.9	25	
4.2	**Investment**	**35.9**	**45**	
4.2.1	Ease of protecting minority investors*	80.0	13 ● ◆	
4.2.2	Market capitalization, % GDP	80.2	19	◆
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.1	38	◆
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.1	22	◆
4.3	**Trade, diversification, and market scale**	**87.7**	**7** ● ◆	
4.3.1	Applied tariff rate, weighted avg., %	6.6	97	
4.3.2	Domestic industry diversification	97.8	12 ● ◆	
4.3.3	Domestic market scale, bn PPP$	8,681.3	3 ● ◆	

		Score/ Value	Rank	
Business sophistication		**29.2**	**52**	◆
5.1	**Knowledge workers**	**26.4**	**83**	
5.1.1	Knowledge-intensive employment, %	17.0	90	
5.1.2	Firms offering formal training, %	35.9	38	
5.1.3	GERD performed by business, % GDP	0.2	51	◆
5.1.4	GERD financed by business, %	36.8	51	
5.1.5	Females employed w/advanced degrees, %	2.3	103 ○	
5.2	**Innovation linkages**	**24.1**	**50**	◆
5.2.1	University-industry R&D collaboration†	42.7	65	
5.2.2	State of cluster development and depth†	45.6	72	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.1	35	◆
5.2.5	Patent families/bn PPP$ GDP	0.2	49	◆
5.3	**Knowledge absorption**	**37.1**	**34**	◆
5.3.1	Intellectual property payments, % total trade	1.4	27	◆
5.3.2	High-tech imports, % total trade	10.6	26	
5.3.3	ICT services imports, % total trade	1.7	43	
5.3.4	FDI net inflows, % GDP	1.6	88	
5.3.5	Research talent, % in businesses	34.0	38	◆
Knowledge and technology outputs		**34.5**	**29**	◆
6.1	**Knowledge creation**	**21.0**	**51**	◆
6.1.1	Patents by origin/bn PPP$ GDP	2.0	36	◆
6.1.2	PCT patents by origin/bn PPP$ GDP	0.2	48	◆
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	10.3	84	
6.1.5	Citable documents H-index	40.8	21 ● ◆	
6.2	**Knowledge impact**	**33.3**	**51**	◆
6.2.1	Labor productivity growth, %	2.8	17 ●	
6.2.2	New businesses/th pop. 15–64	0.1	115 ○	
6.2.3	Software spending, % GDP	0.3	51	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	3.6	68	
6.2.5	High-tech manufacturing, %	34.1	36	◆
6.3	**Knowledge diffusion**	**49.1**	**13** ● ◆	
6.3.1	Intellectual property receipts, % total trade	0.1	46	
6.3.2	Production and export complexity	56.3	42	◆
6.3.3	High-tech exports, % total trade	4.0	39	
6.3.4	ICT services exports, % total trade	11.7	1 ● ◆	
Creative outputs		**23.1**	**68**	
7.1	**Intangible assets**	**31.9**	**61**	
7.1.1	Trademarks by origin/bn PPP$ GDP	33.8	68	
7.1.2	Global brand value, top 5,000, % GDP	70.3	28	◆
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.0	72	
7.1.4	ICTs and organizational model creation†	59.6	47	◆
7.2	**Creative goods and services**	**19.8**	**55**	◆
7.2.1	Cultural and creative services exports, % total trade	1.5	18 ● ◆	
7.2.2	National feature films/mn pop. 15–69	2.2	63	
7.2.3	Entertainment and media market/th pop. 15–69	0.9	59 ○	
7.2.4	Printing and other media, % manufacturing	0.5	83 ○	
7.2.5	Creative goods exports, % total trade	2.7	24	◆
7.3	**Online creativity**	**8.6**	**105**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.9	97	
7.3.2	Country-code TLDs/th pop. 15–69	0.7	95	
7.3.3	Wikipedia edits/mn pop. 15–69	23.4	117 ○	
7.3.4	Mobile app creation/bn PPP$ GDP	13.3	42	

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Indonesia

GII 2021 rank **87**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
84	**87**	**Upper middle**	**SEAO**	**273.5**	**3,328.3**	**12,345**	**85**

		Score/ Value	Rank	
Institutions		**51.2**	**107**	◇
1.1	**Political environment**	**58.5**	**64**	
1.1.1	Political and operational stability*	66.1	74	
1.1.2	Government effectiveness*	54.7	59	
1.2	**Regulatory environment**	**20.4**	**131**	○ ◇
1.2.1	Regulatory quality*	41.1	76	
1.2.2	Rule of law*	37.7	82	
1.2.3	Cost of redundancy dismissal	57.8	129	○ ◇
1.3	**Business environment**	**74.6**	**52**	
1.3.1	Ease of starting a business*	81.2	108	
1.3.2	Ease of resolving insolvency*	68.1	35	
Human capital and research		**22.4**	**91**	
2.1	**Education**	**35.4**	**106**	◇
2.1.1	Expenditure on education, % GDP	3.6	82	
2.1.2	Government funding/pupil, secondary, % GDP/cap	10.5	90	○
2.1.3	School life expectancy, years	13.6	74	
2.1.4	PISA scales in reading, maths and science	381.9	72	○
2.1.5	Pupil-teacher ratio, secondary	15.2	74	
2.2	**Tertiary education**	**21.5**	**93**	
2.2.1	Tertiary enrolment, % gross	36.3	78	
2.2.2	Graduates in science and engineering, %	19.4	76	
2.2.3	Tertiary inbound mobility, %	0.1	109	○ ◇
2.3	**Research and development (R&D)**	**10.4**	**57**	
2.3.1	Researchers, FTE/mn pop.	216.0	80	
2.3.2	Gross expenditure on R&D, % GDP	0.2	89	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	34.9	34	●
Infrastructure		**41.4**	**68**	
3.1	**Information and communication technologies (ICTs)**	**60.9**	**80**	
3.1.1	ICT access*	55.4	84	
3.1.2	ICT use*	45.1	92	
3.1.3	Government's online service*	68.2	72	
3.1.4	E-participation*	75.0	57	
3.2	**General infrastructure**	**36.1**	**36**	◆
3.2.1	Electricity output, GWh/mn pop.	1,090.5	96	◇
3.2.2	Logistics performance*	51.2	45	◆
3.2.3	Gross capital formation, % GDP	33.0	17	● ◆
3.3	**Ecological sustainability**	**27.2**	**69**	
3.3.1	GDP/unit of energy use	14.4	28	●
3.3.2	Environmental performance*	37.8	96	◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.6	78	
Market sophistication		**48.5**	**57**	
4.1	**Credit**	**33.6**	**95**	
4.1.1	Ease of getting credit*	70.0	44	
4.1.2	Domestic credit to private sector, % GDP	37.8	84	
4.1.3	Microfinance gross loans, % GDP	0.0	67	
4.2	**Investment**	**24.0**	**92**	
4.2.1	Ease of protecting minority investors*	70.0	36	
4.2.2	Market capitalization, % GDP	48.2	35	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	65	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	59	
4.3	**Trade, diversification, and market scale**	**87.8**	**6**	● ◆
4.3.1	Applied tariff rate, weighted avg., %	2.0	55	
4.3.2	Domestic industry diversification	94.8	27	●
4.3.3	Domestic market scale, bn PPP$	3,328.3	7	● ◆

		Score/ Value	Rank	
Business sophistication		**17.5**	**110**	◇
5.1	**Knowledge workers**	**8.0**	**126**	○ ◇
5.1.1	Knowledge-intensive employment, %	11.3	106	◇
5.1.2	Firms offering formal training, %	7.7	97	○ ◇
5.1.3	GERD performed by business, % GDP	0.0	83	○
5.1.4	GERD financed by business, %	8.0	80	
5.1.5	Females employed w/advanced degrees, %	6.3	87	◇
5.2	**Innovation linkages**	**20.7**	**64**	
5.2.1	University-industry R&D collaboration†	58.4	27	● ◆
5.2.2	State of cluster development and depth†	61.9	23	● ◆
5.2.3	GERD financed by abroad, % GDP	0.0	99	○
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	113	○
5.2.5	Patent families/bn PPP$ GDP	0.0	99	
5.3	**Knowledge absorption**	**23.9**	**73**	
5.3.1	Intellectual property payments, % total trade	0.9	44	
5.3.2	High-tech imports, % total trade	8.9	48	
5.3.3	ICT services imports, % total trade	1.6	48	
5.3.4	FDI net inflows, % GDP	2.0	78	
5.3.5	Research talent, % in businesses	7.5	65	
Knowledge and technology outputs		**18.3**	**74**	
6.1	**Knowledge creation**	**9.5**	**81**	
6.1.1	Patents by origin/bn PPP$ GDP	0.9	65	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	96	
6.1.3	Utility models by origin/bn PPP$ GDP	0.7	27	
6.1.4	Scientific and technical articles/bn PPP$ GDP	1.5	128	○ ◇
6.1.5	Citable documents H-index	14.5	56	
6.2	**Knowledge impact**	**31.8**	**58**	
6.2.1	Labor productivity growth, %	1.3	36	
6.2.2	New businesses/th pop. 15–64	0.3	106	
6.2.3	Software spending, % GDP	0.4	27	● ◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	2.0	88	
6.2.5	High-tech manufacturing, %	31.9	41	
6.3	**Knowledge diffusion**	**13.7**	**74**	
6.3.1	Intellectual property receipts, % total trade	0.0	72	
6.3.2	Production and export complexity	44.2	61	
6.3.3	High-tech exports, % total trade	3.1	47	
6.3.4	ICT services exports, % total trade	0.6	95	
Creative outputs		**17.5**	**91**	
7.1	**Intangible assets**	**24.3**	**88**	
7.1.1	Trademarks by origin/bn PPP$ GDP	12.2	106	◇
7.1.2	Global brand value, top 5,000, % GDP	30.0	44	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.5	83	
7.1.4	ICTs and organizational model creation†	65.4	27	● ◆
7.2	**Creative goods and services**	**12.0**	**74**	
7.2.1	Cultural and creative services exports, % total trade	0.0	94	
7.2.2	National feature films/mn pop. 15–69	0.6	95	
7.2.3	Entertainment and media market/th pop. 15–69	3.1	50	◇
7.2.4	Printing and other media, % manufacturing	0.9	65	
7.2.5	Creative goods exports, % total trade	2.2	27	●
7.3	**Online creativity**	**9.3**	**98**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	1.5	89	
7.3.2	Country-code TLDs/th pop. 15–69	0.7	94	
7.3.3	Wikipedia edits/mn pop. 15–69	32.9	96	◇
7.3.4	Mobile app creation/bn PPP$ GDP	4.5	57	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Iran (Islamic Republic of)

GII 2021 rank
60

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
44	**86**	**Upper middle**	**CSA**	**84.0**	**1,006.7**	**11,963**	**67**

		Score/ Value	Rank	
Institutions		**45.3**	**124**	◇
1.1	**Political environment**	**41.0**	**114**	◇
1.1.1	Political and operational stability*	46.4	129	○ ◇
1.1.2	Government effectiveness*	38.3	102	◇
1.2	**Regulatory environment**	**43.4**	**119**	◇
1.2.1	Regulatory quality*	6.3	130	○ ◇
1.2.2	Rule of law*	27.0	110	◇
1.2.3	Cost of redundancy dismissal	23.1	98	
1.3	**Business environment**	**51.4**	**125**	○ ◇
1.3.1	Ease of starting a business*	67.8	129	○ ◇
1.3.2	Ease of resolving insolvency*	35.1	111	◇
Human capital and research		**37.3**	**49**	
2.1	**Education**	**44.5**	**80**	
2.1.1	Expenditure on education, % GDP	4.0	69	
2.1.2	Government funding/pupil, secondary, % GDP/cap	17.5	61	
2.1.3	School life expectancy, years	14.8	58	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	19.0	93	
2.2	**Tertiary education**	**52.9**	**9**	● ◆
2.2.1	Tertiary enrolment, % gross	62.8	46	
2.2.2	Graduates in science and engineering, %	40.2	3	● ◆
2.2.3	Tertiary inbound mobility, %	0.6	94	
2.3	**Research and development (R&D)**	**14.6**	**48**	
2.3.1	Researchers, FTE/mn pop.	1,474.9	44	
2.3.2	Gross expenditure on R&D, % GDP	0.8	45	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	24.2	44	
Infrastructure		**40.9**	**70**	
3.1	**Information and communication technologies (ICTs)**	**60.1**	**83**	
3.1.1	ICT access*	79.2	37	● ◆
3.1.2	ICT use*	56.0	69	
3.1.3	Government's online service*	58.8	88	
3.1.4	E-participation*	46.4	107	◇
3.2	**General infrastructure**	**41.5**	**25**	● ◆
3.2.1	Electricity output, GWh/mn pop.	3,787.8	56	
3.2.2	Logistics performance*	37.4	63	
3.2.3	Gross capital formation, % GDP	40.7	6	● ◆
3.3	**Ecological sustainability**	**21.2**	**93**	◇
3.3.1	GDP/unit of energy use	5.9	108	◇
3.3.2	Environmental performance*	48.0	61	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.7	77	
Market sophistication		**43.4**	**82**	
4.1	**Credit**	**38.1**	**78**	
4.1.1	Ease of getting credit*	50.0	94	◇
4.1.2	Domestic credit to private sector, % GDP	66.1	49	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**24.6**	**[85]**	
4.2.1	Ease of protecting minority investors*	40.0	110	◇
4.2.2	Market capitalization, % GDP	27.6	50	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**67.5**	**71**	
4.3.1	Applied tariff rate, weighted avg., %	15.4	130	○ ◇
4.3.2	Domestic industry diversification	93.5	38	
4.3.3	Domestic market scale, bn PPP$	1,006.7	25	●

		Score/ Value	Rank	
Business sophistication		**16.5**	**115**	◇
5.1	**Knowledge workers**	**18.1**	**[104]**	
5.1.1	Knowledge-intensive employment, %	19.8	80	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	0.2	53	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, %	7.9	80	
5.2	**Innovation linkages**	**16.2**	**102**	
5.2.1	University-industry R&D collaboration†	26.7	120	○ ◇
5.2.2	State of cluster development and depth†	42.9	87	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	127	○ ◇
5.2.5	Patent families/bn PPP$ GDP	0.0	74	
5.3	**Knowledge absorption**	**15.1**	**117**	◇
5.3.1	Intellectual property payments, % total trade	0.2	97	
5.3.2	High-tech imports, % total trade	3.8	119	
5.3.3	ICT services imports, % total trade	0.5	107	
5.3.4	FDI net inflows, % GDP	0.8	110	◇
5.3.5	Research talent, % in businesses	19.2	55	
Knowledge and technology outputs		**26.9**	**46**	
6.1	**Knowledge creation**	**50.6**	**14**	● ◆
6.1.1	Patents by origin/bn PPP$ GDP	11.1	7	● ◆
6.1.2	PCT patents by origin/bn PPP$ GDP	0.3	44	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	46.2	11	● ◆
6.1.5	Citable documents H-index	20.5	40	●
6.2	**Knowledge impact**	**24.9**	**85**	
6.2.1	Labor productivity growth, %	−4.9	119	○ ◇
6.2.2	New businesses/th pop. 15–64	0.4	101	
6.2.3	Software spending, % GDP	0.3	38	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	2.1	87	
6.2.5	High-tech manufacturing, %	38.6	28	● ◆
6.3	**Knowledge diffusion**	**5.2**	**119**	◇
6.3.1	Intellectual property receipts, % total trade	0.0	95	
6.3.2	Production and export complexity	27.6	100	◇
6.3.3	High-tech exports, % total trade	0.1	117	
6.3.4	ICT services exports, % total trade	0.1	125	○
Creative outputs		**31.3**	**46**	
7.1	**Intangible assets**	**53.8**	**13**	● ◆
7.1.1	Trademarks by origin/bn PPP$ GDP	418.9	1	● ◆
7.1.2	Global brand value, top 5,000, % GDP	1.0	78	
7.1.3	Industrial designs by origin/bn PPP$ GDP	16.7	4	● ◆
7.1.4	ICTs and organizational model creation†	47.4	92	
7.2	**Creative goods and services**	**2.8**	**113**	◇
7.2.1	Cultural and creative services exports, % total trade	0.1	81	
7.2.2	National feature films/mn pop. 15–69	1.7	73	
7.2.3	Entertainment and media market/th pop. 15–69	3.0	51	◇
7.2.4	Printing and other media, % manufacturing	0.3	98	○ ◇
7.2.5	Creative goods exports, % total trade	0.1	106	
7.3	**Online creativity**	**14.9**	**75**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	1.8	80	
7.3.2	Country-code TLDs/th pop. 15–69	6.2	48	
7.3.3	Wikipedia edits/mn pop. 15–69	50.7	64	
7.3.4	Mobile app creation/bn PPP$ GDP	0.8	75	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Ireland

GII 2021 rank **19**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
19	**22**	**High**	**EUR**	**4.9**	**447.7**	**89,383**	**15**

		Score/ Value	Rank	
Institutions		**84.3**	**18**	
1.1	**Political environment**	**80.1**	**20**	
1.1.1	Political and operational stability*	82.1	24	
1.1.2	Government effectiveness*	79.1	24	
1.2	**Regulatory environment**	**85.9**	**18**	
1.2.1	Regulatory quality*	85.4	14	
1.2.2	Rule of law*	83.5	20	
1.2.3	Cost of redundancy dismissal	14.3	54	
1.3	**Business environment**	**86.8**	**13**	
1.3.1	Ease of starting a business*	94.4	21	
1.3.2	Ease of resolving insolvency*	79.2	18	
Human capital and research		**48.5**	**27**	
2.1	**Education**	**49.2**	**69**	○ ◇
2.1.1	Expenditure on education, % GDP	3.5	86	○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	11.0	89	○ ◇
2.1.3	School life expectancy, years	19.8	2	● ◆
2.1.4	PISA scales in reading, maths and science	504.6	10	
2.1.5	Pupil-teacher ratio, secondary	n/a	n/a	
2.2	**Tertiary education**	**43.7**	**27**	
2.2.1	Tertiary enrolment, % gross	77.3	23	
2.2.2	Graduates in science and engineering, %	24.1	45	
2.2.3	Tertiary inbound mobility, %	9.6	23	
2.3	**Research and development (R&D)**	**52.5**	**20**	
2.3.1	Researchers, FTE/mn pop.	5,282.4	15	
2.3.2	Gross expenditure on R&D, % GDP	1.2	32	◇
2.3.3	Global corporate R&D investors, top 3, mn US$	75.0	12	●
2.3.4	QS university ranking, top 3*	47.5	22	
Infrastructure		**62.1**	**4**	● ◆
3.1	**Information and communication technologies (ICTs)**	**81.1**	**28**	
3.1.1	ICT access*	83.3	24	
3.1.2	ICT use*	78.1	27	
3.1.3	Government's online service*	77.1	47	◇
3.1.4	E-participation*	85.7	29	
3.2	**General infrastructure**	**44.8**	**19**	
3.2.1	Electricity output, GWh/mn pop.	6,226.4	33	
3.2.2	Logistics performance*	67.9	28	◇
3.2.3	Gross capital formation, % GDP	32.9	18	◆
3.3	**Ecological sustainability**	**60.4**	**1**	● ◆
3.3.1	GDP/unit of energy use	30.8	2	● ◆
3.3.2	Environmental performance*	72.8	16	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.2	37	
Market sophistication		**49.7**	**48**	◇
4.1	**Credit**	**41.8**	**62**	○ ◇
4.1.1	Ease of getting credit*	70.0	44	
4.1.2	Domestic credit to private sector, % GDP	37.0	85	○ ◇
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**43.7**	**27**	
4.2.1	Ease of protecting minority investors*	80.0	13	◆
4.2.2	Market capitalization, % GDP	37.4	39	○ ◇
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.2	15	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.1	13	
4.3	**Trade, diversification, and market scale**	**63.5**	**81**	○ ◇
4.3.1	Applied tariff rate, weighted avg., %	1.8	25	
4.3.2	Domestic industry diversification	53.6	106	○ ◇
4.3.3	Domestic market scale, bn PPP$	447.7	44	

		Score/ Value	Rank	
Business sophistication		**51.5**	**17**	
5.1	**Knowledge workers**	**55.8**	**22**	
5.1.1	Knowledge-intensive employment, %	43.8	20	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	0.9	23	
5.1.4	GERD financed by business, %	51.7	26	
5.1.5	Females employed w/advanced degrees, %	26.2	9	●
5.2	**Innovation linkages**	**42.0**	**22**	
5.2.1	University-industry R&D collaboration†	64.8	15	
5.2.2	State of cluster development and depth†	57.3	31	
5.2.3	GERD financed by abroad, % GDP	0.3	11	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.1	21	
5.2.5	Patent families/bn PPP$ GDP	2.0	22	
5.3	**Knowledge absorption**	**56.7**	**5**	●
5.3.1	Intellectual property payments, % total trade	20.6	1	● ◆
5.3.2	High-tech imports, % total trade	7.9	60	
5.3.3	ICT services imports, % total trade	1.2	61	○
5.3.4	FDI net inflows, % GDP	7.7	12	●
5.3.5	Research talent, % in businesses	50.0	24	
Knowledge and technology outputs		**47.6**	**15**	
6.1	**Knowledge creation**	**23.3**	**43**	◇
6.1.1	Patents by origin/bn PPP$ GDP	2.1	35	◇
6.1.2	PCT patents by origin/bn PPP$ GDP	1.8	21	
6.1.3	Utility models by origin/bn PPP$ GDP	0.2	48	○
6.1.4	Scientific and technical articles/bn PPP$ GDP	21.4	41	◇
6.1.5	Citable documents H-index	34.9	27	
6.2	**Knowledge impact**	**46.8**	**10**	●
6.2.1	Labor productivity growth, %	–1.3	92	○
6.2.2	New businesses/th pop. 15–64	7.1	23	
6.2.3	Software spending, % GDP	0.6	3	●
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	5.7	50	
6.2.5	High-tech manufacturing, %	58.5	6	●
6.3	**Knowledge diffusion**	**72.6**	**1**	● ◆
6.3.1	Intellectual property receipts, % total trade	2.9	7	● ◆
6.3.2	Production and export complexity	75.3	17	
6.3.3	High-tech exports, % total trade	8.5	20	
6.3.4	ICT services exports, % total trade	27.3	1	● ◆
Creative outputs		**36.7**	**29**	◇
7.1	**Intangible assets**	**37.2**	**46**	◇
7.1.1	Trademarks by origin/bn PPP$ GDP	n/a	n/a	
7.1.2	Global brand value, top 5,000, % GDP	59.3	32	
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.2	63	○
7.1.4	ICTs and organizational model creation†	70.8	20	
7.2	**Creative goods and services**	**22.2**	**44**	◇
7.2.1	Cultural and creative services exports, % total trade	0.5	51	
7.2.2	National feature films/mn pop. 15–69	8.9	23	
7.2.3	Entertainment and media market/th pop. 15–69	52.1	14	
7.2.4	Printing and other media, % manufacturing	0.4	95	○
7.2.5	Creative goods exports, % total trade	1.4	38	
7.3	**Online creativity**	**50.0**	**22**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	58.8	12	●
7.3.2	Country-code TLDs/th pop. 15–69	27.0	25	
7.3.3	Wikipedia edits/mn pop. 15–69	75.9	20	
7.3.4	Mobile app creation/bn PPP$ GDP	34.9	13	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Israel

GII 2021 rank **15**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
12	18	High	NAWA	8.7	361.0	39,126	13

		Score/ Value	Rank	
Institutions		**76.2**	**34**	◇
1.1	**Political environment**	**76.6**	**28**	◇
1.1.1	Political and operational stability*	69.6	60	○ ◇
1.1.2	Government effectiveness*	80.1	22	
1.2	**Regulatory environment**	**68.6**	**53**	◇
1.2.1	Regulatory quality*	77.0	23	
1.2.2	Rule of law*	74.3	27	◇
1.2.3	Cost of redundancy dismissal	27.4	114	○ ◇
1.3	**Business environment**	**83.4**	**24**	
1.3.1	Ease of starting a business*	94.1	26	
1.3.2	Ease of resolving insolvency*	72.7	27	
Human capital and research		**51.6**	**19**	
2.1	**Education**	**58.1**	**38**	
2.1.1	Expenditure on education, % GDP	6.1	14	
2.1.2	Government funding/pupil, secondary, % GDP/cap	19.4	50	
2.1.3	School life expectancy, years	16.1	34	
2.1.4	PISA scales in reading, maths and science	465.2	39	◇
2.1.5	Pupil-teacher ratio, secondary ◴	14.4	68	○ ◇
2.2	**Tertiary education**	**28.6**	**77**	○ ◇
2.2.1	Tertiary enrolment, % gross	61.5	47	
2.2.2	Graduates in science and engineering, %	18.1	85	○ ◇
2.2.3	Tertiary inbound mobility, % ◴	2.8	70	○ ◇
2.3	**Research and development (R&D)**	**68.0**	**8**	
2.3.1	Researchers, FTE/mn pop.	n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP	4.9	1	● ◆
2.3.3	Global corporate R&D investors, top 3, mn US$	64.2	20	
2.3.4	QS university ranking, top 3*	39.9	32	
Infrastructure		**50.2**	**40**	◇
3.1	**Information and communication technologies (ICTs)**	**76.6**	**45**	◇
3.1.1	ICT access*	81.6	27	
3.1.2	ICT use*	78.4	25	
3.1.3	Government's online service*	74.7	55	◇
3.1.4	E-participation*	71.4	66	○ ◇
3.2	**General infrastructure**	**33.7**	**45**	◇
3.2.1	Electricity output, GWh/mn pop.	7,757.5	25	
3.2.2	Logistics performance*	58.5	36	◇
3.2.3	Gross capital formation, % GDP	20.7	84	○
3.3	**Ecological sustainability**	**40.3**	**35**	
3.3.1	GDP/unit of energy use	15.0	22	
3.3.2	Environmental performance*	65.8	29	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.1	38	
Market sophistication		**66.8**	**8**	
4.1	**Credit**	**48.0**	**39**	
4.1.1	Ease of getting credit*	70.0	44	
4.1.2	Domestic credit to private sector, % GDP	65.4	50	◇
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**74.4**	**7**	◆
4.2.1	Ease of protecting minority investors*	78.0	18	
4.2.2	Market capitalization, % GDP	58.7	26	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.6	1	● ◆
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.5	1	● ◆
4.3	**Trade, diversification, and market scale**	**77.9**	**36**	
4.3.1	Applied tariff rate, weighted avg., % ◴	1.8	53	
4.3.2	Domestic industry diversification ◴	91.7	46	
4.3.3	Domestic market scale, bn PPP$	361.0	48	

		Score/ Value	Rank	
Business sophistication		**58.7**	**8**	
5.1	**Knowledge workers**	**61.2**	**15**	
5.1.1	Knowledge-intensive employment, % ◴	48.4	12	
5.1.2	Firms offering formal training, % ◴	18.6	81	○ ◇
5.1.3	GERD performed by business, % GDP	4.4	1	● ◆
5.1.4	GERD financed by business, %	36.6	52	◇
5.1.5	Females employed w/advanced degrees, % ◴	22.4	25	
5.2	**Innovation linkages**	**82.1**	**1**	● ◆
5.2.1	University-industry R&D collaboration†	79.2	1	● ◆
5.2.2	State of cluster development and depth†	56.9	32	
5.2.3	GERD financed by abroad, % GDP	2.5	1	● ◆
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.3	3	● ◆
5.2.5	Patent families/bn PPP$ GDP	5.3	8	◆
5.3	**Knowledge absorption**	**33.0**	**48**	◇
5.3.1	Intellectual property payments, % total trade	0.6	64	○
5.3.2	High-tech imports, % total trade	10.9	22	
5.3.3	ICT services imports, % total trade	2.2	28	
5.3.4	FDI net inflows, % GDP	5.1	20	
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**55.9**	**6**	
6.1	**Knowledge creation**	**53.8**	**12**	
6.1.1	Patents by origin/bn PPP$ GDP	3.6	23	
6.1.2	PCT patents by origin/bn PPP$ GDP	5.4	1	● ◆
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	41.6	15	
6.1.5	Citable documents H-index	47.4	16	
6.2	**Knowledge impact**	**42.2**	**21**	
6.2.1	Labor productivity growth, %	1.0	45	
6.2.2	New businesses/th pop. 15–64	3.3	42	
6.2.3	Software spending, % GDP	0.2	56	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	21.7	7	◆
6.2.5	High-tech manufacturing, %	33.0	37	
6.3	**Knowledge diffusion**	**71.8**	**2**	● ◆
6.3.1	Intellectual property receipts, % total trade	2.1	12	
6.3.2	Production and export complexity	71.7	20	
6.3.3	High-tech exports, % total trade	11.4	14	
6.3.4	ICT services exports, % total trade	15.3	1	● ◆
Creative outputs		**36.3**	**30**	◇
7.1	**Intangible assets**	**27.5**	**75**	○ ◇
7.1.1	Trademarks by origin/bn PPP$ GDP	11.3	109	○ ◇
7.1.2	Global brand value, top 5,000, % GDP	19.9	49	◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	2.2	46	
7.1.4	ICTs and organizational model creation†	77.0	12	
7.2	**Creative goods and services**	**31.2**	**23**	
7.2.1	Cultural and creative services exports, % total trade	2.9	5	● ◆
7.2.2	National feature films/mn pop. 15–69	5.3	41	
7.2.3	Entertainment and media market/th pop. 15–69	35.6	22	◇
7.2.4	Printing and other media, % manufacturing ◴	1.2	38	
7.2.5	Creative goods exports, % total trade	1.4	37	
7.3	**Online creativity**	**59.0**	**9**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	21.9	26	
7.3.2	Country-code TLDs/th pop. 15–69	14.3	34	◇
7.3.3	Wikipedia edits/mn pop. 15–69	93.9	1	● ◆
7.3.4	Mobile app creation/bn PPP$ GDP	100.0	1	● ◆

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Italy

GII 2021 rank **29**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
25	33	High	EUR	60.5	2,415.4	40,066	28

		Score/ Value	Rank	
Institutions		**75.5**	**36**	
1.1	**Political environment**	**63.8**	**48**	◇
1.1.1	Political and operational stability*	69.6	60	◇
1.1.2	Government effectiveness*	60.9	46	◇
1.2	**Regulatory environment**	**80.6**	**31**	
1.2.1	Regulatory quality*	68.5	39	
1.2.2	Rule of law*	54.1	52	◇
1.2.3	Cost of redundancy dismissal	8.0	1	● ◆
1.3	**Business environment**	**82.1**	**27**	
1.3.1	Ease of starting a business*	86.8	76	○ ◇
1.3.2	Ease of resolving insolvency*	77.5	20	
Human capital and research		**46.0**	**31**	
2.1	**Education**	**54.8**	**50**	
2.1.1	Expenditure on education, % GDP	4.0	67	○
2.1.2	Government funding/pupil, secondary, % GDP/cap ◴	22.9	28	
2.1.3	School life expectancy, years	16.2	33	
2.1.4	PISA scales in reading, maths and science	477.0	34	
2.1.5	Pupil-teacher ratio, secondary ◴	10.1	30	
2.2	**Tertiary education**	**37.9**	**49**	
2.2.1	Tertiary enrolment, % gross	64.3	42	
2.2.2	Graduates in science and engineering, %	24.2	44	
2.2.3	Tertiary inbound mobility, %	5.6	40	
2.3	**Research and development (R&D)**	**45.4**	**22**	
2.3.1	Researchers, FTE/mn pop.	2,652.7	34	
2.3.2	Gross expenditure on R&D, % GDP	1.4	25	
2.3.3	Global corporate R&D investors, top 3, mn US$	72.1	13	●
2.3.4	QS university ranking, top 3*	48.9	19	
Infrastructure		**54.2**	**26**	
3.1	**Information and communication technologies (ICTs)**	**78.3**	**38**	
3.1.1	ICT access*	76.4	44	
3.1.2	ICT use*	71.6	44	
3.1.3	Government's online service*	82.9	36	
3.1.4	E-participation*	82.1	41	
3.2	**General infrastructure**	**32.3**	**51**	
3.2.1	Electricity output, GWh/mn pop.	4,763.4	49	
3.2.2	Logistics performance*	78.6	19	
3.2.3	Gross capital formation, % GDP	16.3	108	○ ◇
3.3	**Ecological sustainability**	**52.0**	**7**	● ◆
3.3.1	GDP/unit of energy use	15.8	18	
3.3.2	Environmental performance*	71.0	20	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	6.5	14	● ◆
Market sophistication		**50.7**	**43**	
4.1	**Credit**	**37.4**	**80**	○
4.1.1	Ease of getting credit*	45.0	101	○ ◇
4.1.2	Domestic credit to private sector, % GDP	74.3	43	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**26.2**	**79**	○
4.2.1	Ease of protecting minority investors*	66.0	50	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	54	○
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	56	○
4.3	**Trade, diversification, and market scale**	**88.6**	**4**	● ◆
4.3.1	Applied tariff rate, weighted avg., %	1.8	25	
4.3.2	Domestic industry diversification	99.4	3	●
4.3.3	Domestic market scale, bn PPP$	2,415.4	12	● ◆

		Score/ Value	Rank	
Business sophistication		**36.7**	**32**	
5.1	**Knowledge workers**	**38.9**	**44**	
5.1.1	Knowledge-intensive employment, %	36.5	34	
5.1.2	Firms offering formal training, %	12.6	93	○ ◇
5.1.3	GERD performed by business, % GDP	0.9	24	
5.1.4	GERD financed by business, %	54.5	20	
5.1.5	Females employed w/advanced degrees, %	13.2	54	
5.2	**Innovation linkages**	**35.4**	**27**	
5.2.1	University-industry R&D collaboration†	51.2	38	
5.2.2	State of cluster development and depth†	73.5	2	● ◆
5.2.3	GERD financed by abroad, % GDP	0.1	31	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	55	
5.2.5	Patent families/bn PPP$ GDP	1.7	24	
5.3	**Knowledge absorption**	**35.8**	**38**	
5.3.1	Intellectual property payments, % total trade	0.8	49	
5.3.2	High-tech imports, % total trade	7.5	69	
5.3.3	ICT services imports, % total trade	2.0	34	
5.3.4	FDI net inflows, % GDP	1.4	96	○
5.3.5	Research talent, % in businesses	48.6	27	
Knowledge and technology outputs		**41.7**	**18**	
6.1	**Knowledge creation**	**41.8**	**21**	
6.1.1	Patents by origin/bn PPP$ GDP	5.1	18	
6.1.2	PCT patents by origin/bn PPP$ GDP	1.4	24	
6.1.3	Utility models by origin/bn PPP$ GDP	0.7	31	
6.1.4	Scientific and technical articles/bn PPP$ GDP	33.0	27	
6.1.5	Citable documents H-index	68.6	8	● ◆
6.2	**Knowledge impact**	**54.0**	**3**	● ◆
6.2.1	Labor productivity growth, %	–2.4	106	○ ◇
6.2.2	New businesses/th pop. 15–64	3.0	49	
6.2.3	Software spending, % GDP	0.5	12	●
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	35.9	2	● ◆
6.2.5	High-tech manufacturing, %	40.9	24	
6.3	**Knowledge diffusion**	**29.3**	**38**	
6.3.1	Intellectual property receipts, % total trade	0.8	23	
6.3.2	Production and export complexity	77.2	14	●
6.3.3	High-tech exports, % total trade	6.0	31	
6.3.4	ICT services exports, % total trade	1.5	68	
Creative outputs		**35.8**	**34**	
7.1	**Intangible assets**	**45.2**	**28**	
7.1.1	Trademarks by origin/bn PPP$ GDP	44.6	52	
7.1.2	Global brand value, top 5,000, % GDP	90.2	22	
7.1.3	Industrial designs by origin/bn PPP$ GDP	15.8	6	● ◆
7.1.4	ICTs and organizational model creation†	54.6	61	◇
7.2	**Creative goods and services**	**20.8**	**48**	
7.2.1	Cultural and creative services exports, % total trade	0.4	52	
7.2.2	National feature films/mn pop. 15–69	4.1	48	
7.2.3	Entertainment and media market/th pop. 15–69	28.4	24	
7.2.4	Printing and other media, % manufacturing	1.1	48	
7.2.5	Creative goods exports, % total trade	2.3	26	
7.3	**Online creativity**	**32.0**	**34**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	23.1	25	
7.3.2	Country-code TLDs/th pop. 15–69	23.9	28	
7.3.3	Wikipedia edits/mn pop. 15–69	74.6	24	
7.3.4	Mobile app creation/bn PPP$ GDP	3.1	65	○

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Jamaica

GII 2021 rank
74

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
66	**82**	**Upper middle**	**LCN**	**3.0**	**27.9**	**10,221**	**72**

		Score/ Value	Rank	
Institutions		**71.6**	**43**	◆
1.1	**Political environment**	**65.5**	**46**	◆
1.1.1	Political and operational stability*	73.2	44	
1.1.2	Government effectiveness*	61.7	44	◆
1.2	**Regulatory environment**	**65.7**	**63**	
1.2.1	Regulatory quality*	47.9	60	
1.2.2	Rule of law*	38.5	79	
1.2.3	Cost of redundancy dismissal	14.0	52	
1.3	**Business environment**	**83.7**	**23**	● ◆
1.3.1	Ease of starting a business*	97.4	6	● ◆
1.3.2	Ease of resolving insolvency*	70.1	32	● ◆
Human capital and research		**25.0**	**[86]**	
2.1	**Education**	**56.5**	**[45]**	
2.1.1	Expenditure on education, % GDP	5.2	33	
2.1.2	Government funding/pupil, secondary, % GDP/cap	28.6	10	● ◆
2.1.3	School life expectancy, years	n/a	n/a	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	15.7	77	
2.2	**Tertiary education**	**18.5**	**[100]**	
2.2.1	Tertiary enrolment, % gross ⏲	27.1	89	◇
2.2.2	Graduates in science and engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research and development (R&D)**	**0.0**	**[123]**	
2.3.1	Researchers, FTE/mn pop.	n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP	n/a	n/a	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**29.9**	**104**	◇
3.1	**Information and communication technologies (ICTs)**	**43.6**	**102**	◇
3.1.1	ICT access*	56.0	83	
3.1.2	ICT use*	42.8	96	◇
3.1.3	Government's online service*	38.8	118	○ ◇
3.1.4	E-participation*	36.9	116	○ ◇
3.2	**General infrastructure**	**19.2**	**113**	○
3.2.1	Electricity output, GWh/mn pop.	1,499.8	91	◇
3.2.2	Logistics performance*	21.9	106	○ ◇
3.2.3	Gross capital formation, % GDP	21.2	78	
3.3	**Ecological sustainability**	**27.0**	**72**	
3.3.1	GDP/unit of energy use	9.2	79	
3.3.2	Environmental performance*	48.2	60	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.7	52	
Market sophistication		**36.0**	**116**	○ ◇
4.1	**Credit**	**40.9**	**65**	
4.1.1	Ease of getting credit*	85.0	14	●
4.1.2	Domestic credit to private sector, % GDP	41.3	81	
4.1.3	Microfinance gross loans, % GDP	0.2	52	
4.2	**Investment**	**32.8**	**57**	
4.2.1	Ease of protecting minority investors*	62.0	60	
4.2.2	Market capitalization, % GDP	95.8	13	●
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.1	27	◆
4.2.4	Venture capital recipients, deals/bn PPP$ GDP ⏲	0.0	38	
4.3	**Trade, diversification, and market scale**	**34.4**	**129**	○ ◇
4.3.1	Applied tariff rate, weighted avg., % ⏲	10.8	120	○ ◇
4.3.2	Domestic industry diversification	n/a	n/a	
4.3.3	Domestic market scale, bn PPP$	27.9	124	○ ◇

		Score/ Value	Rank	
Business sophistication		**26.0**	**58**	
5.1	**Knowledge workers**	**29.6**	**[70]**	
5.1.1	Knowledge-intensive employment, % ⏲	21.6	74	
5.1.2	Firms offering formal training, % ⏲	25.9	61	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, %	n/a	n/a	
5.2	**Innovation linkages**	**26.7**	**41**	◆
5.2.1	University-industry R&D collaboration† ⏲	44.8	55	
5.2.2	State of cluster development and depth† ⏲	46.5	64	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.1	24	● ◆
5.2.5	Patent families/bn PPP$ GDP	0.0	100	○ ◇
5.3	**Knowledge absorption**	**21.7**	**81**	
5.3.1	Intellectual property payments, % total trade	0.8	57	
5.3.2	High-tech imports, % total trade	4.2	115	○
5.3.3	ICT services imports, % total trade	1.2	64	
5.3.4	FDI net inflows, % GDP	5.0	21	●
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**13.5**	**95**	
6.1	**Knowledge creation**	**5.9**	**[103]**	
6.1.1	Patents by origin/bn PPP$ GDP	0.5	81	
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	6.2	105	
6.1.5	Citable documents H-index	5.2	103	
6.2	**Knowledge impact**	**23.2**	**89**	
6.2.1	Labor productivity growth, %	–2.8	111	○
6.2.2	New businesses/th pop. 15–64	1.6	64	
6.2.3	Software spending, % GDP	0.4	23	● ◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.4	101	
6.2.5	High-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**11.4**	**89**	
6.3.1	Intellectual property receipts, % total trade	0.1	64	
6.3.2	Production and export complexity	30.5	91	
6.3.3	High-tech exports, % total trade	0.2	111	○
6.3.4	ICT services exports, % total trade	2.0	55	
Creative outputs		**29.6**	**51**	
7.1	**Intangible assets**	**50.1**	**20**	● ◆
7.1.1	Trademarks by origin/bn PPP$ GDP	97.6	9	● ◆
7.1.2	Global brand value, top 5,000, % GDP	67.6	29	◆
7.1.3	Industrial designs by origin/bn PPP$ GDP	6.8	21	●
7.1.4	ICTs and organizational model creation†	55.2	60	
7.2	**Creative goods and services**	**1.4**	**[124]**	
7.2.1	Cultural and creative services exports, % total trade	0.1	92	
7.2.2	National feature films/mn pop. 15–69	n/a	n/a	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.1	96	
7.3	**Online creativity**	**16.9**	**68**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	1.8	81	
7.3.2	Country-code TLDs/th pop. 15–69	1.0	85	
7.3.3	Wikipedia edits/mn pop. 15–69	48.2	69	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Japan

GII 2021 rank
13

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
14	**11**	**High**	**SEAO**	**126.5**	**5,236.1**	**41,637**	**16**

		Score/ Value	Rank	
Institutions		**88.8**	**7**	
1.1	**Political environment**	**87.0**	**11**	
1.1.1	Political and operational stability*	89.3	6	
1.1.2	Government effectiveness*	85.9	12	
1.2	**Regulatory environment**	**91.4**	**11**	
1.2.1	Regulatory quality*	78.2	21	
1.2.2	Rule of law*	87.2	17	
1.2.3	Cost of redundancy dismissal	8.0	1	● ◆
1.3	**Business environment**	**88.2**	**9**	
1.3.1	Ease of starting a business*	86.1	82	○ ◇
1.3.2	Ease of resolving insolvency*	90.2	3	● ◆
Human capital and research		**50.8**	**20**	
2.1	**Education**	**54.1**	**[53]**	
2.1.1	Expenditure on education, % GDP	3.2	91	○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	n/a	n/a	
2.1.4	PISA scales in reading, maths and science	520.0	5	
2.1.5	Pupil-teacher ratio, secondary ◴	11.0	38	
2.2	**Tertiary education**	**24.1**	**87**	○ ◇
2.2.1	Tertiary enrolment, % gross	n/a	n/a	
2.2.2	Graduates in science and engineering, %	19.7	74	○
2.2.3	Tertiary inbound mobility, %	4.7	49	
2.3	**Research and development (R&D)**	**74.3**	**4**	●
2.3.1	Researchers, FTE/mn pop.	5,374.6	14	
2.3.2	Gross expenditure on R&D, % GDP	3.2	4	●
2.3.3	Global corporate R&D investors, top 3, mn US$	90.0	5	●
2.3.4	QS university ranking, top 3*	77.6	8	
Infrastructure		**59.8**	**9**	
3.1	**Information and communication technologies (ICTs)**	**90.1**	**8**	
3.1.1	ICT access*	88.5	9	
3.1.2	ICT use*	82.4	16	
3.1.3	Government's online service*	90.6	12	
3.1.4	E-participation*	98.8	4	●
3.2	**General infrastructure**	**46.0**	**16**	
3.2.1	Electricity output, GWh/mn pop.	8,307.1	19	
3.2.2	Logistics performance*	91.8	5	
3.2.3	Gross capital formation, % GDP	24.9	47	
3.3	**Ecological sustainability**	**43.2**	**28**	
3.3.1	GDP/unit of energy use	12.7	40	
3.3.2	Environmental performance*	75.1	12	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	3.3	27	
Market sophistication		**62.1**	**15**	
4.1	**Credit**	**64.2**	**11**	
4.1.1	Ease of getting credit*	55.0	88	○
4.1.2	Domestic credit to private sector, % GDP	174.7	3	● ◆
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**34.3**	**51**	
4.2.1	Ease of protecting minority investors*	64.0	56	
4.2.2	Market capitalization, % GDP	118.9	9	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.1	31	◇
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	36	
4.3	**Trade, diversification, and market scale**	**87.9**	**5**	●
4.3.1	Applied tariff rate, weighted avg., %	3.5	70	○
4.3.2	Domestic industry diversification	94.7	30	
4.3.3	Domestic market scale, bn PPP$	5,236.1	4	● ◆

		Score/ Value	Rank	
Business sophistication		**57.3**	**10**	
5.1	**Knowledge workers**	**65.2**	**11**	
5.1.1	Knowledge-intensive employment, %	25.2	59	◇
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	2.6	3	●
5.1.4	GERD financed by business, %	78.9	2	● ◆
5.1.5	Females employed w/advanced degrees, %	22.4	24	
5.2	**Innovation linkages**	**46.4**	**18**	
5.2.1	University-industry R&D collaboration†	60.1	22	
5.2.2	State of cluster development and depth†	63.2	18	
5.2.3	GERD financed by abroad, % GDP	0.0	68	○ ◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	40	◇
5.2.5	Patent families/bn PPP$ GDP	14.1	1	● ◆
5.3	**Knowledge absorption**	**60.3**	**3**	● ◆
5.3.1	Intellectual property payments, % total trade	2.6	10	
5.3.2	High-tech imports, % total trade	13.9	16	
5.3.3	ICT services imports, % total trade	2.2	27	
5.3.4	FDI net inflows, % GDP	0.5	118	○
5.3.5	Research talent, % in businesses	74.4	3	● ◆
Knowledge and technology outputs		**48.3**	**11**	
6.1	**Knowledge creation**	**58.3**	**11**	
6.1.1	Patents by origin/bn PPP$ GDP	45.0	1	● ◆
6.1.2	PCT patents by origin/bn PPP$ GDP	9.6	1	● ◆
6.1.3	Utility models by origin/bn PPP$ GDP	0.7	30	
6.1.4	Scientific and technical articles/bn PPP$ GDP	16.8	50	◇
6.1.5	Citable documents H-index	69.0	6	
6.2	**Knowledge impact**	**35.1**	**43**	
6.2.1	Labor productivity growth, %	–2.0	102	○ ◇
6.2.2	New businesses/th pop. 15–64	0.4	103	○ ◇
6.2.3	Software spending, % GDP	0.3	46	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	6.1	46	
6.2.5	High-tech manufacturing, %	55.1	9	
6.3	**Knowledge diffusion**	**51.5**	**11**	
6.3.1	Intellectual property receipts, % total trade	5.0	1	● ◆
6.3.2	Production and export complexity	100.0	1	● ◆
6.3.3	High-tech exports, % total trade	11.6	13	
6.3.4	ICT services exports, % total trade	0.8	89	○
Creative outputs		**42.1**	**18**	
7.1	**Intangible assets**	**56.9**	**9**	
7.1.1	Trademarks by origin/bn PPP$ GDP	86.5	15	◆
7.1.2	Global brand value, top 5,000, % GDP	150.9	11	
7.1.3	Industrial designs by origin/bn PPP$ GDP	4.2	28	
7.1.4	ICTs and organizational model creation†	67.8	22	
7.2	**Creative goods and services**	**29.6**	**25**	
7.2.1	Cultural and creative services exports, % total trade	0.4	58	
7.2.2	National feature films/mn pop. 15–69	6.9	31	
7.2.3	Entertainment and media market/th pop. 15–69	71.5	5	
7.2.4	Printing and other media, % manufacturing ◴	1.7	23	
7.2.5	Creative goods exports, % total trade	1.8	33	
7.3	**Online creativity**	**24.9**	**46**	◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	15.5	31	◇
7.3.2	Country-code TLDs/th pop. 15–69	5.8	50	◇
7.3.3	Wikipedia edits/mn pop. 15–69	63.5	46	◇
7.3.4	Mobile app creation/bn PPP$ GDP	12.8	43	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Jordan

GII 2021 rank
81

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
81	**79**	**Upper middle**	**NAWA**	**10.2**	**102.2**	**10,007**	**81**

		Score/ Value	Rank	
Institutions		**64.4**	**63**	
1.1	**Political environment**	**57.3**	**69**	
1.1.1	Political and operational stability*	66.1	74	
1.1.2	Government effectiveness*	52.9	65	
1.2	**Regulatory environment**	**73.7**	**39**	● ◆
1.2.1	Regulatory quality*	44.4	68	
1.2.2	Rule of law*	50.5	56	
1.2.3	Cost of redundancy dismissal	8.0	1	● ◆
1.3	**Business environment**	**62.1**	**97**	
1.3.1	Ease of starting a business*	84.5	92	
1.3.2	Ease of resolving insolvency*	39.7	98	
Human capital and research		**26.2**	**84**	
2.1	**Education**	**32.9**	**110**	◇
2.1.1	Expenditure on education, % GDP	3.1	97	○
2.1.2	Government funding/pupil, secondary, % GDP/cap	15.5	72	
2.1.3	School life expectancy, years	10.6	103	○ ◇
2.1.4	PISA scales in reading, maths and science	416.0	58	
2.1.5	Pupil-teacher ratio, secondary	14.4	67	
2.2	**Tertiary education**	**36.3**	**54**	
2.2.1	Tertiary enrolment, % gross	33.1	81	
2.2.2	Graduates in science and engineering, %	26.4	31	●
2.2.3	Tertiary inbound mobility, %	14.0	13	● ◆
2.3	**Research and development (R&D)**	**9.5**	**60**	
2.3.1	Researchers, FTE/mn pop.	596.0	62	
2.3.2	Gross expenditure on R&D, % GDP	0.7	51	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	17.0	56	
Infrastructure		**30.1**	**102**	◇
3.1	**Information and communication technologies (ICTs)**	**41.4**	**106**	◇
3.1.1	ICT access*	45.9	97	◇
3.1.2	ICT use*	50.4	80	
3.1.3	Government's online service*	35.9	121	○ ◇
3.1.4	E-participation*	33.3	120	○ ◇
3.2	**General infrastructure**	**20.5**	**108**	
3.2.1	Electricity output, GWh/mn pop.	2,057.2	80	
3.2.2	Logistics performance*	29.8	83	
3.2.3	Gross capital formation, % GDP	19.8	89	
3.3	**Ecological sustainability**	**28.5**	**65**	
3.3.1	GDP/unit of energy use	9.8	71	
3.3.2	Environmental performance*	53.4	46	◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.2	62	
Market sophistication		**49.7**	**47**	
4.1	**Credit**	**51.7**	**25**	● ◆
4.1.1	Ease of getting credit*	95.0	4	● ◆
4.1.2	Domestic credit to private sector, % GDP	76.9	40	●
4.1.3	Microfinance gross loans, % GDP	0.4	40	
4.2	**Investment**	**26.3**	**76**	
4.2.1	Ease of protecting minority investors*	50.0	92	
4.2.2	Market capitalization, % GDP	52.7	34	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.1	30	◆
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	30	● ◆
4.3	**Trade, diversification, and market scale**	**71.2**	**58**	
4.3.1	Applied tariff rate, weighted avg., %	4.4	79	
4.3.2	Domestic industry diversification	94.8	29	●
4.3.3	Domestic market scale, bn PPP$	102.2	83	

		Score/ Value	Rank	
Business sophistication		**21.9**	**85**	
5.1	**Knowledge workers**	**23.1**	**[92]**	
5.1.1	Knowledge-intensive employment, %	21.4	75	
5.1.2	Firms offering formal training, %	16.9	87	○ ◇
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, %	7.6	82	
5.2	**Innovation linkages**	**26.5**	**42**	◆
5.2.1	University-industry R&D collaboration†	46.8	50	
5.2.2	State of cluster development and depth†	57.6	30	● ◆
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	47	
5.2.5	Patent families/bn PPP$ GDP	0.0	72	
5.3	**Knowledge absorption**	**16.2**	**112**	◇
5.3.1	Intellectual property payments, % total trade	0.1	100	
5.3.2	High-tech imports, % total trade	7.0	79	
5.3.3	ICT services imports, % total trade	0.2	126	○ ◇
5.3.4	FDI net inflows, % GDP	3.0	49	
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**18.0**	**76**	
6.1	**Knowledge creation**	**16.6**	**63**	
6.1.1	Patents by origin/bn PPP$ GDP	0.2	98	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.2	50	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	29.2	30	● ◆
6.1.5	Citable documents H-index	10.0	78	
6.2	**Knowledge impact**	**26.8**	**78**	
6.2.1	Labor productivity growth, %	–0.8	79	
6.2.2	New businesses/th pop. 15–64	0.5	95	
6.2.3	Software spending, % GDP	0.3	42	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	5.6	53	
6.2.5	High-tech manufacturing, %	22.1	57	
6.3	**Knowledge diffusion**	**10.7**	**93**	
6.3.1	Intellectual property receipts, % total trade	0.1	52	
6.3.2	Production and export complexity	47.8	51	
6.3.3	High-tech exports, % total trade	1.4	66	
6.3.4	ICT services exports, % total trade	0.1	129	○
Creative outputs		**18.3**	**88**	
7.1	**Intangible assets**	**22.0**	**92**	
7.1.1	Trademarks by origin/bn PPP$ GDP	25.7	81	
7.1.2	Global brand value, top 5,000, % GDP	7.9	64	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.7	80	
7.1.4	ICTs and organizational model creation†	52.6	68	
7.2	**Creative goods and services**	**13.8**	**68**	
7.2.1	Cultural and creative services exports, % total trade	0.0	108	○
7.2.2	National feature films/mn pop. 15–69	n/a	n/a	
7.2.3	Entertainment and media market/th pop. 15–69	1.8	54	○ ◇
7.2.4	Printing and other media, % manufacturing	2.4	9	● ◆
7.2.5	Creative goods exports, % total trade	0.9	46	
7.3	**Online creativity**	**15.4**	**73**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	4.8	54	
7.3.2	Country-code TLDs/th pop. 15–69	0.2	108	
7.3.3	Wikipedia edits/mn pop. 15–69	45.5	74	
7.3.4	Mobile app creation/bn PPP$ GDP	11.6	44	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Kazakhstan

GII 2021 rank
79

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
101	**61**	**Upper middle**	**CSA**	**18.8**	**501.8**	**26,589**	**77**

		Score/ Value	Rank	
Institutions		**69.8**	**45**	◆
1.1	**Political environment**	**58.8**	**62**	
1.1.1	Political and operational stability*	69.6	60	
1.1.2	Government effectiveness*	53.4	63	
1.2	**Regulatory environment**	**69.9**	**49**	
1.2.1	Regulatory quality*	47.1	62	
1.2.2	Rule of law*	35.3	90	
1.2.3	Cost of redundancy dismissal	8.7	18	●
1.3	**Business environment**	**80.6**	**31**	● ◆
1.3.1	Ease of starting a business*	94.4	20	● ◆
1.3.2	Ease of resolving insolvency*	66.7	39	
Human capital and research		**31.7**	**66**	
2.1	**Education**	**45.8**	**78**	
2.1.1	Expenditure on education, % GDP	2.9	101	◇
2.1.2	Government funding/pupil, secondary, % GDP/cap ◴	21.2	41	
2.1.3	School life expectancy, years	15.8	40	
2.1.4	PISA scales in reading, maths and science	402.4	64	
2.1.5	Pupil-teacher ratio, secondary	8.3	12	● ◆
2.2	**Tertiary education**	**38.3**	**48**	
2.2.1	Tertiary enrolment, % gross	70.7	31	●
2.2.2	Graduates in science and engineering, %	24.1	46	
2.2.3	Tertiary inbound mobility, %	3.3	65	
2.3	**Research and development (R&D)**	**10.9**	**54**	
2.3.1	Researchers, FTE/mn pop. ◴	666.9	61	
2.3.2	Gross expenditure on R&D, % GDP ◴	0.1	103	○ ◇
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	33.8	36	
Infrastructure		**44.4**	**58**	
3.1	**Information and communication technologies (ICTs)**	**80.5**	**29**	● ◆
3.1.1	ICT access*	76.6	43	◆
3.1.2	ICT use*	64.9	56	
3.1.3	Government's online service*	92.3	11	● ◆
3.1.4	E-participation*	88.1	26	●
3.2	**General infrastructure**	**32.6**	**49**	
3.2.1	Electricity output, GWh/mn pop.	5,887.8	35	◆
3.2.2	Logistics performance*	35.4	70	
3.2.3	Gross capital formation, % GDP	28.3	24	●
3.3	**Ecological sustainability**	**20.1**	**99**	◇
3.3.1	GDP/unit of energy use	6.4	104	◇
3.3.2	Environmental performance*	44.7	75	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.4	88	
Market sophistication		**43.8**	**80**	
4.1	**Credit**	**35.9**	**81**	
4.1.1	Ease of getting credit*	80.0	23	
4.1.2	Domestic credit to private sector, % GDP	24.3	108	
4.1.3	Microfinance gross loans, % GDP	0.2	47	
4.2	**Investment**	**23.0**	**101**	
4.2.1	Ease of protecting minority investors*	84.0	7	● ◆
4.2.2	Market capitalization, % GDP	23.4	54	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	89	○ ◇
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	94	○ ◇
4.3	**Trade, diversification, and market scale**	**72.6**	**53**	
4.3.1	Applied tariff rate, weighted avg., %	2.3	57	
4.3.2	Domestic industry diversification	76.3	87	
4.3.3	Domestic market scale, bn PPP$	501.8	40	

		Score/ Value	Rank	
Business sophistication		**23.0**	**78**	
5.1	**Knowledge workers**	**37.1**	**52**	
5.1.1	Knowledge-intensive employment, % ◴	34.3	40	◆
5.1.2	Firms offering formal training, %	21.8	71	
5.1.3	GERD performed by business, % GDP ◴	0.1	74	
5.1.4	GERD financed by business, %	47.4	31	
5.1.5	Females employed w/advanced degrees, % ◴	20.7	29	● ◆
5.2	**Innovation linkages**	**12.9**	**120**	○ ◇
5.2.1	University-industry R&D collaboration†	36.0	95	
5.2.2	State of cluster development and depth†	32.8	117	○ ◇
5.2.3	GERD financed by abroad, % GDP	0.0	90	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	82	
5.2.5	Patent families/bn PPP$ GDP	0.1	54	
5.3	**Knowledge absorption**	**19.0**	**97**	
5.3.1	Intellectual property payments, % total trade	0.3	87	
5.3.2	High-tech imports, % total trade	7.4	70	
5.3.3	ICT services imports, % total trade	0.7	93	
5.3.4	FDI net inflows, % GDP	1.6	91	
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**15.0**	**86**	
6.1	**Knowledge creation**	**14.9**	**66**	
6.1.1	Patents by origin/bn PPP$ GDP ◴	1.9	39	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	73	
6.1.3	Utility models by origin/bn PPP$ GDP ◴	1.6	14	●
6.1.4	Scientific and technical articles/bn PPP$ GDP	3.2	119	○ ◇
6.1.5	Citable documents H-index	5.3	102	
6.2	**Knowledge impact**	**19.1**	**110**	◇
6.2.1	Labor productivity growth, %	0.9	48	
6.2.2	New businesses/th pop. 15–64	2.0	56	
6.2.3	Software spending, % GDP	0.0	118	○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.0	111	
6.2.5	High-tech manufacturing, %	13.5	81	
6.3	**Knowledge diffusion**	**11.0**	**91**	
6.3.1	Intellectual property receipts, % total trade	0.0	102	○ ◇
6.3.2	Production and export complexity	30.2	92	
6.3.3	High-tech exports, % total trade	3.9	42	
6.3.4	ICT services exports, % total trade	0.2	122	○
Creative outputs		**14.3**	**110**	◇
7.1	**Intangible assets**	**19.2**	**105**	
7.1.1	Trademarks by origin/bn PPP$ GDP	22.6	87	
7.1.2	Global brand value, top 5,000, % GDP	3.8	70	
7.1.3	Industrial designs by origin/bn PPP$ GDP ◴	0.2	103	
7.1.4	ICTs and organizational model creation†	48.2	88	
7.2	**Creative goods and services**	**6.5**	**96**	
7.2.1	Cultural and creative services exports, % total trade	0.1	89	
7.2.2	National feature films/mn pop. 15–69	6.1	38	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	0.4	96	○ ◇
7.2.5	Creative goods exports, % total trade	0.2	80	
7.3	**Online creativity**	**12.4**	**83**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.3	115	
7.3.2	Country-code TLDs/th pop. 15–69	3.7	60	
7.3.3	Wikipedia edits/mn pop. 15–69	44.8	77	
7.3.4	Mobile app creation/bn PPP$ GDP	1.5	72	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Kenya

GII 2021 rank
85

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
76	**89**	**Lower middle**	**SSF**	**53.8**	**243.1**	**4,993**	**86**

		Score/ Value	Rank	
Institutions		**59.9**	**80**	
1.1	**Political environment**	**47.1**	**98**	
1.1.1	Political and operational stability*	57.1	106	
1.1.2	Government effectiveness*	42.1	92	
1.2	**Regulatory environment**	**60.1**	**80**	
1.2.1	Regulatory quality*	36.3	94	
1.2.2	Rule of law*	34.8	91	
1.2.3	Cost of redundancy dismissal	15.8	61	
1.3	**Business environment**	**72.6**	**60**	◆
1.3.1	Ease of starting a business*	82.7	100	
1.3.2	Ease of resolving insolvency*	62.4	45	◆
Human capital and research		**21.9**	**92**	
2.1	**Education**	**49.4**	**[68]**	
2.1.1	Expenditure on education, % GDP	5.3	27	●
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	n/a	n/a	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	30.7	119	○ ◇
2.2	**Tertiary education**	**11.6**	**111**	
2.2.1	Tertiary enrolment, % gross	11.5	111	
2.2.2	Graduates in science and engineering, %	16.5	91	
2.2.3	Tertiary inbound mobility, %	0.9	89	
2.3	**Research and development (R&D)**	**4.5**	**78**	
2.3.1	Researchers, FTE/mn pop.	221.4	79	
2.3.2	Gross expenditure on R&D, % GDP	0.8	48	◆
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**25.9**	**114**	
3.1	**Information and communication technologies (ICTs)**	**47.7**	**96**	
3.1.1	ICT access*	41.8	105	
3.1.2	ICT use*	21.7	112	
3.1.3	Government's online service*	67.6	75	
3.1.4	E-participation*	59.5	87	
3.2	**General infrastructure**	**14.0**	**120**	○
3.2.1	Electricity output, GWh/mn pop.	229.0	116	○
3.2.2	Logistics performance*	35.7	67	
3.2.3	Gross capital formation, % GDP	12.3	120	○ ◇
3.3	**Ecological sustainability**	**16.1**	**120**	○
3.3.1	GDP/unit of energy use	6.1	105	
3.3.2	Environmental performance*	34.7	103	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.3	103	
Market sophistication		**48.8**	**54**	
4.1	**Credit**	**56.7**	**20**	● ◆
4.1.1	Ease of getting credit*	95.0	4	● ◆
4.1.2	Domestic credit to private sector, % GDP	27.5	101	
4.1.3	Microfinance gross loans, % GDP	4.2	10	● ◆
4.2	**Investment**	**32.2**	**61**	
4.2.1	Ease of protecting minority investors*	92.0	1	● ◆
4.2.2	Market capitalization, % GDP	26.2	51	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	53	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.1	23	◆
4.3	**Trade, diversification, and market scale**	**57.6**	**102**	
4.3.1	Applied tariff rate, weighted avg., %	11.5	123	○ ◇
4.3.2	Domestic industry diversification	71.8	94	
4.3.3	Domestic market scale, bn PPP$	243.1	61	

		Score/ Value	Rank	
Business sophistication		**23.4**	**77**	
5.1	**Knowledge workers**	**14.8**	**112**	
5.1.1	Knowledge-intensive employment, %	n/a	n/a	
5.1.2	Firms offering formal training, %	37.4	36	
5.1.3	GERD performed by business, % GDP	0.1	67	
5.1.4	GERD financed by business, %	4.3	84	
5.1.5	Females employed w/advanced degrees, %	1.5	110	○
5.2	**Innovation linkages**	**29.4**	**35**	◆
5.2.1	University-industry R&D collaboration†	46.8	49	◆
5.2.2	State of cluster development and depth†	49.1	53	
5.2.3	GERD financed by abroad, % GDP	0.4	6	● ◆
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	65	
5.2.5	Patent families/bn PPP$ GDP	0.0	85	
5.3	**Knowledge absorption**	**25.9**	**68**	
5.3.1	Intellectual property payments, % total trade	1.7	16	● ◆
5.3.2	High-tech imports, % total trade	8.2	58	
5.3.3	ICT services imports, % total trade	0.4	111	
5.3.4	FDI net inflows, % GDP	1.6	87	
5.3.5	Research talent, % in businesses	11.4	62	
Knowledge and technology outputs		**21.1**	**65**	
6.1	**Knowledge creation**	**14.6**	**67**	
6.1.1	Patents by origin/bn PPP$ GDP	1.3	58	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	82	
6.1.3	Utility models by origin/bn PPP$ GDP	0.9	24	
6.1.4	Scientific and technical articles/bn PPP$ GDP	11.1	77	
6.1.5	Citable documents H-index	15.9	52	
6.2	**Knowledge impact**	**23.7**	**86**	
6.2.1	Labor productivity growth, %	2.7	18	●
6.2.2	New businesses/th pop. 15–64	1.5	68	
6.2.3	Software spending, % GDP	0.1	77	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.9	91	
6.2.5	High-tech manufacturing, %	11.1	85	
6.3	**Knowledge diffusion**	**25.0**	**45**	
6.3.1	Intellectual property receipts, % total trade	0.6	27	● ◆
6.3.2	Production and export complexity	36.0	76	
6.3.3	High-tech exports, % total trade	0.5	89	
6.3.4	ICT services exports, % total trade	5.3	14	● ◆
Creative outputs		**16.7**	**95**	
7.1	**Intangible assets**	**24.1**	**89**	
7.1.1	Trademarks by origin/bn PPP$ GDP	24.6	82	
7.1.2	Global brand value, top 5,000, % GDP	11.2	59	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.7	81	
7.1.4	ICTs and organizational model creation†	60.0	44	◆
7.2	**Creative goods and services**	**16.5**	**62**	
7.2.1	Cultural and creative services exports, % total trade	0.0	99	○
7.2.2	National feature films/mn pop. 15–69	n/a	n/a	
7.2.3	Entertainment and media market/th pop. 15–69	2.0	53	
7.2.4	Printing and other media, % manufacturing	3.9	3	● ◆
7.2.5	Creative goods exports, % total trade	0.1	94	
7.3	**Online creativity**	**2.3**	**131**	○ ◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.9	98	
7.3.2	Country-code TLDs/th pop. 15–69	0.9	87	
7.3.3	Wikipedia edits/mn pop. 15–69	12.5	129	○ ◇
7.3.4	Mobile app creation/bn PPP$ GDP	0.0	103	○

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Kuwait

GII 2021 rank **72**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
73	73	High	NAWA	4.3	203.8	41,735	78

		Score/ Value	Rank	
Institutions		**57.7**	**86**	◇
1.1	**Political environment**	**54.9**	**78**	◇
1.1.1	Political and operational stability*	62.5	89	◇
1.1.2	Government effectiveness*	51.1	73	◇
1.2	**Regulatory environment**	**54.5**	**97**	◇
1.2.1	Regulatory quality*	45.2	67	◇
1.2.2	Rule of law*	52.4	53	◇
1.2.3	Cost of redundancy dismissal	28.1	116 ○	◇
1.3	**Business environment**	**63.8**	**90**	◇
1.3.1	Ease of starting a business*	88.4	67	
1.3.2	Ease of resolving insolvency*	39.2	101	◇
Human capital and research		**31.4**	**[69]**	
2.1	**Education**	**52.9**	**[57]**	
2.1.1	Expenditure on education, % GDP	n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap ◴	17.3	64	
2.1.3	School life expectancy, years ◴	14.7	59	◇
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary ◴	7.6	4 ● ◆	
2.2	**Tertiary education**	**38.4**	**[47]**	
2.2.1	Tertiary enrolment, % gross	55.3	54	
2.2.2	Graduates in science and engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research and development (R&D)**	**2.8**	**89**	◇
2.3.1	Researchers, FTE/mn pop. ◴	513.9	67	◇
2.3.2	Gross expenditure on R&D, % GDP ◴	0.1	111 ○	◇
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41 ○	◇
2.3.4	QS university ranking, top 3*	4.4	71	◇
Infrastructure		**49.6**	**43**	
3.1	**Information and communication technologies (ICTs)**	**80.4**	**31** ●	
3.1.1	ICT access*	79.3	35 ●	
3.1.2	ICT use*	67.6	53	◇
3.1.3	Government's online service*	84.1	31 ●	
3.1.4	E-participation*	90.5	18 ●	
3.2	**General infrastructure**	**41.4**	**27** ●	
3.2.1	Electricity output, GWh/mn pop.	17,912.3	4 ● ◆	
3.2.2	Logistics performance*	37.8	62	◇
3.2.3	Gross capital formation, % GDP	25.1	46	
3.3	**Ecological sustainability**	**26.9**	**74**	◇
3.3.1	GDP/unit of energy use	8.4	87	
3.3.2	Environmental performance*	53.6	45	◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.2	64	
Market sophistication		**41.4**	**94**	◇
4.1	**Credit**	**40.7**	**66**	
4.1.1	Ease of getting credit*	45.0	101	◇
4.1.2	Domestic credit to private sector, % GDP ◴	89.3	30 ●	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**26.2**	**78**	
4.2.1	Ease of protecting minority investors*	66.0	50	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	41	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	84 ○	
4.3	**Trade, diversification, and market scale**	**57.4**	**104**	◇
4.3.1	Applied tariff rate, weighted avg., %	4.5	80	
4.3.2	Domestic industry diversification	53.6	105 ○	◇
4.3.3	Domestic market scale, bn PPP$	203.8	64	

		Score/ Value	Rank	
Business sophistication		**18.7**	**100**	◇
5.1	**Knowledge workers**	**17.4**	**[105]**	
5.1.1	Knowledge-intensive employment, % ◴	22.7	70	◇
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, % ◴	1.0	94 ○	◇
5.1.5	Females employed w/advanced degrees, %	n/a	n/a	
5.2	**Innovation linkages**	**25.1**	**45**	
5.2.1	University-industry R&D collaboration†	42.2	69	
5.2.2	State of cluster development and depth†	54.9	37 ●	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	45	
5.2.5	Patent families/bn PPP$ GDP	0.0	93	
5.3	**Knowledge absorption**	**13.7**	**124** ○	◇
5.3.1	Intellectual property payments, % total trade ◴	0.0	125 ○	◇
5.3.2	High-tech imports, % total trade	5.5	105	
5.3.3	ICT services imports, % total trade	0.6	96	◇
5.3.4	FDI net inflows, % GDP	0.2	122 ○	
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**22.1**	**60**	
6.1	**Knowledge creation**	**5.8**	**108**	◇
6.1.1	Patents by origin/bn PPP$ GDP ◴	0.1	116 ○	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	72	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	6.9	103	◇
6.1.5	Citable documents H-index	9.1	82	◇
6.2	**Knowledge impact**	**29.0**	**67**	
6.2.1	Labor productivity growth, %	–1.1	86	
6.2.2	New businesses/th pop. 15–64	5.9	27 ●	
6.2.3	Software spending, % GDP	0.4	26 ●	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	2.7	79	
6.2.5	High-tech manufacturing, %	23.9	53	
6.3	**Knowledge diffusion**	**31.4**	**31** ●	
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	Production and export complexity	27.6	99	◇
6.3.3	High-tech exports, % total trade	0.3	103	◇
6.3.4	ICT services exports, % total trade	7.4	6 ● ◆	
Creative outputs		**18.0**	**89**	◇
7.1	**Intangible assets**	**26.8**	**80**	◇
7.1.1	Trademarks by origin/bn PPP$ GDP ◴	16.6	98	◇
7.1.2	Global brand value, top 5,000, % GDP	53.3	34	
7.1.3	Industrial designs by origin/bn PPP$ GDP	n/a	n/a	
7.1.4	ICTs and organizational model creation†	50.9	79	◇
7.2	**Creative goods and services**	**4.7**	**107**	◇
7.2.1	Cultural and creative services exports, % total trade	n/a	n/a	
7.2.2	National feature films/mn pop. 15–69	1.9	70	◇
7.2.3	Entertainment and media market/th pop. 15–69	10.6	36	◇
7.2.4	Printing and other media, % manufacturing	0.3	97 ○	◇
7.2.5	Creative goods exports, % total trade	0.1	88	
7.3	**Online creativity**	**13.6**	**78**	◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	7.6	44	
7.3.2	Country-code TLDs/th pop. 15–69	0.3	105	◇
7.3.3	Wikipedia edits/mn pop. 15–69	46.3	72	◇
7.3.4	Mobile app creation/bn PPP$ GDP	0.8	74	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Kyrgyzstan

GII 2021 rank
98

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
119	**81**	**Lower middle**	**CSA**	**6.5**	**31.4**	**4,824**	**94**

		Score/ Value	Rank	
Institutions		**55.7**	**95**	
1.1	**Political environment**	**40.3**	**117**	
1.1.1	Political and operational stability*	50.0	123	○ ◇
1.1.2	Government effectiveness*	35.5	111	
1.2	**Regulatory environment**	**55.2**	**93**	
1.2.1	Regulatory quality*	34.4	95	
1.2.2	Rule of law*	23.4	116	
1.2.3	Cost of redundancy dismissal	17.3	69	
1.3	**Business environment**	**71.5**	**66**	
1.3.1	Ease of starting a business*	93.0	40	●
1.3.2	Ease of resolving insolvency*	50.0	70	
Human capital and research		**30.6**	**70**	◆
2.1	**Education**	**62.7**	**[17]**	
2.1.1	Expenditure on education, % GDP	6.0	16	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	13.0	82	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	11.7	46	● ◆
2.2	**Tertiary education**	**28.5**	**78**	
2.2.1	Tertiary enrolment, % gross	42.3	70	◆
2.2.2	Graduates in science and engineering, %	19.7	73	
2.2.3	Tertiary inbound mobility, %	9.0	27	● ◆
2.3	**Research and development (R&D)**	**0.6**	**111**	
2.3.1	Researchers, FTE/mn pop.	n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP	0.1	106	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**35.3**	**87**	
3.1	**Information and communication technologies (ICTs)**	**60.3**	**82**	◆
3.1.1	ICT access*	56.8	82	
3.1.2	ICT use*	48.4	83	
3.1.3	Government's online service*	64.7	79	
3.1.4	E-participation*	71.4	66	
3.2	**General infrastructure**	**29.3**	**63**	
3.2.1	Electricity output, GWh/mn pop.	2,458.0	76	◆
3.2.2	Logistics performance*	23.2	102	
3.2.3	Gross capital formation, % GDP	31.7	21	●
3.3	**Ecological sustainability**	**16.4**	**119**	
3.3.1	GDP/unit of energy use	5.1	114	◇
3.3.2	Environmental performance*	39.8	89	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.1	122	○
Market sophistication		**49.2**	**52**	
4.1	**Credit**	**52.7**	**23**	● ◆
4.1.1	Ease of getting credit*	85.0	14	● ◆
4.1.2	Domestic credit to private sector, % GDP	25.8	103	
4.1.3	Microfinance gross loans, % GDP	4.3	9	● ◆
4.2	**Investment**	**40.0**	**[35]**	
4.2.1	Ease of protecting minority investors*	40.0	110	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**55.0**	**108**	
4.3.1	Applied tariff rate, weighted avg., %	3.1	62	◆
4.3.2	Domestic industry diversification	62.9	101	
4.3.3	Domestic market scale, bn PPP$	31.4	120	◇

		Score/ Value	Rank	
Business sophistication		**17.9**	**107**	
5.1	**Knowledge workers**	**22.4**	**94**	
5.1.1	Knowledge-intensive employment, %	18.8	82	
5.1.2	Firms offering formal training, %	41.4	26	●
5.1.3	GERD performed by business, % GDP	0.0	80	
5.1.4	GERD financed by business, %	6.9	81	
5.1.5	Females employed w/advanced degrees, %	10.8	66	
5.2	**Innovation linkages**	**11.7**	**125**	○
5.2.1	University-industry R&D collaboration†	28.3	117	
5.2.2	State of cluster development and depth†	35.5	112	
5.2.3	GERD financed by abroad, % GDP	0.0	84	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	108	
5.2.5	Patent families/bn PPP$ GDP	0.0	100	○ ◇
5.3	**Knowledge absorption**	**19.7**	**95**	
5.3.1	Intellectual property payments, % total trade	0.1	101	
5.3.2	High-tech imports, % total trade	9.2	42	●
5.3.3	ICT services imports, % total trade	0.5	106	
5.3.4	FDI net inflows, % GDP	1.7	86	
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**12.1**	**102**	
6.1	**Knowledge creation**	**11.0**	**76**	
6.1.1	Patents by origin/bn PPP$ GDP	2.8	27	● ◆
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	61	◆
6.1.3	Utility models by origin/bn PPP$ GDP	0.5	36	
6.1.4	Scientific and technical articles/bn PPP$ GDP	7.4	99	
6.1.5	Citable documents H-index	3.4	120	
6.2	**Knowledge impact**	**16.0**	**115**	
6.2.1	Labor productivity growth, %	0.5	59	
6.2.2	New businesses/th pop. 15–64	1.3	77	
6.2.3	Software spending, % GDP	0.1	91	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.5	122	○
6.2.5	High-tech manufacturing, %	2.4	109	○ ◇
6.3	**Knowledge diffusion**	**9.2**	**97**	
6.3.1	Intellectual property receipts, % total trade	0.0	87	
6.3.2	Production and export complexity	44.7	59	
6.3.3	High-tech exports, % total trade	0.7	84	
6.3.4	ICT services exports, % total trade	0.3	114	
Creative outputs		**10.2**	**120**	
7.1	**Intangible assets**	**13.1**	**123**	○ ◇
7.1.1	Trademarks by origin/bn PPP$ GDP	14.0	103	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.4	95	
7.1.4	ICTs and organizational model creation†	34.8	121	○ ◇
7.2	**Creative goods and services**	**5.5**	**102**	
7.2.1	Cultural and creative services exports, % total trade	0.6	43	
7.2.2	National feature films/mn pop. 15–69	0.2	104	○
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	0.5	85	
7.2.5	Creative goods exports, % total trade	0.1	98	
7.3	**Online creativity**	**9.3**	**97**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.2	117	
7.3.2	Country-code TLDs/th pop. 15–69	0.8	93	
7.3.3	Wikipedia edits/mn pop. 15–69	38.1	88	
7.3.4	Mobile app creation/bn PPP$ GDP	0.0	92	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Lao People's Democratic Republic

GII 2021 rank **117**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
112	**123**	**Lower middle**	**SEAO**	**7.3**	**59.7**	**8,221**	**113**

		Score/ Value	Rank	
Institutions		**37.9**	**130**	◇
1.1	**Political environment**	**46.5**	**100**	
1.1.1	Political and operational stability*	73.2	44	● ◆
1.1.2	Government effectiveness*	33.2	117	
1.2	**Regulatory environment**	**35.8**	**125**	◇
1.2.1	Regulatory quality*	24.9	114	
1.2.2	Rule of law*	21.9	119	
1.2.3	Cost of redundancy dismissal	34.2	123	
1.3	**Business environment**	**31.3**	**132**	○ ◇
1.3.1	Ease of starting a business*	62.7	130	◇
1.3.2	Ease of resolving insolvency*	0.0	129	○ ◇
Human capital and research		**16.3**	**113**	
2.1	**Education**	**29.2**	**116**	
2.1.1	Expenditure on education, % GDP	2.9	98	
2.1.2	Government funding/pupil, secondary, % GDP/cap	12.5	83	
2.1.3	School life expectancy, years	10.5	105	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	17.3	84	
2.2	**Tertiary education**	**19.8**	**95**	
2.2.1	Tertiary enrolment, % gross	14.5	103	
2.2.2	Graduates in science and engineering, %	23.1	53	●
2.2.3	Tertiary inbound mobility, %	0.5	99	
2.3	**Research and development (R&D)**	**0.0**	**[123]**	
2.3.1	Researchers, FTE/mn pop.	n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP	n/a	n/a	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**22.7**	**123**	◇
3.1	**Information and communication technologies (ICTs)**	**25.4**	**128**	◇
3.1.1	ICT access*	35.6	115	
3.1.2	ICT use*	25.3	107	
3.1.3	Government's online service*	19.4	131	○ ◇
3.1.4	E-participation*	21.4	130	○ ◇
3.2	**General infrastructure**	**24.0**	**88**	
3.2.1	Electricity output, GWh/mn pop.	4,872.4	47	● ◆
3.2.2	Logistics performance*	30.4	81	
3.2.3	Gross capital formation, % GDP	n/a	n/a	
3.3	**Ecological sustainability**	**18.8**	**110**	
3.3.1	GDP/unit of energy use	8.7	85	
3.3.2	Environmental performance*	34.8	102	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	119	
Market sophistication		**39.5**	**103**	
4.1	**Credit**	**29.3**	**110**	
4.1.1	Ease of getting credit*	60.0	74	
4.1.2	Domestic credit to private sector, % GDP	20.9	113	
4.1.3	Microfinance gross loans, % GDP	0.7	27	●
4.2	**Investment**	**20.0**	**[114]**	
4.2.1	Ease of protecting minority investors*	20.0	130	○ ◇
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**69.2**	**63**	●
4.3.1	Applied tariff rate, weighted avg., %	0.8	7	● ◆
4.3.2	Domestic industry diversification	85.2	66	
4.3.3	Domestic market scale, bn PPP$	59.7	96	

		Score/ Value	Rank	
Business sophistication		**24.3**	**[70]**	
5.1	**Knowledge workers**	**25.8**	**[84]**	
5.1.1	Knowledge-intensive employment, %	21.3	76	
5.1.2	Firms offering formal training, %	24.4	63	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, %	5.4	94	
5.2	**Innovation linkages**	**29.0**	**[37]**	
5.2.1	University-industry R&D collaboration†	44.9	54	●
5.2.2	State of cluster development and depth†	50.1	46	●
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	n/a	n/a	
5.2.5	Patent families/bn PPP$ GDP	0.0	100	○ ◇
5.3	**Knowledge absorption**	**18.1**	**[102]**	
5.3.1	Intellectual property payments, % total trade	n/a	n/a	
5.3.2	High-tech imports, % total trade	3.4	122	
5.3.3	ICT services imports, % total trade	0.2	125	◇
5.3.4	FDI net inflows, % GDP	7.3	14	● ◆
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**6.8**	**127**	◇
6.1	**Knowledge creation**	**2.3**	**126**	
6.1.1	Patents by origin/bn PPP$ GDP	0.0	125	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	98	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	68	
6.1.4	Scientific and technical articles/bn PPP$ GDP	4.3	117	
6.1.5	Citable documents H-index	4.0	114	
6.2	**Knowledge impact**	**2.5**	**[131]**	
6.2.1	Labor productivity growth, %	n/a	n/a	
6.2.2	New businesses/th pop. 15–64	0.0	121	○ ◇
6.2.3	Software spending, % GDP	n/a	n/a	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.8	113	
6.2.5	High-tech manufacturing, %	4.7	101	
6.3	**Knowledge diffusion**	**15.6**	**67**	
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	Production and export complexity	29.4	95	
6.3.3	High-tech exports, % total trade	5.1	35	●
6.3.4	ICT services exports, % total trade	0.4	105	
Creative outputs		**17.6**	**90**	
7.1	**Intangible assets**	**19.4**	**104**	
7.1.1	Trademarks by origin/bn PPP$ GDP	4.5	124	
7.1.2	Global brand value, top 5,000, % GDP	11.7	58	
7.1.3	Industrial designs by origin/bn PPP$ GDP	n/a	n/a	
7.1.4	ICTs and organizational model creation†	52.5	71	
7.2	**Creative goods and services**	**18.7**	**[59]**	
7.2.1	Cultural and creative services exports, % total trade	n/a	n/a	
7.2.2	National feature films/mn pop. 15–69	1.3	78	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	0.1	102	○ ◇
7.2.5	Creative goods exports, % total trade	3.1	20	● ◆
7.3	**Online creativity**	**13.0**	**80**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	1.9	77	
7.3.2	Country-code TLDs/th pop. 15–69	2.5	64	◆
7.3.3	Wikipedia edits/mn pop. 15–69	36.4	91	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Latvia

GII 2021 rank
38

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
39	**38**	**High**	**EUR**	**1.9**	**58.6**	**30,579**	**36**

		Score/ Value	Rank	
Institutions		**78.9**	**29**	
1.1	**Political environment**	**77.5**	**26**	
1.1.1	Political and operational stability*	82.1	24	
1.1.2	Government effectiveness*	75.2	27	
1.2	**Regulatory environment**	**82.1**	**25**	
1.2.1	Regulatory quality*	74.7	26	
1.2.2	Rule of law*	73.4	30	
1.2.3	Cost of redundancy dismissal	13.0	40	
1.3	**Business environment**	**77.0**	**42**	
1.3.1	Ease of starting a business*	94.1	24	
1.3.2	Ease of resolving insolvency*	59.8	50	
Human capital and research		**37.7**	**46**	
2.1	**Education**	**57.6**	**39**	
2.1.1	Expenditure on education, % GDP	4.4	60	
2.1.2	Government funding/pupil, secondary, % GDP/cap	23.6	22	
2.1.3	School life expectancy, years	16.2	31	
2.1.4	PISA scales in reading, maths and science	487.4	28	
2.1.5	Pupil-teacher ratio, secondary ⏲	8.4	14 ● ◆	
2.2	**Tertiary education**	**43.5**	**28**	
2.2.1	Tertiary enrolment, % gross	93.0	5 ● ◆	
2.2.2	Graduates in science and engineering, %	20.2	72 ○	
2.2.3	Tertiary inbound mobility, %	9.3	26	
2.3	**Research and development (R&D)**	**12.0**	**53** ◇	
2.3.1	Researchers, FTE/mn pop.	1,891.7	41	
2.3.2	Gross expenditure on R&D, % GDP	0.6	54	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41 ○ ◇	
2.3.4	QS university ranking, top 3*	12.8	60	
Infrastructure		**45.1**	**55** ◇	
3.1	**Information and communication technologies (ICTs)**	**66.5**	**68** ◇	
3.1.1	ICT access*	72.5	55 ◇	
3.1.2	ICT use*	76.9	31	
3.1.3	Government's online service*	58.2	90 ○ ◇	
3.1.4	E-participation*	58.3	89 ○ ◇	
3.2	**General infrastructure**	**25.8**	**77** ◇	
3.2.1	Electricity output, GWh/mn pop.	3,370.7	60	
3.2.2	Logistics performance*	35.4	69 ◇	
3.2.3	Gross capital formation, % GDP	23.0	58	
3.3	**Ecological sustainability**	**42.9**	**29**	
3.3.1	GDP/unit of energy use	12.4	45	
3.3.2	Environmental performance*	61.6	36	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	5.5	19 ●	
Market sophistication		**50.1**	**45**	
4.1	**Credit**	**48.8**	**36**	
4.1.1	Ease of getting credit*	85.0	14 ◆	
4.1.2	Domestic credit to private sector, % GDP	34.6	89 ○ ◇	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**32.5**	**58**	
4.2.1	Ease of protecting minority investors*	68.0	44	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.1	32	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	43	
4.3	**Trade, diversification, and market scale**	**69.0**	**66**	
4.3.1	Applied tariff rate, weighted avg., %	1.8	25	
4.3.2	Domestic industry diversification	87.8	61	
4.3.3	Domestic market scale, bn PPP$	58.6	97 ○ ◇	

		Score/ Value	Rank	
Business sophistication		**34.1**	**40**	
5.1	**Knowledge workers**	**44.7**	**34**	
5.1.1	Knowledge-intensive employment, %	41.8	25	
5.1.2	Firms offering formal training, %	52.9	15	
5.1.3	GERD performed by business, % GDP	0.2	56 ○	
5.1.4	GERD financed by business, %	22.3	64 ◇	
5.1.5	Females employed w/advanced degrees, %	25.2	15 ●	
5.2	**Innovation linkages**	**27.4**	**39**	
5.2.1	University-industry R&D collaboration†	50.0	39	
5.2.2	State of cluster development and depth†	48.3	56	
5.2.3	GERD financed by abroad, % GDP	0.3	10 ●	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	54	
5.2.5	Patent families/bn PPP$ GDP	0.2	48	
5.3	**Knowledge absorption**	**30.1**	**58**	
5.3.1	Intellectual property payments, % total trade	0.3	86 ○	
5.3.2	High-tech imports, % total trade	12.7	18 ●	
5.3.3	ICT services imports, % total trade	2.1	31	
5.3.4	FDI net inflows, % GDP	2.7	65	
5.3.5	Research talent, % in businesses	20.9	53	
Knowledge and technology outputs		**27.8**	**45**	
6.1	**Knowledge creation**	**16.4**	**64**	
6.1.1	Patents by origin/bn PPP$ GDP	1.7	42	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.5	34	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	20.1	45	
6.1.5	Citable documents H-index	9.5	80	
6.2	**Knowledge impact**	**33.7**	**46**	
6.2.1	Labor productivity growth, %	1.1	42 ◆	
6.2.2	New businesses/th pop. 15–64	8.0	20	
6.2.3	Software spending, % GDP	0.1	84 ○ ◇	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	14.5	20	
6.2.5	High-tech manufacturing, %	20.6	61	
6.3	**Knowledge diffusion**	**33.4**	**29**	
6.3.1	Intellectual property receipts, % total trade	0.1	68	
6.3.2	Production and export complexity	60.2	34	
6.3.3	High-tech exports, % total trade	7.2	24	
6.3.4	ICT services exports, % total trade	4.6	17 ●	
Creative outputs		**33.8**	**39**	
7.1	**Intangible assets**	**29.9**	**70**	
7.1.1	Trademarks by origin/bn PPP$ GDP	42.9	55	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80 ○ ◇	
7.1.3	Industrial designs by origin/bn PPP$ GDP	3.0	37	
7.1.4	ICTs and organizational model creation†	62.7	37	
7.2	**Creative goods and services**	**42.7**	**9** ● ◆	
7.2.1	Cultural and creative services exports, % total trade	1.7	16 ●	
7.2.2	National feature films/mn pop. 15–69	15.4	8 ●	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	2.5	7 ● ◆	
7.2.5	Creative goods exports, % total trade	2.9	22	
7.3	**Online creativity**	**32.8**	**32**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	10.0	41	
7.3.2	Country-code TLDs/th pop. 15–69	29.4	23	
7.3.3	Wikipedia edits/mn pop. 15–69	74.0	25	
7.3.4	Mobile app creation/bn PPP$ GDP	14.4	38	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Lebanon

GII 2021 rank
92

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
97	**94**	**Upper middle**	**NAWA**	**6.8**	**78.9**	**11,562**	**87**

		Score/ Value	Rank	
Institutions		**50.1**	**112**	◇
1.1	**Political environment**	**33.3**	**129**	○ ◇
1.1.1	Political and operational stability*	35.7	131	○ ◇
1.1.2	Government effectiveness*	32.1	121	○ ◇
1.2	**Regulatory environment**	**63.5**	**72**	
1.2.1	Regulatory quality*	32.4	99	
1.2.2	Rule of law*	24.1	115	◇
1.2.3	Cost of redundancy dismissal	8.7	18	●
1.3	**Business environment**	**53.6**	**121**	○ ◇
1.3.1	Ease of starting a business*	78.2	113	
1.3.2	Ease of resolving insolvency*	29.1	121	○ ◇
Human capital and research		**24.9**	**87**	
2.1	**Education**	**24.8**	**123**	○ ◇
2.1.1	Expenditure on education, % GDP	2.4	107	○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	6.4	101	○ ◇
2.1.3	School life expectancy, years	n/a	n/a	
2.1.4	PISA scales in reading, maths and science	376.8	73	○
2.1.5	Pupil-teacher ratio, secondary	7.7	5	● ◆
2.2	**Tertiary education**	**35.7**	**56**	
2.2.1	Tertiary enrolment, % gross	n/a	n/a	
2.2.2	Graduates in science and engineering, %	23.4	50	
2.2.3	Tertiary inbound mobility, %	9.6	25	● ◆
2.3	**Research and development (R&D)**	**14.3**	**[49]**	
2.3.1	Researchers, FTE/mn pop.	n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP	n/a	n/a	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	28.6	42	
Infrastructure		**30.4**	**100**	◇
3.1	**Information and communication technologies (ICTs)**	**45.4**	**99**	◇
3.1.1	ICT access*	62.8	72	
3.1.2	ICT use*	43.7	94	◇
3.1.3	Government's online service*	41.8	116	◇
3.1.4	E-participation*	33.3	120	○ ◇
3.2	**General infrastructure**	**21.2**	**103**	
3.2.1	Electricity output, GWh/mn pop.	3,100.6	64	
3.2.2	Logistics performance*	31.1	78	
3.2.3	Gross capital formation, % GDP	n/a	n/a	
3.3	**Ecological sustainability**	**24.6**	**82**	
3.3.1	GDP/unit of energy use	9.9	69	
3.3.2	Environmental performance*	45.4	70	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.6	80	
Market sophistication		**42.0**	**90**	
4.1	**Credit**	**34.1**	**91**	
4.1.1	Ease of getting credit*	40.0	113	◇
4.1.2	Domestic credit to private sector, % GDP	106.3	23	● ◆
4.1.3	Microfinance gross loans, % GDP	0.2	54	
4.2	**Investment**	**26.2**	**77**	
4.2.1	Ease of protecting minority investors*	44.0	98	◇
4.2.2	Market capitalization, % GDP	18.0	61	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.1	22	● ◆
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.1	25	◆
4.3	**Trade, diversification, and market scale**	**65.7**	**74**	
4.3.1	Applied tariff rate, weighted avg., %	3.3	64	
4.3.2	Domestic industry diversification	80.7	75	
4.3.3	Domestic market scale, bn PPP$	78.9	89	

		Score/ Value	Rank	
Business sophistication		**25.4**	**64**	
5.1	**Knowledge workers**	**34.0**	**[58]**	
5.1.1	Knowledge-intensive employment, %	27.6	54	
5.1.2	Firms offering formal training, %	20.8	74	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, %	14.6	51	
5.2	**Innovation linkages**	**21.3**	**63**	
5.2.1	University-industry R&D collaboration†	42.6	66	
5.2.2	State of cluster development and depth†	47.5	59	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	79	
5.2.5	Patent families/bn PPP$ GDP	0.0	68	
5.3	**Knowledge absorption**	**21.0**	**87**	
5.3.1	Intellectual property payments, % total trade	0.1	108	◇
5.3.2	High-tech imports, % total trade	4.0	117	
5.3.3	ICT services imports, % total trade	2.5	17	● ◆
5.3.4	FDI net inflows, % GDP	4.6	23	●
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**14.1**	**[91]**	
6.1	**Knowledge creation**	**21.5**	**[49]**	
6.1.1	Patents by origin/bn PPP$ GDP	1.1	62	
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	28.4	31	● ◆
6.1.5	Citable documents H-index	12.8	60	
6.2	**Knowledge impact**	**5.7**	**[125]**	
6.2.1	Labor productivity growth, %	–10.0	120	○ ◇
6.2.2	New businesses/th pop. 15–64	n/a	n/a	
6.2.3	Software spending, % GDP	0.0	108	◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	5.7	47	
6.2.5	High-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**15.2**	**70**	
6.3.1	Intellectual property receipts, % total trade	0.1	66	
6.3.2	Production and export complexity	52.1	45	
6.3.3	High-tech exports, % total trade	0.2	112	
6.3.4	ICT services exports, % total trade	2.1	52	
Creative outputs		**17.2**	**92**	
7.1	**Intangible assets**	**18.7**	**108**	
7.1.1	Trademarks by origin/bn PPP$ GDP	12.7	105	◇
7.1.2	Global brand value, top 5,000, % GDP	14.6	55	
7.1.3	Industrial designs by origin/bn PPP$ GDP	n/a	n/a	
7.1.4	ICTs and organizational model creation†	42.4	106	◇
7.2	**Creative goods and services**	**13.7**	**69**	
7.2.1	Cultural and creative services exports, % total trade	1.6	17	● ◆
7.2.2	National feature films/mn pop. 15–69	3.3	55	
7.2.3	Entertainment and media market/th pop. 15–69	0.9	60	○ ◇
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.6	60	
7.3	**Online creativity**	**17.6**	**65**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	5.9	51	
7.3.2	Country-code TLDs/th pop. 15–69	0.3	107	
7.3.3	Wikipedia edits/mn pop. 15–69	44.4	78	
7.3.4	Mobile app creation/bn PPP$ GDP	20.5	27	●

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Lithuania

GII 2021 rank
39

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
43	**35**	**High**	**EUR**	**2.7**	**106.9**	**38,605**	**40**

		Score/ Value	Rank
Institutions		**76.4**	**33**
1.1	**Political environment**	**77.2**	**27**
1.1.1	Political and operational stability*	83.9	13 ●
1.1.2	Government effectiveness*	73.8	30
1.2	**Regulatory environment**	**81.9**	**27**
1.2.1	Regulatory quality*	73.8	27
1.2.2	Rule of law*	73.7	29
1.2.3	Cost of redundancy dismissal	13.0	40
1.3	**Business environment**	**70.0**	**71**
1.3.1	Ease of starting a business*	93.3	32
1.3.2	Ease of resolving insolvency*	46.7	81 ◇
Human capital and research		**38.7**	**43**
2.1	**Education**	**52.4**	**58**
2.1.1	Expenditure on education, % GDP	3.8	75 ○
2.1.2	Government funding/pupil, secondary, % GDP/cap	16.9	65 ○
2.1.3	School life expectancy, years	16.6	23
2.1.4	PISA scales in reading, maths and science	479.7	32
2.1.5	Pupil-teacher ratio, secondary ⏲	7.8	6 ● ◆
2.2	**Tertiary education**	**43.4**	**29**
2.2.1	Tertiary enrolment, % gross	73.7	25
2.2.2	Graduates in science and engineering, %	26.8	29
2.2.3	Tertiary inbound mobility, %	5.3	46
2.3	**Research and development (R&D)**	**20.2**	**44**
2.3.1	Researchers, FTE/mn pop.	3,446.4	29
2.3.2	Gross expenditure on R&D, % GDP	1.0	40
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41 ○ ◇
2.3.4	QS university ranking, top 3*	19.8	54
Infrastructure		**49.9**	**42**
3.1	**Information and communication technologies (ICTs)**	**77.8**	**40**
3.1.1	ICT access*	75.8	47
3.1.2	ICT use*	76.5	32
3.1.3	Government's online service*	85.3	24
3.1.4	E-participation*	73.8	64
3.2	**General infrastructure**	**20.0**	**110 ○ ◇**
3.2.1	Electricity output, GWh/mn pop.	1,207.5	93 ○ ◇
3.2.2	Logistics performance*	45.1	53 ◇
3.2.3	Gross capital formation, % GDP	15.5	112 ○ ◇
3.3	**Ecological sustainability**	**51.9**	**8 ● ◆**
3.3.1	GDP/unit of energy use	12.6	41
3.3.2	Environmental performance*	62.9	35
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	9.5	8 ● ◆
Market sophistication		**53.7**	**35**
4.1	**Credit**	**42.2**	**60**
4.1.1	Ease of getting credit*	70.0	44
4.1.2	Domestic credit to private sector, % GDP	38.9	83 ○ ◇
4.1.3	Microfinance gross loans, % GDP	n/a	n/a
4.2	**Investment**	**44.6**	**25**
4.2.1	Ease of protecting minority investors*	70.0	36
4.2.2	Market capitalization, % GDP	n/a	n/a
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.1	26
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.1	12 ●
4.3	**Trade, diversification, and market scale**	**74.4**	**48**
4.3.1	Applied tariff rate, weighted avg., %	1.8	25
4.3.2	Domestic industry diversification	95.0	26
4.3.3	Domestic market scale, bn PPP$	106.9	80

		Score/ Value	Rank
Business sophistication		**31.5**	**45**
5.1	**Knowledge workers**	**44.2**	**37**
5.1.1	Knowledge-intensive employment, %	42.6	23
5.1.2	Firms offering formal training, %	27.5	56
5.1.3	GERD performed by business, % GDP	0.4	41
5.1.4	GERD financed by business, %	38.0	48
5.1.5	Females employed w/advanced degrees, %	28.9	3 ● ◆
5.2	**Innovation linkages**	**26.3**	**43**
5.2.1	University-industry R&D collaboration†	55.4	28
5.2.2	State of cluster development and depth†	42.2	94 ○ ◇
5.2.3	GERD financed by abroad, % GDP	0.2	14 ●
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	52
5.2.5	Patent families/bn PPP$ GDP	0.2	40
5.3	**Knowledge absorption**	**24.1**	**71**
5.3.1	Intellectual property payments, % total trade	0.2	95 ○
5.3.2	High-tech imports, % total trade	6.6	84 ○
5.3.3	ICT services imports, % total trade	1.0	76
5.3.4	FDI net inflows, % GDP	2.7	62
5.3.5	Research talent, % in businesses	32.7	40
Knowledge and technology outputs		**25.8**	**49**
6.1	**Knowledge creation**	**19.4**	**54**
6.1.1	Patents by origin/bn PPP$ GDP	1.1	63
6.1.2	PCT patents by origin/bn PPP$ GDP	0.4	37
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a
6.1.4	Scientific and technical articles/bn PPP$ GDP	28.1	32
6.1.5	Citable documents H-index	13.0	58
6.2	**Knowledge impact**	**33.3**	**52**
6.2.1	Labor productivity growth, %	2.4	22 ◆
6.2.2	New businesses/th pop. 15–64	3.3	41
6.2.3	Software spending, % GDP	0.1	93 ○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	15.3	19 ●
6.2.5	High-tech manufacturing, % ⏲	20.8	60
6.3	**Knowledge diffusion**	**24.9**	**47**
6.3.1	Intellectual property receipts, % total trade	0.1	62
6.3.2	Production and export complexity	63.7	31
6.3.3	High-tech exports, % total trade	6.2	30
6.3.4	ICT services exports, % total trade	1.9	60
Creative outputs		**33.6**	**41**
7.1	**Intangible assets**	**31.3**	**62**
7.1.1	Trademarks by origin/bn PPP$ GDP	41.8	57
7.1.2	Global brand value, top 5,000, % GDP	4.0	69 ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	2.4	42
7.1.4	ICTs and organizational model creation†	68.4	21 ●
7.2	**Creative goods and services**	**19.2**	**58**
7.2.1	Cultural and creative services exports, % total trade	0.7	37
7.2.2	National feature films/mn pop. 15–69	5.4	40
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a
7.2.4	Printing and other media, % manufacturing	1.1	51
7.2.5	Creative goods exports, % total trade	1.8	34
7.3	**Online creativity**	**52.6**	**18 ●**
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	14.1	33
7.3.2	Country-code TLDs/th pop. 15–69	33.3	20 ●
7.3.3	Wikipedia edits/mn pop. 15–69	73.7	27
7.3.4	Mobile app creation/bn PPP$ GDP	86.0	5 ● ◆

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Luxembourg

GII 2021 rank **23**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
18	26	High	EUR	0.6	70.7	112,875	18

		Score/ Value	Rank	
Institutions		**79.8**	**27**	
1.1	**Political environment**	**90.4**	**6**	
1.1.1	Political and operational stability*	92.9	4	● ◆
1.1.2	Government effectiveness*	89.2	9	
1.2	**Regulatory environment**	**81.9**	**26**	
1.2.1	Regulatory quality*	87.9	11	
1.2.2	Rule of law*	94.0	10	
1.2.3	Cost of redundancy dismissal	21.7	93	○ ◇
1.3	**Business environment**	**67.2**	**77**	◇
1.3.1	Ease of starting a business*	88.8	61	
1.3.2	Ease of resolving insolvency*	45.5	84	◇
Human capital and research		**40.0**	**40**	◇
2.1	**Education**	**48.3**	**70**	◇
2.1.1	Expenditure on education, % GDP	3.6	83	○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	19.4	51	
2.1.3	School life expectancy, years	14.3	65	◇
2.1.4	PISA scales in reading, maths and science	476.7	35	◇
2.1.5	Pupil-teacher ratio, secondary	8.9	19	◆
2.2	**Tertiary education**	**35.8**	**55**	
2.2.1	Tertiary enrolment, % gross	18.6	100	○ ◇
2.2.2	Graduates in science and engineering, %	18.8	80	
2.2.3	Tertiary inbound mobility, %	47.7	1	● ◆
2.3	**Research and development (R&D)**	**36.0**	**31**	◇
2.3.1	Researchers, FTE/mn pop.	5,128.9	16	
2.3.2	Gross expenditure on R&D, % GDP	1.2	33	◇
2.3.3	Global corporate R&D investors, top 3, mn US$	59.2	23	
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**52.5**	**33**	◇
3.1	**Information and communication technologies (ICTs)**	**82.1**	**26**	
3.1.1	ICT access*	95.1	1	● ◆
3.1.2	ICT use*	86.4	8	
3.1.3	Government's online service*	76.5	49	◇
3.1.4	E-participation*	70.2	70	◇
3.2	**General infrastructure**	**28.6**	**66**	◇
3.2.1	Electricity output, GWh/mn pop.	1,719.4	87	◇
3.2.2	Logistics performance*	73.5	24	
3.2.3	Gross capital formation, % GDP	16.8	105	○ ◇
3.3	**Ecological sustainability**	**46.7**	**22**	
3.3.1	GDP/unit of energy use	16.8	15	
3.3.2	Environmental performance*	82.3	2	●
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.6	54	
Market sophistication		**49.0**	**53**	◇
4.1	**Credit**	**29.6**	**107**	○ ◇
4.1.1	Ease of getting credit*	15.0	127	○ ◇
4.1.2	Domestic credit to private sector, % GDP	107.3	22	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**49.0**	**20**	
4.2.1	Ease of protecting minority investors*	54.0	88	◇
4.2.2	Market capitalization, % GDP	79.6	20	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	1.2	1	● ◆
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	35	
4.3	**Trade, diversification, and market scale**	**68.3**	**69**	◇
4.3.1	Applied tariff rate, weighted avg., %	1.8	25	
4.3.2	Domestic industry diversification	84.2	68	
4.3.3	Domestic market scale, bn PPP$	70.7	93	◇

		Score/ Value	Rank	
Business sophistication		**57.8**	**9**	
5.1	**Knowledge workers**	**65.4**	**9**	
5.1.1	Knowledge-intensive employment, %	60.7	1	● ◆
5.1.2	Firms offering formal training, %	66.1	5	
5.1.3	GERD performed by business, % GDP	0.6	35	◇
5.1.4	GERD financed by business, %	49.6	27	
5.1.5	Females employed w/advanced degrees, %	24.3	16	
5.2	**Innovation linkages**	**59.2**	**6**	
5.2.1	University-industry R&D collaboration†	65.8	13	
5.2.2	State of cluster development and depth†	67.2	11	
5.2.3	GERD financed by abroad, % GDP	0.1	47	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.2	8	
5.2.5	Patent families/bn PPP$ GDP	5.4	7	◆
5.3	**Knowledge absorption**	**49.0**	**14**	
5.3.1	Intellectual property payments, % total trade	4.5	1	● ◆
5.3.2	High-tech imports, % total trade	1.6	131	○ ◇
5.3.3	ICT services imports, % total trade	4.4	1	● ◆
5.3.4	FDI net inflows, % GDP	–16.8	132	○ ◇
5.3.5	Research talent, % in businesses	37.7	36	◇
Knowledge and technology outputs		**30.1**	**38**	◇
6.1	**Knowledge creation**	**39.1**	**24**	
6.1.1	Patents by origin/bn PPP$ GDP	7.3	14	
6.1.2	PCT patents by origin/bn PPP$ GDP	4.5	8	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	18.7	48	◇
6.1.5	Citable documents H-index	11.6	66	◇
6.2	**Knowledge impact**	**27.0**	**76**	◇
6.2.1	Labor productivity growth, %	–1.7	97	○
6.2.2	New businesses/th pop. 15–64	17.2	7	◆
6.2.3	Software spending, % GDP	0.2	73	◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	3.3	71	
6.2.5	High-tech manufacturing, %	16.4	69	◇
6.3	**Knowledge diffusion**	**24.3**	**49**	◇
6.3.1	Intellectual property receipts, % total trade	2.1	11	
6.3.2	Production and export complexity	n/a	n/a	
6.3.3	High-tech exports, % total trade	0.6	86	◇
6.3.4	ICT services exports, % total trade	3.0	35	
Creative outputs		**54.4**	**3**	● ◆
7.1	**Intangible assets**	**52.2**	**15**	
7.1.1	Trademarks by origin/bn PPP$ GDP	69.2	24	
7.1.2	Global brand value, top 5,000, % GDP	112.3	17	
7.1.3	Industrial designs by origin/bn PPP$ GDP	6.9	19	
7.1.4	ICTs and organizational model creation†	72.2	15	
7.2	**Creative goods and services**	**42.8**	**8**	
7.2.1	Cultural and creative services exports, % total trade	6.6	1	● ◆
7.2.2	National feature films/mn pop. 15–69	29.6	1	● ◆
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	0.7	73	
7.2.5	Creative goods exports, % total trade	0.1	102	○
7.3	**Online creativity**	**70.1**	**2**	● ◆
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	84.3	4	● ◆
7.3.2	Country-code TLDs/th pop. 15–69	68.7	9	
7.3.3	Wikipedia edits/mn pop. 15–69	78.8	13	
7.3.4	Mobile app creation/bn PPP$ GDP	44.8	11	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Madagascar

GII 2021 rank
110

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
78	**127**	**Low**	**SSF**	**27.7**	**45.4**	**1,647**	**115**

		Score/ Value	Rank	
Institutions		**51.1**	**108**	
1.1	**Political environment**	**37.1**	**125**	
1.1.1	Political and operational stability*	60.7	97	
1.1.2	Government effectiveness*	25.3	129	○
1.2	**Regulatory environment**	**54.5**	**96**	
1.2.1	Regulatory quality*	24.4	116	
1.2.2	Rule of law*	20.1	120	
1.2.3	Cost of redundancy dismissal	14.7	57	●
1.3	**Business environment**	**61.6**	**100**	
1.3.1	Ease of starting a business*	88.5	65	●
1.3.2	Ease of resolving insolvency*	34.8	113	
Human capital and research		**14.4**	**116**	
2.1	**Education**	**24.5**	**125**	
2.1.1	Expenditure on education, % GDP	2.8	103	
2.1.2	Government funding/pupil, secondary, % GDP/cap ◴	7.2	98	◇
2.1.3	School life expectancy, years	10.2	107	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	18.1	88	◆
2.2	**Tertiary education**	**18.5**	**99**	◆
2.2.1	Tertiary enrolment, % gross	5.4	123	
2.2.2	Graduates in science and engineering, %	23.8	47	● ◆
2.2.3	Tertiary inbound mobility, %	1.4	83	
2.3	**Research and development (R&D)**	**0.1**	**121**	
2.3.1	Researchers, FTE/mn pop. ◴	34.0	99	
2.3.2	Gross expenditure on R&D, % GDP ◴	0.0	116	○ ◇
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**17.6**	**132**	○ ◇
3.1	**Information and communication technologies (ICTs)**	**22.4**	**131**	○ ◇
3.1.1	ICT access*	24.4	129	○
3.1.2	ICT use*	6.8	131	○ ◇
3.1.3	Government's online service*	28.8	126	
3.1.4	E-participation*	29.8	127	○
3.2	**General infrastructure**	**16.5**	**116**	
3.2.1	Electricity output, GWh/mn pop.	n/a	n/a	
3.2.2	Logistics performance*	15.9	115	
3.2.3	Gross capital formation, % GDP	16.4	106	
3.3	**Ecological sustainability**	**13.8**	**129**	○
3.3.1	GDP/unit of energy use	n/a	n/a	
3.3.2	Environmental performance*	26.5	127	○ ◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	108	
Market sophistication		**34.2**	**122**	
4.1	**Credit**	**22.7**	**120**	
4.1.1	Ease of getting credit*	40.0	113	
4.1.2	Domestic credit to private sector, % GDP	14.2	121	
4.1.3	Microfinance gross loans, % GDP	1.5	20	●
4.2	**Investment**	**36.0**	**[43]**	
4.2.1	Ease of protecting minority investors*	36.0	116	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**44.1**	**121**	
4.3.1	Applied tariff rate, weighted avg., %	7.5	100	
4.3.2	Domestic industry diversification	n/a	n/a	
4.3.3	Domestic market scale, bn PPP$	45.4	106	

		Score/ Value	Rank	
Business sophistication		**14.6**	**125**	
5.1	**Knowledge workers**	**5.0**	**[131]**	
5.1.1	Knowledge-intensive employment, % ◴	3.7	123	○ ◇
5.1.2	Firms offering formal training, % ◴	12.7	92	◇
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, % ◴	1.9	107	
5.2	**Innovation linkages**	**16.5**	**100**	
5.2.1	University-industry R&D collaboration† ◴	32.3	104	
5.2.2	State of cluster development and depth† ◴	39.1	104	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP ◴	0.0	112	
5.2.5	Patent families/bn PPP$ GDP	0.0	78	◆
5.3	**Knowledge absorption**	**22.2**	**79**	
5.3.1	Intellectual property payments, % total trade	0.4	75	
5.3.2	High-tech imports, % total trade	4.1	116	
5.3.3	ICT services imports, % total trade	2.2	29	● ◆
5.3.4	FDI net inflows, % GDP	3.8	32	●
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**12.4**	**99**	
6.1	**Knowledge creation**	**4.3**	**115**	
6.1.1	Patents by origin/bn PPP$ GDP	0.0	128	○ ◇
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	98	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	7.1	101	
6.1.5	Citable documents H-index	4.7	109	
6.2	**Knowledge impact**	**19.8**	**105**	
6.2.1	Labor productivity growth, %	1.1	43	●
6.2.2	New businesses/th pop. 15–64	0.1	116	
6.2.3	Software spending, % GDP	0.0	112	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.6	96	◆
6.2.5	High-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**13.1**	**77**	◆
6.3.1	Intellectual property receipts, % total trade	0.1	58	◆
6.3.2	Production and export complexity	20.6	110	
6.3.3	High-tech exports, % total trade	0.2	110	
6.3.4	ICT services exports, % total trade	3.2	32	● ◆
Creative outputs		**24.9**	**[61]**	
7.1	**Intangible assets**	**45.9**	**[25]**	
7.1.1	Trademarks by origin/bn PPP$ GDP	63.6	31	● ◆
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	6.8	22	● ◆
7.1.4	ICTs and organizational model creation†	n/a	n/a	
7.2	**Creative goods and services**	**2.2**	**[117]**	
7.2.1	Cultural and creative services exports, % total trade	0.1	83	
7.2.2	National feature films/mn pop. 15–69	0.8	90	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.1	91	◆
7.3	**Online creativity**	**5.4**	**120**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.1	123	
7.3.2	Country-code TLDs/th pop. 15–69	0.1	119	
7.3.3	Wikipedia edits/mn pop. 15–69	20.3	121	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Malawi

GII 2021 rank
107

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
93	**118**	**Low**	**SSF**	**19.1**	**20.8**	**995**	**111**

		Score/ Value	Rank	
Institutions		**51.8**	**105**	
1.1	**Political environment**	**41.7**	**112**	
1.1.1	Political and operational stability*	57.1	106	
1.1.2	Government effectiveness*	34.0	114	
1.2	**Regulatory environment**	**57.2**	**89**	
1.2.1	Regulatory quality*	25.2	112	
1.2.2	Rule of law*	38.0	81	
1.2.3	Cost of redundancy dismissal	16.7	65	
1.3	**Business environment**	**56.4**	**115**	
1.3.1	Ease of starting a business*	77.9	115	
1.3.2	Ease of resolving insolvency*	34.9	112	
Human capital and research		**11.8**	**122**	
2.1	**Education**	**34.2**	**107**	
2.1.1	Expenditure on education, % GDP	4.7	51	
2.1.2	Government funding/pupil, secondary, % GDP/cap ◴	24.0	20	●
2.1.3	School life expectancy, years ◴	10.9	100	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	68.1	123	○ ◇
2.2	**Tertiary education**	**1.0**	**129**	○ ◇
2.2.1	Tertiary enrolment, % gross ◴	0.8	128	○ ◇
2.2.2	Graduates in science and engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, % ◴	1.1	86	
2.3	**Research and development (R&D)**	**0.1**	**117**	
2.3.1	Researchers, FTE/mn pop. ◴	50.4	93	
2.3.2	Gross expenditure on R&D, % GDP	n/a	n/a	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**21.1**	**127**	
3.1	**Information and communication technologies (ICTs)**	**30.5**	**124**	
3.1.1	ICT access*	22.8	131	○
3.1.2	ICT use*	15.2	120	
3.1.3	Government's online service*	42.4	115	
3.1.4	E-participation*	41.7	111	
3.2	**General infrastructure**	**13.1**	**122**	
3.2.1	Electricity output, GWh/mn pop.	n/a	n/a	
3.2.2	Logistics performance*	25.0	93	
3.2.3	Gross capital formation, % GDP	10.7	123	
3.3	**Ecological sustainability**	**19.6**	**102**	
3.3.1	GDP/unit of energy use	n/a	n/a	
3.3.2	Environmental performance*	38.3	93	◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	114	
Market sophistication		**43.7**	**81**	◆
4.1	**Credit**	**38.6**	**74**	
4.1.1	Ease of getting credit*	90.0	10	● ◆
4.1.2	Domestic credit to private sector, % GDP ◴	10.5	128	○
4.1.3	Microfinance gross loans, % GDP	0.5	36	●
4.2	**Investment**	**37.9**	**[41]**	
4.2.1	Ease of protecting minority investors*	58.0	77	◆
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	31	●
4.3	**Trade, diversification, and market scale**	**54.8**	**109**	
4.3.1	Applied tariff rate, weighted avg., %	4.2	78	◆
4.3.2	Domestic industry diversification ◴	70.2	97	
4.3.3	Domestic market scale, bn PPP$	20.8	128	◇

		Score/ Value	Rank	
Business sophistication		**20.1**	**95**	◆
5.1	**Knowledge workers**	**15.3**	**[111]**	
5.1.1	Knowledge-intensive employment, % ◴	3.7	122	○ ◇
5.1.2	Firms offering formal training, % ◴	32.9	45	◆
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, % ◴	0.6	119	
5.2	**Innovation linkages**	**22.4**	**57**	
5.2.1	University-industry R&D collaboration†	31.7	106	
5.2.2	State of cluster development and depth†	35.5	113	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.1	22	● ◆
5.2.5	Patent families/bn PPP$ GDP	0.0	100	○ ◇
5.3	**Knowledge absorption**	**22.7**	**77**	
5.3.1	Intellectual property payments, % total trade	0.2	96	
5.3.2	High-tech imports, % total trade	9.8	38	●
5.3.3	ICT services imports, % total trade	1.1	70	
5.3.4	FDI net inflows, % GDP	1.4	99	
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**15.8**	**84**	◆
6.1	**Knowledge creation**	**18.0**	**56**	● ◆
6.1.1	Patents by origin/bn PPP$ GDP ◴	0.2	100	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	98	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	35.1	26	● ◆
6.1.5	Citable documents H-index	8.0	85	◆
6.2	**Knowledge impact**	**17.5**	**114**	
6.2.1	Labor productivity growth, %	1.2	39	●
6.2.2	New businesses/th pop. 15–64 ◴	0.1	119	○
6.2.3	Software spending, % GDP	0.0	107	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.9	112	
6.2.5	High-tech manufacturing, % ◴	8.6	93	
6.3	**Knowledge diffusion**	**11.8**	**85**	
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	Production and export complexity	18.0	113	
6.3.3	High-tech exports, % total trade	0.2	106	
6.3.4	ICT services exports, % total trade	2.3	48	●
Creative outputs		**16.4**	**[97]**	
7.1	**Intangible assets**	**25.4**	**[86]**	
7.1.1	Trademarks by origin/bn PPP$ GDP ◴	28.0	78	
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	n/a	n/a	
7.1.4	ICTs and organizational model creation†	28.7	124	○ ◇
7.2	**Creative goods and services**	**7.5**	**[91]**	
7.2.1	Cultural and creative services exports, % total trade	0.1	76	
7.2.2	National feature films/mn pop. 15–69	n/a	n/a	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing ◴	1.2	36	● ◇
7.2.5	Creative goods exports, % total trade	0.2	85	◆
7.3	**Online creativity**	**7.4**	**111**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.2	118	
7.3.2	Country-code TLDs/th pop. 15–69	0.0	125	
7.3.3	Wikipedia edits/mn pop. 15–69	25.5	112	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Malaysia

GII 2021 rank
36

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
34	**36**	**Upper middle**	**SEAO**	**32.4**	**900.4**	**27,287**	**33**

		Score/ Value	Rank	
Institutions		**72.3**	**41**	◆
1.1	**Political environment**	**76.5**	**29**	◆
1.1.1	Political and operational stability*	83.9	13	◆
1.1.2	Government effectiveness*	72.8	33	◆
1.2	**Regulatory environment**	**65.1**	**65**	
1.2.1	Regulatory quality*	61.1	41	◆
1.2.2	Rule of law*	62.3	39	◆
1.2.3	Cost of redundancy dismissal	23.9	103 ○	
1.3	**Business environment**	**75.2**	**50**	
1.3.1	Ease of starting a business*	83.3	97 ○	
1.3.2	Ease of resolving insolvency*	67.0	37	
Human capital and research		**40.6**	**39**	◆
2.1	**Education**	**46.0**	**77**	
2.1.1	Expenditure on education, % GDP	4.2	63	
2.1.2	Government funding/pupil, secondary, % GDP/cap	19.2	53	
2.1.3	School life expectancy, years ◴	13.7	73	
2.1.4	PISA scales in reading, maths and science	430.9	48	
2.1.5	Pupil-teacher ratio, secondary	11.4	43	
2.2	**Tertiary education**	**49.6**	**15**	● ◆
2.2.1	Tertiary enrolment, % gross	43.1	69	
2.2.2	Graduates in science and engineering, %	39.2	5	● ◆
2.2.3	Tertiary inbound mobility, %	6.7	37	
2.3	**Research and development (R&D)**	**26.3**	**40**	◆
2.3.1	Researchers, FTE/mn pop. ◴	2,184.7	37	◆
2.3.2	Gross expenditure on R&D, % GDP ◴	1.0	37	◆
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41 ○	◇
2.3.4	QS university ranking, top 3*	58.3	14	● ◆
Infrastructure		**46.7**	**51**	
3.1	**Information and communication technologies (ICTs)**	**79.2**	**35**	◆
3.1.1	ICT access*	79.2	36	◆
3.1.2	ICT use*	66.6	55	
3.1.3	Government's online service*	85.3	24	
3.1.4	E-participation*	85.7	29	
3.2	**General infrastructure**	**31.3**	**55**	
3.2.1	Electricity output, GWh/mn pop.	5,406.7	39	◆
3.2.2	Logistics performance*	54.5	40	◆
3.2.3	Gross capital formation, % GDP	21.6	73	
3.3	**Ecological sustainability**	**29.6**	**61**	
3.3.1	GDP/unit of energy use	10.2	65	
3.3.2	Environmental performance*	47.9	62	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.5	34	
Market sophistication		**55.3**	**30**	◆
4.1	**Credit**	**50.5**	**31**	◆
4.1.1	Ease of getting credit*	75.0	34	
4.1.2	Domestic credit to private sector, % GDP	120.9	17	● ◆
4.1.3	Microfinance gross loans, % GDP ◴	0.1	56 ○	
4.2	**Investment**	**35.2**	**49**	
4.2.1	Ease of protecting minority investors*	88.0	2	● ◆
4.2.2	Market capitalization, % GDP	121.5	8	● ◆
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	52	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	58	
4.3	**Trade, diversification, and market scale**	**80.2**	**28**	
4.3.1	Applied tariff rate, weighted avg., % ◴	4.0	74	
4.3.2	Domestic industry diversification	94.4	32	
4.3.3	Domestic market scale, bn PPP$	900.4	29	

		Score/ Value	Rank	
Business sophistication		**34.1**	**39**	◆
5.1	**Knowledge workers**	**30.2**	**68**	
5.1.1	Knowledge-intensive employment, %	27.5	55	
5.1.2	Firms offering formal training, % ◴	18.5	82 ○	
5.1.3	GERD performed by business, % GDP ◴	0.5	39	
5.1.4	GERD financed by business, %	38.2	46	
5.1.5	Females employed w/advanced degrees, % ◴	12.5	59	
5.2	**Innovation linkages**	**28.8**	**38**	◆
5.2.1	University-industry R&D collaboration†	58.8	25	◆
5.2.2	State of cluster development and depth†	65.2	13	● ◆
5.2.3	GERD financed by abroad, % GDP	0.1	48	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.1	25	◆
5.2.5	Patent families/bn PPP$ GDP	0.2	51	
5.3	**Knowledge absorption**	**43.3**	**24**	◆
5.3.1	Intellectual property payments, % total trade	0.9	42	
5.3.2	High-tech imports, % total trade	25.5	4	● ◆
5.3.3	ICT services imports, % total trade	1.6	49	
5.3.4	FDI net inflows, % GDP	2.6	67	
5.3.5	Research talent, % in businesses ◴	15.8	59 ○	
Knowledge and technology outputs		**33.4**	**31**	◆
6.1	**Knowledge creation**	**12.8**	**69**	
6.1.1	Patents by origin/bn PPP$ GDP	1.1	61	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.3	43	
6.1.3	Utility models by origin/bn PPP$ GDP	0.1	53 ○	
6.1.4	Scientific and technical articles/bn PPP$ GDP	15.3	56	
6.1.5	Citable documents H-index	20.1	41	
6.2	**Knowledge impact**	**38.5**	**30**	◆
6.2.1	Labor productivity growth, %	–0.3	75	
6.2.2	New businesses/th pop. 15–64	2.4	52	
6.2.3	Software spending, % GDP	0.3	36	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	10.7	27	
6.2.5	High-tech manufacturing, %	44.4	20	◆
6.3	**Knowledge diffusion**	**48.9**	**14**	● ◆
6.3.1	Intellectual property receipts, % total trade	0.1	53	
6.3.2	Production and export complexity	67.7	26	◆
6.3.3	High-tech exports, % total trade	38.6	1	● ◆
6.3.4	ICT services exports, % total trade	1.3	72	
Creative outputs		**34.5**	**37**	◆
7.1	**Intangible assets**	**40.5**	**39**	
7.1.1	Trademarks by origin/bn PPP$ GDP	23.8	86 ○	
7.1.2	Global brand value, top 5,000, % GDP	153.2	10	● ◆
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.6	82 ○	
7.1.4	ICTs and organizational model creation†	71.9	17	◆
7.2	**Creative goods and services**	**41.1**	**10**	● ◆
7.2.1	Cultural and creative services exports, % total trade	0.3	64	
7.2.2	National feature films/mn pop. 15–69	3.8	50	
7.2.3	Entertainment and media market/th pop. 15–69	12.2	33	◆
7.2.4	Printing and other media, % manufacturing ◴	0.8	69 ○	
7.2.5	Creative goods exports, % total trade	8.8	1	● ◆
7.3	**Online creativity**	**15.8**	**71**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	6.3	50	
7.3.2	Country-code TLDs/th pop. 15–69	4.0	58	
7.3.3	Wikipedia edits/mn pop. 15–69	49.7	65	
7.3.4	Mobile app creation/bn PPP$ GDP	3.3	64	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Mali

GII 2021 rank

124

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
114	**126**	**Low**	**SSF**	**20.3**	**47.6**	**2,421**	**123**

		Score/ Value	Rank	
Institutions		**51.3**	**106**	
1.1	**Political environment**	**32.4**	**130**	○
1.1.1	Political and operational stability*	42.9	130	○
1.1.2	Government effectiveness*	27.2	126	
1.2	**Regulatory environment**	**57.7**	**85**	
1.2.1	Regulatory quality*	28.5	107	
1.2.2	Rule of law*	24.7	114	
1.2.3	Cost of redundancy dismissal	13.6	50	●
1.3	**Business environment**	**63.8**	**89**	
1.3.1	Ease of starting a business*	84.3	95	
1.3.2	Ease of resolving insolvency*	43.4	91	
Human capital and research		**11.3**	**123**	
2.1	**Education**	**29.6**	**115**	
2.1.1	Expenditure on education, % GDP	3.8	77	
2.1.2	Government funding/pupil, secondary, % GDP/cap	25.4	16	●
2.1.3	School life expectancy, years ◴	7.5	118	○ ◇
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary ◴	29.7	117	
2.2	**Tertiary education**	**3.0**	**126**	○
2.2.1	Tertiary enrolment, % gross ◴	5.5	122	
2.2.2	Graduates in science and engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, % ◴	0.9	91	
2.3	**Research and development (R&D)**	**1.5**	**101**	
2.3.1	Researchers, FTE/mn pop. ◴	32.9	100	
2.3.2	Gross expenditure on R&D, % GDP ◴	0.3	80	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**22.5**	**124**	
3.1	**Information and communication technologies (ICTs)**	**30.0**	**125**	
3.1.1	ICT access*	36.9	113	◆
3.1.2	ICT use*	16.3	118	
3.1.3	Government's online service*	34.7	122	
3.1.4	E-participation*	32.1	123	
3.2	**General infrastructure**	**22.0**	**98**	
3.2.1	Electricity output, GWh/mn pop.	n/a	n/a	
3.2.2	Logistics performance*	25.2	92	
3.2.3	Gross capital formation, % GDP	18.5	98	
3.3	**Ecological sustainability**	**15.4**	**124**	
3.3.1	GDP/unit of energy use	n/a	n/a	
3.3.2	Environmental performance*	29.4	123	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.3	104	
Market sophistication		**34.5**	**121**	
4.1	**Credit**	**16.5**	**125**	
4.1.1	Ease of getting credit*	30.0	122	
4.1.2	Domestic credit to private sector, % GDP	24.5	107	
4.1.3	Microfinance gross loans, % GDP	0.4	41	●
4.2	**Investment**	**42.0**	**[28]**	
4.2.1	Ease of protecting minority investors*	42.0	102	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**45.0**	**120**	
4.3.1	Applied tariff rate, weighted avg., %	7.2	98	
4.3.2	Domestic industry diversification	n/a	n/a	
4.3.3	Domestic market scale, bn PPP$	47.6	104	

		Score/ Value	Rank	
Business sophistication		**17.7**	**109**	
5.1	**Knowledge workers**	**5.5**	**129**	○ ◇
5.1.1	Knowledge-intensive employment, % ◴	4.3	120	○
5.1.2	Firms offering formal training, % ◴	17.7	85	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, % ◴	0.8	95	
5.1.5	Females employed w/advanced degrees, % ◴	0.5	121	○
5.2	**Innovation linkages**	**20.0**	**70**	
5.2.1	University-industry R&D collaboration†	41.1	71	
5.2.2	State of cluster development and depth†	43.5	83	◆
5.2.3	GERD financed by abroad, % GDP ◴	0.1	32	●
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	76	
5.2.5	Patent families/bn PPP$ GDP	0.0	100	○ ◇
5.3	**Knowledge absorption**	**27.6**	**63**	● ◆
5.3.1	Intellectual property payments, % total trade ◴	0.0	116	
5.3.2	High-tech imports, % total trade ◴	6.8	81	
5.3.3	ICT services imports, % total trade	2.6	16	● ◆
5.3.4	FDI net inflows, % GDP	3.1	46	●
5.3.5	Research talent, % in businesses ◴	31.4	41	● ◆
Knowledge and technology outputs		**13.6**	**94**	
6.1	**Knowledge creation**	**3.6**	**118**	
6.1.1	Patents by origin/bn PPP$ GDP	0.1	117	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	98	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	4.9	109	
6.1.5	Citable documents H-index	5.1	104	
6.2	**Knowledge impact**	**18.5**	**112**	
6.2.1	Labor productivity growth, %	0.7	51	●
6.2.2	New businesses/th pop. 15–64	0.3	108	
6.2.3	Software spending, % GDP	0.0	115	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.5	123	
6.2.5	High-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**18.6**	**58**	● ◆
6.3.1	Intellectual property receipts, % total trade ◴	0.0	108	
6.3.2	Production and export complexity	32.6	84	◆
6.3.3	High-tech exports, % total trade ◴	0.1	123	
6.3.4	ICT services exports, % total trade	4.6	18	● ◆
Creative outputs		**9.6**	**122**	
7.1	**Intangible assets**	**13.9**	**121**	
7.1.1	Trademarks by origin/bn PPP$ GDP	5.6	119	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.3	96	
7.1.4	ICTs and organizational model creation†	45.0	96	
7.2	**Creative goods and services**	**1.0**	**[129]**	
7.2.1	Cultural and creative services exports, % total trade ◴	0.1	79	
7.2.2	National feature films/mn pop. 15–69	0.1	108	○ ◇
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade ◴	0.0	126	
7.3	**Online creativity**	**9.7**	**95**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.1	122	
7.3.2	Country-code TLDs/th pop. 15–69	6.7	45	● ◆
7.3.3	Wikipedia edits/mn pop. 15–69	25.7	111	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Malta

GII 2021 rank

27

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
22	**29**	**High**	**EUR**	**0.4**	**21.6**	**43,087**	**27**

		Score/ Value	Rank	
Institutions		**73.9**	**37**	
1.1	**Political environment**	**73.3**	**36**	
1.1.1	Political and operational stability*	80.4	29	
1.1.2	Government effectiveness*	69.7	37	
1.2	**Regulatory environment**	**85.1**	**19**	
1.2.1	Regulatory quality*	68.5	38	
1.2.2	Rule of law*	71.8	32	
1.2.3	Cost of redundancy dismissal	8.0	1	● ◆
1.3	**Business environment**	**63.3**	**93**	○ ◇
1.3.1	Ease of starting a business*	88.2	69	
1.3.2	Ease of resolving insolvency*	38.3	105	○ ◇
Human capital and research		**39.3**	**41**	
2.1	**Education**	**62.2**	**21**	
2.1.1	Expenditure on education, % GDP	4.8	46	
2.1.2	Government funding/pupil, secondary, % GDP/cap	29.2	9	◆
2.1.3	School life expectancy, years	16.8	19	
2.1.4	PISA scales in reading, maths and science	458.8	42	
2.1.5	Pupil-teacher ratio, secondary ⏲	7.1	2	● ◆
2.2	**Tertiary education**	**36.5**	**53**	
2.2.1	Tertiary enrolment, % gross	64.9	41	
2.2.2	Graduates in science and engineering, %	20.6	69	○
2.2.3	Tertiary inbound mobility, %	10.0	22	
2.3	**Research and development (R&D)**	**19.2**	**45**	
2.3.1	Researchers, FTE/mn pop.	2,116.4	39	
2.3.2	Gross expenditure on R&D, % GDP	0.6	59	
2.3.3	Global corporate R&D investors, top 3, mn US$	40.1	39	
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**56.4**	**18**	
3.1	**Information and communication technologies (ICTs)**	**85.0**	**20**	
3.1.1	ICT access*	92.2	5	● ◆
3.1.2	ICT use*	83.2	13	
3.1.3	Government's online service*	81.2	40	
3.1.4	E-participation*	83.3	38	
3.2	**General infrastructure**	**26.9**	**71**	◇
3.2.1	Electricity output, GWh/mn pop.	4,152.0	54	
3.2.2	Logistics performance*	35.6	68	◇
3.2.3	Gross capital formation, % GDP	23.4	56	
3.3	**Ecological sustainability**	**57.4**	**3**	● ◆
3.3.1	GDP/unit of energy use	28.7	3	● ◆
3.3.2	Environmental performance*	70.7	23	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.2	36	
Market sophistication		**47.0**	**63**	
4.1	**Credit**	**32.8**	**98**	○ ◇
4.1.1	Ease of getting credit*	35.0	118	○ ◇
4.1.2	Domestic credit to private sector, % GDP	75.9	41	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**41.4**	**33**	
4.2.1	Ease of protecting minority investors*	66.0	50	
4.2.2	Market capitalization, % GDP	36.4	42	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.2	13	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP ⏲	0.1	16	
4.3	**Trade, diversification, and market scale**	**66.9**	**72**	
4.3.1	Applied tariff rate, weighted avg., %	1.8	25	
4.3.2	Domestic industry diversification	93.4	40	
4.3.3	Domestic market scale, bn PPP$	21.6	127	○ ◇

		Score/ Value	Rank	
Business sophistication		**53.7**	**14**	
5.1	**Knowledge workers**	**52.9**	**23**	
5.1.1	Knowledge-intensive employment, %	44.6	19	
5.1.2	Firms offering formal training, %	49.9	18	
5.1.3	GERD performed by business, % GDP	0.4	45	
5.1.4	GERD financed by business, %	59.6	14	
5.1.5	Females employed w/advanced degrees, %	16.0	43	
5.2	**Innovation linkages**	**48.6**	**14**	
5.2.1	University-industry R&D collaboration†	43.8	60	
5.2.2	State of cluster development and depth†	53.5	40	
5.2.3	GERD financed by abroad, % GDP	0.1	50	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.5	1	● ◆
5.2.5	Patent families/bn PPP$ GDP	2.0	18	
5.3	**Knowledge absorption**	**59.5**	**4**	● ◆
5.3.1	Intellectual property payments, % total trade	4.0	4	● ◆
5.3.2	High-tech imports, % total trade	5.4	107	○
5.3.3	ICT services imports, % total trade	1.8	40	
5.3.4	FDI net inflows, % GDP	28.5	1	● ◆
5.3.5	Research talent, % in businesses	52.0	19	
Knowledge and technology outputs		**28.3**	**44**	
6.1	**Knowledge creation**	**21.5**	**50**	
6.1.1	Patents by origin/bn PPP$ GDP	2.6	30	
6.1.2	PCT patents by origin/bn PPP$ GDP	1.9	20	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	20.4	44	
6.1.5	Citable documents H-index	6.8	91	○ ◇
6.2	**Knowledge impact**	**37.6**	**33**	
6.2.1	Labor productivity growth, %	–3.7	115	○ ◇
6.2.2	New businesses/th pop. 15–64	17.5	6	◆
6.2.3	Software spending, % GDP	0.3	34	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	9.5	28	
6.2.5	High-tech manufacturing, %	38.4	30	
6.3	**Knowledge diffusion**	**25.9**	**44**	
6.3.1	Intellectual property receipts, % total trade	2.8	9	◆
6.3.2	Production and export complexity	n/a	n/a	
6.3.3	High-tech exports, % total trade	3.9	41	
6.3.4	ICT services exports, % total trade	0.6	96	○
Creative outputs		**52.0**	**9**	◆
7.1	**Intangible assets**	**54.5**	**12**	◆
7.1.1	Trademarks by origin/bn PPP$ GDP	104.7	5	● ◆
7.1.2	Global brand value, top 5,000, % GDP	86.2	24	
7.1.3	Industrial designs by origin/bn PPP$ GDP	4.4	26	
7.1.4	ICTs and organizational model creation†	64.4	31	
7.2	**Creative goods and services**	**45.4**	**5**	● ◆
7.2.1	Cultural and creative services exports, % total trade	12.6	1	● ◆
7.2.2	National feature films/mn pop. 15–69	15.7	7	◆
7.2.3	Entertainment and media market/th pop. 15–69	14.9	30	◇
7.2.4	Printing and other media, % manufacturing	6.7	1	● ◆
7.2.5	Creative goods exports, % total trade	0.2	79	○
7.3	**Online creativity**	**53.8**	**16**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	95.8	3	● ◆
7.3.2	Country-code TLDs/th pop. 15–69	18.5	31	
7.3.3	Wikipedia edits/mn pop. 15–69	76.5	17	
7.3.4	Mobile app creation/bn PPP$ GDP	20.6	26	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Mauritius

GII 2021 rank **52**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
58	**48**	**High**	**SSF**	**1.3**	**26.3**	**20,719**	**52**

		Score/ Value	Rank	
Institutions		**81.2**	**21**	●
1.1	**Political environment**	**76.4**	**30**	
1.1.1	Political and operational stability*	89.3	6	● ◆
1.1.2	Government effectiveness*	70.0	36	
1.2	**Regulatory environment**	**83.2**	**24**	
1.2.1	Regulatory quality*	69.5	35	
1.2.2	Rule of law*	66.8	34	
1.2.3	Cost of redundancy dismissal	8.9	23	●
1.3	**Business environment**	**84.1**	**21**	●
1.3.1	Ease of starting a business*	94.5	19	●
1.3.2	Ease of resolving insolvency*	73.8	26	
Human capital and research		**30.6**	**71**	◇
2.1	**Education**	**58.6**	**35**	
2.1.1	Expenditure on education, % GDP	4.7	50	
2.1.2	Government funding/pupil, secondary, % GDP/cap	30.4	6	● ◆
2.1.3	School life expectancy, years ◴	15.1	51	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	12.2	50	
2.2	**Tertiary education**	**30.1**	**75**	◇
2.2.1	Tertiary enrolment, % gross ◴	40.6	72	◇
2.2.2	Graduates in science and engineering, % ◴	23.3	51	
2.2.3	Tertiary inbound mobility, % ◴	5.4	45	
2.3	**Research and development (R&D)**	**3.1**	**88**	◇
2.3.1	Researchers, FTE/mn pop. ◴	473.9	70	◇
2.3.2	Gross expenditure on R&D, % GDP ◴	0.3	77	◇
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**42.4**	**65**	◇
3.1	**Information and communication technologies (ICTs)**	**68.6**	**59**	◇
3.1.1	ICT access*	76.2	46	
3.1.2	ICT use*	63.9	57	◇
3.1.3	Government's online service*	70.0	69	◇
3.1.4	E-participation*	64.3	80	◇
3.2	**General infrastructure**	**23.2**	**92**	◇
3.2.1	Electricity output, GWh/mn pop.	2,475.9	75	◇
3.2.2	Logistics performance*	31.9	77	◇
3.2.3	Gross capital formation, % GDP	21.9	69	
3.3	**Ecological sustainability**	**35.3**	**46**	
3.3.1	GDP/unit of energy use	19.6	8	● ◆
3.3.2	Environmental performance*	45.1	73	◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.6	81	◇
Market sophistication		**55.5**	**29**	
4.1	**Credit**	**48.7**	**37**	
4.1.1	Ease of getting credit*	65.0	61	
4.1.2	Domestic credit to private sector, % GDP	80.2	36	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**56.6**	**14**	●
4.2.1	Ease of protecting minority investors*	78.0	18	●
4.2.2	Market capitalization, % GDP	68.1	24	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.9	1	● ◆
4.2.4	Venture capital recipients, deals/bn PPP$ GDP ◴	0.1	20	
4.3	**Trade, diversification, and market scale**	**61.3**	**89**	◇
4.3.1	Applied tariff rate, weighted avg., %	1.1	13	●
4.3.2	Domestic industry diversification	75.1	90	
4.3.3	Domestic market scale, bn PPP$	26.2	125	○ ◇

		Score/ Value	Rank	
Business sophistication		**17.1**	**111**	○ ◇
5.1	**Knowledge workers**	**15.9**	**110**	○ ◇
5.1.1	Knowledge-intensive employment, %	24.1	64	◇
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP ◴	0.0	81	○ ◇
5.1.4	GERD financed by business, %	4.1	85	○ ◇
5.1.5	Females employed w/advanced degrees, %	9.2	74	◇
5.2	**Innovation linkages**	**17.9**	**85**	◇
5.2.1	University-industry R&D collaboration†	31.1	109	○ ◇
5.2.2	State of cluster development and depth†	47.4	60	
5.2.3	GERD financed by abroad, % GDP	0.0	86	○ ◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	38	
5.2.5	Patent families/bn PPP$ GDP	0.2	46	
5.3	**Knowledge absorption**	**17.5**	**105**	◇
5.3.1	Intellectual property payments, % total trade	0.2	89	
5.3.2	High-tech imports, % total trade	6.0	97	
5.3.3	ICT services imports, % total trade	1.8	37	
5.3.4	FDI net inflows, % GDP	3.2	42	
5.3.5	Research talent, % in businesses ◴	4.4	72	○ ◇
Knowledge and technology outputs		**13.6**	**93**	◇
6.1	**Knowledge creation**	**5.9**	**[104]**	
6.1.1	Patents by origin/bn PPP$ GDP	0.1	108	○
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	8.9	94	◇
6.1.5	Citable documents H-index	3.5	118	○ ◇
6.2	**Knowledge impact**	**21.4**	**95**	◇
6.2.1	Labor productivity growth, %	–1.9	99	○
6.2.2	New businesses/th pop. 15–64	9.3	18	●
6.2.3	Software spending, % GDP	0.2	76	◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	6.6	42	
6.2.5	High-tech manufacturing, %	3.3	106	○ ◇
6.3	**Knowledge diffusion**	**13.5**	**75**	◇
6.3.1	Intellectual property receipts, % total trade	0.0	93	
6.3.2	Production and export complexity	39.9	68	◇
6.3.3	High-tech exports, % total trade	0.4	95	◇
6.3.4	ICT services exports, % total trade	2.2	49	
Creative outputs		**36.3**	**31**	
7.1	**Intangible assets**	**53.3**	**14**	●
7.1.1	Trademarks by origin/bn PPP$ GDP	85.0	17	● ◆
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	3.8	29	
7.1.4	ICTs and organizational model creation†	53.2	65	◇
7.2	**Creative goods and services**	**19.6**	**56**	
7.2.1	Cultural and creative services exports, % total trade	0.6	42	
7.2.2	National feature films/mn pop. 15–69	9.5	21	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing ◴	1.8	19	
7.2.5	Creative goods exports, % total trade	0.7	56	
7.3	**Online creativity**	**19.2**	**59**	◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	13.0	35	
7.3.2	Country-code TLDs/th pop. 15–69	2.4	65	◇
7.3.3	Wikipedia edits/mn pop. 15–69	59.7	52	
7.3.4	Mobile app creation/bn PPP$ GDP	0.4	81	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Mexico

GII 2021 rank
55

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
51	**62**	**Upper middle**	**LCN**	**128.9**	**2,424.5**	**18,804**	**55**

		Score/ Value	Rank	
Institutions		**61.0**	**77**	
1.1	**Political environment**	**49.9**	**90**	
1.1.1	Political and operational stability*	55.4	112	○ ◇
1.1.2	Government effectiveness*	47.2	84	
1.2	**Regulatory environment**	**55.0**	**94**	
1.2.1	Regulatory quality*	46.2	65	
1.2.2	Rule of law*	29.4	105	
1.2.3	Cost of redundancy dismissal	22.0	96	
1.3	**Business environment**	**78.2**	**37**	
1.3.1	Ease of starting a business*	86.1	83	
1.3.2	Ease of resolving insolvency*	70.3	31	◆
Human capital and research		**33.2**	**56**	
2.1	**Education**	**43.6**	**82**	
2.1.1	Expenditure on education, % GDP	4.5	57	
2.1.2	Government funding/pupil, secondary, % GDP/cap	13.3	81	
2.1.3	School life expectancy, years	14.9	54	
2.1.4	PISA scales in reading, maths and science	416.2	57	
2.1.5	Pupil-teacher ratio, secondary	17.0	83	
2.2	**Tertiary education**	**30.4**	**74**	
2.2.1	Tertiary enrolment, % gross	41.5	71	
2.2.2	Graduates in science and engineering, %	26.0	34	
2.2.3	Tertiary inbound mobility, %	0.2	107	○ ◇
2.3	**Research and development (R&D)**	**25.6**	**41**	
2.3.1	Researchers, FTE/mn pop.	327.2	76	
2.3.2	Gross expenditure on R&D, % GDP	0.3	81	
2.3.3	Global corporate R&D investors, top 3, mn US$	49.9	31	◆
2.3.4	QS university ranking, top 3*	43.2	27	● ◆
Infrastructure		**41.8**	**67**	
3.1	**Information and communication technologies (ICTs)**	**70.0**	**58**	
3.1.1	ICT access*	58.4	79	
3.1.2	ICT use*	57.2	68	
3.1.3	Government's online service*	82.3	38	
3.1.4	E-participation*	82.1	41	
3.2	**General infrastructure**	**24.9**	**84**	
3.2.1	Electricity output, GWh/mn pop.	2,693.7	70	
3.2.2	Logistics performance*	46.6	50	
3.2.3	Gross capital formation, % GDP	19.3	92	
3.3	**Ecological sustainability**	**30.6**	**56**	
3.3.1	GDP/unit of energy use	13.0	39	
3.3.2	Environmental performance*	52.6	49	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.7	75	
Market sophistication		**48.8**	**55**	
4.1	**Credit**	**42.2**	**59**	
4.1.1	Ease of getting credit*	90.0	10	● ◆
4.1.2	Domestic credit to private sector, % GDP	36.6	86	
4.1.3	Microfinance gross loans, % GDP	0.2	45	
4.2	**Investment**	**19.1**	**118**	○
4.2.1	Ease of protecting minority investors*	62.0	60	
4.2.2	Market capitalization, % GDP	33.4	43	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	80	○
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	79	
4.3	**Trade, diversification, and market scale**	**85.1**	**14**	● ◆
4.3.1	Applied tariff rate, weighted avg., %	1.2	15	●
4.3.2	Domestic industry diversification	88.9	55	
4.3.3	Domestic market scale, bn PPP$	2,424.5	11	● ◆

		Score/ Value	Rank	
Business sophistication		**27.2**	**56**	
5.1	**Knowledge workers**	**28.7**	**76**	
5.1.1	Knowledge-intensive employment, %	20.2	79	
5.1.2	Firms offering formal training, %	50.8	17	●
5.1.3	GERD performed by business, % GDP	0.1	68	
5.1.4	GERD financed by business, %	18.2	68	
5.1.5	Females employed w/advanced degrees, %	9.8	71	
5.2	**Innovation linkages**	**17.5**	**90**	
5.2.1	University-industry R&D collaboration†	38.7	84	
5.2.2	State of cluster development and depth†	55.0	36	
5.2.3	GERD financed by abroad, % GDP	0.0	91	○
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	99	
5.2.5	Patent families/bn PPP$ GDP	0.0	64	
5.3	**Knowledge absorption**	**35.5**	**40**	
5.3.1	Intellectual property payments, % total trade	0.1	110	◇
5.3.2	High-tech imports, % total trade	18.2	9	● ◆
5.3.3	ICT services imports, % total trade	0.0	130	○ ◇
5.3.4	FDI net inflows, % GDP	2.7	61	
5.3.5	Research talent, % in businesses	43.7	30	
Knowledge and technology outputs		**24.8**	**53**	
6.1	**Knowledge creation**	**11.3**	**74**	
6.1.1	Patents by origin/bn PPP$ GDP	0.5	80	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	68	
6.1.3	Utility models by origin/bn PPP$ GDP	0.2	47	
6.1.4	Scientific and technical articles/bn PPP$ GDP	7.8	96	
6.1.5	Citable documents H-index	29.1	34	◆
6.2	**Knowledge impact**	**29.6**	**64**	
6.2.1	Labor productivity growth, %	–2.7	110	○
6.2.2	New businesses/th pop. 15–64	1.0	84	
6.2.3	Software spending, % GDP	0.2	65	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	3.0	75	
6.2.5	High-tech manufacturing, %	48.9	12	● ◆
6.3	**Knowledge diffusion**	**33.5**	**28**	◆
6.3.1	Intellectual property receipts, % total trade	0.0	107	○ ◇
6.3.2	Production and export complexity	73.7	19	● ◆
6.3.3	High-tech exports, % total trade	15.3	8	● ◆
6.3.4	ICT services exports, % total trade	0.0	131	○ ◇
Creative outputs		**28.5**	**52**	
7.1	**Intangible assets**	**32.8**	**56**	
7.1.1	Trademarks by origin/bn PPP$ GDP	43.0	54	
7.1.2	Global brand value, top 5,000, % GDP	63.9	30	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.5	86	
7.1.4	ICTs and organizational model creation†	57.9	53	
7.2	**Creative goods and services**	**36.9**	**16**	● ◆
7.2.1	Cultural and creative services exports, % total trade	0.0	111	○
7.2.2	National feature films/mn pop. 15–69	2.1	65	
7.2.3	Entertainment and media market/th pop. 15–69	8.5	38	
7.2.4	Printing and other media, % manufacturing	0.4	93	○ ◇
7.2.5	Creative goods exports, % total trade	10.4	1	● ◆
7.3	**Online creativity**	**11.6**	**86**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	2.6	70	
7.3.2	Country-code TLDs/th pop. 15–69	4.1	57	
7.3.3	Wikipedia edits/mn pop. 15–69	39.7	84	
7.3.4	Mobile app creation/bn PPP$ GDP	1.4	73	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⊙ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Mongolia

GII 2021 rank **58**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
55	65	Lower middle	SEAO	3.3	41.1	12,259	58

		Score/ Value	Rank	
Institutions		**61.2**	**76**	◆
1.1	**Political environment**	**55.3**	**76**	◆
1.1.1	Political and operational stability*	73.2	44	◆
1.1.2	Government effectiveness*	46.3	87	
1.2	**Regulatory environment**	**70.1**	**48**	◆
1.2.1	Regulatory quality*	43.2	73	◆
1.2.2	Rule of law*	39.7	76	
1.2.3	Cost of redundancy dismissal	8.7	18	● ◆
1.3	**Business environment**	**58.4**	**110**	
1.3.1	Ease of starting a business*	86.7	78	
1.3.2	Ease of resolving insolvency*	30.1	120	○
Human capital and research		**27.7**	**81**	
2.1	**Education**	**45.4**	**79**	
2.1.1	Expenditure on education, % GDP	4.1	66	
2.1.2	Government funding/pupil, secondary, % GDP/cap	15.4	73	
2.1.3	School life expectancy, years	14.6	61	◆
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	13.3	57	
2.2	**Tertiary education**	**37.0**	**50**	◆
2.2.1	Tertiary enrolment, % gross	65.6	40	◆
2.2.2	Graduates in science and engineering, %	25.3	37	
2.2.3	Tertiary inbound mobility, %	1.1	87	
2.3	**Research and development (R&D)**	**0.6**	**109**	
2.3.1	Researchers, FTE/mn pop.	n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP	0.1	104	○
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**33.7**	**91**	
3.1	**Information and communication technologies (ICTs)**	**55.8**	**89**	
3.1.1	ICT access*	54.2	86	
3.1.2	ICT use*	55.2	72	◆
3.1.3	Government's online service*	52.9	98	
3.1.4	E-participation*	60.7	85	
3.2	**General infrastructure**	**28.6**	**67**	
3.2.1	Electricity output, GWh/mn pop.	2,061.5	79	
3.2.2	Logistics performance*	15.2	116	○
3.2.3	Gross capital formation, % GDP	33.8	14	●
3.3	**Ecological sustainability**	**16.6**	**118**	
3.3.1	GDP/unit of energy use	7.2	100	
3.3.2	Environmental performance*	32.2	114	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.3	95	
Market sophistication		**63.4**	**13**	● ◆
4.1	**Credit**	**59.6**	**15**	● ◆
4.1.1	Ease of getting credit*	80.0	23	
4.1.2	Domestic credit to private sector, % GDP	49.6	72	
4.1.3	Microfinance gross loans, % GDP	12.9	1	● ◆
4.2	**Investment**	**74.0**	**[8]**	
4.2.1	Ease of protecting minority investors*	74.0	24	◆
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**56.5**	**105**	
4.3.1	Applied tariff rate, weighted avg., %	5.3	88	
4.3.2	Domestic industry diversification	70.1	98	
4.3.3	Domestic market scale, bn PPP$	41.1	108	

		Score/ Value	Rank	
Business sophistication		**24.2**	**71**	
5.1	**Knowledge workers**	**37.3**	**50**	◆
5.1.1	Knowledge-intensive employment, %	26.2	57	◆
5.1.2	Firms offering formal training, %	66.2	4	● ◆
5.1.3	GERD performed by business, % GDP	0.0	87	○
5.1.4	GERD financed by business, %	8.1	79	
5.1.5	Females employed w/advanced degrees, %	23.4	18	● ◆
5.2	**Innovation linkages**	**12.4**	**123**	○
5.2.1	University-industry R&D collaboration†	33.3	98	
5.2.2	State of cluster development and depth†	36.1	111	
5.2.3	GERD financed by abroad, % GDP	0.0	85	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	114	○
5.2.5	Patent families/bn PPP$ GDP	0.0	75	
5.3	**Knowledge absorption**	**22.8**	**76**	
5.3.1	Intellectual property payments, % total trade	0.2	88	
5.3.2	High-tech imports, % total trade	5.2	108	
5.3.3	ICT services imports, % total trade	1.2	62	
5.3.4	FDI net inflows, % GDP	15.1	6	● ◆
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**15.0**	**85**	
6.1	**Knowledge creation**	**30.5**	**33**	◆
6.1.1	Patents by origin/bn PPP$ GDP	2.0	37	◆
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	98	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	5.4	1	● ◆
6.1.4	Scientific and technical articles/bn PPP$ GDP	11.5	74	
6.1.5	Citable documents H-index	4.8	108	
6.2	**Knowledge impact**	**8.7**	**124**	○ ◇
6.2.1	Labor productivity growth, %	n/a	n/a	
6.2.2	New businesses/th pop. 15–64	5.5	29	◆
6.2.3	Software spending, % GDP	0.1	80	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.5	97	
6.2.5	High-tech manufacturing, %	5.0	99	○
6.3	**Knowledge diffusion**	**5.9**	**114**	
6.3.1	Intellectual property receipts, % total trade	0.0	85	
6.3.2	Production and export complexity	23.6	104	
6.3.3	High-tech exports, % total trade	0.5	92	
6.3.4	ICT services exports, % total trade	0.5	101	
Creative outputs		**37.5**	**28**	◆
7.1	**Intangible assets**	**55.1**	**11**	● ◆
7.1.1	Trademarks by origin/bn PPP$ GDP	261.5	1	● ◆
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	20.7	1	● ◆
7.1.4	ICTs and organizational model creation†	42.8	102	
7.2	**Creative goods and services**	**27.3**	**[31]**	
7.2.1	Cultural and creative services exports, % total trade	n/a	n/a	
7.2.2	National feature films/mn pop. 15–69	26.1	3	● ◆
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.1	42	
7.2.5	Creative goods exports, % total trade	0.0	115	
7.3	**Online creativity**	**12.6**	**82**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.6	102	
7.3.2	Country-code TLDs/th pop. 15–69	2.3	67	◆
7.3.3	Wikipedia edits/mn pop. 15–69	47.6	70	◆
7.3.4	Mobile app creation/bn PPP$ GDP	0.1	90	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Montenegro

GII 2021 rank
50

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
53	**53**	**Upper middle**	**EUR**	**0.6**	**12.4**	**19,931**	**49**

		Score/ Value	Rank	
Institutions		**69.6**	**48**	
1.1	**Political environment**	**59.9**	**59**	
1.1.1	Political and operational stability*	71.4	54	
1.1.2	Government effectiveness*	54.1	61	
1.2	**Regulatory environment**	**72.4**	**42**	
1.2.1	Regulatory quality*	53.0	55	
1.2.2	Rule of law*	49.2	58	
1.2.3	Cost of redundancy dismissal	11.2	35	
1.3	**Business environment**	**76.4**	**44**	
1.3.1	Ease of starting a business*	86.7	79	
1.3.2	Ease of resolving insolvency*	66.1	40	
Human capital and research		**32.7**	**59**	
2.1	**Education**	**58.8**	**[34]**	
2.1.1	Expenditure on education, % GDP	n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	14.9	53	
2.1.4	PISA scales in reading, maths and science	421.9	55	
2.1.5	Pupil-teacher ratio, secondary	14.4	69	
2.2	**Tertiary education**	**34.5**	**63**	
2.2.1	Tertiary enrolment, % gross	54.2	56	
2.2.2	Graduates in science and engineering, %	20.5	70	
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research and development (R&D)**	**4.7**	**77**	
2.3.1	Researchers, FTE/mn pop.	763.0	56	
2.3.2	Gross expenditure on R&D, % GDP	0.5	67	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41 ○ ◇	
2.3.4	QS university ranking, top 3*	0.0	74 ○ ◇	
Infrastructure		**43.2**	**60**	
3.1	**Information and communication technologies (ICTs)**	**63.6**	**75**	
3.1.1	ICT access*	78.2	40 ◆	
3.1.2	ICT use*	67.1	54 ◆	
3.1.3	Government's online service*	54.1	96	
3.1.4	E-participation*	54.8	94	
3.2	**General infrastructure**	**27.6**	**68**	
3.2.1	Electricity output, GWh/mn pop.	6,127.0	34 ◆	
3.2.2	Logistics performance*	32.5	76	
3.2.3	Gross capital formation, % GDP	23.0	57	
3.3	**Ecological sustainability**	**38.6**	**39**	
3.3.1	GDP/unit of energy use	10.9	61	
3.3.2	Environmental performance*	46.3	68	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	6.7	13 ● ◆	
Market sophistication		**50.9**	**41**	
4.1	**Credit**	**45.0**	**49**	
4.1.1	Ease of getting credit*	85.0	14 ●	
4.1.2	Domestic credit to private sector, % GDP	49.0	73	
4.1.3	Microfinance gross loans, % GDP	1.0	24	
4.2	**Investment**	**44.9**	**[23]**	
4.2.1	Ease of protecting minority investors*	62.0	60	
4.2.2	Market capitalization, % GDP	82.6	18	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**62.8**	**84**	
4.3.1	Applied tariff rate, weighted avg., %	1.0	11 ●	
4.3.2	Domestic industry diversification	87.5	62	
4.3.3	Domestic market scale, bn PPP$	12.4	131 ○ ◇	

		Score/ Value	Rank	
Business sophistication		**25.3**	**67**	
5.1	**Knowledge workers**	**33.1**	**61**	
5.1.1	Knowledge-intensive employment, %	36.4	35 ◆	
5.1.2	Firms offering formal training, %	15.8	90 ○ ◇	
5.1.3	GERD performed by business, % GDP	0.2	54	
5.1.4	GERD financed by business, %	37.8	50	
5.1.5	Females employed w/advanced degrees, %	17.4	39	
5.2	**Innovation linkages**	**18.2**	**82**	
5.2.1	University-industry R&D collaboration†	45.5	52	
5.2.2	State of cluster development and depth†	43.0	85	
5.2.3	GERD financed by abroad, % GDP	0.0	57	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	48	
5.2.5	Patent families/bn PPP$ GDP	0.0	100 ○ ◇	
5.3	**Knowledge absorption**	**24.6**	**70**	
5.3.1	Intellectual property payments, % total trade	0.2	92	
5.3.2	High-tech imports, % total trade	6.4	92	
5.3.3	ICT services imports, % total trade	2.3	25 ● ◆	
5.3.4	FDI net inflows, % GDP	9.6	8 ● ◆	
5.3.5	Research talent, % in businesses	15.9	58	
Knowledge and technology outputs		**17.1**	**78**	
6.1	**Knowledge creation**	**16.8**	**62**	
6.1.1	Patents by origin/bn PPP$ GDP	1.2	60	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	98 ○ ◇	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	31.2	28 ◆	
6.1.5	Citable documents H-index	2.3	127 ○ ◇	
6.2	**Knowledge impact**	**26.9**	**77**	
6.2.1	Labor productivity growth, %	n/a	n/a	
6.2.2	New businesses/th pop. 15–64	11.3	10 ● ◆	
6.2.3	Software spending, % GDP	0.4	28 ◆	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	11.7	25 ●	
6.2.5	High-tech manufacturing, %	10.3	87 ○	
6.3	**Knowledge diffusion**	**7.5**	**104**	
6.3.1	Intellectual property receipts, % total trade	0.0	86	
6.3.2	Production and export complexity	n/a	n/a	
6.3.3	High-tech exports, % total trade	0.1	113 ○	
6.3.4	ICT services exports, % total trade	2.1	51	
Creative outputs		**35.9**	**33**	◆
7.1	**Intangible assets**	**30.5**	**66**	
7.1.1	Trademarks by origin/bn PPP$ GDP	29.8	75	
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.1	113 ○	
7.1.4	ICTs and organizational model creation†	52.6	70	
7.2	**Creative goods and services**	**24.3**	**39**	
7.2.1	Cultural and creative services exports, % total trade	0.5	49	
7.2.2	National feature films/mn pop. 15–69	13.3	11 ● ◆	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	3.0	4 ● ◆	
7.2.5	Creative goods exports, % total trade	0.1	95	
7.3	**Online creativity**	**58.4**	**12** ● ◆	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	1.4	90	
7.3.2	Country-code TLDs/th pop. 15–69	100.0	1 ● ◆	
7.3.3	Wikipedia edits/mn pop. 15–69	70.9	33 ◆	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Morocco

GII 2021 rank
77

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
67	**84**	**Lower middle**	**NAWA**	**36.9**	**273.6**	**7,609**	**75**

		Score/ Value	Rank	
Institutions		**61.6**	**74**	◆
1.1	**Political environment**	**54.0**	**80**	
1.1.1	Political and operational stability*	66.1	74	
1.1.2	Government effectiveness*	48.0	82	
1.2	**Regulatory environment**	**57.7**	**86**	
1.2.1	Regulatory quality*	38.0	86	
1.2.2	Rule of law*	43.1	71	◆
1.2.3	Cost of redundancy dismissal	20.7	88	
1.3	**Business environment**	**73.0**	**59**	◆
1.3.1	Ease of starting a business*	93.0	41	●
1.3.2	Ease of resolving insolvency*	52.9	67	
Human capital and research		**27.5**	**82**	
2.1	**Education**	**53.2**	**56**	
2.1.1	Expenditure on education, % GDP	n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap ◴	36.4	4	● ◆
2.1.3	School life expectancy, years	14.0	72	◆
2.1.4	PISA scales in reading, maths and science	367.9	75	○
2.1.5	Pupil-teacher ratio, secondary	18.8	92	
2.2	**Tertiary education**	**22.6**	**91**	
2.2.1	Tertiary enrolment, % gross	38.5	77	
2.2.2	Graduates in science and engineering, %	19.0	79	
2.2.3	Tertiary inbound mobility, %	2.0	77	
2.3	**Research and development (R&D)**	**6.7**	**71**	
2.3.1	Researchers, FTE/mn pop. ◴	1,073.5	50	◆
2.3.2	Gross expenditure on R&D, % GDP ◴	0.7	50	◆
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**36.3**	**84**	
3.1	**Information and communication technologies (ICTs)**	**54.8**	**90**	
3.1.1	ICT access*	66.6	67	◆
3.1.2	ICT use*	49.1	81	
3.1.3	Government's online service*	52.3	99	
3.1.4	E-participation*	51.2	99	
3.2	**General infrastructure**	**25.0**	**83**	
3.2.1	Electricity output, GWh/mn pop.	1,131.3	95	
3.2.2	Logistics performance*	22.9	103	○
3.2.3	Gross capital formation, % GDP	28.1	27	●
3.3	**Ecological sustainability**	**29.1**	**62**	◆
3.3.1	GDP/unit of energy use	14.5	26	● ◆
3.3.2	Environmental performance*	42.3	85	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.8	71	
Market sophistication		**41.9**	**91**	
4.1	**Credit**	**33.1**	**97**	
4.1.1	Ease of getting credit*	45.0	101	○
4.1.2	Domestic credit to private sector, % GDP	87.8	32	● ◆
4.1.3	Microfinance gross loans, % GDP	0.2	46	
4.2	**Investment**	**23.3**	**98**	
4.2.1	Ease of protecting minority investors*	70.0	36	●
4.2.2	Market capitalization, % GDP	55.8	30	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	81	○
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	70	
4.3	**Trade, diversification, and market scale**	**69.2**	**64**	
4.3.1	Applied tariff rate, weighted avg., %	3.6	72	
4.3.2	Domestic industry diversification ◴	77.5	84	
4.3.3	Domestic market scale, bn PPP$	273.5	56	

		Score/ Value	Rank	
Business sophistication		**18.1**	**105**	
5.1	**Knowledge workers**	**22.1**	**97**	
5.1.1	Knowledge-intensive employment, % ◴	6.9	115	○ ◇
5.1.2	Firms offering formal training, %	35.7	40	
5.1.3	GERD performed by business, % GDP ◴	0.2	52	
5.1.4	GERD financed by business, % ◴	29.9	61	
5.1.5	Females employed w/advanced degrees, %	n/a	n/a	
5.2	**Innovation linkages**	**14.0**	**112**	○
5.2.1	University-industry R&D collaboration† ◴	29.2	114	○
5.2.2	State of cluster development and depth† ◴	42.9	88	
5.2.3	GERD financed by abroad, % GDP ◴	0.0	76	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	97	
5.2.5	Patent families/bn PPP$ GDP	0.0	87	
5.3	**Knowledge absorption**	**18.0**	**103**	
5.3.1	Intellectual property payments, % total trade	0.3	79	
5.3.2	High-tech imports, % total trade	8.5	54	
5.3.3	ICT services imports, % total trade	0.7	90	
5.3.4	FDI net inflows, % GDP	2.3	72	
5.3.5	Research talent, % in businesses ◴	7.0	66	
Knowledge and technology outputs		**20.1**	**67**	
6.1	**Knowledge creation**	**11.3**	**75**	
6.1.1	Patents by origin/bn PPP$ GDP	0.7	74	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.2	56	◆
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	14.4	60	
6.1.5	Citable documents H-index	11.4	67	
6.2	**Knowledge impact**	**31.6**	**60**	◆
6.2.1	Labor productivity growth, %	0.1	63	
6.2.2	New businesses/th pop. 15–64	1.9	57	
6.2.3	Software spending, % GDP	0.2	57	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	3.7	66	
6.2.5	High-tech manufacturing, %	38.5	29	● ◆
6.3	**Knowledge diffusion**	**17.4**	**63**	
6.3.1	Intellectual property receipts, % total trade	0.0	91	○
6.3.2	Production and export complexity	30.9	90	
6.3.3	High-tech exports, % total trade	2.1	56	
6.3.4	ICT services exports, % total trade	3.3	30	●
Creative outputs		**22.8**	**70**	
7.1	**Intangible assets**	**38.7**	**41**	● ◆
7.1.1	Trademarks by origin/bn PPP$ GDP	58.7	37	●
7.1.2	Global brand value, top 5,000, % GDP	17.8	50	
7.1.3	Industrial designs by origin/bn PPP$ GDP	12.5	10	● ◆
7.1.4	ICTs and organizational model creation†	51.3	77	
7.2	**Creative goods and services**	**5.1**	**104**	
7.2.1	Cultural and creative services exports, % total trade	0.4	57	
7.2.2	National feature films/mn pop. 15–69	1.5	75	
7.2.3	Entertainment and media market/th pop. 15–69	1.1	58	○
7.2.4	Printing and other media, % manufacturing ◴	0.7	77	
7.2.5	Creative goods exports, % total trade	0.1	101	
7.3	**Online creativity**	**8.8**	**104**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	1.5	88	
7.3.2	Country-code TLDs/th pop. 15–69	1.1	83	
7.3.3	Wikipedia edits/mn pop. 15–69	31.8	98	
7.3.4	Mobile app creation/bn PPP$ GDP	3.3	63	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Mozambique

GII 2021 rank
122

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
118	**122**	**Low**	**SSF**	**31.3**	**40.9**	**1,279**	**124**

		Score/ Value	Rank	
Institutions		**43.5**	**127**	
1.1	**Political environment**	**40.0**	**120**	
1.1.1	Political and operational stability*	55.4	112	
1.1.2	Government effectiveness*	32.4	120	
1.2	**Regulatory environment**	**31.9**	**126**	◇
1.2.1	Regulatory quality*	24.6	115	
1.2.2	Rule of law*	19.8	122	
1.2.3	Cost of redundancy dismissal	37.5	126	◇
1.3	**Business environment**	**58.5**	**108**	
1.3.1	Ease of starting a business*	69.3	127	◇
1.3.2	Ease of resolving insolvency*	47.8	78	
Human capital and research		**17.3**	**112**	
2.1	**Education**	**48.0**	**72**	● ◆
2.1.1	Expenditure on education, % GDP	5.5	19	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap ⏲	40.1	2	● ◆
2.1.3	School life expectancy, years ⏲	10.0	108	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary ⏲	36.5	121	○
2.2	**Tertiary education**	**2.2**	**128**	○ ◇
2.2.1	Tertiary enrolment, % gross	7.3	119	
2.2.2	Graduates in science and engineering, %	9.6	108	○ ◇
2.2.3	Tertiary inbound mobility, %	0.4	103	
2.3	**Research and development (R&D)**	**1.6**	**99**	
2.3.1	Researchers, FTE/mn pop. ⏲	43.0	96	
2.3.2	Gross expenditure on R&D, % GDP ⏲	0.3	78	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**38.9**	**76**	◆
3.1	**Information and communication technologies (ICTs)**	**35.4**	**119**	
3.1.1	ICT access*	24.7	128	
3.1.2	ICT use*	12.9	125	
3.1.3	Government's online service*	51.8	102	
3.1.4	E-participation*	52.4	97	
3.2	**General infrastructure**	**67.3**	**1**	● ◆
3.2.1	Electricity output, GWh/mn pop.	564.8	106	
3.2.2	Logistics performance*	n/a	n/a	
3.2.3	Gross capital formation, % GDP	66.0	1	● ◆
3.3	**Ecological sustainability**	**13.9**	**128**	
3.3.1	GDP/unit of energy use	3.9	121	○
3.3.2	Environmental performance*	33.9	106	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.5	84	◆
Market sophistication		**27.8**	**126**	◇
4.1	**Credit**	**13.4**	**126**	
4.1.1	Ease of getting credit*	25.0	126	
4.1.2	Domestic credit to private sector, % GDP	21.7	111	
4.1.3	Microfinance gross loans, % GDP	0.2	53	
4.2	**Investment**	**20.3**	**[113]**	
4.2.1	Ease of protecting minority investors*	32.0	120	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	50	●
4.3	**Trade, diversification, and market scale**	**49.6**	**116**	
4.3.1	Applied tariff rate, weighted avg., % ⏲	4.2	76	◆
4.3.2	Domestic industry diversification	n/a	n/a	
4.3.3	Domestic market scale, bn PPP$	40.9	109	

		Score/ Value	Rank	
Business sophistication		**13.8**	**127**	
5.1	**Knowledge workers**	**6.4**	**128**	
5.1.1	Knowledge-intensive employment, % ⏲	3.9	121	○ ◇
5.1.2	Firms offering formal training, % ⏲	20.7	76	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, % ⏲	0.5	97	
5.1.5	Females employed w/advanced degrees, % ⏲	0.7	117	
5.2	**Innovation linkages**	**18.0**	**83**	
5.2.1	University-industry R&D collaboration† ⏲	34.0	97	
5.2.2	State of cluster development and depth† ⏲	35.0	115	
5.2.3	GERD financed by abroad, % GDP ⏲	0.1	34	●
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	46	●
5.2.5	Patent families/bn PPP$ GDP	0.0	100	○ ◇
5.3	**Knowledge absorption**	**16.9**	**106**	
5.3.1	Intellectual property payments, % total trade	0.5	70	●
5.3.2	High-tech imports, % total trade ⏲	4.3	114	
5.3.3	ICT services imports, % total trade	0.9	85	
5.3.4	FDI net inflows, % GDP	16.6	5	● ◆
5.3.5	Research talent, % in businesses ⏲	0.3	86	○
Knowledge and technology outputs		**10.3**	**116**	
6.1	**Knowledge creation**	**6.0**	**101**	
6.1.1	Patents by origin/bn PPP$ GDP	0.6	77	◆
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	98	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	67	
6.1.4	Scientific and technical articles/bn PPP$ GDP	11.4	75	
6.1.5	Citable documents H-index	5.4	101	
6.2	**Knowledge impact**	**21.1**	**[98]**	
6.2.1	Labor productivity growth, %	0.0	64	●
6.2.2	New businesses/th pop. 15–64	n/a	n/a	
6.2.3	Software spending, % GDP	0.0	111	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.5	99	◆
6.2.5	High-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**3.8**	**124**	◇
6.3.1	Intellectual property receipts, % total trade ⏲	0.0	101	
6.3.2	Production and export complexity	15.0	114	
6.3.3	High-tech exports, % total trade ⏲	0.3	99	
6.3.4	ICT services exports, % total trade	0.3	108	
Creative outputs		**12.0**	**115**	
7.1	**Intangible assets**	**20.3**	**99**	
7.1.1	Trademarks by origin/bn PPP$ GDP	40.8	58	●
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.0	71	
7.1.4	ICTs and organizational model creation†	35.8	120	
7.2	**Creative goods and services**	**2.3**	**[116]**	
7.2.1	Cultural and creative services exports, % total trade	n/a	n/a	
7.2.2	National feature films/mn pop. 15–69	2.0	66	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade ⏲	0.0	125	
7.3	**Online creativity**	**5.2**	**123**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.0	129	○
7.3.2	Country-code TLDs/th pop. 15–69	0.2	109	
7.3.3	Wikipedia edits/mn pop. 15–69	19.7	122	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Myanmar

GII 2021 rank **127**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
120	128	Lower middle	SEAO	54.4	275.5	5,179	129

		Score/ Value	Rank
Institutions		**45.4**	**123**
1.1	**Political environment**	**35.8**	**127** ◇
1.1.1	Political and operational stability*	57.1	106
1.1.2	Government effectiveness*	25.1	130 ○ ◇
1.2	**Regulatory environment**	**45.6**	**113**
1.2.1	Regulatory quality*	23.6	117
1.2.2	Rule of law*	18.7	126 ◇
1.2.3	Cost of redundancy dismissal	23.1	98
1.3	**Business environment**	**54.9**	**119**
1.3.1	Ease of starting a business*	89.3	58 ●
1.3.2	Ease of resolving insolvency*	20.4	128 ◇
Human capital and research		**17.7**	**108**
2.1	**Education**	**20.1**	**127** ◇
2.1.1	Expenditure on education, % GDP	1.9	113 ○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	10.0	92
2.1.3	School life expectancy, years	10.7	102
2.1.4	PISA scales in reading, maths and science	n/a	n/a
2.1.5	Pupil-teacher ratio, secondary ◴	27.2	112 ◇
2.2	**Tertiary education**	**32.7**	**66**
2.2.1	Tertiary enrolment, % gross	18.8	99
2.2.2	Graduates in science and engineering, %	33.7	9 ● ◆
2.2.3	Tertiary inbound mobility, %	0.0	110 ○
2.3	**Research and development (R&D)**	**0.1**	**118**
2.3.1	Researchers, FTE/mn pop. ◴	29.1	102
2.3.2	Gross expenditure on R&D, % GDP ◴	0.0	114 ◇
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41 ○ ◇
2.3.4	QS university ranking, top 3*	0.0	74 ○ ◇
Infrastructure		**26.3**	**113**
3.1	**Information and communication technologies (ICTs)**	**32.3**	**122** ◇
3.1.1	ICT access*	38.0	112
3.1.2	ICT use*	38.9	99
3.1.3	Government's online service*	25.9	128 ○ ◇
3.1.4	E-participation*	26.2	129 ○ ◇
3.2	**General infrastructure**	**25.1**	**79**
3.2.1	Electricity output, GWh/mn pop.	457.2	110
3.2.2	Logistics performance*	11.7	119 ◇
3.2.3	Gross capital formation, % GDP	32.4	20 ●
3.3	**Ecological sustainability**	**21.6**	**91**
3.3.1	GDP/unit of energy use	14.3	29 ● ◆
3.3.2	Environmental performance*	25.1	130 ○ ◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.1	127
Market sophistication		**29.8**	**124** ◇
4.1	**Credit**	**8.6**	**130** ○ ◇
4.1.1	Ease of getting credit*	10.0	129 ○ ◇
4.1.2	Domestic credit to private sector, % GDP	25.7	104
4.1.3	Microfinance gross loans, % GDP	0.3	42 ●
4.2	**Investment**	**10.1**	**130** ○ ◇
4.2.1	Ease of protecting minority investors*	22.0	129 ◇
4.2.2	Market capitalization, % GDP	n/a	n/a
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	72
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	57
4.3	**Trade, diversification, and market scale**	**70.8**	**60** ●
4.3.1	Applied tariff rate, weighted avg., %	1.8	24 ● ◆
4.3.2	Domestic industry diversification	76.4	86
4.3.3	Domestic market scale, bn PPP$	275.5	55 ●

		Score/ Value	Rank
Business sophistication		**8.7**	**132** ○ ◇
5.1	**Knowledge workers**	**3.3**	**132** ○ ◇
5.1.1	Knowledge-intensive employment, %	4.9	118 ◇
5.1.2	Firms offering formal training, % ◴	5.9	98 ○ ◇
5.1.3	GERD performed by business, % GDP	n/a	n/a
5.1.4	GERD financed by business, % ◴	0.0	102 ○ ◇
5.1.5	Females employed w/advanced degrees, %	6.0	91
5.2	**Innovation linkages**	**1.6**	**[131]**
5.2.1	University-industry R&D collaboration†	n/a	n/a
5.2.2	State of cluster development and depth†	n/a	n/a
5.2.3	GERD financed by abroad, % GDP ◴	0.0	82
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	90
5.2.5	Patent families/bn PPP$ GDP	0.0	100 ○ ◇
5.3	**Knowledge absorption**	**21.1**	**86**
5.3.1	Intellectual property payments, % total trade	0.2	90
5.3.2	High-tech imports, % total trade	7.3	72
5.3.3	ICT services imports, % total trade	1.1	68
5.3.4	FDI net inflows, % GDP	4.0	29 ●
5.3.5	Research talent, % in businesses	n/a	n/a
Knowledge and technology outputs		**14.4**	**89**
6.1	**Knowledge creation**	**2.7**	**[123]**
6.1.1	Patents by origin/bn PPP$ GDP	n/a	n/a
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a
6.1.4	Scientific and technical articles/bn PPP$ GDP	1.9	126
6.1.5	Citable documents H-index	3.2	122
6.2	**Knowledge impact**	**33.5**	**48** ● ◆
6.2.1	Labor productivity growth, %	7.3	1 ● ◆
6.2.2	New businesses/th pop. 15–64	0.4	104
6.2.3	Software spending, % GDP	n/a	n/a
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.8	115
6.2.5	High-tech manufacturing, % ◴	12.4	84
6.3	**Knowledge diffusion**	**7.1**	**110**
6.3.1	Intellectual property receipts, % total trade	0.0	88
6.3.2	Production and export complexity	21.4	108
6.3.3	High-tech exports, % total trade	1.3	68
6.3.4	ICT services exports, % total trade	0.6	99
Creative outputs		**7.9**	**131** ○ ◇
7.1	**Intangible assets**	**10.6**	**[128]**
7.1.1	Trademarks by origin/bn PPP$ GDP ◴	24.2	83
7.1.2	Global brand value, top 5,000, % GDP	7.6	65
7.1.3	Industrial designs by origin/bn PPP$ GDP	n/a	n/a
7.1.4	ICTs and organizational model creation†	n/a	n/a
7.2	**Creative goods and services**	**7.2**	**92**
7.2.1	Cultural and creative services exports, % total trade	0.2	67
7.2.2	National feature films/mn pop. 15–69 ◴	0.9	87
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a
7.2.4	Printing and other media, % manufacturing ◴	0.4	94
7.2.5	Creative goods exports, % total trade	0.9	47 ●
7.3	**Online creativity**	**3.0**	**129** ◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.1	127
7.3.2	Country-code TLDs/th pop. 15–69	0.0	127
7.3.3	Wikipedia edits/mn pop. 15–69	16.5	127 ◇
7.3.4	Mobile app creation/bn PPP$ GDP	0.0	91

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Namibia

GII 2021 rank
100

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
110	**88**	**Upper middle**	**SSF**	**2.5**	**24.1**	**9,537**	**104**

		Score/ Value	Rank
Institutions		**61.9**	**73**
1.1	**Political environment**	**59.0**	**61**
1.1.1	Political and operational stability*	71.4	54
1.1.2	Government effectiveness*	52.8	66
1.2	**Regulatory environment**	**72.2**	**43** ●
1.2.1	Regulatory quality*	40.7	77
1.2.2	Rule of law*	54.9	50 ● ◆
1.2.3	Cost of redundancy dismissal	9.7	28 ●
1.3	**Business environment**	**54.6**	**120** ○ ◇
1.3.1	Ease of starting a business*	72.2	120 ○ ◇
1.3.2	Ease of resolving insolvency*	36.9	109 ◇
Human capital and research		**32.9**	**57**
2.1	**Education**	**82.5**	**[1]**
2.1.1	Expenditure on education, % GDP ⏲	8.3	1 ● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a
2.1.3	School life expectancy, years	n/a	n/a
2.1.4	PISA scales in reading, maths and science	n/a	n/a
2.1.5	Pupil-teacher ratio, secondary ⏲	25.9	106 ◇
2.2	**Tertiary education**	**14.0**	**104** ◇
2.2.1	Tertiary enrolment, % gross	24.1	92 ◇
2.2.2	Graduates in science and engineering, %	12.9	101 ○ ◇
2.2.3	Tertiary inbound mobility, % ⏲	6.1	39 ●
2.3	**Research and development (R&D)**	**2.1**	**92**
2.3.1	Researchers, FTE/mn pop. ⏲	149.5	83 ◇
2.3.2	Gross expenditure on R&D, % GDP ⏲	0.4	75
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41 ○ ◇
2.3.4	QS university ranking, top 3*	0.0	74 ○ ◇
Infrastructure		**27.2**	**112** ◇
3.1	**Information and communication technologies (ICTs)**	**46.0**	**98** ◇
3.1.1	ICT access*	46.0	96 ◇
3.1.2	ICT use*	35.8	101 ◇
3.1.3	Government's online service*	52.3	99 ◇
3.1.4	E-participation*	50.0	103 ◇
3.2	**General infrastructure**	**9.7**	**129** ○ ◇
3.2.1	Electricity output, GWh/mn pop.	488.6	108 ◇
3.2.2	Logistics performance*	n/a	n/a
3.2.3	Gross capital formation, % GDP	14.6	117 ○ ◇
3.3	**Ecological sustainability**	**26.0**	**78**
3.3.1	GDP/unit of energy use	12.5	42 ●
3.3.2	Environmental performance*	40.2	88 ◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.7	76
Market sophistication		**41.8**	**92**
4.1	**Credit**	**35.6**	**85**
4.1.1	Ease of getting credit*	60.0	74
4.1.2	Domestic credit to private sector, % GDP	72.0	45 ●
4.1.3	Microfinance gross loans, % GDP ⏲	0.0	65
4.2	**Investment**	**31.5**	**[66]**
4.2.1	Ease of protecting minority investors*	56.0	82
4.2.2	Market capitalization, % GDP	20.8	58
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a
4.3	**Trade, diversification, and market scale**	**58.4**	**99**
4.3.1	Applied tariff rate, weighted avg., %	1.1	13 ●
4.3.2	Domestic industry diversification ⏲	68.7	99 ◇
4.3.3	Domestic market scale, bn PPP$	24.1	126 ○ ◇

		Score/ Value	Rank
Business sophistication		**17.0**	**112** ◇
5.1	**Knowledge workers**	**17.3**	**107** ◇
5.1.1	Knowledge-intensive employment, % ⏲	18.1	87
5.1.2	Firms offering formal training, % ⏲	25.4	62
5.1.3	GERD performed by business, % GDP ⏲	0.0	77
5.1.4	GERD financed by business, % ⏲	11.1	75
5.1.5	Females employed w/advanced degrees, % ⏲	7.4	85
5.2	**Innovation linkages**	**19.1**	**74**
5.2.1	University-industry R&D collaboration†	42.8	64
5.2.2	State of cluster development and depth†	44.6	79
5.2.3	GERD financed by abroad, % GDP ⏲	0.1	49
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	50
5.2.5	Patent families/bn PPP$ GDP	0.1	55
5.3	**Knowledge absorption**	**14.6**	**120** ○ ◇
5.3.1	Intellectual property payments, % total trade	0.0	115 ○ ◇
5.3.2	High-tech imports, % total trade	7.4	71
5.3.3	ICT services imports, % total trade	0.6	98
5.3.4	FDI net inflows, % GDP	0.8	109 ◇
5.3.5	Research talent, % in businesses ⏲	6.9	67
Knowledge and technology outputs		**9.4**	**119** ◇
6.1	**Knowledge creation**	**7.9**	**89**
6.1.1	Patents by origin/bn PPP$ GDP	0.4	84
6.1.2	PCT patents by origin/bn PPP$ GDP	0.2	49
6.1.3	Utility models by origin/bn PPP$ GDP	0.3	43
6.1.4	Scientific and technical articles/bn PPP$ GDP	12.0	71
6.1.5	Citable documents H-index	4.9	107
6.2	**Knowledge impact**	**13.0**	**120** ○ ◇
6.2.1	Labor productivity growth, %	–3.1	113 ○ ◇
6.2.2	New businesses/th pop. 15–64 ⏲	1.2	79
6.2.3	Software spending, % GDP	0.1	88
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.7	92
6.2.5	High-tech manufacturing, % ⏲	4.7	100 ○ ◇
6.3	**Knowledge diffusion**	**7.4**	**105**
6.3.1	Intellectual property receipts, % total trade	0.0	94
6.3.2	Production and export complexity	33.9	80
6.3.3	High-tech exports, % total trade	0.9	73
6.3.4	ICT services exports, % total trade	0.2	124 ○
Creative outputs		**15.2**	**105** ◇
7.1	**Intangible assets**	**19.6**	**101**
7.1.1	Trademarks by origin/bn PPP$ GDP	18.9	94
7.1.2	Global brand value, top 5,000, % GDP	0.0	80 ○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	3.1	36 ●
7.1.4	ICTs and organizational model creation†	46.7	95
7.2	**Creative goods and services**	**2.3**	**[115]**
7.2.1	Cultural and creative services exports, % total trade ⏲	0.1	90
7.2.2	National feature films/mn pop. 15–69	n/a	n/a
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a
7.2.4	Printing and other media, % manufacturing	n/a	n/a
7.2.5	Creative goods exports, % total trade	0.2	77
7.3	**Online creativity**	**19.4**	**58**
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	8.9	42 ● ◆
7.3.2	Country-code TLDs/th pop. 15–69	0.9	90
7.3.3	Wikipedia edits/mn pop. 15–69	52.6	62
7.3.4	Mobile app creation/bn PPP$ GDP	15.0	34 ●

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Nepal

GII 2021 rank
111

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
116	**99**	**Lower middle**	**CSA**	**29.1**	**103.4**	**3,586**	**95**

		Score/ Value	Rank	
Institutions		**49.3**	**115**	
1.1	**Political environment**	**37.9**	**123**	◇
1.1.1	Political and operational stability*	58.9	100	
1.1.2	Government effectiveness*	27.4	124	○ ◇
1.2	**Regulatory environment**	**45.4**	**114**	
1.2.1	Regulatory quality*	25.2	113	
1.2.2	Rule of law*	32.6	97	
1.2.3	Cost of redundancy dismissal	27.2	108	
1.3	**Business environment**	**64.4**	**86**	
1.3.1	Ease of starting a business*	81.7	104	
1.3.2	Ease of resolving insolvency*	47.2	79	
Human capital and research		**15.2**	**115**	
2.1	**Education**	**37.9**	**96**	
2.1.1	Expenditure on education, % GDP	5.1	36	●
2.1.2	Government funding/pupil, secondary, % GDP/cap	10.5	91	
2.1.3	School life expectancy, years	13.2	79	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	28.3	114	◇
2.2	**Tertiary education**	**5.9**	**123**	○ ◇
2.2.1	Tertiary enrolment, % gross	13.3	106	
2.2.2	Graduates in science and engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	0.0	111	○ ◇
2.3	**Research and development (R&D)**	**2.0**	**96**	
2.3.1	Researchers, FTE/mn pop.	n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP	0.3	79	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**30.7**	**98**	
3.1	**Information and communication technologies (ICTs)**	**35.8**	**118**	
3.1.1	ICT access*	41.9	104	
3.1.2	ICT use*	24.5	109	
3.1.3	Government's online service*	40.0	117	
3.1.4	E-participation*	36.9	116	
3.2	**General infrastructure**	**41.3**	**28**	● ◆
3.2.1	Electricity output, GWh/mn pop.	174.9	118	○
3.2.2	Logistics performance*	21.7	107	
3.2.3	Gross capital formation, % GDP	49.1	2	● ◆
3.3	**Ecological sustainability**	**15.0**	**126**	○ ◇
3.3.1	GDP/unit of energy use	5.9	109	
3.3.2	Environmental performance*	32.7	113	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	110	
Market sophistication		**45.8**	**68**	
4.1	**Credit**	**50.5**	**30**	● ◆
4.1.1	Ease of getting credit*	75.0	34	●
4.1.2	Domestic credit to private sector, % GDP	88.1	31	● ◆
4.1.3	Microfinance gross loans, % GDP	1.7	16	●
4.2	**Investment**	**30.5**	**[68]**	
4.2.1	Ease of protecting minority investors*	58.0	77	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	75	
4.3	**Trade, diversification, and market scale**	**56.5**	**106**	
4.3.1	Applied tariff rate, weighted avg., %	14.2	129	○ ◇
4.3.2	Domestic industry diversification	85.3	65	
4.3.3	Domestic market scale, bn PPP$	103.4	82	

		Score/ Value	Rank	
Business sophistication		**25.9**	**[59]**	
5.1	**Knowledge workers**	**23.2**	**[90]**	
5.1.1	Knowledge-intensive employment, %	13.8	97	
5.1.2	Firms offering formal training, %	31.9	48	●
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, %	3.0	101	
5.2	**Innovation linkages**	**24.1**	**[49]**	
5.2.1	University-industry R&D collaboration†	33.1	100	
5.2.2	State of cluster development and depth†	38.1	109	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	73	
5.2.5	Patent families/bn PPP$ GDP	n/a	n/a	
5.3	**Knowledge absorption**	**30.3**	**[56]**	
5.3.1	Intellectual property payments, % total trade	n/a	n/a	
5.3.2	High-tech imports, % total trade	11.4	21	●
5.3.3	ICT services imports, % total trade	0.2	124	○ ◇
5.3.4	FDI net inflows, % GDP	0.5	117	
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**8.7**	**[121]**	
6.1	**Knowledge creation**	**10.3**	**[78]**	
6.1.1	Patents by origin/bn PPP$ GDP	0.2	92	
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	14.1	64	●
6.1.5	Citable documents H-index	7.9	86	
6.2	**Knowledge impact**	**3.8**	**129**	○ ◇
6.2.1	Labor productivity growth, %	n/a	n/a	
6.2.2	New businesses/th pop. 15–64	1.3	75	
6.2.3	Software spending, % GDP	0.0	117	○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.1	108	
6.2.5	High-tech manufacturing, %	6.7	98	
6.3	**Knowledge diffusion**	**11.8**	**[84]**	
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	Production and export complexity	n/a	n/a	
6.3.3	High-tech exports, % total trade	0.1	122	
6.3.4	ICT services exports, % total trade	2.7	40	●
Creative outputs		**14.5**	**108**	
7.1	**Intangible assets**	**21.8**	**93**	
7.1.1	Trademarks by origin/bn PPP$ GDP	46.8	49	●
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.2	102	
7.1.4	ICTs and organizational model creation†	37.9	118	○ ◇
7.2	**Creative goods and services**	**3.8**	**[109]**	
7.2.1	Cultural and creative services exports, % total trade	n/a	n/a	
7.2.2	National feature films/mn pop. 15–69	n/a	n/a	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	0.4	92	
7.2.5	Creative goods exports, % total trade	0.2	73	
7.3	**Online creativity**	**10.5**	**91**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.5	110	
7.3.2	Country-code TLDs/th pop. 15–69	1.0	86	
7.3.3	Wikipedia edits/mn pop. 15–69	29.6	106	
7.3.4	Mobile app creation/bn PPP$ GDP	13.7	39	●

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Netherlands

GII 2021 rank **6**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
3	12	High	EUR	17.1	986.8	57,101	5

		Score/ Value	Rank
Institutions		**88.9**	**6** ●
1.1	**Political environment**	**88.4**	**9**
1.1.1	Political and operational stability*	83.9	13
1.1.2	Government effectiveness*	90.6	7 ●
1.2	**Regulatory environment**	**88.9**	**14**
1.2.1	Regulatory quality*	92.1	5 ●
1.2.2	Rule of law*	94.4	9
1.2.3	Cost of redundancy dismissal	15.8	63 ○
1.3	**Business environment**	**89.4**	**5** ●
1.3.1	Ease of starting a business*	94.3	22
1.3.2	Ease of resolving insolvency*	84.4	7 ●
Human capital and research		**55.9**	**14**
2.1	**Education**	**62.4**	**20**
2.1.1	Expenditure on education, % GDP	5.2	32
2.1.2	Government funding/pupil, secondary, % GDP/cap	21.9	34
2.1.3	School life expectancy, years	18.6	10
2.1.4	PISA scales in reading, maths and science	502.5	15
2.1.5	Pupil-teacher ratio, secondary ◴	14.3	66 ○ ◇
2.2	**Tertiary education**	**40.1**	**39**
2.2.1	Tertiary enrolment, % gross	87.1	13
2.2.2	Graduates in science and engineering, %	17.5	87 ○ ◇
2.2.3	Tertiary inbound mobility, %	11.7	16
2.3	**Research and development (R&D)**	**65.0**	**11**
2.3.1	Researchers, FTE/mn pop.	5,796.1	9
2.3.2	Gross expenditure on R&D, % GDP	2.2	15
2.3.3	Global corporate R&D investors, top 3, mn US$	82.4	9
2.3.4	QS university ranking, top 3*	65.1	13
Infrastructure		**57.7**	**16**
3.1	**Information and communication technologies (ICTs)**	**90.8**	**4** ●
3.1.1	ICT access*	87.3	12
3.1.2	ICT use*	88.7	6 ● ◆
3.1.3	Government's online service*	90.6	12
3.1.4	E-participation*	96.4	9
3.2	**General infrastructure**	**41.1**	**29**
3.2.1	Electricity output, GWh/mn pop.	6,642.8	30
3.2.2	Logistics performance*	91.5	6 ●
3.2.3	Gross capital formation, % GDP	20.9	79 ○
3.3	**Ecological sustainability**	**41.3**	**34**
3.3.1	GDP/unit of energy use	13.2	37
3.3.2	Environmental performance*	75.3	11
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.1	39
Market sophistication		**55.2**	**31**
4.1	**Credit**	**43.0**	**57**
4.1.1	Ease of getting credit*	45.0	101 ○ ◇
4.1.2	Domestic credit to private sector, % GDP	100.0	25
4.1.3	Microfinance gross loans, % GDP	n/a	n/a
4.2	**Investment**	**39.5**	**37**
4.2.1	Ease of protecting minority investors*	58.0	77 ○ ◇
4.2.2	Market capitalization, % GDP ◴	110.0	10
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.2	16
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	29
4.3	**Trade, diversification, and market scale**	**83.0**	**20**
4.3.1	Applied tariff rate, weighted avg., %	1.8	25
4.3.2	Domestic industry diversification	94.3	33
4.3.3	Domestic market scale, bn PPP$	986.8	26

		Score/ Value	Rank
Business sophistication		**61.0**	**5** ●
5.1	**Knowledge workers**	**61.4**	**13**
5.1.1	Knowledge-intensive employment, %	48.9	9
5.1.2	Firms offering formal training, %	n/a	n/a
5.1.3	GERD performed by business, % GDP	1.5	15
5.1.4	GERD financed by business, %	56.7	16
5.1.5	Females employed w/advanced degrees, %	21.1	28
5.2	**Innovation linkages**	**54.8**	**10**
5.2.1	University-industry R&D collaboration†	72.4	5 ●
5.2.2	State of cluster development and depth†	69.0	7
5.2.3	GERD financed by abroad, % GDP	0.2	15
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.1	23
5.2.5	Patent families/bn PPP$ GDP	4.7	10
5.3	**Knowledge absorption**	**66.9**	**2** ● ◆
5.3.1	Intellectual property payments, % total trade	8.4	1 ● ◆
5.3.2	High-tech imports, % total trade	11.6	20
5.3.3	ICT services imports, % total trade	2.4	22
5.3.4	FDI net inflows, % GDP	–2.9	127 ○
5.3.5	Research talent, % in businesses	70.4	6 ◆
Knowledge and technology outputs		**54.8**	**7** ●
6.1	**Knowledge creation**	**67.7**	**6** ●
6.1.1	Patents by origin/bn PPP$ GDP	8.9	11
6.1.2	PCT patents by origin/bn PPP$ GDP	4.1	10
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a
6.1.4	Scientific and technical articles/bn PPP$ GDP	41.3	16
6.1.5	Citable documents H-index	68.8	7 ●
6.2	**Knowledge impact**	**43.1**	**18**
6.2.1	Labor productivity growth, %	–1.2	88 ○
6.2.2	New businesses/th pop. 15–64	6.4	25
6.2.3	Software spending, % GDP	0.5	15
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	7.9	34
6.2.5	High-tech manufacturing, %	50.3	11
6.3	**Knowledge diffusion**	**53.5**	**8**
6.3.1	Intellectual property receipts, % total trade	7.7	1 ● ◆
6.3.2	Production and export complexity	66.5	27
6.3.3	High-tech exports, % total trade	11.2	15
6.3.4	ICT services exports, % total trade	3.6	23
Creative outputs		**52.2**	**7** ●
7.1	**Intangible assets**	**51.4**	**16**
7.1.1	Trademarks by origin/bn PPP$ GDP	42.7	56 ○
7.1.2	Global brand value, top 5,000, % GDP	164.6	7
7.1.3	Industrial designs by origin/bn PPP$ GDP	4.8	25
7.1.4	ICTs and organizational model creation†	80.2	4 ● ◆
7.2	**Creative goods and services**	**36.0**	**18**
7.2.1	Cultural and creative services exports, % total trade	1.9	9
7.2.2	National feature films/mn pop. 15–69	7.6	25
7.2.3	Entertainment and media market/th pop. 15–69	48.9	18
7.2.4	Printing and other media, % manufacturing	0.9	57 ○
7.2.5	Creative goods exports, % total trade	3.2	18
7.3	**Online creativity**	**70.1**	**3** ● ◆
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	78.9	5 ● ◆
7.3.2	Country-code TLDs/th pop. 15–69	100.0	1 ● ◆
7.3.3	Wikipedia edits/mn pop. 15–69	81.1	9
7.3.4	Mobile app creation/bn PPP$ GDP	16.3	30

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

New Zealand

GII 2021 rank **26**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
32	19	High	SEAO	4.8	205.5	41,072	26

		Score/ Value	Rank
Institutions		**90.7**	**4** ● ◆
1.1	**Political environment**	**90.1**	**7** ● ◆
1.1.1	Political and operational stability*	94.6	2 ● ◆
1.1.2	Government effectiveness*	87.8	11
1.2	**Regulatory environment**	**97.3**	**2** ● ◆
1.2.1	Regulatory quality*	92.7	3 ● ◆
1.2.2	Rule of law*	96.4	6 ● ◆
1.2.3	Cost of redundancy dismissal	8.0	1 ● ◆
1.3	**Business environment**	**84.7**	**19**
1.3.1	Ease of starting a business*	100.0	1 ● ◆
1.3.2	Ease of resolving insolvency*	69.5	33
Human capital and research		**54.2**	**17**
2.1	**Education**	**66.9**	**11**
2.1.1	Expenditure on education, % GDP	6.3	12 ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	21.3	40
2.1.3	School life expectancy, years	18.9	8 ◆
2.1.4	PISA scales in reading, maths and science	502.9	13
2.1.5	Pupil-teacher ratio, secondary ◴	13.6	63 ○
2.2	**Tertiary education**	**47.9**	**17**
2.2.1	Tertiary enrolment, % gross	83.0	17
2.2.2	Graduates in science and engineering, %	21.4	65 ○
2.2.3	Tertiary inbound mobility, %	19.7	6 ●
2.3	**Research and development (R&D)**	**47.6**	**21**
2.3.1	Researchers, FTE/mn pop. ◴	5,529.5	10
2.3.2	Gross expenditure on R&D, % GDP ◴	1.3	27
2.3.3	Global corporate R&D investors, top 3, mn US$	48.0	32
2.3.4	QS university ranking, top 3*	49.8	18
Infrastructure		**55.5**	**22**
3.1	**Information and communication technologies (ICTs)**	**90.6**	**6** ● ◆
3.1.1	ICT access*	87.9	10
3.1.2	ICT use*	82.9	15
3.1.3	Government's online service*	92.9	10 ◆
3.1.4	E-participation*	98.8	4 ● ◆
3.2	**General infrastructure**	**41.5**	**26**
3.2.1	Electricity output, GWh/mn pop.	9,126.1	17
3.2.2	Logistics performance*	84.9	15
3.2.3	Gross capital formation, % GDP	20.7	85 ○
3.3	**Ecological sustainability**	**34.3**	**48**
3.3.1	GDP/unit of energy use	9.5	73 ○
3.3.2	Environmental performance*	71.3	19
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.3	60
Market sophistication		**63.0**	**14**
4.1	**Credit**	**83.5**	**4** ● ◆
4.1.1	Ease of getting credit*	100.0	1 ● ◆
4.1.2	Domestic credit to private sector, % GDP	160.0	6 ● ◆
4.1.3	Microfinance gross loans, % GDP	n/a	n/a
4.2	**Investment**	**34.1**	**52**
4.2.1	Ease of protecting minority investors*	86.0	3 ● ◆
4.2.2	Market capitalization, % GDP	46.6	36
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.1	35
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.1	27
4.3	**Trade, diversification, and market scale**	**71.2**	**57**
4.3.1	Applied tariff rate, weighted avg., %	0.9	9
4.3.2	Domestic industry diversification	78.0	83 ○
4.3.3	Domestic market scale, bn PPP$	205.5	63

		Score/ Value	Rank
Business sophistication		**37.7**	**30**
5.1	**Knowledge workers**	**42.2**	**[41]**
5.1.1	Knowledge-intensive employment, %	n/a	n/a
5.1.2	Firms offering formal training, %	n/a	n/a
5.1.3	GERD performed by business, % GDP ◴	0.8	28
5.1.4	GERD financed by business, % ◴	46.4	33
5.1.5	Females employed w/advanced degrees, % ◴	19.5	32
5.2	**Innovation linkages**	**33.6**	**28**
5.2.1	University-industry R&D collaboration†	59.0	24
5.2.2	State of cluster development and depth†	46.0	69 ○
5.2.3	GERD financed by abroad, % GDP ◴	0.1	37
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.1	19
5.2.5	Patent families/bn PPP$ GDP	1.5	25
5.3	**Knowledge absorption**	**37.4**	**32**
5.3.1	Intellectual property payments, % total trade	1.6	20
5.3.2	High-tech imports, % total trade	10.8	25
5.3.3	ICT services imports, % total trade	1.7	44
5.3.4	FDI net inflows, % GDP	1.2	103 ○
5.3.5	Research talent, % in businesses ◴	31.2	42
Knowledge and technology outputs		**29.7**	**39**
6.1	**Knowledge creation**	**39.4**	**23**
6.1.1	Patents by origin/bn PPP$ GDP	1.5	49
6.1.2	PCT patents by origin/bn PPP$ GDP	1.5	22
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a
6.1.4	Scientific and technical articles/bn PPP$ GDP	50.6	9 ◆
6.1.5	Citable documents H-index	34.8	28
6.2	**Knowledge impact**	**32.5**	**56**
6.2.1	Labor productivity growth, %	0.5	58
6.2.2	New businesses/th pop. 15–64	17.8	4 ● ◆
6.2.3	Software spending, % GDP	0.3	45
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	4.5	60
6.2.5	High-tech manufacturing, %	16.0	71 ○ ◇
6.3	**Knowledge diffusion**	**17.3**	**64**
6.3.1	Intellectual property receipts, % total trade	0.7	24
6.3.2	Production and export complexity	46.9	54
6.3.3	High-tech exports, % total trade	1.7	65
6.3.4	ICT services exports, % total trade	1.2	77 ○
Creative outputs		**39.8**	**23**
7.1	**Intangible assets**	**45.6**	**26**
7.1.1	Trademarks by origin/bn PPP$ GDP	83.8	19 ◆
7.1.2	Global brand value, top 5,000, % GDP	46.0	37
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.5	56
7.1.4	ICTs and organizational model creation†	71.3	18
7.2	**Creative goods and services**	**20.1**	**52**
7.2.1	Cultural and creative services exports, % total trade	0.4	59 ○
7.2.2	National feature films/mn pop. 15–69	6.1	37
7.2.3	Entertainment and media market/th pop. 15–69	52.5	13
7.2.4	Printing and other media, % manufacturing	1.5	27
7.2.5	Creative goods exports, % total trade	0.5	64
7.3	**Online creativity**	**47.9**	**23**
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	32.2	20
7.3.2	Country-code TLDs/th pop. 15–69	64.6	10 ◆
7.3.3	Wikipedia edits/mn pop. 15–69	80.8	10
7.3.4	Mobile app creation/bn PPP$ GDP	9.7	46

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Niger

GII 2021 rank
129

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
130	**125**	**Low**	**SSF**	**24.2**	**30.3**	**1,253**	**128**

		Score/ Value	Rank	
Institutions		**54.8**	**97**	
1.1	**Political environment**	**40.4**	**116**	
1.1.1	Political and operational stability*	55.4	112	
1.1.2	Government effectiveness*	32.8	118	
1.2	**Regulatory environment**	**58.7**	**83**	
1.2.1	Regulatory quality*	26.0	110	
1.2.2	Rule of law*	32.7	96	
1.2.3	Cost of redundancy dismissal	14.0	53	●
1.3	**Business environment**	**65.4**	**83**	
1.3.1	Ease of starting a business*	91.5	49	●
1.3.2	Ease of resolving insolvency*	39.3	100	
Human capital and research		**8.5**	**129**	
2.1	**Education**	**18.1**	**128**	
2.1.1	Expenditure on education, % GDP	3.5	84	
2.1.2	Government funding/pupil, secondary, % GDP/cap	11.7	87	
2.1.3	School life expectancy, years ◴	6.4	119	○ ◇
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary ◴	29.7	118	
2.2	**Tertiary education**	**7.4**	**118**	
2.2.1	Tertiary enrolment, % gross	4.2	125	
2.2.2	Graduates in science and engineering, %	12.3	102	
2.2.3	Tertiary inbound mobility, %	5.4	43	●
2.3	**Research and development (R&D)**	**0.1**	**122**	
2.3.1	Researchers, FTE/mn pop. ◴	26.5	104	
2.3.2	Gross expenditure on R&D, % GDP	n/a	n/a	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**19.6**	**130**	
3.1	**Information and communication technologies (ICTs)**	**21.3**	**132**	○ ◇
3.1.1	ICT access*	23.0	130	
3.1.2	ICT use*	3.1	132	○ ◇
3.1.3	Government's online service*	29.4	125	
3.1.4	E-participation*	29.8	127	
3.2	**General infrastructure**	**22.1**	**97**	
3.2.1	Electricity output, GWh/mn pop.	27.0	123	○
3.2.2	Logistics performance*	1.1	124	○ ◇
3.2.3	Gross capital formation, % GDP	32.4	19	●
3.3	**Ecological sustainability**	**15.4**	**123**	
3.3.1	GDP/unit of energy use	6.8	102	
3.3.2	Environmental performance*	30.8	118	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	120	
Market sophistication		**40.2**	**100**	
4.1	**Credit**	**29.3**	**109**	
4.1.1	Ease of getting credit*	70.0	44	
4.1.2	Domestic credit to private sector, % GDP	11.2	126	
4.1.3	Microfinance gross loans, % GDP ◴	0.1	59	
4.2	**Investment**	**33.3**	**[55]**	
4.2.1	Ease of protecting minority investors*	42.0	102	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.1	21	● ◆
4.3	**Trade, diversification, and market scale**	**58.0**	**100**	
4.3.1	Applied tariff rate, weighted avg., %	9.3	112	
4.3.2	Domestic industry diversification	88.2	57	
4.3.3	Domestic market scale, bn PPP$	30.3	121	

		Score/ Value	Rank	
Business sophistication		**16.2**	**[116]**	
5.1	**Knowledge workers**	**20.4**	**[100]**	
5.1.1	Knowledge-intensive employment, % ◴	15.3	93	◆
5.1.2	Firms offering formal training, % ◴	27.5	56	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, % ◴	0.7	118	
5.2	**Innovation linkages**	**1.2**	**[132]**	
5.2.1	University-industry R&D collaboration†	n/a	n/a	
5.2.2	State of cluster development and depth†	n/a	n/a	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	110	
5.2.5	Patent families/bn PPP$ GDP	0.0	100	○ ◇
5.3	**Knowledge absorption**	**27.0**	**65**	◆
5.3.1	Intellectual property payments, % total trade	0.0	120	
5.3.2	High-tech imports, % total trade ◴	9.5	39	●
5.3.3	ICT services imports, % total trade	2.4	23	● ◆
5.3.4	FDI net inflows, % GDP	3.7	33	●
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**10.8**	**114**	
6.1	**Knowledge creation**	**2.4**	**125**	
6.1.1	Patents by origin/bn PPP$ GDP	0.1	112	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	98	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP ◴	0.0	76	○ ◇
6.1.4	Scientific and technical articles/bn PPP$ GDP	4.6	115	
6.1.5	Citable documents H-index	3.5	118	
6.2	**Knowledge impact**	**18.6**	**111**	
6.2.1	Labor productivity growth, %	0.9	50	●
6.2.2	New businesses/th pop. 15–64	0.1	118	
6.2.3	Software spending, % GDP	0.0	114	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.3	129	
6.2.5	High-tech manufacturing, %	15.3	72	◆
6.3	**Knowledge diffusion**	**11.5**	**87**	
6.3.1	Intellectual property receipts, % total trade ◴	0.0	111	
6.3.2	Production and export complexity	n/a	n/a	
6.3.3	High-tech exports, % total trade ◴	0.2	109	
6.3.4	ICT services exports, % total trade	3.3	29	● ◆
Creative outputs		**4.5**	**[132]**	
7.1	**Intangible assets**	**5.6**	**[132]**	
7.1.1	Trademarks by origin/bn PPP$ GDP	12.1	107	
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.0	119	○ ◇
7.1.4	ICTs and organizational model creation†	n/a	n/a	
7.2	**Creative goods and services**	**1.3**	**[125]**	
7.2.1	Cultural and creative services exports, % total trade	0.1	87	
7.2.2	National feature films/mn pop. 15–69 ◴	0.7	92	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade ◴	0.0	123	
7.3	**Online creativity**	**5.4**	**121**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.9	99	◆
7.3.2	Country-code TLDs/th pop. 15–69	0.0	129	
7.3.3	Wikipedia edits/mn pop. 15–69	24.1	115	
7.3.4	Mobile app creation/bn PPP$ GDP ◴	0.0	94	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Nigeria

GII 2021 rank
118

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
124	**115**	**Lower middle**	**SSF**	**206.1**	**1,044.2**	**5,066**	**117**

		Score/ Value	Rank	
Institutions		**51.0**	**109**	
1.1	**Political environment**	**33.7**	**128**	○ ◇
1.1.1	Political and operational stability*	48.2	127	○ ◇
1.1.2	Government effectiveness*	26.5	127	○ ◇
1.2	**Regulatory environment**	**61.0**	**79**	
1.2.1	Regulatory quality*	21.0	122	
1.2.2	Rule of law*	23.1	117	
1.2.3	Cost of redundancy dismissal	8.0	1	● ◆
1.3	**Business environment**	**58.4**	**109**	
1.3.1	Ease of starting a business*	86.2	81	
1.3.2	Ease of resolving insolvency*	30.6	118	
Human capital and research		**11.9**	**[121]**	
2.1	**Education**	**29.0**	**[118]**	
2.1.1	Expenditure on education, % GDP	n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years ◴	8.7	115	○ ◇
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary ◴	23.2	104	
2.2	**Tertiary education**	**6.6**	**[120]**	
2.2.1	Tertiary enrolment, % gross ◴	10.2	112	
2.2.2	Graduates in science and engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research and development (R&D)**	**0.0**	**[123]**	
2.3.1	Researchers, FTE/mn pop.	n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP	n/a	n/a	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**24.6**	**120**	◇
3.1	**Information and communication technologies (ICTs)**	**36.7**	**116**	
3.1.1	ICT access*	31.7	121	◇
3.1.2	ICT use*	14.5	123	◇
3.1.3	Government's online service*	51.8	102	
3.1.4	E-participation*	48.8	105	
3.2	**General infrastructure**	**21.8**	**99**	
3.2.1	Electricity output, GWh/mn pop.	185.2	117	
3.2.2	Logistics performance*	22.5	104	
3.2.3	Gross capital formation, % GDP	25.4	43	●
3.3	**Ecological sustainability**	**15.4**	**122**	◇
3.3.1	GDP/unit of energy use	7.0	101	
3.3.2	Environmental performance*	31.0	117	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.1	128	○
Market sophistication		**39.7**	**102**	
4.1	**Credit**	**35.2**	**88**	
4.1.1	Ease of getting credit*	85.0	14	● ◆
4.1.2	Domestic credit to private sector, % GDP	10.5	127	○ ◇
4.1.3	Microfinance gross loans, % GDP	0.1	60	
4.2	**Investment**	**20.7**	**110**	
4.2.1	Ease of protecting minority investors*	72.0	27	● ◆
4.2.2	Market capitalization, % GDP	9.2	69	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	70	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	61	
4.3	**Trade, diversification, and market scale**	**63.4**	**82**	
4.3.1	Applied tariff rate, weighted avg., % ◴	8.5	106	
4.3.2	Domestic industry diversification	n/a	n/a	
4.3.3	Domestic market scale, bn PPP$	1,044.2	24	● ◆

		Score/ Value	Rank	
Business sophistication		**23.4**	**76**	
5.1	**Knowledge workers**	**34.7**	**[57]**	
5.1.1	Knowledge-intensive employment, % ◴	28.4	52	● ◆
5.1.2	Firms offering formal training, % ◴	30.7	50	●
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, %	6.2	90	
5.2	**Innovation linkages**	**17.8**	**87**	
5.2.1	University-industry R&D collaboration†	26.0	122	◇
5.2.2	State of cluster development and depth†	45.4	75	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	92	
5.2.5	Patent families/bn PPP$ GDP	0.0	98	
5.3	**Knowledge absorption**	**17.8**	**104**	
5.3.1	Intellectual property payments, % total trade	0.4	76	
5.3.2	High-tech imports, % total trade	7.1	76	
5.3.3	ICT services imports, % total trade	0.3	114	
5.3.4	FDI net inflows, % GDP	0.7	114	
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**8.3**	**123**	
6.1	**Knowledge creation**	**5.8**	**107**	
6.1.1	Patents by origin/bn PPP$ GDP ◴	0.1	110	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	97	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	5.1	108	
6.1.5	Citable documents H-index	12.2	63	●
6.2	**Knowledge impact**	**18.2**	**113**	
6.2.1	Labor productivity growth, %	–1.0	83	
6.2.2	New businesses/th pop. 15–64	0.8	87	
6.2.3	Software spending, % GDP	0.1	83	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.3	128	○
6.2.5	High-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**1.0**	**131**	○ ◇
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	Production and export complexity	0.0	121	○ ◇
6.3.3	High-tech exports, % total trade	0.1	120	
6.3.4	ICT services exports, % total trade	0.2	116	
Creative outputs		**11.7**	**116**	
7.1	**Intangible assets**	**16.7**	**112**	
7.1.1	Trademarks by origin/bn PPP$ GDP	10.5	111	
7.1.2	Global brand value, top 5,000, % GDP	3.5	72	
7.1.3	Industrial designs by origin/bn PPP$ GDP ◴	1.1	64	●
7.1.4	ICTs and organizational model creation†	47.5	89	
7.2	**Creative goods and services**	**9.8**	**[80]**	
7.2.1	Cultural and creative services exports, % total trade	n/a	n/a	
7.2.2	National feature films/mn pop. 15–69 ◴	11.3	15	● ◆
7.2.3	Entertainment and media market/th pop. 15–69	1.5	55	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.0	131	○ ◇
7.3	**Online creativity**	**3.7**	**127**	○
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.5	109	
7.3.2	Country-code TLDs/th pop. 15–69	0.4	99	
7.3.3	Wikipedia edits/mn pop. 15–69	18.1	126	○ ◇
7.3.4	Mobile app creation/bn PPP$ GDP	0.4	82	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

North Macedonia

GII 2021 rank
59

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
69	**40**	**Upper middle**	**EUR**	**2.1**	**34.5**	**16,609**	**57**

		Score/ Value	Rank	
Institutions		**68.9**	**52**	
1.1	**Political environment**	**58.1**	**65**	
1.1.1	Political and operational stability*	73.2	44	
1.1.2	Government effectiveness*	50.6	74	
1.2	**Regulatory environment**	**67.9**	**58**	
1.2.1	Regulatory quality*	56.8	49	◆
1.2.2	Rule of law*	40.3	75	
1.2.3	Cost of redundancy dismissal	14.4	55	
1.3	**Business environment**	**80.7**	**30**	● ◆
1.3.1	Ease of starting a business*	88.6	63	
1.3.2	Ease of resolving insolvency*	72.7	28	● ◆
Human capital and research		**30.2**	**73**	
2.1	**Education**	**55.6**	**[47]**	
2.1.1	Expenditure on education, % GDP	n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	13.5	77	
2.1.4	PISA scales in reading, maths and science	400.1	67	○
2.1.5	Pupil-teacher ratio, secondary ◴	8.3	13	● ◆
2.2	**Tertiary education**	**31.0**	**72**	
2.2.1	Tertiary enrolment, % gross	43.1	68	
2.2.2	Graduates in science and engineering, %	23.6	48	
2.2.3	Tertiary inbound mobility, %	5.2	48	
2.3	**Research and development (R&D)**	**4.1**	**83**	
2.3.1	Researchers, FTE/mn pop.	786.7	55	
2.3.2	Gross expenditure on R&D, % GDP	0.4	74	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**46.9**	**49**	
3.1	**Information and communication technologies (ICTs)**	**71.2**	**56**	
3.1.1	ICT access*	67.4	65	
3.1.2	ICT use*	60.1	61	
3.1.3	Government's online service*	74.1	58	
3.1.4	E-participation*	83.3	38	
3.2	**General infrastructure**	**20.1**	**109**	○
3.2.1	Electricity output, GWh/mn pop.	2,691.8	71	
3.2.2	Logistics performance*	30.6	80	
3.2.3	Gross capital formation, % GDP	n/a	n/a	
3.3	**Ecological sustainability**	**49.2**	**18**	● ◆
3.3.1	GDP/unit of energy use	11.8	52	
3.3.2	Environmental performance*	55.4	41	◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	9.9	5	● ◆
Market sophistication		**63.7**	**12**	● ◆
4.1	**Credit**	**41.0**	**64**	
4.1.1	Ease of getting credit*	80.0	23	●
4.1.2	Domestic credit to private sector, % GDP	51.5	65	
4.1.3	Microfinance gross loans, % GDP	0.3	43	
4.2	**Investment**	**82.0**	**[2]**	
4.2.1	Ease of protecting minority investors*	82.0	12	● ◆
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**68.1**	**70**	
4.3.1	Applied tariff rate, weighted avg., %	1.9	54	
4.3.2	Domestic industry diversification	91.5	47	
4.3.3	Domestic market scale, bn PPP$	34.5	118	○ ◇

		Score/ Value	Rank	
Business sophistication		**25.4**	**65**	
5.1	**Knowledge workers**	**32.5**	**62**	
5.1.1	Knowledge-intensive employment, %	29.9	48	
5.1.2	Firms offering formal training, %	39.0	31	
5.1.3	GERD performed by business, % GDP	0.1	62	
5.1.4	GERD financed by business, %	23.6	63	
5.1.5	Females employed w/advanced degrees, %	15.3	48	
5.2	**Innovation linkages**	**13.5**	**116**	○
5.2.1	University-industry R&D collaboration†	30.2	112	○ ◇
5.2.2	State of cluster development and depth† ◴	38.6	108	○
5.2.3	GERD financed by abroad, % GDP	0.0	65	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP ◴	0.0	94	○
5.2.5	Patent families/bn PPP$ GDP	0.0	71	
5.3	**Knowledge absorption**	**30.2**	**57**	
5.3.1	Intellectual property payments, % total trade	1.6	21	● ◆
5.3.2	High-tech imports, % total trade	5.7	103	○
5.3.3	ICT services imports, % total trade	1.1	66	
5.3.4	FDI net inflows, % GDP	4.3	26	●
5.3.5	Research talent, % in businesses	26.6	47	
Knowledge and technology outputs		**22.7**	**57**	
6.1	**Knowledge creation**	**11.5**	**73**	
6.1.1	Patents by origin/bn PPP$ GDP ◴	1.6	43	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.2	54	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	13.4	66	
6.1.5	Citable documents H-index	6.2	94	
6.2	**Knowledge impact**	**36.8**	**35**	
6.2.1	Labor productivity growth, %	–1.1	85	
6.2.2	New businesses/th pop. 15–64	3.6	39	
6.2.3	Software spending, % GDP	0.1	79	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	15.5	17	●
6.2.5	High-tech manufacturing, %	42.4	22	● ◆
6.3	**Knowledge diffusion**	**20.0**	**55**	
6.3.1	Intellectual property receipts, % total trade	0.1	47	
6.3.2	Production and export complexity	45.5	57	
6.3.3	High-tech exports, % total trade	2.9	50	
6.3.4	ICT services exports, % total trade	2.7	41	
Creative outputs		**19.5**	**83**	
7.1	**Intangible assets**	**18.4**	**109**	○
7.1.1	Trademarks by origin/bn PPP$ GDP	n/a	n/a	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	2.0	48	
7.1.4	ICTs and organizational model creation†	41.1	112	○ ◇
7.2	**Creative goods and services**	**17.9**	**60**	
7.2.1	Cultural and creative services exports, % total trade	0.9	30	
7.2.2	National feature films/mn pop. 15–69	5.1	44	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing ◴	2.2	12	● ◆
7.2.5	Creative goods exports, % total trade	0.2	84	
7.3	**Online creativity**	**23.2**	**52**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	6.8	47	
7.3.2	Country-code TLDs/th pop. 15–69	5.6	52	
7.3.3	Wikipedia edits/mn pop. 15–69	68.6	41	◆
7.3.4	Mobile app creation/bn PPP$ GDP	9.3	48	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Norway

GII 2021 rank **20**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
28	13	High	EUR	5.4	349.5	64,856	20

		Score/ Value	Rank
Institutions		**92.6**	**3** ● ◆
1.1	**Political environment**	**91.1**	**4** ●
1.1.1	Political and operational stability*	89.3	6
1.1.2	Government effectiveness*	92.0	5 ●
1.2	**Regulatory environment**	**96.8**	**3** ●
1.2.1	Regulatory quality*	90.7	7 ●
1.2.2	Rule of law*	99.0	2 ●
1.2.3	Cost of redundancy dismissal	8.7	18
1.3	**Business environment**	**89.9**	**3** ●
1.3.1	Ease of starting a business*	94.3	23
1.3.2	Ease of resolving insolvency*	85.4	5 ●
Human capital and research		**56.8**	**13**
2.1	**Education**	**75.3**	**3** ● ◆
2.1.1	Expenditure on education, % GDP	7.9	2 ● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	26.1	14 ◆
2.1.3	School life expectancy, years	18.1	12
2.1.4	PISA scales in reading, maths and science	496.9	22
2.1.5	Pupil-teacher ratio, secondary 🕘	8.5	16 ◆
2.2	**Tertiary education**	**39.7**	**42**
2.2.1	Tertiary enrolment, % gross	83.0	16
2.2.2	Graduates in science and engineering, %	21.8	62 ○
2.2.3	Tertiary inbound mobility, %	4.2	57 ○
2.3	**Research and development (R&D)**	**55.5**	**19**
2.3.1	Researchers, FTE/mn pop.	6,673.7	6
2.3.2	Gross expenditure on R&D, % GDP	2.1	16
2.3.3	Global corporate R&D investors, top 3, mn US$	56.1	24
2.3.4	QS university ranking, top 3*	42.9	28
Infrastructure		**64.8**	**1** ● ◆
3.1	**Information and communication technologies (ICTs)**	**86.0**	**18**
3.1.1	ICT access*	76.3	45 ◇
3.1.2	ICT use*	89.3	3 ● ◆
3.1.3	Government's online service*	87.6	19
3.1.4	E-participation*	90.5	18
3.2	**General infrastructure**	**61.2**	**3** ● ◆
3.2.1	Electricity output, GWh/mn pop.	27,518.4	1 ● ◆
3.2.2	Logistics performance*	76.6	21
3.2.3	Gross capital formation, % GDP	26.7	34
3.3	**Ecological sustainability**	**47.2**	**20**
3.3.1	GDP/unit of energy use	13.9	33
3.3.2	Environmental performance*	77.7	9
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	4.1	22
Market sophistication		**57.6**	**21**
4.1	**Credit**	**59.2**	**16**
4.1.1	Ease of getting credit*	55.0	88 ○
4.1.2	Domestic credit to private sector, % GDP	151.4	9
4.1.3	Microfinance gross loans, % GDP	n/a	n/a
4.2	**Investment**	**37.1**	**42**
4.2.1	Ease of protecting minority investors*	76.0	21
4.2.2	Market capitalization, % GDP	69.0	23
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.1	21
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	34
4.3	**Trade, diversification, and market scale**	**76.5**	**40**
4.3.1	Applied tariff rate, weighted avg., %	2.6	59
4.3.2	Domestic industry diversification	90.6	48
4.3.3	Domestic market scale, bn PPP$	349.5	49

		Score/ Value	Rank
Business sophistication		**45.7**	**23** ◇
5.1	**Knowledge workers**	**57.6**	**21**
5.1.1	Knowledge-intensive employment, %	51.7	5 ●
5.1.2	Firms offering formal training, %	n/a	n/a
5.1.3	GERD performed by business, % GDP	1.1	19
5.1.4	GERD financed by business, %	42.0	39 ◇
5.1.5	Females employed w/advanced degrees, %	25.9	12
5.2	**Innovation linkages**	**42.6**	**20**
5.2.1	University-industry R&D collaboration† 🕘	61.7	20
5.2.2	State of cluster development and depth† 🕘	64.6	15
5.2.3	GERD financed by abroad, % GDP	0.2	27
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.1	18
5.2.5	Patent families/bn PPP$ GDP	2.1	17
5.3	**Knowledge absorption**	**36.9**	**35** ◇
5.3.1	Intellectual property payments, % total trade	0.5	69 ○
5.3.2	High-tech imports, % total trade	7.0	78 ○
5.3.3	ICT services imports, % total trade	3.2	7
5.3.4	FDI net inflows, % GDP	1.1	106 ○
5.3.5	Research talent, % in businesses	48.9	26
Knowledge and technology outputs		**35.4**	**28** ◇
6.1	**Knowledge creation**	**46.7**	**17**
6.1.1	Patents by origin/bn PPP$ GDP	4.5	20
6.1.2	PCT patents by origin/bn PPP$ GDP	2.0	18
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a
6.1.4	Scientific and technical articles/bn PPP$ GDP	45.4	12
6.1.5	Citable documents H-index	41.7	20
6.2	**Knowledge impact**	**39.5**	**25**
6.2.1	Labor productivity growth, %	−0.2	72 ○
6.2.2	New businesses/th pop. 15–64	8.6	19
6.2.3	Software spending, % GDP	0.5	18
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	7.8	35
6.2.5	High-tech manufacturing, %	32.9	38
6.3	**Knowledge diffusion**	**20.1**	**54** ◇
6.3.1	Intellectual property receipts, % total trade	0.3	31 ◇
6.3.2	Production and export complexity	54.0	43 ◇
6.3.3	High-tech exports, % total trade	3.2	46
6.3.4	ICT services exports, % total trade	1.8	62
Creative outputs		**39.3**	**25**
7.1	**Intangible assets**	**37.4**	**45** ◇
7.1.1	Trademarks by origin/bn PPP$ GDP	33.2	69 ○
7.1.2	Global brand value, top 5,000, % GDP	73.2	27
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.3	60 ○
7.1.4	ICTs and organizational model creation†	77.4	10
7.2	**Creative goods and services**	**27.1**	**32**
7.2.1	Cultural and creative services exports, % total trade	0.5	50
7.2.2	National feature films/mn pop. 15–69	10.1	19
7.2.3	Entertainment and media market/th pop. 15–69	82.8	3 ● ◆
7.2.4	Printing and other media, % manufacturing	1.1	45
7.2.5	Creative goods exports, % total trade	0.5	63 ○
7.3	**Online creativity**	**55.5**	**15**
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	50.6	15
7.3.2	Country-code TLDs/th pop. 15–69	63.0	13
7.3.3	Wikipedia edits/mn pop. 15–69	84.3	6 ●
7.3.4	Mobile app creation/bn PPP$ GDP	19.5	28

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. 🕘 indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Oman

GII 2021 rank
76

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
90	**67**	**High**	**NAWA**	**5.1**	**129.2**	**29,908**	**84**

		Score/ Value	Rank	
Institutions		**62.3**	**71**	◇
1.1	**Political environment**	**62.0**	**52**	◇
1.1.1	Political and operational stability*	73.2	44	
1.1.2	Government effectiveness*	56.4	57	◇
1.2	**Regulatory environment**	**56.2**	**91**	◇
1.2.1	Regulatory quality*	51.1	57	◇
1.2.2	Rule of law*	61.3	41	
1.2.3	Cost of redundancy dismissal	n/a	n/a	
1.3	**Business environment**	**68.7**	**73**	◇
1.3.1	Ease of starting a business*	93.5	30 ●	
1.3.2	Ease of resolving insolvency*	44.0	88	◇
Human capital and research		**37.9**	**45**	
2.1	**Education**	**56.6**	**44**	
2.1.1	Expenditure on education, % GDP ⏲	5.0	41	
2.1.2	Government funding/pupil, secondary, % GDP/cap	27.0	13 ● ◆	
2.1.3	School life expectancy, years	14.3	66	◇
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	10.6	35	
2.2	**Tertiary education**	**52.8**	**10 ● ◆**	
2.2.1	Tertiary enrolment, % gross	40.4	73	◇
2.2.2	Graduates in science and engineering, %	44.5	1 ● ◆	
2.2.3	Tertiary inbound mobility, %	2.8	67	
2.3	**Research and development (R&D)**	**4.3**	**81**	◇
2.3.1	Researchers, FTE/mn pop. ⏲	281.2	77	◇
2.3.2	Gross expenditure on R&D, % GDP ⏲	0.2	90	◇
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41 ○	◇
2.3.4	QS university ranking, top 3*	9.7	65	
Infrastructure		**45.1**	**56**	◇
3.1	**Information and communication technologies (ICTs)**	**79.7**	**33**	
3.1.1	ICT access*	80.3	30 ●	
3.1.2	ICT use*	69.8	47	◇
3.1.3	Government's online service*	85.3	24 ●	
3.1.4	E-participation*	83.3	38	
3.2	**General infrastructure**	**33.5**	**46**	
3.2.1	Electricity output, GWh/mn pop.	7,801.0	24 ●	
3.2.2	Logistics performance*	53.4	42	
3.2.3	Gross capital formation, % GDP	22.0	68	
3.3	**Ecological sustainability**	**21.9**	**87**	◇
3.3.1	GDP/unit of energy use	7.5	98	
3.3.2	Environmental performance*	38.5	91	◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.7	50	
Market sophistication		**43.2**	**84**	
4.1	**Credit**	**32.6**	**99**	◇
4.1.1	Ease of getting credit*	35.0	118 ○	◇
4.1.2	Domestic credit to private sector, % GDP	75.1	42	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**24.4**	**88**	
4.2.1	Ease of protecting minority investors*	56.0	82	
4.2.2	Market capitalization, % GDP	25.4	52	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	45	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**72.5**	**54**	
4.3.1	Applied tariff rate, weighted avg., %	1.7	23 ●	
4.3.2	Domestic industry diversification	88.0	59	
4.3.3	Domestic market scale, bn PPP$	129.2	76	

		Score/ Value	Rank	
Business sophistication		**20.2**	**94**	◇
5.1	**Knowledge workers**	**22.4**	**[95]**	
5.1.1	Knowledge-intensive employment, % ⏲	18.5	84	◇
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP ⏲	0.1	66	◇
5.1.4	GERD financed by business, %	31.8	57	
5.1.5	Females employed w/advanced degrees, %	n/a	n/a	
5.2	**Innovation linkages**	**23.7**	**52**	
5.2.1	University-industry R&D collaboration†	51.5	37	
5.2.2	State of cluster development and depth†	62.5	21 ●	
5.2.3	GERD financed by abroad, % GDP	0.0	88 ○	◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.1	30	
5.2.5	Patent families/bn PPP$ GDP	0.0	97	
5.3	**Knowledge absorption**	**14.5**	**121** ○	◇
5.3.1	Intellectual property payments, % total trade	n/a	n/a	
5.3.2	High-tech imports, % total trade ⏲	5.5	106 ○	
5.3.3	ICT services imports, % total trade	0.3	117 ○	◇
5.3.4	FDI net inflows, % GDP	5.4	18 ●	
5.3.5	Research talent, % in businesses ⏲	0.3	85 ○	◇
Knowledge and technology outputs		**11.7**	**107** ○	◇
6.1	**Knowledge creation**	**7.1**	**96**	◇
6.1.1	Patents by origin/bn PPP$ GDP	0.2	94	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	67	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	9.9	86	◇
6.1.5	Citable documents H-index	7.5	87	◇
6.2	**Knowledge impact**	**19.4**	**107** ○	◇
6.2.1	Labor productivity growth, %	–1.7	96	
6.2.2	New businesses/th pop. 15–64	1.4	72	
6.2.3	Software spending, % GDP	0.0	102 ○	◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	4.5	59	
6.2.5	High-tech manufacturing, %	17.5	67	◇
6.3	**Knowledge diffusion**	**8.8**	**99**	◇
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	Production and export complexity	32.7	82	◇
6.3.3	High-tech exports, % total trade ⏲	0.8	78	
6.3.4	ICT services exports, % total trade	0.3	113 ○	
Creative outputs		**22.5**	**71**	◇
7.1	**Intangible assets**	**34.5**	**53**	
7.1.1	Trademarks by origin/bn PPP$ GDP	78.2	22 ● ◆	
7.1.2	Global brand value, top 5,000, % GDP	10.4	60	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.1	114 ○	
7.1.4	ICTs and organizational model creation†	52.5	72	◇
7.2	**Creative goods and services**	**5.0**	**105**	◇
7.2.1	Cultural and creative services exports, % total trade	n/a	n/a	
7.2.2	National feature films/mn pop. 15–69	1.1	82	◇
7.2.3	Entertainment and media market/th pop. 15–69	5.0	48	◇
7.2.4	Printing and other media, % manufacturing	0.5	89 ○	
7.2.5	Creative goods exports, % total trade ⏲	0.4	65	
7.3	**Online creativity**	**15.8**	**70**	◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	1.6	86	◇
7.3.2	Country-code TLDs/th pop. 15–69	0.3	106	◇
7.3.3	Wikipedia edits/mn pop. 15–69	39.3	85	◇
7.3.4	Mobile app creation/bn PPP$ GDP	23.7	23 ●	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Pakistan

GII 2021 rank
99

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
77	**117**	**Lower middle**	**CSA**	**220.9**	**1,076.3**	**5,160**	**107**

		Score/ Value	Rank	
Institutions		**54.0**	**99**	
1.1	**Political environment**	**42.8**	**107**	
1.1.1	Political and operational stability*	57.1	106	
1.1.2	Government effectiveness*	35.6	110	
1.2	**Regulatory environment**	**44.9**	**116**	
1.2.1	Regulatory quality*	26.7	109	
1.2.2	Rule of law*	29.1	107	
1.2.3	Cost of redundancy dismissal	27.2	108	
1.3	**Business environment**	**74.1**	**55**	◆
1.3.1	Ease of starting a business*	89.3	59	
1.3.2	Ease of resolving insolvency*	59.0	53	◆
Human capital and research		**14.0**	**117**	
2.1	**Education**	**27.0**	**121**	○ ◇
2.1.1	Expenditure on education, % GDP	2.9	100	
2.1.2	Government funding/pupil, secondary, % GDP/cap ◴	16.0	70	
2.1.3	School life expectancy, years	8.3	117	○ ◇
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	16.3	79	
2.2	**Tertiary education**	**5.7**	**[124]**	
2.2.1	Tertiary enrolment, % gross	9.0	117	○
2.2.2	Graduates in science and engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research and development (R&D)**	**9.2**	**63**	
2.3.1	Researchers, FTE/mn pop. ◴	335.6	75	
2.3.2	Gross expenditure on R&D, % GDP ◴	0.2	88	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	28.4	43	● ◆
Infrastructure		**25.4**	**117**	
3.1	**Information and communication technologies (ICTs)**	**43.0**	**104**	
3.1.1	ICT access*	39.0	109	
3.1.2	ICT use*	17.9	117	◇
3.1.3	Government's online service*	62.9	82	
3.1.4	E-participation*	52.4	97	
3.2	**General infrastructure**	**12.5**	**125**	○ ◇
3.2.1	Electricity output, GWh/mn pop.	703.0	104	
3.2.2	Logistics performance*	17.3	112	○
3.2.3	Gross capital formation, % GDP	15.4	113	○ ◇
3.3	**Ecological sustainability**	**20.5**	**96**	
3.3.1	GDP/unit of energy use	10.1	67	
3.3.2	Environmental performance*	33.1	111	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.5	85	
Market sophistication		**35.1**	**120**	○
4.1	**Credit**	**20.9**	**123**	○
4.1.1	Ease of getting credit*	45.0	101	
4.1.2	Domestic credit to private sector, % GDP	18.1	115	
4.1.3	Microfinance gross loans, % GDP	0.2	50	
4.2	**Investment**	**21.1**	**107**	
4.2.1	Ease of protecting minority investors*	72.0	27	● ◆
4.2.2	Market capitalization, % GDP ◴	29.2	49	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	88	○
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	78	
4.3	**Trade, diversification, and market scale**	**63.2**	**83**	
4.3.1	Applied tariff rate, weighted avg., %	8.7	109	
4.3.2	Domestic industry diversification	n/a	n/a	
4.3.3	Domestic market scale, bn PPP$	1,076.3	22	● ◆

		Score/ Value	Rank	
Business sophistication		**21.4**	**88**	
5.1	**Knowledge workers**	**20.8**	**[99]**	
5.1.1	Knowledge-intensive employment, % ◴	11.6	105	
5.1.2	Firms offering formal training, % ◴	32.0	46	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, % ◴	1.6	109	
5.2	**Innovation linkages**	**18.4**	**78**	
5.2.1	University-industry R&D collaboration†	49.0	42	● ◆
5.2.2	State of cluster development and depth†	48.6	55	
5.2.3	GERD financed by abroad, % GDP ◴	0.0	89	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	57	
5.2.5	Patent families/bn PPP$ GDP	0.0	94	
5.3	**Knowledge absorption**	**25.1**	**69**	
5.3.1	Intellectual property payments, % total trade	0.4	71	
5.3.2	High-tech imports, % total trade	10.3	29	●
5.3.3	ICT services imports, % total trade	1.0	79	
5.3.4	FDI net inflows, % GDP	0.7	115	
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**19.2**	**71**	
6.1	**Knowledge creation**	**15.6**	**[65]**	
6.1.1	Patents by origin/bn PPP$ GDP	0.3	88	
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	18.1	49	● ◆
6.1.5	Citable documents H-index	17.2	50	● ◆
6.2	**Knowledge impact**	**27.4**	**74**	
6.2.1	Labor productivity growth, %	0.7	52	
6.2.2	New businesses/th pop. 15–64	0.1	117	○
6.2.3	Software spending, % GDP	0.3	33	● ◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	2.3	84	
6.2.5	High-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**14.6**	**71**	
6.3.1	Intellectual property receipts, % total trade ◴	0.0	84	
6.3.2	Production and export complexity	28.2	98	
6.3.3	High-tech exports, % total trade	1.3	70	
6.3.4	ICT services exports, % total trade	2.8	36	●
Creative outputs		**18.4**	**87**	
7.1	**Intangible assets**	**30.8**	**64**	
7.1.1	Trademarks by origin/bn PPP$ GDP	30.7	74	
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.4	90	
7.1.4	ICTs and organizational model creation†	51.6	76	
7.2	**Creative goods and services**	**1.1**	**126**	○ ◇
7.2.1	Cultural and creative services exports, % total trade	0.1	84	
7.2.2	National feature films/mn pop. 15–69	0.1	107	○
7.2.3	Entertainment and media market/th pop. 15–69	0.1	62	○ ◇
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.1	107	
7.3	**Online creativity**	**11.2**	**89**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.5	106	
7.3.2	Country-code TLDs/th pop. 15–69	0.2	110	
7.3.3	Wikipedia edits/mn pop. 15–69	19.6	123	○
7.3.4	Mobile app creation/bn PPP$ GDP	28.5	19	● ◆

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Panama

GII 2021 rank

83

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
79	**83**	**High**	**LCN**	**4.3**	**128.5**	**30,034**	**73**

		Score/ Value	Rank	
Institutions		**62.8**	**69**	◇
1.1	**Political environment**	**58.5**	**63**	◇
1.1.1	Political and operational stability*	71.4	54	◇
1.1.2	Government effectiveness*	52.1	68	◇
1.2	**Regulatory environment**	**64.1**	**68**	◇
1.2.1	Regulatory quality*	53.0	56	◇
1.2.2	Rule of law*	43.6	67	◇
1.2.3	Cost of redundancy dismissal	18.1	76	
1.3	**Business environment**	**65.8**	**82**	◇
1.3.1	Ease of starting a business*	92.0	46	
1.3.2	Ease of resolving insolvency*	39.5	99	◇
Human capital and research		**19.5**	**99**	◇
2.1	**Education**	**31.6**	**111**	◇
2.1.1	Expenditure on education, % GDP ⏲	3.2	92	◇
2.1.2	Government funding/pupil, secondary, % GDP/cap ⏲	9.2	93 ○	◇
2.1.3	School life expectancy, years ⏲	12.9	83	◇
2.1.4	PISA scales in reading, maths and science	364.8	76 ○	◇
2.1.5	Pupil-teacher ratio, secondary ⏲	13.6	62	
2.2	**Tertiary education**	**25.1**	**84**	◇
2.2.1	Tertiary enrolment, % gross ⏲	47.8	65	◇
2.2.2	Graduates in science and engineering, % ⏲	15.4	97	◇
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research and development (R&D)**	**1.7**	**98**	◇
2.3.1	Researchers, FTE/mn pop. ⏲	39.1	97 ○	◇
2.3.2	Gross expenditure on R&D, % GDP ⏲	0.1	96	◇
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41 ○	◇
2.3.4	QS university ranking, top 3*	3.7	72	◇
Infrastructure		**46.8**	**50**	◇
3.1	**Information and communication technologies (ICTs)**	**60.8**	**81**	◇
3.1.1	ICT access*	64.9	70	◇
3.1.2	ICT use*	57.7	66	◇
3.1.3	Government's online service*	62.4	83	◇
3.1.4	E-participation*	58.3	89	◇
3.2	**General infrastructure**	**39.7**	**30** ●	
3.2.1	Electricity output, GWh/mn pop.	2,740.2	68	◇
3.2.2	Logistics performance*	57.1	37	
3.2.3	Gross capital formation, % GDP	33.8	13 ● ◆	
3.3	**Ecological sustainability**	**39.8**	**36** ●	
3.3.1	GDP/unit of energy use	23.5	5 ● ◆	
3.3.2	Environmental performance*	47.3	64	◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	105	◇
Market sophistication		**40.7**	**97**	◇
4.1	**Credit**	**47.6**	**40**	
4.1.1	Ease of getting credit*	80.0	23 ●	
4.1.2	Domestic credit to private sector, % GDP	86.8	33 ●	
4.1.3	Microfinance gross loans, % GDP	0.4	39	
4.2	**Investment**	**16.9**	**126** ○	◇
4.2.1	Ease of protecting minority investors*	56.0	82	
4.2.2	Market capitalization, % GDP	24.5	53	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	79	◇
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	77	
4.3	**Trade, diversification, and market scale**	**57.7**	**101**	◇
4.3.1	Applied tariff rate, weighted avg., % ⏲	5.4	93	◇
4.3.2	Domestic industry diversification	61.5	102 ○	◇
4.3.3	Domestic market scale, bn PPP$	128.5	77	

		Score/ Value	Rank	
Business sophistication		**18.6**	**103**	◇
5.1	**Knowledge workers**	**17.4**	**106**	◇
5.1.1	Knowledge-intensive employment, %	24.0	66	◇
5.1.2	Firms offering formal training, % ⏲	11.0	95 ○	◇
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, % ⏲	1.5	91	◇
5.1.5	Females employed w/advanced degrees, %	10.5	67	◇
5.2	**Innovation linkages**	**18.6**	**75**	◇
5.2.1	University-industry R&D collaboration†	37.1	94	◇
5.2.2	State of cluster development and depth†	47.5	58	
5.2.3	GERD financed by abroad, % GDP ⏲	0.1	53	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	78	
5.2.5	Patent families/bn PPP$ GDP	0.3	37	
5.3	**Knowledge absorption**	**19.7**	**94**	◇
5.3.1	Intellectual property payments, % total trade	0.2	94	
5.3.2	High-tech imports, % total trade ⏲	7.7	66	
5.3.3	ICT services imports, % total trade	0.3	118 ○	◇
5.3.4	FDI net inflows, % GDP	8.2	10 ●	
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**10.9**	**113**	◇
6.1	**Knowledge creation**	**5.0**	**112**	◇
6.1.1	Patents by origin/bn PPP$ GDP	0.2	91	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.2	55	
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	73 ○	
6.1.4	Scientific and technical articles/bn PPP$ GDP	4.8	110	◇
6.1.5	Citable documents H-index	12.2	63	
6.2	**Knowledge impact**	**11.1**	**122** ○	◇
6.2.1	Labor productivity growth, %	n/a	n/a	
6.2.2	New businesses/th pop. 15–64	4.8	32 ●	
6.2.3	Software spending, % GDP	0.2	67	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.6	93	◇
6.2.5	High-tech manufacturing, %	7.3	96	◇
6.3	**Knowledge diffusion**	**16.7**	**66**	
6.3.1	Intellectual property receipts, % total trade	0.0	74	
6.3.2	Production and export complexity	38.3	73	◇
6.3.3	High-tech exports, % total trade ⏲	5.1	36 ●	
6.3.4	ICT services exports, % total trade	1.1	81	
Creative outputs		**25.8**	**58**	
7.1	**Intangible assets**	**25.0**	**87**	◇
7.1.1	Trademarks by origin/bn PPP$ GDP	33.0	70	
7.1.2	Global brand value, top 5,000, % GDP	12.2	57	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.0	119 ○	◇
7.1.4	ICTs and organizational model creation†	57.4	55	
7.2	**Creative goods and services**	**25.3**	**37**	
7.2.1	Cultural and creative services exports, % total trade	0.4	53	
7.2.2	National feature films/mn pop. 15–69 ⏲	0.4	100 ○	◇
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	2.5	6 ● ◆	
7.2.5	Creative goods exports, % total trade ⏲	2.9	23 ●	
7.3	**Online creativity**	**28.0**	**38**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	56.4	13 ●	
7.3.2	Country-code TLDs/th pop. 15–69	1.3	79	◇
7.3.3	Wikipedia edits/mn pop. 15–69	48.6	68	◇
7.3.4	Mobile app creation/bn PPP$ GDP	6.0	54	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Paraguay

GII 2021 rank
88

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
87	**90**	**Upper middle**	**LCN**	**7.1**	**90.7**	**12,503**	**97**

		Score/ Value	Rank	
Institutions		**50.9**	**110**	◇
1.1	**Political environment**	**47.3**	**97**	◇
1.1.1	Political and operational stability*	64.3	80	
1.1.2	Government effectiveness*	38.8	101	◇
1.2	**Regulatory environment**	**46.4**	**111**	◇
1.2.1	Regulatory quality*	38.2	85	
1.2.2	Rule of law*	32.1	98	
1.2.3	Cost of redundancy dismissal	29.4	117	
1.3	**Business environment**	**59.0**	**107**	
1.3.1	Ease of starting a business*	76.0	118	
1.3.2	Ease of resolving insolvency*	42.1	94	
Human capital and research		**19.8**	**98**	◇
2.1	**Education**	**33.8**	**108**	◇
2.1.1	Expenditure on education, % GDP ◴	3.4	87	
2.1.2	Government funding/pupil, secondary, % GDP/cap ◴	11.9	84	
2.1.3	School life expectancy, years ◴	12.2	90	◇
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary ◴	18.4	89	
2.2	**Tertiary education**	**23.8**	**[88]**	
2.2.1	Tertiary enrolment, % gross ◴	34.6	80	
2.2.2	Graduates in science and engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research and development (R&D)**	**1.8**	**97**	
2.3.1	Researchers, FTE/mn pop. ◴	139.7	84	◇
2.3.2	Gross expenditure on R&D, % GDP ◴	0.1	97	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	3.0	73	
Infrastructure		**38.9**	**77**	
3.1	**Information and communication technologies (ICTs)**	**59.2**	**85**	
3.1.1	ICT access*	45.0	99	◇
3.1.2	ICT use*	46.2	88	
3.1.3	Government's online service*	70.6	65	
3.1.4	E-participation*	75.0	57	
3.2	**General infrastructure**	**30.4**	**61**	●
3.2.1	Electricity output, GWh/mn pop.	7,013.9	29	● ◆
3.2.2	Logistics performance*	34.2	73	
3.2.3	Gross capital formation, % GDP	24.8	48	●
3.3	**Ecological sustainability**	**27.1**	**71**	
3.3.1	GDP/unit of energy use	12.4	46	●
3.3.2	Environmental performance*	46.4	67	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.3	92	
Market sophistication		**42.0**	**89**	
4.1	**Credit**	**38.5**	**75**	
4.1.1	Ease of getting credit*	40.0	113	◇
4.1.2	Domestic credit to private sector, % GDP	46.7	75	
4.1.3	Microfinance gross loans, % GDP	4.3	8	● ◆
4.2	**Investment**	**34.0**	**[53]**	
4.2.1	Ease of protecting minority investors*	34.0	118	◇
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**53.6**	**111**	◇
4.3.1	Applied tariff rate, weighted avg., %	5.0	84	
4.3.2	Domestic industry diversification	n/a	n/a	
4.3.3	Domestic market scale, bn PPP$	90.7	87	

		Score/ Value	Rank	
Business sophistication		**25.4**	**66**	
5.1	**Knowledge workers**	**27.7**	**80**	
5.1.1	Knowledge-intensive employment, %	18.6	83	
5.1.2	Firms offering formal training, % ◴	46.4	21	●
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	0.4	98	○ ◇
5.1.5	Females employed w/advanced degrees, % ◴	9.5	72	
5.2	**Innovation linkages**	**12.7**	**121**	◇
5.2.1	University-industry R&D collaboration†	24.5	124	○ ◇
5.2.2	State of cluster development and depth†	40.4	99	
5.2.3	GERD financed by abroad, % GDP	0.0	67	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP ◴	0.0	118	
5.2.5	Patent families/bn PPP$ GDP	0.0	100	○ ◇
5.3	**Knowledge absorption**	**35.7**	**39**	●
5.3.1	Intellectual property payments, % total trade	0.1	98	
5.3.2	High-tech imports, % total trade	22.8	6	● ◆
5.3.3	ICT services imports, % total trade	0.0	131	○ ◇
5.3.4	FDI net inflows, % GDP	1.2	104	
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**10.0**	**117**	◇
6.1	**Knowledge creation**	**3.0**	**[122]**	
6.1.1	Patents by origin/bn PPP$ GDP ◴	0.3	89	
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	2.4	123	○ ◇
6.1.5	Citable documents H-index	4.0	114	
6.2	**Knowledge impact**	**19.4**	**108**	
6.2.1	Labor productivity growth, %	–0.7	77	
6.2.2	New businesses/th pop. 15–64	0.2	110	
6.2.3	Software spending, % GDP	0.0	105	◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	4.5	61	●
6.2.5	High-tech manufacturing, % ◴	15.0	76	
6.3	**Knowledge diffusion**	**7.6**	**103**	
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	Production and export complexity	31.1	88	
6.3.3	High-tech exports, % total trade	0.6	87	
6.3.4	ICT services exports, % total trade	0.1	126	○
Creative outputs		**24.8**	**62**	
7.1	**Intangible assets**	**41.7**	**36**	●
7.1.1	Trademarks by origin/bn PPP$ GDP	119.2	1	● ◆
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP ◴	1.7	50	●
7.1.4	ICTs and organizational model creation†	41.8	110	◇
7.2	**Creative goods and services**	**6.4**	**[98]**	
7.2.1	Cultural and creative services exports, % total trade	0.0	107	○
7.2.2	National feature films/mn pop. 15–69	n/a	n/a	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing ◴	1.3	34	●
7.2.5	Creative goods exports, % total trade	0.1	111	
7.3	**Online creativity**	**9.5**	**96**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	1.7	85	
7.3.2	Country-code TLDs/th pop. 15–69	1.5	74	
7.3.3	Wikipedia edits/mn pop. 15–69	36.7	90	◇
7.3.4	Mobile app creation/bn PPP$ GDP	0.0	97	○

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Peru

GII 2021 rank
70

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
82	**52**	**Upper middle**	**LCN**	**33.0**	**385.7**	**11,516**	**76**

		Score/ Value	Rank	
Institutions		**62.5**	**70**	
1.1	**Political environment**	**53.6**	**83**	
1.1.1	Political and operational stability*	62.5	89	
1.1.2	Government effectiveness*	49.1	78	
1.2	**Regulatory environment**	**69.6**	**50**	
1.2.1	Regulatory quality*	58.2	45	◆
1.2.2	Rule of law*	33.9	95	
1.2.3	Cost of redundancy dismissal	11.4	36	●
1.3	**Business environment**	**64.3**	**87**	
1.3.1	Ease of starting a business*	82.1	102	
1.3.2	Ease of resolving insolvency*	46.6	82	
Human capital and research		**34.3**	**53**	
2.1	**Education**	**42.7**	**85**	
2.1.1	Expenditure on education, % GDP	3.8	73	
2.1.2	Government funding/pupil, secondary, % GDP/cap	14.8	77	
2.1.3	School life expectancy, years ⏲	15.0	52	
2.1.4	PISA scales in reading, maths and science	401.5	66	○
2.1.5	Pupil-teacher ratio, secondary	13.5	60	
2.2	**Tertiary education**	**53.5**	**8**	● ◆
2.2.1	Tertiary enrolment, % gross ⏲	70.7	30	●
2.2.2	Graduates in science and engineering, % ⏲	29.6	17	●
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research and development (R&D)**	**6.8**	**69**	
2.3.1	Researchers, FTE/mn pop.	n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP ⏲	0.1	101	○
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	18.1	55	
Infrastructure		**38.8**	**78**	
3.1	**Information and communication technologies (ICTs)**	**62.5**	**77**	
3.1.1	ICT access*	52.1	88	
3.1.2	ICT use*	46.3	87	
3.1.3	Government's online service*	75.3	52	
3.1.4	E-participation*	76.2	55	
3.2	**General infrastructure**	**19.8**	**112**	○
3.2.1	Electricity output, GWh/mn pop.	1,717.9	88	
3.2.2	Logistics performance*	30.0	82	
3.2.3	Gross capital formation, % GDP	19.2	93	
3.3	**Ecological sustainability**	**34.2**	**49**	
3.3.1	GDP/unit of energy use	17.2	13	● ◆
3.3.2	Environmental performance*	44.0	79	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.5	58	
Market sophistication		**52.2**	**38**	
4.1	**Credit**	**56.8**	**19**	● ◆
4.1.1	Ease of getting credit*	75.0	34	
4.1.2	Domestic credit to private sector, % GDP	45.0	77	
4.1.3	Microfinance gross loans, % GDP	5.8	1	● ◆
4.2	**Investment**	**21.1**	**106**	
4.2.1	Ease of protecting minority investors*	68.0	44	
4.2.2	Market capitalization, % GDP	44.2	37	
4.2.3	Venture capital investors, deals/bn PPP$ GDP ⏲	0.0	83	○
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	90	○
4.3	**Trade, diversification, and market scale**	**78.6**	**31**	●
4.3.1	Applied tariff rate, weighted avg., %	0.7	6	●
4.3.2	Domestic industry diversification	89.6	52	
4.3.3	Domestic market scale, bn PPP$	385.7	47	

		Score/ Value	Rank	
Business sophistication		**34.3**	**37**	◆
5.1	**Knowledge workers**	**58.0**	**[20]**	
5.1.1	Knowledge-intensive employment, %	24.4	62	
5.1.2	Firms offering formal training, % ⏲	65.9	6	● ◆
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, %	17.4	40	
5.2	**Innovation linkages**	**16.5**	**99**	
5.2.1	University-industry R&D collaboration†	31.4	107	○ ◇
5.2.2	State of cluster development and depth†	39.8	101	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	120	○
5.2.5	Patent families/bn PPP$ GDP	0.0	65	
5.3	**Knowledge absorption**	**28.3**	**60**	
5.3.1	Intellectual property payments, % total trade	0.7	61	
5.3.2	High-tech imports, % total trade	8.6	52	
5.3.3	ICT services imports, % total trade	1.8	39	◆
5.3.4	FDI net inflows, % GDP	3.4	41	
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**14.9**	**87**	
6.1	**Knowledge creation**	**9.4**	**82**	
6.1.1	Patents by origin/bn PPP$ GDP	0.3	87	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	65	
6.1.3	Utility models by origin/bn PPP$ GDP	0.6	33	
6.1.4	Scientific and technical articles/bn PPP$ GDP	5.4	107	○
6.1.5	Citable documents H-index	14.3	57	
6.2	**Knowledge impact**	**29.5**	**66**	
6.2.1	Labor productivity growth, %	3.3	14	● ◆
6.2.2	New businesses/th pop. 15–64	3.8	37	
6.2.3	Software spending, % GDP	0.3	50	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	4.0	64	
6.2.5	High-tech manufacturing, %	13.6	80	
6.3	**Knowledge diffusion**	**5.9**	**116**	○
6.3.1	Intellectual property receipts, % total trade	0.1	70	
6.3.2	Production and export complexity	25.2	103	○ ◇
6.3.3	High-tech exports, % total trade	0.3	98	
6.3.4	ICT services exports, % total trade	0.3	107	○
Creative outputs		**21.2**	**77**	
7.1	**Intangible assets**	**30.3**	**67**	
7.1.1	Trademarks by origin/bn PPP$ GDP	66.1	30	●
7.1.2	Global brand value, top 5,000, % GDP	6.5	67	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.3	98	
7.1.4	ICTs and organizational model creation†	48.6	86	
7.2	**Creative goods and services**	**9.9**	**79**	
7.2.1	Cultural and creative services exports, % total trade	0.1	85	
7.2.2	National feature films/mn pop. 15–69	1.1	83	
7.2.3	Entertainment and media market/th pop. 15–69	7.6	41	
7.2.4	Printing and other media, % manufacturing	2.1	14	● ◆
7.2.5	Creative goods exports, % total trade	0.3	71	
7.3	**Online creativity**	**14.1**	**76**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	5.1	53	
7.3.2	Country-code TLDs/th pop. 15–69	1.7	72	
7.3.3	Wikipedia edits/mn pop. 15–69	49.3	67	
7.3.4	Mobile app creation/bn PPP$ GDP	0.5	79	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Philippines

GII 2021 rank **51**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
40	72	Lower middle	SEAO	109.6	933.9	8,574	50

		Score/ Value	Rank	
Institutions		**56.3**	**90**	
1.1	**Political environment**	**55.4**	**74**	◆
1.1.1	Political and operational stability*	62.5	89	
1.1.2	Government effectiveness*	51.8	69	◆
1.2	**Regulatory environment**	**50.2**	**104**	
1.2.1	Regulatory quality*	43.7	71	◆
1.2.2	Rule of law*	34.1	94	
1.2.3	Cost of redundancy dismissal	27.4	114	○
1.3	**Business environment**	**63.2**	**94**	
1.3.1	Ease of starting a business*	71.3	125	○ ◇
1.3.2	Ease of resolving insolvency*	55.1	60	
Human capital and research		**27.9**	**80**	
2.1	**Education**	**37.9**	**[97]**	
2.1.1	Expenditure on education, % GDP	n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years ◴	13.1	80	
2.1.4	PISA scales in reading, maths and science	349.7	78	○
2.1.5	Pupil-teacher ratio, secondary	25.2	105	
2.2	**Tertiary education**	**39.8**	**41**	◆
2.2.1	Tertiary enrolment, % gross ◴	35.5	79	
2.2.2	Graduates in science and engineering, % ◴	28.7	19	●
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research and development (R&D)**	**6.1**	**74**	
2.3.1	Researchers, FTE/mn pop. ◴	105.7	87	
2.3.2	Gross expenditure on R&D, % GDP ◴	0.2	95	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	20.3	53	◆
Infrastructure		**36.1**	**86**	
3.1	**Information and communication technologies (ICTs)**	**58.1**	**87**	
3.1.1	ICT access*	44.1	100	
3.1.2	ICT use*	40.2	98	
3.1.3	Government's online service*	72.9	60	◆
3.1.4	E-participation*	75.0	57	◆
3.2	**General infrastructure**	**21.5**	**101**	
3.2.1	Electricity output, GWh/mn pop.	930.1	100	
3.2.2	Logistics performance*	39.8	59	◆
3.2.3	Gross capital formation, % GDP	19.1	95	
3.3	**Ecological sustainability**	**28.9**	**63**	◆
3.3.1	GDP/unit of energy use	15.1	21	● ◆
3.3.2	Environmental performance*	38.4	92	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.0	67	◆
Market sophistication		**42.9**	**86**	
4.1	**Credit**	**23.4**	**119**	○
4.1.1	Ease of getting credit*	40.0	113	○
4.1.2	Domestic credit to private sector, % GDP	48.0	74	
4.1.3	Microfinance gross loans, % GDP	0.0	70	
4.2	**Investment**	**22.7**	**102**	
4.2.1	Ease of protecting minority investors*	60.0	71	
4.2.2	Market capitalization, % GDP	78.6	21	◆
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	77	○
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	74	
4.3	**Trade, diversification, and market scale**	**82.6**	**21**	● ◆
4.3.1	Applied tariff rate, weighted avg., %	1.7	22	● ◆
4.3.2	Domestic industry diversification	93.4	39	
4.3.3	Domestic market scale, bn PPP$	933.9	27	● ◆

		Score/ Value	Rank	
Business sophistication		**36.3**	**33**	◆
5.1	**Knowledge workers**	**38.1**	**47**	◆
5.1.1	Knowledge-intensive employment, %	21.1	77	
5.1.2	Firms offering formal training, % ◴	59.8	8	● ◆
5.1.3	GERD performed by business, % GDP ◴	0.1	70	
5.1.4	GERD financed by business, % ◴	38.0	49	◆
5.1.5	Females employed w/advanced degrees, % ◴	12.4	60	
5.2	**Innovation linkages**	**17.1**	**94**	
5.2.1	University-industry R&D collaboration†	43.7	61	
5.2.2	State of cluster development and depth†	42.3	92	
5.2.3	GERD financed by abroad, % GDP ◴	0.0	92	○
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	44	◆
5.2.5	Patent families/bn PPP$ GDP	0.0	80	
5.3	**Knowledge absorption**	**53.8**	**10**	● ◆
5.3.1	Intellectual property payments, % total trade	0.8	58	
5.3.2	High-tech imports, % total trade	26.8	1	● ◆
5.3.3	ICT services imports, % total trade	1.2	63	
5.3.4	FDI net inflows, % GDP	2.7	66	
5.3.5	Research talent, % in businesses ◴	51.8	20	◆
Knowledge and technology outputs		**37.1**	**24**	● ◆
6.1	**Knowledge creation**	**19.1**	**55**	
6.1.1	Patents by origin/bn PPP$ GDP	0.5	79	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	80	
6.1.3	Utility models by origin/bn PPP$ GDP	2.5	8	● ◆
6.1.4	Scientific and technical articles/bn PPP$ GDP	2.1	124	○
6.1.5	Citable documents H-index	14.8	55	
6.2	**Knowledge impact**	**33.6**	**47**	◆
6.2.1	Labor productivity growth, %	1.6	31	
6.2.2	New businesses/th pop. 15–64	0.3	109	○
6.2.3	Software spending, % GDP	0.2	59	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	4.2	63	
6.2.5	High-tech manufacturing, %	40.3	27	◆
6.3	**Knowledge diffusion**	**58.7**	**5**	● ◆
6.3.1	Intellectual property receipts, % total trade	0.0	80	
6.3.2	Production and export complexity	59.5	35	◆
6.3.3	High-tech exports, % total trade	32.3	1	● ◆
6.3.4	ICT services exports, % total trade	5.4	13	● ◆
Creative outputs		**24.2**	**65**	
7.1	**Intangible assets**	**29.9**	**71**	
7.1.1	Trademarks by origin/bn PPP$ GDP	34.0	66	
7.1.2	Global brand value, top 5,000, % GDP	40.3	39	◆
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.1	65	
7.1.4	ICTs and organizational model creation†	61.7	39	◆
7.2	**Creative goods and services**	**27.0**	**33**	◆
7.2.1	Cultural and creative services exports, % total trade	0.2	74	
7.2.2	National feature films/mn pop. 15–69 ◴	0.8	89	
7.2.3	Entertainment and media market/th pop. 15–69	4.0	49	◆
7.2.4	Printing and other media, % manufacturing ◴	0.5	87	○
7.2.5	Creative goods exports, % total trade	6.3	10	● ◆
7.3	**Online creativity**	**10.0**	**92**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	1.1	93	
7.3.2	Country-code TLDs/th pop. 15–69	0.4	100	
7.3.3	Wikipedia edits/mn pop. 15–69	37.5	89	
7.3.4	Mobile app creation/bn PPP$ GDP	2.8	67	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Poland

GII 2021 rank
40

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
42	**37**	**High**	**EUR**	**37.8**	**1,280.7**	**33,739**	**38**

		Score/ Value	Rank	
Institutions		**73.2**	**38**	
1.1	**Political environment**	**68.3**	**43**	
1.1.1	Political and operational stability*	76.8	37	
1.1.2	Government effectiveness*	64.0	42	
1.2	**Regulatory environment**	**71.5**	**47**	
1.2.1	Regulatory quality*	70.0	31	
1.2.2	Rule of law*	58.6	47	◇
1.2.3	Cost of redundancy dismissal	18.8	78	○
1.3	**Business environment**	**79.7**	**35**	
1.3.1	Ease of starting a business*	82.9	99	○ ◇
1.3.2	Ease of resolving insolvency*	76.5	23	●
Human capital and research		**42.3**	**37**	
2.1	**Education**	**57.0**	**43**	
2.1.1	Expenditure on education, % GDP	4.6	56	
2.1.2	Government funding/pupil, secondary, % GDP/cap	20.9	43	
2.1.3	School life expectancy, years	16.0	37	
2.1.4	PISA scales in reading, maths and science	512.8	9	●
2.1.5	Pupil-teacher ratio, secondary	10.5	34	
2.2	**Tertiary education**	**35.1**	**60**	
2.2.1	Tertiary enrolment, % gross	68.6	35	
2.2.2	Graduates in science and engineering, %	21.7	63	
2.2.3	Tertiary inbound mobility, %	3.6	58	
2.3	**Research and development (R&D)**	**34.7**	**33**	
2.3.1	Researchers, FTE/mn pop.	3,187.8	30	
2.3.2	Gross expenditure on R&D, % GDP	1.3	28	
2.3.3	Global corporate R&D investors, top 3, mn US$	45.4	35	
2.3.4	QS university ranking, top 3*	29.1	40	
Infrastructure		**50.1**	**41**	
3.1	**Information and communication technologies (ICTs)**	**82.7**	**24**	●
3.1.1	ICT access*	75.7	48	
3.1.2	ICT use*	72.9	38	
3.1.3	Government's online service*	85.9	22	●
3.1.4	E-participation*	96.4	9	● ◆
3.2	**General infrastructure**	**31.0**	**57**	
3.2.1	Electricity output, GWh/mn pop.	4,253.2	52	
3.2.2	Logistics performance*	69.3	27	
3.2.3	Gross capital formation, % GDP	18.1	99	○
3.3	**Ecological sustainability**	**36.5**	**40**	
3.3.1	GDP/unit of energy use	11.7	54	
3.3.2	Environmental performance*	60.9	37	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.9	30	
Market sophistication		**48.3**	**60**	
4.1	**Credit**	**38.3**	**77**	
4.1.1	Ease of getting credit*	75.0	34	
4.1.2	Domestic credit to private sector, % GDP	50.8	67	
4.1.3	Microfinance gross loans, % GDP	0.1	57	○
4.2	**Investment**	**20.8**	**108**	○
4.2.1	Ease of protecting minority investors*	66.0	50	
4.2.2	Market capitalization, % GDP	30.3	47	○
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	63	○
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	68	○
4.3	**Trade, diversification, and market scale**	**85.7**	**11**	●
4.3.1	Applied tariff rate, weighted avg., %	1.8	25	
4.3.2	Domestic industry diversification	98.6	7	●
4.3.3	Domestic market scale, bn PPP$	1,280.7	20	●

		Score/ Value	Rank	
Business sophistication		**34.2**	**38**	
5.1	**Knowledge workers**	**45.1**	**32**	
5.1.1	Knowledge-intensive employment, %	39.9	27	
5.1.2	Firms offering formal training, %	21.7	72	○
5.1.3	GERD performed by business, % GDP	0.8	26	
5.1.4	GERD financed by business, %	53.2	23	
5.1.5	Females employed w/advanced degrees, %	21.6	27	
5.2	**Innovation linkages**	**20.0**	**71**	◇
5.2.1	University-industry R&D collaboration†	38.3	86	○ ◇
5.2.2	State of cluster development and depth†	46.7	63	
5.2.3	GERD financed by abroad, % GDP	0.1	42	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	68	
5.2.5	Patent families/bn PPP$ GDP	0.3	35	
5.3	**Knowledge absorption**	**37.4**	**33**	
5.3.1	Intellectual property payments, % total trade	1.2	32	
5.3.2	High-tech imports, % total trade	8.8	50	
5.3.3	ICT services imports, % total trade	1.4	56	
5.3.4	FDI net inflows, % GDP	2.6	69	
5.3.5	Research talent, % in businesses	47.9	29	
Knowledge and technology outputs		**30.6**	**36**	
6.1	**Knowledge creation**	**27.2**	**35**	
6.1.1	Patents by origin/bn PPP$ GDP	3.3	25	●
6.1.2	PCT patents by origin/bn PPP$ GDP	0.3	42	
6.1.3	Utility models by origin/bn PPP$ GDP	0.7	32	
6.1.4	Scientific and technical articles/bn PPP$ GDP	27.0	34	
6.1.5	Citable documents H-index	36.5	26	
6.2	**Knowledge impact**	**35.3**	**41**	
6.2.1	Labor productivity growth, %	2.3	23	● ◆
6.2.2	New businesses/th pop. 15–64	1.4	70	
6.2.3	Software spending, % GDP	0.2	60	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	8.8	31	
6.2.5	High-tech manufacturing, %	32.6	39	
6.3	**Knowledge diffusion**	**29.3**	**37**	
6.3.1	Intellectual property receipts, % total trade	0.2	42	
6.3.2	Production and export complexity	69.3	23	●
6.3.3	High-tech exports, % total trade	6.3	29	
6.3.4	ICT services exports, % total trade	2.8	37	
Creative outputs		**29.6**	**50**	
7.1	**Intangible assets**	**29.5**	**73**	
7.1.1	Trademarks by origin/bn PPP$ GDP	32.0	73	
7.1.2	Global brand value, top 5,000, % GDP	33.8	42	
7.1.3	Industrial designs by origin/bn PPP$ GDP	n/a	n/a	
7.1.4	ICTs and organizational model creation†	51.9	74	◇
7.2	**Creative goods and services**	**29.4**	**26**	
7.2.1	Cultural and creative services exports, % total trade	1.2	24	
7.2.2	National feature films/mn pop. 15–69	1.8	71	○ ◇
7.2.3	Entertainment and media market/th pop. 15–69	12.1	34	◇
7.2.4	Printing and other media, % manufacturing	1.2	37	
7.2.5	Creative goods exports, % total trade	4.5	12	● ◆
7.3	**Online creativity**	**30.1**	**35**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	7.1	46	
7.3.2	Country-code TLDs/th pop. 15–69	26.9	26	
7.3.3	Wikipedia edits/mn pop. 15–69	68.5	42	
7.3.4	Mobile app creation/bn PPP$ GDP	15.5	32	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Portugal

GII 2021 rank **31**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
30	32	High	EUR	10.2	339.9	33,131	31

		Score/ Value	Rank
Institutions		**80.4**	**25**
1.1	**Political environment**	**78.2**	**25**
1.1.1	Political and operational stability*	82.1	24
1.1.2	Government effectiveness*	76.3	26
1.2	**Regulatory environment**	**77.5**	**34**
1.2.1	Regulatory quality*	68.8	37
1.2.2	Rule of law*	76.6	24
1.2.3	Cost of redundancy dismissal	17.0	67 ○
1.3	**Business environment**	**85.5**	**18** ●
1.3.1	Ease of starting a business*	90.9	53
1.3.2	Ease of resolving insolvency*	80.2	14 ●
Human capital and research		**49.3**	**24**
2.1	**Education**	**63.9**	**15** ●
2.1.1	Expenditure on education, % GDP	5.0	38
2.1.2	Government funding/pupil, secondary, % GDP/cap	29.6	8 ● ◆
2.1.3	School life expectancy, years	16.7	21
2.1.4	PISA scales in reading, maths and science	492.0	26
2.1.5	Pupil-teacher ratio, secondary ◴	9.3	21
2.2	**Tertiary education**	**43.8**	**26**
2.2.1	Tertiary enrolment, % gross	65.7	39
2.2.2	Graduates in science and engineering, %	27.9	24
2.2.3	Tertiary inbound mobility, %	7.9	33
2.3	**Research and development (R&D)**	**40.3**	**27**
2.3.1	Researchers, FTE/mn pop.	4,905.6	18
2.3.2	Gross expenditure on R&D, % GDP	1.4	26
2.3.3	Global corporate R&D investors, top 3, mn US$	45.6	34
2.3.4	QS university ranking, top 3*	29.0	41
Infrastructure		**52.6**	**31**
3.1	**Information and communication technologies (ICTs)**	**81.2**	**27**
3.1.1	ICT access*	86.0	18 ●
3.1.2	ICT use*	73.0	37
3.1.3	Government's online service*	83.5	35
3.1.4	E-participation*	82.1	41
3.2	**General infrastructure**	**33.8**	**44**
3.2.1	Electricity output, GWh/mn pop.	5,032.0	43
3.2.2	Logistics performance*	74.1	23
3.2.3	Gross capital formation, % GDP	19.2	94 ○
3.3	**Ecological sustainability**	**42.8**	**31**
3.3.1	GDP/unit of energy use	15.7	20
3.3.2	Environmental performance*	67.0	27
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.8	31
Market sophistication		**48.6**	**56**
4.1	**Credit**	**41.0**	**63**
4.1.1	Ease of getting credit*	45.0	101 ○ ◇
4.1.2	Domestic credit to private sector, % GDP	90.7	28
4.1.3	Microfinance gross loans, % GDP	n/a	n/a
4.2	**Investment**	**23.9**	**93** ○
4.2.1	Ease of protecting minority investors*	62.0	60 ○
4.2.2	Market capitalization, % GDP ◴	29.2	48 ○
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.1	40
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	39
4.3	**Trade, diversification, and market scale**	**81.0**	**25**
4.3.1	Applied tariff rate, weighted avg., %	1.8	25
4.3.2	Domestic industry diversification	100.0	1 ●
4.3.3	Domestic market scale, bn PPP$	340.0	50

		Score/ Value	Rank
Business sophistication		**33.6**	**41**
5.1	**Knowledge workers**	**42.5**	**39**
5.1.1	Knowledge-intensive employment, %	36.3	36
5.1.2	Firms offering formal training, %	29.0	54 ○
5.1.3	GERD performed by business, % GDP	0.7	31
5.1.4	GERD financed by business, %	48.3	30
5.1.5	Females employed w/advanced degrees, %	17.1	41
5.2	**Innovation linkages**	**25.1**	**46**
5.2.1	University-industry R&D collaboration†	55.1	29
5.2.2	State of cluster development and depth†	54.1	39
5.2.3	GERD financed by abroad, % GDP	0.1	40
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	64
5.2.5	Patent families/bn PPP$ GDP	0.6	31
5.3	**Knowledge absorption**	**33.3**	**47**
5.3.1	Intellectual property payments, % total trade	0.8	45
5.3.2	High-tech imports, % total trade	9.9	37
5.3.3	ICT services imports, % total trade	1.1	71 ○
5.3.4	FDI net inflows, % GDP	3.8	31
5.3.5	Research talent, % in businesses	38.3	34
Knowledge and technology outputs		**31.9**	**34**
6.1	**Knowledge creation**	**31.2**	**31**
6.1.1	Patents by origin/bn PPP$ GDP	2.6	29
6.1.2	PCT patents by origin/bn PPP$ GDP	0.8	30
6.1.3	Utility models by origin/bn PPP$ GDP	0.1	51 ○
6.1.4	Scientific and technical articles/bn PPP$ GDP	50.2	10 ● ◆
6.1.5	Citable documents H-index	32.7	30
6.2	**Knowledge impact**	**43.3**	**17** ●
6.2.1	Labor productivity growth, %	–1.2	90 ○
6.2.2	New businesses/th pop. 15–64	6.5	24
6.2.3	Software spending, % GDP	0.5	8 ●
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	18.1	15 ●
6.2.5	High-tech manufacturing, %	29.7	43
6.3	**Knowledge diffusion**	**21.0**	**52**
6.3.1	Intellectual property receipts, % total trade	0.1	49
6.3.2	Production and export complexity	62.4	33
6.3.3	High-tech exports, % total trade	3.4	45
6.3.4	ICT services exports, % total trade	1.8	61
Creative outputs		**39.3**	**26**
7.1	**Intangible assets**	**50.1**	**19** ●
7.1.1	Trademarks by origin/bn PPP$ GDP	91.7	12 ● ◆
7.1.2	Global brand value, top 5,000, % GDP	50.7	36
7.1.3	Industrial designs by origin/bn PPP$ GDP	7.3	18 ●
7.1.4	ICTs and organizational model creation†	64.8	30
7.2	**Creative goods and services**	**20.1**	**53**
7.2.1	Cultural and creative services exports, % total trade	0.6	41
7.2.2	National feature films/mn pop. 15–69	5.2	42
7.2.3	Entertainment and media market/th pop. 15–69	36.1	21
7.2.4	Printing and other media, % manufacturing	1.1	47
7.2.5	Creative goods exports, % total trade	1.3	39
7.3	**Online creativity**	**36.7**	**30**
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	19.6	29
7.3.2	Country-code TLDs/th pop. 15–69	55.9	14 ●
7.3.3	Wikipedia edits/mn pop. 15–69	64.9	45
7.3.4	Mobile app creation/bn PPP$ GDP	4.4	59 ○

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Qatar

GII 2021 rank
68

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
70	**64**	**High**	**NAWA**	**2.9**	**257.5**	**91,897**	**70**

		Score/ Value	Rank	
Institutions		**66.0**	**57**	◇
1.1	**Political environment**	**69.2**	**41**	
1.1.1	Political and operational stability*	75.0	40	
1.1.2	Government effectiveness*	66.3	39	
1.2	**Regulatory environment**	**66.8**	**61**	◇
1.2.1	Regulatory quality*	61.3	40	
1.2.2	Rule of law*	66.1	36	
1.2.3	Cost of redundancy dismissal	23.2	100	◇
1.3	**Business environment**	**62.0**	**98**	◇
1.3.1	Ease of starting a business*	86.1	84	◇
1.3.2	Ease of resolving insolvency*	38.0	107	◇
Human capital and research		**29.8**	**75**	◇
2.1	**Education**	**40.1**	**94**	◇
2.1.1	Expenditure on education, % GDP	2.7	105 ○	◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	12.3	89	◇
2.1.4	PISA scales in reading, maths and science	413.5	60	◇
2.1.5	Pupil-teacher ratio, secondary	11.8	47	
2.2	**Tertiary education**	**42.0**	**37**	
2.2.1	Tertiary enrolment, % gross	18.9	98	◇
2.2.2	Graduates in science and engineering, %	24.2	43	
2.2.3	Tertiary inbound mobility, %	35.3	1 ● ◆	
2.3	**Research and development (R&D)**	**7.4**	**67**	◇
2.3.1	Researchers, FTE/mn pop. ⏲	577.3	63	◇
2.3.2	Gross expenditure on R&D, % GDP ⏲	0.5	66	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41 ○	◇
2.3.4	QS university ranking, top 3*	12.6	61	
Infrastructure		**52.3**	**34**	
3.1	**Information and communication technologies (ICTs)**	**70.8**	**57**	◇
3.1.1	ICT access*	79.8	34	
3.1.2	ICT use*	72.1	41	
3.1.3	Government's online service*	65.9	76	◇
3.1.4	E-participation*	65.5	77	◇
3.2	**General infrastructure**	**64.4**	**2** ● ◆	
3.2.1	Electricity output, GWh/mn pop.	17,222.5	6 ● ◆	
3.2.2	Logistics performance*	66.3	29 ●	
3.2.3	Gross capital formation, % GDP	n/a	n/a	
3.3	**Ecological sustainability**	**21.7**	**89**	◇
3.3.1	GDP/unit of energy use	7.7	94	
3.3.2	Environmental performance*	37.1	99	◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.7	51	
Market sophistication		**43.2**	**83**	
4.1	**Credit**	**43.2**	**55**	
4.1.1	Ease of getting credit*	45.0	101 ○	◇
4.1.2	Domestic credit to private sector, % GDP	100.9	24 ●	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**15.6**	**128** ○	◇
4.2.1	Ease of protecting minority investors*	28.0	124 ○	◇
4.2.2	Market capitalization, % GDP	87.0	17 ●	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	60	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP ⏲	0.0	89 ○	
4.3	**Trade, diversification, and market scale**	**70.8**	**59**	
4.3.1	Applied tariff rate, weighted avg., %	3.5	67	
4.3.2	Domestic industry diversification	81.8	72	
4.3.3	Domestic market scale, bn PPP$	257.5	59	

		Score/ Value	Rank	
Business sophistication		**19.9**	**96**	◇
5.1	**Knowledge workers**	**12.9**	**118** ○	◇
5.1.1	Knowledge-intensive employment, % ⏲	18.1	86	◇
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP ⏲	0.1	69	◇
5.1.4	GERD financed by business, %	9.3	77	◇
5.1.5	Females employed w/advanced degrees, % ⏲	4.5	96	◇
5.2	**Innovation linkages**	**22.8**	**55**	
5.2.1	University-industry R&D collaboration†	65.4	14 ●	
5.2.2	State of cluster development and depth†	54.1	38	
5.2.3	GERD financed by abroad, % GDP	0.0	93 ○	◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.1	34	
5.2.5	Patent families/bn PPP$ GDP	0.0	69	
5.3	**Knowledge absorption**	**24.1**	**72**	
5.3.1	Intellectual property payments, % total trade ⏲	0.1	102 ○	◇
5.3.2	High-tech imports, % total trade	7.5	68	
5.3.3	ICT services imports, % total trade	2.9	9 ●	
5.3.4	FDI net inflows, % GDP	–0.7	123 ○	
5.3.5	Research talent, % in businesses ⏲	16.1	57	◇
Knowledge and technology outputs		**16.8**	**79**	◇
6.1	**Knowledge creation**	**8.7**	**87**	◇
6.1.1	Patents by origin/bn PPP$ GDP	0.2	102	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	66	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	12.2	70	◇
6.1.5	Citable documents H-index	10.2	76	
6.2	**Knowledge impact**	**30.0**	**62**	
6.2.1	Labor productivity growth, %	–2.6	109 ○	◇
6.2.2	New businesses/th pop. 15–64	6.3	26 ●	
6.2.3	Software spending, % GDP	0.3	32	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	3.1	73	
6.2.5	High-tech manufacturing, %	34.7	35	
6.3	**Knowledge diffusion**	**11.8**	**86**	◇
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	Production and export complexity	36.7	74	◇
6.3.3	High-tech exports, % total trade	0.3	96	◇
6.3.4	ICT services exports, % total trade	1.1	79	
Creative outputs		**24.7**	**63**	◇
7.1	**Intangible assets**	**32.7**	**58**	
7.1.1	Trademarks by origin/bn PPP$ GDP	5.0	121 ○	◇
7.1.2	Global brand value, top 5,000, % GDP	97.5	20 ●	
7.1.3	Industrial designs by origin/bn PPP$ GDP	n/a	n/a	
7.1.4	ICTs and organizational model creation†	63.9	33	
7.2	**Creative goods and services**	**20.4**	**50**	
7.2.1	Cultural and creative services exports, % total trade	0.3	62	
7.2.2	National feature films/mn pop. 15–69	23.0	4 ● ◆	
7.2.3	Entertainment and media market/th pop. 15–69	19.6	28	
7.2.4	Printing and other media, % manufacturing	0.7	72	
7.2.5	Creative goods exports, % total trade ⏲	0.2	82	
7.3	**Online creativity**	**12.9**	**81**	◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	3.4	60	
7.3.2	Country-code TLDs/th pop. 15–69	2.6	63	
7.3.3	Wikipedia edits/mn pop. 15–69	45.8	73	◇
7.3.4	Mobile app creation/bn PPP$ GDP	0.4	83	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Republic of Korea

GII 2021 rank **5**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
5	9	High	SEAO	51.3	2,293.5	44,292	10

		Score/ Value	Rank	
Institutions		**79.5**	**28**	
1.1	**Political environment**	**82.1**	**18**	
1.1.1	Political and operational stability*	83.9	13	
1.1.2	Government effectiveness*	81.2	21	
1.2	**Regulatory environment**	**68.2**	**57**	◇
1.2.1	Regulatory quality*	71.5	29	◇
1.2.2	Rule of law*	78.2	23	
1.2.3	Cost of redundancy dismissal	27.4	110	○ ◇
1.3	**Business environment**	**88.1**	**10**	
1.3.1	Ease of starting a business*	93.4	31	
1.3.2	Ease of resolving insolvency*	82.9	10	
Human capital and research		**67.4**	**1**	● ◆
2.1	**Education**	**61.5**	**22**	
2.1.1	Expenditure on education, % GDP	4.6	55	
2.1.2	Government funding/pupil, secondary, % GDP/cap	28.4	11	◆
2.1.3	School life expectancy, years	16.5	26	
2.1.4	PISA scales in reading, maths and science	519.7	6	
2.1.5	Pupil-teacher ratio, secondary	12.6	53	
2.2	**Tertiary education**	**51.0**	**13**	
2.2.1	Tertiary enrolment, % gross	95.9	4	◆
2.2.2	Graduates in science and engineering, %	29.3	18	
2.2.3	Tertiary inbound mobility, %	2.7	71	○ ◇
2.3	**Research and development (R&D)**	**89.8**	**1**	● ◆
2.3.1	Researchers, FTE/mn pop.	8,407.8	1	● ◆
2.3.2	Gross expenditure on R&D, % GDP	4.6	2	● ◆
2.3.3	Global corporate R&D investors, top 3, mn US$	90.2	4	●
2.3.4	QS university ranking, top 3*	74.9	9	
Infrastructure		**59.2**	**12**	
3.1	**Information and communication technologies (ICTs)**	**94.8**	**1**	● ◆
3.1.1	ICT access*	90.0	8	
3.1.2	ICT use*	89.1	5	◆
3.1.3	Government's online service*	100.0	1	● ◆
3.1.4	E-participation*	100.0	1	●
3.2	**General infrastructure**	**49.4**	**11**	
3.2.1	Electricity output, GWh/mn pop.	11,358.9	11	
3.2.2	Logistics performance*	72.7	25	
3.2.3	Gross capital formation, % GDP	31.3	23	◆
3.3	**Ecological sustainability**	**33.4**	**50**	◇
3.3.1	GDP/unit of energy use	7.7	95	○
3.3.2	Environmental performance*	66.5	28	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.6	33	
Market sophistication		**60.0**	**18**	
4.1	**Credit**	**64.2**	**12**	
4.1.1	Ease of getting credit*	65.0	61	○
4.1.2	Domestic credit to private sector, % GDP	151.7	8	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**31.5**	**65**	◇
4.2.1	Ease of protecting minority investors*	74.0	24	
4.2.2	Market capitalization, % GDP	91.6	15	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.1	34	◇
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	63	○ ◇
4.3	**Trade, diversification, and market scale**	**84.2**	**16**	
4.3.1	Applied tariff rate, weighted avg., %	4.8	82	○
4.3.2	Domestic industry diversification	97.3	14	
4.3.3	Domestic market scale, bn PPP$	2,293.5	14	

		Score/ Value	Rank	
Business sophistication		**60.1**	**7**	
5.1	**Knowledge workers**	**78.1**	**1**	● ◆
5.1.1	Knowledge-intensive employment, %	39.1	28	◇
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	3.7	2	● ◆
5.1.4	GERD financed by business, %	76.9	3	● ◆
5.1.5	Females employed w/advanced degrees, %	20.2	30	
5.2	**Innovation linkages**	**48.3**	**15**	
5.2.1	University-industry R&D collaboration†	62.5	18	
5.2.2	State of cluster development and depth†	61.6	24	
5.2.3	GERD financed by abroad, % GDP	0.1	46	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	37	◇
5.2.5	Patent families/bn PPP$ GDP	11.0	1	● ◆
5.3	**Knowledge absorption**	**54.0**	**8**	
5.3.1	Intellectual property payments, % total trade	1.5	25	
5.3.2	High-tech imports, % total trade	15.9	11	
5.3.3	ICT services imports, % total trade	0.5	104	○ ◇
5.3.4	FDI net inflows, % GDP	0.8	111	○
5.3.5	Research talent, % in businesses	82.3	1	● ◆
Knowledge and technology outputs		**54.5**	**8**	
6.1	**Knowledge creation**	**66.1**	**7**	
6.1.1	Patents by origin/bn PPP$ GDP	74.5	1	● ◆
6.1.2	PCT patents by origin/bn PPP$ GDP	8.7	1	● ◆
6.1.3	Utility models by origin/bn PPP$ GDP	2.2	11	
6.1.4	Scientific and technical articles/bn PPP$ GDP	30.0	29	
6.1.5	Citable documents H-index	45.1	17	
6.2	**Knowledge impact**	**40.0**	**23**	
6.2.1	Labor productivity growth, %	1.1	41	
6.2.2	New businesses/th pop. 15–64	2.6	51	
6.2.3	Software spending, % GDP	0.2	66	◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	6.2	45	
6.2.5	High-tech manufacturing, %	59.1	5	
6.3	**Knowledge diffusion**	**57.2**	**7**	
6.3.1	Intellectual property receipts, % total trade	1.2	18	
6.3.2	Production and export complexity	92.6	3	● ◆
6.3.3	High-tech exports, % total trade	24.1	1	● ◆
6.3.4	ICT services exports, % total trade	0.9	85	○
Creative outputs		**52.1**	**8**	
7.1	**Intangible assets**	**74.1**	**1**	● ◆
7.1.1	Trademarks by origin/bn PPP$ GDP	99.1	8	◆
7.1.2	Global brand value, top 5,000, % GDP	191.6	5	
7.1.3	Industrial designs by origin/bn PPP$ GDP	26.6	1	● ◆
7.1.4	ICTs and organizational model creation†	64.0	32	◇
7.2	**Creative goods and services**	**32.4**	**20**	
7.2.1	Cultural and creative services exports, % total trade	0.6	40	
7.2.2	National feature films/mn pop. 15–69	12.5	13	
7.2.3	Entertainment and media market/th pop. 15–69	51.7	16	
7.2.4	Printing and other media, % manufacturing	0.3	100	○ ◇
7.2.5	Creative goods exports, % total trade	3.6	14	
7.3	**Online creativity**	**28.1**	**37**	◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	8.2	43	◇
7.3.2	Country-code TLDs/th pop. 15–69	8.2	43	◇
7.3.3	Wikipedia edits/mn pop. 15–69	61.8	48	◇
7.3.4	Mobile app creation/bn PPP$ GDP	32.5	14	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Republic of Moldova

GII 2021 rank
64

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
54	**80**	**Lower middle**	**EUR**	**4.0**	**34.9**	**13,253**	**59**

		Score/ Value	Rank	
Institutions		**59.8**	**81**	
1.1	**Political environment**	**49.5**	**92**	
1.1.1	Political and operational stability*	64.3	80	
1.1.2	Government effectiveness*	42.1	93	
1.2	**Regulatory environment**	**54.6**	**95**	
1.2.1	Regulatory quality*	43.8	70	◆
1.2.2	Rule of law*	36.9	84	
1.2.3	Cost of redundancy dismissal	23.7	101	
1.3	**Business environment**	**75.2**	**49**	◆
1.3.1	Ease of starting a business*	95.7	12	● ◆
1.3.2	Ease of resolving insolvency*	54.8	62	
Human capital and research		**28.8**	**77**	
2.1	**Education**	**51.7**	**63**	
2.1.1	Expenditure on education, % GDP	6.1	13	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	24.2	18	●
2.1.3	School life expectancy, years	11.4	96	
2.1.4	PISA scales in reading, maths and science	424.4	51	
2.1.5	Pupil-teacher ratio, secondary	10.3	31	● ◆
2.2	**Tertiary education**	**31.5**	**70**	
2.2.1	Tertiary enrolment, % gross	39.2	75	
2.2.2	Graduates in science and engineering, %	24.8	40	
2.2.3	Tertiary inbound mobility, %	5.6	41	◆
2.3	**Research and development (R&D)**	**3.2**	**84**	
2.3.1	Researchers, FTE/mn pop. ◴	696.1	59	
2.3.2	Gross expenditure on R&D, % GDP ◴	0.3	87	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**36.5**	**82**	◆
3.1	**Information and communication technologies (ICTs)**	**68.0**	**62**	◆
3.1.1	ICT access*	66.4	68	◆
3.1.2	ICT use*	54.2	73	◆
3.1.3	Government's online service*	75.3	52	◆
3.1.4	E-participation*	76.2	55	◆
3.2	**General infrastructure**	**22.2**	**95**	
3.2.1	Electricity output, GWh/mn pop.	1,520.3	90	
3.2.2	Logistics performance*	19.0	108	○
3.2.3	Gross capital formation, % GDP	25.5	41	
3.3	**Ecological sustainability**	**19.3**	**105**	
3.3.1	GDP/unit of energy use	6.0	107	○
3.3.2	Environmental performance*	44.4	76	◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.3	97	
Market sophistication		**44.9**	**74**	
4.1	**Credit**	**33.6**	**94**	
4.1.1	Ease of getting credit*	70.0	44	
4.1.2	Domestic credit to private sector, % GDP	24.8	105	
4.1.3	Microfinance gross loans, % GDP	0.7	30	
4.2	**Investment**	**39.1**	**[38]**	
4.2.1	Ease of protecting minority investors*	68.0	44	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	42	
4.3	**Trade, diversification, and market scale**	**61.8**	**86**	
4.3.1	Applied tariff rate, weighted avg., % ◴	3.5	71	
4.3.2	Domestic industry diversification	80.1	78	
4.3.3	Domestic market scale, bn PPP$	34.9	116	○

		Score/ Value	Rank	
Business sophistication		**21.7**	**87**	
5.1	**Knowledge workers**	**30.5**	**67**	
5.1.1	Knowledge-intensive employment, %	31.1	46	◆
5.1.2	Firms offering formal training, %	38.1	33	
5.1.3	GERD performed by business, % GDP ◴	0.0	76	○
5.1.4	GERD financed by business, %	15.5	72	
5.1.5	Females employed w/advanced degrees, %	16.4	42	◆
5.2	**Innovation linkages**	**13.0**	**119**	○
5.2.1	University-industry R&D collaboration† ◴	28.7	116	○
5.2.2	State of cluster development and depth† ◴	26.1	126	○ ◇
5.2.3	GERD financed by abroad, % GDP	0.0	75	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	n/a	n/a	
5.2.5	Patent families/bn PPP$ GDP	0.2	45	◆
5.3	**Knowledge absorption**	**21.6**	**82**	
5.3.1	Intellectual property payments, % total trade	0.5	66	
5.3.2	High-tech imports, % total trade	7.6	67	
5.3.3	ICT services imports, % total trade	1.9	35	◆
5.3.4	FDI net inflows, % GDP	2.8	60	
5.3.5	Research talent, % in businesses ◴	6.2	69	
Knowledge and technology outputs		**24.2**	**54**	◆
6.1	**Knowledge creation**	**30.2**	**34**	◆
6.1.1	Patents by origin/bn PPP$ GDP	2.4	31	● ◆
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	59	◆
6.1.3	Utility models by origin/bn PPP$ GDP	3.8	1	● ◆
6.1.4	Scientific and technical articles/bn PPP$ GDP	7.4	98	
6.1.5	Citable documents H-index	6.0	96	
6.2	**Knowledge impact**	**19.9**	**104**	
6.2.1	Labor productivity growth, %	–1.1	84	
6.2.2	New businesses/th pop. 15–64	1.9	59	
6.2.3	Software spending, % GDP	0.1	87	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	2.6	81	
6.2.5	High-tech manufacturing, %	16.2	70	
6.3	**Knowledge diffusion**	**22.4**	**51**	
6.3.1	Intellectual property receipts, % total trade	0.1	63	
6.3.2	Production and export complexity	39.7	70	
6.3.3	High-tech exports, % total trade	0.9	74	
6.3.4	ICT services exports, % total trade	5.0	15	● ◆
Creative outputs		**28.5**	**53**	◆
7.1	**Intangible assets**	**43.3**	**34**	◆
7.1.1	Trademarks by origin/bn PPP$ GDP	87.8	14	● ◆
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	12.5	9	● ◆
7.1.4	ICTs and organizational model creation†	48.3	87	
7.2	**Creative goods and services**	**8.2**	**88**	
7.2.1	Cultural and creative services exports, % total trade	0.9	32	◆
7.2.2	National feature films/mn pop. 15–69 ◴	0.3	101	○
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	0.7	74	
7.2.5	Creative goods exports, % total trade	0.1	97	
7.3	**Online creativity**	**19.1**	**60**	◆
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	2.1	75	◆
7.3.2	Country-code TLDs/th pop. 15–69	2.3	66	◆
7.3.3	Wikipedia edits/mn pop. 15–69	45.2	75	◆
7.3.4	Mobile app creation/bn PPP$ GDP	27.4	20	● ◆

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Romania

GII 2021 rank **48**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
50	**54**	**High**	**EUR**	**19.2**	**584.9**	**30,141**	**46**

		Score/ Value	Rank	
Institutions		**68.1**	**53**	◇
1.1	**Political environment**	**52.8**	**86**	◇
1.1.1	Political and operational stability*	69.6	60	◇
1.1.2	Government effectiveness*	44.4	89	◇
1.2	**Regulatory environment**	**78.0**	**33**	
1.2.1	Regulatory quality*	55.6	52	◇
1.2.2	Rule of law*	56.3	49	◇
1.2.3	Cost of redundancy dismissal	8.0	1	● ◆
1.3	**Business environment**	**73.4**	**57**	
1.3.1	Ease of starting a business*	87.7	73	
1.3.2	Ease of resolving insolvency*	59.1	51	
Human capital and research		**28.9**	**76**	◇
2.1	**Education**	**41.5**	**90**	◇
2.1.1	Expenditure on education, % GDP	3.1	95	○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	16.4	68	◇
2.1.3	School life expectancy, years	14.3	67	◇
2.1.4	PISA scales in reading, maths and science	427.8	49	◇
2.1.5	Pupil-teacher ratio, secondary ◴	11.8	48	
2.2	**Tertiary education**	**38.5**	**46**	
2.2.1	Tertiary enrolment, % gross	51.0	62	
2.2.2	Graduates in science and engineering, %	28.1	23	
2.2.3	Tertiary inbound mobility, %	5.4	44	
2.3	**Research and development (R&D)**	**6.8**	**70**	◇
2.3.1	Researchers, FTE/mn pop.	896.0	52	◇
2.3.2	Gross expenditure on R&D, % GDP	0.5	68	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	7.1	69	◇
Infrastructure		**51.5**	**37**	
3.1	**Information and communication technologies (ICTs)**	**73.9**	**52**	
3.1.1	ICT access*	73.4	51	◇
3.1.2	ICT use*	68.9	50	◇
3.1.3	Government's online service*	72.4	61	
3.1.4	E-participation*	81.0	46	
3.2	**General infrastructure**	**29.0**	**65**	
3.2.1	Electricity output, GWh/mn pop.	3,309.2	61	
3.2.2	Logistics performance*	49.8	47	
3.2.3	Gross capital formation, % GDP	22.6	62	
3.3	**Ecological sustainability**	**51.7**	**9**	●
3.3.1	GDP/unit of energy use	14.9	23	●
3.3.2	Environmental performance*	64.7	32	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	7.9	10	● ◆
Market sophistication		**44.7**	**76**	
4.1	**Credit**	**35.3**	**87**	
4.1.1	Ease of getting credit*	80.0	23	
4.1.2	Domestic credit to private sector, % GDP	24.7	106	○ ◇
4.1.3	Microfinance gross loans, % GDP	0.0	73	○
4.2	**Investment**	**17.4**	**123**	○ ◇
4.2.1	Ease of protecting minority investors*	62.0	60	
4.2.2	Market capitalization, % GDP	10.4	68	○ ◇
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	74	○ ◇
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	76	○
4.3	**Trade, diversification, and market scale**	**81.5**	**23**	●
4.3.1	Applied tariff rate, weighted avg., %	1.8	25	
4.3.2	Domestic industry diversification	95.7	24	
4.3.3	Domestic market scale, bn PPP$	584.8	35	

		Score/ Value	Rank	
Business sophistication		**28.0**	**54**	
5.1	**Knowledge workers**	**33.4**	**60**	
5.1.1	Knowledge-intensive employment, %	24.0	65	◇
5.1.2	Firms offering formal training, %	20.5	77	○ ◇
5.1.3	GERD performed by business, % GDP	0.3	48	
5.1.4	GERD financed by business, %	57.1	15	●
5.1.5	Females employed w/advanced degrees, %	11.4	64	◇
5.2	**Innovation linkages**	**16.1**	**103**	○ ◇
5.2.1	University-industry R&D collaboration†	38.2	88	◇
5.2.2	State of cluster development and depth†	42.4	90	◇
5.2.3	GERD financed by abroad, % GDP	0.0	55	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	93	○
5.2.5	Patent families/bn PPP$ GDP	0.0	66	
5.3	**Knowledge absorption**	**34.5**	**44**	
5.3.1	Intellectual property payments, % total trade	0.9	40	
5.3.2	High-tech imports, % total trade	10.0	34	
5.3.3	ICT services imports, % total trade	2.6	14	●
5.3.4	FDI net inflows, % GDP	2.9	52	
5.3.5	Research talent, % in businesses	26.5	48	
Knowledge and technology outputs		**31.8**	**35**	
6.1	**Knowledge creation**	**12.0**	**71**	◇
6.1.1	Patents by origin/bn PPP$ GDP	1.5	48	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	71	
6.1.3	Utility models by origin/bn PPP$ GDP	0.1	59	○
6.1.4	Scientific and technical articles/bn PPP$ GDP	14.2	62	
6.1.5	Citable documents H-index	18.8	44	
6.2	**Knowledge impact**	**45.3**	**12**	●
6.2.1	Labor productivity growth, %	2.1	26	◆
6.2.2	New businesses/th pop. 15–64	7.3	21	●
6.2.3	Software spending, % GDP	0.2	58	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	16.3	16	●
6.2.5	High-tech manufacturing, %	44.1	21	●
6.3	**Knowledge diffusion**	**38.0**	**23**	●
6.3.1	Intellectual property receipts, % total trade	0.1	60	
6.3.2	Production and export complexity	69.0	25	
6.3.3	High-tech exports, % total trade	6.6	27	
6.3.4	ICT services exports, % total trade	5.9	10	●
Creative outputs		**22.2**	**72**	◇
7.1	**Intangible assets**	**26.1**	**83**	◇
7.1.1	Trademarks by origin/bn PPP$ GDP	38.2	61	
7.1.2	Global brand value, top 5,000, % GDP	20.7	48	
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.6	55	
7.1.4	ICTs and organizational model creation†	50.0	82	◇
7.2	**Creative goods and services**	**16.1**	**63**	
7.2.1	Cultural and creative services exports, % total trade	1.8	12	●
7.2.2	National feature films/mn pop. 15–69	2.0	69	◇
7.2.3	Entertainment and media market/th pop. 15–69	7.1	44	◇
7.2.4	Printing and other media, % manufacturing	0.9	58	
7.2.5	Creative goods exports, % total trade	0.8	54	
7.3	**Online creativity**	**20.6**	**56**	◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	4.5	56	
7.3.2	Country-code TLDs/th pop. 15–69	13.5	36	
7.3.3	Wikipedia edits/mn pop. 15–69	54.3	59	◇
7.3.4	Mobile app creation/bn PPP$ GDP	9.6	47	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Russian Federation

GII 2021 rank **45**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
52	**43**	**Upper middle**	**EUR**	**145.9**	**4,021.7**	**27,394**	**47**

		Score/ Value	Rank	
Institutions		**63.1**	**67**	
1.1	**Political environment**	**57.4**	**67**	
1.1.1	Political and operational stability*	64.3	80	
1.1.2	Government effectiveness*	54.0	62	
1.2	**Regulatory environment**	**55.7**	**92**	
1.2.1	Regulatory quality*	32.2	100	○
1.2.2	Rule of law*	27.7	109	○ ◇
1.2.3	Cost of redundancy dismissal	17.3	69	
1.3	**Business environment**	**76.1**	**45**	
1.3.1	Ease of starting a business*	93.1	38	
1.3.2	Ease of resolving insolvency*	59.1	52	
Human capital and research		**47.9**	**29**	◆
2.1	**Education**	**57.6**	**[40]**	
2.1.1	Expenditure on education, % GDP	4.7	52	
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	15.7	41	
2.1.4	PISA scales in reading, maths and science	481.3	31	◆
2.1.5	Pupil-teacher ratio, secondary	n/a	n/a	
2.2	**Tertiary education**	**50.8**	**14**	● ◆
2.2.1	Tertiary enrolment, % gross	84.6	15	● ◆
2.2.2	Graduates in science and engineering, %	31.1	13	● ◆
2.2.3	Tertiary inbound mobility, %	4.5	51	
2.3	**Research and development (R&D)**	**35.2**	**32**	◆
2.3.1	Researchers, FTE/mn pop.	2,746.7	33	◆
2.3.2	Gross expenditure on R&D, % GDP	1.0	38	
2.3.3	Global corporate R&D investors, top 3, mn US$	39.0	40	◆
2.3.4	QS university ranking, top 3*	48.4	21	● ◆
Infrastructure		**42.5**	**63**	
3.1	**Information and communication technologies (ICTs)**	**78.5**	**36**	◆
3.1.1	ICT access*	72.8	54	
3.1.2	ICT use*	72.5	39	◆
3.1.3	Government's online service*	81.8	39	
3.1.4	E-participation*	86.9	27	
3.2	**General infrastructure**	**29.0**	**64**	
3.2.1	Electricity output, GWh/mn pop.	7,705.0	26	◆
3.2.2	Logistics performance*	33.0	74	
3.2.3	Gross capital formation, % GDP	22.9	59	
3.3	**Ecological sustainability**	**19.9**	**101**	○ ◇
3.3.1	GDP/unit of energy use	4.8	117	○ ◇
3.3.2	Environmental performance*	50.5	56	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	107	○
Market sophistication		**48.0**	**61**	
4.1	**Credit**	**40.1**	**70**	
4.1.1	Ease of getting credit*	80.0	23	
4.1.2	Domestic credit to private sector, % GDP	52.4	63	
4.1.3	Microfinance gross loans, % GDP	0.0	78	○
4.2	**Investment**	**19.8**	**116**	○
4.2.1	Ease of protecting minority investors*	60.0	71	
4.2.2	Market capitalization, % GDP	40.9	38	⏲
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	55	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	92	○
4.3	**Trade, diversification, and market scale**	**83.9**	**17**	● ◆
4.3.1	Applied tariff rate, weighted avg., %	5.3	91	
4.3.2	Domestic industry diversification	92.5	44	
4.3.3	Domestic market scale, bn PPP$	4,021.7	6	● ◆

		Score/ Value	Rank	
Business sophistication		**31.8**	**44**	
5.1	**Knowledge workers**	**38.2**	**46**	
5.1.1	Knowledge-intensive employment, %	44.9	18	● ◆
5.1.2	Firms offering formal training, %	11.8	94	○ ◇
5.1.3	GERD performed by business, % GDP	0.6	34	
5.1.4	GERD financed by business, %	30.2	60	
5.1.5	Females employed w/advanced degrees, %	26.2	10	● ◆
5.2	**Innovation linkages**	**17.7**	**88**	
5.2.1	University-industry R&D collaboration†	44.0	58	
5.2.2	State of cluster development and depth†	45.5	73	
5.2.3	GERD financed by abroad, % GDP	0.0	63	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	72	
5.2.5	Patent families/bn PPP$ GDP	0.2	50	
5.3	**Knowledge absorption**	**39.5**	**29**	◆
5.3.1	Intellectual property payments, % total trade	1.6	23	●
5.3.2	High-tech imports, % total trade	9.1	43	
5.3.3	ICT services imports, % total trade	1.3	60	
5.3.4	FDI net inflows, % GDP	1.4	97	○
5.3.5	Research talent, % in businesses	48.0	28	◆
Knowledge and technology outputs		**26.7**	**48**	
6.1	**Knowledge creation**	**35.8**	**26**	◆
6.1.1	Patents by origin/bn PPP$ GDP	5.7	15	● ◆
6.1.2	PCT patents by origin/bn PPP$ GDP	0.3	45	
6.1.3	Utility models by origin/bn PPP$ GDP	2.3	10	● ◆
6.1.4	Scientific and technical articles/bn PPP$ GDP	10.6	80	
6.1.5	Citable documents H-index	37.7	23	● ◆
6.2	**Knowledge impact**	**28.6**	**68**	
6.2.1	Labor productivity growth, %	1.1	44	
6.2.2	New businesses/th pop. 15–64	3.3	43	
6.2.3	Software spending, % GDP	0.3	43	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.1	105	○
6.2.5	High-tech manufacturing, %	25.7	48	
6.3	**Knowledge diffusion**	**15.6**	**68**	
6.3.1	Intellectual property receipts, % total trade	0.2	38	◆
6.3.2	Production and export complexity	43.0	64	
6.3.3	High-tech exports, % total trade	2.6	52	
6.3.4	ICT services exports, % total trade	1.3	71	
Creative outputs		**26.4**	**56**	
7.1	**Intangible assets**	**35.6**	**50**	
7.1.1	Trademarks by origin/bn PPP$ GDP	59.7	35	
7.1.2	Global brand value, top 5,000, % GDP	44.8	38	
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.1	67	
7.1.4	ICTs and organizational model creation†	58.4	49	
7.2	**Creative goods and services**	**9.7**	**81**	
7.2.1	Cultural and creative services exports, % total trade	1.0	27	
7.2.2	National feature films/mn pop. 15–69	1.2	79	
7.2.3	Entertainment and media market/th pop. 15–69	7.0	45	
7.2.4	Printing and other media, % manufacturing	0.6	80	○
7.2.5	Creative goods exports, % total trade	0.4	68	
7.3	**Online creativity**	**24.8**	**47**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	3.4	61	
7.3.2	Country-code TLDs/th pop. 15–69	14.1	35	
7.3.3	Wikipedia edits/mn pop. 15–69	58.8	54	
7.3.4	Mobile app creation/bn PPP$ GDP	21.6	25	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Rwanda

GII 2021 rank
102

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
108	**91**	**Low**	**SSF**	**13.0**	**30.3**	**2,393**	**91**

		Score/ Value	Rank	
Institutions		**67.0**	**54**	◆
1.1	**Political environment**	**61.5**	**55**	◆
1.1.1	Political and operational stability*	75.0	40	● ◆
1.1.2	Government effectiveness*	54.8	58	◆
1.2	**Regulatory environment**	**64.4**	**67**	
1.2.1	Regulatory quality*	45.5	66	◆
1.2.2	Rule of law*	48.7	59	◆
1.2.3	Cost of redundancy dismissal	17.3	68	
1.3	**Business environment**	**75.2**	**48**	● ◆
1.3.1	Ease of starting a business*	93.2	33	● ◆
1.3.2	Ease of resolving insolvency*	57.2	57	◆
Human capital and research		**15.5**	**114**	
2.1	**Education**	**35.6**	**104**	
2.1.1	Expenditure on education, % GDP	3.1	96	
2.1.2	Government funding/pupil, secondary, % GDP/cap	21.4	38	●
2.1.3	School life expectancy, years	11.2	99	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary ◴	20.1	95	
2.2	**Tertiary education**	**7.6**	**117**	
2.2.1	Tertiary enrolment, % gross	6.2	121	○
2.2.2	Graduates in science and engineering, %	13.0	100	
2.2.3	Tertiary inbound mobility, %	3.6	59	
2.3	**Research and development (R&D)**	**3.2**	**85**	◆
2.3.1	Researchers, FTE/mn pop. ◴	13.9	107	○ ◇
2.3.2	Gross expenditure on R&D, % GDP ◴	0.6	53	◆
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**30.4**	**101**	
3.1	**Information and communication technologies (ICTs)**	**43.6**	**101**	◆
3.1.1	ICT access*	28.3	123	○
3.1.2	ICT use*	21.4	113	◆
3.1.3	Government's online service*	61.8	85	◆
3.1.4	E-participation*	63.1	82	◆
3.2	**General infrastructure**	**30.5**	**60**	
3.2.1	Electricity output, GWh/mn pop.	n/a	n/a	
3.2.2	Logistics performance*	43.1	56	◆
3.2.3	Gross capital formation, % GDP	20.8	83	
3.3	**Ecological sustainability**	**17.0**	**115**	
3.3.1	GDP/unit of energy use	n/a	n/a	
3.3.2	Environmental performance*	33.8	107	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.1	131	○
Market sophistication		**41.7**	**93**	
4.1	**Credit**	**60.7**	**14**	● ◆
4.1.1	Ease of getting credit*	95.0	4	● ◆
4.1.2	Domestic credit to private sector, % GDP	21.4	112	
4.1.3	Microfinance gross loans, % GDP ◴	6.7	1	● ◆
4.2	**Investment**	**24.5**	**87**	
4.2.1	Ease of protecting minority investors*	44.0	98	
4.2.2	Market capitalization, % GDP	31.0	45	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.1	28	●
4.3	**Trade, diversification, and market scale**	**39.9**	**125**	○
4.3.1	Applied tariff rate, weighted avg., %	9.6	114	
4.3.2	Domestic industry diversification ◴	43.6	109	○ ◇
4.3.3	Domestic market scale, bn PPP$	30.3	122	

		Score/ Value	Rank	
Business sophistication		**22.0**	**82**	◆
5.1	**Knowledge workers**	**12.9**	**117**	
5.1.1	Knowledge-intensive employment, %	8.9	112	
5.1.2	Firms offering formal training, %	35.9	38	◆
5.1.3	GERD performed by business, % GDP ◴	0.0	75	◆
5.1.4	GERD financed by business, % ◴	0.6	96	○
5.1.5	Females employed w/advanced degrees, %	4.0	98	◆
5.2	**Innovation linkages**	**32.4**	**31**	● ◆
5.2.1	University-industry R&D collaboration†	33.0	101	
5.2.2	State of cluster development and depth†	46.3	66	◆
5.2.3	GERD financed by abroad, % GDP ◴	0.2	18	● ◆
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.1	26	● ◆
5.2.5	Patent families/bn PPP$ GDP	n/a	n/a	
5.3	**Knowledge absorption**	**20.8**	**89**	
5.3.1	Intellectual property payments, % total trade	n/a	n/a	
5.3.2	High-tech imports, % total trade	8.5	55	
5.3.3	ICT services imports, % total trade	0.5	101	
5.3.4	FDI net inflows, % GDP	3.5	39	●
5.3.5	Research talent, % in businesses ◴	5.6	70	
Knowledge and technology outputs		**13.4**	**96**	
6.1	**Knowledge creation**	**8.0**	**88**	
6.1.1	Patents by origin/bn PPP$ GDP ◴	0.2	93	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	98	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.3	41	
6.1.4	Scientific and technical articles/bn PPP$ GDP	14.1	63	
6.1.5	Citable documents H-index	4.0	114	
6.2	**Knowledge impact**	**28.2**	**70**	◆
6.2.1	Labor productivity growth, %	5.8	4	● ◆
6.2.2	New businesses/th pop. 15–64	1.5	67	◆
6.2.3	Software spending, % GDP	0.0	101	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.5	119	
6.2.5	High-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**4.0**	**[123]**	
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	Production and export complexity	n/a	n/a	
6.3.3	High-tech exports, % total trade	0.5	91	◆
6.3.4	ICT services exports, % total trade	0.7	91	
Creative outputs		**11.5**	**117**	
7.1	**Intangible assets**	**16.7**	**111**	
7.1.1	Trademarks by origin/bn PPP$ GDP	10.8	110	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.1	106	
7.1.4	ICTs and organizational model creation†	51.0	78	
7.2	**Creative goods and services**	**3.3**	**[110]**	
7.2.1	Cultural and creative services exports, % total trade	0.0	101	
7.2.2	National feature films/mn pop. 15–69	3.2	59	◆
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.1	100	
7.3	**Online creativity**	**9.1**	**100**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.1	121	
7.3.2	Country-code TLDs/th pop. 15–69	0.1	114	
7.3.3	Wikipedia edits/mn pop. 15–69	29.9	105	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Saudi Arabia

GII 2021 rank
66

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
72	**59**	**High**	**NAWA**	**34.8**	**1,608.6**	**46,273**	**66**

		Score/ Value	Rank	
Institutions		**53.3**	**101**	◇
1.1	**Political environment**	**55.6**	**73**	◇
1.1.1	Political and operational stability*	51.8	119	○ ◇
1.1.2	Government effectiveness*	57.5	54	◇
1.2	**Regulatory environment**	**57.6**	**87**	◇
1.2.1	Regulatory quality*	41.7	75	◇
1.2.2	Rule of law*	51.2	55	◇
1.2.3	Cost of redundancy dismissal	23.7	102	◇
1.3	**Business environment**	**46.6**	**129**	○ ◇
1.3.1	Ease of starting a business*	93.1	36	
1.3.2	Ease of resolving insolvency*	0.0	129	○ ◇
Human capital and research		**45.7**	**32**	
2.1	**Education**	**59.6**	**[30]**	
2.1.1	Expenditure on education, % GDP	n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	16.0	36	
2.1.4	PISA scales in reading, maths and science	386.2	71	○ ◇
2.1.5	Pupil-teacher ratio, secondary	13.6	61	
2.2	**Tertiary education**	**36.6**	**51**	
2.2.1	Tertiary enrolment, % gross	70.9	29	●
2.2.2	Graduates in science and engineering, %	22.0	61	
2.2.3	Tertiary inbound mobility, %	4.4	54	
2.3	**Research and development (R&D)**	**40.9**	**26**	●
2.3.1	Researchers, FTE/mn pop.	n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP	0.8	47	
2.3.3	Global corporate R&D investors, top 3, mn US$	62.7	22	●
2.3.4	QS university ranking, top 3*	43.7	24	●
Infrastructure		**45.1**	**54**	◇
3.1	**Information and communication technologies (ICTs)**	**74.5**	**48**	
3.1.1	ICT access*	81.5	28	●
3.1.2	ICT use*	76.3	34	
3.1.3	Government's online service*	68.8	71	◇
3.1.4	E-participation*	71.4	66	
3.2	**General infrastructure**	**39.1**	**32**	
3.2.1	Electricity output, GWh/mn pop.	11,221.2	12	●
3.2.2	Logistics performance*	44.8	54	◇
3.2.3	Gross capital formation, % GDP	27.6	31	
3.3	**Ecological sustainability**	**21.7**	**90**	◇
3.3.1	GDP/unit of energy use	8.3	88	
3.3.2	Environmental performance*	44.0	79	◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.3	96	◇
Market sophistication		**51.9**	**39**	
4.1	**Credit**	**40.5**	**67**	
4.1.1	Ease of getting credit*	60.0	74	
4.1.2	Domestic credit to private sector, % GDP	54.0	62	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**35.7**	**46**	
4.2.1	Ease of protecting minority investors*	86.0	3	● ◆
4.2.2	Market capitalization, % GDP	144.1	6	● ◆
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	49	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	80	○
4.3	**Trade, diversification, and market scale**	**79.6**	**29**	●
4.3.1	Applied tariff rate, weighted avg., %	4.8	83	◇
4.3.2	Domestic industry diversification	89.5	53	
4.3.3	Domestic market scale, bn PPP$	1,608.6	17	●

		Score/ Value	Rank	
Business sophistication		**21.1**	**89**	◇
5.1	**Knowledge workers**	**16.6**	**[108]**	
5.1.1	Knowledge-intensive employment, %	n/a	n/a	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, %	5.5	93	◇
5.2	**Innovation linkages**	**30.5**	**34**	
5.2.1	University-industry R&D collaboration†	52.9	35	
5.2.2	State of cluster development and depth†	68.5	8	● ◆
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	70	
5.2.5	Patent families/bn PPP$ GDP	0.3	36	
5.3	**Knowledge absorption**	**16.3**	**110**	◇
5.3.1	Intellectual property payments, % total trade	0.0	122	○ ◇
5.3.2	High-tech imports, % total trade	7.1	77	
5.3.3	ICT services imports, % total trade	0.7	89	◇
5.3.4	FDI net inflows, % GDP	0.4	119	○
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**19.6**	**69**	◇
6.1	**Knowledge creation**	**17.1**	**60**	
6.1.1	Patents by origin/bn PPP$ GDP	1.0	64	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.6	32	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	15.9	53	
6.1.5	Citable documents H-index	22.7	38	
6.2	**Knowledge impact**	**27.5**	**72**	
6.2.1	Labor productivity growth, %	–2.0	101	○
6.2.2	New businesses/th pop. 15–64	0.5	99	◇
6.2.3	Software spending, % GDP	0.3	37	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.3	102	◇
6.2.5	High-tech manufacturing, %	35.6	33	
6.3	**Knowledge diffusion**	**14.3**	**72**	◇
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	Production and export complexity	59.4	36	
6.3.3	High-tech exports, % total trade	0.1	118	○ ◇
6.3.4	ICT services exports, % total trade	0.7	92	
Creative outputs		**20.9**	**78**	◇
7.1	**Intangible assets**	**30.9**	**63**	
7.1.1	Trademarks by origin/bn PPP$ GDP	14.0	104	◇
7.1.2	Global brand value, top 5,000, % GDP	110.9	19	●
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.2	101	○
7.1.4	ICTs and organizational model creation†	61.5	40	
7.2	**Creative goods and services**	**8.3**	**86**	◇
7.2.1	Cultural and creative services exports, % total trade	0.0	100	○ ◇
7.2.2	National feature films/mn pop. 15–69	n/a	n/a	
7.2.3	Entertainment and media market/th pop. 15–69	15.9	29	◇
7.2.4	Printing and other media, % manufacturing	1.2	40	
7.2.5	Creative goods exports, % total trade	0.2	81	
7.3	**Online creativity**	**13.3**	**79**	◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	2.7	69	◇
7.3.2	Country-code TLDs/th pop. 15–69	0.8	92	◇
7.3.3	Wikipedia edits/mn pop. 15–69	49.4	66	◇
7.3.4	Mobile app creation/bn PPP$ GDP	0.5	80	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Senegal

GII 2021 rank
105

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
102	**105**	**Lower middle**	**SSF**	**16.7**	**58.1**	**3,463**	**102**

		Score/ Value	Rank	
Institutions		**63.0**	**68**	◆
1.1	**Political environment**	**57.3**	**68**	◆
1.1.1	Political and operational stability*	73.2	44	◆
1.1.2	Government effectiveness*	49.4	75	◆
1.2	**Regulatory environment**	**63.8**	**69**	◆
1.2.1	Regulatory quality*	40.6	79	◆
1.2.2	Rule of law*	41.7	73	
1.2.3	Cost of redundancy dismissal	14.8	58	
1.3	**Business environment**	**67.7**	**76**	
1.3.1	Ease of starting a business*	91.2	51	●
1.3.2	Ease of resolving insolvency*	44.3	87	
Human capital and research		**18.2**	**104**	
2.1	**Education**	**37.3**	**99**	
2.1.1	Expenditure on education, % GDP	4.8	45	
2.1.2	Government funding/pupil, secondary, % GDP/cap	20.5	47	
2.1.3	School life expectancy, years	8.8	114	○ ◇
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	20.4	96	
2.2	**Tertiary education**	**12.9**	**109**	
2.2.1	Tertiary enrolment, % gross	13.1	107	
2.2.2	Graduates in science and engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	7.6	34	● ◆
2.3	**Research and development (R&D)**	**4.5**	**79**	
2.3.1	Researchers, FTE/mn pop.	564.3	65	
2.3.2	Gross expenditure on R&D, % GDP	0.6	60	◆
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**28.8**	**108**	
3.1	**Information and communication technologies (ICTs)**	**39.5**	**111**	
3.1.1	ICT access*	36.0	114	
3.1.2	ICT use*	28.5	105	
3.1.3	Government's online service*	49.4	108	
3.1.4	E-participation*	44.0	110	
3.2	**General infrastructure**	**25.1**	**80**	
3.2.1	Electricity output, GWh/mn pop.	306.6	115	
3.2.2	Logistics performance*	9.6	121	○ ◇
3.2.3	Gross capital formation, % GDP	33.1	16	●
3.3	**Ecological sustainability**	**21.8**	**88**	
3.3.1	GDP/unit of energy use	12.4	44	●
3.3.2	Environmental performance*	30.7	119	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	106	
Market sophistication		**37.7**	**107**	
4.1	**Credit**	**35.7**	**84**	
4.1.1	Ease of getting credit*	65.0	61	
4.1.2	Domestic credit to private sector, % GDP	29.3	97	
4.1.3	Microfinance gross loans, % GDP	1.6	18	●
4.2	**Investment**	**17.8**	**121**	
4.2.1	Ease of protecting minority investors*	44.0	98	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	64	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	62	
4.3	**Trade, diversification, and market scale**	**59.6**	**97**	
4.3.1	Applied tariff rate, weighted avg., %	9.1	111	
4.3.2	Domestic industry diversification	84.8	67	
4.3.3	Domestic market scale, bn PPP$	58.1	98	

		Score/ Value	Rank	
Business sophistication		**12.5**	**131**	○ ◇
5.1	**Knowledge workers**	**6.9**	**127**	○ ◇
5.1.1	Knowledge-intensive employment, %	6.4	116	○ ◇
5.1.2	Firms offering formal training, %	17.4	86	◇
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	2.1	88	
5.1.5	Females employed w/advanced degrees, %	0.6	120	○
5.2	**Innovation linkages**	**15.3**	**106**	
5.2.1	University-industry R&D collaboration†	40.0	74	
5.2.2	State of cluster development and depth†	41.2	97	
5.2.3	GERD financed by abroad, % GDP	0.0	54	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	122	○
5.2.5	Patent families/bn PPP$ GDP	0.0	100	○ ◇
5.3	**Knowledge absorption**	**15.3**	**116**	
5.3.1	Intellectual property payments, % total trade	0.1	99	
5.3.2	High-tech imports, % total trade	4.9	113	
5.3.3	ICT services imports, % total trade	2.0	33	● ◆
5.3.4	FDI net inflows, % GDP	3.5	38	●
5.3.5	Research talent, % in businesses	0.1	87	○ ◇
Knowledge and technology outputs		**14.6**	**88**	
6.1	**Knowledge creation**	**5.3**	**110**	
6.1.1	Patents by origin/bn PPP$ GDP	0.2	95	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	79	
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	64	
6.1.4	Scientific and technical articles/bn PPP$ GDP	9.5	88	
6.1.5	Citable documents H-index	6.8	91	
6.2	**Knowledge impact**	**25.2**	**84**	
6.2.1	Labor productivity growth, %	2.4	21	●
6.2.2	New businesses/th pop. 15–64	0.5	100	
6.2.3	Software spending, % GDP	0.2	71	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.4	100	
6.2.5	High-tech manufacturing, %	16.6	68	
6.3	**Knowledge diffusion**	**13.4**	**76**	
6.3.1	Intellectual property receipts, % total trade	0.1	65	
6.3.2	Production and export complexity	29.4	94	
6.3.3	High-tech exports, % total trade	0.1	116	
6.3.4	ICT services exports, % total trade	2.8	38	●
Creative outputs		**14.4**	**109**	
7.1	**Intangible assets**	**20.2**	**100**	
7.1.1	Trademarks by origin/bn PPP$ GDP	9.6	112	
7.1.2	Global brand value, top 5,000, % GDP	16.4	52	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.3	97	
7.1.4	ICTs and organizational model creation†	58.1	52	◆
7.2	**Creative goods and services**	**8.9**	**84**	
7.2.1	Cultural and creative services exports, % total trade	1.0	28	● ◆
7.2.2	National feature films/mn pop. 15–69	0.2	105	○
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	0.8	67	
7.2.5	Creative goods exports, % total trade	0.1	109	
7.3	**Online creativity**	**8.4**	**106**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	1.0	95	
7.3.2	Country-code TLDs/th pop. 15–69	0.2	112	
7.3.3	Wikipedia edits/mn pop. 15–69	27.2	109	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Serbia

GII 2021 rank
54

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
57	**50**	**Upper middle**	**EUR**	**8.7**	**130.7**	**18,840**	**53**

		Score/ Value	Rank	
Institutions		**69.3**	**50**	
1.1	**Political environment**	**57.3**	**70**	
1.1.1	Political and operational stability*	69.6	60	
1.1.2	Government effectiveness*	51.1	72	
1.2	**Regulatory environment**	**72.5**	**41**	
1.2.1	Regulatory quality*	46.5	64	
1.2.2	Rule of law*	43.6	68	
1.2.3	Cost of redundancy dismissal	8.0	1	● ◆
1.3	**Business environment**	**78.1**	**38**	
1.3.1	Ease of starting a business*	89.3	60	
1.3.2	Ease of resolving insolvency*	67.0	38	
Human capital and research		**32.3**	**62**	
2.1	**Education**	**43.2**	**83**	
2.1.1	Expenditure on education, % GDP	3.6	81	
2.1.2	Government funding/pupil, secondary, % GDP/cap ⏲	11.1	88	○
2.1.3	School life expectancy, years	14.7	60	
2.1.4	PISA scales in reading, maths and science	442.5	44	
2.1.5	Pupil-teacher ratio, secondary	7.9	9	● ◆
2.2	**Tertiary education**	**43.1**	**32**	
2.2.1	Tertiary enrolment, % gross	67.8	36	
2.2.2	Graduates in science and engineering, %	28.4	20	
2.2.3	Tertiary inbound mobility, %	4.6	50	
2.3	**Research and development (R&D)**	**10.6**	**56**	
2.3.1	Researchers, FTE/mn pop.	2,087.2	40	◆
2.3.2	Gross expenditure on R&D, % GDP	0.9	41	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**48.7**	**44**	◆
3.1	**Information and communication technologies (ICTs)**	**74.1**	**50**	
3.1.1	ICT access*	75.2	49	◆
3.1.2	ICT use*	59.8	62	
3.1.3	Government's online service*	79.4	42	
3.1.4	E-participation*	82.1	41	
3.2	**General infrastructure**	**27.1**	**70**	
3.2.1	Electricity output, GWh/mn pop.	5,252.4	41	
3.2.2	Logistics performance*	36.9	64	
3.2.3	Gross capital formation, % GDP	22.1	65	
3.3	**Ecological sustainability**	**45.0**	**25**	◆
3.3.1	GDP/unit of energy use	7.6	96	○
3.3.2	Environmental performance*	55.2	43	◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	10.1	3	● ◆
Market sophistication		**48.4**	**58**	
4.1	**Credit**	**33.2**	**96**	
4.1.1	Ease of getting credit*	65.0	61	
4.1.2	Domestic credit to private sector, % GDP	42.0	80	
4.1.3	Microfinance gross loans, % GDP	0.2	44	
4.2	**Investment**	**35.6**	**[47]**	
4.2.1	Ease of protecting minority investors*	70.0	36	
4.2.2	Market capitalization, % GDP ⏲	3.7	74	○
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**76.4**	**41**	
4.3.1	Applied tariff rate, weighted avg., % ⏲	1.4	17	●
4.3.2	Domestic industry diversification	96.9	17	●
4.3.3	Domestic market scale, bn PPP$	130.7	75	

		Score/ Value	Rank	
Business sophistication		**25.5**	**63**	
5.1	**Knowledge workers**	**28.7**	**77**	
5.1.1	Knowledge-intensive employment, %	28.0	53	
5.1.2	Firms offering formal training, %	38.3	32	
5.1.3	GERD performed by business, % GDP	0.4	46	
5.1.4	GERD financed by business, %	9.1	78	○
5.1.5	Females employed w/advanced degrees, %	15.0	50	
5.2	**Innovation linkages**	**19.8**	**72**	
5.2.1	University-industry R&D collaboration†	38.5	85	
5.2.2	State of cluster development and depth†	38.6	107	○
5.2.3	GERD financed by abroad, % GDP	0.2	24	◆
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	80	
5.2.5	Patent families/bn PPP$ GDP	0.1	58	
5.3	**Knowledge absorption**	**27.9**	**61**	
5.3.1	Intellectual property payments, % total trade	1.0	38	
5.3.2	High-tech imports, % total trade	7.2	75	
5.3.3	ICT services imports, % total trade	2.4	21	◆
5.3.4	FDI net inflows, % GDP	7.6	13	● ◆
5.3.5	Research talent, % in businesses	9.6	64	○
Knowledge and technology outputs		**29.1**	**43**	
6.1	**Knowledge creation**	**23.4**	**42**	
6.1.1	Patents by origin/bn PPP$ GDP	1.3	54	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.2	51	
6.1.3	Utility models by origin/bn PPP$ GDP	0.6	35	
6.1.4	Scientific and technical articles/bn PPP$ GDP	41.0	17	● ◆
6.1.5	Citable documents H-index	14.9	54	
6.2	**Knowledge impact**	**34.8**	**45**	
6.2.1	Labor productivity growth, %	0.7	53	
6.2.2	New businesses/th pop. 15–64	1.9	58	
6.2.3	Software spending, % GDP	0.0	104	○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	21.4	10	● ◆
6.2.5	High-tech manufacturing, %	25.4	49	
6.3	**Knowledge diffusion**	**29.1**	**39**	
6.3.1	Intellectual property receipts, % total trade	0.2	41	
6.3.2	Production and export complexity	59.3	38	
6.3.3	High-tech exports, % total trade	1.8	64	
6.3.4	ICT services exports, % total trade	5.5	12	● ◆
Creative outputs		**21.4**	**76**	
7.1	**Intangible assets**	**20.8**	**98**	○
7.1.1	Trademarks by origin/bn PPP$ GDP	24.2	84	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.0	70	
7.1.4	ICTs and organizational model creation†	51.7	75	
7.2	**Creative goods and services**	**20.2**	**51**	
7.2.1	Cultural and creative services exports, % total trade	1.8	10	● ◆
7.2.2	National feature films/mn pop. 15–69	5.6	39	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.0	55	
7.2.5	Creative goods exports, % total trade	0.6	59	
7.3	**Online creativity**	**23.8**	**51**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	1.3	91	
7.3.2	Country-code TLDs/th pop. 15–69	5.5	53	
7.3.3	Wikipedia edits/mn pop. 15–69	69.8	36	◆
7.3.4	Mobile app creation/bn PPP$ GDP	15.8	31	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Singapore

GII 2021 rank **8**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
13	1	High	SEAO	5.9	551.6	95,603	8

		Score/ Value	Rank
Institutions		**95.1**	**1** ● ◆
1.1	**Political environment**	**100.0**	**1** ● ◆
1.1.1	Political and operational stability*	100.0	1 ● ◆
1.1.2	Government effectiveness*	100.0	1 ● ◆
1.2	**Regulatory environment**	**99.1**	**1** ● ◆
1.2.1	Regulatory quality*	100.0	1 ● ◆
1.2.2	Rule of law*	96.2	8
1.2.3	Cost of redundancy dismissal	8.0	1 ● ◆
1.3	**Business environment**	**86.3**	**17**
1.3.1	Ease of starting a business*	98.2	4 ● ◆
1.3.2	Ease of resolving insolvency*	74.3	25
Human capital and research		**58.7**	**9**
2.1	**Education**	**54.0**	**54** ○
2.1.1	Expenditure on education, % GDP	2.9	102 ○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	21.4	39
2.1.3	School life expectancy, years	16.5	25
2.1.4	PISA scales in reading, maths and science	556.5	2 ● ◆
2.1.5	Pupil-teacher ratio, secondary	11.3	42
2.2	**Tertiary education**	**63.1**	**2** ● ◆
2.2.1	Tertiary enrolment, % gross	88.9	10
2.2.2	Graduates in science and engineering, %	33.5	10 ◆
2.2.3	Tertiary inbound mobility, %	19.2	7
2.3	**Research and development (R&D)**	**59.1**	**15**
2.3.1	Researchers, FTE/mn pop.	6,821.1	5
2.3.2	Gross expenditure on R&D, % GDP	1.8	19
2.3.3	Global corporate R&D investors, top 3, mn US$	50.0	30
2.3.4	QS university ranking, top 3*	68.1	12
Infrastructure		**57.8**	**15**
3.1	**Information and communication technologies (ICTs)**	**90.5**	**7**
3.1.1	ICT access*	90.5	7
3.1.2	ICT use*	77.4	28 ◇
3.1.3	Government's online service*	96.5	5
3.1.4	E-participation*	97.6	6
3.2	**General infrastructure**	**46.7**	**15**
3.2.1	Electricity output, GWh/mn pop.	9,556.1	15
3.2.2	Logistics performance*	90.5	7
3.2.3	Gross capital formation, % GDP	24.8	49 ○
3.3	**Ecological sustainability**	**36.3**	**42**
3.3.1	GDP/unit of energy use	14.4	27
3.3.2	Environmental performance*	58.1	38 ◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.8	49
Market sophistication		**75.9**	**5** ◆
4.1	**Credit**	**62.5**	**13**
4.1.1	Ease of getting credit*	75.0	34
4.1.2	Domestic credit to private sector, % GDP	120.8	18
4.1.3	Microfinance gross loans, % GDP	n/a	n/a
4.2	**Investment**	**88.4**	**1** ● ◆
4.2.1	Ease of protecting minority investors*	86.0	3 ● ◆
4.2.2	Market capitalization, % GDP	200.6	4 ◆
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.7	1 ● ◆
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.3	1 ● ◆
4.3	**Trade, diversification, and market scale**	**76.6**	**39**
4.3.1	Applied tariff rate, weighted avg., %	0.4	3 ●
4.3.2	Domestic industry diversification	80.1	79 ○ ◇
4.3.3	Domestic market scale, bn PPP$	551.6	37

		Score/ Value	Rank
Business sophistication		**62.7**	**3** ● ◆
5.1	**Knowledge workers**	**65.3**	**10**
5.1.1	Knowledge-intensive employment, %	58.3	2 ● ◆
5.1.2	Firms offering formal training, %	n/a	n/a
5.1.3	GERD performed by business, % GDP	1.1	20
5.1.4	GERD financed by business, %	53.1	24
5.1.5	Females employed w/advanced degrees, %	27.1	6 ◆
5.2	**Innovation linkages**	**52.0**	**13**
5.2.1	University-industry R&D collaboration†	69.8	8
5.2.2	State of cluster development and depth†	69.4	6
5.2.3	GERD financed by abroad, % GDP	0.1	33
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.2	5 ◆
5.2.5	Patent families/bn PPP$ GDP	2.4	15
5.3	**Knowledge absorption**	**70.7**	**1** ● ◆
5.3.1	Intellectual property payments, % total trade	2.8	8
5.3.2	High-tech imports, % total trade	22.2	7 ◆
5.3.3	ICT services imports, % total trade	2.4	20
5.3.4	FDI net inflows, % GDP	27.1	3 ● ◆
5.3.5	Research talent, % in businesses	51.5	21
Knowledge and technology outputs		**48.1**	**13**
6.1	**Knowledge creation**	**35.5**	**28** ◇
6.1.1	Patents by origin/bn PPP$ GDP	3.0	26
6.1.2	PCT patents by origin/bn PPP$ GDP	2.3	16
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a
6.1.4	Scientific and technical articles/bn PPP$ GDP	27.6	33
6.1.5	Citable documents H-index	38.4	22
6.2	**Knowledge impact**	**46.7**	**11**
6.2.1	Labor productivity growth, %	−0.3	73 ○
6.2.2	New businesses/th pop. 15–64	10.0	15
6.2.3	Software spending, % GDP	0.3	52 ○
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	5.5	55 ○
6.2.5	High-tech manufacturing, %	76.2	1 ● ◆
6.3	**Knowledge diffusion**	**62.1**	**4** ● ◆
6.3.1	Intellectual property receipts, % total trade	1.4	15
6.3.2	Production and export complexity	86.7	5
6.3.3	High-tech exports, % total trade	25.3	1 ● ◆
6.3.4	ICT services exports, % total trade	2.5	46
Creative outputs		**42.9**	**17**
7.1	**Intangible assets**	**40.2**	**40**
7.1.1	Trademarks by origin/bn PPP$ GDP	19.2	92 ○ ◇
7.1.2	Global brand value, top 5,000, % GDP	153.8	9
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.7	79 ○
7.1.4	ICTs and organizational model creation†	74.6	14
7.2	**Creative goods and services**	**39.0**	**13**
7.2.1	Cultural and creative services exports, % total trade	3.5	1 ● ◆
7.2.2	National feature films/mn pop. 15–69	2.8	61 ○
7.2.3	Entertainment and media market/th pop. 15–69	38.8	20
7.2.4	Printing and other media, % manufacturing	0.5	91 ○
7.2.5	Creative goods exports, % total trade	3.5	17
7.3	**Online creativity**	**52.1**	**19**
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	24.5	23
7.3.2	Country-code TLDs/th pop. 15–69	11.8	38 ◇
7.3.3	Wikipedia edits/mn pop. 15–69	69.6	38 ◇
7.3.4	Mobile app creation/bn PPP$ GDP	100.0	1 ● ◆

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Slovakia

GII 2021 rank
37

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
35	**42**	**High**	**EUR**	**5.5**	**175.7**	**32,184**	**39**

		Score/ Value	Rank	
Institutions		**72.8**	**39**	
1.1	**Political environment**	**71.1**	**39**	
1.1.1	Political and operational stability*	82.1	24	
1.1.2	Government effectiveness*	65.6	41	
1.2	**Regulatory environment**	**72.1**	**44**	
1.2.1	Regulatory quality*	69.8	34	
1.2.2	Rule of law*	61.4	40	
1.2.3	Cost of redundancy dismissal	18.8	78	
1.3	**Business environment**	**75.1**	**51**	
1.3.1	Ease of starting a business*	84.8	91	○ ◇
1.3.2	Ease of resolving insolvency*	65.5	42	
Human capital and research		**32.8**	**58**	◇
2.1	**Education**	**49.5**	**67**	
2.1.1	Expenditure on education, % GDP	3.9	70	
2.1.2	Government funding/pupil, secondary, % GDP/cap	20.7	45	
2.1.3	School life expectancy, years	14.5	63	◇
2.1.4	PISA scales in reading, maths and science	469.4	38	
2.1.5	Pupil-teacher ratio, secondary	11.2	41	
2.2	**Tertiary education**	**31.5**	**69**	◇
2.2.1	Tertiary enrolment, % gross	45.4	67	◇
2.2.2	Graduates in science and engineering, %	22.1	59	
2.2.3	Tertiary inbound mobility, %	8.0	31	
2.3	**Research and development (R&D)**	**17.5**	**46**	
2.3.1	Researchers, FTE/mn pop.	3,111.0	31	
2.3.2	Gross expenditure on R&D, % GDP	0.8	46	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	16.5	57	
Infrastructure		**50.5**	**39**	
3.1	**Information and communication technologies (ICTs)**	**73.1**	**54**	◇
3.1.1	ICT access*	73.3	52	◇
3.1.2	ICT use*	77.1	30	
3.1.3	Government's online service*	71.8	63	
3.1.4	E-participation*	70.2	70	◇
3.2	**General infrastructure**	**26.9**	**72**	◇
3.2.1	Electricity output, GWh/mn pop.	4,899.4	46	
3.2.2	Logistics performance*	45.5	52	
3.2.3	Gross capital formation, % GDP	19.6	91	○
3.3	**Ecological sustainability**	**51.4**	**12**	●
3.3.1	GDP/unit of energy use	11.0	59	
3.3.2	Environmental performance*	68.3	26	●
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	9.3	9	● ◆
Market sophistication		**44.9**	**73**	
4.1	**Credit**	**47.4**	**41**	
4.1.1	Ease of getting credit*	70.0	44	
4.1.2	Domestic credit to private sector, % GDP	62.9	54	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**15.2**	**129**	○ ◇
4.2.1	Ease of protecting minority investors*	56.0	82	○
4.2.2	Market capitalization, % GDP	5.1	71	○ ◇
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	69	○ ◇
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	88	○
4.3	**Trade, diversification, and market scale**	**72.0**	**55**	
4.3.1	Applied tariff rate, weighted avg., %	1.8	25	
4.3.2	Domestic industry diversification	84.2	69	
4.3.3	Domestic market scale, bn PPP$	175.6	68	

		Score/ Value	Rank	
Business sophistication		**32.5**	**43**	
5.1	**Knowledge workers**	**43.6**	**38**	
5.1.1	Knowledge-intensive employment, %	34.2	41	
5.1.2	Firms offering formal training, %	43.3	25	
5.1.3	GERD performed by business, % GDP	0.5	40	
5.1.4	GERD financed by business, %	46.8	32	
5.1.5	Females employed w/advanced degrees, %	15.3	47	
5.2	**Innovation linkages**	**23.2**	**54**	
5.2.1	University-industry R&D collaboration†	37.7	90	○ ◇
5.2.2	State of cluster development and depth†	46.2	68	
5.2.3	GERD financed by abroad, % GDP	0.1	41	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	n/a	n/a	
5.2.5	Patent families/bn PPP$ GDP	0.2	42	
5.3	**Knowledge absorption**	**30.7**	**55**	
5.3.1	Intellectual property payments, % total trade	0.8	59	
5.3.2	High-tech imports, % total trade	12.1	19	●
5.3.3	ICT services imports, % total trade	1.1	69	
5.3.4	FDI net inflows, % GDP	2.9	53	
5.3.5	Research talent, % in businesses	24.8	50	
Knowledge and technology outputs		**34.3**	**30**	
6.1	**Knowledge creation**	**24.2**	**39**	
6.1.1	Patents by origin/bn PPP$ GDP	1.3	55	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.3	41	
6.1.3	Utility models by origin/bn PPP$ GDP	1.5	15	● ◆
6.1.4	Scientific and technical articles/bn PPP$ GDP	25.8	37	
6.1.5	Citable documents H-index	17.4	47	
6.2	**Knowledge impact**	**49.7**	**8**	● ◆
6.2.1	Labor productivity growth, %	–0.1	68	
6.2.2	New businesses/th pop. 15–64	5.3	30	
6.2.3	Software spending, % GDP	0.3	41	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	21.0	11	● ◆
6.2.5	High-tech manufacturing, %	60.1	4	● ◆
6.3	**Knowledge diffusion**	**29.0**	**40**	
6.3.1	Intellectual property receipts, % total trade	0.0	75	
6.3.2	Production and export complexity	76.5	15	●
6.3.3	High-tech exports, % total trade	8.1	22	●
6.3.4	ICT services exports, % total trade	1.7	63	
Creative outputs		**33.0**	**43**	
7.1	**Intangible assets**	**32.7**	**57**	
7.1.1	Trademarks by origin/bn PPP$ GDP	54.2	39	
7.1.2	Global brand value, top 5,000, % GDP	1.7	77	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.9	49	
7.1.4	ICTs and organizational model creation†	65.0	28	
7.2	**Creative goods and services**	**38.9**	**14**	●
7.2.1	Cultural and creative services exports, % total trade	0.3	60	
7.2.2	National feature films/mn pop. 15–69	6.6	35	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	0.6	81	○
7.2.5	Creative goods exports, % total trade	6.8	9	● ◆
7.3	**Online creativity**	**27.7**	**39**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	3.0	64	◇
7.3.2	Country-code TLDs/th pop. 15–69	31.4	22	●
7.3.3	Wikipedia edits/mn pop. 15–69	63.2	47	
7.3.4	Mobile app creation/bn PPP$ GDP	11.5	45	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Slovenia

GII 2021 rank **32**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
36	27	High	EUR	2.1	79.7	38,506	32

		Score/ Value	Rank	
Institutions		**82.9**	**20**	
1.1	**Political environment**	**76.0**	**31**	
1.1.1	Political and operational stability*	78.6	34	
1.1.2	Government effectiveness*	74.7	28	
1.2	**Regulatory environment**	**83.9**	**23**	
1.2.1	Regulatory quality*	69.9	33	
1.2.2	Rule of law*	76.2	25	
1.2.3	Cost of redundancy dismissal	10.7	34	
1.3	**Business environment**	**88.7**	**7**	● ◆
1.3.1	Ease of starting a business*	93.0	39	
1.3.2	Ease of resolving insolvency*	84.4	8	●
Human capital and research		**48.3**	**28**	
2.1	**Education**	**59.6**	**31**	
2.1.1	Expenditure on education, % GDP	4.8	48	
2.1.2	Government funding/pupil, secondary, % GDP/cap	22.8	29	
2.1.3	School life expectancy, years	17.6	15	
2.1.4	PISA scales in reading, maths and science	503.7	11	
2.1.5	Pupil-teacher ratio, secondary	15.1	72	◇
2.2	**Tertiary education**	**44.3**	**23**	
2.2.1	Tertiary enrolment, % gross	77.1	24	
2.2.2	Graduates in science and engineering, %	27.2	27	
2.2.3	Tertiary inbound mobility, %	4.5	53	
2.3	**Research and development (R&D)**	**41.1**	**25**	
2.3.1	Researchers, FTE/mn pop.	5,052.3	17	
2.3.2	Gross expenditure on R&D, % GDP	2.0	17	
2.3.3	Global corporate R&D investors, top 3, mn US$	51.9	27	
2.3.4	QS university ranking, top 3*	11.3	63	
Infrastructure		**53.9**	**27**	
3.1	**Information and communication technologies (ICTs)**	**82.1**	**25**	
3.1.1	ICT access*	84.8	20	
3.1.2	ICT use*	72.5	40	
3.1.3	Government's online service*	85.3	24	
3.1.4	E-participation*	85.7	29	
3.2	**General infrastructure**	**34.6**	**41**	
3.2.1	Electricity output, GWh/mn pop.	7,605.7	27	
3.2.2	Logistics performance*	58.9	34	
3.2.3	Gross capital formation, % GDP	21.9	70	
3.3	**Ecological sustainability**	**45.1**	**24**	
3.3.1	GDP/unit of energy use	11.1	57	
3.3.2	Environmental performance*	72.0	18	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	5.6	18	
Market sophistication		**45.1**	**71**	
4.1	**Credit**	**30.5**	**102**	○ ◇
4.1.1	Ease of getting credit*	45.0	101	○ ◇
4.1.2	Domestic credit to private sector, % GDP	42.5	79	○ ◇
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**30.5**	**67**	
4.2.1	Ease of protecting minority investors*	78.0	18	
4.2.2	Market capitalization, % GDP	13.7	65	○
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	49	
4.3	**Trade, diversification, and market scale**	**74.4**	**47**	
4.3.1	Applied tariff rate, weighted avg., %	1.8	25	
4.3.2	Domestic industry diversification	98.2	10	●
4.3.3	Domestic market scale, bn PPP$	79.7	88	○

		Score/ Value	Rank	
Business sophistication		**42.8**	**27**	
5.1	**Knowledge workers**	**59.2**	**18**	
5.1.1	Knowledge-intensive employment, %	43.2	22	
5.1.2	Firms offering formal training, %	44.0	23	
5.1.3	GERD performed by business, % GDP	1.5	14	
5.1.4	GERD financed by business, %	62.6	11	●
5.1.5	Females employed w/advanced degrees, %	21.8	26	
5.2	**Innovation linkages**	**32.6**	**30**	
5.2.1	University-industry R&D collaboration†	49.6	40	
5.2.2	State of cluster development and depth†	45.4	74	○
5.2.3	GERD financed by abroad, % GDP	0.3	12	●
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	49	
5.2.5	Patent families/bn PPP$ GDP	1.7	23	
5.3	**Knowledge absorption**	**36.6**	**37**	
5.3.1	Intellectual property payments, % total trade	0.6	63	
5.3.2	High-tech imports, % total trade	6.6	86	○
5.3.3	ICT services imports, % total trade	1.5	50	
5.3.4	FDI net inflows, % GDP	2.8	56	
5.3.5	Research talent, % in businesses	60.7	11	●
Knowledge and technology outputs		**33.0**	**32**	
6.1	**Knowledge creation**	**33.9**	**29**	
6.1.1	Patents by origin/bn PPP$ GDP	4.4	21	
6.1.2	PCT patents by origin/bn PPP$ GDP	1.1	28	
6.1.3	Utility models by origin/bn PPP$ GDP	0.2	50	○
6.1.4	Scientific and technical articles/bn PPP$ GDP	56.1	4	● ◆
6.1.5	Citable documents H-index	19.2	43	
6.2	**Knowledge impact**	**38.5**	**28**	
6.2.1	Labor productivity growth, %	−0.9	81	○
6.2.2	New businesses/th pop. 15–64	3.1	45	
6.2.3	Software spending, % GDP	0.1	89	○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	21.0	12	● ◆
6.2.5	High-tech manufacturing, %	41.2	23	
6.3	**Knowledge diffusion**	**26.5**	**43**	
6.3.1	Intellectual property receipts, % total trade	0.2	43	
6.3.2	Production and export complexity	81.3	10	●
6.3.3	High-tech exports, % total trade	5.4	33	
6.3.4	ICT services exports, % total trade	1.7	66	
Creative outputs		**34.3**	**38**	
7.1	**Intangible assets**	**36.3**	**48**	
7.1.1	Trademarks by origin/bn PPP$ GDP	68.4	26	
7.1.2	Global brand value, top 5,000, % GDP	6.7	66	○
7.1.3	Industrial designs by origin/bn PPP$ GDP	2.7	39	
7.1.4	ICTs and organizational model creation†	61.9	38	
7.2	**Creative goods and services**	**23.6**	**42**	
7.2.1	Cultural and creative services exports, % total trade	0.9	34	
7.2.2	National feature films/mn pop. 15–69	14.1	9	●
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.5	28	
7.2.5	Creative goods exports, % total trade	0.8	49	
7.3	**Online creativity**	**41.1**	**29**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	20.9	28	
7.3.2	Country-code TLDs/th pop. 15–69	28.5	24	
7.3.3	Wikipedia edits/mn pop. 15–69	74.9	23	
7.3.4	Mobile app creation/bn PPP$ GDP	36.7	12	●

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

South Africa

GII 2021 rank
61

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
68	**55**	**Upper middle**	**SSF**	**59.3**	**710.8**	**11,911**	**60**

		Score/ Value	Rank	
Institutions		**66.8**	**55**	
1.1	**Political environment**	**60.6**	**57**	
1.1.1	Political and operational stability*	64.3	80	
1.1.2	Government effectiveness*	58.8	51	
1.2	**Regulatory environment**	**71.8**	**46**	
1.2.1	Regulatory quality*	47.6	61	
1.2.2	Rule of law*	44.7	66	
1.2.3	Cost of redundancy dismissal	9.3	25	●
1.3	**Business environment**	**67.9**	**75**	
1.3.1	Ease of starting a business*	81.2	107	○
1.3.2	Ease of resolving insolvency*	54.6	63	
Human capital and research		**31.4**	**67**	
2.1	**Education**	**51.9**	**62**	
2.1.1	Expenditure on education, % GDP	6.5	8	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	22.9	26	
2.1.3	School life expectancy, years	13.5	76	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	28.6	115	○ ◇
2.2	**Tertiary education**	**18.6**	**98**	○ ◇
2.2.1	Tertiary enrolment, % gross	23.8	94	◇
2.2.2	Graduates in science and engineering, %	18.3	84	○
2.2.3	Tertiary inbound mobility, %	3.6	60	
2.3	**Research and development (R&D)**	**23.7**	**43**	
2.3.1	Researchers, FTE/mn pop.	517.7	66	
2.3.2	Gross expenditure on R&D, % GDP	0.8	44	
2.3.3	Global corporate R&D investors, top 3, mn US$	40.7	38	◆
2.3.4	QS university ranking, top 3*	31.4	39	
Infrastructure		**36.3**	**83**	
3.1	**Information and communication technologies (ICTs)**	**63.6**	**74**	
3.1.1	ICT access*	51.5	89	
3.1.2	ICT use*	53.2	75	
3.1.3	Government's online service*	74.7	55	
3.1.4	E-participation*	75.0	57	
3.2	**General infrastructure**	**25.0**	**82**	
3.2.1	Electricity output, GWh/mn pop.	4,227.6	53	
3.2.2	Logistics performance*	61.7	32	◆
3.2.3	Gross capital formation, % GDP	13.2	119	○ ◇
3.3	**Ecological sustainability**	**20.4**	**97**	◇
3.3.1	GDP/unit of energy use	5.6	112	○ ◇
3.3.2	Environmental performance*	43.1	82	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.3	61	
Market sophistication		**57.0**	**23**	● ◆
4.1	**Credit**	**47.3**	**42**	
4.1.1	Ease of getting credit*	60.0	74	
4.1.2	Domestic credit to private sector, % GDP	139.5	11	● ◆
4.1.3	Microfinance gross loans, % GDP	0.0	69	○
4.2	**Investment**	**51.0**	**18**	● ◆
4.2.1	Ease of protecting minority investors*	80.0	13	● ◆
4.2.2	Market capitalization, % GDP	295.9	1	● ◆
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.1	37	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	44	
4.3	**Trade, diversification, and market scale**	**72.7**	**52**	
4.3.1	Applied tariff rate, weighted avg., %	5.4	92	
4.3.2	Domestic industry diversification	81.7	73	
4.3.3	Domestic market scale, bn PPP$	710.8	32	●

		Score/ Value	Rank	
Business sophistication		**29.3**	**51**	
5.1	**Knowledge workers**	**32.2**	**64**	
5.1.1	Knowledge-intensive employment, %	24.5	61	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	0.3	47	
5.1.4	GERD financed by business, %	41.5	41	
5.1.5	Females employed w/advanced degrees, %	11.1	65	
5.2	**Innovation linkages**	**23.4**	**53**	
5.2.1	University-industry R&D collaboration†	52.5	36	
5.2.2	State of cluster development and depth†	49.1	52	
5.2.3	GERD financed by abroad, % GDP	0.1	43	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.1	36	◆
5.2.5	Patent families/bn PPP$ GDP	0.2	41	
5.3	**Knowledge absorption**	**32.3**	**51**	
5.3.1	Intellectual property payments, % total trade	1.8	15	● ◆
5.3.2	High-tech imports, % total trade	10.1	32	
5.3.3	ICT services imports, % total trade	1.2	65	
5.3.4	FDI net inflows, % GDP	1.1	105	○
5.3.5	Research talent, % in businesses	18.6	56	
Knowledge and technology outputs		**21.9**	**61**	
6.1	**Knowledge creation**	**20.5**	**52**	
6.1.1	Patents by origin/bn PPP$ GDP	0.7	71	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.4	38	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	21.6	40	
6.1.5	Citable documents H-index	30.1	32	● ◆
6.2	**Knowledge impact**	**32.7**	**55**	
6.2.1	Labor productivity growth, %	0.3	60	
6.2.2	New businesses/th pop. 15–64	10.2	13	● ◆
6.2.3	Software spending, % GDP	0.4	24	● ◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	4.6	58	
6.2.5	High-tech manufacturing, %	20.5	62	
6.3	**Knowledge diffusion**	**12.5**	**81**	
6.3.1	Intellectual property receipts, % total trade	0.1	55	
6.3.2	Production and export complexity	43.3	63	
6.3.3	High-tech exports, % total trade	2.2	54	
6.3.4	ICT services exports, % total trade	0.6	98	○
Creative outputs		**20.6**	**79**	
7.1	**Intangible assets**	**32.2**	**60**	
7.1.1	Trademarks by origin/bn PPP$ GDP	28.3	77	
7.1.2	Global brand value, top 5,000, % GDP	88.3	23	● ◆
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.3	62	
7.1.4	ICTs and organizational model creation†	58.7	48	
7.2	**Creative goods and services**	**6.5**	**97**	
7.2.1	Cultural and creative services exports, % total trade	0.2	71	
7.2.2	National feature films/mn pop. 15–69	0.6	96	○
7.2.3	Entertainment and media market/th pop. 15–69	7.5	43	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.8	55	
7.3	**Online creativity**	**11.3**	**88**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	3.0	65	
7.3.2	Country-code TLDs/th pop. 15–69	9.7	41	
7.3.3	Wikipedia edits/mn pop. 15–69	34.2	94	◇
7.3.4	Mobile app creation/bn PPP$ GDP	0.6	78	○

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Spain

GII 2021 rank **30**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
29	28	High	EUR	46.8	1,773.4	38,143	30

		Score/ Value	Rank
Institutions		**77.5**	**31**
1.1	**Political environment**	**73.0**	**37**
1.1.1	Political and operational stability*	73.2	44
1.1.2	Government effectiveness*	72.8	32
1.2	**Regulatory environment**	**76.6**	**35**
1.2.1	Regulatory quality*	71.0	30
1.2.2	Rule of law*	72.5	31
1.2.3	Cost of redundancy dismissal	17.4	73 ○
1.3	**Business environment**	**83.1**	**25**
1.3.1	Ease of starting a business*	86.9	75 ○ ◇
1.3.2	Ease of resolving insolvency*	79.2	17 ●
Human capital and research		**47.4**	**30**
2.1	**Education**	**56.0**	**46**
2.1.1	Expenditure on education, % GDP	4.2	61 ○
2.1.2	Government funding/pupil, secondary, % GDP/cap	19.1	55 ○
2.1.3	School life expectancy, years	17.8	13 ●
2.1.4	PISA scales in reading, maths and science	482.3	29
2.1.5	Pupil-teacher ratio, secondary ◴	11.5	44
2.2	**Tertiary education**	**42.1**	**36**
2.2.1	Tertiary enrolment, % gross	91.1	7 ●
2.2.2	Graduates in science and engineering, %	22.3	57
2.2.3	Tertiary inbound mobility, %	3.5	61 ○
2.3	**Research and development (R&D)**	**44.1**	**23**
2.3.1	Researchers, FTE/mn pop.	3,080.5	32
2.3.2	Gross expenditure on R&D, % GDP	1.2	31
2.3.3	Global corporate R&D investors, top 3, mn US$	71.5	14 ●
2.3.4	QS university ranking, top 3*	43.4	26
Infrastructure		**58.2**	**13 ●**
3.1	**Information and communication technologies (ICTs)**	**85.3**	**19**
3.1.1	ICT access*	85.7	19
3.1.2	ICT use*	82.1	17 ●
3.1.3	Government's online service*	88.8	17
3.1.4	E-participation*	84.5	36
3.2	**General infrastructure**	**37.6**	**34**
3.2.1	Electricity output, GWh/mn pop.	5,820.4	37
3.2.2	Logistics performance*	82.8	17
3.2.3	Gross capital formation, % GDP	20.3	87 ○
3.3	**Ecological sustainability**	**51.7**	**10 ●**
3.3.1	GDP/unit of energy use	14.7	24
3.3.2	Environmental performance*	74.3	14 ●
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	6.4	15 ● ◆
Market sophistication		**54.2**	**32**
4.1	**Credit**	**49.3**	**35**
4.1.1	Ease of getting credit*	60.0	74 ○
4.1.2	Domestic credit to private sector, % GDP	94.7	27
4.1.3	Microfinance gross loans, % GDP	n/a	n/a
4.2	**Investment**	**28.0**	**72 ○**
4.2.1	Ease of protecting minority investors*	72.0	27
4.2.2	Market capitalization, % GDP	58.6	27
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	42
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	47
4.3	**Trade, diversification, and market scale**	**85.2**	**12 ●**
4.3.1	Applied tariff rate, weighted avg., %	1.8	25
4.3.2	Domestic industry diversification	94.1	34
4.3.3	Domestic market scale, bn PPP$	1,773.4	16 ● ◆

		Score/ Value	Rank
Business sophistication		**35.5**	**35**
5.1	**Knowledge workers**	**47.3**	**29**
5.1.1	Knowledge-intensive employment, %	33.8	42
5.1.2	Firms offering formal training, %	n/a	n/a
5.1.3	GERD performed by business, % GDP	0.7	32
5.1.4	GERD financed by business, %	49.5	28
5.1.5	Females employed w/advanced degrees, %	23.1	20
5.2	**Innovation linkages**	**25.0**	**47**
5.2.1	University-industry R&D collaboration†	41.8	70 ○
5.2.2	State of cluster development and depth†	57.8	29
5.2.3	GERD financed by abroad, % GDP	0.1	39
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	53
5.2.5	Patent families/bn PPP$ GDP	0.6	32
5.3	**Knowledge absorption**	**34.3**	**45**
5.3.1	Intellectual property payments, % total trade	1.3	28
5.3.2	High-tech imports, % total trade	6.7	82 ○
5.3.3	ICT services imports, % total trade	1.7	42
5.3.4	FDI net inflows, % GDP	2.5	70
5.3.5	Research talent, % in businesses	38.1	35
Knowledge and technology outputs		**36.2**	**26**
6.1	**Knowledge creation**	**38.1**	**25**
6.1.1	Patents by origin/bn PPP$ GDP	1.6	45
6.1.2	PCT patents by origin/bn PPP$ GDP	0.8	29
6.1.3	Utility models by origin/bn PPP$ GDP	1.3	17
6.1.4	Scientific and technical articles/bn PPP$ GDP	37.7	22
6.1.5	Citable documents H-index	60.0	11 ●
6.2	**Knowledge impact**	**42.6**	**20**
6.2.1	Labor productivity growth, %	–2.4	107 ○ ◇
6.2.2	New businesses/th pop. 15–64	3.1	46
6.2.3	Software spending, % GDP	0.6	4 ● ◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	15.4	18
6.2.5	High-tech manufacturing, %	35.3	34
6.3	**Knowledge diffusion**	**28.0**	**42**
6.3.1	Intellectual property receipts, % total trade	0.6	26
6.3.2	Production and export complexity	63.0	32
6.3.3	High-tech exports, % total trade	3.8	43
6.3.4	ICT services exports, % total trade	3.2	31
Creative outputs		**36.2**	**32**
7.1	**Intangible assets**	**44.6**	**30**
7.1.1	Trademarks by origin/bn PPP$ GDP	47.2	48
7.1.2	Global brand value, top 5,000, % GDP	95.4	21
7.1.3	Industrial designs by origin/bn PPP$ GDP	9.6	12 ● ◆
7.1.4	ICTs and organizational model creation†	63.4	34
7.2	**Creative goods and services**	**21.2**	**47**
7.2.1	Cultural and creative services exports, % total trade	1.2	25
7.2.2	National feature films/mn pop. 15–69	7.3	28
7.2.3	Entertainment and media market/th pop. 15–69	31.0	23
7.2.4	Printing and other media, % manufacturing	1.2	39
7.2.5	Creative goods exports, % total trade	0.8	52
7.3	**Online creativity**	**34.3**	**31**
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	28.3	22
7.3.2	Country-code TLDs/th pop. 15–69	17.7	32
7.3.3	Wikipedia edits/mn pop. 15–69	73.0	31
7.3.4	Mobile app creation/bn PPP$ GDP	15.0	35

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Sri Lanka

GII 2021 rank
95

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
85	**103**	**Lower middle**	**CSA**	**21.4**	**287.7**	**13,114**	**101**

		Score/ Value	Rank
Institutions		**47.5**	**119** ○
1.1	**Political environment**	**54.7**	**79**
1.1.1	Political and operational stability*	67.9	71
1.1.2	Government effectiveness*	48.1	81
1.2	**Regulatory environment**	**21.3**	**130** ○ ◇
1.2.1	Regulatory quality*	38.7	83
1.2.2	Rule of law*	46.4	63 ◆
1.2.3	Cost of redundancy dismissal	58.5	130 ○ ◇
1.3	**Business environment**	**66.6**	**79**
1.3.1	Ease of starting a business*	88.2	68
1.3.2	Ease of resolving insolvency*	45.0	85
Human capital and research		**13.5**	**118** ○ ◇
2.1	**Education**	**29.6**	**114** ○
2.1.1	Expenditure on education, % GDP	2.1	112 ○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	6.7	99 ○ ◇
2.1.3	School life expectancy, years	14.1	70 ◆
2.1.4	PISA scales in reading, maths and science	n/a	n/a
2.1.5	Pupil-teacher ratio, secondary ⏲	17.5	85
2.2	**Tertiary education**	**9.9**	**113**
2.2.1	Tertiary enrolment, % gross	21.1	97
2.2.2	Graduates in science and engineering, %	n/a	n/a
2.2.3	Tertiary inbound mobility, %	0.5	97 ○
2.3	**Research and development (R&D)**	**0.9**	**106**
2.3.1	Researchers, FTE/mn pop. ⏲	106.4	86
2.3.2	Gross expenditure on R&D, % GDP ⏲	0.1	100
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41 ○ ◇
2.3.4	QS university ranking, top 3*	0.0	74 ○ ◇
Infrastructure		**39.7**	**73** ◆
3.1	**Information and communication technologies (ICTs)**	**57.4**	**88**
3.1.1	ICT access*	49.1	92
3.1.2	ICT use*	37.4	100
3.1.3	Government's online service*	71.8	63 ◆
3.1.4	E-participation*	71.4	66
3.2	**General infrastructure**	**22.1**	**96**
3.2.1	Electricity output, GWh/mn pop.	711.5	103
3.2.2	Logistics performance*	25.6	90
3.2.3	Gross capital formation, % GDP	24.4	53
3.3	**Ecological sustainability**	**39.5**	**37** ● ◆
3.3.1	GDP/unit of energy use	23.7	4 ● ◆
3.3.2	Environmental performance*	39.0	90
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.4	59 ◆
Market sophistication		**35.8**	**118** ○
4.1	**Credit**	**25.5**	**116** ○
4.1.1	Ease of getting credit*	40.0	113 ○
4.1.2	Domestic credit to private sector, % GDP	49.8	70
4.1.3	Microfinance gross loans, % GDP	0.5	35
4.2	**Investment**	**20.7**	**109**
4.2.1	Ease of protecting minority investors*	72.0	27 ● ◆
4.2.2	Market capitalization, % GDP	19.3	60
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	78 ○
4.2.4	Venture capital recipients, deals/bn PPP$ GDP ⏲	0.0	71
4.3	**Trade, diversification, and market scale**	**61.1**	**90**
4.3.1	Applied tariff rate, weighted avg., %	13.3	127 ○ ◇
4.3.2	Domestic industry diversification	84.0	70
4.3.3	Domestic market scale, bn PPP$	287.7	54

		Score/ Value	Rank
Business sophistication		**25.6**	**62**
5.1	**Knowledge workers**	**23.7**	**87**
5.1.1	Knowledge-intensive employment, % ⏲	23.0	68
5.1.2	Firms offering formal training, % ⏲	18.4	83
5.1.3	GERD performed by business, % GDP ⏲	0.1	73
5.1.4	GERD financed by business, % ⏲	40.3	44 ◆
5.1.5	Females employed w/advanced degrees, % ⏲	3.2	100
5.2	**Innovation linkages**	**21.3**	**62**
5.2.1	University-industry R&D collaboration†	48.7	44 ● ◆
5.2.2	State of cluster development and depth†	50.4	44 ●
5.2.3	GERD financed by abroad, % GDP ⏲	0.0	79
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.1	28 ● ◆
5.2.5	Patent families/bn PPP$ GDP	0.0	73
5.3	**Knowledge absorption**	**31.7**	**53** ◆
5.3.1	Intellectual property payments, % total trade	n/a	n/a
5.3.2	High-tech imports, % total trade ⏲	7.7	64
5.3.3	ICT services imports, % total trade	2.3	26 ● ◆
5.3.4	FDI net inflows, % GDP	1.4	95
5.3.5	Research talent, % in businesses ⏲	20.0	54
Knowledge and technology outputs		**19.7**	**68**
6.1	**Knowledge creation**	**7.7**	**90**
6.1.1	Patents by origin/bn PPP$ GDP	1.2	59
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	69
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a
6.1.4	Scientific and technical articles/bn PPP$ GDP	4.7	114 ○
6.1.5	Citable documents H-index	10.6	72
6.2	**Knowledge impact**	**26.3**	**79**
6.2.1	Labor productivity growth, %	1.0	46 ●
6.2.2	New businesses/th pop. 15–64	0.7	88
6.2.3	Software spending, % GDP	0.4	22 ● ◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	4.2	62 ◆
6.2.5	High-tech manufacturing, %	7.7	95
6.3	**Knowledge diffusion**	**25.0**	**46** ●
6.3.1	Intellectual property receipts, % total trade	n/a	n/a
6.3.2	Production and export complexity	35.6	77
6.3.3	High-tech exports, % total trade ⏲	0.9	75
6.3.4	ICT services exports, % total trade	4.8	16 ● ◆
Creative outputs		**15.8**	**100**
7.1	**Intangible assets**	**21.1**	**97**
7.1.1	Trademarks by origin/bn PPP$ GDP	22.5	88
7.1.2	Global brand value, top 5,000, % GDP	15.7	53
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.6	54
7.1.4	ICTs and organizational model creation†	47.5	91
7.2	**Creative goods and services**	**13.9**	**[67]**
7.2.1	Cultural and creative services exports, % total trade	n/a	n/a
7.2.2	National feature films/mn pop. 15–69 ⏲	1.0	85
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a
7.2.4	Printing and other media, % manufacturing ⏲	2.3	11 ● ◆
7.2.5	Creative goods exports, % total trade ⏲	0.4	67
7.3	**Online creativity**	**7.4**	**112**
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.7	101
7.3.2	Country-code TLDs/th pop. 15–69	0.9	89
7.3.3	Wikipedia edits/mn pop. 15–69	30.0	104
7.3.4	Mobile app creation/bn PPP$ GDP	0.7	77

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Sweden

GII 2021 rank **2**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
2	2	High	EUR	10.1	551.5	52,477	2

		Score/ Value	Rank
Institutions		**88.8**	**9**
1.1	**Political environment**	**89.4**	**8**
1.1.1	Political and operational stability*	85.7	11
1.1.2	Government effectiveness*	91.3	6
1.2	**Regulatory environment**	**90.5**	**13**
1.2.1	Regulatory quality*	90.6	8
1.2.2	Rule of law*	97.0	4 ●
1.2.3	Cost of redundancy dismissal	14.4	55 ○
1.3	**Business environment**	**86.3**	**16**
1.3.1	Ease of starting a business*	93.1	37
1.3.2	Ease of resolving insolvency*	79.5	16
Human capital and research		**64.1**	**2 ● ◆**
2.1	**Education**	**74.3**	**4 ● ◆**
2.1.1	Expenditure on education, % GDP	7.6	5 ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	23.4	24
2.1.3	School life expectancy, years	19.7	3 ● ◆
2.1.4	PISA scales in reading, maths and science	502.5	14
2.1.5	Pupil-teacher ratio, secondary ◴	12.6	52 ○
2.2	**Tertiary education**	**43.9**	**25**
2.2.1	Tertiary enrolment, % gross	72.5	27
2.2.2	Graduates in science and engineering, %	26.6	30
2.2.3	Tertiary inbound mobility, %	7.2	35
2.3	**Research and development (R&D)**	**74.1**	**5**
2.3.1	Researchers, FTE/mn pop.	7,734.8	3 ● ◆
2.3.2	Gross expenditure on R&D, % GDP	3.4	3 ●
2.3.3	Global corporate R&D investors, top 3, mn US$	77.9	10
2.3.4	QS university ranking, top 3*	57.8	16
Infrastructure		**62.6**	**3 ● ◆**
3.1	**Information and communication technologies (ICTs)**	**84.8**	**22**
3.1.1	ICT access*	80.0	33
3.1.2	ICT use*	87.2	7
3.1.3	Government's online service*	90.0	15
3.1.4	E-participation*	82.1	41
3.2	**General infrastructure**	**53.3**	**6 ◆**
3.2.1	Electricity output, GWh/mn pop.	16,383.0	7
3.2.2	Logistics performance*	93.1	2 ●
3.2.3	Gross capital formation, % GDP	24.5	52 ○
3.3	**Ecological sustainability**	**49.6**	**17**
3.3.1	GDP/unit of energy use	11.0	58 ○
3.3.2	Environmental performance*	78.7	8
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	6.7	12 ◆
Market sophistication		**64.6**	**11**
4.1	**Credit**	**57.6**	**17**
4.1.1	Ease of getting credit*	60.0	74 ○
4.1.2	Domestic credit to private sector, % GDP	132.7	15
4.1.3	Microfinance gross loans, % GDP	n/a	n/a
4.2	**Investment**	**54.8**	**16**
4.2.1	Ease of protecting minority investors*	72.0	27
4.2.2	Market capitalization, % GDP	n/a	n/a
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.2	12
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.1	15
4.3	**Trade, diversification, and market scale**	**81.4**	**24**
4.3.1	Applied tariff rate, weighted avg., %	1.8	25 ○
4.3.2	Domestic industry diversification	96.2	20
4.3.3	Domestic market scale, bn PPP$	551.5	38

		Score/ Value	Rank
Business sophistication		**68.1**	**1 ● ◆**
5.1	**Knowledge workers**	**77.3**	**3 ● ◆**
5.1.1	Knowledge-intensive employment, %	54.4	3 ● ◆
5.1.2	Firms offering formal training, % ◴	70.3	3 ●
5.1.3	GERD performed by business, % GDP	2.4	4
5.1.4	GERD financed by business, % ◴	60.8	12
5.1.5	Females employed w/advanced degrees, %	26.4	8
5.2	**Innovation linkages**	**70.3**	**2 ● ◆**
5.2.1	University-industry R&D collaboration†	67.1	11
5.2.2	State of cluster development and depth†	60.2	25
5.2.3	GERD financed by abroad, % GDP ◴	0.3	8
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.3	4 ● ◆
5.2.5	Patent families/bn PPP$ GDP	6.7	1 ● ◆
5.3	**Knowledge absorption**	**56.6**	**6**
5.3.1	Intellectual property payments, % total trade	2.4	11
5.3.2	High-tech imports, % total trade	8.2	57 ○
5.3.3	ICT services imports, % total trade	3.4	5
5.3.4	FDI net inflows, % GDP	3.0	48
5.3.5	Research talent, % in businesses	71.5	5 ◆
Knowledge and technology outputs		**60.3**	**2 ● ◆**
6.1	**Knowledge creation**	**78.4**	**2 ● ◆**
6.1.1	Patents by origin/bn PPP$ GDP	10.8	8
6.1.2	PCT patents by origin/bn PPP$ GDP	7.9	1 ● ◆
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a
6.1.4	Scientific and technical articles/bn PPP$ GDP	54.4	5 ◆
6.1.5	Citable documents H-index	59.4	12
6.2	**Knowledge impact**	**44.1**	**14**
6.2.1	Labor productivity growth, %	–0.1	70 ○
6.2.2	New businesses/th pop. 15–64	7.2	22
6.2.3	Software spending, % GDP	0.5	11
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	7.5	37
6.2.5	High-tech manufacturing, %	48.3	15
6.3	**Knowledge diffusion**	**58.4**	**6**
6.3.1	Intellectual property receipts, % total trade	3.2	6 ◆
6.3.2	Production and export complexity	83.1	8
6.3.3	High-tech exports, % total trade	7.2	23
6.3.4	ICT services exports, % total trade	6.4	8
Creative outputs		**52.9**	**5**
7.1	**Intangible assets**	**57.3**	**8**
7.1.1	Trademarks by origin/bn PPP$ GDP	43.9	53 ○
7.1.2	Global brand value, top 5,000, % GDP	221.3	3 ● ◆
7.1.3	Industrial designs by origin/bn PPP$ GDP	4.3	27
7.1.4	ICTs and organizational model creation†	82.7	2 ● ◆
7.2	**Creative goods and services**	**33.0**	**19**
7.2.1	Cultural and creative services exports, % total trade	1.8	11
7.2.2	National feature films/mn pop. 15–69	10.0	20
7.2.3	Entertainment and media market/th pop. 15–69	57.1	10
7.2.4	Printing and other media, % manufacturing	0.9	61 ○
7.2.5	Creative goods exports, % total trade	1.8	32
7.3	**Online creativity**	**63.7**	**7**
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	43.1	17
7.3.2	Country-code TLDs/th pop. 15–69	69.6	7
7.3.3	Wikipedia edits/mn pop. 15–69	81.6	8
7.3.4	Mobile app creation/bn PPP$ GDP	56.2	9

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Switzerland

GII 2021 rank **1**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
1	**4**	**High**	**EUR**	**8.7**	**590.9**	**68,340**	**1**

		Score/ Value	Rank
Institutions		**87.3**	**13**
1.1	**Political environment**	**92.4**	**3** ● ◆
1.1.1	Political and operational stability*	89.3	6
1.1.2	Government effectiveness*	94.0	2 ● ◆
1.2	**Regulatory environment**	**93.9**	**7**
1.2.1	Regulatory quality*	87.0	12
1.2.2	Rule of law*	97.0	3 ●
1.2.3	Cost of redundancy dismissal	10.1	31
1.3	**Business environment**	**75.5**	**47** ◇
1.3.1	Ease of starting a business*	88.4	66 ○
1.3.2	Ease of resolving insolvency*	62.6	44 ◇
Human capital and research		**60.7**	**6**
2.1	**Education**	**61.3**	**24**
2.1.1	Expenditure on education, % GDP	5.1	34
2.1.2	Government funding/pupil, secondary, % GDP/cap	24.7	17
2.1.3	School life expectancy, years	16.4	27
2.1.4	PISA scales in reading, maths and science	498.2	21
2.1.5	Pupil-teacher ratio, secondary	9.7	25
2.2	**Tertiary education**	**45.1**	**21**
2.2.1	Tertiary enrolment, % gross	61.4	49
2.2.2	Graduates in science and engineering, %	25.2	38
2.2.3	Tertiary inbound mobility, %	17.7	9
2.3	**Research and development (R&D)**	**75.8**	**3** ● ◆
2.3.1	Researchers, FTE/mn pop.	5,450.5	11
2.3.2	Gross expenditure on R&D, % GDP	3.2	6
2.3.3	Global corporate R&D investors, top 3, mn US$	90.0	6
2.3.4	QS university ranking, top 3*	83.9	4
Infrastructure		**62.7**	**2** ● ◆
3.1	**Information and communication technologies (ICTs)**	**87.8**	**15**
3.1.1	ICT access*	87.2	15
3.1.2	ICT use*	90.4	1 ● ◆
3.1.3	Government's online service*	82.9	36
3.1.4	E-participation*	90.5	18
3.2	**General infrastructure**	**42.1**	**24**
3.2.1	Electricity output, GWh/mn pop.	8,222.5	20
3.2.2	Logistics performance*	86.1	13
3.2.3	Gross capital formation, % GDP	22.0	67 ○
3.3	**Ecological sustainability**	**58.1**	**2** ● ◆
3.3.1	GDP/unit of energy use	23.4	6 ◆
3.3.2	Environmental performance*	81.5	3 ●
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	3.7	24
Market sophistication		**71.5**	**6**
4.1	**Credit**	**69.2**	**7**
4.1.1	Ease of getting credit*	65.0	61 ○
4.1.2	Domestic credit to private sector, % GDP	174.6	4 ◆
4.1.3	Microfinance gross loans, % GDP	n/a	n/a
4.2	**Investment**	**70.6**	**10**
4.2.1	Ease of protecting minority investors*	50.0	92 ○ ◇
4.2.2	Market capitalization, % GDP	237.8	3 ● ◆
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.4	7 ◆
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.1	8
4.3	**Trade, diversification, and market scale**	**74.6**	**46**
4.3.1	Applied tariff rate, weighted avg., %	6.1	95 ○ ◇
4.3.2	Domestic industry diversification	90.5	49 ○
4.3.3	Domestic market scale, bn PPP$	590.9	34

		Score/ Value	Rank
Business sophistication		**62.6**	**4** ◆
5.1	**Knowledge workers**	**71.4**	**5**
5.1.1	Knowledge-intensive employment, %	51.0	6
5.1.2	Firms offering formal training, %	n/a	n/a
5.1.3	GERD performed by business, % GDP	2.3	6
5.1.4	GERD financed by business, %	68.6	6 ◆
5.1.5	Females employed w/advanced degrees, %	20.0	31
5.2	**Innovation linkages**	**63.9**	**4**
5.2.1	University-industry R&D collaboration†	77.1	2 ● ◆
5.2.2	State of cluster development and depth†	70.6	4 ◆
5.2.3	GERD financed by abroad, % GDP	0.2	26
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.2	12
5.2.5	Patent families/bn PPP$ GDP	8.5	1 ● ◆
5.3	**Knowledge absorption**	**52.4**	**11**
5.3.1	Intellectual property payments, % total trade	3.1	6 ◆
5.3.2	High-tech imports, % total trade	6.2	93 ○
5.3.3	ICT services imports, % total trade	3.7	4 ◆
5.3.4	FDI net inflows, % GDP	1.9	81 ○
5.3.5	Research talent, % in businesses	49.7	25
Knowledge and technology outputs		**63.9**	**1** ● ◆
6.1	**Knowledge creation**	**86.6**	**1** ● ◆
6.1.1	Patents by origin/bn PPP$ GDP	15.6	1 ● ◆
6.1.2	PCT patents by origin/bn PPP$ GDP	8.3	1 ● ◆
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a
6.1.4	Scientific and technical articles/bn PPP$ GDP	56.6	3 ● ◆
6.1.5	Citable documents H-index	66.1	10
6.2	**Knowledge impact**	**55.4**	**2** ● ◆
6.2.1	Labor productivity growth, %	–0.1	67 ○
6.2.2	New businesses/th pop. 15–64	4.5	33
6.2.3	Software spending, % GDP	0.7	2 ● ◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	12.7	23
6.2.5	High-tech manufacturing, %	68.5	2 ● ◆
6.3	**Knowledge diffusion**	**49.7**	**12**
6.3.1	Intellectual property receipts, % total trade	5.9	1 ● ◆
6.3.2	Production and export complexity	94.0	2 ● ◆
6.3.3	High-tech exports, % total trade	7.2	25
6.3.4	ICT services exports, % total trade	2.6	43
Creative outputs		**60.2**	**2** ● ◆
7.1	**Intangible assets**	**63.4**	**5** ◆
7.1.1	Trademarks by origin/bn PPP$ GDP	66.2	29
7.1.2	Global brand value, top 5,000, % GDP	236.0	2 ● ◆
7.1.3	Industrial designs by origin/bn PPP$ GDP	5.4	23
7.1.4	ICTs and organizational model creation†	77.4	9
7.2	**Creative goods and services**	**47.5**	**3** ● ◆
7.2.1	Cultural and creative services exports, % total trade	0.6	39
7.2.2	National feature films/mn pop. 15–69	19.4	6 ◆
7.2.3	Entertainment and media market/th pop. 15–69	97.4	2 ● ◆
7.2.4	Printing and other media, % manufacturing	1.1	41 ○
7.2.5	Creative goods exports, % total trade	3.7	13
7.3	**Online creativity**	**66.3**	**4**
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	59.2	11
7.3.2	Country-code TLDs/th pop. 15–69	100.0	1 ● ◆
7.3.3	Wikipedia edits/mn pop. 15–69	76.6	16
7.3.4	Mobile app creation/bn PPP$ GDP	25.8	22

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Tajikistan

GII 2021 rank
103

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
96	**104**	**Low**	**CSA**	**9.5**	**33.7**	**3,560**	**109**

		Score/ Value	Rank
Institutions		**47.7**	**118**
1.1	**Political environment**	**37.9**	**124**
1.1.1	Political and operational stability*	58.9	100
1.1.2	Government effectiveness*	27.3	125
1.2	**Regulatory environment**	**44.3**	**118**
1.2.1	Regulatory quality*	17.1	128
1.2.2	Rule of law*	14.4	130 ○
1.2.3	Cost of redundancy dismissal	21.7	93
1.3	**Business environment**	**60.8**	**105**
1.3.1	Ease of starting a business*	93.2	34 ● ◆
1.3.2	Ease of resolving insolvency*	28.4	122 ◇
Human capital and research		**25.2**	**85** ◆
2.1	**Education**	**51.5**	**[64]**
2.1.1	Expenditure on education, % GDP ◴	5.2	30 ●
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a
2.1.3	School life expectancy, years ◴	11.4	97
2.1.4	PISA scales in reading, maths and science	n/a	n/a
2.1.5	Pupil-teacher ratio, secondary ◴	15.4	76 ◆
2.2	**Tertiary education**	**23.4**	**89** ◆
2.2.1	Tertiary enrolment, % gross ◴	31.3	85 ◆
2.2.2	Graduates in science and engineering, % ◴	22.0	60 ●
2.2.3	Tertiary inbound mobility, % ◴	0.8	92
2.3	**Research and development (R&D)**	**0.6**	**113**
2.3.1	Researchers, FTE/mn pop.	n/a	n/a
2.3.2	Gross expenditure on R&D, % GDP ◴	0.1	107
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41 ○ ◇
2.3.4	QS university ranking, top 3*	0.0	74 ○ ◇
Infrastructure		**21.7**	**126**
3.1	**Information and communication technologies (ICTs)**	**30.7**	**123**
3.1.1	ICT access*	41.4	106 ◆
3.1.2	ICT use*	15.0	122
3.1.3	Government's online service*	31.8	124
3.1.4	E-participation*	34.5	119
3.2	**General infrastructure**	**14.9**	**118**
3.2.1	Electricity output, GWh/mn pop.	2,169.2	78 ◆
3.2.2	Logistics performance*	13.6	118
3.2.3	Gross capital formation, % GDP	17.8	100
3.3	**Ecological sustainability**	**19.6**	**103**
3.3.1	GDP/unit of energy use	8.5	86
3.3.2	Environmental performance*	38.2	95 ◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.1	124
Market sophistication		**52.5**	**37** ● ◆
4.1	**Credit**	**57.1**	**18** ● ◆
4.1.1	Ease of getting credit*	90.0	10 ● ◆
4.1.2	Domestic credit to private sector, % GDP	11.8	125
4.1.3	Microfinance gross loans, % GDP	5.7	1 ● ◆
4.2	**Investment**	**40.0**	**[35]**
4.2.1	Ease of protecting minority investors*	40.0	110
4.2.2	Market capitalization, % GDP	n/a	n/a
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a
4.3	**Trade, diversification, and market scale**	**60.3**	**93** ◆
4.3.1	Applied tariff rate, weighted avg., % ◴	5.0	84
4.3.2	Domestic industry diversification	80.8	74
4.3.3	Domestic market scale, bn PPP$	33.7	119

		Score/ Value	Rank
Business sophistication		**13.2**	**[129]**
5.1	**Knowledge workers**	**13.6**	**[114]**
5.1.1	Knowledge-intensive employment, %	n/a	n/a
5.1.2	Firms offering formal training, %	24.3	64
5.1.3	GERD performed by business, % GDP	n/a	n/a
5.1.4	GERD financed by business, % ◴	1.6	90
5.1.5	Females employed w/advanced degrees, %	n/a	n/a
5.2	**Innovation linkages**	**13.7**	**115**
5.2.1	University-industry R&D collaboration†	47.2	47 ● ◆
5.2.2	State of cluster development and depth†	32.5	119
5.2.3	GERD financed by abroad, % GDP ◴	0.0	98 ◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP ◴	0.0	75
5.2.5	Patent families/bn PPP$ GDP	0.0	100 ○ ◇
5.3	**Knowledge absorption**	**12.2**	**[131]**
5.3.1	Intellectual property payments, % total trade	0.0	119
5.3.2	High-tech imports, % total trade	n/a	n/a
5.3.3	ICT services imports, % total trade	0.3	121 ◇
5.3.4	FDI net inflows, % GDP	2.7	64 ●
5.3.5	Research talent, % in businesses	n/a	n/a
Knowledge and technology outputs		**16.6**	**80** ◆
6.1	**Knowledge creation**	**23.1**	**44** ● ◆
6.1.1	Patents by origin/bn PPP$ GDP	0.4	83
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	98 ○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP ◴	3.6	5 ● ◆
6.1.4	Scientific and technical articles/bn PPP$ GDP	4.3	116
6.1.5	Citable documents H-index	1.1	131 ○ ◇
6.2	**Knowledge impact**	**20.7**	**100**
6.2.1	Labor productivity growth, %	4.7	7 ● ◆
6.2.2	New businesses/th pop. 15–64	0.2	114
6.2.3	Software spending, % GDP	0.1	95 ◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.2	132 ○ ◇
6.2.5	High-tech manufacturing, %	2.8	108 ○
6.3	**Knowledge diffusion**	**5.9**	**115**
6.3.1	Intellectual property receipts, % total trade	0.0	105
6.3.2	Production and export complexity	18.7	112
6.3.3	High-tech exports, % total trade	n/a	n/a
6.3.4	ICT services exports, % total trade	0.3	111
Creative outputs		**14.8**	**107**
7.1	**Intangible assets**	**16.5**	**114**
7.1.1	Trademarks by origin/bn PPP$ GDP	18.1	96
7.1.2	Global brand value, top 5,000, % GDP	0.0	80 ○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP ◴	0.0	119 ○ ◇
7.1.4	ICTs and organizational model creation†	44.4	99
7.2	**Creative goods and services**	**12.3**	**[72]**
7.2.1	Cultural and creative services exports, % total trade	0.0	103
7.2.2	National feature films/mn pop. 15–69 ◴	1.8	72
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a
7.2.4	Printing and other media, % manufacturing	1.6	24 ●
7.2.5	Creative goods exports, % total trade	n/a	n/a
7.3	**Online creativity**	**13.9**	**77** ◆
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.0	128
7.3.2	Country-code TLDs/th pop. 15–69	0.4	104
7.3.3	Wikipedia edits/mn pop. 15–69	42.3	82 ◆
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Thailand

GII 2021 rank
43

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
46	**47**	**Upper middle**	**SEAO**	**69.8**	**1,261.5**	**18,073**	**44**

		Score/ Value	Rank	
Institutions		**64.2**	**64**	
1.1	**Political environment**	**61.7**	**54**	
1.1.1	Political and operational stability*	67.9	71	
1.1.2	Government effectiveness*	58.6	52	
1.2	**Regulatory environment**	**46.3**	**112**	○ ◇
1.2.1	Regulatory quality*	46.5	63	
1.2.2	Rule of law*	49.4	57	
1.2.3	Cost of redundancy dismissal	36.0	124	○ ◇
1.3	**Business environment**	**84.6**	**20**	◆
1.3.1	Ease of starting a business*	92.4	43	
1.3.2	Ease of resolving insolvency*	76.8	22	◆
Human capital and research		**31.7**	**63**	
2.1	**Education**	**42.4**	**86**	
2.1.1	Expenditure on education, % GDP	4.1	64	
2.1.2	Government funding/pupil, secondary, % GDP/cap	18.0	59	
2.1.3	School life expectancy, years	15.4	45	
2.1.4	PISA scales in reading, maths and science	412.4	61	
2.1.5	Pupil-teacher ratio, secondary	26.2	109	○ ◇
2.2	**Tertiary education**	**35.4**	**57**	
2.2.1	Tertiary enrolment, % gross	49.3	64	
2.2.2	Graduates in science and engineering, %	27.9	25	
2.2.3	Tertiary inbound mobility, %	1.3	85	
2.3	**Research and development (R&D)**	**17.4**	**47**	
2.3.1	Researchers, FTE/mn pop.	1,350.3	48	
2.3.2	Gross expenditure on R&D, % GDP	1.0	39	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	33.4	37	
Infrastructure		**43.0**	**61**	
3.1	**Information and communication technologies (ICTs)**	**68.4**	**60**	
3.1.1	ICT access*	57.8	81	
3.1.2	ICT use*	59.2	63	
3.1.3	Government's online service*	79.4	42	
3.1.4	E-participation*	77.4	51	
3.2	**General infrastructure**	**33.1**	**48**	
3.2.1	Electricity output, GWh/mn pop.	2,738.5	69	
3.2.2	Logistics performance*	63.3	31	◆
3.2.3	Gross capital formation, % GDP	24.0	54	
3.3	**Ecological sustainability**	**27.6**	**68**	
3.3.1	GDP/unit of energy use	9.2	78	
3.3.2	Environmental performance*	45.4	70	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.4	35	
Market sophistication		**55.6**	**27**	◆
4.1	**Credit**	**52.0**	**24**	◆
4.1.1	Ease of getting credit*	70.0	44	
4.1.2	Domestic credit to private sector, % GDP	143.4	10	● ◆
4.1.3	Microfinance gross loans, % GDP	0.0	81	○
4.2	**Investment**	**31.8**	**64**	
4.2.1	Ease of protecting minority investors*	86.0	3	● ◆
4.2.2	Market capitalization, % GDP	108.0	11	●
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	66	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	85	○
4.3	**Trade, diversification, and market scale**	**83.1**	**19**	◆
4.3.1	Applied tariff rate, weighted avg., %	3.5	69	
4.3.2	Domestic industry diversification	97.0	16	●
4.3.3	Domestic market scale, bn PPP$	1,261.5	21	

		Score/ Value	Rank	
Business sophistication		**34.7**	**36**	◆
5.1	**Knowledge workers**	**37.3**	**51**	
5.1.1	Knowledge-intensive employment, %	13.8	98	○ ◇
5.1.2	Firms offering formal training, %	18.0	84	○
5.1.3	GERD performed by business, % GDP	0.8	27	◆
5.1.4	GERD financed by business, %	80.8	1	● ◆
5.1.5	Females employed w/advanced degrees, %	9.9	70	
5.2	**Innovation linkages**	**20.2**	**67**	
5.2.1	University-industry R&D collaboration†	54.4	30	◆
5.2.2	State of cluster development and depth†	52.2	41	
5.2.3	GERD financed by abroad, % GDP	0.0	83	○
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	56	
5.2.5	Patent families/bn PPP$ GDP	0.1	60	
5.3	**Knowledge absorption**	**46.4**	**18**	● ◆
5.3.1	Intellectual property payments, % total trade	1.7	18	◆
5.3.2	High-tech imports, % total trade	14.2	14	●
5.3.3	ICT services imports, % total trade	0.3	116	○ ◇
5.3.4	FDI net inflows, % GDP	1.8	85	
5.3.5	Research talent, % in businesses	60.8	10	● ◆
Knowledge and technology outputs		**29.7**	**40**	
6.1	**Knowledge creation**	**22.9**	**47**	
6.1.1	Patents by origin/bn PPP$ GDP	0.6	75	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	57	
6.1.3	Utility models by origin/bn PPP$ GDP	2.4	9	● ◆
6.1.4	Scientific and technical articles/bn PPP$ GDP	8.9	93	
6.1.5	Citable documents H-index	21.2	39	
6.2	**Knowledge impact**	**35.0**	**44**	
6.2.1	Labor productivity growth, %	–0.1	66	
6.2.2	New businesses/th pop. 15–64	1.1	80	
6.2.3	Software spending, % GDP	0.2	55	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	6.8	39	
6.2.5	High-tech manufacturing, %	45.1	17	◆
6.3	**Knowledge diffusion**	**31.2**	**33**	◆
6.3.1	Intellectual property receipts, % total trade	0.1	69	
6.3.2	Production and export complexity	70.9	22	◆
6.3.3	High-tech exports, % total trade	13.4	11	● ◆
6.3.4	ICT services exports, % total trade	0.2	118	○
Creative outputs		**27.3**	**55**	
7.1	**Intangible assets**	**30.2**	**68**	
7.1.1	Trademarks by origin/bn PPP$ GDP	24.2	85	
7.1.2	Global brand value, top 5,000, % GDP	62.5	31	
7.1.3	Industrial designs by origin/bn PPP$ GDP	2.6	41	
7.1.4	ICTs and organizational model creation†	60.3	43	◆
7.2	**Creative goods and services**	**37.1**	**15**	● ◆
7.2.1	Cultural and creative services exports, % total trade	n/a	n/a	
7.2.2	National feature films/mn pop. 15–69	1.5	74	
7.2.3	Entertainment and media market/th pop. 15–69	10.7	35	◆
7.2.4	Printing and other media, % manufacturing	0.8	71	
7.2.5	Creative goods exports, % total trade	6.9	8	● ◆
7.3	**Online creativity**	**11.9**	**84**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	5.5	52	
7.3.2	Country-code TLDs/th pop. 15–69	0.4	102	
7.3.3	Wikipedia edits/mn pop. 15–69	39.3	86	
7.3.4	Mobile app creation/bn PPP$ GDP	3.9	61	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Togo

GII 2021 rank
125

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
129	**110**	**Low**	**SSF**	**8.3**	**13.6**	**1,640**	**125**

		Score/ Value	Rank	
Institutions		**57.1**	**87**	
1.1	**Political environment**	**41.0**	**115**	
1.1.1	Political and operational stability*	62.5	89	
1.1.2	Government effectiveness*	30.3	123	
1.2	**Regulatory environment**	**59.1**	**81**	
1.2.1	Regulatory quality*	25.7	111	
1.2.2	Rule of law*	31.2	103	
1.2.3	Cost of redundancy dismissal	13.1	47	●
1.3	**Business environment**	**71.1**	**67**	◆
1.3.1	Ease of starting a business*	95.1	14	● ◆
1.3.2	Ease of resolving insolvency*	47.0	80	
Human capital and research		**17.5**	**110**	
2.1	**Education**	**41.7**	**88**	
2.1.1	Expenditure on education, % GDP	5.4	25	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	15.3	75	
2.1.3	School life expectancy, years	12.7	85	◆
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	26.2	108	
2.2	**Tertiary education**	**9.3**	**[114]**	
2.2.1	Tertiary enrolment, % gross	14.0	105	
2.2.2	Graduates in science and engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research and development (R&D)**	**1.4**	**102**	
2.3.1	Researchers, FTE/mn pop.	48.1	94	
2.3.2	Gross expenditure on R&D, % GDP	0.3	86	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**27.5**	**110**	
3.1	**Information and communication technologies (ICTs)**	**38.4**	**113**	◆
3.1.1	ICT access*	34.3	118	
3.1.2	ICT use*	18.0	116	
3.1.3	Government's online service*	50.0	106	
3.1.4	E-participation*	51.2	99	
3.2	**General infrastructure**	**31.5**	**54**	●
3.2.1	Electricity output, GWh/mn pop.	50.2	122	○
3.2.2	Logistics performance*	18.6	110	
3.2.3	Gross capital formation, % GDP	38.3	8	●
3.3	**Ecological sustainability**	**12.7**	**132**	○
3.3.1	GDP/unit of energy use	4.0	119	
3.3.2	Environmental performance*	29.5	122	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.6	79	◆
Market sophistication		**36.9**	**112**	
4.1	**Credit**	**40.2**	**69**	
4.1.1	Ease of getting credit*	70.0	44	●
4.1.2	Domestic credit to private sector, % GDP	35.1	88	◆
4.1.3	Microfinance gross loans, % GDP	2.0	12	●
4.2	**Investment**	**42.0**	**[28]**	
4.2.1	Ease of protecting minority investors*	42.0	102	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**28.5**	**131**	○ ◇
4.3.1	Applied tariff rate, weighted avg., %	11.0	122	◇
4.3.2	Domestic industry diversification	n/a	n/a	
4.3.3	Domestic market scale, bn PPP$	13.6	130	○ ◇

		Score/ Value	Rank	
Business sophistication		**13.5**	**[128]**	
5.1	**Knowledge workers**	**23.1**	**[91]**	
5.1.1	Knowledge-intensive employment, %	14.1	94	◆
5.1.2	Firms offering formal training, %	33.7	44	● ◆
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, %	0.9	114	
5.2	**Innovation linkages**	**3.0**	**[129]**	
5.2.1	University-industry R&D collaboration†	n/a	n/a	
5.2.2	State of cluster development and depth†	n/a	n/a	
5.2.3	GERD financed by abroad, % GDP	0.0	73	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	66	
5.2.5	Patent families/bn PPP$ GDP	0.0	100	○ ◇
5.3	**Knowledge absorption**	**14.3**	**122**	
5.3.1	Intellectual property payments, % total trade	0.0	113	
5.3.2	High-tech imports, % total trade	5.1	111	
5.3.3	ICT services imports, % total trade	0.8	87	
5.3.4	FDI net inflows, % GDP	0.3	121	
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**6.1**	**128**	○ ◇
6.1	**Knowledge creation**	**4.3**	**116**	
6.1.1	Patents by origin/bn PPP$ GDP	0.1	103	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	98	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	76	○ ◇
6.1.4	Scientific and technical articles/bn PPP$ GDP	11.0	79	
6.1.5	Citable documents H-index	1.7	129	○ ◇
6.2	**Knowledge impact**	**4.8**	**[127]**	
6.2.1	Labor productivity growth, %	n/a	n/a	
6.2.2	New businesses/th pop. 15–64	0.6	92	
6.2.3	Software spending, % GDP	0.1	94	◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.9	89	◆
6.2.5	High-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**9.1**	**98**	
6.3.1	Intellectual property receipts, % total trade	0.0	110	○
6.3.2	Production and export complexity	25.8	101	
6.3.3	High-tech exports, % total trade	0.0	126	○ ◇
6.3.4	ICT services exports, % total trade	1.7	64	●
Creative outputs		**10.3**	**119**	
7.1	**Intangible assets**	**8.3**	**130**	○ ◇
7.1.1	Trademarks by origin/bn PPP$ GDP	14.9	100	
7.1.2	Global brand value, top 5,000, % GDP	26.8	46	● ◆
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.5	85	
7.1.4	ICTs and organizational model creation†	n/a	n/a	
7.2	**Creative goods and services**	**12.7**	**[71]**	
7.2.1	Cultural and creative services exports, % total trade	1.7	14	● ◆
7.2.2	National feature films/mn pop. 15–69	0.7	93	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.0	113	
7.3	**Online creativity**	**11.7**	**85**	◆
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.6	104	◆
7.3.2	Country-code TLDs/th pop. 15–69	0.1	117	
7.3.3	Wikipedia edits/mn pop. 15–69	36.4	92	◆
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Trinidad and Tobago

GII 2021 rank
97

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
95	**97**	**High**	**LCN**	**1.4**	**36.4**	**25,964**	**98**

		Score/ Value	Rank
Institutions		**62.0**	**72**
1.1	**Political environment**	**59.1**	**60**
1.1.1	Political and operational stability*	71.4	54
1.1.2	Government effectiveness*	52.9	64
1.2	**Regulatory environment**	**58.4**	**84**
1.2.1	Regulatory quality*	39.6	80
1.2.2	Rule of law*	43.6	69
1.2.3	Cost of redundancy dismissal	20.5	87
1.3	**Business environment**	**68.5**	**74**
1.3.1	Ease of starting a business*	88.6	64
1.3.2	Ease of resolving insolvency*	48.4	75
Human capital and research		**19.2**	**[100]**
2.1	**Education**	**36.3**	**[101]**
2.1.1	Expenditure on education, % GDP	n/a	n/a
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a
2.1.3	School life expectancy, years	n/a	n/a
2.1.4	PISA scales in reading, maths and science	423.0	54
2.1.5	Pupil-teacher ratio, secondary	n/a	n/a
2.2	**Tertiary education**	**n/a**	**[n/a]**
2.2.1	Tertiary enrolment, % gross	n/a	n/a
2.2.2	Graduates in science and engineering, %	n/a	n/a
2.2.3	Tertiary inbound mobility, %	n/a	n/a
2.3	**Research and development (R&D)**	**2.0**	**94**
2.3.1	Researchers, FTE/mn pop.	567.0	64
2.3.2	Gross expenditure on R&D, % GDP	0.1	108
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41
2.3.4	QS university ranking, top 3*	0.0	74
Infrastructure		**33.8**	**90**
3.1	**Information and communication technologies (ICTs)**	**64.1**	**71**
3.1.1	ICT access*	77.7	41
3.1.2	ICT use*	55.6	70
3.1.3	Government's online service*	61.2	86
3.1.4	E-participation*	61.9	84
3.2	**General infrastructure**	**20.6**	**106**
3.2.1	Electricity output, GWh/mn pop.	6,636.7	31
3.2.2	Logistics performance*	17.1	113
3.2.3	Gross capital formation, % GDP	n/a	n/a
3.3	**Ecological sustainability**	**16.8**	**117**
3.3.1	GDP/unit of energy use	2.5	124
3.3.2	Environmental performance*	47.5	63
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.5	86
Market sophistication		**35.8**	**119**
4.1	**Credit**	**32.0**	**100**
4.1.1	Ease of getting credit*	65.0	61
4.1.2	Domestic credit to private sector, % GDP	40.1	82
4.1.3	Microfinance gross loans, % GDP	0.0	76
4.2	**Investment**	**34.8**	**[50]**
4.2.1	Ease of protecting minority investors*	64.0	56
4.2.2	Market capitalization, % GDP	n/a	n/a
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	51
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a
4.3	**Trade, diversification, and market scale**	**40.5**	**124**
4.3.1	Applied tariff rate, weighted avg., %	8.6	107
4.3.2	Domestic industry diversification	n/a	n/a
4.3.3	Domestic market scale, bn PPP$	36.4	114

		Score/ Value	Rank
Business sophistication		**18.3**	**104**
5.1	**Knowledge workers**	**25.1**	**85**
5.1.1	Knowledge-intensive employment, %	29.8	49
5.1.2	Firms offering formal training, %	28.0	55
5.1.3	GERD performed by business, % GDP	0.0	86
5.1.4	GERD financed by business, %	13.6	73
5.1.5	Females employed w/advanced degrees, %	12.8	57
5.2	**Innovation linkages**	**15.9**	**104**
5.2.1	University-industry R&D collaboration†	33.3	99
5.2.2	State of cluster development and depth†	43.0	86
5.2.3	GERD financed by abroad, % GDP	0.0	66
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	58
5.2.5	Patent families/bn PPP$ GDP	0.0	77
5.3	**Knowledge absorption**	**14.1**	**123**
5.3.1	Intellectual property payments, % total trade	0.6	65
5.3.2	High-tech imports, % total trade	6.5	88
5.3.3	ICT services imports, % total trade	0.5	105
5.3.4	FDI net inflows, % GDP	–1.4	125
5.3.5	Research talent, % in businesses	1.4	77
Knowledge and technology outputs		**15.8**	**83**
6.1	**Knowledge creation**	**3.5**	**119**
6.1.1	Patents by origin/bn PPP$ GDP	0.0	124
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	84
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	65
6.1.4	Scientific and technical articles/bn PPP$ GDP	6.7	104
6.1.5	Citable documents H-index	4.9	106
6.2	**Knowledge impact**	**33.0**	**[54]**
6.2.1	Labor productivity growth, %	0.5	56
6.2.2	New businesses/th pop. 15–64	n/a	n/a
6.2.3	Software spending, % GDP	n/a	n/a
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	2.2	85
6.2.5	High-tech manufacturing, %	n/a	n/a
6.3	**Knowledge diffusion**	**10.9**	**92**
6.3.1	Intellectual property receipts, % total trade	0.0	81
6.3.2	Production and export complexity	45.1	58
6.3.3	High-tech exports, % total trade	2.0	59
6.3.4	ICT services exports, % total trade	0.2	123
Creative outputs		**15.6**	**103**
7.1	**Intangible assets**	**19.5**	**102**
7.1.1	Trademarks by origin/bn PPP$ GDP	22.4	89
7.1.2	Global brand value, top 5,000, % GDP	0.0	80
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.5	84
7.1.4	ICTs and organizational model creation†	49.8	83
7.2	**Creative goods and services**	**1.5**	**[122]**
7.2.1	Cultural and creative services exports, % total trade	0.0	97
7.2.2	National feature films/mn pop. 15–69	n/a	n/a
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a
7.2.4	Printing and other media, % manufacturing	n/a	n/a
7.2.5	Creative goods exports, % total trade	0.1	89
7.3	**Online creativity**	**21.9**	**54**
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	4.2	58
7.3.2	Country-code TLDs/th pop. 15–69	1.5	75
7.3.3	Wikipedia edits/mn pop. 15–69	58.8	55
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Tunisia

GII 2021 rank **71**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
64	78	Lower middle	NAWA	11.8	123.6	10,382	65

		Score/ Value	Rank	
Institutions		**61.4**	**75**	◆
1.1	**Political environment**	**53.1**	**84**	
1.1.1	Political and operational stability*	62.5	89	
1.1.2	Government effectiveness*	48.4	80	◆
1.2	**Regulatory environment**	**56.7**	**90**	
1.2.1	Regulatory quality*	32.1	101	
1.2.2	Rule of law*	48.4	60	◆
1.2.3	Cost of redundancy dismissal	21.6	92	
1.3	**Business environment**	**74.4**	**54**	◆
1.3.1	Ease of starting a business*	94.6	18	● ◆
1.3.2	Ease of resolving insolvency*	54.2	64	
Human capital and research		**42.7**	**35**	● ◆
2.1	**Education**	**71.2**	**8**	● ◆
2.1.1	Expenditure on education, % GDP	6.6	7	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	52.4	1	● ◆
2.1.3	School life expectancy, years	15.1	50	◆
2.1.4	PISA scales in reading, maths and science	371.4	74	○
2.1.5	Pupil-teacher ratio, secondary	13.6	64	
2.2	**Tertiary education**	**48.6**	**16**	● ◆
2.2.1	Tertiary enrolment, % gross	31.8	82	
2.2.2	Graduates in science and engineering, %	43.3	2	● ◆
2.2.3	Tertiary inbound mobility, %	2.2	75	
2.3	**Research and development (R&D)**	**8.2**	**65**	
2.3.1	Researchers, FTE/mn pop.	1,771.6	42	◆
2.3.2	Gross expenditure on R&D, % GDP	0.6	58	◆
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**34.2**	**89**	
3.1	**Information and communication technologies (ICTs)**	**61.7**	**78**	◆
3.1.1	ICT access*	61.5	73	◆
3.1.2	ICT use*	53.8	74	◆
3.1.3	Government's online service*	62.4	83	
3.1.4	E-participation*	69.0	73	
3.2	**General infrastructure**	**11.0**	**128**	○ ◇
3.2.1	Electricity output, GWh/mn pop.	1,816.7	85	
3.2.2	Logistics performance*	24.3	100	
3.2.3	Gross capital formation, % GDP	10.3	124	○ ◇
3.3	**Ecological sustainability**	**30.0**	**58**	◆
3.3.1	GDP/unit of energy use	12.0	50	
3.3.2	Environmental performance*	46.7	65	◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.9	45	◆
Market sophistication		**40.7**	**98**	
4.1	**Credit**	**35.9**	**83**	
4.1.1	Ease of getting credit*	50.0	94	
4.1.2	Domestic credit to private sector, % GDP	86.6	34	● ◆
4.1.3	Microfinance gross loans, % GDP	0.5	34	
4.2	**Investment**	**22.3**	**103**	
4.2.1	Ease of protecting minority investors*	62.0	60	
4.2.2	Market capitalization, % GDP	21.8	57	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	47	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	37	
4.3	**Trade, diversification, and market scale**	**63.9**	**78**	
4.3.1	Applied tariff rate, weighted avg., %	9.4	113	○
4.3.2	Domestic industry diversification	88.5	56	
4.3.3	Domestic market scale, bn PPP$	123.6	78	

		Score/ Value	Rank	
Business sophistication		**16.5**	**114**	○
5.1	**Knowledge workers**	**19.6**	**102**	
5.1.1	Knowledge-intensive employment, %	20.9	78	
5.1.2	Firms offering formal training, %	19.1	80	
5.1.3	GERD performed by business, % GDP	0.1	59	
5.1.4	GERD financed by business, %	18.9	67	
5.1.5	Females employed w/advanced degrees, %	8.8	75	
5.2	**Innovation linkages**	**13.9**	**114**	○
5.2.1	University-industry R&D collaboration†	32.8	103	
5.2.2	State of cluster development and depth†	39.0	105	
5.2.3	GERD financed by abroad, % GDP	0.0	62	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	98	
5.2.5	Patent families/bn PPP$ GDP	0.0	70	
5.3	**Knowledge absorption**	**16.1**	**113**	○
5.3.1	Intellectual property payments, % total trade	0.1	106	○
5.3.2	High-tech imports, % total trade	9.3	41	
5.3.3	ICT services imports, % total trade	0.4	110	○
5.3.4	FDI net inflows, % GDP	2.2	75	
5.3.5	Research talent, % in businesses	5.2	71	
Knowledge and technology outputs		**24.0**	**55**	◆
6.1	**Knowledge creation**	**24.2**	**38**	● ◆
6.1.1	Patents by origin/bn PPP$ GDP	1.4	52	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	81	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	40.9	18	● ◆
6.1.5	Citable documents H-index	11.2	68	
6.2	**Knowledge impact**	**29.7**	**63**	
6.2.1	Labor productivity growth, %	–1.4	93	
6.2.2	New businesses/th pop. 15–64	1.7	60	
6.2.3	Software spending, % GDP	0.3	35	● ◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	8.6	32	● ◆
6.2.5	High-tech manufacturing, %	24.3	51	
6.3	**Knowledge diffusion**	**18.0**	**60**	
6.3.1	Intellectual property receipts, % total trade	0.1	56	
6.3.2	Production and export complexity	51.6	46	◆
6.3.3	High-tech exports, % total trade	4.0	40	●
6.3.4	ICT services exports, % total trade	1.2	76	
Creative outputs		**20.6**	**[80]**	
7.1	**Intangible assets**	**30.5**	**[65]**	
7.1.1	Trademarks by origin/bn PPP$ GDP	n/a	n/a	
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.3	61	
7.1.4	ICTs and organizational model creation†	42.7	105	○
7.2	**Creative goods and services**	**12.9**	**[70]**	
7.2.1	Cultural and creative services exports, % total trade	n/a	n/a	
7.2.2	National feature films/mn pop. 15–69	1.4	77	
7.2.3	Entertainment and media market/th pop. 15–69	1.2	57	○
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	2.0	30	●
7.3	**Online creativity**	**8.3**	**107**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	2.8	67	◆
7.3.2	Country-code TLDs/th pop. 15–69	1.7	73	
7.3.3	Wikipedia edits/mn pop. 15–69	31.1	100	
7.3.4	Mobile app creation/bn PPP$ GDP	0.1	87	○

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Turkey

GII 2021 rank
41

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
41	**45**	**Upper middle**	**NAWA**	**84.3**	**2,381.6**	**28,294**	**51**

		Score/ Value	Rank	
Institutions		**56.0**	**93**	
1.1	**Political environment**	**55.3**	**75**	
1.1.1	Political and operational stability*	62.5	89	
1.1.2	Government effectiveness*	51.7	70	
1.2	**Regulatory environment**	**49.1**	**109**	○
1.2.1	Regulatory quality*	43.3	72	
1.2.2	Rule of law*	39.3	78	
1.2.3	Cost of redundancy dismissal	29.8	118	○
1.3	**Business environment**	**63.6**	**91**	
1.3.1	Ease of starting a business*	88.8	62	
1.3.2	Ease of resolving insolvency*	38.5	104	○
Human capital and research		**48.5**	**26**	◆
2.1	**Education**	**73.0**	**[6]**	
2.1.1	Expenditure on education, % GDP	n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	18.2	11	● ◆
2.1.4	PISA scales in reading, maths and science	462.5	41	
2.1.5	Pupil-teacher ratio, secondary ⏲	16.4	80	
2.2	**Tertiary education**	**44.0**	**24**	◆
2.2.1	Tertiary enrolment, % gross	113.2	2	● ◆
2.2.2	Graduates in science and engineering, %	19.4	75	
2.2.3	Tertiary inbound mobility, %	1.7	80	
2.3	**Research and development (R&D)**	**28.4**	**38**	◆
2.3.1	Researchers, FTE/mn pop.	1,624.3	43	
2.3.2	Gross expenditure on R&D, % GDP	1.1	36	◆
2.3.3	Global corporate R&D investors, top 3, mn US$	50.2	29	◆
2.3.4	QS university ranking, top 3*	23.1	45	
Infrastructure		**47.0**	**48**	
3.1	**Information and communication technologies (ICTs)**	**75.4**	**47**	
3.1.1	ICT access*	67.3	66	
3.1.2	ICT use*	59.1	64	
3.1.3	Government's online service*	85.9	22	◆
3.1.4	E-participation*	89.3	23	◆
3.2	**General infrastructure**	**34.4**	**42**	◆
3.2.1	Electricity output, GWh/mn pop.	3,744.2	57	
3.2.2	Logistics performance*	51.0	46	◆
3.2.3	Gross capital formation, % GDP	28.2	26	
3.3	**Ecological sustainability**	**31.2**	**54**	
3.3.1	GDP/unit of energy use	15.8	19	● ◆
3.3.2	Environmental performance*	42.6	84	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.1	66	
Market sophistication		**49.7**	**49**	
4.1	**Credit**	**40.4**	**68**	
4.1.1	Ease of getting credit*	75.0	34	
4.1.2	Domestic credit to private sector, % GDP	65.4	51	
4.1.3	Microfinance gross loans, % GDP ⏲	0.0	77	○
4.2	**Investment**	**21.6**	**105**	○
4.2.1	Ease of protecting minority investors*	76.0	21	
4.2.2	Market capitalization, % GDP	23.3	55	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	85	○
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	83	○
4.3	**Trade, diversification, and market scale**	**87.0**	**10**	● ◆
4.3.1	Applied tariff rate, weighted avg., %	3.1	63	
4.3.2	Domestic industry diversification	99.2	4	●
4.3.3	Domestic market scale, bn PPP$	2,381.6	13	● ◆

		Score/ Value	Rank	
Business sophistication		**30.8**	**46**	
5.1	**Knowledge workers**	**37.3**	**49**	
5.1.1	Knowledge-intensive employment, %	22.8	69	
5.1.2	Firms offering formal training, %	30.7	50	
5.1.3	GERD performed by business, % GDP	0.7	33	
5.1.4	GERD financed by business, %	56.3	18	◆
5.1.5	Females employed w/advanced degrees, %	10.1	69	
5.2	**Innovation linkages**	**18.4**	**79**	
5.2.1	University-industry R&D collaboration†	43.3	62	
5.2.2	State of cluster development and depth†	49.7	48	
5.2.3	GERD financed by abroad, % GDP	0.0	71	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	115	○
5.2.5	Patent families/bn PPP$ GDP	0.4	33	◆
5.3	**Knowledge absorption**	**36.8**	**36**	
5.3.1	Intellectual property payments, % total trade	0.8	56	
5.3.2	High-tech imports, % total trade	7.8	62	
5.3.3	ICT services imports, % total trade	0.9	84	
5.3.4	FDI net inflows, % GDP	1.4	100	○
5.3.5	Research talent, % in businesses	61.8	9	● ◆
Knowledge and technology outputs		**25.3**	**50**	
6.1	**Knowledge creation**	**25.6**	**37**	
6.1.1	Patents by origin/bn PPP$ GDP	3.4	24	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.7	31	
6.1.3	Utility models by origin/bn PPP$ GDP	1.2	20	
6.1.4	Scientific and technical articles/bn PPP$ GDP	16.0	52	
6.1.5	Citable documents H-index	28.3	35	◆
6.2	**Knowledge impact**	**36.0**	**38**	
6.2.1	Labor productivity growth, %	3.6	12	● ◆
6.2.2	New businesses/th pop. 15–64	1.6	65	
6.2.3	Software spending, % GDP	0.5	20	◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	3.3	70	
6.2.5	High-tech manufacturing, %	23.5	55	
6.3	**Knowledge diffusion**	**14.3**	**73**	
6.3.1	Intellectual property receipts, % total trade	0.0	76	
6.3.2	Production and export complexity	58.7	40	
6.3.3	High-tech exports, % total trade	1.8	61	
6.3.4	ICT services exports, % total trade	0.7	94	
Creative outputs		**35.3**	**35**	◆
7.1	**Intangible assets**	**50.2**	**18**	● ◆
7.1.1	Trademarks by origin/bn PPP$ GDP	100.6	6	● ◆
7.1.2	Global brand value, top 5,000, % GDP	27.9	45	
7.1.3	Industrial designs by origin/bn PPP$ GDP	15.9	5	● ◆
7.1.4	ICTs and organizational model creation†	44.2	100	○
7.2	**Creative goods and services**	**16.7**	**61**	
7.2.1	Cultural and creative services exports, % total trade	0.1	82	
7.2.2	National feature films/mn pop. 15–69	2.6	62	
7.2.3	Entertainment and media market/th pop. 15–69	5.0	47	○
7.2.4	Printing and other media, % manufacturing	0.7	75	○
7.2.5	Creative goods exports, % total trade	3.1	19	●
7.3	**Online creativity**	**23.9**	**50**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	11.4	36	◆
7.3.2	Country-code TLDs/th pop. 15–69	2.2	68	
7.3.3	Wikipedia edits/mn pop. 15–69	52.8	61	
7.3.4	Mobile app creation/bn PPP$ GDP	29.0	18	◆

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Uganda

GII 2021 rank
119

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
122	**119**	**Low**	**SSF**	**45.7**	**106.6**	**2,585**	**114**

		Score/ Value	Rank	
Institutions		**56.5**	**89**	
1.1	**Political environment**	**44.7**	**105**	
1.1.1	Political and operational stability*	58.9	100	
1.1.2	Government effectiveness*	37.6	104	
1.2	**Regulatory environment**	**67.4**	**59**	● ◆
1.2.1	Regulatory quality*	33.7	96	
1.2.2	Rule of law*	38.4	80	
1.2.3	Cost of redundancy dismissal	8.7	18	● ◆
1.3	**Business environment**	**57.5**	**111**	
1.3.1	Ease of starting a business*	71.4	123	◇
1.3.2	Ease of resolving insolvency*	43.6	89	
Human capital and research		**8.1**	**131**	○ ◇
2.1	**Education**	**11.5**	**[131]**	
2.1.1	Expenditure on education, % GDP	2.1	111	○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	n/a	n/a	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	n/a	n/a	
2.2	**Tertiary education**	**12.0**	**110**	
2.2.1	Tertiary enrolment, % gross	4.8	124	○
2.2.2	Graduates in science and engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	10.7	18	● ◆
2.3	**Research and development (R&D)**	**0.7**	**107**	
2.3.1	Researchers, FTE/mn pop.	27.8	103	
2.3.2	Gross expenditure on R&D, % GDP	0.1	98	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**30.0**	**103**	
3.1	**Information and communication technologies (ICTs)**	**40.0**	**109**	◆
3.1.1	ICT access*	25.4	127	○
3.1.2	ICT use*	19.2	115	◆
3.1.3	Government's online service*	58.2	90	◆
3.1.4	E-participation*	57.1	91	◆
3.2	**General infrastructure**	**31.1**	**56**	●
3.2.1	Electricity output, GWh/mn pop.	n/a	n/a	
3.2.2	Logistics performance*	24.6	98	
3.2.3	Gross capital formation, % GDP	26.9	33	●
3.3	**Ecological sustainability**	**18.9**	**109**	
3.3.1	GDP/unit of energy use	n/a	n/a	
3.3.2	Environmental performance*	35.6	101	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.4	91	
Market sophistication		**37.2**	**111**	
4.1	**Credit**	**30.5**	**104**	
4.1.1	Ease of getting credit*	60.0	74	
4.1.2	Domestic credit to private sector, % GDP	13.9	122	
4.1.3	Microfinance gross loans, % GDP	1.4	23	●
4.2	**Investment**	**32.2**	**[62]**	
4.2.1	Ease of protecting minority investors*	56.0	82	◆
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	52	
4.3	**Trade, diversification, and market scale**	**49.0**	**117**	
4.3.1	Applied tariff rate, weighted avg., %	8.1	103	
4.3.2	Domestic industry diversification	n/a	n/a	
4.3.3	Domestic market scale, bn PPP$	106.6	81	◆

		Score/ Value	Rank	
Business sophistication		**16.1**	**118**	
5.1	**Knowledge workers**	**12.4**	**120**	
5.1.1	Knowledge-intensive employment, %	10.3	109	
5.1.2	Firms offering formal training, %	34.7	42	● ◆
5.1.3	GERD performed by business, % GDP	0.0	89	○ ◇
5.1.4	GERD financed by business, %	3.4	87	◆
5.1.5	Females employed w/advanced degrees, %	0.1	124	○ ◇
5.2	**Innovation linkages**	**22.6**	**56**	●
5.2.1	University-industry R&D collaboration†	43.1	63	●
5.2.2	State of cluster development and depth†	43.3	84	
5.2.3	GERD financed by abroad, % GDP	0.1	45	●
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	96	
5.2.5	Patent families/bn PPP$ GDP	n/a	n/a	
5.3	**Knowledge absorption**	**13.5**	**125**	◇
5.3.1	Intellectual property payments, % total trade	0.3	84	
5.3.2	High-tech imports, % total trade	6.1	95	
5.3.3	ICT services imports, % total trade	0.3	123	◇
5.3.4	FDI net inflows, % GDP	3.1	43	●
5.3.5	Research talent, % in businesses	4.0	74	
Knowledge and technology outputs		**11.9**	**105**	
6.1	**Knowledge creation**	**9.1**	**86**	
6.1.1	Patents by origin/bn PPP$ GDP	0.1	118	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	95	◆
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	13.8	65	●
6.1.5	Citable documents H-index	10.6	72	◆
6.2	**Knowledge impact**	**19.3**	**109**	
6.2.1	Labor productivity growth, %	0.9	49	●
6.2.2	New businesses/th pop. 15–64	0.9	86	
6.2.3	Software spending, % GDP	0.0	121	○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.1	106	
6.2.5	High-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**7.3**	**107**	
6.3.1	Intellectual property receipts, % total trade	0.1	50	● ◆
6.3.2	Production and export complexity	32.4	85	◆
6.3.3	High-tech exports, % total trade	0.3	102	
6.3.4	ICT services exports, % total trade	0.3	110	
Creative outputs		**9.0**	**126**	
7.1	**Intangible assets**	**15.6**	**117**	
7.1.1	Trademarks by origin/bn PPP$ GDP	15.2	99	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.3	99	
7.1.4	ICTs and organizational model creation†	42.7	104	
7.2	**Creative goods and services**	**1.0**	**[127]**	
7.2.1	Cultural and creative services exports, % total trade	0.0	96	
7.2.2	National feature films/mn pop. 15–69	n/a	n/a	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.1	103	
7.3	**Online creativity**	**3.7**	**128**	○
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.2	116	
7.3.2	Country-code TLDs/th pop. 15–69	0.1	120	
7.3.3	Wikipedia edits/mn pop. 15–69	15.6	128	○
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Ukraine

GII 2021 rank
49

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
37	**76**	**Lower middle**	**EUR**	**43.7**	**527.9**	**12,710**	**45**

		Score/ Value	Rank	
Institutions		**56.2**	**91**	
1.1	**Political environment**	**46.0**	**101**	
1.1.1	Political and operational stability*	50.0	123	○ ◇
1.1.2	Government effectiveness*	44.1	90	
1.2	**Regulatory environment**	**61.3**	**78**	
1.2.1	Regulatory quality*	36.7	92	
1.2.2	Rule of law*	28.3	108	
1.2.3	Cost of redundancy dismissal	13.0	40	
1.3	**Business environment**	**61.2**	**104**	
1.3.1	Ease of starting a business*	91.1	52	
1.3.2	Ease of resolving insolvency*	31.4	117	○
Human capital and research		**38.2**	**44**	◆
2.1	**Education**	**61.3**	**23**	◆
2.1.1	Expenditure on education, % GDP	5.4	23	
2.1.2	Government funding/pupil, secondary, % GDP/cap	30.3	7	● ◆
2.1.3	School life expectancy, years ◴	14.9	55	◆
2.1.4	PISA scales in reading, maths and science	462.7	40	
2.1.5	Pupil-teacher ratio, secondary	7.8	7	● ◆
2.2	**Tertiary education**	**42.8**	**33**	◆
2.2.1	Tertiary enrolment, % gross ◴	82.7	18	● ◆
2.2.2	Graduates in science and engineering, %	25.1	39	
2.2.3	Tertiary inbound mobility, %	3.5	62	
2.3	**Research and development (R&D)**	**10.4**	**58**	◆
2.3.1	Researchers, FTE/mn pop. ◴	988.1	51	◆
2.3.2	Gross expenditure on R&D, % GDP ◴	0.5	69	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	20.6	51	◆
Infrastructure		**32.3**	**94**	
3.1	**Information and communication technologies (ICTs)**	**64.9**	**69**	◆
3.1.1	ICT access*	65.0	69	◆
3.1.2	ICT use*	45.5	91	
3.1.3	Government's online service*	68.2	72	
3.1.4	E-participation*	81.0	46	◆
3.2	**General infrastructure**	**12.8**	**124**	○ ◇
3.2.1	Electricity output, GWh/mn pop.	3,546.9	58	◆
3.2.2	Logistics performance*	36.4	65	
3.2.3	Gross capital formation, % GDP	6.9	125	○ ◇
3.3	**Ecological sustainability**	**19.2**	**106**	
3.3.1	GDP/unit of energy use	4.0	120	○ ◇
3.3.2	Environmental performance*	49.5	57	◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.6	82	
Market sophistication		**42.3**	**88**	
4.1	**Credit**	**34.3**	**90**	
4.1.1	Ease of getting credit*	75.0	34	
4.1.2	Domestic credit to private sector, % GDP	30.1	94	
4.1.3	Microfinance gross loans, % GDP ◴	0.0	79	○
4.2	**Investment**	**17.9**	**120**	○
4.2.1	Ease of protecting minority investors*	68.0	44	
4.2.2	Market capitalization, % GDP ◴	4.0	73	○ ◇
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	68	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	93	○ ◇
4.3	**Trade, diversification, and market scale**	**74.8**	**44**	◆
4.3.1	Applied tariff rate, weighted avg., %	5.3	89	
4.3.2	Domestic industry diversification	89.8	51	
4.3.3	Domestic market scale, bn PPP$	527.9	39	

		Score/ Value	Rank	
Business sophistication		**28.9**	**53**	◆
5.1	**Knowledge workers**	**38.9**	**45**	◆
5.1.1	Knowledge-intensive employment, %	37.5	32	◆
5.1.2	Firms offering formal training, %	24.3	64	
5.1.3	GERD performed by business, % GDP ◴	0.3	49	◆
5.1.4	GERD financed by business, %	30.5	59	
5.1.5	Females employed w/advanced degrees, %	30.2	2	● ◆
5.2	**Innovation linkages**	**18.0**	**84**	
5.2.1	University-industry R&D collaboration†	42.3	67	
5.2.2	State of cluster development and depth†	40.3	100	
5.2.3	GERD financed by abroad, % GDP	0.1	38	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	116	○
5.2.5	Patent families/bn PPP$ GDP	0.2	47	◆
5.3	**Knowledge absorption**	**29.7**	**59**	
5.3.1	Intellectual property payments, % total trade	0.8	46	
5.3.2	High-tech imports, % total trade ◴	9.9	36	
5.3.3	ICT services imports, % total trade	1.0	78	
5.3.4	FDI net inflows, % GDP	3.6	36	
5.3.5	Research talent, % in businesses ◴	27.3	45	
Knowledge and technology outputs		**32.3**	**33**	◆
6.1	**Knowledge creation**	**35.7**	**27**	◆
6.1.1	Patents by origin/bn PPP$ GDP	3.7	22	◆
6.1.2	PCT patents by origin/bn PPP$ GDP	0.3	46	◆
6.1.3	Utility models by origin/bn PPP$ GDP	14.9	1	● ◆
6.1.4	Scientific and technical articles/bn PPP$ GDP	9.1	90	
6.1.5	Citable documents H-index	17.0	51	◆
6.2	**Knowledge impact**	**31.4**	**61**	◆
6.2.1	Labor productivity growth, %	0.7	54	
6.2.2	New businesses/th pop. 15–64 ◴	1.7	61	
6.2.3	Software spending, % GDP	0.5	17	● ◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	3.3	72	
6.2.5	High-tech manufacturing, %	18.4	65	
6.3	**Knowledge diffusion**	**29.8**	**35**	◆
6.3.1	Intellectual property receipts, % total trade	0.1	48	
6.3.2	Production and export complexity	52.4	44	◆
6.3.3	High-tech exports, % total trade ◴	1.9	60	
6.3.4	ICT services exports, % total trade	6.3	9	● ◆
Creative outputs		**30.9**	**48**	◆
7.1	**Intangible assets**	**45.0**	**29**	◆
7.1.1	Trademarks by origin/bn PPP$ GDP	96.8	10	● ◆
7.1.2	Global brand value, top 5,000, % GDP	3.1	74	
7.1.3	Industrial designs by origin/bn PPP$ GDP	8.3	15	● ◆
7.1.4	ICTs and organizational model creation†	55.6	58	
7.2	**Creative goods and services**	**7.0**	**93**	
7.2.1	Cultural and creative services exports, % total trade	0.5	47	
7.2.2	National feature films/mn pop. 15–69	0.6	97	○
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	0.8	68	
7.2.5	Creative goods exports, % total trade ◴	0.2	78	
7.3	**Online creativity**	**26.4**	**45**	◆
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	4.5	55	◆
7.3.2	Country-code TLDs/th pop. 15–69	5.1	55	◆
7.3.3	Wikipedia edits/mn pop. 15–69	65.0	44	◆
7.3.4	Mobile app creation/bn PPP$ GDP	29.1	17	● ◆

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United Arab Emirates

GII 2021 rank **33**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
47	23	High	NAWA	9.9	647.6	58,466	34

		Score/ Value	Rank	
Institutions		**78.4**	**30**	
1.1	**Political environment**	**78.6**	**24**	
1.1.1	Political and operational stability*	73.2	44	
1.1.2	Government effectiveness*	81.2	20	
1.2	**Regulatory environment**	**84.5**	**21**	
1.2.1	Regulatory quality*	69.1	36	
1.2.2	Rule of law*	68.9	33	
1.2.3	Cost of redundancy dismissal	8.0	1	● ◆
1.3	**Business environment**	**72.0**	**61**	
1.3.1	Ease of starting a business*	94.8	16	
1.3.2	Ease of resolving insolvency*	49.3	72	
Human capital and research		**49.9**	**22**	
2.1	**Education**	**52.0**	**61**	
2.1.1	Expenditure on education, % GDP	3.1	94	○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	15.7	43	
2.1.4	PISA scales in reading, maths and science	433.5	47	○ ◇
2.1.5	Pupil-teacher ratio, secondary	10.5	33	
2.2	**Tertiary education**	**59.2**	**3**	● ◆
2.2.1	Tertiary enrolment, % gross	52.6	60	
2.2.2	Graduates in science and engineering, %	31.0	15	◆
2.2.3	Tertiary inbound mobility, %	48.6	1	● ◆
2.3	**Research and development (R&D)**	**38.6**	**28**	
2.3.1	Researchers, FTE/mn pop.	2,378.9	36	
2.3.2	Gross expenditure on R&D, % GDP	1.3	29	
2.3.3	Global corporate R&D investors, top 3, mn US$	64.9	19	
2.3.4	QS university ranking, top 3*	35.8	33	
Infrastructure		**58.1**	**14**	●
3.1	**Information and communication technologies (ICTs)**	**88.8**	**12**	●
3.1.1	ICT access*	87.3	13	●
3.1.2	ICT use*	83.7	12	●
3.1.3	Government's online service*	90.0	15	
3.1.4	E-participation*	94.0	16	
3.2	**General infrastructure**	**52.9**	**7**	● ◆
3.2.1	Electricity output, GWh/mn pop.	14,120.8	8	●
3.2.2	Logistics performance*	88.6	11	● ◆
3.2.3	Gross capital formation, % GDP	27.7	30	
3.3	**Ecological sustainability**	**32.7**	**51**	
3.3.1	GDP/unit of energy use	10.1	66	
3.3.2	Environmental performance*	55.6	40	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.8	32	
Market sophistication		**56.7**	**26**	
4.1	**Credit**	**50.6**	**28**	
4.1.1	Ease of getting credit*	70.0	44	
4.1.2	Domestic credit to private sector, % GDP	77.6	39	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**41.1**	**34**	
4.2.1	Ease of protecting minority investors*	80.0	13	◆
4.2.2	Market capitalization, % GDP	58.0	29	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.1	20	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.1	18	
4.3	**Trade, diversification, and market scale**	**78.4**	**34**	
4.3.1	Applied tariff rate, weighted avg., %	3.9	73	
4.3.2	Domestic industry diversification	92.9	43	
4.3.3	Domestic market scale, bn PPP$	647.7	33	

		Score/ Value	Rank	
Business sophistication		**47.2**	**22**	
5.1	**Knowledge workers**	**51.4**	**26**	
5.1.1	Knowledge-intensive employment, %	36.0	37	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	0.8	29	
5.1.4	GERD financed by business, %	74.3	5	● ◆
5.1.5	Females employed w/advanced degrees, %	8.6	77	○ ◇
5.2	**Innovation linkages**	**42.5**	**21**	
5.2.1	University-industry R&D collaboration†	62.1	19	
5.2.2	State of cluster development and depth†	68.5	9	● ◆
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.2	15	
5.2.5	Patent families/bn PPP$ GDP	0.1	59	
5.3	**Knowledge absorption**	**47.7**	**16**	
5.3.1	Intellectual property payments, % total trade	0.8	54	
5.3.2	High-tech imports, % total trade	13.0	17	
5.3.3	ICT services imports, % total trade	1.0	75	○
5.3.4	FDI net inflows, % GDP	2.8	57	
5.3.5	Research talent, % in businesses	77.9	2	● ◆
Knowledge and technology outputs		**22.2**	**59**	
6.1	**Knowledge creation**	**5.9**	**105**	○ ◇
6.1.1	Patents by origin/bn PPP$ GDP	0.1	105	○
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	60	
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	75	○
6.1.4	Scientific and technical articles/bn PPP$ GDP	7.7	97	○ ◇
6.1.5	Citable documents H-index	12.8	60	
6.2	**Knowledge impact**	**29.5**	**65**	
6.2.1	Labor productivity growth, %	−0.8	80	○
6.2.2	New businesses/th pop. 15–64	3.0	48	
6.2.3	Software spending, % GDP	0.3	40	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	5.6	51	
6.2.5	High-tech manufacturing, %	26.3	46	
6.3	**Knowledge diffusion**	**31.3**	**32**	
6.3.1	Intellectual property receipts, % total trade	1.1	19	
6.3.2	Production and export complexity	43.6	62	◇
6.3.3	High-tech exports, % total trade	9.4	17	
6.3.4	ICT services exports, % total trade	2.0	58	
Creative outputs		**33.8**	**40**	
7.1	**Intangible assets**	**33.1**	**55**	
7.1.1	Trademarks by origin/bn PPP$ GDP	8.1	115	○ ◇
7.1.2	Global brand value, top 5,000, % GDP	133.4	14	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.1	111	○
7.1.4	ICTs and organizational model creation†	67.3	24	
7.2	**Creative goods and services**	**50.5**	**2**	● ◆
7.2.1	Cultural and creative services exports, % total trade	n/a	n/a	
7.2.2	National feature films/mn pop. 15–69	10.6	18	
7.2.3	Entertainment and media market/th pop. 15–69	25.9	25	
7.2.4	Printing and other media, % manufacturing	1.4	30	
7.2.5	Creative goods exports, % total trade	7.2	6	● ◆
7.3	**Online creativity**	**18.4**	**64**	◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	10.6	38	
7.3.2	Country-code TLDs/th pop. 15–69	7.8	44	
7.3.3	Wikipedia edits/mn pop. 15–69	46.4	71	◇
7.3.4	Mobile app creation/bn PPP$ GDP	9.1	50	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

United Kingdom

GII 2021 rank **4**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
6	7	High	EUR	67.9	2,978.6	44,288	4

		Score/ Value	Rank
Institutions		**86.6**	**15**
1.1	**Political environment**	**80.0**	**21**
1.1.1	Political and operational stability*	75.0	40 ◇
1.1.2	Government effectiveness*	82.6	18
1.2	**Regulatory environment**	**92.4**	**9**
1.2.1	Regulatory quality*	86.0	13
1.2.2	Rule of law*	88.9	16
1.2.3	Cost of redundancy dismissal	9.3	25
1.3	**Business environment**	**87.4**	**12**
1.3.1	Ease of starting a business*	94.6	17
1.3.2	Ease of resolving insolvency*	80.3	13
Human capital and research		**58.2**	**10**
2.1	**Education**	**59.7**	**28**
2.1.1	Expenditure on education, % GDP	5.4	21
2.1.2	Government funding/pupil, secondary, % GDP/cap	20.8	44 ○
2.1.3	School life expectancy, years	17.2	16
2.1.4	PISA scales in reading, maths and science	503.5	12
2.1.5	Pupil-teacher ratio, secondary ⏲	16.7	82 ○ ◇
2.2	**Tertiary education**	**47.4**	**18**
2.2.1	Tertiary enrolment, % gross	61.4	48 ○
2.2.2	Graduates in science and engineering, %	26.9	28
2.2.3	Tertiary inbound mobility, %	18.3	8
2.3	**Research and development (R&D)**	**67.7**	**9**
2.3.1	Researchers, FTE/mn pop.	4,701.2	19
2.3.2	Gross expenditure on R&D, % GDP	1.8	21
2.3.3	Global corporate R&D investors, top 3, mn US$	84.5	8 ●
2.3.4	QS university ranking, top 3*	94.9	2 ● ◆
Infrastructure		**59.7**	**10**
3.1	**Information and communication technologies (ICTs)**	**93.4**	**2 ● ◆**
3.1.1	ICT access*	93.9	3 ● ◆
3.1.2	ICT use*	86.2	9
3.1.3	Government's online service*	95.9	6 ●
3.1.4	E-participation*	97.6	6 ●
3.2	**General infrastructure**	**34.7**	**40** ◇
3.2.1	Electricity output, GWh/mn pop.	4,804.5	48 ○
3.2.2	Logistics performance*	90.1	9
3.2.3	Gross capital formation, % GDP	15.7	111 ○ ◇
3.3	**Ecological sustainability**	**50.9**	**14**
3.3.1	GDP/unit of energy use	17.2	12
3.3.2	Environmental performance*	81.3	4 ●
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	3.6	26
Market sophistication		**78.1**	**4 ● ◆**
4.1	**Credit**	**65.3**	**10**
4.1.1	Ease of getting credit*	75.0	34
4.1.2	Domestic credit to private sector, % GDP	133.6	14
4.1.3	Microfinance gross loans, % GDP	n/a	n/a
4.2	**Investment**	**80.0**	**5 ● ◆**
4.2.1	Ease of protecting minority investors*	84.0	7 ◆
4.2.2	Market capitalization, % GDP	n/a	n/a
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.3	9
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.2	7
4.3	**Trade, diversification, and market scale**	**89.1**	**3 ● ◆**
4.3.1	Applied tariff rate, weighted avg., %	1.8	25 ○
4.3.2	Domestic industry diversification	98.6	6 ●
4.3.3	Domestic market scale, bn PPP$	2,978.6	9

		Score/ Value	Rank
Business sophistication		**49.7**	**21**
5.1	**Knowledge workers**	**61.2**	**14**
5.1.1	Knowledge-intensive employment, %	50.6	7 ●
5.1.2	Firms offering formal training, %	n/a	n/a
5.1.3	GERD performed by business, % GDP	1.2	18
5.1.4	GERD financed by business, %	54.8	19
5.1.5	Females employed w/advanced degrees, %	24.1	17
5.2	**Innovation linkages**	**47.0**	**17**
5.2.1	University-industry R&D collaboration†	63.7	16
5.2.2	State of cluster development and depth†	59.7	26
5.2.3	GERD financed by abroad, % GDP	0.2	16
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.2	13
5.2.5	Patent families/bn PPP$ GDP	2.0	20
5.3	**Knowledge absorption**	**40.7**	**27**
5.3.1	Intellectual property payments, % total trade	1.7	19
5.3.2	High-tech imports, % total trade	10.8	23
5.3.3	ICT services imports, % total trade	1.5	51 ○
5.3.4	FDI net inflows, % GDP	2.8	59 ○
5.3.5	Research talent, % in businesses	41.9	32 ○
Knowledge and technology outputs		**52.3**	**10**
6.1	**Knowledge creation**	**65.0**	**8 ●**
6.1.1	Patents by origin/bn PPP$ GDP	5.6	16
6.1.2	PCT patents by origin/bn PPP$ GDP	2.0	19
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a
6.1.4	Scientific and technical articles/bn PPP$ GDP	43.7	13
6.1.5	Citable documents H-index	100.0	1 ● ◆
6.2	**Knowledge impact**	**43.1**	**19**
6.2.1	Labor productivity growth, %	–3.0	112 ○ ◇
6.2.2	New businesses/th pop. 15–64	15.6	8 ◆
6.2.3	Software spending, % GDP	0.5	14
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	8.3	33
6.2.5	High-tech manufacturing, %	44.9	18
6.3	**Knowledge diffusion**	**48.9**	**15**
6.3.1	Intellectual property receipts, % total trade	2.8	8
6.3.2	Production and export complexity	78.7	13
6.3.3	High-tech exports, % total trade	8.6	19
6.3.4	ICT services exports, % total trade	3.3	28
Creative outputs		**54.0**	**4 ●**
7.1	**Intangible assets**	**56.0**	**10**
7.1.1	Trademarks by origin/bn PPP$ GDP	53.8	40
7.1.2	Global brand value, top 5,000, % GDP	160.7	8
7.1.3	Industrial designs by origin/bn PPP$ GDP	8.5	14
7.1.4	ICTs and organizational model creation†	79.1	6 ●
7.2	**Creative goods and services**	**44.8**	**6 ● ◆**
7.2.1	Cultural and creative services exports, % total trade	2.5	6 ● ◆
7.2.2	National feature films/mn pop. 15–69	6.2	36
7.2.3	Entertainment and media market/th pop. 15–69	61.8	8
7.2.4	Printing and other media, % manufacturing	1.9	18
7.2.5	Creative goods exports, % total trade	3.5	16
7.3	**Online creativity**	**59.0**	**10**
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	60.1	10
7.3.2	Country-code TLDs/th pop. 15–69	69.4	8 ●
7.3.3	Wikipedia edits/mn pop. 15–69	80.0	11
7.3.4	Mobile app creation/bn PPP$ GDP	22.4	24

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

United Republic of Tanzania

GII 2021 rank **90**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
65	120	Lower middle	SSF	59.7	165.3	2,851	88

		Score/ Value	Rank	
Institutions		**52.7**	**103**	
1.1	**Political environment**	**38.0**	**122**	◇
1.1.1	Political and operational stability*	51.8	119	◇
1.1.2	Government effectiveness*	31.1	122	
1.2	**Regulatory environment**	**63.2**	**73**	◆
1.2.1	Regulatory quality*	26.7	108	
1.2.2	Rule of law*	31.5	102	
1.2.3	Cost of redundancy dismissal	9.3	25	● ◆
1.3	**Business environment**	**56.7**	**114**	
1.3.1	Ease of starting a business*	74.4	119	
1.3.2	Ease of resolving insolvency*	39.1	102	
Human capital and research		**10.9**	**125**	◇
2.1	**Education**	**29.1**	**117**	
2.1.1	Expenditure on education, % GDP	3.7	78	
2.1.2	Government funding/pupil, secondary, % GDP/cap	14.9	76	
2.1.3	School life expectancy, years	9.1	111	◇
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	22.1	101	
2.2	**Tertiary education**	**1.0**	**130**	○ ◇
2.2.1	Tertiary enrolment, % gross	3.1	127	○ ◇
2.2.2	Graduates in science and engineering, %	9.5	109	○ ◇
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research and development (R&D)**	**2.6**	**90**	
2.3.1	Researchers, FTE/mn pop.	19.2	105	
2.3.2	Gross expenditure on R&D, % GDP	0.5	65	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**29.9**	**105**	
3.1	**Information and communication technologies (ICTs)**	**37.1**	**115**	
3.1.1	ICT access*	27.7	124	◇
3.1.2	ICT use*	9.6	130	○ ◇
3.1.3	Government's online service*	55.3	95	
3.1.4	E-participation*	56.0	93	
3.2	**General infrastructure**	**35.6**	**38**	● ◆
3.2.1	Electricity output, GWh/mn pop.	128.4	119	
3.2.2	Logistics performance*	n/a	n/a	
3.2.3	Gross capital formation, % GDP	38.1	9	● ◆
3.3	**Ecological sustainability**	**16.9**	**116**	
3.3.1	GDP/unit of energy use	8.0	91	
3.3.2	Environmental performance*	31.1	116	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	115	
Market sophistication		**37.5**	**109**	
4.1	**Credit**	**27.6**	**114**	
4.1.1	Ease of getting credit*	65.0	61	
4.1.2	Domestic credit to private sector, % GDP	12.1	124	
4.1.3	Microfinance gross loans, % GDP	0.1	55	
4.2	**Investment**	**27.4**	**[74]**	
4.2.1	Ease of protecting minority investors*	50.0	92	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	64	
4.3	**Trade, diversification, and market scale**	**57.6**	**103**	
4.3.1	Applied tariff rate, weighted avg., %	8.4	105	
4.3.2	Domestic industry diversification	67.0	100	
4.3.3	Domestic market scale, bn PPP$	165.3	70	

		Score/ Value	Rank	
Business sophistication		**16.0**	**119**	
5.1	**Knowledge workers**	**9.8**	**124**	◇
5.1.1	Knowledge-intensive employment, %	3.4	124	○ ◇
5.1.2	Firms offering formal training, %	30.7	50	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	0.1	101	◇
5.1.5	Females employed w/advanced degrees, %	0.4	122	○
5.2	**Innovation linkages**	**22.1**	**59**	●
5.2.1	University-industry R&D collaboration†	47.2	46	● ◆
5.2.2	State of cluster development and depth†	50.7	43	●
5.2.3	GERD financed by abroad, % GDP	0.2	29	● ◆
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	104	
5.2.5	Patent families/bn PPP$ GDP	0.0	96	
5.3	**Knowledge absorption**	**16.2**	**111**	
5.3.1	Intellectual property payments, % total trade	0.1	112	
5.3.2	High-tech imports, % total trade	7.8	63	●
5.3.3	ICT services imports, % total trade	0.2	127	◇
5.3.4	FDI net inflows, % GDP	1.8	84	
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**12.2**	**100**	
6.1	**Knowledge creation**	**5.5**	**109**	
6.1.1	Patents by origin/bn PPP$ GDP	0.2	99	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	98	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	74	
6.1.4	Scientific and technical articles/bn PPP$ GDP	9.0	91	
6.1.5	Citable documents H-index	10.0	79	
6.2	**Knowledge impact**	**20.7**	**101**	
6.2.1	Labor productivity growth, %	4.1	10	●
6.2.2	New businesses/th pop. 15–64	0.2	112	
6.2.3	Software spending, % GDP	0.0	124	○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.5	121	
6.2.5	High-tech manufacturing, %	8.7	92	
6.3	**Knowledge diffusion**	**10.4**	**94**	
6.3.1	Intellectual property receipts, % total trade	0.0	109	
6.3.2	Production and export complexity	41.7	67	
6.3.3	High-tech exports, % total trade	2.0	57	●
6.3.4	ICT services exports, % total trade	0.2	120	
Creative outputs		**31.4**	**[44]**	
7.1	**Intangible assets**	**47.2**	**[22]**	
7.1.1	Trademarks by origin/bn PPP$ GDP	n/a	n/a	
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	n/a	n/a	
7.1.4	ICTs and organizational model creation†	47.2	94	
7.2	**Creative goods and services**	**28.7**	**[28]**	
7.2.1	Cultural and creative services exports, % total trade	n/a	n/a	
7.2.2	National feature films/mn pop. 15–69	n/a	n/a	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.7	22	●
7.2.5	Creative goods exports, % total trade	2.3	25	●
7.3	**Online creativity**	**2.5**	**130**	○ ◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.2	120	
7.3.2	Country-code TLDs/th pop. 15–69	0.2	111	
7.3.3	Wikipedia edits/mn pop. 15–69	12.4	130	○ ◇
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

United States of America

GII 2021 rank **3**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
4	3	High	NAC	331.0	20,807.3	63,051	3

		Score/ Value	Rank	
Institutions		**87.6**	**12**	
1.1	**Political environment**	**80.8**	**19**	
1.1.1	Political and operational stability*	75.0	40	◇
1.1.2	Government effectiveness*	83.7	17	
1.2	**Regulatory environment**	**91.0**	**12**	
1.2.1	Regulatory quality*	78.7	20	
1.2.2	Rule of law*	85.2	18	
1.2.3	Cost of redundancy dismissal	8.0	1	● ◆
1.3	**Business environment**	**91.0**	**2**	● ◆
1.3.1	Ease of starting a business*	91.6	48	
1.3.2	Ease of resolving insolvency*	90.5	2	● ◆
Human capital and research		**58.1**	**11**	
2.1	**Education**	**57.6**	**41**	
2.1.1	Expenditure on education, % GDP	5.0	42	
2.1.2	Government funding/pupil, secondary, % GDP/cap	22.7	31	
2.1.3	School life expectancy, years	16.3	29	
2.1.4	PISA scales in reading, maths and science	495.3	24	
2.1.5	Pupil-teacher ratio, secondary	14.6	71	○ ◇
2.2	**Tertiary education**	**38.6**	**45**	
2.2.1	Tertiary enrolment, % gross	88.3	11	
2.2.2	Graduates in science and engineering, %	19.0	78	○
2.2.3	Tertiary inbound mobility, %	5.2	47	
2.3	**Research and development (R&D)**	**78.3**	**2**	● ◆
2.3.1	Researchers, FTE/mn pop.	4,408.2	22	
2.3.2	Gross expenditure on R&D, % GDP	3.1	8	
2.3.3	Global corporate R&D investors, top 3, mn US$	100.0	1	● ◆
2.3.4	QS university ranking, top 3*	98.8	1	● ◆
Infrastructure		**55.3**	**23**	
3.1	**Information and communication technologies (ICTs)**	**90.1**	**9**	
3.1.1	ICT access*	83.5	22	
3.1.2	ICT use*	82.1	18	
3.1.3	Government's online service*	94.7	7	
3.1.4	E-participation*	100.0	1	●
3.2	**General infrastructure**	**45.1**	**18**	
3.2.1	Electricity output, GWh/mn pop.	13,284.9	9	
3.2.2	Logistics performance*	85.3	14	
3.2.3	Gross capital formation, % GDP	20.3	86	○
3.3	**Ecological sustainability**	**30.8**	**55**	◇
3.3.1	GDP/unit of energy use	9.1	80	○
3.3.2	Environmental performance*	69.3	24	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	117	○ ◇
Market sophistication		**81.5**	**2**	● ◆
4.1	**Credit**	**88.0**	**1**	● ◆
4.1.1	Ease of getting credit*	95.0	4	◆
4.1.2	Domestic credit to private sector, % GDP	191.8	2	● ◆
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**73.2**	**9**	◆
4.2.1	Ease of protecting minority investors*	71.6	35	
4.2.2	Market capitalization, % GDP	152.9	5	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.3	10	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.3	1	● ◆
4.3	**Trade, diversification, and market scale**	**83.4**	**18**	
4.3.1	Applied tariff rate, weighted avg., %	13.8	128	○ ◇
4.3.2	Domestic industry diversification	98.6	8	
4.3.3	Domestic market scale, bn PPP$	20,807.3	2	● ◆

		Score/ Value	Rank	
Business sophistication		**63.0**	**2**	● ◆
5.1	**Knowledge workers**	**73.5**	**4**	◆
5.1.1	Knowledge-intensive employment, %	52.0	4	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	2.3	5	
5.1.4	GERD financed by business, %	63.1	10	
5.1.5	Females employed w/advanced degrees, %	28.0	5	◆
5.2	**Innovation linkages**	**59.9**	**5**	
5.2.1	University-industry R&D collaboration†	74.4	3	● ◆
5.2.2	State of cluster development and depth†	73.7	1	● ◆
5.2.3	GERD financed by abroad, % GDP	0.2	19	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.2	6	◆
5.2.5	Patent families/bn PPP$ GDP	3.4	12	
5.3	**Knowledge absorption**	**55.7**	**7**	
5.3.1	Intellectual property payments, % total trade	1.6	22	
5.3.2	High-tech imports, % total trade	16.9	10	
5.3.3	ICT services imports, % total trade	1.6	47	
5.3.4	FDI net inflows, % GDP	1.6	89	○
5.3.5	Research talent, % in businesses	72.5	4	◆
Knowledge and technology outputs		**59.2**	**3**	● ◆
6.1	**Knowledge creation**	**72.9**	**3**	● ◆
6.1.1	Patents by origin/bn PPP$ GDP	13.3	1	● ◆
6.1.2	PCT patents by origin/bn PPP$ GDP	2.8	12	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	18.9	46	◇
6.1.5	Citable documents H-index	100.0	1	● ◆
6.2	**Knowledge impact**	**56.9**	**1**	● ◆
6.2.1	Labor productivity growth, %	1.6	30	◆
6.2.2	New businesses/th pop. 15–64	n/a	n/a	
6.2.3	Software spending, % GDP	1.1	1	● ◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.0	110	○ ◇
6.2.5	High-tech manufacturing, %	44.9	19	
6.3	**Knowledge diffusion**	**47.7**	**16**	
6.3.1	Intellectual property receipts, % total trade	4.3	1	● ◆
6.3.2	Production and export complexity	79.7	11	
6.3.3	High-tech exports, % total trade	8.8	18	
6.3.4	ICT services exports, % total trade	2.0	56	
Creative outputs		**47.8**	**12**	
7.1	**Intangible assets**	**48.8**	**21**	
7.1.1	Trademarks by origin/bn PPP$ GDP	21.5	91	○ ◇
7.1.2	Global brand value, top 5,000, % GDP	209.5	4	◆
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.1	66	
7.1.4	ICTs and organizational model creation†	83.7	1	● ◆
7.2	**Creative goods and services**	**43.0**	**7**	
7.2.1	Cultural and creative services exports, % total trade	1.9	8	
7.2.2	National feature films/mn pop. 15–69	2.9	60	○
7.2.3	Entertainment and media market/th pop. 15–69	100.0	1	● ◆
7.2.4	Printing and other media, % manufacturing	1.4	31	
7.2.5	Creative goods exports, % total trade	3.0	21	
7.3	**Online creativity**	**50.4**	**21**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	100.0	1	● ◆
7.3.2	Country-code TLDs/th pop. 15–69	2.1	70	◇
7.3.3	Wikipedia edits/mn pop. 15–69	69.5	40	◇
7.3.4	Mobile app creation/bn PPP$ GDP	27.4	21	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Uruguay

GII 2021 rank
65

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
63	**69**	**High**	**LCN**	**3.5**	**75.3**	**21,338**	**69**

		Score/ Value	Rank	
Institutions		**70.3**	**44**	
1.1	**Political environment**	**72.0**	**38**	
1.1.1	Political and operational stability*	83.9	13	●
1.1.2	Government effectiveness*	66.1	40	
1.2	**Regulatory environment**	**67.3**	**60**	◇
1.2.1	Regulatory quality*	56.8	48	◇
1.2.2	Rule of law*	63.1	37	
1.2.3	Cost of redundancy dismissal	20.8	89	
1.3	**Business environment**	**71.6**	**65**	
1.3.1	Ease of starting a business*	89.6	56	
1.3.2	Ease of resolving insolvency*	53.6	65	
Human capital and research		**31.7**	**64**	◇
2.1	**Education**	**52.3**	**59**	
2.1.1	Expenditure on education, % GDP	5.0	37	
2.1.2	Government funding/pupil, secondary, % GDP/cap	16.1	69	◇
2.1.3	School life expectancy, years ◴	16.8	20	●
2.1.4	PISA scales in reading, maths and science	423.5	52	◇
2.1.5	Pupil-teacher ratio, secondary ◴	12.7	55	
2.2	**Tertiary education**	**33.4**	**65**	◇
2.2.1	Tertiary enrolment, % gross ◴	63.1	45	
2.2.2	Graduates in science and engineering, % ◴	17.5	86	○ ◇
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research and development (R&D)**	**9.4**	**61**	◇
2.3.1	Researchers, FTE/mn pop. ◴	696.4	58	◇
2.3.2	Gross expenditure on R&D, % GDP ◴	0.4	71	◇
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	21.2	49	
Infrastructure		**45.4**	**53**	◇
3.1	**Information and communication technologies (ICTs)**	**80.5**	**30**	
3.1.1	ICT access*	77.7	42	
3.1.2	ICT use*	74.4	36	
3.1.3	Government's online service*	84.1	31	
3.1.4	E-participation*	85.7	29	
3.2	**General infrastructure**	**20.0**	**111**	○ ◇
3.2.1	Electricity output, GWh/mn pop.	4,653.2	50	
3.2.2	Logistics performance*	29.6	84	◇
3.2.3	Gross capital formation, % GDP	16.3	107	○ ◇
3.3	**Ecological sustainability**	**35.8**	**45**	
3.3.1	GDP/unit of energy use	14.6	25	●
3.3.2	Environmental performance*	49.1	58	◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.9	29	●
Market sophistication		**37.6**	**108**	○ ◇
4.1	**Credit**	**27.9**	**113**	○ ◇
4.1.1	Ease of getting credit*	60.0	74	
4.1.2	Domestic credit to private sector, % GDP	28.1	100	◇
4.1.3	Microfinance gross loans, % GDP ◴	0.0	68	○
4.2	**Investment**	**23.9**	**95**	
4.2.1	Ease of protecting minority investors*	30.0	122	○ ◇
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.2	19	●
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	66	
4.3	**Trade, diversification, and market scale**	**61.1**	**91**	◇
4.3.1	Applied tariff rate, weighted avg., %	5.3	89	◇
4.3.2	Domestic industry diversification ◴	75.1	89	○
4.3.3	Domestic market scale, bn PPP$	75.3	90	

		Score/ Value	Rank	
Business sophistication		**22.4**	**81**	◇
5.1	**Knowledge workers**	**27.0**	**82**	◇
5.1.1	Knowledge-intensive employment, %	22.3	71	◇
5.1.2	Firms offering formal training, % ◴	53.3	14	●
5.1.3	GERD performed by business, % GDP ◴	0.1	63	◇
5.1.4	GERD financed by business, %	4.6	83	○ ◇
5.1.5	Females employed w/advanced degrees, %	10.4	68	◇
5.2	**Innovation linkages**	**17.0**	**95**	◇
5.2.1	University-industry R&D collaboration†	39.5	79	◇
5.2.2	State of cluster development and depth†	45.2	76	
5.2.3	GERD financed by abroad, % GDP	0.0	59	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	88	
5.2.5	Patent families/bn PPP$ GDP	0.2	44	
5.3	**Knowledge absorption**	**23.1**	**74**	◇
5.3.1	Intellectual property payments, % total trade	0.8	52	
5.3.2	High-tech imports, % total trade	6.6	85	
5.3.3	ICT services imports, % total trade	2.8	12	●
5.3.4	FDI net inflows, % GDP	3.0	50	
5.3.5	Research talent, % in businesses ◴	0.6	81	○ ◇
Knowledge and technology outputs		**21.4**	**63**	
6.1	**Knowledge creation**	**11.7**	**72**	◇
6.1.1	Patents by origin/bn PPP$ GDP ◴	0.3	86	
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP ◴	0.3	42	
6.1.4	Scientific and technical articles/bn PPP$ GDP	16.2	51	
6.1.5	Citable documents H-index	11.2	68	
6.2	**Knowledge impact**	**32.2**	**57**	
6.2.1	Labor productivity growth, %	2.1	27	◆
6.2.2	New businesses/th pop. 15–64	1.3	78	
6.2.3	Software spending, % GDP	0.2	62	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	13.2	22	●
6.2.5	High-tech manufacturing, % ◴	15.3	73	◇
6.3	**Knowledge diffusion**	**20.3**	**53**	
6.3.1	Intellectual property receipts, % total trade	0.3	32	
6.3.2	Production and export complexity	44.4	60	◇
6.3.3	High-tech exports, % total trade	0.8	77	
6.3.4	ICT services exports, % total trade	3.6	25	●
Creative outputs		**24.5**	**64**	◇
7.1	**Intangible assets**	**29.5**	**72**	
7.1.1	Trademarks by origin/bn PPP$ GDP	52.6	43	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP ◴	0.7	77	
7.1.4	ICTs and organizational model creation†	58.4	50	
7.2	**Creative goods and services**	**14.4**	**64**	
7.2.1	Cultural and creative services exports, % total trade	1.3	20	●
7.2.2	National feature films/mn pop. 15–69 ◴	4.7	46	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing ◴	1.1	46	
7.2.5	Creative goods exports, % total trade	0.0	112	○
7.3	**Online creativity**	**24.7**	**48**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	6.4	49	
7.3.2	Country-code TLDs/th pop. 15–69	11.5	40	
7.3.3	Wikipedia edits/mn pop. 15–69	69.8	37	
7.3.4	Mobile app creation/bn PPP$ GDP	8.6	51	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Uzbekistan

GII 2021 rank
86

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
100	**75**	**Lower middle**	**CSA**	**33.5**	**250.2**	**7,378**	**93**

		Score/ Value	Rank	
Institutions		**55.8**	**94**	
1.1	**Political environment**	**47.6**	**95**	
1.1.1	Political and operational stability*	64.3	80	
1.1.2	Government effectiveness*	39.2	99	
1.2	**Regulatory environment**	**49.9**	**107**	
1.2.1	Regulatory quality*	17.5	126	○ ◇
1.2.2	Rule of law*	19.1	123	◇
1.2.3	Cost of redundancy dismissal	17.3	69	
1.3	**Business environment**	**69.8**	**72**	
1.3.1	Ease of starting a business*	96.2	8	● ◆
1.3.2	Ease of resolving insolvency*	43.5	90	
Human capital and research		**30.4**	**72**	◆
2.1	**Education**	**57.3**	**[42]**	
2.1.1	Expenditure on education, % GDP	5.3	28	●
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	12.5	87	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	10.9	37	● ◆
2.2	**Tertiary education**	**32.0**	**68**	
2.2.1	Tertiary enrolment, % gross	12.6	108	
2.2.2	Graduates in science and engineering, %	34.5	7	● ◆
2.2.3	Tertiary inbound mobility, %	0.2	105	○
2.3	**Research and development (R&D)**	**2.0**	**95**	
2.3.1	Researchers, FTE/mn pop.	476.2	69	
2.3.2	Gross expenditure on R&D, % GDP	0.1	99	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**40.4**	**72**	◆
3.1	**Information and communication technologies (ICTs)**	**66.9**	**65**	◆
3.1.1	ICT access*	60.1	76	◆
3.1.2	ICT use*	48.3	84	
3.1.3	Government's online service*	78.2	46	● ◆
3.1.4	E-participation*	81.0	46	◆
3.2	**General infrastructure**	**35.7**	**37**	● ◆
3.2.1	Electricity output, GWh/mn pop.	1,908.6	82	
3.2.2	Logistics performance*	24.6	95	
3.2.3	Gross capital formation, % GDP	39.5	7	● ◆
3.3	**Ecological sustainability**	**18.7**	**111**	
3.3.1	GDP/unit of energy use	5.8	110	
3.3.2	Environmental performance*	44.3	77	◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	116	
Market sophistication		**56.9**	**24**	● ◆
4.1	**Credit**	**30.2**	**105**	
4.1.1	Ease of getting credit*	65.0	61	
4.1.2	Domestic credit to private sector, % GDP	30.0	95	
4.1.3	Microfinance gross loans, % GDP	0.0	80	○
4.2	**Investment**	**70.0**	**[11]**	
4.2.1	Ease of protecting minority investors*	70.0	36	●
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**70.4**	**62**	
4.3.1	Applied tariff rate, weighted avg., %	8.7	110	
4.3.2	Domestic industry diversification	95.9	22	● ◆
4.3.3	Domestic market scale, bn PPP$	250.2	60	

		Score/ Value	Rank	
Business sophistication		**14.8**	**[123]**	
5.1	**Knowledge workers**	**22.8**	**[93]**	
5.1.1	Knowledge-intensive employment, %	n/a	n/a	
5.1.2	Firms offering formal training, %	16.9	87	◇
5.1.3	GERD performed by business, % GDP	0.1	72	
5.1.4	GERD financed by business, %	42.4	38	◆
5.1.5	Females employed w/advanced degrees, %	n/a	n/a	
5.2	**Innovation linkages**	**2.6**	**[130]**	
5.2.1	University-industry R&D collaboration†	n/a	n/a	
5.2.2	State of cluster development and depth†	n/a	n/a	
5.2.3	GERD financed by abroad, % GDP	0.0	97	○
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	62	
5.2.5	Patent families/bn PPP$ GDP	0.0	90	
5.3	**Knowledge absorption**	**19.0**	**98**	
5.3.1	Intellectual property payments, % total trade	0.3	83	
5.3.2	High-tech imports, % total trade	8.8	51	
5.3.3	ICT services imports, % total trade	0.3	115	
5.3.4	FDI net inflows, % GDP	2.8	58	
5.3.5	Research talent, % in businesses	12.9	60	
Knowledge and technology outputs		**17.9**	**77**	
6.1	**Knowledge creation**	**10.6**	**77**	
6.1.1	Patents by origin/bn PPP$ GDP	1.5	47	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	98	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	1.1	22	●
6.1.4	Scientific and technical articles/bn PPP$ GDP	2.1	125	○
6.1.5	Citable documents H-index	4.4	112	
6.2	**Knowledge impact**	**35.1**	**42**	● ◆
6.2.1	Labor productivity growth, %	4.6	8	● ◆
6.2.2	New businesses/th pop. 15–64	1.6	63	
6.2.3	Software spending, % GDP	n/a	n/a	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	2.3	83	
6.2.5	High-tech manufacturing, %	24.0	52	
6.3	**Knowledge diffusion**	**8.0**	**102**	
6.3.1	Intellectual property receipts, % total trade	0.0	103	
6.3.2	Production and export complexity	34.4	79	
6.3.3	High-tech exports, % total trade	0.1	119	
6.3.4	ICT services exports, % total trade	0.8	87	
Creative outputs		**12.3**	**113**	
7.1	**Intangible assets**	**19.0**	**[106]**	
7.1.1	Trademarks by origin/bn PPP$ GDP	32.8	71	
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.0	69	
7.1.4	ICTs and organizational model creation†	n/a	n/a	
7.2	**Creative goods and services**	**5.9**	**101**	
7.2.1	Cultural and creative services exports, % total trade	0.0	95	
7.2.2	National feature films/mn pop. 15–69	4.2	47	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	0.7	79	
7.2.5	Creative goods exports, % total trade	0.2	86	
7.3	**Online creativity**	**5.3**	**122**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.0	131	○ ◇
7.3.2	Country-code TLDs/th pop. 15–69	1.1	82	
7.3.3	Wikipedia edits/mn pop. 15–69	23.7	116	
7.3.4	Mobile app creation/bn PPP$ GDP	0.0	99	○

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Viet Nam

GII 2021 rank
44

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
38	60	Lower middle	SEAO	97.3	1,047.3	10,755	42

		Score/ Value	Rank	
Institutions		**58.8**	**83**	
1.1	**Political environment**	**60.5**	**58**	◆
1.1.1	Political and operational stability*	78.6	34	◆
1.1.2	Government effectiveness*	51.5	71	◆
1.2	**Regulatory environment**	**54.3**	**98**	
1.2.1	Regulatory quality*	36.6	93	
1.2.2	Rule of law*	46.3	64	◆
1.2.3	Cost of redundancy dismissal	24.6	104	
1.3	**Business environment**	**61.6**	**101**	
1.3.1	Ease of starting a business*	85.1	88	
1.3.2	Ease of resolving insolvency*	38.0	106	○
Human capital and research		**28.1**	**79**	
2.1	**Education**	**54.2**	**[52]**	
2.1.1	Expenditure on education, % GDP	4.2	62	
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	n/a	n/a	
2.1.4	PISA scales in reading, maths and science ◴	502.0	16	◆
2.1.5	Pupil-teacher ratio, secondary	18.6	91	
2.2	**Tertiary education**	**23.2**	**90**	
2.2.1	Tertiary enrolment, % gross	28.6	87	
2.2.2	Graduates in science and engineering, % ◴	22.7	54	
2.2.3	Tertiary inbound mobility, %	0.4	102	○
2.3	**Research and development (R&D)**	**6.9**	**68**	
2.3.1	Researchers, FTE/mn pop. ◴	707.7	57	
2.3.2	Gross expenditure on R&D, % GDP ◴	0.5	64	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	8.9	66	
Infrastructure		**38.2**	**79**	◆
3.1	**Information and communication technologies (ICTs)**	**61.0**	**79**	◆
3.1.1	ICT access*	52.8	87	
3.1.2	ICT use*	55.6	71	◆
3.1.3	Government's online service*	65.3	78	
3.1.4	E-participation*	70.2	70	
3.2	**General infrastructure**	**33.1**	**47**	
3.2.1	Electricity output, GWh/mn pop.	2,521.9	74	◆
3.2.2	Logistics performance*	57.0	38	◆
3.2.3	Gross capital formation, % GDP	26.2	39	
3.3	**Ecological sustainability**	**20.5**	**95**	
3.3.1	GDP/unit of energy use	8.1	90	
3.3.2	Environmental performance*	33.4	110	○
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.5	55	◆
Market sophistication		**57.2**	**22**	◆
4.1	**Credit**	**66.1**	**9**	● ◆
4.1.1	Ease of getting credit*	80.0	23	
4.1.2	Domestic credit to private sector, % GDP	137.9	12	● ◆
4.1.3	Microfinance gross loans, % GDP ◴	3.1	11	●
4.2	**Investment**	**20.6**	**111**	○
4.2.1	Ease of protecting minority investors*	54.0	88	
4.2.2	Market capitalization, % GDP	55.8	31	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	0.0	71	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	54	
4.3	**Trade, diversification, and market scale**	**85.0**	**15**	● ◆
4.3.1	Applied tariff rate, weighted avg., %	1.7	21	◆
4.3.2	Domestic industry diversification	98.3	9	● ◆
4.3.3	Domestic market scale, bn PPP$	1,047.3	23	◆

		Score/ Value	Rank	
Business sophistication		**30.8**	**47**	◆
5.1	**Knowledge workers**	**31.0**	**66**	
5.1.1	Knowledge-intensive employment, %	13.2	100	○
5.1.2	Firms offering formal training, % ◴	22.2	68	
5.1.3	GERD performed by business, % GDP ◴	0.4	44	◆
5.1.4	GERD financed by business, % ◴	64.1	8	● ◆
5.1.5	Females employed w/advanced degrees, %	8.0	79	
5.2	**Innovation linkages**	**22.1**	**58**	
5.2.1	University-industry R&D collaboration†	53.0	34	◆
5.2.2	State of cluster development and depth†	63.6	17	◆
5.2.3	GERD financed by abroad, % GDP ◴	0.0	64	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	74	
5.2.5	Patent families/bn PPP$ GDP	0.0	92	
5.3	**Knowledge absorption**	**39.2**	**30**	◆
5.3.1	Intellectual property payments, % total trade	0.2	91	
5.3.2	High-tech imports, % total trade	25.7	3	● ◆
5.3.3	ICT services imports, % total trade	0.1	129	○ ◇
5.3.4	FDI net inflows, % GDP	6.3	16	●
5.3.5	Research talent, % in businesses ◴	24.1	52	
Knowledge and technology outputs		**29.4**	**41**	◆
6.1	**Knowledge creation**	**9.8**	**79**	
6.1.1	Patents by origin/bn PPP$ GDP	0.7	73	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	88	
6.1.3	Utility models by origin/bn PPP$ GDP	0.4	38	
6.1.4	Scientific and technical articles/bn PPP$ GDP	10.4	83	
6.1.5	Citable documents H-index	13.0	58	
6.2	**Knowledge impact**	**36.4**	**36**	◆
6.2.1	Labor productivity growth, %	5.8	3	● ◆
6.2.2	New businesses/th pop. 15–64 ◴	1.1	81	
6.2.3	Software spending, % GDP	0.3	49	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	3.8	65	
6.2.5	High-tech manufacturing, %	29.9	42	◆
6.3	**Knowledge diffusion**	**41.9**	**21**	◆
6.3.1	Intellectual property receipts, % total trade	0.0	106	○
6.3.2	Production and export complexity	47.2	52	◆
6.3.3	High-tech exports, % total trade	32.1	1	● ◆
6.3.4	ICT services exports, % total trade	0.3	115	○
Creative outputs		**33.4**	**42**	◆
7.1	**Intangible assets**	**41.9**	**35**	◆
7.1.1	Trademarks by origin/bn PPP$ GDP	73.3	23	◆
7.1.2	Global brand value, top 5,000, % GDP	80.8	25	◆
7.1.3	Industrial designs by origin/bn PPP$ GDP	2.2	45	
7.1.4	ICTs and organizational model creation†	54.4	63	
7.2	**Creative goods and services**	**26.0**	**35**	◆
7.2.1	Cultural and creative services exports, % total trade	0.1	91	○
7.2.2	National feature films/mn pop. 15–69 ◴	1.2	81	
7.2.3	Entertainment and media market/th pop. 15–69	2.8	52	○ ◆
7.2.4	Printing and other media, % manufacturing	0.9	64	
7.2.5	Creative goods exports, % total trade	5.8	11	● ◆
7.3	**Online creativity**	**23.9**	**49**	◆
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	2.5	71	◆
7.3.2	Country-code TLDs/th pop. 15–69	2.1	69	◆
7.3.3	Wikipedia edits/mn pop. 15–69	44.0	79	
7.3.4	Mobile app creation/bn PPP$ GDP	47.9	10	● ◆

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Yemen

GII 2021 rank
131

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
125	**132**	**Low**	**NAWA**	**29.8**	**62.7**	**1,931**	**131**

		Score/ Value	Rank	
Institutions		**27.6**	**132**	○ ◇
1.1	**Political environment**	**0.0**	**132**	○ ◇
1.1.1	Political and operational stability*	0.0	132	○ ◇
1.1.2	Government effectiveness*	0.0	132	○ ◇
1.2	**Regulatory environment**	**30.8**	**127**	◇
1.2.1	Regulatory quality*	0.0	132	○ ◇
1.2.2	Rule of law*	0.0	132	○ ◇
1.2.3	Cost of redundancy dismissal	27.4	110	◇
1.3	**Business environment**	**51.9**	**124**	◇
1.3.1	Ease of starting a business*	76.8	116	
1.3.2	Ease of resolving insolvency*	26.9	125	◇
Human capital and research		**10.1**	**[127]**	
2.1	**Education**	**22.0**	**[126]**	
2.1.1	Expenditure on education, % GDP	n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap ◴	11.8	86	
2.1.3	School life expectancy, years ◴	9.1	112	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary ◴	26.8	110	
2.2	**Tertiary education**	**8.4**	**115**	
2.2.1	Tertiary enrolment, % gross ◴	10.2	113	
2.2.2	Graduates in science and engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, % ◴	4.3	56	●
2.3	**Research and development (R&D)**	**0.0**	**[123]**	
2.3.1	Researchers, FTE/mn pop.	n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP	n/a	n/a	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**19.8**	**129**	
3.1	**Information and communication technologies (ICTs)**	**25.2**	**130**	
3.1.1	ICT access*	25.7	126	
3.1.2	ICT use*	11.7	128	
3.1.3	Government's online service*	32.4	123	
3.1.4	E-participation*	31.0	124	
3.2	**General infrastructure**	**2.6**	**132**	○ ◇
3.2.1	Electricity output, GWh/mn pop.	126.6	120	
3.2.2	Logistics performance*	10.2	120	
3.2.3	Gross capital formation, % GDP	6.4	126	○ ◇
3.3	**Ecological sustainability**	**31.5**	**53**	● ◆
3.3.1	GDP/unit of energy use	21.1	7	● ◆
3.3.2	Environmental performance*	n/a	n/a	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.1	123	
Market sophistication		**29.0**	**125**	
4.1	**Credit**	**0.3**	**132**	○ ◇
4.1.1	Ease of getting credit*	0.0	132	○ ◇
4.1.2	Domestic credit to private sector, % GDP ◴	5.6	130	○ ◇
4.1.3	Microfinance gross loans, % GDP	0.1	61	
4.2	**Investment**	**26.0**	**[80]**	
4.2.1	Ease of protecting minority investors*	26.0	126	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**60.6**	**92**	● ◆
4.3.1	Applied tariff rate, weighted avg., % ◴	5.0	87	●
4.3.2	Domestic industry diversification ◴	75.1	91	
4.3.3	Domestic market scale, bn PPP$	62.7	94	●

		Score/ Value	Rank	
Business sophistication		**18.6**	**102**	
5.1	**Knowledge workers**	**11.4**	**[123]**	
5.1.1	Knowledge-intensive employment, % ◴	12.4	102	
5.1.2	Firms offering formal training, % ◴	14.3	91	◇
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, % ◴	1.1	113	
5.2	**Innovation linkages**	**12.1**	**124**	
5.2.1	University-industry R&D collaboration†	17.0	127	○ ◇
5.2.2	State of cluster development and depth†	31.0	122	◇
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	103	
5.2.5	Patent families/bn PPP$ GDP	0.0	100	○ ◇
5.3	**Knowledge absorption**	**32.5**	**50**	● ◆
5.3.1	Intellectual property payments, % total trade	3.3	5	● ◆
5.3.2	High-tech imports, % total trade	2.4	127	◇
5.3.3	ICT services imports, % total trade	0.3	122	◇
5.3.4	FDI net inflows, % GDP	–1.3	124	◇
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**7.2**	**126**	◇
6.1	**Knowledge creation**	**6.6**	**97**	
6.1.1	Patents by origin/bn PPP$ GDP	0.9	66	● ◆
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP ◴	0.0	69	
6.1.4	Scientific and technical articles/bn PPP$ GDP	10.6	81	●
6.1.5	Citable documents H-index	3.3	121	
6.2	**Knowledge impact**	**10.1**	**123**	
6.2.1	Labor productivity growth, %	–3.7	114	◇
6.2.2	New businesses/th pop. 15–64	n/a	n/a	
6.2.3	Software spending, % GDP	0.1	99	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.2	131	
6.2.5	High-tech manufacturing, % ◴	1.2	110	○ ◇
6.3	**Knowledge diffusion**	**5.1**	**120**	
6.3.1	Intellectual property receipts, % total trade	0.0	82	
6.3.2	Production and export complexity	13.6	116	◇
6.3.3	High-tech exports, % total trade ◴	0.1	124	
6.3.4	ICT services exports, % total trade	0.9	84	●
Creative outputs		**12.2**	**114**	
7.1	**Intangible assets**	**22.4**	**91**	●
7.1.1	Trademarks by origin/bn PPP$ GDP	66.5	28	● ◆
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.7	78	●
7.1.4	ICTs and organizational model creation†	21.7	125	○ ◇
7.2	**Creative goods and services**	**0.0**	**[132]**	
7.2.1	Cultural and creative services exports, % total trade	n/a	n/a	
7.2.2	National feature films/mn pop. 15–69	n/a	n/a	
7.2.3	Entertainment and media market/th pop. 15–69	0.0	63	○
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade ◴	0.0	128	
7.3	**Online creativity**	**3.8**	**126**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.4	114	
7.3.2	Country-code TLDs/th pop. 15–69	0.0	130	
7.3.3	Wikipedia edits/mn pop. 15–69	19.1	125	
7.3.4	Mobile app creation/bn PPP$ GDP	0.2	84	◆

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Zambia

GII 2021 rank
121

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
127	**111**	**Lower middle**	**SSF**	**18.4**	**62.4**	**3,302**	**122**

		Score/ Value	Rank
Institutions		**44.4**	**125** ○ ◇
1.1	**Political environment**	**42.2**	**108**
1.1.1	Political and operational stability*	55.4	112
1.1.2	Government effectiveness*	35.6	108
1.2	**Regulatory environment**	**23.8**	**129** ○ ◇
1.2.1	Regulatory quality*	29.0	105
1.2.2	Rule of law*	34.5	92
1.2.3	Cost of redundancy dismissal	50.6	128 ○ ◇
1.3	**Business environment**	**67.1**	**78** ●
1.3.1	Ease of starting a business*	84.9	90
1.3.2	Ease of resolving insolvency*	49.3	71 ●
Human capital and research		**17.9**	**[107]**
2.1	**Education**	**51.4**	**[65]**
2.1.1	Expenditure on education, % GDP	4.6	54 ●
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a
2.1.3	School life expectancy, years	n/a	n/a
2.1.4	PISA scales in reading, maths and science	n/a	n/a
2.1.5	Pupil-teacher ratio, secondary ◴	21.1	98
2.2	**Tertiary education**	**2.3**	**[127]**
2.2.1	Tertiary enrolment, % gross ◴	4.1	126 ○ ◇
2.2.2	Graduates in science and engineering, %	n/a	n/a
2.2.3	Tertiary inbound mobility, %	n/a	n/a
2.3	**Research and development (R&D)**	**0.0**	**[123]**
2.3.1	Researchers, FTE/mn pop.	n/a	n/a
2.3.2	Gross expenditure on R&D, % GDP	n/a	n/a
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41 ○ ◇
2.3.4	QS university ranking, top 3*	0.0	74 ○ ◇
Infrastructure		**24.9**	**119** ◇
3.1	**Information and communication technologies (ICTs)**	**28.5**	**126** ○ ◇
3.1.1	ICT access*	35.3	116
3.1.2	ICT use*	22.1	111
3.1.3	Government's online service*	25.9	128 ○ ◇
3.1.4	E-participation*	31.0	124 ○ ◇
3.2	**General infrastructure**	**30.7**	**59** ●
3.2.1	Electricity output, GWh/mn pop.	933.0	99
3.2.2	Logistics performance*	22.3	105
3.2.3	Gross capital formation, % GDP	35.3	12 ●
3.3	**Ecological sustainability**	**15.3**	**125** ○ ◇
3.3.1	GDP/unit of energy use	5.5	113
3.3.2	Environmental performance*	34.7	103
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	112
Market sophistication		**42.9**	**87**
4.1	**Credit**	**40.0**	**71** ●
4.1.1	Ease of getting credit*	95.0	4 ● ◆
4.1.2	Domestic credit to private sector, % GDP	15.6	118
4.1.3	Microfinance gross loans, % GDP	0.1	63
4.2	**Investment**	**24.6**	**84**
4.2.1	Ease of protecting minority investors*	60.0	71 ●
4.2.2	Market capitalization, % GDP ◴	13.6	66
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	0.0	46 ●
4.3	**Trade, diversification, and market scale**	**64.0**	**77** ●
4.3.1	Applied tariff rate, weighted avg., % ◴	3.4	65 ●
4.3.2	Domestic industry diversification ◴	79.1	81
4.3.3	Domestic market scale, bn PPP$	62.3	95

		Score/ Value	Rank
Business sophistication		**22.0**	**83**
5.1	**Knowledge workers**	**31.5**	**[65]**
5.1.1	Knowledge-intensive employment, % ◴	19.1	81
5.1.2	Firms offering formal training, %	36.6	37 ●
5.1.3	GERD performed by business, % GDP	n/a	n/a
5.1.4	GERD financed by business, %	n/a	n/a
5.1.5	Females employed w/advanced degrees, % ◴	6.2	88
5.2	**Innovation linkages**	**17.8**	**86**
5.2.1	University-industry R&D collaboration†	32.2	105
5.2.2	State of cluster development and depth†	42.1	95
5.2.3	GERD financed by abroad, % GDP	n/a	n/a
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	91
5.2.5	Patent families/bn PPP$ GDP	0.0	89
5.3	**Knowledge absorption**	**16.6**	**107**
5.3.1	Intellectual property payments, % total trade	0.2	93
5.3.2	High-tech imports, % total trade	5.1	112
5.3.3	ICT services imports, % total trade	0.9	82
5.3.4	FDI net inflows, % GDP	2.7	63 ●
5.3.5	Research talent, % in businesses	n/a	n/a
Knowledge and technology outputs		**9.0**	**120**
6.1	**Knowledge creation**	**5.8**	**106**
6.1.1	Patents by origin/bn PPP$ GDP	0.0	123 ○
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	92
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a
6.1.4	Scientific and technical articles/bn PPP$ GDP	8.8	95
6.1.5	Citable documents H-index	6.9	90
6.2	**Knowledge impact**	**14.1**	**117**
6.2.1	Labor productivity growth, %	–1.8	98 ◇
6.2.2	New businesses/th pop. 15–64	1.1	82
6.2.3	Software spending, % GDP	0.0	113 ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.5	120
6.2.5	High-tech manufacturing, % ◴	10.1	88
6.3	**Knowledge diffusion**	**7.1**	**108**
6.3.1	Intellectual property receipts, % total trade	n/a	n/a
6.3.2	Production and export complexity	29.6	93
6.3.3	High-tech exports, % total trade	0.3	101
6.3.4	ICT services exports, % total trade	0.2	119
Creative outputs		**9.5**	**125** ○ ◇
7.1	**Intangible assets**	**14.8**	**120**
7.1.1	Trademarks by origin/bn PPP$ GDP	16.8	97
7.1.2	Global brand value, top 5,000, % GDP	0.0	80 ○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.9	75 ●
7.1.4	ICTs and organizational model creation†	37.3	119 ○ ◇
7.2	**Creative goods and services**	**0.8**	**[130]**
7.2.1	Cultural and creative services exports, % total trade	0.0	112 ○
7.2.2	National feature films/mn pop. 15–69	n/a	n/a
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a
7.2.4	Printing and other media, % manufacturing	n/a	n/a
7.2.5	Creative goods exports, % total trade	0.1	99
7.3	**Online creativity**	**7.7**	**109**
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.1	124 ○
7.3.2	Country-code TLDs/th pop. 15–69	0.1	115
7.3.3	Wikipedia edits/mn pop. 15–69	26.2	110
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Zimbabwe

GII 2021 rank
113

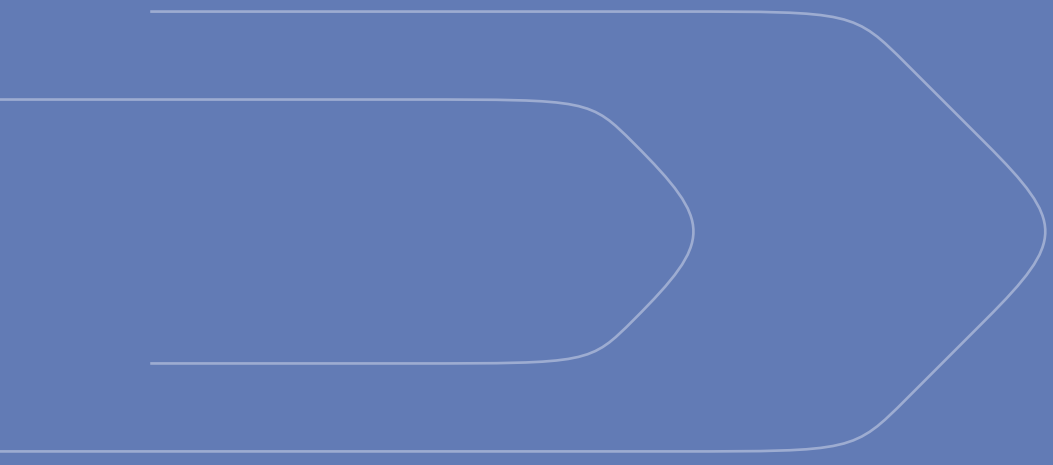
Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$	GII 2020 rank
105	**116**	**Lower middle**	**SSF**	**14.9**	**39.2**	**2,583**	**120**

		Score/ Value	Rank	
Institutions		**40.7**	**129**	◇
1.1	**Political environment**	**32.0**	**131**	○ ◇
1.1.1	Political and operational stability*	48.2	127	◇
1.1.2	Government effectiveness*	23.9	131	○ ◇
1.2	**Regulatory environment**	**37.6**	**123**	
1.2.1	Regulatory quality*	5.2	131	○ ◇
1.2.2	Rule of law*	13.6	131	○ ◇
1.2.3	Cost of redundancy dismissal	25.3	105	
1.3	**Business environment**	**52.4**	**122**	
1.3.1	Ease of starting a business*	72.0	121	◇
1.3.2	Ease of resolving insolvency*	32.9	115	
Human capital and research		**24.6**	**88**	
2.1	**Education**	**46.8**	**76**	
2.1.1	Expenditure on education, % GDP	5.9	17	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	22.2	33	●
2.1.3	School life expectancy, years	11.4	98	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	22.5	103	
2.2	**Tertiary education**	**26.6**	**81**	
2.2.1	Tertiary enrolment, % gross	10.0	114	
2.2.2	Graduates in science and engineering, %	30.2	16	●
2.2.3	Tertiary inbound mobility, %	0.5	98	
2.3	**Research and development (R&D)**	**0.3**	**115**	
2.3.1	Researchers, FTE/mn pop.	99.5	88	
2.3.2	Gross expenditure on R&D, % GDP	n/a	n/a	
2.3.3	Global corporate R&D investors, top 3, mn US$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	0.0	74	○ ◇
Infrastructure		**19.8**	**128**	◇
3.1	**Information and communication technologies (ICTs)**	**40.8**	**108**	
3.1.1	ICT access*	38.4	110	
3.1.2	ICT use*	27.0	106	
3.1.3	Government's online service*	52.3	99	
3.1.4	E-participation*	45.2	108	
3.2	**General infrastructure**	**2.9**	**131**	○ ◇
3.2.1	Electricity output, GWh/mn pop.	652.3	105	
3.2.2	Logistics performance*	3.4	123	○ ◇
3.2.3	Gross capital formation, % GDP	n/a	n/a	
3.3	**Ecological sustainability**	**15.9**	**121**	
3.3.1	GDP/unit of energy use	3.5	122	○ ◇
3.3.2	Environmental performance*	37.0	100	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.2	63	● ◆
Market sophistication		**46.7**	**64**	●
4.1	**Credit**	**34.1**	**92**	
4.1.1	Ease of getting credit*	65.0	61	
4.1.2	Domestic credit to private sector, % GDP	51.8	64	●
4.1.3	Microfinance gross loans, % GDP	0.0	71	
4.2	**Investment**	**54.0**	**[17]**	
4.2.1	Ease of protecting minority investors*	54.0	88	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	**51.9**	**113**	
4.3.1	Applied tariff rate, weighted avg., %	5.0	86	
4.3.2	Domestic industry diversification	58.2	104	◇
4.3.3	Domestic market scale, bn PPP$	39.2	111	

		Score/ Value	Rank	
Business sophistication		**18.7**	**101**	
5.1	**Knowledge workers**	**22.3**	**[96]**	
5.1.1	Knowledge-intensive employment, %	12.8	101	
5.1.2	Firms offering formal training, %	26.4	59	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, %	7.5	84	
5.2	**Innovation linkages**	**17.5**	**91**	
5.2.1	University-industry R&D collaboration†	29.0	115	
5.2.2	State of cluster development and depth†	31.4	121	◇
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.1	33	● ◆
5.2.5	Patent families/bn PPP$ GDP	0.0	100	○ ◇
5.3	**Knowledge absorption**	**16.4**	**108**	
5.3.1	Intellectual property payments, % total trade	0.1	109	
5.3.2	High-tech imports, % total trade	6.7	83	
5.3.3	ICT services imports, % total trade	0.7	94	
5.3.4	FDI net inflows, % GDP	1.8	83	
5.3.5	Research talent, % in businesses	n/a	n/a	
Knowledge and technology outputs		**11.7**	**109**	
6.1	**Knowledge creation**	**9.2**	**84**	
6.1.1	Patents by origin/bn PPP$ GDP	0.2	97	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	74	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	15.1	57	●
6.1.5	Citable documents H-index	7.5	87	
6.2	**Knowledge impact**	**20.2**	**103**	
6.2.1	Labor productivity growth, %	–4.2	117	◇
6.2.2	New businesses/th pop. 15–64	2.1	54	●
6.2.3	Software spending, % GDP	0.2	69	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	3.7	67	
6.2.5	High-tech manufacturing, %	21.7	59	
6.3	**Knowledge diffusion**	**5.6**	**117**	
6.3.1	Intellectual property receipts, % total trade	0.0	77	
6.3.2	Production and export complexity	22.4	106	
6.3.3	High-tech exports, % total trade	0.6	88	
6.3.4	ICT services exports, % total trade	0.3	109	
Creative outputs		**15.7**	**101**	
7.1	**Intangible assets**	**12.0**	**126**	◇
7.1.1	Trademarks by origin/bn PPP$ GDP	4.0	126	○
7.1.2	Global brand value, top 5,000, % GDP	14.9	54	●
7.1.3	Industrial designs by origin/bn PPP$ GDP	n/a	n/a	
7.1.4	ICTs and organizational model creation†	29.7	123	○ ◇
7.2	**Creative goods and services**	**29.8**	**[24]**	
7.2.1	Cultural and creative services exports, % total trade	n/a	n/a	
7.2.2	National feature films/mn pop. 15–69	n/a	n/a	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	0.5	82	
7.2.5	Creative goods exports, % total trade	3.5	15	● ◆
7.3	**Online creativity**	**9.0**	**101**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	0.5	111	
7.3.2	Country-code TLDs/th pop. 15–69	0.8	91	
7.3.3	Wikipedia edits/mn pop. 15–69	28.7	108	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⏲ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Appendices



Appendix I
The Global Innovation Index rational and origins, its conceptual framework and data limitations

Rationale and origins

The Global Innovation Index (GII) was launched in 2007 (see Box Annex 1). The goal was to find and determine metrics and methods that could capture a picture of innovation in society that is as complete as possible.

There were several motivations for setting this goal. First, innovation is important for driving economic progress and competitiveness – both for developed and developing economies. Many governments are putting innovation at the center of their growth strategies. Second, the definition of innovation has broadened – it is no longer restricted to research and development (R&D) laboratories and published scientific papers. Innovation is more general and horizontal in nature, and includes social, business model and technical aspects. Last, but not least, recognizing and celebrating innovation in emerging markets is critical for inspiring people – especially the next generation of entrepreneurs and innovators.

Box Annex 1: History of the GII (2007–2021)

The GII project was launched by Professor Soumitra Dutta in 2007 during his tenure at INSEAD. WIPO started its association with the GII in 2011 and began co-publishing the GII in 2012. In 2013, Cornell University joined as co-publisher, with Professor Dutta representing the GII at Cornell University and Bruno Lanvin at INSEAD. The GII continued to be co-published by Cornell University, INSEAD and WIPO up to 2020. As of 2021, the GII is published by WIPO in partnership with the Portulans Institute, various corporate and academic network partners and the GII Advisory Board.

Now in its 14th edition, the GII helps to create an environment in which innovation factors are under continual evaluation. It provides a key tool for decision-makers and a rich database of detailed metrics that are convenient for refining innovation policies.

Measuring innovation outputs and their impact remains difficult, hence great emphasis is placed on measuring the climate and infrastructure for innovation and on assessing related outcomes.

Although the final results take the shape of several rankings, the GII is more concerned with improving the "journey" to better measurement, understanding innovation, and identifying targeted policies, good practices and other levers that foster innovation. The rich data metrics, at index, sub-index or indicator level, can be used to monitor performance over time and to benchmark developments against economies within the same region or income group classification.

Defining innovation in the GII

The GII adopts a broad notion of innovation, originally elaborated in the *Oslo Manual* developed by the European Communities and the Organisation for Economic Co-operation and Development (OECD). In its fourth edition, the *Oslo Manual* 2018 introduces a more general definition of innovation:[1]

> *An innovation is a new or improved product or process (or combination thereof) that differs significantly from the unit's previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process).*

This update of the *Oslo Manual* also introduces a series of definitions associated with innovation in business activities and for different types of innovation firms. In this context, innovation translates as improvements made to outcomes in the form of either new goods or services or any combination of these. While the GII focuses on a more general definition of innovation, it is important to highlight how these definitions capture the evolution of the way innovation has been perceived and understood over the last two decades.

Economists and policymakers previously focused on R&D-based technological product innovation, largely produced in-house and mostly in manufacturing industries. Innovation of this nature was executed by a highly educated labor force in R&D-intensive companies. The process leading to such innovation was conceptualized as closed, internal and localized. Technological breakthroughs were necessarily "radical" and took place at the "global knowledge frontier." This characterization implied the existence of leading and lagging economies, with low- or middle-income economies only playing "catch up."

Today, innovation capability is increasingly seen as the ability to exploit new technological combinations; it embraces the notion of incremental innovation and "innovation without research." Non-R&D innovative expenditure is an important component of reaping the rewards of technological innovation. Interest in understanding how innovation evolves in low- and middle-income economies is increasing, along with an awareness that incremental forms of innovation can impact development. Furthermore, the process of innovation itself has changed significantly. Investment in innovation-related activity and intangible assets has consistently intensified at the firm, economy and global levels, adding both new innovation actors from outside high-income economies and non-profit actors. The structure of knowledge production activity is more complex and geographically dispersed than ever.[2]

A key challenge is to find metrics that capture innovation as it actually happens in the world today. Direct official measures that quantify innovation outputs remain extremely scarce. For example, there are no official statistics on the amount of innovative activity – defined as the number of new products, processes, or other innovations – for any given innovation actor, let alone for any given country (see the GII 2013, Chapter 1, Annex 1, Box 1). Most measurements also struggle to appropriately capture the innovation outputs of a wider spectrum of innovation actors, such as the services sector or public entities. This includes innovation surveys, which have contributed greatly to the measurement of innovation activities, but fail to provide a good and reliable sense of cross-economy innovation output performance, and are often not applicable to developing economies where innovation is often informal.[3]

The GII aims to improve the measurement of innovation in order to provide a more complete picture of innovation ecosystems across the globe.

The GII conceptual framework

The overall GII ranking is based on two sub-indices that are both equally important in presenting a complete picture of innovation; the Innovation Input Sub-Index and the Innovation Output Sub-Index. Hence, three indices are calculated:

- **Innovation Input Sub-Index:** Five input pillars capture elements of the economy that enable and facilitate innovative activities.
- **Innovation Output Sub-Index:** Innovation outputs are the result of innovative activities within the economy. Although the Output Sub-Index includes only two pillars, it carries the same weight as the Input Sub-Index in calculating the overall GII scores.
- **The overall GII score** is the average of the Input and Output Sub-Indices, on which the GII economy rankings are then produced.

Each of the five input and two output pillars is divided into three sub-pillars, each of which is composed of individual indicators, a total of 81 this year (see the Economy profiles section for the Framework of the Global Innovation Index 2021). A deeper elaboration of the conceptual framework and pillars can be found in last year's edition.[4] Sub-pillars are calculated using the weighted average of its individual indicators and are normalized to take the form of *scores* between 0 and 100. Pillar scores are calculated using the weighted average of its sub-pillar scores.

Adjustments to the GII model in 2021

Annex Table 1 summarizes adjustments to the GII 2021 framework. A total of 11 indicators were modified this year. The methodology of five indicators changed, three are new indicators, two indicators were dropped, and one indicator changed name.

Annex Table 1
Changes to the GII 2021 framework

	GII 2020	Adjustment		GII 2021
4.2.3	Venture capital deals/bn PPP$ GDP	Methodology revised	4.2.3	Venture capital investors, deals/bn PPP$ GDP
		New indicator	4.2.4	Venture capital recipients, deals/bn PPP$ GDP
4.3.2	Intensity of local competition†	Removed		
		New indicator	4.3.2	Domestic industry diversification
5.2.4	JV–strategic alliance deals/bn PPP$ GDP	Methodology revised	5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP
6.1.4	Scientific & technical articles/bn PPP$ GDP	Methodology revised	6.1.4	Scientific and technical articles/bn PPP$ GDP
6.2.1	Growth rate of PPP$ GDP/worker, %	Indicator name changed	6.2.1	Labor productivity growth, %
6.2.5	High- & medium-high-tech manufacturing, %	Methodology revised	6.2.5	High-tech manufacturing, %
		New indicator	6.3.2	Production and export complexity
6.3.2	High-tech net exports, % total trade	Methodology revised	6.3.3	High-tech exports, % total trade
6.3.4	FDI net outflows, % GDP	Removed		

Source: Global Innovation Index 2021, WIPO.

Notes: Refer to the Sources and definitions (Appendix III) for a detailed explanation of terminology and acronyms.

Data limitations and treatment

This year the GII model includes 132 economies, which represent 94.3% of the world's population and 99.0% of the world's GDP in purchasing power parity current international dollars.

The timeliest possible indicators are used for the GII 2021: from the non-missing data, 30.0% are from 2020, 41.4%

are from 2019, 17.5% are from 2018, 5.9% are from 2017, 1.2% are from 2016, and the small remainder of 4.0% are from earlier years.[5]

The GII 2021 model includes 81 indicators, which fall into three categories:

- quantitative/objective/hard data (63 indicators);
- composite indicators/index data (15 indicators); and
- survey/qualitative/subjective/soft data (3 indicators).

This year, for an economy to feature in the GII 2021, the minimum symmetric data coverage is at least 36 indicators in the Innovation Input Sub-Index (66%) and 18 indicators in the Innovation Output Sub-Index (66%), with scores for at least two sub-pillars per pillar. In the GII 2021, 132 economies had sufficient data available to be included in the Index. For each economy, only the most recent yearly data were considered. As a rule, the GII indicators consider data from as far back as 2011, with a few exceptions.

Missing values

For the sake of transparency and replicability of results, missing values are not estimated; they are indicated with "n/a" and are not considered in the sub-pillar score. In return, the European Commission's Competence Centre on Composite Indicators and Scoreboards at the Joint Research Centre (JRC-COIN) audit (see Appendix II) assesses the robustness of the GII modeling choices (no imputation of missing data, fixed predefined weights and arithmetic averages) by imputing missing data, applying random weights and using geometric averages. Since 2012, based on this assessment, a confidence interval has been provided for each ranking in the GII as well as the Input and Output Sub-Indices (Appendix II).

Treatment of series with outliers

Potentially problematic indicators with outliers that could polarize results and unduly bias the rankings were treated according to the rules listed below, as per the recommendations of the JRC-COIN. Only hard data indicators were treated (32 out of 63).

First rule: selection

Problematic indicators were identified by skewness and kurtosis. The problematic indicators had:

- an absolute value of skewness greater than 2.25; *and*
- a kurtosis greater than 3.5.[6]

Second rule: treatment

Indicators with one to five outliers (30 cases) were winsorized; the values distorting the indicator distribution were assigned the next highest value, up to the level where skewness and/or kurtosis had the values specified above.[7]

Indicators with five or more outliers and for which skewness or kurtosis did not enter within the ranges specified above were transformed using natural logarithms after multiplication by a given factor *f*.[8] Since only "goods" were affected (i.e., indicators for which higher values indicate better outcomes, as opposed to "bads"), the following formula was used:

$$\ln\left[\frac{(max \times f - 1)\,(economy\ value - min)}{\max - min} + 1\right]$$

where "min" and "max" are the minimum and maximum indicator sample values.[9]

Normalization

The 81 indicators were then normalized into the [0, 100] range, with higher scores representing better outcomes. Normalization was according to the min–max method, where the "min" and "max" values were the minimum and maximum indicator sample values, respectively. Index and survey data were exceptions; the original series range of values was kept as min and max values ([0, 1] for UNPAN indices; [1, 7] for the World Economic Forum Executive Opinion Survey questions; [0, 100] for World Bank's World Governance Indicators; etc.). The following formulas were applied:

$$\text{Goods:}\quad \frac{economy\ value - min}{max - min} \times 100$$

$$\text{Bads:}\quad \frac{max - economy\ value}{max - min} \times 100$$

Caveats on the year-to-year comparison of rankings

The GII compares the performance of national innovation systems across economies and presents the changes in economy rankings over time.

Importantly, scores and rankings from one year to the next are not directly comparable. Each ranking reflects the relative positioning of a particular economy based on the conceptual framework, the data coverage and the sample of economies of that GII edition, also reflecting changes in the underlying indicators at source and in data availability.

A few factors influence year-on-year rankings of an economy:

- the actual performance of the economy in question;
- adjustments made to the GII framework (changes in indicator composition and measurement revisions);
- data updates, the treatment of outliers, and missing values; and
- the inclusion or exclusion of economies in the sample.

Additionally, the following characteristics complicate the time-series analysis based on simple GII rankings or scores:

- **Missing values.** The GII produces relative index scores, which means that a missing value for one economy affects the index score of other economies. Because the number of missing values decreases every year, this problem reduces over time.
- **Reference year.** The data underlying the GII do not refer to a single year but to several years, depending on the latest available year for any given variable. In addition, the reference years for different variables are not the same for each economy, in an attempt to limit the number of missing data points.
- **Normalization factor.** Most GII variables are normalized using either GDP or population, with the intention of enabling cross-economy comparability. Yet, this implies that year-on-year changes in individual indicators may be driven either by the variable (numerator) or by its normalization factor (denominator).
- **Consistent data collection.** Measuring the change in year-on-year performance relies on the consistent collection of data over time. Changes in the definition of variables or in the data collection process could create movements in the rankings that are unrelated to performance.

A detailed economy study based on the GII database and the economy profile over time, coupled with analytical work on the ground, including that of innovation actors and decision-makers, yields the best results in terms of monitoring an economy's innovation performance, as well as in identifying possible avenues for improvement.

Notes:

1 Eurostat and OECD, 2018.

2 See WIPO (2011–2021) for bi-annual elaborations on the changing nature and geographic dispersion of innovation. See Arundel et al. (2021) for an elaboration on the role and measurement of knowledge and technology transfer between innovation actors.

3 On innovation in the informal economy, see Kraemer-Mbula and Wunsch-Vincent (2017).

4 See WIPO (2020), Appendix 1: https://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2020-appendix1.pdf.

5 The GII is calculated based on 9,647 data points out of a possible 10,692 (132 economies multiplied by 81 indicators), implying that 9.8% of data points are missing. The Sources and Definitions (Appendix III) include the range of years used for each indicator. If an indicator for an economy is missing, it is marked as "n/a" in the Economy profiles.

6 Based on Groeneveld and Meeden (1984), which sets the criteria of absolute skewness above 1 and kurtosis above 3.5. The skewness criterion was relaxed to account for the small sample at hand (132 economies).

7 This distributional issue affects the following variables: 2.1.5, 3.2.1, 4.2.2, 5.2.3, 5.2.4, 5.3.2, 5.3.3, 5.3.4, 6.1.5, 7.2.2, 7.2.4 and 7.3.1 (1 outlier); 2.2.3, 5.3.1 and 7.1.3 (2 outliers); 4.2.4, 6.1.3, 6.3.4, 7.1.1, 7.2.1, 7.3.2 and 7.3.4 (3 outliers); 5.2.5, 6.3.1 and 7.2.5 (4 outliers); and 4.2.3, 6.1.1, 6.1.2 and 6.3.3 (5 outliers). An exception was made this year by also winsorizing an indicator that had six outliers: 4.1.3.

8 Indicators 2.3.3 and 4.3.3 were treated using log-transformation (factor *f* of 1).

9 This formula achieves two things: converting all series into "goods" and scaling the series to the range [1, max] so that natural logs are positive starting at 0, where "min" and "max" are the minimum and maximum indicator sample values. The corresponding formula for "bads" is:

$$\ln\left[\frac{(\max \times f - 1) \times (\max - \textit{economy value})}{\max - \min + 1}\right]$$

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Appendix II
Joint Research Centre (JRC) statistical audit of the 2021 Global Innovation Index

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Conceptual and practical challenges are inevitable when trying to understand and model the fundamentals of innovation at the national level worldwide. Now in its 14th edition, the Global Innovation Index (GII) 2021 takes up these conceptual challenges and also deals with the practical challenges relating to data quality and methodological choices.

This appendix summarises the comprehensive audit of the GII, conducted for the eleventh consecutive year by the European Commission's Competence Centre on Composite Indicators and Scoreboards (COIN) at the Joint Research Centre (JRC) in Ispra.

As in previous editions, the present JRC-COIN audit focuses on the statistical soundness of the multi-level structure of the index as well as on the impact of key modeling assumptions on the results. The independent statistical assessment of the GII provided by the JRC-COIN guarantees the transparency and reliability of the index for both policymakers and other stakeholders, thus facilitating more accurate priority setting and policy formulation in the innovation field.

As in past GII reports, the JRC-COIN analysis complements the economy rankings with confidence intervals for the GII, the Innovation Input Sub-Index and the Innovation Output Sub-Index, in order to better appreciate the robustness of these rankings to the computation methodology. Finally, the JRC-COIN analysis includes an assessment of the added value of the GII and a measure of "distance to the efficiency frontier" of innovation by using data envelopment analysis. This is a shortened version of the audit, the full audit is available at https://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2021-appendix1.pdf.

Main conclusions

The JRC-COIN analysis suggests that the conceptualized multilevel structure of the GII 2021 – with its 81 indicators, 21 sub-pillars, 7 pillars and 2 sub-indices comprising the overall index – is statistically sound and balanced: that is, each sub-pillar makes a similar contribution to the variation of its respective pillar. The refinements made by the developing team have helped to enhance the already strong statistical coherence in the GII framework, in which the capacity of the 81 (but two) indicators to distinguish economies' performance is maintained at the sub-pillar level or higher in all but two cases.

The decision not to impute missing values, which is common in comparable contexts and justified on the grounds of transparency and replicability, can at times have an undesirable impact on some economy scores, with the additional negative side-effect that it might encourage economies not to report low data values. The GII team's adoption, in 2016, of a more stringent data coverage threshold (at least 66 percent data availability for each of the input- and output-related indicators, separately) has notably improved confidence in the economy rankings for the GII and the two sub-indices.

Additionally, the GII team's decision, in 2012, to use weights as scaling coefficients during the index development constitutes a significant departure from the traditional, yet erroneous, vision of weights as a reflection of indicators' importance in a weighted average. It is hoped that such an approach will be adopted by other developers of composite indicators to avoid situations where bias sneaks in when least expected.

The strong correlations between the GII components are proven not to be a sign of redundancy of information in the GII. For more than 43 percent (up to 65 percent) of the 132 economies included in the GII 2021, the GII ranking and the rankings of any of the 7 pillars differ by 10 positions or more. This demonstrates the added value of the GII ranking, which helps to highlight other components of innovation that are not immediately apparent from an analysis of the seven pillars separately. At the same time, this finding points to the value of duly considering the merits of the GII pillars, sub-pillars and their constituent indicators individually. By doing so, economy-specific strengths and bottlenecks in innovation can be identified and serve as an input for evidence-based policymaking.

To test the impact of the GII modeling assumptions, a number of different models were tested in this audit based on different approaches to imputing of missing data, aggregation at the pillar level and assignment of weights. Using these models, the 90 percent confidence intervals relating to the ranking positions that an economy might have had under different model assumptions were computed. For the vast majority of economies these intervals are sufficiently narrow to allow meaningful inferences to be drawn: the intervals comprise fewer than 10 positions for 80 percent (106 out of 132) of the economies. Some caution is needed when considering two economies – Brunei Darussalam and the United Republic of Tanzania – which have GII rankings that are highly sensitive to the methodological choices. Consequently, their GII ranks – between the 82nd (Brunei Darussalam) and 90th position (United Republic of Tanzania) in the GII classification – should be interpreted cautiously and certainly not taken at face value. This is a remarkable improvement compared to GII versions up to 2016, when more than 40 economies had confidence interval widths of more than 20 positions. The improvement in the confidence that can be placed in the GII 2021 rankings is the direct result of the decision to

adopt a more stringent criterion for an economy's inclusion since 2016, which now requires at least 66 percent data availability within each of the two sub-indices. Some caution is also warranted in regard to the Input Sub-Index for seven economies – Algeria, Belarus, Botswana, Brunei Darussalam, Cabo Verde, Mauritius and the Plurinational State of Bolivia – that have 90 percent confidence interval widths of more than 20 positions (up to 31 for Botswana). A similar degree of caution is also needed in the Output Sub-Index for four economies – Brunei Darussalam, Malawi, Togo and the United Republic of Tanzania – that have 90 percent confidence interval widths of more than 20 positions (up to 40 for Tanzania). Compared to the GII 2019, the higher data availability in the Output Sub-Index this year has led to a much lower number of economies with very wide intervals (4 compared to 13 in the GII 2019 edition), which is a noteworthy improvement.

Although ranks for a few economies, in the GII 2021 overall or in the two sub-indices, appear to be sensitive to the methodological choices, the published rankings for the vast majority can be considered to be representative of the plurality of scenarios simulated in this audit. Taking the median rank as the benchmark for an economy's expected rank in the realm of the GII's unavoidable methodological uncertainties, 75 percent of the economies are found to shift fewer than three positions with respect to the median rank in the GII, or in the Input and Output Sub-Indices.

In order to offer full transparency and complete information, Annex Table 2 reports the GII 2021 Index and Input and Output Sub-Indices' economy ranks together with the simulated 90 percent confidence intervals to allow a better appreciation of the robustness of the results to the choice of weights and aggregation formula and the impact of estimating missing data (where applicable).

All things considered, the present JRC-COIN audit findings confirm that the GII 2021 meets international quality standards for statistical soundness, which indicates that the GII is a reliable benchmarking tool for innovation practices at the economy level around the world.

Finally, the "distance to the efficiency frontier" measure calculated using data envelopment analysis can be used both as a measure of efficiency and as a suitable approach to benchmarking economies' multidimensional performance on innovation without imposing a fixed and common set of weights that may not be fair to a particular economy. The decision made by the GII team to abandon the efficiency ratio (ratio of Output to Input Sub-Index) is particularly laudable. In fact, ratios of composite indicators (Output to Input Sub-Index in this case) come with much higher uncertainty than the sum of the components (Input plus Output Sub-Index, equivalent to the GII). For this reason, developers and users of indices alike need to approach efficiency ratios of this nature with great care. The GII should not represent the ultimate and definitive ranking of economies with respect to innovation. On the contrary, the GII best represents an ongoing attempt to find metrics and approaches that capture the richness of innovation more effectively, continuously adapting the GII framework to reflect the improved availability of statistics and the theoretical advances in the field. In any case, the GII should be regarded as a sound attempt, based on the principle of transparency, matured over 14 years of constant refinements, to pave the way for better and more informed innovation policies worldwide.

Annex Table 2

GII 2021 and Input/Output Sub-Indices: Ranks and 90 percent confidence intervals

	GII 2021		Input Sub-Index		Output Sub-Index	
	Rank	Interval	Rank	Interval	Rank	Interval
Switzerland	1	[1, 1]	4	[2, 4]	1	[1, 1]
Sweden	2	[2, 2]	2	[1, 4]	2	[2, 3]
United States	3	[3, 4]	3	[2, 5]	4	[3, 8]
United Kingdom	4	[4, 7]	7	[6, 9]	6	[4, 8]
Republic of Korea	5	[3, 5]	9	[7, 12]	5	[4, 5]
Netherlands	6	[6, 8]	12	[8, 14]	3	[3, 7]
Finland	7	[5, 8]	6	[4, 9]	9	[9, 10]
Singapore	8	[6, 10]	1	[1, 3]	13	[12, 14]
Denmark	9	[9, 10]	5	[5, 7]	11	[11, 11]
Germany	10	[7, 10]	14	[11, 15]	8	[5, 8]
France	11	[11, 13]	17	[16, 18]	10	[9, 10]
China	12	[11, 14]	25	[21, 26]	7	[2, 7]
Japan	13	[12, 14]	11	[9, 13]	14	[12, 14]
Hong Kong, China	14	[11, 23]	10	[8, 15]	17	[12, 29]
Israel	15	[14, 16]	18	[11, 20]	12	[12, 17]
Canada	16	[15, 19]	8	[5, 13]	23	[20, 25]
Iceland	17	[16, 18]	20	[19, 22]	16	[14, 17]
Austria	18	[17, 19]	16	[13, 18]	24	[20, 24]
Ireland	19	[16, 20]	22	[18, 23]	19	[16, 21]
Norway	20	[19, 23]	13	[10, 16]	28	[27, 28]
Estonia	21	[19, 22]	24	[22, 26]	20	[17, 20]
Belgium	22	[21, 25]	21	[19, 22]	26	[24, 27]
Luxembourg	23	[21, 24]	26	[23, 28]	18	[17, 22]
Czech Republic	24	[20, 25]	30	[29, 30]	15	[14, 17]
Australia	25	[23, 27]	15	[13, 19]	33	[31, 36]
New Zealand	26	[26, 30]	19	[18, 24]	32	[31, 36]
Malta	27	[25, 28]	29	[27, 32]	22	[20, 26]
Cyprus	28	[25, 28]	31	[30, 33]	21	[19, 22]
Italy	29	[27, 30]	33	[31, 33]	25	[23, 26]
Spain	30	[29, 30]	28	[26, 31]	29	[27, 29]
Portugal	31	[31, 32]	32	[29, 33]	30	[29, 31]
Slovenia	32	[31, 32]	27	[26, 30]	36	[33, 36]
United Arab Emirates	33	[33, 36]	23	[23, 25]	47	[45, 52]
Hungary	34	[33, 34]	34	[34, 37]	31	[29, 33]
Bulgaria	35	[33, 36]	46	[40, 48]	27	[25, 30]
Malaysia	36	[34, 36]	36	[34, 38]	34	[32, 34]
Slovakia	37	[37, 40]	42	[40, 46]	35	[34, 36]
Latvia	38	[37, 39]	38	[37, 40]	39	[39, 40]
Lithuania	39	[37, 40]	35	[34, 38]	43	[41, 44]
Poland	40	[37, 40]	37	[35, 38]	42	[40, 44]
Turkey	41	[41, 41]	45	[39, 51]	41	[40, 43]
Croatia	42	[42, 48]	41	[40, 47]	48	[47, 50]
Thailand	43	[42, 45]	47	[40, 49]	46	[45, 47]
Viet Nam	44	[42, 47]	60	[55, 69]	38	[37, 39]
Russian Federation	45	[43, 47]	43	[39, 47]	52	[50, 54]
India	46	[43, 48]	57	[47, 58]	45	[41, 47]
Greece	47	[42, 50]	39	[36, 43]	60	[56, 61]
Romania	48	[48, 52]	54	[47, 58]	50	[48, 55]
Ukraine	49	[43, 53]	76	[63, 77]	37	[37, 38]
Montenegro	50	[49, 58]	53	[52, 62]	53	[50, 60]
Philippines	51	[47, 55]	72	[61, 77]	40	[38, 43]
Mauritius	52	[49, 66]	48	[41, 69]	58	[57, 67]
Chile	53	[49, 55]	44	[40, 46]	61	[59, 62]
Serbia	54	[51, 56]	50	[48, 54]	57	[54, 59]
Mexico	55	[51, 56]	62	[54, 64]	51	[50, 53]
Costa Rica	56	[51, 58]	66	[59, 68]	49	[49, 54]
Brazil	57	[53, 59]	56	[47, 59]	59	[56, 60]
Mongolia	58	[55, 62]	65	[60, 75]	55	[46, 61]
North Macedonia	59	[55, 61]	40	[39, 58]	69	[62, 70]
Iran (Islamic Republic of)	60	[57, 65]	86	[77, 92]	44	[44, 45]
South Africa	61	[60, 64]	55	[47, 59]	68	[65, 68]
Belarus	62	[49, 64]	68	[47, 70]	62	[47, 63]
Georgia	63	[61, 69]	49	[48, 68]	74	[69, 74]
Republic of Moldova	64	[58, 66]	80	[76, 82]	54	[52, 55]
Uruguay	65	[62, 66]	69	[63, 72]	63	[61, 63]
Saudi Arabia	66	[64, 69]	59	[49, 66]	72	[68, 72]

Annex Table 2

GII 2021 and Input/Output Sub-Indices: Ranks and 90 percent confidence intervals (continued)

	GII 2021		Input Sub-Index		Output Sub-Index	
	Rank	Interval	Rank	Interval	Rank	Interval
Colombia	67	[62, 69]	58	[49, 58]	75	[72, 75]
Qatar	68	[67, 71]	64	[60, 71]	70	[68, 74]
Armenia	69	[64, 71]	85	[83, 90]	56	[54, 58]
Peru	70	[68, 73]	52	[48, 64]	82	[78, 83]
Tunisia	71	[68, 78]	78	[69, 82]	64	[63, 75]
Kuwait	72	[72, 78]	73	[70, 80]	73	[68, 74]
Argentina	73	[67, 75]	77	[63, 79]	71	[67, 73]
Jamaica	74	[68, 76]	82	[72, 87]	66	[62, 74]
Bosnia and Herzegovina	75	[73, 82]	70	[68, 81]	80	[77, 84]
Oman	76	[73, 79]	67	[60, 69]	90	[83, 90]
Morocco	77	[70, 78]	84	[80, 87]	67	[64, 67]
Bahrain	78	[73, 81]	63	[56, 71]	99	[86, 99]
Kazakhstan	79	[77, 83]	61	[56, 65]	101	[96, 101]
Azerbaijan	80	[80, 91]	74	[72, 83]	91	[89, 98]
Jordan	81	[77, 83]	79	[73, 83]	81	[78, 83]
Brunei Darussalam	82	[77, 111]	51	[46, 67]	115	[106, 127]
Panama	83	[76, 85]	83	[77, 91]	79	[68, 86]
Albania	84	[82, 86]	71	[70, 79]	92	[91, 96]
Kenya	85	[78, 86]	89	[84, 95]	76	[75, 79]
Uzbekistan	86	[84, 90]	75	[71, 83]	100	[93, 101]
Indonesia	87	[80, 87]	87	[83, 92]	84	[78, 85]
Paraguay	88	[86, 92]	90	[84, 94]	87	[79, 96]
Cabo Verde	89	[89, 97]	96	[89, 110]	88	[81, 101]
United Republic of Tanzania	90	[89, 112]	120	[116, 124]	65	[64, 104]
Ecuador	91	[89, 97]	92	[89, 100]	94	[90, 96]
Lebanon	92	[88, 95]	94	[84, 96]	97	[88, 97]
Dominican Republic	93	[92, 100]	93	[90, 99]	98	[97, 104]
Egypt	94	[85, 96]	102	[95, 103]	86	[81, 91]
Sri Lanka	95	[84, 97]	103	[93, 107]	85	[79, 88]
El Salvador	96	[89, 99]	100	[95, 102]	89	[83, 102]
Trinidad and Tobago	97	[89, 98]	97	[86, 102]	95	[89, 99]
Kyrgyzstan	98	[96, 109]	81	[80, 89]	119	[115, 121]
Pakistan	99	[90, 101]	117	[100, 117]	77	[76, 87]
Namibia	100	[96, 106]	88	[85, 97]	110	[107, 113]
Guatemala	101	[95, 107]	112	[108, 119]	83	[81, 89]
Rwanda	102	[99, 110]	91	[87, 102]	108	[106, 113]
Tajikistan	103	[98, 107]	104	[100, 117]	96	[89, 97]
Bolivia (Plurinational State of)	104	[100, 109]	95	[83, 104]	111	[109, 116]
Senegal	105	[100, 108]	105	[97, 116]	102	[97, 103]
Botswana	106	[96, 113]	98	[85, 116]	109	[107, 113]
Malawi	107	[100, 116]	118	[114, 123]	93	[87, 113]
Honduras	108	[97, 110]	101	[96, 108]	106	[99, 109]
Cambodia	109	[102, 110]	106	[100, 109]	104	[102, 105]
Madagascar	110	[101, 118]	127	[126, 129]	78	[76, 94]
Nepal	111	[102, 113]	99	[96, 107]	116	[101, 118]
Ghana	112	[102, 112]	114	[105, 117]	103	[101, 111]
Zimbabwe	113	[108, 123]	116	[104, 123]	105	[104, 120]
Côte d'Ivoire	114	[112, 119]	107	[103, 117]	121	[119, 124]
Burkina Faso	115	[115, 126]	108	[107, 119]	123	[122, 128]
Bangladesh	116	[115, 123]	121	[119, 127]	113	[111, 115]
Lao People's Democratic Republic	117	[112, 122]	123	[111, 126]	112	[107, 120]
Nigeria	118	[114, 125]	115	[106, 118]	124	[122, 128]
Uganda	119	[113, 125]	119	[109, 125]	122	[121, 125]
Algeria	120	[113, 125]	109	[98, 120]	128	[126, 131]
Zambia	121	[119, 127]	111	[104, 118]	127	[124, 130]
Mozambique	122	[115, 128]	122	[114, 126]	118	[115, 123]
Cameroon	123	[114, 127]	124	[115, 125]	117	[114, 126]
Mali	124	[116, 125]	126	[122, 126]	114	[113, 116]
Togo	125	[107, 127]	110	[108, 119]	129	[104, 129]
Ethiopia	126	[123, 129]	129	[128, 129]	107	[106, 124]
Myanmar	127	[114, 128]	128	[125, 129]	120	[106, 120]
Benin	128	[125, 131]	113	[110, 122]	132	[129, 132]
Niger	129	[120, 129]	125	[119, 128]	130	[117, 130]
Guinea	130	[130, 132]	130	[130, 132]	126	[117, 131]
Yemen	131	[128, 132]	132	[130, 132]	125	[123, 127]
Angola	132	[130, 132]	131	[130, 132]	131	[130, 132]

Appendix III
Sources and definitions

This appendix complements the Economy profiles and the online data tables by providing the title, description, definition and source for each of the 81 indicators included in the Global Innovation Index (GII) this year.

For all 132 economies in the GII in 2021, the most recent values, within the period 2011 to 2020, were used for each indicator, with a few noted exceptions (see Appendix I). The year provided next to the indicator description (directly below the indicator title) corresponds to the year when data were most frequently available for economies. When more than one year is considered, the period used is indicated at the end of the indicator's source in parentheses.

Of the 81 indicators, 63 variables are hard data, 15 are composite indicators, marked with (*), and 3 are survey questions from the World Economic Forum's Executive Opinion Survey (EOS), marked with (†). In some cases, additional markings are provided at the end of the indicator description. Instances marked with [a] signal indicators that were assigned half weights and those marked [b] are indicators where higher scores indicate poorer outcomes, commonly known as "bads." Appendix I presents more details on the computation.

Some indicators are scaled during computation to make them comparable across economies. Indicators are scaled either in relation to other comparable indicators or through division by gross domestic product (GDP) in current U.S. dollars, purchasing power parity GDP in international dollars (PPP$ GDP), population, total trade, etc. In all cases, the scaling factor used was the value that corresponded to the same year of the indicator.

1. Institutions

1.1. Political environment

1.1.1. Political and operational stability*
Political, legal, operational or security risk index*[ab] | 2020

Index that measures the likelihood and severity of political, legal, operational or security risks affecting business operations. Scores are annualized and standardized.

Source: IHS Markit, *Country Risk Scores*, aggregated for end Q1, Q2, Q3 and Q4 2020. (https://ihsmarkit.com/industry/economics-country-risk.html).

1.1.2. Government effectiveness*
Government effectiveness index* | 2019

Index that reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Scores are standardized.

Source: World Bank, Worldwide Governance Indicators, 2019 update. (http://info.worldbank.org/governance/wgi/#home).

1.2. Regulatory environment

1.2.1. Regulatory quality*
Regulatory quality index*[a] | 2019

Index that reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private-sector development. Scores are standardized.

Source: World Bank, Worldwide Governance Indicators, 2019 update. (http://info.worldbank.org/governance/wgi/#home).

1.2.2. Rule of law*
Rule of law index*[a] | 2019

Index that reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police and the courts, as well as the likelihood of crime and violence. Scores are standardized.

Source: World Bank, Worldwide Governance Indicators, 2019 update. (http://info.worldbank.org/governance/wgi/#home).

1.2.3. Cost of redundancy dismissal

Sum of notice period and severance pay for redundancy dismissal (salary in weeks, averages for workers with 1, 5 and 10 years of tenure, with a minimum threshold of 8 weeks)[b] | 2019

Redundancy costs measure the cost of advance notice requirements and severance payments due when terminating a redundant worker, expressed in weeks of salary. The average value of notice requirements and severance payments applicable to a worker with 1 year of tenure, a worker with 5 years, and a worker with 10 years are also considered. One month is recorded as 4 and 1/3 weeks. If the redundancy cost adds up to 8 or fewer weeks of salary, a value of 8 is assigned but the actual number of weeks is published. If the cost adds up to more than 8 weeks of salary, the score is the number of weeks.

Source: World Bank, *Doing Business 2020, Comparing Business Regulation in 190 Economies*. The World Bank has temporarily suspended its *Doing Business* data collection but it will be resumed at a later stage. (https://www.doingbusiness.org/en/reports/global-reports/doing-business-2020).

1.3. Business environment

1.3.1. Ease of starting a business*

Ease of starting a business* | 2019

The ranking of economies on the ease of starting a business is determined by sorting their scores. These scores are the simple average of the scores for each of the component indicators. The World Bank's *Doing Business* records all procedures officially required, or commonly undertaken in practice, for an entrepreneur to start up and formally operate an industrial or commercial business, as well as the time and cost to complete these procedures and the paid-in minimum capital requirement. These procedures include obtaining all necessary licenses and permits and completing any required notifications, verifications or inscriptions for the company and employees with relevant authorities. Data are collected from limited liability companies based in the largest business cities. For 11 economies, namely Bangladesh, Brazil, China, India, Indonesia, Japan, Mexico, Nigeria, Pakistan, the Russian Federation and the United States of America, the data are also collected for the second-largest business cities.

Source: World Bank, *Doing Business 2020*, *Comparing Business Regulation in 190 Economies*. The World Bank has temporarily suspended its *Doing Business* data collection but it will be resumed at a later stage. (https://www.doingbusiness.org/en/reports/global-reports/doing-business-2020).

1.3.2. Ease of resolving insolvency*

Ease of resolving insolvency* | 2019

Doing Business studies the time, cost and outcome of insolvency proceedings involving domestic legal entities. These variables are used to calculate the recovery rate, which is recorded as cents on the dollar recovered by secured creditors through reorganization, liquidation or debt enforcement (foreclosure or receivership) proceedings. To determine the present value of the amount recovered by creditors, *Doing Business* uses the lending rates from the International Monetary Fund, supplemented with data from central banks and the Economist Intelligence Unit.

The data for the resolving insolvency indicators are derived from questionnaire responses by local insolvency practitioners and verified through a study of laws and regulations as well as public information on insolvency systems. The ranking of economies on the ease of resolving insolvency is determined by taking the simple average of their scores for the recovery rate and the strength of the insolvency framework index. More information on the methodology is available on the *Doing Business* website (https://www.doingbusiness.org/en/methodology/resolving-insolvency).

Source: World Bank, *Doing Business 2020*, *Comparing Business Regulation in 190 Economies*. The World Bank has temporarily suspended its *Doing Business* data collection but it will be resumed at a later stage. (https://www.doingbusiness.org/en/reports/global-reports/doing-business-2020).

2. Human capital and research

2.1. Education

2.1.1. Expenditure on education, % GDP

Government expenditure on education (% of GDP) | 2017

Total general (local, regional and central) government expenditure on education (current, capital and transfers), expressed as a percentage of GDP. It includes expenditure funded by transfers from international sources to government.

Source: UNESCO Institute for Statistics (UIS) online database and Eurostat (2010–19). (http://data.uis.unesco.org; https://ec.europa.eu/eurostat/data/database).

2.1.2. Government funding/pupil, secondary, % GDP/cap

Government funding per secondary pupil (% of GDP per capita) | 2017

Average total (current, capital and transfers) general government expenditure per student, at secondary level, expressed as a percentage of GDP per capita.

Source: UNESCO Institute for Statistics (UIS) online database (2010–19). (http://data.uis.unesco.org).

2.1.3. School life expectancy, years

School life expectancy, primary to tertiary education, both sexes (years) | 2018

Total number of years that a person of school entrance age can expect to spend within the primary to tertiary levels of education. For a child of a given age, the school life expectancy is calculated as the sum of the age-specific enrolment rates for primary to tertiary levels of education. The part of the enrolment that is not distributed by age is divided by the school-age population for the primary to tertiary level of education in which they are enrolled and multiplied by the duration of that level of education. The result is then added to the sum of the age-specific enrolment rates. A relatively high value indicates a greater probability of children spending more years in education and a higher overall retention rate within the education system. It must be noted that the expected number of years does not necessarily coincide with the expected number of grades of education completed due to grade repetition.

Source: UNESCO Institute for Statistics (UIS) online database (2010–20). (http://data.uis.unesco.org).

2.1.4. PISA scales in reading, maths and science

PISA scales in reading, mathematics and science[a] | 2018

PISA is the OECD's (Organisation for Economic Co-operation and Development) Programme for International Student Assessment. PISA measures 15-year-olds' ability to use their reading, mathematics and science knowledge skills. Results from PISA indicate the quality and equity of learning outcomes attained around the world. The 2018 PISA survey is the seventh round of the triennial assessment.

The indicator is built using the average of the reading, mathematics and science scores for each country. PISA scores are set in relation to the variation in results observed across all test participants in a country. There is, theoretically, no minimum or maximum score in PISA; rather, the results are scaled to fit approximately normal distributions, with means around 500 score points and standard deviations around 100 score points.

The 2018 scores for China correspond to the provinces/municipalities of Beijing, Shanghai, Jiangsu and Zhejiang only. The 2018 scores for Azerbaijan correspond only to the capital Baku. The 2018 average scores for Spain are based only on the scores for mathematics and science, as the reading scores were not published by the OECD due to implausible student response behavior.

Source: OECD Programme for International Student Assessment (PISA) (2015–18). (www.pisa.oecd.org).

2.1.5. Pupil–teacher ratio, secondary

Pupil–teacher ratio, secondary[ab] | 2019

The number of pupils enrolled in secondary school divided by the number of secondary school teachers (regardless of their teaching assignment). Where the data are missing for the secondary education level as a whole, the ratios for upper-secondary are reported; if these are also missing, the ratios for lower-secondary are reported instead. A high pupil–teacher ratio suggests that each teacher has to be responsible for a large number of pupils. In other words, the higher the pupil–teacher ratio, the lower the relative access of pupils to teachers.

Source: UNESCO Institute for Statistics (UIS) online database (2010–20). (http://data.uis.unesco.org).

2.2. Tertiary education

2.2.1. Tertiary enrolment, % gross

School enrolment, tertiary (% gross) | 2018

The ratio of total tertiary enrolment, regardless of age, to the population of the age group that officially corresponds to the tertiary level of education. Tertiary education, whether or not at an advanced research qualification, normally requires, as a minimum condition of admission, the successful completion of education at the secondary level. The school enrolment ratio can exceed 100% due to grade repetition and the inclusion of under-aged and over-aged students, who are early or late entrants.

Source: UNESCO Institute for Statistics (UIS) online database (2010–20). (http://data.uis.unesco.org).

2.2.2. Graduates in science and engineering, %

Graduates from Science, Technology, Engineering and Mathematics programs (% of total tertiary graduates) | 2018

The share of all tertiary-level graduates in natural sciences, mathematics, statistics, information and technology, manufacturing, engineering and construction as a percentage of all tertiary-level graduates. Data for Israel, Japan, Mexico, the Republic of Korea, the United Kingdom and the United States of America are taken from the OECD Main Science and Technology Indicators database. Data for Malta, Portugal and Romania are taken from Eurostat.

Source: UNESCO Institute for Statistics (UIS) online database; Eurostat database; and OECD, Main Science and Technology Indicators (MSTI) database, March 2021 (2010–20). (http://data.uis.unesco.org; https://ec.europa.eu/eurostat/data/database; https://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB).

2.2.3. Tertiary inbound mobility, %

Tertiary inbound mobility rate (%)[a] | 2018

The number of students from abroad studying in a given country as a percentage of the total tertiary-level enrolment in that country.

Source: UNESCO Institute for Statistics (UIS) online database (2010–19). (http://data.uis.unesco.org).

2.3. Research and development (R&D)

2.3.1. Researchers FTE/mn pop.

Researchers, full-time equivalent (FTE) (per million population) | 2019

Researchers in R&D are professionals engaged in the conception or creation of new knowledge. They conduct research and improve or develop concepts, theories, models, techniques, instrumentation, software or operational methods. Data collected from UNESCO Institute for Statistics, Eurostat and OECD Main Science and Technology Indicators.

Source: UNESCO Institute for Statistics (UIS) online database; Eurostat; OECD, Main Science and Technology Indicators (MSTI) database, March 2021 (2010–19). (http://data.uis.unesco.org; https://ec.europa.eu/eurostat/data/database; https://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB).

2.3.2. Gross expenditure on R&D (GERD), % GDP

Gross expenditure on R&D (% of GDP) | 2019

Total domestic intramural expenditure on R&D during a given period as a percentage of GDP. “Intramural R&D expenditure” is all expenditure for R&D performed within a statistical unit or sector of the economy during a specific period, regardless of the source of funding. Data collected from UNESCO Institute for Statistics, Eurostat and OECD Main Science and Technology Indicators.

Source: UNESCO Institute for Statistics (UIS) online database; Eurostat, Eurostat database; OECD, Main Science and Technology Indicators (MSTI) database, 2021 (2010–19). (http://data.uis.unesco.org; https://ec.europa.eu/eurostat/data/database; https://stats.oecd.org/Index.aspx?DataSet-Code=MSTI_PUB).

2.3.3. Global corporate R&D investors, top 3, mn US$

Average expenditure of the top three global companies by R&D, million US$ | 2020

Average expenditure on R&D of the top three global companies. If a country has fewer than three global companies listed, the figure is either the average of the sum of the two companies listed or the total for a single listed company. A score of 0 is given to countries with no listed companies. The data include economies outside the European Union (EU).

Source: The 2020 EU Industrial R&D Investment Scoreboard. (https://iri.jrc.ec.europa.eu/scoreboard/2020-eu-industrial-rd-investment-scoreboard).

2.3.4. QS university ranking, top 3*

Average score of the top three universities according to the QS world university ranking* | 2020

Average score of the top three universities per country. If fewer than three universities are listed in the QS ranking of the global top 1,000 universities, the sum of the scores of the listed universities is divided by three, thus implying a score of zero for the non-listed universities. The 2021 ranking corresponds to data extracted in 2020.

Source: QS Quacquarelli Symonds Ltd, *QS World University Ranking, Top Universities*. (https://www.topuniversities.com/university-rankings/world-university-rankings/2021).

3. Infrastructure

3.1. Information and communication technologies (ICTs)

3.1.1. ICT access*

ICT access index*[a] | 2019

The ICT access index, previously part of the International Telecommunication Union (ITU) ICT Development Index, is a composite index that weights five ICT indicators (20% each): (1) Fixed telephone subscriptions per 100 inhabitants; (2) Mobile cellular telephone subscriptions per 100 inhabitants; (3) International Internet bandwidth (bit/s) per Internet user; (4) Percentage of households with a computer; and (5) Percentage of households with Internet access.

Source: GII calculations based on the World Telecommunication/ICT Indicators Database (released January 2020) following the methodology of the ITU ICT Development Index 2017. (https://www.itu.int/en/ITU-D/Statistics/Pages/publications/mis2017.aspx).

3.1.2. ICT use*

ICT use index*[a] | 2019

The ICT use index, previously part of the International Telecommunication Union (ITU) ICT Development Index, is a composite index that weights three ICT indicators (one third each): (1) Percentage of individuals using the Internet; (2) Fixed (wired) broadband Internet subscriptions per 100 inhabitants; (3) Active mobile broadband subscriptions per 100 inhabitants.

Source: GII calculations based on the World Telecommunication/ICT Indicators Database (released January 2020) following the methodology of the ITU ICT Development Index 2017. (https://www.itu.int/en/ITU-D/Statistics/Pages/publications/mis2017.aspx).

3.1.3. Government's online service*

Government's online service index*[a] | 2020

The Online Services Index component of the E-Government Development Index is a composite indicator measuring the use of ICTs by governments in delivering public services at the national level. To arrive at a set of Online Service Index values for 2020, a total of 215 online United Nations Volunteer researchers from 96 countries, covering 66 languages, assessed each country's national website in the native language, including the national portal, e-services portal and e-participation portal, as well as the websites of the related ministries of education, labor, social

services, health, finance and environment, as applicable. The total number of points scored by each country is normalized to a range of 0 to 1. The online index value for a given country is equal to the actual total score less the lowest total score divided by the range of total score values for all countries.

Note: The precise meaning of these values varies from one edition of the Survey to the next, as understanding of the potential of e-government changes and the underlying technology evolves. See the link below for more details.

Source: United Nations Public Administration Network, *E-Government Survey 2020*. (https://publicadministration.un.org/egovkb/en-us/Reports/UN-E-Government-Survey-2020).

3.1.4. E-participation*
Online E-Participation Index*[a] | 2020

The E-Participation Index (EPI) is derived as a supplementary index to the United Nations E-Government Survey. It extends the scope of the Survey by focusing on government use of online services in providing information to its citizens ("e-information sharing"), interacting with stakeholders ("e-consultation") and engaging in decision-making processes ("e-decision-making"). A country's EPI reflects the e-participation mechanisms that are deployed by its government in comparison to all other countries. The purpose of this measure is not to prescribe any specific practice, but rather to offer insight into how different countries are using online tools to promote interaction between government and citizens, as well as between citizens, for the benefit of all. As the EPI is a qualitative assessment based on the availability and relevance of participatory services available on government websites, the comparative ranking of countries is for illustrative purposes only and serves as an indicator of the broad trends in promoting citizen engagement. The index ranges from 0 to 1, with 1 showing greater e-participation. Mathematically, the EPI is normalized by taking the total score value for a given country, subtracting the lowest total score for any country in the survey and dividing by the range of total score values for all countries.

Note: The precise meaning of these values varies from one edition of the Survey to the next, as understanding of the potential of e-government changes and the underlying technology evolves. See the link below for more details.

Source: United Nations Public Administration Network, *E-Government Survey 2020*. (https://publicadministration.un.org/egovkb/en-us/Reports/UN-E-Government-Survey-2020).

3.2. General infrastructure

3.2.1. Electricity output, GWh/mn pop.
Electricity output (GWh per million population)[a] | 2018

Electricity production, measured at the terminals of all alternator sets in a station. In addition to hydropower, coal, oil, gas and nuclear power generation, this indicator covers generation by geothermal, solar, wind, tide and wave energy, as well as that from combustible renewables and waste. Production includes the output of plants that are designed to produce solely electricity as well as the output of combined heat and power plants. Electricity output in GWh is scaled by population.

Source: International Energy Agency (IEA) *World Energy Balances*, July 2020 edition and February 2021 edition (selected economies) (2018–19). (https://www.iea.org/reports/world-energy-balances-overview).

3.2.2. Logistics performance*
Logistics Performance Index*[a] | 2018

A multidimensional assessment of logistics performance, the Logistics Performance Index (LPI) ranks 160 countries, combining data on six core performance components into a single aggregate measure including customs performance, infrastructure quality and timeliness of shipments. The data used in the ranking come from a survey of logistics professionals who are asked questions about the foreign countries in which they operate. The LPI's six components are: (1) Customs: the efficiency of customs and border management clearance; (2) Infrastructure: the quality of trade and transport infrastructure; (3) International shipments: the ease of arranging competitively priced shipments; (4) Services quality: the competence and quality of logistics services; (5) Tracking and tracing: the ability to track and trace consignments; and (6) Timeliness: the frequency with which shipments reach consignees within scheduled or expected delivery times. The LPI therefore consists of both qualitative and quantitative measures and helps to build profiles of logistics friendliness for these countries.

Source: World Bank and Turku School of Economics, Logistics Performance Index 2018; Arvis *et al.*, 2018, *Connecting to Compete 2018: Trade Logistics in the Global Economy – The Logistics Performance Index and its Indicators*. (https://data.worldbank.org/indicator/LP.LPI.OVRL.XQ; https://openknowledge.worldbank.org/bitstream/handle/10986/29971/LPI2018.pdf).

3.2.3. Gross capital formation, % GDP

Gross capital formation (% of GDP) | 2020

Gross capital formation is expressed as the ratio of total investment in current local currency to GDP in current local currency. Investment or gross capital formation is measured by the total value of the gross fixed capital formation and changes in inventories and acquisitions less disposals of valuables for a unit or sector, on the basis of the System of National Accounts (SNA) 1993.

Source: International Monetary Fund, World Economic Outlook Database, October 2020. (https://www.imf.org/en/Publications/SPROLLs/world-economic-outlook-databases).

3.3. Ecological sustainability

3.3.1. GDP/unit of energy use

GDP per total energy supply (per thousand 2015 PPP$ GDP) | 2018

Purchasing power parity gross domestic product (2015 PPP$ GDP) per total energy supply (TES). TES is made up of the cost of production + imports – exports – international marine bunkers – international aviation bunkers +/– stock changes. GDP/TES is an indicator of energy productivity.

Source: International Energy Agency (IEA) *World Energy Balances*, July 2020 edition (2018–19). (https://www.iea.org/reports/world-energy-balances-overview)

3.3.2. Environmental performance*

Environmental Performance Index* | 2020

The 2020 Environmental Performance Index (EPI) ranks 180 countries on different categories covering environmental health and ecosystem vitality. These indicators provide a gauge of how close countries are to achieving established environmental policy targets. The EPI offers a scorecard that highlights leaders and laggards in environmental performance and provides practical guidance for countries that aspire to move toward a sustainable future. The index ranges from 0 to 100, with 100 indicating best performance.

Source: Yale University and Columbia University, 2020 Environmental Performance Index. (https://epi.yale.edu/epi-results/2020/component/epi).

3.3.3. ISO 14001 environmental certificates/bn PPP$ GDP

ISO 14001 Environmental management systems – Number of certificates issued (per billion PPP$ GDP) | 2019

ISO 14001 specifies the requirements for an environmental management system that an organization can use to enhance its environmental performance. ISO 14001 is intended for use by an organization that is seeking to manage its environmental responsibilities in a systematic manner that contributes to the environmental pillar of sustainability. ISO 14001 helps an organization to achieve the intended outcomes of its environmental management system, providing value for the environment, the organization itself and interested parties. Consistent with the organization's environmental policy, the intended outcomes of an environmental management system include enhancement of environmental performance, fulfillment of compliance obligations and achievement of environmental objectives. ISO 14001 is applicable to any organization, regardless of size, type or nature, and applies to the environmental aspects of its activities, products and services that the organization determines it can either control or influence from a life cycle perspective. ISO 14001 does not state specific environmental performance criteria. It can be used in whole or in part to systematically improve environmental management. Claims of conformity to ISO 14001, however, are not acceptable unless all its requirements are incorporated into an organization's environmental management system and fulfilled without exclusion. The data are reported per billion PPP$ GDP.

Source: International Organization for Standardization, *ISO Survey of Certifications to Management System Standards*, 2019; International Monetary Fund, World Economic Outlook Database, October 2020. (https://www.iso.org/the-iso-survey.html; https://www.imf.org/en/Publications/SPROLLs/world-economic-outlook-databases).

4. Market sophistication

4.1. Credit

4.1.1. Ease of getting credit*

Ease of getting credit* | 2019

The ranking of economies on the ease of getting credit is determined by sorting their scores for getting credit.

These scores are the score for the sum of the strength of the legal rights index (range 0–12) and the depth of credit information index (range 0–8). The World Bank's *Doing Business* measures the legal rights of borrowers and lenders with respect to secured transactions through one set of indicators and the reporting of credit information through another. The first set of indicators measures whether certain features that facilitate lending exist within the applicable collateral and bankruptcy laws. The second set measures the coverage, scope and accessibility of credit information available through credit reporting service providers, such as credit bureaus or credit registries. Although *Doing Business* compiles data on getting credit for public registry coverage (% of adults) and for private bureau coverage (% of adults), these indicators are not included in the ranking.

Source: World Bank, *Doing Business 2020*, *Comparing Business Regulation in 190 Economies*. The World Bank has temporarily suspended its *Doing Business* data collection but it will be resumed at a later stage. (https://www.doingbusiness.org/en/reports/global-reports/doing-business-2020).

4.1.2. Domestic credit to private sector, % GDP

Domestic credit to private sector (% of GDP) | 2019

Domestic credit to private sector refers to financial resources provided to the private sector by financial corporations, such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries these claims include credit to public enterprises. The financial corporations include monetary authorities and deposit money banks, as well as other financial corporations where data are available (including corporations that do not allow transferable deposits but do accept such liabilities as time and savings deposits). Examples of other financial corporations are finance and leasing companies, money lenders, insurance corporations, pension funds and foreign exchange companies.

Source: International Monetary Fund, International Financial Statistics and data files; World Bank and OECD GDP estimates; extracted from the World Bank's World Development Indicators database (2010–19). (https://data.imf.org; http://data.worldbank.org).

4.1.3. Microfinance gross loans, % GDP

Microfinance institutions: Gross loan portfolio (% of GDP)[a] | 2018

Combined gross loan balances of microfinance institutions (current US$) in a country as a percentage of its GDP (current US$).

Source: Microfinance Information Exchange, MIX Market database; International Monetary Fund, World Economic Outlook Database, October 2020 (2011–19). (https://datacatalog.worldbank.org/dataset/mix-market; https://www.imf.org/external/pubs/ft/weo/2019/02/weodata/index.aspx).

4.2. Investment

4.2.1. Ease of protecting minority investors*

Ease of protecting minority investors* | 2019

This ranking is the sum of the scores for the extent of conflict of interest regulation index and the extent of shareholder governance index. The extent of conflict of interest regulation index measures the protection of shareholders against directors' misuse of corporate assets for personal gain by distinguishing three aspects of regulation that address conflicts of interest: (1) transparency of related-party transactions (extent of disclosure index); (2) shareholders' ability to sue and hold directors liable for self-dealing (extent of director liability index); (3) access to evidence and allocation of legal expenses in shareholder litigation (ease of shareholder suits index). The extent of shareholder governance index measures shareholders' rights in corporate governance by distinguishing three aspects of good governance: (1) shareholders' rights and role in major corporate decisions (extent of shareholder rights index); (2) governance safeguards protecting shareholders from undue board control and entrenchment (extent of ownership and control index); (3) corporate transparency on ownership stakes, compensation, audits and financial prospects (extent of corporate transparency index). The index also measures whether a subset of relevant rights and safeguards are available in limited companies. The data come from a questionnaire administered to corporate and securities lawyers and are based on securities regulations, company laws, civil procedure codes and court rules of evidence.

Source: World Bank, *Doing Business 2020*, *Comparing Business Regulation in 190 Economies*. The World Bank has temporarily suspended its *Doing Business* data collection but it will be resumed at a later date. (https://www.doingbusiness.org/en/reports/global-reports/doing-business-2020).

4.2.2. Market capitalization, % GDP
Market capitalization of listed domestic companies (% of GDP, three-year average) | 2019

Market capitalization (also known as "market value") is the share price times the number of shares outstanding (including their several classes) for listed domestic companies. Investment funds, unit trusts, and companies whose only business goal is to hold shares of other listed companies are excluded. Data are the average of the end-of-year values for the last three years.

Source: World Federation of Exchanges database; extracted from the World Bank's World Development Indicators database (2011–19). (https://www.world-exchanges.org/our-work/statistics; http://data.worldbank.org).

4.2.3. Venture capital investors, deals/bn PPP$ GDP
Number of venture capital deals invested in (per billion PPP$ GDP, three-year average) | 2020

Refinitiv Eikon data on private equity deals, per deal, with information on the location of the firm investing in a venture capital (VC) deal, among other details. The data extraction corresponds to a query on VC deals between January 1, 2018 and December 31, 2020, with the data aggregated by the location of the investing firm. The data represent the three-year average of 2018–20 deals invested in and are reported per billion PPP$ GDP.

Source: Refinitiv (a London Stock Exchange Group (LSEG) business) Eikon (private equity screener) accessed April 23, 2021; International Monetary Fund, World Economic Outlook Database, October 2020 (2018–20). (https://solutions.refinitiv.com/eikon-trading-software; https://www.imf.org/en/Publications/SPROLLs/world-economic-outlook-databases).

4.2.4. Venture capital recipients, deals/bn PPP$ GDP
Number of venture capital deals received (per billion PPP$ GDP, three-year average) | 2020

Refinitiv data on private equity deals, per deal, with information on the location of the firm receiving the VC investment, among other details. The data exraction corresponds to a query on VC deals between January 1, 2018 and December 31, 2020, with the data aggregated by the location invested in. The data represent the three-year average of 2018–20 deals received and are reported per billion PPP$ GDP.

Source: Refinitiv (an LSEG business) Eikon (private equity screener) accessed April 23, 2021; International Monetary Fund, World Economic Outlook Database October 2020 (2018–20). (https://solutions.refinitiv.com/eikon-trading-software; https://www.imf.org/en/Publications/SPROLLs/world-economic-outlook-databases).

4.3. Trade, diversification, and market scale

4.3.1. Applied tariff rate, weighted avg., %
Tariff rate, applied, weighted average, all products (%)[ab] | 2019

Weighted average applied tariff is the average of effectively applied rates weighted by the product import shares corresponding to each partner country. Data are classified using the Harmonized System of trade at the six- or eight-digit level. Tariff line data were matched to Standard International Trade Classification (SITC) revision 3 codes to define commodity groups and import weights. As far as possible, specific rates have been converted to their ad valorem equivalent rates and have been included in the calculation of weighted average tariffs. Effectively applied tariff rates at the six- and eight-digit product level are averaged for products in each commodity group. When the effectively applied rate is unavailable, the most favored nation rate is used instead.

Source: World Bank, based on data from United Nations Conference on Trade and Development's (UNCTAD) Trade Analysis Information System (TRAINS) database and the World Trade Organization's (WTO) Integrated Database (IDB) and Consolidated Tariff Schedules (CTS) Database; extracted from World Bank's World Development Indicators database (2013–19). (http://data.worldbank.org; https://www.wto.org).

4.3.2. Domestic industry diversification
Domestic industry diversification (based on manufacturing output)[b] | 2018

Herfindahl-Hirschman Index (HHI) for the domestic industry defined as the sum of the squared shares of sub-sectors in total manufacturing output. The HHI is a measure of concentration and can help to determine the extent to which a country's industrial system is diversified across different industrial sub-sectors (or, conversely, concentrated in a few industrial sub-sectors). In the context of measuring domestic industry diversification, the HHI is calculated by squaring the shares of individual

sub-sectors in total domestic manufacturing output and then summing the squares. A country with a perfectly diversified industrial system will have an index close to zero, whereas a country that is active in only one industrial sub-sector will have a value of one (least diversified). That is, the more diversified a country's industry is, the lower its HHI value will be.

Source: United Nations Industrial Development Organization (UNIDO), Industrial Statistics Database, two-digit level of International Standard Industrial Classification (ISIC) Revision 3 (INDSTAT 2 2021); EQUIP (Enhancing the Quality of Industrial Policies) *Tool 4: Diversification – Domestic and Export Dimensions*, 2015 (2011–19) (http://stat.unido.org; www.equip-project.org/wp-content/uploads/2015/08/EQuIP_Tool-4_V150821.pdf).

4.3.3. Domestic market scale, bn PPP$
Domestic market scale as measured by GDP, bn PPP$ | 2020

The domestic market size is measured by GDP based on the PPP valuation of country GDP, in current international dollars (billions).

Source: International Monetary Fund, World Economic Outlook Database, October 2020. (https://www.imf.org/en/Publications/SPROLLs/world-economic-outlook-databases).

5. Business sophistication

5.1. Knowledge workers

5.1.1. Knowledge-intensive employment, %
Employment in knowledge-intensive services (% of workforce) | 2019

Sum of people in categories 1 to 3 as a percentage of total people employed, according to the International Standard Classification of Occupations (ISCO). Categories included in ISCO-08 are: 1 Managers; 2 Professionals; 3 Technicians and Associate Professionals. Where ISCO-08 data were not available, ISCO-88 data were used. Categories included in ISCO-88 are: 1 Legislators, senior officials and managers; 2 Professionals; 3 Technicians and associate professionals.

Source: International Labour Organization (ILO), ILOSTAT Database of Labour Statistics (2010–20). (www.ilo.org/ilostat).

5.1.2. Firms offering formal training, %
Firms offering formal training (% of firms) | 2019

The percentage of firms offering formal training programs for their permanent, full-time employees in the sample of firms in the World Bank's Enterprise Survey in each country.

Source: World Bank, Enterprise Surveys (2010–20). (www.enterprisesurveys.org).

5.1.3. GERD performed by business, % GDP
GERD: Performed by business enterprise (% of total GDP) | 2019

Gross expenditure on R&D performed by business enterprise as a percentage of GDP. For the definition of GERD, see indicator 2.3.2.

Source: UNESCO Institute for Statistics (UIS) online database; Eurostat, Eurostat database; OECD, Main Science and Technology Indicators (MSTI) database, 2019 (2010–19). (http://data.uis.unesco.org; https://ec.europa.eu/eurostat/data/database; https://stats.oecd.org/Index.aspx?DataSet-Code=MSTI_PUB).

5.1.4. GERD financed by business, %
GERD financed by business enterprise (% of total GERD) | 2018

Gross expenditure on R&D financed by business enterprise as a percentage of total gross expenditure on R&D. For the definition of GERD, see indicator 2.3.2. Plurinational State of Bolivia and Burkina Faso use data for 2009.

Source: UNESCO Institute for Statistics (UIS) online database; Eurostat, Eurostat database; OECD, Main Science and Technology Indicators (MSTI) database, 2019 (2010–19). (http://data.uis.unesco.org; https://ec.europa.eu/eurostat/data/database; https://stats.oecd.org/Index.aspx?DataSet-Code=MSTI_PUB).

5.1.5. Females employed w/advanced degrees, %
Females employed with advanced degrees, % total employed (25+ years old)[a] | 2019

The percentage of females employed with advanced degrees out of total employed. The employed comprise all persons of working age who, during a specified brief period, were in one of the following categories: (1) paid employment; or (2) self-employment. Data are disaggregated by level of education, which refers to the highest level of education completed, classified according to the International Standard Classification of Education (ISCE). Data for Canada are based on Table 14-10-0020-01 of the country's Labour Force Survey estimates.

Source: International Labour Organization, ILOSTAT Database of Labour Statistics; Statistics Canada. Table 14-10-0020-01 Unemployment rate, participation rate and employment rate by educational attainment, annual, accessed February 10, 2020 (2011–20). (www.ilo.org/ilostat; https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410002001).

5.2. Innovation linkages

5.2.1. University–industry R&D collaboration†
The extent to which businesses and universities collaborate on R&D†[a] | 2020

Average answer to the survey question: In your country, to what extent do businesses and universities collaborate on research and development (R&D)? [1 = not at all; 7 = to a great extent]

Source: World Economic Forum, Executive Opinion Survey 2020 (2018–20), Appendix C of *The Global Competitiveness Report 2020*. (www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport2020.pdf).

5.2.2. State of cluster development and depth†
How widespread clusters are† | 2020

Average answer to the survey question: In your country, how widespread are well-developed and deep clusters (geographic concentrations of firms, suppliers, producers of related products and services, and specialized institutions in a particular field)? [1 = nonexistent; 7 = widespread in many fields].

Source: World Economic Forum, Executive Opinion Survey 2020 (2018–20), Appendix C of *The Global Competitiveness Report 2020*. (www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport2020.pdf).

5.2.3. GERD financed by abroad, % GDP
GERD financed by abroad (% of total GDP) | 2018

Percentage of gross expenditure on R&D financed by abroad (billions, national currency) – that is, with foreign financing as a percentage of GDP (billions, national currency). For the definition of GERD, see indicator 2.3.2.

Source: UNESCO Institute for Statistics (UIS) online database; Eurostat, Eurostat database; OECD, Main Science and Technology Indicators (MSTI) database, 2019 (2010–19). (http://data.uis.unesco.org; https://ec.europa.eu/eurostat/data/database; https://stats.oecd.org/Index.aspx?DataSet-Code=MSTI_PUB).

5.2.4. Joint venture/strategic alliance deals/bn PPP$ GDP
Number of joint venture/strategic alliance deals, fractional counting (per billion PPP$ GDP, three-year average) | 2020

Refinitiv's data on joint ventures/strategic alliances, per deal, with details on the country of origin of partner firms, among others. The data extraction corresponds to a query on joint venture/strategic alliance deals between January 1, 2018 and December 31, 2020. The nation of each company participating in a deal (*n* companies per deal) is allocated, per deal, a score equivalent to 1/*n* (with the effect that all country scores add up to the total number of deals). The data are reported per billion PPP$ GDP.

Source: Refinitive (an LSEG business) SDC Platinum database; International Monetary Fund World Economic Outlook Database, October 2020. (https://www.refinitiv.com/en/financial-data/deals-data/joint-venture-deals; https://www.imf.org/en/Publications/SPROLLs/world-economic-outlook-databases).

5.2.5. Patent families/bn PPP$ GDP
Number of patent families filed in at least two offices (per billion PPP$ GDP) | 2017

A patent family is a set of interrelated patent applications filed in one or more countries or jurisdictions to protect the same invention. Patent families containing applications filed in at least two

different offices is a subset of patent families where protection of the same invention is sought in at least two different countries. In this report, "patent families data" refers to patent families containing applications filed in at least two intellectual property (IP) offices; the data are scaled by PPP$ GDP (billions). A patent is a set of exclusive rights granted by law to applicants for inventions that are new, non-obvious and industrially applicable. A patent is valid for a limited period of time (generally 20 years) and within a defined territory. The patent system is designed to encourage innovation by providing innovators with time-limited exclusive legal rights, thus enabling them to reap the rewards of their innovative activity.

Source: World Intellectual Property Organization, Intellectual Property Statistics; International Monetary Fund, World Economic Outlook Database, October 2020. (www.wipo.int/ipstats; https://www.imf.org/en/Publications/SPROLLs/world-economic-outlook-databases).

5.3. Knowledge absorption

5.3.1. Intellectual property payments, % total trade

Charges for use of intellectual property, i.e., payments (%, total trade, three-year average) | 2019

Charges for the use of intellectual property not included elsewhere, i.e., payments (% of total trade), average of three most recent years or most recent. Value is calculated according to the Extended Balance of Payments Services Classification EBOPS 2010 – that is, code SH: Charges for the use of intellectual property not included elsewhere, as a percentage of total trade. Total trade is defined as the sum of total imports of code G goods and code SOX commercial services (excluding government goods and services not included elsewhere) plus total exports of code G goods and code SOX commercial services (excluding government goods and services not included elsewhere), divided by 2. According to the sixth edition of the International Monetary Fund's *Balance of Payments Manual*, the item "Goods" covers general merchandise, net exports of goods under merchanting and non-monetary gold. The "commercial services" category is defined as being equal to "services" minus "government goods and services not included elsewhere." Receipts are between residents and non-residents for the use of proprietary rights (such as patents, trademarks, copyrights, industrial processes and designs, including trade secrets and franchises), and for licenses to reproduce or distribute (or both) intellectual property embodied in produced originals or prototypes (such as copyrights on books and manuscripts, computer software, cinematographic works and sound recordings) and related rights (such as for live performances and television, cable or satellite broadcast).

Source: World Trade Organization, Trade in Commercial Services database, values based on the classification of the sixth (2009) edition of the International Monetary Fund's *Balance of Payments and International Investment Position Manual* and Balance of Payments database. (https://www.imf.org/external/pubs/ft/bop/2007/pdf/bpm6.pdf; www.oecd.org/std/its/EBOPS-2010.pdf).

5.3.2. High-tech imports, % total trade

High-tech imports (% of total trade) | 2019

High-technology imports as a percentage of total trade. High-technology exports and imports contain technical products with a high intensity of R&D, defined by the Eurostat classification, which is based on Standard International Trade Classification (SITC) Revision 4 and the OECD definition. Commodities belong to the following sectors: aerospace; computers and office machines; electronics – telecommunications; pharmacy; scientific instruments; electrical machinery; chemistry; non-electrical machinery; and armament.

Source: World Trade Organization, United Nations, Comtrade Database; Eurostat, *Annex 5: High-tech aggregation by SITC Rev. 4*, April 2009 (2015–19). (http://comtrade.un.org; http://ec.europa.eu/eurostat/cache/metadata/Annexes/htec_esms_an5.pdf).

5.3.3. ICT services imports, % total trade

Telecommunications, computer, and information services imports (% of total trade)[a] | 2019

Telecommunications, computer, and information services as a percentage of total trade according to the OECD's Extended Balance of Payments Services Classification EBOPS 2010, coded SI: Telecommunications, computer, and information services. For the definition of total trade, see indicator 5.3.1.

Source: World Trade Organization, Trade in Commercial Services database, values based on the classification of the sixth (2009) edition of the International Monetary Fund's *Balance of Payments and International Investment Position Manual* and Balance of Payments database. (https://www.imf.org/external/pubs/ft/bop/2007/pdf/bpm6.pdf; www.oecd.org/std/its/EBOPS-2010.pdf).

5.3.4. FDI net inflows, % GDP

Foreign direct investment (FDI), net inflows (% of GDP, three-year average)[a] | 2019

Foreign direct investment is the average of the most recent three years of net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This data series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors, and is divided by GDP.

Source: International Monetary Fund, International Financial Statistics and Balance of Payments databases, World Bank, International Debt Statistics, and World Bank and OECD GDP estimates; extracted from the World Bank's World Development Indicators database, 2019 (2018–19). (http://data.worldbank.org).

5.3.5. Research talent, % in businesses

Researchers in business enterprise (%) | 2019

Researchers in the business enterprise sector (measured in full-time equivalence, FTE) refers to researchers as professionals engaged in the conception or creation of new knowledge, products, processes, methods and systems, as well as in the management of these projects, broken down by the sectors in which they are employed (business enterprise, government, higher education and private non-profit organizations). In the context of R&D statistics, the business enterprise sector includes all firms, organizations and institutions whose primary activity is the market production of goods or services (other than higher education) for sale to the general public at an economically significant price, and the mainly private non-profit institutions serving them; the core of this sector is made up of private enterprises.

Source: UNESCO Institute for Statistics (UIS) online database; Eurostat; OECD, Main Science and Technology Indicators (MSTI) database, March 2021 (2010–19). (http://data.uis.unesco.org; https://ec.europa.eu/eurostat/data/database; https://stats.oecd.org/Index.aspx?DataSet-Code=MSTI_PUB).

6. Knowledge and technology outputs

6.1. Knowledge creation

6.1.1. Patents by origin/bn PPP$ GDP

Number of resident patent applications filed at a given national or regional patent office (per billion PPP$ GDP) | 2019

The definition of a patent can be found in the description of indicator 5.2.5. A resident patent application refers to an application filed with an IP office for or on behalf of the first-named applicant's country of residence. For example, an application filed with the Japan Patent Office by a resident of Japan is considered a resident application for Japan. Similarly, an application filed with the European Patent Office (EPO) by an applicant who resides in any of the EPO member states, for example Germany, is considered a resident application for that member state (Germany). Data are scaled by PPP$ GDP (billions).

Source: World Intellectual Property Organization, Intellectual Property Statistics; International Monetary Fund, World Economic Outlook Database, October 2020 (2010–19). (www.wipo.int/ipstats; https://www.imf.org/en/Publications/SPROLLs/world-economic-outlook-databases).

6.1.2. PCT patents by origin/bn PPP$ GDP

Number of Patent Cooperation Treaty applications (per billion PPP$ GDP)[a] | 2020

A PCT application refers to an international patent application filed through the WIPO-administered Patent Cooperation Treaty (PCT). The PCT system makes it possible to seek patent protection for an invention simultaneously in a number of countries by filing a single international patent application. The origin of PCT applications is defined by the residence of the first-named applicant. Data are available only for those economies which are PCT Contracting States (153 to date). Data are scaled by PPP$ GDP (billions).

Source: World Intellectual Property Organization, Intellectual Property Statistics; International Monetary Fund, World Economic Outlook Database, October 2020. (www.wipo.int/ipstats; https://www.imf.org/en/Publications/SPROLLs/world-economic-outlook-databases).

6.1.3. Utility models by origin/bn PPP$ GDP

Number of resident utility model applications filed at the national patent office (per billion PPP$ GDP) | 2019

A utility model (UM) is a special form of patent right. The terms and conditions for granting a UM are slightly different from those for patents and include a shorter term of protection and less stringent patentability requirements. A resident UM application refers to an application filed with an IP office for or on behalf of the first-named applicant's country of residence. For example, an application filed with the IP office of Germany by a resident of Germany is considered a resident application for Germany. Data are scaled by PPP$ GDP (billions).

Source: World Intellectual Property Organization, Intellectual Property Statistics; International Monetary Fund, World Economic Outlook Database, October 2020 (2010–19). (www.wipo.int/ipstats; https://www.imf.org/en/Publications/SPROLLs/world-economic-outlook-databases).

6.1.4. Scientific and technical articles/bn PPP$ GDP

Number of scientific and technical journal articles (per billion PPP$ GDP) | 2020

The number of articles published in science and technology. This encompasses 182 different research categories belonging to research areas including engineering, chemistry, physics, environmental sciences, computer science, mathematics, biochemistry, molecular biology, oncology, agriculture, cell biology and many more. Article counts are taken from a set of journals covered by the Science Citation Index Expanded (SCIE) and the Social Sciences Citation Index (SSCI). Articles are classified by year of publication and assigned to each economy on the basis of the institutional address(es) listed in the article.

Articles are counted on a count basis (rather than a fractional basis) – that is, for articles with collaborating institutions from multiple economies, each economy receives credit on the basis of its participating institutions. The data are reported per billion PPP$ GDP.

Source: Clarivate, Web of Science, accessed March 15, 2021; International Monetary Fund, *World Economic Outlook Database*, October 2020. (https://clarivate.com/webofsciencegroup/solutions/web-of-science; https://www.imf.org/en/Publications/SPROLLs/world-economic-outlook-databases).

6.1.5. Citable documents H-index

The H-index is the economy's number of published articles (H) that have received at least H citations | 2020

The H-index expresses the journal's number of articles (H) that have received at least H citations. It quantifies both journal scientific productivity and scientific impact, and is also applicable to scientists, journals, and so on. The H-index is tabulated from the number of citations received in subsequent years by articles published in a given year, divided by the number of articles published that year.

Source: SCImago (2021) SJR – SCImago Journal & Country Rank, retrieved March 2021. (www.scimagojr.com).

6.2. Knowledge impact

6.2.1. Labor productivity growth, %

Growth rate of GDP per person employed (%, three-year average) | 2020

Growth rate of real GDP per person employed, average of three most recent available years (2018, 2019, 2020). Growth of GDP per person engaged provides a measure of labor productivity (defined as output per unit of labor input). GDP per person employed is GDP divided by total employment in the economy.

Source: The Conference Board Total Economy Database™ Output, Labor and Labor Productivity, 1950–2020, April 2021 preliminary release. (https://www.conference-board.org/data/economydatabase).

6.2.2. New businesses/th pop. 15–64

New business density (new registrations per thousand population, 15–64 years old)[a] | 2018

Number of newly registered corporations per 1,000 persons of working-age (15–64 years old). The units of measurement are private, formal sector companies with limited liability. Data corrections relative to the 2016 survey were implemented by the World Bank for Panama.

Source: World Bank, *Doing Business 2020*, *Entrepreneurship Project* (2009–18). (https://www.doingbusiness.org/en/data/exploretopics/entrepreneurship).

6.2.3. Software spending, % GDP
Total computer software spending (% of GDP) | 2020

Computer software spending includes the total value of purchased or leased packaged software, such as operating systems, database systems, programming tools, utilities and applications. It excludes expenditures for internal software development and outsourced custom software development. The data are a combination of actual figures and estimates. Data are reported as a percentage of GDP.

Source: IHS Markit, Information and Communication Technology Database. (https://www.ihs.com/index.html).

6.2.4. ISO 9001 quality certificates/bn PPP$ GDP
ISO 9001 Quality management systems – number of certificates issued (per billion PPP$ GDP) | 2019

ISO 9001 specifies requirements for a quality management system when an organization needs to demonstrate its ability to provide products and services that meet both customer and applicable statutory and regulatory requirements. It aims to enhance customer satisfaction through the effective application of the system, including processes for improving the system and ensuring conformity to customer and applicable statutory and regulatory requirements. All the requirements of ISO 9001 are generic and are intended to be applicable to any organization, regardless of its type or size, or the products and services it provides. The data are reported per billion PPP$ GDP.

Source: International Organization for Standardization (ISO), *ISO Survey of Certifications to Management System Standards*, 2019; International Monetary Fund, World Economic Outlook database, October 2020. (https://www.iso.org/the-iso-survey.html; https://www.imf.org/en/ Publications/SPROLLs/world-economic-outlook-databases).

6.2.5. High-tech manufacturing, %
High-tech and medium-high-tech manufacturing (% of total manufacturing output) | 2018

High-technology and medium-high-technology output as a percentage of total manufacturing output, on the basis of the OECD classification of Technology Intensity Definition, itself based on International Standard Industrial Classification (ISIC) Revision 4 and ISIC Revision 3, and using data from the INDSTAT 2 database of the United Nations Industrial Development Organization (UNIDO).

Source: United Nations Industrial Development Organization (UNIDO), Industrial Statistics Database INDSTAT 2, 2020; OECD, Directorate for Science, Technology and Industry, Economic Analysis and Statistics Division, "ISIC Rev. 3 Technology Intensity Definition: Classification of Manufacturing Industries into Categories Based on R&D Intensities" (2010–18). (https://stat.unido.org; www.oecd.org/sti/ind/48350231.pdf).

6.3. Knowledge diffusion

6.3.1. Intellectual property receipts, % total trade
Charges for use of intellectual property, i.e., receipts (% total trade, three-year average)[a] | 2019

Charges for the use of intellectual property not included elsewhere, i.e. receipts (% of total trade), average of three most recent years or most recent. Value is calculated according to the Extended Balance of Payments Services Classification EBOPS 2010 – that is, code SH: Charges for the use of intellectual property not included elsewhere, as a percentage of total trade. Receipts are between residents and non-residents for the use of proprietary rights (such as patents, trademarks, copyrights, industrial processes and designs, including trade secrets and franchises), and for licenses to reproduce or distribute (or both) intellectual property embodied in produced originals or prototypes (such as copyrights on books and manuscripts, computer software, cinematographic works and sound recordings) and related rights (such as for live performances and television, cable, or satellite broadcast). For the definition of total trade, see indicator 5.3.1.

Source: World Trade Organization, Trade in Commercial Services database, values based on the classification of the sixth (2009) edition of the International Monetary Fund's *Balance of Payments and International Investment Position Manual* and Balance of Payments database (2010–19). (https://www.imf.org/external/pubs/ft/bop/2007/pdf/bpm6.pdf; www.oecd.org/std/its/EBOPS-2010.pdf).

6.3.2. Production and export complexity
The Economic Complexity Index[a] | 2018

The Economic Complexity Index is a ranking of countries based on the diversity and complexity of their export basket. High-complexity countries are home to a range of sophisticated, specialized capabilities and are therefore able to produce a highly diversified set of complex products. Determining the economic complexity of a country is not solely dependent on a country's productive knowledge. Information about how many capabilities the country has is contained not only in

the absolute number of products that it makes, but also in the ubiquity of those products (the number of countries that export the product) and in the sophistication and diversity of the products that those other countries make. Economic complexity expresses the diversity and sophistication of the productive capabilities embedded in the exports of each country.

Source: The Atlas of Economic Complexity, Growth Lab at Harvard University. (https://atlas.cid.harvard.edu).

6.3.3. High-tech exports, % total trade
High-tech exports (% of total trade) | 2019

High-technology exports as a percentage of total trade. See indicator 5.3.2 for details. Data for Hong Kong, China are corrected for re-exports using data from the Trade Data Monitor.

Source: World Trade Organization, United Nations, Comtrade database; Eurostat, *Annex 5: High-tech aggregation by SITC Rev. 4*, April 2009 (2015–19). (http://comtrade.un.org; https://ec.europa.eu/eurostat/cache/metadata/Annexes/htec_esms_an5.pdf).

6.3.4. ICT services exports, % total trade
Telecommunications, computer, and information services exports (% of total trade) | 2019

Telecommunications, computer, and information services as a percentage of total trade according to the Extended Balance of Payments Services Classification EBOPS 2010, coded SI: Telecommunications, computer, and information services.

Source: Source: World Trade Organization, Trade in Commercial Services database, values based on the classification of the sixth (2009) edition of the International Monetary Fund's *Balance of Payments and International Investment Position Manual* and Balance of Payments database (2019). (https://www.imf.org/external/pubs/ft/bop/2007/pdf/bpm6.pdf; www.oecd.org/std/its/EBOPS-2010.pdf).

7. Creative outputs

7.1. Intangible assets

7.1.1. Trademarks by origin/bn PPP$ GDP
Number of classes in resident trademark applications issued at a given national or regional office (per billion PPP$ GDP) | 2019

A trademark is a sign used by the owner of certain products or provider of certain services to distinguish them from the products or services of other companies. A trademark can consist of words or a combination of words and other elements, such as slogans, names, logos, figures and images, letters, numbers, sounds and moving images. The procedures for registering trademarks are governed by the legislation and procedures of national and regional IP offices. Trademark rights are limited to the jurisdiction of the IP office that registers the trademark. Trademarks can be registered by filing an application at the relevant national or regional office(s) or by filing an international application through the Madrid System. A resident trademark application refers to an application filed with an IP office for or on behalf of the first-named applicant's country of residence. For example, an application filed with the Japan Patent Office by a resident of Japan is considered to be a resident application for Japan. Similarly, an application filed with the Office for Harmonization in the Internal Market (OHIM) by an applicant who resides in any of the EU member states, such as France, is considered to be a resident application for that member state (France). This indicator is based on class count – the total number of goods and services classes specified in resident trademark applications. Data are scaled by PPP$ GDP (billions).

Source: World Intellectual Property Organization, Intellectual Property Statistics; International Monetary Fund, World Economic Outlook Database, October 2020 (2012–19). (www.wipo.int/ipstats; https://www.imf.org/en/Publications/SPROLLs/world-economic-outlook-databases).

7.1.2. Global brand value, top 5,000, % GDP
Global brand value of the top 5,000 brands (per billion PPP$ GDP) | 2020

Sum of global brand values, top 5,000 as a percentage of GDP. Brand Finance calculates brand value using the royalty relief methodology, which determines the value that a company would be willing to pay to license its brand if it did not own it. The methodology is compliant with industry standards set in ISO 10668. This approach involves estimating the future revenue attributable to a brand and calculating a royalty rate that would be

charged for the use of the brand. Brand Finance's study is based on publicly available information on the largest brands in the world. This indicator assesses the economy's brands in the top 5,000 global brand database and produces the sum of the brand values corresponding to that economy. This sum is then scaled by GDP. A score of 0 is assigned where there are no brands in the country that make the top 5,000 ranking. A score of n/a is assigned where Brand Finance has been unable to determine if there are brands from the country that would rank within the top 5,000 due to data availability limitations.

Source: Brand Finance database; International Monetary Fund, World Economic Outlook Database, October 2020. (https://brandirectory.com; https://brandfinance.com/knowledge-centre; https://www.imf.org/en/Publications/SPROLLs/world-economic-outlook-databases).

7.1.3. Industrial designs by origin/bn PPP$ GDP
Number of designs contained in resident industrial design applications filed at a given national or regional office (per billion PPP$ GDP)[a] | 2019

An industrial design is a set of exclusive rights granted by law to applicants to protect the ornamental or aesthetic aspect of their products. An industrial design is valid for a limited period of time and within a defined territory. A resident industrial design application refers to an application filed with the IP office for or on behalf of the applicant's country of residence. For example, an application filed with the Japan Patent Office by a resident of Japan is considered to be a resident application for Japan. Similarly, an application filed with the Office for Harmonization in the Internal Market (OHIM) by an applicant who resides in any of the OHIM member states, such as Italy, is considered to be a resident application for that member state (Italy). This indicator is based on design count – the total number of designs contained in the resident industrial design applications. Data are scaled by PPP$ GDP (billions).

Source: World Intellectual Property Organization, Intellectual Property Statistics; International Monetary Fund, World Economic Outlook Database, October 2020 (2014–19). (www.wipo.int/ipstats; https://www.imf.org/en/Publications/SPROLLs/world-economic-outlook-databases).

7.1.4. ICTs and organizational model creation†
Extent to which ICTs enable new organizational models† | 2018

Average answer to the question: In your country, to what extent do ICTs enable new organizational models (e.g., virtual teams, remote working, telecommuting) within companies? [1 = not at all; 7 = to a great extent]

Source: World Economic Forum, Executive Opinion Survey 2019. (www3.weforum.org/docs/WEF_GCR_2019_Appendix_B.pdf).

7.2. Creative goods and services

7.2.1. Cultural and creative services exports, % total trade
Cultural and creative services exports (% of total trade)[a] | 2019

Creative services exports as a percentage of total exports according to the Extended Balance of Payments Services Classification EBOPS 2010 – that is, EBOPS code SI3: Information services; code SJ22: Advertising, market research, and public opinion polling services; code SK1: Audio-visual and related services; and code SK23: Heritage and recreational services as a percentage of total trade. See indicator 5.3.1 for the full definition of total trade.

Source: World Trade Organization, Trade in Commercial Services database, values based on the classification of the sixth (2009) edition of the International Monetary Fund's *Balance of Payments and International Investment Position Manual* and Balance of Payments database (2011–19). (https://timeseries.wto.org; www.oecd.org/std/its/EBOPS-2010.pdf).

7.2.2. National feature films/mn pop. 15–69
Number of national feature films produced (per million population, 15–69 years old)[a] | 2017

A feature film is defined as a film with a running time of 60 minutes or longer. It includes works of fiction, animation and documentaries. It is intended for commercial exhibition in cinemas. Feature films produced exclusively for television broadcasting, as well as newsreels and advertising films, are excluded. Data are reported per million population aged 15–69 years old.

Source: UNESCO Institute for Statistics (UIS) online database; United Nations, Department of Economic and Social Affairs, Population Division, *World Population Prospects: The 2019 Revision* (population) (2010–17). (http://data.uis.unesco.org; https://population.un.org/wpp).

7.2.3. Entertainment and media market/th pop. 15–69
Global entertainment and media market (per thousand population, 15–69 years old)[a] | 2020

The Global Entertainment & Media Outlook (the Outlook) is a comprehensive source of global analyses and five-year forecasts of consumer and advertising spending across different territories and entertainment and media segments.

The E-sports dataset has been expanded with the addition of E-sports media rights, providing a richer picture of this fast-emerging market. A number of changes have also been made to the segmentation of the Outlook to better reflect the shape of the modern entertainment and media market. The Music and Radio segments have been merged, along with the new Podcasts data, to create the new Music, radio and podcasts segment, reflecting the growing interconnectedness of the audio entertainment market. Additionally, the Video games segment has been merged with E-sports to create the new Video games and e-sports segment, capturing the close relationship between the two markets.

The figures for Algeria, Bahrain, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, the Islamic Republic of Iran, Malta, Tunisia and Yemen were estimated from a total corresponding to Middle East and North Africa (MENA) countries using a breakdown of total GDP (current US$) for the above-mentioned countries to define referential percentages.

Source: Calculations were derived from PwC's *Global Entertainment and Media Outlook, 2020–2024*; United Nations, Department of Economic and Social Affairs, Population Division, *World Population Prospects: The 2019 Revision* (population); World Economic Outlook Database, October 2020 (current US$ GDP); Middle East & North Africa in the World Bank's DataBank. (www.pwc.com/outlook; https://population.un.org/wpp; https://www.imf.org/en/Publications/SPROLLs/world-economic-outlook-databases; http://data.worldbank.org/region/middle-east-and-north-africa).

7.2.4. Printing and other media, % manufacturing
Printing publications and other media output (% of manufacturing total output)[a] | 2018

Printing and reproduction of recorded media output (ISIC Revision 4 Division 18, group 181 with class 1811 and 1812 and group 182 with class 1820) as a percentage of total manufacturing output (ISIC Revision 4, section C). Where data for ISIC Revision 4 were not available, data from ISIC Revision 3 were used (ISIC Revision 3 group 222, classes 2221, 2222 and 2230).

Source: United Nations Industrial Development Organization, Industrial Statistics Database; four-digit level of International Standard Industrial Classification (ISIC) Revision 4 (INDSTAT 4 2020) and ISIC Revision 3 (2010–18). (https://stat.unido.org).

7.2.5. Creative goods exports, % total trade
Creative goods exports (% of total trade) | 2019

Total value of creative goods exports (current US$) over total trade. For the definition of total trade, see indicator 5.3.1.

Source: United Nations, Comtrade database; 2009 UNESCO Framework for Cultural Statistics, Table 3, *International trade of cultural goods and services defined with the Harmonised System (HS) 2007 codes*; World Trade Organization, Trade in Commercial Services database, itself based on the sixth (2009) edition of the International Monetary Fund's *Balance of Payments and International Investment Position Manual* and Balance of Payments database (2012–19). (http://comtrade.un.org; https://unstats.un.org/unsd/statcom/doc10/BG-FCS-E.pdf; https://www.wto.org/english/res_e/statis_e/tradeserv_stat_e.htm; https://www.oecd.org/sdd/its/EBOPS-2010.pdf).

7.3. Online creativity

7.3.1. Generic top-level domains (TLDs)/th pop. 15–69
Generic top-level domains (TLDs) (per thousand population, 15–69 years old) | 2020

A generic top-level domain (TLD) is one of the categories of TLDs maintained by the Internet Assigned Numbers Authority (IANA) for use on the Internet. Generic TLDs can be unrestricted (.com, .info, .net and .org) or restricted – that is, used on the basis of fulfilling eligibility criteria (.biz, .name and .pro). Of these, the statistic covers the five generic domains .biz, .info, .org, .net and .com. Generic domains .name and .pro, and sponsored domains (.arpa, .aero, .asia, .cat, .coop, .edu, .gov, .int, .jobs, .mil, .museum, .tel and .travel) are not included. Neither are country-code top-level domains (refer to indicator 7.3.2). The statistic represents the total number of registered domains (i.e., net totals by December 2020, existing domains + new registrations – expired domains). Data are collected on the basis of a 4 percent random sample of the total population of domains drawn from the root zone files (a complete listing of active domains) for each TLD. The geographic location of a domain is determined by the registration address for the domain name registrant that is returned from a whois query. These registration data are parsed by country and

postal code and then aggregated to any number of geographic levels, such as county, city or economy. The original hard data were scaled by thousand population, 15–69 years old. For confidentiality reasons, only normalized values are reported; while relative positions are preserved, magnitudes are not.

Source: ZookNIC Inc; United Nations, Department of Economic and Social Affairs, Population Division, *World Population Prospects: The 2019 Revision* (population). (www.zooknic.com; https://population.un.org/wpp).

7.3.2. Country-code TLDs/th pop. 15–69
Country-code top-level domains (TLDs) (per thousand population, 15–69 years old) | 2020

A country-code top-level domain (TLD) is one of the categories of TLDs maintained by the Internet Assigned Numbers Authority (IANA) for use on the Internet. Country-code TLDs are two-letter domains especially designated for a particular economy, country or autonomous territory. The statistic represents the total number of registered domains (i.e., net totals by December 2020, existing domains + new registrations – expired domains). Data are collected from the registry responsible for each country-code TLD and represent the total number of domain registrations in the country-code TLD. Each country-code TLD is assigned to the country with which it is associated rather than based on the registration address of the registrant. ZookNIC reports that, for the country-code TLDs it covers, 85–100 percent of domains are registered in the same country; the only exceptions are the country-code TLDs that have been licensed for worldwide commercial use. Data are reported per thousand population, 15–69 years old. For confidentiality reasons, only normalized values are reported; while relative positions are preserved, magnitudes are not.

Source: ZookNIC Inc; United Nations, Department of Economic and Social Affairs, Population Division, *World Population Prospects: The 2019 Revision* (population). (www.zooknic.com; https://population.un.org/wpp).

7.3.3. Wikipedia edits/mn pop. 15–69
Wikipedia yearly edits by country (per million population, 15–69 years old) | 2020

Data extracted from Wikimedia Foundation's internal data sources. For every country with more than 100,000 edit counts in 2020, the data from 2020 are used. Data are reported per million population, 15–69 years old. Data from China are treated as missing and classified as "n/a."

Source: Wikimedia Foundation; United Nations, Department of Economic and Social Affairs, Population Division. World Population Prospects: The 2019 Revision (population). (https://wikimediafoundation.org; https://esa.un.org/unpd/wpp).

7.3.4. Mobile app creation/bn PPP$ GDP
Global downloads of mobile apps (scaled by per billion PPP$ GDP) | 2020

Global downloads of mobile apps, by origin of the headquarters of the developer/firm, scaled by PPP$ GDP (billions). Global downloads are compiled by App Annie Intelligence, public data sources and the company's proprietary forecast model based on data from Google Play Store and iOS App Store in each country between January 1, 2020 and December 31, 2020. Since data for China are not available for Google Play Store and only for iOS App Store, data from China are treated as missing and classified as "n/a."

Source: App Annie Intelligence; International Monetary Fund, World Economic Outlook Database, October 2020 (2016–20). (https://www.appannie.com; https://www.imf.org/en/Publications/SPROLLs/world-economic-outlook-databases).

Appendix IV
Global Innovation Index science and technology cluster methodology

Since 2016 the Global Innovation Index (GII) has sought to identify Science and Technology (S&T) clusters using a bottom-up approach. This approach disregards administrative or political borders and instead pinpoints those geographical areas showing a high density of inventors and scientific authors. The resultant clusters often encompass several municipal districts, sub-federal states, and sometimes even two or more countries.

The same methodology used in previous editions of the GII was employed in the compilation of this year's list of the top 100 GII S&T clusters worldwide (Bergquist and Fink, 2020: 43–63). It comprised:

- selecting inventors listed in published patent applications under WIPO's Patent Cooperation Treaty (PCT) spanning the period 2015 to 2019;
- selecting authors listed in scientific publications in the Web of Science's Science Citation Index Expanded (SCIE) covering the same period;
- geocoding inventor and author addresses and then applying the density-based spatial clustering of applications with noise (DBSCAN) algorithm to the geocoded inventor and author points.

The WIPO PCT patent dataset consists of approximately 1.1 million patent applications published between 2015 and 2019 containing 3.2 million inventor addresses. For the SCIE, the dataset comprises 9.1 million articles published during the same period containing 27.7 million listed author addresses.

The geocoding of addresses for this report is as follows. PCT inventor addresses were geocoded using the Environmental Systems Research Institute (ESRI) ArcGIS World Geocoder service.[1] When the ESRI address matches proved either insufficiently accurate or ambiguous, the city name in the address string was extracted and matched using records in the city level dataset from the GeoNames Gazetteer database.[2] This latter database gives the geolocation of cities around the globe and contains 48,000 geocoded cities. This same city matching approach was applied to all SCIE author addresses.

Overall, 96.4% of inventor addresses were geocoded at either the city level or a more accurate level, while 95.5% of scientific author addresses were geocoded at the city level. Annex Table 5 provides a summary of the geocoding results for the top 20 countries, which together account for the majority of inventor and scientific author addresses. As shown in the table, the coverage of geocoded addresses across all 20 countries is typically above 95%, only falling below 90% in one instance.

Addresses were clustered by applying the DBSCAN algorithm. This algorithm requires pre-defined radius and density parameters. As in previous years, a radius of 15 km and a density of 4,500 was applied. Equal weight was given to inventors and authors by expressing data points as a share of total inventor and author addresses, respectively. Given that the number of scientific articles far exceeds the number of patents, cluster identification based on the raw data points would have resulted in clusters shaped predominantly by the scientific author landscape.

The result was an initial list of 227 clusters. After review, neighboring clusters were merged if the edge of a cluster was within 3–5 km of another and where the co-author/co-inventor relationships were higher than they were for any other relationship with any other cluster or non-cluster points. A total of 22 clusters met these criteria, mergers reducing the overall number of clusters identified to 216.[3]

The remaining 216 clusters were then put into rank by counting the number of patents and scientific articles in a given cluster. Numbers were aggregated utilizing fractional counting, where counts reflect the share of a patent's inventors and an article's authors present in a particular cluster. In addition, mirroring the equal weighting approach described above, fractional counts are relative to the total numbers of patents and scientific articles.

To produce an intensity ranking, the European Commission's Global Human Settlement Layer (GHSL) population distribution data were matched geographically to the top 100 clusters identified in the overall ranking. Just as with inventor/author geocoded locations, this population data allowed us to define the total population of a cluster using a bottom-up approach. We chose to delimit a cluster's area as being all the space within 0.05 degrees of each inventor/author location. Overlaying the resultant cluster polygons on top of the population data and aggregating all points which lay within the polygon gave a total population estimate for each cluster.[4] The clusters were then ranked by dividing the total S&T share by population.

Annex Table 3
Top 100 clusters, 2021

Cluster rank	Cluster name	Economy	Share of total PCT filings (%)	Share of total publications (%)	Total	Rank change
1	Tokyo–Yokohama	JP	10.78	1.61	12.40	0
2	Shenzhen–Hong Kong–Guangzhou	CN/HK	7.79	1.51	9.30	0
3	Beijing	CN	2.62	2.95	5.57	1
4	Seoul	KR	3.93	1.61	5.54	–1
5	San Jose–San Francisco, CA	US	3.69	1.03	4.72	0
6	Osaka–Kobe–Kyoto	JP	2.88	0.72	3.60	0
7	Boston–Cambridge, MA	US	1.44	1.47	2.91	0
8	Shanghai	CN	1.36	1.49	2.85	1
9	New York City, NY	US	1.11	1.54	2.66	–1
10	Paris	FR	1.26	1.02	2.28	0
11	San Diego, CA	US	1.77	0.38	2.15	0
12	Nagoya	JP	1.74	0.24	1.99	0
13	Washington, DC–Baltimore, MD	US	0.43	1.44	1.86	0
14	Los Angeles, CA	US	0.89	0.78	1.67	0
15	London	GB	0.42	1.21	1.63	0
16	Houston, TX	US	0.96	0.51	1.46	0
17	Seattle, WA	US	1.05	0.38	1.42	0
18	Nanjing	CN	0.21	1.07	1.28	3
19	Amsterdam–Rotterdam	NL	0.40	0.88	1.28	–1
20	Cologne	DE	0.73	0.53	1.26	–1
21	Hangzhou	CN	0.60	0.60	1.20	4
22	Daejeon	KR	0.87	0.29	1.16	0
23	Chicago, IL	US	0.50	0.64	1.14	–3
24	Munich	DE	0.74	0.36	1.09	–1
25	Wuhan	CN	0.24	0.82	1.05	4
26	Stuttgart	DE	0.82	0.21	1.03	0
27	Tel Aviv–Jerusalem	IL	0.66	0.35	1.01	–3
28	Taipei–Hsinchu	TW	0.29	0.69	0.97	–1
29	Singapore	SG	0.38	0.52	0.90	–1
30	Philadelphia, PA	US	0.31	0.58	0.89	1
31	Melbourne	AU	0.19	0.69	0.87	4
32	Moscow	RU	0.18	0.68	0.86	0
33	Xi'an	CN	0.08	0.77	0.86	7
34	Minneapolis, MN	US	0.58	0.27	0.85	–4
35	Stockholm	SE	0.54	0.31	0.84	–2
36	Eindhoven	BE/NL	0.76	0.07	0.83	–2
37	Sydney	AU	0.23	0.58	0.81	0
38	Raleigh, NC	US	0.27	0.54	0.80	–2
39	Chengdu	CN	0.15	0.62	0.77	8
40	Toronto, ON	CA	0.22	0.54	0.76	–1
41	Tehran	IR	0.02	0.74	0.75	2
42	Frankfurt Am Main	DE	0.47	0.28	0.75	–4
43	Brussels	BE	0.30	0.44	0.73	–2
44	Portland, OR	US	0.58	0.14	0.72	–2
45	Berlin	DE	0.31	0.40	0.71	–1
46	Madrid	ES	0.13	0.58	0.71	–1
47	Barcelona	ES	0.22	0.49	0.71	–1
48	Milan	IT	0.21	0.44	0.65	0
49	Istanbul	TR	0.28	0.36	0.64	2
50	Zürich	CH/DE	0.29	0.34	0.63	–1
51	Denver, CO	US	0.24	0.37	0.61	–1
52	Tianjin	CN	0.08	0.53	0.61	4
53	Qingdao	CN	0.28	0.32	0.60	16
54	Montréal, QC	CA	0.19	0.41	0.60	–2
55	Heidelberg–Mannheim	DE	0.36	0.23	0.59	–2
56	Copenhagen	DK	0.28	0.30	0.59	–2
57	Atlanta, GA	US	0.16	0.40	0.56	–2
58	Cambridge	GB	0.26	0.29	0.55	–1
59	Changsha	CN	0.06	0.48	0.54	7
60	Rome	IT	0.08	0.45	0.53	–2
61	Cincinnati, OH	US	0.37	0.15	0.52	–2
62	Bengaluru	IN	0.32	0.20	0.52	–2
63	Suzhou	CN	0.33	0.18	0.51	9
64	Delhi	IN	0.09	0.41	0.50	3
65	Dallas, TX	US	0.29	0.20	0.49	–3
66	São Paulo	BR	0.07	0.41	0.48	–5
67	Pittsburgh, PA	US	0.15	0.33	0.48	–3
68	Nuremberg–Erlangen	DE	0.33	0.14	0.47	–5
69	Chongqing	CN	0.09	0.38	0.47	8
70	Ann Arbor, MI	US	0.12	0.35	0.47	–5
71	Vienna	AT	0.14	0.30	0.44	–1
72	Oxford	GB	0.14	0.31	0.44	–1
73	Hefei	CN	0.07	0.37	0.44	6
74	Helsinki	FI	0.25	0.19	0.44	–6
75	Harbin	CN	0.02	0.40	0.42	5
76	Jinan	CN	0.07	0.34	0.41	6
77	Vancouver, BC	CA	0.13	0.27	0.41	–3
78	Lyon	FR	0.22	0.19	0.41	–2
79	Busan	KR	0.20	0.20	0.40	–4
80	Cleveland, OH	US	0.12	0.27	0.39	–7
81	Changchun	CN	0.02	0.37	0.39	6
82	Phoenix, AZ	US	0.23	0.16	0.39	–4
83	Hamamatsu	JP	0.33	0.04	0.37	2
84	Kanazawa	JP	0.32	0.05	0.37	7
85	Ottawa, ON	CA	0.18	0.19	0.37	–4
86	Brisbane	AU	0.11	0.25	0.36	–3
87	Bridgeport–New Haven, CT	US	0.12	0.24	0.36	–3
88	Austin, TX	US	0.20	0.15	0.35	–2
89	Ankara	TR	0.04	0.30	0.35	–1
90	Shenyang	CN	0.04	0.30	0.34	14
91	Hamburg	DE	0.17	0.17	0.34	–1
92	Lausanne	CH/FR	0.17	0.17	0.34	–3
93	Mumbai	IN	0.13	0.21	0.34	5
94	Lund–Malmö	SE	0.20	0.13	0.33	2
95	Manchester	GB	0.09	0.23	0.32	–2
96	St. Louis, MO	US	0.09	0.23	0.32	–2
97	Dalian	CN	0.06	0.26	0.32	13
98	Daegu	KR	0.16	0.16	0.32	3
99	Göteborg	SE	0.18	0.14	0.32	1
100	Warsaw	PL	0.04	0.28	0.32	–1

Source: WIPO Statistics Database, April 2021

Annex Table 4
Ranking of S&T intensity, 2015–2019

Intensity rank	Cluster name	Economy	PCT applications per capita[a]	Scientific publications per capita[a]	Total S&T share per capita[a]	Rank change
1	Cambridge	GB	6,051	54,840	1.27	0
2	Eindhoven	BE/NL	8,274	6,116	0.81	1
3	Ann Arbor, MI	US	2,137	49,399	0.80	2
4	Oxford	GB	2,899	54,032	0.79	–2
5	San Jose–San Francisco, CA	US	6,595	15,217	0.77	–1
6	Daejeon	KR	5,752	15,903	0.73	1
7	Boston–Cambridge, MA	US	3,898	32,690	0.72	–1
8	Seattle, WA	US	4,846	14,432	0.60	0
9	San Diego, CA	US	5,314	9,380	0.58	0
10	Raleigh, NC	US	1,850	30,887	0.52	1
11	Lund–Malmö	SE	3,551	19,940	0.50	–1
12	Kanazawa	JP	4,022	5,241	0.47	5
13	Munich	DE	3,210	12,759	0.44	2
14	Lausanne	CH/FR	2,756	21,535	0.44	–1
15	Stockholm	SE	3,042	14,369	0.42	–1
16	Göteborg	SE	2,425	16,374	0.38	0
17	Nuremberg–Erlangen	DE	2,762	9,619	0.38	2
18	Copenhagen	DK	1,929	17,279	0.38	2
19	Bridgeport–New Haven, CT	US	1,160	19,079	0.36	9
20	Pittsburgh, PA	US	1,146	21,186	0.36	2
21	Tokyo–Yokohama	JP	3,232	3,996	0.34	5
22	Portland, OR	US	3,031	6,022	0.34	–1
23	Helsinki	FI	2,240	14,230	0.33	–5
24	Ottawa, ON	CA	1,581	14,097	0.33	5
25	Zürich	CH/DE	1,710	16,534	0.33	–1
26	Stuttgart	DE	2,905	6,066	0.33	1
27	Hamamatsu	JP	2,891	2,780	0.32	5
28	Minneapolis, MN	US	2,462	9,426	0.31	–5
29	Washington, DC–Baltimore, MD	US	748	20,741	0.31	6
30	Heidelberg–Mannheim	DE	1,980	10,513	0.31	0
31	Cleveland, OH	US	958	17,401	0.29	2
32	Houston, TX	US	1,973	8,679	0.29	–1
33	Beijing	CN	1,442	13,441	0.29	3
34	Cincinnati, OH	US	2,227	7,612	0.28	0
35	Seoul	KR	1,920	6,502	0.25	2
36	Atlanta, GA	US	667	14,332	0.24	6
37	Nagoya	JP	2,162	2,513	0.23	2
38	Melbourne	AU	515	15,468	0.23	13
39	Sydney	AU	710	14,631	0.23	2
40	Osaka–Kobe–Kyoto	JP	1,956	4,037	0.23	7
41	Frankfurt Am Main	DE	1,439	7,006	0.22	8
42	St. Louis, MO	US	714	15,481	0.22	–2
43	Philadelphia, PA	US	806	12,710	0.22	5
44	Lyon	FR	1,305	9,074	0.22	2
45	Vancouver, BC	CA	776	13,157	0.22	–1
46	Denver, CO	US	932	11,651	0.21	–3
47	Brisbane	AU	611	11,857	0.21	8
48	Paris	FR	1,241	8,323	0.21	4
49	Chicago, IL	US	1,003	10,678	0.21	1
50	Austin, TX	US	1,443	8,939	0.20	–12
51	Shenzhen–Hong Kong–Guangzhou	CN/HK	1,759	2,818	0.19	6
52	Amsterdam–Rotterdam	NL	643	11,700	0.19	2
53	Nanjing	CN	320	13,467	0.18	13
54	Toronto, ON	CA	529	11,038	0.18	8
55	Berlin	DE	870	9,124	0.18	1
56	Vienna	AT	675	12,195	0.18	–3
57	Montréal, QC	CA	599	10,774	0.18	3
58	London	GB	499	11,827	0.18	0
59	New York City, NY	US	777	8,907	0.17	2
60	Brussels	BE	783	9,549	0.17	–1
61	Hangzhou	CN	907	7,524	0.17	7
62	Milan	IT	537	9,324	0.16	5
63	Barcelona	ES	549	9,970	0.16	1
64	Tel Aviv–Jerusalem	IL	1,130	4,980	0.16	–1
65	Rome	IT	248	12,266	0.15	0
66	Xi'an	CN	152	11,490	0.15	11
67	Los Angeles, CA	US	810	5,887	0.14	3
68	Cologne	DE	874	5,215	0.14	4
69	Phoenix, AZ	US	904	5,005	0.14	2
70	Qingdao	CN	691	6,541	0.14	14
71	Wuhan	CN	317	8,991	0.14	10
72	Dallas, TX	US	844	4,749	0.13	1
73	Changsha	CN	158	11,127	0.13	5
74	Singapore	SG	587	6,557	0.13	0
75	Hamburg	DE	780	6,471	0.13	–6
76	Madrid	ES	260	9,245	0.13	–1
77	Warsaw	PL	177	10,150	0.12	–1
78	Daegu	KR	690	5,622	0.12	n.a.
79	Changchun	CN	70	9,587	0.12	4
80	Tehran	IR	28	9,414	0.11	5
81	Shanghai	CN	595	5,388	0.11	1
82	Busan	KR	612	5,120	0.11	–3
83	Jinan	CN	205	8,349	0.11	3
84	Manchester	GB	340	7,375	0.11	–4
85	Harbin	CN	41	8,451	0.09	4
86	Hefei	CN	171	7,776	0.09	1
87	Taipei–Hsinchu	TW	288	5,731	0.09	1
88	Dalian	CN	203	6,895	0.09	n.a.
89	Chongqing	CN	166	6,098	0.09	4
90	Chengdu	CN	165	5,812	0.08	4
91	Suzhou	CN	594	2,771	0.08	0
92	Tianjin	CN	110	6,018	0.08	0
93	Moscow	RU	147	4,591	0.07	2
94	Ankara	TR	108	6,088	0.07	–4
95	Shenyang	CN	81	5,042	0.06	n.a.
96	Bengaluru	IN	288	1,469	0.04	1
97	Istanbul	TR	205	2,210	0.04	–1
98	São Paulo	BR	41	2,006	0.03	0
99	Delhi	IN	39	1,506	0.02	0
100	Mumbai	IN	68	942	0.01	0

Source: WIPO Statistics Database, April 2021.

Notes: [a] Per capita figures refer to 1,000,000 of population.
n.a. indicates not applicable.

Annex Table 5
Summary of geocoding results

	Scientific publications			PCT applications				
Country	Number of addresses	City-level address accuracy (%)	Publications covered (%)	Number of addresses	Block-level address accuracy (%)	Sub-city level address accuracy (%)	City-level address accuracy (%)	Applications covered (%)
United States of America	6,182,602	96.88	98.16	854,454	94.42	5.29	0.14	99.87
China	4,055,364	98.86	99.40	552,389	86.81	0.06	8.53	95.47
Japan	1,155,048	92.06	95.38	566,043	31.60	27.42	39.11	98.51
Germany	1,324,151	97.36	98.19	262,762	97.45	0.50	1.70	99.81
Republic of Korea	765,479	94.63	96.95	231,499	0.08	0.96	79.62	87.33
United Kingdom	1,347,330	96.64	97.74	81,471	69.54	20.72	8.27	98.61
France	1,068,353	92.93	95.09	107,038	88.02	1.65	6.08	96.67
Italy	1,053,749	95.60	97.05	41,973	89.28	5.09	4.83	99.30
India	692,442	91.19	93.66	39,998	33.29	48.56	16.28	98.47
Canada	854,790	98.37	98.99	41,732	96.80	2.56	0.50	99.79
Spain	804,686	96.84	98.07	26,229	77.23	10.76	11.22	99.40
Australia	815,110	85.97	89.98	20,479	92	4.98	2.37	99.46
Netherlands	494,358	97.38	98.50	50,950	85.84	0.34	13.53	99.73
Brazil	614,712	98.60	99.55	9,423	83.13	11.50	4.76	99.65
Sweden	287,747	97.63	98.18	42,930	94.30	0.80	4.52	99.68
Russian Federation	370,048	98.96	99.24	14083	88.35	5.28	5.25	99.50
Switzerland	318,693	90.68	92.40	36,586	90.90	2.36	3.60	97.92
Turkey	376,436	96.35	96.71	14,422	38.02	47.74	11.51	97.55
Iran (Islamic Republic of)	396,857	97.15	98.35	774	0.39	2.58	92.51	94.68
Israel	152,955	91.04	95.38	29,351	58.76	3.32	29.55	95.78

Source: WIPO Statistics Database, April 2021.

Note: Listed are the top 20 countries with the highest combined shares of scientific articles and patents. PCT inventor addresses were geocoded to the highest level of detail. Due to the far larger volume of scientific author addresses, these were geocoded only to city level. DEA is Data Envelopment Analysis.

Notes

1 ESRI ArcGIS World Geocoder service. https://www.esri.com/en-us/arcgis/products/arcgis-world-geocoder.

2 GeoNames. http://geonames.org.

3 The mergers were: Guangzhaou with Shenzhen–Hong Kong; Hsinchu with Taipei; Matsudo with Tokyo–Yokohama; Jureselem with Tel Aviv; Istanbul Europe with Istanbul Asia; Rotterdam with Amsterdam; Irvine with Los Angeles; Boulder with Denver; Worcester with Boston–Cambridge; Dortmund with Cologne; Baltimore with Washington DC.

4 See Bergquist and Fink (2020: 61–63) for a more detailed description of how population data was matched to clusters: https://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2020.pdf.

Reference

K. Bergquist and C. Fink (2020). The top 100 science and technology clusters. In Dutta, S., B. Lanvin and S. Wunsch-Vincent (eds), *The Global Innovation Index 2020: Who Will Finance Innovation?* Ithaca, NY, Fontainebleau, and Geneva: Cornell University, INSEAD, and WIPO.

The Global Innovation Index 2021

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