Global Innovation Index 2024

Unlocking the Promise of Social Entrepreneurship

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Global Innovation Index 2024

Unlocking the Promise of Social Entrepreneurship

17th Edition

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

Editors

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Suggested citation: World Intellectual Property Organization (WIPO) (2024). *Global Innovation Index 2024: Unlocking the Promise of Social Entrepreneurship*. Geneva: WIPO. 10.34667/tind.50062

Cover: Getty Images / Floriana, SeventyFour

First published 2024

World Intellectual Property Organization 34, chemin des Colombettes, P.O. Box 18 CH-1211 Geneva 20, Switzerland

ISBN: 978-92-805-3680-5 (print)
ISBN: 978-92-805-3681-2(online)

ISSN: 2263-3693 (print)
ISSN: 2788-6972 (online)

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Foreword

Photo: WIPO / Emmanuel Berrod

Welcome to the 17th edition of WIPO's flagship *Global Innovation Index* (GII), our guide to the innovative performance of 133 countries, as well as the world's top 100 science and technology clusters. This year's special theme, *Unlocking the Promise of Social Entrepreneurship*, explores the link between innovation and social enterprises, and the impact this delivers for our world.

Looking at the global landscape in 2023, we find cloudy skies and gloomy weather. Following boom years between 2020 and 2022, R&D expenditures decelerated, the number of scientific publications fell, and venture capital investments returned to pre-pandemic levels, including in Africa and Latin America. If tighter financial conditions persist, this will hinder needed innovation investments in the near term.

Amidst these gray clouds and headwinds, we can see some rays of light. New innovation in Digital and Deep Science – highlighted in GII 2022 – continue to power progress, with significant developments in areas like genome sequencing, computer power, and electric batteries.

There are also improvements in what we term the socio-economic impact of innovation, with positive trends in key indicators, including a decline in global poverty and rises in labor productivity and life expectancy.In terms of rankings, we see that the top spots have remained quite stable. I think this reflects the fact that innovation ecosystems take time to build and those that already have strong foundations in place are reaping the benefits.

But we are seeing a continued trend of strong progress from emerging economies. Indonesia, Mauritius, Saudi Arabia, Qatar and Brazil have climbed the most in the GII over the past five years, with China, India, Iran, Morocco, the Philippines and Türkiye the highest risers over the past 10 years. A further 19 economies, primarily in Sub-Saharan Africa and Southeast Asia, are outperforming their development levels in innovation.

While these trends are promising, many of these innovation ecosystems still require careful nurturing. WIPO will continue to support countries at all stages of development to seize opportunities for entrepreneurship and innovation-driven growth.

The GII tends to be centered around innovation for economic growth and development. We have broadened our scope this year and chosen the theme of social innovation. Estimates suggest there are up to 11 million social enterprises and 30 million social entrepreneurs globally, contributing around USD 2 trillion to global GDP. Often these organizations are at the forefront of addressing critical issues like poverty, environmental sustainability, and social injustice.

Despite their undeniable impact, social enterprises have often been on the margins of traditional innovation models and policies. This 2024 GII edition brings the topic to center stage, highlighting the state of social entrepreneurship globally and offering policy recommendations to unlock the sector's innovation potential.

We hope that these insights, alongside the GII's wealth of data and analysis, serve as a powerful tool for pro-innovation policymaking globally and the continued development of strong, dynamic innovation ecosystems in all parts of the world.

Daren Tang
Director General
World Intellectual Property Organization (WIPO)

Acknowledgments

The *Global Innovation Index 2024* 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, Davide Bonaglia, Oriol Gisbert Martí, Anmol Kaur Grewal (all GII Fellows), Lorena Rivera León, Economist, and Jeff Slee, Data Scientist, from the WIPO Composite Indicator Research Section responsible for the GII, and William Becker, consultant in a personal capacity.

Soumitra Dutta (Oxford University and Portulans Institute), Bruno Lanvin (International Institute for Management Development, IMD 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 to GII elaboration or dissemination: Kyle Bergquist, Ryan Lamb, Bruno Le Feuvre and Hao Zhou, all 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 WIPO's External Offices.

A special thank you goes to our partners at the Portulans Institute; in particular, Rafael Escalona Reynoso, Mariam Chaduneli and Sylvie Antal for their contributions. We also thank the GII's Advisory Committee, the GII Industry Association Network, Academic Network and the GII Data Collaborators for their participation, as well as the Competence Centre on Composite Indicators and Scoreboards (COIN) team from the European Commission's Joint Research Centre – led my Michaela Saisana – that conducted the statistical audit. The report was edited by Richard Cook, Andy Platts and James Cooke at Book Now Ltd. The GII interactive data website was developed by Pere Rovira and Víctor Pascual at OneTandem.

We are grateful to the following individuals and institutions for collaborating with data requests, and without whom the Index would not be what it is:

AlpInvest: Peter Corneliu

BloombergNEF: Evelina Stoikou

Brand Finance: Areeb Arshad, Annie Brown, Artur Bryzghalov, David Haigh, Bethany Johnson, Thulith Perera and Binuri Ranasinghe

CB Insights: Matthew Rados and Aaron Winkler

Centre for Science and Technology Studies (CWTS), Leiden University: Robert Tijssen and Alfredo Yegros

Clarivate Analytics: Joseph Brightbill and Uwe Wendland

data.ai (a Sensor Tower Company): Donny Kristianto and Lexi Sydow

Energy Institute: Ian Jones, Ololade Osifala and Sneha Thomas

European Commission Joint Research Centre: Jaime Lagüera González, Panagiotis Ravanos, Michaela Saisana, Oscar Smallenbroek and Carlos Tacao Moura from COIN; and Elisabeth Nindl

GitHub: Peter Cihon, Mike Linksvayer and Kevin Xu

Global Entrepreneurship Monitor (GEM): Niels Bosma, Alicia Coduras and Aileen Ionescu-Somers

Growth Lab at Harvard University: Sebastian Bustos, Timothy Paul Cheston and Annie White

Harvard Business School (HBS): Josh Lerner

International Atomic Energy Agency (IAEA): Mauro Carrara and Egor Titovich

International Energy Agency (IEA): Aidan Kennedy, Taylor Morrison and Roberta Quadrelli

International Federation of Robotics (IFR): Susanne Bieller and Nina Kutzbach

International Labour Organization (ILO): Horacio Barría, Roger Gomis, Steven Kapsos and Yves Perardel

International Monetary Fund (IMF): Andrea Quevedo and Kazuko Shirono

International Organization for Standardization (ISO): Laurent Charlet and Cristina Draghici

International Telecommunication Union (ITU): Nehal Desai, Thierry Geiger, Esperanza Magpantay, Nathan Menthon, Martin Schaaper and Daniel Vertesy

IQVIA institute for Human Data Science: Murray Aitken

LSEG Data & Analytics

LUISS Guido Carli University: Cecilia Jona-Lasinio

Moody's Analytics: Renato Ferrigno, Kirill Katschura, Santhosh Metri and Sasha Uvarova

NASA Goddard Institute for Space Studies (NASA GISS): Reto Ruedy

National Institutes of Health: Kris Wetterstrand

Omdia: David Hancock

Organisation for Economic Co-operation and Development (OECD): Fernando Galindo-Rueda, Tue Halgreen, Corinne Heckmann, Miyako Ikeda, Simon Normandeau and Fabien Verger

PricewaterhouseCoopers (PwC): Kamlesh Balasubramanian and Shreeta Sen

QS Quacquarelli Symonds Ltd: Andrew MacFarlane and Samuel Wong

Red de Indicadores de Ciencia y Tecnología (RICYT): Rodolfo Barrere and Laura Trama

S&P Global Market Intelligence: Mohsen Bonakdarpour and Karen Campbell

SCImago: Félix de Moya Anegón

Statistical Office of the European Communities (Eurostat): Malgorzata Stadnik

Statistics Netherlands: Klaas De Vries

The Conference Board: Dana Peterson and Markus Schomer

Trade Data Monitor LLC: C. Donald Brasher Jr., John Miller, Maria Vretenicic and Altan Yurdakul

TU Wien: Karl Rupp

UNESCO Institute for Statistics (UIS): Adolfo Gustavo Imhof, Olivier Labé, Patrick Montjouridès, Rohan Pathirage and José Pessoa

United Nations Industrial Development Organization (UNIDO): Fernando Cantú Bazaldua and Vladimir Lukic

United Nations International Children's Emergency Fund (UNICEF): Tom Slaymaker

United Nations Population Division: Patrick Gerland

United Nations Public Administration Network

World Bank: Jean-François Arvis, Tony Fujs, Aart Kraay, Hiroko Maeda, Eric Roland Metreau, Frederic Meunier, Florina Pirlea, Jorge Luis Rodriguez Meza and Christina Wiederer

World Economic Forum: Roberto Crotti, Philipp Grosskurth, Ricky Li and Vesselina Stefanova Ratcheva

World Federation of Exchanges: Mihaela Croitoru

World Health Organization (WHO): Richard Johnston

World Trade Organization (WTO): Shradha Bhatia, Barbara Carmelina D'Andrea Adrian, Yu Dayong, Florian Eberth, Monia Snoussi-Mimouni, Janvier Usanase and Ying Yan

Yale University: Sebastián Block

ZookNIC Inc: Matthew Zook

Advisory Committee

Since 2011, the Advisory Committee has been guiding the strategic trajectory of the Global Innovation Index (GII). The Committee's purpose is to underscore the significance of innovation in both economic and social progress and to facilitate the dissemination of GII findings across every economy and region the world over. Consisting of a diverse array of international policymakers, thought leaders and corporate executives, members of the Advisory Committee are chosen from a variety of geographical and institutional contexts and make their contribution in an individual capacity. We extend our gratitude to all members of the Advisory Committee for their ongoing dedication and cooperation.

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The Global Innovation Index Industry Association Network (GIIIAN) is made up of well-established organizations representing a dynamic consortia of firms and private sector entities, all dedicated to advancing innovation. Building on 15 years of robust support from the GII's Corporate Network, this initiative has been rebranded as GIIIAN in 2024. Currently comprising three associations, the number of network partners will be continually expanded over time. Companies in the Network lead in innovation and competitiveness across sectors, nations and regions, offering invaluable insights into the best ways of measuring and fostering innovation. They partner with WIPO to co-organize GII events and promote the GII's mission to enhance innovation measurement and growth.

Brazilian National Confederation of Industry (CNI)
Antonio Ricardo Alvarez Alban, President

Confederation of Indian Industry (CII)
Chandrajit Banerjee, Director General

International Chamber of Commerce (ICC)
Philippe Varin, Chair

Academic Network

Established in 2011, the GII Academic Network facilitates collaboration between leading global universities, their students and faculty members to conduct research and disseminate findings related to the Global Innovation Index (GII). Hosted by the Portulans Institute, this network currently comprises 12 institutions which play a crucial role in advancing academic discourse and knowledge exchange within the innovation domain. We express our sincere gratitude to all partners in the GII Academic Network for their invaluable contribution and support.

Brazil: University of São Paulo (USP), School of Economics, Management, Accounting and Actuarial Sciences; Moacir de Miranda Oliveira Júnior, Full Professor, Business Administration Department

China: Peking University, Office of Science and Technology Development; Weihao Yao, Director

Colombia: Universidad de los Andes, School of Management; Veneta Stefanova Andonova Zuleta, Associate Professor, and Carolina Dávila Aranda, International Office Director

Egypt: The American University in Cairo (AUC), School of Business; Sherif Kamel, Dean, and Nagla Rizk, Professor and Director, Access to Knowledge for Development Center

France: Institut Européen d'Administration des Affaires (INSEAD), Bruno Lanvin, Distinguished Fellow

Mexico: EGADE Business School at Tecnológico de Monterrey,Horacio Arredondo, Dean, and José Ernesto Amorós, Professor and Research Group Leader, Entrepreneurship & Innovation

Nigeria: Lagos Business School (LBS) Pan-Atlantic University, Chris Ogbechie, Dean, and Olayinka David-West, Associate Dean

Russian Federation: National Research University Higher School of Economics (HSE University),Institute for Statistical Studies and Economics of Knowledge; Leonid Gokhberg, First Vice-Rector and Director

South Africa: University of Johannesburg, College of Business and Economics, Erika Kraemer-Mbula, Professor of Economics

United Kingdom: University of Oxford, Saïd Business School, Soumitra Dutta, Dean

United States of America: Cornell SC Johnson College of Business, Ravi Kanbur, Professor, Charles H. Dyson School of Applied Economics and Management

Viet Nam: VinUniversity, Phan Thi Thuc Anh, Associate Vice Provost

The GII Partners

Preface

The goal of the Global Innovation Index (GII) is to be a holistic and flexible measure of the innovation happening all around the world today. To achieve this goal, the GII needs to go beyond capturing technological breakthroughs. It has also to account for the pioneering business models and social innovations driving positive change.

The 2024 edition of the GII focuses on social entrepreneurship, a model gaining prominence for its role in spearheading innovation aimed at addressing critical societal challenges. In recent years, an increasing cohort of entrepreneurs has embarked upon ventures that not only strive to achieve meaningful social impact, but also to be sustainable through market-based mechanisms. This innovative paradigm presents novel solutions in domains where traditional commercial enterprises have failed.

When executed aptly, social entrepreneurship promises shared value across communities and nations, facilitating the type of multidimensional value creation able to harmonize societal advancement with financial sustainability. Yet, despite its burgeoning significance, social entrepreneurship remains relatively unexplored within the traditional spheres of innovation research.

With this in mind, this 2024 edition of the GII sets out to provide an evidence-based foundation for advancing our understanding of social entrepreneurship as a significant driver of innovation. Rigorous research is now needed into how to cultivate an environment able to unleash the full innovation potential of social entrepreneurship. As co-editors of the GII, we remain committed to precise data and analytical rigor – principles with immense value that have been the cornerstone of the GII since its inception – and are proud to mobilize in order to cast additional light on the promising linkages between social entrepreneurship and innovation.

Developing comprehensive insights into the socioeconomic implications of social entrepreneurship empowers stakeholders to make informed decisions and implement strategic initiatives with a long-term impact, rather than resorting to sporadic actions yielding only anecdotal and short-lived effects. Within this context, the GII has a pivotal role to play as a catalyst for progress within both the public and private sectors. By objectively evaluating policies, initiatives, and the ecosystems that foster innovation, the GII can be instrumental in helping shape an informed landscape of global innovation practices, including social entrepreneurship.

Published annually by the World Intellectual Property Organization (WIPO), the GII has consolidated its position as the world's leading benchmark study of innovation. This authoritative report is enriched by valuable insights drawn from Academic Network partners across 13 countries that further contribute to the GII's status as the world's leading innovation study.

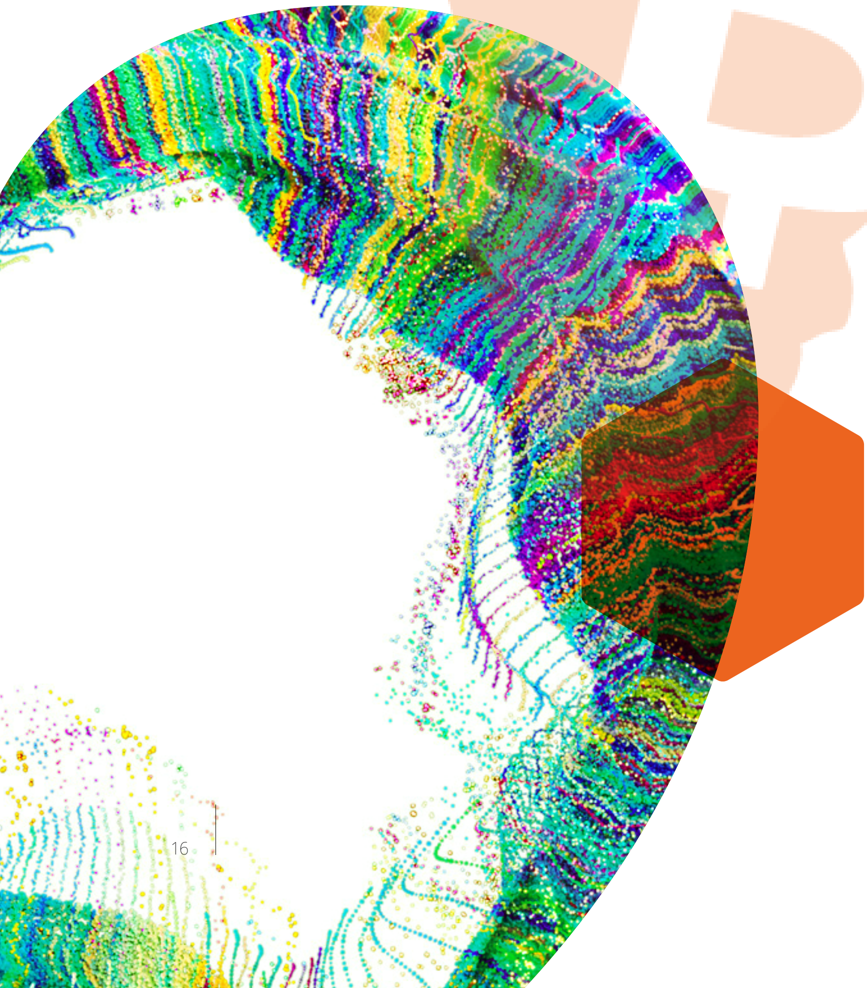
With steadfast support from the leadership at WIPO, including Director General Daren Tang and Assistant Director General Marco Alemán, the dedicated team behind the GII continues in its effort to advance the quantification of innovation's crucial role as an engine for sustainable and inclusive development. It is our hope that the 2024 edition of the GII will prove to be a seminal contribution in highlighting the significant potential of social entrepreneurship as a powerful catalyst for innovation and for global good.

Soumitra Dutta
Founder and co-editor of the *Global Innovation Index*
Co-founder of the Portulans Institute

Bruno Lanvin
Co-editor of the *Global Innovation Index*
Co-founder of the Portulans Institute

GII 2024 at a glance

The Global Innovation Index 2024 captures the innovation ecosystem performance of 133 economies and tracks the most recent global innovation trends.



Global leaders in innovation, 2024

Top three innovation economies by region

Latin America and the Caribbean
1 Brazil
2 Chile
3 Mexico

Sub-Saharan Africa*
1 South Africa
2 Botswana
3 Senegal

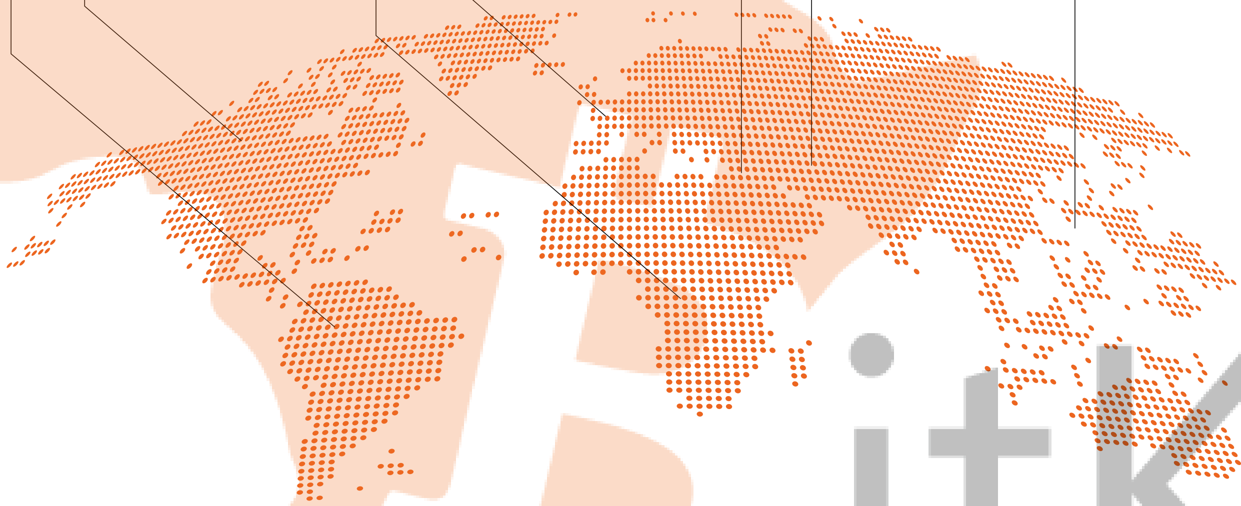
Northern Africa and Western Asia†
1 Israel
2 United Arab Emirates
3 Türkiye

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

Northern America
1 United States
2 Canada

Europe
1 Switzerland
2 Sweden
3 United Kingdom

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



Top three innovation economies by income group

High-income
1 Switzerland
2 Sweden
3 United States

Upper middle-income
1 China
2 Malaysia
3 Türkiye ☆

Lower middle-income
1 India
2 Viet Nam
3 Philippines ☆

Low-income ^
1 Rwanda
2 Togo
3 Uganda ☆

☆ Indicates a new entrant into the top three in 2024.

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

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

^ Top three in the Low-income group – excluding island economies. The top four in the low-income group, including all economies are as follows: Rwanda (1st), Madagascar (2nd), Togo (3rd) and Uganda (4th).

Notes: World Bank Income Group Classification (July 2023). Year-on-year changes in GII rank are influenced by performance and methodological considerations (see Appendix I).

Source: Global Innovation Index Database, WIPO, 2024.

Global Innovation Index 2024 rankings

GII rank	Economy	Score	Income group rank	Region rank
1	Switzerland	67.5	1	1
2	Sweden	64.5	2	2
3	United States of America	62.4	3	1
4	Singapore	61.2	4	1
5	United Kingdom	61.0	5	3
6	Republic of Korea	60.9	6	2
7	Finland	59.4	7	4
8	Netherlands (Kingdom of the)	58.8	8	5
9	Germany	58.1	9	6
10	Denmark	57.1	10	7
11	China	56.3	1	3
12	France	55.4	11	8
13	Japan	54.1	12	4
14	Canada	52.9	13	2
15	Israel	52.7	14	1
16	Estonia	52.3	15	9
17	Austria	50.3	16	10
18	Hong Kong, China	50.1	17	5
19	Ireland	50.0	18	11
20	Luxembourg	49.1	19	12
21	Norway	49.1	19	12
22	Iceland	48.5	21	14
23	Australia	48.1	22	6
24	Belgium	47.7	23	15
25	New Zealand	45.9	24	7
26	Italy	45.3	25	16
27	Cyprus	45.1	26	2
28	Spain	44.9	27	17
29	Malta	44.8	28	18
30	Czech Republic	44.0	29	19
31	Portugal	43.7	30	20
32	United Arab Emirates	42.8	31	3
33	Malaysia	40.5	2	8
34	Slovenia	40.2	32	21
35	Lithuania	40.1	33	22
36	Hungary	39.6	34	23
37	Türkiye	39.0	3	4
38	Bulgaria	38.5	4	24
39	India	38.3	1	1
40	Poland	37.0	35	25
41	Thailand	36.9	5	9
42	Latvia	36.4	36	26
43	Croatia	36.3	37	27
44	Viet Nam	36.2	2	10
45	Greece	36.2	38	28
46	Slovakia	34.3	39	29
47	Saudi Arabia	33.9	40	5
48	Romania	33.4	41	30
49	Qatar	32.9	42	6
50	Brazil	32.7	6	1
51	Chile	32.6	43	2
52	Serbia	32.3	7	31
53	Philippines	31.1	3	11
54	Indonesia	30.6	8	12
55	Mauritius	30.6	8	1
56	Mexico	30.4	10	3
57	Georgia	30.4	10	7
58	North Macedonia	29.9	12	32
59	Russian Federation	29.7	13	33
60	Ukraine	29.5	4	34
61	Colombia	29.2	14	4
62	Uruguay	29.1	44	5
63	Armenia	29.0	15	8
64	Iran (Islamic Republic of)	28.9	5	2
65	Montenegro	28.9	16	35
66	Morocco	28.8	6	9
67	Mongolia	28.7	7	13
68	Republic of Moldova	28.7	17	36
69	South Africa	28.3	18	2
70	Costa Rica	28.3	18	6
71	Kuwait	28.1	45	10
72	Bahrain	27.6	46	11
73	Jordan	27.5	8	12
74	Oman	27.1	47	13
75	Peru	26.7	20	7
76	Argentina	26.4	21	8
77	Barbados	26.1	48	9
78	Kazakhstan	25.7	22	3
79	Jamaica	25.7	22	10
80	Bosnia and Herzegovina	25.5	24	37
81	Tunisia	25.4	9	14
82	Panama	24.7	49	11
83	Uzbekistan	24.7	10	4
84	Albania	24.5	25	38
85	Belarus	24.2	26	39
86	Egypt	23.7	11	15
87	Botswana	23.1	27	3
88	Brunei Darussalam	22.8	50	14
89	Sri Lanka	22.6	12	5
90	Cabo Verde	22.3	13	4
91	Pakistan	22.0	14	6
92	Senegal	22.0	14	5
93	Paraguay	21.9	28	12
94	Lebanon	21.5	16	16
95	Azerbaijan	21.3	29	17
96	Kenya	21.0	17	6
97	Dominican Republic	20.8	30	13
98	El Salvador	20.6	31	14
99	Kyrgyzstan	20.4	18	7
100	Bolivia (Plurinational State of)	20.2	19	15
101	Ghana	20.0	20	7
102	Namibia	20.0	32	7
103	Cambodia	19.9	21	15
104	Rwanda	19.7	1	9
105	Ecuador	19.3	33	16
106	Bangladesh	19.1	22	8
107	Tajikistan	18.6	23	9
108	Trinidad and Tobago	18.4	51	17
109	Nepal	18.1	24	10
110	Madagascar	17.9	2	10
111	Lao People's Democratic Republic	17.8	25	16
112	Côte d'Ivoire	17.5	26	11
113	Nigeria	17.1	27	12
114	Honduras	16.7	28	18
115	Algeria	16.2	29	18
116	Zambia	15.7	30	13
117	Togo	15.6	3	14
118	Zimbabwe	15.6	31	14
119	Benin	15.4	32	16
120	United Republic of Tanzania	15.3	33	17
121	Uganda	14.9	4	18
122	Guatemala	14.6	34	19
123	Cameroon	14.4	34	19
124	Nicaragua	14.0	35	20
125	Myanmar	13.8	36	17
126	Mauritania	13.2	37	20
127	Burundi	13.2	5	20
128	Mozambique	13.1	6	22
129	Burkina Faso	12.8	7	23
130	Ethiopia	12.3	8	24
131	Mali	11.8	9	25
132	Niger	11.2	10	26
133	Angola	10.2	38	27

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

Source: Global Innovation Index Database, WIPO, 2024.

Innovation performance at different income levels, 2024

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

Source: Global Innovation Index Database, WIPO, 2024.

Key takeaways

What is the current state of global innovation? Is innovation accelerating or slowing down? How is innovation coping in the face of higher interest rates and geopolitical conflicts?

Results of the Global Innovation Tracker 2024

The Global Innovation Tracker 2024 provides a comprehensive analysis of the current state of global innovation. Findings highlight progress as well as challenges across four key stages of the innovation cycle: science and innovation investment, technological progress, technology adoption, and the socioeconomic impact of innovation.

1. Innovation investments witnessed a major downturn in 2023, a reversal of the 2020–2022 boom

Following a boom between 2020 and 2022, science and innovation investment experienced a significant downturn in 2023 (see the Global Innovation Tracker Dashboard).

Global Innovation Tracker Dashboard

Science and innovation investment

	Scientific publications	R&D investments: Global total	R&D investments: Top corporate R&D spenders	Venture capital: Deal numbers	Venture capital: Deal values	International patent filings
Short term	−5.3% 2022 → 2023	5% 2021 → 2022 2.9%* 2022 → 2023	6.1%* 2022 → 2023	−9.5% 2022 → 2023	−39.7% 2022 → 2023	−1.8% 2022 → 2023

Technological progress

	Computing power: Moore's Law	Computing power: Green supercomputers	Costs of renewable energy: Solar photovoltaic	Costs of renewable energy: Wind	Electric battery price	Cost of genome sequencing	Drug approvals
Short term	60.0% 2021 → 2023	13.6% 2022 → 2023	−3.9% 2021 → 2022	−3.5% 2021 → 2022	−13.7% 2022 → 2023	−8.1%* 2021 → 2023	9.5% 2022 → 2023

Technology adoption

	Safe sanitation	Connectivity: Fixed broadband	Connectivity: 5G	Robots	Electric vehicles	Cancer radiotherapy
Short term	1.4% 2021 → 2022	4.5% 2022 → 2023	22.6% 2022 → 2023	12.2% 2021 → 2022	53.8% 2022 → 2023	2.7% 2022 → 2023

Socioeconomic impact

	Labor productivity	Poverty	Life expectancy	Global warming
Short term	1% 2022 → 2023	−5% 2021 → 2022	0.9% 2021 → 2022	+1.17°C 2023

Notes: See the Data notes at the end of this section for a definition of the indicators and their data sources. Long-term annual growth refers to the compound annual growth rate(CAGR) over the indicated period. Historic data may have been updated and might differ from last year's Global Innovation Tracker. Figures are rounded. Estimates or incomplete data are indicated by an asterisk (*). n.a. indicates not available. Short-term rates for Moore's Law and the Cost of genome sequencing refer to the CAGR between 2021 and 2023.

Source: Global Innovation Index Database, WIPO, 2024.

- Scientific publications dropped by 5 percent in 2023, following growth rates above 8 percent annually in 2020 and 2021, and a slowdown in 2022.
- Global R&D grew at a rate of 5 percent in 2022 – slightly down from 2021 – but is projected to slow to about 3 percent in 2023 (all in real terms).
- Worldwide, R&D expenditure by the highest R&D-spending corporations grew by around 6 percent in real terms in 2023, below the long-term growth rate for the last 6 years (around 8 percent) and down strongly from peaks of 10 to 13 percent between 2019–2021, and also from pre-pandemic growth rates (all in real terms).
- Venture capital (VC) and scientific publications have declined sharply back to pre-pandemic levels, with a pronounced impact on emerging regions such as Latin America and Africa. Reflecting a deteriorating climate for risk finance, the value of VC investments has been falling from the exceptionally high levels of 2021, with a 36 percent drop in 2022 followed by a further 39 percent drop in 2023. The number of VC deals has also decreased, experiencing a downturn of 9.5 percent in 2023.
- International patent filings – which had stagnated since 2021 – saw a decline of 1.8 percent in 2023, marking the first such decline since 2009.

Looking forward, while some central banks have started cutting interest rates, tighter conditions for innovation finance might continue to weigh on innovation investment in the near term.

2. Technology continues to progress rapidly, technology adoption is growing, and the socioeconomic impact of innovation has mostly turned positive again. However, green technology and environmental indicators have either been progressing more slowly than before or have declined.

- **Technological progress** remained strong in 2023, particularly in health-related fields such as genome sequencing, as well as computing power and electric batteries. However, the rate of progress in green technologies lagged behind average growth for the decade, highlighting the challenge in reducing supercomputers' energy consumption and a slower reduction in renewable energy prices.
- **Technology adoption** increased across all indicators in 2023, especially in 5G, robotics, and electric vehicles. Overall penetration levels have increased compared to a decade ago, but there are exceptions, for example, the rate of adoption of safe sanitation has also significantly slowed.
- In terms of the **socioeconomic impact of innovation**, the situation is starting to look more positive again. Many indicators have returned to growth relative to what was reported in the 2023 GII edition, but some have yet to return to pre-pandemic levels.

  - Labor productivity has seen an increase, albeit at a rate below the average for the past decade.
  - Significant progress has been made in reducing poverty, with the number of people in extreme poverty in 2022 being half what is was in 2005. However, levels of poverty are still higher than those recorded in 2018.
  - Life expectancy saw a rise in 2022, but nonetheless remains at 2015 levels.
  - On environmental impact, though, the world is falling behind. Carbon emissions are growing once again after a temporary COVID-19 hiatus. 2023 was the hottest year on record, underlining the need for urgent and effective climate action.

Results of the Global Innovation Index 2024 rankings

3. Switzerland, Sweden, the United States, Singapore, and the United Kingdom lead the GII 2024; China, Türkiye, India, Viet Nam, the Philippines, Indonesia, the Islamic Republic of Iran and Morocco are the middle-income economies that have climbed the fastest in the GII ranking since 2013.

- Switzerland ranks first in the GII for the 14th consecutive year. Sweden and the United States (US) maintain 2nd and 3rd positions, respectively. Singapore (4th) moves further into the top 5, followed by the United Kingdom (UK) (5th).
- China – still the only middle-income economy within the GII top 30 – moves up the ranking to edge closer to the top 10, reaching 11th position.

- Japan remains firm in 13th – a position it has held since 2021.
- Canada rises up the rankings to 14th position, its best rank since 2014, and representing a comeback.
- Ireland (19th) and Luxembourg (20th) enter the top 20, climbing three ranks and one rank, respectively.
- Australia (23rd) and New Zealand (25th) continue moving ahead within and, respectively, towards the top 25.
- European Union (EU) economies the Czech Republic (30th) enters, and Cyprus (27th) and Spain (28th) move up within the top 30, while Poland (40th) enters the top 40.
- There are only four other middle-income economies, apart from China, among the top 40 economies, namely, Malaysia (33rd), Türkiye (37th), Bulgaria (38th), and India (39th). However, Thailand (41st) and Viet Nam (44th) move closer too.
- Brazil (50th) remains in the top 50 in 2024.
- Saudi Arabia (47th) and Qatar (49th) continue climbing up in the top 50; the two economies in the Middle East that have moved up the rankings this year.
- The Philippines (53rd) and Indonesia (54th) move closer to the top 50, with Indonesia making one of the strongest GII upward spurts recorded over the last three years.
- Morocco (66th) in Northern Africa and Western Asia moves ahead in the top 70.
- Beyond the top 100, Tajikistan (107th), Algeria (115th) and Burundi (127th) have progressed the most in the rankings.
- In the last five years, Indonesia, Mauritius (55th), Saudi Arabia, Qatar, Brazil and Pakistan (91st) have climbed most in the GII, in terms of rank progression.
- China, India, Indonesia, the Islamic Republic of Iran (64th), the Philippines, Türkiye, Viet Nam and Morocco are the middle-income economies within the GII top 70 that have climbed the most in the GII ranking since 2013.

4. Singapore, the United States and China score best in particular innovation indicators

- Singapore takes the lead in 2024 in terms of number of GII innovation indicators for which it ranks top globally, ranking 1st in the world on 14 out of 78 indicators.
- The United States (9 out of 78 indicators) and China (8 out of 78) follow.
- Select middle- and low-income economies excelled in various domains. Relative to GDP, trade or population, the Plurinational State of Bolivia, Cambodia and Nepal, for example, rank 1st in Loans from microfinance institutions, Malaysia in Graduates in science and engineering, and Mexico in Creative goods exports. Relatively, Morocco leads in Industrial designs, the Islamic Republic of Iran in Trademarks, and Namibia in Expenditure on education.

5. The regional GII leaders in innovation are Switzerland, the United States, Brazil, India, Singapore, Israel, and Mauritius; India and Rwanda continue to lead their income groups. Türkiye and the Philippines are newcomers to the top 3 for their income group.

- In the South East Asia, East Asia and Oceania (SEAO) regions, Singapore, the Republic of Korea (6th) and China (11th) lead. Four additional SEAO economies are world innovation leaders ranking in the top 25, namely, Japan (13th), Hong Kong, China (18th), Australia (23rd) and New Zealand (25th).
- In Northern Africa and Western Asia, Israel (15th) leads the region and is followed by Cyprus (27th), the United Arab Emirates (32nd) and Türkiye (37th). Eight economies within the region move up the ranking. Saudi Arabia (47th) and Qatar (49th) each move ahead one spot to consolidate themselves in the top 50. Georgia moves up to 57th place, entering the top 60, while Armenia (63rd) enters and Morocco (66th) consolidates its position in the top 70.
- In Latin America and the Caribbean, the regional top three remains unchanged: Brazil (50th) maintains top position, followed by Chile (51st, up by one rank) and Mexico (56th, up by two ranks).
- Seven additional economies within the region also improved their ranking: Colombia (61st) – one of the largest jumps in the region, matched only by Paraguay (93rd), Uruguay (62nd), Costa Rica (70th), Peru (75th), Panama (82nd) and Honduras (114th).
- In Central and Southern Asia, India continues to lead, moving one place forward to 39th position, the Islamic Republic of Iran (64th), Kazakhstan (78th) and Uzbekistan (83rd) come next. In addition to India and Kazakhstan, three additional economies within the region go up in the ranking: Sri Lanka (89th), Kyrgyzstan (99th) and Tajikistan (107th).

- In Sub-Saharan Africa, Mauritius (55th) is followed by South Africa (69th), Botswana (87th), Cabo Verde (90th) and Senegal (92nd). Kenya (96th) gains four places in the ranking, consolidating its position within the top 100. Zambia (116th), Benin (119th), Mauritania (126th), and Burundi (127th) also move up the GII ranking.
- In the GII 2024, Türkiye enters the top 3 for the upper middle-income group, behind China and Malaysia (33rd).
- India leads the lower middle-income group, followed by Viet Nam (44th) and the Philippines (53rd) – a newcomer to this income group's top 3.
- Rwanda (104th) leads the low-income group, followed by Madagascar (110th), Togo (117th) and Uganda (121st).

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

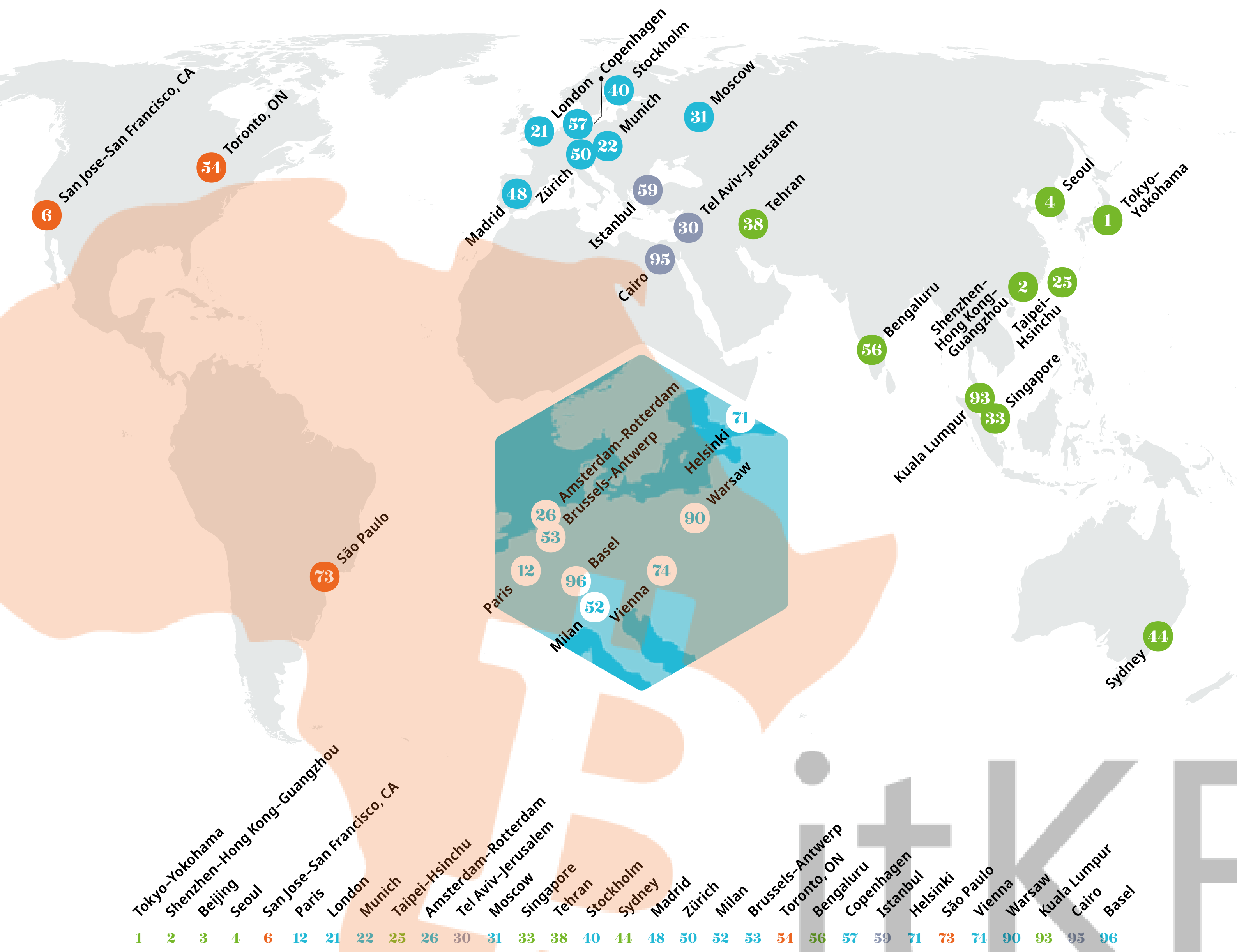
- In the GII 2024, 19 economies outperform on innovation relative to their level of development, the majority still located in Sub-Saharan Africa and South East Asia, East Asia, and Oceania.
- India, the Republic of Moldova (68th), and Viet Nam continue to lead as the longest-standing innovation overperformers, for a 14thconsecutive year.
- Indonesia, Pakistan, and Uzbekistan maintain their overperformer status for a third consecutive year, and Brazil for a fourth.
- Conversely, 41 economies are performing below expectation on innovation, the majority from Latin America and the Caribbean and Sub-Saharan Africa.

Results of the global top 100 S&T cluster rankings

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

- Tokyo–Yokohama (Japan) continues to lead, followed by Shenzhen–Hong Kong–Guangzhou (China and Hong Kong, China), Beijing (China), Seoul (Republic of Korea) and Shanghai–Suzhou (China).
- China, for a second consecutive year, leads with the most clusters (26) in the top 100. The United States follows, with 20 clusters, then Germany with eight.
- São Paulo (Brazil); newcomer Cairo (Egypt); Bengaluru, Delhi, Chennai and Mumbai (India); Tehran (Islamic Republic of Iran); Kuala Lumpur and Singapore; Istanbul and Ankara (Türkiye); and Moscow (Russian Federation) are the only middle-income economy clusters outside of China.
- Cambridge in the United Kingdom and San Jose–San Francisco, CA, in the United States are the two most S&T-intensive clusters relative to population density. Eindhoven (Kingdom of the Netherlands), Oxford (United Kingdom) and Boston–Cambridge, MA (United States) follow. In the Republic of Korea, Daejeon ranks the seventh most S&T-intensive cluster and is the only Asian cluster in the top 10 by intensity. Munich (Germany) maintains its rank as the 10th most S&T-intensive cluster globally.
- The GII 2024 identifies the top African S&T clusters within Africa beyond the global top 100. Egypt has the most clusters (11), followed by South Africa (8), Morocco (5), Nigeria (4), Tunisia (4), Ethiopia (2), Ghana (2) and Kenya (1) , with others following. These clusters are strong in scientific publications but weaker in international patenting, thus they continue to be more science rather than full-blown S&T clusters.

Top S&T cluster by economy or cross-boarder region ranked among the top 100, 2024



Note: Circles with dotted borders indicate the number of total clusters in that economy, for economies with three or more top 100 S&T clusters.

Source: Global Innovation Index Database, WIPO, 2024.

Results of the Special theme – Unlocking the promise of social entrepreneurship

8. This year's special GII theme looks to the future of social entrepreneurship and asks: What will it take for social entrepreneurship to catalyze transformative innovation and societal impact?

- The special theme "Unlocking the promise of social entrepreneurship" emphasizes the rise and significance of social entrepreneurship as a global phenomenon aimed at addressing critical social and environmental issues through innovative business models. Social entrepreneurs aim to develop and fund solutions that address societal challenges while generating revenue within the confines of a market economy.
- This approach has gained momentum among young inventors and innovators seeking to align their work with positive social change, especially in areas overlooked by traditional businesses and governments.

- Current estimates suggest there are between 10 and 11 million social enterprises and up to 30 million social entrepreneurs globally, contributing roughly USD 2 trillion to global GDP.
- Social enterprises tackle various issues that include poverty, environmental sustainability and social injustice. For instance, Bandhu Tech in India provides housing for migrant workers using an AI-enhanced platform; Green Bio Energy in Uganda produces eco-friendly briquettes; Peek Vision offers mobile eye-health services in low-resource settings; Thaki refurbishes laptops for refugee education; and in India the Community Design Agency involves low-income communities in housing projects.
- Despite their impact made by these enterprises, traditional innovation models and policies have largely ignored such community-based ventures.
- Social entrepreneurship operates within diverse definitions and legal frameworks, reflecting the regional histories and policy environments in which they exist. These enterprises often face competing demands between social impact and financial success, beneficiaries and investors, and long-term systemic change versus short-term survival. However, such tensions also serve to drive their innovation potential, by combining aspects of the social sector and the market.
- Social enterprises create impact through various pathways, including customer-focused models that provide essential services to underserved populations, employee-focused models that hire and train marginalized individuals, product/service-focused models that develop sustainable products, and ecosystem-focused models that mobilize diverse stakeholders in order to effect systemic change. Examples include SOIL in Haiti, which provides sanitation services; iKure in India, offering primary health care through a hub-and-spoke model; Eco Femme in India, producing reusable menstrual pads; and WeRobotics in Switzerland, which connects local drone and AI experts with global organizations.
- Innovation in social entrepreneurship often involves process and product innovations tailored to fit local contexts, emphasizing collaboration and open-source strategies. Intellectual property (IP) activity varies, with some enterprises securing patents and trademarks.
- The report identifies several barriers to social entrepreneurship, including limited legal frameworks, financing challenges, and inadequate impact measurement.
- Policy recommendations include developing supportive legal and regulatory environments, investing in education and training programs, promoting data collection, assisting social entrepreneurs in reaching underserved communities, incubating social enterprise networks, and creating incentives for private investment. Public and private sector collaboration is crucial for addressing these barriers and unlocking the full potential of social entrepreneurship.
- At the same time, the onus for action and change is not only on the actors that surround social entrepreneurs. There is also scope for social entrepreneurs themselves to more actively drive innovation in their ventures. To some extent, this is a matter of social entrepreneurs recognizing the critical role that innovation plays and directing their attention toward key activities such as R&D, process innovation, and patenting and trademarking. But it also involves social entrepreneurs taking concrete actions to embed their enterprises in existing innovation ecosystems. They can do this, by tapping existing sources of scientific and technological knowledge, as well as venture capital, R&D tax credits, and other innovation finance tools, and by collaborating with universities, public research organizations and other entrepreneurs.
- Ultimately, social entrepreneurship offers a transformative approach to tackling global challenges, by merging business innovation with social goals. By investing in supportive policies, infrastructure and financing, it is possible to create an environment where social enterprises thrive, driving sustainable development and creating lasting positive impacts on a global scale.
- Innovation policy needs to be better designed to support social entrepreneurship, which requires a focus on institutional frameworks, human capital, infrastructure, networks, financing, and measurement. The 2024 edition of the GII addresses these gaps by highlighting the state of social entrepreneurship globally and the role of innovation in creating positive impacts, and offers policy recommendations for unlocking the sector's potential.

Global Innovation Tracker

What is the current state of innovation? How rapidly is technology progressing and being embraced? What are the resulting societal impacts?

Global Innovation Tracker Dashboard

Science and innovation investment

	Scientific publications	R&D investments: Global total	R&D investments: Top corporate R&D spenders	Venture capital: Deal numbers	Venture capital: Deal values	International patent filings
Short term	−5.3% 2022 → 2023	5% 2021 → 2022 2.9%* 2022 → 2023	6.1%* 2022 → 2023	−9.5% 2022 → 2023	−39.7% 2022 → 2023	−1.8% 2022 → 2023
Long term (annual growth)	3.9% 2013 → 2023	5.1% 2012 → 2022	9.7%* 2017 → 2023	9.7% 2013 → 2023	13.8% 2013 → 2023	2.9% 2013 → 2023

Technological progress

	Computing power: Moore's Law	Computing power: Green supercomputers	Costs of renewable energy: Solar photovoltaic	Costs of renewable energy: Wind	Electric battery price	Cost of genome sequencing	Drug approvals
Short term	60.0% 2021 → 2023	13.6% 2022 → 2023	−3.9% 2021 → 2022	−3.5% 2021 → 2022	−13.7% 2022 → 2023	−8.1%* 2021 → 2023	9.5% 2022 → 2023
Long term (annual growth)	42.3% 2013 → 2023	30.6% 2013 → 2023	−15.0% 2012 → 2022	−9.1% 2012 → 2022	−15.8% 2013 → 2023	−20.1%* 2013 → 2023	3.7% 2013 → 2023

Technology adoption

	Safe sanitation	Connectivity: Fixed broadband	Connectivity: 5G	Robots	Electric vehicles	Cancer radiotherapy
Short term	1.4% 2021 → 2022	4.5% 2022 → 2023	22.6% 2022 → 2023	12.2% 2021 → 2022	53.8% 2022 → 2023	2.7% 2022 → 2023
Long term (annual growth)	2.4% 2012 → 2022	6.7% 2013 → 2023	45.3% 2021 → 2023	12.2% 2012 → 2022	58.9% 2013 → 2023	1.6% 2013 → 2023
Penetration	57 of 100 inhabitants in 2022 (45 in 2012)	19 per 100 inhabitants in 2023 (10 in 2013)	38% of global population in 2023 (18% in 2021)	n.a.	3 out of 100 cars in 2023 (0.04 in 2013)	21 out of 100 countries met requirements in 2023

Socioeconomic impact

	Labor productivity	Poverty	Life expectancy	Global warming
Short term	1% 2022 → 2023	−5% 2020 → 2021	0.9% 2020 → 2021	+1.17°C 2023
Long term (annual growth)	2.2% 2013 → 2023	−2.7% 2012 → 2022	0.1% 2012 → 2022	+0.68°C 2013
Level	USD 51,450 in 2023 (43,260 in 2013)	712 million in 2022 (934 in 2012)	72 years in 2022 (71 in 2012)	n.a.

Notes: See the Data notes at the end of this section for a definition of the indicators and their data sources. Long-term annual growth refers to the compound annual growth rate(CAGR) over the indicated period. Historic data may have been updated and might differ from last year's Global Innovation Tracker. Figures are rounded. Estimates or incomplete data are indicated by an asterisk (*). n.a. indicates not available. Short-term rates for Moore's Law and the Cost of genome sequencing refer to the CAGR between 2021 and 2023.

What is the current state of global innovation? Is innovation accelerating or slowing down? How is innovation coping in the face of higher interest rates and geopolitical conflicts?

The Global Innovation Tracker 2024 addresses these crucial questions. It takes the pulse of four key stages in the innovation cycle: (1) science and innovation investment; (2) technological progress; (3) technology adoption; and (4) the socioeconomic impact of innovation. The main findings are as follows:

1. **Science and innovation investment:** Following a boom between 2020 and 2022, investment in science and innovation experienced a significant downturn in 2023, marking a notable reversal from previous years. Venture capital and scientific publications declined sharply back to pre-pandemic levels, the impact being most pronounced in emerging regions such as Latin America and Africa. Corporate R&D spending also slowed, mirroring stagnant revenue growth and resembling the post-2009 crisis deceleration. Despite high R&D levels and stable intensities, international patenting has decreased. Looking forward, while some central banks have started cut interest rates, the tighter conditions for innovation finance, might continue to weigh negatively on innovation investments in the near term. The outlook for 2024 and 2025 is unusually uncertain.
2. **Technological progress:** Technological advancements remained strong in 2023, particularly in health-related fields such as genome sequencing, as well as computing power and electric batteries. However, progress in green technologies lagged behind average growth for the decade, highlighting the difficulty in reducing the energy consumed by supercomputers and a slower than previously common declines in renewable energy prices'.
3. **Technology adoption:** The adoption of technology saw positive growth across all indicators in 2023, especially in 5G, robotics, and electric vehicles. While overall penetration levels increased compared to a decade earlier, there are exceptions, such as the slower penetration rate of cancer radiotherapy equipment. The adoption of safe sanitation has also slowed significantly.
4. **Socioeconomic impact:** Many socioeconomic indicators have returned to positive growth, representing a return to normalcy post-COVID-19. However, several metrics, such as poverty rates and life expectancy, have not yet returned to pre-pandemic levels. Productivity has increased but still lags, in terms of overcoming the structural slowdown identified in the Special theme of the GII 2022 – the effective deployment of a new Digital Age and a Deep Science innovation wave is still work in progress, it would seem. Environmental impact indicators, including carbon emissions and global temperatures, continue to rise, underscoring the need for further action to combat climate change. Technological innovation plays a crucial role in addressing environmental challenges; yet, it is clear that technology is only one part of the solution.

Science and innovation investment

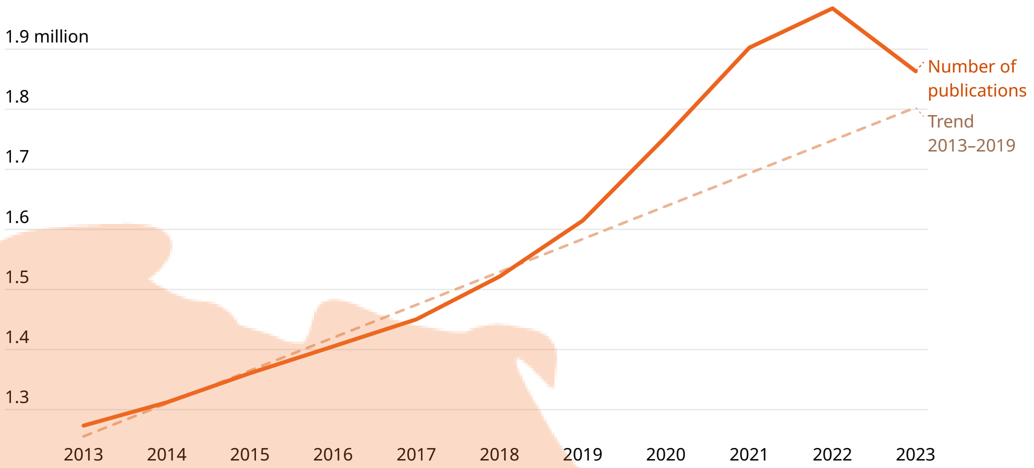
Innovation investment remained resilient throughout the 2020–2021 COVID-19 period and the associated downturn. Indeed, many innovation investment variables – including scientific publications, R&D and venture capital – boomed. However, the first signs of weakness in innovation investment appeared in 2022, although returning from a historic high. This slowdown intensified in 2023, making the outlook for 2024 and 2025 uncertain.

Scientific publications

The scientific landscape experienced a significant shift, a 5 percent decrease in publications between 2022 and 2023 deviating from the decade-long average increase of around 4 percent.

However, this represents nothing other than a return to the pre-pandemic growth trend (Figure 1). Indeed, the period between 2019 and 2021, just prior to and during the COVID-19 pandemic, witnessed an acceleration in new publications, with exceptional growth in 2020 (8.7 percent) and 2021 (8.4 percent). This period was followed by a deceleration in 2022 (3.4 percent), linked to a decrease in research output in environmental sciences and COVID-19-related fields. Yet, despite this decline, the number of publications in 2023 remained above the 2013–2019 trend.

Figure 1 Number of scientific publications (millions), 2013–2023



Source: WIPO, based on data published by Clarivate, Web of Science, accessed April 2024.

Research and development (R&D)

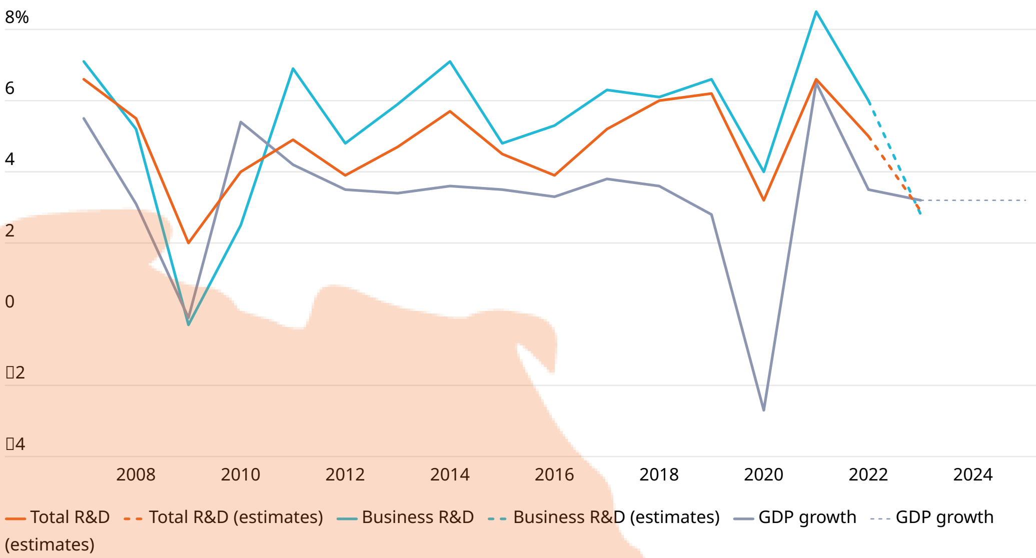
Total R&D expenditure

The most recently available data show that global R&D investment growth in 2022 slowed to 5 percent (in real terms). This is down from 6.6 percent in 2021,[1] and slightly below the pre-pandemic growth rate of 6.2 percent in 2019. The growth of business R&D expenditure – the most significant component of total global R&D, representing 70 percent of total global R&D – likewise slowed to 6 percent in 2022 (compared to 8.5 percent growth in 2021), yet is still comparable to the pre-pandemic rate of 6.6 percent in 2019 (Figure 2).[2]

Estimates for 2023, based on projected GDP growth, paint a potentially unhappier scenario, with global R&D growth expected to slow again to less than 3 percent in 2023, and business R&D to 2.8 percent (1.7 percent and 1.4 percent, respectively, excluding the United States and China).[3] If estimates prove correct, these would be the lowest growth rates on record since 2010. Moreover, this would mean that the growth rate for business R&D growth would be at the same level as the growth rate for total gross domestic R&D expenditure (business plus private); a situation that has been observed before, but never at such comparatively low rates (see Figure 2).

1 Estimates of growth in 2021 were also revised up to 6.6 percent, compared to 5.2 percent reported in the GII 2023, as several economies subsequently reported more complete and up-to-date estimates.
2 The top 5 economies in R&D spending all saw growth in 2022, though it was slower than in 2021 for most, except for Japan and the Republic of Korea. The United States spent 4.9 percent (down from 7.7 percent), China 7.7 percent (down from 9.6 percent), Japan 4.9 percent (up from 2.9 percent), Germany 1.9 percent (down from 3 percent), and the Republic of Korea 8.9 percent (up from 6.8 percent).
3 The OECD has found similar slowdown scenarios for 2023 for the OECD area (OECD, 2024).

Figure 2 GDP growth and total and business R&D growth rates, 2007–2025



Source: WIPO estimates, based on the UNESCO Institute for Statistics database, Organisation for Economic Co-operation and Development (OECD) Main Science and Technology Indicators (March 2024); Eurostat; Ibero-American and Inter-American Network of Science and Technology Indicators (RICYT); and the International Monetary Fund World Economic Outlook Update, April 2024.

Top corporate R&D spenders

On the corporate side, 2023–2024 R&D data is available for around 1,700 of the top 2,500 biggest corporate R&D spenders globally (Nindl *et al.*, 2023).[4] In 2023, corporate R&D expenditure stood at around USD 1.2 trillion, up by around 8.3 percent in nominal terms and around 6.1 percent in real terms[5] – these figures, derived from the weighted averages of national growth rates, represent a decline from the 2022 real growth of 7.5 percent and a decline form the long-term real growth rate.

Compared to the pre-pandemic 2019 and pandemic period, there has been up to a halving of real top corporate R&D growth in 2020 and 2021 (see Table 1).

Interestingly, however, R&D intensity – that is, R&D expenditure as a percentage of total revenue of the top corporate R&D spenders, has remained constant.

4 It is important to acknowledge that the data presented focuses on top R&D performers, often referred to as “R&D superfirms.” A comprehensive evaluation of corporate R&D performance for 2023 would require additional data, including information from small and medium-sized enterprises that may have found obtaining innovation finance challenging in an environment where R&D is becoming both costlier and riskier.

5 Converting the R&D figures to constant 2015 PPP prices helps to isolate the changes in R&D spending by eliminating the effects of price fluctuations and exchange rate variations, assuming all other conditions remain constant. Setting the PPP constant to a specific year, such as 2015, indicates the amount of R&D that one could purchase for 1 USD in the US in 2015.

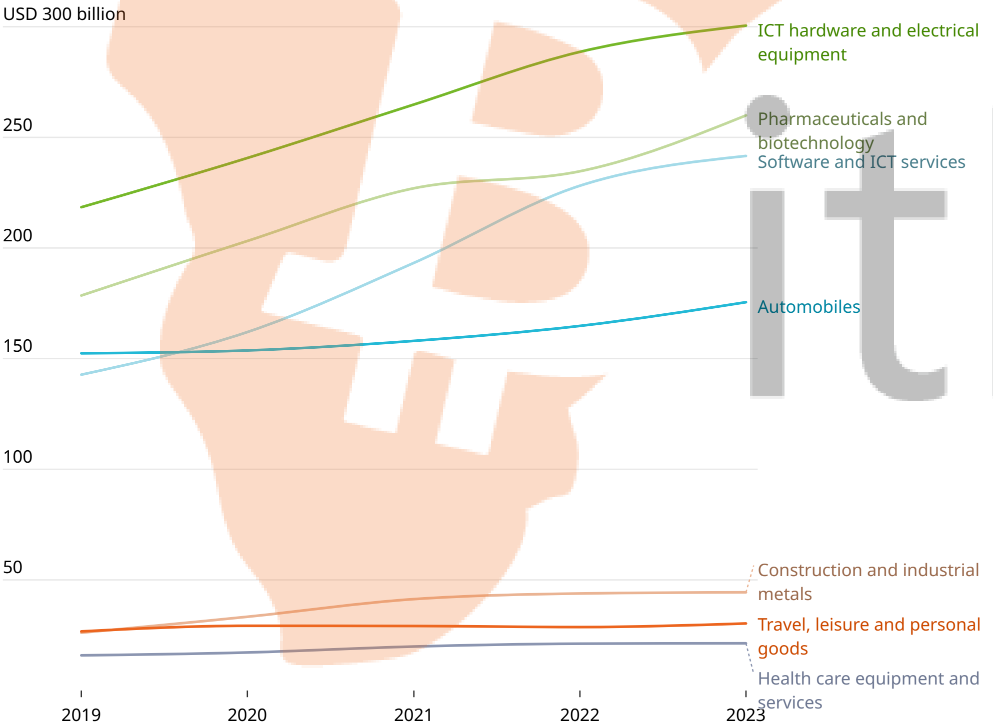
Table 1 R&D growth rates of top global corporate R&D spenders, 2019–2023

	R&D			
Year	Nominal (billion USD)	Weighted nominal growth (%)	Weighted real growth (%)	Weighted R&D intensity (%)
2019	894	10.5	10.4	5.6
2020	982	12.7	10.7	6.0
2021	1,089	15.2	12.8	5.7
2022	1,174	8.8	7.5	5.8
2023	1,243	8.3	6.1	5.7

Notes: Real growth refers to the growth of variables in USD PPP 2015. R&D intensity refers to the ratio of the level of real R&D PPP 2015 expenditure to real revenue PPP 2015.
Source: WIPO, based on Bureau van Dijk (BvD) Orbis database.

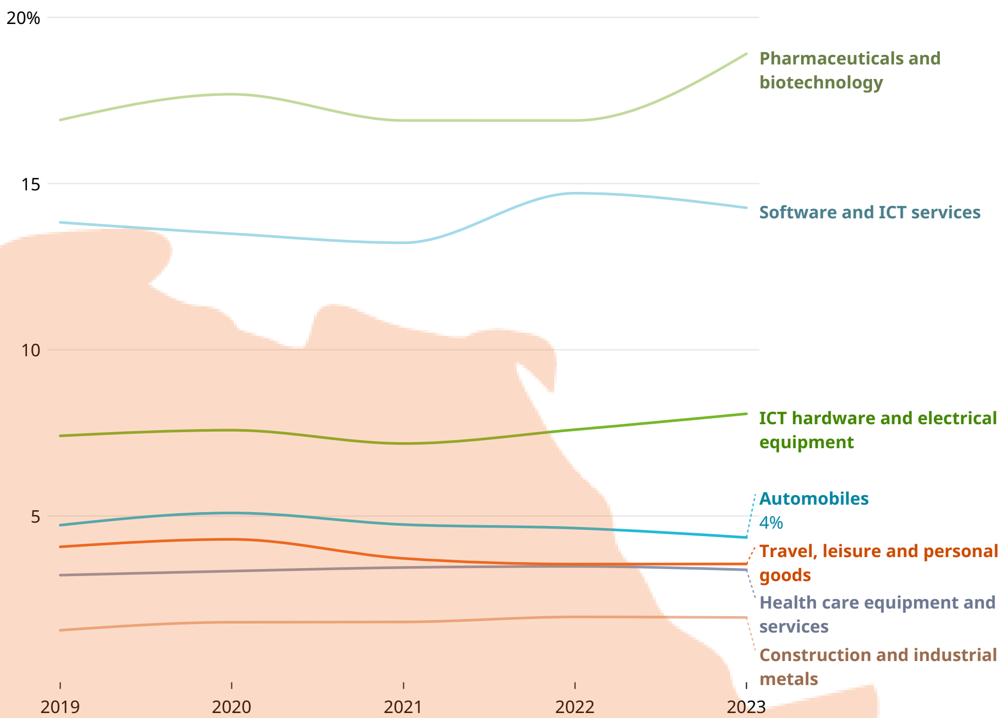
In terms of unweighted nominal growth (Figure 3), the ICT hardware and electrical equipment, and the software and ICT services sector, saw their growth rates divided by two between 2022 and 2023. In contrast, the pharmaceutical sector experienced a significant rebound in R&D expenditure, with growth increasing more than threefold, from 3 percent in 2022 to 10 percent in 2023. In 2023, the pharmaceutical sector led in R&D intensity at 19 percent, followed by Software and ICT services with 14 percent.

Figure 3a Nominal R&D expenditure of top R&D spenders by industry and year, 2019–2023



Source: WIPO, based on Bureau van Dijk (BvD) Orbis database.

Figure 3b Intensity of top R&D spenders by industry and year, 2019–2023



Source: WIPO, based on Bureau van Dijk (BvD) Orbis database.

Figure 4 shows the nominal percentage change in R&D expenditure for 2023 among the top 15 firms in the top seven industries. In 2023, most of the top 15 R&D spenders across various industries increased investment, continuing a positive trend. However, 25 firms did the opposite and reduced investment.

Notably, four of the top R&D investors in ICT hardware reduced expenditure, in contrast to the year before, when all ICT top R&D investors increased R&D expenditure. In software, two firms decreased spending, while in pharmaceuticals, four firms did so. A few highlights:

- In the ICT hardware sector, a slowdown was evident, with Nvidia’s R&D growth rate decelerating from around 35 percent in 2022 to 18 percent in 2023.
- Meta's and Uber's R&D – which jointly recorded the highest growth rate last year at 30 percent – fell substantially to around 10 and 13 percentage points, respectively.
- In contrast, the pharmaceuticals sector experienced an accelerated growth, with Eli Lilly, Novartis, and Merck US all recording an R&D growth rate exceeding 20 percent.
- The automotive industry reported a substantial rise in R&D expenditure, particularly by Tesla (by around 30 percent).

Figure 4 Top R&D spenders by industry, growth rate 2022–2023

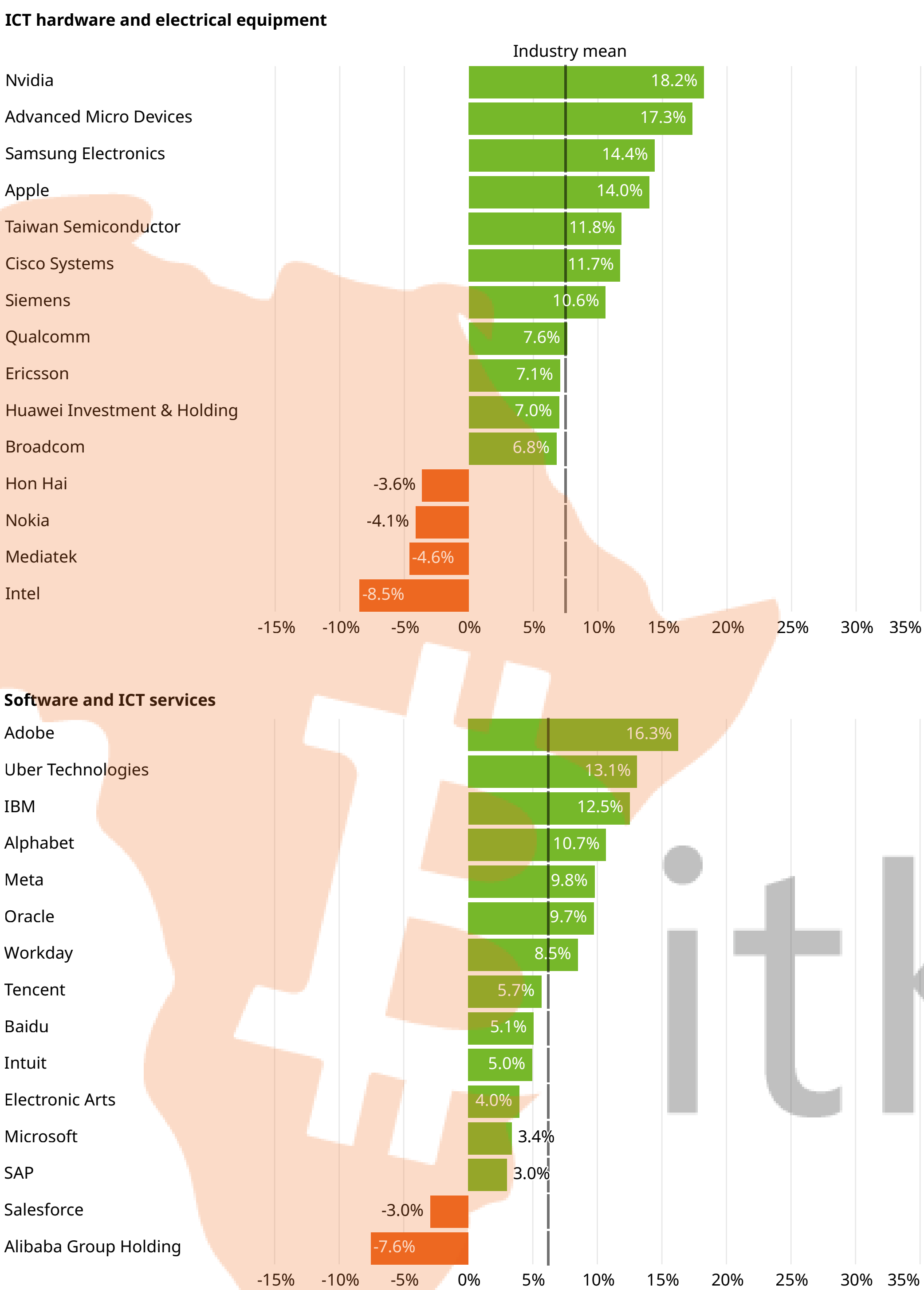
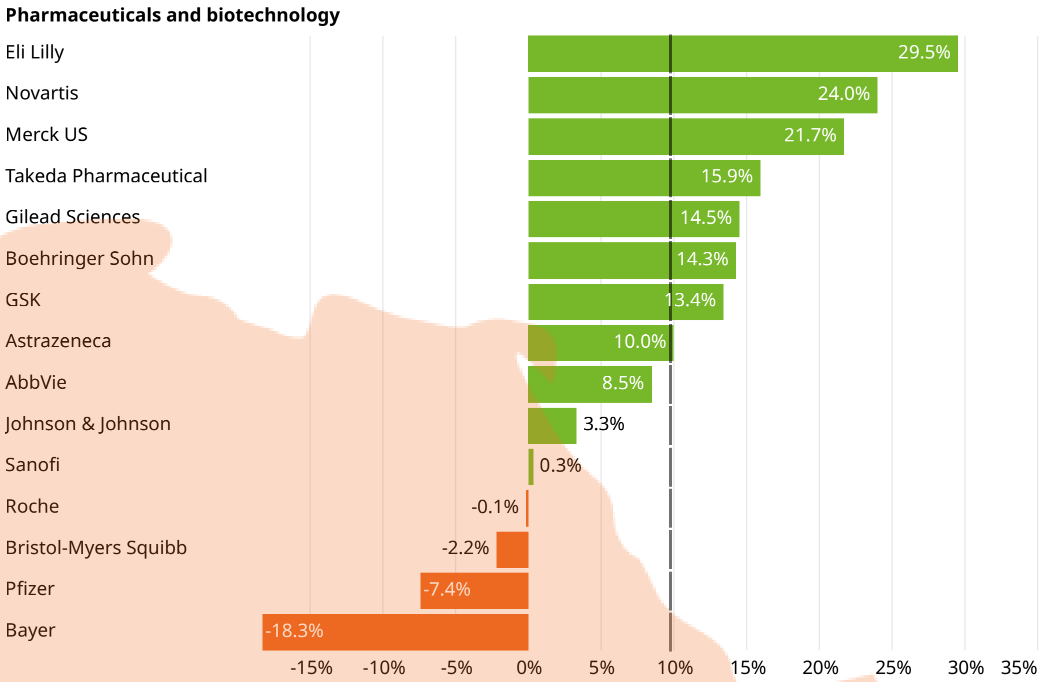


Figure 4 *Continued*



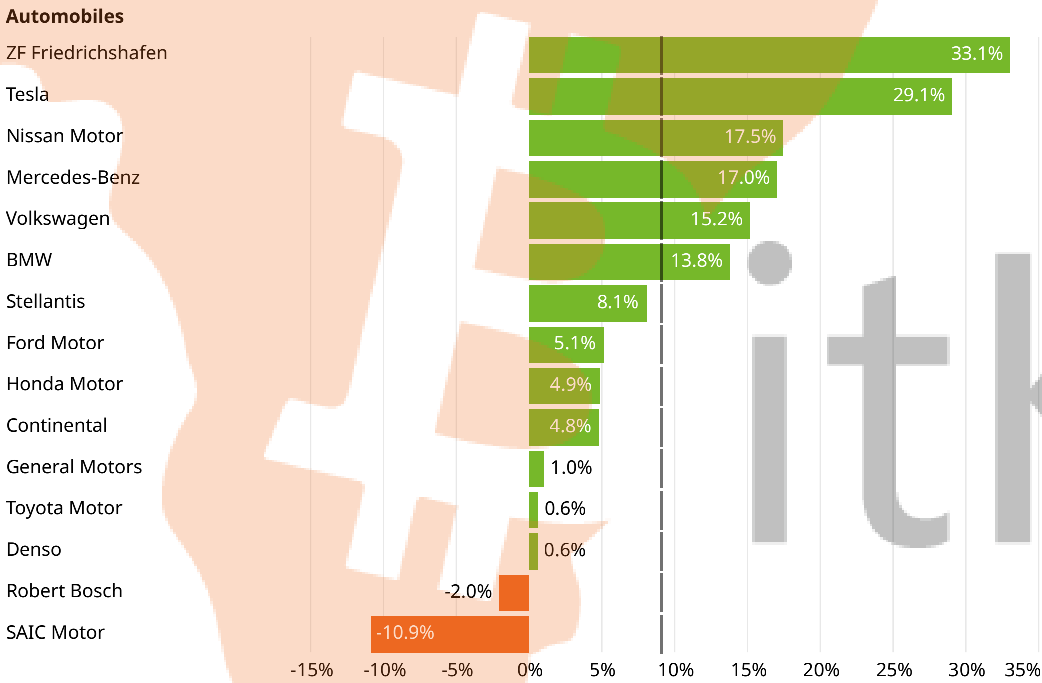
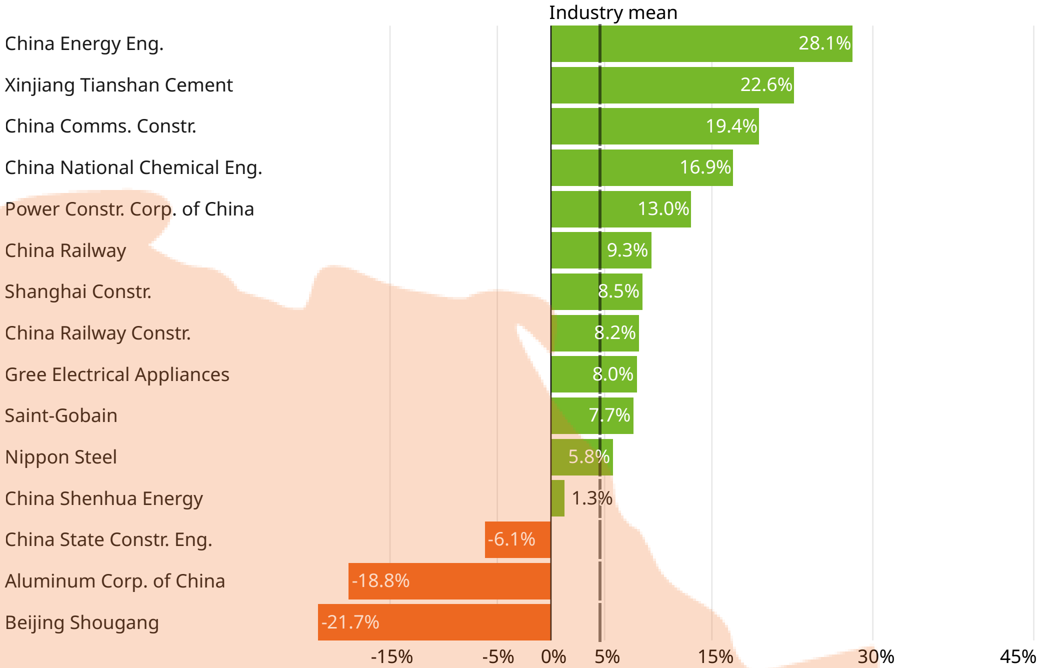
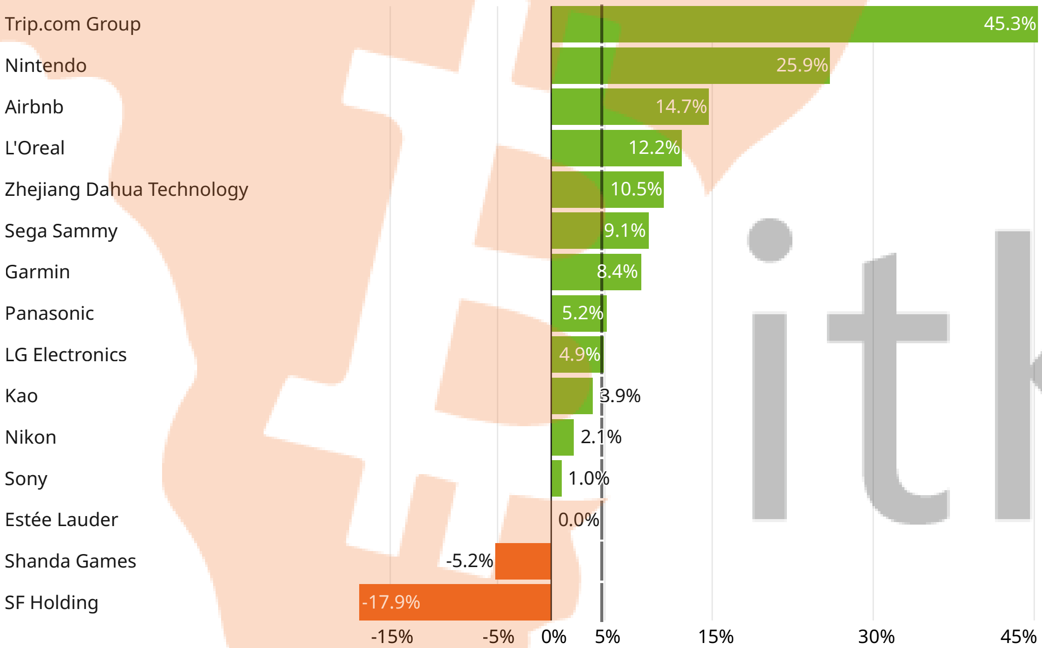


Figure 4 *Continued*

Construction and industrial metals



Travel, leisure and personal goods



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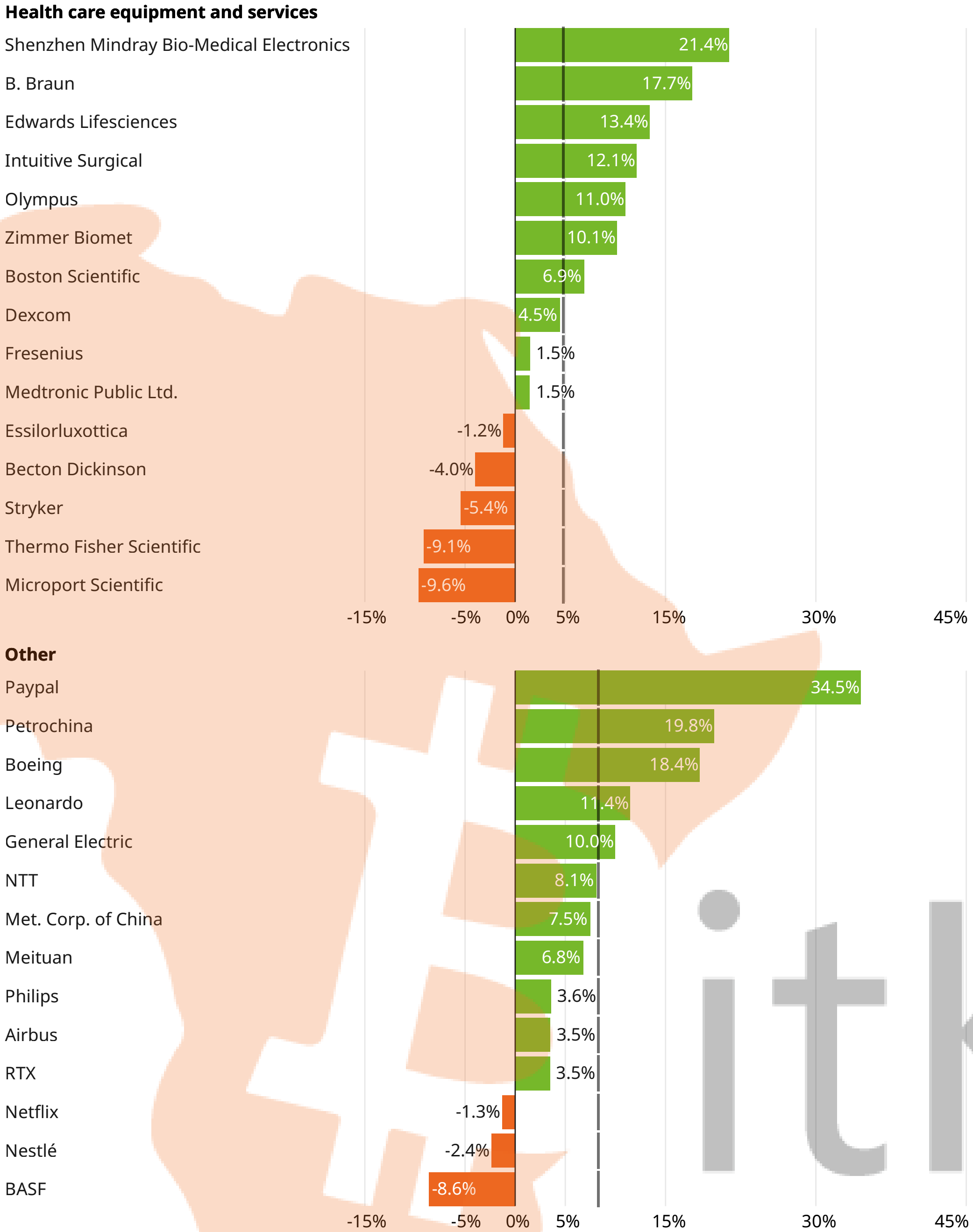


Note: Vertical lines represent the sample average R&D growth for a specific industry.
Source: WIPO, based on Bureau van Dijk (BvD) Orbis database.

Venture capital

After experiencing extraordinary growth in 2021, with a 47 percent increase in the number of deals and a 127 percent increase in deal value reminiscent of the pre-dotcom bubble era, the venture capital (VC) landscape faced significant challenges in 2022. Tighter monetary conditions led to a sharp reduction in VC fund inflows, with a 36 percent drop in deal value, even though the number of deals competed continued to rise by 22 percent.

This trend continued into 2023. The number of VC deals fell by around 10 percent (see Dashboard), while the total amount of money invested in VC dropped further, by around 40 percent (Figure 5).

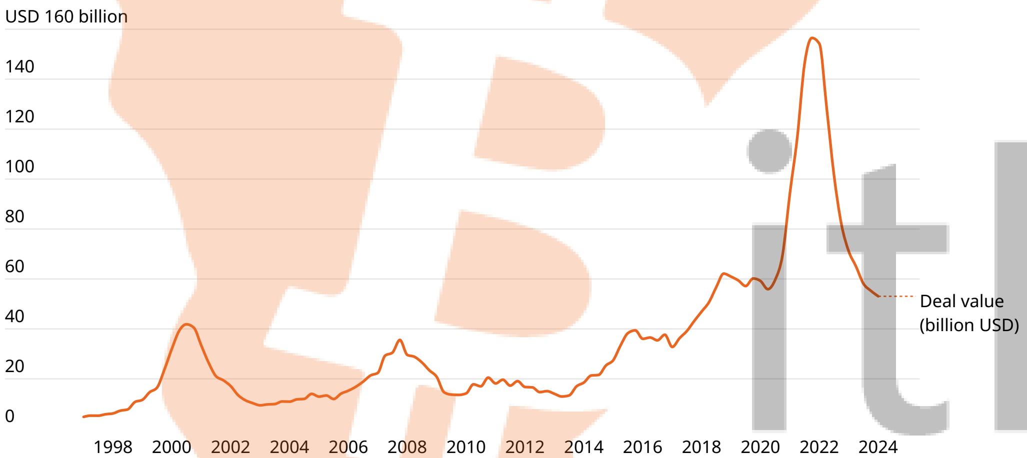
In 2023, Africa experienced the steepest decline in VC deals seen at the regional level, dropping by around 25 percent from 471 to 349. Africa was followed by the Asia-Pacific region, which saw an almost 20 percent decrease, from approximately 9,600 deals down to 7,700. Northern America, although still leading with around 9,000 deals, experienced a 7 percent decline from the 9,600 recorded in 2022. Latin America also saw a decrease, with deals falling by 7 percent, from 539 to 500. Interestingly, Europe bucked the trend, with the number of deals increasing by 7 percent, reaching a historic record of approximately 5,400 deals.

The total amount invested in VC dropped significantly, from USD 595 billion in 2021 to USD 379 billion in 2022, and dropped further to USD 228 billion in 2023. This decline is reminiscent of the financial crisis of 2009. Tighter monetary policy is driver behind this slowdown.

The Latin America region experienced the steepest decline in VC value, plummeting by 67 percent. This was followed by Northern America, with a 40 percent decrease, Europe at 38 percent, Asia-Pacific at 38 percent, and Africa with the smallest decline at 30 percent. Despite a steep fall in the number of deals, Africa's VC values remained relatively robust in 2023.

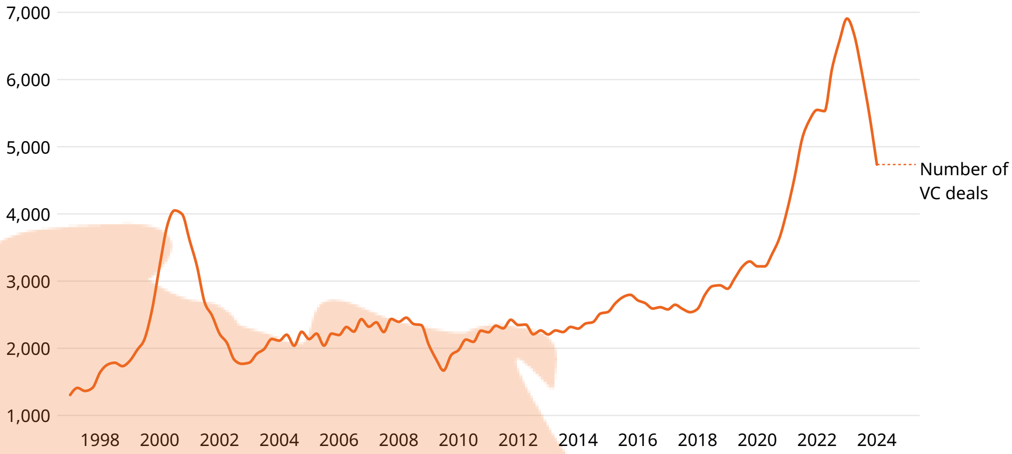
A long-term perspective reveals significant structural changes within the geographical distribution of VC investment (Figure 6). In 1997, the United States and Canada concentrated 86 percent of VC values, while the Asia-Pacific region attracted only 3 percent. A quarter of a century later, in 2023, the Asia-Pacific region share had increased by 25 percentage points, while that of the United States and Canada had declined by 35 points. Meanwhile, in Latin America, the share has remained stagnant at 1 percent, whereas Africa's share has grown from zero in 1997 to 0.8 percent in 2023.

Figure 5a Quarterly value of venture capital deals, 1997–2024, 3-point moving average



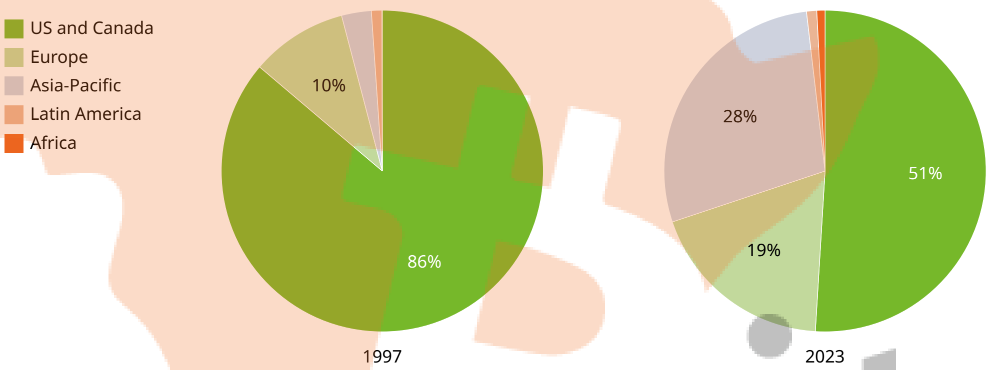
Source: WIPO, based on data published by Refinitiv Eikon (private equity screener), accessed March 2024.

Figure 5b Number of venture capital deals, 1997–2024, 3-point moving average



Source: WIPO, based on data published by Refinitiv Eikon (private equity screener), accessed March 2024.

Figure 6 Regional distribution of venture capital deal value, 1997 and 2023



Source: WIPO, based on data published by Refinitiv Eikon (private equity screener), accessed March 2024.

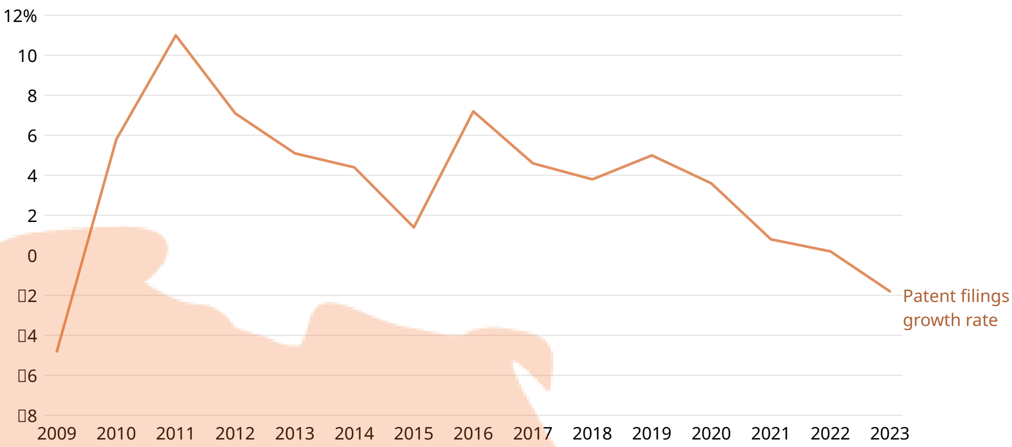
International patent filings

In 2023, international patent filings under the WIPO-administered Patent Cooperation Treaty (PCT) fell by almost 2 percent. This marked the first decline since the financial crisis in 2009, which saw a more significant drop of almost 5 percent.[6] The growth of patent filings has progressively slowed since 2011 (Figure 7).

Despite a minimal reduction in number, China maintained its position as the leading origin of PCT patent filings, in 2023. The United States and Japan followed, even though they experienced a steeper decline of 5.3 percent and 2.9 percent, respectively. In contrast, India and Türkiye showed substantial growth in PCT filings. India's PCT applications surged by an impressive 44.6 percent, while Türkiye also experienced a significant increase of 8.5 percent.

6 For assessments of how IP filings fared during this and previous crises see, WIPO, 2010; WIPO, 2023; and Fink et al., 2022.

Figure 7 Patent filings growth, 2009–2023



Source: WIPO, based on the WIPO Statistics Database.

Technological progress

Indicators capturing technological progress have exhibited mostly positive and sometimes strongly positive performance. The rapid improvement in computing power consistent with Moore’s Law continues to profoundly shape our world. This is complemented by a swift increase in the availability of drugs, indicating significant progress in health and a consistent reduction in genome sequencing costs, which is critical for advancing medical research.

However, indicators relating to progress in green technologies and the environment showed sub-par progress, as compared to average decade-long growth. Specifically, the speed of making progress in making supercomputers more energy-efficient and renewable energy more affordable is falling behind.

Computing power

The GII Global Innovation Tracker employs two metrics to monitor the balance between technological progress and sustainability: namely, Moore’s Law (a reliable indicator for tracking advancements in computing power) and supercomputer efficiency, which provides a pathway for tracing progress in computing sustainability. Together, these two metrics offer a comprehensive perspective on ongoing efforts at integrating computational advancement with environmental sustainability.

Moore’s Law

Moore’s Law, the empirical observation that the number of transistors on an integrated circuit doubles approximately every two years, continues to hold true. Between 2021 and 2023, the transistor count increased by more than 150 percent, implying a compound annual growth rate of 60 percent. This rate surpasses the long-run rate of around 40 percent annual growth observed over the past decade.

Still, the miniaturization of transistors is becoming increasingly complex, pushing the boundaries of science and technology. As of now, we have achieved 8-nanometer transistors. The anticipated end of Moore’s Law is around 1.5nm to 1nm, at which point the fundamental laws of physics begin to constrict transistor packing.

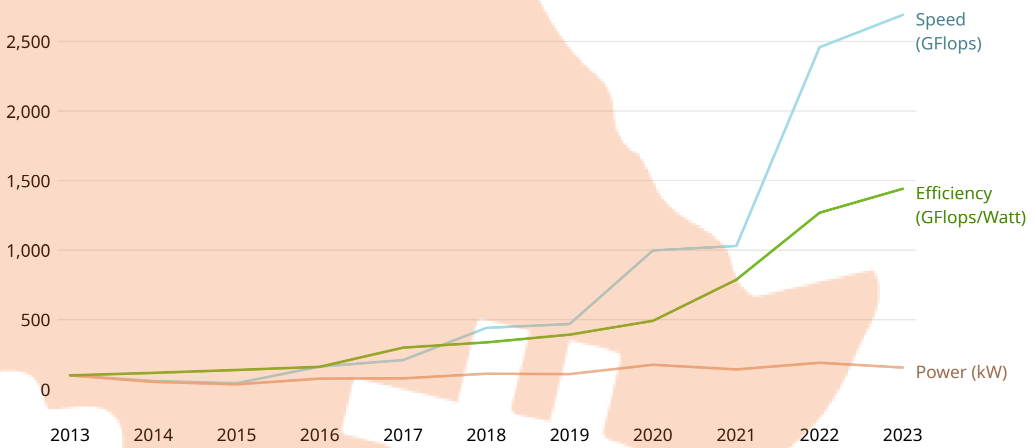
Green supercomputing

Supercomputers, once confined to scientific research in fields such as climate prediction, genomics and drug discovery, are rapidly permeating the world of business, particularly with respect to the training of AI neural networks. The fastest supercomputers can execute more than 1 quintillion operations per second, also referred to as an exaflop, a computational capacity equivalent to that of 100,000 laptops.

Despite undergoing an exponential increase in speed over time, these computing systems are notoriously greedy consumers of energy (Figure 8). Efficiency, rather than simply operations per second, is becoming a critical metric for these machines.

The GII Tracker assesses performance based on how many Gigaflops are achieved per Watt of energy consumed. Between 2022 and 2023, the average efficiency of the top 50 “greenest” supercomputers increased by around 14 percent, well below the decade’s compound annual growth rate of 30 percent.

Figure 8 Average speed, power and efficiency of top 50 green supercomputers, 2013–2023



Notes: Average efficiency is calculated as the ratio of average speed to average power for the top 50 green supercomputers. An increase in efficiency can occur even when both speed and power are decreasing. 2013 is the base year and set to 100.

Source: WIPO based on data published by TOP500.

Costs of renewable energy

Between 2021 and 2022, the global weighted-average levelized cost of electricity (LCOE) from newly commissioned solar photovoltaic (PV) and wind power witnessed a reduction of 3.9 percent and 3.5 percent, respectively. Yet, this rate of reduction is substantially lower than the past decade’s compound annual rate of 15 percent for solar and 9 percent for wind.

In 2010, the global weighted-average cost of onshore wind was 95 percent higher than the lowest cost of fossil fuel-fired power. However, by 2022, it was 52 percent lower than the cheapest fossil fuel-fired solutions. Similarly, solar PV, which was 710 percent more expensive than the cheapest fossil fuel-fired solution in 2010, became 29 percent less expensive by 2022, marking a remarkable reduction in cost (IRENA, 2023).

Despite these positive trends, the renewable energy sector faces emerging challenges. The escalating demand for natural resources and manufactured materials, coupled with a reduction in fossil fuel prices from their 2022 peak, could potentially make renewable energy sources less competitive relative to fossil fuels.

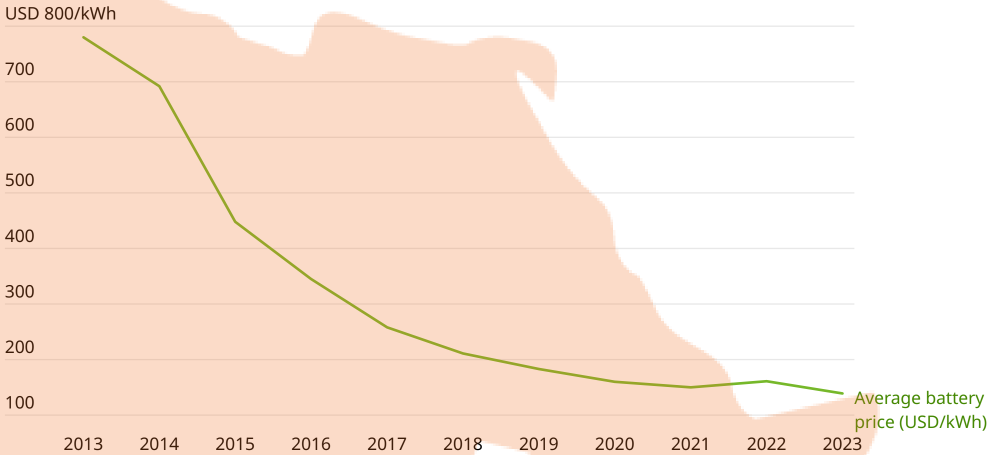
Electric battery price

Technological progress has persistently driven down the cost of lithium-ion batteries for over a decade, making electric vehicles (EVs) increasingly affordable. However, 2022 marked a key turnaround, with a first-ever increase in the price of electric batteries following upon an increase in production costs.

This price reversal ended again in 2023, with lithium-ion battery prices hitting an unprecedented low of USD 139 per kWh, marking a substantial 13.7 percent reduction from the 7 percent increase seen in 2022 (Figure 9). However, the 2023 price reduction is at a lower rate than the long-term price reduction observed over the past decade.

The 2023 price reduction reflects falling raw material and component prices, increased production capacity across the battery value chain and weaker-than-expected demand growth. The industry is also shifting toward new lithium iron phosphate cells, which are significantly cheaper than previous technologies.

Figure 9 Average lithium-ion battery price, 2013–2023



Note: Prices a shown in real 2023 USD.

Source: WIPO, based on data published by BloombergNEF.

Cost of genome sequencing

DNA sequencing plays a crucial role in the understanding of the human genome, and has numerous potential applications in health care, including the rapid diagnosis of complex diseases.

The cost of sequencing an entire genome has fallen dramatically over time. Based on estimates valid for the United States, it has fallen from approximately USD 100 million in 2001 to just over USD 500 in 2023. This rapid reduction in cost, driven by advancements in next-generation DNA sequencing methods, has far outpaced the expected rate of progress predicated on Moore's Law.

Between 2021 and 2023, there was an annualized reduction of 8 percent in the cost of genome sequencing, falling below the long-term trend of a –20 percent CAGR.[7]

Looking ahead, new metrics will be required in order to assess the cost of more advanced DNA sequencing techniques. Emerging long-read DNA sequencing technologies allow for the more accurate identification of complex structural variations. But they are more costly and necessitate different metrics in order to track progress.[8]

7 This slowdown can be partially attributed to the cessation of funding for the large-scale sequencing program funded by the National Human Genome Research Institute (NHGRI) and a new cost estimation method, which incorporates additional analysis costs and averages costs across a smaller number of research centers. The earlier cost estimation method represented genome sequencing done by the research center for their own research projects. The newer methods represent costs from those centers but made available to external customers.

8 Short-read technologies can assess differences in a person's genome that possibly affect risk of disease. In contrast, long-read DNA sequencing produces data that can inform more accurately how the overall structure of the genome affects biology. Currently, long-read sequencing, costing around USD 3,000, mainly benefits research, but it may eventually be used in health care.

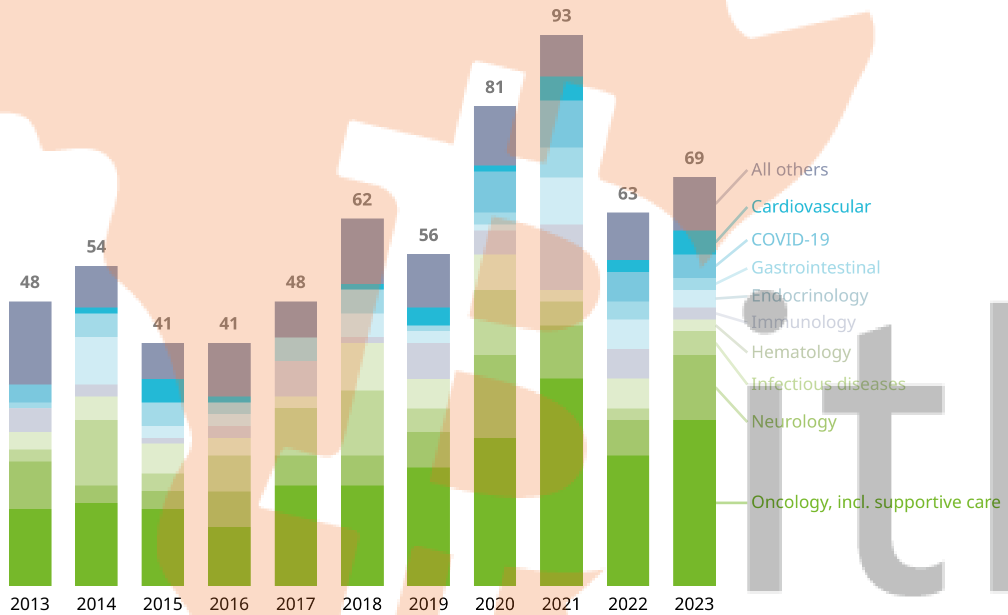
Drug approvals

In this edition of the Tracker, we assess the state of innovation in pharmaceuticals by examining the number of novel active substances (NASs) launched globally. A NAS is defined as a new molecular or biologic entity or combination where at least one element is new (IQVIA, 2024).

In 2023, a total of 69 NASs were introduced globally, marking a significant 9.5 percent increase on the 63 launched in 2022. This figure surpasses the average annual growth rate of 3.7 percent observed over the decade. Still, this is lower than during 2020 and 2021, when the number of drugs introduced surged due to the COVID-19 pandemic before returning to the pre-pandemic trend. In contrast to this year's use of IQVIA data, last year's Global Innovation Tracker relied on Food and Drug Administration (FDA) data for the monitoring of drug approvals. FDA data confirms the positive trend in 2023, with a notable rise of 49 percent in drug approvals after a steep decline in 2022.

Figure 10 shows annual NAS launches between 2013 and 2023 disaggregated by therapeutic area. Around 30 percent of the drugs introduced relate to oncology, 11 percent to neurology and around 10 percent to infectious diseases, together accounting for half of total launches during the period.

Figure 10 Number of yearly drug launches, by therapeutic area, 2013–2023



Source: WIPO, based on data published by IQVIA Institute for Human Data Science.

Technology adoption

In 2023, technology adoption was positive across all the indicators considered. Growth was evident in areas such as robotics and EVs. Connectivity is also expanding rapidly with the rise of 5G networks, promising faster data transmission speeds and a more reliable service. However, despite long-term growth in safe sanitation, the pace of expansion is currently insufficient to meet the United Nations Sustainable Development Goal of universal coverage by 2030. There has been a decline of countries meeting the minimum cancer equipment needs too. The growth rate for the adoption of safe sanitation has also significantly slowed.

Safe sanitation

Safe sanitation, that is, the use of improved sanitation facilities, increased by 1.4 percent between 2021 and 2022, representing 57 per 100 inhabitants. This rate of growth is below the decade's average annual increase of 2.4 percent from 2012 to 2022. A decade ago, under half of the world's population (45 percent) had access to safe sanitation. This implies that approximately 1.3 billion people have gained access to safe sanitation since 2012.

The most significant progress in safe sanitation access since 2012 has been observed in Central and Southern Asia (+6.6 percent), particularly in India, and East and South East Asia (+4.6 percent), with China leading the way.

However, current rates of international adoption indicate that only 65 percent of the world's population will have access to safe sanitation by 2030. This falls short by 35 points of the Sustainable Development Goal of universal coverage (UNICEF and WHO, 2023).

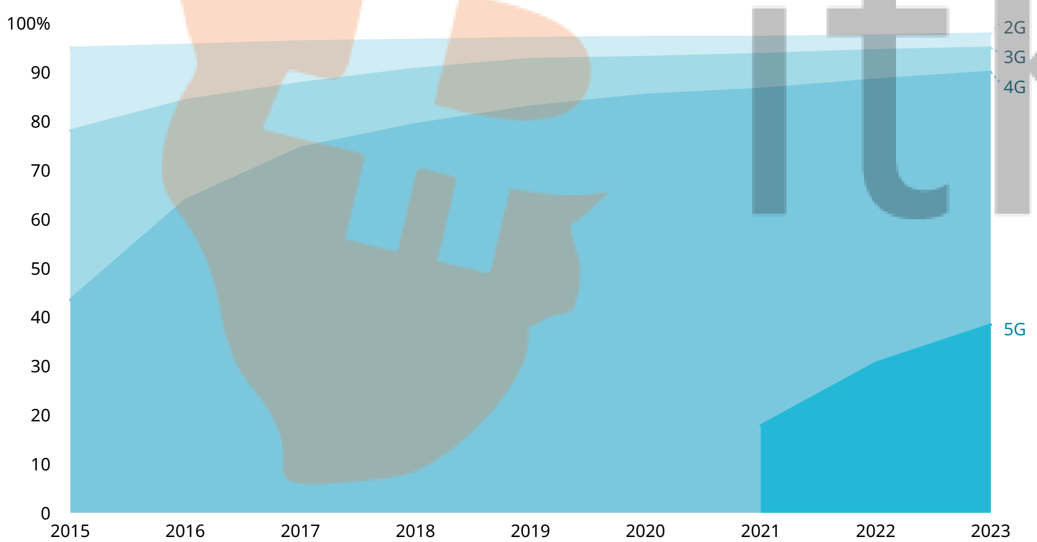
Connectivity

This year the Global Innovation Tracker includes for the first time data on the proportion of the world's population covered by 5G networks. This is part of the GII's effort to monitor the spread of cutting-edge communication technologies. In 2023, 5G coverage extended to approximately 38 percent of the global population; a notable achievement considering commercial deployment only began in 2019. This represents a close to 25 percent increase on the coverage in 2022 and an annual compound growth rate of 45 percent since 2021. Furthermore, today, 95 percent of the world's population is covered by at least a 3G network (Figure 11).[9]

Coverage varies according to region. Europe leads in 5G deployment, with 68 percent of the population covered, followed by the Americas at 59 percent and the Asia-Pacific region at 42 percent. The Arab States have 12 percent coverage, while the Commonwealth of Independent States (CIS) region and Africa have 8 percent and 6 percent coverage, respectively (ITU, 2023).

The fixed broadband subscription rate rose to around 19 per 100 inhabitants, in 2023, a 4 percent increase on the previous year. This is, however, below the compound annual growth rate of 7 percent over the past decade. Europe leads with 36 per 100 inhabitants, followed by the Americas at 26, the CIS region at 23, Asia-Pacific at 19, the Arab States at 11. Africa has the lowest coverage of all at just 0.8 per 100 inhabitants.

Figure 11 Population coverage by type of mobile network, 2015–2023



Notes: The values for 2G, 3G and 4G represents that proportion of the population that has access to each respective network or a superior one. Data pertaining to 5G coverage is unavailable for years prior to 2021.

Source: WIPO, based on data published by the International Telecommunication Union.

9 Since 2G does not support internet access, we consider 3G coverage.

Robots and automatization

In 2022, the operational stock of robots increased significantly by 12 percent, mirroring the compound growth rate over the past decade. Growth occurred despite supply chain disruptions, with robot adoption reaching new heights. Over 550,000 new installations were recorded, marking a 5 percent increase on the previous record set in 2021. The electronics industry emerged as the leading consumer of robots in 2022, accounting for 28 percent of all new installations. The automotive industry closely followed, with a 25 percent share of new installations (Müller, 2023).

Geographically, the industrial robot market was dominated by five countries: China, Japan, the United States, the Republic of Korea and Germany. Together, these five countries accounted for 74 percent of the operational stock of robots in 2022.

Over time, there has been a noticeable shift in robot adoption. Japan, the United States and Germany have seen a decrease in their share, whereas China's share has increased significantly.

Electric vehicles

The global EV market experienced substantial growth in 2022. The stock of EVs increased by 54 percent that year, slightly below the 10-year average growth rate of 59 percent. The share of EVs rose to 3 percent, in 2022, up from 2 percent in 2021 and a mere 0.07 percent a decade ago (IEA, 2024).

Electric vehicles accounted for 18 percent of global car sales in 2022. The market was dominated by China, Europe and the United States, which together constituted around 95 percent of total EV sales.

Emerging markets and developing economies outside China constituted only a small proportion of the global market. Affordability remains a significant barrier, particularly in low- and lower middle-income economies. Challenges such as limited access to charging infrastructure and EV servicing further impede adoption not only in these economies but also in high-income regions, too.

Nonetheless, 2022 saw a significant surge in electromobility within India, Thailand and Indonesia. Electric car sales in these countries tripled compared to 2021, largely driven by Tata's dominance within the Indian market and government incentives aimed at bolstering EV manufacturing.

Cancer radiotherapy

To better capture the adoption of health-related innovations, the Global Innovation Tracker provides information on the availability of cancer therapy equipment, specifically the number of linear accelerators (LINACs) – devices for delivering high-energy x-rays or electrons to cancers for therapeutic or palliative purposes – per inhabitant.

Data for 2023 shows an around 3 percent rise in the availability of LINACs per capita compared to the previous year, exceeding the average annual global increase in LINAC availability of 1.6 percent over the past decade.

In 2023, 21 out of 100 countries met the minimum radiotherapy requirements set out by the International Atomic Energy Agency (IAEA) DIrectory of RAdiotherapy Centres (DIRAC) (see Data note). Among upper middle-income economies, there has been a notable increase in the percentage of countries meeting radiotherapy requirements. However, the number of lower middle- and low-income economies meeting radiotherapy technology minimum requirements remains low, indicating a persistent divide in access to adequate radiotherapy services.

Socioeconomic impact

In terms of the socioeconomic impact of innovation, many indicators have returned to some growth relative to the results of last year's 2023 edition of the GII. Labor productivity has seen an increase, albeit at a rate below the average for the past decade, with levels slightly above those of 2021. Significant long-term progress has been made in reducing poverty, with the number of people in extreme poverty in 2022 being half of what it was in 2005. However, levels remain above those recorded in 2018, and thus pre-pandemic levels, indicating that more effort is needed if progress is to be sustained or even accelerated.

Life expectancy saw a rapid rise in 2022, but remains at levels last seen in 2015. Also, the disparity between healthy life expectancy and total life expectancy is still to be addressed. On environmental issues, the world is falling further behind. After a temporary reduction in 2020, carbon emissions are growing once. The year 2023 was the hottest on record, highlighting an urgent need for effective climate action.

Labor productivity

Labor productivity showed an increase of around 1 percent between 2022 and 2023, an improvement from the sluggish growth of around 0.2 percent observed between 2021 and 2022. In terms of output per worker, there has been a notable increase, from around USD 43,000 in 2012 to USD 51,000 in 2023.

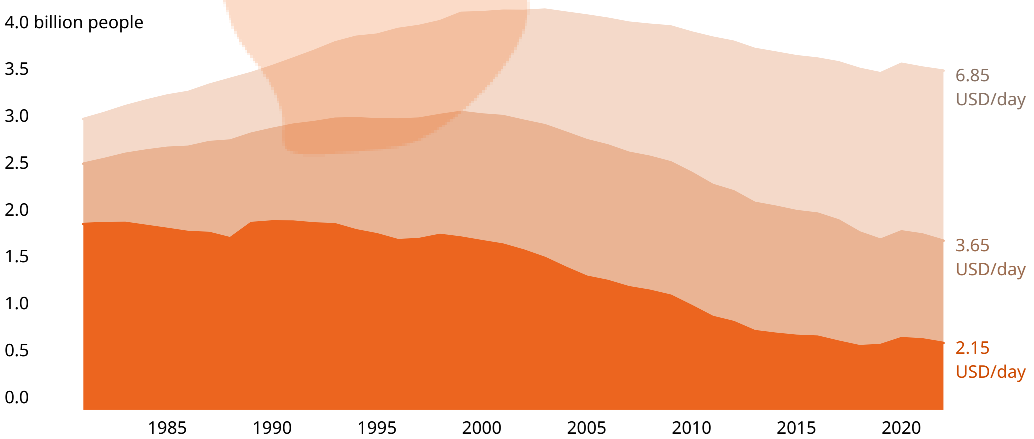
Despite this positive trend, the current growth rate still lags behind the decade average of 2.2 percent productivity growth; a trend further discussed in the context of two possibly new Digital Age and deep Science Innovation waves in the GII 2022 special theme What is the future of innovation-driven growth?

Poverty

This year, the Global Innovation Tracker incorporates data on poverty. In 2022, approximately 712 million people were living in extreme poverty, defined as subsisting on less than USD 2.15 a day (2017 PPP) – a 5 percent decrease on the previous year. Comparatively, in 2012, the number of people living in poverty was 936 million, representing a reduction of over 200 million individuals over the decade (Figure 12).

Since the 2000s, the share of the global population living below the lower middle-income (USD 3.65) and the upper middle-income (USD 6.85) poverty line also shrank. Currently, nearly 2 billion people live on under USD 3.65 a day, and more than 3.5 billion people (around half of the world's population) live below the USD 6.85 threshold. Despite the 2022 improvement, poverty is still greater today than it was before the pandemic struck.

Figure 12 Population living in poverty, by income threshold, 1981–2022, USD PPP 2017



Source: WIPO, based on data published by World Bank, Poverty and Inequality Platform.

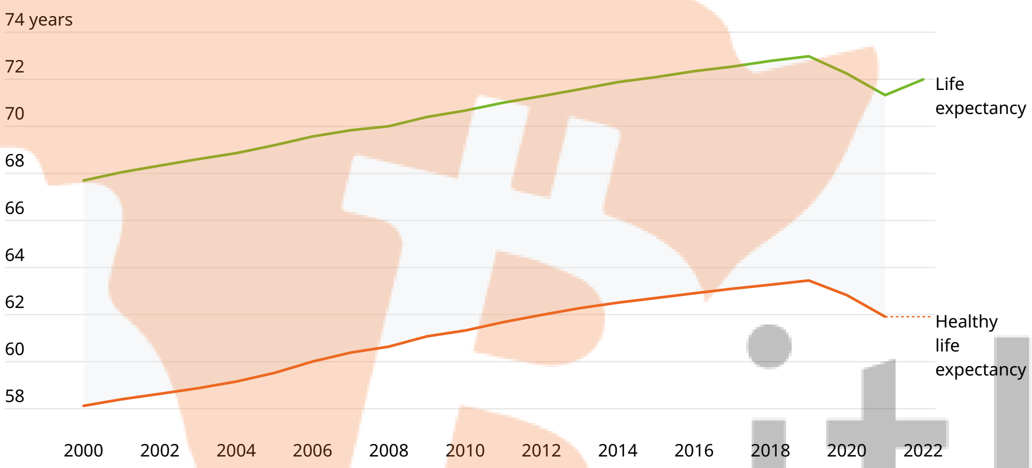
Life expectancy

Globally, average life expectancy at birth is now around 20 years longer than it was back in 1960, when it stood at 51 years. However, COVID-19 caused a marked decline in life expectancy, and recovery has been gradual.

Following two consecutive periods of unprecedented decline – a 1 percent decrease between 2019 and 2020, and a further 1.3 percent decrease between 2020 and 2021 – life expectancy rose by around 1 percent in 2022. As of 2022, the life expectancy of a representative individual is 72 years, the same as in 2015. A decade earlier, in 2012, life expectancy was slightly lower, at 71 years (Figure 13).

Despite improvements, significant disparities in life expectancy persist. There remains a striking gap of approximately 30 years between the highest and lowest life expectancies. For instance, in Japan, life expectancy is slightly below 84 years, whereas in some other countries it is around 55 years. This gap has narrowed over time since 1960, when it was 45 years. Additionally, a notable disparity exists between life expectancy at birth and healthy life expectancy at birth (HALE). This gap has remained fairly constant since the start of the millennium, at around 9.5 years.

Figure 13 Life expectancy and healthy life expectancy at birth (years), 2000–2022



Source: WIPO, based on data published by World Bank (LE) and World Health Organization (HALE).

Global warming

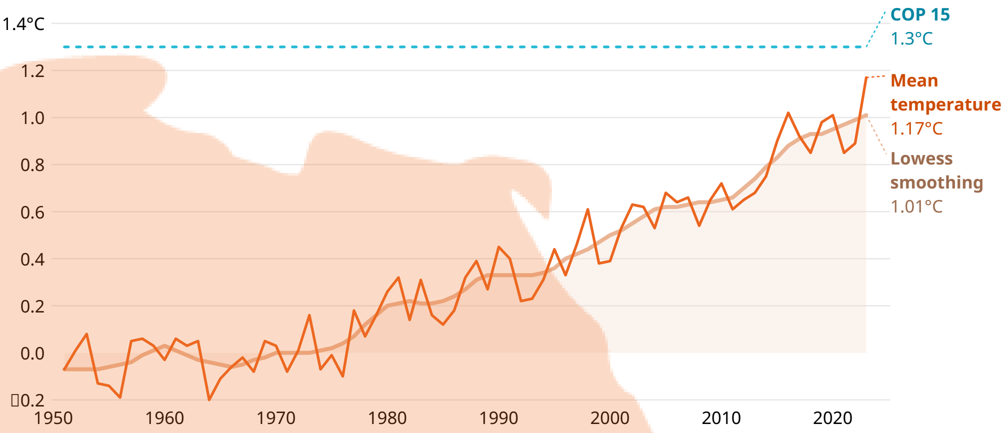
In an effort to understand both the impact of economic activity on the climate and the potential mitigation strategies through innovation, this year's Global Innovation Tracker includes data on global warming. This approach aligns with the global commitment made in 2015 under the Paris Agreement, when countries worldwide agreed to a long-term goal of limiting the rise in global surface temperature to no more than 2°C above pre-industrial levels, with a preferred limit of 1.5°C.[10]

Notably, 2023 marked a significant milestone in being the hottest year on record, with the global temperature 1.17°C above the baseline period (1951–1980).[11] Problematically, the average temperature in 2023 was only 0.13°C below the preferred 1.5°C target and 0.63°C below the maximum 2°C target, thresholds that are quite likely to be surpassed in the coming decades (Figure 14).

10 See https://unfccc.int/documents/184656
11 Temperature variations occur within the context of an overall upward trend driven by human activity, with fluctuations due to natural phenomena such as El Niño and La Niña events or volcanic eruptions.

Furthermore, carbon dioxide (CO_2) emissions are on the rise. In 2022, CO_2emissions returned to pre-COVID-19 pandemic levels, increasing by 0.9 percent compared to 2021. Fossil CO_2emissions are expected to have risen further in 2023, to 1.4 percent above 2019 levels (Figure 15).

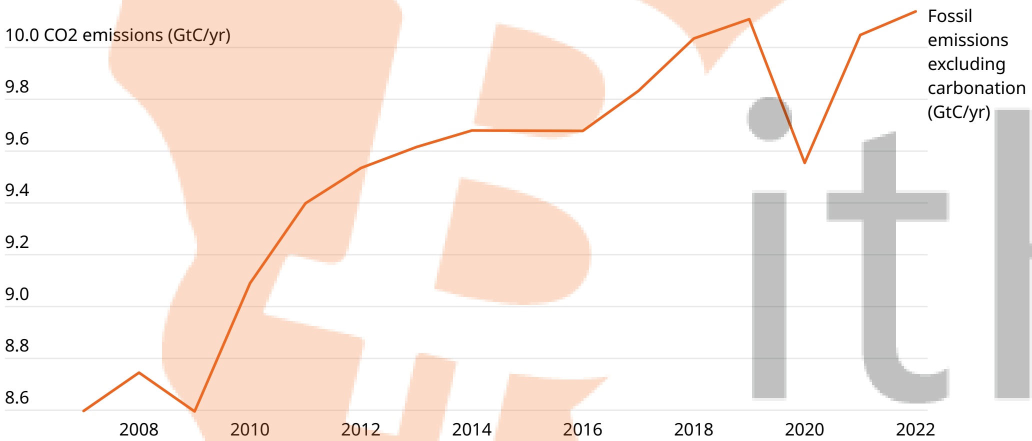
Figure 14 Global temperature anomaly, 1951–2023 land–ocean global mean temperature



Notes: COP 15 (lower threshold) indicates the lower limit of 1.5°C global warming relative to the pre-industrial temperature. This corresponds to a temperature increase of 1.3°C with respect to the average temperature from 1951 to 1980. Lowess smoothing denotes Locally Weighted Scatterplot Smoothing with a fifth-degree polynomial.

Source: WIPO, based on data published by NASA GISS GISTEM.

Figure 15 Carbon dioxide emissions, 2007–2022 (gigatonnes of carbon)



Source: WIPO, based on data published by Global Carbon Budget 2023.

Conclusion

The Global Innovation Tracker 2024 provides a comprehensive analysis of the current state of global innovation, revealing a complex landscape subject to economic, geopolitical and technological factors. Findings serve to highlight progress, as well as challenges across four key stages of the innovation cycle: science and innovation investment, technological progress, technology adoption, and the socioeconomic impact of innovation.

In conclusion, while global innovation has remained resilient over the past few years, it faces significant economic and geopolitical headwinds. Despite continued technological progress and growing technology adoption, achieving socioeconomic progress remains a challenge. The path forward requires sustained investment, the enhanced adoption of breakthrough technologies, and comprehensive strategies to harness innovation for socioeconomic and environmental benefit. The outlook for 2024 and 2025 remains uncertain, necessitating vigilant monitoring and adaptive strategies to navigate the evolving global landscape.

At this point, an important reminder is in order: the GII Global Innovation Tracker makes a significant effort to capture innovation investment and technological progress, adoption and impact through a limited set of indicators and to provide high-level trends via the Dashboard. While the indicators for investment impact are quite standard and comprehensive, the other indicators on technological progress, adoption and impact are more selective and experimental, and might not exhaustively capture today's broad range of innovative activity. Nonetheless, we hope this evolving tool will trigger a sound debate on better innovation measurement and policy, which will in turn improve both the innovation metrics and the Tracker itself, as a consequence.

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 investments captures R&D expenditures worldwide in PPP-adjusted constant 2015 prices. The 2022 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 2024 update); Eurostat and the Ibero-American and Inter-American Network of Science and Technology Indicators (RICYT). For those countries for which data were unavailable for 2022, the 2022 data were estimated using the last observation carried forward (LOCF) method for R&D intensities (R&D expenditures as a percentage of GDP) and applied to GDP PPP for the same year. R&D expenditures for 2023 were estimated for all countries, using the latest available R&D intensity and estimations of GDP growth at constant prices from the International Monetary Fund, World Economic Outlook Database, April 2024.

Top corporate R&D spenders' data is sourced from the European Commission's 2023 EU Industrial R&D Investment Scoreboard and further analyzed using WIPO calculations and the Bureau van Dijk (BvD) Orbis database, with all figures reported in current US dollars. The choice of the US dollar as the currency was arbitrary; however, its recent appreciation affects the valuation of R&D spending in foreign currencies, potentially skewing the perceived trends in R&D expenditure across different regions. To address these fluctuations and provide a more balanced view, the approach considers the contribution of each country to global R&D, weighting it according to their share of total R&D expenditure. The PPP-adjusted constant 2015-dollar measure is utilized to calculate each country's share in a given year. The R&D figures are then aggregated using a weighted average method, where these proportional shares serve as weights to compute the annual growth rates. This method helps mitigate the impact of currency valuation changes, offering a clearer picture of actual spending trends in R&D across various regions.

Venture capital (VC) deals refers to the absolute number of VC deals received by companies located within a region. VC value refers to the total amount of current US dollars invested – via venture capital – into companies located within a region. Source: Refinitiv Eikon data on private equity and venture capital, www.refinitiv.com/en/products/eikon-trading-software/private-equity-data.

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, www.wipo.int/ipstats. See also WIPO (2024).

Microchip transistor count (Moore's Law) refers to the number of transistors to be found on the most advanced, commercially available microchips in a given year. Source: Karl Rupp, https://github.com/karlrupp/microprocessor-trend-data.

Green supercomputersaverage efficiency of top 50 systems on the Green500 list. The Green500 ranks the most energy-efficient computer systems, by measuring computational capacity per unit of energy consumed (Gflops/Watts). Source: TOP500 (November 2023), www.top500.org/lists/green500.

Cost of renewable energycaptures the global weighted average levelized cost of electricity (LCOE) generation of solar photovoltaics and onshore and offshore wind. Source: International Renewable Energy Agency (IRENA), www.irena.org/Publications/2023/Aug/Renewable-Power-Generation-Costs-in-2022. See IEA (2023).

Electric battery price refers to the average lithium-ion battery price (in 2023 USD, including the cell, module and pack), weighted by power capacity (MWh), across all sectors. Source: BloombergNEF (BNEF), https://about.bnef.com/blog/lithium-ion-battery-pack-prices-hit-record-low-of-139-kwh.

Cost of genome sequencing refers to the cost of sequencing the DNA of one human genome (in USD). Source: National Human Genome Research Institute (NHGRI), US National Institute of Health, Wetterstrand KA. DNA sequencing costs: Data from the NHGRI Genome Sequencing Program (GSP), www.genome.gov/sequencingcostsdata.

Drug approvals refers to the number of novel active substances (NASs). A NAS is a new molecular or biologic entity or combination, where at least one element is new. Includes NASs launched anywhere in the world by year of first global launch. Launch is determined using IQVIA audits of sales activity, as well as companies' public statements.

Source: IQVIA Institute for Human Data Science, *Global Trends in R&D 2024: Activity, Productivity, and Enablers,* www.iqvia.com/insights/the-iqvia-institute/reports-and-publications/reports/global-trends-in-r-and-d-2024-activity-productivity-and-enablers.

Safe sanitationrefers to that portion of the population that uses an improved sanitation facility not shared with other households and where excreta are safely disposed of in situ or removed and treated off-site. Improved sanitation facilities include flush/pour toilets connected to piped sewerage systems; septic tanks or pit latrines; pit latrines with slabs; and composting toilets. Source: WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP), https://washdata.org.

Broadband penetration is equivalent to the number of fixed and (active) mobile broadband subscriptions, respectively, per 100 inhabitants. Source: International Telecommunication Union (ITU) World Telecommunication/ICT Indicators database, www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx.

5G coverage refers to the percentage of the population covered by 5G mobile network technology. Source: International Telecommunication Union (ITU), www.itu.int/en/ITU-D/Statistics/Pages/facts.

Robots is a measure of the number of robots currently deployed in industrial automation applications (also known as the operational stock of industrial robots). The stock is calculated assuming an average service life of 12 years with immediate withdrawal from service at the end of the period. Source: International Federation of Robotics (IFR), https://ifr.org/img/worldrobotics/Executive_Summary_WR_Industrial_Robots_2023.pdf.

Electric vehicle (EV) stock is the number of passenger cars worldwide that are battery electric vehicles (BEVs) or plug-in hybrid electric vehicles (PHEVs). EV share is the percentage of the total passenger car stock that is electric. Source: International Energy Agency, *Global EV Outlook 2024*. https://www.iea.org/data-and-statistics/data-tools/global-ev-data-explorer.

Cancer radiotherapy refers to the total number of linear accelerators per inhabitant. Linear accelerators (LINACs) are devices for delivering high-energy x-rays or electrons to cancers for a therapeutic purpose. A higher ratio indicates a better-equipped health care system. Penetration rate refers to the number of countries that meet minimal radiotherapy resource requirements worldwide, based on a rough assumption that one in every two cancer cases requires radiotherapy and that one machine is needed for every 500 patients requiring radiotherapy. Source: Special tabulations by International Atomic Energy Agency (IAEA) DIrectory of RAdiotherapy Centres (DIRAC) for the GII based on IAEA DIRAC (https://dirac.iaea.org) and IARC GLOBOCAN (https://gco.iarc.fr) databases.

Labor productivity (rates) refers to the world total of output per hour worked; (levels) refers to the world total of output per employee. Both indicators were estimated by The Conference Board. Source: The Conference Board Total Economy Database™, May 2024, https://conference-board.org/data/economydatabase.

Poverty refers to that part of the population living below the poverty line of USD 2.15 a day (2017 PPP). Source: World Bank Poverty and Inequality Platform, https://pip.worldbank.org.

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

Air temperature refers to the global mean estimate temperature anomaly with respect to the base period 1951–1980 based on land and ocean data. Source: NASA GISS, https://data.giss.nasa.gov/gistemp.

GII 2024 results

The GII unveils the world’s innovation leaders, gauging the innovation performance of 133 economies.

This section presents the highlights of the Global Innovation Index 2024 (GII), including a discussion on the top ranked economies by income group and world region, as well as identifying those economies that are overperforming on innovation relative to their level of development.

The GII 2024 rankings are mainly derived from 2022 and 2023 data points (about 80 percent of all data). Appendix I provides details on how to interpret the results, cautioning against simple year-on-year comparison of the GII rankings.

Innovation leaders in 2024

Asian middle-income economies China, India, Indonesia and Türkiye surge ahead. Thailand and Viet Nam move closer to the top 40. Morocco joins the group of middle-income economies within the GII top 70 that have climbed fastest in the GII ranking since 2013.

Switzerland ranks 1st in the GII for the 14th consecutive year (Figure 16). It is still the global leader in innovation outputs, ranking 1st in both Knowledge and technology outputs and Creative outputs. It also ranks in the top 5 of all the other GII pillars, with the exception of Infrastructure (7th). Sweden and the United States (US) maintain their respective 2nd and 3rd positions for the second consecutive year. Sweden leads in Infrastructure (1st), Business sophistication (1st), Knowledge and technology outputs (2nd) and Human capital and research (3rd). It holds top positions for its Researchers (1st), Intellectual property (IP) payments and receipts (both 1st), its Knowledge-intensive employment (3rd), its Global brand value (3rd) and its Low-carbon energy use (4th). The United States scores best in the world in nine of the 78 GII 2024 innovation indicators – behind Singapore. It ranks 1st in the world in indicators that include the quality of its universities, the impact of its scientific publications (H-index), software spending and IP receipts (Box 1).

Singapore (4th) moves further into the top 5 and is the economy with the greatest number of GII indicators ranking 1st in the world for the first time (with 14 out of 78 indicators – Box 1), overtaking the United States. However, even if Singapore moves closer to the top 3, breaking into that group remains challenging. The top 3 economies share the characteristics of both excelling across all GII pillars and successfully balancing their innovation inputs and outputs (Table 4). Even though Singapore has already surpassed Switzerland, Sweden and the United States in terms of innovation inputs, the gaps between Singapore and the top 3 still remain large in innovation outputs, and especially in Creative outputs.

The Republic of Korea moves up to 6th position and ranks in the top 3 worldwide in key indicators including Researchers (2nd), R&D expenditures (2nd), R&D performed by business (1st) and Production and export complexity (3rd).

Box 1 GII innovation indicators – 2024 trailblazers

Singapore takes the lead in 2024 in terms of the number of GII innovation indicators in which it ranks top globally, ranking 1st in the world in 14 out of 78 indicators and overtaking the United States. It leads in Regulatory quality, Policy stability for doing business, ICT access, Logistics performance, Venture capital received, Venture capital investors, High-tech manufacturing and GitHub commits.

The United States follows Singapore globally, ranking 1st worldwide in nine indicators (four less than in 2023), including holding the top spot in Global corporate R&D investors, Unicorn valuation and Intangible asset intensity. China follows in 3rd place, leading in eight innovation indicators (two more than in 2023), including Utility models, Trademarks and Industrial designs. Switzerland comes next, in 4th place, attaining the top ranking in University–industry R&D collaboration, Intellectual property payments and receipts and PCT patents. Japan, Israel, Hong Kong, China and Luxembourg, tie in 5th place, ranking 1st in six indicators, including Public research–industry co-publications, GERD performed by business, High-tech imports and Knowledge-intensive employment, respectively. They are followed by Sweden, the Republic of Korea and Iceland, tying in 9th place, leading in Researchers, Researchers working in the private sector (Research talent) and Low-carbon energy use, respectively.

In addition, certain middle- and low-income economies are excelling in various domains. Relative to other countries and to their own GDP or population, the Plurinational State of Bolivia, Cambodia and Nepal rank 1st in Loans from microfinance institutions, Malaysia in Graduates in science and engineering and Mexico in Creative goods exports. Correspondingly, Morocco leads in Industrial designs, the Islamic Republic of Iran in Trademarks and Namibia in Expenditure on education.

Box Table 1 Economies with the most GII indicators ranked top, 2024

Economy	Inputs	Outputs	Total
Singapore	9	5	14
United States	3	6	9
China	3	5	8
Switzerland	3	4	7
Japan	3	3	6
Israel	4	2	6
Hong Kong, China	4	2	6
Luxembourg	5	1	6
Sweden	2	3	5
Republic of Korea	2	3	5
Iceland	3	2	5

Note: The GII methodology allows multiple economies to rank 1st on any one indicator; see Economy profiles and Appendix I.
Source: Global Innovation Index Database, WIPO, 2024.

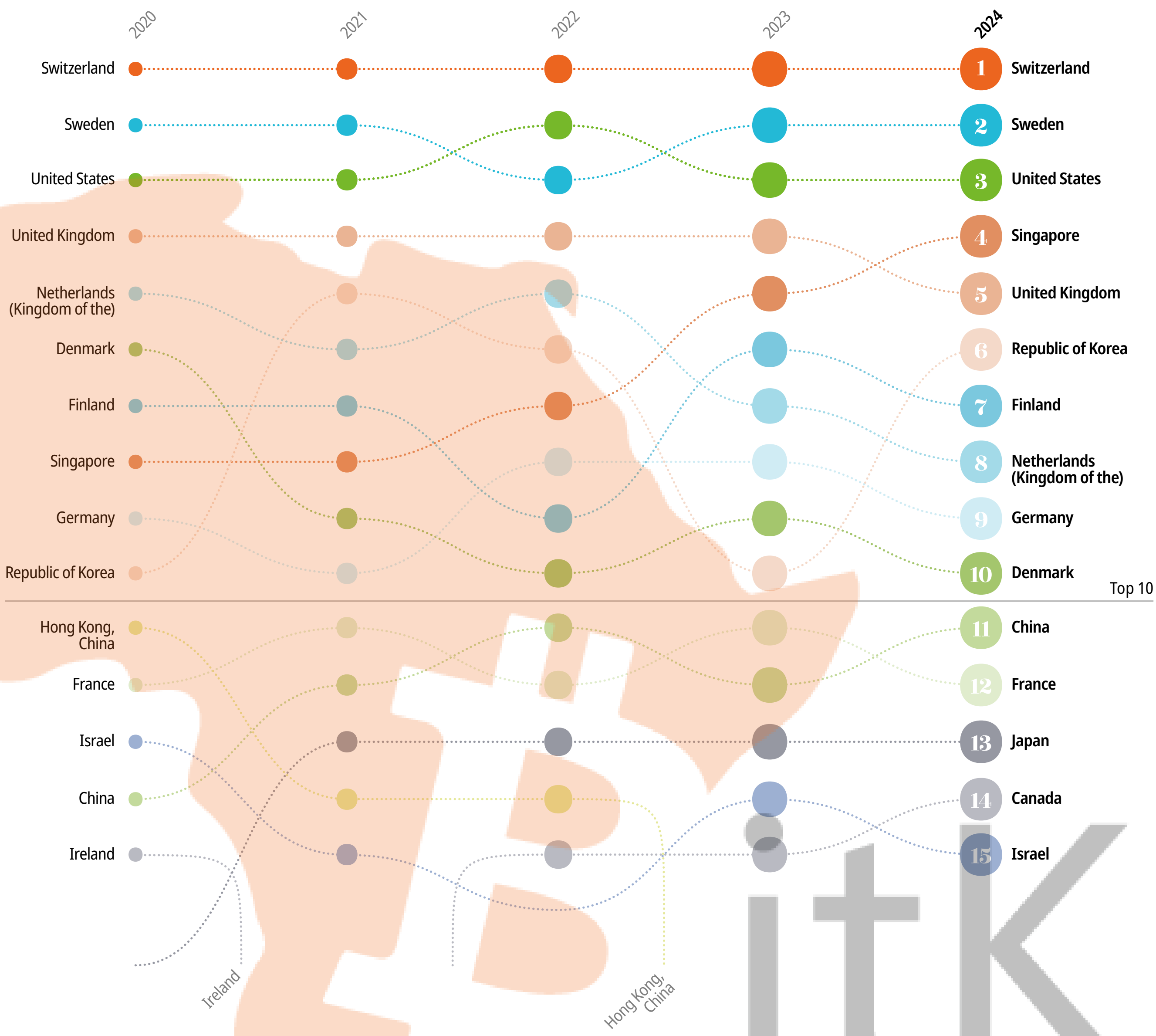
China moves up the ranking to 11th position, edging closer to the top 10 again. It maintains its 1st position among the upper middle-income group and 3rd position among economies in South East Asia, East Asia and Oceania, behind Singapore and the Republic of Korea. China is also the third economy with the greatest number of indicators ranked 1st, two more than in 2023, behind Singapore and the United States (Box 1). It ranks in the top 3 globally in indicators such as High-tech exports (1st), Global corporate R&D investors (2nd), Labor productivity growth (2nd) and GERD financed by business (3rd).

Japan remains firmly at the 13th rank – a position it has held since 2021. Canada makes a comeback, rising to 14th position, its best rank since 2014. It holds the highest rank globally in Venture capital (VC) recipients (1st), and Joint venture/strategic alliance deals (1st). It also holds tops ranks for the quality of its universities (4th) and the impact of its scientific publications (H-index – 4th).

Ireland (19th) and Luxembourg (20th) enter the top 20, climbing three ranks and one rank, respectively (Figure 17). In part influenced by the strong presence of foreign multinationals in the field of ICT, Ireland ranks top globally in ICT services exports (1st) and Intellectual property payments (1st) and ranks in the top 3 for its Intangible asset intensity (2nd).

Australia (23rd) and New Zealand (25th) also continue to move upward within the top 25. Australia excels in the quality of its universities (3rd), the impact of its scientific publications (6th) and its Knowledge-intensive employment (9th). New Zealand enters the top 25 with high rankings in Regulatory environment (5th), Firms offering formal training (5th) and Domestic credit to private sector (9th).

Figure 16 The GII dynamo: The top 15 innovators, 2020–2024



Note: Year-on-year comparisons of GII rankings need to take into account changes to the GII model that have occurred over time, as well as data availability.

Source: Global Innovation Index Database, WIPO, 2024.

European Union (EU) economies Cyprus (27th), Spain (28th) and the Czech Republic (30th) move up within the top 30, while Poland (40th) makes it into the top 40 (Figure 17). Beyond the EU, European economies Serbia (52nd) and Montenegro (65th) continue to improve their ranking, with Montenegro entering the top 70.

Apart from China, there are only four other middle-income economies among the top 40 economies this year: namely, Malaysia (33rd), Türkiye (37th), Bulgaria (38th) and India (39th). However, Thailand (41st) and Viet Nam (44th) move ahead, consolidating their positions in the top 45 and moving towards the top 40. With its best rank since 2009, Thailand is sustaining its long-term progression. Türkiye is also moving ahead, claiming 3rd position among the upper middle-income economies and overtaking Bulgaria. All these middle-income economies, with the exception of Bulgaria, moved up in the rankings this year.

The United Arab Emirates remains in 32nd place. Saudi Arabia (47th) and Qatar (49th) continue to climb upward into the top 50 and are the only two economies in the Middle East region to move up the ranking this year (Figure 17). Taking a broader view, among the Middle East economies, only the United Arab Emirates (32nd), the Islamic Republic of Iran (64th) and Oman (74th) have improved their position since 2013.

Georgia (57th) and Armenia (63rd) make important improvements, entering the top 60 and top 70, respectively. However, the position of both economies in the ranking has fluctuated over the years.

Northern African economies Morocco (66th) and Algeria (115th) experience notable improvements in their innovation ranking. Together with China, India, Indonesia (54th), the Islamic Republic of Iran (64th), the Philippines (53rd), Türkiye and Viet Nam, Morocco joins the group of middle-income economies within the GII top 70 that have made the biggest advances in the GII ranking since 2013 (Figure 17). Algeria ranks in the top 10 in Expenditure on education (10th), and in the top 20 globally for its Graduates in science and engineering (20th). It also made important progress in IP-related indicators including Patents (65th, up by 15 with its number of resident patent applications almost doubling in 2022), Trademarks (87th) and Industrial designs (46th).

Egypt holds the 86th position, with Cairo also entering the GII top 100 science and technology clusters ranking for the first time in 2024 (see Cluster ranking).

Brazil (50th) remains in the top 50 in 2024, keeping its leading position in Latin America and the Caribbean, ahead of Chile (51st) and Mexico (56th), both of which also move up the ranking. Moreover, Colombia (61st), Costa Rica (70th) and Paraguay (93rd) make the greatest headway in the region, with Costa Rica entering the top 70. Caribbean economy Barbados enters the GII in 2024 at the 77th position, after taking active steps to improve its innovation indicators (see Box 2).

The Philippines (53rd) and Indonesia (54th) continue to improve their GII ranking, with both entering the top 55. The Philippines claims 3rd position in the lower middle-income group. Indonesia enters the top 60 and is the economy in South East Asia, East Asia and Oceania that makes the greatest advancement in ranks in 2024. It makes notable improvements in Policy stability for doing business (13th) and key IP indicators, such as Industrial designs (64th), Trademarks (72nd) and PCT patents (82nd), even if these are still at moderate levels.

Ukraine (60th) drops by five positions and is now 4th among the lower middle-income group (Table 2). Its position is mostly affected by falls in indicators related to its Institutions (107th) and its Human capital and research (54th), including Tertiary enrolment (44th), School life expectancy (76th), Government effectiveness (99th) and Rule of law (115th). Foreign direct investment (FDI) inflows (88th) also dropped considerably.

In the last five years, Indonesia, Mauritius (55th), Saudi Arabia, Qatar, Brazil and Pakistan (91st) made the greatest advances in the GII, in order of their rank progression (Figure 17). Saudi Arabia performs relatively better in innovation inputs (36th) and excels in Market capitalization (1st), State of cluster development (2nd) and Global corporate R&D investors (16th). In contrast, Pakistan performs relatively well in innovation outputs, excelling in Mobile app creation (14th), ICT services exports (22nd) and Software spending (24th).

In Central and Southern Asia, Kazakhstan (78th) enters the top 80 (Figure 17). Kazakhstan performs better in innovation inputs (72nd), excelling in Government's online service (8th), Utility models (10th), E-participation (15th) and Entrepreneurship policies and culture (25th). Uzbekistan (83rd) remains in the top 85 and is the 10th ranking economy among the lower middle-income group (Table 2) – a significant improvement since 2013, when it held the 133rd spot. Sri Lanka (89th) consolidates its place in the top 90, while Kyrgyzstan (99th) takes a big stride into the top 100. Taking a longer term view, all economies in the region have made sustained progress in their rankings over the past decade. Uzbekistan, the Islamic Republic of Iran, Pakistan and India have made the largest advancements, in that order.

Eight out of the 27 economies from Sub-Saharan Africa (SSA) covered this year improve their ranking. Mauritius (55th) moves forward into the top 55, Cabo Verde (90th) consolidates its place in the top 90 while Senegal (92nd) moves closer to it. Kenya (96th) makes the largest improvement in the region, advancing four ranks into the top 100. Kenya improves notably in innovation outputs (87th, up by four positions), and in particular in Knowledge and technology outputs. Its most notable improvements are in the IP-related indicators Utility models (15th), Patents by origin (49th) and PCT patents (69th), all of which go up by around 20 ranks. It also makes notable improvements in ICT services exports (17th).

Beyond the top 100, Tajikistan (107th), Algeria (115th) and Burundi (127th) have progressed the most in the rankings. Bangladesh (106th) and Madagascar (110th), despite setbacks in 2024, have demonstrated GII rank improvements over the long run.

Burundi is the only low-income economy that moved up the ranking this year, while Uganda's ranking remains unchanged, in 121st position globally and 4th among its income group (Table 2).

Figure 17a Breaking barriers: Economies soaring to new heights in innovation, 2024

Top 20 — **Ireland** (19th) and **Luxembourg** (20th) make it into the top 20 in 2024

Top 30 — The **Czech Republic** (30th) joins the top 30

Top 40 — **Poland** (40th) makes it into the top 40

Top 50 — **Saudi Arabia** (47th) and **Qatar** (49th) continue to climb within the top 50

Top 60 — **Indonesia** (54th) and **Georgia** (57th) join the top 60

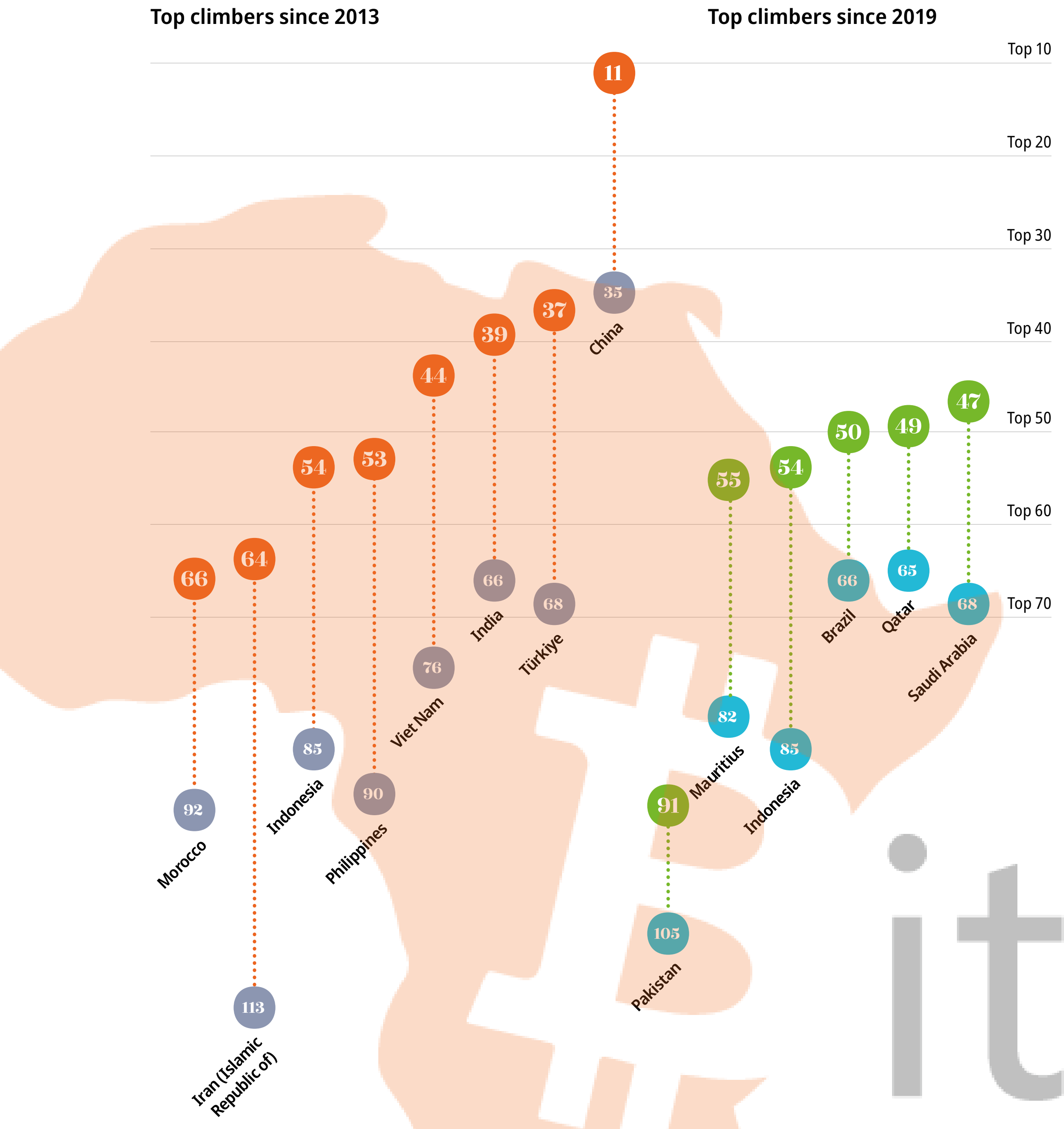
Top 70 — **Armenia** (63rd), **Montenegro** (65th) and **Costa Rica** (70th) join the top 70, while **Morocco** (66th) continues moving up

Top 80 — **Kazakhstan** (78th) joins the top 80 and **Barbados** joins the GII 2024 at the 77th position

Note: Year-on-year comparisons of GII rankings must take into account changes to the GII model that have occurred over time, as well as data availability.

Source: Global Innovation Index Database, WIPO, 2024.

Figure 17b Economies climbing the ladder



Note: Year-on-year comparisons of GII rankings must take into account changes to the GII model that have occurred over time, as well as data availability.

Source: Global Innovation Index Database, WIPO, 2024.

China (11th), Türkiye (37th), India (39th), Viet Nam (44th), the Philippines (53rd), Indonesia (54th), the Islamic Republic of Iran (64th) and Morocco (66th) are the group of middle-income economies within the GII top 70 which have climbed fastest in the ranking since 2013.

Standout economies' 5-year innovation surge, 2019–2024

In the last five years, Indonesia (54th), Mauritius (55th), Saudi Arabia (47th), Qatar (49th), Brazil (50th) and Pakistan (91st) ascended the most (in order of their rank progression).

Table 2 Top 10 Economies by income group

Income group rank	GII rank	**High-income economies** (51 in total)
1	1	Switzerland
2	2	Sweden
3	3	United States
4	4	Singapore
5	5	United Kingdom
6	6	Republic of Korea
7	7	Finland
8	8	Netherlands (Kingdom of the)
9	9	Germany
10	10	Denmark

Income group rank	GII rank	**Upper middle-income economies** (34 in total)
1	11	China
2	33	Malaysia
3	37	Türkiye
4	38	Bulgaria
5	41	Thailand
6	50	Brazil
7	52	Serbia
8	54	Indonesia
9	55	Mauritius
10	56	Mexico

Income group rank	GII rank	**Lower middle-income economies** (38 in total)
1	39	India
2	44	Viet Nam
3	53	Philippines
4	60	Ukraine
5	64	Iran (Islamic Republic of)
6	66	Morocco
7	67	Mongolia
8	73	Jordan
9	81	Tunisia
10	83	Uzbekistan

Income group rank	GII rank	**Low-income economies** (10 in total)
1	104	Rwanda
2	110	Madagascar
3	117	Togo
4	121	Uganda
5	127	Burundi
6	128	Mozambique
7	129	Burkina Faso
8	130	Ethiopia
9	131	Mali
10	132	Niger

Source: Global Innovation Index Database, WIPO, 2024.

Box 2 outlines important "dos and don'ts" to bear in mind when using the GII to improve an economy's innovation performance.

Box 2 How to best use the Global Innovation Index and what not to do

For many years, governments around the world have successfully used the GII to improve their economies' innovation performance and shape evidence-based innovation policies. A survey carried out by WIPO in 2024 showed that 77 percent of WIPO member states were using the GII to improve innovation ecosystems and metrics (up by roughly 20 percent in comparison to 2022, with 91 out of 118 responding member states using the GII), as well as it being a benchmark for national innovation policies or economic strategies across all world regions.

One major benefit of the GII is that it puts evidence and metrics at the core of conceiving, deploying and evaluating innovation policies. A first step brings together statisticians, innovation actors and policymakers to develop a clear understanding of a country's innovation performance. In a second step, the policy discussion turns to leveraging domestic innovation opportunities, while at the same time overcoming country-specific weaknesses. Both steps are an exercise in coordination among different public and private innovation actors, as well as between government entities. In a number of countries, the GII has facilitated such a dialogue between these actors.

Some dos:

- Ensure that innovation is embedded as a key priority in a country's pathway to national development and progress, possibly formulated within a clear innovation policy.
- Establish a cross-ministerial task force to pursue innovation policy matters through a "whole of government approach," ideally reporting to the top tier of government (for instance, the prime minister's office).
- Ensure that any innovation policy task force consults with innovation actors from both the private and public sectors, including startups, research universities and innovation clusters.
- Ensure that any national intellectual property (IP) policy is aligned with or integrated into the innovation law or strategy.
- Ensure that the targets of an innovation policy are clear, quantifiable and can be evaluated.

Some don'ts:

- Avoid nominating a single government entity to oversee the GII data and policy work, such as the intellectual property office or one ministry. This is a team effort involving different government entities, not the responsibility of one body working alone.
- Do not set overly ambitious, and therefore unrealistic, GII ranking targets. GII rankings rarely increase in leaps and bounds from one year to the next, particularly within the top 50.
- Do not expect policy changes to result in immediate improvement in GII indicator performance. There are significant lags between the formulation of innovation policy, its execution and its impact. The latest available innovation data is also rarely current, often lagging by a few years.
- Do not treat the GII as a mathematical exercise – that is, by attempting to collect or focus on specific indicators simply to climb the ranking. A country's GII rank alone is only a partial reflection of a national innovation ecosystem and related progress. Moreover, the GII framework changes regularly. Note also that the year-on-year changes within the GII are influenced by relative performance in relation to other countries, together with other methodological considerations (see Appendix I). Setting objectives over a period of years (for example, three to five years) and then reviewing combined progress over several years is a more appropriate way of using the GII.

With these caveats in mind, the GII has become a catalyst for the national collection of innovation indicators. As detailed in Appendix III, the vast majority of GII data is not collected by the World Intellectual Property Organization (WIPO) itself directly from its member states. Instead, WIPO uses data submitted by economies to those organizations that are globally responsible for collection of specific data (for example, the UNESCO Institute for Statistics for data relating to R&D).[1] For all other data sets, the GII team can help countries identify missing and outdated data (marked clearly in the economy profiles and briefs) and advise data collectors on how to remedy the situation. This system has proven remarkably effective in building more global and inclusive innovation and related data sets in WIPO's partner organizations, with better data coverage across all United Nations member states, effectively contributing to a useful public good that facilitates better innovation policymaking.

Finally, a new trend is the interest being expressed by countries in building sub-national innovation indices at the regional or city level that mirror the GII framework or comprise selected GII indicators.[2] WIPO is supporting this work in two ways: (i) by organizing workshops on the exchange of best practice, and (ii) by providing a background study on sub-national innovation indices. Member states are welcome to participate in these events and efforts, and to provide additional information on their sub-national innovation index plans and needs.

Innovation overperformers

India, the Republic of Moldova and Viet Nam continue to lead as the longest-standing innovation overperformers. Indonesia, Pakistan and Uzbekistan maintain their status as overperformers for a third consecutive year.

In the GII 2024, 19 economies are performing above expectation relative to their level of development – these are the GII innovation overperformers (Figure 18 and Table 3).

India, the Republic of Moldova and Viet Nam continue to be record holders by being innovation overperformers since 2011, for a 14th consecutive year. Viet Nam (44th) scores above its income level in all GII pillars, and even above the upper middle-income group, with the exception of Human capital and research. The Philippines (53rd) and Morocco (66th) keep their innovation

1 The sole exception is the intellectual property data that WIPO collects annually from member states. See https://www.wipo.int/web/ip-statistics.

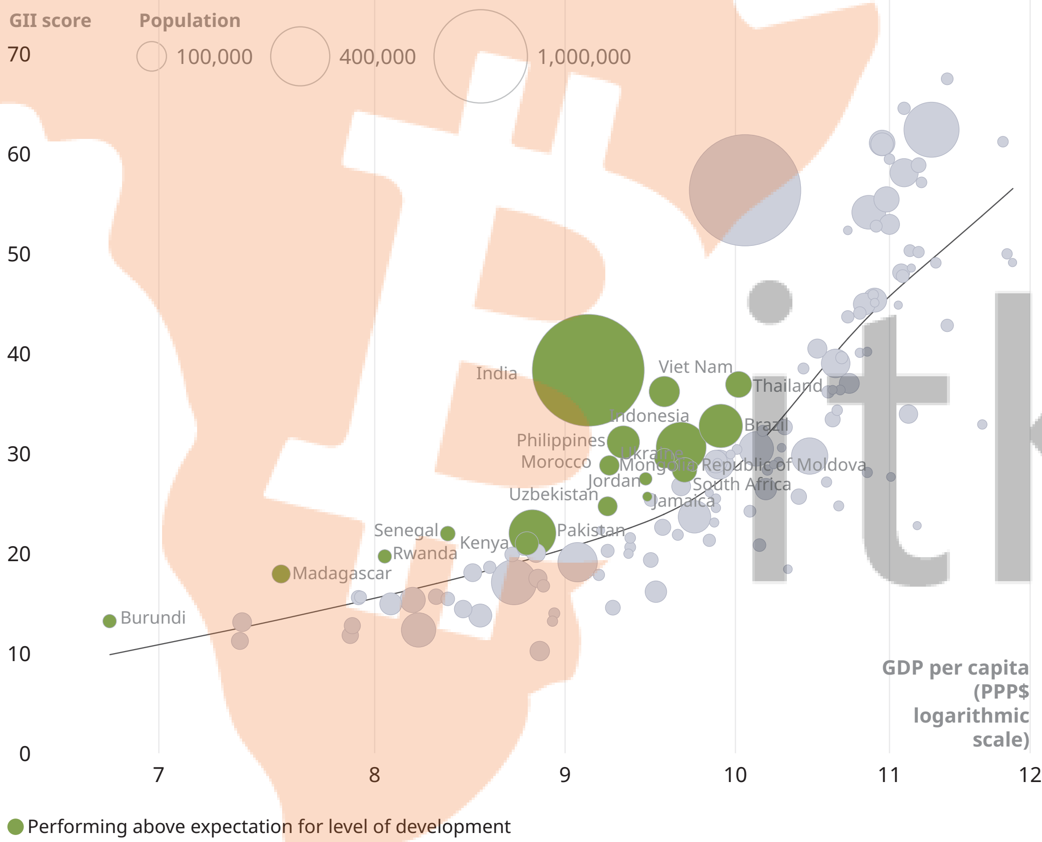
2 The recent WIPO study reviews the applicability of the GII framework to the development of sub-national innovation metrics. It analyses the existing sub-national innovation indices of WIPO member states who are pioneers in this field. It also determines which future innovation metrics are applicable to the measurement of innovation at the sub-national level, particularly those exploiting "big data" and new computational methods. See WIPO (2024a).

overperformer status for a sixth time, and both move up in the rankings this year. Senegal (92nd) retains its overperformer status again this year, after regaining its place in the prestigious list in 2023. In addition, Indonesia (54th), Uzbekistan (83rd) and Pakistan (91st) keep their overperformer status for a third consecutive year.

From a regional perspective, South East Asia, East Asia, and Oceania and Sub-Saharan Africa still have the same number of overperformers, with five each. Central and Southern Asia holds 3rd place, while Europe, Latin America and the Caribbean and Northern Africa and Western Asia tie in 4th place, with two overperforming economies each (Table 3).

Conversely, 41 economies are performing below expectation on innovation, the majority from Latin America and the Caribbean and Sub-Saharan Africa (both with 11 economies each). Among the high-income group, six are economies from Northern Africa and Western Asia: namely, the United Arab Emirates (32nd), Saudi Arabia (47th), Qatar (49th), Kuwait (71st), Bahrain (72nd) and Oman (74th), driven in large part by their natural-resource-driven high GDP per capita – a key factor for this analysis. In the upper middle-income group, three economies which perform below expectation are European economies, notably the Russian Federation (59th), Montenegro (65th) and Belarus (85th). In the lower middle-income group, 10 economies are performing below expectation for their level of development.

Figure 18 Innovation overperformers, relative to their economic development



Note: Bubbles sized according to population. The cubic spline trendline shows the expected level of innovation performance at different levels of GDP per capita for all economies covered in the GII 2024.

Source: Global Innovation Index Database, WIPO, 2024.

Table 3 Innovation overperformers in 2024: Income group, region and years as an innovation overperformer.

Economy	Income group	Region	Years as an innovation overperformer (total)
India	Lower middle-income	Central and Southern Asia	2011–2024 (14)
Republic of Moldova	Upper middle-income	Europe	2011–2024 (14)
Viet Nam	Lower middle-income	South East Asia, East Asia, and Oceania	2011–2024 (14)
Mongolia	Lower middle-income	South East Asia, East Asia, and Oceania	2011–2015, 2018–2024 (12)
Rwanda	Low-income	Sub-Saharan Africa	2012, 2014–2024 (12)
Ukraine	Lower middle-income	Europe	2012, 2014–2024 (12)
Thailand	Upper middle-income	South East Asia, East Asia, and Oceania	2011, 2014–2015, 2018–2024 (10)
Jordan	Lower middle-income	Northern Africa and Western Asia	2011–2015, 2022–2024 (8)
Madagascar	Low-income	Sub-Saharan Africa	2016–2018, 2020–2024 (8)
Senegal	Lower middle-income	Sub-Saharan Africa	2012–2015, 2017, 2023–2024 (7)
South Africa	Upper middle-income	Sub-Saharan Africa	2018–2024 (7)
Morocco	Lower middle-income	Northern Africa and Western Asia	2015, 2020–2024 (6)
Philippines	Lower middle-income	South East Asia, East Asia, and Oceania	2019, 2020–2024 (6)
Burundi	Low-income	Sub-Saharan Africa	2017, 2019, 2022–2024 (5)
Brazil	Upper middle-income	Latin America and the Caribbean	2021–2024 (4)
Jamaica	Upper middle-income	Latin America and the Caribbean	2020, 2022–2024 (4)
Indonesia	Upper middle-income	South East Asia, East Asia, and Oceania	2022–2024 (3)
Pakistan	Lower middle-income	Central and Southern Asia	2022–2024 (3)
Uzbekistan	Lower middle-income	Central and Southern Asia	2022–2024 (3)

Note: Income group classification follows the World Bank Income Group Classification (July 2023). Geographical regions correspond to the United Nations publication on standard country or areas codes for statistical use (M49).

Source: Global Innovation Index Database, WIPO, 2024.

Efficiency champions: Converting innovation investment into tangible innovation output

Middle-income economies, such as China and Türkiye, outdo their high-income peers in innovation outputs

Among high-income economies, Switzerland (1st) leads in producing higher levels of outputs compared to Sweden (2nd), the United States (3rd) and Finland (7th), while the United Kingdom (5th) and the Republic of Korea (6th) produce higher levels of outputs than the United States, but with lower input levels (Figure 19).

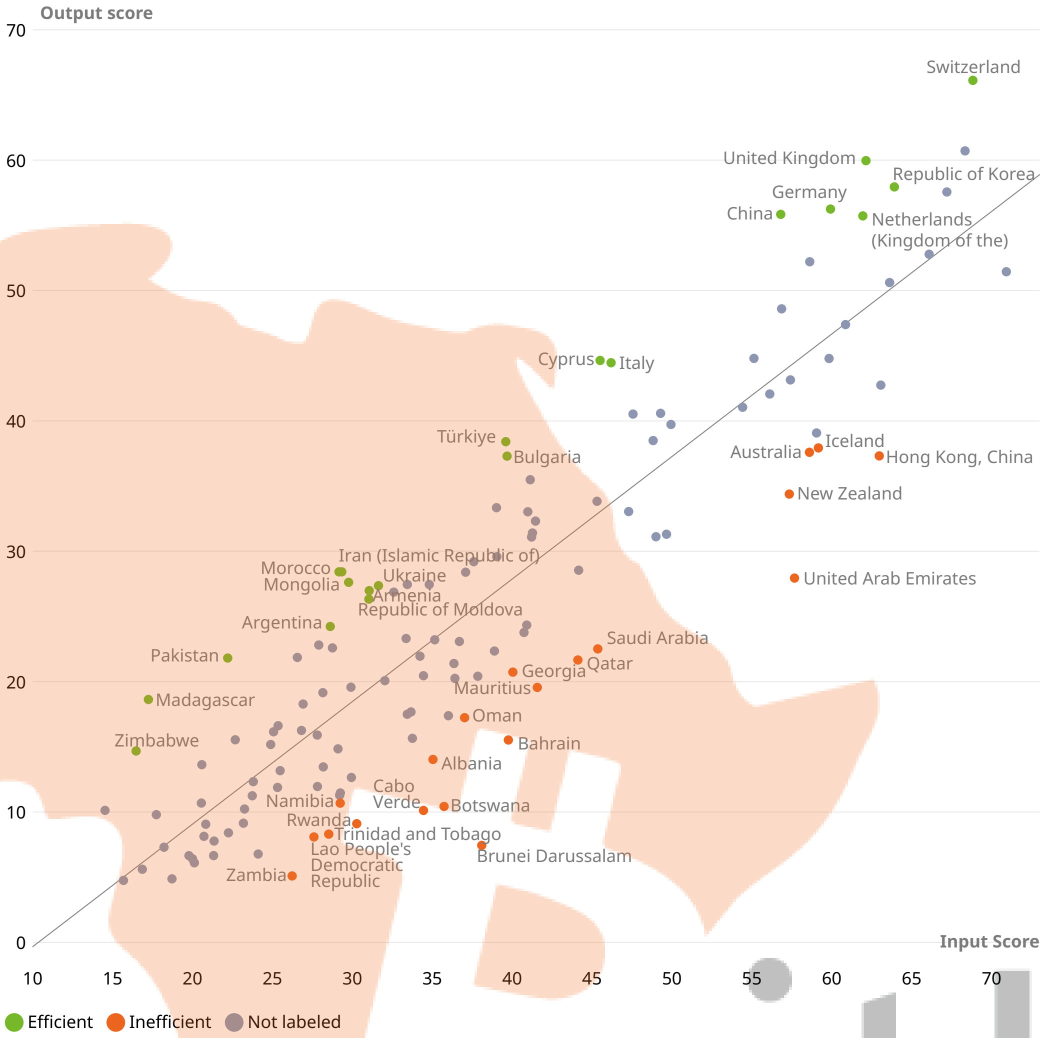
Among the upper middle-income group economies, China (11th) also shines, producing levels of outputs that are higher than those of high-income economies, such as Singapore (4th), Finland (7th), the Kingdom of the Netherlands (8th), Denmark (10th) and France (12th), but with fewer inputs. Türkiye (37th) does likewise relative to Iceland (22nd) and Australia (23rd); while Bulgaria (38th) also surpasses the level of outputs of New Zealand (25th) with lower input levels.

Among the lower middle-income group economies, the Islamic Republic of Iran (64th), Morocco (66th) and Pakistan (91st) are efficient innovators, while Madagascar (110th) stands out among the low-income group for its innovation efficiency.

However, certain economies, including Australia (23rd), the United Arab Emirates (32nd), Saudi Arabia (47th), Botswana (87th), Cabo Verde (90th) and Rwanda (104th), find it harder to translate inputs into outputs. This year, Serbia (52nd), Montenegro (65th), Peru (75th), Kazakhstan (78th), Azerbaijan (95th) and Kyrgyzstan (99th) have improved their performance in converting inputs into outputs.

Innovation leaders (top 25) demonstrate balanced and strong performance across all seven pillars. Beyond the top 10, which all have balanced ecosystems, this group includes France (12th), Japan (13th), Canada (14th), Estonia (16th), Austria (17th), Norway (21st) and Australia (23rd) (Table 4). Some lower ranked economies excel in specific innovation pillars, such as Botswana and Rwanda in Institutions (36th and 38th, respectively), Kyrgyzstan in Human capital and research (42nd), Albania (84th) in Infrastructure (31st) and the Islamic Republic of Iran and Cambodia in Market sophistication (17th and 39th, respectively). Barbados and Costa Rica rank relatively highly in Business sophistication (49th and 50th, respectively). India and Hungary excel in Knowledge and technology outputs (22nd and 25th, respectively), while Türkiye and Mongolia shine in Creative outputs (16th and 32nd, respectively). These examples showcase the diverse strengths of economies that are vibrant in innovation, which can be nurtured to enhance their overall rankings.

Figure 19 Innovation input to output performance, 2024



Note: Line corresponds to the fitted line between the input score and output score of all economies included in the GII 2024.
Source: Global Innovation Index Database, WIPO, 2024.

Innovation across the world's regions

Central and Southern Asia further narrows the gap with Latin America and the Caribbean, and outpaces it in innovation outputs

For yet another year, there are no changes in the rankings of the world's regions, based on an unweighted average GII score of all economies within a region. Northern America and Europe continue to lead, followed by South East Asia, East Asia, and Oceania (SEAO). Northern Africa and Western Asia follow, while Latin America and the Caribbean, Central and Southern Asia (CSA) and Sub-Saharan Africa follow at a greater distance. However, this year the distance dividing economies in Latin America and the Caribbean and CSA is very small – on average no more than 0.10 GII score points. In fact, on average, economies in CSA have already surpassed Latin American and Caribbean economies in innovation outputs (by an average of 1.3 GII score points) but remain behind in innovation inputs (by an average of 1.5 score points).

Northern America

Largely driven by the United States, Northern America, which comprises the United States and Canada, is still the most innovative world region, maintaining a comfortable performance gap in relation to Europe. The United States holds stable in 3rd position, while Canada moves up to 14th place. Canada performs well in Market sophistication (4th), Business sophistication (13th), Human capital and research (11th) and Institutions (14th), ranking ahead of the United States in the latter two pillars. It continues to rank in the top 10 for its University–industry R&D collaboration (5th), its Researchers working in the private sector (Research talent, 8th) and its Intellectual property payments (9th).

Europe

Europe still hosts the highest number of innovation leaders among the top 25 – 15 in total, with seven among the top 10. Malta (29th) exits the group of innovation leaders this year. Out of the 39 European economies covered, only nine move up the ranking this year (10 fewer than last year): namely, Austria (17th), Ireland (19th) and Luxembourg (20th) (the latter two both entering the top 20), Spain (28th), the Czech Republic (30th) (entering the top 30), Poland (40th) (entering the top 40), Croatia (43rd), Serbia (52nd), and Montenegro (65th) (reaching the top 70).

Among economies that are improving, Austria excels in Domestic industry diversification (3rd), Production and export complexity (7th), R&D expenditures (8th), which reached 3.2 percent of GDP in 2022, and Public research–industry co-publications (8th). Spain is performing well in Software spending (12th), Industrial designs (13th) and Global corporate R&D investors (15th).

Serbia gets closer to the top 50 with a strong performance in Domestic industry diversification (11th), ICT services exports (12th), Scientific and technical articles (13th) and Cultural and creative services exports (14th).

South East Asia, East Asia, and Oceania

Seven South East Asia, East Asia, and Oceania (SEAO) economies are world innovation leaders – one more than in 2023 – namely, Singapore (4th), the Republic of Korea (6th), China (11th), Japan (13th), Hong Kong, China (18th), Australia (23rd) and New Zealand (25th). New Zealand goes up by two ranks and joins the innovation leaders. These seven economies continue to lead in key innovation indicators. Singapore leads globally (1st) in 14 indicators (Box 1) including Venture capital received, the Republic of Korea in Patents China in High-tech exports, Japan in PCT patents, Hong Kong, China in Market capitalization and Australia in School life expectancy.

Eleven economies within the SEAO region (out of 17 covered) improve their rankings this year, with Indonesia (54th) again making the greatest advance and entering the top 60. Indonesia excels in University–industry R&D collaboration (6th), Policy stability for doing business (13th) and Intangible asset intensity (13th).

Table 4 Heatmap: GII 2024 rankings overall and by innovation pillar, 2024

Economy	Overall GII	Institutions	Human capital and research	Infrastructure	Market sophistication	Business sophistication	Knowledge and technology outputs	Creative outputs
Switzerland	1	3	4	7	5	4	1	1
Sweden	2	16	3	1	9	1	2	6
United States	3	17	12	30	1	2	4	8
Singapore	4	1	2	11	7	3	9	19
United Kingdom	5	26	7	18	3	14	5	3
Republic of Korea	6	24	1	9	15	5	10	2
Finland	7	4	6	2	11	8	6	17
Netherlands (Kingdom of the)	8	9	14	25	14	7	8	7
Germany	9	19	5	27	13	18	11	5
Denmark	10	2	9	8	21	12	13	10
China	11	44	22	5	16	11	3	14
France	12	29	16	19	10	17	16	4
Japan	13	23	19	13	8	6	12	22
Canada	14	14	11	21	4	13	20	25
Israel	15	34	18	41	12	9	7	30
Estonia	16	12	31	6	6	27	21	15
Austria	17	18	8	10	32	23	18	24
Hong Kong, China	18	8	15	16	2	25	58	12
Ireland	19	11	25	20	48	16	14	28
Luxembourg	20	5	28	53	30	10	36	9

Table 4 *Continued*

Economy	Overall GII	Insti-tutions	Human capital and research	Infra-structure	Market sophist-ication	Business sophist-ication	Knowledge and technology outputs	Creative outputs
Norway	21	6	20	4	31	22	26	26
Iceland	22	13	26	3	22	21	37	21
Australia	23	15	10	15	20	26	28	29
Belgium	24	21	13	44	46	15	15	36
New Zealand	25	7	23	12	34	20	45	31
Italy	26	55	30	28	38	34	19	18
Cyprus	27	46	46	45	41	29	23	13
Spain	28	49	27	14	33	31	24	23
Malta	29	39	35	37	42	19	48	11
Czech Republic	30	30	32	24	75	30	17	33
Portugal	31	37	21	46	36	33	33	20
United Arab Emirates	32	10	17	17	26	24	56	40
Malaysia	33	27	38	52	18	36	35	49
Slovenia	34	41	24	26	62	32	27	48
Lithuania	35	22	44	38	28	38	29	55
Hungary	36	53	34	35	60	28	25	44
Türkiye	37	100	40	40	37	48	43	16
Bulgaria	38	83	62	22	50	44	30	27
India	39	54	51	72	23	58	22	43
Poland	40	73	36	51	61	35	47	35
Thailand	41	74	71	50	25	41	39	38
Latvia	42	42	45	33	53	40	51	39
Croatia	43	68	41	23	54	54	32	50
Viet Nam	44	58	73	56	43	46	44	34
Greece	45	57	29	42	66	65	40	41
Slovakia	46	63	52	47	68	43	31	58
Saudi Arabia	47	35	33	49	27	79	68	67
Romania	48	81	70	32	67	47	38	56
Qatar	49	20	48	39	59	68	82	61
Brazil	50	103	57	55	47	39	50	42
Chile	51	48	58	54	44	51	65	59
Serbia	52	67	50	29	40	63	41	85
Philippines	53	65	84	85	77	37	42	60
Indonesia	54	40	90	67	35	78	73	65
Mauritius	55	33	69	87	24	69	91	62
Mexico	56	106	63	71	56	56	55	47
Georgia	57	32	60	74	64	55	72	77
North Macedonia	58	75	77	43	69	52	53	72
Russian Federation	59	126	39	76	57	53	52	53
Ukraine	60	107	54	82	85	45	34	68
Colombia	61	80	87	64	70	42	61	66
Uruguay	62	31	83	48	94	70	69	81
Armenia	63	77	89	79	83	85	60	46
Iran (Islamic Republic of)	64	133	64	95	17	110	49	52
Montenegro	65	86	61	57	52	59	74	70
Morocco	66	78	81	88	82	125	70	37
Mongolia	67	93	86	73	106	61	86	32
Republic of Moldova	68	90	68	89	63	105	64	51
South Africa	69	91	79	75	49	57	63	63
Costa Rica	70	47	82	59	87	50	59	86
Kuwait	71	66	53	60	76	120	67	69
Bahrain	72	28	75	36	80	83	83	95
Jordan	73	52	85	90	55	72	76	76
Oman	74	43	66	63	73	86	87	82
Peru	75	85	49	62	51	77	95	74
Argentina	76	123	55	77	97	60	77	54
Barbados	77	50	80	108	107	49	57	89
Kazakhstan	78	76	65	68	86	66	85	83
Jamaica	79	59	98	104	110	75	94	45
Bosnia and Herzegovina	80	110	72	69	29	104	71	94
Tunisia	81	102	47	107	84	119	54	73
Panama	82	82	99	58	95	112	90	64
Uzbekistan	83	62	93	70	78	71	78	103
Albania	84	60	101	31	91	64	89	99
Belarus	85	132	43	84	98	81	46	92
Egypt	86	94	96	92	74	103	81	78
Botswana	87	36	74	97	79	62	112	108
Brunei Darussalam	88	25	56	65	105	82	115	124

Table 4 *Continued*

Economy	Overall GII	Insti-tutions	Human capital and research	Infra-structure	Market sophist-ication	Business sophist-ication	Knowledge and technology outputs	Creative outputs
Sri Lanka	89	101	110	66	109	87	79	84
Cabo Verde	90	45	102	34	103	89	100	111
Pakistan	91	118	119	125	90	73	66	71
Senegal	92	70	106	81	72	123	62	112
Paraguay	93	96	115	61	88	102	113	75
Lebanon	94	128	59	116	45	80	80	93
Azerbaijan	95	51	94	102	114	67	103	96
Kenya	96	87	118	106	101	93	75	101
Dominican Republic	97	61	104	83	116	97	106	91
El Salvador	98	99	109	101	89	90	101	80
Kyrgyzstan	99	119	42	78	81	117	107	104
Bolivia (Plurinational State of)	100	127	67	124	19	84	120	102
Ghana	101	71	113	105	129	76	116	79
Namibia	102	56	91	113	93	92	122	105
Cambodia	103	89	111	103	39	124	98	106
Rwanda	104	38	95	93	117	113	105	114
Ecuador	105	109	100	80	113	94	96	98
Bangladesh	106	108	128	86	92	126	92	88
Tajikistan	107	104	92	109	96	101	84	115
Trinidad and Tobago	108	72	37	110	128	111	104	121
Nepal	109	111	130	100	65	116	110	97
Madagascar	110	124	108	133	99	130	124	57
Lao People's Democratic Republic	111	88	121	96	58	106	108	123
Côte d'Ivoire	112	69	129	98	126	98	128	100
Nigeria	113	125	78	127	121	107	121	87
Honduras	114	122	88	112	100	100	99	110
Algeria	115	95	76	94	132	114	125	109
Zambia	116	92	97	91	112	95	131	131
Togo	117	112	116	126	108	121	111	107
Zimbabwe	118	130	127	128	119	91	97	90
Benin	119	64	112	118	123	108	117	129
United Republic of Tanzania	120	79	132	111	120	118	129	113
Uganda	121	84	123	120	124	129	102	116
Guatemala	122	114	126	117	111	88	109	125
Cameroon	123	98	114	129	130	74	119	117
Nicaragua	124	129	117	114	71	99	118	130
Myanmar	125	131	107	115	102	132	93	118
Mauritania	126	97	120	122	131	109	127	127
Burundi	127	115	105	119	118	122	132	120
Mozambique	128	121	122	99	104	127	130	128
Burkina Faso	129	105	103	132	115	131	114	126
Ethiopia	130	117	133	123	133	128	88	122
Mali	131	113	124	131	122	96	123	133
Niger	132	116	131	130	125	115	126	132
Angola	133	120	125	121	127	133	133	119

< 34   34–67   67–100   ≥ 100

Notes: Dark green = 4th quartile (best performers, ranks 1st to 33rd). Light green = 3rd quartile (ranks 34th to 66th). Light orange = 2nd quartile (ranks 67th to 99th). Dark orange = 1st quartile (ranks 100th to 133rd).

Source: Global Innovation Index Database, WIPO, 2024.

The Philippines goes up three ranks to reach the 53rd position. This year it has also attained 3rd position in the lower middle-income group (Table 2). Notable areas in which it excels are trade-related indicators, including High-tech exports (1st globally), High-tech imports (4th), Creative goods exports (14th) and ICT services exports (19th). It has also made advances, albeit at lower levels, in intangible assets, thanks to its strong Global brand value (34th) – and the intangible asset intensity of its companies (35th).

Thailand (41st) and Viet Nam (44th) continue to make advances towards the top 40. Both economies also excel in trade-related indicators. Viet Nam ranks 1st globally in High-tech exports, High-tech imports and Creative goods exports, while Thailand ranks 7th in Creative goods exports and 8th in High-tech exports. Thailand also excels in Utility models (5th) and Domestic credit to private sector (8th), while Viet Nam stands out for its Labor productivity growth (3rd) and Mobile app creation (7th). Both economies also rank in the top 30 for their global brands, with Viet Nam reaching the 22nd position globally and Thailand the 26th position.

Australia (23rd), Malaysia (33rd) and Mongolia (67th) also move up the ranking.

Central and Southern Asia

Within Central and Southern Asia, India continues to lead, moving one spot forward to the 39th position. India leads the lower middle-income group (Table 2). It holds top ranking within the Central and Southern Asia region for Knowledge and technology outputs (22nd), Creative outputs (43rd), Institutions (54th) and Business sophistication (58th). India's strengths lie in key indicators such as ICT services exports (1st), Venture capital received (6th) and Intangible asset intensity (7th). India's unicorn companies also secure the country the 8th rank globally.

In addition to India, four other economies within the region move up the ranking: Kazakhstan (78th), Sri Lanka (89th), Kyrgyzstan (99th) and Tajikistan (107th). Kazakhstan retains the 3rd place in the region, behind the Islamic Republic of Iran (64th, down by two places). Kyrgyzstan excels in Expenditure on education (3rd), Loans from microfinance institutions (10th) and Low-carbon energy use (13th).

Uzbekistan (83rd) retains its 4th position within the region, with its top performance in Labor productivity growth (7th) and Graduates in science and engineering (12th).

Northern Africa and Western Asia

In Northern Africa and Western Asia, Israel (15th) leads the region, despite moving down one rank this year. It leads in several key innovation indicators, ranking 1st globally in R&D expenditure, Venture capital received, R&D performed by business, ICT services exports and Unicorn valuation.

Türkiye continues to forge ahead, gaining two ranks to reach 37th place. It also takes the 3rd position among the upper middle-income group (Table 2). Türkiye stands out in various areas, notably in Intangible assets (4th), where it ranks 1st globally in Trademarks and Industrial designs, and 9th in Intangible asset intensity – all these indicators showing an improvement this year.

Eight economies within the region move up the ranking. Saudi Arabia (47th) and Qatar (49th) move ahead one spot each, consolidating their positions in the top 50. Georgia moves up to 57th place, entering the top 60, while Armenia (63rd) enters and Morocco (66th) consolidates its position in the top 70. Morocco ranks 1st globally in Industrial designs and ranks in the top 30 on Expenditure on education (20th), Intangible asset intensity (22nd), Gross capital formation (27th), High-tech manufacturing (27th) and Trademarks (30th).

Cyprus (27th) and Algeria (115th) also gain one and four ranks, respectively.

Latin America and the Caribbean

In Latin America and the Caribbean, the regional top 3 remain unchanged: Brazil (50th) retains the top position, followed by Chile (51st) and Mexico (56th). Chile and Mexico improve their positions by one and two ranks, respectively. Chile holds top positions in Tertiary enrolment (7th), Market capitalization (17th) and FDI net inflows (19th). Mexico comes top in trade and high-tech indicators, including Creative goods exports (1st), High-tech exports (11th), High-tech imports (16th) and High-tech manufacturing (15th).

Seven additional economies within the region also improved their ranking: Colombia (61st) – one of the largest jumps in the region, matched only by Paraguay (93rd), Uruguay (62nd), Costa Rica (70th), Peru (75th), Panama (82nd) and Honduras (114th).

Colombia climbs five ranks this year, improving notably in the Innovation Output Sub-Index (62nd). It ranks 18th globally for the valuation of its three unicorn companies, whose joint value represent about 2 percent of its GDP in 2024. It also leads in Intellectual property payments (11th) and High-tech imports (15th).

Uruguay is the regional leader in Institutions (31st) and Infrastructure (48th), Trinidad and Tobago leads in Human capital and research (37th), and Brazil is top of the region in Business sophistication (39th), Knowledge and technology outputs (50th) and Creative outputs (42nd).

Costa Rica leads in the top 10 in Labor productivity growth (10th) and ICT services exports (10th). Barbados rejoins the GII 2024 at the 77th position, leading globally (1st) in Patent families and PCT patents, and performing in the top 20 in Patents by origin (4th) and Venture capital recipients (16th).

This year, Brazil (50th) and Jamaica (79th) continue to perform above expectation for their level of development (Table 3).

Box 3 Innovation as the driver of the United Nations Sustainable Development Goals

The 2030 Agenda for Sustainable Development, with its 17 Sustainable Development Goals (SDGs), has set an ambitious agenda to drive sustainable development efforts around the world. While technology and innovation are key enablers for the delivery of sustainable and effective solutions to achieve all the SDGs, fostering innovation is integral to SDG 9 "Industry, innovation and infrastructure", with specific targets that aim to promote the increase of R&D expenditure as a proportion of GDP (9.5.1) and to increase the number of researchers per million inhabitants (9.5.2), both of which are also important GII indicators.[3]

In this context, the GII has been recognized as an authoritative benchmark for measuring innovation within the 2019, 2021 and 2023 UN General Assembly biennial resolutions on Science, Technology and Innovation for Sustainable Development. The resolution specifically encourages "efforts to increase the availability of data to support the measurement of national innovation systems (such as the existing GII) and empirical research on innovation and development to assist policymakers in designing and implementing innovation strategies".[4] This relevance of the GII and WIPO's work to the SDGs is further amplified by contributions to the ninth annual Multi-stakeholder Forum on Science, Technology and Innovation for the SDGs (STI Forum) held in New York on May 9 and 10, 2024.[5]

Sub-Saharan Africa

In Sub-Saharan Africa, only Mauritius (55th) ranks among the top 60. Three of the region's other economies rank within the top 90 globally: namely, South Africa (69th), Botswana (87th) and Cabo Verde (90th). Two additional economies – Senegal (92nd) and Kenya (96th) – rank in the top 100. Eight of the region's economies move up the GII ranking, including Mauritius, Cabo Verde, Senegal, Kenya, Zambia (116th), Benin (119th), Mauritania (126th) and Burundi (127th).

Burundi, Madagascar (110th), Rwanda (104th), Senegal and South Africa are also innovation overperformers this year, with Rwanda's period of overperformance lasting longest, at 12 years (Table 3). Kenya gains four places and consolidates its place in the top 100. It performs well in Venture capital recipients (13th), Utility models (15th), ICT services exports (17th) and Labor productivity growth (29th).

3 See https://sdgs.un.org/goals/goal9.
4 Resolution adopted by the General Assembly on 19 December 2023, 78/160. Science, technology and innovation for sustainable development A/RES/78/160.
5 As part of the Forum's program, WIPO led an expert conversation on the post-pandemic state of the global innovation system, co-sponsored and co-organized by the Permanent Mission of India to the United Nations, the Confederation of Indian Industry and the Oxford University Saïd Business School; and co-led the organization of the Forum's dedicated session on gender and STI, focusing on advancing sustainable development with women-centered science and technology solutions, delving into the gender gap in STI and the limited consideration of women's perspectives in STI solutions. For more on the role of intellectual property in achieving SDGs, see WIPO (2023) and www.wipo.int/sdgs.

Mauritius ranks highest in the region in Institutions (33rd), Human capital and research (69th) and Market sophistication (24th). It leads worldwide in Venture capital received (1st) and ranks 2nd in Venture capital investors. Cabo Verde leads the region in Infrastructure (34th), ranking 1st in Gross capital formation. South Africa tops the region in Business sophistication (57th) and performs well in ICT services imports (18th) and Global brand value (24th).

Senegal leads the region in Knowledge and technology outputs (62nd). It also performs well in Gross capital formation (4th), Unicorn valuation (7th), Loans from microfinance institutions (9th), FDI net inflows (12th) and Venture capital received (22nd).

Finally, Madagascar heads the region in Creative outputs (57th), performing well in Industrial designs (14th) and Trademarks (21st), both of which show improvement this year.

Conclusion

The latest GII rankings highlight the following points:

- There have been shifts within the world's top innovators. Within the top 10, the top 3 remain unchanged, while Singapore and the Republic of Korea advance. China – the only middle-income economy among the innovation leaders – bounces back to 11th position, edging closer to the top 10 once again (after having dropped back by one place last year). Within the top 25, Canada, Austria, Ireland, Luxembourg, Australia and New Zealand ascend, with Ireland and Luxembourg entering the top 20, and New Zealand the top 25.

  - Europe still hosts the highest number of economies in the top GII ranking echelons – seven in the GII top 10 and 15 in the GII top 25.

- A small number of leading innovative middle-income economies are showing remarkable progress in their innovation performance.

  - China remains the frontrunner, but other key players previously identified by the GII, such as Indonesia (54th) (entering the top 60), the Philippines (53rd), Türkiye (37th), Viet Nam (44th) and India (39th), ordered by their rank progression in 2024, are also all climbing the ranks. Thailand (41st) is demonstrating increased potential, nearing the top 40 – its best rank since 2009 – and sustaining its progression over the long run. Additionally, Morocco (66th) has emerged as one of the fastest climbers within the top 70 since 2013. These middle-income economies, despite some of them suffering setbacks in their performance in the GII 2021 and 2022 (e.g. Viet Nam, the Philippines and Indonesia), exhibit resilience and strategic long-term focus on innovation, even amid the challenges posed by the economic recovery from the COVID-19 pandemic. Moreover, these economies share common traits: they are all Asian economies; they are emerging markets with potential for rapid growth due to industrialization, urbanization and globalization; all have diverse economic structures; and they are heavily integrated in global value chains and high-tech trade.
  - Other economies have also demonstrated great progress over the long term, albeit at lower rankings, sustaining their rank increases since 2013. This group, which demonstrates high potential – despite some short-term setbacks, includes notable long-term, climbers Uzbekistan (83rd), the Islamic Republic of Iran (64th), Pakistan (91st), Madagascar (110th) (the only low-income economy in this group), Bangladesh (106th) and Egypt (86th) (ordered by their rank progression since 2013).

- With no new additions, this year 19 economies are performing above expectation relative to their level of development. Indonesia, Pakistan and Uzbekistan have maintained their overperformer status for the third consecutive year, indicating a potentially sustainable positive trend.

  - In contrast, 41 economies are performing below expectation in 2024, most of which are in Latin America and the Caribbean and Sub-Saharan Africa.
  - More middle- and low-income economies would benefit from a systematic and gradual improvement of the set-up and performance of their innovation ecosystem.

- Nine economies in Latin America and the Caribbean have risen in the ranking, including top regional performers Chile and Mexico. While these advancements are undoubtedly positive, this year's results indicate that, on average, other world regions, such as Central and Southern Asia, will soon overtake Latin America and the Caribbean in terms of innovation performance. This should serve as a call to action for policymakers in Latin America and the Caribbean to sustain and enhance their long-term innovation efforts.
- In Sub-Saharan Africa, Mauritius remains the highest ranking economy, while eight economies, including Kenya and Senegal, have moved up the GII ranking in 2024. Madagascar, Côte d'Ivoire (112th) and Togo (117th) have made the greatest advances in the region since 2013. However, large economies, such as South Africa (69th), Nigeria (113th) and Ethiopia (130th) have lost ground in the ranking this year, and most of them (with the exception of Kenya) have not been able to sustain their rank progression over time.

The GII will continue to monitor the evolving innovation landscape. The dynamic ecosystems observed in key middle-income economies showcase remarkable resilience and strategic prioritization of innovation. The GII will persist in providing robust data and insights to inform evidence-based policymaking, ensuring that both high-income and emerging economies can navigate and bridge the innovation gap effectively.

Cluster ranking

The GII reveals the world's top 100 science and technology (S&T) clusters and identifies the most S&T- intensive top global clusters.

The GII 2024 top 100 science and technology clusters

The Global Innovation Index (GII) ranks the world's leading economies according to their innovation capabilities. A common thread among top-performing nations is the presence of thriving science and technology (S&T) clusters. Since 2016, the GII has employed a bottom-up approach to identifying such clusters. This methodology disregards administrative or political borders and instead pinpoints those geographical areas with a high density of inventors and scientific authors. The resulting clusters identified in this way often span several municipal districts, sub-federal states, and sometimes even two or more countries.

Two innovation metrics are used to compile the top 100 GII S&T clusters worldwide (see methodological Appendix IV for details). The first metric focuses on the location of inventors listed in published patent applications under the WIPO Patent Cooperation Treat (PCT).[1] The second metric considers the authors listed on published scientific articles.

S&T clusters – which can be entire regions or cities – serve as the backbone of a robust national innovation ecosystem. Situated in areas such as San Francisco's Silicon Valley, Cambridge, Munich and Paris in Europe, or Bengaluru, Seoul, Shenzhen and Tokyo in Asia, these S&T clusters are home to renowned universities, brilliant scientists, R&D-intensive companies, and prolific inventors. It is the collaboration among these entities that results in the groundbreaking scientific advancements and inventions that propel national, regional and global innovation forward.

The GII recognizes the significance of these regional hubs and charts annually the world's top 100 S&T clusters (Map 1). These areas boast the highest density of inventors and scientific authors globally.

The GII 2024 also presents S&T clusters beyond the top 100 in order to shed light on other areas around the world with an appreciably high level of science and technology. In addition, the GII 2024 takes a first step toward highlighting S&T clusters within Africa, a region whose output is typically not taken account of when clustering at the global level.

Lastly, to complement this section of the GII, a series of "Top Clusters Briefs" (link) provide further details on top ranking hotspots. This complements other work undertaken by WIPO to better measure and understand sub-national innovation activity (de Rassenfosse, G. and S. Wunsch-Vincent , 2024).[2]

Tokyo–Yokohama plus six other Asian and three US clusters lead the top 100 S&T clusters

Among the top 100 S&T clusters, Tokyo–Yokohama (Japan) is the top performing cluster, followed by Shenzhen–Hong Kong–Guangzhou (China and Hong Kong, China). Both clusters rank one and two owing to having a large output of PCT applications, thanks in great part to patents filed by Mitsubishi Electric located in Tokyo–Yokohama and Huawei located in Shenzhen–Hong Kong–Guangzhou, respectively. When combined, Tokyo–Yokohama and Shenzhen–Hong Kong–Guangzhou account for almost one in every five PCT applications filed globally.

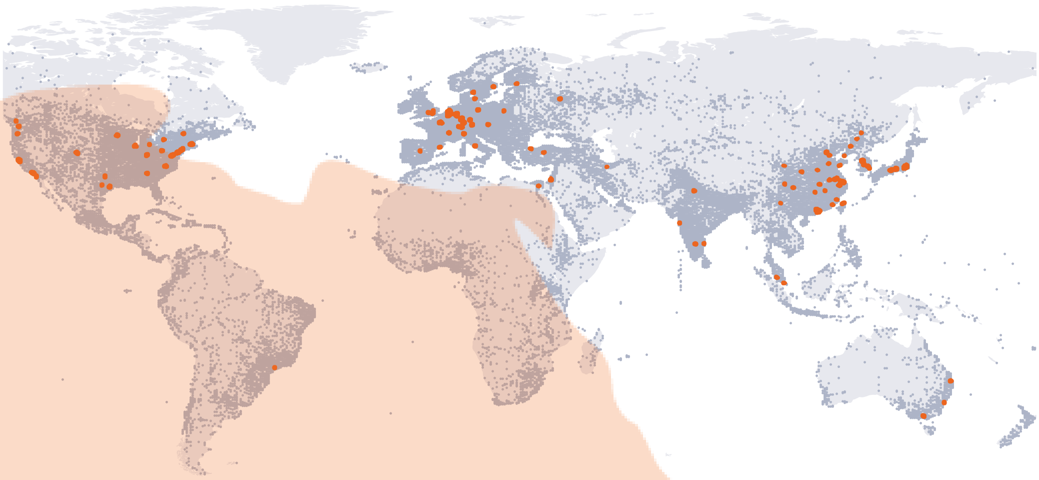
Beijing (China), Seoul (Republic of Korea) and Shanghai–Suzhou (China) follow, ranking 3^{rd}, 4^{th} and 5^{th}, respectively. Beijing (China) reclaims third spot in the rankings, overtaking Seoul (Republic of Korea) in fourth, in 2024. Shanghai–Suzhou (China) is in the top 5, primarily owing to

1 The WIPO Patent Cooperation Treaty (PCT) assists applicants in seeking patent protection internationally for inventions, helps patent offices with patent granting decisions, and facilitates public access to a wealth of technical information relating to those inventions. By filing one international patent application under the PCT System, applicants can simultaneously seek protection for an invention in a large number of countries (https://www.wipo.int/pct/en).

2 See Box 2 in GII 2024 Results and "WIPO General Assemblies 2024 – Side Event Global Innovation Index: Measuring and Promoting Sub-national Innovation Performance: The Role of Regional Innovation Indices," July 12, 2024, and "Workshop – Global Innovation Index Sharing of Experiences in the Creation & Implementation of Regional Innovation Indices," June 7, 2022.

a strong growth in PCT filings. San Jose–San Francisco, CA (United States of America (US)) follows in 6th position.

Map 1 Top 100 clusters worldwide, 2024



Note: Noise refers to all inventor/author locations not classified as being within a cluster.
Source: WIPO Statistics Database, April 2024.

The four remaining top 10 clusters are unchanged from the previous year, with the exception of Nanjing (China), replacing San Diego, CA (United States), which is 10th and New York City, NY, which is now 11th. Nanjing's growth was spurred by its scientific article output, primarily from authors affiliated with Southeast University and Nanjing University.

This year five clusters entered the top 100 for the first time. Nanchang (China) located in the eastern part of Jiangxi Province secures the 94th position. Cairo (Egypt) enters the top 100 ranked 95th. This marks the first time that a Northern African cluster is represented within the top 100 S&T clusters. Following closely behind Cairo's entrance are two Chinese clusters entering the top 100 for the first time: Kunming, the capital of Yunan Province China (98th), and Macao Special Administrative Region of China–Zhuhai (Macao SAR–Zhuhai) (100th).

For Nanchang (Nanchang University), Cairo (Cairo University) and Kunming (Kunming University of Science and Technology), their total output was primarily in the form of scientific articles, which experienced strong growth in all three clusters and is the reason for their entry into the top 100. Macao SAR–Zhuhai's primary output is PCT patents, thanks in large measure to the presence of GREE Electric Appliances, which accounts for almost half of Macao SAR–Zhuhai's applications. Similarly to the other three newcomers to the top 100, the driver behind Macao SAR–Zhuhai's increased standing in the ranking is a growth in published scientific articles.

Kuala Lumpur (Malaysia) ranked 93rd also appears in the top 100 S&T clusters for the first time. Kuala Lumpur achieved this status thanks to improved geocoding accuracy assigning more author and inventor locations to that city.[3] MIMOS (Malaysia's National Applied Research and Development Centre) is Kuala Lumpur's top patent applicant and active in semiconductor research, and the Universiti Malaya the top publishing organization.

Clusters within China once again demonstrated significant increases in S&T output in 2024. China hosts the two fastest growing clusters globally – Hefei (+22.7 percent) and Zhengzhou (+18.9 percent).[4] Hefei's growth was driven by a strong PCT applications growth, and in particular the growth of applications filed by ChangXin Memory Technologies headquartered

3 See the methodological Appendix IV.
4 Net S&T output refers to a change in combined output of both components (PCT filings and SCIE articles) over time.

in Hefei. Zhengzhou's rapid growth was instead driven by the number of scientific articles published, the largest contributor being Zhengzhou University.

Clusters located in other middle-income economies besides China also experienced strong S&T output growth. Cairo (Egypt) had the highest growth rate for this group at 10.9 percent. Chennai (India) with 7.8 percent and Istanbul (Türkiye) with 7.5 percent also had a high rate of growth for this group.

High-income economy clusters generally grew at a slower pace than clusters in middle-income economies, with 37 out of the 63 high-income clusters witnessing negative net S&T output for the period. Nevertheless, notable exceptions to this trend exist among high-income economy clusters. Daejeon (Republic of Korea, +6.9 percent), Seoul (+4.1 percent) and San Diego, CA (+4.2 percent) once again had strong growth years. Warsaw (+3.1 percent) in Poland also experienced strong growth.

The top S&T clusters for each economy or cross-border region are shown in Table 5. The leading clusters per country remain unchanged from last year, except for Sydney overtaking Melbourne to become the leading Australian S&T cluster, with the University of Sydney publishing the most scientific articles and Cochlear, the medical device company, filing the most patent applications. It is notable that Samsung Electronics (Republic of Korea) is also the leading patentee in Bengaluru, Moscow and Warsaw (beyond Seoul).

Table 5 Top S&T cluster by economy or cross-border region ranked among the top 100, 2024

Rank	Cluster name	Economy	Rank change	Top applicant	Top organization
1	Tokyo–Yokohama	JP	0	Mitsubishi Electric	University of Tokyo
2	Shenzhen–Hong Kong–Guangzhou	CN/HK	0	Huawei	Sun Yat Sen University
3	Beijing	CN	1	BOE Technology	Tsinghua University
4	Seoul	KR	−1	Samsung Electronics	Seoul National University
6	San Jose–San Francisco, CA	US	0	Google	Stanford University
12	Paris	FR	−1	L'Oréal	Sorbonne Université
21	London	GB	−1	Nicoventures Trading	University College London
22	Munich	DE	−1	BMW	Technical University of Munich
25	Taipei–Hsinchu	TW*	2	Hewlett-Packard	National Taiwan University
26	Amsterdam–Rotterdam	NL	−1	TNO	Utrecht University
30	Tel Aviv–Jerusalem	IL	0	Tel Aviv University	Hebrew University of Jerusalem
31	Moscow	RU	0	Samsung Electronics	Lomonosov Moscow State University
33	Singapore	SG/MY	1	National University of Singapore	National University of Singapore
38	Tehran	IR	−3	Abdolahad, Mohammad	University of Tehran
40	Stockholm	SE	−2	LM Ericsson	Karolinska Institutet
44	Sydney	AU	0	Cochlear	University of Sydney
48	Madrid	ES	−1	LM Ericsson	Complutense University of Madrid

Table 5 *Continued*

Rank	Cluster name	Economy	Rank change	Top applicant	Top organization
50	Zürich	CH	−1	ETH Zürich	ETH Zürich
52	Milan	IT	−1	Pirelli Tyre	University of Milan
53	Brussels–Antwerp	BE	−3	Agfa	KU Leuven
54	Toronto, ON	CA	−2	DH Technologies Development	University of Toronto
56	Bengaluru	IN	1	Samsung Electronics	IISC – Bangalore
57	Copenhagen	DK	−2	Novozymes	University of Copenhagen
59	Istanbul	TR	1	Arcelik	Istanbul Technical University
71	Helsinki	FI	1	Nokia	University of Helsinki
73	São Paulo	BR	−2	Braskem	Universidade de São Paulo
74	Vienna	AT	1	Technische Universitat Wien	Medical University of Vienna
90	Warsaw	PL	−1	Samsung Electronics	University of Warsaw
93	Kuala Lumpur	MY	0	MIMOS Berhad	Universiti Malaya
95	Cairo	EG	8	Si-Ware Systems	Cairo University
96	Basel	CH/DE/FR	−1	DSM IP Assets	University of Basel

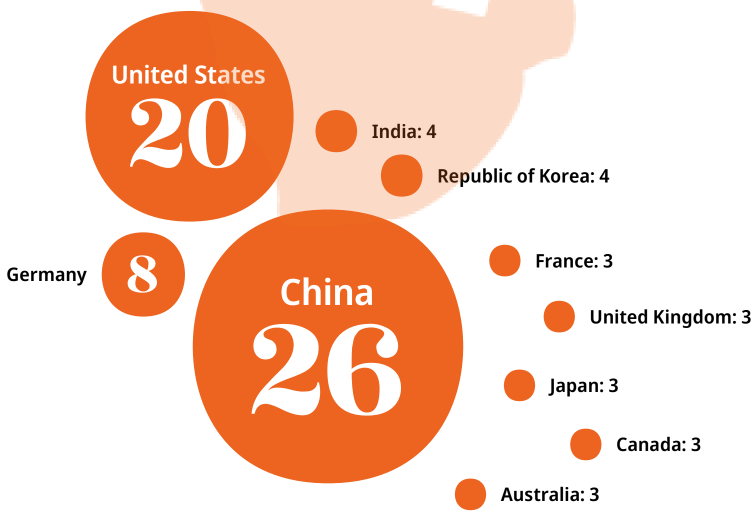
Notes: Tables in this section use ISO alpha-2 country codes, with the following additions: TW* = Taiwan, Province of China; IISC – Bangalore = Indian Institute of Science – Bangalore, TNO = Nederlandse Organisatie Voor Toegepast Natuurwetenschappelijk Onderzoek. Economy labels were assigned to a cluster, when at least 1 percent of a cluster's output occurred in a given economy.

Source: WIPO Statistics Database, April 2024.

China and the United States have the most S&T clusters in the top 100 S&T

In 2024, as in previous years, the top 100 S&T clusters continue to be predominantly located in three regions: North America, Europe, and Asia, with a particular concentration in two key economies: China and the United States (see Map 1).

Table 6 Economies with three or more top 100 S&T clusters, 2024



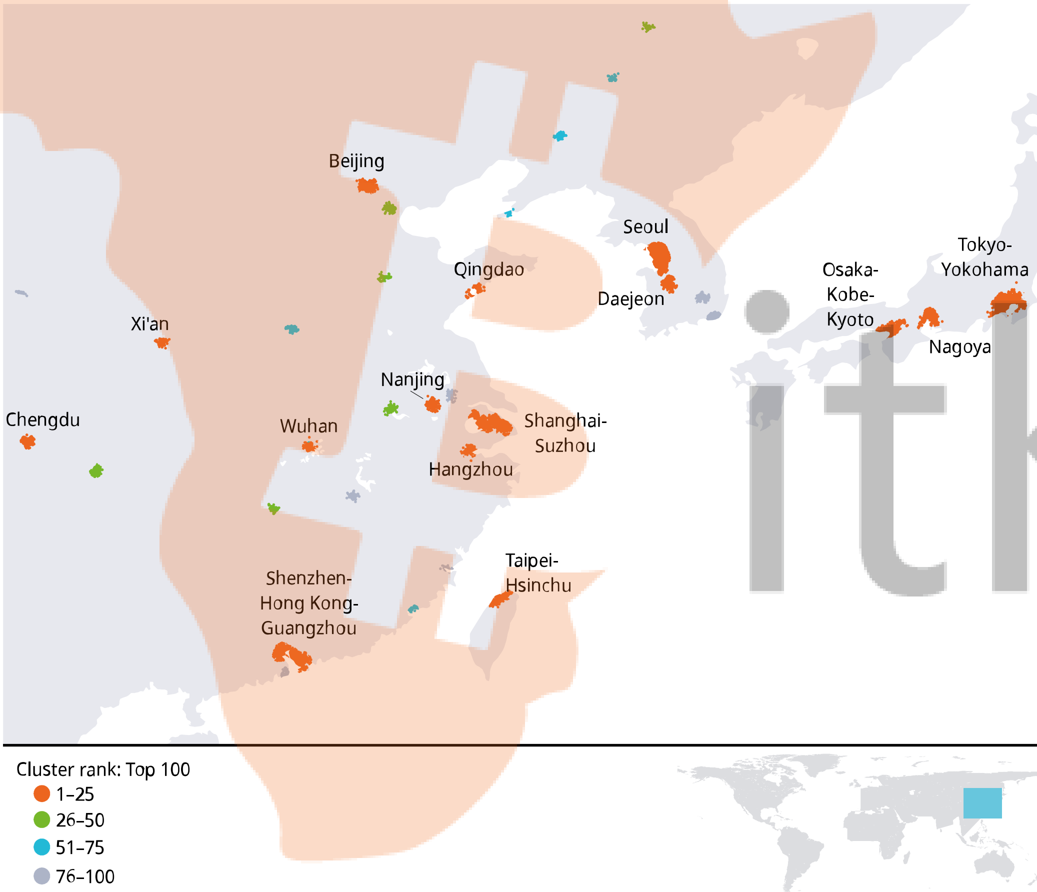
Source: WIPO Statistics Database, April 2024.

China, for the second consecutive year, leads with the most clusters (26) in the top 100 (Map 2). The United States follows closely behind with 20 clusters. Germany ranks third with eight clusters in the top 100, with Munich (22nd), Cologne (27th) and Stuttgart (29th) its top three clusters. India, with its top cluster of Bengaluru (56th) in southern India, and the Republic of Korea both have four clusters in the top 100. France, the United Kingdom (UK), Japan and Canada each have three clusters in the top 100. Paris (12th) leads France's ranking, while London (21st) represents the United Kingdom's top cluster. Canada's top cluster is Toronto, Ontario (54th).

In addition to China, seven other middle-income economies have clusters among the top 100. They are:

- Brazil (1 cluster), with São Paulo, the sole top 100 S&T cluster within Latin America;
- Egypt (1), with Cairo, the sole top 100 S&T cluster within Africa (see Map 2);
- India (4), with Bengaluru, Delhi, Chennai and Mumbai;
- Islamic Republic of Iran (1), with Tehran;
- Malaysia (2), with Kuala Lumpur and its cross-border clusters shared with Singapore (see Map 2);
- Russian Federation (1), with Moscow; and
- Türkiye (2), with Istanbul and Ankara.Türkiye (2), with Istanbul and Ankara.

Map 2a Top S&T clusters, East Asia, 2024

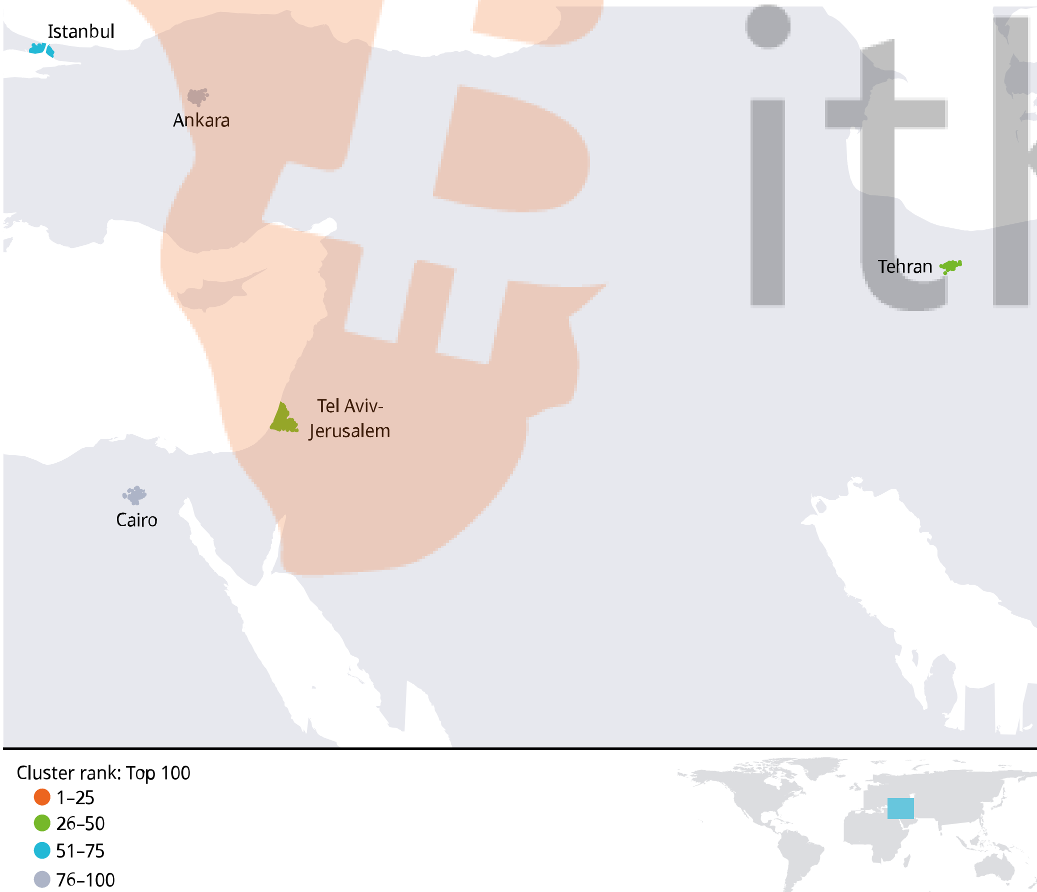


Source: WIPO Statistics Database, May 2024.

Map 2b Top S&T clusters, United States, 2024

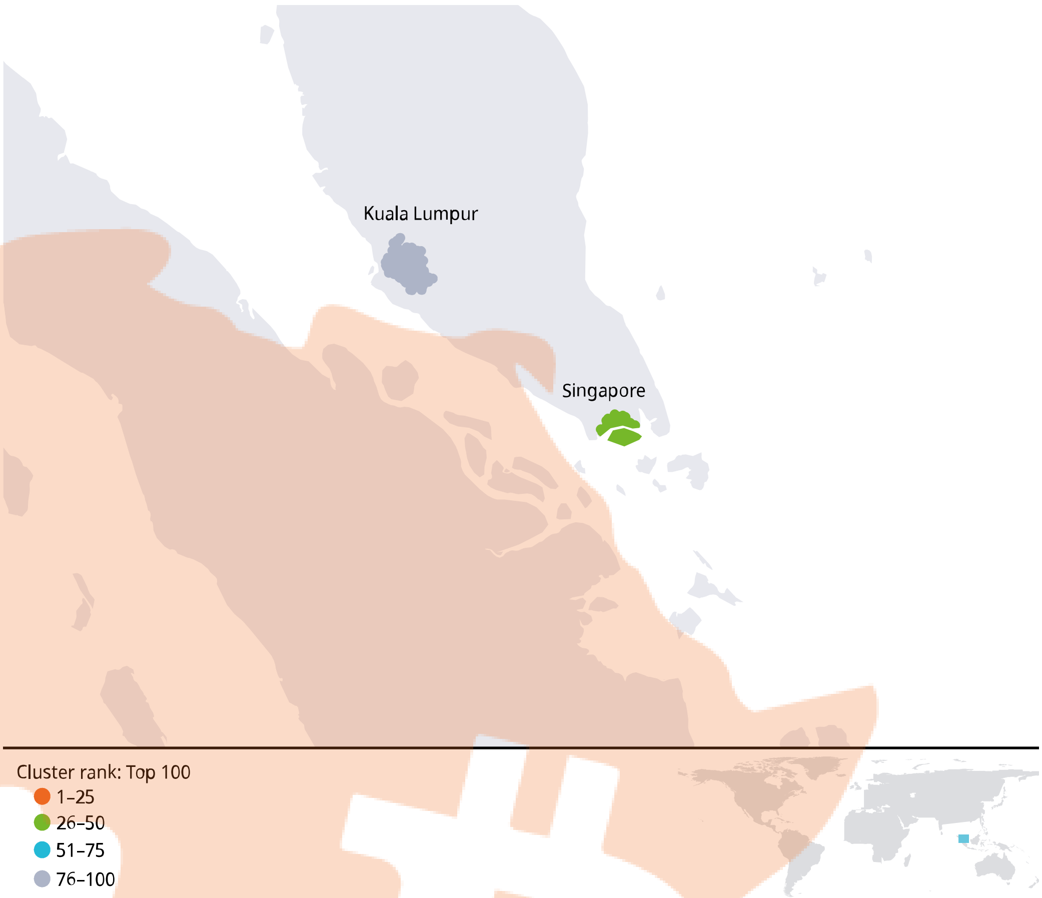
Source: WIPO Statistics Database, May 2024.

Map 2c Top S&T clusters, Middle East, 2024



Source: WIPO Statistics Database, May 2024.

Map 2d Top S&T clusters, Malaysia and Singapore, 2024



Source: WIPO Statistics Database, May 2024.

Beyond the top 100, Bangkok, Buenos Aires, Cairo, Kuala Lumpur and Mexico City are top middle-income economy S&T clusters

Based on the same parameters applied to produce the top 100 ranking S&T clusters globally, an additional 132 clusters were identified beyond the top 100, including 24 clusters based in the United States, 15 in China and 11 in each of France and Germany.

Table 7 identifies top S&T clusters in economies not previously represented in the top 100, including Portugal and Saudi Arabia, which each had two clusters.

Middle-income economies Argentina, Mexico, Pakistan, Serbia and Thailand all host a top S&T cluster in the extended list, namely, Buenos Aires, Mexico City, Islamabad, Belgrade and Bangkok, respectively.

Table 7 Top S&T clusters in extended ranking, economies not covered by the top 100 S&T clusters, 2024

Economy	Economy name	Clusters beyond top 100	Cluster name(s)
PT	Portugal	2	Lisbon and Porto
SA	Saudi Arabia	2	Dammam and Riyadh
AR	Argentina	1	Buenos Aires
CL	Chile	1	Santiago
CZ	Czech Republic	1	Prague
GR	Greece	1	Athens
HU	Hungary	1	Budapest
IE	Republic of Ireland	1	Dublin
MX	Mexico	1	Mexico City
NZ	New Zealand	1	Auckland
NO	Norway	1	Oslo
PK	Pakistan	1	Islamabad
RO	Romania	1	Bucharest
RS	Serbia	1	Belgrade
TH	Thailand	1	Bangkok

Source: WIPO Statistics Database, April 2024.

Top science or S&T clusters in Africa

The GII 2024 has sought to identify the top S&T clusters within Africa that would not otherwise have been captured by the GII methodology determining the global 100 top S&T clusters.

To begin, a similar clustering methodology used at the global level was applied to authors and inventors located within the region of Africa. By lowering the density parameter sufficiently (see Appendix IV for more details), the top 50 African clusters were identified (Map 3 and Table 7 for the results).

In addition to Cairo, which has already been highlighted as a GII S&T top 100 ranking cluster, Johannesburg (South Africa), Cape Town (South Africa), Tunis (Tunisia) and Alexandria (Egypt) comprise the top 5 S&T clusters within Africa.

Egypt has the most clusters (11, with Cairo leading), followed by South Africa (8, with Johannesburg leading), Morocco (5, with Rabat leading), Nigeria (4, with Ibadan leading), Tunisia (4, Tunis leading), Ethiopia (2, with Addis Ababa leading), Ghana (2, with Accra leading), Kenya (1, with Nairobi leading), followed by Algeria, Benin, Burkina Faso, Cameroon, the Congo, Côte d'Ivoire, the Democratic Republic of the Congo, Malawi, Senegal, Sudan, Uganda, the United Republic of Tanzania, Zambia and Zimbabwe with each one cluster. Appendix Table 6 shows the top patentees and publishing organizations for said clusters, with the majority of top institutions active in medical technology, and civil engineering, for example.

It is noteworthy, that many, but not all, African clusters are primarily driven by scientific articles and not PCT patenting activity. Hence in certain cases it is more appropriate to label them as African top science clusters, rather than African S&T clusters. That said, it would be wrong to assume that African S&T clusters do not patent at all. Firstly, the clusters in Egypt, South Africa, Morocco, and Tunisia, but also Algeria and Kenya, show significant international patent filing activity. Secondly, it is useful to recall that the GII methodology to determine top S&T clusters only captures patents filed under the PCT System. PCT patents tend to be patents that seek protection in more than one jurisdiction, and therefore does not include the more numerous set of patents that only seek protection in a single jurisdiction, usually the applicants domestic jurisdiction (national patents). While some clusters have modest PCT filing activity as of yet, these same clusters often still show healthy domestic patenting activity. Future editions of the

GII will unpack some such clusters in greater detail, including for other world regions in addition to Africa.

Map 3 Top science or S&T clusters within Africa

Source: WIPO Statistics Database, April 2024.

Table 8 Top science or S&T clusters within Africa

Economy name	Cluster count	Clusters names
Egypt	11	Cairo, Alexandria, Mansoura, Zagazig, Banha–Shibin El Kom, Asyut, Tanta, Beni Suef, Minya, Kafr El-Shaikh, Ismailia
South Africa	8	Johannesburg, Cape Town, Durban, Bloemfontein, Pietermaritzburg, Potchefstroom, Grahamstown, Port Elizabeth
Morocco	5	Rabat, Casablanca, Marrakesh, Fès, Oujda
Nigeria	4	Ibadan, Nsukka, Lagos, Abuja
Tunisia	4	Tunis, Sfax, Monastir, Sousse
Ethiopia	2	Addis Ababa, Gondar
Ghana	2	Accra, Kumasi
Algeria	1	Algiers
Benin	1	Cotonou
Burkina Faso	1	Ouagadougou
Cameroon	1	Yaoundé
Congo	1	Kinshasa–Brazzaville
Côte d'Ivoire	1	Abidjan
Democratic Republic of the Congo	1	Kinshasa–Brazzaville
Kenya	1	Nairobi
Malawi	1	Blantyre
Senegal	1	Dakar
Sudan	1	Khartoum
Uganda	1	Kampala
United Republic of Tanzania	1	Dar es Salaam
Zambia	1	Lusaka
Zimbabwe	1	Harare

Source: WIPO Statistics Database, April 2024.

S&T intensity of the top 100 clusters: Europe and the United States occupy the top 5 spots, with Cambridge (United Kingdom) and San Jose–San Francisco, CA (United States) out in the lead

Since 2020, the GII has also presented the top 100 clusters ranked by S&T intensity. This ranking is based on the sum of patent and scientific publication shares divided by population. This work draws on geospatial imagery in order to estimate the underlying population level (see Appendix IV).

Table 9 Top 25 S&T clusters by S&T intensity, 2024

Rank per-capita	Cluster name	Economy	Top applicant	Top scientific organization
1	Cambridge	GB	ARM	Cambridge University
2	San Jose–San Francisco, CA	US	Google	Stanford University
3	Eindhoven	NL	Philips Electronics	Eindhoven University of Tech.
4	Oxford	GB	Oxford University	Oxford University
5	Boston–Cambridge, MA	US	MIT	MIT
6	San Diego, CA	US	Qualcomm	University of California San Diego
7	Daejeon	KR	LG Chem	KAIST
8	Ann Arbor, MI	US	University of Michigan	University of Michigan
9	Seattle, WA	US	Microsoft	University of Washington Seattle
10	Munich	DE	BMW	Technical University of Munich
11	Beijing	CN	BOE Technology	Tsinghua University
12	Göteborg	SE	LM Ericsson	University of Gothenburg
13	Raleigh, NC	US	Duke University	Duke University
14	Stockholm	SE	LM Ericsson	Karolinska Institutet
15	Tokyo–Yokohama	JP	Mitsubishi Electric	University of Tokyo
16	Copenhagen	DK	Novozymes	University of Copenhagen
17	Helsinki	FI	Nokia	University of Helsinki
18	Zürich	CH	ETH Zürich	ETH Zürich
19	Basel	CH/DE/FR	DSM IP Assets	University of Basel
20	Stuttgart	DE	Robert Bosch	Eberhard Karls University of Tübingen
21	Nuremberg–Erlangen	DE	Siemens	University of Erlangen Nuremberg
22	Seoul	KR	Samsung Electronics	Seoul National University
23	Qingdao	CN	Qingdao Haier Air Conditioner General	Qingdao University
24	Minneapolis, MN	US	3M Innovative Properties	University of Minnesota Twin Cities
25	Pittsburgh, PA	US	University of Pittsburgh	University of Pittsburgh

Notes: KAIST, Korea Advanced Institute of Science & Technology; MIT, Massachusetts Institute of Technology.
Source: WIPO Statistics Database, April 2024.

Cambridge in the United Kingdom and San Jose–San Francisco, CA, in the United States were the two most S&T-intensive clusters, globally, followed by Eindhoven (Kingdom of the Netherlands), Oxford (United Kingdom), and Boston–Cambridge, MA (United States) (Table 9).

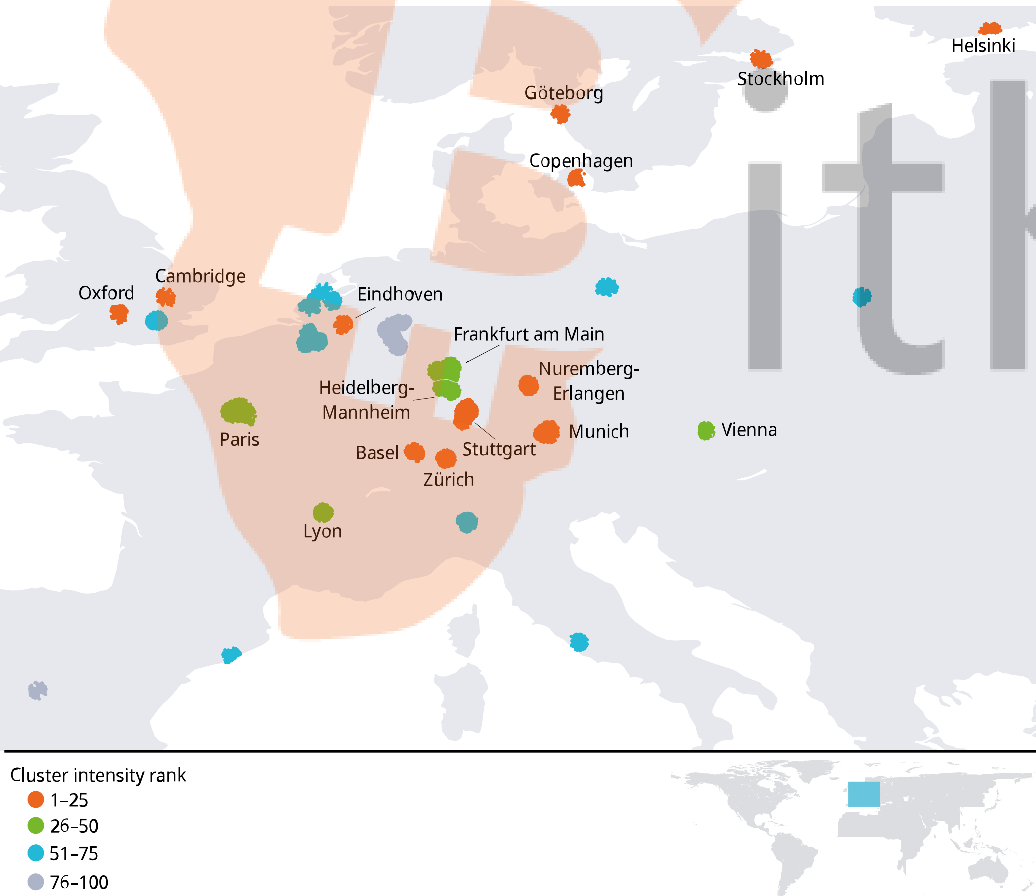
Cambridge's position as the top cluster by S&T-intensiveness was once again thanks to the presence of Cambridge University and central processing unit (CPU) maker ARM. Cambridge produced the most articles per capita, at just over 35,000 per one million people (see Appendix Table 4). San Jose–San Francisco, CA, leads on PCT filings per capita, producing roughly 7,900 per one million people, followed by Eindhoven, with 7,536 per million.

There are three clusters among both the global top 10 and the top 10 for intensity, all in the United States: San Jose–San Francisco, CA; Boston–Cambridge, MA, and San Diego, CA.

Daejeon (Republic of Korea) is the highest-ranking Asian S&T cluster by intensity

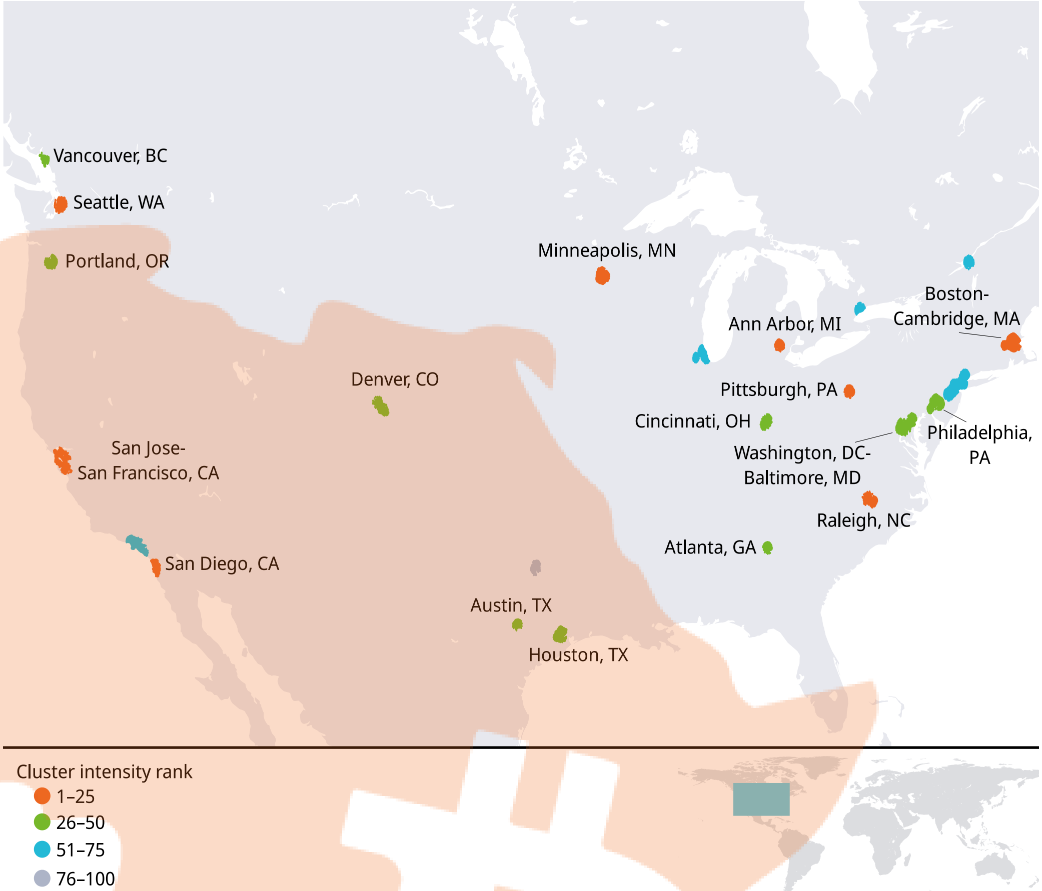
When viewed with a focus on intensity, many clusters within Europe and North America display a higher level of S&T activity compared to their Asian counterparts. Twelve of the top 25 clusters by intensity are located within Europe. North America had eight clusters in the top 25 by intensity and Asia had five clusters, which is markedly different than the 15 clusters in the global top 25 that were located in Asia (Map 4 and Table 9). Asia's top cluster by intensity was Daejeon (Republic of Korea) ranked 7th, owing to the presence of LG Chem and LG Energy Solutions. Daejeon was followed by the much larger metropolises of Beijing (China) ranked 11th (up from 14th last year), and Tokyo–Yokohama ranked 15th (up from 17th last year). A new entrant to the top 25 for China was Qingdao, with Qingdao Haier Air Conditioner being the top patentee and Qingdao University the top publishing organization.

Map 4a European S&T clusters by intensity, 2024



Source: WIPO Statistics Database, April 2024.

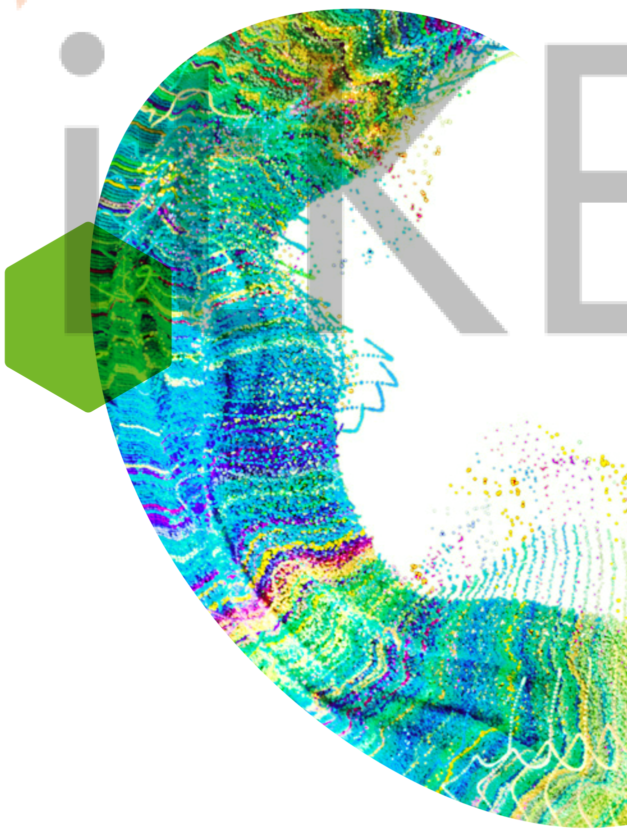
Map 4b United States S&T clusters by intensity, 2024



Source: WIPO Statistics Database, April 2024.

Special Theme 2024: Unlocking the Promise of Social Entrepreneurship

This year's special GII theme looks to the future of social entrepreneurship and asks: What will it take for social entrepreneurship to catalyze transformative innovation and societal impact?



This chapter was written by **Marya Besharov and Kevin Miner, Skoll Centre for Social Entrepreneurship, Saïd Business School, University of Oxford** and **Anmol Kaur Grewal and Sacha Wunsch-Vincent, WIPO**[1].

As part of a broader trend toward innovation with more direct social impact, new social entrepreneurial ventures and start-ups have proliferated in recent years.

Social entrepreneurs set out to develop and fund solutions that directly address social issues with impact on communities, societies, and the world at large while trying to generate revenue by operating within the confines of the market economy.

For many young inventors and innovators, social entrepreneurship offers a chance to align their work with the desire to create positive change in their communities and the world at large. By addressing issues affecting people and places often overlooked by business and government due to misaligned incentives or priorities, social entrepreneurship holds immense potential to generate above-average social returns through the promotion of innovation in the areas that need it most.

Traditional innovation models and ecosystem studies have thus far turned a blind eye to these forms of socially motivated, community-based, and localized innovation models.[2] As a result, innovation policy has not been optimally designed to support social entrepreneurship.

To address these issues, this 2024 edition of the *Global Innovation Index* (GII), with in-depth case studies and contributions by experts (available online), puts the spotlight on social entrepreneurship, addressing three critical questions for unleashing the potential of this promising new phenomenon:

- What is the state of social entrepreneurship globally?
- How do social enterprises create positive impact, and what role does innovation play?
- How can policy help to unlock the promise of social entrepreneurship?

The state of social entrepreneurship

Today, social entrepreneurship is a major economic and social force on the global stage, as entrepreneurs develop innovative business models to address some of the world's most pressing economic, social and environmental problems. Current estimates suggest there are 10-11 million social enterprises and up to 30 million social entrepreneurs around the world, contributing roughly $2 trillion to global GDP(Schwab Foundation for Social Entrepreneurship and World Economic Forum, 2024; British Council and Social Enterprise UK, 2022).

These organizations tackle poverty, helping millions of people globally build sustainable livelihoods through education, training, and employment; they address environmental devastation, developing renewable sources of energy and working with companies to reduce emissions; and they combat racial and social injustice, working to shift cultural norms and organizational practices to ensure previously marginalized groups have full access to economic and social opportunities, among many other issues.

1 This report draws in part on Hanna Hottenrott's Background study for the GII 2024 Special theme, "An economic perspective on social entrepreneurship: Insights and policy implications," Technical University of Munich (TUM) and Leibniz Centre for European Economic Research (ZEW), June 2024, as well as 14 cases studies of social entrepreneurs by Cynthia Rayner and the WIPO and Skoll Centre Workshop: A Conversation on the State of Social Entrepreneurship, held on April 12, 2024, as part of the 2024 Skoll World Forum. Jeroo Billimoria, Soumitra Dutta, Johanna Mair, Alex Nicholls and Cynthia Rayner provided useful comments on earlier drafts. We thank Menna Clark and Jessica Jacobson from the Skoll Centre team for design and administrative support.

2 For earlier work on innovation in the informal economy, see Kraemer-Mbula and Wunsch-Vincent (2016).

Defining social entrepreneurship

Definitions of social entrepreneurship vary widely around the world, reflecting the diversity of legal systems, regional histories, and financing and policy environments in which social entrepreneurs operate (GII 2024 Expert contribution from Kraemer-Mbula).[3] In this report, we define social entrepreneurship as the process of developing and implementing innovative organizational models to address social and/or environmental challenges, without profit as the primary purpose (see GII 2024 Expert contribution from Dey and Gupta on the nuance between social enterprise and social business).

Because they pursue social and/or environmental purposes through organizational models that often involve commercial activity, social enterprises are hybrids that blur traditional boundaries between the social sector and the market (Dees, 1998; Martin and Osberg, 2003; Smith *et al.*, 2013). As a result, they frequently face competing demands between social impact versus financial success, beneficiaries versus investors, and long-term systemic change versus short-term organizational survival. If not managed effectively, these competing demands can create internal tensions and lead to performance decline (Battilana and Dorado, 2010).

At the same time, competing demands are also the source of social entrepreneurship's innovation potential: that is to say, novel creative solutions emerge when aspects of different institutional worlds – in this case the social sector and the market – are brought together (Smith and Besharov, 2019).

To harness this innovation potential, social enterprises develop governance models, organizational structures, leadership practices, human resources policies and stakeholder relationships that focus attention on the social mission without sacrificing financial viability (Pache, Battilana and Spencer 2024; Smith and Besharov, 2019 ; Mitzinneck and Besharov, 2019; Battilana *et al.*, 2015; Battilana and Dorado, 2010). And they deploy this innovation potential to address a wide range of global challenges, of which economic opportunity is the most common, followed by issues of environment, health, education and inequality (Table 10).

3 See also Bacq and Janssen, 2011; Choi and Majumdar, 2014; Mair and Noboa, 2006; Ran and Weller, 2021; Weerawardena and Mort, 2006.

Table 10 Top 5 issues addressed by social entrepreneurship globally

Issue	Example
Economic opportunity	**Bandhu**
	Bandhu is an India-based for-profit social enterprise delivering an AI-enhanced mobile technology platform that aggregates supply and demand for low-income migrant housing. They also train and contract with on-the-ground women community "champions" in order to increase the housing supply for interstate migrant workers.
	Bandhu's field and technology teams communicate in a constant feedback loop, with insights from community champions and migrant workers used to improve platform features. Bandhu also works in close partnership with engineering teams from other firms in open-source development partnerships to better understand how to provide for an underserved and understudied population.
	So far, 160,000 people have accessed the Bandhu platform in order to browse housing opportunities, and 60,000 workers have secured housing.
Environment	**Green Bio Energy (GBE)**
	GBE is a Uganda-based producer of eco-friendly, carbonized briquettes made from recycled materials. In addition to producing and distributing eco-friendly fuel and appliances, GBE provides consulting services to micro-entrepreneurs seeking to build a market for eco-friendly energy alternatives.
	As part of its model, GBE mobilizes community members to join the supply chain, particularly in waste collection and manufacturing efforts that support briquette production. GBE also invests in customer education explaining the health, economic, and environmental benefits of using their briquettes over charcoal.
	GBE currently serves 1,000 customers, with annual sales of 600 tons of briquettes, offsetting over 8,760 tons of CO_2 emissions.
Health	**Peek Vision**
	Peek Vision partners with governments, non-governmental organizations (NGOs) and large eye health providers across Africa and Asia to provide mobile eye-health screening and referrals that can be delivered in low-resource settings by non-specialists. It also offers a comprehensive data intelligence platform that helps service providers optimize eye health coverage across hard-to-reach populations.
	Peek's innovative mobile eye screening and referral technology has been specifically designed to be accessible to non-specialist community workers, bringing services to populations in remote areas at lower costs. Using Peek reduces costs per patient by up to six times compared to a standard eye health program.
	Programmes using Peek have screened over 8 million people, identifying nearly 1.6 million with eye health needs and connecting more than 840,000 people with care. Peek now screens 100,000+ people every week.
Education	**Thaki**
	Thaki is a social enterprise operating primarily in Lebanon and Jordan. The organization receives and refurbishes second-hand devices – mainly laptops – and loads them with offline learning content for distribution to NGO partners and schools in refugee and vulnerable host communities. Thaki also develops digital literacy training for teachers and has co-developed a digital social-emotional learning program for young children.
	Recognizing the unique needs of refugee schools, Thaki ensures that educational content can be delivered regardless of circumstances. Internet service is not required in order to access content on Thaki devices; and they have partnered with solar power providers to deploy off-grid electricity solutions for schools.
	To-date, Thaki has distributed over 5,800 devices to 157 education partners, serving more than 33,000 students.
Inequality	**Community Design Agency (CDA)**
	CDA is an India-based design and architecture social enterprise that meaningfully involves low-income communities in the process of transforming existing public housing and designing new housing communities and workplaces. Their approach preserves the social fabric and empowers marginalized, low-income residents by creating quality and climate resilient neighborhoods.
	Through innovative participatory processes with local citizens, CDA co-designs spaces tailored to the unique needs of often-neglected communities. CDA also collaborates with local and international partners to explore the viability of new blended financing models for local housing and neighborhood improvement initiatives.
	CDA has thus far worked across four cities and leveraged nearly USD 1 million in public subsidies through its initiatives in slum redevelopment and neighborhood regeneration, directly and indirectly impacting over 25,000 lives.

Source: Authors' own representation based on data from EUCLID Network, 2022, British Council and Social Enterprise UK, 2022; Catalyst 2030 Annual Membership Survey 2023 data provided to the Authors; Social Enterprise UK, 2023.

Reflecting the diversity of issues addressed, social entrepreneurship is thriving across sectors, including agriculture, education, financial services and energy (see GII 2024 Background study from Hottenrott). Recently, social entrepreneurship has gained increased attention in the health care sector, particularly as COVID-19 highlighted serious inequities and gaps in the services provided by the market and public sectors (see GII 2024 Expert contribution from Kraemer-Mbula). As the global economy increasingly embraces high technology, including artificial intelligence (AI), data analytics, fintech and more, social entrepreneurship is venturing into these areas as well (see GII 2024 Expert contribution from Kraemer-Mbula; GII 2024 Case study contribution from Rayner on Bandhu, Fairtrasa, iKure, Peek Vision, and WeRobotics).

The origins of social entrepreneurship

Perhaps it is unsurprising that there is not yet a uniform definition of social entrepreneurship, the term itself being relatively new. It first emerged in the late 20th century to describe the innovative work being done by a new wave of leaders who sought to address complex social and environmental challenges by combining aspects of business and non-profit organizations (Nicholls 2008; Bornstein and Davis, 2010; Zahra and Wright, 2016; Stephan, Uhlaner and Stride, 2015). This "hybrid" approach to addressing social issues started to spread in the early 2000s, with steadily increasing media mentions and a growing number of social enterprises over the subsequent two decades (Litrico and Besharov, 2019).

While social entrepreneurs themselves played a significant role in this growth, they were not alone; the development of the field was the product of active work undertaken by a diverse set of actors promoting innovation and entrepreneurship as a means of addressing complex social problems (Nicholls, 2010).

Alliances and networks formed in the early days of social entrepreneurship to share visions and business models and advocate for legal, policy and financial change in support of these new kinds of ventures. Ashoka, founded in 1980, is widely recognized as one of the first networks established to support social entrepreneurs globally. It created a community where knowledge and experience were freely shared, and collective advocacy was harnessed in order to incubate new social entrepreneurs and scale existing work.

Another early pioneer, the Bangladesh Rural Advancement Committee (BRAC), a development organization formed in 1972, has operated, resourced and advocated for social enterprises in Asia for decades.

More recently, Catalyst 2030 was launched at the World Economic Forum in 2020 to catalyze collaboration in the fragmented community of social enterprises, governments, corporations and universities globally, and leverage their collective power so as to accelerate progress toward achieving the United Nations Sustainable Development Goals (SDGs) (see GII 2024 Expert contribution from Billimoria on the critical role of alliances and networks; Catalyst 2030, 2022).

Philanthropic foundations interested in sustainable and scalable social interventions and services were also pivotal to the rise of social entrepreneurship. Starting in the late 1980s and continuing through to the present day, organizations such as Echoing Green (1987), the Schwab Foundation for Social Entrepreneurship (1998) and the Skoll Foundation (1999) have operated award or fellowship programmes designed to recognize and promote individual social entrepreneurs. Through events such as the Skoll World Forum, which brings social entrepreneurs together alongside philanthropic leaders, government leaders, academics, and other partners, these funders have proved influential in establishing a global ecosystem of social entrepreneurs.

Government supporters also played a role, tapping into the innovative solutions presented by social enterprises aimed at addressing persistent social and environmental problems. The United Kingdom (UK) was one of the earliest adopters of a policy strategy on social entrepreneurship, establishing a dedicated Social Enterprise Unit in 2001 tasked with the goal of building a network of stakeholders and identifying barriers facing the community (Stumbitz *et al.*, 2019, chapter 1). In 2007, the Republic of Korea passed one of the most comprehensive pieces of legislation in Asia, the Social Enterprise Promotion Act, which established the Korea Social Enterprise Promotion Agency (KoSEA) to support social enterprise commercialization and networks.[4] More recently, international bodies like ASEAN, the Organisation for Economic Co-operation and Development (OECD), the African Union and the European Union (EU) have all promoted social entrepreneurship (see GII 2024 Expert contribution from Klijn and Bonnici).

Universities and professional associations have launched academic centers, dedicated journals and conferences on which to build a research base on social entrepreneurship and disseminate insights regarding the impact of social entrepreneurship on communities, environments and economies. Academic centers dedicated to social entrepreneurship, innovation and impact were formed, starting in the early 2000s, often at business schools.[5] Some of these academic centers were established with the support of philanthropic foundations.[6]

Why is social entrepreneurship important now?

Today, social entrepreneurship is recognized for its ability to address mounting global social and environmental challenges threatening lives and livelihoods, especially those of the most marginalized. Two decades of research has demonstrated the effectiveness of social entrepreneurship in alleviating poverty and other complex challenges.[7] Additionally, in an era of globally high youth unemployment and dissatisfaction with work, social entrepreneurship offers a unique opportunity to educate and engage young people in addressing the societal issues they care about, while at the same time developing local and regional economies (see GII 2024 Expert contribution from Çiftçi).

These positive impacts have garnered the world's attention. International agencies, including the United Nations, the OECD, the International Labour Organization (ILO), the World Intellectual Property Organization (WIPO), as well as local and national governments and academic institutions, have recognized the potential of and calling for greater support for social entrepreneurship. In 2023, for example, the United Nations General Assembly passed a pivotal resolution (United Nations General Assembly, 2023, Res. 77/281) acknowledging the importance of social entrepreneurship and urging member states and financial institutions to bolster their support, stating: "Social entrepreneurship, including cooperatives and social enterprises, can help to alleviate poverty and catalyse social transformation by strengthening the productive capacities of those in vulnerable situations and producing goods and services accessible to them."

Critics have, however, argued that social entrepreneurship could crowd out government activity, emboldening governments to reduce the provision of critical services and rely instead on a patchwork of social enterprises to fill any gaps (Ganz, Kay and Spicer, 2018; Giridharadas, 2018). Indeed, there is evidence to suggest that, as some governments scaled back welfare programmes in the late 20th and early 21st centuries, social enterprises, along with associations, non-profit organizations and cooperatives, stepped in to fill these voids (see GII 2024 Expert contribution from Dey and Gupta).[8]

But recent research has also shown that social enterprises can be effective in highlighting deficiencies in existing public and market solutions and in catalyzing innovative public and private activity to address long-term, systemic challenges.[9] Social entrepreneurs often collaborate with governments and private enterprises to build lasting solutions to pressing challenges. Tebita Ambulance, for example, an Ethiopia-based social enterprise, has collaborated with policymakers to establish and advance emergency medical service standards in Addis Ababa. Kibret Adebe, a social entrepreneur with years of medical expertise and founder

4 See Korea Social Enterprise Promotion Agency. Available at: https://www.socialenterprise.or.kr/_engsocial/?m_cd=0101
5 Examples include the Social Enterprise Initiative at Harvard Business School in 1993, Center for the Advancement of Social Entrepreneurship (CASE) at Duke University in 2002, and the Skoll Centre for Social Entrepreneurship at Saïd Business School, University of Oxford in 2003. For instance, the Skoll Foundation supported the founding of the Skoll Centre for Social Entrepreneurship at Saïd Business School, University of Oxford, to help further grow the field through education and research.
6 For instance, the Skoll Foundation supported the founding of the Skoll Centre for Social Entrepreneurship at Saïd Business School, University of Oxford, to help further grow the field through education and research.
7 For example, on poverty alleviation, Tobias *et al.*, 2013; Sutter *et al.*, 2019; Ghauri *et al.*, 2014; on promoting gender equity, Datta and Gailey, 2012; Haugh and Talwar, 2016; on combatting climate change, Calic and Mosakowski, 2016.
8 See also OECD, 2003; Defourny and Nyssens, 2010.
9 For examples, see Lechterman and Mair, 2024; Mair and Rathert, 2024; Savaget *et al.*, 2024.

of Tebita Ambulance, worked closely with the Addis Ababa Health Bureau to build the country's first emergency medical service standards and licensing system in 2007. This groundbreaking work allowed Tebita Ambulance to become the country's first private emergency medical services company and set a precedent for other emergency medical service organizations to follow. Today, Tebita Ambulance continues to work with policymakers to update and enhance emergency medical standards in Ethiopia (see GII 2024 Case study contribution from Rayner).

Regional variation

Social entrepreneurship is a global phenomenon. But there are significant regional differences regarding its prevalence, the issues addressed by social entrepreneurs and their organizational models (Mair, 2020). However, the absence of globally recognized definitions and comparable, high-quality data has left much of this variation unexplored. This lack of clarity has also hindered financial investment and the development of supportive policies at local, national and international levels (see GII 2024 Expert contribution from Bosma).

Evidence from the Global Entrepreneurship Monitor survey – one of the few global datasets asking questions about social entrepreneurship motivation and action, and a close data collaborator for the GII – finds substantial variation in prevalence by country (see GII 2024 Expert contribution from Bosma). The data indicate a strong presence of early-stage social entrepreneurs in Northern and Southern America, with Brazil and Guatemala showing some of the highest relative rates of social entrepreneurship among the countries surveyed (Figure 20).

Figure 20 Prevalence of social entrepreneurship among early-stage entrepreneurs, 2021–2022

Source: GII 2024 Expert contribution from Bosma based on data from the Global Entrepreneurship Monitor, 2021–2022.

One of the few attempts to compare the number of social enterprises across countries suggests that China has the highest absolute number, with 2,000,000 social enterprises, whereas the United States has the highest rate of social entrepreneurship, with approximately 38 social enterprises per 10,000 people (Schwab Foundation for Social Entrepreneurship and WEF, 2024). The United States has a healthy ecosystem for entrepreneurial activity in general (ranking among the top 3 most innovative nations in this year's and previous GII editions) and its relatively high percentage of socially-minded entrepreneurs contributes to this robust prevalence (see GII 2024 Expert contribution from Bosma).

However, data on social entrepreneurship are often biased toward a handful of countries, making balanced international comparisons impossible. For instance, less than half of all countries have any publicly available data on social entrepreneurship prevalence; and of those that do, most are either European, South and East Asian or Northern American countries (Schwab Foundation for Social Entrepreneurship and WEF, 2024; British Council and Social Enterprise UK, 2022).

Global comparisons of social entrepreneurship are further complicated by differing definitions. For instance, the UK Department for Digital, Culture, Media and Sport (DCMS) defines social enterprises as those organizations with an explicit social mission, with at least 50 percent of their income from trading activities, and which reinvest at least 50 percent of surplus/profit into their social mission (UK DCMS and BEIS, 2019). In contrast, the Republic of Korea's 2007 Social Enterprise Promotion Act defines social enterprises as having specific legal forms, paid employees, a primary focus on social objectives, a participative decision-making structure, and which direct two-thirds of profits toward social goals (OECD, 2022).

These small differences in definitions can lead to substantial variation in estimates of the number of social enterprises. In the United Kingdom, for example, there are an estimated 113,000 social enterprises as defined by the DCMS; but if the definition is narrowed to enterprises using a specific legal form, the number drops to 35,000; and if it is broadened to include all revenue-generating activities for social purposes, the number exceeds 380,000 (UK DCMS and BEIS, 2019).

Complicating the definition is the variety of legal forms that social enterprises can take, including for-profit, non-profit, as well as various hybrid forms that combine aspects of business and charity (Mair, 2020). Examples of such hybrid forms include the Benefit Corporation in the United States and the Community Interest Corporation (CIC) in the United Kingdom. But even in countries that have such hybrid forms, not all social enterprises use them. In the United Kingdom, for example, while some social enterprises are registered as CICs, many others are charities, sole proprietorships or limited liability companies (Social Enterprise UK, 2023). In Italy, the spectrum of legal forms is so broad that social enterprises are to be found across 15 different legal forms (Euclid Network, 2022). To complicate matters further, some social enterprises register multiple separate entities in order to manage the trade-offs between different legal forms.

Recently, there has been a push for jurisdictions to adopt dedicated legal forms for social enterprises, with the hope of increasing awareness, financial support and opportunities to participate in social procurement (see GII 2024 Expert contribution from Klijn and Bonnici).[10] However, despite this effort, dedicated legal forms remain rare. In a survey of over 80 jurisdictions, only about 20 percent had dedicated legal forms for social enterprises, of which EU countries comprising a large proportion (Morrison & Foerster, LexMundi Pro Bono Foundation and Catalyst 2030, 2022). In most countries, social enterprises choose from among non-profit, for-profit, and co-operative forms.

Overall, the variation in definitions and legal forms has likely had a mixed effect. On the downside, it may have inhibited the growth of social entrepreneurship, as it is challenging for investors and policymakers to identify and support social ventures, thus limiting their potential to scale. On the upside, this same variation offers social entrepreneurs significant flexibility, enabling them to choose a legal form and organizational model that best supports their venture's mission. Therefore, while there is value in establishing uniform definitions and dedicated legal forms, such efforts should be undertaken carefully in order to avoid unduly constraining choice and flexibility for social entrepreneurs.

Financing

Financing is regularly cited as the most common issue faced by social entrepreneurs globally (Euclid Network, 2022; Social Enterprise UK, 2023). Among European social enterprises, for example, approximately 40 percent reported unmet financial needs (Euclid Network, 2022).

10 See also OECD, 2022.

While public financing is one of the most important sources of funds for social enterprises, it is unevenly distributed across regions. Moreover, impact investing – widely thought to be a promising and significant source of funding – makes up only a small proportion of the financing received by social enterprises.

Addressing such funding challenges will require a coordinated effort to expand public financing, with funds serving to de-risk early-stage ventures, thereby facilitating the expansion of impact investing and other sources of capital.

The most prevalent and sought after forms of financing globally are grants from philanthropic foundations and government agencies, as well as individual donors (Catalyst 2030 Annual Membership Survey 2023 data provided to the Authors; Centre for Asian Philanthropy and Society, 2019; Euclid Network, 2022). Such funds provide essential support for social enterprises, particularly in the early stages, allowing them to cover operational costs, develop innovative solutions and scale impact without having to worry about interest payments, principal repayment or equity dilution. Other sources include self-financing, private donations, bank loans and, to a lesser degree, impact investing (Table 11).

Table 11 Top 5 financing sources for social entrepreneurship

Source	Examples
Public financing	·Public grants ·Public low-rate loans
Self-financing	·Personal savings ·Funding from friends and family
Private philanthropy	·Grants from award and fellowship organizations ·Concessionary/catalytic capital ·Accelerators/prize funding ·Donations and investments from high-net-worth individuals and families
Debt/loans (including microfinance)	·Traditional bank loans ·Credit cards ·Microfinance
Impact investing	·Socially responsible investing ·Green bonds ·Social bank loans ·Impact venture capital

Source: Authors' own representation based on data from European Social Entrepreneurship Monitor 2021–2022 (2022), drawing on Mair (2020); Centre for Asian Philanthropy and Society (2019); Siemens Stiftung (2020); British Council and Social Enterprise UK (2022).

Public financing in the form of government grants and low-interest loans are among the most prevalent forms of financing for social entrepreneurship. The availability of public financing for social entrepreneurship varies by region, typically correlating with the level of national wealth.

In the EU, approximately 40 percent of social enterprises receive public sector funding. This support is bolstered by various EU-wide social and environmental funds, such as the European Social Fund Plus (ESF+), Erasmus+, and Horizon Europe (Euclid Network, 2022).

In Asia, the public financing landscape is more diverse. In the Republic of Korea, for instance, public financing plays a crucial role, with around 60 percent of social enterprises benefiting from government grants annually, whereas in countries such as Indonesia, Thailand and Pakistan, social enterprises report public financing levels of 20 percent, 10 percent, and less than 10 percent, respectively (Centre for Asian Philanthropy and Society, 2019).

In the absence of formal financial services provided by either government, philanthropy or impact investment, social entrepreneurs turn to *self-financing*. Particularly in developing countries, self-financing, often coupled with bootstrapping – the practice of getting by with minimum external investment – has become a go-to strategy (see GII 2024 Expert contribution from Afolabi on how social entrepreneurs in Nigeria resort to bootstrapping to navigate the funding landscape, because of there being few viable external financing opportunities).

In Algeria, Indonesia and Türkiye, for instance, more than 66 percent of social enterprises reported resorting to self-financing through family, friends and personal savings as a source of funding (British Council and Social Enterprise UK, 2022).

In the EU, self-financing is less common, with 40 percent of social enterprises reporting using savings and only 16 percent reporting having requested funding from family and friends (Euclid Network, 2022). The UK has one of the lowest rates of self-financing, with less than 10 percent requesting finance from family and friends, likely owing to the presence of a relatively robust governmental, philanthropic and impact investing ecosystem (Social Enterprise UK, 2023).

Private philanthropy was key to the emergence of social entrepreneurship in the early 2000s and continues to be a key source of capital with few conditions attached. Today, international philanthropic organizations and high-net-worth individuals and families give millions of dollars globally to social enterprises at all scales, often in the form of grants, but also through equity investment, loans and other financing tools.

Among European social enterprises, roughly 20 percent received funding from foundations between 2021 and 2022 (Euclid Network, 2022). While international philanthropic organizations have received much attention, domestic philanthropies are also a key source of financing, often in the form of grants. In Japan, more than half of all funding for social enterprises came from domestic foundation grants between 2018 and 2019 (Centre for Asian Philanthropy and Society, 2019).

Debt financing through *loans* is a less common form of financing for social enterprises, with the highest concentration in regions where public and philanthropic grants are less available. India and Sri Lanka have reported some of the highest rates of social enterprise debt financing at roughly 40 percent (British Council and Social Enterprise UK, 2022). In many parts of Africa, including Côte d'Ivoire, Egypt, Ethiopia and Rwanda, loans from commercial banks and microfinance organizations are a dominant financing source (Siemens Stiftung, 2020). However, loans in these countries often come with high and occasionally predatory interest rates, as well as significant collateral requirements (Siemens Stiftung, 2020). In response, new approaches to debt financing that offer concessionary interest rates have started to emerge, but these are not yet widespread (see, e.g., GII 2024 Case study contribution from Rayner on Grupo Mamut).

The *impact investing* market has grown substantially over recent years. Several estimates put the size of the global impact investing market in the low trillions of dollars (Hand, Ringel and Daniel, 2022; Volk, 2021). Yet impact investing still represents only a tiny fraction of the global pool of investable capital; and it is not a significant source of funding for most social enterprises. Notably, financing through impact investing is rare, even when access to advanced financial markets is available. Under 10 percent of social enterprises in regions with advanced capital markets request funding from incubators, business angels, impact investment, venture capital or venture debt (Social Enterprise UK, 2023; Euclid Network, 2022). One reason for such low rates of impact investing is that many social enterprises are too small to attract interest from investors – small ticket sizes create prohibitively high search and transaction costs for direct investment (Nicholls, 2021c).

Impact investing capital is also unevenly distributed globally, with funds concentrated in Europe and Northern America (Hand, Ringel and Daniel, 2022). Although current impact investors plan to step-up funding to social enterprises in developing economies, they are often not well connected to the ventures that are most in need of funding, creating a matching problem. Additionally, regional disparities in capital can inadvertently elevate certain issues over others. For example, the Global Impact Investing Network (GIIN) data suggest that today's impact investors tend to prioritize climate change mitigation and adaptation, while other issues like education and housing receive less attention in comparison (Hand, Ringel and Daniel, 2022).

Innovation and impact in social entrepreneurship

The global impact of social entrepreneurship is vast and varied, spanning issues such as access to education, sustainable clothing, peace promotion in conflict zones and the preservation of indigenous cultures. Across this wide range of issues, social enterprises share a common trait: they use innovation to create and scale impact, not just to drive financial performance (Seelos and Mair, 2017).

Innovation occurs first and foremost in the organizational models social enterprises adopt. And it is also evident in how they develop product and process improvements and use intellectual property (IP). Innovation in social entrepreneurship is often decentralized and deeply embedded within local contexts, with active participation from community members. Additionally, because many social enterprises operate in areas with limited public infrastructure and investment, they often assume roles that commercial innovators typically avoid, involving shifting the political, economic, social and cultural systems that perpetuate social and environmental problems.

Organizational model innovation

Social enterprises innovate within organizational models by embedding their social or environmental mission into one or more aspects of the business – namely, the customers they serve, the people they employ, the products or services they produce, or the broader ecosystems in which they operate (Table 12). Each of these approaches offers a distinct pathway to impact and is associated with distinct types of innovation activity.[11] While some social enterprises focus on a single pathway, many adopt multiple pathways, innovating across multiple dimensions of their organizational models.

11 Delivering impact from innovation activities requires that social enterprises translate these activities into outputs, outcomes and, ultimately, impact. See Nicholls, 2021a.

Table 12 Organizational pathways to impact in social entrepreneurship

Pathway	Source of impact	Core innovation activity	Examples
Customer	Customer or market segment served	• Process innovation	• Target customers who lack access to essential products or services
		• Consumer education	• Provide affordable solutions to underserved communities in low-resource contexts
		• Marketing and branding	• Engage underserved communities in product and service development
Employee	Population employed	• Process innovation	• Hire from under-employed and marginalized populations
		• Employee education and training	• Provide skills development opportunities otherwise unavailable to employees
			• Provide flexibility and other benefits that suit under-employed populations
			• Prepare employees for sustainable, long-term employment opportunities
Product/service	Products or services sold	• Product/service innovation	• Create products or services that surpass existing solutions in terms of social or environmental benefits
		• IP	• Design products or services that empower customers to have positive social or environmental impact
		• Open sourcing	• Develop socially or environmentally sustainable production processes
Ecosystem	Ecosystem surrounding	• Systems innovation	• Advocate for policy reforms
	the issue or problem		• Support research
	area		• Build networks
			• Invest in awareness and education

Source: Authors' own representation, adapted from Besharov et al., 2019.

Social enterprises adopting the *customer pathway* achieve impact by providing essential products or services to specific populations or market segments that would otherwise have no or limited access (Box 4). The focus is often on reaching those populations that have been marginalized or stigmatized on the basis of income, race, gender or other characteristics, or have simply gone unnoticed by business and government. For example, microfinance organizations offer small loans and other financial products to the ultra-poor, often women, who could not otherwise access capital for starting a business.

The most important innovation activities associated with the customer pathway tend to involve process innovation, particularly to develop delivery systems to reach the target market, although there may also be innovation activities tailoring existing products or services so that they align with the particular needs of the target customer segment. Process innovation often involves education of consumers leading to an awareness of benefits that may, in turn, lead to changes in household or individual behavior. A core innovation within microfinance organizations, for example, is to develop processes for reaching the ultra-poor, while a secondary innovation involves adapting loan products and other financial services to meet the needs of this same demographic (for example, through group lending).

Box 4 The customer pathway in action

Organization: Sustainable Organic Integrated Livelihoods (SOIL)

Geography: Haiti

Year founded: 2006

Revenues: Approximately EUR 2–3 million

Financing: Government and multilateral agencies (71 percent); donations (25 percent); earned income (4 percent)

Legal structure: Non-profit organization

Background: In Haiti, only 17 percent of the population has access to improved sanitation facilities – the lowest level in the Americas. To address this critical issue, SOIL was co-founded by Dr. Sasha Kramer and Sarah Brownell to provide a full-cycle sanitation service that treats human waste in order to limit the spread of disease.

Business model: SOIL targets Haitian households without access to centralized sanitation systems, offering low-cost container-based toilets and collection services. The collected waste is processed into organic compost and marketed under the Konpòs Lakay brand for agricultural use in farming and reforestation efforts.

Innovation activities:

Process research: SOIL has a dedicated research team focused on understanding sanitation issues in Haiti and improving services to meet customer needs.

Product/service adaptations: To better reach key populations, SOIL has developed portable household toilet models which do not require built infrastructure.

Innovation linkages:

Innovative financing tools: SOIL collaborates with the Haitian government, international development banks, and private funders to explore how blended finance can ensure the sustainability of public service provision through a combination of public and private financing.

Impact: SOIL's impact is evident in the more than 3,200 households and 19,000 individuals for whom they have provided toilets, collection services, and composting waste treatment which has helped limit disease, improve living standards and personal dignity, and expand healthy forests.

Source: Authors' own representation based on the GII 2024 Case study contribution from Rayner.

Social enterprises adopting the *employee pathway* (also known as work integration social enterprises) (Box 5) generate impact by hiring under-employed or marginalized populations to work in the organization and supporting them with the training and skills development that will enable them to remain within employment (Joyce *et al.*, 2022). Often, such individuals face challenges in finding jobs due to societal biases and stigma, limited skills and education, or disabilities. In addition to providing a direct source of income and offering meaningful work to individuals from these populations, social enterprises engaging the employee model often invest significantly in enhancing their employees' skills and supporting them in securing new job opportunities that offer higher wages, thereby helping to break the cycles of poverty and bias (see, e.g., Smith and Besharov, 2019).

The most important innovation activities within the employee pathway often involve process innovations. Examples are redesigning hiring processes so as to identify candidates with potential for upskilling and restructuring workflows so that they align with the abilities rather than the limitations of the target employee population. Employee education and training are also crucial innovation activities. Social enterprises adopting the employee pathway frequently invest heavily in their human capital so as to overcome challenges related to poverty, stigma or disability, thereby fostering future innovation potential.

Box 5 The employee pathway in action

Organization: iKure

Geography: India

Year founded: 2010

Revenues: Approximately EUR 2 million

Financing: Earned income (95 percent); grants and other sources (5 percent)

Legal structure: For-profit company

Background: Access to primary health care services in rural India often requires patients travel long distances at significant cost. Sujay Santra, an IBM and Oracle IT engineer from West Bengal, founded iKure to bring quality primary services to rural communities via a hub-and-spoke model after watching his father go through the challenges of rural health care.

Business model: The iKure model is based around 10 health care hubs and 160 peripheral clinics serving rural patients. Central to the model are the community health workers that iKure selects, contracts and trains from within the communities in which it works. These health workers visit homes, collect and capture diagnostic data, and return to peripheral clinics to access services for patients.

Innovation activities:

Employee training: iKure invests heavily in training its community health workers, who often have minimal prior expertise and may lack those basic skills, such as using a smart phone, that are often essential for securing employment.

Process adaptations: Given that many of iKure's community health care workers operate within rural settings where internet connectivity is either low or non-existent, iKure has invested in and developed a remote data collection system using point-of-care devices powered by GPS.

Innovation linkages:

New technology training: To efficiently and accurately capture health data, iKure trains their community health workers in using the latest available portable diagnostic tools.

Impact: iKure's impact can be seen in the more than 120 woman community members contracted to provide health services in "last-mile" communities. In addition, iKure operates 10 health care hubs and 160 peripheral clinics, providing treatment to more than 3 million individuals across over 6,400 villages.

Source: Authors' own representation based on the GII 2024 Case study contribution from Rayner.

Social enterprises adopting the *product/service pathway* generate impact by developing and selling socially- and environmentally-friendly products or services (Box 6). In some cases, these offerings address significant social or environmental challenges directly, as is the case with social enterprises that provide critical health services such as primary eye care or diarrheal medication. In other cases, the product/service pathway entails offering more socially or environmentally sustainable versions of existing products or services that have negative externalities, as is the case with social enterprises that sell products made from recycled or renewable materials. And in some cases, the offering may be a mix of both, for example, illustrated by Eco Femme, an Indian producer of reusable, low-cost menstruation pads.

The most important innovation activities associated with the product/service pathway tend to involve product innovation, including research and development (R&D) and engineering innovations to design more sustainable or socially beneficial products or services. Product/service innovations often require significant "action research," in which social entrepreneurs engage deeply with community members so as to understand their needs and desires. These organizations may also pursue IP to protect and legitimize their investments, although many social entrepreneurs find the patent process to be costly, time-intensive and, ultimately, difficult to enforce within the contexts in which they operate. Additionally, some social entrepreneurs use open-sourcing of their product/service innovations as a means of generating further impact, rather than focusing on IP protection in order to capture market share, as is common in much commercial innovation.

Box 6 The product/service pathway in action

Organization: Eco Femme

Geography: India, with international sales

Year founded: 2010

Revenues: Approximately EUR 250,000

Financing: Earned income (75 percent); grants (25 percent)

Legal structure: Unique legal entity that allows for commercial and non-commercial activities

Background: More than one-quarter of the world's population is of reproductive age. Yet many do not have access to products or education on maintaining healthy, dignified menstruation. Such a circumstance is especially acute in areas where basic sanitation infrastructure is lacking, or menstruation is stigmatized. Further, traditional menstrual products are not sustainable, often using a substantial amount of nonrecyclable materials. To address these issues, Eco Femme was co-founded by Kathy Walkling, Jessamijn Miedema, Anita Budhraja and Anbu Sironmani.

Business model: Combining commercial and non-commercial operations, Eco Femme sells low-cost, reusable, and organic cloth menstrual pads both locally and internationally and uses the revenues to provide menstrual health education and free or subsidized cloth pad distribution. A sliding-scale pricing model is deployed to cater to different populations and ability to pay.

Innovation activities:

Product design innovation: Eco Femme continuously improves its product design to better meet customer needs and environmental goals. They switched to organic cotton, for example, after reaching a sales threshold that allowed them to source in bulk.

Pricing innovation: Recognizing differing income levels among customers, Eco Femme developed a sliding-scale pricing model where wealthier customers help subsidize pads for poorer women.

Innovation linkages:

External research consultants: Eco Femme collaborated with a research consultant to develop a comprehensive monitoring and evaluation module for its menstrual health education.

Training non-profits: Eco Femme extends its impact and reach by training and working with a large network of approximately 60 NGOs and individuals in menstrual health education and distribution of its cloth pads throughout India.

Impact: Since 2010, Eco Femme has distributed nearly 1.4 million pads, impacting nearly 90,000 girls and preventing approximately 104 million disposable pads from reaching landfills.

Source: Authors' own representation based on the GII 2024 Case study contribution from Rayner.

Social enterprises adopting the *ecosystem pathway* create impact by mobilizing diverse groups of social actors to effect transformation within local, regional or even global ecosystems (Box 7). Outside actors engaged within these models encompass a wide range of stakeholders, including fellow social entrepreneurs seeking collaboration on products and services, underserved populations, policymakers, academics, journalists and others. By advocating for policy changes, engaging communities, supporting research, fostering networks and investing in awareness and education, the ecosystem pathway can generate varied and lasting impacts at a significant geographical scale.

In the ecosystem pathway, engaging in systems innovation is the core activity. This can take several different forms, including shifting policy, engaging communities, supporting research, building networks, and undertaking awareness and education initiatives to achieve social or environmental change. Across all these forms, systems innovation involves engaging with stakeholders in a collaborative rather than competitive manner. In markets where policies and standards are unreliable, public infrastructure limited and consumers unserved, the focus is on creating a viable sector with a healthy number of actors, rather than protecting market share.

Box 7 The ecosystem pathway in action

Organization: WeRobotics

Geography: Global

Year founded: 2015

Revenues: Approximately EUR 2-3 million

Financing: Donations (25-60 percent), earned income (10-40 percent), in-kind donations of technology and services (30-35 percent)

Legal structure: Non-profit organization

Background: Drones, when combined with data and AI technologies, can significantly enhance decision-making regarding a wide variety of issues, including climate action, disaster management and agriculture. Local experts are often best placed to deploy these technologies. Yet they are often disconnected from international partners and tech firms. WeRobotics began as a collaboration between Sonja Betschart and Adam Klaptocz of Drone Adventures and Patrick Meier and Andrew Schroeder of UAViator. The co-founders established a network of Flying Labs in over 40 countries so as to integrate local expertise with drone, data and AI technologies, and thereby enhance international development initiatives.

Business model: WeRobotics provides a platform for local drone, data and AI experts to connect with global and local organizations and industries, deploying and improving drone and associated technologies in this highly regulated and expertise-intense sector. The WeRobotics network connects local “Flying Labs” (independent organizations with technological expertise) in over 40 countries across Africa, Latin America, and the Asia Pacific regions.

Innovation activities:

Network-building: WeRobotics’ activities focus on validating local expertise and facilitating a network that is fully driven by local agency, accountability and self-sustainability, with sharing and collaboration as its core values. Additionally, the network provides opportunities for experts to expand their knowledge and connect with potential collaborators to develop new technologies.

Awareness and education work: Local technology experts in developing regions often struggle to gain legitimacy with large international technology firms and policymakers. WeRobotics works to shift such a mindset by demonstrating the value of incorporating local expertise.

Process improvements: WeRobotics developed an annual application process to license local experts to join the Flying Labs network, ensuring a network with high standards and reliability.

Innovation linkages:

Open sourcing organizational structure: WeRobotics spends significant time and energy documenting, improving and sharing its model and structure so that other organizations can copy their locally-led approach.

Connecting to existing drone and AI innovators: By providing pro bono drone and AI technology to local experts and companies, WeRobotics enables them to learn and deploy these technologies for local projects.

Impact: WeRobotics has developed 41 Flying Labs with 56 partners and 266 local and international supporters, and it has made 498 opportunities available through its network since 2019.

Source: Authors’ own representation based on the GII 2024 Case study contribution from Rayner.

Product and process innovation

Social enterprises are actively engaged in product and process innovation. A survey of European social enterprises, for instance, found that 60 percent planned to scale in the near future by introducing new products or services; 30 percent by implementing new processes; and 20 percent by investing in either new equipment, information technology (IT) or computer software (Euclid Network, 2022). Globally, similar trends can be observed. More than 50 percent of social enterprises in Morocco, Nigeria, the Philippines, Thailand and Viet Nam also plan to scale through the development of new products and services (see British Council, 2018a, 2018b, 2019, 2020, 2022; British Council and Social Enterprise UK, 2022).

We see a similar emphasis on product and process innovation among social enterprises reported in the GII 2024 Case study contribution from Rayner. Grupo Mamut, for example, a Bolivian manufacturer of rubber products recycled from tires, has recently reinvested roughly USD 500,000 into the creation of a sustainable materials laboratory to research and develop new products. In an example of process innovation, Community Design Agency in India has continuously refined its participatory design processes so they better meet the needs of low-income housing residents.

Beneath the surface, there are nuances in how social enterprises pursue innovations. In particular, social entrepreneurs often engage local communities in the innovation process, with R&D frequently involving those people most affected by the issues that social enterprises seek to address, rather than occurring in labs, innovation centers or meeting rooms far way (see GII 2024 Expert contributions from Montoya Castaño on Participatory Action Research at Universidad Nacional de Colombia; Kraemer-Mbula on R&D practices among African social enterprises).

This proximity to the problem is what allows social enterprises to create innovative products and processes. An example is Fairtrasa International AG, a global social enterprise that distributes produce from organic smallholder farmer cooperatives in Latin America, Africa and Asia to retailers and wholesalers across Europe. After years of working with smallholder farmers, Fairtrasa realized that these farmers often lacked the resources or expertise to engage with the latest technology or local best practices for organic, regenerative farming. This led them to develop a three-tiered model to train and organize smallholder farmers globally (see GII 2024 Case study contribution from Rayner).

A second difference involves social enterprises' commitment to the use of innovation for positive social impact. This approach introduces added costs, complexities and ethical responsibilities to the innovation process. For instance, before launching Greenhope, an Indonesian producer of biodegradable resins, co-founder Sugianto Tandio spent 10 years developing and patenting a fully biodegradable resin made from cassava starch (see GII 2024 Case study contribution from Rayner). Despite having the option of stopping at a partial solution, Tandio persisted in creating a product that was 100 percent biodegradable, driven by a commitment to ensure that the product would do no harm.

Even seemingly simple innovation activities, like diffusing a technology from one place to another, can come at a significant cost, when social enterprises engage in meticulous cultural sensitivity research so as to ensure that products or processes they develop will have the desired positive social impact. For example, Smart Start, an early childhood development training and licensing service operating in South Africa, changed from a cost-effective playgroup model educating kids two days a week to a more frequent programme, after research revealed that many families lacked access to child care during off days (see GII 2024 Case study contribution from Rayner).

The work underlying this report also found some significant spillover effects of innovation in social enterprises. Specifically, the introduction of new products and practices in social enterprises has often been found to stimulate private sector innovation in more formal corporations or governmental institutions (see GII 2024 Background study from Hottenrott).

Social entrepreneurship and intellectual property

The use of IP among social enterprises varies widely. Some organizations invest heavily in traditional IP to secure patents and trademarks, others adopt open-source or other non-restrictive models, and many fall somewhere in between (see GII 2024 Expert contribution from Kraemer-Mbula).

Traditional IP activity is often concentrated in social enterprises operating in sectors that require heavy investment in R&D, such as technology and medicine (see GII 2024 Expert contribution from Kraemer-Mbula). Patents and trademark rights not only enable social enterprises to develop long-term revenue from innovation investments, but also serve as powerful signals of legitimacy for organizational models that may be regularly contested by investors, suppliers and partners. For instance, Greenhope has invested significant resources in securing six patents across the United States, Singapore and Indonesia. However, patenting can be costly and may not be the most reliable vector of protection in regions where IP rights are weaker. Bandhu, for example, considered applying for a patent, but ultimately decided against it, because of the expense and complexity involved (see GII 2024 Case study contribution from Rayner).

Trademarks, in turn, offer social enterprises the opportunity to legitimize their brand and protect their investment in brand equity, such as in community outreach and customer and supplier education. Trademarks to protect their main brand name are fairly common among social enterprises worldwide. In a sample of over 300 social enterprises from the Skoll

Foundation and Schwab Foundation awardee communities, 37 percent had active trademarks, with a median of two trademarks per venture.[12]

Many social enterprises, however, do not engage in filing for formal IP protection. Since the primary goal of social entrepreneurship is not necessarily profit but social impact, these organizations often do not resort to formal IP but use different means to diffuse product and process innovations so as to help scale benefits. Open-sourcing software and other technologies for the benefit of other social enterprises, governments and even corporations is a common scaling tactic (see GII 2024 Case study contribution from Rayner on Bandhu, Community Development Agency, WeRobotics). But the potential role of formal IP is often underappreciated or unknown. Even with a strong emphasis on collaboration, social enterprises may benefit from learning more about and utilizing IP, and correspondingly from greater policy support to develop this capability – a point returned to in the concluding section of this chapter which is on policy implications.

Systems innovation

Innovation activities do not stop at the factory gates or office door. Beyond product and process innovation and IP activity, social enterprises also engage in systems innovation. This involves novel approaches to shaping the political, economic, social and cultural systems that perpetuate the social problems that social enterprises seek to address (see GII 2024 Expert contribution from Billimoria).

These activities are particularly common in social enterprises emphasizing the ecosystem pathway to impact. This is because they allow social enterprises to shift cultural biases regarding marginalized or stigmatized populations and issues, modernize sector practices and norms, and help alter laws and policies, thereby developing or altering the ecosystem around a focal problem area (Table 13).

Yet systems innovation is not limited to organizations adopting the ecosystem pathway. Eco Femme, for instance, which primarily pursues the product/service pathway, works to destigmatize education about menstruation and menstrual products in India. Fairtrasa, which primarily pursues the customer pathway, has been working to deploy new technology solutions that enable smallholder farmers in developing countries to link directly with consumer-packaged goods firms. And Smart Start, which also focuses on the customer pathway, co-developed first-of-its-kind policies and standards on early childhood development at the national and provincial levels in South Africa (see GII 2024 Case study contribution from Rayner).

Data from Ashoka, whose work supports one of the longest-standing global networks of social entrepreneurs, suggests that these are not just isolated examples: 66 percent of over 800 social entrepreneurs in Ashoka's network have advised policymakers or legislative bodies; 63 percent have achieved legislative change or influenced policy; 62 percent have provided research and or data to policymakers; and 57 percent have convinced government to allocate funds to specific causes (Valera *et al.*, 2022).

12 Authors' data on Skoll Foundation and Schwab Foundation Social Entrepreneur awardees; *n*=323.

Table 13 Forms of systems innovation in social entrepreneurship

Form of systems innovation	Description	Examples
Policy shifts	Influencing or changing policies to better support social and environmental goals	· Co-creating policies and standards with peers and governments · Seconding staff to government agencies to develop policies and write industry standards · Promoting new entity types and taxation policies for social enterprises
Research support	Participating in or funding research to advance understanding and solutions for social issues	· Sponsoring studies · Providing data to local governments · Partnering with universities to better understand key problems
Network-building	Establishing and nurturing networks among stakeholders to foster collaboration and resource-sharing	· Creating advocacy coalitions of NGOs · Connecting government agencies to relevant local actors · Connecting local suppliers with international markets · Building alliances between businesses and social enterprises
Awareness and education initiatives	Raising awareness and educating the public or specific groups about social or environmental issues	· Launching small business education initiatives focused on impactful procurement · Organizing workshops on sustainable practices

Source: Authors' own representation. For supporting empirical data, see Mair and Rathert (forthcoming 2024).

Policy opportunities to unlock the promise of social entrepreneurship

Social entrepreneurship has had a significant impact in tackling complex social and environmental problems. Yet, there are still formidable barriers to overcome in unlocking its full transformative potential. Policy has a critical role to play in removing these barriers and enabling further innovation and impact in social entrepreneurship.

Globally, governments and international bodies have started to develop solutions for some of the innovation challenges social entrepreneurs face (see GII 2024 Expert contribution from Klijn and Bonnici). For example, the OECD has recently produced in-depth manuals for policymakers on developing legal frameworks for social enterprises, measuring social impact, conducting impactful public procurement, and providing training social entrepreneurs. Moreover, many jurisdictions are pushing ahead with advanced policy support. A review of 75 jurisdictions globally found that 20 percent have dedicated legal forms for social entrepreneurship; 30 percent offer government funding support; and 20 percent offer operational support such as training or consulting. [13]

Yet, unlocking the full innovation and impact potential of social entrepreneurship will require more comprehensive action. Drawing on the expert contributions to the GII 2024 Special theme (available online), we highlight the barriers to and opportunities for social entrepreneurship

13 Authors' analysis of LexMundi Pro Bono Foundation Social Enterprise Law Surveys Database. Available at: https://www.lexmundi.com/guides/social-enterprise-law-surveys.

across six dimensions: namely, institutional frameworks, human capital, infrastructure, networks, financing, and measurement (Table 14).[14]

Table 14 Barriers and opportunities in social entrepreneurship

Dimension	Barriers	Opportunities
Institutional frameworks	· Constraining legal forms · Lack of dedicated support services · Limited collaboration between policymakers and social entrepreneurs · Regulatory restrictions	· Specialized legal forms · Dedicated agencies and support services for social enterprises · Spaces for collaboration between policymakers and social entrepreneurs
Human capital	· Complex skillsets required of social entrepreneurs and their employees · Limited knowledge of traditional innovation ecosystem	· Higher education curricula on social entrepreneurship · Social entrepreneurship training programmes · Innovation education programmes
Infrastructure	· Lack of global data collection, standards and definitions for social entrepreneurship · Regional disparities in infrastructure	· Internationally agreed standards and definitions · National data registries · Programmes to help social entrepreneurs reach geographies with limited infrastructure
Networks	· Gaps in global awareness and knowledge · Complexities in public/private research systems · Weak connections between research systems in advanced economies and developing regions	· Public backing of social entrepreneurship networks · Public–private–social sector research partnerships · University partnerships across advanced economies and developing regions
Financing	· Investor knowledge gaps · Insufficient financing for small and mid-sized social enterprises · High self-financing rates · Low and uneven rates of impact investing	· Investor awareness campaigns · Procurement incentives to support social enterprises · Investor incentives · Tax incentives for legal forms that enable pursuit of social benefits · Tailored public financing for small and mid-sized social enterprises
Measurement	· Disagreement about how to best measure impact · Difficulty translating impact into quantitative metrics · Lack of accepted certification processes · Low impact measurement rates among social enterprises	· Investment in impact accounting research · Public or government-supported third-party certification systems · Public support to train and finance social enterprises in impact measurement capabilities

Source: Authors' own representation based on GII 2024 Expert contributions.

14 The dimensions of policy barriers and opportunities correspond to the GII's input and output pillars.

Institutional frameworks

Develop supportive legal and regulatory environments

Globally, the institutional frameworks supporting social entrepreneurship innovation – encompassing regulatory quality, rule of law and agency support – remain underdeveloped. Many countries lack a specific legal form for social entrepreneurship and impose restrictions that limit scaling opportunities. For instance, regulations often prevent directors of traditional for-profit ventures from considering social or public benefits alongside shareholder returns (Morrison & Foerster, LexMundi Pro Bono Foundation and Catalyst 2030, 2022). Such gaps expose social enterprises to legal risks and bureaucratic hurdles. And they restrict access to funding and partnerships, which in turn inhibits organizational growth (see GII 2024 Expert contribution from Afolabi).

Governments have an opportunity to develop facilitative institutional frameworks and regulatory policies that help social enterprises to flourish. Establishing legal definitions for social entrepreneurship is a crucial first step. These definitions should align with international peers and or transnational organizations so as to enable global collaboration, research and funding.[15] Additionally, policymakers should adopt specific legal forms that facilitate the joint pursuit of social and financial goals, such as the Benefit Corporation in the United States and the Community Interest Corporation in the United Kingdom.

Creating dedicated governmental units or departments to support social entrepreneurship is also essential. In a sample of 75 jurisdictions, less than 10 percent had such specialized support.[16] These structures can help legitimize local social entrepreneurial efforts; support nascent social ventures; facilitate collaboration between social entrepreneurs and policymakers; and advocate for the removal of legal and policy restrictions (see GII 2024 Expert contribution from Bilimoria on the importance of formalized government support).

There is also a need for policymakers to collaborate with social entrepreneurs to remove restrictions associated with non-specialized legal forms. Existing regulations designed for traditional non-profit or for-profit organizations often hinder impact and innovation in social enterprises. For example, restrictions on foreign philanthropic investment into non-profits limits access to essential international funding sources for social enterprises (Oelberger and Shachter, 2021).

Human capital

Invest in education and training programmes

Social enterprises face substantial hurdles in accessing quality human capital, with many social entrepreneurs reporting challenges in finding employees with the right skillsets (Social Enterprise UK, 2023; Euclid Network 2022). To drive forward more innovation, social enterprises need a workforce that has technical skills in areas such as finance, accounting and engineering alongside relational and cultural skills in areas such as communication and community engagement, and local language fluency, as well as historical and contextual knowledge (Battilana and Dorado, 2010). This unique mix of skills has not been emphasized globally and is further complicated in developing countries by substantial rates of out-migration (see GII 2024 Expert contribution from Afolabi).

Similarly to small and medium-sized enterprises (SMEs), social enterprises may also lack skilled human capital that has the capacity to tap global knowledge and information resources, such as the knowledge incorporated in scientific publications or patent documents, in order to find possible solutions to technical or process challenges.

15 See OECD guidance on designing legal frameworks for social enterprises; OECD, 2022.
16 Authors' analysis of LexMundi Pro Bono Foundation Social Enterprise Law Surveys Database. Available at: https://www.lexmundi.com/guides/social-enterprise-law-surveys.

Policymakers have an important role to play in ensuring social enterprises have access to the human capital needed for innovation. Growing a supply of capable entrepreneurs with relational and cultural skillsets begins with changes to school curricula so as to emphasize entrepreneurialism with a social impact (see GII 2024 Expert contribution from Çiftçi on King's College Nepal's social entrepreneurship courses). Publicly-supported training programmes can also have a major impact on the prevalence and robustness of social entrepreneurship. For instance, social enterprises that completed the United Kingdom's School for Social Entrepreneurs programme reported an average 40 percent increase in earned income and had a two-year survival rate of 81 percent, compared to 73 percent for UK SMEs (AKOU, 2023).

Infrastructure

Promote data collection

The lack of data on social entrepreneurship is a major infrastructure deficiency holding back innovation and impact. As two recent efforts to quantify the number of social enterprises globally reveal, large parts of the world have no data on social entrepreneurship, and in those places that do have data the samples are small, out of date or based on competing definitions (Schwab Foundation for Social Entrepreneurship and WEF, 2024; British Council and Social Enterprise UK, 2022). Without access to comparable and high-quality data, policymakers will struggle to regulate and allocate resources appropriately; impact investors will continue to overlook the role of social entrepreneurship in building economies and changing lives; and social entrepreneurs will miss out on valuable opportunities to catalyze impact.

In addition to developing globally recognized legal definitions, governments must align on data standards and functional definitions for social entrepreneurship. National data registries or regular surveys that gather information on prevalence, legal forms, organizational models, turnover and impact can provide critical inputs for building an ecosystem capable of addressing innovation challenges and scaling social entrepreneurship.

Assist social entrepreneurs in reaching underserved communities

Regional disparities in innovation infrastructure, including access to information and communication technologies, stable and affordable energy, and government services, are particularly critical for social entrepreneurship, which often targets communities with the least access. Infrastructure gaps are increasingly extreme in both developed as well as developing countries, creating challenges for social entrepreneurs everywhere as they seek to meet the needs of disadvantaged communities. In India, for example, the divide between urban and rural areas in terms of access to health care, financial literacy and gender equity makes it difficult for social enterprises to reach the most vulnerable populations (see GII 2024 Expert contribution from Kannan and Ramanujam on the social enterprises working in India to overcome these barriers; GII 2024 Case study contribution from Rayner on iKure).

National and local governments have a role to play in helping to bridge regional disparities by providing increased support to social entrepreneurs operating within disadvantaged communities. This support could include grants, subsidies, tax benefits and investment in critical infrastructure projects tailored to the unique needs of such regions, thereby enabling social entrepreneurs to operate more effectively and sustainably.

Networks

Incubate social enterprise networks

Unlike large corporations and philanthropic organizations, social enterprises often struggle to gain attention, because of their small size and hybrid nature. Moreover, because they blend aspects of multiple forms of organizing, social enterprises do not fit neatly into existing categories. Without visibility and credibility, social enterprises often miss out on impactful partnerships and a deeper engagement with existing support structures for innovation. These issues are particularly acute for social enterprises working with advanced technologies such as AI, data analytics, smart logistics and fintech, where strategic partnerships are becoming essential for accessing expertise and modern technology (see GII 2024 Expert contribution from Kraemer-Mbula; GII 2024 Case study contribution from Rayner on WeRobotics).

Governments can play a crucial role in addressing these challenges by helping to incubate social enterprise networks and alliances. Organizations such as the Euclid Network in Europe and Catalyst 2030, which represents social entrepreneurs globally, leverage collective strength in order to capture media, government and business attention, and connect social enterprises to valuable public and private partnerships (see GII 2024 Expert contribution from Bilimoria). Policymakers can help to legitimize and grow these organizations by engaging them in meaningful discussion, providing funding and facilitating access to new partners – particularly those with capabilities in advanced technologies who can help to upskill social enterprises.

Deepen research links between advanced and developing economies

Uneven development of the research and education ecosystem, including accelerators, universities and public research partnerships, further impedes innovation within social enterprises. Concentrated in a few hyper-productive regions, existing innovation ecosystems are ill-equipped to support the local needs of social entrepreneurs, especially in developing regions.

The presence of well-resourced local research universities can substantially benefit social enterprises by helping to identify pressing local issues, legitimize fledging social ventures and diffuse their innovative products, processes and services (see GII 2024 Expert contribution from Montoya Castaño).

At the same time, social entrepreneurs could also better leverage the potential of existing know-how, research, and research institutions and universities. Links between social entrepreneurs and key actors in existing innovation ecosystems are often weak. Social entrepreneurs may not routinely seek solutions within an existing body of knowledge or reach out to universities and public research institutions to collaboratively conduct or commission R&D geared to solving their technological or process challenges. Alongside stronger ties between social entrepreneurs and existing innovation ecosystem actors, there is a need to increase the absorptive capacity of social enterprises. This often due to them not having R&D departments or trained personnel who can digest and apply existing public research results, as well as proactively request new, targeted research for the enterprise's venture.

Financing

Raising investor awareness

Social enterprises face challenges in gaining the attention of funders, both public and private, because funders often understand neither social enterprises' needs nor their impact potential, and, moreover, they struggle to verify and compare social impact across ventures. For example, 40 percent of social enterprises report that they have experienced a lack of awareness and understanding among banks, investors and support organizations (Euclid Network, 2022).

To address these gaps, it is crucial to educate private investors, financial institutions and policymakers about the pathways through which social enterprises generate impact. Governments can draw inspiration from award-giving organizations such as the Skoll Foundation and the Schwab Foundation for Social Entrepreneurship, which have positively influenced the trajectory of social entrepreneurship and raised its visibility. Publicly-supported awards and grants can help highlight and finance exceptional social enterprises, while also educating private investors about the positive social impact of these ventures.

Expanding public financing

The availability of financing for social entrepreneurship remains a significant constraint, leading to high rates of self-financing, high-interest debt and overall slow growth. While some governments have made investments into social enterprises, more action is needed to create a supportive financing environment. Tax and procurement incentives, as well as tailored grant funding, are critical levers.

Tax incentives for dedicated legal forms that facilitate the joint pursuit of social and financial objectives can encourage the establishment of new social enterprises and provide additional resources for reinvestment in impact and innovation. Procurement incentives, such as those established by the United Kingdom's Social Value Act (see GII 2024 Expert contribution from Klijn and Bonnici), can help local and national governments to create supply strategies that emphasize public benefits, while enabling social enterprises to grow their trading activities.

Tailored grant funding – which involves promoting funding opportunities; offering size-dependent funding, simplifying application processes; and providing guidance on minimally intrusive impact measurement requirements – can address gaps in mid-range financing and the substantial search and transaction costs associated with applying for grants. These issues are particular challenges for small and mid-sized social enterprises. Tailored grant funding has significant potential to help such organizations to grow and become more attractive to impact investors.

Creating incentives for private investment

Impact investing has predominantly focused on relatively large, low-risk organizations, leaving most social enterprises with a limited access to the transition funding required for scaling beyond proof-of-concept (see GII 2024 Expert contribution from Dey and Gupta). To mitigate this issue, governments can play a role in reducing the perceived risk associated with investing in social enterprises.

This can be achieved through blended financing mechanisms, concessionary capital and the establishment of funds dedicated to social enterprises, making them more attractive to large institutional investors. Public and philanthropic funders can provide concessional investments so as to lower risk and attract larger sums of private impact capital. Additionally, public support can help to create more robust financing ecosystems through social entrepreneurship funds and funds-of-funds, which facilitate connections between public–private capital and groups of social enterprises. This approach allows investors to customize investments so they align with their capital goals, thereby enhancing the overall growth and impact of social enterprises.[17]

Measurement

Investment in public–private certification and measurement approaches

The comprehensive and accurate measurement of social impact remains a challenge for all impact-oriented organizations (see GII 2024 Background study from Hottenrott and Expert contribution from Garg Patel).[18] Over the last 15 to 20 years, coordinated efforts by investors, governments, researchers and impact practitioners have advanced the development of various tools and frameworks for the purpose of systematically quantifying impact. These include metrics taxonomies like the Impact Reporting and Investment Standards (IRIS and IRIS+) and rating services such as the Global Impact Investing Rating System (GIIRS), as well as the 60 Decibels benchmarks (see GII 2024 Expert contribution from Kraemer-Mbula). While these efforts represent immense progress, measuring the impact of social entrepreneurship remains challenging due to limited data, human capital and financial resources, and the localized nature of many of the issues social enterprises address.

Existing efforts to quantify the impact of social entrepreneurship tend to take three main forms.

Person-based measures focus on the total number of lives affected. For example, the 3,200 social enterprises in the Catalyst 2030 network have touched over one billion lives, and the Schwab Foundation's 470 social entrepreneurship awardees have reached over 891 million lives over the past 25 years.[19]

17 For additional detail on policies to support sustainable financing of social entrepreneurship, see Nicholls, 2021b.
18 See also Zulkefly *et al.*, 2022.
19 See Catalyst 2030 (available at: https://catalyst2030.net/) impact measurement; Schwab Foundation for Social Entrepreneurs impact measurement, 2024.

Resource-based measures focus on the amount of money raised or earned by social enterprises, the vast majority of which is invested or reinvested back into their respective social or environmental missions (Euclid Network, 2022). For example, the 3,200 social enterprises in Catalyst 2030's network have raised over USD 2.2 billion in funding, and the 64 social enterprises in the three most recent cohorts of Schwab Foundation awardees have total revenues of over USD 900 million.

And finally, *issue-based* measures focus on metrics tailored to the specific social or environmental challenge being addressed. Assessing the impact of social enterprises working on health, for example, would involve tracking the number of patients screened or receiving medicine, or the number of health products provided; while assessing the impact of social enterprises that tackle inequality might involve tracking metrics, such as the gender pay gap or the political representation of marginalized groups.

Such variation in approaches to measuring impact is a double-edged sword. On the one hand, it makes it difficult for policymakers to assess the overall impact of social entrepreneurship and for investors to make comparisons across different ventures, when deciding where to allocate capital. Among impact investors, for example, the challenge of impact comparison is the single most significant issue today (Hand, Sunderjit and Pardo, 2023). On the other hand, varied approaches to measuring impact help to capture important underlying differences in how social enterprises create impact, which would otherwise be lost if the field converged on a single, standardized metric.

Consider, for example, how impact measurement differs along the customer, employee, product/service, and ecosystem pathways:

- Assessing impact from the *customer pathway* often involves measuring the number of customers reached. Yet it is important to go beyond simple counts of customers and consider what further downstream changes (both positive and negative) occur when new customer segments have access to previously unavailable products or services. Microfinance loans, for example, can impact recipients' economic security and their socio-emotional well-being, as well as that of their families and communities.
- The impact of the *employee pathway* is often assessed by measuring the number of employees hired, the wages paid and the investment in employee training. Yet, as with the customer pathway, it is important to consider downstream impacts as well; for example, the increase in overall lifetime earnings and improvements in self-confidence, self-efficacy and other measures of well-being.
- The impact of the *product/service pathway* is often assessed based on the volume of products and services sold. However, it is also important to consider the longer-term positive and negative consequences of these products. For organizations selling products or services made from recyclable or renewable materials, a crucial measure of impact would be the amount of waste, emissions or pollution saved by customers adopting these products or services instead of conventional alternatives.
- Assessing the impact of the *ecosystem pathway* is particularly challenging. This goes beyond direct measures, such as the number of actors involved or mobilized within an ecosystem. The downstream impact created through the ecosystem pathway can also be measured through tracking changes in legislation and the levels of new knowledge creation, as well as shifts in social norms and attitudes. Overall, this pathway may be both the most important source of impact and the one that is most difficult to measure.

We are still years away from any globally accepted measurement standards for gauging impact. However, policymakers can take immediate action to help improve metrics. National and international support for accounting research on social impact can expedite the development of standardized measures that ensure critical considerations, such as the diversity of social entrepreneurial issues, impact pathways and innovation strategies, are properly accounted for. Additionally, public or state-recognized third-party certification systems can help social enterprises connect with both public resources and impact investors. A key component of any certification process should be supporting social enterprises in developing their impact reporting capacity and ensuring that the certification process is as straightforward as possible. Globally, many social enterprises lack the resources or expertise required in order to establish impact reporting functions and apply for certifications. For instance, 40 percent of European social enterprises report not having measured the impact they are making at all; and only 20 percent report using an existing certification system (Euclid Network, 2022).

Conclusion

Social entrepreneurship is more than a trend; it is a transformative approach to addressing some of the world's most pressing social and environmental challenges. By merging the innovative capacity of business with the altruistic goals of the social sector, social enterprises are uniquely positioned to generate significant positive impacts globally. They achieve impact through serving marginalized communities, employing individuals who would not otherwise have access to jobs, and creating socially beneficial products and services. But also by shifting broader societal systems, often serving as catalysts for policy reform, cultural change and economic development.

The potential of social entrepreneurship is vast. Yet, unlocking its full promise requires a supportive ecosystem. Governments, international bodies and the private sector must work collaboratively to create tailor-made enabling environments – including regulatory, legal and measurement frameworks, as well as financing mechanisms, networks and training programmes – that recognize and support social entrepreneurs and their ventures. Incorporating and re-purposing institutions and innovation support mechansisms originally developed for public science and corporate innovation should be part of this process.

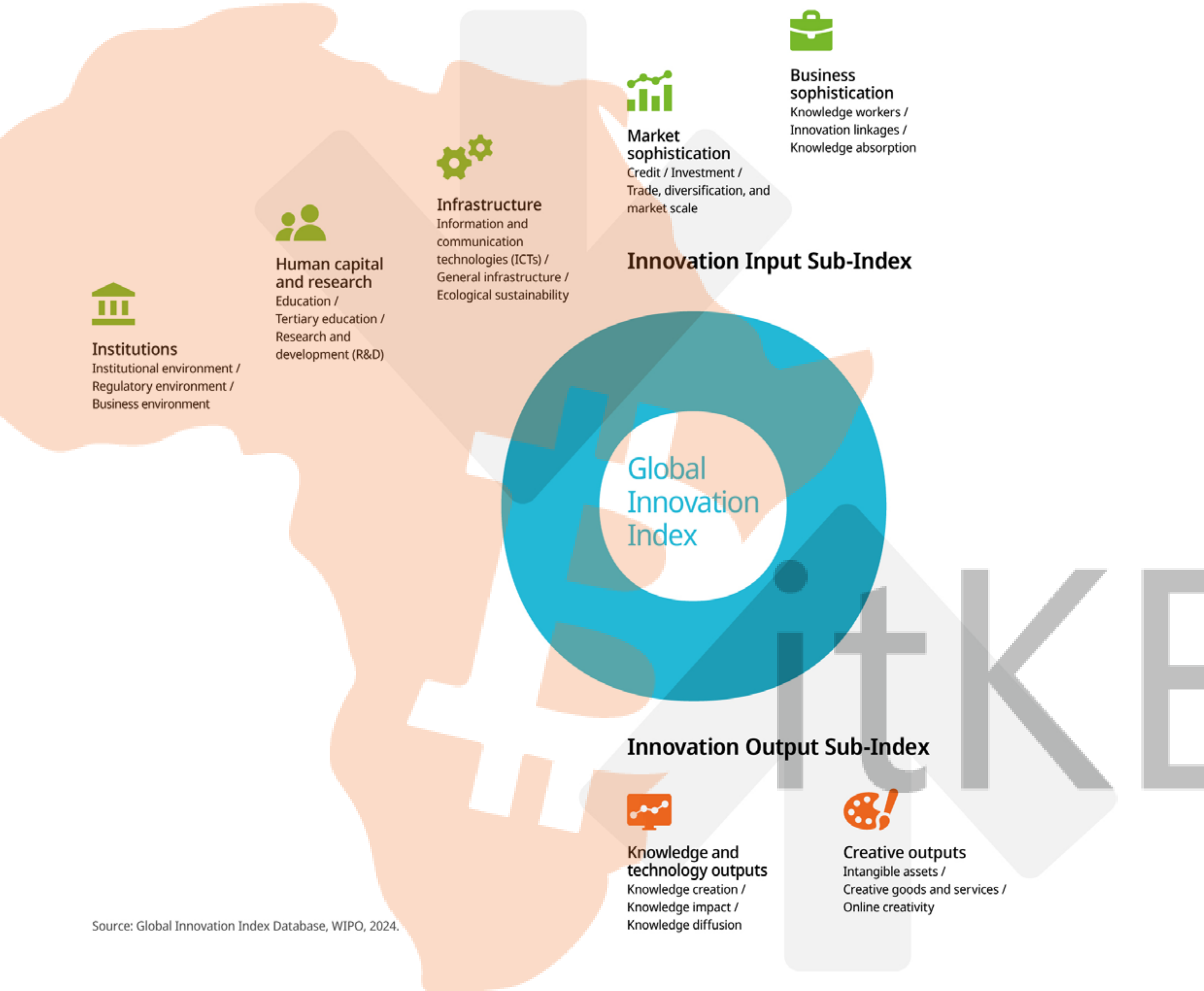
At the same time, the onus for change is not confined to the actors that surround social entrepreneurs. There is scope for social entrepreneurs themselves to more actively drive innovation within their enterprises. This can be done through dedicated attention to key activities such as R&D, process innovation, and patenting and trademarking. But it also requires concrete action to embed social enterprises within existing innovation ecosystems; for instance, by tapping existing sources of scientific and technological knowledge, as well as venture capital, R&D tax credits and other innovation finance tools and by collaborating with universities, public research organizations and other entrepreneurs.

Together, by investing in supportive policies, education, infrastructure and financing, and by encouraging social entrepreneurs to engage with existing innovation ecosystems, we can collectively unlock the full potential of social entrepreneurship to drive sustainable development on a global scale.

GII 2024 Economy profiles

The following tables provide detailed profiles for 133 economies.

Framework of the Global Innovation Index 2024



Source: Global Innovation Index Database, WIPO, 2024.

How to read the Economy profiles

The following tables provide detailed profiles for each of the 133 economies in the *Global Innovation Index 2024*. They are composed of four sections.

1. At the top is the overall Global Innovation Index (GII) rank for each economy.

2. Next are the key metrics for each profile which provide the specific context for that particular economy: namely, its Innovation Input and Output Sub-Index rankings, the income group to which the economy belongs, its geographical region, population in millions, GDP in billion USD purchasing power parity (PPP), and, lastly, GDP per capita in USD PPP.

Because economies may either drop in or out of the GII, and due to adjustments made to the GII framework every year and other technical factors unrelated to actual performance (missing data, updates of data, and so on), the GII rankings are not directly comparable between one year and another. Appendix I provides further details.

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

3. Pillars are identified by an illustrative icon, sub-pillars by two- digit and indicators by three-digit numbers. For example, under the pillar Institutions 🏛 is the sub-pillar 1.3, Business environment, under which is indicator 1.3.2, Entrepreneurship policies and culture.

The GII 2024 includes 78 indicators in total and three types of data. Composite (or index) indicators are identified with an asterisk (*), survey questions with a dagger (†). The remaining indicators are all hard data series.

As far as possible, we have provided the (scaled/unscaled) value of the indicators rather than the score. Indicators based on survey responses (five indicators) or an index (10 indicators) are always reported as scores, while eight of the 63 hard data indicators are likewise reported as scores. This means that, overall, 55 out of 78 indicators are reported as values in the economy profiles.

When data are either unavailable or out of date, "n/a" is used, with a cutoff year of 2014. To the right of an indicator name, a clock symbol ⏲ is used when the available economy data 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 indicator sources and definitions, see Appendix III.

4. On the far right of each column, the strengths of an economy are indicated by a solid circle ● and weaknesses by a hollow circle ○. The strengths of an economy within its income group are indicated by a solid diamond ◆ and weaknesses by a hollow diamond ◇. The exceptions to this are the top 25 high-income economies, whose strengths and weaknesses are instead computed within the top 25 group.

Rankings of 1, 2 and 3 are highlighted as an economy's strengths, except in particular instances at the sub-pillar level, when the desired data minimum coverage (DMC) is unmet for that sub-pillar. For the remaining indicators, the strengths and weaknesses of a specific economy are based on the percentage of economies whose scores fall either above or below its own score (i.e., percentile ranks) and where the data is no older than the indicator mode minus 5 years. In practice, this means that for indicators with a data year mode of 2023, an economy's data year must date from 2018 or be more recent in order to classify as a strength or weakness.

For any given economy, strengths ● are those scores with percentile ranks greater than the 10th largest percentile rank among the 78 indicators for that economy.

For that same economy, weaknesses ○ are those scores with percentile ranks lower than the 10th smallest percentile rank among the 78 indicators for that economy.

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

For that same economy, income group weaknesses ◇ are those scores below the income group average minus the standard deviation within that 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 with more than one such sub-pillar also include the ranks for that pillar within square brackets. For these pillars and sub-pillars, neither strengths nor weaknesses are signaled.

Albania

GII 2024 rank

84

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
97	66	Upper middle	EUR	2.8	55.9	19,566

Institutions

			Score/ Value	Rank	
	Institutions		**50.3**	**60**	
1.1	**Institutional environment**		**55.2**	**60**	
1.1.1	Operational stability for businesses*		64.7	61	
1.1.2	Government effectiveness*		45.7	62	
1.2	**Regulatory environment**		**42.6**	**67**	
1.2.1	Regulatory quality*		46.0	64	
1.2.2	Rule of law*		39.1	73	
1.3	**Business environment**		**53.2**	**[53]**	
1.3.1	Policy stability for doing business†	⏲	53.2	53	
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	

Human capital and research

			Score/ Value	Rank	
	Human capital and research		**21.6**	**101**	◇
2.1	**Education**		**37.4**	**108**	◇
2.1.1	Expenditure on education, % GDP		2.7	108	
2.1.2	Government funding/pupil, secondary, % GDP/cap	⏲	9.8	87	◇
2.1.3	School life expectancy, years		14.5	60	
2.1.4	PISA scales in reading, maths and science		367.5	76	
2.1.5	Pupil–teacher ratio, secondary		9.7	31	
2.2	**Tertiary education**		**27.3**	**83**	
2.2.1	Tertiary enrolment, % gross		62.7	51	
2.2.2	Graduates in science and engineering, %		20.8	72	
2.2.3	Tertiary inbound mobility, %		1.5	82	
2.3	**Research and development (R&D)**		**0.0**	**[120]**	
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 USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇

Infrastructure

			Score/ Value	Rank	
	Infrastructure		**52.3**	**31**	◆
3.1	**Information and communication technologies (ICTs)**		**82.3**	**36**	
3.1.1	ICT access*		99.3	22	●◆
3.1.2	ICT use*		74.5	74	
3.1.3	Government's online service*		79.9	33	
3.1.4	E-participation*		75.6	22	●
3.2	**General infrastructure**		**20.8**	**95**	
3.2.1	Electricity output, GWh/mn pop.		2,521.6	72	
3.2.2	Logistics performance*		18.2	89	◇
3.2.3	Gross capital formation, % GDP		25.1	48	
3.3	**Ecological sustainability**		**53.8**	**1**	●◆
3.3.1	GDP/unit of energy use		19.2	12	●◆
3.3.2	Low-carbon energy use, %		69.8	5	●◆
3.3.3	ISO 14001 environment/bn PPP$ GDP		4.3	25	●

Market sophistication

			Score/ Value	Rank	
	Market sophistication		**24.2**	**91**	
4.1	**Credit**		**8.3**	**118**	◇
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		34.0	90	
4.1.3	Loans from microfinance institutions, % GDP		0.6	40	
4.2	**Investment**		**2.9**	**[100]**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP	⏲	0.0	89	
4.2.4	VC received, value, % GDP	⏲	0.0	97	
4.3	**Trade, diversification and market scale**		**61.4**	**46**	
4.3.1	Applied tariff rate, weighted avg., %		1.0	15	●
4.3.2	Domestic industry diversification		90.9	32	
4.3.3	Domestic market scale, bn PPP$		55.9	108	

Business sophistication

			Score/ Value	Rank	
	Business sophistication		**26.8**	**64**	
5.1	**Knowledge workers**		**41.4**	**[47]**	
5.1.1	Knowledge-intensive employment, %	⏲	18.4	82	
5.1.2	Firms offering formal training, %	⏲	46.2	23	●
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, %	⏲	11.8	66	
5.2	**Innovation linkages**		**21.2**	**78**	
5.2.1	Public research–industry co-publications, %		0.3	128	○
5.2.2	University–industry R&D collaboration†	⏲	59.7	38	◆
5.2.3	State of cluster development†	⏲	38.0	85	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	73	
5.2.5	Patent families/bn PPP$ GDP		0.0	82	
5.3	**Knowledge absorption**		**17.9**	**102**	◇
5.3.1	Intellectual property payments, % total trade		0.6	63	
5.3.2	High-tech imports, % total trade		0.2	133	○◇
5.3.3	ICT services imports, % total trade		0.8	93	
5.3.4	FDI net inflows, % GDP		7.2	14	●◆
5.3.5	Research talent, % in businesses		n/a	n/a	

Knowledge and technology outputs

			Score/ Value	Rank	
	Knowledge and technology outputs		**14.4**	**89**	
6.1	**Knowledge creation**		**5.6**	**108**	
6.1.1	Patents by origin/bn PPP$ GDP		0.5	77	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.2	51	
6.1.3	Utility models by origin/bn PPP$ GDP		0.0	68	
6.1.4	Scientific and technical articles/bn PPP$ GDP		5.9	96	
6.1.5	Citable documents H-index		3.0	122	○
6.2	**Knowledge impact**		**20.0**	**101**	
6.2.1	Labor productivity growth, %		2.6	16	●
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.1	92	
6.2.4	High-tech manufacturing, %		4.5	100	○◇
6.3	**Knowledge diffusion**		**17.8**	**65**	
6.3.1	Intellectual property receipts, % total trade		0.3	40	◆
6.3.2	Production and export complexity		37.2	75	
6.3.3	High-tech exports, % total trade		0.0	132	○
6.3.4	ICT services exports, % total trade		2.0	56	
6.3.5	ISO 9001 quality/bn PPP$ GDP		9.4	30	●

Creative outputs

			Score/ Value	Rank	
	Creative outputs		**13.6**	**99**	◇
7.1	**Intangible assets**		**7.6**	**105**	◇
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		27.0	71	
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.3	86	
7.2	**Creative goods and services**		**16.8**	**60**	
7.2.1	Cultural and creative services exports, % total trade		1.0	27	◆
7.2.2	National feature films/mn pop. 15–69		3.4	41	
7.2.3	Entertainment and media market/th pop. 15–69		n/a	n/a	
7.2.4	Creative goods exports, % total trade		0.0	130	○
7.3	**Online creativity**		**22.6**	**87**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		4.7	57	
7.3.2	GitHub commits/mn pop. 15–69		7.9	62	
7.3.3	Mobile app creation/bn PPP$ GDP		55.1	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Algeria

GII 2024 rank

115

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
115	113	Lower middle	NAWA	46.2	629.0	13,682

			Score/ Value	Rank	
	Institutions		**34.8**	**95**	
1.1	**Institutional environment**		**38.6**	**99**	
1.1.1	Operational stability for businesses*		46.7	100	
1.1.2	Government effectiveness*		30.6	100	
1.2	**Regulatory environment**		**16.9**	**121**	
1.2.1	Regulatory quality*		13.9	124	
1.2.2	Rule of law*		20.0	110	
1.3	**Business environment**		**49.0**	**[61]**	
1.3.1	Policy stability for doing business†		49.0	66	
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**28.1**	**76**	
2.1	**Education**		**46.0**	**[78]**	
2.1.1	Expenditure on education, % GDP	⏲	6.3	10	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap		n/a	n/a	
2.1.3	School life expectancy, years		15.5	44	● ◆
2.1.4	PISA scales in reading, maths and science	⏲	361.7	78	
2.1.5	Pupil–teacher ratio, secondary		n/a	n/a	
2.2	**Tertiary education**		**33.9**	**65**	
2.2.1	Tertiary enrolment, % gross		53.4	67	◆
2.2.2	Graduates in science and engineering, %		29.9	20	●
2.2.3	Tertiary inbound mobility, %		0.5	99	
2.3	**Research and development (R&D)**		**4.2**	**79**	
2.3.1	Researchers, FTE/mn pop.	⏲	832.4	58	
2.3.2	Gross expenditure on R&D, % GDP	⏲	0.5	58	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○ ◇
2.3.4	QS university ranking, top 3*		0.0	75	○ ◇
	Infrastructure		**29.9**	**94**	
3.1	**Information and communication technologies (ICTs)**		**52.8**	**99**	
3.1.1	ICT access*		84.0	80	◆
3.1.2	ICT use*		75.4	73	
3.1.3	Government's online service*		30.8	121	
3.1.4	E-participation*		20.9	123	
3.2	**General infrastructure**		**31.3**	**66**	
3.2.1	Electricity output, GWh/mn pop.	⏲	1,932.9	81	
3.2.2	Logistics performance*		18.2	89	
3.2.3	Gross capital formation, % GDP		36.0	10	●
3.3	**Ecological sustainability**		**5.6**	**128**	◇
3.3.1	GDP/unit of energy use		7.8	95	
3.3.2	Low-carbon energy use, %		0.3	124	◇
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.3	108	
	Market sophistication		**5.2**	**132**	○ ◇
4.1	**Credit**		**5.0**	**[126]**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		21.1	115	
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**1.7**	**108**	
4.2.1	Market capitalization, % GDP	⏲	0.2	85	○ ◇
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	108	○
4.2.4	VC received, value, % GDP		0.0	66	
4.3	**Trade, diversification and market scale**		**8.8**	**132**	○ ◇
4.3.1	Applied tariff rate, weighted avg., %	⏲	12.7	133	○ ◇
4.3.2	Domestic industry diversification	⏲	14.2	108	
4.3.3	Domestic market scale, bn PPP$		629.0	41	●

			Score/ Value	Rank	
	Business sophistication		**18.0**	**114**	
5.1	**Knowledge workers**		**15.0**	**113**	
5.1.1	Knowledge-intensive employment, %	⏲	17.9	86	
5.1.2	Firms offering formal training, %		n/a	n/a	
5.1.3	GERD performed by business, % GDP	⏲	0.0	77	
5.1.4	GERD financed by business, %	⏲	6.7	82	
5.1.5	Females employed w/advanced degrees, %	⏲	8.1	83	
5.2	**Innovation linkages**		**23.0**	**65**	●
5.2.1	Public research–industry co-publications, %		0.6	115	
5.2.2	University–industry R&D collaboration†		54.7	47	●
5.2.3	State of cluster development†		55.0	50	●
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	121	◇
5.2.5	Patent families/bn PPP$ GDP		0.0	100	
5.3	**Knowledge absorption**		**15.8**	**120**	
5.3.1	Intellectual property payments, % total trade		0.4	82	
5.3.2	High-tech imports, % total trade	⏲	10.4	35	●
5.3.3	ICT services imports, % total trade		0.3	119	
5.3.4	FDI net inflows, % GDP		0.5	107	
5.3.5	Research talent, % in businesses	⏲	0.5	83	◇
	Knowledge and technology outputs		**9.1**	**125**	
6.1	**Knowledge creation**		**10.2**	**82**	
6.1.1	Patents by origin/bn PPP$ GDP		0.8	65	●
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	85	
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		8.1	83	
6.1.5	Citable documents H-index		10.2	74	
6.2	**Knowledge impact**		**10.9**	**128**	◇
6.2.1	Labor productivity growth, %		−0.6	111	
6.2.2	Unicorn valuation, % GDP		0.0	49	○ ◇
6.2.3	Software spending, % GDP		0.0	132	○ ◇
6.2.4	High-tech manufacturing, %	⏲	4.1	101	
6.3	**Knowledge diffusion**		**6.2**	**112**	
6.3.1	Intellectual property receipts, % total trade		0.0	106	
6.3.2	Production and export complexity		27.3	94	
6.3.3	High-tech exports, % total trade	⏲	0.0	131	○
6.3.4	ICT services exports, % total trade		0.2	126	
6.3.5	ISO 9001 quality/bn PPP$ GDP		1.1	112	
	Creative outputs		**9.2**	**109**	
7.1	**Intangible assets**		**9.2**	**100**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		20.0	87	
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○ ◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		1.5	46	●
7.2	**Creative goods and services**		**0.6**	**124**	
7.2.1	Cultural and creative services exports, % total trade		0.0	105	
7.2.2	National feature films/mn pop. 15–69		0.1	84	
7.2.3	Entertainment and media market/th pop. 15–69		1.7	53	
7.2.4	Creative goods exports, % total trade	⏲	0.0	125	
7.3	**Online creativity**		**17.7**	**106**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.3	117	
7.3.2	GitHub commits/mn pop. 15–69		1.4	110	
7.3.3	Mobile app creation/bn PPP$ GDP		51.5	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Angola

GII 2024 rank

133

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
133	132	Lower middle	SSA	36.7	260.3	7,077

Code	Indicator		Score/Value	Rank	
	Institutions		**25.0**	**120**	
1.1	**Institutional environment**		**33.7**	**108**	
1.1.1	Operational stability for businesses*		50.7	92	●
1.1.2	Government effectiveness*		16.8	127	◇
1.2	**Regulatory environment**		**20.2**	**114**	
1.2.1	Regulatory quality*		25.9	105	●
1.2.2	Rule of law*		14.5	121	
1.3	**Business environment**		**21.0**	**116**	◇
1.3.1	Policy stability for doing business†		27.7	109	
1.3.2	Entrepreneurship policies and culture†	⏲	14.2	72	
	Human capital and research		**12.4**	**125**	◇
2.1	**Education**		**29.7**	**[123]**	
2.1.1	Expenditure on education, % GDP		2.3	117	
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	⏲	26.8	113	
2.2	**Tertiary education**		**7.3**	**116**	◇
2.2.1	Tertiary enrolment, % gross	⏲	11.1	114	
2.2.2	Graduates in science and engineering, %	⏲	12.0	107	
2.2.3	Tertiary inbound mobility, %		n/a	n/a	
2.3	**Research and development (R&D)**		**0.1**	**118**	
2.3.1	Researchers, FTE/mn pop.	⏲	19.0	108	
2.3.2	Gross expenditure on R&D, % GDP	⏲	0.0	112	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**22.6**	**121**	
3.1	**Information and communication technologies (ICTs)**		**34.7**	**116**	
3.1.1	ICT access*		36.7	118	◇
3.1.2	ICT use*		45.4	110	
3.1.3	Government's online service*		41.6	107	
3.1.4	E-participation*		15.1	129	◇
3.2	**General infrastructure**		**11.5**	**122**	
3.2.1	Electricity output, GWh/mn pop.	⏲	486.3	111	
3.2.2	Logistics performance*		0.0	110	○◇
3.2.3	Gross capital formation, % GDP		24.5	58	●
3.3	**Ecological sustainability**		**21.7**	**60**	●
3.3.1	GDP/unit of energy use		12.3	48	●
3.3.2	Low-carbon energy use, %		32.5	29	●
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.1	128	
	Market sophistication		**11.6**	**127**	◇
4.1	**Credit**		**6.9**	**122**	
4.1.1	Finance for startups and scaleups†	⏲	20.8	78	◇
4.1.2	Domestic credit to private sector, % GDP		8.4	130	○◇
4.1.3	Loans from microfinance institutions, % GDP	⏲	0.0	62	○◇
4.2	**Investment**		**n/a**	**[n/a]**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP		n/a	n/a	
4.2.4	VC received, value, % GDP		n/a	n/a	
4.3	**Trade, diversification and market scale**		**16.3**	**126**	◇
4.3.1	Applied tariff rate, weighted avg., %		7.1	113	
4.3.2	Domestic industry diversification		0.0	109	○◇
4.3.3	Domestic market scale, bn PPP$		260.3	64	●

Code	Indicator		Score/Value	Rank	
	Business sophistication		**6.8**	**133**	○◇
5.1	**Knowledge workers**		**5.7**	**[130]**	
5.1.1	Knowledge-intensive employment, %	⏲	7.5	114	
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, %	⏲	1.3	115	
5.2	**Innovation linkages**		**1.4**	**132**	◇
5.2.1	Public research–industry co-publications, %		0.6	114	
5.2.2	University–industry R&D collaboration†		0.6	129	◇
5.2.3	State of cluster development†		0.0	130	○◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	115	
5.2.5	Patent families/bn PPP$ GDP		0.0	102	○◇
5.3	**Knowledge absorption**		**13.3**	**129**	◇
5.3.1	Intellectual property payments, % total trade		0.6	65	●◆
5.3.2	High-tech imports, % total trade		4.5	115	
5.3.3	ICT services imports, % total trade		0.4	117	
5.3.4	FDI net inflows, % GDP		−5.5	129	◇
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**3.6**	**133**	○◇
6.1	**Knowledge creation**		**0.4**	**133**	○◇
6.1.1	Patents by origin/bn PPP$ GDP	⏲	0.0	126	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	99	○◇
6.1.3	Utility models by origin/bn PPP$ GDP	⏲	0.0	62	●
6.1.4	Scientific and technical articles/bn PPP$ GDP		0.6	132	○◇
6.1.5	Citable documents H-index		0.9	130	◇
6.2	**Knowledge impact**		**6.7**	**132**	◇
6.2.1	Labor productivity growth, %		−4.1	131	◇
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.1	89	●
6.2.4	High-tech manufacturing, %		3.6	103	◇
6.3	**Knowledge diffusion**		**3.8**	**124**	
6.3.1	Intellectual property receipts, % total trade		0.0	116	○◇
6.3.2	Production and export complexity		16.9	112	
6.3.3	High-tech exports, % total trade		0.2	105	●
6.3.4	ICT services exports, % total trade		0.1	132	
6.3.5	ISO 9001 quality/bn PPP$ GDP		0.5	127	◇
	Creative outputs		**5.9**	**[119]**	
7.1	**Intangible assets**		**4.9**	**[113]**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP	⏲	12.0	106	
7.1.3	Global brand value, top 5,000, % GDP		n/a	n/a	
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.2	102	
7.2	**Creative goods and services**		**0.1**	**[133]**	
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	Creative goods exports, % total trade		0.0	127	
7.3	**Online creativity**		**13.5**	**119**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.1	130	
7.3.2	GitHub commits/mn pop. 15–69		0.4	125	
7.3.3	Mobile app creation/bn PPP$ GDP		40.1	119	◇

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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Argentina

GII 2024 rank

76

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
59	92	Upper middle	LCN	45.5	1,239.5	26,506

			Score/ Value	Rank	
	Institutions		**21.7**	**123**	○◇
1.1	**Institutional environment**		**37.3**	**103**	◇
1.1.1	Operational stability for businesses*		38.0	114	○◇
1.1.2	Government effectiveness*		36.6	84	
1.2	**Regulatory environment**		**26.8**	**103**	
1.2.1	Regulatory quality*		23.5	110	◇
1.2.2	Rule of law*		30.1	93	
1.3	**Business environment**		**1.1**	**132**	○◇
1.3.1	Policy stability for doing business†		0.0	130	○◇
1.3.2	Entrepreneurship policies and culture†		2.1	83	○◇
	Human capital and research		**33.9**	**55**	
2.1	**Education**		**44.6**	**81**	
2.1.1	Expenditure on education, % GDP	⏲	4.6	49	
2.1.2	Government funding/pupil, secondary, % GDP/cap		16.2	66	
2.1.3	School life expectancy, years	⏲	19.0	9	●◆
2.1.4	PISA scales in reading, maths and science		394.8	66	
2.1.5	Pupil–teacher ratio, secondary		n/a	n/a	
2.2	**Tertiary education**		**32.7**	**69**	
2.2.1	Tertiary enrolment, % gross	⏲	107.1	3	●◆
2.2.2	Graduates in science and engineering, %		15.0	103	○◇
2.2.3	Tertiary inbound mobility, %	⏲	3.2	63	
2.3	**Research and development (R&D)**		**24.5**	**41**	◆
2.3.1	Researchers, FTE/mn pop.		1,271.8	49	
2.3.2	Gross expenditure on R&D, % GDP		0.5	57	
2.3.3	Global corporate R&D investors, top 3, mn USD$		40.7	40	◆
2.3.4	QS university ranking, top 3*		35.9	37	●
	Infrastructure		**36.7**	**77**	
3.1	**Information and communication technologies (ICTs)**		**76.4**	**53**	
3.1.1	ICT access*		94.9	50	
3.1.2	ICT use*		67.7	88	
3.1.3	Government's online service*		78.9	38	
3.1.4	E-participation*		64.0	51	
3.2	**General infrastructure**		**17.9**	**103**	
3.2.1	Electricity output, GWh/mn pop.		3,132.7	62	
3.2.2	Logistics performance*		31.8	71	
3.2.3	Gross capital formation, % GDP		17.2	116	○◇
3.3	**Ecological sustainability**		**15.8**	**88**	
3.3.1	GDP/unit of energy use		10.7	65	
3.3.2	Low-carbon energy use, %		13.3	79	
3.3.3	ISO 14001 environment/bn PPP$ GDP		1.3	63	
	Market sophistication		**23.0**	**97**	
4.1	**Credit**		**12.1**	**107**	
4.1.1	Finance for startups and scaleups†		21.3	76	○
4.1.2	Domestic credit to private sector, % GDP	⏲	16.0	119	○◇
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**3.5**	**94**	
4.2.1	Market capitalization, % GDP		8.4	77	○
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.0	78	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	92	
4.2.4	VC received, value, % GDP		0.0	64	
4.3	**Trade, diversification and market scale**		**53.3**	**74**	
4.3.1	Applied tariff rate, weighted avg., %		5.8	102	◇
4.3.2	Domestic industry diversification		81.4	60	
4.3.3	Domestic market scale, bn PPP$		1,239.5	29	●

			Score/ Value	Rank	
	Business sophistication		**27.7**	**60**	
5.1	**Knowledge workers**		**31.7**	**68**	
5.1.1	Knowledge-intensive employment, %		18.3	83	
5.1.2	Firms offering formal training, %	⏲	40.2	36	
5.1.3	GERD performed by business, % GDP		0.2	52	
5.1.4	GERD financed by business, %		20.6	69	
5.1.5	Females employed w/advanced degrees, %	⏲	15.5	49	
5.2	**Innovation linkages**		**17.6**	**95**	
5.2.1	Public research–industry co-publications, %		1.4	68	
5.2.2	University–industry R&D collaboration†		37.0	84	
5.2.3	State of cluster development†		31.5	104	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	90	
5.2.5	Patent families/bn PPP$ GDP		0.1	69	
5.3	**Knowledge absorption**		**33.9**	**45**	
5.3.1	Intellectual property payments, % total trade		1.8	13	●◆
5.3.2	High-tech imports, % total trade		11.5	25	●
5.3.3	ICT services imports, % total trade		2.2	26	●◆
5.3.4	FDI net inflows, % GDP		1.7	82	
5.3.5	Research talent, % in businesses		11.5	61	
	Knowledge and technology outputs		**18.6**	**77**	
6.1	**Knowledge creation**		**13.2**	**71**	
6.1.1	Patents by origin/bn PPP$ GDP		0.4	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		0.1	47	
6.1.4	Scientific and technical articles/bn PPP$ GDP		7.0	90	
6.1.5	Citable documents H-index		27.7	36	●
6.2	**Knowledge impact**		**24.9**	**67**	
6.2.1	Labor productivity growth, %		−1.9	127	○◇
6.2.2	Unicorn valuation, % GDP		0.4	41	
6.2.3	Software spending, % GDP		0.3	41	
6.2.4	High-tech manufacturing, %		29.5	41	
6.3	**Knowledge diffusion**		**17.6**	**67**	
6.3.1	Intellectual property receipts, % total trade		0.3	38	◆
6.3.2	Production and export complexity		38.1	73	
6.3.3	High-tech exports, % total trade		0.7	84	
6.3.4	ICT services exports, % total trade		2.8	46	
6.3.5	ISO 9001 quality/bn PPP$ GDP		5.6	52	
	Creative outputs		**29.9**	**54**	
7.1	**Intangible assets**		**36.0**	**44**	
7.1.1	Intangible asset intensity, top 15, %		59.0	34	
7.1.2	Trademarks by origin/bn PPP$ GDP		59.6	25	●
7.1.3	Global brand value, top 5,000, % GDP		1.4	51	
7.1.4	Industrial designs by origin/bn PPP$ GDP		1.1	54	
7.2	**Creative goods and services**		**17.8**	**59**	
7.2.1	Cultural and creative services exports, % total trade		1.0	28	●◆
7.2.2	National feature films/mn pop. 15–69		6.3	19	●◆
7.2.3	Entertainment and media market/th pop. 15–69		3.3	50	◇
7.2.4	Creative goods exports, % total trade		0.0	113	○
7.3	**Online creativity**		**29.8**	**53**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		4.1	60	
7.3.2	GitHub commits/mn pop. 15–69		17.3	47	
7.3.3	Mobile app creation/bn PPP$ GDP		68.0	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Armenia

GII 2024 rank

63

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
55	79	Upper middle	NAWA	2.9	58.5	19,745

			Score/ Value	Rank	
	Institutions		**44.1**	**77**	
1.1	**Institutional environment**		**45.9**	**81**	
1.1.1	Operational stability for businesses*		56.0	83	
1.1.2	Government effectiveness*		35.8	89	
1.2	**Regulatory environment**		**40.2**	**70**	
1.2.1	Regulatory quality*		41.3	74	
1.2.2	Rule of law*		39.0	75	
1.3	**Business environment**		**46.4**	**65**	
1.3.1	Policy stability for doing business†		44.4	76	
1.3.2	Entrepreneurship policies and culture†	⏲	48.3	31	
	Human capital and research		**25.2**	**89**	
2.1	**Education**		**42.8**	**87**	
2.1.1	Expenditure on education, % GDP		2.5	114	◇
2.1.2	Government funding/pupil, secondary, % GDP/cap		12.2	81	
2.1.3	School life expectancy, years		14.4	63	
2.1.4	PISA scales in reading, maths and science		n/a	n/a	
2.1.5	Pupil–teacher ratio, secondary		11.6	47	
2.2	**Tertiary education**		**29.0**	**75**	
2.2.1	Tertiary enrolment, % gross		59.8	56	
2.2.2	Graduates in science and engineering, %		18.4	89	
2.2.3	Tertiary inbound mobility, %		7.3	39	◆
2.3	**Research and development (R&D)**		**3.9**	**81**	
2.3.1	Researchers, FTE/mn pop.		1,219.9	50	
2.3.2	Gross expenditure on R&D, % GDP		0.2	85	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**36.2**	**79**	
3.1	**Information and communication technologies (ICTs)**		**73.8**	**61**	
3.1.1	ICT access*		88.3	71	
3.1.2	ICT use*		80.7	50	
3.1.3	Government's online service*		69.3	63	
3.1.4	E-participation*		57.0	64	
3.2	**General infrastructure**		**17.8**	**104**	
3.2.1	Electricity output, GWh/mn pop.	⏲	2,823.4	67	
3.2.2	Logistics performance*		18.2	89	○◇
3.2.3	Gross capital formation, % GDP		21.9	87	
3.3	**Ecological sustainability**		**17.2**	**82**	
3.3.1	GDP/unit of energy use		9.4	80	
3.3.2	Low-carbon energy use, %		27.1	45	
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.1	126	○
	Market sophistication		**27.0**	**83**	
4.1	**Credit**		**27.8**	**64**	
4.1.1	Finance for startups and scaleups†	⏲	32.9	61	
4.1.2	Domestic credit to private sector, % GDP		52.6	63	
4.1.3	Loans from microfinance institutions, % GDP		3.0	13	●
4.2	**Investment**		**5.1**	**78**	
4.2.1	Market capitalization, % GDP		0.6	84	○
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.0	70	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.1	46	
4.2.4	VC received, value, % GDP		0.0	91	
4.3	**Trade, diversification and market scale**		**48.1**	**83**	
4.3.1	Applied tariff rate, weighted avg., %		3.7	87	
4.3.2	Domestic industry diversification		72.0	76	◇
4.3.3	Domestic market scale, bn PPP$		58.5	106	

			Score/ Value	Rank	
	Business sophistication		**22.7**	**85**	
5.1	**Knowledge workers**		**33.4**	**61**	
5.1.1	Knowledge-intensive employment, %	⏲	18.7	81	
5.1.2	Firms offering formal training, %	⏲	27.5	59	
5.1.3	GERD performed by business, % GDP		n/a	n/a	
5.1.4	GERD financed by business, %	⏲	16.7	73	
5.1.5	Females employed w/advanced degrees, %	⏲	16.4	44	
5.2	**Innovation linkages**		**15.4**	**106**	
5.2.1	Public research–industry co-publications, %		1.5	63	
5.2.2	University–industry R&D collaboration†		25.7	104	
5.2.3	State of cluster development†		31.8	101	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	⏲	0.0	92	
5.2.5	Patent families/bn PPP$ GDP		0.0	81	
5.3	**Knowledge absorption**		**19.3**	**97**	◇
5.3.1	Intellectual property payments, % total trade		0.0	121	○◇
5.3.2	High-tech imports, % total trade		9.8	41	●
5.3.3	ICT services imports, % total trade		0.5	108	
5.3.4	FDI net inflows, % GDP		2.7	54	
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**21.9**	**60**	
6.1	**Knowledge creation**		**19.4**	**57**	
6.1.1	Patents by origin/bn PPP$ GDP		0.4	81	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.1	68	
6.1.3	Utility models by origin/bn PPP$ GDP		1.5	11	●
6.1.4	Scientific and technical articles/bn PPP$ GDP		14.7	45	
6.1.5	Citable documents H-index		9.9	76	
6.2	**Knowledge impact**		**24.1**	**69**	
6.2.1	Labor productivity growth, %		3.5	8	●◆
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.2	75	
6.2.4	High-tech manufacturing, %		4.8	98	◇
6.3	**Knowledge diffusion**		**22.2**	**53**	
6.3.1	Intellectual property receipts, % total trade		0.0	116	○◇
6.3.2	Production and export complexity		30.0	89	
6.3.3	High-tech exports, % total trade		5.0	38	●
6.3.4	ICT services exports, % total trade		7.2	8	●◆
6.3.5	ISO 9001 quality/bn PPP$ GDP		0.7	121	○
	Creative outputs		**32.1**	**46**	
7.1	**Intangible assets**		**33.5**	**52**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		108.0	7	●◆
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		2.1	40	
7.2	**Creative goods and services**		**25.5**	**[45]**	
7.2.1	Cultural and creative services exports, % total trade		0.4	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	Creative goods exports, % total trade		3.2	16	●
7.3	**Online creativity**		**35.8**	**41**	●
7.3.1	Top-level domains (TLDs)/th pop. 15–69		4.2	59	
7.3.2	GitHub commits/mn pop. 15–69		30.9	36	●◆
7.3.3	Mobile app creation/bn PPP$ GDP		72.4	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Australia

23

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
30	18	High	SEAO	26.5	1,719.3	64,674

		Score/ Value	Rank	
	Institutions	**77.0**	**15**	
1.1	**Institutional environment**	**84.0**	**14**	
1.1.1	Operational stability for businesses*	84.0	12	
1.1.2	Government effectiveness*	83.9	14	
1.2	**Regulatory environment**	**89.4**	**6**	●
1.2.1	Regulatory quality*	91.6	2	●
1.2.2	Rule of law*	87.1	16	
1.3	**Business environment**	**57.5**	**36**	
1.3.1	Policy stability for doing business†	70.4	26	
1.3.2	Entrepreneurship policies and culture† 🕓	44.6	36	
	Human capital and research	**58.7**	**10**	
2.1	**Education**	**61.7**	**31**	
2.1.1	Expenditure on education, % GDP	5.2	37	
2.1.2	Government funding/pupil, secondary, % GDP/cap	19.2	55	○
2.1.3	School life expectancy, years	20.7	1	● ◆
2.1.4	PISA scales in reading, maths and science	497.4	10	
2.1.5	Pupil–teacher ratio, secondary	n/a	n/a	
2.2	**Tertiary education**	**54.1**	**8**	
2.2.1	Tertiary enrolment, % gross	106.2	4	● ◆
2.2.2	Graduates in science and engineering, %	19.1	84	○ ◇
2.2.3	Tertiary inbound mobility, %	23.0	6	● ◆
2.3	**Research and development (R&D)**	**60.3**	**15**	
2.3.1	Researchers, FTE/mn pop.	n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP 🕓	1.7	23	
2.3.3	Global corporate R&D investors, top 3, mn USD$	65.3	19	
2.3.4	QS university ranking, top 3*	88.2	3	● ◆
	Infrastructure	**55.4**	**15**	
3.1	**Information and communication technologies (ICTs)**	**95.2**	**5**	●
3.1.1	ICT access*	99.8	14	
3.1.2	ICT use*	89.1	21	
3.1.3	Government's online service*	93.1	7	●
3.1.4	E-participation*	98.8	2	● ◆
3.2	**General infrastructure**	**47.0**	**24**	
3.2.1	Electricity output, GWh/mn pop.	10,417.8	14	
3.2.2	Logistics performance*	72.7	18	
3.2.3	Gross capital formation, % GDP	23.4	71	○
3.3	**Ecological sustainability**	**24.0**	**52**	
3.3.1	GDP/unit of energy use	9.7	74	○
3.3.2	Low-carbon energy use, %	14.4	75	○
3.3.3	ISO 14001 environment/bn PPP$ GDP	4.4	24	
	Market sophistication	**53.8**	**20**	
4.1	**Credit**	**54.9**	**16**	
4.1.1	Finance for startups and scaleups† 🕓	60.6	28	
4.1.2	Domestic credit to private sector, % GDP	133.9	11	
4.1.3	Loans from microfinance institutions, % GDP	n/a	n/a	
4.2	**Investment**	**33.1**	**24**	
4.2.1	Market capitalization, % GDP	116.5	12	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	0.3	21	
4.2.3	VC recipients, deals/bn PPP$ GDP	0.2	19	
4.2.4	VC received, value, % GDP	0.0	30	
4.3	**Trade, diversification and market scale**	**73.3**	**17**	
4.3.1	Applied tariff rate, weighted avg., %	0.6	7	●
4.3.2	Domestic industry diversification	90.9	33	
4.3.3	Domestic market scale, bn PPP$	1,719.3	20	

		Score/ Value	Rank	
	Business sophistication	**48.2**	**26**	◇
5.1	**Knowledge workers**	**64.9**	**[18]**	
5.1.1	Knowledge-intensive employment, % 🕓	51.5	9	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP 🕓	0.9	25	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, % 🕓	28.7	6	●
5.2	**Innovation linkages**	**50.3**	**21**	
5.2.1	Public research–industry co-publications, %	2.1	42	◇
5.2.2	University–industry R&D collaboration†	80.9	12	
5.2.3	State of cluster development†	78.5	22	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.1	13	
5.2.5	Patent families/bn PPP$ GDP	1.0	29	◇
5.3	**Knowledge absorption**	**29.3**	**56**	◇
5.3.1	Intellectual property payments, % total trade	1.1	31	
5.3.2	High-tech imports, % total trade	11.2	30	
5.3.3	ICT services imports, % total trade	1.0	78	○ ◇
5.3.4	FDI net inflows, % GDP	2.2	71	
5.3.5	Research talent, % in businesses	n/a	n/a	
	Knowledge and technology outputs	**33.1**	**28**	◇
6.1	**Knowledge creation**	**46.3**	**17**	
6.1.1	Patents by origin/bn PPP$ GDP	1.5	39	◇
6.1.2	PCT patents by origin/bn PPP$ GDP	0.9	29	◇
6.1.3	Utility models by origin/bn PPP$ GDP	-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP	34.7	10	
6.1.5	Citable documents H-index	70.7	6	●
6.2	**Knowledge impact**	**36.9**	**34**	
6.2.1	Labor productivity growth, %	0.3	78	○
6.2.2	Unicorn valuation, % GDP	2.5	14	
6.2.3	Software spending, % GDP	0.2	68	◇
6.2.4	High-tech manufacturing, %	23.9	50	◇
6.3	**Knowledge diffusion**	**16.2**	**71**	◇
6.3.1	Intellectual property receipts, % total trade	0.3	35	◇
6.3.2	Production and export complexity	29.2	91	○ ◇
6.3.3	High-tech exports, % total trade	2.0	63	◇
6.3.4	ICT services exports, % total trade	1.2	77	○
6.3.5	ISO 9001 quality/bn PPP$ GDP	8.7	33	
	Creative outputs	**42.1**	**29**	◇
7.1	**Intangible assets**	**42.4**	**30**	
7.1.1	Intangible asset intensity, top 15, %	68.6	20	
7.1.2	Trademarks by origin/bn PPP$ GDP	50.2	35	
7.1.3	Global brand value, top 5,000, % GDP	7.8	28	
7.1.4	Industrial designs by origin/bn PPP$ GDP	1.3	49	
7.2	**Creative goods and services**	**24.4**	**47**	◇
7.2.1	Cultural and creative services exports, % total trade	0.3	67	○
7.2.2	National feature films/mn pop. 15–69	2.8	46	
7.2.3	Entertainment and media market/th pop. 15–69	65.0	5	
7.2.4	Creative goods exports, % total trade	0.5	64	
7.3	**Online creativity**	**59.0**	**18**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69	55.7	10	
7.3.2	GitHub commits/mn pop. 15–69	49.0	23	◇
7.3.3	Mobile app creation/bn PPP$ GDP	72.2	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Austria

GII 2024 rank

17

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
19	20	High	EUR	9.1	626.5	69,069

			Score/ Value	Rank	
	Institutions		**74.7**	**18**	
1.1	**Institutional environment**		**80.5**	**18**	
1.1.1	Operational stability for businesses*		78.7	25	
1.1.2	Government effectiveness*		82.3	15	
1.2	**Regulatory environment**		**84.1**	**15**	
1.2.1	Regulatory quality*		75.5	22	
1.2.2	Rule of law*		92.8	8	●
1.3	**Business environment**		**59.6**	**34**	
1.3.1	Policy stability for doing business†		70.9	25	
1.3.2	Entrepreneurship policies and culture†	⏲	48.2	32	○
	Human capital and research		**59.4**	**8**	●
2.1	**Education**		**62.8**	**24**	
2.1.1	Expenditure on education, % GDP		4.8	46	
2.1.2	Government funding/pupil, secondary, % GDP/cap		26.7	13	
2.1.3	School life expectancy, years	⏲	16.4	31	
2.1.4	PISA scales in reading, maths and science		486.3	19	
2.1.5	Pupil–teacher ratio, secondary		9.3	24	
2.2	**Tertiary education**		**59.7**	**4**	● ◆
2.2.1	Tertiary enrolment, % gross	⏲	93.9	12	
2.2.2	Graduates in science and engineering, %		30.6	17	◆
2.2.3	Tertiary inbound mobility, %	⏲	18.7	11	
2.3	**Research and development (R&D)**		**55.6**	**18**	
2.3.1	Researchers, FTE/mn pop.		6,669.2	9	●
2.3.2	Gross expenditure on R&D, % GDP		3.2	8	●
2.3.3	Global corporate R&D investors, top 3, mn USD$		57.7	25	
2.3.4	QS university ranking, top 3*		44.5	27	
	Infrastructure		**56.8**	**10**	●
3.1	**Information and communication technologies (ICTs)**		**87.6**	**17**	
3.1.1	ICT access*		97.2	33	
3.1.2	ICT use*		89.5	19	
3.1.3	Government's online service*		87.0	19	
3.1.4	E-participation*		76.7	21	
3.2	**General infrastructure**		**50.6**	**14**	
3.2.1	Electricity output, GWh/mn pop.		7,147.9	23	
3.2.2	Logistics performance*		86.4	7	
3.2.3	Gross capital formation, % GDP		26.4	40	
3.3	**Ecological sustainability**		**32.1**	**37**	
3.3.1	GDP/unit of energy use		15.4	27	
3.3.2	Low-carbon energy use, %		35.4	24	
3.3.3	ISO 14001 environment/bn PPP$ GDP		2.6	40	
	Market sophistication		**45.2**	**32**	◇
4.1	**Credit**		**46.6**	**29**	
4.1.1	Finance for startups and scaleups†	⏲	61.3	27	
4.1.2	Domestic credit to private sector, % GDP		89.6	32	
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**21.5**	**39**	◇
4.2.1	Market capitalization, % GDP		30.2	47	○ ◇
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.3	22	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.1	31	
4.2.4	VC received, value, % GDP		0.0	35	
4.3	**Trade, diversification and market scale**		**67.5**	**24**	
4.3.1	Applied tariff rate, weighted avg., %		1.1	21	
4.3.2	Domestic industry diversification		99.2	3	● ◆
4.3.3	Domestic market scale, bn PPP$		626.5	42	

			Score/ Value	Rank	
	Business sophistication		**51.0**	**23**	◇
5.1	**Knowledge workers**		**57.2**	**25**	◇
5.1.1	Knowledge-intensive employment, %		45.6	21	
5.1.2	Firms offering formal training, %	⏲	42.6	31	◇
5.1.3	GERD performed by business, % GDP		2.2	8	●
5.1.4	GERD financed by business, %		49.9	31	
5.1.5	Females employed w/advanced degrees, %		14.0	56	○ ◇
5.2	**Innovation linkages**		**52.1**	**17**	
5.2.1	Public research–industry co-publications, %		5.6	8	●
5.2.2	University–industry R&D collaboration†		69.4	25	
5.2.3	State of cluster development†		78.6	21	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	36	◇
5.2.5	Patent families/bn PPP$ GDP		3.8	11	●
5.3	**Knowledge absorption**		**43.6**	**23**	
5.3.1	Intellectual property payments, % total trade		0.7	58	○
5.3.2	High-tech imports, % total trade		8.6	60	○
5.3.3	ICT services imports, % total trade		3.3	8	●
5.3.4	FDI net inflows, % GDP		−0.1	122	○
5.3.5	Research talent, % in businesses		63.7	7	●
	Knowledge and technology outputs		**41.8**	**18**	
6.1	**Knowledge creation**		**43.2**	**19**	
6.1.1	Patents by origin/bn PPP$ GDP		6.8	12	
6.1.2	PCT patents by origin/bn PPP$ GDP		2.5	12	
6.1.3	Utility models by origin/bn PPP$ GDP		0.3	35	○
6.1.4	Scientific and technical articles/bn PPP$ GDP		27.9	22	
6.1.5	Citable documents H-index		44.1	18	
6.2	**Knowledge impact**		**45.7**	**20**	
6.2.1	Labor productivity growth, %		−0.4	107	○
6.2.2	Unicorn valuation, % GDP		1.4	27	
6.2.3	Software spending, % GDP		0.6	10	●
6.2.4	High-tech manufacturing, %		44.5	19	
6.3	**Knowledge diffusion**		**36.5**	**31**	
6.3.1	Intellectual property receipts, % total trade		0.6	25	
6.3.2	Production and export complexity		85.2	7	●
6.3.3	High-tech exports, % total trade		8.1	23	
6.3.4	ICT services exports, % total trade		3.5	31	
6.3.5	ISO 9001 quality/bn PPP$ GDP		6.5	42	
	Creative outputs		**44.5**	**24**	
7.1	**Intangible assets**		**43.9**	**28**	
7.1.1	Intangible asset intensity, top 15, %		46.9	52	○ ◇
7.1.2	Trademarks by origin/bn PPP$ GDP		42.2	43	
7.1.3	Global brand value, top 5,000, % GDP		7.6	29	
7.1.4	Industrial designs by origin/bn PPP$ GDP		4.0	22	
7.2	**Creative goods and services**		**31.8**	**32**	
7.2.1	Cultural and creative services exports, % total trade		1.0	29	
7.2.2	National feature films/mn pop. 15–69		5.3	21	
7.2.3	Entertainment and media market/th pop. 15–69		55.6	9	
7.2.4	Creative goods exports, % total trade		0.9	49	
7.3	**Online creativity**		**58.3**	**20**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		46.7	13	
7.3.2	GitHub commits/mn pop. 15–69		58.2	19	
7.3.3	Mobile app creation/bn PPP$ GDP		70.1	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Azerbaijan

95

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
101	82	Upper middle	NAWA	10.3	192.1	18,694

			Score/ Value	Rank	
	Institutions		**53.8**	**51**	●
1.1	**Institutional environment**		**55.1**	**61**	
1.1.1	Operational stability for businesses*		67.3	48	●
1.1.2	Government effectiveness*		42.9	73	
1.2	**Regulatory environment**		**32.5**	**91**	
1.2.1	Regulatory quality*		39.1	78	
1.2.2	Rule of law*		25.9	105	
1.3	**Business environment**		**73.9**	**[15]**	
1.3.1	Policy stability for doing business†	⏲	73.9	19	● ◆
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**24.9**	**94**	
2.1	**Education**		**41.2**	**91**	
2.1.1	Expenditure on education, % GDP		2.9	105	
2.1.2	Government funding/pupil, secondary, % GDP/cap		19.6	53	
2.1.3	School life expectancy, years		12.7	88	
2.1.4	PISA scales in reading, maths and science		380.7	70	
2.1.5	Pupil–teacher ratio, secondary		8.8	20	●
2.2	**Tertiary education**		**28.0**	**82**	
2.2.1	Tertiary enrolment, % gross		41.8	79	
2.2.2	Graduates in science and engineering, %		25.3	45	●
2.2.3	Tertiary inbound mobility, %		2.4	76	
2.3	**Research and development (R&D)**		**5.4**	**73**	
2.3.1	Researchers, FTE/mn pop.		1,690.7	45	
2.3.2	Gross expenditure on R&D, % GDP		0.2	95	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○ ◇
2.3.4	QS university ranking, top 3*		2.5	74	
	Infrastructure		**27.7**	**102**	◇
3.1	**Information and communication technologies (ICTs)**		**62.3**	**84**	
3.1.1	ICT access*		89.2	69	
3.1.2	ICT use*		65.6	92	◇
3.1.3	Government's online service*		57.1	81	
3.1.4	E-participation*		37.2	92	◇
3.2	**General infrastructure**		**11.7**	**121**	◇
3.2.1	Electricity output, GWh/mn pop.		2,854.1	65	
3.2.2	Logistics performance*		n/a	n/a	
3.2.3	Gross capital formation, % GDP		18.0	112	
3.3	**Ecological sustainability**		**9.0**	**111**	◇
3.3.1	GDP/unit of energy use		9.6	77	
3.3.2	Low-carbon energy use, %		2.5	115	◇
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.7	83	
	Market sophistication		**17.5**	**114**	◇
4.1	**Credit**		**3.9**	**[127]**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		18.3	117	◇
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**1.0**	**110**	○
4.2.1	Market capitalization, % GDP		2.7	83	○
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.0	89	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	99	
4.2.4	VC received, value, % GDP		0.0	106	○
4.3	**Trade, diversification and market scale**		**47.5**	**84**	
4.3.1	Applied tariff rate, weighted avg., %		5.3	97	◇
4.3.2	Domestic industry diversification		80.4	63	
4.3.3	Domestic market scale, bn PPP$		192.1	75	

			Score/ Value	Rank	
	Business sophistication		**25.9**	**67**	
5.1	**Knowledge workers**		**31.8**	**67**	
5.1.1	Knowledge-intensive employment, %		23.1	64	
5.1.2	Firms offering formal training, %	⏲	33.9	51	
5.1.3	GERD performed by business, % GDP	⏲	0.0	90	○
5.1.4	GERD financed by business, %	⏲	30.8	60	
5.1.5	Females employed w/advanced degrees, %	⏲	13.7	57	
5.2	**Innovation linkages**		**32.6**	**39**	● ◆
5.2.1	Public research–industry co-publications, %		1.9	46	●
5.2.2	University–industry R&D collaboration†	⏲	66.8	30	● ◆
5.2.3	State of cluster development†	⏲	73.6	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	91	
5.3	**Knowledge absorption**		**13.2**	**130**	○ ◇
5.3.1	Intellectual property payments, % total trade		0.5	68	
5.3.2	High-tech imports, % total trade		3.4	126	○ ◇
5.3.3	ICT services imports, % total trade		0.3	125	○ ◇
5.3.4	FDI net inflows, % GDP		–2.5	128	○ ◇
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**11.1**	**103**	
6.1	**Knowledge creation**		**7.5**	**97**	
6.1.1	Patents by origin/bn PPP$ GDP		1.2	50	●
6.1.2	PCT patents by origin/bn PPP$ GDP		0.1	72	
6.1.3	Utility models by origin/bn PPP$ GDP		0.1	49	
6.1.4	Scientific and technical articles/bn PPP$ GDP		4.5	107	
6.1.5	Citable documents H-index		5.6	95	
6.2	**Knowledge impact**		**20.6**	**94**	
6.2.1	Labor productivity growth, %		1.9	28	●
6.2.2	Unicorn valuation, % GDP		0.0	49	○ ◇
6.2.3	Software spending, % GDP		0.1	102	
6.2.4	High-tech manufacturing, %		15.3	74	
6.3	**Knowledge diffusion**		**5.2**	**119**	◇
6.3.1	Intellectual property receipts, % total trade		0.0	84	
6.3.2	Production and export complexity		17.0	111	○ ◇
6.3.3	High-tech exports, % total trade		0.2	114	
6.3.4	ICT services exports, % total trade		0.4	108	
6.3.5	ISO 9001 quality/bn PPP$ GDP		1.8	98	
	Creative outputs		**14.2**	**96**	
7.1	**Intangible assets**		**16.5**	**[85]**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		39.9	49	●
7.1.3	Global brand value, top 5,000, % GDP		n/a	n/a	
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.4	81	
7.2	**Creative goods and services**		**1.7**	**112**	◇
7.2.1	Cultural and creative services exports, % total trade		0.1	92	
7.2.2	National feature films/mn pop. 15–69		0.0	85	○ ◇
7.2.3	Entertainment and media market/th pop. 15–69		3.5	47	◇
7.2.4	Creative goods exports, % total trade		0.1	107	
7.3	**Online creativity**		**21.9**	**90**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		1.1	95	
7.3.2	GitHub commits/mn pop. 15–69		4.6	80	
7.3.3	Mobile app creation/bn PPP$ GDP		60.0	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Bahrain

GII 2024 rank

72

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
93	49	High	NAWA	1.6	96.0	60,715

			Score/Value	Rank	
	Institutions		**68.1**	**28**	●
1.1	**Institutional environment**		**61.0**	**50**	◇
1.1.1	Operational stability for businesses*		61.3	68	◇
1.1.2	Government effectiveness*		60.7	40	
1.2	**Regulatory environment**		**61.9**	**39**	
1.2.1	Regulatory quality*		67.3	33	
1.2.2	Rule of law*		56.4	43	◇
1.3	**Business environment**		**81.4**	**[4]**	
1.3.1	Policy stability for doing business†		81.4	7	● ◆
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**28.6**	**75**	◇
2.1	**Education**		**46.7**	**76**	◇
2.1.1	Expenditure on education, % GDP		2.0	122	○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	⏲	17.4	60	◇
2.1.3	School life expectancy, years		16.3	33	
2.1.4	PISA scales in reading, maths and science		n/a	n/a	
2.1.5	Pupil–teacher ratio, secondary		12.7	57	
2.2	**Tertiary education**		**33.7**	**66**	
2.2.1	Tertiary enrolment, % gross		77.2	28	●
2.2.2	Graduates in science and engineering, %		16.4	95	◇
2.2.3	Tertiary inbound mobility, %		10.6	25	●
2.3	**Research and development (R&D)**		**5.2**	**75**	◇
2.3.1	Researchers, FTE/mn pop.	⏲	384.0	81	
2.3.2	Gross expenditure on R&D, % GDP	⏲	0.1	102	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○ ◇
2.3.4	QS university ranking, top 3*		15.8	59	
	Infrastructure		**51.0**	**36**	
3.1	**Information and communication technologies (ICTs)**		**77.1**	**50**	
3.1.1	ICT access*		100.0	1	●
3.1.2	ICT use*		92.7	7	●
3.1.3	Government's online service*		72.6	54	
3.1.4	E-participation*		43.0	86	◇
3.2	**General infrastructure**		**67.6**	**3**	● ◆
3.2.1	Electricity output, GWh/mn pop.	⏲	23,164.7	3	● ◆
3.2.2	Logistics performance*		63.6	33	
3.2.3	Gross capital formation, % GDP		30.9	21	● ◆
3.3	**Ecological sustainability**		**8.3**	**114**	◇
3.3.1	GDP/unit of energy use		4.3	123	○ ◇
3.3.2	Low-carbon energy use, %		0.0	131	○ ◇
3.3.3	ISO 14001 environment/bn PPP$ GDP		2.5	42	
	Market sophistication		**28.3**	**80**	◇
4.1	**Credit**		**25.7**	**[68]**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP	⏲	73.9	38	
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**18.3**	**43**	
4.2.1	Market capitalization, % GDP		70.8	25	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.1	38	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.1	48	
4.2.4	VC received, value, % GDP		0.0	34	
4.3	**Trade, diversification and market scale**		**41.1**	**98**	◇
4.3.1	Applied tariff rate, weighted avg., %		3.9	89	◇
4.3.2	Domestic industry diversification	⏲	52.2	99	◇
4.3.3	Domestic market scale, bn PPP$		96.0	91	

			Score/Value	Rank	
	Business sophistication		**22.8**	**83**	◇
5.1	**Knowledge workers**		**19.5**	**[105]**	
5.1.1	Knowledge-intensive employment, %	⏲	21.9	70	
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, %	⏲	21.8	67	
5.1.5	Females employed w/advanced degrees, %		n/a	n/a	
5.2	**Innovation linkages**		**29.8**	**46**	
5.2.1	Public research–industry co-publications, %		0.5	123	◇
5.2.2	University–industry R&D collaboration†		39.4	76	◇
5.2.3	State of cluster development†		70.6	32	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.1	19	●
5.2.5	Patent families/bn PPP$ GDP		0.0	75	◇
5.3	**Knowledge absorption**		**19.0**	**99**	◇
5.3.1	Intellectual property payments, % total trade		n/a	n/a	
5.3.2	High-tech imports, % total trade		3.2	128	○ ◇
5.3.3	ICT services imports, % total trade		1.5	54	
5.3.4	FDI net inflows, % GDP		4.0	32	●
5.3.5	Research talent, % in businesses	⏲	0.4	84	
	Knowledge and technology outputs		**16.8**	**83**	◇
6.1	**Knowledge creation**		**4.5**	**115**	◇
6.1.1	Patents by origin/bn PPP$ GDP		0.0	121	◇
6.1.2	PCT patents by origin/bn PPP$ GDP		0.1	64	
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		5.7	99	◇
6.1.5	Citable documents H-index		4.2	110	◇
6.2	**Knowledge impact**		**24.0**	**70**	◇
6.2.1	Labor productivity growth, %		1.4	43	
6.2.2	Unicorn valuation, % GDP		0.0	49	○ ◇
6.2.3	Software spending, % GDP		0.3	36	
6.2.4	High-tech manufacturing, %	⏲	9.8	88	◇
6.3	**Knowledge diffusion**		**21.8**	**54**	
6.3.1	Intellectual property receipts, % total trade		0.0	116	○ ◇
6.3.2	Production and export complexity		54.3	43	
6.3.3	High-tech exports, % total trade		1.0	79	
6.3.4	ICT services exports, % total trade		3.9	28	●
6.3.5	ISO 9001 quality/bn PPP$ GDP		6.8	38	
	Creative outputs		**14.3**	**95**	◇
7.1	**Intangible assets**		**12.4**	**95**	◇
7.1.1	Intangible asset intensity, top 15, %		–7.9	72	◇
7.1.2	Trademarks by origin/bn PPP$ GDP		4.6	120	○ ◇
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○ ◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.0	121	○
7.2	**Creative goods and services**		**9.1**	**77**	◇
7.2.1	Cultural and creative services exports, % total trade		n/a	n/a	
7.2.2	National feature films/mn pop. 15–69		0.8	70	◇
7.2.3	Entertainment and media market/th pop. 15–69		9.8	37	◇
7.2.4	Creative goods exports, % total trade		1.0	46	
7.3	**Online creativity**		**23.1**	**82**	◇
7.3.1	Top-level domains (TLDs)/th pop. 15–69		2.6	74	◇
7.3.2	GitHub commits/mn pop. 15–69		7.5	64	◇
7.3.3	Mobile app creation/bn PPP$ GDP		59.3	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Bangladesh

GII 2024 rank

106

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
92	114	Lower middle	CSA	171.5	1,476.9	8,673

			Score/ Value	Rank	
	Institutions		**30.4**	**108**	
1.1	**Institutional environment**		**30.7**	**114**	
1.1.1	Operational stability for businesses*		37.3	115	
1.1.2	Government effectiveness*		24.1	115	
1.2	**Regulatory environment**		**22.0**	**109**	
1.2.1	Regulatory quality*		17.5	119	
1.2.2	Rule of law*		26.6	100	
1.3	**Business environment**		**38.6**	**[82]**	
1.3.1	Policy stability for doing business†		38.6	90	
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**11.4**	**128**	○◇
2.1	**Education**		**22.3**	**129**	○◇
2.1.1	Expenditure on education, % GDP		2.1	120	○◇
2.1.2	Government funding/pupil, secondary, % GDP/cap		6.5	92	○
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		29.0	118	◇
2.2	**Tertiary education**		**6.6**	**120**	◇
2.2.1	Tertiary enrolment, % gross		22.8	98	
2.2.2	Graduates in science and engineering, %	⏲	11.1	109	○◇
2.2.3	Tertiary inbound mobility, %		0.1	112	○
2.3	**Research and development (R&D)**		**5.3**	**[74]**	
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 USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		10.6	65	●
	Infrastructure		**34.1**	**86**	
3.1	**Information and communication technologies (ICTs)**		**60.3**	**86**	
3.1.1	ICT access*		58.7	102	
3.1.2	ICT use*		69.7	86	
3.1.3	Government's online service*		61.5	74	
3.1.4	E-participation*		51.2	74	◆
3.2	**General infrastructure**		**26.4**	**83**	
3.2.1	Electricity output, GWh/mn pop.		595.8	107	
3.2.2	Logistics performance*		22.7	82	
3.2.3	Gross capital formation, % GDP		31.4	19	●
3.3	**Ecological sustainability**		**15.7**	**89**	
3.3.1	GDP/unit of energy use		19.7	10	●◆
3.3.2	Low-carbon energy use, %		0.8	122	◇
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.2	116	
	Market sophistication		**23.9**	**92**	
4.1	**Credit**		**23.1**	**76**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		39.0	82	
4.1.3	Loans from microfinance institutions, % GDP		3.1	11	●
4.2	**Investment**		**3.1**	**99**	
4.2.1	Market capitalization, % GDP		19.8	63	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.0	96	○
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	94	
4.2.4	VC received, value, % GDP		0.0	78	
4.3	**Trade, diversification and market scale**		**45.6**	**89**	
4.3.1	Applied tariff rate, weighted avg., %	⏲	7.5	116	
4.3.2	Domestic industry diversification	⏲	66.6	84	
4.3.3	Domestic market scale, bn PPP$		1,476.9	24	●◆

			Score/ Value	Rank	
	Business sophistication		**13.5**	**126**	○◇
5.1	**Knowledge workers**		**9.8**	**[121]**	
5.1.1	Knowledge-intensive employment, %		11.7	102	
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, %	⏲	1.7	114	
5.2	**Innovation linkages**		**14.7**	**109**	
5.2.1	Public research–industry co-publications, %		1.3	77	
5.2.2	University–industry R&D collaboration†		21.2	117	
5.2.3	State of cluster development†		38.2	84	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	118	○
5.2.5	Patent families/bn PPP$ GDP		0.0	102	○◇
5.3	**Knowledge absorption**		**16.0**	**117**	
5.3.1	Intellectual property payments, % total trade		0.1	107	
5.3.2	High-tech imports, % total trade	⏲	8.5	61	
5.3.3	ICT services imports, % total trade		0.2	128	○◇
5.3.4	FDI net inflows, % GDP		0.4	112	
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**13.3**	**92**	
6.1	**Knowledge creation**		**7.3**	**[98]**	
6.1.1	Patents by origin/bn PPP$ GDP		0.1	117	
6.1.2	PCT patents by origin/bn PPP$ GDP		n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		3.9	112	
6.1.5	Citable documents H-index		13.6	60	●
6.2	**Knowledge impact**		**25.9**	**64**	●
6.2.1	Labor productivity growth, %		4.2	6	●◆
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.2	76	
6.2.4	High-tech manufacturing, %	⏲	6.5	96	
6.3	**Knowledge diffusion**		**6.9**	**108**	
6.3.1	Intellectual property receipts, % total trade		0.0	100	
6.3.2	Production and export complexity		23.8	99	
6.3.3	High-tech exports, % total trade	⏲	0.2	104	
6.3.4	ICT services exports, % total trade		1.0	84	
6.3.5	ISO 9001 quality/bn PPP$ GDP		0.7	119	
	Creative outputs		**17.7**	**88**	
7.1	**Intangible assets**		**23.1**	**76**	
7.1.1	Intangible asset intensity, top 15, %		49.9	49	
7.1.2	Trademarks by origin/bn PPP$ GDP		6.6	114	
7.1.3	Global brand value, top 5,000, % GDP		0.4	66	
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.9	63	●
7.2	**Creative goods and services**		**2.1**	**[110]**	
7.2.1	Cultural and creative services exports, % total trade		0.1	86	
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	Creative goods exports, % total trade	⏲	0.1	108	
7.3	**Online creativity**		**22.7**	**86**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.2	120	
7.3.2	GitHub commits/mn pop. 15–69		2.9	97	
7.3.3	Mobile app creation/bn PPP$ GDP		65.0	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Barbados

GII 2024 rank

77

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
77	77	High	LCN	0.2	5.4	18,738

			Score/Value	Rank	
	Institutions		**55.1**	**50**	
1.1	**Institutional environment**		**64.3**	**42**	
1.1.1	Operational stability for businesses*		73.3	38	●
1.1.2	Government effectiveness*		55.2	51	◇
1.2	**Regulatory environment**		**54.2**	**49**	◇
1.2.1	Regulatory quality*		54.4	49	◇
1.2.2	Rule of law*		54.1	51	◇
1.3	**Business environment**		**46.8**	**[64]**	
1.3.1	Policy stability for doing business†	⏲	46.8	70	
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**26.8**	**[80]**	
2.1	**Education**		**53.6**	**[62]**	
2.1.1	Expenditure on education, % GDP		5.1	40	
2.1.2	Government funding/pupil, secondary, % GDP/cap		21.7	40	
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		15.3	80	◇
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)**		**0.0**	**[120]**	
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 USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**26.5**	**108**	◇
3.1	**Information and communication technologies (ICTs)**		**60.1**	**88**	◇
3.1.1	ICT access*		90.3	63	◇
3.1.2	ICT use*		62.5	95	◇
3.1.3	Government's online service*		49.0	93	◇
3.1.4	E-participation*		38.4	90	◇
3.2	**General infrastructure**		**12.5**	**[120]**	
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		17.9	113	○◇
3.3	**Ecological sustainability**		**6.9**	**119**	○◇
3.3.1	GDP/unit of energy use		n/a	n/a	
3.3.2	Low-carbon energy use, %		3.7	110	
3.3.3	ISO 14001 environment/bn PPP$ GDP		1.2	66	
	Market sophistication		**20.7**	**107**	◇
4.1	**Credit**		**25.6**	**[69]**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		73.8	39	
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**21.6**	**38**	
4.2.1	Market capitalization, % GDP	⏲	63.9	30	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	⏲	0.2	30	●
4.2.3	VC recipients, deals/bn PPP$ GDP		0.2	16	●
4.2.4	VC received, value, % GDP		0.0	107	○◇
4.3	**Trade, diversification and market scale**		**15.0**	**127**	○◇
4.3.1	Applied tariff rate, weighted avg., %		8.9	123	○◇
4.3.2	Domestic industry diversification		n/a	n/a	
4.3.3	Domestic market scale, bn PPP$		5.4	133	○◇

			Score/Value	Rank	
	Business sophistication		**31.1**	**49**	
5.1	**Knowledge workers**		**28.1**	**[78]**	
5.1.1	Knowledge-intensive employment, %	⏲	28.6	50	◇
5.1.2	Firms offering formal training, %		9.0	95	○◇
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, %	⏲	10.7	70	◇
5.2	**Innovation linkages**		**40.0**	**30**	●
5.2.1	Public research–industry co-publications, %		1.1	83	◇
5.2.2	University–industry R&D collaboration†	⏲	22.5	114	○◇
5.2.3	State of cluster development†	⏲	29.6	107	◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	⏲	0.1	18	●
5.2.5	Patent families/bn PPP$ GDP		58.1	1	●◆
5.3	**Knowledge absorption**		**25.1**	**72**	
5.3.1	Intellectual property payments, % total trade		0.4	77	
5.3.2	High-tech imports, % total trade		6.2	93	
5.3.3	ICT services imports, % total trade		1.7	43	
5.3.4	FDI net inflows, % GDP		4.6	26	●
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**23.0**	**57**	
6.1	**Knowledge creation**		**50.4**	**13**	●
6.1.1	Patents by origin/bn PPP$ GDP	⏲	17.1	4	●◆
6.1.2	PCT patents by origin/bn PPP$ GDP		14.9	1	●◆
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		14.2	47	
6.1.5	Citable documents H-index		3.4	117	○◇
6.2	**Knowledge impact**		**10.3**	**[130]**	
6.2.1	Labor productivity growth, %		n/a	n/a	
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.2	71	
6.2.4	High-tech manufacturing, %		n/a	n/a	
6.3	**Knowledge diffusion**		**8.5**	**101**	◇
6.3.1	Intellectual property receipts, % total trade		0.6	26	●
6.3.2	Production and export complexity		n/a	n/a	
6.3.3	High-tech exports, % total trade		1.3	71	
6.3.4	ICT services exports, % total trade		0.4	106	
6.3.5	ISO 9001 quality/bn PPP$ GDP		2.6	82	◇
	Creative outputs		**17.1**	**89**	◇
7.1	**Intangible assets**		**8.9**	**[101]**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		21.9	82	
7.1.3	Global brand value, top 5,000, % GDP		n/a	n/a	
7.1.4	Industrial designs by origin/bn PPP$ GDP	⏲	0.2	99	
7.2	**Creative goods and services**		**30.6**	**38**	●
7.2.1	Cultural and creative services exports, % total trade		0.5	54	
7.2.2	National feature films/mn pop. 15–69		11.3	3	●◆
7.2.3	Entertainment and media market/th pop. 15–69		n/a	n/a	
7.2.4	Creative goods exports, % total trade		0.7	55	
7.3	**Online creativity**		**20.1**	**96**	◇
7.3.1	Top-level domains (TLDs)/th pop. 15–69		7.8	46	
7.3.2	GitHub commits/mn pop. 15–69		5.9	71	◇
7.3.3	Mobile app creation/bn PPP$ GDP		46.6	108	◇

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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Belarus

GII 2024 rank

85

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
69	102	Upper middle	EUR	9.1	221.2	24,017

Institutions

			Score/Value	Rank	
	Institutions		**12.7**	**132**	○◇
1.1	**Institutional environment**		**25.5**	**123**	◇
1.1.1	Operational stability for businesses*		29.3	119	◇
1.1.2	Government effectiveness*		21.8	117	◇
1.2	**Regulatory environment**		**7.8**	**130**	○◇
1.2.1	Regulatory quality*		6.9	131	○◇
1.2.2	Rule of law*		8.8	127	○◇
1.3	**Business environment**		**4.9**	**[129]**	
1.3.1	Policy stability for doing business†		n/a	n/a	
1.3.2	Entrepreneurship policies and culture†	⏲	4.9	82	○◇

Human capital and research

			Score/Value	Rank	
	Human capital and research		**39.2**	**43**	◆
2.1	**Education**		**62.3**	**27**	●◆
2.1.1	Expenditure on education, % GDP		5.2	39	
2.1.2	Government funding/pupil, secondary, % GDP/cap		n/a	n/a	
2.1.3	School life expectancy, years		14.0	68	
2.1.4	PISA scales in reading, maths and science	⏲	472.3	35	◆
2.1.5	Pupil–teacher ratio, secondary		9.7	30	●
2.2	**Tertiary education**		**46.4**	**20**	●◆
2.2.1	Tertiary enrolment, % gross		70.9	42	
2.2.2	Graduates in science and engineering, %		32.0	13	●◆
2.2.3	Tertiary inbound mobility, %		7.7	37	◆
2.3	**Research and development (R&D)**		**9.0**	**61**	
2.3.1	Researchers, FTE/mn pop.		1,381.8	48	
2.3.2	Gross expenditure on R&D, % GDP		0.5	59	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		14.3	61	

Infrastructure

			Score/Value	Rank	
	Infrastructure		**34.4**	**84**	
3.1	**Information and communication technologies (ICTs)**		**66.6**	**78**	
3.1.1	ICT access*		96.7	38	
3.1.2	ICT use*		79.9	55	
3.1.3	Government's online service*		48.1	95	◇
3.1.4	E-participation*		41.9	87	
3.2	**General infrastructure**		**24.4**	**88**	
3.2.1	Electricity output, GWh/mn pop.	⏲	4,433.0	52	
3.2.2	Logistics performance*		27.3	76	
3.2.3	Gross capital formation, % GDP		23.4	70	
3.3	**Ecological sustainability**		**12.2**	**104**	
3.3.1	GDP/unit of energy use		6.7	102	◇
3.3.2	Low-carbon energy use, %		4.9	105	
3.3.3	ISO 14001 environment/bn PPP$ GDP		2.4	43	

Market sophistication

			Score/Value	Rank	
	Market sophistication		**22.8**	**98**	
4.1	**Credit**		**8.0**	**120**	◇
4.1.1	Finance for startups and scaleups†	⏲	15.9	80	◇
4.1.2	Domestic credit to private sector, % GDP	⏲	29.2	98	
4.1.3	Loans from microfinance institutions, % GDP		0.0	59	○
4.2	**Investment**		**0.7**	**113**	○
4.2.1	Market capitalization, % GDP		3.7	81	○
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.0	101	○
4.2.3	VC recipients, deals/bn PPP$ GDP	⏲	0.0	103	○
4.2.4	VC received, value, % GDP	⏲	0.0	100	
4.3	**Trade, diversification and market scale**		**59.7**	**53**	
4.3.1	Applied tariff rate, weighted avg., %		2.0	67	
4.3.2	Domestic industry diversification	⏲	90.8	35	
4.3.3	Domestic market scale, bn PPP$		221.2	70	

Business sophistication

			Score/Value	Rank	
	Business sophistication		**23.6**	**81**	
5.1	**Knowledge workers**		**47.7**	**38**	◆
5.1.1	Knowledge-intensive employment, %		42.1	26	●◆
5.1.2	Firms offering formal training, %	⏲	31.5	54	
5.1.3	GERD performed by business, % GDP	⏲	0.4	44	
5.1.4	GERD financed by business, %	⏲	45.0	38	
5.1.5	Females employed w/advanced degrees, %	⏲	21.1	29	●◆
5.2	**Innovation linkages**		**4.2**	**[130]**	
5.2.1	Public research–industry co-publications, %		0.8	100	
5.2.2	University–industry R&D collaboration†		n/a	n/a	
5.2.3	State of cluster development†		n/a	n/a	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	⏲	0.0	85	
5.2.5	Patent families/bn PPP$ GDP		0.0	74	
5.3	**Knowledge absorption**		**18.8**	**100**	◇
5.3.1	Intellectual property payments, % total trade		0.5	72	
5.3.2	High-tech imports, % total trade	⏲	5.4	106	
5.3.3	ICT services imports, % total trade		0.7	100	
5.3.4	FDI net inflows, % GDP		2.1	74	
5.3.5	Research talent, % in businesses		n/a	n/a	

Knowledge and technology outputs

			Score/Value	Rank	
	Knowledge and technology outputs		**28.4**	**46**	
6.1	**Knowledge creation**		**16.9**	**62**	
6.1.1	Patents by origin/bn PPP$ GDP		1.7	37	●
6.1.2	PCT patents by origin/bn PPP$ GDP		0.1	67	
6.1.3	Utility models by origin/bn PPP$ GDP		1.4	12	●
6.1.4	Scientific and technical articles/bn PPP$ GDP		4.4	108	
6.1.5	Citable documents H-index		9.8	78	
6.2	**Knowledge impact**		**22.3**	**81**	
6.2.1	Labor productivity growth, %		1.1	52	
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.0	113	◇
6.2.4	High-tech manufacturing, %	⏲	27.6	44	
6.3	**Knowledge diffusion**		**46.0**	**17**	●◆
6.3.1	Intellectual property receipts, % total trade		0.3	43	◆
6.3.2	Production and export complexity		65.9	29	●◆
6.3.3	High-tech exports, % total trade	⏲	2.0	60	
6.3.4	ICT services exports, % total trade		5.9	16	●◆
6.3.5	ISO 9001 quality/bn PPP$ GDP		35.2	1	●◆

Creative outputs

			Score/Value	Rank	
	Creative outputs		**15.3**	**92**	
7.1	**Intangible assets**		**7.4**	**106**	◇
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		17.1	95	◇
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		1.1	56	
7.2	**Creative goods and services**		**9.1**	**[78]**	
7.2.1	Cultural and creative services exports, % total trade		0.3	72	
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	Creative goods exports, % total trade	⏲	0.9	48	
7.3	**Online creativity**		**37.3**	**37**	●◆
7.3.1	Top-level domains (TLDs)/th pop. 15–69	⏲	3.5	65	
7.3.2	GitHub commits/mn pop. 15–69		23.3	41	◆
7.3.3	Mobile app creation/bn PPP$ GDP		85.1	4	●◆

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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Belgium

GII 2024 rank

24

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
22	26	High	EUR	11.7	769.7	65,813

			Score/ Value	Rank	
	Institutions		**72.4**	**21**	
1.1	**Institutional environment**		**76.0**	**24**	
1.1.1	Operational stability for businesses*		76.0	34	
1.1.2	Government effectiveness*		76.0	25	
1.2	**Regulatory environment**		**78.6**	**21**	
1.2.1	Regulatory quality*		74.7	23	
1.2.2	Rule of law*		82.5	20	
1.3	**Business environment**		**62.4**	**[30]**	
1.3.1	Policy stability for doing business†		62.4	38	
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	

			Score/ Value	Rank	
	Human capital and research		**56.3**	**13**	●
2.1	**Education**		**70.2**	**4**	● ◆
2.1.1	Expenditure on education, % GDP	⏲	6.2	13	◆
2.1.2	Government funding/pupil, secondary, % GDP/cap		26.1	17	
2.1.3	School life expectancy, years	⏲	18.9	10	●
2.1.4	PISA scales in reading, maths and science		486.3	20	
2.1.5	Pupil–teacher ratio, secondary	⏲	8.7	19	◆
2.2	**Tertiary education**		**36.7**	**53**	
2.2.1	Tertiary enrolment, % gross	⏲	82.7	19	
2.2.2	Graduates in science and engineering, %		18.6	87	○ ◇
2.2.3	Tertiary inbound mobility, %	⏲	9.8	27	
2.3	**Research and development (R&D)**		**61.9**	**12**	●
2.3.1	Researchers, FTE/mn pop.		6,963.9	7	●
2.3.2	Gross expenditure on R&D, % GDP		3.4	4	●
2.3.3	Global corporate R&D investors, top 3, mn USD$		63.7	20	
2.3.4	QS university ranking, top 3*		56.8	16	

			Score/ Value	Rank	
	Infrastructure		**48.9**	**44**	◇
3.1	**Information and communication technologies (ICTs)**		**72.0**	**68**	○ ◇
3.1.1	ICT access*		99.6	18	
3.1.2	ICT use*		78.6	63	○ ◇
3.1.3	Government's online service*		65.7	67	○ ◇
3.1.4	E-participation*		44.2	83	○ ◇
3.2	**General infrastructure**		**52.4**	**13**	●
3.2.1	Electricity output, GWh/mn pop.		8,032.5	19	
3.2.2	Logistics performance*		86.4	7	
3.2.3	Gross capital formation, % GDP		27.1	35	
3.3	**Ecological sustainability**		**22.4**	**59**	
3.3.1	GDP/unit of energy use		11.4	58	
3.3.2	Low-carbon energy use, %		25.4	50	
3.3.3	ISO 14001 environment/bn PPP$ GDP		1.7	60	

			Score/ Value	Rank	
	Market sophistication		**38.2**	**46**	◇
4.1	**Credit**		**25.5**	**[70]**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		73.6	40	
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**23.8**	**34**	◇
4.2.1	Market capitalization, % GDP	⏲	75.2	24	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.4	16	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.1	37	◇
4.2.4	VC received, value, % GDP		0.0	39	◇
4.3	**Trade, diversification and market scale**		**65.3**	**28**	
4.3.1	Applied tariff rate, weighted avg., %		1.1	21	
4.3.2	Domestic industry diversification		89.8	40	
4.3.3	Domestic market scale, bn PPP$		769.7	36	

			Score/ Value	Rank	
	Business sophistication		**56.3**	**15**	
5.1	**Knowledge workers**		**77.1**	**5**	● ◆
5.1.1	Knowledge-intensive employment, %		49.2	12	●
5.1.2	Firms offering formal training, %	⏲	57.8	9	●
5.1.3	GERD performed by business, % GDP		2.5	5	●
5.1.4	GERD financed by business, %		64.4	8	●
5.1.5	Females employed w/advanced degrees, %		28.0	11	●
5.2	**Innovation linkages**		**49.5**	**22**	
5.2.1	Public research–industry co-publications, %		4.5	16	
5.2.2	University–industry R&D collaboration†		78.2	16	
5.2.3	State of cluster development†		69.0	35	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	26	
5.2.5	Patent families/bn PPP$ GDP		2.7	17	
5.3	**Knowledge absorption**		**42.4**	**25**	
5.3.1	Intellectual property payments, % total trade		0.7	55	
5.3.2	High-tech imports, % total trade		10.1	38	
5.3.3	ICT services imports, % total trade		2.8	16	
5.3.4	FDI net inflows, % GDP		0.4	115	○
5.3.5	Research talent, % in businesses		62.0	9	

			Score/ Value	Rank	
	Knowledge and technology outputs		**44.2**	**15**	
6.1	**Knowledge creation**		**48.2**	**14**	
6.1.1	Patents by origin/bn PPP$ GDP		4.5	17	
6.1.2	PCT patents by origin/bn PPP$ GDP		1.7	17	
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		28.5	19	
6.1.5	Citable documents H-index		54.2	14	
6.2	**Knowledge impact**		**47.4**	**17**	
6.2.1	Labor productivity growth, %		0.3	79	○
6.2.2	Unicorn valuation, % GDP		1.5	25	
6.2.3	Software spending, % GDP		0.6	9	●
6.2.4	High-tech manufacturing, %		42.1	23	
6.3	**Knowledge diffusion**		**37.0**	**30**	
6.3.1	Intellectual property receipts, % total trade		0.8	22	
6.3.2	Production and export complexity		72.8	20	
6.3.3	High-tech exports, % total trade		12.7	14	
6.3.4	ICT services exports, % total trade		3.3	33	
6.3.5	ISO 9001 quality/bn PPP$ GDP		4.3	67	○

			Score/ Value	Rank	
	Creative outputs		**37.9**	**36**	◇
7.1	**Intangible assets**		**33.7**	**50**	◇
7.1.1	Intangible asset intensity, top 15, %		51.5	46	○ ◇
7.1.2	Trademarks by origin/bn PPP$ GDP		26.5	73	○
7.1.3	Global brand value, top 5,000, % GDP		4.5	33	◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		1.9	41	
7.2	**Creative goods and services**		**29.1**	**40**	◇
7.2.1	Cultural and creative services exports, % total trade		1.1	24	
7.2.2	National feature films/mn pop. 15–69		5.0	24	
7.2.3	Entertainment and media market/th pop. 15–69		45.1	17	
7.2.4	Creative goods exports, % total trade		0.8	51	
7.3	**Online creativity**		**55.1**	**23**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		38.2	18	
7.3.2	GitHub commits/mn pop. 15–69		64.6	13	●
7.3.3	Mobile app creation/bn PPP$ GDP		62.5	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Benin

GII 2024 rank

119

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
125	109	Lower middle	SSA	14.1	59.2	4,305

			Score/ Value	Rank	
	Institutions		**47.3**	**64**	●◆
1.1	**Institutional environment**		**45.8**	**82**	
1.1.1	Operational stability for businesses*		52.0	89	
1.1.2	Government effectiveness*		39.7	80	●
1.2	**Regulatory environment**		**29.6**	**95**	
1.2.1	Regulatory quality*		32.7	91	
1.2.2	Rule of law*		26.6	101	
1.3	**Business environment**		**66.4**	**[24]**	
1.3.1	Policy stability for doing business†		66.4	33	●◆
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**16.7**	**112**	
2.1	**Education**		**32.5**	**115**	
2.1.1	Expenditure on education, % GDP		3.2	101	
2.1.2	Government funding/pupil, secondary, % GDP/cap	⏲	8.2	91	
2.1.3	School life expectancy, years	⏲	10.4	101	
2.1.4	PISA scales in reading, maths and science		n/a	n/a	
2.1.5	Pupil–teacher ratio, secondary		16.2	85	
2.2	**Tertiary education**		**17.7**	**103**	
2.2.1	Tertiary enrolment, % gross	⏲	10.2	116	◇
2.2.2	Graduates in science and engineering, %		21.8	66	●
2.2.3	Tertiary inbound mobility, %	⏲	3.1	64	●
2.3	**Research and development (R&D)**		**0.0**	**[120]**	
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 USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**23.7**	**118**	
3.1	**Information and communication technologies (ICTs)**		**33.9**	**117**	◇
3.1.1	ICT access*		33.4	121	◇
3.1.2	ICT use*		22.2	118	◇
3.1.3	Government's online service*		47.4	97	
3.1.4	E-participation*		32.6	101	
3.2	**General infrastructure**		**31.3**	**65**	●
3.2.1	Electricity output, GWh/mn pop.		84.6	124	○◇
3.2.2	Logistics performance*		36.4	65	
3.2.3	Gross capital formation, % GDP		32.4	16	●
3.3	**Ecological sustainability**		**5.9**	**127**	◇
3.3.1	GDP/unit of energy use		8.6	86	
3.3.2	Low-carbon energy use, %		0.1	129	○◇
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.2	118	
	Market sophistication		**13.7**	**123**	◇
4.1	**Credit**		**14.7**	**97**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		17.1	118	
4.1.3	Loans from microfinance institutions, % GDP		2.4	18	●
4.2	**Investment**		**n/a**	**[n/a]**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP		n/a	n/a	
4.2.4	VC received, value, % GDP		n/a	n/a	
4.3	**Trade, diversification and market scale**		**12.7**	**128**	◇
4.3.1	Applied tariff rate, weighted avg., %		9.6	125	◇
4.3.2	Domestic industry diversification		n/a	n/a	
4.3.3	Domestic market scale, bn PPP$		59.2	105	

			Score/ Value	Rank	
	Business sophistication		**19.2**	**108**	
5.1	**Knowledge workers**		**10.7**	**[118]**	
5.1.1	Knowledge-intensive employment, %	⏲	6.1	117	◇
5.1.2	Firms offering formal training, %	⏲	20.0	80	
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, %	⏲	1.2	116	
5.2	**Innovation linkages**		**20.9**	**80**	●
5.2.1	Public research–industry co-publications, %		0.3	131	○◇
5.2.2	University–industry R&D collaboration†		38.6	78	●
5.2.3	State of cluster development†		42.8	75	●
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		n/a	n/a	
5.2.5	Patent families/bn PPP$ GDP		0.0	83	
5.3	**Knowledge absorption**		**25.9**	**68**	●
5.3.1	Intellectual property payments, % total trade		0.0	119	◇
5.3.2	High-tech imports, % total trade		4.1	121	
5.3.3	ICT services imports, % total trade		2.9	15	●◆
5.3.4	FDI net inflows, % GDP		1.5	85	
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**9.7**	**117**	
6.1	**Knowledge creation**		**4.5**	**116**	
6.1.1	Patents by origin/bn PPP$ GDP		0.1	112	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	99	○◇
6.1.3	Utility models by origin/bn PPP$ GDP	⏲	0.0	74	○◇
6.1.4	Scientific and technical articles/bn PPP$ GDP		8.4	80	
6.1.5	Citable documents H-index		4.1	113	
6.2	**Knowledge impact**		**23.7**	**72**	●
6.2.1	Labor productivity growth, %		2.8	12	●◆
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.0	109	
6.2.4	High-tech manufacturing, %		n/a	n/a	
6.3	**Knowledge diffusion**		**1.0**	**133**	○◇
6.3.1	Intellectual property receipts, % total trade		0.0	93	
6.3.2	Production and export complexity		n/a	n/a	
6.3.3	High-tech exports, % total trade		0.1	127	
6.3.4	ICT services exports, % total trade		0.2	119	
6.3.5	ISO 9001 quality/bn PPP$ GDP		0.8	118	
	Creative outputs		**3.8**	**129**	○◇
7.1	**Intangible assets**		**0.6**	**130**	○◇
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		2.9	126	○
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.1	117	
7.2	**Creative goods and services**		**1.6**	**[114]**	
7.2.1	Cultural and creative services exports, % total trade		0.1	89	
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	Creative goods exports, % total trade		0.0	128	
7.3	**Online creativity**		**12.5**	**122**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.3	116	
7.3.2	GitHub commits/mn pop. 15–69		0.8	118	
7.3.3	Mobile app creation/bn PPP$ GDP		36.5	122	◇

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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Bolivia (Plurinational State of) 100

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
106	88	Lower middle	LCN	12.2	125.4	10,340

		Score/Value	Rank	
	Institutions	**15.5**	**127**	○◇
1.1	**Institutional environment**	**34.0**	**107**	
1.1.1	Operational stability for businesses*	38.7	112	
1.1.2	Government effectiveness*	29.3	101	
1.2	**Regulatory environment**	**8.3**	**129**	○◇
1.2.1	Regulatory quality*	10.0	129	○◇
1.2.2	Rule of law*	6.5	131	○◇
1.3	**Business environment**	**4.2**	**[130]**	
1.3.1	Policy stability for doing business†	4.2	128	○◇
1.3.2	Entrepreneurship policies and culture†	n/a	n/a	

		Score/Value	Rank	
	Human capital and research	**31.5**	**[67]**	
2.1	**Education**	**62.9**	**[23]**	
2.1.1	Expenditure on education, % GDP	7.7	4	●◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	22.9	34	●
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	18.3	94	
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)**	**0.2**	**116**	
2.3.1	Researchers, FTE/mn pop. ◷	62.4	97	
2.3.2	Gross expenditure on R&D, % GDP	n/a	n/a	
2.3.3	Global corporate R&D investors, top 3, mn USD$	0.0	41	○◇
2.3.4	QS university ranking, top 3*	0.0	75	○◇

		Score/Value	Rank	
	Infrastructure	**21.5**	**124**	◇
3.1	**Information and communication technologies (ICTs)**	**45.0**	**108**	
3.1.1	ICT access* ◷	57.8	104	
3.1.2	ICT use*	n/a	n/a	
3.1.3	Government's online service*	46.9	98	
3.1.4	E-participation*	30.2	105	
3.2	**General infrastructure**	**7.5**	**129**	○
3.2.1	Electricity output, GWh/mn pop.	941.6	99	
3.2.2	Logistics performance*	13.6	102	
3.2.3	Gross capital formation, % GDP	15.7	122	○◇
3.3	**Ecological sustainability**	**11.9**	**105**	
3.3.1	GDP/unit of energy use	9.6	75	
3.3.2	Low-carbon energy use, %	11.4	82	
3.3.3	ISO 14001 environment/bn PPP$ GDP	0.4	96	

		Score/Value	Rank	
	Market sophistication	**54.8**	**19**	●◆
4.1	**Credit**	**62.3**	**10**	●◆
4.1.1	Finance for startups and scaleups†	n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP ◷	71.2	45	●
4.1.3	Loans from microfinance institutions, % GDP	17.2	1	●◆
4.2	**Investment**	**n/a**	**[n/a]**	
4.2.1	Market capitalization, % GDP	n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	VC received, value, % GDP	n/a	n/a	
4.3	**Trade, diversification and market scale**	**47.4**	**85**	
4.3.1	Applied tariff rate, weighted avg., %	4.8	94	
4.3.2	Domestic industry diversification ◷	77.6	69	
4.3.3	Domestic market scale, bn PPP$	125.4	86	

		Score/Value	Rank	
	Business sophistication	**22.7**	**84**	
5.1	**Knowledge workers**	**42.7**	**[42]**	
5.1.1	Knowledge-intensive employment, %	14.4	93	
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, % ◷	13.3	59	●◆
5.2	**Innovation linkages**	**9.7**	**125**	◇
5.2.1	Public research–industry co-publications, %	1.3	75	●
5.2.2	University–industry R&D collaboration†	14.0	124	○◇
5.2.3	State of cluster development†	19.8	120	◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP ◷	0.0	108	
5.2.5	Patent families/bn PPP$ GDP	0.0	102	○◇
5.3	**Knowledge absorption**	**15.7**	**123**	
5.3.1	Intellectual property payments, % total trade	0.3	86	
5.3.2	High-tech imports, % total trade	7.2	83	
5.3.3	ICT services imports, % total trade	0.8	98	
5.3.4	FDI net inflows, % GDP	−0.6	124	
5.3.5	Research talent, % in businesses ◷	4.0	75	

		Score/Value	Rank	
	Knowledge and technology outputs	**9.5**	**120**	
6.1	**Knowledge creation**	**3.3**	**117**	
6.1.1	Patents by origin/bn PPP$ GDP	0.1	110	
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	59	
6.1.4	Scientific and technical articles/bn PPP$ GDP	2.0	123	
6.1.5	Citable documents H-index	6.4	91	
6.2	**Knowledge impact**	**19.5**	**105**	
6.2.1	Labor productivity growth, %	−0.5	109	
6.2.2	Unicorn valuation, % GDP	0.0	49	○◇
6.2.3	Software spending, % GDP	0.3	48	●
6.2.4	High-tech manufacturing, % ◷	10.4	84	
6.3	**Knowledge diffusion**	**5.7**	**115**	
6.3.1	Intellectual property receipts, % total trade	0.0	81	
6.3.2	Production and export complexity	18.3	108	
6.3.3	High-tech exports, % total trade	0.4	97	
6.3.4	ICT services exports, % total trade	0.4	111	
6.3.5	ISO 9001 quality/bn PPP$ GDP	1.9	93	

		Score/Value	Rank	
	Creative outputs	**13.1**	**102**	
7.1	**Intangible assets**	**15.9**	**[90]**	
7.1.1	Intangible asset intensity, top 15, %	n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP	40.1	48	●
7.1.3	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.4	Industrial designs by origin/bn PPP$ GDP	0.3	95	
7.2	**Creative goods and services**	**4.5**	**101**	
7.2.1	Cultural and creative services exports, % total trade	0.0	107	○
7.2.2	National feature films/mn pop. 15–69	0.9	68	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Creative goods exports, % total trade	0.6	58	●
7.3	**Online creativity**	**16.0**	**111**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69	0.9	98	
7.3.2	GitHub commits/mn pop. 15–69	4.2	86	
7.3.3	Mobile app creation/bn PPP$ GDP	43.0	115	◇

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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Bosnia and Herzegovina

80

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
84	74	Upper middle	EUR	3.2	68.0	19,634

			Score/ Value	Rank	
	Institutions		**30.0**	**110**	
1.1	**Institutional environment**		**33.4**	**109**	◇
1.1.1	Operational stability for businesses*		50.7	92	
1.1.2	Government effectiveness*		16.2	128	○◇
1.2	**Regulatory environment**		**36.4**	**80**	
1.2.1	Regulatory quality*		37.7	81	
1.2.2	Rule of law*		35.0	83	
1.3	**Business environment**		**20.1**	**118**	○
1.3.1	Policy stability for doing business†		13.0	124	○◇
1.3.2	Entrepreneurship policies and culture†	◷	27.2	58	
	Human capital and research		**30.4**	**72**	
2.1	**Education**		**57.2**	**51**	
2.1.1	Expenditure on education, % GDP		n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap	◷	33.0	4	●◆
2.1.3	School life expectancy, years		13.3	77	
2.1.4	PISA scales in reading, maths and science	◷	402.6	61	
2.1.5	Pupil–teacher ratio, secondary		8.2	13	●
2.2	**Tertiary education**		**32.0**	**71**	
2.2.1	Tertiary enrolment, % gross		44.6	74	
2.2.2	Graduates in science and engineering, %		24.5	49	
2.2.3	Tertiary inbound mobility, %		7.2	40	◆
2.3	**Research and development (R&D)**		**2.1**	**90**	
2.3.1	Researchers, FTE/mn pop.		535.0	70	
2.3.2	Gross expenditure on R&D, % GDP		0.2	88	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**40.6**	**69**	
3.1	**Information and communication technologies (ICTs)**		**63.8**	**83**	
3.1.1	ICT access*		89.4	68	
3.1.2	ICT use*		69.9	85	
3.1.3	Government's online service*		43.6	103	◇
3.1.4	E-participation*		52.3	71	
3.2	**General infrastructure**		**33.1**	**58**	
3.2.1	Electricity output, GWh/mn pop.		5,040.2	42	
3.2.2	Logistics performance*		40.9	60	
3.2.3	Gross capital formation, % GDP		26.7	37	●
3.3	**Ecological sustainability**		**24.7**	**50**	
3.3.1	GDP/unit of energy use		7.1	99	◇
3.3.2	Low-carbon energy use, %		17.6	65	
3.3.3	ISO 14001 environment/bn PPP$ GDP		5.0	22	●
	Market sophistication		**46.5**	**29**	●◆
4.1	**Credit**		**31.5**	**54**	
4.1.1	Finance for startups and scaleups†	◷	52.7	36	
4.1.2	Domestic credit to private sector, % GDP		48.2	71	
4.1.3	Loans from microfinance institutions, % GDP		2.4	17	●
4.2	**Investment**		**n/a**	**[n/a]**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP		n/a	n/a	
4.2.4	VC received, value, % GDP		n/a	n/a	
4.3	**Trade, diversification and market scale**		**61.6**	**43**	
4.3.1	Applied tariff rate, weighted avg., %		1.5	54	
4.3.2	Domestic industry diversification		94.9	17	●
4.3.3	Domestic market scale, bn PPP$		68.0	101	

			Score/ Value	Rank	
	Business sophistication		**19.7**	**104**	◇
5.1	**Knowledge workers**		**29.7**	**73**	
5.1.1	Knowledge-intensive employment, %		25.9	56	
5.1.2	Firms offering formal training, %		24.6	67	
5.1.3	GERD performed by business, % GDP	◷	0.1	63	
5.1.4	GERD financed by business, %		38.7	46	
5.1.5	Females employed w/advanced degrees, %		9.7	77	
5.2	**Innovation linkages**		**13.7**	**111**	
5.2.1	Public research–industry co-publications, %		1.6	58	
5.2.2	University–industry R&D collaboration†		10.3	127	○◇
5.2.3	State of cluster development†		32.4	100	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	◷	0.0	60	
5.2.5	Patent families/bn PPP$ GDP		0.1	66	
5.3	**Knowledge absorption**		**15.8**	**121**	○◇
5.3.1	Intellectual property payments, % total trade		0.1	100	◇
5.3.2	High-tech imports, % total trade		6.1	96	
5.3.3	ICT services imports, % total trade		0.4	112	○◇
5.3.4	FDI net inflows, % GDP		2.5	66	
5.3.5	Research talent, % in businesses	◷	11.5	60	
	Knowledge and technology outputs		**20.3**	**71**	
6.1	**Knowledge creation**		**9.5**	**85**	
6.1.1	Patents by origin/bn PPP$ GDP		0.6	71	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	89	
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		10.9	68	
6.1.5	Citable documents H-index		5.1	96	
6.2	**Knowledge impact**		**20.1**	**100**	
6.2.1	Labor productivity growth, %		1.4	42	●
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.1	101	
6.2.4	High-tech manufacturing, %		16.6	70	
6.3	**Knowledge diffusion**		**31.3**	**39**	●
6.3.1	Intellectual property receipts, % total trade		0.1	65	
6.3.2	Production and export complexity		62.3	32	●◆
6.3.3	High-tech exports, % total trade		2.9	50	
6.3.4	ICT services exports, % total trade		3.1	40	●
6.3.5	ISO 9001 quality/bn PPP$ GDP		19.6	9	●◆
	Creative outputs		**14.7**	**94**	
7.1	**Intangible assets**		**13.5**	**94**	
7.1.1	Intangible asset intensity, top 15, %	◷	-27.9	76	○◇
7.1.2	Trademarks by origin/bn PPP$ GDP		13.0	104	◇
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		1.0	60	
7.2	**Creative goods and services**		**11.7**	**68**	
7.2.1	Cultural and creative services exports, % total trade		0.2	73	
7.2.2	National feature films/mn pop. 15–69		3.9	34	
7.2.3	Entertainment and media market/th pop. 15–69		n/a	n/a	
7.2.4	Creative goods exports, % total trade		0.3	71	
7.3	**Online creativity**		**19.9**	**98**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		2.9	70	
7.3.2	GitHub commits/mn pop. 15–69		9.7	57	
7.3.3	Mobile app creation/bn PPP$ GDP		47.2	107	○◇

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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Botswana

GII 2024 rank

87

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
110	64	Upper middle	SSA	2.5	51.9	19,394

			Score/ Value	Rank	
	Institutions		**64.3**	**36**	●◆
1.1	**Institutional environment**		**65.4**	**41**	●◆
1.1.1	Operational stability for businesses*		74.7	35	●◆
1.1.2	Government effectiveness*		56.1	47	◆
1.2	**Regulatory environment**		**57.7**	**44**	◆
1.2.1	Regulatory quality*		58.1	44	◆
1.2.2	Rule of law*		57.2	42	●◆
1.3	**Business environment**		**69.8**	**[21]**	
1.3.1	Policy stability for doing business†		69.8	28	●◆
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**29.0**	**[74]**	
2.1	**Education**		**69.0**	**[6]**	
2.1.1	Expenditure on education, % GDP	⏲	8.1	2	●◆
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	⏲	11.5	45	
2.2	**Tertiary education**		**17.9**	**99**	◇
2.2.1	Tertiary enrolment, % gross	⏲	22.9	97	◇
2.2.2	Graduates in science and engineering, %		19.7	76	
2.2.3	Tertiary inbound mobility, %	⏲	2.5	74	
2.3	**Research and development (R&D)**		**0.0**	**[120]**	
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 USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**29.3**	**97**	◇
3.1	**Information and communication technologies (ICTs)**		**45.3**	**106**	◇
3.1.1	ICT access*		83.2	81	
3.1.2	ICT use*		63.1	94	◇
3.1.3	Government's online service*		19.8	130	○◇
3.1.4	E-participation*		15.1	129	○◇
3.2	**General infrastructure**		**30.2**	**70**	
3.2.1	Electricity output, GWh/mn pop.	⏲	962.1	98	◇
3.2.2	Logistics performance*		45.5	56	
3.2.3	Gross capital formation, % GDP		27.4	33	●
3.3	**Ecological sustainability**		**12.3**	**102**	
3.3.1	GDP/unit of energy use		15.3	29	●
3.3.2	Low-carbon energy use, %		0.1	130	○◇
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.5	94	
	Market sophistication		**28.7**	**79**	
4.1	**Credit**		**18.8**	**89**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		29.8	96	
4.1.3	Loans from microfinance institutions, % GDP	⏲	2.7	15	●
4.2	**Investment**		**9.4**	**62**	
4.2.1	Market capitalization, % GDP		63.8	31	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP	⏲	0.0	85	
4.2.4	VC received, value, % GDP	⏲	0.0	94	
4.3	**Trade, diversification and market scale**		**58.0**	**59**	
4.3.1	Applied tariff rate, weighted avg., %		1.1	17	●
4.3.2	Domestic industry diversification		81.3	61	
4.3.3	Domestic market scale, bn PPP$		51.9	112	

			Score/ Value	Rank	
	Business sophistication		**27.4**	**62**	
5.1	**Knowledge workers**		**44.0**	**[41]**	
5.1.1	Knowledge-intensive employment, %		21.8	72	
5.1.2	Firms offering formal training, %		34.6	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, %		17.5	40	●◆
5.2	**Innovation linkages**		**15.6**	**104**	
5.2.1	Public research–industry co-publications, %		0.7	105	
5.2.2	University–industry R&D collaboration†		13.3	125	◇
5.2.3	State of cluster development†		49.6	60	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	61	
5.2.5	Patent families/bn PPP$ GDP		0.1	70	
5.3	**Knowledge absorption**		**22.6**	**80**	
5.3.1	Intellectual property payments, % total trade		1.5	24	●
5.3.2	High-tech imports, % total trade		4.2	117	◇
5.3.3	ICT services imports, % total trade		0.8	95	
5.3.4	FDI net inflows, % GDP		−0.1	123	◇
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**10.6**	**112**	◇
6.1	**Knowledge creation**		**6.4**	**104**	
6.1.1	Patents by origin/bn PPP$ GDP		0.3	90	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	99	○◇
6.1.3	Utility models by origin/bn PPP$ GDP		0.1	56	
6.1.4	Scientific and technical articles/bn PPP$ GDP		9.1	77	
6.1.5	Citable documents H-index		5.1	96	
6.2	**Knowledge impact**		**20.4**	**97**	
6.2.1	Labor productivity growth, %		0.0	93	
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.1	91	
6.2.4	High-tech manufacturing, %		22.2	53	
6.3	**Knowledge diffusion**		**4.9**	**122**	◇
6.3.1	Intellectual property receipts, % total trade		0.0	98	
6.3.2	Production and export complexity		20.0	107	◇
6.3.3	High-tech exports, % total trade		0.5	91	
6.3.4	ICT services exports, % total trade		0.3	117	
6.3.5	ISO 9001 quality/bn PPP$ GDP		0.4	129	○
	Creative outputs		**10.3**	**108**	◇
7.1	**Intangible assets**		**16.5**	**87**	
7.1.1	Intangible asset intensity, top 15, %	⏲	1.8	70	
7.1.2	Trademarks by origin/bn PPP$ GDP	⏲	18.2	93	◇
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.1	110	
7.2	**Creative goods and services**		**2.7**	**[106]**	
7.2.1	Cultural and creative services exports, % total trade		0.1	87	
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	Creative goods exports, % total trade		0.2	84	
7.3	**Online creativity**		**5.5**	**125**	◇
7.3.1	Top-level domains (TLDs)/th pop. 15–69		1.3	90	
7.3.2	GitHub commits/mn pop. 15–69		1.9	106	
7.3.3	Mobile app creation/bn PPP$ GDP	⏲	13.3	125	○◇

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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Brazil

GII 2024 rank

50

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
49	58	Upper middle	LCN	211.1	4,101.0	20,079

			Score/ Value	Rank	
	Institutions		**31.8**	**103**	○
1.1	**Institutional environment**		**42.3**	**92**	
1.1.1	Operational stability for businesses*		56.0	83	
1.1.2	Government effectiveness*		28.6	103	○◇
1.2	**Regulatory environment**		**36.3**	**81**	
1.2.1	Regulatory quality*		36.0	85	
1.2.2	Rule of law*		36.5	79	
1.3	**Business environment**		**16.7**	**125**	○◇
1.3.1	Policy stability for doing business†		23.5	115	○◇
1.3.2	Entrepreneurship policies and culture†		9.9	77	○◇
	Human capital and research		**33.9**	**57**	
2.1	**Education**		**50.6**	**69**	
2.1.1	Expenditure on education, % GDP	⏲	5.8	19	●
2.1.2	Government funding/pupil, secondary, % GDP/cap		20.9	44	
2.1.3	School life expectancy, years	⏲	15.6	42	
2.1.4	PISA scales in reading, maths and science		397.3	64	○
2.1.5	Pupil–teacher ratio, secondary	⏲	16.3	86	
2.2	**Tertiary education**		**20.4**	**93**	
2.2.1	Tertiary enrolment, % gross		60.4	55	
2.2.2	Graduates in science and engineering, %		15.9	97	○
2.2.3	Tertiary inbound mobility, %		0.2	107	○◇
2.3	**Research and development (R&D)**		**30.6**	**36**	◆
2.3.1	Researchers, FTE/mn pop.	⏲	888.5	54	
2.3.2	Gross expenditure on R&D, % GDP	⏲	1.1	35	◆
2.3.3	Global corporate R&D investors, top 3, mn USD$		48.9	33	◆
2.3.4	QS university ranking, top 3*		45.7	26	◆
	Infrastructure		**45.5**	**55**	
3.1	**Information and communication technologies (ICTs)**		**84.5**	**29**	◆
3.1.1	ICT access*		85.8	78	
3.1.2	ICT use*		74.3	75	
3.1.3	Government's online service*		88.5	14	●◆
3.1.4	E-participation*		89.5	11	●◆
3.2	**General infrastructure**		**25.2**	**86**	
3.2.1	Electricity output, GWh/mn pop.		3,145.0	61	
3.2.2	Logistics performance*		50.0	50	
3.2.3	Gross capital formation, % GDP		18.4	108	○
3.3	**Ecological sustainability**		**26.6**	**46**	
3.3.1	GDP/unit of energy use		10.6	66	
3.3.2	Low-carbon energy use, %		43.2	17	●◆
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.9	75	
	Market sophistication		**38.2**	**47**	
4.1	**Credit**		**20.8**	**81**	
4.1.1	Finance for startups and scaleups†		37.6	57	
4.1.2	Domestic credit to private sector, % GDP		71.8	43	
4.1.3	Loans from microfinance institutions, % GDP		0.0	60	○
4.2	**Investment**		**16.8**	**45**	
4.2.1	Market capitalization, % GDP		52.6	36	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.1	53	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.1	50	
4.2.4	VC received, value, % GDP		0.0	27	
4.3	**Trade, diversification and market scale**		**77.0**	**15**	●◆
4.3.1	Applied tariff rate, weighted avg., %		5.4	100	○◇
4.3.2	Domestic industry diversification		92.1	27	
4.3.3	Domestic market scale, bn PPP$		4,101.0	8	●◆

			Score/ Value	Rank	
	Business sophistication		**36.2**	**39**	◆
5.1	**Knowledge workers**		**45.7**	**[40]**	
5.1.1	Knowledge-intensive employment, %		24.6	60	
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, %	⏲	43.2	41	
5.1.5	Females employed w/advanced degrees, %		14.8	52	
5.2	**Innovation linkages**		**22.6**	**69**	
5.2.1	Public research–industry co-publications, %		1.7	56	
5.2.2	University–industry R&D collaboration†		41.0	75	
5.2.3	State of cluster development†		46.8	65	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	74	
5.2.5	Patent families/bn PPP$ GDP		0.1	49	
5.3	**Knowledge absorption**		**40.1**	**29**	◆
5.3.1	Intellectual property payments, % total trade		1.8	15	●◆
5.3.2	High-tech imports, % total trade		13.4	19	●
5.3.3	ICT services imports, % total trade		2.4	23	●◆
5.3.4	FDI net inflows, % GDP		3.4	45	
5.3.5	Research talent, % in businesses	⏲	26.1	51	
	Knowledge and technology outputs		**24.5**	**50**	
6.1	**Knowledge creation**		**20.2**	**56**	
6.1.1	Patents by origin/bn PPP$ GDP		1.1	53	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.1	58	
6.1.3	Utility models by origin/bn PPP$ GDP		0.6	27	
6.1.4	Scientific and technical articles/bn PPP$ GDP		11.4	63	
6.1.5	Citable documents H-index		39.4	24	◆
6.2	**Knowledge impact**		**37.6**	**30**	◆
6.2.1	Labor productivity growth, %		0.2	86	
6.2.2	Unicorn valuation, % GDP		1.7	22	●◆
6.2.3	Software spending, % GDP		0.3	42	
6.2.4	High-tech manufacturing, %		35.7	33	
6.3	**Knowledge diffusion**		**15.5**	**75**	
6.3.1	Intellectual property receipts, % total trade		0.2	44	
6.3.2	Production and export complexity		38.9	69	
6.3.3	High-tech exports, % total trade		2.1	58	
6.3.4	ICT services exports, % total trade		1.2	76	
6.3.5	ISO 9001 quality/bn PPP$ GDP		4.9	59	
	Creative outputs		**32.3**	**42**	
7.1	**Intangible assets**		**45.8**	**26**	
7.1.1	Intangible asset intensity, top 15, %		65.6	26	
7.1.2	Trademarks by origin/bn PPP$ GDP		92.7	9	●◆
7.1.3	Global brand value, top 5,000, % GDP		3.5	39	
7.1.4	Industrial designs by origin/bn PPP$ GDP		1.4	48	
7.2	**Creative goods and services**		**7.4**	**85**	
7.2.1	Cultural and creative services exports, % total trade		0.5	52	
7.2.2	National feature films/mn pop. 15–69		1.1	65	○
7.2.3	Entertainment and media market/th pop. 15–69		6.2	44	
7.2.4	Creative goods exports, % total trade		0.2	85	
7.3	**Online creativity**		**30.2**	**52**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		5.3	53	
7.3.2	GitHub commits/mn pop. 15–69		13.5	50	
7.3.3	Mobile app creation/bn PPP$ GDP		71.9	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Brunei Darussalam

88

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
123	55	High	SEAO	0.5	32.0	72,610

			Score/ Value	Rank	
	Institutions		**70.0**	**25**	●
1.1	**Institutional environment**		**89.6**	**5**	● ◆
1.1.1	Operational stability for businesses*		98.0	2	● ◆
1.1.2	Government effectiveness*		81.1	16	●
1.2	**Regulatory environment**		**70.2**	**28**	●
1.2.1	Regulatory quality*		69.9	29	●
1.2.2	Rule of law*		70.6	29	●
1.3	**Business environment**		**50.1**	**[57]**	
1.3.1	Policy stability for doing business†	⏲	50.1	61	
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**33.9**	**56**	◇
2.1	**Education**		**54.1**	**61**	
2.1.1	Expenditure on education, % GDP	⏲	4.4	58	
2.1.2	Government funding/pupil, secondary, % GDP/cap	⏲	24.0	28	
2.1.3	School life expectancy, years	⏲	13.7	72	◇
2.1.4	PISA scales in reading, maths and science		439.1	44	
2.1.5	Pupil–teacher ratio, secondary	⏲	7.2	3	● ◆
2.2	**Tertiary education**		**41.0**	**36**	
2.2.1	Tertiary enrolment, % gross	⏲	32.7	89	◇
2.2.2	Graduates in science and engineering, %	⏲	38.4	3	● ◆
2.2.3	Tertiary inbound mobility, %	⏲	3.7	58	
2.3	**Research and development (R&D)**		**6.6**	**71**	◇
2.3.1	Researchers, FTE/mn pop.		513.6	73	◇
2.3.2	Gross expenditure on R&D, % GDP	⏲	0.3	76	◇
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○ ◇
2.3.4	QS university ranking, top 3*		17.1	54	
	Infrastructure		**41.8**	**65**	◇
3.1	**Information and communication technologies (ICTs)**		**72.6**	**65**	◇
3.1.1	ICT access*		96.9	34	
3.1.2	ICT use*		92.7	6	●
3.1.3	Government's online service*		54.4	86	◇
3.1.4	E-participation*		46.5	80	◇
3.2	**General infrastructure**		**47.4**	**23**	●
3.2.1	Electricity output, GWh/mn pop.	⏲	12,809.0	11	●
3.2.2	Logistics performance*		n/a	n/a	
3.2.3	Gross capital formation, % GDP		29.1	30	● ◆
3.3	**Ecological sustainability**		**5.4**	**129**	◇
3.3.1	GDP/unit of energy use		6.6	104	
3.3.2	Low-carbon energy use, %		0.0	132	○ ◇
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.7	85	◇
	Market sophistication		**21.2**	**[105]**	
4.1	**Credit**		**9.1**	**[113]**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		31.6	92	◇
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**4.5**	**[86]**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.1	49	
4.2.3	VC recipients, deals/bn PPP$ GDP		n/a	n/a	
4.2.4	VC received, value, % GDP		n/a	n/a	
4.3	**Trade, diversification and market scale**		**50.2**	**80**	
4.3.1	Applied tariff rate, weighted avg., %		0.0	3	● ◆
4.3.2	Domestic industry diversification		n/a	n/a	
4.3.3	Domestic market scale, bn PPP$		32.0	126	

			Score/ Value	Rank	
	Business sophistication		**23.5**	**82**	◇
5.1	**Knowledge workers**		**31.9**	**[66]**	
5.1.1	Knowledge-intensive employment, %		35.5	41	
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	98	○ ◇
5.1.5	Females employed w/advanced degrees, %	⏲	13.0	61	◇
5.2	**Innovation linkages**		**26.1**	**56**	
5.2.1	Public research–industry co-publications, %		2.3	36	
5.2.2	University–industry R&D collaboration†	⏲	51.7	51	
5.2.3	State of cluster development†	⏲	46.3	66	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	59	
5.2.5	Patent families/bn PPP$ GDP		0.0	102	○ ◇
5.3	**Knowledge absorption**		**12.5**	**132**	○ ◇
5.3.1	Intellectual property payments, % total trade		0.1	103	
5.3.2	High-tech imports, % total trade		3.0	129	◇
5.3.3	ICT services imports, % total trade		0.3	121	◇
5.3.4	FDI net inflows, % GDP		1.5	87	
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**9.8**	**115**	◇
6.1	**Knowledge creation**		**8.2**	**91**	◇
6.1.1	Patents by origin/bn PPP$ GDP		0.0	128	○ ◇
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	99	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		13.8	49	
6.1.5	Citable documents H-index		4.3	108	◇
6.2	**Knowledge impact**		**19.0**	**107**	◇
6.2.1	Labor productivity growth, %		−1.1	120	◇
6.2.2	Unicorn valuation, % GDP		0.0	49	○ ◇
6.2.3	Software spending, % GDP		0.2	67	
6.2.4	High-tech manufacturing, %		n/a	n/a	
6.3	**Knowledge diffusion**		**2.3**	**129**	◇
6.3.1	Intellectual property receipts, % total trade		0.0	116	○ ◇
6.3.2	Production and export complexity		n/a	n/a	
6.3.3	High-tech exports, % total trade		0.2	103	◇
6.3.4	ICT services exports, % total trade		0.0	133	○ ◇
6.3.5	ISO 9001 quality/bn PPP$ GDP		3.0	78	
	Creative outputs		**5.1**	**[124]**	
7.1	**Intangible assets**		**1.7**	**[122]**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		5.7	115	◇
7.1.3	Global brand value, top 5,000, % GDP		n/a	n/a	
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.0	126	○ ◇
7.2	**Creative goods and services**		**0.3**	**[128]**	
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	Creative goods exports, % total trade		0.0	114	
7.3	**Online creativity**		**16.5**	**109**	◇
7.3.1	Top-level domains (TLDs)/th pop. 15–69		3.2	66	◇
7.3.2	GitHub commits/mn pop. 15–69		2.5	99	◇
7.3.3	Mobile app creation/bn PPP$ GDP		43.8	113	◇

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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Bulgaria

GII 2024 rank

38

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
32	50	Upper middle	EUR	6.8	216.5	33,780

			Score/ Value	Rank	
	Institutions		**41.8**	**83**	
1.1	**Institutional environment**		**50.5**	**77**	
1.1.1	Operational stability for businesses*		64.0	63	
1.1.2	Government effectiveness*		36.9	82	
1.2	**Regulatory environment**		**45.5**	**62**	
1.2.1	Regulatory quality*		50.3	56	
1.2.2	Rule of law*		40.8	69	
1.3	**Business environment**		**29.6**	**98**	○
1.3.1	Policy stability for doing business†		33.1	99	○
1.3.2	Entrepreneurship policies and culture†	⏲	26.1	60	○
	Human capital and research		**32.3**	**62**	
2.1	**Education**		**50.6**	**68**	
2.1.1	Expenditure on education, % GDP	⏲	4.3	60	
2.1.2	Government funding/pupil, secondary, % GDP/cap		25.9	18	● ◆
2.1.3	School life expectancy, years	⏲	13.9	70	
2.1.4	PISA scales in reading, maths and science		414.2	52	
2.1.5	Pupil–teacher ratio, secondary	⏲	11.4	43	
2.2	**Tertiary education**		**35.0**	**58**	
2.2.1	Tertiary enrolment, % gross	⏲	74.0	32	
2.2.2	Graduates in science and engineering, %		20.4	74	○
2.2.3	Tertiary inbound mobility, %	⏲	8.0	35	◆
2.3	**Research and development (R&D)**		**11.3**	**57**	
2.3.1	Researchers, FTE/mn pop.		2,704.8	33	◆
2.3.2	Gross expenditure on R&D, % GDP		0.8	46	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○ ◇
2.3.4	QS university ranking, top 3*		5.3	71	
	Infrastructure		**54.4**	**22**	● ◆
3.1	**Information and communication technologies (ICTs)**		**79.9**	**45**	
3.1.1	ICT access*		94.3	51	
3.1.2	ICT use*		84.2	37	◆
3.1.3	Government's online service*		67.9	64	
3.1.4	E-participation*		73.3	29	
3.2	**General infrastructure**		**33.5**	**57**	
3.2.1	Electricity output, GWh/mn pop.		7,763.3	22	● ◆
3.2.2	Logistics performance*		50.0	50	
3.2.3	Gross capital formation, % GDP		20.8	94	○
3.3	**Ecological sustainability**		**49.9**	**3**	● ◆
3.3.1	GDP/unit of energy use		8.1	89	○
3.3.2	Low-carbon energy use, %		29.0	39	
3.3.3	ISO 14001 environment/bn PPP$ GDP		12.3	1	● ◆
	Market sophistication		**37.7**	**50**	
4.1	**Credit**		**38.0**	**37**	
4.1.1	Finance for startups and scaleups†	⏲	61.8	24	◆
4.1.2	Domestic credit to private sector, % GDP		44.9	75	
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**11.5**	**56**	
4.2.1	Market capitalization, % GDP		20.9	60	○
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.2	36	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.1	40	
4.2.4	VC received, value, % GDP		0.0	69	
4.3	**Trade, diversification and market scale**		**63.5**	**34**	
4.3.1	Applied tariff rate, weighted avg., %		1.1	21	
4.3.2	Domestic industry diversification		95.3	14	● ◆
4.3.3	Domestic market scale, bn PPP$		216.5	71	

		Score/ Value	Rank	
	Business sophistication	**32.1**	**44**	
5.1	**Knowledge workers**	**37.1**	**56**	
5.1.1	Knowledge-intensive employment, %	32.6	45	◆
5.1.2	Firms offering formal training, %	15.5	89	○ ◇
5.1.3	GERD performed by business, % GDP	0.5	38	
5.1.4	GERD financed by business, %	32.9	57	
5.1.5	Females employed w/advanced degrees, %	20.5	31	◆
5.2	**Innovation linkages**	**26.3**	**55**	
5.2.1	Public research–industry co-publications, %	2.0	43	
5.2.2	University–industry R&D collaboration†	47.3	58	
5.2.3	State of cluster development†	51.7	57	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	76	
5.2.5	Patent families/bn PPP$ GDP	0.3	42	
5.3	**Knowledge absorption**	**33.0**	**49**	
5.3.1	Intellectual property payments, % total trade	0.6	66	
5.3.2	High-tech imports, % total trade	8.8	57	
5.3.3	ICT services imports, % total trade	1.2	68	
5.3.4	FDI net inflows, % GDP	3.9	34	
5.3.5	Research talent, % in businesses	51.9	24	◆
	Knowledge and technology outputs	**31.7**	**30**	◆
6.1	**Knowledge creation**	**19.1**	**58**	
6.1.1	Patents by origin/bn PPP$ GDP	1.0	58	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.2	48	
6.1.3	Utility models by origin/bn PPP$ GDP	1.0	19	
6.1.4	Scientific and technical articles/bn PPP$ GDP	13.3	52	
6.1.5	Citable documents H-index	15.9	53	
6.2	**Knowledge impact**	**30.2**	**51**	
6.2.1	Labor productivity growth, %	2.9	11	●
6.2.2	Unicorn valuation, % GDP	0.0	49	○ ◇
6.2.3	Software spending, % GDP	0.2	78	
6.2.4	High-tech manufacturing, %	29.5	40	
6.3	**Knowledge diffusion**	**45.8**	**18**	● ◆
6.3.1	Intellectual property receipts, % total trade	0.4	29	◆
6.3.2	Production and export complexity	58.6	39	
6.3.3	High-tech exports, % total trade	4.6	40	
6.3.4	ICT services exports, % total trade	5.2	20	● ◆
6.3.5	ISO 9001 quality/bn PPP$ GDP	33.9	2	● ◆
	Creative outputs	**42.9**	**27**	◆
7.1	**Intangible assets**	**49.7**	**22**	● ◆
7.1.1	Intangible asset intensity, top 15, %	62.1	31	
7.1.2	Trademarks by origin/bn PPP$ GDP	68.3	20	●
7.1.3	Global brand value, top 5,000, % GDP	0.0	75	○ ◇
7.1.4	Industrial designs by origin/bn PPP$ GDP	6.8	12	● ◆
7.2	**Creative goods and services**	**33.3**	**23**	● ◆
7.2.1	Cultural and creative services exports, % total trade	2.0	12	● ◆
7.2.2	National feature films/mn pop. 15–69	5.2	22	◆
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Creative goods exports, % total trade	1.0	45	
7.3	**Online creativity**	**38.9**	**35**	◆
7.3.1	Top-level domains (TLDs)/th pop. 15–69	12.5	39	
7.3.2	GitHub commits/mn pop. 15–69	33.2	34	◆
7.3.3	Mobile app creation/bn PPP$ GDP	70.9	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Burkina Faso

GII 2024 rank

129

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
124	127	Low	SSA	23.0	62.8	2,683

			Score/Value	Rank	
	Institutions		**31.2**	**105**	
1.1	**Institutional environment**		**22.9**	**125**	
1.1.1	Operational stability for businesses*		23.3	126	
1.1.2	Government effectiveness*		22.4	116	
1.2	**Regulatory environment**		**28.0**	**99**	
1.2.1	Regulatory quality*		29.5	98	
1.2.2	Rule of law*		26.4	102	
1.3	**Business environment**		**42.8**	**75**	●
1.3.1	Policy stability for doing business†	⏲	44.7	74	●
1.3.2	Entrepreneurship policies and culture†	⏲	40.9	41	● ◆
	Human capital and research		**19.8**	**103**	
2.1	**Education**		**37.7**	**107**	
2.1.1	Expenditure on education, % GDP		5.3	35	●
2.1.2	Government funding/pupil, secondary, % GDP/cap	⏲	16.2	65	
2.1.3	School life expectancy, years		8.1	109	
2.1.4	PISA scales in reading, maths and science		n/a	n/a	
2.1.5	Pupil–teacher ratio, secondary		18.9	95	◆
2.2	**Tertiary education**		**20.2**	**94**	◆
2.2.1	Tertiary enrolment, % gross		9.7	118	
2.2.2	Graduates in science and engineering, %		25.3	43	●
2.2.3	Tertiary inbound mobility, %		1.8	80	
2.3	**Research and development (R&D)**		**1.3**	**97**	
2.3.1	Researchers, FTE/mn pop.		n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP	⏲	0.3	81	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○ ◇
2.3.4	QS university ranking, top 3*		0.0	75	○ ◇
	Infrastructure		**12.0**	**132**	○ ◇
3.1	**Information and communication technologies (ICTs)**		**18.5**	**130**	
3.1.1	ICT access*	⏲	12.0	127	
3.1.2	ICT use*		10.2	123	○
3.1.3	Government's online service*		30.7	122	
3.1.4	E-participation*		20.9	123	
3.2	**General infrastructure**		**15.7**	**113**	
3.2.1	Electricity output, GWh/mn pop.		n/a	n/a	
3.2.2	Logistics performance*		9.1	105	◇
3.2.3	Gross capital formation, % GDP		21.1	92	
3.3	**Ecological sustainability**		**1.7**	**132**	○ ◇
3.3.1	GDP/unit of energy use		n/a	n/a	
3.3.2	Low-carbon energy use, %		2.6	113	◇
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.1	129	
	Market sophistication		**16.6**	**115**	
4.1	**Credit**		**20.4**	**85**	● ◆
4.1.1	Finance for startups and scaleups†	⏲	21.8	75	
4.1.2	Domestic credit to private sector, % GDP		31.3	94	
4.1.3	Loans from microfinance institutions, % GDP		2.8	14	●
4.2	**Investment**		**4.6**	**[83]**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	65	●
4.2.4	VC received, value, % GDP		0.0	103	
4.3	**Trade, diversification and market scale**		**24.6**	**118**	
4.3.1	Applied tariff rate, weighted avg., %		6.6	109	
4.3.2	Domestic industry diversification		n/a	n/a	
4.3.3	Domestic market scale, bn PPP$		62.8	102	

			Score/Value	Rank	
	Business sophistication		**11.6**	**131**	○ ◇
5.1	**Knowledge workers**		**8.4**	**[124]**	
5.1.1	Knowledge-intensive employment, %		11.4	105	
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, %		1.0	118	
5.2	**Innovation linkages**		**5.0**	**129**	◇
5.2.1	Public research–industry co-publications, %		0.3	126	◇
5.2.2	University–industry R&D collaboration†	⏲	16.1	122	◇
5.2.3	State of cluster development†	⏲	1.3	129	○ ◇
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	102	○ ◇
5.3	**Knowledge absorption**		**21.4**	**87**	
5.3.1	Intellectual property payments, % total trade		0.0	115	
5.3.2	High-tech imports, % total trade		5.5	105	
5.3.3	ICT services imports, % total trade		1.9	34	● ◆
5.3.4	FDI net inflows, % GDP		−0.1	121	
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**9.9**	**114**	
6.1	**Knowledge creation**		**5.1**	**111**	
6.1.1	Patents by origin/bn PPP$ GDP		0.1	109	
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	74	○ ◇
6.1.4	Scientific and technical articles/bn PPP$ GDP		8.9	78	●
6.1.5	Citable documents H-index		5.0	99	
6.2	**Knowledge impact**		**18.0**	**112**	
6.2.1	Labor productivity growth, %		0.9	56	●
6.2.2	Unicorn valuation, % GDP		0.0	49	○ ◇
6.2.3	Software spending, % GDP		0.0	118	
6.2.4	High-tech manufacturing, %		n/a	n/a	
6.3	**Knowledge diffusion**		**6.7**	**110**	
6.3.1	Intellectual property receipts, % total trade		0.0	96	
6.3.2	Production and export complexity		24.2	98	
6.3.3	High-tech exports, % total trade		0.1	125	
6.3.4	ICT services exports, % total trade		0.9	86	●
6.3.5	ISO 9001 quality/bn PPP$ GDP		0.5	126	
	Creative outputs		**4.7**	**126**	
7.1	**Intangible assets**		**1.0**	**127**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		3.3	124	
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○ ◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.1	106	
7.2	**Creative goods and services**		**2.3**	**[108]**	
7.2.1	Cultural and creative services exports, % total trade		0.2	80	
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	Creative goods exports, % total trade		0.0	123	
7.3	**Online creativity**		**14.5**	**117**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69	⏲	0.0	131	○
7.3.2	GitHub commits/mn pop. 15–69		0.1	130	○
7.3.3	Mobile app creation/bn PPP$ GDP		43.5	114	

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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Burundi

127

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
128	124	Low	SSA	13.7	11.6	890

			Score/Value	Rank	
	Institutions		**27.1**	**115**	
1.1	**Institutional environment**		**21.2**	**126**	
1.1.1	Operational stability for businesses*		31.3	118	
1.1.2	Government effectiveness*		11.0	131	○◇
1.2	**Regulatory environment**		**12.1**	**125**	◇
1.2.1	Regulatory quality*		16.9	120	◇
1.2.2	Rule of law*		7.2	130	◇
1.3	**Business environment**		**48.1**	**[62]**	
1.3.1	Policy stability for doing business†	⏲	48.1	68	●
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**18.7**	**105**	
2.1	**Education**		**39.2**	**[101]**	
2.1.1	Expenditure on education, % GDP		4.8	45	●
2.1.2	Government funding/pupil, secondary, % GDP/cap		n/a	n/a	
2.1.3	School life expectancy, years	⏲	10.2	103	
2.1.4	PISA scales in reading, maths and science		n/a	n/a	
2.1.5	Pupil–teacher ratio, secondary		26.4	112	
2.2	**Tertiary education**		**16.0**	**106**	
2.2.1	Tertiary enrolment, % gross		6.5	122	
2.2.2	Graduates in science and engineering, %	⏲	19.7	77	
2.2.3	Tertiary inbound mobility, %	⏲	4.8	52	●◆
2.3	**Research and development (R&D)**		**0.9**	**101**	
2.3.1	Researchers, FTE/mn pop.	⏲	23.2	105	◇
2.3.2	Gross expenditure on R&D, % GDP	⏲	0.2	84	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**23.6**	**119**	
3.1	**Information and communication technologies (ICTs)**		**20.5**	**129**	
3.1.1	ICT access*		1.2	131	○
3.1.2	ICT use*		21.5	119	
3.1.3	Government's online service*		26.8	127	
3.1.4	E-participation*		32.6	101	
3.2	**General infrastructure**		**30.9**	**[68]**	
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		23.9	62	●
3.3	**Ecological sustainability**		**19.4**	**69**	●
3.3.1	GDP/unit of energy use		n/a	n/a	
3.3.2	Low-carbon energy use, %		29.2	38	●
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.6	92	
	Market sophistication		**15.3**	**118**	
4.1	**Credit**		**8.5**	**116**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		42.2	77	◆
4.1.3	Loans from microfinance institutions, % GDP	⏲	0.3	47	
4.2	**Investment**		**n/a**	**[n/a]**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP		n/a	n/a	
4.2.4	VC received, value, % GDP		n/a	n/a	
4.3	**Trade, diversification and market scale**		**22.1**	**123**	
4.3.1	Applied tariff rate, weighted avg., %		7.1	112	
4.3.2	Domestic industry diversification		n/a	n/a	
4.3.3	Domestic market scale, bn PPP$		11.6	131	○

			Score/Value	Rank	
	Business sophistication		**15.2**	**122**	
5.1	**Knowledge workers**		**10.7**	**117**	
5.1.1	Knowledge-intensive employment, %	⏲	2.7	127	○◇
5.1.2	Firms offering formal training, %	⏲	32.0	52	
5.1.3	GERD performed by business, % GDP	⏲	0.0	82	
5.1.4	GERD financed by business, %	⏲	8.8	78	◆
5.1.5	Females employed w/advanced degrees, %	⏲	0.7	122	
5.2	**Innovation linkages**		**17.8**	**92**	
5.2.1	Public research–industry co-publications, %		1.2	81	
5.2.2	University–industry R&D collaboration†	⏲	30.4	97	
5.2.3	State of cluster development†	⏲	29.4	108	
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	102	○◇
5.3	**Knowledge absorption**		**17.1**	**108**	
5.3.1	Intellectual property payments, % total trade		0.0	117	
5.3.2	High-tech imports, % total trade		7.5	76	●
5.3.3	ICT services imports, % total trade		1.5	55	●
5.3.4	FDI net inflows, % GDP		0.4	113	
5.3.5	Research talent, % in businesses	⏲	1.5	81	
	Knowledge and technology outputs		**7.1**	**132**	○◇
6.1	**Knowledge creation**		**6.9**	**101**	
6.1.1	Patents by origin/bn PPP$ GDP	⏲	0.2	95	
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	36	●
6.1.4	Scientific and technical articles/bn PPP$ GDP		6.1	94	
6.1.5	Citable documents H-index		0.9	130	○◇
6.2	**Knowledge impact**		**12.5**	**126**	◇
6.2.1	Labor productivity growth, %		−1.6	125	◇
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.1	98	◆
6.2.4	High-tech manufacturing, %		n/a	n/a	
6.3	**Knowledge diffusion**		**1.8**	**130**	◇
6.3.1	Intellectual property receipts, % total trade		0.0	92	
6.3.2	Production and export complexity		n/a	n/a	
6.3.3	High-tech exports, % total trade		0.0	128	◇
6.3.4	ICT services exports, % total trade		0.3	114	
6.3.5	ISO 9001 quality/bn PPP$ GDP		1.6	100	
	Creative outputs		**5.8**	**120**	
7.1	**Intangible assets**		**1.6**	**124**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP	⏲	4.6	121	
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○◇
7.1.4	Industrial designs by origin/bn PPP$ GDP	⏲	0.2	98	
7.2	**Creative goods and services**		**4.7**	**[98]**	
7.2.1	Cultural and creative services exports, % total trade		0.3	66	●
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	Creative goods exports, % total trade		0.0	119	
7.3	**Online creativity**		**15.2**	**114**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.1	129	
7.3.2	GitHub commits/mn pop. 15–69		0.2	128	
7.3.3	Mobile app creation/bn PPP$ GDP		45.3	111	

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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Cabo Verde

GII 2024 rank

90

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
113	68	Lower middle	SSA	0.5	5.7	9,909

			Score/Value	Rank	
	Institutions		**56.7**	**45**	●◆
1.1	**Institutional environment**		**56.6**	**56**	◆
1.1.1	Operational stability for businesses*		70.0	40	●◆
1.1.2	Government effectiveness*		43.3	71	◆
1.2	**Regulatory environment**		**51.5**	**54**	●◆
1.2.1	Regulatory quality*		48.8	57	◆
1.2.2	Rule of law*		54.3	50	●◆
1.3	**Business environment**		**61.8**	**[31]**	
1.3.1	Policy stability for doing business†	⏲	61.8	39	●◆
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**20.3**	**102**	
2.1	**Education**		**48.1**	**72**	
2.1.1	Expenditure on education, % GDP	⏲	6.0	15	●◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	⏲	14.1	73	
2.1.3	School life expectancy, years	⏲	11.9	94	
2.1.4	PISA scales in reading, maths and science		n/a	n/a	
2.1.5	Pupil–teacher ratio, secondary	⏲	15.3	79	
2.2	**Tertiary education**		**12.5**	**109**	
2.2.1	Tertiary enrolment, % gross	⏲	20.2	103	
2.2.2	Graduates in science and engineering, %	⏲	16.1	96	◇
2.2.3	Tertiary inbound mobility, %	⏲	1.4	85	
2.3	**Research and development (R&D)**		**0.3**	**112**	
2.3.1	Researchers, FTE/mn pop.	⏲	117.9	91	
2.3.2	Gross expenditure on R&D, % GDP		n/a	n/a	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**51.1**	**34**	●◆
3.1	**Information and communication technologies (ICTs)**		**47.2**	**104**	
3.1.1	ICT access*		72.7	91	
3.1.2	ICT use*		48.7	108	
3.1.3	Government's online service*		44.4	100	
3.1.4	E-participation*		23.3	116	
3.2	**General infrastructure**		**100.0**	**[1]**	
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		46.2	1	●◆
3.3	**Ecological sustainability**		**6.2**	**124**	◇
3.3.1	GDP/unit of energy use		n/a	n/a	
3.3.2	Low-carbon energy use, %		8.1	91	
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.4	101	
	Market sophistication		**21.9**	**[103]**	
4.1	**Credit**		**19.5**	**[88]**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		58.1	54	●
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**n/a**	**[n/a]**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP		n/a	n/a	
4.2.4	VC received, value, % GDP		n/a	n/a	
4.3	**Trade, diversification and market scale**		**24.4**	**120**	
4.3.1	Applied tariff rate, weighted avg., %		11.6	130	○◇
4.3.2	Domestic industry diversification	⏲	64.7	89	
4.3.3	Domestic market scale, bn PPP$		5.7	132	○

			Score/Value	Rank	
	Business sophistication		**22.2**	**89**	
5.1	**Knowledge workers**		**23.9**	**[94]**	
5.1.1	Knowledge-intensive employment, %	⏲	17.1	87	
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	87	
5.2	**Innovation linkages**		**19.8**	**86**	
5.2.1	Public research–industry co-publications, %		0.8	102	
5.2.2	University–industry R&D collaboration†	⏲	34.3	91	
5.2.3	State of cluster development†	⏲	37.8	88	
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	102	○◇
5.3	**Knowledge absorption**		**23.0**	**78**	
5.3.1	Intellectual property payments, % total trade		0.3	89	
5.3.2	High-tech imports, % total trade		3.7	125	○
5.3.3	ICT services imports, % total trade		1.8	36	●◆
5.3.4	FDI net inflows, % GDP		4.6	27	●
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**12.0**	**100**	
6.1	**Knowledge creation**		**10.1**	**[83]**	
6.1.1	Patents by origin/bn PPP$ GDP		0.4	85	
6.1.2	PCT patents by origin/bn PPP$ GDP		n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		11.2	67	
6.1.5	Citable documents H-index		0.0	133	○◇
6.2	**Knowledge impact**		**19.9**	**102**	
6.2.1	Labor productivity growth, %		−0.1	99	
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.2	51	●
6.2.4	High-tech manufacturing, %	⏲	10.3	85	
6.3	**Knowledge diffusion**		**5.9**	**113**	
6.3.1	Intellectual property receipts, % total trade		0.0	102	
6.3.2	Production and export complexity		n/a	n/a	
6.3.3	High-tech exports, % total trade		0.0	133	○◇
6.3.4	ICT services exports, % total trade		1.0	83	
6.3.5	ISO 9001 quality/bn PPP$ GDP		5.7	51	●◆
	Creative outputs		**8.3**	**[111]**	
7.1	**Intangible assets**		**12.0**	**[96]**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		19.9	88	
7.1.3	Global brand value, top 5,000, % GDP		n/a	n/a	
7.1.4	Industrial designs by origin/bn PPP$ GDP	⏲	1.1	57	
7.2	**Creative goods and services**		**5.9**	**[90]**	
7.2.1	Cultural and creative services exports, % total trade		0.4	60	
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	Creative goods exports, % total trade		0.0	132	○
7.3	**Online creativity**		**3.2**	**127**	○◇
7.3.1	Top-level domains (TLDs)/th pop. 15–69		2.1	77	◆
7.3.2	GitHub commits/mn pop. 15–69		4.3	85	
7.3.3	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Cambodia **103**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
103	97	Lower middle	SEAO	17.4	98.3	6,087

			Score/Value	Rank	
	Institutions		**37.6**	**89**	
1.1	**Institutional environment**		**50.1**	**78**	◆
1.1.1	Operational stability for businesses*		65.3	55	●◆
1.1.2	Government effectiveness*		34.8	93	
1.2	**Regulatory environment**		**21.1**	**113**	
1.2.1	Regulatory quality*		23.2	111	
1.2.2	Rule of law*		19.0	112	
1.3	**Business environment**		**41.8**	**[76]**	
1.3.1	Policy stability for doing business†	⏲	41.8	83	
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**16.8**	**111**	
2.1	**Education**		**32.0**	**[117]**	
2.1.1	Expenditure on education, % GDP	⏲	1.7	124	○◇
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		337.4	86	○◇
2.1.5	Pupil–teacher ratio, secondary	⏲	9.9	34	●◆
2.2	**Tertiary education**		**17.8**	**100**	
2.2.1	Tertiary enrolment, % gross		15.0	108	
2.2.2	Graduates in science and engineering, %	⏲	23.2	58	
2.2.3	Tertiary inbound mobility, %	⏲	0.3	106	○
2.3	**Research and development (R&D)**		**0.5**	**109**	
2.3.1	Researchers, FTE/mn pop.	⏲	30.8	102	
2.3.2	Gross expenditure on R&D, % GDP	⏲	0.1	99	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**27.3**	**103**	
3.1	**Information and communication technologies (ICTs)**		**49.9**	**103**	
3.1.1	ICT access*		65.5	97	
3.1.2	ICT use*		71.7	82	
3.1.3	Government's online service*		35.7	116	
3.1.4	E-participation*		26.7	108	
3.2	**General infrastructure**		**16.0**	**112**	
3.2.1	Electricity output, GWh/mn pop.	⏲	612.5	106	
3.2.2	Logistics performance*		13.6	102	○
3.2.3	Gross capital formation, % GDP		24.3	60	
3.3	**Ecological sustainability**		**15.9**	**85**	
3.3.1	GDP/unit of energy use		8.1	90	
3.3.2	Low-carbon energy use, %		23.4	54	●
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.6	86	
	Market sophistication		**42.9**	**39**	●◆
4.1	**Credit**		**83.6**	**2**	●◆
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		180.0	5	●◆
4.1.3	Loans from microfinance institutions, % GDP		31.7	1	●◆
4.2	**Investment**		**2.6**	**104**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.0	88	
4.2.3	VC recipients, deals/bn PPP$ GDP	⏲	0.0	88	
4.2.4	VC received, value, % GDP	⏲	0.0	83	
4.3	**Trade, diversification and market scale**		**42.6**	**96**	
4.3.1	Applied tariff rate, weighted avg., %		2.1	68	◆
4.3.2	Domestic industry diversification		n/a	n/a	
4.3.3	Domestic market scale, bn PPP$		98.3	90	

			Score/Value	Rank	
	Business sophistication		**14.4**	**124**	◇
5.1	**Knowledge workers**		**9.0**	**122**	◇
5.1.1	Knowledge-intensive employment, %	⏲	5.9	118	◇
5.1.2	Firms offering formal training, %		10.0	94	◇
5.1.3	GERD performed by business, % GDP	⏲	0.0	84	
5.1.4	GERD financed by business, %	⏲	19.4	70	
5.1.5	Females employed w/advanced degrees, %	⏲	2.1	110	
5.2	**Innovation linkages**		**17.3**	**96**	
5.2.1	Public research–industry co-publications, %		0.8	101	
5.2.2	University–industry R&D collaboration†	⏲	25.3	105	
5.2.3	State of cluster development†	⏲	41.7	80	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	46	●◆
5.2.5	Patent families/bn PPP$ GDP		0.1	62	◆
5.3	**Knowledge absorption**		**17.0**	**109**	
5.3.1	Intellectual property payments, % total trade		0.1	108	
5.3.2	High-tech imports, % total trade		3.8	124	
5.3.3	ICT services imports, % total trade		0.6	104	
5.3.4	FDI net inflows, % GDP		13.0	7	●◆
5.3.5	Research talent, % in businesses	⏲	4.3	74	
	Knowledge and technology outputs		**12.3**	**98**	
6.1	**Knowledge creation**		**2.7**	**120**	
6.1.1	Patents by origin/bn PPP$ GDP		0.0	128	○◇
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	99	○◇
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		3.4	114	
6.1.5	Citable documents H-index		5.0	99	
6.2	**Knowledge impact**		**22.0**	**87**	
6.2.1	Labor productivity growth, %		2.4	19	●
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.0	117	◇
6.2.4	High-tech manufacturing, %		n/a	n/a	
6.3	**Knowledge diffusion**		**12.1**	**85**	
6.3.1	Intellectual property receipts, % total trade		0.0	80	
6.3.2	Production and export complexity		33.3	82	
6.3.3	High-tech exports, % total trade		4.1	45	●
6.3.4	ICT services exports, % total trade		0.4	107	
6.3.5	ISO 9001 quality/bn PPP$ GDP		2.9	79	
	Creative outputs		**11.6**	**106**	
7.1	**Intangible assets**		**7.7**	**104**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		28.6	67	
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○◇
7.1.4	Industrial designs by origin/bn PPP$ GDP	⏲	0.3	96	
7.2	**Creative goods and services**		**6.6**	**[88]**	
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	Creative goods exports, % total trade		0.5	62	
7.3	**Online creativity**		**24.5**	**69**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.4	110	
7.3.2	GitHub commits/mn pop. 15–69		2.3	101	
7.3.3	Mobile app creation/bn PPP$ GDP		70.8	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Cameroon

GII 2024 rank

123

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
120	120	Lower middle	SSA	28.4	133.3	4,661

			Score/ Value	Rank	
	Institutions		**33.5**	**98**	
1.1	**Institutional environment**		**30.8**	**113**	
1.1.1	Operational stability for businesses*		40.7	110	
1.1.2	Government effectiveness*		21.0	119	
1.2	**Regulatory environment**		**16.0**	**122**	
1.2.1	Regulatory quality*		18.2	117	
1.2.2	Rule of law*		13.9	122	
1.3	**Business environment**		**53.7**	**51**	●
1.3.1	Policy stability for doing business†		44.4	77	
1.3.2	Entrepreneurship policies and culture†	⏲	63.1	17	
	Human capital and research		**16.5**	**[114]**	
2.1	**Education**		**42.5**	**[89]**	
2.1.1	Expenditure on education, % GDP		2.6	110	
2.1.2	Government funding/pupil, secondary, % GDP/cap		n/a	n/a	
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		17.2	89	
2.2	**Tertiary education**		**7.0**	**118**	◇
2.2.1	Tertiary enrolment, % gross	⏲	14.3	109	
2.2.2	Graduates in science and engineering, %		n/a	n/a	
2.2.3	Tertiary inbound mobility, %	⏲	2.8	69	
2.3	**Research and development (R&D)**		**0.0**	**[120]**	
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 USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**18.5**	**129**	○◇
3.1	**Information and communication technologies (ICTs)**		**29.2**	**124**	◇
3.1.1	ICT access*	⏲	39.9	116	
3.1.2	ICT use*		17.3	122	○◇
3.1.3	Government's online service*		32.8	118	
3.1.4	E-participation*		26.7	108	
3.2	**General infrastructure**		**4.7**	**131**	○◇
3.2.1	Electricity output, GWh/mn pop.	⏲	291.9	116	
3.2.2	Logistics performance*		0.0	110	○◇
3.2.3	Gross capital formation, % GDP		18.2	110	◇
3.3	**Ecological sustainability**		**21.5**	**62**	●
3.3.1	GDP/unit of energy use		9.4	81	
3.3.2	Low-carbon energy use, %		36.2	22	●
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.4	97	
	Market sophistication		**10.5**	**130**	○◇
4.1	**Credit**		**22.8**	**77**	●
4.1.1	Finance for startups and scaleups†	⏲	54.5	33	
4.1.2	Domestic credit to private sector, % GDP	⏲	14.7	123	
4.1.3	Loans from microfinance institutions, % GDP	⏲	1.0	30	●
4.2	**Investment**		**3.1**	**98**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.0	83	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	82	
4.2.4	VC received, value, % GDP		0.0	82	
4.3	**Trade, diversification and market scale**		**5.6**	**133**	○◇
4.3.1	Applied tariff rate, weighted avg., %	⏲	11.6	128	○◇
4.3.2	Domestic industry diversification		n/a	n/a	
4.3.3	Domestic market scale, bn PPP$		133.3	84	

			Score/ Value	Rank	
	Business sophistication		**24.6**	**74**	●
5.1	**Knowledge workers**		**31.4**	**[69]**	
5.1.1	Knowledge-intensive employment, %	⏲	27.2	53	●◆
5.1.2	Firms offering formal training, %	⏲	37.6	43	
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	112	
5.2	**Innovation linkages**		**19.2**	**87**	
5.2.1	Public research–industry co-publications, %		0.7	104	
5.2.2	University–industry R&D collaboration†		47.6	57	●
5.2.3	State of cluster development†		39.9	83	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	113	
5.2.5	Patent families/bn PPP$ GDP		0.0	95	
5.3	**Knowledge absorption**		**23.1**	**77**	●
5.3.1	Intellectual property payments, % total trade		0.1	101	
5.3.2	High-tech imports, % total trade	⏲	5.0	109	
5.3.3	ICT services imports, % total trade		2.0	31	●◆
5.3.4	FDI net inflows, % GDP		1.9	77	●
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**9.6**	**119**	
6.1	**Knowledge creation**		**8.0**	**92**	
6.1.1	Patents by origin/bn PPP$ GDP		0.4	84	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	78	
6.1.3	Utility models by origin/bn PPP$ GDP	⏲	0.0	74	○◇
6.1.4	Scientific and technical articles/bn PPP$ GDP		11.8	60	●
6.1.5	Citable documents H-index		7.3	88	
6.2	**Knowledge impact**		**18.4**	**111**	
6.2.1	Labor productivity growth, %		0.0	94	
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.1	90	
6.2.4	High-tech manufacturing, %		n/a	n/a	
6.3	**Knowledge diffusion**		**2.4**	**127**	○
6.3.1	Intellectual property receipts, % total trade		0.0	74	
6.3.2	Production and export complexity		0.0	120	○◇
6.3.3	High-tech exports, % total trade	⏲	0.1	124	
6.3.4	ICT services exports, % total trade		0.8	91	
6.3.5	ISO 9001 quality/bn PPP$ GDP		1.6	101	
	Creative outputs		**6.7**	**117**	
7.1	**Intangible assets**		**1.6**	**123**	◇
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		5.2	118	
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.2	101	
7.2	**Creative goods and services**		**4.2**	**[104]**	
7.2.1	Cultural and creative services exports, % total trade		0.3	70	
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	Creative goods exports, % total trade	⏲	0.0	126	○
7.3	**Online creativity**		**19.2**	**102**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69	⏲	0.5	105	
7.3.2	GitHub commits/mn pop. 15–69		1.4	111	
7.3.3	Mobile app creation/bn PPP$ GDP		55.8	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Canada

GII 2024 rank **14**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
20	8	High	NAC	39.3	2,379.0	59,813

			Score/ Value	Rank	
	Institutions		**78.2**	**14**	
1.1	**Institutional environment**		**84.5**	**13**	
1.1.1	Operational stability for businesses*		84.0	12	
1.1.2	Government effectiveness*		84.9	11	
1.2	**Regulatory environment**		**87.3**	**11**	
1.2.1	Regulatory quality*		85.9	9	●
1.2.2	Rule of law*		88.8	12	
1.3	**Business environment**		**62.7**	**29**	
1.3.1	Policy stability for doing business†		71.0	24	
1.3.2	Entrepreneurship policies and culture†		54.3	22	
	Human capital and research		**58.4**	**11**	
2.1	**Education**		**66.3**	**12**	
2.1.1	Expenditure on education, % GDP		4.1	66	○
2.1.2	Government funding/pupil, secondary, % GDP/cap		n/a	n/a	
2.1.3	School life expectancy, years	⏲	16.0	38	
2.1.4	PISA scales in reading, maths and science		506.4	7	
2.1.5	Pupil–teacher ratio, secondary	⏲	9.4	25	
2.2	**Tertiary education**		**50.2**	**13**	
2.2.1	Tertiary enrolment, % gross	⏲	77.8	27	
2.2.2	Graduates in science and engineering, %		26.2	38	
2.2.3	Tertiary inbound mobility, %	⏲	17.4	12	
2.3	**Research and development (R&D)**		**58.6**	**16**	
2.3.1	Researchers, FTE/mn pop.	⏲	5,423.9	16	
2.3.2	Gross expenditure on R&D, % GDP		1.7	21	
2.3.3	Global corporate R&D investors, top 3, mn USD$		66.8	17	
2.3.4	QS university ranking, top 3*		84.9	4	●
	Infrastructure		**54.7**	**21**	
3.1	**Information and communication technologies (ICTs)**		**85.8**	**21**	
3.1.1	ICT access*		99.7	17	
3.1.2	ICT use*		77.4	68	○◇
3.1.3	Government's online service*		83.5	27	
3.1.4	E-participation*		82.6	14	
3.2	**General infrastructure**		**60.0**	**10**	◆
3.2.1	Electricity output, GWh/mn pop.		16,850.8	6	●◆
3.2.2	Logistics performance*		86.4	7	
3.2.3	Gross capital formation, % GDP		23.8	63	○
3.3	**Ecological sustainability**		**18.4**	**72**	○◇
3.3.1	GDP/unit of energy use		6.1	108	○◇
3.3.2	Low-carbon energy use, %		35.5	23	
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.4	99	○◇
	Market sophistication		**67.2**	**4**	●
4.1	**Credit**		**63.3**	**[8]**	
4.1.1	Finance for startups and scaleups†		63.3	21	
4.1.2	Domestic credit to private sector, % GDP		n/a	n/a	
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**60.9**	**11**	
4.2.1	Market capitalization, % GDP		149.7	8	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.5	13	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.4	1	●◆
4.2.4	VC received, value, % GDP		0.0	10	
4.3	**Trade, diversification and market scale**		**77.5**	**14**	
4.3.1	Applied tariff rate, weighted avg., %		1.2	50	
4.3.2	Domestic industry diversification		95.0	15	
4.3.3	Domestic market scale, bn PPP$		2,379.0	16	

			Score/ Value	Rank	
	Business sophistication		**56.8**	**13**	
5.1	**Knowledge workers**		**53.8**	**30**	◇
5.1.1	Knowledge-intensive employment, %	⏲	43.7	25	
5.1.2	Firms offering formal training, %		n/a	n/a	
5.1.3	GERD performed by business, % GDP		1.0	21	
5.1.4	GERD financed by business, %		46.9	35	◇
5.1.5	Females employed w/advanced degrees, %		20.3	32	
5.2	**Innovation linkages**		**70.0**	**3**	●◆
5.2.1	Public research–industry co-publications, %		4.0	20	
5.2.2	University–industry R&D collaboration†		88.1	5	●
5.2.3	State of cluster development†		91.9	6	●◆
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.2	1	●◆
5.2.5	Patent families/bn PPP$ GDP		2.1	20	
5.3	**Knowledge absorption**		**46.7**	**17**	
5.3.1	Intellectual property payments, % total trade		2.5	9	●
5.3.2	High-tech imports, % total trade		10.8	32	
5.3.3	ICT services imports, % total trade		1.4	56	◇
5.3.4	FDI net inflows, % GDP		2.5	63	○
5.3.5	Research talent, % in businesses	⏲	62.8	8	
	Knowledge and technology outputs		**41.4**	**20**	
6.1	**Knowledge creation**		**46.6**	**16**	
6.1.1	Patents by origin/bn PPP$ GDP		2.0	31	
6.1.2	PCT patents by origin/bn PPP$ GDP		1.0	25	◇
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		27.4	23	
6.1.5	Citable documents H-index		80.5	4	●◆
6.2	**Knowledge impact**		**49.0**	**14**	
6.2.1	Labor productivity growth, %		−0.2	102	○
6.2.2	Unicorn valuation, % GDP		2.3	15	
6.2.3	Software spending, % GDP		0.7	5	●◆
6.2.4	High-tech manufacturing, %		31.8	36	
6.3	**Knowledge diffusion**		**28.6**	**45**	
6.3.1	Intellectual property receipts, % total trade		1.3	17	
6.3.2	Production and export complexity		57.6	41	◇
6.3.3	High-tech exports, % total trade		5.4	37	
6.3.4	ICT services exports, % total trade		2.2	54	
6.3.5	ISO 9001 quality/bn PPP$ GDP		2.6	83	○◇
	Creative outputs		**44.1**	**25**	
7.1	**Intangible assets**		**40.2**	**35**	
7.1.1	Intangible asset intensity, top 15, %		72.0	14	
7.1.2	Trademarks by origin/bn PPP$ GDP		23.8	77	○
7.1.3	Global brand value, top 5,000, % GDP		12.2	13	
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.3	89	○
7.2	**Creative goods and services**		**32.8**	**25**	
7.2.1	Cultural and creative services exports, % total trade		1.1	22	
7.2.2	National feature films/mn pop. 15–69		4.7	30	
7.2.3	Entertainment and media market/th pop. 15–69		61.2	7	
7.2.4	Creative goods exports, % total trade		0.8	52	
7.3	**Online creativity**		**63.3**	**13**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		51.7	11	
7.3.2	GitHub commits/mn pop. 15–69		66.6	11	
7.3.3	Mobile app creation/bn PPP$ GDP		71.5	42	

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Chile

GII 2024 rank

51

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
58	46	High	LCN	19.7	597.5	29,935

			Score/Value	Rank	
	Institutions		**56.3**	**48**	
1.1	**Institutional environment**		**62.5**	**47**	◇
1.1.1	Operational stability for businesses*		66.7	51	◇
1.1.2	Government effectiveness*		58.3	44	
1.2	**Regulatory environment**		**65.6**	**34**	
1.2.1	Regulatory quality*		67.5	32	
1.2.2	Rule of law*		63.6	37	
1.3	**Business environment**		**40.9**	**78**	
1.3.1	Policy stability for doing business†		35.4	95	○◇
1.3.2	Entrepreneurship policies and culture†		46.4	34	
	Human capital and research		**33.5**	**58**	◇
2.1	**Education**		**50.3**	**70**	◇
2.1.1	Expenditure on education, % GDP	⏲	4.0	70	
2.1.2	Government funding/pupil, secondary, % GDP/cap		20.1	49	
2.1.3	School life expectancy, years		16.9	22	●
2.1.4	PISA scales in reading, maths and science		434.4	46	◇
2.1.5	Pupil–teacher ratio, secondary		17.3	91	○◇
2.2	**Tertiary education**		**36.1**	**54**	
2.2.1	Tertiary enrolment, % gross		99.3	7	●◆
2.2.2	Graduates in science and engineering, %		21.4	70	
2.2.3	Tertiary inbound mobility, %		1.4	86	○◇
2.3	**Research and development (R&D)**		**14.2**	**50**	
2.3.1	Researchers, FTE/mn pop.	⏲	512.0	74	◇
2.3.2	Gross expenditure on R&D, % GDP	⏲	0.3	69	◇
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		46.3	25	●
	Infrastructure		**45.6**	**54**	
3.1	**Information and communication technologies (ICTs)**		**82.3**	**37**	
3.1.1	ICT access*		91.7	59	◇
3.1.2	ICT use*		87.9	25	
3.1.3	Government's online service*		81.0	30	
3.1.4	E-participation*		68.6	43	
3.2	**General infrastructure**		**30.0**	**71**	◇
3.2.1	Electricity output, GWh/mn pop.		4,440.0	51	
3.2.2	Logistics performance*		40.9	60	◇
3.2.3	Gross capital formation, % GDP		24.4	59	
3.3	**Ecological sustainability**		**24.5**	**51**	
3.3.1	GDP/unit of energy use		12.6	47	
3.3.2	Low-carbon energy use, %		28.1	42	
3.3.3	ISO 14001 environment/bn PPP$ GDP		1.7	58	
	Market sophistication		**38.6**	**44**	
4.1	**Credit**		**35.9**	**40**	
4.1.1	Finance for startups and scaleups†		30.8	66	○◇
4.1.2	Domestic credit to private sector, % GDP		112.8	18	●
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**17.6**	**44**	
4.2.1	Market capitalization, % GDP		107.3	17	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.1	48	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	52	
4.2.4	VC received, value, % GDP		0.0	45	
4.3	**Trade, diversification and market scale**		**62.3**	**40**	
4.3.1	Applied tariff rate, weighted avg., %		0.3	5	●
4.3.2	Domestic industry diversification	⏲	77.9	68	
4.3.3	Domestic market scale, bn PPP$		597.5	43	

			Score/Value	Rank	
	Business sophistication		**30.5**	**51**	
5.1	**Knowledge workers**		**34.7**	**59**	
5.1.1	Knowledge-intensive employment, %		33.5	43	
5.1.2	Firms offering formal training, %		n/a	n/a	
5.1.3	GERD performed by business, % GDP	⏲	0.1	59	◇
5.1.4	GERD financed by business, %	⏲	34.7	55	
5.1.5	Females employed w/advanced degrees, %		13.2	60	◇
5.2	**Innovation linkages**		**20.1**	**85**	◇
5.2.1	Public research–industry co-publications, %		0.9	95	○◇
5.2.2	University–industry R&D collaboration†		37.9	80	◇
5.2.3	State of cluster development†		42.6	76	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	66	
5.2.5	Patent families/bn PPP$ GDP		0.2	44	
5.3	**Knowledge absorption**		**36.8**	**38**	
5.3.1	Intellectual property payments, % total trade		1.6	18	●
5.3.2	High-tech imports, % total trade		8.0	70	
5.3.3	ICT services imports, % total trade		2.4	21	●
5.3.4	FDI net inflows, % GDP		5.5	19	●
5.3.5	Research talent, % in businesses	⏲	26.6	50	
	Knowledge and technology outputs		**21.2**	**65**	◇
6.1	**Knowledge creation**		**16.7**	**63**	
6.1.1	Patents by origin/bn PPP$ GDP		0.6	69	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.3	38	
6.1.3	Utility models by origin/bn PPP$ GDP		0.2	43	
6.1.4	Scientific and technical articles/bn PPP$ GDP		16.9	41	
6.1.5	Citable documents H-index		24.8	38	
6.2	**Knowledge impact**		**35.1**	**40**	
6.2.1	Labor productivity growth, %		1.0	55	
6.2.2	Unicorn valuation, % GDP		0.7	35	
6.2.3	Software spending, % GDP		0.5	23	●
6.2.4	High-tech manufacturing, %	⏲	21.5	56	
6.3	**Knowledge diffusion**		**11.7**	**88**	◇
6.3.1	Intellectual property receipts, % total trade		0.1	69	
6.3.2	Production and export complexity		35.4	77	◇
6.3.3	High-tech exports, % total trade		1.1	73	
6.3.4	ICT services exports, % total trade		0.5	103	○
6.3.5	ISO 9001 quality/bn PPP$ GDP		4.8	63	
	Creative outputs		**27.5**	**59**	
7.1	**Intangible assets**		**36.5**	**43**	
7.1.1	Intangible asset intensity, top 15, %		43.5	55	○
7.1.2	Trademarks by origin/bn PPP$ GDP		75.3	17	●◆
7.1.3	Global brand value, top 5,000, % GDP		3.4	40	
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.1	111	○
7.2	**Creative goods and services**		**10.0**	**74**	◇
7.2.1	Cultural and creative services exports, % total trade		0.2	78	○
7.2.2	National feature films/mn pop. 15–69		3.6	38	
7.2.3	Entertainment and media market/th pop. 15–69		11.8	32	◇
7.2.4	Creative goods exports, % total trade		0.1	87	
7.3	**Online creativity**		**27.1**	**58**	◇
7.3.1	Top-level domains (TLDs)/th pop. 15–69		7.6	47	
7.3.2	GitHub commits/mn pop. 15–69		9.3	58	◇
7.3.3	Mobile app creation/bn PPP$ GDP		64.5	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

China

GII 2024 rank

11

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
7	23	Upper middle	SEAO	1,422.6	32,897.9	23,309

			Score/ Value	Rank	
	Institutions		**57.6**	**44**	◆
1.1	**Institutional environment**		**61.8**	**49**	◆
1.1.1	Operational stability for businesses*		66.7	51	
1.1.2	Government effectiveness*		56.9	46	◆
1.2	**Regulatory environment**		**36.7**	**78**	○
1.2.1	Regulatory quality*		30.8	94	○
1.2.2	Rule of law*		42.6	62	
1.3	**Business environment**		**74.2**	**14**	◆
1.3.1	Policy stability for doing business†	⏲	74.3	18	◆
1.3.2	Entrepreneurship policies and culture†		74.0	11	◆
	Human capital and research		**50.3**	**22**	◆
2.1	**Education**		**69.2**	**[5]**	
2.1.1	Expenditure on education, % GDP		3.3	95	○
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	⏲	579.0	1	● ◆
2.1.5	Pupil–teacher ratio, secondary		13.3	63	
2.2	**Tertiary education**		**23.6**	**87**	○
2.2.1	Tertiary enrolment, % gross		72.0	36	
2.2.2	Graduates in science and engineering, %		n/a	n/a	
2.2.3	Tertiary inbound mobility, %		0.4	103	○ ◇
2.3	**Research and development (R&D)**		**58.1**	**17**	◆
2.3.1	Researchers, FTE/mn pop.	⏲	1,702.9	43	
2.3.2	Gross expenditure on R&D, % GDP	⏲	2.4	14	◆
2.3.3	Global corporate R&D investors, top 3, mn USD$		91.0	2	● ◆
2.3.4	QS university ranking, top 3*		84.2	5	◆
	Infrastructure		**62.4**	**5**	◆
3.1	**Information and communication technologies (ICTs)**		**87.0**	**19**	◆
3.1.1	ICT access*		89.6	66	
3.1.2	ICT use*		84.6	33	◆
3.1.3	Government's online service*		87.6	15	◆
3.1.4	E-participation*		86.0	13	◆
3.2	**General infrastructure**		**62.1**	**7**	◆
3.2.1	Electricity output, GWh/mn pop.		6,282.6	32	◆
3.2.2	Logistics performance*		72.7	18	◆
3.2.3	Gross capital formation, % GDP		43.1	2	● ◆
3.3	**Ecological sustainability**		**38.0**	**23**	◆
3.3.1	GDP/unit of energy use		6.9	101	○ ◇
3.3.2	Low-carbon energy use, %		18.3	63	
3.3.3	ISO 14001 environment/bn PPP$ GDP		9.9	4	● ◆
	Market sophistication		**55.8**	**16**	◆
4.1	**Credit**		**48.9**	**25**	◆
4.1.1	Finance for startups and scaleups†		69.3	15	◆
4.1.2	Domestic credit to private sector, % GDP		185.4	4	● ◆
4.1.3	Loans from microfinance institutions, % GDP		0.8	36	○
4.2	**Investment**		**25.9**	**32**	◆
4.2.1	Market capitalization, % GDP		76.2	23	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.1	43	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.1	36	◆
4.2.4	VC received, value, % GDP		0.0	21	◆
4.3	**Trade, diversification and market scale**		**92.6**	**4**	● ◆
4.3.1	Applied tariff rate, weighted avg., %		2.5	73	○
4.3.2	Domestic industry diversification	⏲	97.8	5	◆
4.3.3	Domestic market scale, bn PPP$		32,897.9	1	● ◆

			Score/ Value	Rank	
	Business sophistication		**58.0**	**11**	◆
5.1	**Knowledge workers**		**70.9**	**[8]**	
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	⏲	1.9	13	◆
5.1.4	GERD financed by business, %		78.0	3	● ◆
5.1.5	Females employed w/advanced degrees, %		n/a	n/a	
5.2	**Innovation linkages**		**58.4**	**13**	◆
5.2.1	Public research–industry co-publications, %		7.1	4	● ◆
5.2.2	University–industry R&D collaboration†	⏲	83.8	8	◆
5.2.3	State of cluster development†	⏲	100.0	1	● ◆
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	75	○
5.2.5	Patent families/bn PPP$ GDP		1.8	23	◆
5.3	**Knowledge absorption**		**44.6**	**21**	◆
5.3.1	Intellectual property payments, % total trade		1.4	26	
5.3.2	High-tech imports, % total trade		19.9	8	◆
5.3.3	ICT services imports, % total trade		1.1	72	
5.3.4	FDI net inflows, % GDP		1.6	84	○
5.3.5	Research talent, % in businesses	⏲	57.9	18	◆
	Knowledge and technology outputs		**61.7**	**3**	● ◆
6.1	**Knowledge creation**		**69.9**	**3**	● ◆
6.1.1	Patents by origin/bn PPP$ GDP		48.5	2	● ◆
6.1.2	PCT patents by origin/bn PPP$ GDP		2.1	14	◆
6.1.3	Utility models by origin/bn PPP$ GDP		97.4	1	● ◆
6.1.4	Scientific and technical articles/bn PPP$ GDP		20.2	32	◆
6.1.5	Citable documents H-index		68.4	8	◆
6.2	**Knowledge impact**		**63.1**	**4**	● ◆
6.2.1	Labor productivity growth, %		5.4	2	● ◆
6.2.2	Unicorn valuation, % GDP		3.5	12	◆
6.2.3	Software spending, % GDP		0.4	28	◆
6.2.4	High-tech manufacturing, %	⏲	48.4	11	◆
6.3	**Knowledge diffusion**		**52.0**	**14**	◆
6.3.1	Intellectual property receipts, % total trade		0.4	32	◆
6.3.2	Production and export complexity		76.4	18	◆
6.3.3	High-tech exports, % total trade		26.3	1	● ◆
6.3.4	ICT services exports, % total trade		2.4	52	
6.3.5	ISO 9001 quality/bn PPP$ GDP		18.6	12	◆
	Creative outputs		**50.0**	**14**	◆
7.1	**Intangible assets**		**82.0**	**1**	● ◆
7.1.1	Intangible asset intensity, top 15, %		69.8	17	
7.1.2	Trademarks by origin/bn PPP$ GDP		241.7	1	● ◆
7.1.3	Global brand value, top 5,000, % GDP		9.5	19	◆
7.1.4	Industrial designs by origin/bn PPP$ GDP		25.7	1	● ◆
7.2	**Creative goods and services**		**32.4**	**27**	◆
7.2.1	Cultural and creative services exports, % total trade		0.6	49	
7.2.2	National feature films/mn pop. 15–69		0.5	79	○ ◇
7.2.3	Entertainment and media market/th pop. 15–69		10.7	35	○ ◆
7.2.4	Creative goods exports, % total trade		10.9	1	● ◆
7.3	**Online creativity**		**3.6**	**[126]**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69	⏲	3.6	63	
7.3.2	GitHub commits/mn pop. 15–69		n/a	n/a	
7.3.3	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Colombia

GII 2024 rank

61

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
62	65	Upper middle	LCN	52.3	1,016.1	19,482

			Score/ Value	Rank	
	Institutions		**42.5**	**80**	
1.1	**Institutional environment**		**50.5**	**76**	
1.1.1	Operational stability for businesses*		56.7	81	
1.1.2	Government effectiveness*		44.4	67	
1.2	**Regulatory environment**		**38.6**	**76**	
1.2.1	Regulatory quality*		45.5	66	
1.2.2	Rule of law*		31.6	87	
1.3	**Business environment**		**38.3**	**83**	
1.3.1	Policy stability for doing business†		41.2	85	
1.3.2	Entrepreneurship policies and culture†		35.4	48	

			Score/ Value	Rank	
	Human capital and research		**25.6**	**87**	
2.1	**Education**		**37.0**	**111**	○◇
2.1.1	Expenditure on education, % GDP	◷	3.9	76	
2.1.2	Government funding/pupil, secondary, % GDP/cap	◷	15.5	68	
2.1.3	School life expectancy, years		14.3	64	
2.1.4	PISA scales in reading, maths and science		400.8	63	
2.1.5	Pupil–teacher ratio, secondary		25.4	109	○◇
2.2	**Tertiary education**		**28.7**	**77**	
2.2.1	Tertiary enrolment, % gross		59.3	57	
2.2.2	Graduates in science and engineering, %		23.9	53	
2.2.3	Tertiary inbound mobility, %		0.2	109	○◇
2.3	**Research and development (R&D)**		**11.0**	**59**	
2.3.1	Researchers, FTE/mn pop.	◷	89.9	94	○◇
2.3.2	Gross expenditure on R&D, % GDP	◷	0.2	86	○
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		40.2	32	●◆

			Score/ Value	Rank	
	Infrastructure		**42.0**	**64**	
3.1	**Information and communication technologies (ICTs)**		**70.5**	**73**	
3.1.1	ICT access*		73.1	90	
3.1.2	ICT use*		66.7	91	◇
3.1.3	Government's online service*		71.5	59	
3.1.4	E-participation*		70.9	37	
3.2	**General infrastructure**		**19.6**	**100**	
3.2.1	Electricity output, GWh/mn pop.		1,672.0	89	
3.2.2	Logistics performance*		36.4	65	
3.2.3	Gross capital formation, % GDP		19.1	104	○
3.3	**Ecological sustainability**		**35.9**	**27**	●
3.3.1	GDP/unit of energy use		17.9	16	●◆
3.3.2	Low-carbon energy use, %		29.3	35	
3.3.3	ISO 14001 environment/bn PPP$ GDP		4.0	26	●

			Score/ Value	Rank	
	Market sophistication		**32.1**	**70**	
4.1	**Credit**		**20.0**	**86**	
4.1.1	Finance for startups and scaleups†		26.1	72	○
4.1.2	Domestic credit to private sector, % GDP		44.2	76	
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**13.2**	**51**	
4.2.1	Market capitalization, % GDP		29.2	48	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.0	80	○
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	56	
4.2.4	VC received, value, % GDP		0.0	29	
4.3	**Trade, diversification and market scale**		**63.1**	**36**	
4.3.1	Applied tariff rate, weighted avg., %		2.0	66	
4.3.2	Domestic industry diversification		84.9	56	
4.3.3	Domestic market scale, bn PPP$		1,016.1	31	●

			Score/ Value	Rank	
	Business sophistication		**33.6**	**42**	
5.1	**Knowledge workers**		**42.3**	**45**	
5.1.1	Knowledge-intensive employment, %		24.4	61	
5.1.2	Firms offering formal training, %		42.1	34	
5.1.3	GERD performed by business, % GDP	◷	0.1	64	
5.1.4	GERD financed by business, %	◷	53.4	23	●◆
5.1.5	Females employed w/advanced degrees, %		16.5	43	
5.2	**Innovation linkages**		**21.6**	**77**	
5.2.1	Public research–industry co-publications, %		1.6	59	
5.2.2	University–industry R&D collaboration†		48.7	56	
5.2.3	State of cluster development†		38.0	86	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	97	○
5.2.5	Patent families/bn PPP$ GDP		0.1	61	
5.3	**Knowledge absorption**		**37.0**	**35**	◆
5.3.1	Intellectual property payments, % total trade		2.2	11	●◆
5.3.2	High-tech imports, % total trade		16.2	15	●◆
5.3.3	ICT services imports, % total trade		2.0	32	●◆
5.3.4	FDI net inflows, % GDP		3.6	40	
5.3.5	Research talent, % in businesses	◷	2.5	78	○◇

			Score/ Value	Rank	
	Knowledge and technology outputs		**21.7**	**61**	
6.1	**Knowledge creation**		**11.6**	**75**	
6.1.1	Patents by origin/bn PPP$ GDP		1.1	54	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.1	60	
6.1.3	Utility models by origin/bn PPP$ GDP		0.2	41	
6.1.4	Scientific and technical articles/bn PPP$ GDP		6.8	92	
6.1.5	Citable documents H-index		19.0	46	
6.2	**Knowledge impact**		**34.4**	**42**	
6.2.1	Labor productivity growth, %		1.6	39	
6.2.2	Unicorn valuation, % GDP		2.0	18	●◆
6.2.3	Software spending, % GDP		0.2	81	
6.2.4	High-tech manufacturing, %		21.1	58	
6.3	**Knowledge diffusion**		**19.2**	**60**	
6.3.1	Intellectual property receipts, % total trade		0.2	45	
6.3.2	Production and export complexity		39.7	65	
6.3.3	High-tech exports, % total trade		1.2	72	
6.3.4	ICT services exports, % total trade		1.4	68	
6.3.5	ISO 9001 quality/bn PPP$ GDP		11.8	20	●

			Score/ Value	Rank	
	Creative outputs		**24.7**	**66**	
7.1	**Intangible assets**		**31.6**	**58**	
7.1.1	Intangible asset intensity, top 15, %		40.8	58	
7.1.2	Trademarks by origin/bn PPP$ GDP		51.9	33	
7.1.3	Global brand value, top 5,000, % GDP		2.4	44	
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.5	77	
7.2	**Creative goods and services**		**7.4**	**84**	
7.2.1	Cultural and creative services exports, % total trade		0.4	58	
7.2.2	National feature films/mn pop. 15–69		1.5	61	
7.2.3	Entertainment and media market/th pop. 15–69		5.7	45	
7.2.4	Creative goods exports, % total trade		0.2	80	
7.3	**Online creativity**		**28.2**	**57**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		12.5	40	
7.3.2	GitHub commits/mn pop. 15–69		8.9	59	
7.3.3	Mobile app creation/bn PPP$ GDP		63.3	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Costa Rica **70**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
76	61	Upper middle	LCN	5.1	141.5	26,809

			Score/ Value	Rank	
	Institutions		**56.4**	**47**	
1.1	**Institutional environment**		**55.4**	**59**	
1.1.1	Operational stability for businesses*		65.3	55	
1.1.2	Government effectiveness*		45.4	64	
1.2	**Regulatory environment**		**56.5**	**45**	◆
1.2.1	Regulatory quality*		56.7	45	◆
1.2.2	Rule of law*		56.4	44	◆
1.3	**Business environment**		**57.2**	**[39]**	
1.3.1	Policy stability for doing business†		57.2	45	
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**26.4**	**82**	
2.1	**Education**		**54.7**	**55**	
2.1.1	Expenditure on education, % GDP	◷	6.3	11	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap		21.9	39	
2.1.3	School life expectancy, years	◷	15.8	41	
2.1.4	PISA scales in reading, maths and science		403.6	59	
2.1.5	Pupil–teacher ratio, secondary		13.5	65	
2.2	**Tertiary education**		**19.7**	**97**	
2.2.1	Tertiary enrolment, % gross	◷	54.7	66	
2.2.2	Graduates in science and engineering, %		15.7	100	○
2.2.3	Tertiary inbound mobility, %	◷	1.2	89	
2.3	**Research and development (R&D)**		**4.8**	**77**	
2.3.1	Researchers, FTE/mn pop.	◷	397.8	79	
2.3.2	Gross expenditure on R&D, % GDP	◷	0.3	79	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○ ◇
2.3.4	QS university ranking, top 3*		11.0	63	
	Infrastructure		**43.7**	**59**	
3.1	**Information and communication technologies (ICTs)**		**72.4**	**66**	
3.1.1	ICT access*		91.2	61	
3.1.2	ICT use*		79.0	61	
3.1.3	Government's online service*		64.8	70	
3.1.4	E-participation*		54.7	66	
3.2	**General infrastructure**		**20.8**	**94**	
3.2.1	Electricity output, GWh/mn pop.		2,444.8	74	
3.2.2	Logistics performance*		36.4	65	
3.2.3	Gross capital formation, % GDP		19.4	103	○
3.3	**Ecological sustainability**		**37.8**	**25**	◆
3.3.1	GDP/unit of energy use		20.1	9	● ◆
3.3.2	Low-carbon energy use, %		49.1	14	● ◆
3.3.3	ISO 14001 environment/bn PPP$ GDP		1.2	67	
	Market sophistication		**24.9**	**87**	
4.1	**Credit**		**17.3**	**[92]**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		52.7	61	
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**2.7**	**102**	○
4.2.1	Market capitalization, % GDP		3.1	82	○
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.1	63	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	87	
4.2.4	VC received, value, % GDP		0.0	89	○
4.3	**Trade, diversification and market scale**		**54.6**	**72**	
4.3.1	Applied tariff rate, weighted avg., %		0.9	12	●
4.3.2	Domestic industry diversification	◷	68.4	80	◇
4.3.3	Domestic market scale, bn PPP$		141.5	82	

			Score/ Value	Rank	
	Business sophistication		**30.7**	**50**	
5.1	**Knowledge workers**		**31.1**	**70**	
5.1.1	Knowledge-intensive employment, %		21.9	69	
5.1.2	Firms offering formal training, %		36.8	45	
5.1.3	GERD performed by business, % GDP	◷	0.1	62	
5.1.4	GERD financed by business, %		29.3	62	
5.1.5	Females employed w/advanced degrees, %		11.9	64	
5.2	**Innovation linkages**		**22.9**	**66**	
5.2.1	Public research–industry co-publications, %		1.3	76	
5.2.2	University–industry R&D collaboration†		43.5	68	
5.2.3	State of cluster development†		55.5	48	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	112	○
5.2.5	Patent families/bn PPP$ GDP		0.0	76	
5.3	**Knowledge absorption**		**38.2**	**32**	◆
5.3.1	Intellectual property payments, % total trade		2.9	8	● ◆
5.3.2	High-tech imports, % total trade		9.3	50	
5.3.3	ICT services imports, % total trade		1.5	48	
5.3.4	FDI net inflows, % GDP		4.7	24	●
5.3.5	Research talent, % in businesses	◷	21.4	53	
	Knowledge and technology outputs		**22.6**	**59**	
6.1	**Knowledge creation**		**4.9**	**112**	○
6.1.1	Patents by origin/bn PPP$ GDP		0.1	114	○
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	80	
6.1.3	Utility models by origin/bn PPP$ GDP		0.0	64	
6.1.4	Scientific and technical articles/bn PPP$ GDP		5.8	98	
6.1.5	Citable documents H-index		9.9	76	
6.2	**Knowledge impact**		**32.8**	**45**	
6.2.1	Labor productivity growth, %		3.1	10	●
6.2.2	Unicorn valuation, % GDP		0.0	49	○ ◇
6.2.3	Software spending, % GDP		0.3	46	
6.2.4	High-tech manufacturing, %	◷	30.3	39	
6.3	**Knowledge diffusion**		**30.1**	**41**	
6.3.1	Intellectual property receipts, % total trade		0.0	82	
6.3.2	Production and export complexity		51.9	47	
6.3.3	High-tech exports, % total trade		7.9	24	●
6.3.4	ICT services exports, % total trade		7.0	10	● ◆
6.3.5	ISO 9001 quality/bn PPP$ GDP		3.3	75	
	Creative outputs		**17.9**	**86**	
7.1	**Intangible assets**		**16.1**	**88**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		64.7	22	●
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○ ◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.0	122	○
7.2	**Creative goods and services**		**13.5**	**66**	
7.2.1	Cultural and creative services exports, % total trade		0.8	37	
7.2.2	National feature films/mn pop. 15–69		2.4	53	
7.2.3	Entertainment and media market/th pop. 15–69		n/a	n/a	
7.2.4	Creative goods exports, % total trade		0.3	73	
7.3	**Online creativity**		**25.8**	**64**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		5.2	54	
7.3.2	GitHub commits/mn pop. 15–69		13.1	53	
7.3.3	Mobile app creation/bn PPP$ GDP		59.2	87	

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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Croatia

43

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
40	42	High	EUR	3.9	164.7	42,873

			Score/ Value	Rank	
Institutions			**46.1**	**68**	◇
1.1	**Institutional environment**		**68.6**	**38**	
1.1.1	Operational stability for businesses*		78.0	29	
1.1.2	Government effectiveness*		59.2	43	
1.2	**Regulatory environment**		**54.7**	**47**	◇
1.2.1	Regulatory quality*		55.0	48	◇
1.2.2	Rule of law*		54.4	49	◇
1.3	**Business environment**		**15.1**	**126**	○◇
1.3.1	Policy stability for doing business†	⏲	24.9	113	○◇
1.3.2	Entrepreneurship policies and culture†		5.3	81	○◇
Human capital and research			**39.8**	**41**	
2.1	**Education**		**67.7**	**11**	●◆
2.1.1	Expenditure on education, % GDP	⏲	5.2	38	
2.1.2	Government funding/pupil, secondary, % GDP/cap		n/a	n/a	
2.1.3	School life expectancy, years	⏲	15.6	43	
2.1.4	PISA scales in reading, maths and science		473.8	34	
2.1.5	Pupil–teacher ratio, secondary	⏲	6.1	1	●◆
2.2	**Tertiary education**		**38.0**	**46**	
2.2.1	Tertiary enrolment, % gross	⏲	72.3	35	
2.2.2	Graduates in science and engineering, %		27.9	31	
2.2.3	Tertiary inbound mobility, %	⏲	2.7	71	
2.3	**Research and development (R&D)**		**13.7**	**52**	
2.3.1	Researchers, FTE/mn pop.		2,566.6	36	
2.3.2	Gross expenditure on R&D, % GDP		1.4	30	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		5.3	72	◇
Infrastructure			**54.1**	**23**	●
3.1	**Information and communication technologies (ICTs)**		**83.6**	**31**	
3.1.1	ICT access*		92.9	55	
3.1.2	ICT use*		89.1	22	●
3.1.3	Government's online service*		79.1	36	
3.1.4	E-participation*		73.3	29	
3.2	**General infrastructure**		**34.1**	**53**	
3.2.1	Electricity output, GWh/mn pop.		3,835.0	58	
3.2.2	Logistics performance*		54.5	42	
3.2.3	Gross capital formation, % GDP		24.7	56	
3.3	**Ecological sustainability**		**44.6**	**9**	●◆
3.3.1	GDP/unit of energy use		14.3	34	
3.3.2	Low-carbon energy use, %		25.8	49	
3.3.3	ISO 14001 environment/bn PPP$ GDP		8.9	7	●◆
Market sophistication			**36.5**	**54**	
4.1	**Credit**		**31.8**	**50**	
4.1.1	Finance for startups and scaleups†		47.2	48	
4.1.2	Domestic credit to private sector, % GDP		50.3	69	
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**14.5**	**48**	
4.2.1	Market capitalization, % GDP		32.0	45	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.0	81	○
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	72	○◇
4.2.4	VC received, value, % GDP		0.0	23	
4.3	**Trade, diversification and market scale**		**63.3**	**35**	
4.3.1	Applied tariff rate, weighted avg., %		1.1	21	
4.3.2	Domestic industry diversification		95.8	12	●
4.3.3	Domestic market scale, bn PPP$		164.7	78	

			Score/ Value	Rank	
Business sophistication			**29.8**	**54**	
5.1	**Knowledge workers**		**42.6**	**43**	
5.1.1	Knowledge-intensive employment, %		35.2	42	
5.1.2	Firms offering formal training, %		24.4	68	○
5.1.3	GERD performed by business, % GDP		0.8	32	
5.1.4	GERD financed by business, %		38.4	47	
5.1.5	Females employed w/advanced degrees, %		19.7	34	
5.2	**Innovation linkages**		**15.0**	**107**	○◇
5.2.1	Public research–industry co-publications, %		3.5	23	●
5.2.2	University–industry R&D collaboration†	⏲	21.2	116	○◇
5.2.3	State of cluster development†	⏲	10.3	126	○◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	81	○
5.2.5	Patent families/bn PPP$ GDP		0.1	58	
5.3	**Knowledge absorption**		**31.6**	**53**	
5.3.1	Intellectual property payments, % total trade		1.1	34	
5.3.2	High-tech imports, % total trade		8.1	69	
5.3.3	ICT services imports, % total trade		1.6	46	
5.3.4	FDI net inflows, % GDP		4.7	25	●
5.3.5	Research talent, % in businesses		31.3	43	
Knowledge and technology outputs			**31.3**	**32**	
6.1	**Knowledge creation**		**20.8**	**54**	
6.1.1	Patents by origin/bn PPP$ GDP		1.0	61	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.3	40	
6.1.3	Utility models by origin/bn PPP$ GDP		0.2	44	
6.1.4	Scientific and technical articles/bn PPP$ GDP		27.9	21	●
6.1.5	Citable documents H-index		17.7	49	
6.2	**Knowledge impact**		**39.7**	**25**	●
6.2.1	Labor productivity growth, %		2.0	25	◆
6.2.2	Unicorn valuation, % GDP		3.5	11	●◆
6.2.3	Software spending, % GDP		0.0	114	○◇
6.2.4	High-tech manufacturing, %		20.6	60	
6.3	**Knowledge diffusion**		**33.5**	**34**	
6.3.1	Intellectual property receipts, % total trade		0.3	39	
6.3.2	Production and export complexity		62.5	31	
6.3.3	High-tech exports, % total trade		4.2	43	
6.3.4	ICT services exports, % total trade		3.4	32	
6.3.5	ISO 9001 quality/bn PPP$ GDP		18.7	11	●◆
Creative outputs			**31.5**	**50**	
7.1	**Intangible assets**		**32.1**	**55**	
7.1.1	Intangible asset intensity, top 15, %		50.5	47	
7.1.2	Trademarks by origin/bn PPP$ GDP		32.1	62	
7.1.3	Global brand value, top 5,000, % GDP		0.2	72	◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		2.8	31	
7.2	**Creative goods and services**		**24.1**	**49**	
7.2.1	Cultural and creative services exports, % total trade		1.5	16	●
7.2.2	National feature films/mn pop. 15–69		3.3	42	
7.2.3	Entertainment and media market/th pop. 15–69		n/a	n/a	
7.2.4	Creative goods exports, % total trade		0.7	54	
7.3	**Online creativity**		**37.6**	**36**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		13.1	38	
7.3.2	GitHub commits/mn pop. 15–69		30.0	37	
7.3.3	Mobile app creation/bn PPP$ GDP		69.7	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Cyprus

GII 2024 rank **27**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
17	35	High	NAWA	1.3	49.7	53,931

			Score/Value	Rank	
	Institutions		**56.4**	**46**	
1.1	**Institutional environment**		**68.9**	**37**	
1.1.1	Operational stability for businesses*		74.7	35	
1.1.2	Government effectiveness*		63.1	37	
1.2	**Regulatory environment**		**61.2**	**40**	
1.2.1	Regulatory quality*		62.2	37	
1.2.2	Rule of law*		60.2	39	
1.3	**Business environment**		**39.2**	**81**	
1.3.1	Policy stability for doing business†		55.3	50	
1.3.2	Entrepreneurship policies and culture†		23.1	63	◇
	Human capital and research		**37.9**	**46**	
2.1	**Education**		**63.8**	**19**	
2.1.1	Expenditure on education, % GDP	⏲	5.5	28	
2.1.2	Government funding/pupil, secondary, % GDP/cap		38.5	2	● ◆
2.1.3	School life expectancy, years	⏲	16.2	34	
2.1.4	PISA scales in reading, maths and science		403.4	60	◇
2.1.5	Pupil–teacher ratio, secondary	⏲	7.4	4	● ◆
2.2	**Tertiary education**		**42.3**	**30**	
2.2.1	Tertiary enrolment, % gross	⏲	96.5	10	
2.2.2	Graduates in science and engineering, %		11.2	108	○ ◇
2.2.3	Tertiary inbound mobility, %	⏲	21.8	7	● ◆
2.3	**Research and development (R&D)**		**7.6**	**65**	◇
2.3.1	Researchers, FTE/mn pop.		1,768.5	42	
2.3.2	Gross expenditure on R&D, % GDP		0.8	46	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○ ◇
2.3.4	QS university ranking, top 3*		0.0	75	○ ◇
	Infrastructure		**48.4**	**45**	
3.1	**Information and communication technologies (ICTs)**		**82.2**	**39**	
3.1.1	ICT access*		99.5	21	
3.1.2	ICT use*		79.4	59	
3.1.3	Government's online service*		75.6	46	
3.1.4	E-participation*		74.4	25	
3.2	**General infrastructure**		**30.3**	**69**	◇
3.2.1	Electricity output, GWh/mn pop.		5,823.2	38	
3.2.2	Logistics performance*		50.0	50	◇
3.2.3	Gross capital formation, % GDP		20.1	101	○ ◇
3.3	**Ecological sustainability**		**32.7**	**32**	
3.3.1	GDP/unit of energy use		16.4	22	
3.3.2	Low-carbon energy use, %		7.6	92	
3.3.3	ISO 14001 environment/bn PPP$ GDP		6.5	14	◆
	Market sophistication		**41.4**	**41**	
4.1	**Credit**		**28.0**	**62**	
4.1.1	Finance for startups and scaleups†		29.7	68	○ ◇
4.1.2	Domestic credit to private sector, % GDP		75.6	37	
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**40.6**	**16**	
4.2.1	Market capitalization, % GDP		20.0	62	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		1.6	5	● ◆
4.2.3	VC recipients, deals/bn PPP$ GDP		0.2	12	
4.2.4	VC received, value, % GDP		0.0	32	
4.3	**Trade, diversification and market scale**		**55.7**	**70**	
4.3.1	Applied tariff rate, weighted avg., %		1.1	21	
4.3.2	Domestic industry diversification		75.1	73	
4.3.3	Domestic market scale, bn PPP$		49.7	114	○

			Score/Value	Rank	
	Business sophistication		**43.3**	**29**	
5.1	**Knowledge workers**		**50.9**	**33**	
5.1.1	Knowledge-intensive employment, %		38.4	35	
5.1.2	Firms offering formal training, %	⏲	39.7	37	
5.1.3	GERD performed by business, % GDP		0.3	47	
5.1.4	GERD financed by business, %		35.7	54	
5.1.5	Females employed w/advanced degrees, %		28.6	7	● ◆
5.2	**Innovation linkages**		**42.3**	**28**	
5.2.1	Public research–industry co-publications, %		4.0	18	
5.2.2	University–industry R&D collaboration†		43.4	70	
5.2.3	State of cluster development†		50.4	58	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.1	12	
5.2.5	Patent families/bn PPP$ GDP		1.2	28	
5.3	**Knowledge absorption**		**36.8**	**37**	
5.3.1	Intellectual property payments, % total trade		1.4	25	
5.3.2	High-tech imports, % total trade		3.4	127	○ ◇
5.3.3	ICT services imports, % total trade		18.3	1	● ◆
5.3.4	FDI net inflows, % GDP		−59.4	131	○ ◇
5.3.5	Research talent, % in businesses		34.4	38	
	Knowledge and technology outputs		**38.6**	**23**	
6.1	**Knowledge creation**		**36.0**	**26**	
6.1.1	Patents by origin/bn PPP$ GDP		1.0	59	
6.1.2	PCT patents by origin/bn PPP$ GDP		1.3	21	
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		39.6	4	● ◆
6.1.5	Citable documents H-index		13.6	61	
6.2	**Knowledge impact**		**22.2**	**82**	◇
6.2.1	Labor productivity growth, %		1.8	31	◆
6.2.2	Unicorn valuation, % GDP		0.0	49	○ ◇
6.2.3	Software spending, % GDP		0.1	86	◇
6.2.4	High-tech manufacturing, %		14.8	75	◇
6.3	**Knowledge diffusion**		**57.8**	**4**	● ◆
6.3.1	Intellectual property receipts, % total trade		2.6	11	◆
6.3.2	Production and export complexity		52.7	46	
6.3.3	High-tech exports, % total trade		0.9	81	
6.3.4	ICT services exports, % total trade		28.0	1	● ◆
6.3.5	ISO 9001 quality/bn PPP$ GDP		18.7	10	◆
	Creative outputs		**50.6**	**13**	
7.1	**Intangible assets**		**53.1**	**16**	
7.1.1	Intangible asset intensity, top 15, %		47.6	51	
7.1.2	Trademarks by origin/bn PPP$ GDP		84.4	11	◆
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○ ◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		7.8	9	◆
7.2	**Creative goods and services**		**38.0**	**15**	
7.2.1	Cultural and creative services exports, % total trade		5.5	1	● ◆
7.2.2	National feature films/mn pop. 15–69		2.0	56	
7.2.3	Entertainment and media market/th pop. 15–69		n/a	n/a	
7.2.4	Creative goods exports, % total trade		0.1	92	
7.3	**Online creativity**		**58.4**	**19**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69	⏲	30.1	23	
7.3.2	GitHub commits/mn pop. 15–69		45.2	25	
7.3.3	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Czech Republic

GII 2024 rank **30**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
24	32	High	EUR	10.8	539.3	49,025

			Score/Value	Rank	
Institutions			**67.5**	**30**	
1.1	**Institutional environment**		**75.6**	**27**	
1.1.1	Operational stability for businesses*		78.7	25	
1.1.2	Government effectiveness*		72.6	28	
1.2	**Regulatory environment**		**76.8**	**22**	
1.2.1	Regulatory quality*		78.2	19	
1.2.2	Rule of law*		75.4	25	
1.3	**Business environment**		**49.9**	**[59]**	
1.3.1	Policy stability for doing business†		49.9	63	○
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
Human capital and research			**43.7**	**32**	
2.1	**Education**		**57.4**	**47**	
2.1.1	Expenditure on education, % GDP	⏲	5.1	41	
2.1.2	Government funding/pupil, secondary, % GDP/cap		27.5	12	
2.1.3	School life expectancy, years	⏲	16.3	32	
2.1.4	PISA scales in reading, maths and science		491.1	15	
2.1.5	Pupil–teacher ratio, secondary		n/a	n/a	
2.2	**Tertiary education**		**45.9**	**22**	
2.2.1	Tertiary enrolment, % gross	⏲	69.1	45	
2.2.2	Graduates in science and engineering, %		25.5	42	
2.2.3	Tertiary inbound mobility, %	⏲	15.6	13	
2.3	**Research and development (R&D)**		**27.8**	**37**	
2.3.1	Researchers, FTE/mn pop.		4,697.5	26	
2.3.2	Gross expenditure on R&D, % GDP		2.0	19	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		31.3	41	
Infrastructure			**54.0**	**24**	
3.1	**Information and communication technologies (ICTs)**		**74.9**	**58**	
3.1.1	ICT access*		95.2	47	
3.1.2	ICT use*		81.6	46	
3.1.3	Government's online service*		63.5	72	○◇
3.1.4	E-participation*		59.3	57	
3.2	**General infrastructure**		**44.9**	**29**	
3.2.1	Electricity output, GWh/mn pop.		7,843.4	21	
3.2.2	Logistics performance*		54.5	42	
3.2.3	Gross capital formation, % GDP		30.3	25	◆
3.3	**Ecological sustainability**		**42.4**	**11**	**●◆**
3.3.1	GDP/unit of energy use		9.8	72	○
3.3.2	Low-carbon energy use, %		23.3	55	
3.3.3	ISO 14001 environment/bn PPP$ GDP		9.9	5	●◆
Market sophistication			**30.1**	**75**	○
4.1	**Credit**		**16.5**	**[94]**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		50.5	67	○
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**9.7**	**60**	○
4.2.1	Market capitalization, % GDP		11.3	73	○
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.1	39	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	53	○
4.2.4	VC received, value, % GDP		0.0	49	
4.3	**Trade, diversification and market scale**		**64.1**	**31**	
4.3.1	Applied tariff rate, weighted avg., %		1.1	21	
4.3.2	Domestic industry diversification		90.8	36	
4.3.3	Domestic market scale, bn PPP$		539.3	46	

			Score/Value	Rank	
Business sophistication			**42.5**	**30**	
5.1	**Knowledge workers**		**47.9**	**37**	
5.1.1	Knowledge-intensive employment, %		39.8	31	
5.1.2	Firms offering formal training, %	⏲	43.6	28	
5.1.3	GERD performed by business, % GDP		1.3	19	
5.1.4	GERD financed by business, %		37.2	52	○
5.1.5	Females employed w/advanced degrees, %		14.1	55	
5.2	**Innovation linkages**		**33.0**	**38**	
5.2.1	Public research–industry co-publications, %		2.3	37	
5.2.2	University–industry R&D collaboration†		72.0	22	
5.2.3	State of cluster development†		54.4	51	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	78	○
5.2.5	Patent families/bn PPP$ GDP		0.5	35	
5.3	**Knowledge absorption**		**46.6**	**18**	
5.3.1	Intellectual property payments, % total trade		0.8	51	
5.3.2	High-tech imports, % total trade		23.0	6	●◆
5.3.3	ICT services imports, % total trade		1.8	37	
5.3.4	FDI net inflows, % GDP		3.9	33	
5.3.5	Research talent, % in businesses		53.6	22	
Knowledge and technology outputs			**42.7**	**17**	
6.1	**Knowledge creation**		**35.4**	**27**	
6.1.1	Patents by origin/bn PPP$ GDP		1.4	40	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.3	37	
6.1.3	Utility models by origin/bn PPP$ GDP		2.0	6	●◆
6.1.4	Scientific and technical articles/bn PPP$ GDP		26.2	25	
6.1.5	Citable documents H-index		30.7	32	
6.2	**Knowledge impact**		**37.7**	**29**	
6.2.1	Labor productivity growth, %		0.4	77	○
6.2.2	Unicorn valuation, % GDP		0.3	43	
6.2.3	Software spending, % GDP		0.3	39	
6.2.4	High-tech manufacturing, %		56.4	8	●◆
6.3	**Knowledge diffusion**		**55.0**	**8**	**●◆**
6.3.1	Intellectual property receipts, % total trade		0.4	30	
6.3.2	Production and export complexity		87.1	6	●◆
6.3.3	High-tech exports, % total trade		22.0	7	●◆
6.3.4	ICT services exports, % total trade		3.2	39	
6.3.5	ISO 9001 quality/bn PPP$ GDP		23.2	4	●◆
Creative outputs			**38.3**	**33**	
7.1	**Intangible assets**		**20.9**	**78**	○◇
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		43.2	40	
7.1.3	Global brand value, top 5,000, % GDP		2.0	46	
7.1.4	Industrial designs by origin/bn PPP$ GDP		2.4	38	
7.2	**Creative goods and services**		**53.6**	**3**	**●◆**
7.2.1	Cultural and creative services exports, % total trade		0.8	38	
7.2.2	National feature films/mn pop. 15–69		11.0	4	●◆
7.2.3	Entertainment and media market/th pop. 15–69		24.7	26	
7.2.4	Creative goods exports, % total trade		9.8	1	●◆
7.3	**Online creativity**		**58.0**	**21**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		34.0	20	
7.3.2	GitHub commits/mn pop. 15–69		65.4	12	●
7.3.3	Mobile app creation/bn PPP$ GDP		74.6	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Côte d'Ivoire 112

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
107	111	Lower middle	SSA	31.2	202.6	6,960

			Score/ Value	Rank	
	Institutions		**45.8**	**69**	●
1.1	**Institutional environment**		**46.8**	**80**	
1.1.1	Operational stability for businesses*		58.7	74	
1.1.2	Government effectiveness*		35.0	92	
1.2	**Regulatory environment**		**34.0**	**87**	
1.2.1	Regulatory quality*		37.8	80	◆
1.2.2	Rule of law*		30.1	92	
1.3	**Business environment**		**56.6**	**[42]**	
1.3.1	Policy stability for doing business†		56.6	48	●
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**11.2**	**129**	○◇
2.1	**Education**		**28.3**	**126**	○
2.1.1	Expenditure on education, % GDP		3.5	90	
2.1.2	Government funding/pupil, secondary, % GDP/cap		11.8	83	
2.1.3	School life expectancy, years	⏲	10.1	105	
2.1.4	PISA scales in reading, maths and science		n/a	n/a	
2.1.5	Pupil–teacher ratio, secondary		26.4	111	◇
2.2	**Tertiary education**		**5.0**	**123**	○◇
2.2.1	Tertiary enrolment, % gross	⏲	9.8	117	◇
2.2.2	Graduates in science and engineering, %		n/a	n/a	
2.2.3	Tertiary inbound mobility, %	⏲	2.4	75	
2.3	**Research and development (R&D)**		**0.3**	**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 USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**29.2**	**98**	
3.1	**Information and communication technologies (ICTs)**		**53.1**	**97**	
3.1.1	ICT access*		68.5	94	
3.1.2	ICT use*		58.0	100	
3.1.3	Government's online service*		49.9	91	
3.1.4	E-participation*		36.0	94	
3.2	**General infrastructure**		**20.7**	**96**	
3.2.1	Electricity output, GWh/mn pop.		394.9	113	
3.2.2	Logistics performance*		n/a	n/a	
3.2.3	Gross capital formation, % GDP		26.8	36	●
3.3	**Ecological sustainability**		**13.7**	**99**	
3.3.1	GDP/unit of energy use		13.1	41	●
3.3.2	Low-carbon energy use, %		9.7	87	
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.3	110	
	Market sophistication		**11.8**	**126**	○◇
4.1	**Credit**		**9.0**	**114**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		21.1	114	
4.1.3	Loans from microfinance institutions, % GDP		1.2	27	●
4.2	**Investment**		**3.7**	**92**	
4.2.1	Market capitalization, % GDP	⏲	13.2	70	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.0	75	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	77	
4.2.4	VC received, value, % GDP		0.0	87	
4.3	**Trade, diversification and market scale**		**22.8**	**122**	◇
4.3.1	Applied tariff rate, weighted avg., %		7.4	115	
4.3.2	Domestic industry diversification		n/a	n/a	
4.3.3	Domestic market scale, bn PPP$		202.6	72	●

			Score/ Value	Rank	
	Business sophistication		**20.6**	**98**	
5.1	**Knowledge workers**		**14.6**	**[114]**	
5.1.1	Knowledge-intensive employment, %	⏲	7.1	115	
5.1.2	Firms offering formal training, %		27.1	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, %	⏲	1.2	117	
5.2	**Innovation linkages**		**21.7**	**76**	
5.2.1	Public research–industry co-publications, %		0.3	129	○◇
5.2.2	University–industry R&D collaboration†		49.1	55	●
5.2.3	State of cluster development†		55.4	49	●
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	⏲	0.0	106	
5.2.5	Patent families/bn PPP$ GDP		0.0	102	○◇
5.3	**Knowledge absorption**		**25.6**	**70**	●
5.3.1	Intellectual property payments, % total trade		0.1	109	
5.3.2	High-tech imports, % total trade		5.9	101	
5.3.3	ICT services imports, % total trade		2.4	20	●◆
5.3.4	FDI net inflows, % GDP		1.8	79	
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**8.9**	**128**	○
6.1	**Knowledge creation**		**2.5**	**122**	◇
6.1.1	Patents by origin/bn PPP$ GDP		0.2	101	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	99	○◇
6.1.3	Utility models by origin/bn PPP$ GDP	⏲	0.0	74	○◇
6.1.4	Scientific and technical articles/bn PPP$ GDP		2.3	122	
6.1.5	Citable documents H-index		5.0	99	
6.2	**Knowledge impact**		**21.6**	**90**	
6.2.1	Labor productivity growth, %		2.4	18	●
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.0	126	○◇
6.2.4	High-tech manufacturing, %		n/a	n/a	
6.3	**Knowledge diffusion**		**2.5**	**126**	○
6.3.1	Intellectual property receipts, % total trade		0.0	115	
6.3.2	Production and export complexity		4.1	118	○◇
6.3.3	High-tech exports, % total trade		0.3	100	
6.3.4	ICT services exports, % total trade		0.5	102	
6.3.5	ISO 9001 quality/bn PPP$ GDP		1.5	104	
	Creative outputs		**13.6**	**100**	
7.1	**Intangible assets**		**20.0**	**79**	
7.1.1	Intangible asset intensity, top 15, %	⏲	35.9	63	
7.1.2	Trademarks by origin/bn PPP$ GDP		4.7	119	
7.1.3	Global brand value, top 5,000, % GDP		0.5	62	●
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.5	75	
7.2	**Creative goods and services**		**1.1**	**[116]**	
7.2.1	Cultural and creative services exports, % total trade		0.1	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	Creative goods exports, % total trade		0.0	118	
7.3	**Online creativity**		**13.3**	**120**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.3	114	
7.3.2	GitHub commits/mn pop. 15–69		0.4	123	
7.3.3	Mobile app creation/bn PPP$ GDP		39.2	120	○◇

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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Denmark

10

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
12	7	High	EUR	5.9	441.8	74,958

			Score/ Value	Rank
	Institutions		**88.7**	**2 ●◆**
1.1	**Institutional environment**		**92.7**	**3 ●◆**
1.1.1	Operational stability for businesses*		89.3	6 ●
1.1.2	Government effectiveness*		96.0	3 ●◆
1.2	**Regulatory environment**		**94.3**	**2 ●**
1.2.1	Regulatory quality*		90.2	4 ●
1.2.2	Rule of law*		98.3	2 ●◆
1.3	**Business environment**		**79.3**	**[6]**
1.3.1	Policy stability for doing business†		79.3	9
1.3.2	Entrepreneurship policies and culture†		n/a	n/a
	Human capital and research		**58.9**	**9**
2.1	**Education**		**68.0**	**9 ◆**
2.1.1	Expenditure on education, % GDP	◷	5.9	17
2.1.2	Government funding/pupil, secondary, % GDP/cap		24.4	23
2.1.3	School life expectancy, years		18.7	11
2.1.4	PISA scales in reading, maths and science		490.6	16
2.1.5	Pupil–teacher ratio, secondary		10.2	35
2.2	**Tertiary education**		**43.1**	**29**
2.2.1	Tertiary enrolment, % gross		84.6	17
2.2.2	Graduates in science and engineering, %		24.0	52 ○
2.2.3	Tertiary inbound mobility, %		10.1	26
2.3	**Research and development (R&D)**		**65.5**	**9**
2.3.1	Researchers, FTE/mn pop.		8,735.6	3 ●◆
2.3.2	Gross expenditure on R&D, % GDP		2.9	12
2.3.3	Global corporate R&D investors, top 3, mn USD$		69.8	13
2.3.4	QS university ranking, top 3*		56.3	17
	Infrastructure		**60.6**	**8**
3.1	**Information and communication technologies (ICTs)**		**94.6**	**7**
3.1.1	ICT access*		100.0	1 ●
3.1.2	ICT use*		92.4	10 ◆
3.1.3	Government's online service*		97.8	4 ●◆
3.1.4	E-participation*		88.4	12
3.2	**General infrastructure**		**47.5**	**22**
3.2.1	Electricity output, GWh/mn pop.		5,922.8	37
3.2.2	Logistics performance*		90.9	3 ●◆
3.2.3	Gross capital formation, % GDP		23.5	69 ○
3.3	**Ecological sustainability**		**39.8**	**18**
3.3.1	GDP/unit of energy use		21.1	8
3.3.2	Low-carbon energy use, %		41.5	19
3.3.3	ISO 14001 environment/bn PPP$ GDP		2.7	37
	Market sophistication		**52.9**	**21**
4.1	**Credit**		**52.9**	**[21]**
4.1.1	Finance for startups and scaleups†		n/a	n/a
4.1.2	Domestic credit to private sector, % GDP		143.4	10
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a
4.2	**Investment**		**42.9**	**15**
4.2.1	Market capitalization, % GDP		n/a	n/a
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.4	15
4.2.3	VC recipients, deals/bn PPP$ GDP		0.2	11
4.2.4	VC received, value, % GDP		0.0	20
4.3	**Trade, diversification and market scale**		**63.0**	**37**
4.3.1	Applied tariff rate, weighted avg., %		1.1	21
4.3.2	Domestic industry diversification		89.3	42 ○
4.3.3	Domestic market scale, bn PPP$		441.8	51 ○

			Score/ Value	Rank
	Business sophistication		**56.9**	**12**
5.1	**Knowledge workers**		**65.6**	**17**
5.1.1	Knowledge-intensive employment, %		48.9	13
5.1.2	Firms offering formal training, %	◷	40.6	35 ◇
5.1.3	GERD performed by business, % GDP		1.8	14
5.1.4	GERD financed by business, %	◷	59.6	13
5.1.5	Females employed w/advanced degrees, %		25.5	17
5.2	**Innovation linkages**		**61.4**	**10**
5.2.1	Public research–industry co-publications, %		5.3	12
5.2.2	University–industry R&D collaboration†		80.0	14
5.2.3	State of cluster development†		81.6	19
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.1	16
5.2.5	Patent families/bn PPP$ GDP		4.9	9
5.3	**Knowledge absorption**		**43.7**	**22**
5.3.1	Intellectual property payments, % total trade		0.8	48 ○
5.3.2	High-tech imports, % total trade		6.3	92 ○
5.3.3	ICT services imports, % total trade		3.4	6 ●
5.3.4	FDI net inflows, % GDP		3.7	39
5.3.5	Research talent, % in businesses		60.6	14
	Knowledge and technology outputs		**48.3**	**13**
6.1	**Knowledge creation**		**56.4**	**11**
6.1.1	Patents by origin/bn PPP$ GDP		8.9	10
6.1.2	PCT patents by origin/bn PPP$ GDP		3.5	8
6.1.3	Utility models by origin/bn PPP$ GDP		0.1	50 ○
6.1.4	Scientific and technical articles/bn PPP$ GDP		45.5	2 ●◆
6.1.5	Citable documents H-index		51.4	15
6.2	**Knowledge impact**		**47.4**	**16**
6.2.1	Labor productivity growth, %		0.4	76 ○
6.2.2	Unicorn valuation, % GDP		1.6	24
6.2.3	Software spending, % GDP		0.5	20
6.2.4	High-tech manufacturing, %		47.5	12
6.3	**Knowledge diffusion**		**41.0**	**23**
6.3.1	Intellectual property receipts, % total trade		2.4	12
6.3.2	Production and export complexity		69.7	24
6.3.3	High-tech exports, % total trade		6.1	35
6.3.4	ICT services exports, % total trade		2.9	43
6.3.5	ISO 9001 quality/bn PPP$ GDP		5.8	48 ○
	Creative outputs		**52.9**	**10**
7.1	**Intangible assets**		**52.7**	**17**
7.1.1	Intangible asset intensity, top 15, %		86.3	3 ●◆
7.1.2	Trademarks by origin/bn PPP$ GDP		23.5	78 ○
7.1.3	Global brand value, top 5,000, % GDP		14.4	9
7.1.4	Industrial designs by origin/bn PPP$ GDP		3.9	23
7.2	**Creative goods and services**		**33.8**	**22**
7.2.1	Cultural and creative services exports, % total trade		0.7	40
7.2.2	National feature films/mn pop. 15–69		4.7	28
7.2.3	Entertainment and media market/th pop. 15–69		68.3	4
7.2.4	Creative goods exports, % total trade		1.4	34
7.3	**Online creativity**		**72.6**	**4 ●**
7.3.1	Top-level domains (TLDs)/th pop. 15–69		65.5	6 ●
7.3.2	GitHub commits/mn pop. 15–69		76.8	9
7.3.3	Mobile app creation/bn PPP$ GDP		75.4	17

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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Dominican Republic

GII 2024 rank

97

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
99	94	Upper middle	LCN	11.3	273.7	25,523

			Score/ Value	Rank	
	Institutions		**49.5**	**61**	
1.1	**Institutional environment**		**55.1**	**62**	
1.1.1	Operational stability for businesses*		68.0	43	●
1.1.2	Government effectiveness*		42.2	75	
1.2	**Regulatory environment**		**42.4**	**68**	
1.2.1	Regulatory quality*		43.7	70	
1.2.2	Rule of law*		41.2	67	
1.3	**Business environment**		**51.0**	**56**	
1.3.1	Policy stability for doing business†		66.3	34	● ◆
1.3.2	Entrepreneurship policies and culture†	⏲	35.7	46	
	Human capital and research		**19.1**	**104**	◇
2.1	**Education**		**38.1**	**105**	
2.1.1	Expenditure on education, % GDP		3.9	74	
2.1.2	Government funding/pupil, secondary, % GDP/cap		13.4	77	
2.1.3	School life expectancy, years	⏲	13.6	74	
2.1.4	PISA scales in reading, maths and science		350.3	85	○ ◇
2.1.5	Pupil–teacher ratio, secondary		11.9	52	●
2.2	**Tertiary education**		**19.3**	**98**	
2.2.1	Tertiary enrolment, % gross	⏲	58.6	59	
2.2.2	Graduates in science and engineering, %		13.5	105	◇
2.2.3	Tertiary inbound mobility, %	⏲	2.4	77	
2.3	**Research and development (R&D)**		**0.0**	**[120]**	
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 USD$		0.0	41	○ ◇
2.3.4	QS university ranking, top 3*		0.0	75	○ ◇
	Infrastructure		**35.2**	**83**	
3.1	**Information and communication technologies (ICTs)**		**59.3**	**90**	
3.1.1	ICT access*	⏲	65.0	98	◇
3.1.2	ICT use*		70.3	84	
3.1.3	Government's online service*		57.8	79	
3.1.4	E-participation*		44.2	83	
3.2	**General infrastructure**		**28.9**	**76**	
3.2.1	Electricity output, GWh/mn pop.	⏲	1,916.7	82	
3.2.2	Logistics performance*		22.7	82	
3.2.3	Gross capital formation, % GDP		32.3	17	● ◆
3.3	**Ecological sustainability**		**17.5**	**77**	
3.3.1	GDP/unit of energy use		19.1	13	● ◆
3.3.2	Low-carbon energy use, %		7.3	93	
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.2	124	
	Market sophistication		**16.4**	**116**	◇
4.1	**Credit**		**9.4**	**112**	◇
4.1.1	Finance for startups and scaleups†	⏲	11.1	83	○ ◇
4.1.2	Domestic credit to private sector, % GDP		27.9	102	
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**0.2**	**[116]**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.0	100	○
4.2.3	VC recipients, deals/bn PPP$ GDP		n/a	n/a	
4.2.4	VC received, value, % GDP		n/a	n/a	
4.3	**Trade, diversification and market scale**		**39.5**	**102**	◇
4.3.1	Applied tariff rate, weighted avg., %		3.3	83	
4.3.2	Domestic industry diversification		n/a	n/a	
4.3.3	Domestic market scale, bn PPP$		273.7	63	

			Score/ Value	Rank	
	Business sophistication		**20.6**	**97**	◇
5.1	**Knowledge workers**		**28.0**	**[79]**	
5.1.1	Knowledge-intensive employment, %		16.9	88	
5.1.2	Firms offering formal training, %	⏲	23.4	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, %		10.1	75	
5.2	**Innovation linkages**		**17.0**	**97**	
5.2.1	Public research–industry co-publications, %		0.4	125	○
5.2.2	University–industry R&D collaboration†		29.1	100	
5.2.3	State of cluster development†		52.5	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	94	
5.3	**Knowledge absorption**		**17.0**	**110**	◇
5.3.1	Intellectual property payments, % total trade		0.5	70	
5.3.2	High-tech imports, % total trade		4.6	113	
5.3.3	ICT services imports, % total trade		0.3	118	◇
5.3.4	FDI net inflows, % GDP		3.4	44	●
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**11.0**	**106**	
6.1	**Knowledge creation**		**1.0**	**131**	○ ◇
6.1.1	Patents by origin/bn PPP$ GDP		0.0	124	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	92	
6.1.3	Utility models by origin/bn PPP$ GDP		0.0	61	
6.1.4	Scientific and technical articles/bn PPP$ GDP		0.9	131	○ ◇
6.1.5	Citable documents H-index		2.4	125	○
6.2	**Knowledge impact**		**21.2**	**92**	
6.2.1	Labor productivity growth, %		2.3	21	●
6.2.2	Unicorn valuation, % GDP		0.0	49	○ ◇
6.2.3	Software spending, % GDP		0.0	125	○ ◇
6.2.4	High-tech manufacturing, %		n/a	n/a	
6.3	**Knowledge diffusion**		**10.7**	**92**	
6.3.1	Intellectual property receipts, % total trade		0.0	109	◇
6.3.2	Production and export complexity		44.9	58	
6.3.3	High-tech exports, % total trade		1.3	70	
6.3.4	ICT services exports, % total trade		0.2	120	
6.3.5	ISO 9001 quality/bn PPP$ GDP		0.9	113	
	Creative outputs		**15.9**	**91**	
7.1	**Intangible assets**		**10.1**	**99**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		39.8	50	●
7.1.3	Global brand value, top 5,000, % GDP		0.1	74	
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.0	119	
7.2	**Creative goods and services**		**24.3**	**[48]**	
7.2.1	Cultural and creative services exports, % total trade		n/a	n/a	
7.2.2	National feature films/mn pop. 15–69		2.5	52	
7.2.3	Entertainment and media market/th pop. 15–69		n/a	n/a	
7.2.4	Creative goods exports, % total trade	⏲	2.7	22	●
7.3	**Online creativity**		**19.3**	**101**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		1.7	84	
7.3.2	GitHub commits/mn pop. 15–69		3.8	92	
7.3.3	Mobile app creation/bn PPP$ GDP		52.5	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Ecuador

GII 2024 rank

105

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
100	104	Upper middle	LCN	18.0	242.6	13,285

			Score/ Value	Rank	
	Institutions		**30.1**	**109**	
1.1	**Institutional environment**		**41.6**	**94**	
1.1.1	Operational stability for businesses*		47.3	98	
1.1.2	Government effectiveness*		35.9	88	
1.2	**Regulatory environment**		**27.9**	**100**	
1.2.1	Regulatory quality*		29.8	96	
1.2.2	Rule of law*		26.0	103	
1.3	**Business environment**		**20.8**	**117**	
1.3.1	Policy stability for doing business†		23.0	119	○ ◇
1.3.2	Entrepreneurship policies and culture†		18.5	68	
	Human capital and research		**21.9**	**100**	
2.1	**Education**		**38.0**	**106**	
2.1.1	Expenditure on education, % GDP		3.6	86	
2.1.2	Government funding/pupil, secondary, % GDP/cap		6.1	94	○ ◇
2.1.3	School life expectancy, years	⏲	14.9	52	●
2.1.4	PISA scales in reading, maths and science		n/a	n/a	
2.1.5	Pupil–teacher ratio, secondary		20.4	98	
2.2	**Tertiary education**		**22.7**	**89**	
2.2.1	Tertiary enrolment, % gross	⏲	57.9	60	
2.2.2	Graduates in science and engineering, %	⏲	18.3	90	
2.2.3	Tertiary inbound mobility, %	⏲	0.6	96	◇
2.3	**Research and development (R&D)**		**5.0**	**76**	
2.3.1	Researchers, FTE/mn pop.	⏲	402.3	77	
2.3.2	Gross expenditure on R&D, % GDP	⏲	0.4	62	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○ ◇
2.3.4	QS university ranking, top 3*		8.7	68	
	Infrastructure		**36.0**	**80**	
3.1	**Information and communication technologies (ICTs)**		**68.6**	**76**	
3.1.1	ICT access*		64.0	100	◇
3.1.2	ICT use*		66.7	90	◇
3.1.3	Government's online service*		74.0	50	●
3.1.4	E-participation*		69.8	41	●
3.2	**General infrastructure**		**16.5**	**109**	
3.2.1	Electricity output, GWh/mn pop.	⏲	1,805.3	85	
3.2.2	Logistics performance*		n/a	n/a	
3.2.3	Gross capital formation, % GDP		22.4	82	
3.3	**Ecological sustainability**		**22.8**	**56**	●
3.3.1	GDP/unit of energy use		11.9	54	●
3.3.2	Low-carbon energy use, %		30.1	34	●
3.3.3	ISO 14001 environment/bn PPP$ GDP		1.0	72	
	Market sophistication		**18.3**	**113**	◇
4.1	**Credit**		**13.3**	**101**	
4.1.1	Finance for startups and scaleups†		14.6	81	○ ◇
4.1.2	Domestic credit to private sector, % GDP		52.9	60	
4.1.3	Loans from microfinance institutions, % GDP	⏲	0.7	38	
4.2	**Investment**		**2.1**	**107**	○
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.0	92	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	107	○
4.2.4	VC received, value, % GDP		0.0	65	
4.3	**Trade, diversification and market scale**		**39.6**	**101**	◇
4.3.1	Applied tariff rate, weighted avg., %		6.2	107	◇
4.3.2	Domestic industry diversification		63.1	91	◇
4.3.3	Domestic market scale, bn PPP$		242.6	66	

			Score/ Value	Rank	
	Business sophistication		**21.1**	**94**	
5.1	**Knowledge workers**		**30.1**	**72**	
5.1.1	Knowledge-intensive employment, %		12.9	100	◇
5.1.2	Firms offering formal training, %	⏲	73.7	1	
5.1.3	GERD performed by business, % GDP	⏲	0.2	55	
5.1.4	GERD financed by business, %	⏲	0.2	96	
5.1.5	Females employed w/advanced degrees, %		9.0	82	
5.2	**Innovation linkages**		**12.2**	**117**	
5.2.1	Public research–industry co-publications, %		0.5	117	
5.2.2	University–industry R&D collaboration†		30.8	96	
5.2.3	State of cluster development†		23.7	115	◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	117	○
5.2.5	Patent families/bn PPP$ GDP		0.0	84	
5.3	**Knowledge absorption**		**21.0**	**88**	
5.3.1	Intellectual property payments, % total trade		0.7	56	●
5.3.2	High-tech imports, % total trade		8.3	64	
5.3.3	ICT services imports, % total trade		0.5	110	◇
5.3.4	FDI net inflows, % GDP		0.8	102	
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**12.6**	**96**	
6.1	**Knowledge creation**		**7.2**	**100**	
6.1.1	Patents by origin/bn PPP$ GDP		0.1	108	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	77	
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	71	
6.1.5	Citable documents H-index		9.3	82	
6.2	**Knowledge impact**		**23.1**	**77**	
6.2.1	Labor productivity growth, %		−1.0	118	◇
6.2.2	Unicorn valuation, % GDP		1.2	30	● ◆
6.2.3	Software spending, % GDP		0.2	72	
6.2.4	High-tech manufacturing, %		9.9	87	
6.3	**Knowledge diffusion**		**7.5**	**104**	◇
6.3.1	Intellectual property receipts, % total trade		0.0	79	
6.3.2	Production and export complexity		16.1	113	○ ◇
6.3.3	High-tech exports, % total trade		0.4	98	
6.3.4	ICT services exports, % total trade		0.2	121	○
6.3.5	ISO 9001 quality/bn PPP$ GDP		6.3	45	●
	Creative outputs		**13.7**	**98**	◇
7.1	**Intangible assets**		**16.5**	**86**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		62.2	23	●
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○ ◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.4	84	
7.2	**Creative goods and services**		**0.7**	**[123]**	
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		n/a	n/a	
7.2.4	Creative goods exports, % total trade		0.0	115	
7.3	**Online creativity**		**21.2**	**94**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		1.3	88	
7.3.2	GitHub commits/mn pop. 15–69		4.6	79	
7.3.3	Mobile app creation/bn PPP$ GDP		57.6	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Egypt

86

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
80	95	Lower middle	NAWA	114.5	1,809.4	17,123

			Score/Value	Rank	
	Institutions		**35.9**	**94**	
1.1	**Institutional environment**		**38.5**	**100**	
1.1.1	Operational stability for businesses*		44.7	105	
1.1.2	Government effectiveness*		32.3	98	
1.2	**Regulatory environment**		**29.7**	**94**	
1.2.1	Regulatory quality*		23.1	112	○
1.2.2	Rule of law*		36.3	81	
1.3	**Business environment**		**39.4**	**79**	
1.3.1	Policy stability for doing business†		51.7	57	
1.3.2	Entrepreneurship policies and culture†	⏲	27.2	59	
	Human capital and research		**23.1**	**96**	
2.1	**Education**		**39.0**	**103**	
2.1.1	Expenditure on education, % GDP	⏲	3.9	75	
2.1.2	Government funding/pupil, secondary, % GDP/cap		9.4	88	○
2.1.3	School life expectancy, years	⏲	12.9	84	
2.1.4	PISA scales in reading, maths and science		n/a	n/a	
2.1.5	Pupil–teacher ratio, secondary		17.9	92	
2.2	**Tertiary education**		**17.8**	**101**	
2.2.1	Tertiary enrolment, % gross		37.8	83	
2.2.2	Graduates in science and engineering, %		16.9	94	
2.2.3	Tertiary inbound mobility, %		2.0	79	
2.3	**Research and development (R&D)**		**12.5**	**54**	◆
2.3.1	Researchers, FTE/mn pop.		841.4	55	
2.3.2	Gross expenditure on R&D, % GDP		1.0	38	●◆
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		24.7	48	●◆
	Infrastructure		**31.8**	**92**	
3.1	**Information and communication technologies (ICTs)**		**60.7**	**85**	
3.1.1	ICT access*		88.7	70	◆
3.1.2	ICT use*		67.7	89	
3.1.3	Government's online service*		52.8	87	
3.1.4	E-participation*		33.7	98	
3.2	**General infrastructure**		**19.8**	**99**	
3.2.1	Electricity output, GWh/mn pop.		1,940.9	80	
3.2.2	Logistics performance*		45.5	56	◆
3.2.3	Gross capital formation, % GDP		16.1	120	○◇
3.3	**Ecological sustainability**		**14.9**	**93**	
3.3.1	GDP/unit of energy use		14.7	33	●◆
3.3.2	Low-carbon energy use, %		5.7	104	
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.8	78	
	Market sophistication		**30.2**	**74**	
4.1	**Credit**		**20.7**	**82**	
4.1.1	Finance for startups and scaleups†	⏲	48.1	44	
4.1.2	Domestic credit to private sector, % GDP		30.8	95	
4.1.3	Loans from microfinance institutions, % GDP		0.5	43	
4.2	**Investment**		**8.4**	**66**	
4.2.1	Market capitalization, % GDP		10.1	75	○
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.0	72	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	58	
4.2.4	VC received, value, % GDP		0.0	42	
4.3	**Trade, diversification and market scale**		**61.4**	**44**	●◆
4.3.1	Applied tariff rate, weighted avg., %	⏲	5.4	99	
4.3.2	Domestic industry diversification	⏲	90.8	34	●
4.3.3	Domestic market scale, bn PPP$		1,809.4	18	●◆

			Score/Value	Rank	
	Business sophistication		**19.8**	**103**	
5.1	**Knowledge workers**		**12.3**	**116**	○
5.1.1	Knowledge-intensive employment, %		22.2	67	
5.1.2	Firms offering formal training, %	⏲	7.9	99	○◇
5.1.3	GERD performed by business, % GDP	⏲	0.0	78	
5.1.4	GERD financed by business, %	⏲	3.9	86	○
5.1.5	Females employed w/advanced degrees, %	⏲	5.8	94	
5.2	**Innovation linkages**		**30.3**	**44**	●◆
5.2.1	Public research–industry co-publications, %		0.9	94	
5.2.2	University–industry R&D collaboration†		50.3	53	
5.2.3	State of cluster development†		88.9	9	●◆
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	96	
5.2.5	Patent families/bn PPP$ GDP		0.0	98	
5.3	**Knowledge absorption**		**17.0**	**111**	
5.3.1	Intellectual property payments, % total trade		0.5	71	
5.3.2	High-tech imports, % total trade		4.8	110	
5.3.3	ICT services imports, % total trade		0.9	83	
5.3.4	FDI net inflows, % GDP		1.7	83	
5.3.5	Research talent, % in businesses	⏲	6.3	68	
	Knowledge and technology outputs		**17.7**	**81**	
6.1	**Knowledge creation**		**11.1**	**77**	
6.1.1	Patents by origin/bn PPP$ GDP		0.4	87	
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	72	○
6.1.4	Scientific and technical articles/bn PPP$ GDP		13.9	48	
6.1.5	Citable documents H-index		19.2	44	●◆
6.2	**Knowledge impact**		**28.6**	**59**	
6.2.1	Labor productivity growth, %		2.3	20	●
6.2.2	Unicorn valuation, % GDP		0.3	44	●
6.2.3	Software spending, % GDP		0.3	50	
6.2.4	High-tech manufacturing, %	⏲	18.5	63	
6.3	**Knowledge diffusion**		**13.2**	**82**	
6.3.1	Intellectual property receipts, % total trade		0.1	68	
6.3.2	Production and export complexity		39.6	66	
6.3.3	High-tech exports, % total trade		0.7	85	
6.3.4	ICT services exports, % total trade		2.0	57	
6.3.5	ISO 9001 quality/bn PPP$ GDP		2.0	91	
	Creative outputs		**20.7**	**78**	
7.1	**Intangible assets**		**27.5**	**67**	
7.1.1	Intangible asset intensity, top 15, %		52.3	44	
7.1.2	Trademarks by origin/bn PPP$ GDP		22.6	81	
7.1.3	Global brand value, top 5,000, % GDP		0.9	56	
7.1.4	Industrial designs by origin/bn PPP$ GDP		1.1	55	
7.2	**Creative goods and services**		**5.8**	**93**	
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	81	○
7.2.3	Entertainment and media market/th pop. 15–69		1.2	56	○
7.2.4	Creative goods exports, % total trade		1.1	42	●
7.3	**Online creativity**		**21.9**	**91**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.4	108	
7.3.2	GitHub commits/mn pop. 15–69		4.4	84	
7.3.3	Mobile app creation/bn PPP$ GDP		61.0	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

El Salvador

GII 2024 rank

98

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
89	107	Upper middle	LCN	6.3	74.5	11,717

			Score/ Value	Rank	
	Institutions		**33.3**	**99**	
1.1	**Institutional environment**		**43.8**	**88**	
1.1.1	Operational stability for businesses*		52.0	89	
1.1.2	Government effectiveness*		35.6	90	
1.2	**Regulatory environment**		**26.1**	**105**	◇
1.2.1	Regulatory quality*		29.7	97	
1.2.2	Rule of law*		22.6	108	◇
1.3	**Business environment**		**30.0**	**97**	
1.3.1	Policy stability for doing business†		23.5	116	◇
1.3.2	Entrepreneurship policies and culture†	⏲	36.5	45	
	Human capital and research		**17.6**	**109**	◇
2.1	**Education**		**30.4**	**121**	◇
2.1.1	Expenditure on education, % GDP		4.5	56	●
2.1.2	Government funding/pupil, secondary, % GDP/cap		15.1	71	
2.1.3	School life expectancy, years	⏲	11.8	95	
2.1.4	PISA scales in reading, maths and science		360.5	79	○◇
2.1.5	Pupil–teacher ratio, secondary	⏲	27.6	115	○◇
2.2	**Tertiary education**		**21.8**	**90**	
2.2.1	Tertiary enrolment, % gross	⏲	30.8	91	◇
2.2.2	Graduates in science and engineering, %	⏲	23.4	56	
2.2.3	Tertiary inbound mobility, %	⏲	0.4	102	◇
2.3	**Research and development (R&D)**		**0.8**	**103**	
2.3.1	Researchers, FTE/mn pop.	⏲	64.7	96	◇
2.3.2	Gross expenditure on R&D, % GDP	⏲	0.2	93	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**27.7**	**101**	◇
3.1	**Information and communication technologies (ICTs)**		**44.4**	**109**	◇
3.1.1	ICT access*		39.6	117	◇
3.1.2	ICT use*		63.3	93	◇
3.1.3	Government's online service*		41.1	109	◇
3.1.4	E-participation*		33.7	98	◇
3.2	**General infrastructure**		**17.1**	**106**	
3.2.1	Electricity output, GWh/mn pop.		1,147.4	94	◇
3.2.2	Logistics performance*		27.3	76	
3.2.3	Gross capital formation, % GDP		20.3	98	
3.3	**Ecological sustainability**		**21.6**	**61**	
3.3.1	GDP/unit of energy use		11.8	55	●
3.3.2	Low-carbon energy use, %		32.0	30	●
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.3	107	
	Market sophistication		**24.6**	**89**	
4.1	**Credit**		**26.2**	**67**	
4.1.1	Finance for startups and scaleups†	⏲	31.6	64	
4.1.2	Domestic credit to private sector, % GDP		61.4	51	●
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**4.1**	**[91]**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.0	84	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	80	
4.2.4	VC received, value, % GDP		n/a	n/a	
4.3	**Trade, diversification and market scale**		**43.5**	**93**	◇
4.3.1	Applied tariff rate, weighted avg., %		1.8	62	
4.3.2	Domestic industry diversification		n/a	n/a	
4.3.3	Domestic market scale, bn PPP$		74.5	99	

			Score/ Value	Rank	
	Business sophistication		**22.1**	**90**	
5.1	**Knowledge workers**		**24.0**	**93**	
5.1.1	Knowledge-intensive employment, %		14.8	91	◇
5.1.2	Firms offering formal training, %		34.9	49	
5.1.3	GERD performed by business, % GDP	⏲	0.1	70	
5.1.4	GERD financed by business, %	⏲	31.5	59	
5.1.5	Females employed w/advanced degrees, %	⏲	4.9	96	◇
5.2	**Innovation linkages**		**11.7**	**122**	○◇
5.2.1	Public research–industry co-publications, %		0.4	124	○
5.2.2	University–industry R&D collaboration†		24.1	108	
5.2.3	State of cluster development†		19.1	121	○◇
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	87	
5.3	**Knowledge absorption**		**30.6**	**54**	●
5.3.1	Intellectual property payments, % total trade		1.0	37	●
5.3.2	High-tech imports, % total trade		11.6	24	●
5.3.3	ICT services imports, % total trade		1.4	57	●
5.3.4	FDI net inflows, % GDP		1.5	89	
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**11.9**	**101**	
6.1	**Knowledge creation**		**1.0**	**132**	○◇
6.1.1	Patents by origin/bn PPP$ GDP		0.1	116	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	99	○◇
6.1.3	Utility models by origin/bn PPP$ GDP		0.0	69	
6.1.4	Scientific and technical articles/bn PPP$ GDP		1.1	130	○◇
6.1.5	Citable documents H-index		2.0	127	○
6.2	**Knowledge impact**		**17.8**	**113**	
6.2.1	Labor productivity growth, %		0.7	67	
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.0	111	◇
6.2.4	High-tech manufacturing, %		n/a	n/a	
6.3	**Knowledge diffusion**		**17.0**	**68**	
6.3.1	Intellectual property receipts, % total trade		0.0	103	
6.3.2	Production and export complexity		44.3	60	
6.3.3	High-tech exports, % total trade		3.0	49	●
6.3.4	ICT services exports, % total trade		2.8	45	●
6.3.5	ISO 9001 quality/bn PPP$ GDP		2.4	86	
	Creative outputs		**20.4**	**[80]**	
7.1	**Intangible assets**		**27.9**	**[66]**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		71.5	18	●
7.1.3	Global brand value, top 5,000, % GDP		n/a	n/a	
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.3	92	
7.2	**Creative goods and services**		**5.9**	**[91]**	
7.2.1	Cultural and creative services exports, % total trade		0.2	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	Creative goods exports, % total trade		0.5	60	
7.3	**Online creativity**		**19.8**	**99**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		1.3	89	
7.3.2	GitHub commits/mn pop. 15–69		5.0	74	
7.3.3	Mobile app creation/bn PPP$ GDP		53.0	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Estonia

16

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
16	14	High	EUR	1.4	61.0	45,236

		Score/ Value	Rank	
	Institutions	**78.7**	**12**	
1.1	**Institutional environment**	**80.9**	**17**	
1.1.1	Operational stability for businesses*	82.7	16	
1.1.2	Government effectiveness*	79.1	18	
1.2	**Regulatory environment**	**83.8**	**17**	
1.2.1	Regulatory quality*	82.8	14	
1.2.2	Rule of law*	84.7	17	
1.3	**Business environment**	**71.4**	**18**	
1.3.1	Policy stability for doing business†	57.2	46	◇
1.3.2	Entrepreneurship policies and culture†	85.6	3	● ◆
	Human capital and research	**44.5**	**31**	◇
2.1	**Education**	**64.7**	**15**	
2.1.1	Expenditure on education, % GDP ◷	5.9	18	
2.1.2	Government funding/pupil, secondary, % GDP/cap	19.8	52	○
2.1.3	School life expectancy, years	16.0	37	
2.1.4	PISA scales in reading, maths and science	515.6	6	
2.1.5	Pupil–teacher ratio, secondary	8.9	21	◆
2.2	**Tertiary education**	**45.6**	**23**	
2.2.1	Tertiary enrolment, % gross	71.4	39	
2.2.2	Graduates in science and engineering, %	28.1	29	
2.2.3	Tertiary inbound mobility, %	11.4	21	
2.3	**Research and development (R&D)**	**23.3**	**42**	◇
2.3.1	Researchers, FTE/mn pop.	4,695.2	27	
2.3.2	Gross expenditure on R&D, % GDP	1.8	20	
2.3.3	Global corporate R&D investors, top 3, mn USD$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	16.5	57	◇
	Infrastructure	**61.3**	**6**	●
3.1	**Information and communication technologies (ICTs)**	**98.4**	**1**	● ◆
3.1.1	ICT access*	99.5	19	
3.1.2	ICT use*	96.3	2	● ◆
3.1.3	Government's online service*	100.0	1	● ◆
3.1.4	E-participation*	97.7	3	● ◆
3.2	**General infrastructure**	**47.6**	**21**	
3.2.1	Electricity output, GWh/mn pop.	6,659.2	28	
3.2.2	Logistics performance*	68.2	25	◇
3.2.3	Gross capital formation, % GDP	30.0	28	
3.3	**Ecological sustainability**	**37.8**	**24**	
3.3.1	GDP/unit of energy use	9.5	79	○
3.3.2	Low-carbon energy use, %	14.5	73	○
3.3.3	ISO 14001 environment/bn PPP$ GDP	9.6	6	● ◆
	Market sophistication	**66.5**	**6**	●
4.1	**Credit**	**45.9**	**30**	
4.1.1	Finance for startups and scaleups†	72.1	13	
4.1.2	Domestic credit to private sector, % GDP	57.4	55	◇
4.1.3	Loans from microfinance institutions, % GDP	4.2	7	
4.2	**Investment**	**92.7**	**2**	● ◆
4.2.1	Market capitalization, % GDP	n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	1.9	3	● ◆
4.2.3	VC recipients, deals/bn PPP$ GDP	1.1	1	● ◆
4.2.4	VC received, value, % GDP	0.0	1	● ◆
4.3	**Trade, diversification and market scale**	**60.9**	**48**	
4.3.1	Applied tariff rate, weighted avg., %	1.1	21	
4.3.2	Domestic industry diversification	90.6	37	
4.3.3	Domestic market scale, bn PPP$	61.0	104	○

		Score/ Value	Rank	
	Business sophistication	**48.1**	**27**	◇
5.1	**Knowledge workers**	**61.2**	**21**	
5.1.1	Knowledge-intensive employment, %	46.8	17	
5.1.2	Firms offering formal training, %	42.2	32	◇
5.1.3	GERD performed by business, % GDP	1.0	22	
5.1.4	GERD financed by business, %	51.0	26	
5.1.5	Females employed w/advanced degrees, %	28.1	10	
5.2	**Innovation linkages**	**36.3**	**33**	◇
5.2.1	Public research–industry co-publications, %	1.8	50	◇
5.2.2	University–industry R&D collaboration†	57.4	43	◇
5.2.3	State of cluster development†	50.0	59	◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.1	17	
5.2.5	Patent families/bn PPP$ GDP	0.9	31	◇
5.3	**Knowledge absorption**	**47.0**	**16**	
5.3.1	Intellectual property payments, % total trade	0.2	92	○ ◇
5.3.2	High-tech imports, % total trade	7.9	73	○
5.3.3	ICT services imports, % total trade	4.6	4	● ◆
5.3.4	FDI net inflows, % GDP	11.8	9	
5.3.5	Research talent, % in businesses	47.5	29	
	Knowledge and technology outputs	**39.9**	**21**	
6.1	**Knowledge creation**	**28.6**	**35**	◇
6.1.1	Patents by origin/bn PPP$ GDP	1.2	46	◇
6.1.2	PCT patents by origin/bn PPP$ GDP	0.5	33	◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.6	26	
6.1.4	Scientific and technical articles/bn PPP$ GDP	35.7	9	
6.1.5	Citable documents H-index	17.8	48	◇
6.2	**Knowledge impact**	**46.3**	**19**	
6.2.1	Labor productivity growth, %	0.2	90	○
6.2.2	Unicorn valuation, % GDP	22.2	1	● ◆
6.2.3	Software spending, % GDP	0.1	94	○ ◇
6.2.4	High-tech manufacturing, %	25.1	48	
6.3	**Knowledge diffusion**	**44.6**	**20**	
6.3.1	Intellectual property receipts, % total trade	0.5	28	◇
6.3.2	Production and export complexity	68.0	27	
6.3.3	High-tech exports, % total trade	7.6	26	
6.3.4	ICT services exports, % total trade	7.5	7	◆
6.3.5	ISO 9001 quality/bn PPP$ GDP	16.5	16	◆
	Creative outputs	**49.7**	**15**	
7.1	**Intangible assets**	**42.2**	**31**	
7.1.1	Intangible asset intensity, top 15, %	54.9	38	○ ◇
7.1.2	Trademarks by origin/bn PPP$ GDP	70.7	19	
7.1.3	Global brand value, top 5,000, % GDP	1.0	55	◇
7.1.4	Industrial designs by origin/bn PPP$ GDP	3.3	25	
7.2	**Creative goods and services**	**52.1**	**4**	● ◆
7.2.1	Cultural and creative services exports, % total trade	2.7	8	◆
7.2.2	National feature films/mn pop. 15–69	10.7	5	◆
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Creative goods exports, % total trade	1.2	40	
7.3	**Online creativity**	**62.4**	**15**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69	28.2	25	
7.3.2	GitHub commits/mn pop. 15–69	75.1	10	
7.3.3	Mobile app creation/bn PPP$ GDP	83.9	6	◆

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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Ethiopia

GII 2024 rank

130

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
112	133	Low	SSA	128.7	393.3	3,719

			Score/Value	Rank	
	Institutions		**25.6**	**117**	
1.1	**Institutional environment**		**26.3**	**121**	
1.1.1	Operational stability for businesses*		28.0	122	
1.1.2	Government effectiveness*		24.5	113	
1.2	**Regulatory environment**		**21.4**	**112**	
1.2.1	Regulatory quality*		16.9	121	◇
1.2.2	Rule of law*		26.0	104	
1.3	**Business environment**		**29.0**	**[102]**	
1.3.1	Policy stability for doing business†	🕒	29.0	104	
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**7.2**	**[133]**	
2.1	**Education**		**16.2**	**[132]**	
2.1.1	Expenditure on education, % GDP		3.7	82	
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	🕒	43.7	126	
2.2	**Tertiary education**		**4.2**	**[125]**	
2.2.1	Tertiary enrolment, % gross	🕒	10.4	115	
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)**		**1.3**	**98**	
2.3.1	Researchers, FTE/mn pop.	🕒	90.2	93	◆
2.3.2	Gross expenditure on R&D, % GDP	🕒	0.3	78	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**21.5**	**123**	
3.1	**Information and communication technologies (ICTs)**		**26.3**	**126**	
3.1.1	ICT access*		13.8	126	
3.1.2	ICT use*		43.2	111	◆
3.1.3	Government's online service*		30.7	122	
3.1.4	E-participation*		17.4	126	
3.2	**General infrastructure**		**17.0**	**108**	
3.2.1	Electricity output, GWh/mn pop.	🕒	129.0	120	
3.2.2	Logistics performance*		n/a	n/a	
3.2.3	Gross capital formation, % GDP		24.8	54	●
3.3	**Ecological sustainability**		**21.2**	**63**	●
3.3.1	GDP/unit of energy use		5.7	113	
3.3.2	Low-carbon energy use, %		45.6	15	●◆
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.1	133	○◇
	Market sophistication		**5.0**	**133**	○◇
4.1	**Credit**		**5.1**	**[125]**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		n/a	n/a	
4.1.3	Loans from microfinance institutions, % GDP		0.5	44	
4.2	**Investment**		**0.4**	**115**	○◇
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.0	95	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	105	◇
4.2.4	VC received, value, % GDP		0.0	105	
4.3	**Trade, diversification and market scale**		**9.5**	**131**	○◇
4.3.1	Applied tariff rate, weighted avg., %		11.3	127	◇
4.3.2	Domestic industry diversification		n/a	n/a	
4.3.3	Domestic market scale, bn PPP$		393.3	54	●◆

			Score/Value	Rank	
	Business sophistication		**13.3**	**128**	
5.1	**Knowledge workers**		**7.2**	**127**	
5.1.1	Knowledge-intensive employment, %	🕒	4.4	122	
5.1.2	Firms offering formal training, %	🕒	20.8	77	
5.1.3	GERD performed by business, % GDP	🕒	0.0	87	
5.1.4	GERD financed by business, %	🕒	1.5	90	
5.1.5	Females employed w/advanced degrees, %		n/a	n/a	
5.2	**Innovation linkages**		**12.2**	**119**	
5.2.1	Public research–industry co-publications, %		0.5	118	
5.2.2	University–industry R&D collaboration†	🕒	32.3	93	
5.2.3	State of cluster development†	🕒	21.9	117	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	102	
5.2.5	Patent families/bn PPP$ GDP		0.0	102	○◇
5.3	**Knowledge absorption**		**20.6**	**92**	
5.3.1	Intellectual property payments, % total trade		0.0	113	
5.3.2	High-tech imports, % total trade		10.3	36	●
5.3.3	ICT services imports, % total trade		1.5	49	●
5.3.4	FDI net inflows, % GDP		3.0	48	●
5.3.5	Research talent, % in businesses	🕒	2.2	80	
	Knowledge and technology outputs		**14.7**	**88**	◆
6.1	**Knowledge creation**		**14.6**	**65**	●◆
6.1.1	Patents by origin/bn PPP$ GDP		0.0	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		0.7	25	●◆
6.1.4	Scientific and technical articles/bn PPP$ GDP		13.5	51	●◆
6.1.5	Citable documents H-index		9.5	80	◆
6.2	**Knowledge impact**		**23.9**	**71**	●◆
6.2.1	Labor productivity growth, %		3.5	9	●◆
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.0	133	○◇
6.2.4	High-tech manufacturing, %		n/a	n/a	
6.3	**Knowledge diffusion**		**5.7**	**116**	
6.3.1	Intellectual property receipts, % total trade		0.0	108	
6.3.2	Production and export complexity		20.9	104	
6.3.3	High-tech exports, % total trade		0.1	126	
6.3.4	ICT services exports, % total trade		0.9	87	
6.3.5	ISO 9001 quality/bn PPP$ GDP		0.2	131	○◇
	Creative outputs		**5.5**	**122**	
7.1	**Intangible assets**		**1.9**	**121**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		5.2	117	
7.1.3	Global brand value, top 5,000, % GDP		0.3	69	●◆
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.2	104	
7.2	**Creative goods and services**		**0.1**	**[132]**	
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	Creative goods exports, % total trade		0.0	121	
7.3	**Online creativity**		**18.1**	**105**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.0	133	○◇
7.3.2	GitHub commits/mn pop. 15–69		1.1	113	
7.3.3	Mobile app creation/bn PPP$ GDP		53.2	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Finland

7

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
9	5	High	EUR	5.6	335.8	59,869

		Score/Value	Rank
	Institutions	**85.5**	**4 ●**
1.1	**Institutional environment**	**85.9**	**10**
1.1.1	Operational stability for businesses*	82.0	17
1.1.2	Government effectiveness*	89.8	6
1.2	**Regulatory environment**	**94.3**	**3 ●**
1.2.1	Regulatory quality*	88.6	6
1.2.2	Rule of law*	100.0	1 ● ◆
1.3	**Business environment**	**76.4**	**12**
1.3.1	Policy stability for doing business†	84.2	6 ◆
1.3.2	Entrepreneurship policies and culture† ◷	68.7	14
	Human capital and research	**61.1**	**6**
2.1	**Education**	**68.0**	**10 ◆**
2.1.1	Expenditure on education, % GDP ◷	5.7	21
2.1.2	Government funding/pupil, secondary, % GDP/cap	25.2	20
2.1.3	School life expectancy, years	19.5	5 ◆
2.1.4	PISA scales in reading, maths and science	495.1	11
2.1.5	Pupil–teacher ratio, secondary	12.7	58 ○
2.2	**Tertiary education**	**52.1**	**10**
2.2.1	Tertiary enrolment, % gross	104.9	5 ● ◆
2.2.2	Graduates in science and engineering, %	29.4	24
2.2.3	Tertiary inbound mobility, %	8.5	33
2.3	**Research and development (R&D)**	**63.2**	**11**
2.3.1	Researchers, FTE/mn pop.	8,073.2	4 ● ◆
2.3.2	Gross expenditure on R&D, % GDP	3.0	10
2.3.3	Global corporate R&D investors, top 3, mn USD$	71.8	11
2.3.4	QS university ranking, top 3*	50.4	21
	Infrastructure	**65.9**	**2 ● ◆**
3.1	**Information and communication technologies (ICTs)**	**97.2**	**2 ● ◆**
3.1.1	ICT access*	100.0	8
3.1.2	ICT use*	95.3	3 ● ◆
3.1.3	Government's online service*	98.2	2 ● ◆
3.1.4	E-participation*	95.3	6
3.2	**General infrastructure**	**59.4**	**11**
3.2.1	Electricity output, GWh/mn pop.	12,990.8	10
3.2.2	Logistics performance*	95.5	2 ● ◆
3.2.3	Gross capital formation, % GDP	25.0	53 ○
3.3	**Ecological sustainability**	**40.9**	**14**
3.3.1	GDP/unit of energy use	8.2	87 ○
3.3.2	Low-carbon energy use, %	53.7	11 ◆
3.3.3	ISO 14001 environment/bn PPP$ GDP	5.4	17
	Market sophistication	**56.9**	**11**
4.1	**Credit**	**58.4**	**13**
4.1.1	Finance for startups and scaleups† ◷	100.0	1 ● ◆
4.1.2	Domestic credit to private sector, % GDP	95.4	25
4.1.3	Loans from microfinance institutions, % GDP	3.7	8
4.2	**Investment**	**47.9**	**14**
4.2.1	Market capitalization, % GDP	n/a	n/a
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	0.4	19
4.2.3	VC recipients, deals/bn PPP$ GDP	0.3	9
4.2.4	VC received, value, % GDP	0.0	15
4.3	**Trade, diversification and market scale**	**64.4**	**29**
4.3.1	Applied tariff rate, weighted avg., %	1.1	21 ○
4.3.2	Domestic industry diversification	95.7	13
4.3.3	Domestic market scale, bn PPP$	335.8	58 ○

		Score/Value	Rank
	Business sophistication	**61.1**	**8**
5.1	**Knowledge workers**	**69.5**	**11**
5.1.1	Knowledge-intensive employment, %	47.4	15
5.1.2	Firms offering formal training, % ◷	50.2	17
5.1.3	GERD performed by business, % GDP	2.0	10
5.1.4	GERD financed by business, %	58.1	16
5.1.5	Females employed w/advanced degrees, %	26.9	13
5.2	**Innovation linkages**	**65.0**	**5 ●**
5.2.1	Public research–industry co-publications, %	5.9	7
5.2.2	University–industry R&D collaboration†	83.4	9
5.2.3	State of cluster development†	76.5	23
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.1	14
5.2.5	Patent families/bn PPP$ GDP	7.0	6 ◆
5.3	**Knowledge absorption**	**48.7**	**13**
5.3.1	Intellectual property payments, % total trade	1.0	38
5.3.2	High-tech imports, % total trade	7.5	77 ○
5.3.3	ICT services imports, % total trade	4.3	5 ● ◆
5.3.4	FDI net inflows, % GDP	3.5	42
5.3.5	Research talent, % in businesses	60.5	15
	Knowledge and technology outputs	**58.0**	**6**
6.1	**Knowledge creation**	**60.9**	**6**
6.1.1	Patents by origin/bn PPP$ GDP	10.8	7
6.1.2	PCT patents by origin/bn PPP$ GDP	4.6	1 ● ◆
6.1.3	Utility models by origin/bn PPP$ GDP	0.7	24
6.1.4	Scientific and technical articles/bn PPP$ GDP	39.0	5 ● ◆
6.1.5	Citable documents H-index	42.5	20
6.2	**Knowledge impact**	**54.9**	**8**
6.2.1	Labor productivity growth, %	−0.7	113 ○
6.2.2	Unicorn valuation, % GDP	3.9	9
6.2.3	Software spending, % GDP	0.6	18
6.2.4	High-tech manufacturing, %	37.2	29
6.3	**Knowledge diffusion**	**58.1**	**3 ●**
6.3.1	Intellectual property receipts, % total trade	2.8	7
6.3.2	Production and export complexity	77.1	15
6.3.3	High-tech exports, % total trade	4.7	39
6.3.4	ICT services exports, % total trade	9.9	6 ◆
6.3.5	ISO 9001 quality/bn PPP$ GDP	9.4	31
	Creative outputs	**47.6**	**17**
7.1	**Intangible assets**	**45.0**	**27**
7.1.1	Intangible asset intensity, top 15, %	68.8	19
7.1.2	Trademarks by origin/bn PPP$ GDP	29.8	65 ○
7.1.3	Global brand value, top 5,000, % GDP	11.4	14
7.1.4	Industrial designs by origin/bn PPP$ GDP	2.5	36
7.2	**Creative goods and services**	**31.4**	**33**
7.2.1	Cultural and creative services exports, % total trade	0.5	51 ○
7.2.2	National feature films/mn pop. 15–69	9.0	8
7.2.3	Entertainment and media market/th pop. 15–69	48.9	14
7.2.4	Creative goods exports, % total trade	0.5	66 ○
7.3	**Online creativity**	**69.0**	**8**
7.3.1	Top-level domains (TLDs)/th pop. 15–69	31.8	22
7.3.2	GitHub commits/mn pop. 15–69	95.5	4 ● ◆
7.3.3	Mobile app creation/bn PPP$ GDP	79.9	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

France 12

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
10	17	High	EUR	66.4	3,868.6	58,765

			Score/ Value	Rank	
	Institutions		**67.5**	**29**	◇
1.1	**Institutional environment**		**71.2**	**33**	◇
1.1.1	Operational stability for businesses*		68.0	43	○◇
1.1.2	Government effectiveness*		74.4	26	◇
1.2	**Regulatory environment**		**75.4**	**23**	
1.2.1	Regulatory quality*		73.1	25	
1.2.2	Rule of law*		77.8	22	
1.3	**Business environment**		**55.8**	**43**	
1.3.1	Policy stability for doing business†		59.4	44	◇
1.3.2	Entrepreneurship policies and culture†		52.2	23	
	Human capital and research		**54.4**	**16**	
2.1	**Education**		**60.7**	**34**	
2.1.1	Expenditure on education, % GDP	◷	5.2	36	
2.1.2	Government funding/pupil, secondary, % GDP/cap		26.5	14	
2.1.3	School life expectancy, years		16.1	36	
2.1.4	PISA scales in reading, maths and science		478.3	26	
2.1.5	Pupil–teacher ratio, secondary	◷	13.4	64	○
2.2	**Tertiary education**		**40.8**	**38**	
2.2.1	Tertiary enrolment, % gross		70.8	43	
2.2.2	Graduates in science and engineering, %		25.6	41	○
2.2.3	Tertiary inbound mobility, %		9.1	30	
2.3	**Research and development (R&D)**		**61.6**	**13**	
2.3.1	Researchers, FTE/mn pop.		5,085.8	18	
2.3.2	Gross expenditure on R&D, % GDP		2.2	16	
2.3.3	Global corporate R&D investors, top 3, mn USD$		79.4	9	●
2.3.4	QS university ranking, top 3*		80.0	6	●
	Infrastructure		**54.9**	**19**	
3.1	**Information and communication technologies (ICTs)**		**84.5**	**30**	
3.1.1	ICT access*		95.7	44	
3.1.2	ICT use*		84.9	32	
3.1.3	Government's online service*		86.4	20	
3.1.4	E-participation*		70.9	37	
3.2	**General infrastructure**		**47.9**	**20**	
3.2.1	Electricity output, GWh/mn pop.		6,861.3	27	
3.2.2	Logistics performance*		81.8	13	
3.2.3	Gross capital formation, % GDP		25.6	45	○
3.3	**Ecological sustainability**		**32.3**	**36**	
3.3.1	GDP/unit of energy use		13.9	36	
3.3.2	Low-carbon energy use, %		44.5	16	
3.3.3	ISO 14001 environment/bn PPP$ GDP		1.8	56	○
	Market sophistication		**60.9**	**10**	●
4.1	**Credit**		**57.5**	**14**	
4.1.1	Finance for startups and scaleups†		71.2	14	
4.1.2	Domestic credit to private sector, % GDP		120.0	16	
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**37.4**	**20**	
4.2.1	Market capitalization, % GDP	◷	92.7	21	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.3	24	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.2	14	
4.2.4	VC received, value, % GDP		0.0	17	
4.3	**Trade, diversification and market scale**		**87.9**	**7**	●◆
4.3.1	Applied tariff rate, weighted avg., %		1.1	21	○
4.3.2	Domestic industry diversification		96.3	10	●
4.3.3	Domestic market scale, bn PPP$		3,868.6	10	●◆

			Score/ Value	Rank	
	Business sophistication		**55.5**	**17**	
5.1	**Knowledge workers**		**70.5**	**9**	●
5.1.1	Knowledge-intensive employment, %		47.7	14	
5.1.2	Firms offering formal training, %	◷	67.9	2	●◆
5.1.3	GERD performed by business, % GDP		1.4	17	
5.1.4	GERD financed by business, %		55.4	20	
5.1.5	Females employed w/advanced degrees, %		25.8	16	
5.2	**Innovation linkages**		**48.4**	**23**	◇
5.2.1	Public research–industry co-publications, %		4.6	15	
5.2.2	University–industry R&D collaboration†		60.6	35	◇
5.2.3	State of cluster development†		75.4	26	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.1	25	
5.2.5	Patent families/bn PPP$ GDP		2.9	14	
5.3	**Knowledge absorption**		**47.5**	**15**	
5.3.1	Intellectual property payments, % total trade		1.5	23	
5.3.2	High-tech imports, % total trade		9.9	40	
5.3.3	ICT services imports, % total trade		3.0	13	
5.3.4	FDI net inflows, % GDP		2.6	60	○
5.3.5	Research talent, % in businesses		61.7	10	
	Knowledge and technology outputs		**43.6**	**16**	
6.1	**Knowledge creation**		**42.0**	**20**	
6.1.1	Patents by origin/bn PPP$ GDP		6.6	13	
6.1.2	PCT patents by origin/bn PPP$ GDP		2.0	16	
6.1.3	Utility models by origin/bn PPP$ GDP		0.1	51	○
6.1.4	Scientific and technical articles/bn PPP$ GDP		17.4	40	◇
6.1.5	Citable documents H-index		78.0	5	●
6.2	**Knowledge impact**		**48.5**	**15**	
6.2.1	Labor productivity growth, %		−0.8	115	○◇
6.2.2	Unicorn valuation, % GDP		1.9	19	
6.2.3	Software spending, % GDP		0.6	8	●
6.2.4	High-tech manufacturing, %		46.2	14	
6.3	**Knowledge diffusion**		**40.4**	**26**	
6.3.1	Intellectual property receipts, % total trade		1.6	15	
6.3.2	Production and export complexity		76.7	17	
6.3.3	High-tech exports, % total trade		10.4	18	
6.3.4	ICT services exports, % total trade		2.4	50	○
6.3.5	ISO 9001 quality/bn PPP$ GDP		5.9	47	○
	Creative outputs		**60.8**	**4**	●◆
7.1	**Intangible assets**		**80.0**	**3**	●◆
7.1.1	Intangible asset intensity, top 15, %		84.5	5	●◆
7.1.2	Trademarks by origin/bn PPP$ GDP		79.2	13	◆
7.1.3	Global brand value, top 5,000, % GDP		17.3	6	●
7.1.4	Industrial designs by origin/bn PPP$ GDP		10.0	7	●◆
7.2	**Creative goods and services**		**31.2**	**34**	
7.2.1	Cultural and creative services exports, % total trade		1.2	21	
7.2.2	National feature films/mn pop. 15–69		4.7	29	
7.2.3	Entertainment and media market/th pop. 15–69		43.6	19	
7.2.4	Creative goods exports, % total trade		1.5	32	
7.3	**Online creativity**		**51.9**	**26**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		29.9	24	
7.3.2	GitHub commits/mn pop. 15–69		50.5	21	◇
7.3.3	Mobile app creation/bn PPP$ GDP		75.4	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Georgia 57

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
73	48	Upper middle	NAWA	3.8	82.2	22,357

			Score/ Value	Rank	
	Institutions		**67.0**	**32**	◆
1.1	**Institutional environment**		**63.2**	**45**	◆
1.1.1	Operational stability for businesses*		65.3	55	
1.1.2	Government effectiveness*		61.0	39	◆
1.2	**Regulatory environment**		**58.8**	**42**	◆
1.2.1	Regulatory quality*		69.0	31	◆
1.2.2	Rule of law*		48.7	57	
1.3	**Business environment**		**79.1**	**8**	●◆
1.3.1	Policy stability for doing business†		72.1	21	●◆
1.3.2	Entrepreneurship policies and culture†	◷	86.1	2	
	Human capital and research		**32.6**	**60**	
2.1	**Education**		**54.6**	**57**	
2.1.1	Expenditure on education, % GDP		3.8	80	
2.1.2	Government funding/pupil, secondary, % GDP/cap		n/a	n/a	
2.1.3	School life expectancy, years		16.7	25	◆
2.1.4	PISA scales in reading, maths and science		382.7	69	○
2.1.5	Pupil–teacher ratio, secondary		8.1	12	●
2.2	**Tertiary education**		**37.6**	**47**	
2.2.1	Tertiary enrolment, % gross		78.5	26	●◆
2.2.2	Graduates in science and engineering, %		19.6	79	
2.2.3	Tertiary inbound mobility, %		10.7	24	●◆
2.3	**Research and development (R&D)**		**5.5**	**72**	
2.3.1	Researchers, FTE/mn pop.		1,823.0	41	◆
2.3.2	Gross expenditure on R&D, % GDP		0.2	82	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**38.3**	**74**	
3.1	**Information and communication technologies (ICTs)**		**71.8**	**69**	
3.1.1	ICT access*		95.2	48	
3.1.2	ICT use*		82.8	42	
3.1.3	Government's online service*		57.0	82	
3.1.4	E-participation*		52.3	71	
3.2	**General infrastructure**		**20.5**	**97**	
3.2.1	Electricity output, GWh/mn pop.		3,837.9	56	
3.2.2	Logistics performance*		27.3	76	
3.2.3	Gross capital formation, % GDP		20.3	97	
3.3	**Ecological sustainability**		**22.5**	**58**	
3.3.1	GDP/unit of energy use		11.0	60	
3.3.2	Low-carbon energy use, %		36.4	21	●
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.2	115	○
	Market sophistication		**33.0**	**64**	
4.1	**Credit**		**33.3**	**45**	
4.1.1	Finance for startups and scaleups†	◷	53.6	34	
4.1.2	Domestic credit to private sector, % GDP		63.6	50	
4.1.3	Loans from microfinance institutions, % GDP		2.2	20	
4.2	**Investment**		**4.3**	**89**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.0	90	○
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	57	
4.2.4	VC received, value, % GDP		0.0	93	○
4.3	**Trade, diversification and market scale**		**61.4**	**45**	
4.3.1	Applied tariff rate, weighted avg., %		0.3	4	●◆
4.3.2	Domestic industry diversification		85.0	55	
4.3.3	Domestic market scale, bn PPP$		82.2	94	

			Score/ Value	Rank	
	Business sophistication		**29.3**	**55**	
5.1	**Knowledge workers**		**34.1**	**60**	
5.1.1	Knowledge-intensive employment, %	◷	24.7	59	
5.1.2	Firms offering formal training, %		31.4	55	
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, %	◷	18.1	38	◆
5.2	**Innovation linkages**		**29.6**	**47**	
5.2.1	Public research–industry co-publications, %		0.9	90	
5.2.2	University–industry R&D collaboration†		58.4	41	
5.2.3	State of cluster development†		69.3	34	◆
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	56	
5.2.5	Patent families/bn PPP$ GDP		0.1	52	
5.3	**Knowledge absorption**		**24.3**	**74**	
5.3.1	Intellectual property payments, % total trade		0.7	61	
5.3.2	High-tech imports, % total trade		7.3	82	
5.3.3	ICT services imports, % total trade		0.9	86	
5.3.4	FDI net inflows, % GDP		6.2	18	●◆
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**20.2**	**72**	
6.1	**Knowledge creation**		**13.5**	**68**	
6.1.1	Patents by origin/bn PPP$ GDP		1.2	52	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.1	66	
6.1.3	Utility models by origin/bn PPP$ GDP		0.5	31	
6.1.4	Scientific and technical articles/bn PPP$ GDP		11.3	66	
6.1.5	Citable documents H-index		10.6	72	
6.2	**Knowledge impact**		**29.1**	**57**	
6.2.1	Labor productivity growth, %		7.0	1	●◆
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.1	103	○
6.2.4	High-tech manufacturing, %		9.6	89	○
6.3	**Knowledge diffusion**		**18.2**	**63**	
6.3.1	Intellectual property receipts, % total trade		0.0	77	
6.3.2	Production and export complexity		44.4	59	
6.3.3	High-tech exports, % total trade		1.0	76	
6.3.4	ICT services exports, % total trade		4.2	26	●
6.3.5	ISO 9001 quality/bn PPP$ GDP		2.4	85	
	Creative outputs		**21.2**	**77**	
7.1	**Intangible assets**		**18.7**	**82**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		36.9	55	
7.1.3	Global brand value, top 5,000, % GDP		1.5	49	
7.1.4	Industrial designs by origin/bn PPP$ GDP		2.5	37	
7.2	**Creative goods and services**		**12.4**	**67**	
7.2.1	Cultural and creative services exports, % total trade		0.6	45	
7.2.2	National feature films/mn pop. 15–69	◷	2.7	48	
7.2.3	Entertainment and media market/th pop. 15–69		n/a	n/a	
7.2.4	Creative goods exports, % total trade		0.2	75	
7.3	**Online creativity**		**35.0**	**44**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		3.9	62	
7.3.2	GitHub commits/mn pop. 15–69		35.2	33	◆
7.3.3	Mobile app creation/bn PPP$ GDP		66.0	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Germany

GII 2024 rank

9

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
6	13	High	EUR	84.5	5,538.0	66,038

		Score/Value	Rank	
	Institutions	**73.5**	**19**	
1.1	**Institutional environment**	**78.5**	**20**	
1.1.1	Operational stability for businesses*	79.3	24	
1.1.2	Government effectiveness*	77.7	21	
1.2	**Regulatory environment**	**84.8**	**13**	
1.2.1	Regulatory quality*	81.8	15	
1.2.2	Rule of law*	87.8	14	
1.3	**Business environment**	**57.3**	**37**	
1.3.1	Policy stability for doing business†	67.1	31	
1.3.2	Entrepreneurship policies and culture†	47.4	33	○

		Score/Value	Rank	
	Human capital and research	**61.4**	**5**	●
2.1	**Education**	**62.0**	**30**	
2.1.1	Expenditure on education, % GDP	4.5	55	○
2.1.2	Government funding/pupil, secondary, % GDP/cap	26.4	16	
2.1.3	School life expectancy, years ⏲	17.3	18	
2.1.4	PISA scales in reading, maths and science	482.3	23	
2.1.5	Pupil–teacher ratio, secondary ⏲	11.4	44	
2.2	**Tertiary education**	**53.9**	**9**	
2.2.1	Tertiary enrolment, % gross ⏲	75.7	29	
2.2.2	Graduates in science and engineering, %	35.1	7	● ◆
2.2.3	Tertiary inbound mobility, % ⏲	11.2	22	
2.3	**Research and development (R&D)**	**68.4**	**7**	●
2.3.1	Researchers, FTE/mn pop.	5,824.6	12	
2.3.2	Gross expenditure on R&D, % GDP	3.1	9	
2.3.3	Global corporate R&D investors, top 3, mn USD$	90.5	3	● ◆
2.3.4	QS university ranking, top 3*	72.4	11	

		Score/Value	Rank	
	Infrastructure	**52.9**	**27**	
3.1	**Information and communication technologies (ICTs)**	**81.6**	**41**	◇
3.1.1	ICT access*	97.5	32	
3.1.2	ICT use*	80.2	52	○ ◇
3.1.3	Government's online service*	76.8	44	◇
3.1.4	E-participation*	72.1	32	
3.2	**General infrastructure**	**49.4**	**18**	
3.2.1	Electricity output, GWh/mn pop.	6,963.3	24	
3.2.2	Logistics performance*	90.9	3	● ◆
3.2.3	Gross capital formation, % GDP	24.0	61	○
3.3	**Ecological sustainability**	**27.8**	**44**	
3.3.1	GDP/unit of energy use	15.6	25	
3.3.2	Low-carbon energy use, %	22.8	56	○
3.3.3	ISO 14001 environment/bn PPP$ GDP	2.7	36	

		Score/Value	Rank	
	Market sophistication	**56.4**	**13**	
4.1	**Credit**	**46.7**	**28**	
4.1.1	Finance for startups and scaleups†	64.0	20	
4.1.2	Domestic credit to private sector, % GDP	83.4	35	
4.1.3	Loans from microfinance institutions, % GDP	n/a	n/a	
4.2	**Investment**	**27.2**	**30**	
4.2.1	Market capitalization, % GDP	54.5	34	○
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	0.3	26	
4.2.3	VC recipients, deals/bn PPP$ GDP	0.1	24	
4.2.4	VC received, value, % GDP	0.0	26	
4.3	**Trade, diversification and market scale**	**95.3**	**2**	● ◆
4.3.1	Applied tariff rate, weighted avg., %	1.1	21	
4.3.2	Domestic industry diversification	94.8	19	
4.3.3	Domestic market scale, bn PPP$	5,538.0	1	● ◆

		Score/Value	Rank	
	Business sophistication	**55.3**	**18**	
5.1	**Knowledge workers**	**61.9**	**20**	
5.1.1	Knowledge-intensive employment, %	46.1	20	
5.1.2	Firms offering formal training, % ⏲	44.1	26	
5.1.3	GERD performed by business, % GDP	2.1	9	
5.1.4	GERD financed by business, %	62.8	10	
5.1.5	Females employed w/advanced degrees, %	16.1	48	◇
5.2	**Innovation linkages**	**58.5**	**12**	
5.2.1	Public research–industry co-publications, %	6.1	6	●
5.2.2	University–industry R&D collaboration†	79.1	15	
5.2.3	State of cluster development†	85.0	13	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	29	◇
5.2.5	Patent families/bn PPP$ GDP	5.0	8	●
5.3	**Knowledge absorption**	**45.5**	**20**	
5.3.1	Intellectual property payments, % total trade	1.1	32	
5.3.2	High-tech imports, % total trade	12.0	22	
5.3.3	ICT services imports, % total trade	2.7	19	
5.3.4	FDI net inflows, % GDP	2.5	64	○
5.3.5	Research talent, % in businesses	61.5	12	

		Score/Value	Rank	
	Knowledge and technology outputs	**53.9**	**11**	
6.1	**Knowledge creation**	**57.0**	**9**	
6.1.1	Patents by origin/bn PPP$ GDP	11.5	6	●
6.1.2	PCT patents by origin/bn PPP$ GDP	3.1	11	
6.1.3	Utility models by origin/bn PPP$ GDP	1.0	18	
6.1.4	Scientific and technical articles/bn PPP$ GDP	18.9	36	
6.1.5	Citable documents H-index	87.3	3	● ◆
6.2	**Knowledge impact**	**50.6**	**11**	
6.2.1	Labor productivity growth, %	−0.1	97	○
6.2.2	Unicorn valuation, % GDP	1.7	23	
6.2.3	Software spending, % GDP	0.5	19	
6.2.4	High-tech manufacturing, %	57.5	5	●
6.3	**Knowledge diffusion**	**54.1**	**10**	
6.3.1	Intellectual property receipts, % total trade	2.7	10	
6.3.2	Production and export complexity	91.8	4	● ◆
6.3.3	High-tech exports, % total trade	12.8	13	
6.3.4	ICT services exports, % total trade	2.1	55	○
6.3.5	ISO 9001 quality/bn PPP$ GDP	10.3	26	

		Score/Value	Rank	
	Creative outputs	**58.6**	**5**	● ◆
7.1	**Intangible assets**	**68.6**	**5**	● ◆
7.1.1	Intangible asset intensity, top 15, %	70.1	16	
7.1.2	Trademarks by origin/bn PPP$ GDP	53.9	28	
7.1.3	Global brand value, top 5,000, % GDP	15.1	8	
7.1.4	Industrial designs by origin/bn PPP$ GDP	8.9	8	◆
7.2	**Creative goods and services**	**31.9**	**30**	
7.2.1	Cultural and creative services exports, % total trade	1.0	30	
7.2.2	National feature films/mn pop. 15–69	4.0	33	○
7.2.3	Entertainment and media market/th pop. 15–69	50.6	12	
7.2.4	Creative goods exports, % total trade	2.0	26	
7.3	**Online creativity**	**65.3**	**11**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69	63.1	7	●
7.3.2	GitHub commits/mn pop. 15–69	62.6	15	
7.3.3	Mobile app creation/bn PPP$ GDP	70.3	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Ghana

GII 2024 rank

101

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
94	108	Lower middle	SSA	33.8	227.2	6,905

			Score/ Value	Rank	
	Institutions		**45.3**	**71**	
1.1	**Institutional environment**		**44.8**	**87**	
1.1.1	Operational stability for businesses*		47.3	98	
1.1.2	Government effectiveness*		42.3	74	◆
1.2	**Regulatory environment**		**39.4**	**73**	◆
1.2.1	Regulatory quality*		37.1	83	◆
1.2.2	Rule of law*		41.6	65	◆
1.3	**Business environment**		**51.6**	**[54]**	
1.3.1	Policy stability for doing business†		51.6	58	
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**16.7**	**113**	
2.1	**Education**		**39.8**	**97**	
2.1.1	Expenditure on education, % GDP		2.9	104	
2.1.2	Government funding/pupil, secondary, % GDP/cap	⏲	19.5	54	
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	⏲	16.1	84	
2.2	**Tertiary education**		**10.1**	**112**	
2.2.1	Tertiary enrolment, % gross		20.4	102	
2.2.2	Graduates in science and engineering, %		14.3	104	◇
2.2.3	Tertiary inbound mobility, %		0.9	91	
2.3	**Research and development (R&D)**		**0.2**	**114**	
2.3.1	Researchers, FTE/mn pop.	⏲	87.0	95	
2.3.2	Gross expenditure on R&D, % GDP		n/a	n/a	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**27.2**	**105**	
3.1	**Information and communication technologies (ICTs)**		**51.4**	**100**	
3.1.1	ICT access*		53.7	106	
3.1.2	ICT use*		59.1	99	
3.1.3	Government's online service*		48.7	94	
3.1.4	E-participation*		44.2	83	
3.2	**General infrastructure**		**9.6**	**125**	○
3.2.1	Electricity output, GWh/mn pop.	⏲	671.6	104	
3.2.2	Logistics performance*		18.2	89	
3.2.3	Gross capital formation, % GDP		16.6	118	◇
3.3	**Ecological sustainability**		**20.4**	**66**	
3.3.1	GDP/unit of energy use		15.8	24	●◆
3.3.2	Low-carbon energy use, %		18.7	60	
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.6	90	
	Market sophistication		**11.1**	**129**	○◇
4.1	**Credit**		**1.5**	**133**	○◇
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		12.3	127	○
4.1.3	Loans from microfinance institutions, % GDP		0.1	54	
4.2	**Investment**		**8.3**	**67**	
4.2.1	Market capitalization, % GDP		11.7	72	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.1	65	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.1	47	●
4.2.4	VC received, value, % GDP		0.0	57	
4.3	**Trade, diversification and market scale**		**23.5**	**121**	◇
4.3.1	Applied tariff rate, weighted avg., %		7.3	114	
4.3.2	Domestic industry diversification		n/a	n/a	
4.3.3	Domestic market scale, bn PPP$		227.2	69	

			Score/ Value	Rank	
	Business sophistication		**24.2**	**76**	
5.1	**Knowledge workers**		**28.6**	**[76]**	
5.1.1	Knowledge-intensive employment, %		8.7	112	
5.1.2	Firms offering formal training, %		49.8	20	●◆
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, %	⏲	3.3	101	
5.2	**Innovation linkages**		**24.0**	**62**	
5.2.1	Public research–industry co-publications, %		1.3	73	
5.2.2	University–industry R&D collaboration†		47.2	59	
5.2.3	State of cluster development†		54.3	52	●
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	79	
5.2.5	Patent families/bn PPP$ GDP		0.0	102	○◇
5.3	**Knowledge absorption**		**20.1**	**95**	
5.3.1	Intellectual property payments, % total trade		0.9	41	●◆
5.3.2	High-tech imports, % total trade		4.0	123	
5.3.3	ICT services imports, % total trade		0.7	102	
5.3.4	FDI net inflows, % GDP		2.7	58	●
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**9.8**	**116**	
6.1	**Knowledge creation**		**6.7**	**102**	
6.1.1	Patents by origin/bn PPP$ GDP		0.0	123	○
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	70	
6.1.4	Scientific and technical articles/bn PPP$ GDP		11.3	64	
6.1.5	Citable documents H-index		9.3	83	
6.2	**Knowledge impact**		**17.3**	**115**	
6.2.1	Labor productivity growth, %		0.9	58	●
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.0	130	○◇
6.2.4	High-tech manufacturing, %		n/a	n/a	
6.3	**Knowledge diffusion**		**5.2**	**118**	
6.3.1	Intellectual property receipts, % total trade		0.1	53	●◆
6.3.2	Production and export complexity		13.4	115	○◇
6.3.3	High-tech exports, % total trade		0.1	117	
6.3.4	ICT services exports, % total trade		0.8	88	
6.3.5	ISO 9001 quality/bn PPP$ GDP		0.9	115	
	Creative outputs		**20.6**	**79**	
7.1	**Intangible assets**		**17.4**	**83**	
7.1.1	Intangible asset intensity, top 15, %	⏲	–52.8	77	○◇
7.1.2	Trademarks by origin/bn PPP$ GDP		3.1	125	○
7.1.3	Global brand value, top 5,000, % GDP		n/a	n/a	
7.1.4	Industrial designs by origin/bn PPP$ GDP		3.0	28	●
7.2	**Creative goods and services**		**32.5**	**[26]**	
7.2.1	Cultural and creative services exports, % total trade		2.3	10	●◆
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	Creative goods exports, % total trade		0.0	116	
7.3	**Online creativity**		**15.1**	**116**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.2	118	
7.3.2	GitHub commits/mn pop. 15–69		4.7	78	
7.3.3	Mobile app creation/bn PPP$ GDP		40.3	118	◇

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Greece

GII 2024 rank

45

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
43	43	High	EUR	10.2	417.0	39,864

			Score/ Value	Rank	
	Institutions		**50.5**	**57**	◇
1.1	**Institutional environment**		**62.2**	**48**	◇
1.1.1	Operational stability for businesses*		68.7	42	
1.1.2	Government effectiveness*		55.7	49	◇
1.2	**Regulatory environment**		**53.6**	**51**	◇
1.2.1	Regulatory quality*		54.0	50	◇
1.2.2	Rule of law*		53.2	52	◇
1.3	**Business environment**		**35.7**	**90**	○◇
1.3.1	Policy stability for doing business†		49.2	65	
1.3.2	Entrepreneurship policies and culture†		22.2	65	○◇
	Human capital and research		**46.7**	**29**	
2.1	**Education**		**59.8**	**38**	
2.1.1	Expenditure on education, % GDP	⏲	4.1	68	
2.1.2	Government funding/pupil, secondary, % GDP/cap	⏲	20.1	50	
2.1.3	School life expectancy, years	⏲	20.0	2	●◆
2.1.4	PISA scales in reading, maths and science		436.5	45	
2.1.5	Pupil–teacher ratio, secondary	⏲	8.2	15	●◆
2.2	**Tertiary education**		**55.5**	**7**	●
2.2.1	Tertiary enrolment, % gross	⏲	150.2	1	●◆
2.2.2	Graduates in science and engineering, %		27.5	33	
2.2.3	Tertiary inbound mobility, %	⏲	2.8	68	
2.3	**Research and development (R&D)**		**24.9**	**40**	
2.3.1	Researchers, FTE/mn pop.		4,776.4	23	●
2.3.2	Gross expenditure on R&D, % GDP		1.5	26	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		26.8	47	
	Infrastructure		**49.3**	**42**	
3.1	**Information and communication technologies (ICTs)**		**76.9**	**51**	
3.1.1	ICT access*		92.6	57	
3.1.2	ICT use*		79.5	58	
3.1.3	Government's online service*		75.2	48	
3.1.4	E-participation*		60.5	55	
3.2	**General infrastructure**		**36.5**	**47**	
3.2.1	Electricity output, GWh/mn pop.		4,690.6	47	
3.2.2	Logistics performance*		72.7	18	
3.2.3	Gross capital formation, % GDP		20.1	100	○
3.3	**Ecological sustainability**		**34.6**	**29**	
3.3.1	GDP/unit of energy use		15.4	28	
3.3.2	Low-carbon energy use, %		19.2	58	
3.3.3	ISO 14001 environment/bn PPP$ GDP		5.9	16	●
	Market sophistication		**32.8**	**66**	
4.1	**Credit**		**28.9**	**60**	
4.1.1	Finance for startups and scaleups†		40.5	55	○◇
4.1.2	Domestic credit to private sector, % GDP		52.6	62	
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**7.5**	**70**	
4.2.1	Market capitalization, % GDP		27.3	54	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.1	46	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	69	
4.2.4	VC received, value, % GDP		0.0	61	
4.3	**Trade, diversification and market scale**		**61.9**	**42**	
4.3.1	Applied tariff rate, weighted avg., %		1.1	21	
4.3.2	Domestic industry diversification	⏲	86.4	47	
4.3.3	Domestic market scale, bn PPP$		417.0	53	

			Score/ Value	Rank	
	Business sophistication		**26.7**	**65**	◇
5.1	**Knowledge workers**		**38.3**	**53**	
5.1.1	Knowledge-intensive employment, %		32.0	47	
5.1.2	Firms offering formal training, %		13.7	91	○◇
5.1.3	GERD performed by business, % GDP		0.7	35	
5.1.4	GERD financed by business, %		38.3	48	
5.1.5	Females employed w/advanced degrees, %		19.9	33	
5.2	**Innovation linkages**		**18.0**	**91**	○◇
5.2.1	Public research–industry co-publications, %		2.3	34	
5.2.2	University–industry R&D collaboration†		25.2	106	○◇
5.2.3	State of cluster development†		20.8	118	○◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	37	
5.2.5	Patent families/bn PPP$ GDP		0.4	37	
5.3	**Knowledge absorption**		**23.8**	**75**	◇
5.3.1	Intellectual property payments, % total trade		0.4	81	
5.3.2	High-tech imports, % total trade		7.2	85	
5.3.3	ICT services imports, % total trade		0.8	90	○◇
5.3.4	FDI net inflows, % GDP		2.6	61	
5.3.5	Research talent, % in businesses		30.3	46	
	Knowledge and technology outputs		**29.6**	**40**	
6.1	**Knowledge creation**		**25.0**	**37**	
6.1.1	Patents by origin/bn PPP$ GDP		1.6	38	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.3	42	
6.1.3	Utility models by origin/bn PPP$ GDP		0.0	63	○
6.1.4	Scientific and technical articles/bn PPP$ GDP		29.0	18	●
6.1.5	Citable documents H-index		33.9	29	
6.2	**Knowledge impact**		**38.6**	**28**	●
6.2.1	Labor productivity growth, %		0.8	62	
6.2.2	Unicorn valuation, % GDP		1.3	28	●
6.2.3	Software spending, % GDP		0.6	14	●◆
6.2.4	High-tech manufacturing, %	⏲	16.5	72	○
6.3	**Knowledge diffusion**		**25.3**	**52**	
6.3.1	Intellectual property receipts, % total trade		0.1	64	
6.3.2	Production and export complexity		49.4	50	
6.3.3	High-tech exports, % total trade		2.5	54	
6.3.4	ICT services exports, % total trade		1.1	80	
6.3.5	ISO 9001 quality/bn PPP$ GDP		19.8	8	●◆
	Creative outputs		**32.6**	**41**	
7.1	**Intangible assets**		**38.0**	**40**	
7.1.1	Intangible asset intensity, top 15, %		56.5	37	
7.1.2	Trademarks by origin/bn PPP$ GDP		n/a	n/a	
7.1.3	Global brand value, top 5,000, % GDP		0.6	60	
7.1.4	Industrial designs by origin/bn PPP$ GDP		3.2	26	●
7.2	**Creative goods and services**		**20.3**	**55**	
7.2.1	Cultural and creative services exports, % total trade		0.5	55	
7.2.2	National feature films/mn pop. 15–69		4.9	26	
7.2.3	Entertainment and media market/th pop. 15–69		21.8	29	
7.2.4	Creative goods exports, % total trade		1.3	37	
7.3	**Online creativity**		**34.0**	**46**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		16.8	33	
7.3.2	GitHub commits/mn pop. 15–69		23.2	42	
7.3.3	Mobile app creation/bn PPP$ GDP		62.0	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Guatemala

122

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
122	117	Upper middle	LCN	18.1	201.4	10,595

		Score/ Value	Rank	
	Institutions	**28.8**	**114**	◇
1.1	**Institutional environment**	**36.1**	**105**	◇
1.1.1	Operational stability for businesses*	52.0	89	
1.1.2	Government effectiveness*	20.3	122	◇
1.2	**Regulatory environment**	**22.8**	**108**	◇
1.2.1	Regulatory quality*	34.2	88	
1.2.2	Rule of law*	11.5	124	◇
1.3	**Business environment**	**27.4**	**106**	
1.3.1	Policy stability for doing business†	42.4	81	
1.3.2	Entrepreneurship policies and culture†	12.4	75	
	Human capital and research	**12.1**	**126**	◇
2.1	**Education**	**31.7**	**118**	◇
2.1.1	Expenditure on education, % GDP	3.2	100	
2.1.2	Government funding/pupil, secondary, % GDP/cap	5.9	95	○◇
2.1.3	School life expectancy, years ⏲	10.8	100	◇
2.1.4	PISA scales in reading, maths and science	363.8	77	
2.1.5	Pupil–teacher ratio, secondary	9.1	22	●
2.2	**Tertiary education**	**4.3**	**124**	○◇
2.2.1	Tertiary enrolment, % gross ⏲	18.7	105	◇
2.2.2	Graduates in science and engineering, % ⏲	9.8	110	
2.2.3	Tertiary inbound mobility, % ⏲	0.2	108	○◇
2.3	**Research and development (R&D)**	**0.2**	**115**	
2.3.1	Researchers, FTE/mn pop. ⏲	14.5	109	○◇
2.3.2	Gross expenditure on R&D, % GDP ⏲	0.1	109	○
2.3.3	Global corporate R&D investors, top 3, mn USD$	0.0	41	○◇
2.3.4	QS university ranking, top 3*	0.0	75	○◇
	Infrastructure	**24.0**	**117**	◇
3.1	**Information and communication technologies (ICTs)**	**43.1**	**110**	◇
3.1.1	ICT access* ⏲	48.6	109	◇
3.1.2	ICT use*	n/a	n/a	
3.1.3	Government's online service*	49.3	92	
3.1.4	E-participation*	31.4	104	◇
3.2	**General infrastructure**	**11.3**	**123**	◇
3.2.1	Electricity output, GWh/mn pop. ⏲	812.4	101	◇
3.2.2	Logistics performance*	22.7	82	
3.2.3	Gross capital formation, % GDP	16.6	119	◇
3.3	**Ecological sustainability**	**17.7**	**74**	
3.3.1	GDP/unit of energy use	9.5	78	
3.3.2	Low-carbon energy use, %	27.3	44	●
3.3.3	ISO 14001 environment/bn PPP$ GDP	0.3	113	
	Market sophistication	**19.4**	**111**	◇
4.1	**Credit**	**11.8**	**109**	
4.1.1	Finance for startups and scaleups†	12.5	82	○◇
4.1.2	Domestic credit to private sector, % GDP	36.8	83	
4.1.3	Loans from microfinance institutions, % GDP	n/a	n/a	
4.2	**Investment**	**1.1**	**109**	
4.2.1	Market capitalization, % GDP	n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	0.0	93	
4.2.3	VC recipients, deals/bn PPP$ GDP	0.0	100	
4.2.4	VC received, value, % GDP	0.0	96	
4.3	**Trade, diversification and market scale**	**45.4**	**90**	
4.3.1	Applied tariff rate, weighted avg., %	1.7	61	●
4.3.2	Domestic industry diversification	n/a	n/a	
4.3.3	Domestic market scale, bn PPP$	201.4	73	

		Score/ Value	Rank	
	Business sophistication	**22.4**	**88**	
5.1	**Knowledge workers**	**22.7**	**98**	◇
5.1.1	Knowledge-intensive employment, %	10.9	107	◇
5.1.2	Firms offering formal training, % ⏲	55.7	11	
5.1.3	GERD performed by business, % GDP ⏲	0.0	91	○
5.1.4	GERD financed by business, % ⏲	11.1	76	
5.1.5	Females employed w/advanced degrees, % ⏲	3.8	99	◇
5.2	**Innovation linkages**	**18.2**	**90**	
5.2.1	Public research–industry co-publications, %	0.9	89	
5.2.2	University–industry R&D collaboration†	37.9	81	
5.2.3	State of cluster development†	42.3	78	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP ⏲	0.0	116	
5.2.5	Patent families/bn PPP$ GDP	0.0	97	
5.3	**Knowledge absorption**	**26.5**	**64**	●
5.3.1	Intellectual property payments, % total trade	1.6	20	●
5.3.2	High-tech imports, % total trade	10.7	34	●
5.3.3	ICT services imports, % total trade	1.2	69	●
5.3.4	FDI net inflows, % GDP	2.3	69	●
5.3.5	Research talent, % in businesses ⏲	3.5	77	◇
	Knowledge and technology outputs	**10.7**	**109**	◇
6.1	**Knowledge creation**	**1.4**	**129**	○◇
6.1.1	Patents by origin/bn PPP$ GDP	0.0	120	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	96	
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	66	
6.1.4	Scientific and technical articles/bn PPP$ GDP	1.3	129	○◇
6.1.5	Citable documents H-index	4.0	114	
6.2	**Knowledge impact**	**16.9**	**118**	
6.2.1	Labor productivity growth, %	0.7	65	●
6.2.2	Unicorn valuation, % GDP	0.0	49	○◇
6.2.3	Software spending, % GDP	0.0	127	◇
6.2.4	High-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**13.8**	**79**	
6.3.1	Intellectual property receipts, % total trade	0.1	62	●
6.3.2	Production and export complexity	37.9	74	
6.3.3	High-tech exports, % total trade	1.4	69	●
6.3.4	ICT services exports, % total trade	2.4	51	●
6.3.5	ISO 9001 quality/bn PPP$ GDP	1.3	109	
	Creative outputs	**4.8**	**[125]**	
7.1	**Intangible assets**	**0.8**	**[129]**	
7.1.1	Intangible asset intensity, top 15, %	n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP	n/a	n/a	
7.1.3	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.4	Industrial designs by origin/bn PPP$ GDP	0.1	112	
7.2	**Creative goods and services**	**2.5**	**[107]**	
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	Creative goods exports, % total trade	0.2	78	
7.3	**Online creativity**	**15.2**	**113**	◇
7.3.1	Top-level domains (TLDs)/th pop. 15–69	1.8	82	
7.3.2	GitHub commits/mn pop. 15–69	2.2	102	
7.3.3	Mobile app creation/bn PPP$ GDP	41.6	116	◇

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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Honduras

GII 2024 rank

114

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
111	112	Lower middle	LCN	10.6	75.0	7,163

			Score/ Value	Rank	
	Institutions		**22.2**	**122**	
1.1	**Institutional environment**		**32.7**	**111**	
1.1.1	Operational stability for businesses*		44.0	106	
1.1.2	Government effectiveness*		21.4	118	
1.2	**Regulatory environment**		**21.9**	**110**	
1.2.1	Regulatory quality*		29.1	99	
1.2.2	Rule of law*		14.7	119	
1.3	**Business environment**		**11.9**	**[127]**	
1.3.1	Policy stability for doing business†		11.9	125	◇
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**25.5**	**88**	
2.1	**Education**		**63.1**	**[22]**	
2.1.1	Expenditure on education, % GDP		4.4	57	●
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		11.8	50	● ◆
2.2	**Tertiary education**		**12.7**	**108**	
2.2.1	Tertiary enrolment, % gross	⏲	25.1	95	
2.2.2	Graduates in science and engineering, %	⏲	15.7	99	◇
2.2.3	Tertiary inbound mobility, %	⏲	0.8	93	
2.3	**Research and development (R&D)**		**0.6**	**106**	
2.3.1	Researchers, FTE/mn pop.	⏲	187.4	84	
2.3.2	Gross expenditure on R&D, % GDP	⏲	0.1	108	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○ ◇
2.3.4	QS university ranking, top 3*		0.0	75	○ ◇
	Infrastructure		**25.3**	**112**	
3.1	**Information and communication technologies (ICTs)**		**31.4**	**120**	◇
3.1.1	ICT access*		49.4	108	
3.1.2	ICT use*		52.0	106	
3.1.3	Government's online service*		16.2	131	○ ◇
3.1.4	E-participation*		8.1	131	○ ◇
3.2	**General infrastructure**		**23.6**	**91**	
3.2.1	Electricity output, GWh/mn pop.	⏲	1,081.9	96	
3.2.2	Logistics performance*		36.4	65	
3.2.3	Gross capital formation, % GDP		23.7	64	
3.3	**Ecological sustainability**		**21.0**	**64**	
3.3.1	GDP/unit of energy use		9.1	85	
3.3.2	Low-carbon energy use, %		34.3	25	●
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.6	89	
	Market sophistication		**22.8**	**[100]**	
4.1	**Credit**		**23.9**	**[74]**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		69.5	47	●
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**1.0**	**[111]**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.0	86	
4.2.3	VC recipients, deals/bn PPP$ GDP		n/a	n/a	
4.2.4	VC received, value, % GDP		n/a	n/a	
4.3	**Trade, diversification and market scale**		**43.3**	**94**	
4.3.1	Applied tariff rate, weighted avg., %		1.9	63	◆
4.3.2	Domestic industry diversification		n/a	n/a	
4.3.3	Domestic market scale, bn PPP$		75.0	98	

			Score/ Value	Rank	
	Business sophistication		**20.6**	**100**	
5.1	**Knowledge workers**		**22.0**	**99**	
5.1.1	Knowledge-intensive employment, %		11.1	106	
5.1.2	Firms offering formal training, %	⏲	47.7	21	
5.1.3	GERD performed by business, % GDP	⏲	0.0	89	
5.1.4	GERD financed by business, %	⏲	21.1	68	
5.1.5	Females employed w/advanced degrees, %	⏲	2.4	108	
5.2	**Innovation linkages**		**11.9**	**121**	
5.2.1	Public research–industry co-publications, %		0.6	113	
5.2.2	University–industry R&D collaboration†		20.6	118	
5.2.3	State of cluster development†		31.7	102	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	111	
5.2.5	Patent families/bn PPP$ GDP		0.0	86	
5.3	**Knowledge absorption**		**27.8**	**62**	
5.3.1	Intellectual property payments, % total trade		0.8	50	● ◆
5.3.2	High-tech imports, % total trade	⏲	9.0	53	●
5.3.3	ICT services imports, % total trade		1.5	53	●
5.3.4	FDI net inflows, % GDP		2.4	67	
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**12.1**	**99**	
6.1	**Knowledge creation**		**1.4**	**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	99	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP		0.0	74	○ ◇
6.1.4	Scientific and technical articles/bn PPP$ GDP		2.8	118	
6.1.5	Citable documents H-index		2.2	126	
6.2	**Knowledge impact**		**26.2**	**62**	
6.2.1	Labor productivity growth, %		1.7	35	●
6.2.2	Unicorn valuation, % GDP		0.0	49	○ ◇
6.2.3	Software spending, % GDP		0.2	70	
6.2.4	High-tech manufacturing, %		n/a	n/a	
6.3	**Knowledge diffusion**		**8.6**	**100**	
6.3.1	Intellectual property receipts, % total trade		0.0	116	○ ◇
6.3.2	Production and export complexity		30.0	88	
6.3.3	High-tech exports, % total trade	⏲	0.2	110	
6.3.4	ICT services exports, % total trade		0.8	90	
6.3.5	ISO 9001 quality/bn PPP$ GDP		2.3	87	
	Creative outputs		**8.4**	**110**	
7.1	**Intangible assets**		**8.3**	**102**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		34.1	58	●
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○ ◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.0	124	
7.2	**Creative goods and services**		**1.0**	**[120]**	
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	Creative goods exports, % total trade	⏲	0.1	102	
7.3	**Online creativity**		**15.9**	**112**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.4	111	
7.3.2	GitHub commits/mn pop. 15–69		1.8	107	
7.3.3	Mobile app creation/bn PPP$ GDP		45.5	110	

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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Hong Kong, China

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Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
31	9	High	SEAO	7.4	549.0	72,861

			Score/ Value	Rank	
	Institutions		**82.1**	**8**	
1.1	**Institutional environment**		**87.1**	**8**	
1.1.1	Operational stability for businesses*		88.7	7	●
1.1.2	Government effectiveness*		85.5	8	
1.2	**Regulatory environment**		**82.1**	**19**	
1.2.1	Regulatory quality*		83.6	12	
1.2.2	Rule of law*		80.5	21	
1.3	**Business environment**		**77.1**	**11**	
1.3.1	Policy stability for doing business†		76.9	15	
1.3.2	Entrepreneurship policies and culture†	⏲	77.2	7	
	Human capital and research		**55.7**	**15**	
2.1	**Education**		**62.6**	**26**	
2.1.1	Expenditure on education, % GDP		3.7	83	○◇
2.1.2	Government funding/pupil, secondary, % GDP/cap		24.7	22	
2.1.3	School life expectancy, years		17.3	19	
2.1.4	PISA scales in reading, maths and science		520.2	5	
2.1.5	Pupil–teacher ratio, secondary		10.7	38	
2.2	**Tertiary education**		**56.6**	**5**	●◆
2.2.1	Tertiary enrolment, % gross		97.3	8	
2.2.2	Graduates in science and engineering, %		n/a	n/a	
2.2.3	Tertiary inbound mobility, %		19.0	10	
2.3	**Research and development (R&D)**		**48.1**	**20**	
2.3.1	Researchers, FTE/mn pop.		4,809.0	22	
2.3.2	Gross expenditure on R&D, % GDP		1.1	36	◇
2.3.3	Global corporate R&D investors, top 3, mn USD$		n/a	n/a	
2.3.4	QS university ranking, top 3*		78.2	8	
	Infrastructure		**55.4**	**16**	
3.1	**Information and communication technologies (ICTs)**		**95.9**	**[4]**	
3.1.1	ICT access*		99.5	20	
3.1.2	ICT use*		92.2	12	
3.1.3	Government's online service*		n/a	n/a	
3.1.4	E-participation*		n/a	n/a	
3.2	**General infrastructure**		**37.1**	**44**	◇
3.2.1	Electricity output, GWh/mn pop.	⏲	5,018.2	43	
3.2.2	Logistics performance*		86.4	7	
3.2.3	Gross capital formation, % GDP		15.9	121	○◇
3.3	**Ecological sustainability**		**33.2**	**31**	
3.3.1	GDP/unit of energy use		35.2	2	●◆
3.3.2	Low-carbon energy use, %		0.2	126	○◇
3.3.3	ISO 14001 environment/bn PPP$ GDP		2.0	50	
	Market sophistication		**71.9**	**2**	●◆
4.1	**Credit**		**92.2**	**1**	●◆
4.1.1	Finance for startups and scaleups†	⏲	84.3	5	
4.1.2	Domestic credit to private sector, % GDP		263.6	1	●◆
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**66.0**	**7**	
4.2.1	Market capitalization, % GDP		1,506.5	1	●◆
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		1.4	7	◆
4.2.3	VC recipients, deals/bn PPP$ GDP		0.1	30	
4.2.4	VC received, value, % GDP		0.0	11	
4.3	**Trade, diversification and market scale**		**57.6**	**62**	
4.3.1	Applied tariff rate, weighted avg., %		0.0	1	●◆
4.3.2	Domestic industry diversification		62.1	94	○◇
4.3.3	Domestic market scale, bn PPP$		549.0	44	

			Score/ Value	Rank	
	Business sophistication		**49.7**	**25**	◇
5.1	**Knowledge workers**		**48.7**	**35**	◇
5.1.1	Knowledge-intensive employment, %		41.2	29	
5.1.2	Firms offering formal training, %		44.4	24	
5.1.3	GERD performed by business, % GDP	⏲	0.4	45	◇
5.1.4	GERD financed by business, %	⏲	49.2	32	
5.1.5	Females employed w/advanced degrees, %	⏲	16.1	47	◇
5.2	**Innovation linkages**		**50.4**	**20**	
5.2.1	Public research–industry co-publications, %		2.0	44	◇
5.2.2	University–industry R&D collaboration†		74.2	19	
5.2.3	State of cluster development†		80.2	20	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.1	8	
5.2.5	Patent families/bn PPP$ GDP		0.9	30	◇
5.3	**Knowledge absorption**		**50.1**	**11**	
5.3.1	Intellectual property payments, % total trade		0.3	88	○◇
5.3.2	High-tech imports, % total trade		58.3	1	●◆
5.3.3	ICT services imports, % total trade		0.4	116	○◇
5.3.4	FDI net inflows, % GDP		35.0	2	●◆
5.3.5	Research talent, % in businesses	⏲	35.6	37	◇
	Knowledge and technology outputs		**22.8**	**58**	◇
6.1	**Knowledge creation**		**26.7**	**[36]**	
6.1.1	Patents by origin/bn PPP$ GDP		0.8	64	◇
6.1.2	PCT patents by origin/bn PPP$ GDP		n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP		0.8	22	
6.1.4	Scientific and technical articles/bn PPP$ GDP		n/a	n/a	
6.1.5	Citable documents H-index		40.0	23	
6.2	**Knowledge impact**		**36.1**	**38**	
6.2.1	Labor productivity growth, %		0.5	71	
6.2.2	Unicorn valuation, % GDP		2.5	13	
6.2.3	Software spending, % GDP		0.3	30	
6.2.4	High-tech manufacturing, %		9.4	90	○◇
6.3	**Knowledge diffusion**		**5.7**	**114**	○◇
6.3.1	Intellectual property receipts, % total trade		0.1	56	◇
6.3.2	Production and export complexity		n/a	n/a	
6.3.3	High-tech exports, % total trade		0.1	120	○◇
6.3.4	ICT services exports, % total trade		0.5	99	○◇
6.3.5	ISO 9001 quality/bn PPP$ GDP		5.4	53	
	Creative outputs		**51.8**	**12**	
7.1	**Intangible assets**		**50.3**	**21**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		50.9	34	
7.1.3	Global brand value, top 5,000, % GDP		24.2	1	●◆
7.1.4	Industrial designs by origin/bn PPP$ GDP		1.4	47	
7.2	**Creative goods and services**		**45.6**	**10**	
7.2.1	Cultural and creative services exports, % total trade		0.1	88	○◇
7.2.2	National feature films/mn pop. 15–69		4.8	27	
7.2.3	Entertainment and media market/th pop. 15–69		49.9	13	
7.2.4	Creative goods exports, % total trade		12.1	1	●◆
7.3	**Online creativity**		**60.9**	**17**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		36.3	19	
7.3.2	GitHub commits/mn pop. 15–69		n/a	n/a	
7.3.3	Mobile app creation/bn PPP$ GDP		85.6	3	●◆

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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Hungary **36**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
35	37	High	EUR	9.7	421.7	43,601

		Score/ Value	Rank
	Institutions	**52.2**	**53** ◇
1.1	**Institutional environment**	**66.0**	**40**
1.1.1	Operational stability for businesses*	74.0	37
1.1.2	Government effectiveness*	57.9	45
1.2	**Regulatory environment**	**54.3**	**48** ◇
1.2.1	Regulatory quality*	52.5	54 ◇
1.2.2	Rule of law*	56.0	46 ◇
1.3	**Business environment**	**36.3**	**87** ○
1.3.1	Policy stability for doing business†	40.4	89 ○◇
1.3.2	Entrepreneurship policies and culture†	32.3	50 ○
	Human capital and research	**42.9**	**34**
2.1	**Education**	**57.2**	**50**
2.1.1	Expenditure on education, % GDP ⏲	5.0	43
2.1.2	Government funding/pupil, secondary, % GDP/cap	18.9	56 ○
2.1.3	School life expectancy, years ⏲	15.1	48
2.1.4	PISA scales in reading, maths and science	477.2	29
2.1.5	Pupil–teacher ratio, secondary ⏲	9.6	28
2.2	**Tertiary education**	**36.8**	**52**
2.2.1	Tertiary enrolment, % gross ⏲	56.5	62
2.2.2	Graduates in science and engineering, %	21.6	67 ○
2.2.3	Tertiary inbound mobility, % ⏲	13.2	16 ●
2.3	**Research and development (R&D)**	**34.9**	**29**
2.3.1	Researchers, FTE/mn pop.	4,726.0	25
2.3.2	Gross expenditure on R&D, % GDP	1.4	31
2.3.3	Global corporate R&D investors, top 3, mn USD$	50.8	29
2.3.4	QS university ranking, top 3*	18.1	51
	Infrastructure	**51.0**	**35**
3.1	**Information and communication technologies (ICTs)**	**74.3**	**60**
3.1.1	ICT access*	96.8	37
3.1.2	ICT use*	78.2	64 ◇
3.1.3	Government's online service*	72.0	56
3.1.4	E-participation*	50.0	75 ◇
3.2	**General infrastructure**	**37.1**	**45**
3.2.1	Electricity output, GWh/mn pop.	3,686.5	59
3.2.2	Logistics performance*	50.0	50 ◇
3.2.3	Gross capital formation, % GDP	29.3	29 ◆
3.3	**Ecological sustainability**	**41.8**	**13** ●
3.3.1	GDP/unit of energy use	13.0	42
3.3.2	Low-carbon energy use, %	22.7	57
3.3.3	ISO 14001 environment/bn PPP$ GDP	8.8	8 ●◆
	Market sophistication	**34.1**	**60**
4.1	**Credit**	**33.1**	**47**
4.1.1	Finance for startups and scaleups†	55.4	31
4.1.2	Domestic credit to private sector, % GDP	36.0	85 ○◇
4.1.3	Loans from microfinance institutions, % GDP	n/a	n/a
4.2	**Investment**	**5.0**	**79** ○◇
4.2.1	Market capitalization, % GDP	16.2	67 ○
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	0.1	56
4.2.3	VC recipients, deals/bn PPP$ GDP	0.0	84 ○◇
4.2.4	VC received, value, % GDP	0.0	67 ○
4.3	**Trade, diversification and market scale**	**64.0**	**32**
4.3.1	Applied tariff rate, weighted avg., %	1.1	21
4.3.2	Domestic industry diversification	92.9	26
4.3.3	Domestic market scale, bn PPP$	421.7	52

		Score/ Value	Rank
	Business sophistication	**46.3**	**28**
5.1	**Knowledge workers**	**48.2**	**36**
5.1.1	Knowledge-intensive employment, %	38.7	33
5.1.2	Firms offering formal training, %	28.1	58
5.1.3	GERD performed by business, % GDP	1.0	23
5.1.4	GERD financed by business, %	50.6	27
5.1.5	Females employed w/advanced degrees, %	18.7	36
5.2	**Innovation linkages**	**35.4**	**35**
5.2.1	Public research–industry co-publications, %	5.5	9 ●◆
5.2.2	University–industry R&D collaboration†	55.1	46
5.2.3	State of cluster development†	48.1	63
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	67
5.2.5	Patent families/bn PPP$ GDP	0.3	39
5.3	**Knowledge absorption**	**55.4**	**6** ●◆
5.3.1	Intellectual property payments, % total trade	1.0	36
5.3.2	High-tech imports, % total trade	15.1	17 ●
5.3.3	ICT services imports, % total trade	1.4	58
5.3.4	FDI net inflows, % GDP	38.4	1 ●◆
5.3.5	Research talent, % in businesses	60.4	16
	Knowledge and technology outputs	**35.6**	**25**
6.1	**Knowledge creation**	**22.5**	**48**
6.1.1	Patents by origin/bn PPP$ GDP	1.3	45
6.1.2	PCT patents by origin/bn PPP$ GDP	0.4	36
6.1.3	Utility models by origin/bn PPP$ GDP	0.5	30
6.1.4	Scientific and technical articles/bn PPP$ GDP	19.9	33
6.1.5	Citable documents H-index	29.3	34
6.2	**Knowledge impact**	**37.2**	**33**
6.2.1	Labor productivity growth, %	1.6	37 ◆
6.2.2	Unicorn valuation, % GDP	0.0	49 ○◇
6.2.3	Software spending, % GDP	0.2	59
6.2.4	High-tech manufacturing, %	56.5	7 ●◆
6.3	**Knowledge diffusion**	**47.1**	**15** ●
6.3.1	Intellectual property receipts, % total trade	0.9	19
6.3.2	Production and export complexity	81.4	11 ●
6.3.3	High-tech exports, % total trade	13.5	12 ●◆
6.3.4	ICT services exports, % total trade	1.9	59
6.3.5	ISO 9001 quality/bn PPP$ GDP	20.5	7 ●◆
	Creative outputs	**32.1**	**44**
7.1	**Intangible assets**	**27.5**	**68**
7.1.1	Intangible asset intensity, top 15, %	52.5	43
7.1.2	Trademarks by origin/bn PPP$ GDP	20.7	85 ○
7.1.3	Global brand value, top 5,000, % GDP	1.5	50
7.1.4	Industrial designs by origin/bn PPP$ GDP	1.0	59
7.2	**Creative goods and services**	**32.9**	**24**
7.2.1	Cultural and creative services exports, % total trade	0.8	35
7.2.2	National feature films/mn pop. 15–69	3.0	43
7.2.3	Entertainment and media market/th pop. 15–69	13.2	31 ◇
7.2.4	Creative goods exports, % total trade	6.1	8 ●◆
7.3	**Online creativity**	**40.6**	**34**
7.3.1	Top-level domains (TLDs)/th pop. 15–69	22.0	27
7.3.2	GitHub commits/mn pop. 15–69	32.6	35
7.3.3	Mobile app creation/bn PPP$ GDP	67.0	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Iceland

GII 2024 rank

22

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
29	15	High	EUR	0.4	27.1	69,833

			Score/Value	Rank	
	Institutions		**78.6**	**13**	
1.1	**Institutional environment**		**88.4**	**6**	●
1.1.1	Operational stability for businesses*		92.0	3	● ◆
1.1.2	Government effectiveness*		84.8	12	
1.2	**Regulatory environment**		**84.4**	**14**	
1.2.1	Regulatory quality*		76.2	20	
1.2.2	Rule of law*		92.7	9	
1.3	**Business environment**		**63.1**	**[28]**	
1.3.1	Policy stability for doing business†		63.1	37	
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**47.5**	**26**	◇
2.1	**Education**		**68.4**	**7**	● ◆
2.1.1	Expenditure on education, % GDP		7.1	5	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap		24.0	29	
2.1.3	School life expectancy, years	⏲	19.1	7	●
2.1.4	PISA scales in reading, maths and science		447.3	41	◇
2.1.5	Pupil–teacher ratio, secondary	⏲	9.3	23	
2.2	**Tertiary education**		**34.2**	**63**	◇
2.2.1	Tertiary enrolment, % gross	⏲	86.5	16	
2.2.2	Graduates in science and engineering, %		17.0	93	○ ◇
2.2.3	Tertiary inbound mobility, %	⏲	7.9	36	
2.3	**Research and development (R&D)**		**39.9**	**26**	◇
2.3.1	Researchers, FTE/mn pop.		6,865.2	8	
2.3.2	Gross expenditure on R&D, % GDP		2.7	13	
2.3.3	Global corporate R&D investors, top 3, mn USD$		46.6	35	◇
2.3.4	QS university ranking, top 3*		0.0	75	○ ◇
	Infrastructure		**64.9**	**3**	● ◆
3.1	**Information and communication technologies (ICTs)**		**89.5**	**14**	
3.1.1	ICT access*		100.0	9	
3.1.2	ICT use*		91.6	15	
3.1.3	Government's online service*		87.5	16	
3.1.4	E-participation*		79.1	17	
3.2	**General infrastructure**		**65.0**	**5**	● ◆
3.2.1	Electricity output, GWh/mn pop.		52,670.2	1	● ◆
3.2.2	Logistics performance*		68.2	25	◇
3.2.3	Gross capital formation, % GDP		22.5	81	
3.3	**Ecological sustainability**		**40.0**	**17**	
3.3.1	GDP/unit of energy use		3.3	126	○ ◇
3.3.2	Low-carbon energy use, %		83.7	1	● ◆
3.3.3	ISO 14001 environment/bn PPP$ GDP		2.2	48	
	Market sophistication		**52.4**	**22**	
4.1	**Credit**		**34.6**	**[42]**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		96.6	24	
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**71.5**	**4**	● ◆
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.7	10	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.6	1	● ◆
4.2.4	VC received, value, % GDP		0.0	8	
4.3	**Trade, diversification and market scale**		**51.1**	**78**	◇
4.3.1	Applied tariff rate, weighted avg., %		1.1	20	
4.3.2	Domestic industry diversification	⏲	61.8	96	○ ◇
4.3.3	Domestic market scale, bn PPP$		27.1	128	○

			Score/Value	Rank	
	Business sophistication		**52.4**	**21**	
5.1	**Knowledge workers**		**69.7**	**10**	
5.1.1	Knowledge-intensive employment, %		52.2	6	●
5.1.2	Firms offering formal training, %		n/a	n/a	
5.1.3	GERD performed by business, % GDP		1.9	12	
5.1.4	GERD financed by business, %		52.5	24	
5.1.5	Females employed w/advanced degrees, %		26.5	15	
5.2	**Innovation linkages**		**46.8**	**26**	◇
5.2.1	Public research–industry co-publications, %		4.9	14	
5.2.2	University–industry R&D collaboration†		68.0	29	
5.2.3	State of cluster development†		58.4	42	◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.1	21	
5.2.5	Patent families/bn PPP$ GDP		1.4	25	◇
5.3	**Knowledge absorption**		**40.8**	**28**	
5.3.1	Intellectual property payments, % total trade		0.7	57	
5.3.2	High-tech imports, % total trade		8.3	66	
5.3.3	ICT services imports, % total trade		3.2	10	
5.3.4	FDI net inflows, % GDP		−0.1	119	○
5.3.5	Research talent, % in businesses		54.6	20	
	Knowledge and technology outputs		**30.3**	**37**	◇
6.1	**Knowledge creation**		**46.9**	**15**	
6.1.1	Patents by origin/bn PPP$ GDP		3.4	22	
6.1.2	PCT patents by origin/bn PPP$ GDP		1.6	18	
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		46.9	1	● ◆
6.1.5	Citable documents H-index		18.4	47	◇
6.2	**Knowledge impact**		**25.1**	**66**	◇
6.2.1	Labor productivity growth, %		0.8	59	
6.2.2	Unicorn valuation, % GDP		0.0	49	○ ◇
6.2.3	Software spending, % GDP		0.3	38	
6.2.4	High-tech manufacturing, %	⏲	17.7	65	◇
6.3	**Knowledge diffusion**		**18.7**	**61**	◇
6.3.1	Intellectual property receipts, % total trade		0.8	21	
6.3.2	Production and export complexity		n/a	n/a	
6.3.3	High-tech exports, % total trade		2.5	53	
6.3.4	ICT services exports, % total trade		3.7	30	
6.3.5	ISO 9001 quality/bn PPP$ GDP		3.3	74	
	Creative outputs		**45.6**	**21**	
7.1	**Intangible assets**		**31.0**	**60**	◇
7.1.1	Intangible asset intensity, top 15, %		54.3	40	◇
7.1.2	Trademarks by origin/bn PPP$ GDP		54.5	26	
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○ ◇
7.1.4	Industrial designs by origin/bn PPP$ GDP	⏲	0.3	90	○
7.2	**Creative goods and services**		**43.5**	**12**	
7.2.1	Cultural and creative services exports, % total trade		1.0	26	
7.2.2	National feature films/mn pop. 15–69		36.9	1	● ◆
7.2.3	Entertainment and media market/th pop. 15–69		n/a	n/a	
7.2.4	Creative goods exports, % total trade		0.1	97	○
7.3	**Online creativity**		**76.8**	**3**	●
7.3.1	Top-level domains (TLDs)/th pop. 15–69		89.3	3	● ◆
7.3.2	GitHub commits/mn pop. 15–69		82.0	8	●
7.3.3	Mobile app creation/bn PPP$ GDP		59.2	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

India

GII 2024 rank

39

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
33	44	Lower middle	CSA	1,439.2	13,119.6	9,183

			Score/ Value	Rank	
	Institutions		**51.5**	**54**	◆
1.1	**Institutional environment**		**56.2**	**58**	◆
1.1.1	Operational stability for businesses*		58.7	74	
1.1.2	Government effectiveness*		53.7	53	◆
1.2	**Regulatory environment**		**43.8**	**64**	◆
1.2.1	Regulatory quality*		40.5	75	◆
1.2.2	Rule of law*		47.1	59	◆
1.3	**Business environment**		**54.4**	**47**	
1.3.1	Policy stability for doing business†		38.5	91	
1.3.2	Entrepreneurship policies and culture†		70.2	13	◆
	Human capital and research		**34.8**	**51**	◆
2.1	**Education**		**44.5**	**82**	
2.1.1	Expenditure on education, % GDP	◷	4.6	50	
2.1.2	Government funding/pupil, secondary, % GDP/cap		18.0	58	
2.1.3	School life expectancy, years		12.9	85	○
2.1.4	PISA scales in reading, maths and science		n/a	n/a	
2.1.5	Pupil–teacher ratio, secondary		20.0	97	○
2.2	**Tertiary education**		**28.4**	**79**	
2.2.1	Tertiary enrolment, % gross		33.1	88	
2.2.2	Graduates in science and engineering, %		29.3	25	
2.2.3	Tertiary inbound mobility, %		0.1	110	○
2.3	**Research and development (R&D)**		**31.4**	**34**	◆
2.3.1	Researchers, FTE/mn pop.	◷	260.4	83	○
2.3.2	Gross expenditure on R&D, % GDP	◷	0.6	54	◆
2.3.3	Global corporate R&D investors, top 3, mn USD$		65.4	18	●◆
2.3.4	QS university ranking, top 3*		47.2	24	◆
	Infrastructure		**39.0**	**72**	◆
3.1	**Information and communication technologies (ICTs)**		**64.0**	**82**	
3.1.1	ICT access*		46.7	110	○
3.1.2	ICT use*		74.2	79	
3.1.3	Government's online service*		77.2	42	◆
3.1.4	E-participation*		58.1	61	◆
3.2	**General infrastructure**		**39.2**	**37**	
3.2.1	Electricity output, GWh/mn pop.		1,259.9	92	
3.2.2	Logistics performance*		59.1	37	◆
3.2.3	Gross capital formation, % GDP		31.3	20	
3.3	**Ecological sustainability**		**13.9**	**97**	
3.3.1	GDP/unit of energy use		10.0	71	
3.3.2	Low-carbon energy use, %		11.2	84	
3.3.3	ISO 14001 environment/bn PPP$ GDP		1.1	68	
	Market sophistication		**52.3**	**23**	◆
4.1	**Credit**		**33.2**	**46**	
4.1.1	Finance for startups and scaleups†		79.2	8	●◆
4.1.2	Domestic credit to private sector, % GDP	◷	50.4	68	
4.1.3	Loans from microfinance institutions, % GDP		0.4	46	○
4.2	**Investment**		**39.5**	**17**	◆
4.2.1	Market capitalization, % GDP		105.6	18	◆
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.1	42	◆
4.2.3	VC recipients, deals/bn PPP$ GDP		0.1	33	◆
4.2.4	VC received, value, % GDP		0.0	6	●◆
4.3	**Trade, diversification and market scale**		**84.3**	**10**	●◆
4.3.1	Applied tariff rate, weighted avg., %		5.4	98	
4.3.2	Domestic industry diversification		94.9	16	●◆
4.3.3	Domestic market scale, bn PPP$		13,119.6	1	●◆

			Score/ Value	Rank	
	Business sophistication		**28.1**	**58**	◆
5.1	**Knowledge workers**		**25.1**	**88**	
5.1.1	Knowledge-intensive employment, %		11.7	103	○
5.1.2	Firms offering formal training, %	◷	35.9	48	
5.1.3	GERD performed by business, % GDP	◷	0.2	51	◆
5.1.4	GERD financed by business, %	◷	40.6	43	◆
5.1.5	Females employed w/advanced degrees, %		2.9	105	○
5.2	**Innovation linkages**		**24.6**	**61**	
5.2.1	Public research–industry co-publications, %		2.4	33	◆
5.2.2	University–industry R&D collaboration†		36.9	86	
5.2.3	State of cluster development†		37.9	87	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	27	◆
5.2.5	Patent families/bn PPP$ GDP		0.2	45	◆
5.3	**Knowledge absorption**		**34.6**	**42**	◆
5.3.1	Intellectual property payments, % total trade		1.3	28	◆
5.3.2	High-tech imports, % total trade		9.5	45	
5.3.3	ICT services imports, % total trade		2.1	29	◆
5.3.4	FDI net inflows, % GDP		1.8	80	
5.3.5	Research talent, % in businesses	◷	30.7	44	◆
	Knowledge and technology outputs		**38.8**	**22**	◆
6.1	**Knowledge creation**		**24.9**	**39**	◆
6.1.1	Patents by origin/bn PPP$ GDP		3.2	23	◆
6.1.2	PCT patents by origin/bn PPP$ GDP		0.3	41	◆
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		8.0	84	
6.1.5	Citable documents H-index		43.1	19	●◆
6.2	**Knowledge impact**		**53.4**	**9**	●◆
6.2.1	Labor productivity growth, %		1.1	50	
6.2.2	Unicorn valuation, % GDP		4.7	8	●◆
6.2.3	Software spending, % GDP		0.2	55	
6.2.4	High-tech manufacturing, %		34.6	34	◆
6.3	**Knowledge diffusion**		**38.3**	**28**	◆
6.3.1	Intellectual property receipts, % total trade		0.2	47	◆
6.3.2	Production and export complexity		55.1	42	◆
6.3.3	High-tech exports, % total trade		4.2	41	
6.3.4	ICT services exports, % total trade		11.9	1	●◆
6.3.5	ISO 9001 quality/bn PPP$ GDP		5.4	54	◆
	Creative outputs		**32.1**	**43**	◆
7.1	**Intangible assets**		**39.6**	**37**	◆
7.1.1	Intangible asset intensity, top 15, %		77.7	7	●◆
7.1.2	Trademarks by origin/bn PPP$ GDP		37.7	54	
7.1.3	Global brand value, top 5,000, % GDP		5.5	31	◆
7.1.4	Industrial designs by origin/bn PPP$ GDP		1.6	43	
7.2	**Creative goods and services**		**23.3**	**50**	◆
7.2.1	Cultural and creative services exports, % total trade		1.9	13	●◆
7.2.2	National feature films/mn pop. 15–69		2.5	51	
7.2.3	Entertainment and media market/th pop. 15–69		1.0	61	○
7.2.4	Creative goods exports, % total trade		1.8	28	
7.3	**Online creativity**		**26.0**	**63**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.8	101	○
7.3.2	GitHub commits/mn pop. 15–69		4.7	77	
7.3.3	Mobile app creation/bn PPP$ GDP		72.6	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Indonesia

GII 2024 rank **54**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
67	54	Upper middle	SEAO	281.2	4,393.4	15,836

Institutions

			Score/ Value	Rank	
	Institutions		**59.5**	**40**	◆
1.1	**Institutional environment**		**57.7**	**55**	
1.1.1	Operational stability for businesses*		60.0	70	
1.1.2	Government effectiveness*		55.4	50	◆
1.2	**Regulatory environment**		**42.8**	**66**	
1.2.1	Regulatory quality*		47.2	60	
1.2.2	Rule of law*		38.4	77	
1.3	**Business environment**		**78.0**	**10**	●◆
1.3.1	Policy stability for doing business†		78.0	13	●◆
1.3.2	Entrepreneurship policies and culture†	⏲	77.9	6	●◆

Human capital and research

			Score/ Value	Rank	
	Human capital and research		**25.2**	**90**	
2.1	**Education**		**30.2**	**122**	○◇
2.1.1	Expenditure on education, % GDP		2.4	115	○◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	⏲	10.6	86	○◇
2.1.3	School life expectancy, years	⏲	13.8	71	
2.1.4	PISA scales in reading, maths and science		369.0	75	○
2.1.5	Pupil–teacher ratio, secondary		20.7	101	
2.2	**Tertiary education**		**20.0**	**96**	
2.2.1	Tertiary enrolment, % gross		42.6	77	
2.2.2	Graduates in science and engineering, %	⏲	19.4	81	
2.2.3	Tertiary inbound mobility, %	⏲	0.1	111	○◇
2.3	**Research and development (R&D)**		**25.5**	**38**	◆
2.3.1	Researchers, FTE/mn pop.	⏲	399.6	78	
2.3.2	Gross expenditure on R&D, % GDP	⏲	0.3	75	
2.3.3	Global corporate R&D investors, top 3, mn USD$		54.6	27	◆
2.3.4	QS university ranking, top 3*		39.0	33	

Infrastructure

			Score/ Value	Rank	
	Infrastructure		**41.2**	**67**	
3.1	**Information and communication technologies (ICTs)**		**76.7**	**52**	
3.1.1	ICT access*		80.9	85	
3.1.2	ICT use*		81.2	49	
3.1.3	Government's online service*		74.0	51	
3.1.4	E-participation*		70.9	37	
3.2	**General infrastructure**		**32.0**	**61**	
3.2.1	Electricity output, GWh/mn pop.		1,223.9	93	◇
3.2.2	Logistics performance*		40.9	60	
3.2.3	Gross capital formation, % GDP		30.3	26	◆
3.3	**Ecological sustainability**		**14.8**	**94**	
3.3.1	GDP/unit of energy use		13.9	35	
3.3.2	Low-carbon energy use, %		6.6	99	
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.9	76	

Market sophistication

			Score/ Value	Rank	
	Market sophistication		**44.3**	**35**	◆
4.1	**Credit**		**30.3**	**56**	
4.1.1	Finance for startups and scaleups†	⏲	80.4	7	●◆
4.1.2	Domestic credit to private sector, % GDP		35.3	87	
4.1.3	Loans from microfinance institutions, % GDP		0.0	61	○
4.2	**Investment**		**13.0**	**53**	
4.2.1	Market capitalization, % GDP		47.3	39	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.0	73	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	63	
4.2.4	VC received, value, % GDP		0.0	33	
4.3	**Trade, diversification and market scale**		**89.6**	**6**	●◆
4.3.1	Applied tariff rate, weighted avg., %		1.6	57	
4.3.2	Domestic industry diversification		94.3	22	●
4.3.3	Domestic market scale, bn PPP$		4,393.4	7	●◆

Business sophistication

			Score/ Value	Rank	
	Business sophistication		**24.2**	**78**	
5.1	**Knowledge workers**		**10.1**	**120**	○◇
5.1.1	Knowledge-intensive employment, %		10.9	108	◇
5.1.2	Firms offering formal training, %		8.4	98	○◇
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	92	◇
5.2	**Innovation linkages**		**36.9**	**32**	◆
5.2.1	Public research–industry co-publications, %		0.5	121	○
5.2.2	University–industry R&D collaboration†		86.2	6	●◆
5.2.3	State of cluster development†		91.8	7	●◆
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	105	
5.2.5	Patent families/bn PPP$ GDP		0.0	101	
5.3	**Knowledge absorption**		**25.6**	**71**	
5.3.1	Intellectual property payments, % total trade		0.8	52	
5.3.2	High-tech imports, % total trade		8.9	55	
5.3.3	ICT services imports, % total trade		1.9	33	◆
5.3.4	FDI net inflows, % GDP		1.7	81	
5.3.5	Research talent, % in businesses	⏲	7.5	64	

Knowledge and technology outputs

			Score/ Value	Rank	
	Knowledge and technology outputs		**19.9**	**73**	
6.1	**Knowledge creation**		**11.1**	**78**	
6.1.1	Patents by origin/bn PPP$ GDP		0.4	82	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	82	
6.1.3	Utility models by origin/bn PPP$ GDP		1.0	21	
6.1.4	Scientific and technical articles/bn PPP$ GDP		1.6	126	○◇
6.1.5	Citable documents H-index		14.4	57	
6.2	**Knowledge impact**		**34.9**	**41**	
6.2.1	Labor productivity growth, %		1.2	47	
6.2.2	Unicorn valuation, % GDP		0.7	36	
6.2.3	Software spending, % GDP		0.4	26	●◆
6.2.4	High-tech manufacturing, %		29.4	42	
6.3	**Knowledge diffusion**		**13.8**	**80**	
6.3.1	Intellectual property receipts, % total trade		0.1	70	
6.3.2	Production and export complexity		40.7	63	
6.3.3	High-tech exports, % total trade		3.5	46	
6.3.4	ICT services exports, % total trade		0.8	89	
6.3.5	ISO 9001 quality/bn PPP$ GDP		2.5	84	

Creative outputs

			Score/ Value	Rank	
	Creative outputs		**24.8**	**65**	
7.1	**Intangible assets**		**32.6**	**54**	
7.1.1	Intangible asset intensity, top 15, %		74.4	13	●
7.1.2	Trademarks by origin/bn PPP$ GDP		26.6	72	
7.1.3	Global brand value, top 5,000, % GDP		2.8	41	
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.9	64	
7.2	**Creative goods and services**		**9.8**	**75**	
7.2.1	Cultural and creative services exports, % total trade		0.0	101	○
7.2.2	National feature films/mn pop. 15–69		0.6	74	
7.2.3	Entertainment and media market/th pop. 15–69		3.4	48	◇
7.2.4	Creative goods exports, % total trade		2.5	24	●
7.3	**Online creativity**		**24.0**	**74**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		1.2	92	
7.3.2	GitHub commits/mn pop. 15–69		4.2	89	
7.3.3	Mobile app creation/bn PPP$ GDP		66.5	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Iran (Islamic Republic of)

64

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
48	85	Lower middle	CSA	90.6	1,725.9	19,942

			Score/Value	Rank	
	Institutions		**10.9**	**133**	○◇
1.1	**Institutional environment**		**20.1**	**127**	◇
1.1.1	Operational stability for businesses*		19.3	130	○◇
1.1.2	Government effectiveness*		20.9	120	
1.2	**Regulatory environment**		**7.3**	**131**	○◇
1.2.1	Regulatory quality*		0.0	133	○◇
1.2.2	Rule of law*		14.7	118	
1.3	**Business environment**		**5.3**	**128**	○◇
1.3.1	Policy stability for doing business†		10.6	126	○◇
1.3.2	Entrepreneurship policies and culture†		0.0	85	○◇
	Human capital and research		**32.1**	**64**	◆
2.1	**Education**		**40.0**	**93**	
2.1.1	Expenditure on education, % GDP		2.7	109	
2.1.2	Government funding/pupil, secondary, % GDP/cap		16.0	67	
2.1.3	School life expectancy, years	◷	14.1	66	◆
2.1.4	PISA scales in reading, maths and science		n/a	n/a	
2.1.5	Pupil–teacher ratio, secondary	◷	19.0	96	
2.2	**Tertiary education**		**41.3**	**35**	◆
2.2.1	Tertiary enrolment, % gross		60.7	54	◆
2.2.2	Graduates in science and engineering, %		35.0	8	●◆
2.2.3	Tertiary inbound mobility, %	◷	0.8	94	
2.3	**Research and development (R&D)**		**15.0**	**48**	◆
2.3.1	Researchers, FTE/mn pop.	◷	1,597.3	47	◆
2.3.2	Gross expenditure on R&D, % GDP	◷	0.8	45	◆
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		31.2	42	◆
	Infrastructure		**29.6**	**95**	
3.1	**Information and communication technologies (ICTs)**		**50.9**	**102**	
3.1.1	ICT access*	◷	73.1	89	
3.1.2	ICT use*		78.1	65	◆
3.1.3	Government's online service*		35.9	115	
3.1.4	E-participation*		16.3	128	○◇
3.2	**General infrastructure**		**34.9**	**50**	
3.2.1	Electricity output, GWh/mn pop.	◷	3,914.3	54	◆
3.2.2	Logistics performance*		9.1	105	○
3.2.3	Gross capital formation, % GDP		40.1	5	●◆
3.3	**Ecological sustainability**		**3.2**	**130**	○◇
3.3.1	GDP/unit of energy use		4.4	122	◇
3.3.2	Low-carbon energy use, %		1.2	120	◇
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.4	104	
	Market sophistication		**55.4**	**17**	●◆
4.1	**Credit**		**24.2**	**72**	
4.1.1	Finance for startups and scaleups†		28.0	70	
4.1.2	Domestic credit to private sector, % GDP	◷	60.3	52	
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**100.0**	**[1]**	
4.2.1	Market capitalization, % GDP		484.1	1	●◆
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP		n/a	n/a	
4.2.4	VC received, value, % GDP		n/a	n/a	
4.3	**Trade, diversification and market scale**		**41.9**	**97**	
4.3.1	Applied tariff rate, weighted avg., %		11.7	131	○◇
4.3.2	Domestic industry diversification	◷	83.7	58	
4.3.3	Domestic market scale, bn PPP$		1,725.9	19	●◆

			Score/Value	Rank	
	Business sophistication		**18.6**	**110**	
5.1	**Knowledge workers**		**19.8**	**[104]**	
5.1.1	Knowledge-intensive employment, %		20.4	78	
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, %	◷	8.0	86	
5.2	**Innovation linkages**		**12.7**	**114**	
5.2.1	Public research–industry co-publications, %		1.1	82	
5.2.2	University–industry R&D collaboration†		19.2	121	◇
5.2.3	State of cluster development†		32.5	99	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	◷	0.0	125	○◇
5.2.5	Patent families/bn PPP$ GDP		0.0	88	
5.3	**Knowledge absorption**		**23.4**	**76**	
5.3.1	Intellectual property payments, % total trade		0.2	94	
5.3.2	High-tech imports, % total trade	◷	13.5	18	●
5.3.3	ICT services imports, % total trade		0.7	101	
5.3.4	FDI net inflows, % GDP		0.4	108	
5.3.5	Research talent, % in businesses	◷	19.2	55	
	Knowledge and technology outputs		**25.9**	**49**	◆
6.1	**Knowledge creation**		**30.0**	**32**	◆
6.1.1	Patents by origin/bn PPP$ GDP		5.1	14	●◆
6.1.2	PCT patents by origin/bn PPP$ GDP		0.2	46	◆
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		23.3	28	●◆
6.1.5	Citable documents H-index		23.5	40	◆
6.2	**Knowledge impact**		**39.0**	**26**	●◆
6.2.1	Labor productivity growth, %		0.7	68	
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.7	3	●◆
6.2.4	High-tech manufacturing, %	◷	30.8	37	◆
6.3	**Knowledge diffusion**		**8.8**	**99**	
6.3.1	Intellectual property receipts, % total trade		0.0	95	
6.3.2	Production and export complexity		38.3	72	
6.3.3	High-tech exports, % total trade	◷	0.2	107	
6.3.4	ICT services exports, % total trade		0.2	125	
6.3.5	ISO 9001 quality/bn PPP$ GDP		1.3	108	
	Creative outputs		**30.9**	**52**	◆
7.1	**Intangible assets**		**49.2**	**23**	●◆
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		218.3	1	●◆
7.1.3	Global brand value, top 5,000, % GDP		0.2	71	
7.1.4	Industrial designs by origin/bn PPP$ GDP		5.0	16	●◆
7.2	**Creative goods and services**		**4.3**	**102**	
7.2.1	Cultural and creative services exports, % total trade		0.2	79	
7.2.2	National feature films/mn pop. 15–69		1.4	63	
7.2.3	Entertainment and media market/th pop. 15–69		1.1	59	
7.2.4	Creative goods exports, % total trade	◷	0.2	74	
7.3	**Online creativity**		**20.9**	**95**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		4.1	61	◆
7.3.2	GitHub commits/mn pop. 15–69		1.9	105	
7.3.3	Mobile app creation/bn PPP$ GDP		56.7	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Ireland

19

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
15	25	High	EUR	5.2	722.9	137,638

			Score/ Value	Rank	
	Institutions		**79.1**	**11**	
1.1	**Institutional environment**		**82.6**	**15**	
1.1.1	Operational stability for businesses*		80.7	22	
1.1.2	Government effectiveness*		84.4	13	
1.2	**Regulatory environment**		**86.3**	**12**	
1.2.1	Regulatory quality*		84.9	10	●
1.2.2	Rule of law*		87.6	15	
1.3	**Business environment**		**68.6**	**23**	
1.3.1	Policy stability for doing business†		77.4	14	
1.3.2	Entrepreneurship policies and culture†	◷	59.7	19	
	Human capital and research		**48.1**	**25**	◇
2.1	**Education**		**54.2**	**59**	◇
2.1.1	Expenditure on education, % GDP	◷	2.9	103	○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap		12.0	82	○ ◇
2.1.3	School life expectancy, years	◷	19.1	6	● ◆
2.1.4	PISA scales in reading, maths and science		503.8	8	
2.1.5	Pupil–teacher ratio, secondary	◷	14.5	72	○ ◇
2.2	**Tertiary education**		**42.0**	**33**	
2.2.1	Tertiary enrolment, % gross	◷	78.8	24	
2.2.2	Graduates in science and engineering, %		24.9	46	
2.2.3	Tertiary inbound mobility, %	◷	9.3	29	
2.3	**Research and development (R&D)**		**48.0**	**21**	
2.3.1	Researchers, FTE/mn pop.		5,505.3	15	
2.3.2	Gross expenditure on R&D, % GDP		1.0	42	◇
2.3.3	Global corporate R&D investors, top 3, mn USD$		70.7	12	
2.3.4	QS university ranking, top 3*		50.0	22	
	Infrastructure		**54.8**	**20**	
3.1	**Information and communication technologies (ICTs)**		**78.5**	**47**	◇
3.1.1	ICT access*		91.7	58	◇
3.1.2	ICT use*		79.4	60	◇
3.1.3	Government's online service*		75.6	45	◇
3.1.4	E-participation*		67.4	47	◇
3.2	**General infrastructure**		**40.9**	**35**	◇
3.2.1	Electricity output, GWh/mn pop.		6,584.6	29	
3.2.2	Logistics performance*		68.2	25	◇
3.2.3	Gross capital formation, % GDP		23.6	65	○
3.3	**Ecological sustainability**		**45.0**	**7**	● ◆
3.3.1	GDP/unit of energy use		41.6	1	● ◆
3.3.2	Low-carbon energy use, %		18.5	61	
3.3.3	ISO 14001 environment/bn PPP$ GDP		1.6	62	
	Market sophistication		**37.9**	**48**	◇
4.1	**Credit**		**34.3**	**43**	◇
4.1.1	Finance for startups and scaleups†	◷	61.6	25	
4.1.2	Domestic credit to private sector, % GDP		26.2	106	○ ◇
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**21.1**	**40**	◇
4.2.1	Market capitalization, % GDP	◷	37.4	42	◇
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.4	20	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.1	32	◇
4.2.4	VC received, value, % GDP		0.0	41	◇
4.3	**Trade, diversification and market scale**		**58.3**	**58**	
4.3.1	Applied tariff rate, weighted avg., %		1.1	21	
4.3.2	Domestic industry diversification	◷	69.6	79	
4.3.3	Domestic market scale, bn PPP$		722.9	38	

			Score/ Value	Rank	
	Business sophistication		**55.7**	**16**	
5.1	**Knowledge workers**		**67.5**	**15**	
5.1.1	Knowledge-intensive employment, %		47.2	16	
5.1.2	Firms offering formal training, %	◷	59.8	8	
5.1.3	GERD performed by business, % GDP		0.8	34	◇
5.1.4	GERD financed by business, %		55.5	19	
5.1.5	Females employed w/advanced degrees, %		29.9	4	● ◆
5.2	**Innovation linkages**		**48.0**	**24**	◇
5.2.1	Public research–industry co-publications, %		3.8	22	
5.2.2	University–industry R&D collaboration†		70.2	23	
5.2.3	State of cluster development†		74.1	28	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.1	24	
5.2.5	Patent families/bn PPP$ GDP		2.2	18	
5.3	**Knowledge absorption**		**51.6**	**8**	●
5.3.1	Intellectual property payments, % total trade		21.4	1	● ◆
5.3.2	High-tech imports, % total trade		7.4	80	○
5.3.3	ICT services imports, % total trade		1.7	41	
5.3.4	FDI net inflows, % GDP		8.9	11	
5.3.5	Research talent, % in businesses		44.4	33	◇
	Knowledge and technology outputs		**47.3**	**14**	
6.1	**Knowledge creation**		**22.7**	**46**	◇
6.1.1	Patents by origin/bn PPP$ GDP		1.8	33	
6.1.2	PCT patents by origin/bn PPP$ GDP		1.1	22	◇
6.1.3	Utility models by origin/bn PPP$ GDP		0.1	45	○
6.1.4	Scientific and technical articles/bn PPP$ GDP		12.8	55	◇
6.1.5	Citable documents H-index		35.3	28	
6.2	**Knowledge impact**		**52.8**	**10**	●
6.2.1	Labor productivity growth, %		−0.9	117	○ ◇
6.2.2	Unicorn valuation, % GDP		1.8	21	
6.2.3	Software spending, % GDP		0.6	17	
6.2.4	High-tech manufacturing, %	◷	66.6	3	
6.3	**Knowledge diffusion**		**66.4**	**1**	● ◆
6.3.1	Intellectual property receipts, % total trade		2.8	9	●
6.3.2	Production and export complexity		79.3	13	
6.3.3	High-tech exports, % total trade		14.9	9	●
6.3.4	ICT services exports, % total trade		33.0	1	● ◆
6.3.5	ISO 9001 quality/bn PPP$ GDP		4.2	68	○
	Creative outputs		**42.3**	**28**	◇
7.1	**Intangible assets**		**40.0**	**36**	
7.1.1	Intangible asset intensity, top 15, %		88.3	2	● ◆
7.1.2	Trademarks by origin/bn PPP$ GDP		n/a	n/a	
7.1.3	Global brand value, top 5,000, % GDP		3.7	38	◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.6	73	○
7.2	**Creative goods and services**		**34.2**	**21**	
7.2.1	Cultural and creative services exports, % total trade		0.9	33	
7.2.2	National feature films/mn pop. 15–69		8.4	11	
7.2.3	Entertainment and media market/th pop. 15–69		45.8	16	
7.2.4	Creative goods exports, % total trade		1.1	43	
7.3	**Online creativity**		**55.0**	**24**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		31.8	21	
7.3.2	GitHub commits/mn pop. 15–69		59.6	17	
7.3.3	Mobile app creation/bn PPP$ GDP		73.5	29	

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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Israel

GII 2024 rank

15

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
13	22	High	NAWA	9.3	537.1	54,771

		Score/ Value	Rank	
	Institutions	**65.5**	**34**	◇
1.1	**Institutional environment**	**70.1**	**35**	◇
1.1.1	Operational stability for businesses*	64.0	62	○◇
1.1.2	Government effectiveness*	76.3	24	
1.2	**Regulatory environment**	**72.2**	**26**	◇
1.2.1	Regulatory quality*	73.5	24	
1.2.2	Rule of law*	70.9	28	◇
1.3	**Business environment**	**54.0**	**49**	◇
1.3.1	Policy stability for doing business† ⏲	59.4	43	◇
1.3.2	Entrepreneurship policies and culture†	48.6	29	

		Score/ Value	Rank	
	Human capital and research	**53.1**	**18**	
2.1	**Education**	**58.1**	**46**	◇
2.1.1	Expenditure on education, % GDP	6.5	9	◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	20.9	43	○
2.1.3	School life expectancy, years ⏲	15.0	49	◇
2.1.4	PISA scales in reading, maths and science	465.5	37	◇
2.1.5	Pupil–teacher ratio, secondary ⏲	14.5	73	○◇
2.2	**Tertiary education**	**34.8**	**59**	○◇
2.2.1	Tertiary enrolment, % gross ⏲	59.0	58	○◇
2.2.2	Graduates in science and engineering, %	27.2	35	
2.2.3	Tertiary inbound mobility, % ⏲	3.4	61	○◇
2.3	**Research and development (R&D)**	**66.3**	**8**	
2.3.1	Researchers, FTE/mn pop.	n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP	6.0	1	●◆
2.3.3	Global corporate R&D investors, top 3, mn USD$	61.3	23	
2.3.4	QS university ranking, top 3*	37.6	34	

		Score/ Value	Rank	
	Infrastructure	**50.0**	**41**	◇
3.1	**Information and communication technologies (ICTs)**	**84.8**	**28**	
3.1.1	ICT access*	92.7	56	◇
3.1.2	ICT use*	89.3	20	
3.1.3	Government's online service*	86.1	21	
3.1.4	E-participation*	70.9	37	
3.2	**General infrastructure**	**45.4**	**28**	
3.2.1	Electricity output, GWh/mn pop.	7,968.8	20	
3.2.2	Logistics performance*	68.2	25	◇
3.2.3	Gross capital formation, % GDP	26.3	41	
3.3	**Ecological sustainability**	**19.8**	**67**	○◇
3.3.1	GDP/unit of energy use	17.2	19	
3.3.2	Low-carbon energy use, %	6.3	100	○◇
3.3.3	ISO 14001 environment/bn PPP$ GDP	1.7	57	

		Score/ Value	Rank	
	Market sophistication	**56.7**	**12**	
4.1	**Credit**	**43.4**	**32**	
4.1.1	Finance for startups and scaleups†	62.6	23	
4.1.2	Domestic credit to private sector, % GDP	70.2	46	◇
4.1.3	Loans from microfinance institutions, % GDP	n/a	n/a	
4.2	**Investment**	**66.3**	**6**	●
4.2.1	Market capitalization, % GDP	63.0	32	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	0.9	8	
4.2.3	VC recipients, deals/bn PPP$ GDP	0.7	1	●◆
4.2.4	VC received, value, % GDP	0.0	1	●◆
4.3	**Trade, diversification and market scale**	**60.5**	**51**	
4.3.1	Applied tariff rate, weighted avg., %	1.7	60	○
4.3.2	Domestic industry diversification ⏲	84.1	57	○
4.3.3	Domestic market scale, bn PPP$	537.1	47	

		Score/ Value	Rank	
	Business sophistication	**59.0**	**9**	
5.1	**Knowledge workers**	**79.2**	**4**	●◆
5.1.1	Knowledge-intensive employment, %	52.0	7	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	5.6	1	●◆
5.1.4	GERD financed by business, %	45.0	37	◇
5.1.5	Females employed w/advanced degrees, % ⏲	24.7	20	
5.2	**Innovation linkages**	**64.3**	**6**	●
5.2.1	Public research–industry co-publications, %	2.9	26	◇
5.2.2	University–industry R&D collaboration† ⏲	96.6	2	●◆
5.2.3	State of cluster development† ⏲	62.0	38	◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.2	3	●◆
5.2.5	Patent families/bn PPP$ GDP	5.3	7	●
5.3	**Knowledge absorption**	**33.6**	**47**	◇
5.3.1	Intellectual property payments, % total trade	0.8	45	
5.3.2	High-tech imports, % total trade	10.0	39	
5.3.3	ICT services imports, % total trade	2.1	27	
5.3.4	FDI net inflows, % GDP	5.1	20	
5.3.5	Research talent, % in businesses	n/a	n/a	

		Score/ Value	Rank	
	Knowledge and technology outputs	**56.1**	**7**	●
6.1	**Knowledge creation**	**53.1**	**12**	
6.1.1	Patents by origin/bn PPP$ GDP	3.0	24	
6.1.2	PCT patents by origin/bn PPP$ GDP	3.6	7	
6.1.3	Utility models by origin/bn PPP$ GDP	-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP	26.5	24	
6.1.5	Citable documents H-index	46.1	17	
6.2	**Knowledge impact**	**59.4**	**5**	●
6.2.1	Labor productivity growth, %	2.1	24	◆
6.2.2	Unicorn valuation, % GDP	10.4	1	●◆
6.2.3	Software spending, % GDP	0.2	65	○◇
6.2.4	High-tech manufacturing, % ⏲	45.3	17	
6.3	**Knowledge diffusion**	**55.9**	**7**	●
6.3.1	Intellectual property receipts, % total trade	0.6	27	◇
6.3.2	Production and export complexity	72.4	21	
6.3.3	High-tech exports, % total trade	10.5	17	
6.3.4	ICT services exports, % total trade	18.0	1	●◆
6.3.5	ISO 9001 quality/bn PPP$ GDP	17.6	14	◆

		Score/ Value	Rank	
	Creative outputs	**41.1**	**30**	◇
7.1	**Intangible assets**	**29.0**	**65**	○◇
7.1.1	Intangible asset intensity, top 15, %	66.7	23	
7.1.2	Trademarks by origin/bn PPP$ GDP	9.6	111	○◇
7.1.3	Global brand value, top 5,000, % GDP	2.8	42	◇
7.1.4	Industrial designs by origin/bn PPP$ GDP	1.2	53	
7.2	**Creative goods and services**	**44.8**	**11**	
7.2.1	Cultural and creative services exports, % total trade	3.1	7	◆
7.2.2	National feature films/mn pop. 15–69	6.4	17	
7.2.3	Entertainment and media market/th pop. 15–69	37.9	21	
7.2.4	Creative goods exports, % total trade	1.2	39	
7.3	**Online creativity**	**61.4**	**16**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69	14.8	36	◇
7.3.2	GitHub commits/mn pop. 15–69	83.4	7	
7.3.3	Mobile app creation/bn PPP$ GDP	86.0	2	●◆

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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Italy

GII 2024 rank

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Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
18	34	High	EUR	59.5	3,193.2	54,259

			Score/Value	Rank	
Institutions			**51.2**	**55**	◇
1.1	**Institutional environment**		**60.5**	**51**	◇
1.1.1	Operational stability for businesses*		65.3	55	◇
1.1.2	Government effectiveness*		55.7	48	◇
1.2	**Regulatory environment**		**53.8**	**50**	◇
1.2.1	Regulatory quality*		55.3	47	◇
1.2.2	Rule of law*		52.4	53	◇
1.3	**Business environment**		**39.4**	**80**	○
1.3.1	Policy stability for doing business†		53.1	55	
1.3.2	Entrepreneurship policies and culture†		25.7	61	○
Human capital and research			**45.4**	**30**	
2.1	**Education**		**59.0**	**42**	
2.1.1	Expenditure on education, % GDP	⏲	4.0	72	○
2.1.2	Government funding/pupil, secondary, % GDP/cap		24.0	27	
2.1.3	School life expectancy, years	⏲	16.7	27	
2.1.4	PISA scales in reading, maths and science		476.8	31	
2.1.5	Pupil–teacher ratio, secondary	⏲	9.9	32	
2.2	**Tertiary education**		**34.2**	**64**	
2.2.1	Tertiary enrolment, % gross	⏲	71.3	40	
2.2.2	Graduates in science and engineering, %		23.9	54	
2.2.3	Tertiary inbound mobility, %	⏲	3.4	60	
2.3	**Research and development (R&D)**		**43.1**	**24**	
2.3.1	Researchers, FTE/mn pop.		2,723.8	32	
2.3.2	Gross expenditure on R&D, % GDP		1.3	32	
2.3.3	Global corporate R&D investors, top 3, mn USD$		69.5	14	●
2.3.4	QS university ranking, top 3*		53.5	18	●
Infrastructure			**52.5**	**28**	
3.1	**Information and communication technologies (ICTs)**		**82.9**	**34**	
3.1.1	ICT access*		91.2	60	◇
3.1.2	ICT use*		83.1	40	
3.1.3	Government's online service*		85.2	23	
3.1.4	E-participation*		72.1	32	
3.2	**General infrastructure**		**37.8**	**42**	
3.2.1	Electricity output, GWh/mn pop.		4,826.5	44	
3.2.2	Logistics performance*		72.7	18	
3.2.3	Gross capital formation, % GDP		21.3	91	○
3.3	**Ecological sustainability**		**36.8**	**26**	
3.3.1	GDP/unit of energy use		16.6	21	
3.3.2	Low-carbon energy use, %		15.9	70	
3.3.3	ISO 14001 environment/bn PPP$ GDP		6.8	12	● ◆
Market sophistication			**43.1**	**38**	
4.1	**Credit**		**36.8**	**38**	
4.1.1	Finance for startups and scaleups†		48.9	41	
4.1.2	Domestic credit to private sector, % GDP		71.5	44	
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**8.0**	**69**	○
4.2.1	Market capitalization, % GDP	⏲	27.9	52	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.1	61	○
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	60	○
4.2.4	VC received, value, % GDP		0.0	59	
4.3	**Trade, diversification and market scale**		**84.4**	**9**	● ◆
4.3.1	Applied tariff rate, weighted avg., %		1.1	21	
4.3.2	Domestic industry diversification		99.1	4	●
4.3.3	Domestic market scale, bn PPP$		3,193.2	13	● ◆

			Score/Value	Rank	
Business sophistication			**38.7**	**34**	
5.1	**Knowledge workers**		**39.8**	**48**	
5.1.1	Knowledge-intensive employment, %		35.7	40	
5.1.2	Firms offering formal training, %	⏲	12.6	92	○ ◇
5.1.3	GERD performed by business, % GDP		0.8	32	
5.1.4	GERD financed by business, %		53.9	22	
5.1.5	Females employed w/advanced degrees, %		14.6	54	
5.2	**Innovation linkages**		**42.3**	**27**	
5.2.1	Public research–industry co-publications, %		2.8	27	
5.2.2	University–industry R&D collaboration†		68.5	28	
5.2.3	State of cluster development†		75.8	25	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	48	
5.2.5	Patent families/bn PPP$ GDP		1.9	21	
5.3	**Knowledge absorption**		**34.0**	**44**	
5.3.1	Intellectual property payments, % total trade		0.8	53	
5.3.2	High-tech imports, % total trade		9.4	47	
5.3.3	ICT services imports, % total trade		1.9	35	
5.3.4	FDI net inflows, % GDP		0.4	110	○
5.3.5	Research talent, % in businesses		43.9	34	
Knowledge and technology outputs			**41.4**	**19**	
6.1	**Knowledge creation**		**39.0**	**24**	
6.1.1	Patents by origin/bn PPP$ GDP		4.4	18	
6.1.2	PCT patents by origin/bn PPP$ GDP		1.0	27	
6.1.3	Utility models by origin/bn PPP$ GDP		0.5	28	
6.1.4	Scientific and technical articles/bn PPP$ GDP		23.5	27	
6.1.5	Citable documents H-index		68.4	8	● ◆
6.2	**Knowledge impact**		**39.7**	**23**	
6.2.1	Labor productivity growth, %		0.3	80	○
6.2.2	Unicorn valuation, % GDP		0.2	47	
6.2.3	Software spending, % GDP		0.6	6	● ◆
6.2.4	High-tech manufacturing, %		36.7	32	
6.3	**Knowledge diffusion**		**45.4**	**19**	
6.3.1	Intellectual property receipts, % total trade		0.7	24	
6.3.2	Production and export complexity		77.0	16	●
6.3.3	High-tech exports, % total trade		7.5	27	
6.3.4	ICT services exports, % total trade		1.3	73	○
6.3.5	ISO 9001 quality/bn PPP$ GDP		31.1	3	● ◆
Creative outputs			**47.5**	**18**	●
7.1	**Intangible assets**		**63.8**	**8**	● ◆
7.1.1	Intangible asset intensity, top 15, %		63.8	29	
7.1.2	Trademarks by origin/bn PPP$ GDP		41.1	45	
7.1.3	Global brand value, top 5,000, % GDP		9.5	18	
7.1.4	Industrial designs by origin/bn PPP$ GDP		13.4	1	● ◆
7.2	**Creative goods and services**		**26.3**	**44**	
7.2.1	Cultural and creative services exports, % total trade		0.5	57	
7.2.2	National feature films/mn pop. 15–69		6.0	20	
7.2.3	Entertainment and media market/th pop. 15–69		27.0	23	
7.2.4	Creative goods exports, % total trade		2.3	25	
7.3	**Online creativity**		**36.3**	**40**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		21.3	28	
7.3.2	GitHub commits/mn pop. 15–69		20.2	45	
7.3.3	Mobile app creation/bn PPP$ GDP		67.4	60	

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Jamaica

GII 2024 rank

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Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
65	91	Upper middle	LCN	2.8	35.7	12,995

			Score/ Value	Rank	
	Institutions		**50.3**	**59**	
1.1	**Institutional environment**		**62.6**	**46**	◆
1.1.1	Operational stability for businesses*		65.3	55	
1.1.2	Government effectiveness*		59.8	41	●◆
1.2	**Regulatory environment**		**44.3**	**63**	
1.2.1	Regulatory quality*		46.8	61	
1.2.2	Rule of law*		41.8	64	
1.3	**Business environment**		**44.2**	**71**	
1.3.1	Policy stability for doing business†		52.7	56	
1.3.2	Entrepreneurship policies and culture†	⏲	35.6	47	
	Human capital and research		**22.4**	**[98]**	
2.1	**Education**		**52.0**	**64**	
2.1.1	Expenditure on education, % GDP		5.7	23	●
2.1.2	Government funding/pupil, secondary, % GDP/cap		31.7	6	●◆
2.1.3	School life expectancy, years	⏲	12.8	86	
2.1.4	PISA scales in reading, maths and science		396.7	65	
2.1.5	Pupil–teacher ratio, secondary		14.6	74	
2.2	**Tertiary education**		**15.2**	**[107]**	
2.2.1	Tertiary enrolment, % gross	⏲	26.4	93	
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**	**[120]**	
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 USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**27.2**	**104**	◇
3.1	**Information and communication technologies (ICTs)**		**55.4**	**95**	◇
3.1.1	ICT access*		89.9	65	
3.1.2	ICT use*		61.3	98	◇
3.1.3	Government's online service*		43.8	102	◇
3.1.4	E-participation*		26.7	108	◇
3.2	**General infrastructure**		**17.1**	**107**	
3.2.1	Electricity output, GWh/mn pop.	⏲	1,527.6	90	
3.2.2	Logistics performance*		18.2	89	○◇
3.2.3	Gross capital formation, % GDP		22.8	78	
3.3	**Ecological sustainability**		**9.1**	**110**	◇
3.3.1	GDP/unit of energy use		10.1	70	
3.3.2	Low-carbon energy use, %		3.2	111	
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.5	95	
	Market sophistication		**19.6**	**110**	◇
4.1	**Credit**		**23.9**	**73**	
4.1.1	Finance for startups and scaleups†	⏲	31.3	65	
4.1.2	Domestic credit to private sector, % GDP		50.8	66	
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**14.8**	**[47]**	
4.2.1	Market capitalization, % GDP		81.3	22	●
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	⏲	0.0	77	
4.2.3	VC recipients, deals/bn PPP$ GDP		n/a	n/a	
4.2.4	VC received, value, % GDP		n/a	n/a	
4.3	**Trade, diversification and market scale**		**19.9**	**125**	○◇
4.3.1	Applied tariff rate, weighted avg., %		7.7	118	○◇
4.3.2	Domestic industry diversification		n/a	n/a	
4.3.3	Domestic market scale, bn PPP$		35.7	123	○

			Score/ Value	Rank	
	Business sophistication		**24.3**	**75**	
5.1	**Knowledge workers**		**32.9**	**[63]**	
5.1.1	Knowledge-intensive employment, %		22.6	66	
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, %	⏲	10.3	74	
5.2	**Innovation linkages**		**18.3**	**89**	
5.2.1	Public research–industry co-publications, %		0.6	110	
5.2.2	University–industry R&D collaboration†		35.5	89	
5.2.3	State of cluster development†		34.2	95	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	30	●◆
5.2.5	Patent families/bn PPP$ GDP		0.0	77	
5.3	**Knowledge absorption**		**21.6**	**86**	
5.3.1	Intellectual property payments, % total trade		0.9	42	●
5.3.2	High-tech imports, % total trade		4.2	116	
5.3.3	ICT services imports, % total trade		1.0	81	
5.3.4	FDI net inflows, % GDP		2.0	76	
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**13.1**	**94**	
6.1	**Knowledge creation**		**5.5**	**109**	
6.1.1	Patents by origin/bn PPP$ GDP		0.2	94	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.1	61	
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		5.2	103	
6.1.5	Citable documents H-index		4.7	104	
6.2	**Knowledge impact**		**22.6**	**79**	
6.2.1	Labor productivity growth, %		−1.1	119	○◇
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.3	31	●◆
6.2.4	High-tech manufacturing, %		n/a	n/a	
6.3	**Knowledge diffusion**		**11.3**	**90**	
6.3.1	Intellectual property receipts, % total trade		0.1	61	
6.3.2	Production and export complexity		35.2	78	
6.3.3	High-tech exports, % total trade		0.1	122	○
6.3.4	ICT services exports, % total trade		1.6	65	
6.3.5	ISO 9001 quality/bn PPP$ GDP		1.9	94	
	Creative outputs		**32.1**	**45**	
7.1	**Intangible assets**		**54.1**	**14**	●◆
7.1.1	Intangible asset intensity, top 15, %		60.2	32	
7.1.2	Trademarks by origin/bn PPP$ GDP	⏲	85.9	10	●
7.1.3	Global brand value, top 5,000, % GDP		6.3	30	●◆
7.1.4	Industrial designs by origin/bn PPP$ GDP		4.6	17	●
7.2	**Creative goods and services**		**1.8**	**111**	◇
7.2.1	Cultural and creative services exports, % total trade		0.0	98	○
7.2.2	National feature films/mn pop. 15–69	⏲	0.5	77	
7.2.3	Entertainment and media market/th pop. 15–69		n/a	n/a	
7.2.4	Creative goods exports, % total trade		0.1	100	
7.3	**Online creativity**		**18.2**	**104**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		1.2	94	
7.3.2	GitHub commits/mn pop. 15–69		3.2	95	
7.3.3	Mobile app creation/bn PPP$ GDP		50.3	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Japan

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Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
14	12	High	SEAO	124.4	6,495.2	52,120

		Score/Value	Rank
	Institutions	**71.2**	**23**
1.1	**Institutional environment**	**86.5**	**9**
1.1.1	Operational stability for businesses*	86.7	9
1.1.2	Government effectiveness*	86.3	7
1.2	**Regulatory environment**	**84.1**	**16**
1.2.1	Regulatory quality*	79.6	17
1.2.2	Rule of law*	88.5	13
1.3	**Business environment**	**42.9**	**74 ○◇**
1.3.1	Policy stability for doing business†	63.2	36
1.3.2	Entrepreneurship policies and culture†	22.7	64 ○◇
	Human capital and research	**52.9**	**19**
2.1	**Education**	**60.4**	**35**
2.1.1	Expenditure on education, % GDP ⏲	3.5	92 ○◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	24.8	21
2.1.3	School life expectancy, years ⏲	15.4	45 ◇
2.1.4	PISA scales in reading, maths and science	532.7	3 ●◆
2.1.5	Pupil–teacher ratio, secondary ⏲	10.6	36
2.2	**Tertiary education**	**29.5**	**74 ○◇**
2.2.1	Tertiary enrolment, % gross ⏲	63.2	50 ◇
2.2.2	Graduates in science and engineering, %	19.5	80 ○◇
2.2.3	Tertiary inbound mobility, % ⏲	5.6	47
2.3	**Research and development (R&D)**	**68.6**	**6 ●**
2.3.1	Researchers, FTE/mn pop.	5,646.8	14
2.3.2	Gross expenditure on R&D, % GDP	3.4	6
2.3.3	Global corporate R&D investors, top 3, mn USD$	85.5	6
2.3.4	QS university ranking, top 3*	75.7	9
	Infrastructure	**56.3**	**13**
3.1	**Information and communication technologies (ICTs)**	**93.5**	**8**
3.1.1	ICT access*	95.8	43
3.1.2	ICT use*	88.4	23
3.1.3	Government's online service*	90.0	10
3.1.4	E-participation*	100.0	1 ●◆
3.2	**General infrastructure**	**50.0**	**16**
3.2.1	Electricity output, GWh/mn pop.	8,035.1	18
3.2.2	Logistics performance*	81.8	13
3.2.3	Gross capital formation, % GDP	26.3	42
3.3	**Ecological sustainability**	**25.3**	**48**
3.3.1	GDP/unit of energy use	13.5	40
3.3.2	Low-carbon energy use, %	15.0	72 ○
3.3.3	ISO 14001 environment/bn PPP$ GDP	3.6	27
	Market sophistication	**61.5**	**8**
4.1	**Credit**	**63.2**	**9**
4.1.1	Finance for startups and scaleups†	53.3	35 ◇
4.1.2	Domestic credit to private sector, % GDP	194.9	3 ●◆
4.1.3	Loans from microfinance institutions, % GDP	n/a	n/a
4.2	**Investment**	**27.7**	**29**
4.2.1	Market capitalization, % GDP	129.8	10
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	0.2	31
4.2.3	VC recipients, deals/bn PPP$ GDP	0.1	22
4.2.4	VC received, value, % GDP	0.0	53 ○◇
4.3	**Trade, diversification and market scale**	**93.5**	**3 ●◆**
4.3.1	Applied tariff rate, weighted avg., %	1.3	52
4.3.2	Domestic industry diversification ⏲	91.0	31
4.3.3	Domestic market scale, bn PPP$	6,495.2	1 ●◆

		Score/Value	Rank
	Business sophistication	**62.5**	**6 ●**
5.1	**Knowledge workers**	**66.8**	**16**
5.1.1	Knowledge-intensive employment, %	20.9	74 ○◇
5.1.2	Firms offering formal training, %	n/a	n/a
5.1.3	GERD performed by business, % GDP	2.7	4 ●
5.1.4	GERD financed by business, %	78.5	2 ●◆
5.1.5	Females employed w/advanced degrees, % ⏲	22.9	23
5.2	**Innovation linkages**	**61.7**	**9**
5.2.1	Public research–industry co-publications, %	9.0	1 ●◆
5.2.2	University–industry R&D collaboration†	66.8	31 ◇
5.2.3	State of cluster development†	66.4	36 ◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	41 ◇
5.2.5	Patent families/bn PPP$ GDP	12.6	3 ●◆
5.3	**Knowledge absorption**	**59.1**	**3 ●◆**
5.3.1	Intellectual property payments, % total trade	3.2	7
5.3.2	High-tech imports, % total trade	16.3	14
5.3.3	ICT services imports, % total trade	2.3	25
5.3.4	FDI net inflows, % GDP	1.0	98 ○
5.3.5	Research talent, % in businesses	75.2	5 ◆
	Knowledge and technology outputs	**49.7**	**12**
6.1	**Knowledge creation**	**58.3**	**8**
6.1.1	Patents by origin/bn PPP$ GDP	35.6	3 ●◆
6.1.2	PCT patents by origin/bn PPP$ GDP	7.5	1 ●◆
6.1.3	Utility models by origin/bn PPP$ GDP	0.5	29
6.1.4	Scientific and technical articles/bn PPP$ GDP	12.0	59 ◇
6.1.5	Citable documents H-index	66.6	10
6.2	**Knowledge impact**	**36.5**	**36**
6.2.1	Labor productivity growth, %	0.0	95 ○
6.2.2	Unicorn valuation, % GDP	0.2	45 ◇
6.2.3	Software spending, % GDP	0.3	33
6.2.4	High-tech manufacturing, % ⏲	54.6	9
6.3	**Knowledge diffusion**	**54.3**	**9**
6.3.1	Intellectual property receipts, % total trade	5.1	1 ●◆
6.3.2	Production and export complexity	100.0	1 ●◆
6.3.3	High-tech exports, % total trade	11.7	15
6.3.4	ICT services exports, % total trade	1.0	81 ○
6.3.5	ISO 9001 quality/bn PPP$ GDP	6.7	40
	Creative outputs	**45.1**	**22**
7.1	**Intangible assets**	**54.7**	**13**
7.1.1	Intangible asset intensity, top 15, %	68.3	21
7.1.2	Trademarks by origin/bn PPP$ GDP	42.6	41
7.1.3	Global brand value, top 5,000, % GDP	16.1	7
7.1.4	Industrial designs by origin/bn PPP$ GDP	3.5	24
7.2	**Creative goods and services**	**35.5**	**20**
7.2.1	Cultural and creative services exports, % total trade	0.4	59 ○
7.2.2	National feature films/mn pop. 15–69	7.8	13
7.2.3	Entertainment and media market/th pop. 15–69	59.8	8
7.2.4	Creative goods exports, % total trade	1.7	29
7.3	**Online creativity**	**35.4**	**42 ◇**
7.3.1	Top-level domains (TLDs)/th pop. 15–69	9.9	41 ◇
7.3.2	GitHub commits/mn pop. 15–69	24.6	40 ◇
7.3.3	Mobile app creation/bn PPP$ GDP	71.8	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Jordan

GII 2024 rank

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Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
74	69	Lower middle	NAWA	11.4	132.1	12,809

			Score/ Value	Rank	
	Institutions		**52.4**	**52**	◆
1.1	**Institutional environment**		**51.9**	**73**	◆
1.1.1	Operational stability for businesses*		54.7	85	
1.1.2	Government effectiveness*		49.1	56	◆
1.2	**Regulatory environment**		**48.0**	**58**	◆
1.2.1	Regulatory quality*		46.0	65	◆
1.2.2	Rule of law*		50.1	56	◆
1.3	**Business environment**		**57.2**	**40**	
1.3.1	Policy stability for doing business†		69.2	30	● ◆
1.3.2	Entrepreneurship policies and culture†		45.2	35	
	Human capital and research		**26.1**	**85**	
2.1	**Education**		**33.7**	**113**	
2.1.1	Expenditure on education, % GDP		3.2	98	
2.1.2	Government funding/pupil, secondary, % GDP/cap		16.6	63	
2.1.3	School life expectancy, years		n/a	n/a	
2.1.4	PISA scales in reading, maths and science		359.3	81	○
2.1.5	Pupil–teacher ratio, secondary		15.1	77	
2.2	**Tertiary education**		**35.9**	**55**	◆
2.2.1	Tertiary enrolment, % gross		36.0	85	
2.2.2	Graduates in science and engineering, %		27.2	36	
2.2.3	Tertiary inbound mobility, %		10.8	23	● ◆
2.3	**Research and development (R&D)**		**8.7**	**63**	
2.3.1	Researchers, FTE/mn pop.	⏲	577.9	67	
2.3.2	Gross expenditure on R&D, % GDP	⏲	0.7	51	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○ ◇
2.3.4	QS university ranking, top 3*		17.7	52	
	Infrastructure		**32.4**	**90**	
3.1	**Information and communication technologies (ICTs)**		**71.6**	**71**	◆
3.1.1	ICT access*		97.8	31	● ◆
3.1.2	ICT use*		72.8	80	
3.1.3	Government's online service*		62.4	73	◆
3.1.4	E-participation*		53.5	67	◆
3.2	**General infrastructure**		**8.0**	**128**	○
3.2.1	Electricity output, GWh/mn pop.	⏲	1,916.0	83	
3.2.2	Logistics performance*		n/a	n/a	
3.2.3	Gross capital formation, % GDP		16.8	117	○ ◇
3.3	**Ecological sustainability**		**17.6**	**75**	
3.3.1	GDP/unit of energy use		11.5	57	
3.3.2	Low-carbon energy use, %		13.0	80	
3.3.3	ISO 14001 environment/bn PPP$ GDP		1.7	59	◆
	Market sophistication		**36.4**	**55**	
4.1	**Credit**		**30.1**	**58**	
4.1.1	Finance for startups and scaleups†		50.2	38	
4.1.2	Domestic credit to private sector, % GDP		84.4	34	◆
4.1.3	Loans from microfinance institutions, % GDP		0.9	33	
4.2	**Investment**		**22.5**	**37**	
4.2.1	Market capitalization, % GDP		47.0	40	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.1	45	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.1	45	
4.2.4	VC received, value, % GDP		0.0	14	● ◆
4.3	**Trade, diversification and market scale**		**56.7**	**66**	
4.3.1	Applied tariff rate, weighted avg., %		2.9	79	
4.3.2	Domestic industry diversification		90.5	38	
4.3.3	Domestic market scale, bn PPP$		132.1	85	

			Score/ Value	Rank	
	Business sophistication		**24.9**	**72**	
5.1	**Knowledge workers**		**25.3**	**[85]**	
5.1.1	Knowledge-intensive employment, %		22.1	68	
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, %	⏲	8.0	85	
5.2	**Innovation linkages**		**34.5**	**36**	◆
5.2.1	Public research–industry co-publications, %		0.6	116	○
5.2.2	University–industry R&D collaboration†		73.1	21	● ◆
5.2.3	State of cluster development†		84.4	15	● ◆
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	52	◆
5.2.5	Patent families/bn PPP$ GDP		0.0	85	
5.3	**Knowledge absorption**		**15.0**	**126**	○
5.3.1	Intellectual property payments, % total trade		0.2	97	
5.3.2	High-tech imports, % total trade		6.0	99	
5.3.3	ICT services imports, % total trade		0.2	127	○
5.3.4	FDI net inflows, % GDP		1.8	78	
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**19.6**	**76**	
6.1	**Knowledge creation**		**22.5**	**49**	◆
6.1.1	Patents by origin/bn PPP$ GDP		0.2	100	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.1	54	◆
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		33.8	12	● ◆
6.1.5	Citable documents H-index		10.8	70	
6.2	**Knowledge impact**		**23.0**	**78**	
6.2.1	Labor productivity growth, %		−0.8	114	
6.2.2	Unicorn valuation, % GDP		0.0	49	○ ◇
6.2.3	Software spending, % GDP		0.3	34	●
6.2.4	High-tech manufacturing, %		20.5	61	
6.3	**Knowledge diffusion**		**13.3**	**81**	
6.3.1	Intellectual property receipts, % total trade		0.1	63	
6.3.2	Production and export complexity		45.3	57	◆
6.3.3	High-tech exports, % total trade		1.0	75	
6.3.4	ICT services exports, % total trade		0.1	131	○
6.3.5	ISO 9001 quality/bn PPP$ GDP		5.1	56	◆
	Creative outputs		**21.3**	**76**	
7.1	**Intangible assets**		**24.0**	**75**	
7.1.1	Intangible asset intensity, top 15, %		31.9	65	
7.1.2	Trademarks by origin/bn PPP$ GDP		27.4	69	
7.1.3	Global brand value, top 5,000, % GDP		0.7	59	
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.5	74	
7.2	**Creative goods and services**		**10.3**	**72**	
7.2.1	Cultural and creative services exports, % total trade		0.0	110	○
7.2.2	National feature films/mn pop. 15–69		0.5	75	○
7.2.3	Entertainment and media market/th pop. 15–69		1.4	54	○
7.2.4	Creative goods exports, % total trade		2.9	20	● ◆
7.3	**Online creativity**		**27.0**	**59**	◆
7.3.1	Top-level domains (TLDs)/th pop. 15–69		1.8	83	
7.3.2	GitHub commits/mn pop. 15–69		4.6	81	
7.3.3	Mobile app creation/bn PPP$ GDP		74.5	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Kazakhstan

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Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
83	72	Upper middle	CSA	20.4	654.0	32,712

			Score/Value	Rank	
	Institutions		**44.2**	**76**	
1.1	**Institutional environment**		**52.5**	**70**	
1.1.1	Operational stability for businesses*		57.3	78	
1.1.2	Government effectiveness*		47.7	58	
1.2	**Regulatory environment**		**35.9**	**84**	
1.2.1	Regulatory quality*		41.5	72	
1.2.2	Rule of law*		30.2	91	
1.3	**Business environment**		**44.3**	**68**	
1.3.1	Policy stability for doing business†		38.2	92	
1.3.2	Entrepreneurship policies and culture†	⏲	50.4	25	

			Score/Value	Rank	
	Human capital and research		**32.0**	**65**	
2.1	**Education**		**51.1**	**66**	
2.1.1	Expenditure on education, % GDP		4.2	63	
2.1.2	Government funding/pupil, secondary, % GDP/cap	⏲	21.2	42	
2.1.3	School life expectancy, years	⏲	14.8	53	
2.1.4	PISA scales in reading, maths and science		411.6	54	
2.1.5	Pupil–teacher ratio, secondary	⏲	8.3	16	●
2.2	**Tertiary education**		**34.7**	**60**	
2.2.1	Tertiary enrolment, % gross	⏲	64.8	48	
2.2.2	Graduates in science and engineering, %	⏲	24.1	51	
2.2.3	Tertiary inbound mobility, %	⏲	5.5	48	
2.3	**Research and development (R&D)**		**10.3**	**60**	
2.3.1	Researchers, FTE/mn pop.		681.5	64	
2.3.2	Gross expenditure on R&D, % GDP		0.1	98	○
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		32.5	38	●

			Score/Value	Rank	
	Infrastructure		**40.9**	**68**	
3.1	**Information and communication technologies (ICTs)**		**87.7**	**16**	●◆
3.1.1	ICT access*		94.9	49	
3.1.2	ICT use*		82.8	41	
3.1.3	Government's online service*		92.7	8	●◆
3.1.4	E-participation*		80.2	15	●◆
3.2	**General infrastructure**		**28.1**	**79**	
3.2.1	Electricity output, GWh/mn pop.	⏲	6,056.5	34	●◆
3.2.2	Logistics performance*		27.3	76	
3.2.3	Gross capital formation, % GDP		25.1	49	
3.3	**Ecological sustainability**		**6.8**	**121**	○◇
3.3.1	GDP/unit of energy use		6.9	100	◇
3.3.2	Low-carbon energy use, %		4.0	108	
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.5	93	

			Score/Value	Rank	
	Market sophistication		**25.2**	**86**	
4.1	**Credit**		**21.3**	**80**	
4.1.1	Finance for startups and scaleups†	⏲	45.6	50	
4.1.2	Domestic credit to private sector, % GDP		25.0	107	
4.1.3	Loans from microfinance institutions, % GDP	⏲	1.1	29	
4.2	**Investment**		**3.4**	**95**	
4.2.1	Market capitalization, % GDP		25.3	56	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.0	94	○
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	91	
4.2.4	VC received, value, % GDP		0.0	92	
4.3	**Trade, diversification and market scale**		**51.0**	**79**	
4.3.1	Applied tariff rate, weighted avg., %		2.7	76	
4.3.2	Domestic industry diversification		61.2	97	○◇
4.3.3	Domestic market scale, bn PPP$		654.0	40	

			Score/Value	Rank	
	Business sophistication		**26.0**	**66**	
5.1	**Knowledge workers**		**42.4**	**44**	
5.1.1	Knowledge-intensive employment, %		39.0	32	●◆
5.1.2	Firms offering formal training, %	⏲	21.8	75	
5.1.3	GERD performed by business, % GDP	⏲	0.1	72	
5.1.4	GERD financed by business, %	⏲	47.4	34	
5.1.5	Females employed w/advanced degrees, %	⏲	20.7	30	
5.2	**Innovation linkages**		**13.5**	**112**	
5.2.1	Public research–industry co-publications, %		1.6	61	
5.2.2	University–industry R&D collaboration†		23.9	109	
5.2.3	State of cluster development†		24.2	114	○◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	107	
5.2.5	Patent families/bn PPP$ GDP		0.1	71	
5.3	**Knowledge absorption**		**22.0**	**83**	
5.3.1	Intellectual property payments, % total trade		0.4	83	
5.3.2	High-tech imports, % total trade		9.0	52	
5.3.3	ICT services imports, % total trade		0.8	94	
5.3.4	FDI net inflows, % GDP		2.9	50	
5.3.5	Research talent, % in businesses		n/a	n/a	

			Score/Value	Rank	
	Knowledge and technology outputs		**15.9**	**85**	
6.1	**Knowledge creation**		**16.4**	**64**	
6.1.1	Patents by origin/bn PPP$ GDP		1.3	43	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	81	
6.1.3	Utility models by origin/bn PPP$ GDP	⏲	1.6	10	●
6.1.4	Scientific and technical articles/bn PPP$ GDP		3.2	115	○
6.1.5	Citable documents H-index		6.1	92	
6.2	**Knowledge impact**		**18.9**	**108**	
6.2.1	Labor productivity growth, %		1.8	30	●
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.0	128	○◇
6.2.4	High-tech manufacturing, %		14.1	78	
6.3	**Knowledge diffusion**		**12.3**	**84**	
6.3.1	Intellectual property receipts, % total trade		0.0	101	
6.3.2	Production and export complexity		31.2	87	
6.3.3	High-tech exports, % total trade		6.1	36	●
6.3.4	ICT services exports, % total trade		0.6	96	
6.3.5	ISO 9001 quality/bn PPP$ GDP		0.9	114	○

			Score/Value	Rank	
	Creative outputs		**19.5**	**83**	
7.1	**Intangible assets**		**19.8**	**80**	
7.1.1	Intangible asset intensity, top 15, %	⏲	13.2	68	○
7.1.2	Trademarks by origin/bn PPP$ GDP		24.6	75	
7.1.3	Global brand value, top 5,000, % GDP		0.3	67	
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.2	103	
7.2	**Creative goods and services**		**14.0**	**65**	
7.2.1	Cultural and creative services exports, % total trade		0.1	95	
7.2.2	National feature films/mn pop. 15–69		4.5	31	◆
7.2.3	Entertainment and media market/th pop. 15–69		n/a	n/a	
7.2.4	Creative goods exports, % total trade		0.9	47	
7.3	**Online creativity**		**24.4**	**71**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		2.0	80	
7.3.2	GitHub commits/mn pop. 15–69		5.8	72	
7.3.3	Mobile app creation/bn PPP$ GDP		65.3	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Kenya

GII 2024 rank

96

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
87	105	Lower middle	SSA	55.3	339.0	6,577

			Score/ Value	Rank	
Institutions			**39.6**	**87**	
1.1	**Institutional environment**		**41.4**	**95**	
1.1.1	Operational stability for businesses*		46.7	100	
1.1.2	Government effectiveness*		36.1	86	
1.2	**Regulatory environment**		**33.2**	**89**	
1.2.1	Regulatory quality*		31.8	92	
1.2.2	Rule of law*		34.6	84	
1.3	**Business environment**		**44.2**	**[70]**	
1.3.1	Policy stability for doing business†		44.2	80	
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
Human capital and research			**16.1**	**118**	○
2.1	**Education**		**39.2**	**[102]**	
2.1.1	Expenditure on education, % GDP	⏲	4.6	51	
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	122	
2.2	**Tertiary education**		**7.2**	**117**	○◇
2.2.1	Tertiary enrolment, % gross		20.5	100	
2.2.2	Graduates in science and engineering, %		n/a	n/a	
2.2.3	Tertiary inbound mobility, %	⏲	1.3	87	
2.3	**Research and development (R&D)**		**2.1**	**89**	
2.3.1	Researchers, FTE/mn pop.		169.3	87	
2.3.2	Gross expenditure on R&D, % GDP		0.4	65	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
Infrastructure			**27.1**	**106**	
3.1	**Information and communication technologies (ICTs)**		**55.8**	**94**	
3.1.1	ICT access*		50.7	107	
3.1.2	ICT use*		50.6	107	○
3.1.3	Government's online service*		64.9	68	◆
3.1.4	E-participation*		57.0	64	◆
3.2	**General infrastructure**		**8.5**	**127**	○
3.2.1	Electricity output, GWh/mn pop.		239.9	117	○
3.2.2	Logistics performance*		n/a	n/a	
3.2.3	Gross capital formation, % GDP		19.1	105	
3.3	**Ecological sustainability**		**17.1**	**83**	
3.3.1	GDP/unit of energy use		8.0	94	
3.3.2	Low-carbon energy use, %		28.5	40	●
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.4	100	
Market sophistication			**22.6**	**101**	
4.1	**Credit**		**6.1**	**123**	○
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		31.5	93	
4.1.3	Loans from microfinance institutions, % GDP		0.3	49	
4.2	**Investment**		**26.3**	**31**	●
4.2.1	Market capitalization, % GDP		18.8	64	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.1	40	●◆
4.2.3	VC recipients, deals/bn PPP$ GDP		0.2	13	●◆
4.2.4	VC received, value, % GDP		0.0	25	●◆
4.3	**Trade, diversification and market scale**		**35.3**	**108**	
4.3.1	Applied tariff rate, weighted avg., %		8.0	120	○
4.3.2	Domestic industry diversification	⏲	62.6	92	
4.3.3	Domestic market scale, bn PPP$		339.0	57	

			Score/ Value	Rank	
Business sophistication			**21.3**	**93**	
5.1	**Knowledge workers**		**24.3**	**[91]**	
5.1.1	Knowledge-intensive employment, %	⏲	13.8	97	
5.1.2	Firms offering formal training, %	⏲	37.4	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, %	⏲	2.2	109	○
5.2	**Innovation linkages**		**22.2**	**70**	
5.2.1	Public research–industry co-publications, %		1.8	51	●◆
5.2.2	University–industry R&D collaboration†		42.9	72	
5.2.3	State of cluster development†		41.0	82	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	58	
5.2.5	Patent families/bn PPP$ GDP		0.0	93	
5.3	**Knowledge absorption**		**17.4**	**107**	
5.3.1	Intellectual property payments, % total trade		0.4	84	
5.3.2	High-tech imports, % total trade		6.8	89	
5.3.3	ICT services imports, % total trade		0.5	111	
5.3.4	FDI net inflows, % GDP		0.4	111	
5.3.5	Research talent, % in businesses		n/a	n/a	
Knowledge and technology outputs			**19.7**	**75**	
6.1	**Knowledge creation**		**17.7**	**61**	
6.1.1	Patents by origin/bn PPP$ GDP		1.2	49	●
6.1.2	PCT patents by origin/bn PPP$ GDP		0.1	69	
6.1.3	Utility models by origin/bn PPP$ GDP		1.2	15	●
6.1.4	Scientific and technical articles/bn PPP$ GDP		8.3	81	
6.1.5	Citable documents H-index		15.9	54	
6.2	**Knowledge impact**		**21.7**	**89**	
6.2.1	Labor productivity growth, %		1.8	29	●
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.1	85	
6.2.4	High-tech manufacturing, %	⏲	12.4	81	
6.3	**Knowledge diffusion**		**19.6**	**58**	
6.3.1	Intellectual property receipts, % total trade		0.4	33	●◆
6.3.2	Production and export complexity		34.2	79	
6.3.3	High-tech exports, % total trade		0.3	102	
6.3.4	ICT services exports, % total trade		5.7	17	●◆
6.3.5	ISO 9001 quality/bn PPP$ GDP		1.8	99	
Creative outputs			**13.6**	**101**	
7.1	**Intangible assets**		**15.1**	**92**	
7.1.1	Intangible asset intensity, top 15, %	⏲	−18.3	73	○◇
7.1.2	Trademarks by origin/bn PPP$ GDP		16.6	96	
7.1.3	Global brand value, top 5,000, % GDP		1.2	54	
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.3	91	
7.2	**Creative goods and services**		**1.1**	**119**	○
7.2.1	Cultural and creative services exports, % total trade	⏲	0.0	102	○
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		1.7	52	
7.2.4	Creative goods exports, % total trade		0.1	98	
7.3	**Online creativity**		**22.9**	**83**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.8	100	
7.3.2	GitHub commits/mn pop. 15–69		10.0	55	◆
7.3.3	Mobile app creation/bn PPP$ GDP		58.1	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Kuwait

71

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
68	70	High	NAWA	4.8	256.6	51,765

			Score/ Value	Rank	
	Institutions		**46.8**	**66**	◇
1.1	**Institutional environment**		**53.5**	**67**	◇
1.1.1	Operational stability for businesses*		60.0	70	◇
1.1.2	Government effectiveness*		46.9	60	◇
1.2	**Regulatory environment**		**49.6**	**55**	◇
1.2.1	Regulatory quality*		47.4	58	◇
1.2.2	Rule of law*		51.9	55	◇
1.3	**Business environment**		**37.3**	**86**	
1.3.1	Policy stability for doing business†		47.2	69	
1.3.2	Entrepreneurship policies and culture†	⏲	27.3	57	
	Human capital and research		**34.5**	**[53]**	
2.1	**Education**		**59.9**	**[37]**	
2.1.1	Expenditure on education, % GDP		n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap	⏲	17.9	59	
2.1.3	School life expectancy, years	⏲	14.7	54	
2.1.4	PISA scales in reading, maths and science		n/a	n/a	
2.1.5	Pupil–teacher ratio, secondary	⏲	7.6	6	
2.2	**Tertiary education**		**39.3**	**[42]**	
2.2.1	Tertiary enrolment, % gross	⏲	61.6	53	
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)**		**4.3**	**78**	◇
2.3.1	Researchers, FTE/mn pop.		182.0	85	◇
2.3.2	Gross expenditure on R&D, % GDP		0.1	105	○◇
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		14.5	60	
	Infrastructure		**43.6**	**60**	◇
3.1	**Information and communication technologies (ICTs)**		**80.0**	**44**	●
3.1.1	ICT access*		100.0	1	●
3.1.2	ICT use*		100.0	1	●◆
3.1.3	Government's online service*		66.5	66	◇
3.1.4	E-participation*		53.5	67	
3.2	**General infrastructure**		**44.1**	**31**	●
3.2.1	Electricity output, GWh/mn pop.	⏲	19,007.1	5	●◆
3.2.2	Logistics performance*		50.0	50	◇
3.2.3	Gross capital formation, % GDP		17.5	115	○◇
3.3	**Ecological sustainability**		**6.8**	**120**	◇
3.3.1	GDP/unit of energy use		4.7	120	○◇
3.3.2	Low-carbon energy use, %		0.1	127	○◇
3.3.3	ISO 14001 environment/bn PPP$ GDP		1.8	55	
	Market sophistication		**29.8**	**76**	◇
4.1	**Credit**		**41.9**	**35**	●
4.1.1	Finance for startups and scaleups†	⏲	49.8	40	
4.1.2	Domestic credit to private sector, % GDP	⏲	95.1	27	●
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**11.0**	**57**	
4.2.1	Market capitalization, % GDP		95.5	20	●
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.1	58	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	97	◇
4.2.4	VC received, value, % GDP		0.0	63	
4.3	**Trade, diversification and market scale**		**36.6**	**107**	◇
4.3.1	Applied tariff rate, weighted avg., %	⏲	3.4	84	
4.3.2	Domestic industry diversification	⏲	31.6	105	○◇
4.3.3	Domestic market scale, bn PPP$		256.6	65	

			Score/ Value	Rank	
	Business sophistication		**16.4**	**120**	◇
5.1	**Knowledge workers**		**16.8**	**[111]**	
5.1.1	Knowledge-intensive employment, %	⏲	22.7	65	
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	92	
5.1.5	Females employed w/advanced degrees, %		n/a	n/a	
5.2	**Innovation linkages**		**20.9**	**81**	◇
5.2.1	Public research–industry co-publications, %		1.3	78	
5.2.2	University–industry R&D collaboration†		23.6	110	◇
5.2.3	State of cluster development†		57.4	44	●
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	49	
5.2.5	Patent families/bn PPP$ GDP		0.0	99	◇
5.3	**Knowledge absorption**		**11.5**	**133**	○◇
5.3.1	Intellectual property payments, % total trade		0.0	121	○◇
5.3.2	High-tech imports, % total trade		4.7	111	
5.3.3	ICT services imports, % total trade		0.1	131	○◇
5.3.4	FDI net inflows, % GDP		−0.1	120	
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**20.8**	**67**	◇
6.1	**Knowledge creation**		**6.4**	**105**	◇
6.1.1	Patents by origin/bn PPP$ GDP	⏲	0.1	113	◇
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	97	
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		7.4	87	◇
6.1.5	Citable documents H-index		9.1	84	◇
6.2	**Knowledge impact**		**30.1**	**54**	
6.2.1	Labor productivity growth, %		0.3	82	
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.5	22	●
6.2.4	High-tech manufacturing, %	⏲	20.9	59	
6.3	**Knowledge diffusion**		**25.8**	**51**	
6.3.1	Intellectual property receipts, % total trade		n/a	n/a	
6.3.2	Production and export complexity		46.4	55	◇
6.3.3	High-tech exports, % total trade		0.2	111	◇
6.3.4	ICT services exports, % total trade		5.6	18	●
6.3.5	ISO 9001 quality/bn PPP$ GDP		3.4	73	
	Creative outputs		**23.1**	**69**	◇
7.1	**Intangible assets**		**31.6**	**57**	
7.1.1	Intangible asset intensity, top 15, %		39.7	62	
7.1.2	Trademarks by origin/bn PPP$ GDP		19.4	90	
7.1.3	Global brand value, top 5,000, % GDP		9.6	17	●
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.1	116	
7.2	**Creative goods and services**		**5.9**	**92**	◇
7.2.1	Cultural and creative services exports, % total trade		n/a	n/a	
7.2.2	National feature films/mn pop. 15–69		0.8	71	◇
7.2.3	Entertainment and media market/th pop. 15–69		11.2	33	◇
7.2.4	Creative goods exports, % total trade		0.1	94	
7.3	**Online creativity**		**23.4**	**79**	◇
7.3.1	Top-level domains (TLDs)/th pop. 15–69		2.7	73	◇
7.3.2	GitHub commits/mn pop. 15–69		1.9	104	◇
7.3.3	Mobile app creation/bn PPP$ GDP		65.5	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Kyrgyzstan

GII 2024 rank

99

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
105	86	Lower middle	CSA	7.1	44.6	6,438

		Score/ Value	Rank	
	Institutions	**25.1**	**119**	
1.1	**Institutional environment**	**24.7**	**124**	
1.1.1	Operational stability for businesses*	28.7	120	
1.1.2	Government effectiveness*	20.8	121	
1.2	**Regulatory environment**	**18.1**	**120**	
1.2.1	Regulatory quality*	25.2	106	
1.2.2	Rule of law*	10.9	125	◇
1.3	**Business environment**	**32.5**	**[95]**	
1.3.1	Policy stability for doing business†	32.5	100	
1.3.2	Entrepreneurship policies and culture†	n/a	n/a	
	Human capital and research	**39.6**	**42**	●◆
2.1	**Education**	**71.1**	**[3]**	
2.1.1	Expenditure on education, % GDP	8.0	3	●◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years ⏲	13.0	81	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil–teacher ratio, secondary	12.8	59	
2.2	**Tertiary education**	**47.2**	**19**	●◆
2.2.1	Tertiary enrolment, % gross	56.0	64	◆
2.2.2	Graduates in science and engineering, %	18.9	85	
2.2.3	Tertiary inbound mobility, %	28.5	4	●◆
2.3	**Research and development (R&D)**	**0.4**	**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 USD$	0.0	41	○◇
2.3.4	QS university ranking, top 3*	0.0	75	○◇
	Infrastructure	**36.3**	**78**	
3.1	**Information and communication technologies (ICTs)**	**69.0**	**75**	◆
3.1.1	ICT access*	95.2	46	●◆
3.1.2	ICT use*	74.2	78	
3.1.3	Government's online service*	57.7	80	
3.1.4	E-participation*	48.8	78	
3.2	**General infrastructure**	**15.2**	**114**	
3.2.1	Electricity output, GWh/mn pop.	2,035.9	79	
3.2.2	Logistics performance*	9.1	105	○
3.2.3	Gross capital formation, % GDP	23.2	72	
3.3	**Ecological sustainability**	**24.9**	**49**	●◆
3.3.1	GDP/unit of energy use	7.6	97	
3.3.2	Low-carbon energy use, %	50.6	13	●◆
3.3.3	ISO 14001 environment/bn PPP$ GDP	0.1	130	○
	Market sophistication	**27.7**	**81**	
4.1	**Credit**	**20.7**	**84**	
4.1.1	Finance for startups and scaleups†	n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP	21.9	112	
4.1.3	Loans from microfinance institutions, % GDP	3.3	10	●
4.2	**Investment**	**n/a**	**[n/a]**	
4.2.1	Market capitalization, % GDP	n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	VC received, value, % GDP	n/a	n/a	
4.3	**Trade, diversification and market scale**	**34.8**	**110**	
4.3.1	Applied tariff rate, weighted avg., %	2.9	78	
4.3.2	Domestic industry diversification	26.1	106	○◇
4.3.3	Domestic market scale, bn PPP$	44.6	115	

		Score/ Value	Rank	
	Business sophistication	**17.5**	**117**	
5.1	**Knowledge workers**	**20.3**	**102**	
5.1.1	Knowledge-intensive employment, % ⏲	18.1	85	
5.1.2	Firms offering formal training, %	24.1	72	
5.1.3	GERD performed by business, % GDP ⏲	0.0	79	
5.1.4	GERD financed by business, % ⏲	6.9	81	
5.1.5	Females employed w/advanced degrees, % ⏲	11.7	67	
5.2	**Innovation linkages**	**11.4**	**124**	
5.2.1	Public research–industry co-publications, %	0.5	122	
5.2.2	University–industry R&D collaboration†	19.7	119	
5.2.3	State of cluster development†	27.6	110	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP ⏲	0.0	88	
5.2.5	Patent families/bn PPP$ GDP	0.1	54	●◆
5.3	**Knowledge absorption**	**20.8**	**89**	
5.3.1	Intellectual property payments, % total trade	0.1	98	
5.3.2	High-tech imports, % total trade	11.2	29	●
5.3.3	ICT services imports, % total trade	0.7	103	
5.3.4	FDI net inflows, % GDP	0.0	118	
5.3.5	Research talent, % in businesses	n/a	n/a	
	Knowledge and technology outputs	**10.8**	**107**	
6.1	**Knowledge creation**	**8.6**	**89**	
6.1.1	Patents by origin/bn PPP$ GDP	1.8	32	●◆
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	99	○◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.2	42	
6.1.4	Scientific and technical articles/bn PPP$ GDP	5.5	101	
6.1.5	Citable documents H-index	3.0	121	
6.2	**Knowledge impact**	**13.0**	**125**	◇
6.2.1	Labor productivity growth, %	0.2	84	
6.2.2	Unicorn valuation, % GDP	0.0	49	○◇
6.2.3	Software spending, % GDP	0.0	107	
6.2.4	High-tech manufacturing, %	2.1	107	○◇
6.3	**Knowledge diffusion**	**10.8**	**91**	
6.3.1	Intellectual property receipts, % total trade	0.0	75	
6.3.2	Production and export complexity	40.4	64	
6.3.3	High-tech exports, % total trade	2.0	64	
6.3.4	ICT services exports, % total trade	0.6	97	
6.3.5	ISO 9001 quality/bn PPP$ GDP	0.3	130	○◇
	Creative outputs	**12.1**	**104**	
7.1	**Intangible assets**	**4.9**	**114**	
7.1.1	Intangible asset intensity, top 15, %	n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP	17.5	94	
7.1.3	Global brand value, top 5,000, % GDP	0.0	75	○◇
7.1.4	Industrial designs by origin/bn PPP$ GDP	0.2	97	
7.2	**Creative goods and services**	**14.6**	**[64]**	
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	Creative goods exports, % total trade	1.2	41	●
7.3	**Online creativity**	**24.2**	**72**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69	0.5	106	
7.3.2	GitHub commits/mn pop. 15–69	8.3	61	●
7.3.3	Mobile app creation/bn PPP$ GDP	63.8	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Lao People's Democratic Republic **111**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
121	99	Lower middle	SEAO	7.7	74.2	9,787

			Score/ Value	Rank	
Institutions			**38.5**	**88**	
1.1	**Institutional environment**		**42.9**	**91**	
1.1.1	Operational stability for businesses*		57.3	78	
1.1.2	Government effectiveness*		28.4	104	
1.2	**Regulatory environment**		**18.3**	**119**	
1.2.1	Regulatory quality*		15.9	122	
1.2.2	Rule of law*		20.7	109	
1.3	**Business environment**		**54.3**	**[48]**	
1.3.1	Policy stability for doing business†		54.3	51	●
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
Human capital and research			**15.4**	**121**	
2.1	**Education**		**28.6**	**125**	
2.1.1	Expenditure on education, % GDP		1.4	126	○◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	◷	12.6	80	
2.1.3	School life expectancy, years	◷	10.2	104	
2.1.4	PISA scales in reading, maths and science		n/a	n/a	
2.1.5	Pupil–teacher ratio, secondary		16.6	87	
2.2	**Tertiary education**		**17.5**	**104**	
2.2.1	Tertiary enrolment, % gross	◷	12.5	112	
2.2.2	Graduates in science and engineering, %	◷	23.1	59	
2.2.3	Tertiary inbound mobility, %	◷	0.6	97	
2.3	**Research and development (R&D)**		**0.0**	**[120]**	
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 USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
Infrastructure			**29.5**	**96**	
3.1	**Information and communication technologies (ICTs)**		**39.6**	**113**	
3.1.1	ICT access*	◷	58.7	103	
3.1.2	ICT use*		52.5	104	
3.1.3	Government's online service*		22.7	129	◇
3.1.4	E-participation*		24.4	115	
3.2	**General infrastructure**		**18.1**	**102**	
3.2.1	Electricity output, GWh/mn pop.	◷	6,048.5	35	●◆
3.2.2	Logistics performance*		13.6	102	
3.2.3	Gross capital formation, % GDP		n/a	n/a	
3.3	**Ecological sustainability**		**30.8**	**39**	●◆
3.3.1	GDP/unit of energy use		9.6	76	
3.3.2	Low-carbon energy use, %		59.9	9	●◆
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.3	109	
Market sophistication			**34.9**	**[58]**	
4.1	**Credit**		**9.5**	**[111]**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		n/a	n/a	
4.1.3	Loans from microfinance institutions, % GDP		0.9	35	
4.2	**Investment**		**n/a**	**[n/a]**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP		n/a	n/a	
4.2.4	VC received, value, % GDP		n/a	n/a	
4.3	**Trade, diversification and market scale**		**60.3**	**52**	●◆
4.3.1	Applied tariff rate, weighted avg., %	◷	0.7	9	●◆
4.3.2	Domestic industry diversification	◷	85.3	53	
4.3.3	Domestic market scale, bn PPP$		74.2	100	

			Score/ Value	Rank	
Business sophistication			**19.7**	**106**	
5.1	**Knowledge workers**		**18.1**	**[108]**	
5.1.1	Knowledge-intensive employment, %		9.0	111	
5.1.2	Firms offering formal training, %	◷	24.4	68	
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, %	◷	4.6	97	
5.2	**Innovation linkages**		**27.6**	**54**	◆
5.2.1	Public research–industry co-publications, %		1.5	67	
5.2.2	University–industry R&D collaboration†		57.9	42	●◆
5.2.3	State of cluster development†		61.6	39	●◆
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	◷	0.0	93	
5.2.5	Patent families/bn PPP$ GDP		0.0	102	○◇
5.3	**Knowledge absorption**		**13.5**	**128**	◇
5.3.1	Intellectual property payments, % total trade		0.0	121	○◇
5.3.2	High-tech imports, % total trade	◷	4.0	122	
5.3.3	ICT services imports, % total trade		0.2	130	◇
5.3.4	FDI net inflows, % GDP		4.7	23	●
5.3.5	Research talent, % in businesses		n/a	n/a	
Knowledge and technology outputs			**10.8**	**108**	
6.1	**Knowledge creation**		**2.0**	**126**	◇
6.1.1	Patents by origin/bn PPP$ GDP		0.0	128	○◇
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	99	○◇
6.1.3	Utility models by origin/bn PPP$ GDP		0.1	54	
6.1.4	Scientific and technical articles/bn PPP$ GDP		2.4	119	
6.1.5	Citable documents H-index		3.7	115	
6.2	**Knowledge impact**		**20.3**	**99**	
6.2.1	Labor productivity growth, %		1.1	51	●
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.2	56	
6.2.4	High-tech manufacturing, %	◷	4.8	99	
6.3	**Knowledge diffusion**		**9.9**	**94**	
6.3.1	Intellectual property receipts, % total trade		0.0	116	○◇
6.3.2	Production and export complexity		32.7	83	
6.3.3	High-tech exports, % total trade	◷	3.2	48	●
6.3.4	ICT services exports, % total trade		0.3	116	
6.3.5	ISO 9001 quality/bn PPP$ GDP		1.1	111	
Creative outputs			**5.4**	**123**	◇
7.1	**Intangible assets**		**0.9**	**128**	◇
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP	◷	4.5	122	
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.0	123	
7.2	**Creative goods and services**		**18.6**	**[58]**	
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	Creative goods exports, % total trade	◷	1.5	33	●
7.3	**Online creativity**		**1.3**	**129**	◇
7.3.1	Top-level domains (TLDs)/th pop. 15–69		2.1	78	◆
7.3.2	GitHub commits/mn pop. 15–69		0.5	122	
7.3.3	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Latvia

GII 2024 rank **42**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
46	38	High	EUR	1.9	76.5	40,892

		Score/ Value	Rank	
	Institutions	**57.9**	**42**	
1.1	**Institutional environment**	**69.7**	**36**	
1.1.1	Operational stability for businesses*	77.3	32	
1.1.2	Government effectiveness*	62.1	38	
1.2	**Regulatory environment**	**71.4**	**27**	
1.2.1	Regulatory quality*	72.6	26	
1.2.2	Rule of law*	70.3	30	
1.3	**Business environment**	**32.7**	**94**	◇
1.3.1	Policy stability for doing business†	23.1	118	○◇
1.3.2	Entrepreneurship policies and culture†	42.3	40	
	Human capital and research	**39.2**	**45**	
2.1	**Education**	**63.3**	**20**	
2.1.1	Expenditure on education, % GDP ⏲	5.6	25	
2.1.2	Government funding/pupil, secondary, % GDP/cap	23.1	33	
2.1.3	School life expectancy, years	16.5	29	
2.1.4	PISA scales in reading, maths and science	483.9	22	
2.1.5	Pupil–teacher ratio, secondary	9.4	26	
2.2	**Tertiary education**	**41.9**	**34**	
2.2.1	Tertiary enrolment, % gross	91.3	14	●
2.2.2	Graduates in science and engineering, %	19.4	82	○
2.2.3	Tertiary inbound mobility, %	12.7	17	●
2.3	**Research and development (R&D)**	**12.2**	**55**	◇
2.3.1	Researchers, FTE/mn pop.	2,262.0	40	
2.3.2	Gross expenditure on R&D, % GDP	0.8	48	
2.3.3	Global corporate R&D investors, top 3, mn USD$	0.0	41	○◇
2.3.4	QS university ranking, top 3*	13.8	62	
	Infrastructure	**51.3**	**33**	
3.1	**Information and communication technologies (ICTs)**	**85.4**	**24**	
3.1.1	ICT access*	96.2	41	
3.1.2	ICT use*	92.7	8	●
3.1.3	Government's online service*	79.4	35	
3.1.4	E-participation*	73.3	29	
3.2	**General infrastructure**	**36.0**	**48**	
3.2.1	Electricity output, GWh/mn pop.	2,651.1	69	◇
3.2.2	Logistics performance*	63.6	33	
3.2.3	Gross capital formation, % GDP	25.0	50	
3.3	**Ecological sustainability**	**32.5**	**33**	
3.3.1	GDP/unit of energy use	13.5	39	
3.3.2	Low-carbon energy use, %	25.8	48	
3.3.3	ISO 14001 environment/bn PPP$ GDP	4.7	23	
	Market sophistication	**36.6**	**53**	
4.1	**Credit**	**32.5**	**49**	
4.1.1	Finance for startups and scaleups†	57.0	30	
4.1.2	Domestic credit to private sector, % GDP	28.8	100	○◇
4.1.3	Loans from microfinance institutions, % GDP	n/a	n/a	
4.2	**Investment**	**19.9**	**41**	
4.2.1	Market capitalization, % GDP	n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	0.2	33	
4.2.3	VC recipients, deals/bn PPP$ GDP	0.1	28	
4.2.4	VC received, value, % GDP	0.0	55	
4.3	**Trade, diversification and market scale**	**57.3**	**63**	
4.3.1	Applied tariff rate, weighted avg., %	1.1	21	
4.3.2	Domestic industry diversification	79.5	65	
4.3.3	Domestic market scale, bn PPP$	76.5	97	○

		Score/ Value	Rank	
	Business sophistication	**35.9**	**40**	
5.1	**Knowledge workers**	**54.8**	**29**	
5.1.1	Knowledge-intensive employment, %	44.7	24	
5.1.2	Firms offering formal training, % ⏲	52.9	15	●
5.1.3	GERD performed by business, % GDP	0.3	50	
5.1.4	GERD financed by business, %	33.5	56	
5.1.5	Females employed w/advanced degrees, %	26.6	14	●
5.2	**Innovation linkages**	**22.8**	**67**	◇
5.2.1	Public research–industry co-publications, %	2.0	45	
5.2.2	University–industry R&D collaboration†	42.9	73	
5.2.3	State of cluster development†	37.4	91	◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	65	
5.2.5	Patent families/bn PPP$ GDP	0.3	41	
5.3	**Knowledge absorption**	**30.0**	**55**	
5.3.1	Intellectual property payments, % total trade	0.1	99	○
5.3.2	High-tech imports, % total trade	11.7	23	
5.3.3	ICT services imports, % total trade	1.7	42	
5.3.4	FDI net inflows, % GDP	5.0	22	
5.3.5	Research talent, % in businesses	29.2	47	
	Knowledge and technology outputs	**24.2**	**51**	
6.1	**Knowledge creation**	**20.3**	**55**	
6.1.1	Patents by origin/bn PPP$ GDP	1.7	36	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.4	35	
6.1.3	Utility models by origin/bn PPP$ GDP	-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP	18.9	37	
6.1.5	Citable documents H-index	9.4	81	◇
6.2	**Knowledge impact**	**20.5**	**95**	◇
6.2.1	Labor productivity growth, %	1.8	32	◆
6.2.2	Unicorn valuation, % GDP	0.0	49	○◇
6.2.3	Software spending, % GDP	0.1	96	○◇
6.2.4	High-tech manufacturing, %	13.1	79	○◇
6.3	**Knowledge diffusion**	**31.9**	**38**	
6.3.1	Intellectual property receipts, % total trade	0.0	72	
6.3.2	Production and export complexity	61.5	36	
6.3.3	High-tech exports, % total trade	6.9	31	
6.3.4	ICT services exports, % total trade	4.4	23	
6.3.5	ISO 9001 quality/bn PPP$ GDP	12.0	19	●
	Creative outputs	**32.8**	**39**	
7.1	**Intangible assets**	**17.2**	**84**	◇
7.1.1	Intangible asset intensity, top 15, %	n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP	41.0	46	
7.1.3	Global brand value, top 5,000, % GDP	0.0	75	○◇
7.1.4	Industrial designs by origin/bn PPP$ GDP	2.3	39	
7.2	**Creative goods and services**	**51.9**	**5**	●◆
7.2.1	Cultural and creative services exports, % total trade	2.4	9	●◆
7.2.2	National feature films/mn pop. 15–69	8.5	10	●
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Creative goods exports, % total trade	2.9	19	●
7.3	**Online creativity**	**45.0**	**31**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69	19.2	31	
7.3.2	GitHub commits/mn pop. 15–69	38.7	29	
7.3.3	Mobile app creation/bn PPP$ GDP	77.0	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Lebanon

GII 2024 rank

94

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
88	101	Lower middle	NAWA	5.8	NA	NA

			Score/Value	Rank	
	Institutions		**14.7**	**128**	◇
1.1	**Institutional environment**		**2.9**	**133**	○◇
1.1.1	Operational stability for businesses*		0.0	133	○◇
1.1.2	Government effectiveness*		5.9	132	○◇
1.2	**Regulatory environment**		**12.2**	**124**	◇
1.2.1	Regulatory quality*		12.1	125	◇
1.2.2	Rule of law*		12.2	123	◇
1.3	**Business environment**		**29.2**	**100**	
1.3.1	Policy stability for doing business†	⏲	9.3	127	○◇
1.3.2	Entrepreneurship policies and culture†	⏲	49.0	28	
	Human capital and research		**33.1**	**[59]**	
2.1	**Education**		**39.4**	**[99]**	
2.1.1	Expenditure on education, % GDP	⏲	1.7	125	○◇
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	⏲	376.8	72	
2.1.5	Pupil–teacher ratio, secondary	⏲	7.7	7	
2.2	**Tertiary education**		**46.2**	**21**	●◆
2.2.1	Tertiary enrolment, % gross		61.6	52	◆
2.2.2	Graduates in science and engineering, %		28.4	28	●
2.2.3	Tertiary inbound mobility, %		14.3	14	●◆
2.3	**Research and development (R&D)**		**13.7**	**[53]**	
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 USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		27.3	46	◆
	Infrastructure		**24.1**	**116**	
3.1	**Information and communication technologies (ICTs)**		**53.1**	**98**	
3.1.1	ICT access*	⏲	85.4	79	◆
3.1.2	ICT use*		52.2	105	
3.1.3	Government's online service*		36.5	114	
3.1.4	E-participation*		38.4	90	
3.2	**General infrastructure**		**6.8**	**[130]**	
3.2.1	Electricity output, GWh/mn pop.	⏲	1,841.6	84	
3.2.2	Logistics performance*		n/a	n/a	
3.2.3	Gross capital formation, % GDP		n/a	n/a	
3.3	**Ecological sustainability**		**12.4**	**101**	
3.3.1	GDP/unit of energy use		12.0	53	
3.3.2	Low-carbon energy use, %		4.4	107	
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.9	74	
	Market sophistication		**38.5**	**45**	◆
4.1	**Credit**		**56.2**	**15**	●◆
4.1.1	Finance for startups and scaleups†	⏲	74.0	12	●◆
4.1.2	Domestic credit to private sector, % GDP	⏲	106.6	20	●◆
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**8.1**	**68**	
4.2.1	Market capitalization, % GDP	⏲	27.3	53	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	⏲	0.3	25	●◆
4.2.3	VC recipients, deals/bn PPP$ GDP	⏲	0.0	81	
4.2.4	VC received, value, % GDP	⏲	0.0	88	
4.3	**Trade, diversification and market scale**		**51.2**	**77**	
4.3.1	Applied tariff rate, weighted avg., %		2.7	75	
4.3.2	Domestic industry diversification	⏲	73.4	75	
4.3.3	Domestic market scale, bn PPP$	⏲	78.2	96	

			Score/Value	Rank	
	Business sophistication		**23.6**	**80**	
5.1	**Knowledge workers**		**37.4**	**[55]**	
5.1.1	Knowledge-intensive employment, %	⏲	27.5	52	◆
5.1.2	Firms offering formal training, %	⏲	20.8	77	
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	53	◆
5.2	**Innovation linkages**		**15.9**	**103**	
5.2.1	Public research–industry co-publications, %		0.3	132	○◇
5.2.2	University–industry R&D collaboration†	⏲	34.0	92	
5.2.3	State of cluster development†	⏲	31.6	103	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	⏲	0.0	45	◆
5.2.5	Patent families/bn PPP$ GDP		0.1	63	◆
5.3	**Knowledge absorption**		**17.6**	**105**	
5.3.1	Intellectual property payments, % total trade		0.0	111	
5.3.2	High-tech imports, % total trade		8.3	65	
5.3.3	ICT services imports, % total trade		0.3	123	
5.3.4	FDI net inflows, % GDP	⏲	3.8	37	●
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**17.8**	**80**	
6.1	**Knowledge creation**		**30.2**	**[31]**	
6.1.1	Patents by origin/bn PPP$ GDP	⏲	1.1	55	
6.1.2	PCT patents by origin/bn PPP$ GDP		n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP	⏲	28.3	20	●◆
6.1.5	Citable documents H-index		13.1	64	
6.2	**Knowledge impact**		**4.8**	**133**	○◇
6.2.1	Labor productivity growth, %		−5.5	132	○◇
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.0	116	
6.2.4	High-tech manufacturing, %	⏲	14.6	76	
6.3	**Knowledge diffusion**		**18.5**	**62**	
6.3.1	Intellectual property receipts, % total trade		0.1	52	◆
6.3.2	Production and export complexity		51.6	48	◆
6.3.3	High-tech exports, % total trade		2.0	59	
6.3.4	ICT services exports, % total trade		1.3	74	
6.3.5	ISO 9001 quality/bn PPP$ GDP		6.7	41	◆
	Creative outputs		**14.7**	**93**	
7.1	**Intangible assets**		**4.4**	**[118]**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP	⏲	12.7	105	
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		n/a	n/a	
7.2	**Creative goods and services**		**23.1**	**51**	◆
7.2.1	Cultural and creative services exports, % total trade		1.2	20	●◆
7.2.2	National feature films/mn pop. 15–69		6.5	16	●◆
7.2.3	Entertainment and media market/th pop. 15–69	⏲	1.1	60	○
7.2.4	Creative goods exports, % total trade		1.3	38	
7.3	**Online creativity**		**26.9**	**60**	◆
7.3.1	Top-level domains (TLDs)/th pop. 15–69		3.0	69	◆
7.3.2	GitHub commits/mn pop. 15–69		7.2	66	
7.3.3	Mobile app creation/bn PPP$ GDP	⏲	70.5	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Lithuania

GII 2024 rank

35

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
42	30	High	EUR	2.9	137.3	49,245

		Score/Value	Rank
	Institutions	**71.9**	**22**
1.1	**Institutional environment**	**75.6**	**25**
1.1.1	Operational stability for businesses*	81.3	18
1.1.2	Government effectiveness*	70.0	31
1.2	**Regulatory environment**	**75.1**	**24**
1.2.1	Regulatory quality*	76.0	21
1.2.2	Rule of law*	74.2	26
1.3	**Business environment**	**65.0**	**26**
1.3.1	Policy stability for doing business†	53.2	54
1.3.2	Entrepreneurship policies and culture†	76.8	8 ● ◆
	Human capital and research	**39.2**	**44**
2.1	**Education**	**59.1**	**41**
2.1.1	Expenditure on education, % GDP ◷	4.8	47
2.1.2	Government funding/pupil, secondary, % GDP/cap	18.8	57
2.1.3	School life expectancy, years ◷	16.4	30
2.1.4	PISA scales in reading, maths and science	477.1	30
2.1.5	Pupil–teacher ratio, secondary ◷	8.3	17 ● ◆
2.2	**Tertiary education**	**39.7**	**41**
2.2.1	Tertiary enrolment, % gross ◷	71.9	37
2.2.2	Graduates in science and engineering, %	25.8	39
2.2.3	Tertiary inbound mobility, % ◷	7.3	38
2.3	**Research and development (R&D)**	**18.7**	**46**
2.3.1	Researchers, FTE/mn pop.	4,019.4	28
2.3.2	Gross expenditure on R&D, % GDP	1.0	37
2.3.3	Global corporate R&D investors, top 3, mn USD$	0.0	41 ○ ◇
2.3.4	QS university ranking, top 3*	17.6	53
	Infrastructure	**50.4**	**38**
3.1	**Information and communication technologies (ICTs)**	**81.3**	**43**
3.1.1	ICT access*	96.4	40
3.1.2	ICT use*	93.7	4 ● ◆
3.1.3	Government's online service*	81.7	28
3.1.4	E-participation*	53.5	67
3.2	**General infrastructure**	**31.5**	**64**
3.2.1	Electricity output, GWh/mn pop.	1,493.6	91 ○ ◇
3.2.2	Logistics performance*	59.1	37
3.2.3	Gross capital formation, % GDP	23.6	67
3.3	**Ecological sustainability**	**38.4**	**21**
3.3.1	GDP/unit of energy use	15.1	31
3.3.2	Low-carbon energy use, %	10.4	85 ○
3.3.3	ISO 14001 environment/bn PPP$ GDP	8.6	9 ● ◆
	Market sophistication	**47.1**	**28**
4.1	**Credit**	**44.0**	**31**
4.1.1	Finance for startups and scaleups†	77.3	10 ● ◆
4.1.2	Domestic credit to private sector, % GDP	35.7	86 ○ ◇
4.1.3	Loans from microfinance institutions, % GDP	n/a	n/a
4.2	**Investment**	**35.3**	**22**
4.2.1	Market capitalization, % GDP	n/a	n/a
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	0.2	29
4.2.3	VC recipients, deals/bn PPP$ GDP	0.2	20
4.2.4	VC received, value, % GDP	0.0	16 ●
4.3	**Trade, diversification and market scale**	**61.9**	**41**
4.3.1	Applied tariff rate, weighted avg., %	1.1	21
4.3.2	Domestic industry diversification ◷	92.1	28
4.3.3	Domestic market scale, bn PPP$	137.3	83

		Score/Value	Rank
	Business sophistication	**36.4**	**38**
5.1	**Knowledge workers**	**52.4**	**31**
5.1.1	Knowledge-intensive employment, %	46.6	19 ●
5.1.2	Firms offering formal training, % ◷	27.5	59
5.1.3	GERD performed by business, % GDP	0.5	39
5.1.4	GERD financed by business, %	36.1	53
5.1.5	Females employed w/advanced degrees, %	30.5	1 ● ◆
5.2	**Innovation linkages**	**29.4**	**49**
5.2.1	Public research–industry co-publications, %	0.9	97 ○ ◇
5.2.2	University–industry R&D collaboration†	68.8	27
5.2.3	State of cluster development†	52.1	55
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	53
5.2.5	Patent families/bn PPP$ GDP	0.4	36
5.3	**Knowledge absorption**	**27.4**	**63**
5.3.1	Intellectual property payments, % total trade	0.5	73
5.3.2	High-tech imports, % total trade	7.2	84 ○
5.3.3	ICT services imports, % total trade	1.4	63
5.3.4	FDI net inflows, % GDP	4.4	29
5.3.5	Research talent, % in businesses	31.5	40
	Knowledge and technology outputs	**32.7**	**29**
6.1	**Knowledge creation**	**21.1**	**53**
6.1.1	Patents by origin/bn PPP$ GDP	1.1	56
6.1.2	PCT patents by origin/bn PPP$ GDP	0.3	39
6.1.3	Utility models by origin/bn PPP$ GDP	-	-
6.1.4	Scientific and technical articles/bn PPP$ GDP	22.1	31
6.1.5	Citable documents H-index	13.3	63
6.2	**Knowledge impact**	**47.0**	**18 ●**
6.2.1	Labor productivity growth, %	1.3	46
6.2.2	Unicorn valuation, % GDP	8.8	1 ● ◆
6.2.3	Software spending, % GDP	0.1	104 ○ ◇
6.2.4	High-tech manufacturing, % ◷	23.4	51
6.3	**Knowledge diffusion**	**30.2**	**40**
6.3.1	Intellectual property receipts, % total trade	0.0	89 ○
6.3.2	Production and export complexity	65.5	30
6.3.3	High-tech exports, % total trade	7.1	30
6.3.4	ICT services exports, % total trade	3.0	42
6.3.5	ISO 9001 quality/bn PPP$ GDP	11.7	23
	Creative outputs	**29.5**	**55**
7.1	**Intangible assets**	**24.6**	**72**
7.1.1	Intangible asset intensity, top 15, %	−7.3	71 ○ ◇
7.1.2	Trademarks by origin/bn PPP$ GDP	38.6	52
7.1.3	Global brand value, top 5,000, % GDP	0.0	75 ○ ◇
7.1.4	Industrial designs by origin/bn PPP$ GDP	2.5	34
7.2	**Creative goods and services**	**21.5**	**52**
7.2.1	Cultural and creative services exports, % total trade	0.9	34
7.2.2	National feature films/mn pop. 15–69	3.5	39
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a
7.2.4	Creative goods exports, % total trade	1.4	35
7.3	**Online creativity**	**47.3**	**28**
7.3.1	Top-level domains (TLDs)/th pop. 15–69	21.2	29
7.3.2	GitHub commits/mn pop. 15–69	38.9	28
7.3.3	Mobile app creation/bn PPP$ GDP	81.9	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Luxembourg **20**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
21	24	High	EUR	0.7	94.2	143,304

			Score/Value	Rank	
	Institutions		**83.9**	**5**	●
1.1	**Institutional environment**		**88.1**	**7**	
1.1.1	Operational stability for businesses*		86.0	11	
1.1.2	Government effectiveness*		90.3	5	●
1.2	**Regulatory environment**		**92.3**	**4**	●
1.2.1	Regulatory quality*		90.0	5	●
1.2.2	Rule of law*		94.6	4	●
1.3	**Business environment**		**71.3**	**20**	
1.3.1	Policy stability for doing business†		92.2	3	● ◆
1.3.2	Entrepreneurship policies and culture†		50.4	26	

			Score/Value	Rank	
	Human capital and research		**46.9**	**28**	◇
2.1	**Education**		**57.2**	**52**	◇
2.1.1	Expenditure on education, % GDP		4.7	48	
2.1.2	Government funding/pupil, secondary, % GDP/cap		21.3	41	
2.1.3	School life expectancy, years	⏲	14.2	65	◇
2.1.4	PISA scales in reading, maths and science	⏲	476.7	32	
2.1.5	Pupil–teacher ratio, secondary	⏲	7.8	8	◆
2.2	**Tertiary education**		**52.0**	**11**	
2.2.1	Tertiary enrolment, % gross	⏲	20.7	99	○ ◇
2.2.2	Graduates in science and engineering, %		22.9	61	
2.2.3	Tertiary inbound mobility, %	⏲	49.3	1	● ◆
2.3	**Research and development (R&D)**		**31.7**	**33**	◇
2.3.1	Researchers, FTE/mn pop.		4,881.0	21	
2.3.2	Gross expenditure on R&D, % GDP		1.0	40	◇
2.3.3	Global corporate R&D investors, top 3, mn USD$		61.7	22	
2.3.4	QS university ranking, top 3*		0.0	75	○ ◇

		Score/Value	Rank	
	Infrastructure	**45.7**	**53**	◇
3.1	**Information and communication technologies (ICTs)**	**85.1**	**25**	
3.1.1	ICT access*	100.0	1	●
3.1.2	ICT use*	84.4	35	
3.1.3	Government's online service*	81.4	29	
3.1.4	E-participation*	74.4	25	
3.2	**General infrastructure**	**29.3**	**73**	◇
3.2.1	Electricity output, GWh/mn pop.	1,771.0	86	◇
3.2.2	Logistics performance*	68.2	25	◇
3.2.3	Gross capital formation, % GDP	18.2	111	○ ◇
3.3	**Ecological sustainability**	**22.7**	**57**	
3.3.1	GDP/unit of energy use	22.7	7	
3.3.2	Low-carbon energy use, %	7.0	98	○ ◇
3.3.3	ISO 14001 environment/bn PPP$ GDP	1.0	71	

		Score/Value	Rank	
	Market sophistication	**45.8**	**30**	◇
4.1	**Credit**	**42.2**	**34**	
4.1.1	Finance for startups and scaleups†	47.9	45	◇
4.1.2	Domestic credit to private sector, % GDP	101.5	21	
4.1.3	Loans from microfinance institutions, % GDP	n/a	n/a	
4.2	**Investment**	**48.8**	**13**	
4.2.1	Market capitalization, % GDP	67.9	28	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	1.6	4	● ◆
4.2.3	VC recipients, deals/bn PPP$ GDP	0.1	23	
4.2.4	VC received, value, % GDP	0.0	12	
4.3	**Trade, diversification and market scale**	**46.4**	**87**	◇
4.3.1	Applied tariff rate, weighted avg., %	1.1	21	
4.3.2	Domestic industry diversification	n/a	n/a	
4.3.3	Domestic market scale, bn PPP$	94.2	92	○

			Score/Value	Rank	
	Business sophistication		**58.3**	**10**	
5.1	**Knowledge workers**		**69.2**	**13**	
5.1.1	Knowledge-intensive employment, %		64.1	1	● ◆
5.1.2	Firms offering formal training, %	⏲	66.1	4	● ◆
5.1.3	GERD performed by business, % GDP		0.5	40	◇
5.1.4	GERD financed by business, %		44.2	39	◇
5.1.5	Females employed w/advanced degrees, %		27.6	12	
5.2	**Innovation linkages**		**56.7**	**15**	
5.2.1	Public research–industry co-publications, %		4.0	19	
5.2.2	University–industry R&D collaboration†		78.0	17	
5.2.3	State of cluster development†		75.2	27	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.1	15	
5.2.5	Patent families/bn PPP$ GDP		3.6	12	
5.3	**Knowledge absorption**		**48.8**	**12**	
5.3.1	Intellectual property payments, % total trade		5.4	1	● ◆
5.3.2	High-tech imports, % total trade		1.5	132	○ ◇
5.3.3	ICT services imports, % total trade		4.8	1	● ◆
5.3.4	FDI net inflows, % GDP		−117.3	131	○ ◇
5.3.5	Research talent, % in businesses		33.2	39	◇

		Score/Value	Rank	
	Knowledge and technology outputs	**30.5**	**36**	◇
6.1	**Knowledge creation**	**39.3**	**22**	
6.1.1	Patents by origin/bn PPP$ GDP	4.9	15	
6.1.2	PCT patents by origin/bn PPP$ GDP	3.2	10	
6.1.3	Utility models by origin/bn PPP$ GDP	-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP	15.8	43	◇
6.1.5	Citable documents H-index	12.0	66	◇
6.2	**Knowledge impact**	**32.3**	**46**	◇
6.2.1	Labor productivity growth, %	−0.8	116	○ ◇
6.2.2	Unicorn valuation, % GDP	2.1	16	
6.2.3	Software spending, % GDP	0.2	80	◇
6.2.4	High-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**20.0**	**57**	◇
6.3.1	Intellectual property receipts, % total trade	1.5	16	
6.3.2	Production and export complexity	n/a	n/a	
6.3.3	High-tech exports, % total trade	0.8	82	◇
6.3.4	ICT services exports, % total trade	3.2	37	
6.3.5	ISO 9001 quality/bn PPP$ GDP	1.9	96	○ ◇

		Score/Value	Rank	
	Creative outputs	**53.6**	**9**	
7.1	**Intangible assets**	**48.2**	**24**	
7.1.1	Intangible asset intensity, top 15, %	75.0	12	
7.1.2	Trademarks by origin/bn PPP$ GDP	47.6	38	
7.1.3	Global brand value, top 5,000, % GDP	10.4	15	
7.1.4	Industrial designs by origin/bn PPP$ GDP	2.5	35	
7.2	**Creative goods and services**	**55.1**	**2**	● ◆
7.2.1	Cultural and creative services exports, % total trade	6.5	1	● ◆
7.2.2	National feature films/mn pop. 15–69	10.4	6	◆
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Creative goods exports, % total trade	0.1	96	○
7.3	**Online creativity**	**63.0**	**14**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69	66.8	5	●
7.3.2	GitHub commits/mn pop. 15–69	49.6	22	◇
7.3.3	Mobile app creation/bn PPP$ GDP	72.5	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Madagascar

110

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
81	129	Low	SSA	31.2	56.8	1,907

			Score/Value	Rank	
	Institutions		**21.5**	**124**	
1.1	**Institutional environment**		**28.8**	**118**	
1.1.1	Operational stability for businesses*		39.3	111	
1.1.2	Government effectiveness*		18.2	124	
1.2	**Regulatory environment**		**18.6**	**118**	
1.2.1	Regulatory quality*		20.4	115	
1.2.2	Rule of law*		16.8	116	
1.3	**Business environment**		**17.2**	**123**	◇
1.3.1	Policy stability for doing business†	⏲	21.0	121	◇
1.3.2	Entrepreneurship policies and culture†	⏲	13.4	74	
	Human capital and research		**17.9**	**108**	
2.1	**Education**		**37.3**	**[109]**	
2.1.1	Expenditure on education, % GDP		3.1	102	
2.1.2	Government funding/pupil, secondary, % GDP/cap		n/a	n/a	
2.1.3	School life expectancy, years	⏲	9.4	106	
2.1.4	PISA scales in reading, maths and science		n/a	n/a	
2.1.5	Pupil–teacher ratio, secondary	⏲	18.1	93	◆
2.2	**Tertiary education**		**16.4**	**105**	
2.2.1	Tertiary enrolment, % gross		6.2	123	
2.2.2	Graduates in science and engineering, %		23.5	55	●
2.2.3	Tertiary inbound mobility, %		0.6	98	◇
2.3	**Research and development (R&D)**		**0.1**	**119**	◇
2.3.1	Researchers, FTE/mn pop.	⏲	33.7	101	
2.3.2	Gross expenditure on R&D, % GDP	⏲	0.0	113	○◇
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**11.8**	**133**	○◇
3.1	**Information and communication technologies (ICTs)**		**18.4**	**132**	○
3.1.1	ICT access*		0.0	132	○◇
3.1.2	ICT use*		18.5	120	
3.1.3	Government's online service*		28.3	126	
3.1.4	E-participation*		26.7	108	
3.2	**General infrastructure**		**9.6**	**126**	◇
3.2.1	Electricity output, GWh/mn pop.	⏲	87.1	123	○
3.2.2	Logistics performance*		9.1	105	○◇
3.2.3	Gross capital formation, % GDP		20.2	99	
3.3	**Ecological sustainability**		**7.5**	**117**	
3.3.1	GDP/unit of energy use		4.7	119	
3.3.2	Low-carbon energy use, %		12.6	81	●
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.2	120	
	Market sophistication		**22.8**	**99**	◆
4.1	**Credit**		**12.8**	**104**	
4.1.1	Finance for startups and scaleups†	⏲	23.6	74	
4.1.2	Domestic credit to private sector, % GDP		18.7	116	
4.1.3	Loans from microfinance institutions, % GDP		1.0	32	●
4.2	**Investment**		**n/a**	**[n/a]**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP		n/a	n/a	
4.2.4	VC received, value, % GDP		n/a	n/a	
4.3	**Trade, diversification and market scale**		**32.7**	**112**	◆
4.3.1	Applied tariff rate, weighted avg., %		6.6	108	
4.3.2	Domestic industry diversification		49.0	102	
4.3.3	Domestic market scale, bn PPP$		56.8	107	

			Score/Value	Rank	
	Business sophistication		**12.1**	**130**	○◇
5.1	**Knowledge workers**		**4.1**	**[133]**	
5.1.1	Knowledge-intensive employment, %		4.2	123	
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, %	⏲	1.9	113	
5.2	**Innovation linkages**		**11.5**	**123**	
5.2.1	Public research–industry co-publications, %		0.7	103	
5.2.2	University–industry R&D collaboration†	⏲	19.7	120	◇
5.2.3	State of cluster development†	⏲	25.0	113	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	⏲	0.0	69	●
5.2.5	Patent families/bn PPP$ GDP		0.0	102	○◇
5.3	**Knowledge absorption**		**20.7**	**90**	
5.3.1	Intellectual property payments, % total trade		0.3	90	◆
5.3.2	High-tech imports, % total trade		4.5	114	
5.3.3	ICT services imports, % total trade		1.4	59	●
5.3.4	FDI net inflows, % GDP		2.6	59	●
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**9.1**	**124**	
6.1	**Knowledge creation**		**5.1**	**110**	
6.1.1	Patents by origin/bn PPP$ GDP		0.2	104	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	86	◆
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		6.5	93	
6.1.5	Citable documents H-index		4.1	111	
6.2	**Knowledge impact**		**10.2**	**131**	○◇
6.2.1	Labor productivity growth, %		−0.7	112	
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.0	120	
6.2.4	High-tech manufacturing, %		1.0	108	○◇
6.3	**Knowledge diffusion**		**12.1**	**86**	●◆
6.3.1	Intellectual property receipts, % total trade		0.0	91	
6.3.2	Production and export complexity		23.7	100	
6.3.3	High-tech exports, % total trade		0.1	116	
6.3.4	ICT services exports, % total trade		3.9	29	●◆
6.3.5	ISO 9001 quality/bn PPP$ GDP		1.4	106	
	Creative outputs		**28.1**	**[57]**	
7.1	**Intangible assets**		**54.0**	**[15]**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		65.1	21	●◆
7.1.3	Global brand value, top 5,000, % GDP		n/a	n/a	
7.1.4	Industrial designs by origin/bn PPP$ GDP		6.4	14	●◆
7.2	**Creative goods and services**		**4.3**	**[103]**	
7.2.1	Cultural and creative services exports, % total trade		0.2	74	●
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	Creative goods exports, % total trade		0.1	88	◆
7.3	**Online creativity**		**0.3**	**131**	○◇
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.1	127	
7.3.2	GitHub commits/mn pop. 15–69		0.9	117	
7.3.3	Mobile app creation/bn PPP$ GDP	⏲	0.0	127	○◇

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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Malaysia

33

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
41	28	Upper middle	SEAO	35.1	1,225.9	37,083

			Score/ Value	Rank	
	Institutions		**69.1**	**27**	◆
1.1	**Institutional environment**		**75.6**	**26**	◆
1.1.1	Operational stability for businesses*		81.3	18	◆
1.1.2	Government effectiveness*		69.9	32	◆
1.2	**Regulatory environment**		**59.4**	**41**	◆
1.2.1	Regulatory quality*		58.8	43	◆
1.2.2	Rule of law*		60.0	40	◆
1.3	**Business environment**		**72.3**	**17**	● ◆
1.3.1	Policy stability for doing business†		69.2	29	◆
1.3.2	Entrepreneurship policies and culture†	⏲	75.4	10	
	Human capital and research		**41.5**	**38**	◆
2.1	**Education**		**44.1**	**85**	
2.1.1	Expenditure on education, % GDP		3.5	91	○
2.1.2	Government funding/pupil, secondary, % GDP/cap		20.6	45	
2.1.3	School life expectancy, years	⏲	12.9	83	○
2.1.4	PISA scales in reading, maths and science		404.4	58	○
2.1.5	Pupil–teacher ratio, secondary		11.3	42	
2.2	**Tertiary education**		**49.3**	**16**	● ◆
2.2.1	Tertiary enrolment, % gross		40.3	82	
2.2.2	Graduates in science and engineering, %		40.2	1	● ◆
2.2.3	Tertiary inbound mobility, %		9.0	31	◆
2.3	**Research and development (R&D)**		**31.0**	**35**	◆
2.3.1	Researchers, FTE/mn pop.	⏲	726.5	63	
2.3.2	Gross expenditure on R&D, % GDP	⏲	1.0	43	
2.3.3	Global corporate R&D investors, top 3, mn USD$		43.2	38	◆
2.3.4	QS university ranking, top 3*		57.9	15	● ◆
	Infrastructure		**45.8**	**52**	
3.1	**Information and communication technologies (ICTs)**		**82.3**	**35**	
3.1.1	ICT access*		98.6	28	◆
3.1.2	ICT use*		89.6	18	◆
3.1.3	Government's online service*		73.8	53	
3.1.4	E-participation*		67.4	47	
3.2	**General infrastructure**		**39.0**	**39**	◆
3.2.1	Electricity output, GWh/mn pop.	⏲	5,360.7	40	◆
3.2.2	Logistics performance*		68.2	25	◆
3.2.3	Gross capital formation, % GDP		23.2	73	
3.3	**Ecological sustainability**		**15.9**	**86**	
3.3.1	GDP/unit of energy use		9.3	82	
3.3.2	Low-carbon energy use, %		7.1	96	○
3.3.3	ISO 14001 environment/bn PPP$ GDP		2.6	38	
	Market sophistication		**55.0**	**18**	◆
4.1	**Credit**		**67.5**	**5**	● ◆
4.1.1	Finance for startups and scaleups†	⏲	94.0	2	
4.1.2	Domestic credit to private sector, % GDP		113.3	17	● ◆
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**29.4**	**28**	◆
4.2.1	Market capitalization, % GDP		111.3	14	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.2	32	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.2	18	◆
4.2.4	VC received, value, % GDP		0.0	43	
4.3	**Trade, diversification and market scale**		**68.0**	**21**	
4.3.1	Applied tariff rate, weighted avg., %		1.0	16	●
4.3.2	Domestic industry diversification	⏲	88.0	43	
4.3.3	Domestic market scale, bn PPP$		1,225.9	30	

			Score/ Value	Rank	
	Business sophistication		**37.0**	**36**	◆
5.1	**Knowledge workers**		**36.1**	**57**	
5.1.1	Knowledge-intensive employment, %		29.6	48	
5.1.2	Firms offering formal training, %	⏲	24.0	73	○
5.1.3	GERD performed by business, % GDP	⏲	0.5	42	
5.1.4	GERD financed by business, %	⏲	38.2	49	
5.1.5	Females employed w/advanced degrees, %	⏲	15.3	50	
5.2	**Innovation linkages**		**33.8**	**37**	◆
5.2.1	Public research–industry co-publications, %		0.9	98	○
5.2.2	University–industry R&D collaboration†		59.0	39	
5.2.3	State of cluster development†		70.4	33	◆
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.1	23	◆
5.2.5	Patent families/bn PPP$ GDP		0.2	47	
5.3	**Knowledge absorption**		**41.0**	**27**	◆
5.3.1	Intellectual property payments, % total trade		1.0	35	
5.3.2	High-tech imports, % total trade		29.0	3	● ◆
5.3.3	ICT services imports, % total trade		1.4	62	
5.3.4	FDI net inflows, % GDP		3.4	43	
5.3.5	Research talent, % in businesses	⏲	15.8	57	○
	Knowledge and technology outputs		**30.9**	**35**	◆
6.1	**Knowledge creation**		**13.3**	**70**	
6.1.1	Patents by origin/bn PPP$ GDP		0.7	66	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.1	62	
6.1.3	Utility models by origin/bn PPP$ GDP		0.1	52	
6.1.4	Scientific and technical articles/bn PPP$ GDP		11.7	61	
6.1.5	Citable documents H-index		24.3	39	
6.2	**Knowledge impact**		**36.8**	**35**	◆
6.2.1	Labor productivity growth, %		1.1	49	
6.2.2	Unicorn valuation, % GDP		0.4	42	
6.2.3	Software spending, % GDP		0.3	32	◆
6.2.4	High-tech manufacturing, %	⏲	45.4	16	◆
6.3	**Knowledge diffusion**		**42.7**	**22**	◆
6.3.1	Intellectual property receipts, % total trade		0.1	54	
6.3.2	Production and export complexity		66.9	28	◆
6.3.3	High-tech exports, % total trade		45.3	1	● ◆
6.3.4	ICT services exports, % total trade		1.2	78	
6.3.5	ISO 9001 quality/bn PPP$ GDP		11.8	22	
	Creative outputs		**31.7**	**49**	
7.1	**Intangible assets**		**34.9**	**49**	
7.1.1	Intangible asset intensity, top 15, %		62.8	30	
7.1.2	Trademarks by origin/bn PPP$ GDP		16.4	97	○ ◇
7.1.3	Global brand value, top 5,000, % GDP		9.6	16	● ◆
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.3	85	○
7.2	**Creative goods and services**		**32.3**	**28**	◆
7.2.1	Cultural and creative services exports, % total trade		0.3	71	
7.2.2	National feature films/mn pop. 15–69		1.9	57	○
7.2.3	Entertainment and media market/th pop. 15–69		10.2	36	◆
7.2.4	Creative goods exports, % total trade		8.0	1	● ◆
7.3	**Online creativity**		**24.7**	**68**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		4.2	58	
7.3.2	GitHub commits/mn pop. 15–69		7.0	68	
7.3.3	Mobile app creation/bn PPP$ GDP		62.7	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Mali

GII 2024 rank

131

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
132	126	Low	SSA	23.8	61.6	2,639

			Score/ Value	Rank	
	Institutions		**28.9**	**113**	
1.1	**Institutional environment**		**16.4**	**130**	◇
1.1.1	Operational stability for businesses*		20.0	129	◇
1.1.2	Government effectiveness*		12.7	129	◇
1.2	**Regulatory environment**		**20.2**	**115**	
1.2.1	Regulatory quality*		25.2	107	
1.2.2	Rule of law*		15.2	117	
1.3	**Business environment**		**50.1**	**[58]**	
1.3.1	Policy stability for doing business†		50.1	62	●
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**12.7**	**124**	
2.1	**Education**		**36.2**	**112**	
2.1.1	Expenditure on education, % GDP		4.0	71	●
2.1.2	Government funding/pupil, secondary, % GDP/cap	◷	26.5	15	●
2.1.3	School life expectancy, years	◷	7.1	112	○◇
2.1.4	PISA scales in reading, maths and science		n/a	n/a	
2.1.5	Pupil–teacher ratio, secondary	◷	21.2	104	
2.2	**Tertiary education**		**1.2**	**128**	○◇
2.2.1	Tertiary enrolment, % gross	◷	4.7	127	○
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)**		**0.7**	**104**	
2.3.1	Researchers, FTE/mn pop.	◷	29.3	103	
2.3.2	Gross expenditure on R&D, % GDP	◷	0.2	90	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**16.3**	**131**	
3.1	**Information and communication technologies (ICTs)**		**21.6**	**128**	
3.1.1	ICT access*		31.1	124	
3.1.2	ICT use*		0.0	125	○◇
3.1.3	Government's online service*		29.8	124	
3.1.4	E-participation*		25.6	112	
3.2	**General infrastructure**		**17.2**	**105**	
3.2.1	Electricity output, GWh/mn pop.		n/a	n/a	
3.2.2	Logistics performance*		22.7	82	
3.2.3	Gross capital formation, % GDP		17.7	114	◇
3.3	**Ecological sustainability**		**10.2**	**108**	
3.3.1	GDP/unit of energy use		n/a	n/a	
3.3.2	Low-carbon energy use, %		15.6	71	●
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.3	112	
	Market sophistication		**14.8**	**122**	
4.1	**Credit**		**12.9**	**103**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		29.6	97	
4.1.3	Loans from microfinance institutions, % GDP		1.6	23	●
4.2	**Investment**		**4.4**	**[87]**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	74	
4.2.4	VC received, value, % GDP		0.0	84	
4.3	**Trade, diversification and market scale**		**27.1**	**117**	
4.3.1	Applied tariff rate, weighted avg., %	◷	6.0	105	
4.3.2	Domestic industry diversification		n/a	n/a	
4.3.3	Domestic market scale, bn PPP$		61.6	103	

			Score/ Value	Rank	
	Business sophistication		**20.9**	**96**	◆
5.1	**Knowledge workers**		**5.8**	**129**	
5.1.1	Knowledge-intensive employment, %	◷	3.6	125	
5.1.2	Firms offering formal training, %	◷	17.7	84	
5.1.3	GERD performed by business, % GDP		n/a	n/a	
5.1.4	GERD financed by business, %	◷	0.8	93	
5.1.5	Females employed w/advanced degrees, %	◷	0.5	125	
5.2	**Innovation linkages**		**30.5**	**[43]**	
5.2.1	Public research–industry co-publications, %		1.0	87	
5.2.2	University–industry R&D collaboration†		36.3	88	
5.2.3	State of cluster development†		45.4	69	●◆
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		n/a	n/a	
5.2.5	Patent families/bn PPP$ GDP		n/a	n/a	
5.3	**Knowledge absorption**		**26.3**	**66**	●
5.3.1	Intellectual property payments, % total trade		0.0	121	○◇
5.3.2	High-tech imports, % total trade	◷	7.5	78	
5.3.3	ICT services imports, % total trade		1.7	40	●◆
5.3.4	FDI net inflows, % GDP		2.6	62	●
5.3.5	Research talent, % in businesses	◷	31.4	41	●◆
	Knowledge and technology outputs		**9.2**	**123**	
6.1	**Knowledge creation**		**2.6**	**121**	◇
6.1.1	Patents by origin/bn PPP$ GDP		0.1	118	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	99	○◇
6.1.3	Utility models by origin/bn PPP$ GDP	◷	0.0	74	○◇
6.1.4	Scientific and technical articles/bn PPP$ GDP		4.0	111	◇
6.1.5	Citable documents H-index		4.8	103	
6.2	**Knowledge impact**		**15.6**	**122**	
6.2.1	Labor productivity growth, %		0.1	91	
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.0	124	
6.2.4	High-tech manufacturing, %		n/a	n/a	
6.3	**Knowledge diffusion**		**9.3**	**95**	
6.3.1	Intellectual property receipts, % total trade		0.0	110	
6.3.2	Production and export complexity		24.7	97	
6.3.3	High-tech exports, % total trade	◷	0.2	108	
6.3.4	ICT services exports, % total trade		2.4	53	●
6.3.5	ISO 9001 quality/bn PPP$ GDP		0.5	125	
	Creative outputs		**0.6**	**133**	○
7.1	**Intangible assets**		**1.0**	**126**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		3.6	123	
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.1	108	
7.2	**Creative goods and services**		**0.2**	**[131]**	
7.2.1	Cultural and creative services exports, % total trade		0.0	109	
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	Creative goods exports, % total trade	◷	0.0	120	
7.3	**Online creativity**		**0.1**	**133**	○◇
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.1	123	
7.3.2	GitHub commits/mn pop. 15–69		0.1	129	
7.3.3	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Malta

29

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
25	27	High	EUR	0.5	33.3	63,481

			Score/ Value	Rank	
	Institutions		**61.8**	**39**	
1.1	**Institutional environment**		**71.2**	**34**	
1.1.1	Operational stability for businesses*		77.3	32	
1.1.2	Government effectiveness*		65.0	35	
1.2	**Regulatory environment**		**63.0**	**37**	
1.2.1	Regulatory quality*		59.5	42	
1.2.2	Rule of law*		66.4	35	
1.3	**Business environment**		**51.4**	**[55]**	
1.3.1	Policy stability for doing business†		51.4	59	
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**42.8**	**35**	
2.1	**Education**		**64.6**	**16**	
2.1.1	Expenditure on education, % GDP	⏲	5.4	31	
2.1.2	Government funding/pupil, secondary, % GDP/cap	⏲	30.7	7	◆
2.1.3	School life expectancy, years		15.9	40	
2.1.4	PISA scales in reading, maths and science		459.0	39	
2.1.5	Pupil–teacher ratio, secondary	⏲	6.8	2	●◆
2.2	**Tertiary education**		**44.2**	**26**	
2.2.1	Tertiary enrolment, % gross		78.6	25	
2.2.2	Graduates in science and engineering, %		15.2	102	○◇
2.2.3	Tertiary inbound mobility, %		23.8	5	●◆
2.3	**Research and development (R&D)**		**19.7**	**44**	
2.3.1	Researchers, FTE/mn pop.		2,424.3	38	
2.3.2	Gross expenditure on R&D, % GDP		0.7	52	
2.3.3	Global corporate R&D investors, top 3, mn USD$		43.0	39	
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**51.0**	**37**	
3.1	**Information and communication technologies (ICTs)**		**87.2**	**18**	
3.1.1	ICT access*		98.8	24	
3.1.2	ICT use*		87.1	26	
3.1.3	Government's online service*		87.3	18	
3.1.4	E-participation*		75.6	22	
3.2	**General infrastructure**		**33.6**	**56**	
3.2.1	Electricity output, GWh/mn pop.		4,378.6	53	
3.2.2	Logistics performance*		54.5	42	
3.2.3	Gross capital formation, % GDP		23.5	68	
3.3	**Ecological sustainability**		**32.3**	**35**	
3.3.1	GDP/unit of energy use		32.1	3	●◆
3.3.2	Low-carbon energy use, %		1.9	119	○◇
3.3.3	ISO 14001 environment/bn PPP$ GDP		2.4	45	
	Market sophistication		**40.1**	**42**	
4.1	**Credit**		**24.9**	**[71]**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		72.0	42	
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**39.1**	**19**	
4.2.1	Market capitalization, % GDP		28.0	51	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		1.5	6	●◆
4.2.3	VC recipients, deals/bn PPP$ GDP		0.1	41	
4.2.4	VC received, value, % GDP		0.0	13	
4.3	**Trade, diversification and market scale**		**56.4**	**68**	
4.3.1	Applied tariff rate, weighted avg., %		1.1	21	
4.3.2	Domestic industry diversification	⏲	77.5	70	
4.3.3	Domestic market scale, bn PPP$		33.3	125	○

			Score/ Value	Rank	
	Business sophistication		**53.9**	**19**	
5.1	**Knowledge workers**		**56.1**	**26**	
5.1.1	Knowledge-intensive employment, %		44.9	23	
5.1.2	Firms offering formal training, %	⏲	49.9	18	
5.1.3	GERD performed by business, % GDP		0.5	41	
5.1.4	GERD financed by business, %		61.3	11	
5.1.5	Females employed w/advanced degrees, %		18.0	39	
5.2	**Innovation linkages**		**47.7**	**25**	
5.2.1	Public research–industry co-publications, %		1.5	65	
5.2.2	University–industry R&D collaboration†		47.0	60	
5.2.3	State of cluster development†		51.8	56	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.2	2	●◆
5.2.5	Patent families/bn PPP$ GDP		2.8	16	
5.3	**Knowledge absorption**		**57.8**	**4**	**●◆**
5.3.1	Intellectual property payments, % total trade		7.7	1	●◆
5.3.2	High-tech imports, % total trade		9.4	46	
5.3.3	ICT services imports, % total trade		0.9	84	
5.3.4	FDI net inflows, % GDP		27.6	4	●◆
5.3.5	Research talent, % in businesses		48.9	27	
	Knowledge and technology outputs		**27.7**	**48**	
6.1	**Knowledge creation**		**23.6**	**43**	
6.1.1	Patents by origin/bn PPP$ GDP		2.6	26	
6.1.2	PCT patents by origin/bn PPP$ GDP		1.0	26	
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		16.9	42	
6.1.5	Citable documents H-index		7.3	89	○◇
6.2	**Knowledge impact**		**22.1**	**84**	**◇**
6.2.1	Labor productivity growth, %		0.2	85	○
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.3	35	
6.2.4	High-tech manufacturing, %	⏲	11.3	83	
6.3	**Knowledge diffusion**		**37.2**	**29**	
6.3.1	Intellectual property receipts, % total trade		4.5	1	●◆
6.3.2	Production and export complexity		n/a	n/a	
6.3.3	High-tech exports, % total trade		4.2	44	
6.3.4	ICT services exports, % total trade		1.3	75	
6.3.5	ISO 9001 quality/bn PPP$ GDP		8.1	35	
	Creative outputs		**51.8**	**11**	
7.1	**Intangible assets**		**60.0**	**10**	**◆**
7.1.1	Intangible asset intensity, top 15, %		76.1	10	
7.1.2	Trademarks by origin/bn PPP$ GDP		118.5	6	●◆
7.1.3	Global brand value, top 5,000, % GDP		2.6	43	
7.1.4	Industrial designs by origin/bn PPP$ GDP		5.2	15	
7.2	**Creative goods and services**		**37.1**	**17**	
7.2.1	Cultural and creative services exports, % total trade		19.2	1	●◆
7.2.2	National feature films/mn pop. 15–69		5.2	23	
7.2.3	Entertainment and media market/th pop. 15–69		14.3	30	◇
7.2.4	Creative goods exports, % total trade		0.2	86	○
7.3	**Online creativity**		**50.1**	**27**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		39.3	17	
7.3.2	GitHub commits/mn pop. 15–69		35.5	32	
7.3.3	Mobile app creation/bn PPP$ GDP		75.4	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Mauritania

126

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
127	125	Lower middle	SSA	5.0	33.4	7,542

			Score/Value	Rank	
	Institutions		**33.8**	**97**	
1.1	**Institutional environment**		**37.8**	**102**	
1.1.1	Operational stability for businesses*		50.0	94	●
1.1.2	Government effectiveness*		25.7	111	
1.2	**Regulatory environment**		**19.4**	**116**	
1.2.1	Regulatory quality*		13.9	123	
1.2.2	Rule of law*		24.9	106	
1.3	**Business environment**		**44.2**	**[69]**	
1.3.1	Policy stability for doing business†	⏲	44.2	79	●
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	

			Score/Value	Rank	
	Human capital and research		**15.4**	**120**	
2.1	**Education**		**17.3**	**131**	◇
2.1.1	Expenditure on education, % GDP		2.3	118	
2.1.2	Government funding/pupil, secondary, % GDP/cap		8.6	90	
2.1.3	School life expectancy, years	⏲	8.1	110	◇
2.1.4	PISA scales in reading, maths and science		n/a	n/a	
2.1.5	Pupil–teacher ratio, secondary	⏲	28.8	117	◇
2.2	**Tertiary education**		**28.9**	**76**	●
2.2.1	Tertiary enrolment, % gross	⏲	6.0	124	◇
2.2.2	Graduates in science and engineering, %	⏲	34.6	9	● ◆
2.2.3	Tertiary inbound mobility, %	⏲	1.4	83	
2.3	**Research and development (R&D)**		**0.0**	**120**	○ ◇
2.3.1	Researchers, FTE/mn pop.		n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP	⏲	0.0	114	○ ◇
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○ ◇
2.3.4	QS university ranking, top 3*		0.0	75	○ ◇

			Score/Value	Rank	
	Infrastructure		**21.9**	**122**	◇
3.1	**Information and communication technologies (ICTs)**		**13.5**	**133**	○ ◇
3.1.1	ICT access*		6.2	129	◇
3.1.2	ICT use*		47.8	109	
3.1.3	Government's online service*		0.0	132	○ ◇
3.1.4	E-participation*		0.0	132	○ ◇
3.2	**General infrastructure**		**48.9**	**19**	● ◆
3.2.1	Electricity output, GWh/mn pop.		n/a	n/a	
3.2.2	Logistics performance*		9.1	105	
3.2.3	Gross capital formation, % GDP		42.6	3	● ◆
3.3	**Ecological sustainability**		**3.1**	**131**	◇
3.3.1	GDP/unit of energy use		n/a	n/a	
3.3.2	Low-carbon energy use, %		3.9	109	
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.3	114	

			Score/Value	Rank	
	Market sophistication		**9.1**	**[131]**	
4.1	**Credit**		**5.6**	**[124]**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP	⏲	22.7	111	
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**n/a**	**[n/a]**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP		n/a	n/a	
4.2.4	VC received, value, % GDP		n/a	n/a	
4.3	**Trade, diversification and market scale**		**12.6**	**129**	◇
4.3.1	Applied tariff rate, weighted avg., %		9.6	124	◇
4.3.2	Domestic industry diversification		n/a	n/a	
4.3.3	Domestic market scale, bn PPP$		33.4	124	

			Score/Value	Rank	
	Business sophistication		**18.7**	**109**	
5.1	**Knowledge workers**		**23.9**	**[95]**	
5.1.1	Knowledge-intensive employment, %		n/a	n/a	
5.1.2	Firms offering formal training, %	⏲	52.7	16	
5.1.3	GERD performed by business, % GDP		n/a	n/a	
5.1.4	GERD financed by business, %	⏲	0.0	98	○ ◇
5.1.5	Females employed w/advanced degrees, %	⏲	0.7	123	
5.2	**Innovation linkages**		**15.4**	**105**	
5.2.1	Public research–industry co-publications, %		0.7	106	
5.2.2	University–industry R&D collaboration†	⏲	51.3	52	●
5.2.3	State of cluster development†	⏲	15.0	125	◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	⏲	0.0	80	●
5.2.5	Patent families/bn PPP$ GDP		0.0	102	○ ◇
5.3	**Knowledge absorption**		**16.7**	**114**	
5.3.1	Intellectual property payments, % total trade		0.0	118	◇
5.3.2	High-tech imports, % total trade		1.9	131	◇
5.3.3	ICT services imports, % total trade		0.5	107	
5.3.4	FDI net inflows, % GDP		11.5	10	● ◆
5.3.5	Research talent, % in businesses		n/a	n/a	

			Score/Value	Rank	
	Knowledge and technology outputs		**8.9**	**127**	
6.1	**Knowledge creation**		**1.5**	**127**	◇
6.1.1	Patents by origin/bn PPP$ GDP		0.2	103	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	99	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	⏲	0.0	74	○ ◇
6.1.4	Scientific and technical articles/bn PPP$ GDP		2.3	121	
6.1.5	Citable documents H-index		0.5	132	◇
6.2	**Knowledge impact**		**23.5**	**74**	●
6.2.1	Labor productivity growth, %		−0.4	105	
6.2.2	Unicorn valuation, % GDP		0.0	49	○ ◇
6.2.3	Software spending, % GDP		0.3	37	●
6.2.4	High-tech manufacturing, %		n/a	n/a	
6.3	**Knowledge diffusion**		**1.7**	**131**	◇
6.3.1	Intellectual property receipts, % total trade		0.0	116	○ ◇
6.3.2	Production and export complexity		6.4	117	◇
6.3.3	High-tech exports, % total trade		0.0	130	
6.3.4	ICT services exports, % total trade		0.2	122	
6.3.5	ISO 9001 quality/bn PPP$ GDP		0.4	128	◇

			Score/Value	Rank	
	Creative outputs		**4.4**	**[127]**	
7.1	**Intangible assets**		**0.5**	**[131]**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		1.8	127	
7.1.3	Global brand value, top 5,000, % GDP		n/a	n/a	
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.1	115	
7.2	**Creative goods and services**		**2.8**	**[105]**	
7.2.1	Cultural and creative services exports, % total trade		0.2	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	Creative goods exports, % total trade		0.0	124	
7.3	**Online creativity**		**13.7**	**118**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.1	125	
7.3.2	GitHub commits/mn pop. 15–69		0.3	127	
7.3.3	Mobile app creation/bn PPP$ GDP		40.7	117	◇

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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Mauritius

GII 2024 rank

55

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
79	40	Upper middle	SSA	1.3	37.0	29,349

			Score/ Value	Rank	
	Institutions		**66.6**	**33**	◆
1.1	**Institutional environment**		**75.1**	**28**	◆
1.1.1	Operational stability for businesses*		86.7	9	●◆
1.1.2	Government effectiveness*		63.6	36	◆
1.2	**Regulatory environment**		**69.6**	**29**	◆
1.2.1	Regulatory quality*		72.5	27	●◆
1.2.2	Rule of law*		66.8	33	◆
1.3	**Business environment**		**55.0**	**46**	
1.3.1	Policy stability for doing business†		60.9	40	
1.3.2	Entrepreneurship policies and culture†		49.1	27	
	Human capital and research		**31.0**	**69**	
2.1	**Education**		**58.3**	**45**	
2.1.1	Expenditure on education, % GDP		3.6	87	
2.1.2	Government funding/pupil, secondary, % GDP/cap		31.8	5	●◆
2.1.3	School life expectancy, years	⏲	14.6	55	
2.1.4	PISA scales in reading, maths and science		n/a	n/a	
2.1.5	Pupil–teacher ratio, secondary	⏲	10.7	37	
2.2	**Tertiary education**		**32.1**	**70**	
2.2.1	Tertiary enrolment, % gross		44.4	75	
2.2.2	Graduates in science and engineering, %		24.8	47	
2.2.3	Tertiary inbound mobility, %		7.1	41	
2.3	**Research and development (R&D)**		**2.6**	**88**	
2.3.1	Researchers, FTE/mn pop.		569.0	68	
2.3.2	Gross expenditure on R&D, % GDP		0.3	73	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**33.9**	**87**	
3.1	**Information and communication technologies (ICTs)**		**66.1**	**79**	
3.1.1	ICT access*		83.1	82	
3.1.2	ICT use*		81.5	47	
3.1.3	Government's online service*		58.9	77	
3.1.4	E-participation*		40.7	88	
3.2	**General infrastructure**		**15.0**	**116**	○◇
3.2.1	Electricity output, GWh/mn pop.		2,470.3	73	
3.2.2	Logistics performance*		18.2	89	○◇
3.2.3	Gross capital formation, % GDP		19.6	102	
3.3	**Ecological sustainability**		**20.6**	**65**	
3.3.1	GDP/unit of energy use		18.7	14	●◆
3.3.2	Low-carbon energy use, %		8.2	90	
3.3.3	ISO 14001 environment/bn PPP$ GDP		1.3	64	
	Market sophistication		**50.8**	**24**	●◆
4.1	**Credit**		**32.9**	**48**	
4.1.1	Finance for startups and scaleups†		40.7	54	
4.1.2	Domestic credit to private sector, % GDP		72.3	41	
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**62.3**	**9**	●◆
4.2.1	Market capitalization, % GDP		66.0	29	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		2.2	2	●◆
4.2.3	VC recipients, deals/bn PPP$ GDP		0.1	27	◆
4.2.4	VC received, value, % GDP		0.0	1	●◆
4.3	**Trade, diversification and market scale**		**57.1**	**64**	
4.3.1	Applied tariff rate, weighted avg., %		0.9	13	●
4.3.2	Domestic industry diversification		78.1	67	
4.3.3	Domestic market scale, bn PPP$		37.0	122	○

			Score/ Value	Rank	
	Business sophistication		**25.6**	**69**	
5.1	**Knowledge workers**		**25.3**	**86**	
5.1.1	Knowledge-intensive employment, %		20.6	76	
5.1.2	Firms offering formal training, %		47.0	22	
5.1.3	GERD performed by business, % GDP	⏲	0.0	80	○
5.1.4	GERD financed by business, %	⏲	4.1	85	○◇
5.1.5	Females employed w/advanced degrees, %	⏲	9.2	81	
5.2	**Innovation linkages**		**29.6**	**48**	
5.2.1	Public research–industry co-publications, %		2.4	31	
5.2.2	University–industry R&D collaboration†		37.2	83	
5.2.3	State of cluster development†		52.7	53	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	38	◆
5.2.5	Patent families/bn PPP$ GDP		1.3	27	●◆
5.3	**Knowledge absorption**		**22.0**	**82**	
5.3.1	Intellectual property payments, % total trade		0.2	91	◇
5.3.2	High-tech imports, % total trade		6.3	91	
5.3.3	ICT services imports, % total trade		2.3	24	●◆
5.3.4	FDI net inflows, % GDP		2.0	75	
5.3.5	Research talent, % in businesses	⏲	4.4	73	
	Knowledge and technology outputs		**13.5**	**91**	
6.1	**Knowledge creation**		**8.7**	**88**	
6.1.1	Patents by origin/bn PPP$ GDP		0.0	128	○◇
6.1.2	PCT patents by origin/bn PPP$ GDP		1.1	23	●◆
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		4.0	110	
6.1.5	Citable documents H-index		4.5	106	
6.2	**Knowledge impact**		**15.8**	**121**	○◇
6.2.1	Labor productivity growth, %		0.3	81	
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.1	87	
6.2.4	High-tech manufacturing, %		3.9	102	○◇
6.3	**Knowledge diffusion**		**16.1**	**72**	
6.3.1	Intellectual property receipts, % total trade		0.0	86	
6.3.2	Production and export complexity		38.8	70	
6.3.3	High-tech exports, % total trade		0.6	89	
6.3.4	ICT services exports, % total trade		2.5	49	
6.3.5	ISO 9001 quality/bn PPP$ GDP		6.4	43	
	Creative outputs		**25.6**	**62**	
7.1	**Intangible assets**		**30.0**	**63**	
7.1.1	Intangible asset intensity, top 15, %		40.4	59	
7.1.2	Trademarks by origin/bn PPP$ GDP		54.1	27	
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.7	67	
7.2	**Creative goods and services**		**16.3**	**[62]**	
7.2.1	Cultural and creative services exports, % total trade		0.9	32	
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	Creative goods exports, % total trade		0.5	63	
7.3	**Online creativity**		**26.1**	**62**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		6.7	50	
7.3.2	GitHub commits/mn pop. 15–69		7.8	63	
7.3.3	Mobile app creation/bn PPP$ GDP		63.7	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Mexico

GII 2024 rank

56

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
52	73	Upper middle	LCN	129.7	3,277.6	24,976

			Score/ Value	Rank	
	Institutions		**30.9**	**106**	○
1.1	**Institutional environment**		**43.0**	**90**	
1.1.1	Operational stability for businesses*		49.3	95	
1.1.2	Government effectiveness*		36.6	83	
1.2	**Regulatory environment**		**28.5**	**97**	
1.2.1	Regulatory quality*		37.9	79	
1.2.2	Rule of law*		19.0	113	○◇
1.3	**Business environment**		**21.3**	**114**	○
1.3.1	Policy stability for doing business†		22.3	120	○◇
1.3.2	Entrepreneurship policies and culture†		20.3	67	○
	Human capital and research		**32.2**	**63**	
2.1	**Education**		**44.4**	**83**	
2.1.1	Expenditure on education, % GDP	◷	4.6	52	
2.1.2	Government funding/pupil, secondary, % GDP/cap		14.1	72	
2.1.3	School life expectancy, years		14.5	61	
2.1.4	PISA scales in reading, maths and science		406.8	55	
2.1.5	Pupil–teacher ratio, secondary		15.2	78	
2.2	**Tertiary education**		**27.0**	**84**	
2.2.1	Tertiary enrolment, % gross		46.4	72	
2.2.2	Graduates in science and engineering, %		24.3	50	
2.2.3	Tertiary inbound mobility, %		1.2	88	○
2.3	**Research and development (R&D)**		**25.2**	**39**	◆
2.3.1	Researchers, FTE/mn pop.	◷	384.1	80	
2.3.2	Gross expenditure on R&D, % GDP		0.3	80	
2.3.3	Global corporate R&D investors, top 3, mn USD$		49.7	30	●◆
2.3.4	QS university ranking, top 3*		42.8	30	●◆
	Infrastructure		**39.3**	**71**	
3.1	**Information and communication technologies (ICTs)**		**77.2**	**49**	
3.1.1	ICT access*		77.4	87	
3.1.2	ICT use*		78.8	62	
3.1.3	Government's online service*		80.6	31	
3.1.4	E-participation*		72.1	32	
3.2	**General infrastructure**		**25.1**	**87**	
3.2.1	Electricity output, GWh/mn pop.		3,076.4	63	
3.2.2	Logistics performance*		36.4	65	
3.2.3	Gross capital formation, % GDP		22.8	79	
3.3	**Ecological sustainability**		**15.5**	**90**	
3.3.1	GDP/unit of energy use		12.7	44	
3.3.2	Low-carbon energy use, %		10.0	86	
3.3.3	ISO 14001 environment/bn PPP$ GDP		1.0	70	
	Market sophistication		**36.2**	**56**	
4.1	**Credit**		**18.7**	**90**	
4.1.1	Finance for startups and scaleups†		36.3	59	
4.1.2	Domestic credit to private sector, % GDP		34.3	89	
4.1.3	Loans from microfinance institutions, % GDP		0.9	34	
4.2	**Investment**		**9.0**	**64**	
4.2.1	Market capitalization, % GDP		33.9	44	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.0	79	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	78	
4.2.4	VC received, value, % GDP		0.0	47	
4.3	**Trade, diversification and market scale**		**81.0**	**12**	●◆
4.3.1	Applied tariff rate, weighted avg., %		1.1	19	●
4.3.2	Domestic industry diversification		87.0	46	
4.3.3	Domestic market scale, bn PPP$		3,277.6	12	●◆

			Score/ Value	Rank	
	Business sophistication		**28.6**	**56**	
5.1	**Knowledge workers**		**27.1**	**80**	
5.1.1	Knowledge-intensive employment, %		21.3	73	
5.1.2	Firms offering formal training, %		37.8	42	
5.1.3	GERD performed by business, % GDP	◷	0.1	67	
5.1.4	GERD financed by business, %		17.0	72	
5.1.5	Females employed w/advanced degrees, %		10.5	72	
5.2	**Innovation linkages**		**22.0**	**73**	
5.2.1	Public research–industry co-publications, %		0.6	108	○
5.2.2	University–industry R&D collaboration†		42.5	74	
5.2.3	State of cluster development†		57.9	43	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	99	○
5.2.5	Patent families/bn PPP$ GDP		0.0	80	
5.3	**Knowledge absorption**		**36.8**	**36**	◆
5.3.1	Intellectual property payments, % total trade		0.9	44	
5.3.2	High-tech imports, % total trade		15.5	16	●◆
5.3.3	ICT services imports, % total trade		0.8	91	
5.3.4	FDI net inflows, % GDP		2.7	57	
5.3.5	Research talent, % in businesses	◷	50.6	26	◆
	Knowledge and technology outputs		**23.1**	**55**	
6.1	**Knowledge creation**		**10.4**	**80**	
6.1.1	Patents by origin/bn PPP$ GDP		0.3	89	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	76	
6.1.3	Utility models by origin/bn PPP$ GDP		0.2	40	
6.1.4	Scientific and technical articles/bn PPP$ GDP		5.2	104	○
6.1.5	Citable documents H-index		29.3	35	◆
6.2	**Knowledge impact**		**30.8**	**50**	
6.2.1	Labor productivity growth, %		−1.4	123	○◇
6.2.2	Unicorn valuation, % GDP		0.9	33	
6.2.3	Software spending, % GDP		0.2	83	
6.2.4	High-tech manufacturing, %		46.1	15	●◆
6.3	**Knowledge diffusion**		**28.2**	**46**	
6.3.1	Intellectual property receipts, % total trade		0.2	46	
6.3.2	Production and export complexity		71.7	22	●◆
6.3.3	High-tech exports, % total trade		13.9	11	●◆
6.3.4	ICT services exports, % total trade		0.2	124	○
6.3.5	ISO 9001 quality/bn PPP$ GDP		3.2	76	
	Creative outputs		**31.8**	**47**	
7.1	**Intangible assets**		**35.7**	**46**	
7.1.1	Intangible asset intensity, top 15, %		71.1	15	●
7.1.2	Trademarks by origin/bn PPP$ GDP		45.0	39	
7.1.3	Global brand value, top 5,000, % GDP		4.0	35	
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.3	88	
7.2	**Creative goods and services**		**32.2**	**29**	●◆
7.2.1	Cultural and creative services exports, % total trade	◷	0.1	90	○
7.2.2	National feature films/mn pop. 15–69		2.9	45	
7.2.3	Entertainment and media market/th pop. 15–69		8.5	39	
7.2.4	Creative goods exports, % total trade		9.7	1	●◆
7.3	**Online creativity**		**23.5**	**78**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		3.1	67	
7.3.2	GitHub commits/mn pop. 15–69		4.4	83	
7.3.3	Mobile app creation/bn PPP$ GDP		63.1	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Mongolia

67

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
51	84	Lower middle	SEAO	3.4	53.0	15,088

			Score/Value	Rank	
	Institutions		**35.9**	**93**	
1.1	**Institutional environment**		**45.8**	**83**	
1.1.1	Operational stability for businesses*		58.7	74	
1.1.2	Government effectiveness*		32.9	96	
1.2	**Regulatory environment**		**36.6**	**79**	
1.2.1	Regulatory quality*		34.7	87	
1.2.2	Rule of law*		38.5	76	
1.3	**Business environment**		**25.3**	**[109]**	
1.3.1	Policy stability for doing business†		25.3	112	
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**26.1**	**86**	
2.1	**Education**		**51.1**	**65**	
2.1.1	Expenditure on education, % GDP		4.3	62	
2.1.2	Government funding/pupil, secondary, % GDP/cap		n/a	n/a	
2.1.3	School life expectancy, years	⏲	14.5	57	◆
2.1.4	PISA scales in reading, maths and science		405.1	56	
2.1.5	Pupil–teacher ratio, secondary	⏲	13.1	61	
2.2	**Tertiary education**		**25.5**	**85**	
2.2.1	Tertiary enrolment, % gross		65.3	47	◆
2.2.2	Graduates in science and engineering, %		17.8	91	
2.2.3	Tertiary inbound mobility, %		2.5	73	
2.3	**Research and development (R&D)**		**1.6**	**94**	
2.3.1	Researchers, FTE/mn pop.		533.6	71	
2.3.2	Gross expenditure on R&D, % GDP		0.1	104	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○ ◇
2.3.4	QS university ranking, top 3*		0.0	75	○ ◇
	Infrastructure		**38.4**	**73**	◆
3.1	**Information and communication technologies (ICTs)**		**72.7**	**64**	◆
3.1.1	ICT access*	⏲	90.5	62	◆
3.1.2	ICT use*		82.2	43	● ◆
3.1.3	Government's online service*		58.7	78	
3.1.4	E-participation*		59.3	57	◆
3.2	**General infrastructure**		**33.9**	**54**	
3.2.1	Electricity output, GWh/mn pop.	⏲	2,219.2	75	
3.2.2	Logistics performance*		18.2	89	
3.2.3	Gross capital formation, % GDP		38.3	9	● ◆
3.3	**Ecological sustainability**		**8.5**	**113**	
3.3.1	GDP/unit of energy use		5.8	111	◇
3.3.2	Low-carbon energy use, %		2.5	114	
3.3.3	ISO 14001 environment/bn PPP$ GDP		1.7	61	◆
	Market sophistication		**21.0**	**106**	
4.1	**Credit**		**8.5**	**115**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		41.0	79	
4.1.3	Loans from microfinance institutions, % GDP		0.4	45	
4.2	**Investment**		**n/a**	**[n/a]**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP		n/a	n/a	
4.2.4	VC received, value, % GDP		n/a	n/a	
4.3	**Trade, diversification and market scale**		**33.5**	**111**	
4.3.1	Applied tariff rate, weighted avg., %		5.0	95	
4.3.2	Domestic industry diversification	⏲	38.8	104	○ ◇
4.3.3	Domestic market scale, bn PPP$		53.0	111	

			Score/Value	Rank	
	Business sophistication		**27.5**	**61**	◆
5.1	**Knowledge workers**		**42.0**	**46**	◆
5.1.1	Knowledge-intensive employment, %		25.7	57	◆
5.1.2	Firms offering formal training, %	⏲	66.2	3	● ◆
5.1.3	GERD performed by business, % GDP	⏲	0.0	86	○
5.1.4	GERD financed by business, %	⏲	8.1	79	
5.1.5	Females employed w/advanced degrees, %	⏲	22.5	25	● ◆
5.2	**Innovation linkages**		**14.5**	**110**	
5.2.1	Public research–industry co-publications, %		1.9	47	◆
5.2.2	University–industry R&D collaboration†		26.6	102	
5.2.3	State of cluster development†		20.6	119	◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	86	
5.2.5	Patent families/bn PPP$ GDP		0.0	73	
5.3	**Knowledge absorption**		**26.0**	**67**	
5.3.1	Intellectual property payments, % total trade		0.3	85	
5.3.2	High-tech imports, % total trade		6.0	100	
5.3.3	ICT services imports, % total trade		1.1	73	
5.3.4	FDI net inflows, % GDP		13.9	6	● ◆
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**15.8**	**86**	
6.1	**Knowledge creation**		**23.2**	**45**	● ◆
6.1.1	Patents by origin/bn PPP$ GDP		2.3	29	● ◆
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	99	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP		2.0	7	● ◆
6.1.4	Scientific and technical articles/bn PPP$ GDP		10.4	69	
6.1.5	Citable documents H-index		4.7	104	
6.2	**Knowledge impact**		**17.3**	**116**	
6.2.1	Labor productivity growth, %		1.3	45	●
6.2.2	Unicorn valuation, % GDP		0.0	49	○ ◇
6.2.3	Software spending, % GDP		0.1	88	
6.2.4	High-tech manufacturing, %	⏲	2.9	105	○ ◇
6.3	**Knowledge diffusion**		**7.1**	**107**	
6.3.1	Intellectual property receipts, % total trade		0.0	94	
6.3.2	Production and export complexity		12.5	116	○ ◇
6.3.3	High-tech exports, % total trade		0.5	92	
6.3.4	ICT services exports, % total trade		0.4	105	
6.3.5	ISO 9001 quality/bn PPP$ GDP		6.2	46	◆
	Creative outputs		**39.4**	**32**	● ◆
7.1	**Intangible assets**		**66.7**	**6**	● ◆
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		207.3	1	● ◆
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○ ◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		21.8	1	● ◆
7.2	**Creative goods and services**		**2.2**	**[109]**	
7.2.1	Cultural and creative services exports, % total trade	⏲	0.1	84	
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	Creative goods exports, % total trade		0.0	122	○
7.3	**Online creativity**		**22.2**	**89**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		1.6	85	
7.3.2	GitHub commits/mn pop. 15–69		7.0	69	
7.3.3	Mobile app creation/bn PPP$ GDP		58.0	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Montenegro

GII 2024 rank

65

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
72	62	Upper middle	EUR	0.6	17.4	28,002

			Score/ Value	Rank	
	Institutions		**39.8**	**86**	
1.1	**Institutional environment**		**51.3**	**75**	
1.1.1	Operational stability for businesses*		59.3	73	
1.1.2	Government effectiveness*		43.3	72	
1.2	**Regulatory environment**		**48.2**	**57**	
1.2.1	Regulatory quality*		56.1	46	◆
1.2.2	Rule of law*		40.2	71	
1.3	**Business environment**		**20.1**	**[119]**	
1.3.1	Policy stability for doing business†	⏲	20.1	122	○ ◇
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**32.6**	**61**	
2.1	**Education**		**57.4**	**[49]**	
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		15.1	47	
2.1.4	PISA scales in reading, maths and science		404.6	57	
2.1.5	Pupil–teacher ratio, secondary		12.1	53	
2.2	**Tertiary education**		**37.0**	**50**	
2.2.1	Tertiary enrolment, % gross		56.1	63	
2.2.2	Graduates in science and engineering, %		21.0	71	
2.2.3	Tertiary inbound mobility, %		n/a	n/a	
2.3	**Research and development (R&D)**		**3.3**	**85**	
2.3.1	Researchers, FTE/mn pop.	⏲	753.6	61	
2.3.2	Gross expenditure on R&D, % GDP	⏲	0.4	67	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○ ◇
2.3.4	QS university ranking, top 3*		0.0	75	○ ◇
	Infrastructure		**44.5**	**57**	
3.1	**Information and communication technologies (ICTs)**		**66.8**	**77**	
3.1.1	ICT access*		88.2	72	
3.1.2	ICT use*		83.2	39	
3.1.3	Government's online service*		50.6	90	
3.1.4	E-participation*		45.3	81	
3.2	**General infrastructure**		**31.9**	**63**	
3.2.1	Electricity output, GWh/mn pop.		5,405.8	39	◆
3.2.2	Logistics performance*		31.8	71	
3.2.3	Gross capital formation, % GDP		28.0	32	
3.3	**Ecological sustainability**		**34.9**	**28**	●
3.3.1	GDP/unit of energy use		10.9	62	
3.3.2	Low-carbon energy use, %		33.7	26	●
3.3.3	ISO 14001 environment/bn PPP$ GDP		5.2	20	●
	Market sophistication		**36.9**	**52**	
4.1	**Credit**		**14.4**	**99**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		47.3	73	
4.1.3	Loans from microfinance institutions, % GDP		1.2	25	
4.2	**Investment**		**n/a**	**[n/a]**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP		n/a	n/a	
4.2.4	VC received, value, % GDP		n/a	n/a	
4.3	**Trade, diversification and market scale**		**59.3**	**55**	
4.3.1	Applied tariff rate, weighted avg., %		1.1	18	●
4.3.2	Domestic industry diversification	⏲	86.2	48	
4.3.3	Domestic market scale, bn PPP$		17.4	130	○

			Score/ Value	Rank	
	Business sophistication		**27.9**	**59**	
5.1	**Knowledge workers**		**39.2**	**50**	
5.1.1	Knowledge-intensive employment, %	⏲	38.6	34	◆
5.1.2	Firms offering formal training, %		25.6	65	
5.1.3	GERD performed by business, % GDP	⏲	0.2	54	
5.1.4	GERD financed by business, %	⏲	37.8	51	
5.1.5	Females employed w/advanced degrees, %	⏲	16.9	42	
5.2	**Innovation linkages**		**16.8**	**98**	
5.2.1	Public research–industry co-publications, %		1.0	88	
5.2.2	University–industry R&D collaboration†	⏲	35.2	90	
5.2.3	State of cluster development†	⏲	22.5	116	○ ◇
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	102	○ ◇
5.3	**Knowledge absorption**		**27.9**	**61**	
5.3.1	Intellectual property payments, % total trade		0.2	95	◇
5.3.2	High-tech imports, % total trade		6.1	94	
5.3.3	ICT services imports, % total trade		2.4	22	● ◆
5.3.4	FDI net inflows, % GDP		12.3	8	● ◆
5.3.5	Research talent, % in businesses	⏲	12.5	59	
	Knowledge and technology outputs		**19.8**	**74**	
6.1	**Knowledge creation**		**18.0**	**60**	
6.1.1	Patents by origin/bn PPP$ GDP		0.4	79	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.6	30	◆
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		22.4	30	◆
6.1.5	Citable documents H-index		2.5	124	○
6.2	**Knowledge impact**		**23.5**	**73**	
6.2.1	Labor productivity growth, %		2.2	23	●
6.2.2	Unicorn valuation, % GDP		0.0	49	○ ◇
6.2.3	Software spending, % GDP		0.2	52	
6.2.4	High-tech manufacturing, %	⏲	7.3	94	
6.3	**Knowledge diffusion**		**18.0**	**64**	
6.3.1	Intellectual property receipts, % total trade		0.0	87	
6.3.2	Production and export complexity		n/a	n/a	
6.3.3	High-tech exports, % total trade		0.4	96	
6.3.4	ICT services exports, % total trade		4.9	21	● ◆
6.3.5	ISO 9001 quality/bn PPP$ GDP		10.3	27	●
	Creative outputs		**23.0**	**70**	
7.1	**Intangible assets**		**5.7**	**110**	◇
7.1.1	Intangible asset intensity, top 15, %	⏲	−181.4	78	○ ◇
7.1.2	Trademarks by origin/bn PPP$ GDP	⏲	29.5	66	
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○ ◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.1	107	
7.2	**Creative goods and services**		**10.5**	**[69]**	
7.2.1	Cultural and creative services exports, % total trade		0.7	44	
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	Creative goods exports, % total trade		0.2	83	
7.3	**Online creativity**		**70.1**	**7**	● ◆
7.3.1	Top-level domains (TLDs)/th pop. 15–69		100.0	1	● ◆
7.3.2	GitHub commits/mn pop. 15–69		35.7	31	◆
7.3.3	Mobile app creation/bn PPP$ GDP		74.5	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Morocco **66**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
47	89	Lower middle	NAWA	37.7	385.3	10,408

		Score/Value	Rank	
	Institutions	**43.5**	**78**	
1.1	**Institutional environment**	**47.6**	**79**	
1.1.1	Operational stability for businesses*	54.7	85	
1.1.2	Government effectiveness*	40.5	79	
1.2	**Regulatory environment**	**38.9**	**75**	◆
1.2.1	Regulatory quality*	39.6	77	◆
1.2.2	Rule of law*	38.2	78	
1.3	**Business environment**	**44.1**	**72**	
1.3.1	Policy stability for doing business†	66.4	32	●◆
1.3.2	Entrepreneurship policies and culture†	21.8	66	
	Human capital and research	**26.7**	**81**	
2.1	**Education**	**46.0**	**77**	
2.1.1	Expenditure on education, % GDP	5.8	20	●◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	14.6	56	◆
2.1.4	PISA scales in reading, maths and science	356.5	82	○
2.1.5	Pupil–teacher ratio, secondary	20.6	100	
2.2	**Tertiary education**	**30.5**	**72**	
2.2.1	Tertiary enrolment, % gross	46.2	73	
2.2.2	Graduates in science and engineering, %	27.2	34	
2.2.3	Tertiary inbound mobility, %	1.7	81	
2.3	**Research and development (R&D)**	**3.6**	**83**	
2.3.1	Researchers, FTE/mn pop.	⏲ 1,080.7	51	
2.3.2	Gross expenditure on R&D, % GDP	n/a	n/a	
2.3.3	Global corporate R&D investors, top 3, mn USD$	0.0	41	○◇
2.3.4	QS university ranking, top 3*	0.0	75	○◇
	Infrastructure	**33.9**	**88**	
3.1	**Information and communication technologies (ICTs)**	**59.9**	**89**	
3.1.1	ICT access*	⏲ 95.4	45	◆
3.1.2	ICT use*	77.1	70	◆
3.1.3	Government's online service*	41.7	106	
3.1.4	E-participation*	25.6	112	○
3.2	**General infrastructure**	**27.0**	**82**	
3.2.1	Electricity output, GWh/mn pop.	1,131.7	95	
3.2.2	Logistics performance*	n/a	n/a	
3.2.3	Gross capital formation, % GDP	30.1	27	●
3.3	**Ecological sustainability**	**14.6**	**95**	
3.3.1	GDP/unit of energy use	13.6	38	
3.3.2	Low-carbon energy use, %	7.3	94	
3.3.3	ISO 14001 environment/bn PPP$ GDP	0.8	79	
	Market sophistication	**27.5**	**82**	
4.1	**Credit**	**23.4**	**75**	
4.1.1	Finance for startups and scaleups†	32.3	62	
4.1.2	Domestic credit to private sector, % GDP	88.0	33	●◆
4.1.3	Loans from microfinance institutions, % GDP	0.6	39	
4.2	**Investment**	**9.1**	**63**	
4.2.1	Market capitalization, % GDP	49.2	38	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	0.1	62	
4.2.3	VC recipients, deals/bn PPP$ GDP	0.0	55	
4.2.4	VC received, value, % GDP	0.0	71	
4.3	**Trade, diversification and market scale**	**50.1**	**81**	
4.3.1	Applied tariff rate, weighted avg., %	2.9	80	
4.3.2	Domestic industry diversification	⏲ 65.7	85	
4.3.3	Domestic market scale, bn PPP$	385.3	55	

		Score/Value	Rank	
	Business sophistication	**14.2**	**125**	○◇
5.1	**Knowledge workers**	**8.6**	**[123]**	
5.1.1	Knowledge-intensive employment, %	8.2	113	○
5.1.2	Firms offering formal training, %	8.8	96	○◇
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, %	⏲ 3.1	103	○
5.2	**Innovation linkages**	**16.4**	**100**	
5.2.1	Public research–industry co-publications, %	0.5	119	○
5.2.2	University–industry R&D collaboration†	30.2	98	
5.2.3	State of cluster development†	42.9	74	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	94	
5.2.5	Patent families/bn PPP$ GDP	0.1	64	◆
5.3	**Knowledge absorption**	**17.6**	**106**	
5.3.1	Intellectual property payments, % total trade	0.3	87	
5.3.2	High-tech imports, % total trade	7.2	86	
5.3.3	ICT services imports, % total trade	0.9	88	
5.3.4	FDI net inflows, % GDP	1.5	86	
5.3.5	Research talent, % in businesses	⏲ 7.0	66	
	Knowledge and technology outputs	**20.5**	**70**	
6.1	**Knowledge creation**	**13.5**	**67**	
6.1.1	Patents by origin/bn PPP$ GDP	0.7	67	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	59	◆
6.1.3	Utility models by origin/bn PPP$ GDP	-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP	13.5	50	
6.1.5	Citable documents H-index	11.3	68	
6.2	**Knowledge impact**	**32.2**	**47**	
6.2.1	Labor productivity growth, %	1.8	33	●
6.2.2	Unicorn valuation, % GDP	0.0	49	○◇
6.2.3	Software spending, % GDP	0.2	62	
6.2.4	High-tech manufacturing, %	⏲ 39.9	27	●◆
6.3	**Knowledge diffusion**	**15.7**	**73**	
6.3.1	Intellectual property receipts, % total trade	0.0	97	
6.3.2	Production and export complexity	34.2	80	
6.3.3	High-tech exports, % total trade	2.1	57	
6.3.4	ICT services exports, % total trade	3.2	36	●
6.3.5	ISO 9001 quality/bn PPP$ GDP	3.4	72	
	Creative outputs	**36.4**	**37**	◆
7.1	**Intangible assets**	**58.6**	**11**	●◆
7.1.1	Intangible asset intensity, top 15, %	67.4	22	●
7.1.2	Trademarks by origin/bn PPP$ GDP	53.0	30	●
7.1.3	Global brand value, top 5,000, % GDP	1.7	48	
7.1.4	Industrial designs by origin/bn PPP$ GDP	10.8	1	●◆
7.2	**Creative goods and services**	**4.6**	**99**	
7.2.1	Cultural and creative services exports, % total trade	0.4	64	
7.2.2	National feature films/mn pop. 15–69	1.0	66	
7.2.3	Entertainment and media market/th pop. 15–69	1.2	57	○
7.2.4	Creative goods exports, % total trade	0.1	95	
7.3	**Online creativity**	**23.7**	**76**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69	1.2	91	
7.3.2	GitHub commits/mn pop. 15–69	7.2	67	
7.3.3	Mobile app creation/bn PPP$ GDP	62.6	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Mozambique

GII 2024 rank

128

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
129	123	Low	SSA	33.6	53.7	1,584

			Score/Value	Rank	
	Institutions		**22.4**	**121**	
1.1	**Institutional environment**		**30.7**	**115**	
1.1.1	Operational stability for businesses*		36.0	117	
1.1.2	Government effectiveness*		25.3	112	
1.2	**Regulatory environment**		**18.7**	**117**	
1.2.1	Regulatory quality*		22.8	114	
1.2.2	Rule of law*		14.5	120	
1.3	**Business environment**		**18.0**	**121**	◇
1.3.1	Policy stability for doing business†	⏲	35.4	96	
1.3.2	Entrepreneurship policies and culture†	⏲	0.7	84	◇
	Human capital and research		**14.3**	**122**	
2.1	**Education**		**39.8**	**[95]**	
2.1.1	Expenditure on education, % GDP	⏲	7.0	6	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap		n/a	n/a	
2.1.3	School life expectancy, years	⏲	10.4	102	
2.1.4	PISA scales in reading, maths and science		n/a	n/a	
2.1.5	Pupil–teacher ratio, secondary	⏲	36.5	124	◇
2.2	**Tertiary education**		**1.6**	**126**	
2.2.1	Tertiary enrolment, % gross	⏲	7.3	120	
2.2.2	Graduates in science and engineering, %	⏲	9.6	111	◇
2.2.3	Tertiary inbound mobility, %	⏲	0.4	104	◇
2.3	**Research and development (R&D)**		**1.3**	**96**	
2.3.1	Researchers, FTE/mn pop.	⏲	44.0	100	
2.3.2	Gross expenditure on R&D, % GDP	⏲	0.3	72	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○ ◇
2.3.4	QS university ranking, top 3*		0.0	75	○ ◇
	Infrastructure		**28.8**	**99**	◆
3.1	**Information and communication technologies (ICTs)**		**18.5**	**131**	
3.1.1	ICT access*		19.6	125	
3.1.2	ICT use*		8.0	124	
3.1.3	Government's online service*		28.9	125	
3.1.4	E-participation*		17.4	126	
3.2	**General infrastructure**		**39.9**	**36**	● ◆
3.2.1	Electricity output, GWh/mn pop.	⏲	588.0	108	◆
3.2.2	Logistics performance*		n/a	n/a	
3.2.3	Gross capital formation, % GDP		39.0	6	● ◆
3.3	**Ecological sustainability**		**27.9**	**42**	● ◆
3.3.1	GDP/unit of energy use		3.6	124	◇
3.3.2	Low-carbon energy use, %		63.2	7	● ◆
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.6	87	
	Market sophistication		**21.7**	**104**	◆
4.1	**Credit**		**8.2**	**119**	
4.1.1	Finance for startups and scaleups†	⏲	0.0	85	○ ◇
4.1.2	Domestic credit to private sector, % GDP		21.3	113	
4.1.3	Loans from microfinance institutions, % GDP		1.8	22	●
4.2	**Investment**		**n/a**	**[n/a]**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP		n/a	n/a	
4.2.4	VC received, value, % GDP		n/a	n/a	
4.3	**Trade, diversification and market scale**		**35.3**	**109**	◆
4.3.1	Applied tariff rate, weighted avg., %		3.9	88	◆
4.3.2	Domestic industry diversification		n/a	n/a	
4.3.3	Domestic market scale, bn PPP$		53.7	109	

			Score/Value	Rank	
	Business sophistication		**13.3**	**127**	
5.1	**Knowledge workers**		**5.7**	**131**	
5.1.1	Knowledge-intensive employment, %	⏲	3.9	124	
5.1.2	Firms offering formal training, %	⏲	20.7	79	
5.1.3	GERD performed by business, % GDP	⏲	0.0	92	
5.1.4	GERD financed by business, %	⏲	0.5	95	
5.1.5	Females employed w/advanced degrees, %	⏲	0.7	121	
5.2	**Innovation linkages**		**12.5**	**115**	
5.2.1	Public research–industry co-publications, %		1.7	53	●
5.2.2	University–industry R&D collaboration†	⏲	22.7	113	
5.2.3	State of cluster development†	⏲	15.7	124	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	⏲	0.0	70	●
5.2.5	Patent families/bn PPP$ GDP		0.0	102	○ ◇
5.3	**Knowledge absorption**		**21.8**	**85**	
5.3.1	Intellectual property payments, % total trade		0.0	121	○ ◇
5.3.2	High-tech imports, % total trade		4.7	112	
5.3.3	ICT services imports, % total trade		1.1	71	●
5.3.4	FDI net inflows, % GDP		23.0	5	● ◆
5.3.5	Research talent, % in businesses	⏲	0.3	86	
	Knowledge and technology outputs		**8.3**	**130**	
6.1	**Knowledge creation**		**6.7**	**103**	
6.1.1	Patents by origin/bn PPP$ GDP		0.5	75	● ◆
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	99	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	⏲	0.1	57	
6.1.4	Scientific and technical articles/bn PPP$ GDP		8.4	79	
6.1.5	Citable documents H-index		4.9	102	
6.2	**Knowledge impact**		**14.5**	**124**	
6.2.1	Labor productivity growth, %		−0.3	104	
6.2.2	Unicorn valuation, % GDP		0.0	49	○ ◇
6.2.3	Software spending, % GDP		0.0	121	
6.2.4	High-tech manufacturing, %		n/a	n/a	
6.3	**Knowledge diffusion**		**3.7**	**125**	
6.3.1	Intellectual property receipts, % total trade		0.0	116	○ ◇
6.3.2	Production and export complexity		13.7	114	◇
6.3.3	High-tech exports, % total trade		0.1	115	
6.3.4	ICT services exports, % total trade		0.1	127	◇
6.3.5	ISO 9001 quality/bn PPP$ GDP		1.4	105	
	Creative outputs		**3.9**	**128**	
7.1	**Intangible assets**		**6.7**	**108**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		14.7	100	
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○ ◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		1.1	58	●
7.2	**Creative goods and services**		**0.3**	**[129]**	
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	Creative goods exports, % total trade		0.0	117	
7.3	**Online creativity**		**1.9**	**128**	◇
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.1	128	
7.3.2	GitHub commits/mn pop. 15–69		0.4	124	
7.3.3	Mobile app creation/bn PPP$ GDP		5.4	126	◇

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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Myanmar

GII 2024 rank

125

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
114	128	Lower middle	SEAO	54.1	277.8	5,124

			Score/ Value	Rank	
	Institutions		**13.5**	**131**	◇
1.1	**Institutional environment**		**11.0**	**132**	◇
1.1.1	Operational stability for businesses*		22.0	127	◇
1.1.2	Government effectiveness*		0.0	133	○◇
1.2	**Regulatory environment**		**4.7**	**133**	○◇
1.2.1	Regulatory quality*		9.4	130	◇
1.2.2	Rule of law*		0.0	133	○◇
1.3	**Business environment**		**24.7**	**[111]**	
1.3.1	Policy stability for doing business†	⏲	24.7	114	
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	

			Score/ Value	Rank	
	Human capital and research		**18.5**	**107**	
2.1	**Education**		**25.4**	**127**	◇
2.1.1	Expenditure on education, % GDP	⏲	2.1	119	
2.1.2	Government funding/pupil, secondary, % GDP/cap	⏲	11.0	85	
2.1.3	School life expectancy, years	⏲	11.5	96	
2.1.4	PISA scales in reading, maths and science		n/a	n/a	
2.1.5	Pupil–teacher ratio, secondary	⏲	27.2	114	◇
2.2	**Tertiary education**		**30.0**	**73**	
2.2.1	Tertiary enrolment, % gross	⏲	20.4	101	
2.2.2	Graduates in science and engineering, %	⏲	33.7	10	●◆
2.2.3	Tertiary inbound mobility, %	⏲	0.0	113	○◇
2.3	**Research and development (R&D)**		**0.1**	**117**	
2.3.1	Researchers, FTE/mn pop.	⏲	19.0	107	
2.3.2	Gross expenditure on R&D, % GDP		0.0	111	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇

			Score/ Value	Rank	
	Infrastructure		**24.4**	**115**	
3.1	**Information and communication technologies (ICTs)**		**30.0**	**122**	◇
3.1.1	ICT access*		n/a	n/a	
3.1.2	ICT use*		37.6	112	◇
3.1.3	Government's online service*		23.4	128	◇
3.1.4	E-participation*		29.1	106	
3.2	**General infrastructure**		**29.1**	**75**	
3.2.1	Electricity output, GWh/mn pop.	⏲	365.1	114	
3.2.2	Logistics performance*		n/a	n/a	
3.2.3	Gross capital formation, % GDP		32.3	18	●
3.3	**Ecological sustainability**		**14.1**	**96**	
3.3.1	GDP/unit of energy use		10.8	64	●
3.3.2	Low-carbon energy use, %		16.4	69	
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.1	125	

			Score/ Value	Rank	
	Market sophistication		**22.4**	**102**	
4.1	**Credit**		**12.3**	**105**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP	⏲	29.0	99	
4.1.3	Loans from microfinance institutions, % GDP	⏲	1.5	24	●
4.2	**Investment**		**0.5**	**114**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.0	102	○◇
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	102	
4.2.4	VC received, value, % GDP		0.0	107	○◇
4.3	**Trade, diversification and market scale**		**54.3**	**73**	
4.3.1	Applied tariff rate, weighted avg., %		1.2	49	●◆
4.3.2	Domestic industry diversification		67.2	83	
4.3.3	Domestic market scale, bn PPP$		277.8	62	●

			Score/ Value	Rank	
	Business sophistication		**9.9**	**132**	◇
5.1	**Knowledge workers**		**7.5**	**126**	◇
5.1.1	Knowledge-intensive employment, %	⏲	5.2	119	◇
5.1.2	Firms offering formal training, %	⏲	5.9	101	
5.1.3	GERD performed by business, % GDP		n/a	n/a	
5.1.4	GERD financed by business, %	⏲	0.0	98	○◇
5.1.5	Females employed w/advanced degrees, %	⏲	7.2	91	
5.2	**Innovation linkages**		**2.8**	**131**	◇
5.2.1	Public research–industry co-publications, %		0.6	109	
5.2.2	University–industry R&D collaboration†	⏲	0.0	130	
5.2.3	State of cluster development†	⏲	8.4	127	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	⏲	0.0	124	◇
5.2.5	Patent families/bn PPP$ GDP		0.0	102	○◇
5.3	**Knowledge absorption**		**19.3**	**96**	
5.3.1	Intellectual property payments, % total trade		0.2	96	
5.3.2	High-tech imports, % total trade		6.1	95	
5.3.3	ICT services imports, % total trade		1.0	82	
5.3.4	FDI net inflows, % GDP		2.5	65	●
5.3.5	Research talent, % in businesses		n/a	n/a	

			Score/ Value	Rank	
	Knowledge and technology outputs		**13.3**	**93**	
6.1	**Knowledge creation**		**2.3**	**[125]**	
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		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		1.4	128	
6.1.5	Citable documents H-index		3.0	122	
6.2	**Knowledge impact**		**30.2**	**52**	●
6.2.1	Labor productivity growth, %		−0.5	110	
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.3	44	●
6.2.4	High-tech manufacturing, %		44.8	18	●◆
6.3	**Knowledge diffusion**		**7.3**	**105**	
6.3.1	Intellectual property receipts, % total trade		0.1	67	
6.3.2	Production and export complexity		21.9	102	
6.3.3	High-tech exports, % total trade		1.7	67	●
6.3.4	ICT services exports, % total trade		0.3	113	
6.3.5	ISO 9001 quality/bn PPP$ GDP		1.6	102	

			Score/ Value	Rank	
	Creative outputs		**6.3**	**[118]**	
7.1	**Intangible assets**		**1.3**	**[125]**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		n/a	n/a	
7.1.3	Global brand value, top 5,000, % GDP		0.3	68	
7.1.4	Industrial designs by origin/bn PPP$ GDP		n/a	n/a	
7.2	**Creative goods and services**		**4.5**	**[100]**	
7.2.1	Cultural and creative services exports, % total trade		0.1	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	Creative goods exports, % total trade		0.5	59	●
7.3	**Online creativity**		**18.3**	**103**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.0	132	
7.3.2	GitHub commits/mn pop. 15–69		0.6	119	
7.3.3	Mobile app creation/bn PPP$ GDP		54.1	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Namibia

GII 2024 rank

102

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
109	87	Upper middle	SSA	3.0	30.7	11,603

			Score/Value	Rank	
	Institutions		**50.6**	**56**	
1.1	**Institutional environment**		**53.8**	**66**	
1.1.1	Operational stability for businesses*		62.7	65	
1.1.2	Government effectiveness*		45.0	65	
1.2	**Regulatory environment**		**48.4**	**56**	
1.2.1	Regulatory quality*		41.4	73	
1.2.2	Rule of law*		55.4	47	● ◆
1.3	**Business environment**		**49.5**	**[60]**	
1.3.1	Policy stability for doing business†	◷	49.5	64	
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**25.2**	**91**	
2.1	**Education**		**65.5**	**[13]**	
2.1.1	Expenditure on education, % GDP		9.0	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		32.0	123	○ ◇
2.2	**Tertiary education**		**8.3**	**114**	◇
2.2.1	Tertiary enrolment, % gross	◷	28.4	92	◇
2.2.2	Graduates in science and engineering, %	◷	8.9	113	○ ◇
2.2.3	Tertiary inbound mobility, %	◷	3.2	62	
2.3	**Research and development (R&D)**		**1.8**	**93**	
2.3.1	Researchers, FTE/mn pop.	◷	152.8	88	
2.3.2	Gross expenditure on R&D, % GDP	◷	0.3	68	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○ ◇
2.3.4	QS university ranking, top 3*		0.0	75	○ ◇
	Infrastructure		**25.1**	**113**	◇
3.1	**Information and communication technologies (ICTs)**		**45.1**	**107**	◇
3.1.1	ICT access*		64.5	99	◇
3.1.2	ICT use*		55.3	102	◇
3.1.3	Government's online service*		37.2	113	◇
3.1.4	E-participation*		23.3	116	◇
3.2	**General infrastructure**		**12.9**	**119**	◇
3.2.1	Electricity output, GWh/mn pop.		514.2	110	◇
3.2.2	Logistics performance*		36.4	65	
3.2.3	Gross capital formation, % GDP		14.1	126	○ ◇
3.3	**Ecological sustainability**		**17.5**	**78**	
3.3.1	GDP/unit of energy use		12.0	50	●
3.3.2	Low-carbon energy use, %		18.0	64	
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.8	82	
	Market sophistication		**23.5**	**[93]**	
4.1	**Credit**		**20.0**	**[87]**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		59.4	53	
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**6.1**	**[71]**	
4.2.1	Market capitalization, % GDP		17.8	66	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP		n/a	n/a	
4.2.4	VC received, value, % GDP		n/a	n/a	
4.3	**Trade, diversification and market scale**		**44.6**	**91**	
4.3.1	Applied tariff rate, weighted avg., %		2.3	69	
4.3.2	Domestic industry diversification		51.4	101	◇
4.3.3	Domestic market scale, bn PPP$		30.7	127	○

			Score/Value	Rank	
	Business sophistication		**21.7**	**92**	
5.1	**Knowledge workers**		**18.9**	**106**	◇
5.1.1	Knowledge-intensive employment, %	◷	18.1	84	
5.1.2	Firms offering formal training, %	◷	25.4	66	
5.1.3	GERD performed by business, % GDP	◷	0.0	76	
5.1.4	GERD financed by business, %	◷	11.1	75	
5.1.5	Females employed w/advanced degrees, %	◷	7.4	90	◇
5.2	**Innovation linkages**		**26.0**	**57**	
5.2.1	Public research–industry co-publications, %		2.4	32	●
5.2.2	University–industry R&D collaboration†	◷	46.2	61	
5.2.3	State of cluster development†	◷	42.3	77	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	33	● ◆
5.2.5	Patent families/bn PPP$ GDP		0.1	55	
5.3	**Knowledge absorption**		**20.3**	**94**	
5.3.1	Intellectual property payments, % total trade		0.1	102	◇
5.3.2	High-tech imports, % total trade		7.4	81	
5.3.3	ICT services imports, % total trade		1.5	51	●
5.3.4	FDI net inflows, % GDP		3.8	38	●
5.3.5	Research talent, % in businesses	◷	6.9	67	
	Knowledge and technology outputs		**9.4**	**122**	◇
6.1	**Knowledge creation**		**8.9**	**87**	
6.1.1	Patents by origin/bn PPP$ GDP		0.6	72	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.2	44	●
6.1.3	Utility models by origin/bn PPP$ GDP		0.1	48	
6.1.4	Scientific and technical articles/bn PPP$ GDP		10.1	72	
6.1.5	Citable documents H-index		4.3	109	
6.2	**Knowledge impact**		**11.0**	**127**	○ ◇
6.2.1	Labor productivity growth, %		−1.5	124	○ ◇
6.2.2	Unicorn valuation, % GDP		0.0	49	○ ◇
6.2.3	Software spending, % GDP		0.1	95	
6.2.4	High-tech manufacturing, %		3.4	104	○ ◇
6.3	**Knowledge diffusion**		**8.2**	**102**	◇
6.3.1	Intellectual property receipts, % total trade		0.0	76	
6.3.2	Production and export complexity		28.4	93	
6.3.3	High-tech exports, % total trade		1.0	78	
6.3.4	ICT services exports, % total trade		0.4	109	
6.3.5	ISO 9001 quality/bn PPP$ GDP		1.8	97	
	Creative outputs		**12.0**	**105**	◇
7.1	**Intangible assets**		**7.0**	**107**	◇
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		13.2	102	◇
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○ ◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		1.3	50	●
7.2	**Creative goods and services**		**8.5**	**[80]**	
7.2.1	Cultural and creative services exports, % total trade		0.6	50	
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	Creative goods exports, % total trade		0.1	91	
7.3	**Online creativity**		**25.3**	**65**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		3.6	64	
7.3.2	GitHub commits/mn pop. 15–69		2.3	100	
7.3.3	Mobile app creation/bn PPP$ GDP		70.2	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Nepal

GII 2024 rank

109

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
102	**110**	**Lower middle**	**CSA**	**29.7**	**150.8**	**4,934**

			Score/ Value	Rank	
	Institutions		**29.9**	**111**	
1.1	**Institutional environment**		**33.0**	**110**	
1.1.1	Operational stability for businesses*		46.0	104	
1.1.2	Government effectiveness*		20.0	123	
1.2	**Regulatory environment**		**27.9**	**101**	
1.2.1	Regulatory quality*		24.8	108	
1.2.2	Rule of law*		31.0	89	
1.3	**Business environment**		**28.7**	**[103]**	
1.3.1	Policy stability for doing business†		28.7	105	
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**10.5**	**[130]**	
2.1	**Education**		**24.7**	**128**	○ ◇
2.1.1	Expenditure on education, % GDP		3.6	85	
2.1.2	Government funding/pupil, secondary, % GDP/cap	⏲	9.4	89	○
2.1.3	School life expectancy, years	⏲	12.6	89	
2.1.4	PISA scales in reading, maths and science		n/a	n/a	
2.1.5	Pupil–teacher ratio, secondary		37.2	125	○ ◇
2.2	**Tertiary education**		**6.7**	**[119]**	
2.2.1	Tertiary enrolment, % gross		14.0	110	
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**	**[120]**	
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 USD$		0.0	41	○ ◇
2.3.4	QS university ranking, top 3*		0.0	75	○ ◇
	Infrastructure		**27.8**	**100**	
3.1	**Information and communication technologies (ICTs)**		**31.8**	**119**	◇
3.1.1	ICT access*	⏲	33.1	122	◇
3.1.2	ICT use*		n/a	n/a	
3.1.3	Government's online service*		40.2	110	
3.1.4	E-participation*		22.1	121	
3.2	**General infrastructure**		**33.9**	**55**	●
3.2.1	Electricity output, GWh/mn pop.	⏲	322.0	115	
3.2.2	Logistics performance*		n/a	n/a	
3.2.3	Gross capital formation, % GDP		35.4	11	●
3.3	**Ecological sustainability**		**17.7**	**73**	
3.3.1	GDP/unit of energy use		6.6	103	
3.3.2	Low-carbon energy use, %		32.9	28	●
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.4	102	
	Market sophistication		**33.0**	**65**	●
4.1	**Credit**		**67.0**	**6**	● ◆
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		95.3	26	● ◆
4.1.3	Loans from microfinance institutions, % GDP		9.1	1	● ◆
4.2	**Investment**		**0.9**	**[112]**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP	⏲	0.0	101	
4.2.4	VC received, value, % GDP	⏲	0.0	99	
4.3	**Trade, diversification and market scale**		**31.0**	**113**	
4.3.1	Applied tariff rate, weighted avg., %		12.2	132	○ ◇
4.3.2	Domestic industry diversification	⏲	85.9	50	●
4.3.3	Domestic market scale, bn PPP$		150.8	80	

			Score/ Value	Rank	
	Business sophistication		**17.9**	**[116]**	
5.1	**Knowledge workers**		**13.6**	**[115]**	
5.1.1	Knowledge-intensive employment, %	⏲	13.2	99	
5.1.2	Firms offering formal training, %		14.1	90	
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, %	⏲	2.9	106	
5.2	**Innovation linkages**		**17.8**	**93**	
5.2.1	Public research–industry co-publications, %		1.7	54	●
5.2.2	University–industry R&D collaboration†		31.9	95	
5.2.3	State of cluster development†		33.2	96	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	71	
5.2.5	Patent families/bn PPP$ GDP		0.0	102	○ ◇
5.3	**Knowledge absorption**		**22.4**	**[81]**	
5.3.1	Intellectual property payments, % total trade		n/a	n/a	
5.3.2	High-tech imports, % total trade		10.7	33	●
5.3.3	ICT services imports, % total trade		0.1	132	○ ◇
5.3.4	FDI net inflows, % GDP		0.4	114	
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**10.7**	**[110]**	
6.1	**Knowledge creation**		**10.4**	**[81]**	
6.1.1	Patents by origin/bn PPP$ GDP	⏲	0.2	99	
6.1.2	PCT patents by origin/bn PPP$ GDP		n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		9.3	75	
6.1.5	Citable documents H-index		8.2	86	
6.2	**Knowledge impact**		**14.8**	**123**	
6.2.1	Labor productivity growth, %		0.5	73	
6.2.2	Unicorn valuation, % GDP		0.0	49	○ ◇
6.2.3	Software spending, % GDP		0.0	123	◇
6.2.4	High-tech manufacturing, %	⏲	9.0	91	
6.3	**Knowledge diffusion**		**6.8**	**[109]**	
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		0.0	129	○
6.3.4	ICT services exports, % total trade		1.3	72	
6.3.5	ISO 9001 quality/bn PPP$ GDP		3.5	71	●
	Creative outputs		**14.0**	**97**	
7.1	**Intangible assets**		**10.4**	**98**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP	⏲	40.7	47	●
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○ ◇
7.1.4	Industrial designs by origin/bn PPP$ GDP	⏲	0.2	105	
7.2	**Creative goods and services**		**9.7**	**[76]**	
7.2.1	Cultural and creative services exports, % total trade		n/a	n/a	
7.2.2	National feature films/mn pop. 15–69	⏲	2.7	47	
7.2.3	Entertainment and media market/th pop. 15–69		n/a	n/a	
7.2.4	Creative goods exports, % total trade		0.2	76	
7.3	**Online creativity**		**25.3**	**66**	●
7.3.1	Top-level domains (TLDs)/th pop. 15–69		1.0	96	
7.3.2	GitHub commits/mn pop. 15–69		4.9	75	
7.3.3	Mobile app creation/bn PPP$ GDP		70.2	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Netherlands (Kingdom of the) 8

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
8	11	High	EUR	18.1	1,297.0	73,317

			Score/ Value	Rank	
	Institutions		**81.4**	**9**	
1.1	**Institutional environment**		**81.6**	**16**	
1.1.1	Operational stability for businesses*		78.0	29	
1.1.2	Government effectiveness*		85.2	9	
1.2	**Regulatory environment**		**89.1**	**9**	
1.2.1	Regulatory quality*		86.8	7	●
1.2.2	Rule of law*		91.4	11	
1.3	**Business environment**		**73.4**	**16**	
1.3.1	Policy stability for doing business†		71.2	23	
1.3.2	Entrepreneurship policies and culture†		75.6	9	◆
	Human capital and research		**56.1**	**14**	
2.1	**Education**		**62.2**	**28**	
2.1.1	Expenditure on education, % GDP	⏲	5.1	41	
2.1.2	Government funding/pupil, secondary, % GDP/cap		23.2	32	
2.1.3	School life expectancy, years	⏲	18.6	13	
2.1.4	PISA scales in reading, maths and science		480.1	25	
2.1.5	Pupil–teacher ratio, secondary	⏲	13.8	67	○
2.2	**Tertiary education**		**42.3**	**31**	
2.2.1	Tertiary enrolment, % gross	⏲	89.0	15	
2.2.2	Graduates in science and engineering, %		19.3	83	○ ◇
2.2.3	Tertiary inbound mobility, %	⏲	13.7	15	
2.3	**Research and development (R&D)**		**63.8**	**10**	
2.3.1	Researchers, FTE/mn pop.		6,532.6	10	
2.3.2	Gross expenditure on R&D, % GDP		2.3	15	
2.3.3	Global corporate R&D investors, top 3, mn USD$		81.1	8	
2.3.4	QS university ranking, top 3*		70.3	12	
	Infrastructure		**53.7**	**25**	
3.1	**Information and communication technologies (ICTs)**		**91.5**	**12**	
3.1.1	ICT access*		95.8	42	
3.1.2	ICT use*		84.6	34	
3.1.3	Government's online service*		89.2	11	
3.1.4	E-participation*		96.5	5	●
3.2	**General infrastructure**		**46.5**	**26**	
3.2.1	Electricity output, GWh/mn pop.		6,870.8	26	
3.2.2	Logistics performance*		90.9	3	● ◆
3.2.3	Gross capital formation, % GDP		21.3	89	○
3.3	**Ecological sustainability**		**23.2**	**54**	○
3.3.1	GDP/unit of energy use		15.5	26	
3.3.2	Low-carbon energy use, %		14.4	74	○
3.3.3	ISO 14001 environment/bn PPP$ GDP		2.3	46	○
	Market sophistication		**56.1**	**14**	
4.1	**Credit**		**59.4**	**11**	
4.1.1	Finance for startups and scaleups†		86.1	3	● ◆
4.1.2	Domestic credit to private sector, % GDP		92.1	29	
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**39.3**	**18**	
4.2.1	Market capitalization, % GDP	⏲	109.9	16	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.5	12	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.2	17	
4.2.4	VC received, value, % GDP		0.0	18	
4.3	**Trade, diversification and market scale**		**69.4**	**20**	
4.3.1	Applied tariff rate, weighted avg., %		1.1	21	○
4.3.2	Domestic industry diversification		91.5	30	
4.3.3	Domestic market scale, bn PPP$		1,297.0	27	

			Score/ Value	Rank	
	Business sophistication		**62.5**	**7**	●
5.1	**Knowledge workers**		**67.7**	**14**	
5.1.1	Knowledge-intensive employment, %		53.6	4	●
5.1.2	Firms offering formal training, %	⏲	54.1	13	
5.1.3	GERD performed by business, % GDP		1.6	15	
5.1.4	GERD financed by business, %		56.5	18	
5.1.5	Females employed w/advanced degrees, %		23.2	22	
5.2	**Innovation linkages**		**62.0**	**8**	
5.2.1	Public research–industry co-publications, %		5.4	10	
5.2.2	University–industry R&D collaboration†		90.4	4	● ◆
5.2.3	State of cluster development†		88.8	10	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.1	22	
5.2.5	Patent families/bn PPP$ GDP		4.6	10	
5.3	**Knowledge absorption**		**57.7**	**5**	● ◆
5.3.1	Intellectual property payments, % total trade		4.7	1	● ◆
5.3.2	High-tech imports, % total trade		11.4	27	
5.3.3	ICT services imports, % total trade		2.9	14	
5.3.4	FDI net inflows, % GDP		−12.1	130	○ ◇
5.3.5	Research talent, % in businesses		70.2	6	
	Knowledge and technology outputs		**55.5**	**8**	
6.1	**Knowledge creation**		**63.4**	**5**	●
6.1.1	Patents by origin/bn PPP$ GDP		7.0	11	
6.1.2	PCT patents by origin/bn PPP$ GDP		3.3	9	
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		29.5	17	
6.1.5	Citable documents H-index		70.5	7	●
6.2	**Knowledge impact**		**49.4**	**13**	
6.2.1	Labor productivity growth, %		−0.1	100	○
6.2.2	Unicorn valuation, % GDP		2.1	17	
6.2.3	Software spending, % GDP		0.6	13	
6.2.4	High-tech manufacturing, %		43.6	21	
6.3	**Knowledge diffusion**		**53.8**	**11**	
6.3.1	Intellectual property receipts, % total trade		4.8	1	● ◆
6.3.2	Production and export complexity		68.0	26	
6.3.3	High-tech exports, % total trade		11.1	16	
6.3.4	ICT services exports, % total trade		4.2	25	
6.3.5	ISO 9001 quality/bn PPP$ GDP		8.3	34	
	Creative outputs		**55.9**	**7**	●
7.1	**Intangible assets**		**46.6**	**25**	
7.1.1	Intangible asset intensity, top 15, %		82.0	6	
7.1.2	Trademarks by origin/bn PPP$ GDP		37.8	53	○
7.1.3	Global brand value, top 5,000, % GDP		8.8	23	
7.1.4	Industrial designs by origin/bn PPP$ GDP		2.9	29	
7.2	**Creative goods and services**		**40.1**	**14**	
7.2.1	Cultural and creative services exports, % total trade		2.0	11	
7.2.2	National feature films/mn pop. 15–69		3.6	37	○
7.2.3	Entertainment and media market/th pop. 15–69		43.8	18	
7.2.4	Creative goods exports, % total trade		3.0	17	
7.3	**Online creativity**		**90.4**	**1**	● ◆
7.3.1	Top-level domains (TLDs)/th pop. 15–69		100.0	1	● ◆
7.3.2	GitHub commits/mn pop. 15–69		97.8	3	● ◆
7.3.3	Mobile app creation/bn PPP$ GDP		73.3	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

New Zealand

GII 2024 rank **25**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
34	21	High	SEAO	5.2	279.2	53,809

			Score/Value	Rank	
	Institutions		**82.9**	**7**	●
1.1	**Institutional environment**		**85.2**	**11**	●
1.1.1	Operational stability for businesses*		91.3	4	● ◆
1.1.2	Government effectiveness*		79.0	19	
1.2	**Regulatory environment**		**92.2**	**5**	●
1.2.1	Regulatory quality*		90.8	3	●
1.2.2	Rule of law*		93.5	7	●
1.3	**Business environment**		**71.3**	**[19]**	
1.3.1	Policy stability for doing business†		71.3	22	
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**49.8**	**23**	◇
2.1	**Education**		**63.1**	**21**	
2.1.1	Expenditure on education, % GDP		5.5	27	
2.1.2	Government funding/pupil, secondary, % GDP/cap		17.2	61	○ ◇
2.1.3	School life expectancy, years	⏲	19.7	4	● ◆
2.1.4	PISA scales in reading, maths and science		494.7	12	
2.1.5	Pupil–teacher ratio, secondary	⏲	14.6	75	○ ◇
2.2	**Tertiary education**		**42.2**	**32**	
2.2.1	Tertiary enrolment, % gross	⏲	79.4	22	
2.2.2	Graduates in science and engineering, %		22.7	62	○
2.2.3	Tertiary inbound mobility, %	⏲	12.0	18	
2.3	**Research and development (R&D)**		**44.0**	**23**	◇
2.3.1	Researchers, FTE/mn pop.	⏲	5,084.4	19	
2.3.2	Gross expenditure on R&D, % GDP	⏲	1.5	27	
2.3.3	Global corporate R&D investors, top 3, mn USD$		48.9	32	◇
2.3.4	QS university ranking, top 3*		51.8	19	
	Infrastructure		**56.4**	**12**	●
3.1	**Information and communication technologies (ICTs)**		**92.3**	**10**	●
3.1.1	ICT access*		98.6	27	
3.1.2	ICT use*		79.8	57	◇
3.1.3	Government's online service*		95.3	6	●
3.1.4	E-participation*		95.3	6	●
3.2	**General infrastructure**		**46.2**	**27**	
3.2.1	Electricity output, GWh/mn pop.		8,716.8	17	
3.2.2	Logistics performance*		68.2	25	◇
3.2.3	Gross capital formation, % GDP		26.1	44	
3.3	**Ecological sustainability**		**30.7**	**40**	
3.3.1	GDP/unit of energy use		11.0	59	
3.3.2	Low-carbon energy use, %		43.0	18	
3.3.3	ISO 14001 environment/bn PPP$ GDP		2.3	47	
	Market sophistication		**44.8**	**34**	◇
4.1	**Credit**		**54.3**	**[18]**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		146.9	9	●
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**23.3**	**35**	◇
4.2.1	Market capitalization, % GDP		49.9	37	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.3	23	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.2	21	
4.2.4	VC received, value, % GDP		0.0	50	◇
4.3	**Trade, diversification and market scale**		**56.7**	**65**	
4.3.1	Applied tariff rate, weighted avg., %		0.7	8	●
4.3.2	Domestic industry diversification		70.2	78	○ ◇
4.3.3	Domestic market scale, bn PPP$		279.2	61	

			Score/Value	Rank	
	Business sophistication		**52.9**	**20**	
5.1	**Knowledge workers**		**60.6**	**22**	
5.1.1	Knowledge-intensive employment, %		n/a	n/a	
5.1.2	Firms offering formal training, %		66.0	5	● ◆
5.1.3	GERD performed by business, % GDP	⏲	0.9	26	
5.1.4	GERD financed by business, %		50.1	30	
5.1.5	Females employed w/advanced degrees, %	⏲	21.5	28	
5.2	**Innovation linkages**		**52.1**	**18**	
5.2.1	Public research–industry co-publications, %		4.3	17	
5.2.2	University–industry R&D collaboration†		73.5	20	
5.2.3	State of cluster development†		86.1	12	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.1	20	
5.2.5	Patent families/bn PPP$ GDP		1.4	26	◇
5.3	**Knowledge absorption**		**46.0**	**19**	
5.3.1	Intellectual property payments, % total trade		1.6	19	
5.3.2	High-tech imports, % total trade		12.1	21	
5.3.3	ICT services imports, % total trade		3.1	12	●
5.3.4	FDI net inflows, % GDP		2.3	70	○
5.3.5	Research talent, % in businesses	⏲	46.2	31	
	Knowledge and technology outputs		**28.5**	**45**	◇
6.1	**Knowledge creation**		**34.9**	**28**	◇
6.1.1	Patents by origin/bn PPP$ GDP		1.0	60	◇
6.1.2	PCT patents by origin/bn PPP$ GDP		1.0	24	◇
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		30.7	15	
6.1.5	Citable documents H-index		35.5	27	
6.2	**Knowledge impact**		**22.5**	**80**	○ ◇
6.2.1	Labor productivity growth, %		0.3	83	○
6.2.2	Unicorn valuation, % GDP		0.0	49	○ ◇
6.2.3	Software spending, % GDP		0.2	54	◇
6.2.4	High-tech manufacturing, %		16.9	69	○ ◇
6.3	**Knowledge diffusion**		**28.1**	**48**	
6.3.1	Intellectual property receipts, % total trade		1.8	13	
6.3.2	Production and export complexity		48.0	52	◇
6.3.3	High-tech exports, % total trade		2.0	61	◇
6.3.4	ICT services exports, % total trade		1.7	61	
6.3.5	ISO 9001 quality/bn PPP$ GDP		5.7	49	
	Creative outputs		**40.3**	**31**	◇
7.1	**Intangible assets**		**41.6**	**33**	
7.1.1	Intangible asset intensity, top 15, %		54.6	39	◇
7.1.2	Trademarks by origin/bn PPP$ GDP		75.7	16	◆
7.1.3	Global brand value, top 5,000, % GDP		3.7	37	◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		1.5	45	
7.2	**Creative goods and services**		**20.9**	**53**	◇
7.2.1	Cultural and creative services exports, % total trade		0.5	56	
7.2.2	National feature films/mn pop. 15–69		2.2	54	○
7.2.3	Entertainment and media market/th pop. 15–69		51.5	11	
7.2.4	Creative goods exports, % total trade		0.4	67	○
7.3	**Online creativity**		**56.9**	**22**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		40.9	16	
7.3.2	GitHub commits/mn pop. 15–69		59.7	16	
7.3.3	Mobile app creation/bn PPP$ GDP		70.0	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Nicaragua

124

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
126	118	Lower middle	LCN	6.8	51.0	7,642

			Score/ Value	Rank	
	Institutions		**13.9**	**129**	◇
1.1	**Institutional environment**		**27.8**	**119**	
1.1.1	Operational stability for businesses*		38.7	112	
1.1.2	Government effectiveness*		16.9	126	◇
1.2	**Regulatory environment**		**12.0**	**126**	◇
1.2.1	Regulatory quality*		17.8	118	
1.2.2	Rule of law*		6.3	132	○◇
1.3	**Business environment**		**1.8**	**[131]**	
1.3.1	Policy stability for doing business†	⏲	1.8	129	○◇
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**16.2**	**[117]**	
2.1	**Education**		**37.2**	**[110]**	
2.1.1	Expenditure on education, % GDP	⏲	4.1	69	●
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		29.5	119	◇
2.2	**Tertiary education**		**10.7**	**[111]**	
2.2.1	Tertiary enrolment, % gross	⏲	19.9	104	
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)**		**0.5**	**108**	
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 USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**24.5**	**114**	
3.1	**Information and communication technologies (ICTs)**		**40.9**	**111**	
3.1.1	ICT access*		45.0	112	
3.1.2	ICT use*		52.8	103	
3.1.3	Government's online service*		42.6	105	
3.1.4	E-participation*		23.3	116	
3.2	**General infrastructure**		**15.2**	**115**	
3.2.1	Electricity output, GWh/mn pop.	⏲	614.5	105	
3.2.2	Logistics performance*		18.2	89	
3.2.3	Gross capital formation, % GDP		22.0	85	
3.3	**Ecological sustainability**		**17.6**	**76**	
3.3.1	GDP/unit of energy use		9.1	84	
3.3.2	Low-carbon energy use, %		28.4	41	●
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.2	121	
	Market sophistication		**31.4**	**71**	●
4.1	**Credit**		**16.9**	**93**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		28.6	101	
4.1.3	Loans from microfinance institutions, % GDP		2.4	19	●
4.2	**Investment**		**n/a**	**[n/a]**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP		n/a	n/a	
4.2.4	VC received, value, % GDP		n/a	n/a	
4.3	**Trade, diversification and market scale**		**45.9**	**88**	
4.3.1	Applied tariff rate, weighted avg., %		1.9	64	●◆
4.3.2	Domestic industry diversification		52.1	100	
4.3.3	Domestic market scale, bn PPP$		51.0	113	

			Score/ Value	Rank	
	Business sophistication		**20.6**	**99**	
5.1	**Knowledge workers**		**38.0**	**[54]**	
5.1.1	Knowledge-intensive employment, %	⏲	13.8	98	
5.1.2	Firms offering formal training, %	⏲	57.3	10	
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, %	⏲	6.1	93	
5.2	**Innovation linkages**		**5.9**	**128**	◇
5.2.1	Public research–industry co-publications, %		1.5	62	●
5.2.2	University–industry R&D collaboration†	⏲	2.8	128	◇
5.2.3	State of cluster development†	⏲	6.1	128	◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	⏲	0.0	77	
5.2.5	Patent families/bn PPP$ GDP		0.0	102	○◇
5.3	**Knowledge absorption**		**17.9**	**104**	
5.3.1	Intellectual property payments, % total trade		0.0	114	
5.3.2	High-tech imports, % total trade		6.7	90	
5.3.3	ICT services imports, % total trade		0.3	120	
5.3.4	FDI net inflows, % GDP		7.6	13	●◆
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**9.7**	**118**	
6.1	**Knowledge creation**		**1.4**	**128**	◇
6.1.1	Patents by origin/bn PPP$ GDP	⏲	0.0	122	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	99	○◇
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		1.5	127	
6.1.5	Citable documents H-index		3.2	119	
6.2	**Knowledge impact**		**17.6**	**114**	
6.2.1	Labor productivity growth, %		0.7	66	●
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.0	108	
6.2.4	High-tech manufacturing, %		14.4	77	
6.3	**Knowledge diffusion**		**10.1**	**93**	
6.3.1	Intellectual property receipts, % total trade		0.0	116	○◇
6.3.2	Production and export complexity		20.0	106	
6.3.3	High-tech exports, % total trade		0.4	93	
6.3.4	ICT services exports, % total trade		3.3	34	●
6.3.5	ISO 9001 quality/bn PPP$ GDP		0.7	120	
	Creative outputs		**3.6**	**[130]**	
7.1	**Intangible assets**		**0.0**	**[132]**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		n/a	n/a	
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○◇
7.1.4	Industrial designs by origin/bn PPP$ GDP	⏲	0.0	126	
7.2	**Creative goods and services**		**4.9**	**[97]**	
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	Creative goods exports, % total trade		0.4	69	●
7.3	**Online creativity**		**9.6**	**124**	◇
7.3.1	Top-level domains (TLDs)/th pop. 15–69		1.2	93	
7.3.2	GitHub commits/mn pop. 15–69		1.7	108	
7.3.3	Mobile app creation/bn PPP$ GDP	⏲	25.8	124	◇

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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Niger

132

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
130	130	Low	SSA	26.2	42.7	1,579

			Score/Value	Rank	
	Institutions		**26.5**	**116**	
1.1	**Institutional environment**		**26.6**	**120**	
1.1.1	Operational stability for businesses*		26.0	124	
1.1.2	Government effectiveness*		27.3	107	
1.2	**Regulatory environment**		**26.4**	**104**	
1.2.1	Regulatory quality*		22.9	113	
1.2.2	Rule of law*		29.9	94	
1.3	**Business environment**		**n/a**	**[n/a]**	
1.3.1	Policy stability for doing business†		n/a	n/a	
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**10.0**	**131**	◇
2.1	**Education**		**21.8**	**130**	◇
2.1.1	Expenditure on education, % GDP		4.1	67	●
2.1.2	Government funding/pupil, secondary, % GDP/cap	⏲	11.8	84	◇
2.1.3	School life expectancy, years	⏲	6.7	113	○◇
2.1.4	PISA scales in reading, maths and science		n/a	n/a	
2.1.5	Pupil–teacher ratio, secondary	⏲	29.7	120	
2.2	**Tertiary education**		**8.3**	**113**	
2.2.1	Tertiary enrolment, % gross	⏲	4.3	128	○◇
2.2.2	Graduates in science and engineering, %	⏲	12.3	106	◇
2.2.3	Tertiary inbound mobility, %	⏲	5.4	49	●◆
2.3	**Research and development (R&D)**		**0.0**	**[120]**	
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 USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**17.9**	**130**	
3.1	**Information and communication technologies (ICTs)**		**22.2**	**127**	
3.1.1	ICT access*		10.7	128	
3.1.2	ICT use*		n/a	n/a	
3.1.3	Government's online service*		32.6	119	
3.1.4	E-participation*		23.3	116	
3.2	**General infrastructure**		**25.5**	**84**	
3.2.1	Electricity output, GWh/mn pop.	⏲	28.5	126	○◇
3.2.2	Logistics performance*		n/a	n/a	
3.2.3	Gross capital formation, % GDP		30.4	23	●
3.3	**Ecological sustainability**		**6.0**	**125**	
3.3.1	GDP/unit of energy use		8.2	88	◆
3.3.2	Low-carbon energy use, %		2.1	118	◇
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.1	131	◇
	Market sophistication		**11.9**	**125**	
4.1	**Credit**		**1.9**	**132**	◇
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		12.6	126	◇
4.1.3	Loans from microfinance institutions, % GDP		0.2	52	
4.2	**Investment**		**5.7**	**[74]**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	59	●
4.2.4	VC received, value, % GDP		0.0	102	
4.3	**Trade, diversification and market scale**		**28.1**	**116**	
4.3.1	Applied tariff rate, weighted avg., %		7.9	119	
4.3.2	Domestic industry diversification	⏲	45.8	103	
4.3.3	Domestic market scale, bn PPP$		42.7	119	

			Score/Value	Rank	
	Business sophistication		**17.9**	**[115]**	
5.1	**Knowledge workers**		**18.2**	**[107]**	
5.1.1	Knowledge-intensive employment, %	⏲	15.3	90	◆
5.1.2	Firms offering formal training, %	⏲	27.5	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, %	⏲	0.2	126	◇
5.2	**Innovation linkages**		**1.1**	**[133]**	
5.2.1	Public research–industry co-publications, %		0.1	133	○◇
5.2.2	University–industry R&D collaboration†		n/a	n/a	
5.2.3	State of cluster development†		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	102	○◇
5.3	**Knowledge absorption**		**34.5**	**43**	●◆
5.3.1	Intellectual property payments, % total trade		0.0	121	○◇
5.3.2	High-tech imports, % total trade		21.9	7	●◆
5.3.3	ICT services imports, % total trade		1.4	60	●
5.3.4	FDI net inflows, % GDP		3.5	41	●
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**9.0**	**126**	
6.1	**Knowledge creation**		**2.4**	**124**	◇
6.1.1	Patents by origin/bn PPP$ GDP		0.1	107	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	99	○◇
6.1.3	Utility models by origin/bn PPP$ GDP	⏲	0.0	74	○◇
6.1.4	Scientific and technical articles/bn PPP$ GDP		3.5	113	◇
6.1.5	Citable documents H-index		3.1	120	
6.2	**Knowledge impact**		**19.2**	**106**	
6.2.1	Labor productivity growth, %		1.5	41	●
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.0	122	
6.2.4	High-tech manufacturing, %		n/a	n/a	
6.3	**Knowledge diffusion**		**5.5**	**117**	
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		2.6	48	●◆
6.3.5	ISO 9001 quality/bn PPP$ GDP		0.1	133	○◇
	Creative outputs		**2.2**	**[132]**	
7.1	**Intangible assets**		**0.0**	**[132]**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		1.2	128	○◇
7.1.3	Global brand value, top 5,000, % GDP		n/a	n/a	
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.0	126	○◇
7.2	**Creative goods and services**		**8.5**	**[79]**	
7.2.1	Cultural and creative services exports, % total trade		0.6	47	●
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	Creative goods exports, % total trade		0.0	129	
7.3	**Online creativity**		**0.2**	**132**	◇
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.3	112	◆
7.3.2	GitHub commits/mn pop. 15–69		0.0	131	○◇
7.3.3	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Nigeria

113

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
98	121	Lower middle	SSA	227.9	1,365.9	6,148

			Score/ Value	Rank	
	Institutions		**21.1**	**125**	◇
1.1	**Institutional environment**		**19.5**	**129**	○◇
1.1.1	Operational stability for businesses*		22.0	127	○◇
1.1.2	Government effectiveness*		16.9	125	◇
1.2	**Regulatory environment**		**14.6**	**123**	
1.2.1	Regulatory quality*		11.5	127	○◇
1.2.2	Rule of law*		17.6	114	
1.3	**Business environment**		**29.3**	**[99]**	
1.3.1	Policy stability for doing business†		29.3	103	
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**27.3**	**[78]**	
2.1	**Education**		**75.6**	**[1]**	
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	⏲	15.3	81	
2.2	**Tertiary education**		**5.2**	**[122]**	
2.2.1	Tertiary enrolment, % gross	⏲	11.8	113	
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)**		**1.2**	**99**	
2.3.1	Researchers, FTE/mn pop.	⏲	22.8	106	○
2.3.2	Gross expenditure on R&D, % GDP	⏲	0.3	74	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**19.7**	**127**	○◇
3.1	**Information and communication technologies (ICTs)**		**36.7**	**115**	
3.1.1	ICT access*		43.8	113	
3.1.2	ICT use*		26.6	115	◇
3.1.3	Government's online service*		47.5	96	
3.1.4	E-participation*		29.1	106	
3.2	**General infrastructure**		**16.5**	**110**	
3.2.1	Electricity output, GWh/mn pop.	⏲	168.9	118	
3.2.2	Logistics performance*		22.7	82	
3.2.3	Gross capital formation, % GDP		22.4	83	
3.3	**Ecological sustainability**		**5.9**	**126**	◇
3.3.1	GDP/unit of energy use		6.3	106	
3.3.2	Low-carbon energy use, %		5.7	102	
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.1	127	○
	Market sophistication		**15.2**	**121**	
4.1	**Credit**		**3.8**	**128**	○
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		14.1	124	
4.1.3	Loans from microfinance institutions, % GDP		0.5	41	
4.2	**Investment**		**11.6**	**55**	●
4.2.1	Market capitalization, % GDP		22.0	58	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.1	60	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.1	42	●
4.2.4	VC received, value, % GDP		0.0	46	●
4.3	**Trade, diversification and market scale**		**30.3**	**114**	
4.3.1	Applied tariff rate, weighted avg., %		8.4	122	
4.3.2	Domestic industry diversification		n/a	n/a	
4.3.3	Domestic market scale, bn PPP$		1,365.9	26	●

			Score/ Value	Rank	
	Business sophistication		**19.5**	**107**	
5.1	**Knowledge workers**		**28.6**	**[77]**	
5.1.1	Knowledge-intensive employment, %		26.6	55	●◆
5.1.2	Firms offering formal training, %	⏲	30.7	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, %	⏲	2.7	107	
5.2	**Innovation linkages**		**12.2**	**118**	
5.2.1	Public research–industry co-publications, %		1.0	86	
5.2.2	University–industry R&D collaboration†		15.0	123	◇
5.2.3	State of cluster development†		32.6	98	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	89	
5.2.5	Patent families/bn PPP$ GDP		0.0	102	○◇
5.3	**Knowledge absorption**		**17.9**	**103**	
5.3.1	Intellectual property payments, % total trade		0.4	75	
5.3.2	High-tech imports, % total trade		5.3	108	
5.3.3	ICT services imports, % total trade		0.8	96	
5.3.4	FDI net inflows, % GDP		0.4	109	
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**9.5**	**121**	
6.1	**Knowledge creation**		**7.3**	**99**	
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		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		4.3	109	
6.1.5	Citable documents H-index		13.6	61	●
6.2	**Knowledge impact**		**19.8**	**103**	
6.2.1	Labor productivity growth, %		−1.2	121	
6.2.2	Unicorn valuation, % GDP		0.5	38	●
6.2.3	Software spending, % GDP		0.1	84	
6.2.4	High-tech manufacturing, %		n/a	n/a	
6.3	**Knowledge diffusion**		**1.3**	**132**	○◇
6.3.1	Intellectual property receipts, % total trade		0.0	116	○◇
6.3.2	Production and export complexity		2.4	119	○◇
6.3.3	High-tech exports, % total trade		0.1	119	
6.3.4	ICT services exports, % total trade		0.4	110	
6.3.5	ISO 9001 quality/bn PPP$ GDP		0.6	122	
	Creative outputs		**17.8**	**87**	
7.1	**Intangible assets**		**24.4**	**73**	●
7.1.1	Intangible asset intensity, top 15, %		51.9	45	●
7.1.2	Trademarks by origin/bn PPP$ GDP	⏲	10.5	109	
7.1.3	Global brand value, top 5,000, % GDP		0.6	61	●
7.1.4	Industrial designs by origin/bn PPP$ GDP	⏲	0.9	61	●
7.2	**Creative goods and services**		**0.6**	**[125]**	
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		1.1	58	
7.2.4	Creative goods exports, % total trade		0.0	131	○
7.3	**Online creativity**		**21.8**	**92**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.4	109	
7.3.2	GitHub commits/mn pop. 15–69		4.2	88	
7.3.3	Mobile app creation/bn PPP$ GDP		60.8	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

North Macedonia

58

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
63	60	Upper middle	EUR	1.8	44.1	21,391

		Score/ Value	Rank	
	Institutions	**44.4**	**75**	
1.1	**Institutional environment**	**54.3**	**65**	
1.1.1	Operational stability for businesses*	66.7	51	
1.1.2	Government effectiveness*	41.9	76	
1.2	**Regulatory environment**	**47.4**	**59**	
1.2.1	Regulatory quality*	53.7	51	
1.2.2	Rule of law*	41.1	68	
1.3	**Business environment**	**31.6**	**96**	
1.3.1	Policy stability for doing business†	31.7	102	○
1.3.2	Entrepreneurship policies and culture† ⏲	31.4	52	
	Human capital and research	**27.9**	**77**	
2.1	**Education**	**52.1**	**[63]**	
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	79	
2.1.4	PISA scales in reading, maths and science	375.7	73	○
2.1.5	Pupil–teacher ratio, secondary ⏲	8.1	10	●
2.2	**Tertiary education**	**28.2**	**80**	
2.2.1	Tertiary enrolment, % gross	41.7	80	
2.2.2	Graduates in science and engineering, %	20.6	73	
2.2.3	Tertiary inbound mobility, %	8.4	34	◆
2.3	**Research and development (R&D)**	**3.4**	**84**	
2.3.1	Researchers, FTE/mn pop.	733.8	62	
2.3.2	Gross expenditure on R&D, % GDP	0.4	66	
2.3.3	Global corporate R&D investors, top 3, mn USD$	0.0	41	○◇
2.3.4	QS university ranking, top 3*	0.0	75	○◇
	Infrastructure	**49.1**	**43**	◆
3.1	**Information and communication technologies (ICTs)**	**74.5**	**59**	
3.1.1	ICT access*	90.1	64	
3.1.2	ICT use*	72.4	81	
3.1.3	Government's online service*	67.1	65	
3.1.4	E-participation*	68.6	43	
3.2	**General infrastructure**	**28.0**	**80**	
3.2.1	Electricity output, GWh/mn pop.	2,828.0	66	
3.2.2	Logistics performance*	45.5	56	
3.2.3	Gross capital formation, % GDP	n/a	n/a	
3.3	**Ecological sustainability**	**44.8**	**8**	●◆
3.3.1	GDP/unit of energy use	12.0	52	
3.3.2	Low-carbon energy use, %	13.7	77	
3.3.3	ISO 14001 environment/bn PPP$ GDP	11.5	3	●◆
	Market sophistication	**32.2**	**69**	
4.1	**Credit**	**33.5**	**44**	
4.1.1	Finance for startups and scaleups† ⏲	48.4	42	
4.1.2	Domestic credit to private sector, % GDP	55.7	56	
4.1.3	Loans from microfinance institutions, % GDP	n/a	n/a	
4.2	**Investment**	**4.6**	**[84]**	
4.2.1	Market capitalization, % GDP	n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP	0.0	64	
4.2.4	VC received, value, % GDP	0.0	104	○
4.3	**Trade, diversification and market scale**	**58.4**	**57**	
4.3.1	Applied tariff rate, weighted avg., %	1.4	53	
4.3.2	Domestic industry diversification	85.2	54	
4.3.3	Domestic market scale, bn PPP$	44.1	117	○

		Score/ Value	Rank	
	Business sophistication	**29.9**	**52**	
5.1	**Knowledge workers**	**39.5**	**49**	
5.1.1	Knowledge-intensive employment, %	33.3	44	◆
5.1.2	Firms offering formal training, %	44.3	25	●
5.1.3	GERD performed by business, % GDP	0.1	61	
5.1.4	GERD financed by business, %	25.9	65	
5.1.5	Females employed w/advanced degrees, % ⏲	17.1	41	
5.2	**Innovation linkages**	**18.5**	**88**	
5.2.1	Public research–industry co-publications, %	0.9	93	
5.2.2	University–industry R&D collaboration†	32.0	94	
5.2.3	State of cluster development†	30.5	106	○
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	n/a	n/a	
5.2.5	Patent families/bn PPP$ GDP	0.1	51	
5.3	**Knowledge absorption**	**31.7**	**52**	
5.3.1	Intellectual property payments, % total trade	1.7	16	●◆
5.3.2	High-tech imports, % total trade	7.6	74	
5.3.3	ICT services imports, % total trade	1.2	65	
5.3.4	FDI net inflows, % GDP	3.8	36	●
5.3.5	Research talent, % in businesses	27.9	48	
	Knowledge and technology outputs	**23.7**	**53**	
6.1	**Knowledge creation**	**10.5**	**79**	
6.1.1	Patents by origin/bn PPP$ GDP	0.6	70	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	56	
6.1.3	Utility models by origin/bn PPP$ GDP	-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP	10.3	70	
6.1.5	Citable documents H-index	6.5	90	
6.2	**Knowledge impact**	**31.7**	**49**	
6.2.1	Labor productivity growth, %	1.6	38	
6.2.2	Unicorn valuation, % GDP	0.0	49	○◇
6.2.3	Software spending, % GDP	0.1	93	
6.2.4	High-tech manufacturing, %	49.4	10	●◆
6.3	**Knowledge diffusion**	**28.8**	**43**	
6.3.1	Intellectual property receipts, % total trade	0.1	49	
6.3.2	Production and export complexity	46.4	54	
6.3.3	High-tech exports, % total trade	2.5	52	
6.3.4	ICT services exports, % total trade	4.3	24	●
6.3.5	ISO 9001 quality/bn PPP$ GDP	17.0	15	●◆
	Creative outputs	**22.5**	**72**	
7.1	**Intangible assets**	**15.6**	**91**	
7.1.1	Intangible asset intensity, top 15, % ⏲	-26.7	75	○◇
7.1.2	Trademarks by origin/bn PPP$ GDP	31.0	64	
7.1.3	Global brand value, top 5,000, % GDP	0.0	75	○◇
7.1.4	Industrial designs by origin/bn PPP$ GDP	0.3	87	
7.2	**Creative goods and services**	**29.3**	**39**	◆
7.2.1	Cultural and creative services exports, % total trade	1.2	19	●◆
7.2.2	National feature films/mn pop. 15–69	8.3	12	●◆
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Creative goods exports, % total trade	0.1	93	
7.3	**Online creativity**	**29.5**	**55**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69	7.0	49	
7.3.2	GitHub commits/mn pop. 15–69	12.8	54	
7.3.3	Mobile app creation/bn PPP$ GDP	68.7	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Norway

21

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
26	16	High	EUR	5.5	453.0	82,236

			Score/ Value	Rank	
	Institutions		**83.3**	**6**	●
1.1	**Institutional environment**		**93.0**	**2**	●◆
1.1.1	Operational stability for businesses*		91.3	4	●◆
1.1.2	Government effectiveness*		94.7	4	●◆
1.2	**Regulatory environment**		**88.0**	**10**	
1.2.1	Regulatory quality*		81.7	16	
1.2.2	Rule of law*		94.4	5	●
1.3	**Business environment**		**68.8**	**22**	
1.3.1	Policy stability for doing business†	⏲	75.3	16	
1.3.2	Entrepreneurship policies and culture†		62.3	18	
	Human capital and research		**50.9**	**20**	
2.1	**Education**		**64.3**	**17**	
2.1.1	Expenditure on education, % GDP		4.0	73	○
2.1.2	Government funding/pupil, secondary, % GDP/cap		28.0	11	
2.1.3	School life expectancy, years	⏲	18.6	12	
2.1.4	PISA scales in reading, maths and science		474.4	33	
2.1.5	Pupil–teacher ratio, secondary	⏲	8.1	11	◆
2.2	**Tertiary education**		**39.0**	**43**	
2.2.1	Tertiary enrolment, % gross	⏲	93.9	13	
2.2.2	Graduates in science and engineering, %		23.0	60	
2.2.3	Tertiary inbound mobility, %	⏲	4.2	56	
2.3	**Research and development (R&D)**		**49.6**	**19**	
2.3.1	Researchers, FTE/mn pop.		7,351.5	6	●
2.3.2	Gross expenditure on R&D, % GDP		1.6	24	
2.3.3	Global corporate R&D investors, top 3, mn USD$		54.9	26	
2.3.4	QS university ranking, top 3*		43.6	28	
	Infrastructure		**64.6**	**4**	●◆
3.1	**Information and communication technologies (ICTs)**		**82.3**	**38**	◇
3.1.1	ICT access*		96.9	35	
3.1.2	ICT use*		85.6	31	
3.1.3	Government's online service*		78.0	39	◇
3.1.4	E-participation*		68.6	43	◇
3.2	**General infrastructure**		**66.6**	**4**	●◆
3.2.1	Electricity output, GWh/mn pop.		26,694.2	1	●◆
3.2.2	Logistics performance*		72.7	18	
3.2.3	Gross capital formation, % GDP		22.6	80	○
3.3	**Ecological sustainability**		**45.0**	**6**	●◆
3.3.1	GDP/unit of energy use		12.7	45	
3.3.2	Low-carbon energy use, %		70.8	3	●◆
3.3.3	ISO 14001 environment/bn PPP$ GDP		3.0	34	
	Market sophistication		**45.2**	**31**	◇
4.1	**Credit**		**51.6**	**22**	
4.1.1	Finance for startups and scaleups†		63.1	22	
4.1.2	Domestic credit to private sector, % GDP		110.8	19	
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**23.2**	**36**	◇
4.2.1	Market capitalization, % GDP	⏲	68.2	27	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.3	27	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.1	29	
4.2.4	VC received, value, % GDP		0.0	38	◇
4.3	**Trade, diversification and market scale**		**60.8**	**49**	
4.3.1	Applied tariff rate, weighted avg., %		1.6	58	
4.3.2	Domestic industry diversification		85.9	49	
4.3.3	Domestic market scale, bn PPP$		453.0	50	
	Business sophistication		**51.2**	**22**	◇
5.1	**Knowledge workers**		**62.0**	**19**	
5.1.1	Knowledge-intensive employment, %		52.3	5	●
5.1.2	Firms offering formal training, %		n/a	n/a	
5.1.3	GERD performed by business, % GDP		0.9	27	
5.1.4	GERD financed by business, %		43.4	40	◇
5.1.5	Females employed w/advanced degrees, %		28.3	8	
5.2	**Innovation linkages**		**54.4**	**16**	
5.2.1	Public research–industry co-publications, %		3.0	24	◇
5.2.2	University–industry R&D collaboration†	⏲	70.1	24	
5.2.3	State of cluster development†	⏲	83.2	16	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.1	9	
5.2.5	Patent families/bn PPP$ GDP		1.9	22	
5.3	**Knowledge absorption**		**37.2**	**33**	◇
5.3.1	Intellectual property payments, % total trade		0.4	76	○◇
5.3.2	High-tech imports, % total trade		5.3	107	○◇
5.3.3	ICT services imports, % total trade		3.2	9	
5.3.4	FDI net inflows, % GDP		0.9	101	○
5.3.5	Research talent, % in businesses		52.0	23	
	Knowledge and technology outputs		**34.7**	**26**	◇
6.1	**Knowledge creation**		**46.0**	**18**	
6.1.1	Patents by origin/bn PPP$ GDP		3.6	20	
6.1.2	PCT patents by origin/bn PPP$ GDP		1.5	19	
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		34.2	11	
6.1.5	Citable documents H-index		42.3	21	
6.2	**Knowledge impact**		**38.6**	**27**	
6.2.1	Labor productivity growth, %		0.2	89	○
6.2.2	Unicorn valuation, % GDP		0.8	34	◇
6.2.3	Software spending, % GDP		0.7	2	●◆
6.2.4	High-tech manufacturing, %		17.9	64	○◇
6.3	**Knowledge diffusion**		**19.6**	**59**	◇
6.3.1	Intellectual property receipts, % total trade		0.3	36	◇
6.3.2	Production and export complexity		53.0	44	◇
6.3.3	High-tech exports, % total trade		2.4	55	◇
6.3.4	ICT services exports, % total trade		1.5	66	
6.3.5	ISO 9001 quality/bn PPP$ GDP		4.9	58	
	Creative outputs		**43.4**	**26**	
7.1	**Intangible assets**		**36.0**	**45**	
7.1.1	Intangible asset intensity, top 15, %		65.7	25	
7.1.2	Trademarks by origin/bn PPP$ GDP		21.3	84	○
7.1.3	Global brand value, top 5,000, % GDP		8.1	25	
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.9	62	
7.2	**Creative goods and services**		**30.8**	**37**	
7.2.1	Cultural and creative services exports, % total trade		0.4	62	○
7.2.2	National feature films/mn pop. 15–69		6.3	18	
7.2.3	Entertainment and media market/th pop. 15–69		69.7	3	●
7.2.4	Creative goods exports, % total trade		0.3	72	○
7.3	**Online creativity**		**70.9**	**5**	●
7.3.1	Top-level domains (TLDs)/th pop. 15–69		50.7	12	
7.3.2	GitHub commits/mn pop. 15–69		89.2	5	●◆
7.3.3	Mobile app creation/bn PPP$ GDP		73.0	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Oman

GII 2024 rank **74**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
86	59	High	NAWA	5.0	200.3	39,336

			Score/Value	Rank	
	Institutions		**57.6**	**43**	
1.1	**Institutional environment**		**56.3**	**57**	◇
1.1.1	Operational stability for businesses*		68.0	43	
1.1.2	Government effectiveness*		44.6	66	◇
1.2	**Regulatory environment**		**55.7**	**46**	◇
1.2.1	Regulatory quality*		53.2	52	◇
1.2.2	Rule of law*		58.2	41	●
1.3	**Business environment**		**60.9**	**32**	●
1.3.1	Policy stability for doing business†		78.1	12	●
1.3.2	Entrepreneurship policies and culture†		43.7	37	
	Human capital and research		**32.0**	**66**	◇
2.1	**Education**		**47.6**	**74**	◇
2.1.1	Expenditure on education, % GDP		4.2	64	
2.1.2	Government funding/pupil, secondary, % GDP/cap		16.5	64	◇
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		12.3	55	
2.2	**Tertiary education**		**44.2**	**27**	●
2.2.1	Tertiary enrolment, % gross	⏲	43.8	76	◇
2.2.2	Graduates in science and engineering, %		39.5	2	● ◆
2.2.3	Tertiary inbound mobility, %	⏲	3.1	65	
2.3	**Research and development (R&D)**		**4.2**	**80**	◇
2.3.1	Researchers, FTE/mn pop.		381.8	82	◇
2.3.2	Gross expenditure on R&D, % GDP		0.3	77	◇
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○ ◇
2.3.4	QS university ranking, top 3*		8.5	69	◇
	Infrastructure		**42.7**	**63**	◇
3.1	**Information and communication technologies (ICTs)**		**79.1**	**46**	
3.1.1	ICT access*		99.3	23	●
3.1.2	ICT use*		80.7	51	
3.1.3	Government's online service*		71.5	58	
3.1.4	E-participation*		65.1	50	
3.2	**General infrastructure**		**39.0**	**40**	●
3.2.1	Electricity output, GWh/mn pop.	⏲	9,132.7	16	●
3.2.2	Logistics performance*		54.5	42	
3.2.3	Gross capital formation, % GDP		23.0	75	
3.3	**Ecological sustainability**		**10.0**	**109**	◇
3.3.1	GDP/unit of energy use		6.0	109	○ ◇
3.3.2	Low-carbon energy use, %		1.0	121	○ ◇
3.3.3	ISO 14001 environment/bn PPP$ GDP		2.4	44	
	Market sophistication		**30.3**	**73**	
4.1	**Credit**		**31.7**	**52**	
4.1.1	Finance for startups and scaleups†		45.8	49	
4.1.2	Domestic credit to private sector, % GDP		53.4	59	
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**3.1**	**97**	◇
4.2.1	Market capitalization, % GDP		20.9	61	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.1	54	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	104	○ ◇
4.2.4	VC received, value, % GDP		0.0	98	○ ◇
4.3	**Trade, diversification and market scale**		**56.0**	**69**	
4.3.1	Applied tariff rate, weighted avg., %	⏲	2.0	65	
4.3.2	Domestic industry diversification	⏲	79.6	64	
4.3.3	Domestic market scale, bn PPP$		200.3	74	

			Score/Value	Rank	
	Business sophistication		**22.5**	**86**	◇
5.1	**Knowledge workers**		**15.7**	**112**	◇
5.1.1	Knowledge-intensive employment, %		14.7	92	◇
5.1.2	Firms offering formal training, %		n/a	n/a	
5.1.3	GERD performed by business, % GDP	⏲	0.1	65	◇
5.1.4	GERD financed by business, %	⏲	31.8	58	
5.1.5	Females employed w/advanced degrees, %	⏲	0.9	120	○ ◇
5.2	**Innovation linkages**		**35.4**	**34**	●
5.2.1	Public research–industry co-publications, %		1.2	79	◇
5.2.2	University–industry R&D collaboration†		62.8	34	●
5.2.3	State of cluster development†		87.9	11	● ◆
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	34	●
5.2.5	Patent families/bn PPP$ GDP		0.0	92	◇
5.3	**Knowledge absorption**		**16.4**	**115**	○ ◇
5.3.1	Intellectual property payments, % total trade		0.6	67	
5.3.2	High-tech imports, % total trade		4.1	120	○ ◇
5.3.3	ICT services imports, % total trade		1.0	80	
5.3.4	FDI net inflows, % GDP		3.9	35	●
5.3.5	Research talent, % in businesses	⏲	0.3	85	○ ◇
	Knowledge and technology outputs		**14.8**	**87**	◇
6.1	**Knowledge creation**		**7.5**	**96**	◇
6.1.1	Patents by origin/bn PPP$ GDP		0.2	98	◇
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	88	
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		8.2	82	◇
6.1.5	Citable documents H-index		9.0	85	◇
6.2	**Knowledge impact**		**21.5**	**91**	◇
6.2.1	Labor productivity growth, %		2.2	22	● ◆
6.2.2	Unicorn valuation, % GDP		0.0	49	○ ◇
6.2.3	Software spending, % GDP		0.1	106	◇
6.2.4	High-tech manufacturing, %	⏲	16.5	71	
6.3	**Knowledge diffusion**		**15.5**	**74**	◇
6.3.1	Intellectual property receipts, % total trade		n/a	n/a	
6.3.2	Production and export complexity		38.9	68	◇
6.3.3	High-tech exports, % total trade		1.9	66	
6.3.4	ICT services exports, % total trade		0.4	104	
6.3.5	ISO 9001 quality/bn PPP$ GDP		4.6	65	
	Creative outputs		**19.6**	**82**	◇
7.1	**Intangible assets**		**24.8**	**71**	
7.1.1	Intangible asset intensity, top 15, %		29.9	66	◇
7.1.2	Trademarks by origin/bn PPP$ GDP		32.8	60	
7.1.3	Global brand value, top 5,000, % GDP		1.8	47	
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.0	118	○
7.2	**Creative goods and services**		**5.1**	**[96]**	
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		7.8	40	◇
7.2.4	Creative goods exports, % total trade		0.2	81	
7.3	**Online creativity**		**23.9**	**75**	◇
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.9	97	◇
7.3.2	GitHub commits/mn pop. 15–69		1.3	112	◇
7.3.3	Mobile app creation/bn PPP$ GDP		69.4	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Pakistan

GII 2024 rank

91

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
70	116	Lower middle	CSA	247.5	1,568.4	6,774

			Score/Value	Rank	
	Institutions		**25.3**	**118**	
1.1	**Institutional environment**		**25.8**	**122**	
1.1.1	Operational stability for businesses*		24.0	125	○◇
1.1.2	Government effectiveness*		27.7	106	
1.2	**Regulatory environment**		**21.6**	**111**	
1.2.1	Regulatory quality*		18.6	116	
1.2.2	Rule of law*		24.6	107	
1.3	**Business environment**		**28.4**	**104**	
1.3.1	Policy stability for doing business†		48.2	67	
1.3.2	Entrepreneurship policies and culture†	⏲	8.6	79	○◇
	Human capital and research		**15.4**	**119**	
2.1	**Education**		**31.1**	**119**	
2.1.1	Expenditure on education, % GDP	⏲	1.7	123	○◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	⏲	17.1	62	
2.1.3	School life expectancy, years	⏲	7.6	111	○◇
2.1.4	PISA scales in reading, maths and science		n/a	n/a	
2.1.5	Pupil–teacher ratio, secondary	⏲	11.1	41	●◆
2.2	**Tertiary education**		**6.3**	**[121]**	
2.2.1	Tertiary enrolment, % gross		13.4	111	
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)**		**8.9**	**62**	
2.3.1	Researchers, FTE/mn pop.	⏲	415.3	76	
2.3.2	Gross expenditure on R&D, % GDP	⏲	0.2	91	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		28.8	44	●◆
	Infrastructure		**21.1**	**125**	○◇
3.1	**Information and communication technologies (ICTs)**		**46.2**	**105**	
3.1.1	ICT access*		36.3	119	◇
3.1.2	ICT use*		61.7	97	
3.1.3	Government's online service*		52.0	88	
3.1.4	E-participation*		34.9	97	
3.2	**General infrastructure**		**2.2**	**133**	○◇
3.2.1	Electricity output, GWh/mn pop.	⏲	673.4	103	
3.2.2	Logistics performance*		n/a	n/a	
3.2.3	Gross capital formation, % GDP		14.5	124	○◇
3.3	**Ecological sustainability**		**14.9**	**92**	
3.3.1	GDP/unit of energy use		10.1	69	
3.3.2	Low-carbon energy use, %		16.4	68	
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.7	84	
	Market sophistication		**24.3**	**90**	
4.1	**Credit**		**13.2**	**102**	
4.1.1	Finance for startups and scaleups†	⏲	28.9	69	
4.1.2	Domestic credit to private sector, % GDP		14.8	121	○
4.1.3	Loans from microfinance institutions, % GDP		0.7	37	
4.2	**Investment**		**5.1**	**77**	
4.2.1	Market capitalization, % GDP		12.3	71	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.0	82	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	75	
4.2.4	VC received, value, % GDP		0.0	60	
4.3	**Trade, diversification and market scale**		**54.8**	**71**	
4.3.1	Applied tariff rate, weighted avg., %		6.9	111	
4.3.2	Domestic industry diversification	⏲	87.3	45	
4.3.3	Domestic market scale, bn PPP$		1,568.4	23	●◆

			Score/Value	Rank	
	Business sophistication		**24.9**	**73**	
5.1	**Knowledge workers**		**20.2**	**[103]**	
5.1.1	Knowledge-intensive employment, %	⏲	11.4	104	
5.1.2	Firms offering formal training, %	⏲	32.0	52	
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	111	
5.2	**Innovation linkages**		**25.1**	**59**	
5.2.1	Public research–industry co-publications, %		0.5	120	
5.2.2	University–industry R&D collaboration†		52.6	50	
5.2.3	State of cluster development†		57.3	45	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	43	●◆
5.2.5	Patent families/bn PPP$ GDP		0.0	96	
5.3	**Knowledge absorption**		**29.3**	**57**	◆
5.3.1	Intellectual property payments, % total trade		0.4	79	
5.3.2	High-tech imports, % total trade	⏲	16.7	13	●◆
5.3.3	ICT services imports, % total trade	⏲	1.1	74	
5.3.4	FDI net inflows, % GDP		0.6	106	
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**21.0**	**66**	
6.1	**Knowledge creation**		**18.8**	**[59]**	
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		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		15.0	44	●
6.1.5	Citable documents H-index		20.2	42	●◆
6.2	**Knowledge impact**		**28.9**	**58**	
6.2.1	Labor productivity growth, %	⏲	0.7	63	
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.4	24	●◆
6.2.4	High-tech manufacturing, %	⏲	21.5	57	
6.3	**Knowledge diffusion**		**15.4**	**76**	
6.3.1	Intellectual property receipts, % total trade		0.0	85	
6.3.2	Production and export complexity		28.7	92	
6.3.3	High-tech exports, % total trade		0.7	88	
6.3.4	ICT services exports, % total trade		4.7	22	●◆
6.3.5	ISO 9001 quality/bn PPP$ GDP		2.2	88	
	Creative outputs		**22.6**	**71**	
7.1	**Intangible assets**		**31.2**	**59**	
7.1.1	Intangible asset intensity, top 15, %		39.7	61	
7.1.2	Trademarks by origin/bn PPP$ GDP		25.3	74	
7.1.3	Global brand value, top 5,000, % GDP		n/a	n/a	
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.3	93	
7.2	**Creative goods and services**		**1.5**	**115**	
7.2.1	Cultural and creative services exports, % total trade		0.1	85	
7.2.2	National feature films/mn pop. 15–69		0.2	82	○
7.2.3	Entertainment and media market/th pop. 15–69		0.0	62	○◇
7.2.4	Creative goods exports, % total trade		0.1	105	
7.3	**Online creativity**		**26.5**	**61**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.3	113	
7.3.2	GitHub commits/mn pop. 15–69		2.2	103	
7.3.3	Mobile app creation/bn PPP$ GDP		77.1	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Panama

82

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
78	83	High	LCN	4.5	190.3	42,738

			Score/Value	Rank	
	Institutions		**42.0**	**82**	◇
1.1	**Institutional environment**		**52.0**	**71**	◇
1.1.1	Operational stability for businesses*		63.3	64	◇
1.1.2	Government effectiveness*		40.7	78	◇
1.2	**Regulatory environment**		**39.3**	**74**	◇
1.2.1	Regulatory quality*		45.2	68	◇
1.2.2	Rule of law*		33.5	85	◇
1.3	**Business environment**		**34.7**	**91**	◇
1.3.1	Policy stability for doing business†		41.6	84	
1.3.2	Entrepreneurship policies and culture†		27.9	55	
	Human capital and research		**22.1**	**99**	◇
2.1	**Education**		**44.2**	**84**	◇
2.1.1	Expenditure on education, % GDP		3.9	79	
2.1.2	Government funding/pupil, secondary, % GDP/cap		n/a	n/a	
2.1.3	School life expectancy, years	⏲	13.0	80	
2.1.4	PISA scales in reading, maths and science		378.8	71	◇
2.1.5	Pupil–teacher ratio, secondary	⏲	13.6	66	
2.2	**Tertiary education**		**20.1**	**95**	◇
2.2.1	Tertiary enrolment, % gross	⏲	53.0	68	◇
2.2.2	Graduates in science and engineering, %		15.2	101	○ ◇
2.2.3	Tertiary inbound mobility, %	⏲	2.7	72	
2.3	**Research and development (R&D)**		**1.9**	**92**	◇
2.3.1	Researchers, FTE/mn pop.		142.0	90	◇
2.3.2	Gross expenditure on R&D, % GDP		0.2	89	◇
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○ ◇
2.3.4	QS university ranking, top 3*		3.6	73	◇
	Infrastructure		**43.9**	**58**	◇
3.1	**Information and communication technologies (ICTs)**		**65.1**	**80**	◇
3.1.1	ICT access*		81.2	84	◇
3.1.2	ICT use*		n/a	n/a	
3.1.3	Government's online service*		64.0	71	◇
3.1.4	E-participation*		50.0	75	◇
3.2	**General infrastructure**		**39.1**	**38**	●
3.2.1	Electricity output, GWh/mn pop.	⏲	2,783.3	68	◇
3.2.2	Logistics performance*		45.5	56	◇
3.2.3	Gross capital formation, % GDP		33.8	13	● ◆
3.3	**Ecological sustainability**		**27.4**	**45**	●
3.3.1	GDP/unit of energy use		25.2	5	● ◆
3.3.2	Low-carbon energy use, %		18.5	62	
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.3	111	◇
	Market sophistication		**23.2**	**95**	◇
4.1	**Credit**		**28.6**	**61**	
4.1.1	Finance for startups and scaleups†		21.2	77	○ ◇
4.1.2	Domestic credit to private sector, % GDP	⏲	100.1	23	●
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**4.2**	**90**	◇
4.2.1	Market capitalization, % GDP		22.6	57	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.0	76	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	96	◇
4.2.4	VC received, value, % GDP		0.0	68	
4.3	**Trade, diversification and market scale**		**36.9**	**106**	◇
4.3.1	Applied tariff rate, weighted avg., %		2.4	71	
4.3.2	Domestic industry diversification	⏲	25.9	107	○ ◇
4.3.3	Domestic market scale, bn PPP$		190.3	76	

			Score/Value	Rank	
	Business sophistication		**18.4**	**112**	◇
5.1	**Knowledge workers**		**24.1**	**92**	◇
5.1.1	Knowledge-intensive employment, %		23.2	63	◇
5.1.2	Firms offering formal training, %		n/a	n/a	
5.1.3	GERD performed by business, % GDP	⏲	0.0	93	○ ◇
5.1.4	GERD financed by business, %		21.9	66	◇
5.1.5	Females employed w/advanced degrees, %		11.0	69	◇
5.2	**Innovation linkages**		**16.3**	**101**	◇
5.2.1	Public research–industry co-publications, %		2.2	40	●
5.2.2	University–industry R&D collaboration†		23.5	111	◇
5.2.3	State of cluster development†		31.1	105	◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	109	◇
5.2.5	Patent families/bn PPP$ GDP		0.1	56	●
5.3	**Knowledge absorption**		**14.8**	**127**	○ ◇
5.3.1	Intellectual property payments, % total trade		0.8	46	●
5.3.2	High-tech imports, % total trade		2.8	130	○ ◇
5.3.3	ICT services imports, % total trade		0.4	114	◇
5.3.4	FDI net inflows, % GDP		0.6	105	
5.3.5	Research talent, % in businesses	⏲	7.4	65	◇
	Knowledge and technology outputs		**14.4**	**90**	◇
6.1	**Knowledge creation**		**4.5**	**114**	◇
6.1.1	Patents by origin/bn PPP$ GDP	⏲	0.2	93	◇
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	67	
6.1.4	Scientific and technical articles/bn PPP$ GDP		2.9	117	○ ◇
6.1.5	Citable documents H-index		11.3	69	
6.2	**Knowledge impact**		**21.7**	**88**	◇
6.2.1	Labor productivity growth, %		2.5	17	● ◆
6.2.2	Unicorn valuation, % GDP		0.0	49	○ ◇
6.2.3	Software spending, % GDP		0.2	79	
6.2.4	High-tech manufacturing, %	⏲	6.0	97	○ ◇
6.3	**Knowledge diffusion**		**16.8**	**69**	◇
6.3.1	Intellectual property receipts, % total trade		0.0	99	
6.3.2	Production and export complexity		31.6	85	◇
6.3.3	High-tech exports, % total trade	⏲	9.6	19	●
6.3.4	ICT services exports, % total trade		1.3	71	
6.3.5	ISO 9001 quality/bn PPP$ GDP		2.0	92	◇
	Creative outputs		**24.8**	**64**	◇
7.1	**Intangible assets**		**19.6**	**81**	◇
7.1.1	Intangible asset intensity, top 15, %	⏲	2.5	69	◇
7.1.2	Trademarks by origin/bn PPP$ GDP	⏲	32.7	61	
7.1.3	Global brand value, top 5,000, % GDP		0.4	64	◇
7.1.4	Industrial designs by origin/bn PPP$ GDP	⏲	0.0	120	○
7.2	**Creative goods and services**		**31.0**	**[36]**	
7.2.1	Cultural and creative services exports, % total trade		0.2	75	
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	Creative goods exports, % total trade	⏲	4.5	12	● ◆
7.3	**Online creativity**		**28.9**	**56**	● ◇
7.3.1	Top-level domains (TLDs)/th pop. 15–69	⏲	14.1	37	●
7.3.2	GitHub commits/mn pop. 15–69		3.5	93	◇
7.3.3	Mobile app creation/bn PPP$ GDP		69.0	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Paraguay

GII 2024 rank

93

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
90	98	Upper middle	LCN	6.8	117.3	15,533

		Score/ Value	Rank	
	Institutions	**34.5**	**96**	
1.1	**Institutional environment**	**42.3**	**93**	
1.1.1	Operational stability for businesses*	56.7	81	
1.1.2	Government effectiveness*	28.0	105	◇
1.2	**Regulatory environment**	**32.1**	**92**	
1.2.1	Regulatory quality*	37.4	82	
1.2.2	Rule of law*	26.9	99	
1.3	**Business environment**	**29.1**	**101**	
1.3.1	Policy stability for doing business†	44.4	75	
1.3.2	Entrepreneurship policies and culture† ⏲	13.7	73	
	Human capital and research	**16.4**	**115**	◇
2.1	**Education**	**32.0**	**116**	◇
2.1.1	Expenditure on education, % GDP	3.4	93	
2.1.2	Government funding/pupil, secondary, % GDP/cap	12.7	79	
2.1.3	School life expectancy, years	n/a	n/a	
2.1.4	PISA scales in reading, maths and science	359.7	80	◇
2.1.5	Pupil–teacher ratio, secondary ⏲	15.4	83	
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)**	**0.9**	**100**	
2.3.1	Researchers, FTE/mn pop. ⏲	142.4	89	◇
2.3.2	Gross expenditure on R&D, % GDP ⏲	0.1	96	
2.3.3	Global corporate R&D investors, top 3, mn USD$	0.0	41	○◇
2.3.4	QS university ranking, top 3*	0.0	75	○◇
	Infrastructure	**43.2**	**61**	●
3.1	**Information and communication technologies (ICTs)**	**60.2**	**87**	
3.1.1	ICT access*	65.7	96	◇
3.1.2	ICT use*	68.5	87	
3.1.3	Government's online service*	56.4	84	
3.1.4	E-participation*	50.0	75	
3.2	**General infrastructure**	**29.1**	**74**	●
3.2.1	Electricity output, GWh/mn pop.	6,469.5	30	●◆
3.2.2	Logistics performance*	27.3	76	
3.2.3	Gross capital formation, % GDP	25.5	46	●
3.3	**Ecological sustainability**	**40.2**	**16**	●◆
3.3.1	GDP/unit of energy use	12.0	51	●
3.3.2	Low-carbon energy use, %	78.1	2	●◆
3.3.3	ISO 14001 environment/bn PPP$ GDP	0.3	106	
	Market sophistication	**24.8**	**88**	
4.1	**Credit**	**12.1**	**106**	
4.1.1	Finance for startups and scaleups† ⏲	7.5	84	○◇
4.1.2	Domestic credit to private sector, % GDP	51.3	65	●
4.1.3	Loans from microfinance institutions, % GDP	n/a	n/a	
4.2	**Investment**	**n/a**	**[n/a]**	
4.2.1	Market capitalization, % GDP	n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	VC received, value, % GDP	n/a	n/a	
4.3	**Trade, diversification and market scale**	**37.4**	**105**	◇
4.3.1	Applied tariff rate, weighted avg., %	3.5	85	
4.3.2	Domestic industry diversification	n/a	n/a	
4.3.3	Domestic market scale, bn PPP$	117.3	87	

		Score/ Value	Rank	
	Business sophistication	**20.1**	**102**	◇
5.1	**Knowledge workers**	**26.8**	**81**	
5.1.1	Knowledge-intensive employment, %	20.9	75	
5.1.2	Firms offering formal training, %	36.5	47	●
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	0.2	97	○◇
5.1.5	Females employed w/advanced degrees, % ⏲	9.5	80	
5.2	**Innovation linkages**	**8.8**	**126**	◇
5.2.1	Public research–industry co-publications, %	0.6	111	
5.2.2	University–industry R&D collaboration†	11.0	126	○◇
5.2.3	State of cluster development†	26.5	112	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	119	
5.2.5	Patent families/bn PPP$ GDP	0.0	102	○◇
5.3	**Knowledge absorption**	**24.7**	**73**	●
5.3.1	Intellectual property payments, % total trade	0.1	104	◇
5.3.2	High-tech imports, % total trade	19.6	9	●◆
5.3.3	ICT services imports, % total trade	0.0	133	○◇
5.3.4	FDI net inflows, % GDP	0.6	104	
5.3.5	Research talent, % in businesses	n/a	n/a	
	Knowledge and technology outputs	**10.3**	**113**	◇
6.1	**Knowledge creation**	**2.5**	**123**	
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	0.1	58	
6.1.4	Scientific and technical articles/bn PPP$ GDP	2.0	124	◇
6.1.5	Citable documents H-index	3.6	116	
6.2	**Knowledge impact**	**16.2**	**120**	◇
6.2.1	Labor productivity growth, %	0.1	92	
6.2.2	Unicorn valuation, % GDP	0.0	49	○◇
6.2.3	Software spending, % GDP	0.0	110	◇
6.2.4	High-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**12.4**	**83**	
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	Production and export complexity	31.9	84	
6.3.3	High-tech exports, % total trade	1.1	74	●
6.3.4	ICT services exports, % total trade	0.1	128	◇
6.3.5	ISO 9001 quality/bn PPP$ GDP	4.6	66	●
	Creative outputs	**21.5**	**75**	
7.1	**Intangible assets**	**32.7**	**53**	●
7.1.1	Intangible asset intensity, top 15, %	n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP	130.5	5	●◆
7.1.3	Global brand value, top 5,000, % GDP	0.0	75	○◇
7.1.4	Industrial designs by origin/bn PPP$ GDP	0.0	125	○
7.2	**Creative goods and services**	**0.5**	**[127]**	
7.2.1	Cultural and creative services exports, % total trade	0.0	111	○◇
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	Creative goods exports, % total trade	0.1	101	
7.3	**Online creativity**	**20.0**	**97**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69	1.5	87	
7.3.2	GitHub commits/mn pop. 15–69	2.9	96	
7.3.3	Mobile app creation/bn PPP$ GDP	55.5	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Peru

75

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
85	63	Upper middle	LCN	33.8	548.5	15,894

			Score/ Value	Rank	
	Institutions		**40.2**	**85**	
1.1	**Institutional environment**		**45.5**	**84**	
1.1.1	Operational stability for businesses*		57.3	78	
1.1.2	Government effectiveness*		33.6	95	
1.2	**Regulatory environment**		**37.7**	**77**	
1.2.1	Regulatory quality*		47.3	59	
1.2.2	Rule of law*		28.0	97	
1.3	**Business environment**		**37.4**	**85**	
1.3.1	Policy stability for doing business†		32.2	101	
1.3.2	Entrepreneurship policies and culture†	⏲	42.5	39	

			Score/ Value	Rank	
	Human capital and research		**35.5**	**49**	
2.1	**Education**		**43.4**	**86**	
2.1.1	Expenditure on education, % GDP		3.9	78	
2.1.2	Government funding/pupil, secondary, % GDP/cap		15.2	69	
2.1.3	School life expectancy, years	⏲	14.5	59	
2.1.4	PISA scales in reading, maths and science		402.4	62	
2.1.5	Pupil–teacher ratio, secondary		13.9	68	
2.2	**Tertiary education**		**56.0**	**6**	●◆
2.2.1	Tertiary enrolment, % gross	⏲	71.2	41	
2.2.2	Graduates in science and engineering, %	⏲	29.6	22	●◆
2.2.3	Tertiary inbound mobility, %		n/a	n/a	
2.3	**Research and development (R&D)**		**7.0**	**68**	
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 USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		18.6	50	

			Score/ Value	Rank	
	Infrastructure		**43.1**	**62**	
3.1	**Information and communication technologies (ICTs)**		**74.9**	**57**	
3.1.1	ICT access*		67.8	95	◇
3.1.2	ICT use*		77.4	69	
3.1.3	Government's online service*		79.0	37	●
3.1.4	E-participation*		75.6	22	●
3.2	**General infrastructure**		**23.6**	**90**	
3.2.1	Electricity output, GWh/mn pop.	⏲	1,683.8	88	
3.2.2	Logistics performance*		40.9	60	
3.2.3	Gross capital formation, % GDP		21.5	88	
3.3	**Ecological sustainability**		**30.9**	**38**	
3.3.1	GDP/unit of energy use		17.2	20	●◆
3.3.2	Low-carbon energy use, %		26.1	47	
3.3.3	ISO 14001 environment/bn PPP$ GDP		2.9	35	●

			Score/ Value	Rank	
	Market sophistication		**37.0**	**51**	
4.1	**Credit**		**42.4**	**33**	●◆
4.1.1	Finance for startups and scaleups†	⏲	44.3	51	
4.1.2	Domestic credit to private sector, % GDP	⏲	47.7	72	
4.1.3	Loans from microfinance institutions, % GDP		6.1	4	●◆
4.2	**Investment**		**4.5**	**85**	
4.2.1	Market capitalization, % GDP		35.8	43	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.0	91	○
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	93	○
4.2.4	VC received, value, % GDP		0.0	80	
4.3	**Trade, diversification and market scale**		**64.2**	**30**	●
4.3.1	Applied tariff rate, weighted avg., %		0.5	6	●◆
4.3.2	Domestic industry diversification		85.5	52	
4.3.3	Domestic market scale, bn PPP$		548.5	45	

			Score/ Value	Rank	
	Business sophistication		**24.2**	**77**	
5.1	**Knowledge workers**		**32.1**	**65**	
5.1.1	Knowledge-intensive employment, %		15.5	89	
5.1.2	Firms offering formal training, %		61.4	7	●◆
5.1.3	GERD performed by business, % GDP	⏲	0.0	75	
5.1.4	GERD financed by business, %		n/a	n/a	
5.1.5	Females employed w/advanced degrees, %		7.4	89	◇
5.2	**Innovation linkages**		**12.4**	**116**	○
5.2.1	Public research–industry co-publications, %		1.1	84	
5.2.2	University–industry R&D collaboration†		22.8	112	○◇
5.2.3	State of cluster development†		27.5	111	○
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	123	○
5.2.5	Patent families/bn PPP$ GDP		0.0	78	
5.3	**Knowledge absorption**		**28.2**	**60**	
5.3.1	Intellectual property payments, % total trade		0.9	43	
5.3.2	High-tech imports, % total trade		8.5	62	
5.3.3	ICT services imports, % total trade		1.5	50	
5.3.4	FDI net inflows, % GDP		2.7	55	
5.3.5	Research talent, % in businesses		n/a	n/a	

			Score/ Value	Rank	
	Knowledge and technology outputs		**13.0**	**95**	
6.1	**Knowledge creation**		**11.3**	**76**	
6.1.1	Patents by origin/bn PPP$ GDP		0.3	88	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	75	
6.1.3	Utility models by origin/bn PPP$ GDP		0.8	23	●
6.1.4	Scientific and technical articles/bn PPP$ GDP		4.9	106	
6.1.5	Citable documents H-index		14.2	59	
6.2	**Knowledge impact**		**19.5**	**104**	
6.2.1	Labor productivity growth, %		−0.1	96	
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.2	69	
6.2.4	High-tech manufacturing, %		11.7	82	
6.3	**Knowledge diffusion**		**8.1**	**103**	◇
6.3.1	Intellectual property receipts, % total trade		0.1	71	
6.3.2	Production and export complexity		21.3	103	○◇
6.3.3	High-tech exports, % total trade		0.4	95	
6.3.4	ICT services exports, % total trade		0.2	123	○
6.3.5	ISO 9001 quality/bn PPP$ GDP		5.3	55	

			Score/ Value	Rank	
	Creative outputs		**21.8**	**74**	
7.1	**Intangible assets**		**29.5**	**64**	
7.1.1	Intangible asset intensity, top 15, %		39.9	60	
7.1.2	Trademarks by origin/bn PPP$ GDP		53.7	29	●
7.1.3	Global brand value, top 5,000, % GDP		0.8	58	
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.2	100	
7.2	**Creative goods and services**		**5.1**	**95**	
7.2.1	Cultural and creative services exports, % total trade		n/a	n/a	
7.2.2	National feature films/mn pop. 15–69		0.9	67	
7.2.3	Entertainment and media market/th pop. 15–69		6.9	43	
7.2.4	Creative goods exports, % total trade		0.2	79	
7.3	**Online creativity**		**23.1**	**81**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		2.9	71	
7.3.2	GitHub commits/mn pop. 15–69		6.1	70	
7.3.3	Mobile app creation/bn PPP$ GDP		60.4	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Philippines

GII 2024 rank

53

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
53	67	Lower middle	SEAO	114.9	1,278.6	11,326

			Score/ Value	Rank	
Institutions			**47.2**	**65**	◆
1.1	**Institutional environment**		**51.8**	**74**	◆
1.1.1	Operational stability for businesses*		58.0	77	
1.1.2	Government effectiveness*		45.7	63	◆
1.2	**Regulatory environment**		**36.2**	**82**	
1.2.1	Regulatory quality*		43.5	71	◆
1.2.2	Rule of law*		29.0	95	
1.3	**Business environment**		**53.6**	**[52]**	
1.3.1	Policy stability for doing business†		53.6	52	
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
Human capital and research			**26.2**	**84**	
2.1	**Education**		**33.0**	**114**	○
2.1.1	Expenditure on education, % GDP		3.6	89	
2.1.2	Government funding/pupil, secondary, % GDP/cap		n/a	n/a	
2.1.3	School life expectancy, years	⏲	12.8	87	
2.1.4	PISA scales in reading, maths and science		352.5	83	○
2.1.5	Pupil–teacher ratio, secondary	⏲	24.1	108	○
2.2	**Tertiary education**		**38.2**	**45**	◆
2.2.1	Tertiary enrolment, % gross	⏲	34.9	87	
2.2.2	Graduates in science and engineering, %		26.3	37	
2.2.3	Tertiary inbound mobility, %		n/a	n/a	
2.3	**Research and development (R&D)**		**7.2**	**67**	
2.3.1	Researchers, FTE/mn pop.	⏲	172.0	86	○
2.3.2	Gross expenditure on R&D, % GDP	⏲	0.3	71	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○ ◇
2.3.4	QS university ranking, top 3*		22.1	49	◆
Infrastructure			**34.3**	**85**	
3.1	**Information and communication technologies (ICTs)**		**56.7**	**92**	
3.1.1	ICT access*	⏲	57.7	105	○
3.1.2	ICT use*		62.4	96	
3.1.3	Government's online service*		59.1	76	
3.1.4	E-participation*		47.7	79	
3.2	**General infrastructure**		**28.8**	**77**	
3.2.1	Electricity output, GWh/mn pop.	⏲	931.8	100	○
3.2.2	Logistics performance*		54.5	42	◆
3.2.3	Gross capital formation, % GDP		23.1	74	
3.3	**Ecological sustainability**		**17.3**	**80**	
3.3.1	GDP/unit of energy use		14.8	32	● ◆
3.3.2	Low-carbon energy use, %		11.3	83	
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.8	77	
Market sophistication			**29.7**	**77**	
4.1	**Credit**		**8.0**	**121**	○
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		48.9	70	
4.1.3	Loans from microfinance institutions, % GDP	⏲	0.0	58	○
4.2	**Investment**		**13.1**	**52**	
4.2.1	Market capitalization, % GDP		68.9	26	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.1	57	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	73	
4.2.4	VC received, value, % GDP		0.0	40	
4.3	**Trade, diversification and market scale**		**67.9**	**22**	● ◆
4.3.1	Applied tariff rate, weighted avg., %		1.5	55	◆
4.3.2	Domestic industry diversification		90.4	39	
4.3.3	Domestic market scale, bn PPP$		1,278.6	28	●

			Score/ Value	Rank	
Business sophistication			**36.7**	**37**	● ◆
5.1	**Knowledge workers**		**33.3**	**62**	◆
5.1.1	Knowledge-intensive employment, %		14.2	95	
5.1.2	Firms offering formal training, %		42.2	32	
5.1.3	GERD performed by business, % GDP	⏲	0.1	68	
5.1.4	GERD financed by business, %	⏲	38.0	50	
5.1.5	Females employed w/advanced degrees, %	⏲	13.7	58	◆
5.2	**Innovation linkages**		**29.1**	**50**	◆
5.2.1	Public research–industry co-publications, %		2.2	38	◆
5.2.2	University–industry R&D collaboration†		56.4	44	◆
5.2.3	State of cluster development†		56.7	46	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	57	
5.2.5	Patent families/bn PPP$ GDP		0.0	90	
5.3	**Knowledge absorption**		**47.7**	**14**	● ◆
5.3.1	Intellectual property payments, % total trade		0.5	69	
5.3.2	High-tech imports, % total trade		28.5	4	● ◆
5.3.3	ICT services imports, % total trade		1.7	44	◆
5.3.4	FDI net inflows, % GDP		2.4	68	
5.3.5	Research talent, % in businesses	⏲	51.8	25	
Knowledge and technology outputs			**28.7**	**42**	◆
6.1	**Knowledge creation**		**13.4**	**69**	
6.1.1	Patents by origin/bn PPP$ GDP		0.5	78	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	94	○
6.1.3	Utility models by origin/bn PPP$ GDP		1.3	13	●
6.1.4	Scientific and technical articles/bn PPP$ GDP		1.7	125	○
6.1.5	Citable documents H-index		14.7	56	
6.2	**Knowledge impact**		**29.4**	**55**	
6.2.1	Labor productivity growth, %		0.2	88	
6.2.2	Unicorn valuation, % GDP		0.2	46	
6.2.3	Software spending, % GDP		0.2	61	
6.2.4	High-tech manufacturing, %		37.2	30	● ◆
6.3	**Knowledge diffusion**		**43.2**	**21**	● ◆
6.3.1	Intellectual property receipts, % total trade		0.0	88	
6.3.2	Production and export complexity		62.1	33	● ◆
6.3.3	High-tech exports, % total trade		33.6	1	● ◆
6.3.4	ICT services exports, % total trade		5.3	19	● ◆
6.3.5	ISO 9001 quality/bn PPP$ GDP		3.1	77	
Creative outputs			**26.2**	**60**	◆
7.1	**Intangible assets**		**31.9**	**56**	
7.1.1	Intangible asset intensity, top 15, %		58.1	35	
7.1.2	Trademarks by origin/bn PPP$ GDP		31.2	63	
7.1.3	Global brand value, top 5,000, % GDP		4.2	34	● ◆
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.5	76	
7.2	**Creative goods and services**		**16.4**	**61**	◆
7.2.1	Cultural and creative services exports, % total trade		0.1	94	○
7.2.2	National feature films/mn pop. 15–69		1.4	62	
7.2.3	Entertainment and media market/th pop. 15–69		4.4	46	◆
7.2.4	Creative goods exports, % total trade		4.0	14	● ◆
7.3	**Online creativity**		**24.9**	**67**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.6	104	
7.3.2	GitHub commits/mn pop. 15–69		4.0	90	
7.3.3	Mobile app creation/bn PPP$ GDP		70.0	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Poland

GII 2024 rank

40

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
38	45	High	EUR	38.8	1,712.6	45,538

		Score/ Value	Rank	
	Institutions	**44.9**	**73**	◇
1.1	**Institutional environment**	**58.7**	**53**	◇
1.1.1	Operational stability for businesses*	66.7	51	◇
1.1.2	Government effectiveness*	50.8	54	◇
1.2	**Regulatory environment**	**58.4**	**43**	
1.2.1	Regulatory quality*	60.7	39	
1.2.2	Rule of law*	56.2	45	◇
1.3	**Business environment**	**17.6**	**122**	○ ◇
1.3.1	Policy stability for doing business†	18.8	123	○ ◇
1.3.2	Entrepreneurship policies and culture†	16.4	69	○ ◇
	Human capital and research	**42.6**	**36**	
2.1	**Education**	**60.3**	**36**	
2.1.1	Expenditure on education, % GDP ◷	4.9	44	
2.1.2	Government funding/pupil, secondary, % GDP/cap	20.2	48	
2.1.3	School life expectancy, years	16.2	35	
2.1.4	PISA scales in reading, maths and science	492.3	14	●
2.1.5	Pupil–teacher ratio, secondary	9.9	33	
2.2	**Tertiary education**	**33.1**	**68**	
2.2.1	Tertiary enrolment, % gross	74.0	33	
2.2.2	Graduates in science and engineering, %	19.6	78	○
2.2.3	Tertiary inbound mobility, %	6.7	44	
2.3	**Research and development (R&D)**	**34.5**	**30**	
2.3.1	Researchers, FTE/mn pop.	3,751.0	29	
2.3.2	Gross expenditure on R&D, % GDP	1.5	28	
2.3.3	Global corporate R&D investors, top 3, mn USD$	44.9	37	
2.3.4	QS university ranking, top 3*	31.4	40	
	Infrastructure	**45.8**	**51**	
3.1	**Information and communication technologies (ICTs)**	**83.0**	**33**	
3.1.1	ICT access*	98.8	25	●
3.1.2	ICT use*	92.2	11	●
3.1.3	Government's online service*	77.1	43	
3.1.4	E-participation*	64.0	51	
3.2	**General infrastructure**	**36.9**	**46**	
3.2.1	Electricity output, GWh/mn pop.	4,684.7	48	
3.2.2	Logistics performance*	68.2	25	
3.2.3	Gross capital formation, % GDP	22.0	84	○
3.3	**Ecological sustainability**	**17.4**	**79**	
3.3.1	GDP/unit of energy use	12.9	43	
3.3.2	Low-carbon energy use, %	8.3	89	○
3.3.3	ISO 14001 environment/bn PPP$ GDP	1.9	53	
	Market sophistication	**33.6**	**61**	
4.1	**Credit**	**20.7**	**83**	◇
4.1.1	Finance for startups and scaleups†	47.9	47	
4.1.2	Domestic credit to private sector, % GDP	39.7	81	
4.1.3	Loans from microfinance institutions, % GDP	0.2	53	○ ◇
4.2	**Investment**	**5.7**	**73**	◇
4.2.1	Market capitalization, % GDP	26.7	55	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	0.1	67	○
4.2.3	VC recipients, deals/bn PPP$ GDP	0.0	70	
4.2.4	VC received, value, % GDP	0.0	76	○ ◇
4.3	**Trade, diversification and market scale**	**74.2**	**16**	●
4.3.1	Applied tariff rate, weighted avg., %	1.1	21	
4.3.2	Domestic industry diversification	97.7	6	●
4.3.3	Domestic market scale, bn PPP$	1,712.6	21	●

		Score/ Value	Rank	
	Business sophistication	**38.0**	**35**	
5.1	**Knowledge workers**	**51.1**	**32**	
5.1.1	Knowledge-intensive employment, %	41.5	28	
5.1.2	Firms offering formal training, % ◷	21.7	76	○ ◇
5.1.3	GERD performed by business, % GDP	1.0	24	
5.1.4	GERD financed by business, %	51.0	25	
5.1.5	Females employed w/advanced degrees, %	24.7	19	●
5.2	**Innovation linkages**	**23.1**	**64**	◇
5.2.1	Public research–industry co-publications, %	1.8	48	
5.2.2	University–industry R&D collaboration†	39.1	77	◇
5.2.3	State of cluster development†	46.1	67	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	82	○
5.2.5	Patent families/bn PPP$ GDP	0.3	38	
5.3	**Knowledge absorption**	**39.8**	**30**	
5.3.1	Intellectual property payments, % total trade	1.1	33	
5.3.2	High-tech imports, % total trade	8.6	58	
5.3.3	ICT services imports, % total trade	2.0	30	
5.3.4	FDI net inflows, % GDP	4.6	28	
5.3.5	Research talent, % in businesses	55.8	19	
	Knowledge and technology outputs	**28.0**	**47**	
6.1	**Knowledge creation**	**24.0**	**40**	
6.1.1	Patents by origin/bn PPP$ GDP	2.3	28	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.2	45	
6.1.3	Utility models by origin/bn PPP$ GDP	0.4	33	
6.1.4	Scientific and technical articles/bn PPP$ GDP	18.3	38	
6.1.5	Citable documents H-index	36.7	26	●
6.2	**Knowledge impact**	**30.1**	**53**	
6.2.1	Labor productivity growth, %	1.7	34	◆
6.2.2	Unicorn valuation, % GDP	0.0	49	○ ◇
6.2.3	Software spending, % GDP	0.3	47	
6.2.4	High-tech manufacturing, %	30.5	38	
6.3	**Knowledge diffusion**	**29.9**	**42**	
6.3.1	Intellectual property receipts, % total trade	0.3	34	
6.3.2	Production and export complexity	68.6	25	
6.3.3	High-tech exports, % total trade	6.9	32	
6.3.4	ICT services exports, % total trade	3.2	38	
6.3.5	ISO 9001 quality/bn PPP$ GDP	6.3	44	
	Creative outputs	**38.1**	**35**	
7.1	**Intangible assets**	**40.7**	**34**	
7.1.1	Intangible asset intensity, top 15, %	65.3	27	
7.1.2	Trademarks by origin/bn PPP$ GDP	27.4	70	
7.1.3	Global brand value, top 5,000, % GDP	3.9	36	
7.1.4	Industrial designs by origin/bn PPP$ GDP	4.3	18	●
7.2	**Creative goods and services**	**27.9**	**42**	
7.2.1	Cultural and creative services exports, % total trade	0.9	31	
7.2.2	National feature films/mn pop. 15–69	2.6	49	
7.2.3	Entertainment and media market/th pop. 15–69	10.9	34	◇
7.2.4	Creative goods exports, % total trade	4.7	11	● ◆
7.3	**Online creativity**	**42.9**	**33**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69	15.6	35	
7.3.2	GitHub commits/mn pop. 15–69	40.9	26	●
7.3.3	Mobile app creation/bn PPP$ GDP	72.3	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Portugal

31

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
27	31	High	EUR	10.4	465.1	45,227

		Score/ Value	Rank
	Institutions	**62.8**	**37**
1.1	**Institutional environment**	**74.4**	**31**
1.1.1	Operational stability for businesses*	78.7	25
1.1.2	Government effectiveness*	70.1	30
1.2	**Regulatory environment**	**68.8**	**30**
1.2.1	Regulatory quality*	61.9	38
1.2.2	Rule of law*	75.8	24
1.3	**Business environment**	**45.3**	**66 ○**
1.3.1	Policy stability for doing business†	42.0	82 ○
1.3.2	Entrepreneurship policies and culture† ⏲	48.5	30
	Human capital and research	**50.7**	**21**
2.1	**Education**	**64.2**	**18 ●**
2.1.1	Expenditure on education, % GDP ⏲	4.6	53
2.1.2	Government funding/pupil, secondary, % GDP/cap	29.7	9 ● ◆
2.1.3	School life expectancy, years ⏲	16.8	24
2.1.4	PISA scales in reading, maths and science	477.6	27
2.1.5	Pupil–teacher ratio, secondary ⏲	8.2	14 ● ◆
2.2	**Tertiary education**	**45.5**	**25**
2.2.1	Tertiary enrolment, % gross ⏲	71.9	38
2.2.2	Graduates in science and engineering, %	27.7	32
2.2.3	Tertiary inbound mobility, % ⏲	11.7	20
2.3	**Research and development (R&D)**	**42.3**	**25**
2.3.1	Researchers, FTE/mn pop.	5,744.3	13 ●
2.3.2	Gross expenditure on R&D, % GDP	1.7	22
2.3.3	Global corporate R&D investors, top 3, mn USD$	46.7	34
2.3.4	QS university ranking, top 3*	36.5	35
	Infrastructure	**48.1**	**46**
3.1	**Information and communication technologies (ICTs)**	**81.5**	**42**
3.1.1	ICT access*	96.6	39
3.1.2	ICT use*	80.0	54 ○
3.1.3	Government's online service*	77.4	40
3.1.4	E-participation*	72.1	32
3.2	**General infrastructure**	**32.0**	**62 ○**
3.2.1	Electricity output, GWh/mn pop.	4,497.5	49
3.2.2	Logistics performance*	59.1	37
3.2.3	Gross capital formation, % GDP	20.4	96 ○
3.3	**Ecological sustainability**	**30.7**	**41**
3.3.1	GDP/unit of energy use	17.3	18 ●
3.3.2	Low-carbon energy use, %	27.7	43
3.3.3	ISO 14001 environment/bn PPP$ GDP	2.6	39
	Market sophistication	**43.7**	**36**
4.1	**Credit**	**49.8**	**23**
4.1.1	Finance for startups and scaleups† ⏲	67.5	17
4.1.2	Domestic credit to private sector, % GDP	90.1	30
4.1.3	Loans from microfinance institutions, % GDP	n/a	n/a
4.2	**Investment**	**14.5**	**49**
4.2.1	Market capitalization, % GDP ⏲	29.1	49 ○
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	0.2	35
4.2.3	VC recipients, deals/bn PPP$ GDP	0.1	39
4.2.4	VC received, value, % GDP	0.0	54 ○
4.3	**Trade, diversification and market scale**	**66.7**	**27**
4.3.1	Applied tariff rate, weighted avg., %	1.1	21
4.3.2	Domestic industry diversification	100.0	1 ● ◆
4.3.3	Domestic market scale, bn PPP$	465.1	49

		Score/ Value	Rank
	Business sophistication	**38.9**	**33**
5.1	**Knowledge workers**	**54.9**	**28**
5.1.1	Knowledge-intensive employment, %	41.9	27
5.1.2	Firms offering formal training, %	39.5	38
5.1.3	GERD performed by business, % GDP	1.1	20
5.1.4	GERD financed by business, %	56.6	17
5.1.5	Females employed w/advanced degrees, %	19.6	35
5.2	**Innovation linkages**	**28.7**	**52**
5.2.1	Public research–industry co-publications, %	1.6	57 ○
5.2.2	University–industry R&D collaboration†	55.3	45
5.2.3	State of cluster development†	48.3	62 ○
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	47
5.2.5	Patent families/bn PPP$ GDP	0.7	32
5.3	**Knowledge absorption**	**33.0**	**50**
5.3.1	Intellectual property payments, % total trade	0.8	47
5.3.2	High-tech imports, % total trade	9.6	44
5.3.3	ICT services imports, % total trade	1.3	64 ○
5.3.4	FDI net inflows, % GDP	2.8	52
5.3.5	Research talent, % in businesses	44.9	32
	Knowledge and technology outputs	**31.1**	**33**
6.1	**Knowledge creation**	**30.5**	**30**
6.1.1	Patents by origin/bn PPP$ GDP	2.3	30
6.1.2	PCT patents by origin/bn PPP$ GDP	0.5	34
6.1.3	Utility models by origin/bn PPP$ GDP	0.1	53 ○
6.1.4	Scientific and technical articles/bn PPP$ GDP	36.1	8 ● ◆
6.1.5	Citable documents H-index	33.9	29
6.2	**Knowledge impact**	**36.3**	**37**
6.2.1	Labor productivity growth, %	1.1	48
6.2.2	Unicorn valuation, % GDP	0.0	49 ○ ◇
6.2.3	Software spending, % GDP	0.6	11 ● ◆
6.2.4	High-tech manufacturing, %	27.6	45
6.3	**Knowledge diffusion**	**26.4**	**49**
6.3.1	Intellectual property receipts, % total trade	0.1	48
6.3.2	Production and export complexity	61.7	35
6.3.3	High-tech exports, % total trade	3.4	47
6.3.4	ICT services exports, % total trade	3.0	41
6.3.5	ISO 9001 quality/bn PPP$ GDP	9.7	29
	Creative outputs	**45.9**	**20**
7.1	**Intangible assets**	**51.2**	**20**
7.1.1	Intangible asset intensity, top 15, %	69.5	18
7.1.2	Trademarks by origin/bn PPP$ GDP	76.4	15 ● ◆
7.1.3	Global brand value, top 5,000, % GDP	5.1	32
7.1.4	Industrial designs by origin/bn PPP$ GDP	4.1	19 ●
7.2	**Creative goods and services**	**28.5**	**41**
7.2.1	Cultural and creative services exports, % total trade	0.7	42
7.2.2	National feature films/mn pop. 15–69	7.7	14
7.2.3	Entertainment and media market/th pop. 15–69	30.2	22
7.2.4	Creative goods exports, % total trade	1.4	36
7.3	**Online creativity**	**52.8**	**25**
7.3.1	Top-level domains (TLDs)/th pop. 15–69	42.0	15 ●
7.3.2	GitHub commits/mn pop. 15–69	45.6	24
7.3.3	Mobile app creation/bn PPP$ GDP	70.7	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Qatar

GII 2024 rank **49**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
71	39	High	NAWA	3.0	328.1	114,210

			Score/ Value	Rank	
	Institutions		**73.4**	**20**	●
1.1	**Institutional environment**		**77.5**	**23**	
1.1.1	Operational stability for businesses*		81.3	18	●
1.1.2	Government effectiveness*		73.7	27	
1.2	**Regulatory environment**		**67.5**	**32**	
1.2.1	Regulatory quality*		64.7	34	
1.2.2	Rule of law*		70.2	31	
1.3	**Business environment**		**75.2**	**13**	●◆
1.3.1	Policy stability for doing business†		78.6	11	●
1.3.2	Entrepreneurship policies and culture†		71.8	12	●◆
	Human capital and research		**36.6**	**48**	
2.1	**Education**		**47.6**	**73**	◇
2.1.1	Expenditure on education, % GDP	◷	3.2	99	◇
2.1.2	Government funding/pupil, secondary, % GDP/cap		n/a	n/a	
2.1.3	School life expectancy, years	◷	13.3	78	◇
2.1.4	PISA scales in reading, maths and science		421.9	51	◇
2.1.5	Pupil–teacher ratio, secondary		12.6	56	
2.2	**Tertiary education**		**49.9**	**15**	●
2.2.1	Tertiary enrolment, % gross		35.1	86	◇
2.2.2	Graduates in science and engineering, %		17.8	92	◇
2.2.3	Tertiary inbound mobility, %		38.5	1	●◆
2.3	**Research and development (R&D)**		**12.2**	**56**	◇
2.3.1	Researchers, FTE/mn pop.	◷	982.5	53	◇
2.3.2	Gross expenditure on R&D, % GDP	◷	0.7	53	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		27.8	45	
	Infrastructure		**50.2**	**39**	
3.1	**Information and communication technologies (ICTs)**		**71.6**	**70**	◇
3.1.1	ICT access*		99.9	12	●
3.1.2	ICT use*		93.6	5	●◆
3.1.3	Government's online service*		56.8	83	◇
3.1.4	E-participation*		36.0	94	◇
3.2	**General infrastructure**		**67.8**	**2**	●◆
3.2.1	Electricity output, GWh/mn pop.	◷	19,211.3	4	●◆
3.2.2	Logistics performance*		63.6	33	
3.2.3	Gross capital formation, % GDP		n/a	n/a	
3.3	**Ecological sustainability**		**11.3**	**107**	◇
3.3.1	GDP/unit of energy use		5.6	114	◇
3.3.2	Low-carbon energy use, %		0.3	125	○◇
3.3.3	ISO 14001 environment/bn PPP$ GDP		3.1	31	
	Market sophistication		**34.7**	**59**	
4.1	**Credit**		**47.8**	**26**	
4.1.1	Finance for startups and scaleups†		59.5	29	
4.1.2	Domestic credit to private sector, % GDP		100.8	22	●
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**9.5**	**61**	
4.2.1	Market capitalization, % GDP		96.1	19	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.1	51	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	106	○◇
4.2.4	VC received, value, % GDP		0.0	95	◇
4.3	**Trade, diversification and market scale**		**46.7**	**86**	
4.3.1	Applied tariff rate, weighted avg., %		3.6	86	◇
4.3.2	Domestic industry diversification		61.8	95	◇
4.3.3	Domestic market scale, bn PPP$		328.1	59	

			Score/ Value	Rank	
	Business sophistication		**25.7**	**68**	◇
5.1	**Knowledge workers**		**17.2**	**110**	◇
5.1.1	Knowledge-intensive employment, %		26.6	54	◇
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, %	◷	9.3	77	◇
5.1.5	Females employed w/advanced degrees, %	◷	5.3	95	◇
5.2	**Innovation linkages**		**41.3**	**29**	
5.2.1	Public research–industry co-publications, %		1.5	64	
5.2.2	University–industry R&D collaboration†		82.8	10	●
5.2.3	State of cluster development†		89.6	8	●◆
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	28	
5.2.5	Patent families/bn PPP$ GDP		0.0	79	◇
5.3	**Knowledge absorption**		**18.5**	**101**	◇
5.3.1	Intellectual property payments, % total trade		0.0	121	○◇
5.3.2	High-tech imports, % total trade		4.2	118	◇
5.3.3	ICT services imports, % total trade		1.6	45	
5.3.4	FDI net inflows, % GDP		−0.8	126	○
5.3.5	Research talent, % in businesses	◷	16.1	56	◇
	Knowledge and technology outputs		**17.5**	**82**	◇
6.1	**Knowledge creation**		**9.2**	**86**	◇
6.1.1	Patents by origin/bn PPP$ GDP	◷	0.2	102	◇
6.1.2	PCT patents by origin/bn PPP$ GDP		0.1	71	
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		9.3	74	◇
6.1.5	Citable documents H-index		13.1	64	
6.2	**Knowledge impact**		**31.8**	**48**	
6.2.1	Labor productivity growth, %		−0.1	98	
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.3	29	
6.2.4	High-tech manufacturing, %		40.9	25	
6.3	**Knowledge diffusion**		**11.3**	**89**	◇
6.3.1	Intellectual property receipts, % total trade		0.0	116	○◇
6.3.2	Production and export complexity		33.5	81	◇
6.3.3	High-tech exports, % total trade		0.3	101	◇
6.3.4	ICT services exports, % total trade		1.0	82	
6.3.5	ISO 9001 quality/bn PPP$ GDP		5.0	57	
	Creative outputs		**25.9**	**61**	
7.1	**Intangible assets**		**36.5**	**42**	
7.1.1	Intangible asset intensity, top 15, %		34.1	64	
7.1.2	Trademarks by origin/bn PPP$ GDP		5.4	116	○◇
7.1.3	Global brand value, top 5,000, % GDP		8.9	21	
7.1.4	Industrial designs by origin/bn PPP$ GDP		n/a	n/a	
7.2	**Creative goods and services**		**7.6**	**83**	◇
7.2.1	Cultural and creative services exports, % total trade		0.2	83	
7.2.2	National feature films/mn pop. 15–69		0.0	85	○◇
7.2.3	Entertainment and media market/th pop. 15–69		26.0	25	
7.2.4	Creative goods exports, % total trade		0.0	133	○◇
7.3	**Online creativity**		**22.8**	**85**	◇
7.3.1	Top-level domains (TLDs)/th pop. 15–69		2.8	72	◇
7.3.2	GitHub commits/mn pop. 15–69		3.9	91	◇
7.3.3	Mobile app creation/bn PPP$ GDP		61.9	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Republic of Korea 6

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
4	6	High	SEAO	51.7	2,924.2	56,709

		Score/Value	Rank	
	Institutions	**71.0**	**24**	
1.1	**Institutional environment**	**80.3**	**19**	
1.1.1	Operational stability for businesses*	81.3	18	
1.1.2	Government effectiveness*	79.2	17	
1.2	**Regulatory environment**	**74.5**	**25**	
1.2.1	Regulatory quality*	71.9	28	
1.2.2	Rule of law*	77.1	23	
1.3	**Business environment**	**58.2**	**35**	
1.3.1	Policy stability for doing business†	51.2	60	○◇
1.3.2	Entrepreneurship policies and culture†	65.1	15	
	Human capital and research	**68.6**	**1**	●◆
2.1	**Education**	**71.2**	**2**	●◆
2.1.1	Expenditure on education, % GDP ◷	5.4	32	
2.1.2	Government funding/pupil, secondary, % GDP/cap	36.8	3	●◆
2.1.3	School life expectancy, years	16.6	28	
2.1.4	PISA scales in reading, maths and science	523.5	4	
2.1.5	Pupil–teacher ratio, secondary	11.5	46	
2.2	**Tertiary education**	**49.2**	**17**	
2.2.1	Tertiary enrolment, % gross	103.3	6	◆
2.2.2	Graduates in science and engineering, %	30.4	18	◆
2.2.3	Tertiary inbound mobility, %	4.4	55	○
2.3	**Research and development (R&D)**	**85.5**	**1**	●◆
2.3.1	Researchers, FTE/mn pop.	9,467.2	2	●◆
2.3.2	Gross expenditure on R&D, % GDP	5.2	2	●◆
2.3.3	Global corporate R&D investors, top 3, mn USD$	87.1	5	
2.3.4	QS university ranking, top 3*	72.8	10	
	Infrastructure	**60.5**	**9**	
3.1	**Information and communication technologies (ICTs)**	**95.0**	**6**	
3.1.1	ICT access*	100.0	11	
3.1.2	ICT use*	87.9	24	
3.1.3	Government's online service*	98.1	3	●◆
3.1.4	E-participation*	94.2	9	
3.2	**General infrastructure**	**60.7**	**8**	◆
3.2.1	Electricity output, GWh/mn pop.	12,290.0	12	
3.2.2	Logistics performance*	77.3	16	
3.2.3	Gross capital formation, % GDP	32.9	15	◆
3.3	**Ecological sustainability**	**25.7**	**47**	
3.3.1	GDP/unit of energy use	8.0	93	○
3.3.2	Low-carbon energy use, %	16.5	67	○
3.3.3	ISO 14001 environment/bn PPP$ GDP	5.3	18	
	Market sophistication	**55.8**	**15**	
4.1	**Credit**	**65.9**	**7**	
4.1.1	Finance for startups and scaleups†	66.5	18	
4.1.2	Domestic credit to private sector, % GDP	175.0	6	
4.1.3	Loans from microfinance institutions, % GDP	n/a	n/a	
4.2	**Investment**	**30.1**	**26**	
4.2.1	Market capitalization, % GDP	117.5	11	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	0.2	28	
4.2.3	VC recipients, deals/bn PPP$ GDP	0.1	25	
4.2.4	VC received, value, % GDP	0.0	31	
4.3	**Trade, diversification and market scale**	**71.5**	**18**	
4.3.1	Applied tariff rate, weighted avg., %	4.7	93	○◇
4.3.2	Domestic industry diversification	93.4	24	
4.3.3	Domestic market scale, bn PPP$	2,924.2	14	

		Score/Value	Rank	
	Business sophistication	**63.7**	**5**	
5.1	**Knowledge workers**	**82.2**	**1**	●◆
5.1.1	Knowledge-intensive employment, %	40.7	30	◇
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	4.1	1	●◆
5.1.4	GERD financed by business, %	76.3	4	◆
5.1.5	Females employed w/advanced degrees, %	22.3	26	
5.2	**Innovation linkages**	**58.4**	**14**	
5.2.1	Public research–industry co-publications, %	6.6	5	
5.2.2	University–industry R&D collaboration†	69.0	26	
5.2.3	State of cluster development†	70.8	31	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	32	◇
5.2.5	Patent families/bn PPP$ GDP	13.3	2	●◆
5.3	**Knowledge absorption**	**50.4**	**9**	
5.3.1	Intellectual property payments, % total trade	1.6	21	
5.3.2	High-tech imports, % total trade	18.2	11	◆
5.3.3	ICT services imports, % total trade	1.2	67	○◇
5.3.4	FDI net inflows, % GDP	0.9	100	○
5.3.5	Research talent, % in businesses	82.6	1	●◆
	Knowledge and technology outputs	**54.1**	**10**	
6.1	**Knowledge creation**	**65.1**	**4**	●◆
6.1.1	Patents by origin/bn PPP$ GDP	66.1	1	●◆
6.1.2	PCT patents by origin/bn PPP$ GDP	7.6	1	●◆
6.1.3	Utility models by origin/bn PPP$ GDP	1.0	20	
6.1.4	Scientific and technical articles/bn PPP$ GDP	22.7	29	
6.1.5	Citable documents H-index	47.1	16	
6.2	**Knowledge impact**	**45.1**	**21**	
6.2.1	Labor productivity growth, %	0.8	60	
6.2.2	Unicorn valuation, % GDP	1.8	20	
6.2.3	Software spending, % GDP	0.2	64	○◇
6.2.4	High-tech manufacturing, %	58.2	4	●
6.3	**Knowledge diffusion**	**52.3**	**13**	
6.3.1	Intellectual property receipts, % total trade	1.1	18	
6.3.2	Production and export complexity	94.3	3	●◆
6.3.3	High-tech exports, % total trade	24.3	6	◆
6.3.4	ICT services exports, % total trade	1.4	67	○
6.3.5	ISO 9001 quality/bn PPP$ GDP	10.5	25	
	Creative outputs	**61.7**	**2**	●◆
7.1	**Intangible assets**	**81.5**	**2**	●◆
7.1.1	Intangible asset intensity, top 15, %	50.1	48	○◇
7.1.2	Trademarks by origin/bn PPP$ GDP	96.5	8	◆
7.1.3	Global brand value, top 5,000, % GDP	18.3	5	◆
7.1.4	Industrial designs by origin/bn PPP$ GDP	19.0	1	●◆
7.2	**Creative goods and services**	**37.8**	**16**	
7.2.1	Cultural and creative services exports, % total trade	0.8	39	
7.2.2	National feature films/mn pop. 15–69	4.9	25	
7.2.3	Entertainment and media market/th pop. 15–69	46.9	15	
7.2.4	Creative goods exports, % total trade	4.2	13	◆
7.3	**Online creativity**	**46.2**	**30**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69	7.2	48	◇
7.3.2	GitHub commits/mn pop. 15–69	56.1	20	
7.3.3	Mobile app creation/bn PPP$ GDP	75.4	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Republic of Moldova

68

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
57	80	Upper middle	EUR	3.1	42.2	16,916

		Score/Value	Rank
	Institutions	**37.6**	**90**
1.1	**Institutional environment**	**45.0**	**86**
1.1.1	Operational stability for businesses*	54.0	88
1.1.2	Government effectiveness*	36.0	87
1.2	**Regulatory environment**	**40.1**	**71**
1.2.1	Regulatory quality*	44.5	69
1.2.2	Rule of law*	35.6	82
1.3	**Business environment**	**27.8**	**[105]**
1.3.1	Policy stability for doing business† ◷	27.8	108 ○
1.3.2	Entrepreneurship policies and culture†	n/a	n/a
	Human capital and research	**31.1**	**68**
2.1	**Education**	**55.4**	**54**
2.1.1	Expenditure on education, % GDP	6.1	14 ● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	22.3	37
2.1.3	School life expectancy, years	14.9	51
2.1.4	PISA scales in reading, maths and science	414.0	53
2.1.5	Pupil–teacher ratio, secondary ◷	10.9	39 ●
2.2	**Tertiary education**	**35.0**	**57**
2.2.1	Tertiary enrolment, % gross	64.4	49
2.2.2	Graduates in science and engineering, %	23.3	57
2.2.3	Tertiary inbound mobility, %	7.0	43
2.3	**Research and development (R&D)**	**2.8**	**87**
2.3.1	Researchers, FTE/mn pop.	768.0	60
2.3.2	Gross expenditure on R&D, % GDP	0.2	83
2.3.3	Global corporate R&D investors, top 3, mn USD$	0.0	41 ○ ◇
2.3.4	QS university ranking, top 3*	0.0	75 ○ ◇
	Infrastructure	**33.4**	**89**
3.1	**Information and communication technologies (ICTs)**	**73.7**	**62**
3.1.1	ICT access*	79.4	86
3.1.2	ICT use*	77.0	71
3.1.3	Government's online service*	71.0	60
3.1.4	E-participation*	67.4	47
3.2	**General infrastructure**	**19.6**	**101**
3.2.1	Electricity output, GWh/mn pop.	2,048.6	77
3.2.2	Logistics performance*	18.2	89 ○ ◇
3.2.3	Gross capital formation, % GDP	24.5	57
3.3	**Ecological sustainability**	**7.0**	**118** ○ ◇
3.3.1	GDP/unit of energy use	8.0	91
3.3.2	Low-carbon energy use, %	3.0	112 ○
3.3.3	ISO 14001 environment/bn PPP$ GDP	0.4	105
	Market sophistication	**33.3**	**63**
4.1	**Credit**	**30.3**	**55**
4.1.1	Finance for startups and scaleups†	n/a	n/a
4.1.2	Domestic credit to private sector, % GDP	27.5	104
4.1.3	Loans from microfinance institutions, % GDP	4.8	6 ● ◆
4.2	**Investment**	**11.7**	**[54]**
4.2.1	Market capitalization, % GDP	n/a	n/a
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	n/a	n/a
4.2.3	VC recipients, deals/bn PPP$ GDP	0.0	54
4.2.4	VC received, value, % GDP	0.0	56
4.3	**Trade, diversification and market scale**	**58.0**	**60**
4.3.1	Applied tariff rate, weighted avg., %	0.9	14 ●
4.3.2	Domestic industry diversification	80.6	62
4.3.3	Domestic market scale, bn PPP$	42.2	121 ○

		Score/Value	Rank
	Business sophistication	**19.7**	**105** ◇
5.1	**Knowledge workers**	**26.8**	**82**
5.1.1	Knowledge-intensive employment, %	19.0	80
5.1.2	Firms offering formal training, % ◷	38.1	40
5.1.3	GERD performed by business, % GDP ◷	0.0	74
5.1.4	GERD financed by business, % ◷	15.5	74
5.1.5	Females employed w/advanced degrees, %	11.8	65
5.2	**Innovation linkages**	**11.9**	**120** ○
5.2.1	Public research–industry co-publications, %	0.6	112 ○
5.2.2	University–industry R&D collaboration† ◷	25.0	107
5.2.3	State of cluster development† ◷	16.9	123 ○ ◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP ◷	0.0	44 ●
5.2.5	Patent families/bn PPP$ GDP	0.1	65
5.3	**Knowledge absorption**	**20.4**	**93**
5.3.1	Intellectual property payments, % total trade	0.7	60
5.3.2	High-tech imports, % total trade	7.4	79
5.3.3	ICT services imports, % total trade	1.0	77
5.3.4	FDI net inflows, % GDP	2.8	53
5.3.5	Research talent, % in businesses ◷	6.2	69
	Knowledge and technology outputs	**21.2**	**64**
6.1	**Knowledge creation**	**23.4**	**44** ●
6.1.1	Patents by origin/bn PPP$ GDP	1.2	47
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	55
6.1.3	Utility models by origin/bn PPP$ GDP	2.5	4 ● ◆
6.1.4	Scientific and technical articles/bn PPP$ GDP	6.1	95
6.1.5	Citable documents H-index	5.1	96
6.2	**Knowledge impact**	**18.5**	**110**
6.2.1	Labor productivity growth, %	0.5	72
6.2.2	Unicorn valuation, % GDP	0.0	49 ○ ◇
6.2.3	Software spending, % GDP	0.1	97
6.2.4	High-tech manufacturing, %	16.0	73
6.3	**Knowledge diffusion**	**21.7**	**55**
6.3.1	Intellectual property receipts, % total trade	0.0	78
6.3.2	Production and export complexity	43.6	62
6.3.3	High-tech exports, % total trade	0.7	86
6.3.4	ICT services exports, % total trade	6.4	13 ● ◆
6.3.5	ISO 9001 quality/bn PPP$ GDP	2.6	81
	Creative outputs	**31.5**	**51**
7.1	**Intangible assets**	**41.9**	**32** ●
7.1.1	Intangible asset intensity, top 15, %	n/a	n/a
7.1.2	Trademarks by origin/bn PPP$ GDP	80.8	12 ●
7.1.3	Global brand value, top 5,000, % GDP	0.0	75 ○ ◇
7.1.4	Industrial designs by origin/bn PPP$ GDP	7.0	11 ● ◆
7.2	**Creative goods and services**	**10.3**	**[70]**
7.2.1	Cultural and creative services exports, % total trade	0.7	43
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	Creative goods exports, % total trade	0.1	89
7.3	**Online creativity**	**31.9**	**50**
7.3.1	Top-level domains (TLDs)/th pop. 15–69	3.1	68
7.3.2	GitHub commits/mn pop. 15–69	14.5	49
7.3.3	Mobile app creation/bn PPP$ GDP	78.1	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Romania

GII 2024 rank **48**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
45	57	High	EUR	19.1	780.8	41,029

		Score/ Value	Rank	
	Institutions	**42.2**	**81**	◇
1.1	**Institutional environment**	**52.0**	**72**	◇
1.1.1	Operational stability for businesses*	60.0	70	◇
1.1.2	Government effectiveness*	44.0	68	◇
1.2	**Regulatory environment**	**53.4**	**52**	◇
1.2.1	Regulatory quality*	51.4	55	◇
1.2.2	Rule of law*	55.4	48	◇
1.3	**Business environment**	**21.2**	**115**	○◇
1.3.1	Policy stability for doing business†	28.2	107	○◇
1.3.2	Entrepreneurship policies and culture†	14.2	71	○◇
	Human capital and research	**30.8**	**70**	◇
2.1	**Education**	**47.2**	**75**	◇
2.1.1	Expenditure on education, % GDP ◷	3.3	97	○◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	19.9	51	
2.1.3	School life expectancy, years ◷	14.5	58	◇
2.1.4	PISA scales in reading, maths and science	427.9	47	◇
2.1.5	Pupil–teacher ratio, secondary ◷	11.6	48	
2.2	**Tertiary education**	**38.5**	**44**	
2.2.1	Tertiary enrolment, % gross ◷	55.3	65	
2.2.2	Graduates in science and engineering, %	29.3	26	
2.2.3	Tertiary inbound mobility, % ◷	6.0	45	
2.3	**Research and development (R&D)**	**6.7**	**70**	◇
2.3.1	Researchers, FTE/mn pop.	1,005.1	52	◇
2.3.2	Gross expenditure on R&D, % GDP	0.5	61	
2.3.3	Global corporate R&D investors, top 3, mn USD$	0.0	41	○◇
2.3.4	QS university ranking, top 3*	9.2	67	◇
	Infrastructure	**51.4**	**32**	
3.1	**Information and communication technologies (ICTs)**	**75.8**	**55**	
3.1.1	ICT access*	96.9	36	
3.1.2	ICT use*	79.8	56	
3.1.3	Government's online service*	64.8	69	◇
3.1.4	E-participation*	61.6	54	
3.2	**General infrastructure**	**33.0**	**59**	
3.2.1	Electricity output, GWh/mn pop.	2,909.2	64	
3.2.2	Logistics performance*	50.0	50	◇
3.2.3	Gross capital formation, % GDP	26.2	43	
3.3	**Ecological sustainability**	**45.6**	**5**	●◆
3.3.1	GDP/unit of energy use	17.8	17	●
3.3.2	Low-carbon energy use, %	24.6	51	
3.3.3	ISO 14001 environment/bn PPP$ GDP	8.4	11	●◆
	Market sophistication	**32.4**	**67**	
4.1	**Credit**	**26.8**	**65**	
4.1.1	Finance for startups and scaleups†	39.7	56	◇
4.1.2	Domestic credit to private sector, % GDP	24.8	108	○◇
4.1.3	Loans from microfinance institutions, % GDP	3.1	12	●
4.2	**Investment**	**3.4**	**96**	○◇
4.2.1	Market capitalization, % GDP	10.4	74	○
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	0.0	69	
4.2.3	VC recipients, deals/bn PPP$ GDP	0.0	86	○◇
4.2.4	VC received, value, % GDP	0.0	79	◇
4.3	**Trade, diversification and market scale**	**67.0**	**26**	
4.3.1	Applied tariff rate, weighted avg., %	1.1	21	
4.3.2	Domestic industry diversification	94.7	20	●
4.3.3	Domestic market scale, bn PPP$	780.8	35	

		Score/ Value	Rank	
	Business sophistication	**31.1**	**47**	
5.1	**Knowledge workers**	**35.6**	**58**	
5.1.1	Knowledge-intensive employment, %	28.2	51	◇
5.1.2	Firms offering formal training, %	17.6	85	○◇
5.1.3	GERD performed by business, % GDP	0.3	48	
5.1.4	GERD financed by business, %	55.2	21	
5.1.5	Females employed w/advanced degrees, %	12.8	62	◇
5.2	**Innovation linkages**	**20.6**	**83**	◇
5.2.1	Public research–industry co-publications, %	2.3	35	
5.2.2	University–industry R&D collaboration†	37.0	85	◇
5.2.3	State of cluster development†	37.5	89	◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	100	○◇
5.2.5	Patent families/bn PPP$ GDP	0.1	72	◇
5.3	**Knowledge absorption**	**37.2**	**34**	
5.3.1	Intellectual property payments, % total trade	0.8	49	
5.3.2	High-tech imports, % total trade	11.3	28	
5.3.3	ICT services imports, % total trade	2.8	17	●
5.3.4	FDI net inflows, % GDP	3.2	46	
5.3.5	Research talent, % in businesses	31.4	42	
	Knowledge and technology outputs	**29.9**	**38**	
6.1	**Knowledge creation**	**13.2**	**72**	◇
6.1.1	Patents by origin/bn PPP$ GDP	1.2	51	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	73	
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	60	
6.1.4	Scientific and technical articles/bn PPP$ GDP	12.4	57	
6.1.5	Citable documents H-index	19.7	43	
6.2	**Knowledge impact**	**35.8**	**39**	
6.2.1	Labor productivity growth, %	2.8	13	●◆
6.2.2	Unicorn valuation, % GDP	0.0	49	○◇
6.2.3	Software spending, % GDP	0.3	49	
6.2.4	High-tech manufacturing, %	41.7	24	
6.3	**Knowledge diffusion**	**40.8**	**24**	●
6.3.1	Intellectual property receipts, % total trade	0.1	59	
6.3.2	Production and export complexity	73.9	19	●
6.3.3	High-tech exports, % total trade	6.4	34	
6.3.4	ICT services exports, % total trade	7.0	9	●◆
6.3.5	ISO 9001 quality/bn PPP$ GDP	15.6	17	●
	Creative outputs	**28.5**	**56**	
7.1	**Intangible assets**	**30.6**	**61**	
7.1.1	Intangible asset intensity, top 15, %	52.8	42	
7.1.2	Trademarks by origin/bn PPP$ GDP	36.3	56	
7.1.3	Global brand value, top 5,000, % GDP	1.3	53	
7.1.4	Industrial designs by origin/bn PPP$ GDP	1.2	52	
7.2	**Creative goods and services**	**20.3**	**54**	
7.2.1	Cultural and creative services exports, % total trade	1.9	15	●
7.2.2	National feature films/mn pop. 15–69	2.1	55	
7.2.3	Entertainment and media market/th pop. 15–69	7.0	42	◇
7.2.4	Creative goods exports, % total trade	0.7	53	
7.3	**Online creativity**	**32.4**	**48**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69	8.0	44	
7.3.2	GitHub commits/mn pop. 15–69	19.1	46	
7.3.3	Mobile app creation/bn PPP$ GDP	69.9	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Russian Federation

GII 2024 rank

59

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
56	76	Upper middle	EUR	145.8	5,056.5	35,310

			Score/Value	Rank	
	Institutions		**19.1**	**126**	○◇
1.1	**Institutional environment**		**19.6**	**128**	○◇
1.1.1	Operational stability for businesses*		13.3	131	○◇
1.1.2	Government effectiveness*		25.8	110	◇
1.2	**Regulatory environment**		**10.7**	**127**	○◇
1.2.1	Regulatory quality*		11.8	126	○◇
1.2.2	Rule of law*		9.6	126	○◇
1.3	**Business environment**		**27.0**	**107**	
1.3.1	Policy stability for doing business†	🕒	37.9	94	
1.3.2	Entrepreneurship policies and culture†	🕒	16.2	70	

			Score/Value	Rank	
	Human capital and research		**41.1**	**39**	◆
2.1	**Education**		**58.7**	**44**	
2.1.1	Expenditure on education, % GDP	🕒	3.7	84	
2.1.2	Government funding/pupil, secondary, % GDP/cap		n/a	n/a	
2.1.3	School life expectancy, years		13.4	75	
2.1.4	PISA scales in reading, maths and science	🕒	481.3	24	◆
2.1.5	Pupil–teacher ratio, secondary		8.0	9	●
2.2	**Tertiary education**		**43.2**	**28**	●◆
2.2.1	Tertiary enrolment, % gross		56.6	61	
2.2.2	Graduates in science and engineering, %	🕒	31.4	15	●◆
2.2.3	Tertiary inbound mobility, %		8.5	32	◆
2.3	**Research and development (R&D)**		**21.5**	**43**	
2.3.1	Researchers, FTE/mn pop.		2,697.9	34	◆
2.3.2	Gross expenditure on R&D, % GDP		0.9	44	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		43.5	29	●◆

			Score/Value	Rank	
	Infrastructure		**36.9**	**76**	
3.1	**Information and communication technologies (ICTs)**		**77.4**	**48**	
3.1.1	ICT access*		93.2	54	
3.1.2	ICT use*		86.1	28	◆
3.1.3	Government's online service*		70.9	61	
3.1.4	E-participation*		59.3	57	
3.2	**General infrastructure**		**25.4**	**85**	
3.2.1	Electricity output, GWh/mn pop.		n/a	n/a	
3.2.2	Logistics performance*		22.7	82	
3.2.3	Gross capital formation, % GDP		23.0	76	
3.3	**Ecological sustainability**		**7.9**	**116**	○◇
3.3.1	GDP/unit of energy use		4.7	121	○◇
3.3.2	Low-carbon energy use, %		13.6	78	
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.2	122	○

			Score/Value	Rank	
	Market sophistication		**36.1**	**57**	
4.1	**Credit**		**17.4**	**91**	
4.1.1	Finance for startups and scaleups†	🕒	30.6	67	
4.1.2	Domestic credit to private sector, % GDP	🕒	54.4	58	
4.1.3	Loans from microfinance institutions, % GDP	🕒	0.3	48	
4.2	**Investment**		**4.4**	**88**	
4.2.1	Market capitalization, % GDP		38.7	41	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.0	85	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	109	○◇
4.2.4	VC received, value, % GDP		0.0	74	
4.3	**Trade, diversification and market scale**		**86.6**	**8**	●◆
4.3.1	Applied tariff rate, weighted avg., %		4.0	91	
4.3.2	Domestic industry diversification		91.6	29	
4.3.3	Domestic market scale, bn PPP$		5,056.5	1	●◆

			Score/Value	Rank	
	Business sophistication		**29.8**	**53**	
5.1	**Knowledge workers**		**32.6**	**64**	
5.1.1	Knowledge-intensive employment, %		45.2	22	●◆
5.1.2	Firms offering formal training, %	🕒	11.8	93	○◇
5.1.3	GERD performed by business, % GDP	🕒	0.6	36	
5.1.4	GERD financed by business, %	🕒	29.2	63	
5.1.5	Females employed w/advanced degrees, %	🕒	9.7	79	
5.2	**Innovation linkages**		**22.8**	**68**	
5.2.1	Public research–industry co-publications, %		1.6	60	
5.2.2	University–industry R&D collaboration†	🕒	44.1	66	
5.2.3	State of cluster development†	🕒	47.8	64	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	103	
5.2.5	Patent families/bn PPP$ GDP		0.2	48	
5.3	**Knowledge absorption**		**33.9**	**46**	
5.3.1	Intellectual property payments, % total trade		1.5	22	●
5.3.2	High-tech imports, % total trade	🕒	9.6	43	
5.3.3	ICT services imports, % total trade		0.9	87	
5.3.4	FDI net inflows, % GDP		0.3	116	○◇
5.3.5	Research talent, % in businesses	🕒	46.5	30	◆

			Score/Value	Rank	
	Knowledge and technology outputs		**23.7**	**52**	
6.1	**Knowledge creation**		**29.6**	**33**	◆
6.1.1	Patents by origin/bn PPP$ GDP		4.1	19	●◆
6.1.2	PCT patents by origin/bn PPP$ GDP		0.1	57	
6.1.3	Utility models by origin/bn PPP$ GDP		1.8	8	●◆
6.1.4	Scientific and technical articles/bn PPP$ GDP		7.6	86	
6.1.5	Citable documents H-index		37.5	25	●◆
6.2	**Knowledge impact**		**26.1**	**63**	
6.2.1	Labor productivity growth, %		0.7	64	
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.2	60	
6.2.4	High-tech manufacturing, %		26.8	46	
6.3	**Knowledge diffusion**		**15.3**	**77**	
6.3.1	Intellectual property receipts, % total trade		0.3	41	◆
6.3.2	Production and export complexity		47.9	53	
6.3.3	High-tech exports, % total trade	🕒	2.4	56	
6.3.4	ICT services exports, % total trade		1.2	79	
6.3.5	ISO 9001 quality/bn PPP$ GDP		0.8	116	○

			Score/Value	Rank	
	Creative outputs		**30.1**	**53**	
7.1	**Intangible assets**		**39.0**	**39**	
7.1.1	Intangible asset intensity, top 15, %		47.9	50	
7.1.2	Trademarks by origin/bn PPP$ GDP		78.8	14	●
7.1.3	Global brand value, top 5,000, % GDP		2.2	45	
7.1.4	Industrial designs by origin/bn PPP$ GDP		1.2	51	
7.2	**Creative goods and services**		**10.3**	**71**	
7.2.1	Cultural and creative services exports, % total trade		0.6	46	
7.2.2	National feature films/mn pop. 15–69		1.4	64	
7.2.3	Entertainment and media market/th pop. 15–69		n/a	n/a	
7.2.4	Creative goods exports, % total trade	🕒	0.4	70	
7.3	**Online creativity**		**32.0**	**49**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		8.5	43	
7.3.2	GitHub commits/mn pop. 15–69		14.8	48	
7.3.3	Mobile app creation/bn PPP$ GDP		72.8	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Rwanda

GII 2024 rank

104

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
116	81	Low	SSA	14.0	42.3	3,137

		Score/Value	Rank	
	Institutions	**62.1**	**38**	●◆
1.1	**Institutional environment**	**58.7**	**54**	◆
1.1.1	Operational stability for businesses*	67.3	48	◆
1.1.2	Government effectiveness*	50.1	55	◆
1.2	**Regulatory environment**	**47.1**	**60**	◆
1.2.1	Regulatory quality*	46.1	63	◆
1.2.2	Rule of law*	48.0	58	◆
1.3	**Business environment**	**80.5**	**[5]**	
1.3.1	Policy stability for doing business†	80.5	8	●◆
1.3.2	Entrepreneurship policies and culture†	n/a	n/a	
	Human capital and research	**24.4**	**95**	◆
2.1	**Education**	**42.0**	**90**	
2.1.1	Expenditure on education, % GDP	4.1	65	
2.1.2	Government funding/pupil, secondary, % GDP/cap	30.3	8	●◆
2.1.3	School life expectancy, years	11.4	99	
2.1.4	PISA scales in reading, maths and science	n/a	n/a	
2.1.5	Pupil–teacher ratio, secondary	27.6	116	
2.2	**Tertiary education**	**28.1**	**81**	◆
2.2.1	Tertiary enrolment, % gross	7.0	121	○
2.2.2	Graduates in science and engineering, %	31.0	16	●◆
2.2.3	Tertiary inbound mobility, %	4.5	54	
2.3	**Research and development (R&D)**	**3.2**	**86**	◆
2.3.1	Researchers, FTE/mn pop. ⏲	58.5	98	
2.3.2	Gross expenditure on R&D, % GDP ⏲	0.8	49	◆
2.3.3	Global corporate R&D investors, top 3, mn USD$	0.0	41	○◇
2.3.4	QS university ranking, top 3*	0.0	75	○◇
	Infrastructure	**30.6**	**93**	◆
3.1	**Information and communication technologies (ICTs)**	**54.5**	**96**	◆
3.1.1	ICT access*	43.0	114	◆
3.1.2	ICT use*	35.2	113	◆
3.1.3	Government's online service*	77.2	41	●◆
3.1.4	E-participation*	62.8	53	◆
3.2	**General infrastructure**	**22.1**	**93**	
3.2.1	Electricity output, GWh/mn pop. ⏲	72.8	125	○
3.2.2	Logistics performance*	31.8	71	◆
3.2.3	Gross capital formation, % GDP	25.0	52	
3.3	**Ecological sustainability**	**15.3**	**91**	
3.3.1	GDP/unit of energy use	5.9	110	
3.3.2	Low-carbon energy use, %	29.2	37	●
3.3.3	ISO 14001 environment/bn PPP$ GDP	0.2	117	
	Market sophistication	**16.0**	**117**	
4.1	**Credit**	**8.3**	**117**	
4.1.1	Finance for startups and scaleups†	n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP	22.9	110	
4.1.3	Loans from microfinance institutions, % GDP	1.0	31	
4.2	**Investment**	**15.3**	**46**	◆
4.2.1	Market capitalization, % GDP	30.8	46	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	0.0	74	◆
4.2.3	VC recipients, deals/bn PPP$ GDP	0.1	26	●◆
4.2.4	VC received, value, % GDP	0.0	58	◆
4.3	**Trade, diversification and market scale**	**24.4**	**119**	
4.3.1	Applied tariff rate, weighted avg., %	11.6	129	○◇
4.3.2	Domestic industry diversification	64.0	90	◆
4.3.3	Domestic market scale, bn PPP$	42.3	120	

		Score/Value	Rank	
	Business sophistication	**18.2**	**113**	◆
5.1	**Knowledge workers**	**10.3**	**119**	
5.1.1	Knowledge-intensive employment, %	6.8	116	
5.1.2	Firms offering formal training, %	27.4	62	
5.1.3	GERD performed by business, % GDP ⏲	0.0	73	
5.1.4	GERD financed by business, % ⏲	0.6	94	○
5.1.5	Females employed w/advanced degrees, % ⏲	3.1	104	◆
5.2	**Innovation linkages**	**28.6**	**53**	◆
5.2.1	Public research–industry co-publications, %	2.5	30	●◆
5.2.2	University–industry R&D collaboration†	49.7	54	◆
5.2.3	State of cluster development†	55.8	47	●◆
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	40	●◆
5.2.5	Patent families/bn PPP$ GDP	0.0	102	○◇
5.3	**Knowledge absorption**	**15.5**	**125**	○
5.3.1	Intellectual property payments, % total trade	0.0	116	
5.3.2	High-tech imports, % total trade	8.0	71	
5.3.3	ICT services imports, % total trade	0.6	105	◇
5.3.4	FDI net inflows, % GDP	2.1	73	
5.3.5	Research talent, % in businesses ⏲	5.6	71	
	Knowledge and technology outputs	**11.0**	**105**	
6.1	**Knowledge creation**	**7.6**	**95**	
6.1.1	Patents by origin/bn PPP$ GDP	0.2	97	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	99	○◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.2	39	
6.1.4	Scientific and technical articles/bn PPP$ GDP	11.3	65	
6.1.5	Citable documents H-index	3.4	117	
6.2	**Knowledge impact**	**23.2**	**76**	◆
6.2.1	Labor productivity growth, %	4.5	5	●◆
6.2.2	Unicorn valuation, % GDP	0.0	49	○◇
6.2.3	Software spending, % GDP	0.0	112	
6.2.4	High-tech manufacturing, %	8.3	92	◆
6.3	**Knowledge diffusion**	**2.3**	**128**	○◇
6.3.1	Intellectual property receipts, % total trade	0.0	90	
6.3.2	Production and export complexity	n/a	n/a	
6.3.3	High-tech exports, % total trade	0.5	90	◆
6.3.4	ICT services exports, % total trade	0.7	94	
6.3.5	ISO 9001 quality/bn PPP$ GDP	0.5	123	
	Creative outputs	**7.2**	**114**	
7.1	**Intangible assets**	**5.1**	**112**	
7.1.1	Intangible asset intensity, top 15, %	n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP	20.0	86	
7.1.3	Global brand value, top 5,000, % GDP	0.0	75	○◇
7.1.4	Industrial designs by origin/bn PPP$ GDP	0.1	109	
7.2	**Creative goods and services**	**1.6**	**[113]**	
7.2.1	Cultural and creative services exports, % total trade	0.0	103	
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	Creative goods exports, % total trade	0.2	77	◆
7.3	**Online creativity**	**17.0**	**108**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69	0.2	122	
7.3.2	GitHub commits/mn pop. 15–69	4.8	76	◆
7.3.3	Mobile app creation/bn PPP$ GDP	45.9	109	

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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Saudi Arabia

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Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
66	36	High	NAWA	32.3	2,246.5	68,453

		Score/Value	Rank	
	Institutions	**64.9**	**35**	
1.1	**Institutional environment**	**63.3**	**44**	
1.1.1	Operational stability for businesses*	67.3	48	◇
1.1.2	Government effectiveness*	59.2	42	
1.2	**Regulatory environment**	**52.5**	**53**	◇
1.2.1	Regulatory quality*	52.8	53	◇
1.2.2	Rule of law*	52.2	54	◇
1.3	**Business environment**	**78.8**	**9**	● ◆
1.3.1	Policy stability for doing business†	78.8	10	●
1.3.2	Entrepreneurship policies and culture†	78.9	5	● ◆
	Human capital and research	**43.4**	**33**	
2.1	**Education**	**57.4**	**[48]**	
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	16.9	21	
2.1.4	PISA scales in reading, maths and science	387.2	68	○ ◇
2.1.5	Pupil–teacher ratio, secondary	14.4	70	◇
2.2	**Tertiary education**	**39.8**	**40**	
2.2.1	Tertiary enrolment, % gross	73.7	34	
2.2.2	Graduates in science and engineering, %	28.1	30	
2.2.3	Tertiary inbound mobility, %	4.1	57	
2.3	**Research and development (R&D)**	**33.2**	**31**	
2.3.1	Researchers, FTE/mn pop.	834.8	57	◇
2.3.2	Gross expenditure on R&D, % GDP	0.5	60	
2.3.3	Global corporate R&D investors, top 3, mn USD$	67.9	16	●
2.3.4	QS university ranking, top 3*	49.0	23	
	Infrastructure	**46.1**	**49**	
3.1	**Information and communication technologies (ICTs)**	**85.0**	**26**	
3.1.1	ICT access*	100.0	1	●
3.1.2	ICT use*	91.2	17	●
3.1.3	Government's online service*	80.3	32	
3.1.4	E-participation*	68.6	43	
3.2	**General infrastructure**	**47.0**	**25**	
3.2.1	Electricity output, GWh/mn pop.	⏲ 11,373.9	13	●
3.2.2	Logistics performance*	59.1	37	
3.2.3	Gross capital formation, % GDP	26.6	38	
3.3	**Ecological sustainability**	**6.3**	**123**	○ ◇
3.3.1	GDP/unit of energy use	7.2	98	
3.3.2	Low-carbon energy use, %	0.1	128	○ ◇
3.3.3	ISO 14001 environment/bn PPP$ GDP	0.8	80	◇
	Market sophistication	**48.7**	**27**	
4.1	**Credit**	**49.4**	**24**	
4.1.1	Finance for startups and scaleups†	81.8	6	● ◆
4.1.2	Domestic credit to private sector, % GDP	⏲ 52.0	64	
4.1.3	Loans from microfinance institutions, % GDP	n/a	n/a	
4.2	**Investment**	**37.2**	**21**	
4.2.1	Market capitalization, % GDP	291.5	1	● ◆
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	0.1	55	
4.2.3	VC recipients, deals/bn PPP$ GDP	0.0	76	◇
4.2.4	VC received, value, % GDP	0.0	24	
4.3	**Trade, diversification and market scale**	**59.4**	**54**	
4.3.1	Applied tariff rate, weighted avg., %	3.9	90	◇
4.3.2	Domestic industry diversification	64.8	87	○ ◇
4.3.3	Domestic market scale, bn PPP$	2,246.5	17	●

		Score/Value	Rank	
	Business sophistication	**23.7**	**79**	◇
5.1	**Knowledge workers**	**17.7**	**[109]**	
5.1.1	Knowledge-intensive employment, %	n/a	n/a	
5.1.2	Firms offering formal training, %	⏲ 3.9	102	○ ◇
5.1.3	GERD performed by business, % GDP	0.2	56	
5.1.4	GERD financed by business, %	39.4	45	
5.1.5	Females employed w/advanced degrees, %	n/a	n/a	
5.2	**Innovation linkages**	**37.4**	**31**	
5.2.1	Public research–industry co-publications, %	0.8	99	◇
5.2.2	University–industry R&D collaboration†	60.3	36	
5.2.3	State of cluster development†	99.7	2	● ◆
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	55	
5.2.5	Patent families/bn PPP$ GDP	0.5	34	
5.3	**Knowledge absorption**	**16.0**	**118**	○ ◇
5.3.1	Intellectual property payments, % total trade	0.0	121	○ ◇
5.3.2	High-tech imports, % total trade	⏲ 8.2	68	
5.3.3	ICT services imports, % total trade	0.7	99	◇
5.3.4	FDI net inflows, % GDP	1.2	96	
5.3.5	Research talent, % in businesses	6.0	70	○ ◇
	Knowledge and technology outputs	**20.6**	**68**	◇
6.1	**Knowledge creation**	**22.1**	**52**	
6.1.1	Patents by origin/bn PPP$ GDP	1.2	48	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.2	52	
6.1.3	Utility models by origin/bn PPP$ GDP	-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP	18.3	39	
6.1.5	Citable documents H-index	27.7	36	
6.2	**Knowledge impact**	**22.1**	**85**	◇
6.2.1	Labor productivity growth, %	−2.1	128	○ ◇
6.2.2	Unicorn valuation, % GDP	0.1	48	
6.2.3	Software spending, % GDP	0.3	40	
6.2.4	High-tech manufacturing, %	26.3	47	
6.3	**Knowledge diffusion**	**17.6**	**66**	◇
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	Production and export complexity	58.6	38	
6.3.3	High-tech exports, % total trade	⏲ 0.8	83	◇
6.3.4	ICT services exports, % total trade	0.5	100	
6.3.5	ISO 9001 quality/bn PPP$ GDP	1.9	95	◇
	Creative outputs	**24.4**	**67**	◇
7.1	**Intangible assets**	**33.5**	**51**	
7.1.1	Intangible asset intensity, top 15, %	59.1	33	
7.1.2	Trademarks by origin/bn PPP$ GDP	11.8	107	○ ◇
7.1.3	Global brand value, top 5,000, % GDP	9.4	20	
7.1.4	Industrial designs by origin/bn PPP$ GDP	0.4	79	
7.2	**Creative goods and services**	**7.9**	**82**	◇
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	80	○ ◇
7.2.3	Entertainment and media market/th pop. 15–69	23.6	27	
7.2.4	Creative goods exports, % total trade	⏲ 0.4	68	
7.3	**Online creativity**	**22.9**	**84**	◇
7.3.1	Top-level domains (TLDs)/th pop. 15–69	1.5	86	◇
7.3.2	GitHub commits/mn pop. 15–69	2.6	98	◇
7.3.3	Mobile app creation/bn PPP$ GDP	64.5	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Senegal

GII 2024 rank

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Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
95	90	Lower middle	SSA	18.1	78.5	4,325

		Score/Value	Rank
	Institutions	**45.5**	**70**
1.1	**Institutional environment**	**53.3**	**68 ◆**
1.1.1	Operational stability for businesses*	62.7	65 ◆
1.1.2	Government effectiveness*	44.0	69 ◆
1.2	**Regulatory environment**	**35.2**	**85**
1.2.1	Regulatory quality*	34.0	89
1.2.2	Rule of law*	36.3	80
1.3	**Business environment**	**47.9**	**63**
1.3.1	Policy stability for doing business†	45.3	73
1.3.2	Entrepreneurship policies and culture† ⏲	50.6	24
	Human capital and research	**18.6**	**106**
2.1	**Education**	**39.9**	**94**
2.1.1	Expenditure on education, % GDP	5.6	24 ● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap ⏲	20.2	47
2.1.3	School life expectancy, years	9.1	107 ○ ◇
2.1.4	PISA scales in reading, maths and science	n/a	n/a
2.1.5	Pupil–teacher ratio, secondary	23.5	106
2.2	**Tertiary education**	**12.1**	**110**
2.2.1	Tertiary enrolment, % gross	16.8	106
2.2.2	Graduates in science and engineering, %	n/a	n/a
2.2.3	Tertiary inbound mobility, %	6.0	46 ●
2.3	**Research and development (R&D)**	**3.8**	**82**
2.3.1	Researchers, FTE/mn pop. ⏲	581.0	65
2.3.2	Gross expenditure on R&D, % GDP ⏲	0.6	56
2.3.3	Global corporate R&D investors, top 3, mn USD$	0.0	41 ○ ◇
2.3.4	QS university ranking, top 3*	0.0	75 ○ ◇
	Infrastructure	**35.7**	**81**
3.1	**Information and communication technologies (ICTs)**	**51.3**	**101**
3.1.1	ICT access*	72.4	92
3.1.2	ICT use*	56.1	101
3.1.3	Government's online service*	44.0	101
3.1.4	E-participation*	32.6	101
3.2	**General infrastructure**	**44.2**	**30 ● ◆**
3.2.1	Electricity output, GWh/mn pop.	432.5	112
3.2.2	Logistics performance*	n/a	n/a
3.2.3	Gross capital formation, % GDP	42.0	4 ● ◆
3.3	**Ecological sustainability**	**11.8**	**106**
3.3.1	GDP/unit of energy use	11.7	56
3.3.2	Low-carbon energy use, %	7.1	95
3.3.3	ISO 14001 environment/bn PPP$ GDP	0.4	98
	Market sophistication	**31.0**	**72**
4.1	**Credit**	**30.3**	**57**
4.1.1	Finance for startups and scaleups† ⏲	42.9	53
4.1.2	Domestic credit to private sector, % GDP	32.3	91
4.1.3	Loans from microfinance institutions, % GDP	3.5	9 ●
4.2	**Investment**	**24.5**	**33 ●**
4.2.1	Market capitalization, % GDP	n/a	n/a
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	0.1	64
4.2.3	VC recipients, deals/bn PPP$ GDP	0.1	35 ● ◆
4.2.4	VC received, value, % GDP	0.0	22 ● ◆
4.3	**Trade, diversification and market scale**	**38.1**	**104**
4.3.1	Applied tariff rate, weighted avg., %	8.1	121 ○
4.3.2	Domestic industry diversification ⏲	76.6	71
4.3.3	Domestic market scale, bn PPP$	78.5	95

		Score/Value	Rank
	Business sophistication	**14.7**	**123 ○ ◇**
5.1	**Knowledge workers**	**6.9**	**128 ○ ◇**
5.1.1	Knowledge-intensive employment, % ⏲	4.6	120 ○ ◇
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, % ⏲	1.0	119 ○
5.2	**Innovation linkages**	**16.7**	**99**
5.2.1	Public research–industry co-publications, %	0.3	127 ○ ◇
5.2.2	University–industry R&D collaboration†	44.3	65
5.2.3	State of cluster development†	33.1	97
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	87
5.2.5	Patent families/bn PPP$ GDP	0.0	102 ○ ◇
5.3	**Knowledge absorption**	**20.6**	**91**
5.3.1	Intellectual property payments, % total trade	0.1	105
5.3.2	High-tech imports, % total trade	4.1	119
5.3.3	ICT services imports, % total trade	1.1	75
5.3.4	FDI net inflows, % GDP	8.8	12 ● ◆
5.3.5	Research talent, % in businesses	n/a	n/a
	Knowledge and technology outputs	**21.5**	**62**
6.1	**Knowledge creation**	**5.9**	**106**
6.1.1	Patents by origin/bn PPP$ GDP	0.5	76
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	83
6.1.3	Utility models by origin/bn PPP$ GDP ⏲	0.0	74 ○ ◇
6.1.4	Scientific and technical articles/bn PPP$ GDP	7.2	89
6.1.5	Citable documents H-index	5.9	94
6.2	**Knowledge impact**	**49.6**	**12 ● ◆**
6.2.1	Labor productivity growth, %	1.0	54
6.2.2	Unicorn valuation, % GDP	4.8	7 ● ◆
6.2.3	Software spending, % GDP	0.2	66
6.2.4	High-tech manufacturing, % ⏲	22.1	54
6.3	**Knowledge diffusion**	**8.9**	**96**
6.3.1	Intellectual property receipts, % total trade	0.1	66
6.3.2	Production and export complexity	26.5	95
6.3.3	High-tech exports, % total trade	0.4	94
6.3.4	ICT services exports, % total trade	1.3	70
6.3.5	ISO 9001 quality/bn PPP$ GDP	1.4	107
	Creative outputs	**8.2**	**112**
7.1	**Intangible assets**	**4.9**	**115**
7.1.1	Intangible asset intensity, top 15, %	n/a	n/a
7.1.2	Trademarks by origin/bn PPP$ GDP	7.7	113
7.1.3	Global brand value, top 5,000, % GDP	1.4	52
7.1.4	Industrial designs by origin/bn PPP$ GDP	0.4	83
7.2	**Creative goods and services**	**10.1**	**[73]**
7.2.1	Cultural and creative services exports, % total trade	0.7	41 ●
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	Creative goods exports, % total trade	0.0	109
7.3	**Online creativity**	**13.0**	**121 ○**
7.3.1	Top-level domains (TLDs)/th pop. 15–69 ⏲	0.5	107
7.3.2	GitHub commits/mn pop. 15–69	1.0	114
7.3.3	Mobile app creation/bn PPP$ GDP	37.6	121 ○ ◇

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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Serbia

GII 2024 rank
52

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
60	47	Upper middle	EUR	6.8	173.1	26,074

			Score/Value	Rank	
	Institutions		**46.5**	**67**	
1.1	**Institutional environment**		**53.2**	**69**	
1.1.1	Operational stability for businesses*		60.7	69	
1.1.2	Government effectiveness*		45.7	61	
1.2	**Regulatory environment**		**43.0**	**65**	
1.2.1	Regulatory quality*		45.4	67	
1.2.2	Rule of law*		40.6	70	
1.3	**Business environment**		**43.2**	**73**	
1.3.1	Policy stability for doing business†		46.5	71	
1.3.2	Entrepreneurship policies and culture†	◷	40.0	43	

			Score/Value	Rank	
	Human capital and research		**35.4**	**50**	
2.1	**Education**		**54.6**	**56**	
2.1.1	Expenditure on education, % GDP	◷	3.3	94	○
2.1.2	Government funding/pupil, secondary, % GDP/cap		n/a	n/a	
2.1.3	School life expectancy, years		13.9	69	
2.1.4	PISA scales in reading, maths and science		442.6	42	
2.1.5	Pupil–teacher ratio, secondary		7.5	5	●◆
2.2	**Tertiary education**		**40.4**	**39**	◆
2.2.1	Tertiary enrolment, % gross		66.3	46	
2.2.2	Graduates in science and engineering, %		29.8	21	◆
2.2.3	Tertiary inbound mobility, %		4.6	53	
2.3	**Research and development (R&D)**		**11.2**	**58**	
2.3.1	Researchers, FTE/mn pop.		2,349.7	39	◆
2.3.2	Gross expenditure on R&D, % GDP		1.0	41	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		5.5	70	

			Score/Value	Rank	
	Infrastructure		**52.3**	**29**	◆
3.1	**Information and communication technologies (ICTs)**		**84.9**	**27**	◆
3.1.1	ICT access*		93.8	52	
3.1.2	ICT use*		82.0	45	
3.1.3	Government's online service*		83.6	26	◆
3.1.4	E-participation*		80.2	15	●◆
3.2	**General infrastructure**		**28.2**	**78**	
3.2.1	Electricity output, GWh/mn pop.		5,230.8	41	◆
3.2.2	Logistics performance*		31.8	71	
3.2.3	Gross capital formation, % GDP		24.7	55	
3.3	**Ecological sustainability**		**43.9**	**10**	●◆
3.3.1	GDP/unit of energy use		8.0	92	○
3.3.2	Low-carbon energy use, %		14.3	76	
3.3.3	ISO 14001 environment/bn PPP$ GDP		12.3	2	●◆

			Score/Value	Rank	
	Market sophistication		**42.2**	**40**	
4.1	**Credit**		**22.1**	**79**	
4.1.1	Finance for startups and scaleups†	◷	31.6	63	○
4.1.2	Domestic credit to private sector, % GDP		40.3	80	
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**n/a**	**[n/a]**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP		n/a	n/a	
4.2.4	VC received, value, % GDP		n/a	n/a	
4.3	**Trade, diversification and market scale**		**62.4**	**39**	
4.3.1	Applied tariff rate, weighted avg., %		1.5	56	
4.3.2	Domestic industry diversification		95.9	11	●◆
4.3.3	Domestic market scale, bn PPP$		173.1	77	

			Score/Value	Rank	
	Business sophistication		**27.2**	**63**	
5.1	**Knowledge workers**		**30.6**	**71**	
5.1.1	Knowledge-intensive employment, %		28.9	49	
5.1.2	Firms offering formal training, %	◷	38.3	39	
5.1.3	GERD performed by business, % GDP		0.4	43	
5.1.4	GERD financed by business, %		1.2	91	○◇
5.1.5	Females employed w/advanced degrees, %	◷	15.1	51	
5.2	**Innovation linkages**		**22.1**	**72**	
5.2.1	Public research–industry co-publications, %		1.1	85	
5.2.2	University–industry R&D collaboration†		45.0	64	
5.2.3	State of cluster development†		48.9	61	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	83	
5.2.5	Patent families/bn PPP$ GDP		0.1	59	
5.3	**Knowledge absorption**		**29.0**	**58**	
5.3.1	Intellectual property payments, % total trade		1.4	27	
5.3.2	High-tech imports, % total trade		7.1	87	
5.3.3	ICT services imports, % total trade		1.8	38	
5.3.4	FDI net inflows, % GDP		7.0	15	●◆
5.3.5	Research talent, % in businesses		10.9	63	○

			Score/Value	Rank	
	Knowledge and technology outputs		**29.6**	**41**	
6.1	**Knowledge creation**		**23.9**	**41**	
6.1.1	Patents by origin/bn PPP$ GDP		0.8	63	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.2	47	
6.1.3	Utility models by origin/bn PPP$ GDP		0.5	32	
6.1.4	Scientific and technical articles/bn PPP$ GDP		33.3	13	●◆
6.1.5	Citable documents H-index		16.1	52	
6.2	**Knowledge impact**		**24.5**	**68**	
6.2.1	Labor productivity growth, %		2.8	15	●
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.0	115	○◇
6.2.4	High-tech manufacturing, %		24.3	49	
6.3	**Knowledge diffusion**		**40.4**	**25**	◆
6.3.1	Intellectual property receipts, % total trade		0.4	31	◆
6.3.2	Production and export complexity		61.3	37	◆
6.3.3	High-tech exports, % total trade		2.6	51	
6.3.4	ICT services exports, % total trade		6.5	12	●◆
6.3.5	ISO 9001 quality/bn PPP$ GDP		22.7	5	●◆

			Score/Value	Rank	
	Creative outputs		**17.9**	**85**	
7.1	**Intangible assets**		**5.7**	**109**	○◇
7.1.1	Intangible asset intensity, top 15, %		−94.1	78	○◇
7.1.2	Trademarks by origin/bn PPP$ GDP		23.4	79	
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.7	70	
7.2	**Creative goods and services**		**24.8**	**46**	
7.2.1	Cultural and creative services exports, % total trade		1.9	14	●◆
7.2.2	National feature films/mn pop. 15–69		2.5	50	
7.2.3	Entertainment and media market/th pop. 15–69		n/a	n/a	
7.2.4	Creative goods exports, % total trade		0.5	61	
7.3	**Online creativity**		**35.4**	**43**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		4.7	55	
7.3.2	GitHub commits/mn pop. 15–69		27.6	38	◆
7.3.3	Mobile app creation/bn PPP$ GDP		73.7	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Singapore 4

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
11	1	High	SEAO	5.8	753.3	133,108

			Score/ Value	Rank
	Institutions		**99.1**	**1 ●◆**
1.1	**Institutional environment**		**100.0**	**1 ●◆**
1.1.1	Operational stability for businesses*		100.0	1 ●◆
1.1.2	Government effectiveness*		100.0	1 ●◆
1.2	**Regulatory environment**		**97.4**	**1 ●◆**
1.2.1	Regulatory quality*		100.0	1 ●◆
1.2.2	Rule of law*		94.9	3 ●
1.3	**Business environment**		**100.0**	**[1]**
1.3.1	Policy stability for doing business†		100.0	1 ●◆
1.3.2	Entrepreneurship policies and culture†		n/a	n/a
	Human capital and research		**65.0**	**2 ●◆**
2.1	**Education**		**59.6**	**39**
2.1.1	Expenditure on education, % GDP		2.4	116 ○◇
2.1.2	Government funding/pupil, secondary, % GDP/cap		20.5	46 ○
2.1.3	School life expectancy, years	⏲	16.9	23
2.1.4	PISA scales in reading, maths and science		559.6	2 ●◆
2.1.5	Pupil–teacher ratio, secondary	⏲	11.6	49
2.2	**Tertiary education**		**75.0**	**2 ●◆**
2.2.1	Tertiary enrolment, % gross	⏲	97.1	9
2.2.2	Graduates in science and engineering, %		35.9	5 ◆
2.2.3	Tertiary inbound mobility, %		n/a	n/a
2.3	**Research and development (R&D)**		**60.6**	**14**
2.3.1	Researchers, FTE/mn pop.	⏲	7,488.4	5
2.3.2	Gross expenditure on R&D, % GDP	⏲	2.2	17
2.3.3	Global corporate R&D investors, top 3, mn USD$		62.4	21
2.3.4	QS university ranking, top 3*		68.7	13
	Infrastructure		**56.7**	**11**
3.1	**Information and communication technologies (ICTs)**		**96.2**	**3 ●◆**
3.1.1	ICT access*		100.0	1 ●
3.1.2	ICT use*		91.5	16
3.1.3	Government's online service*		95.8	5
3.1.4	E-participation*		97.7	3 ●◆
3.2	**General infrastructure**		**55.3**	**12**
3.2.1	Electricity output, GWh/mn pop.		10,234.2	15
3.2.2	Logistics performance*		100.0	1 ●◆
3.2.3	Gross capital formation, % GDP		22.8	77 ○
3.3	**Ecological sustainability**		**18.7**	**70 ○◇**
3.3.1	GDP/unit of energy use		16.2	23
3.3.2	Low-carbon energy use, %		0.6	123 ○◇
3.3.3	ISO 14001 environment/bn PPP$ GDP		2.5	41
	Market sophistication		**65.0**	**7**
4.1	**Credit**		**47.4**	**[27]**
4.1.1	Finance for startups and scaleups†		n/a	n/a
4.1.2	Domestic credit to private sector, % GDP	⏲	129.5	14
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a
4.2	**Investment**		**88.6**	**3 ●◆**
4.2.1	Market capitalization, % GDP		158.8	7
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		2.7	1 ●◆
4.2.3	VC recipients, deals/bn PPP$ GDP		1.8	1 ●◆
4.2.4	VC received, value, % GDP		0.0	1 ●◆
4.3	**Trade, diversification and market scale**		**59.0**	**56**
4.3.1	Applied tariff rate, weighted avg., %		0.0	2 ●◆
4.3.2	Domestic industry diversification		62.2	93 ○◇
4.3.3	Domestic market scale, bn PPP$		753.3	37

			Score/ Value	Rank
	Business sophistication		**68.7**	**3 ●◆**
5.1	**Knowledge workers**		**71.1**	**7**
5.1.1	Knowledge-intensive employment, %		61.7	2 ●◆
5.1.2	Firms offering formal training, %		42.9	30 ◇
5.1.3	GERD performed by business, % GDP	⏲	1.4	18
5.1.4	GERD financed by business, %	⏲	58.3	15
5.1.5	Females employed w/advanced degrees, %	⏲	30.0	3 ●◆
5.2	**Innovation linkages**		**63.5**	**7**
5.2.1	Public research–industry co-publications, %		3.8	21
5.2.2	University–industry R&D collaboration†		84.9	7
5.2.3	State of cluster development†		84.5	14
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.2	5 ◆
5.2.5	Patent families/bn PPP$ GDP		2.9	15
5.3	**Knowledge absorption**		**71.4**	**2 ●◆**
5.3.1	Intellectual property payments, % total trade		2.4	10
5.3.2	High-tech imports, % total trade		25.1	5 ◆
5.3.3	ICT services imports, % total trade		3.3	7
5.3.4	FDI net inflows, % GDP		28.5	3 ●◆
5.3.5	Research talent, % in businesses	⏲	54.2	21
	Knowledge and technology outputs		**55.4**	**9**
6.1	**Knowledge creation**		**39.9**	**21**
6.1.1	Patents by origin/bn PPP$ GDP		2.4	27
6.1.2	PCT patents by origin/bn PPP$ GDP		2.3	13
6.1.3	Utility models by origin/bn PPP$ GDP		-	-
6.1.4	Scientific and technical articles/bn PPP$ GDP		19.2	34
6.1.5	Citable documents H-index		40.3	22
6.2	**Knowledge impact**		**68.9**	**2 ●◆**
6.2.1	Labor productivity growth, %		1.0	53
6.2.2	Unicorn valuation, % GDP		18.2	1 ●◆
6.2.3	Software spending, % GDP		0.2	58 ○◇
6.2.4	High-tech manufacturing, %		82.0	1 ●◆
6.3	**Knowledge diffusion**		**57.5**	**5**
6.3.1	Intellectual property receipts, % total trade		1.7	14
6.3.2	Production and export complexity		89.2	5
6.3.3	High-tech exports, % total trade		28.8	1 ●◆
6.3.4	ICT services exports, % total trade		3.3	35
6.3.5	ISO 9001 quality/bn PPP$ GDP		7.0	37
	Creative outputs		**47.4**	**19**
7.1	**Intangible assets**		**37.0**	**41**
7.1.1	Intangible asset intensity, top 15, %		44.9	54 ○◇
7.1.2	Trademarks by origin/bn PPP$ GDP		19.0	92 ○◇
7.1.3	Global brand value, top 5,000, % GDP		13.3	11
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.5	78 ○
7.2	**Creative goods and services**		**48.6**	**9**
7.2.1	Cultural and creative services exports, % total trade		5.7	1 ●◆
7.2.2	National feature films/mn pop. 15–69		1.8	59 ○◇
7.2.3	Entertainment and media market/th pop. 15–69		41.5	20
7.2.4	Creative goods exports, % total trade		3.3	15
7.3	**Online creativity**		**67.1**	**9**
7.3.1	Top-level domains (TLDs)/th pop. 15–69		16.3	34 ◇
7.3.2	GitHub commits/mn pop. 15–69		100.0	1 ●◆
7.3.3	Mobile app creation/bn PPP$ GDP		85.1	5 ◆

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GII 2024 rank

Slovakia

46

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
44	52	High	EUR	5.5	229.6	42,228

		Score/ Value	Rank	
	Institutions	**47.8**	**63**	◇
1.1	**Institutional environment**	**63.6**	**43**	
1.1.1	Operational stability for businesses*	73.3	38	
1.1.2	Government effectiveness*	53.9	52	◇
1.2	**Regulatory environment**	**62.9**	**38**	
1.2.1	Regulatory quality*	64.2	35	
1.2.2	Rule of law*	61.7	38	
1.3	**Business environment**	**17.0**	**124**	○ ◇
1.3.1	Policy stability for doing business† ◷	26.6	110	○ ◇
1.3.2	Entrepreneurship policies and culture†	7.4	80	○ ◇
	Human capital and research	**34.6**	**52**	◇
2.1	**Education**	**54.5**	**58**	
2.1.1	Expenditure on education, % GDP ◷	4.3	61	
2.1.2	Government funding/pupil, secondary, % GDP/cap	24.4	24	
2.1.3	School life expectancy, years	14.9	50	
2.1.4	PISA scales in reading, maths and science	457.7	40	
2.1.5	Pupil–teacher ratio, secondary	12.3	54	
2.2	**Tertiary education**	**34.6**	**61**	
2.2.1	Tertiary enrolment, % gross	52.5	70	◇
2.2.2	Graduates in science and engineering, %	21.4	69	
2.2.3	Tertiary inbound mobility, %	11.9	19	●
2.3	**Research and development (R&D)**	**14.9**	**49**	
2.3.1	Researchers, FTE/mn pop.	3,384.4	31	
2.3.2	Gross expenditure on R&D, % GDP	1.0	39	
2.3.3	Global corporate R&D investors, top 3, mn USD$	0.0	41	○ ◇
2.3.4	QS university ranking, top 3*	9.3	66	◇
	Infrastructure	**47.9**	**47**	
3.1	**Information and communication technologies (ICTs)**	**70.3**	**74**	◇
3.1.1	ICT access*	88.1	73	◇
3.1.2	ICT use*	78.0	66	◇
3.1.3	Government's online service*	69.7	62	
3.1.4	E-participation*	45.3	81	◇
3.2	**General infrastructure**	**31.2**	**67**	◇
3.2.1	Electricity output, GWh/mn pop.	4,802.3	45	
3.2.2	Logistics performance*	54.5	42	
3.2.3	Gross capital formation, % GDP	20.8	95	○
3.3	**Ecological sustainability**	**42.3**	**12**	● ◆
3.3.1	GDP/unit of energy use	10.9	63	
3.3.2	Low-carbon energy use, %	30.1	33	
3.3.3	ISO 14001 environment/bn PPP$ GDP	8.5	10	● ◆
	Market sophistication	**32.2**	**68**	
4.1	**Credit**	**35.6**	**41**	
4.1.1	Finance for startups and scaleups†	48.2	43	
4.1.2	Domestic credit to private sector, % GDP	66.9	48	
4.1.3	Loans from microfinance institutions, % GDP	n/a	n/a	
4.2	**Investment**	**4.7**	**82**	◇
4.2.1	Market capitalization, % GDP ◷	5.5	79	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	0.1	44	
4.2.3	VC recipients, deals/bn PPP$ GDP	0.0	67	
4.2.4	VC received, value, % GDP	0.0	77	○ ◇
4.3	**Trade, diversification and market scale**	**56.5**	**67**	
4.3.1	Applied tariff rate, weighted avg., %	1.1	21	
4.3.2	Domestic industry diversification	74.1	74	
4.3.3	Domestic market scale, bn PPP$	229.6	67	

		Score/ Value	Rank	
	Business sophistication	**32.5**	**43**	
5.1	**Knowledge workers**	**48.8**	**34**	
5.1.1	Knowledge-intensive employment, %	38.3	36	
5.1.2	Firms offering formal training, % ◷	43.3	29	
5.1.3	GERD performed by business, % GDP	0.6	37	
5.1.4	GERD financed by business, %	45.7	36	
5.1.5	Females employed w/advanced degrees, %	18.2	37	
5.2	**Innovation linkages**	**20.3**	**84**	◇
5.2.1	Public research–industry co-publications, %	2.2	41	
5.2.2	University–industry R&D collaboration† ◷	27.2	101	○ ◇
5.2.3	State of cluster development† ◷	43.0	73	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	98	○ ◇
5.2.5	Patent families/bn PPP$ GDP	0.2	43	
5.3	**Knowledge absorption**	**28.5**	**59**	
5.3.1	Intellectual property payments, % total trade	0.7	59	
5.3.2	High-tech imports, % total trade	11.5	26	●
5.3.3	ICT services imports, % total trade	1.0	76	
5.3.4	FDI net inflows, % GDP	1.1	97	○
5.3.5	Research talent, % in businesses	30.6	45	
	Knowledge and technology outputs	**31.4**	**31**	
6.1	**Knowledge creation**	**22.4**	**50**	
6.1.1	Patents by origin/bn PPP$ GDP	1.1	57	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.3	43	
6.1.3	Utility models by origin/bn PPP$ GDP	1.1	16	● ◆
6.1.4	Scientific and technical articles/bn PPP$ GDP	19.0	35	
6.1.5	Citable documents H-index	16.3	51	
6.2	**Knowledge impact**	**37.3**	**32**	
6.2.1	Labor productivity growth, %	1.4	44	
6.2.2	Unicorn valuation, % GDP	0.0	49	○ ◇
6.2.3	Software spending, % GDP	0.2	53	
6.2.4	High-tech manufacturing, %	57.3	6	● ◆
6.3	**Knowledge diffusion**	**34.5**	**33**	
6.3.1	Intellectual property receipts, % total trade	0.0	73	
6.3.2	Production and export complexity	79.9	12	●
6.3.3	High-tech exports, % total trade	7.1	29	●
6.3.4	ICT services exports, % total trade	1.7	62	
6.3.5	ISO 9001 quality/bn PPP$ GDP	17.8	13	● ◆
	Creative outputs	**27.8**	**58**	
7.1	**Intangible assets**	**16.0**	**89**	◇
7.1.1	Intangible asset intensity, top 15, %	n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP	42.5	42	
7.1.3	Global brand value, top 5,000, % GDP	0.2	73	◇
7.1.4	Industrial designs by origin/bn PPP$ GDP	1.7	42	
7.2	**Creative goods and services**	**41.9**	**13**	●
7.2.1	Cultural and creative services exports, % total trade	0.4	63	
7.2.2	National feature films/mn pop. 15–69	7.0	15	●
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Creative goods exports, % total trade	5.8	9	● ◆
7.3	**Online creativity**	**37.2**	**38**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69	17.7	32	
7.3.2	GitHub commits/mn pop. 15–69	22.8	44	
7.3.3	Mobile app creation/bn PPP$ GDP	71.3	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Slovenia

GII 2024 rank

34

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
37	33	High	EUR	2.1	108.7	51,407

		Score/ Value	Rank	
	Institutions	**58.9**	**41**	
1.1	**Institutional environment**	**75.0**	**29**	
1.1.1	Operational stability for businesses*	78.0	29	
1.1.2	Government effectiveness*	71.9	29	
1.2	**Regulatory environment**	**65.9**	**33**	
1.2.1	Regulatory quality*	60.1	41	
1.2.2	Rule of law*	71.7	27	
1.3	**Business environment**	**35.7**	**89**	○ ◇
1.3.1	Policy stability for doing business†	40.5	88	○ ◇
1.3.2	Entrepreneurship policies and culture†	31.0	53	○
	Human capital and research	**49.3**	**24**	
2.1	**Education**	**62.7**	**25**	
2.1.1	Expenditure on education, % GDP ◷	5.7	22	
2.1.2	Government funding/pupil, secondary, % GDP/cap	24.0	30	
2.1.3	School life expectancy, years	17.5	16	●
2.1.4	PISA scales in reading, maths and science	484.3	21	
2.1.5	Pupil–teacher ratio, secondary	14.2	69	◇
2.2	**Tertiary education**	**47.9**	**18**	●
2.2.1	Tertiary enrolment, % gross	82.4	21	
2.2.2	Graduates in science and engineering, %	29.5	23	
2.2.3	Tertiary inbound mobility, %	9.5	28	
2.3	**Research and development (R&D)**	**37.4**	**27**	
2.3.1	Researchers, FTE/mn pop.	5,414.3	17	●
2.3.2	Gross expenditure on R&D, % GDP	2.1	18	●
2.3.3	Global corporate R&D investors, top 3, mn USD$	49.5	31	
2.3.4	QS university ranking, top 3*	10.9	64	
	Infrastructure	**53.2**	**26**	
3.1	**Information and communication technologies (ICTs)**	**86.0**	**20**	●
3.1.1	ICT access*	98.7	26	
3.1.2	ICT use*	85.7	30	
3.1.3	Government's online service*	85.3	22	
3.1.4	E-participation*	74.4	25	
3.2	**General infrastructure**	**34.4**	**52**	
3.2.1	Electricity output, GWh/mn pop.	6,339.5	31	
3.2.2	Logistics performance*	54.5	42	
3.2.3	Gross capital formation, % GDP	21.9	86	○
3.3	**Ecological sustainability**	**39.3**	**20**	●
3.3.1	GDP/unit of energy use	12.7	46	
3.3.2	Low-carbon energy use, %	33.6	27	
3.3.3	ISO 14001 environment/bn PPP$ GDP	6.3	15	●
	Market sophistication	**33.4**	**62**	
4.1	**Credit**	**31.7**	**51**	
4.1.1	Finance for startups and scaleups†	50.7	37	
4.1.2	Domestic credit to private sector, % GDP	41.1	78	
4.1.3	Loans from microfinance institutions, % GDP	n/a	n/a	
4.2	**Investment**	**5.8**	**72**	◇
4.2.1	Market capitalization, % GDP	15.6	69	○
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	0.1	52	
4.2.3	VC recipients, deals/bn PPP$ GDP	0.0	62	
4.2.4	VC received, value, % GDP	0.0	72	○
4.3	**Trade, diversification and market scale**	**62.6**	**38**	
4.3.1	Applied tariff rate, weighted avg., %	1.1	21	
4.3.2	Domestic industry diversification	94.7	21	
4.3.3	Domestic market scale, bn PPP$	108.7	88	○

		Score/ Value	Rank	
	Business sophistication	**41.6**	**32**	
5.1	**Knowledge workers**	**59.9**	**23**	
5.1.1	Knowledge-intensive employment, %	46.7	18	●
5.1.2	Firms offering formal training, % ◷	44.0	27	
5.1.3	GERD performed by business, % GDP	1.5	16	
5.1.4	GERD financed by business, %	48.7	33	
5.1.5	Females employed w/advanced degrees, %	22.7	24	
5.2	**Innovation linkages**	**30.2**	**45**	
5.2.1	Public research–industry co-publications, %	3.0	25	
5.2.2	University–industry R&D collaboration†	53.3	49	
5.2.3	State of cluster development†	37.1	92	○ ◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	64	
5.2.5	Patent families/bn PPP$ GDP	1.4	24	
5.3	**Knowledge absorption**	**34.9**	**41**	
5.3.1	Intellectual property payments, % total trade	0.6	64	
5.3.2	High-tech imports, % total trade	8.6	59	
5.3.3	ICT services imports, % total trade	1.4	61	
5.3.4	FDI net inflows, % GDP	2.7	56	
5.3.5	Research talent, % in businesses	58.1	17	
	Knowledge and technology outputs	**34.4**	**27**	
6.1	**Knowledge creation**	**39.2**	**23**	
6.1.1	Patents by origin/bn PPP$ GDP	3.4	21	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.9	28	
6.1.3	Utility models by origin/bn PPP$ GDP	-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP	39.0	6	● ◆
6.1.5	Citable documents H-index	19.2	44	
6.2	**Knowledge impact**	**25.3**	**65**	
6.2.1	Labor productivity growth, %	0.9	57	
6.2.2	Unicorn valuation, % GDP	0.0	49	○ ◇
6.2.3	Software spending, % GDP	0.1	100	○ ◇
6.2.4	High-tech manufacturing, %	36.8	31	
6.3	**Knowledge diffusion**	**38.7**	**27**	
6.3.1	Intellectual property receipts, % total trade	0.3	42	
6.3.2	Production and export complexity	83.1	9	●
6.3.3	High-tech exports, % total trade	7.2	28	
6.3.4	ICT services exports, % total trade	1.8	60	
6.3.5	ISO 9001 quality/bn PPP$ GDP	21.4	6	● ◆
	Creative outputs	**31.7**	**48**	
7.1	**Intangible assets**	**24.1**	**74**	
7.1.1	Intangible asset intensity, top 15, %	−24.5	74	○ ◇
7.1.2	Trademarks by origin/bn PPP$ GDP	42.2	44	
7.1.3	Global brand value, top 5,000, % GDP	0.4	63	◇
7.1.4	Industrial designs by origin/bn PPP$ GDP	2.8	30	
7.2	**Creative goods and services**	**31.8**	**31**	
7.2.1	Cultural and creative services exports, % total trade	0.8	36	
7.2.2	National feature films/mn pop. 15–69	8.7	9	●
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Creative goods exports, % total trade	1.6	31	
7.3	**Online creativity**	**46.7**	**29**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69	23.0	26	
7.3.2	GitHub commits/mn pop. 15–69	39.6	27	
7.3.3	Mobile app creation/bn PPP$ GDP	77.5	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

South Africa

GII 2024 rank

69

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
61	75	Upper middle	SSA	63.2	997.4	16,211

			Score/ Value	Rank	
	Institutions		**36.5**	**91**	
1.1	**Institutional environment**		**43.7**	**89**	
1.1.1	Operational stability for businesses*		46.7	100	○
1.1.2	Government effectiveness*		40.7	77	
1.2	**Regulatory environment**		**40.7**	**69**	
1.2.1	Regulatory quality*		37.0	84	
1.2.2	Rule of law*		44.4	61	
1.3	**Business environment**		**25.2**	**110**	○
1.3.1	Policy stability for doing business†		40.6	87	
1.3.2	Entrepreneurship policies and culture†		9.8	78	○◇
	Human capital and research		**26.8**	**79**	
2.1	**Education**		**48.7**	**71**	
2.1.1	Expenditure on education, % GDP		6.6	8	●◆
2.1.2	Government funding/pupil, secondary, % GDP/cap		22.0	38	
2.1.3	School life expectancy, years	◷	14.1	67	
2.1.4	PISA scales in reading, maths and science		n/a	n/a	
2.1.5	Pupil–teacher ratio, secondary	◷	29.8	121	○◇
2.2	**Tertiary education**		**17.7**	**102**	○◇
2.2.1	Tertiary enrolment, % gross	◷	25.4	94	◇
2.2.2	Graduates in science and engineering, %		18.7	86	○
2.2.3	Tertiary inbound mobility, %	◷	2.9	66	
2.3	**Research and development (R&D)**		**14.0**	**51**	
2.3.1	Researchers, FTE/mn pop.	◷	475.9	75	
2.3.2	Gross expenditure on R&D, % GDP	◷	0.6	55	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		41.5	31	●◆
	Infrastructure		**37.1**	**75**	
3.1	**Information and communication technologies (ICTs)**		**72.4**	**67**	
3.1.1	ICT access*		81.6	83	
3.1.2	ICT use*		77.7	67	
3.1.3	Government's online service*		72.2	55	
3.1.4	E-participation*		58.1	61	
3.2	**General infrastructure**		**30.0**	**72**	
3.2.1	Electricity output, GWh/mn pop.		3,851.3	55	
3.2.2	Logistics performance*		72.7	18	●◆
3.2.3	Gross capital formation, % GDP		14.8	123	○◇
3.3	**Ecological sustainability**		**8.9**	**112**	○◇
3.3.1	GDP/unit of energy use		6.2	107	○◇
3.3.2	Low-carbon energy use, %		5.7	103	○
3.3.3	ISO 14001 environment/bn PPP$ GDP		1.2	65	
	Market sophistication		**37.8**	**49**	
4.1	**Credit**		**27.9**	**63**	
4.1.1	Finance for startups and scaleups†		37.5	58	
4.1.2	Domestic credit to private sector, % GDP		92.2	28	●◆
4.1.3	Loans from microfinance institutions, % GDP		1.2	26	
4.2	**Investment**		**33.9**	**23**	●◆
4.2.1	Market capitalization, % GDP		290.7	4	●◆
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.1	41	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.1	49	
4.2.4	VC received, value, % GDP		0.0	52	
4.3	**Trade, diversification and market scale**		**51.7**	**76**	
4.3.1	Applied tariff rate, weighted avg., %		5.2	96	◇
4.3.2	Domestic industry diversification		76.2	72	
4.3.3	Domestic market scale, bn PPP$		997.4	32	

			Score/ Value	Rank	
	Business sophistication		**28.6**	**57**	
5.1	**Knowledge workers**		**21.8**	**101**	◇
5.1.1	Knowledge-intensive employment, %		21.8	71	
5.1.2	Firms offering formal training, %	◷	7.9	99	○◇
5.1.3	GERD performed by business, % GDP	◷	0.2	57	
5.1.4	GERD financed by business, %	◷	26.9	64	
5.1.5	Females employed w/advanced degrees, %		10.7	71	
5.2	**Innovation linkages**		**31.0**	**42**	
5.2.1	Public research–industry co-publications, %		1.4	72	
5.2.2	University–industry R&D collaboration†		63.1	33	◆
5.2.3	State of cluster development†		58.9	40	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	31	◆
5.2.5	Patent families/bn PPP$ GDP		0.2	46	
5.3	**Knowledge absorption**		**32.9**	**51**	
5.3.1	Intellectual property payments, % total trade		1.2	29	●
5.3.2	High-tech imports, % total trade		9.4	48	
5.3.3	ICT services imports, % total trade		2.7	18	●◆
5.3.4	FDI net inflows, % GDP		4.3	31	●
5.3.5	Research talent, % in businesses	◷	11.1	62	
	Knowledge and technology outputs		**21.4**	**63**	
6.1	**Knowledge creation**		**22.4**	**51**	
6.1.1	Patents by origin/bn PPP$ GDP		1.7	35	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.2	49	
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		14.2	46	
6.1.5	Citable documents H-index		32.1	31	●◆
6.2	**Knowledge impact**		**27.6**	**61**	
6.2.1	Labor productivity growth, %		0.2	87	
6.2.2	Unicorn valuation, % GDP		0.4	40	
6.2.3	Software spending, % GDP		0.4	27	●◆
6.2.4	High-tech manufacturing, %		17.5	66	
6.3	**Knowledge diffusion**		**14.1**	**78**	
6.3.1	Intellectual property receipts, % total trade		0.1	50	
6.3.2	Production and export complexity		39.3	67	
6.3.3	High-tech exports, % total trade		2.0	62	
6.3.4	ICT services exports, % total trade		0.7	92	
6.3.5	ISO 9001 quality/bn PPP$ GDP		4.9	60	
	Creative outputs		**25.3**	**63**	
7.1	**Intangible assets**		**34.9**	**48**	
7.1.1	Intangible asset intensity, top 15, %		56.9	36	
7.1.2	Trademarks by origin/bn PPP$ GDP		23.4	80	
7.1.3	Global brand value, top 5,000, % GDP		8.3	24	●◆
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.7	68	
7.2	**Creative goods and services**		**7.2**	**86**	
7.2.1	Cultural and creative services exports, % total trade		0.4	65	
7.2.2	National feature films/mn pop. 15–69		0.5	78	○◇
7.2.3	Entertainment and media market/th pop. 15–69		7.3	41	
7.2.4	Creative goods exports, % total trade		0.7	56	
7.3	**Online creativity**		**24.1**	**73**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		5.3	52	
7.3.2	GitHub commits/mn pop. 15–69		5.0	73	
7.3.3	Mobile app creation/bn PPP$ GDP		61.8	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Spain

GII 2024 rank

28

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
23	29	High	EUR	47.9	2,413.1	50,472

		Score/ Value	Rank
	Institutions	**56.2**	**49**
1.1	**Institutional environment**	**68.0**	**39**
1.1.1	Operational stability for businesses*	68.0	43
1.1.2	Government effectiveness*	68.0	33
1.2	**Regulatory environment**	**64.8**	**35**
1.2.1	Regulatory quality*	62.8	36
1.2.2	Rule of law*	66.8	34
1.3	**Business environment**	**35.8**	**88** ○◇
1.3.1	Policy stability for doing business†	38.1	93 ○◇
1.3.2	Entrepreneurship policies and culture†	33.4	49 ○

		Score/ Value	Rank
	Human capital and research	**47.3**	**27**
2.1	**Education**	**60.8**	**33**
2.1.1	Expenditure on education, % GDP ◷	4.6	54 ○
2.1.2	Government funding/pupil, secondary, % GDP/cap	22.4	36
2.1.3	School life expectancy, years ◷	17.8	14
2.1.4	PISA scales in reading, maths and science	477.3	28
2.1.5	Pupil–teacher ratio, secondary ◷	11.0	40
2.2	**Tertiary education**	**37.0**	**51**
2.2.1	Tertiary enrolment, % gross ◷	94.6	11 ●
2.2.2	Graduates in science and engineering, %	21.5	68 ○
2.2.3	Tertiary inbound mobility, % ◷	3.6	59 ○
2.3	**Research and development (R&D)**	**44.2**	**22**
2.3.1	Researchers, FTE/mn pop.	3,410.1	30
2.3.2	Gross expenditure on R&D, % GDP	1.4	29
2.3.3	Global corporate R&D investors, top 3, mn USD$	68.2	15 ●
2.3.4	QS university ranking, top 3*	50.7	20

		Score/ Value	Rank
	Infrastructure	**56.3**	**14** ●
3.1	**Information and communication technologies (ICTs)**	**85.6**	**22**
3.1.1	ICT access*	99.8	16 ●
3.1.2	ICT use*	84.1	38
3.1.3	Government's online service*	84.1	25
3.1.4	E-participation*	74.4	25
3.2	**General infrastructure**	**42.4**	**32**
3.2.1	Electricity output, GWh/mn pop.	6,024.6	36
3.2.2	Logistics performance*	81.8	13
3.2.3	Gross capital formation, % GDP	21.3	90 ○
3.3	**Ecological sustainability**	**40.9**	**15** ●
3.3.1	GDP/unit of energy use	15.2	30
3.3.2	Low-carbon energy use, %	29.2	36
3.3.3	ISO 14001 environment/bn PPP$ GDP	6.8	13 ●◆

		Score/ Value	Rank
	Market sophistication	**44.8**	**33**
4.1	**Credit**	**38.1**	**36**
4.1.1	Finance for startups and scaleups†	44.2	52 ○
4.1.2	Domestic credit to private sector, % GDP	90.0	31
4.1.3	Loans from microfinance institutions, % GDP	n/a	n/a
4.2	**Investment**	**18.6**	**42**
4.2.1	Market capitalization, % GDP	53.3	35
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	0.1	37
4.2.3	VC recipients, deals/bn PPP$ GDP	0.1	38
4.2.4	VC received, value, % GDP	0.0	37
4.3	**Trade, diversification and market scale**	**77.9**	**13** ●
4.3.1	Applied tariff rate, weighted avg., %	1.1	21
4.3.2	Domestic industry diversification	94.9	18
4.3.3	Domestic market scale, bn PPP$	2,413.1	15 ●

		Score/ Value	Rank
	Business sophistication	**41.8**	**31**
5.1	**Knowledge workers**	**58.0**	**24**
5.1.1	Knowledge-intensive employment, %	35.7	39
5.1.2	Firms offering formal training, % ◷	55.2	12 ●
5.1.3	GERD performed by business, % GDP	0.8	29
5.1.4	GERD financed by business, %	50.2	28
5.1.5	Females employed w/advanced degrees, %	24.7	18
5.2	**Innovation linkages**	**32.5**	**40**
5.2.1	Public research–industry co-publications, %	2.7	28
5.2.2	University–industry R&D collaboration†	43.5	69 ○
5.2.3	State of cluster development†	66.2	37
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	35
5.2.5	Patent families/bn PPP$ GDP	0.6	33
5.3	**Knowledge absorption**	**35.0**	**40**
5.3.1	Intellectual property payments, % total trade	1.2	30
5.3.2	High-tech imports, % total trade	8.8	56 ○
5.3.3	ICT services imports, % total trade	1.7	39
5.3.4	FDI net inflows, % GDP	3.0	49
5.3.5	Research talent, % in businesses	40.1	36

		Score/ Value	Rank
	Knowledge and technology outputs	**36.4**	**24**
6.1	**Knowledge creation**	**36.6**	**25**
6.1.1	Patents by origin/bn PPP$ GDP	1.4	41
6.1.2	PCT patents by origin/bn PPP$ GDP	0.6	31
6.1.3	Utility models by origin/bn PPP$ GDP	1.1	17 ◆
6.1.4	Scientific and technical articles/bn PPP$ GDP	25.7	26
6.1.5	Citable documents H-index	62.1	12 ●
6.2	**Knowledge impact**	**37.5**	**31**
6.2.1	Labor productivity growth, %	−0.3	103 ○
6.2.2	Unicorn valuation, % GDP	0.4	39
6.2.3	Software spending, % GDP	0.6	12 ●◆
6.2.4	High-tech manufacturing, %	33.9	35
6.3	**Knowledge diffusion**	**35.0**	**32**
6.3.1	Intellectual property receipts, % total trade	0.8	23
6.3.2	Production and export complexity	62.1	34
6.3.3	High-tech exports, % total trade	6.5	33
6.3.4	ICT services exports, % total trade	2.8	44
6.3.5	ISO 9001 quality/bn PPP$ GDP	14.5	18

		Score/ Value	Rank
	Creative outputs	**44.8**	**23**
7.1	**Intangible assets**	**52.2**	**19**
7.1.1	Intangible asset intensity, top 15, %	66.2	24
7.1.2	Trademarks by origin/bn PPP$ GDP	39.7	51
7.1.3	Global brand value, top 5,000, % GDP	7.8	27
7.1.4	Industrial designs by origin/bn PPP$ GDP	6.5	13 ●◆
7.2	**Creative goods and services**	**31.1**	**35**
7.2.1	Cultural and creative services exports, % total trade	1.1	25
7.2.2	National feature films/mn pop. 15–69	9.4	7 ●◆
7.2.3	Entertainment and media market/th pop. 15–69	26.6	24
7.2.4	Creative goods exports, % total trade	0.8	50
7.3	**Online creativity**	**43.6**	**32**
7.3.1	Top-level domains (TLDs)/th pop. 15–69	19.8	30
7.3.2	GitHub commits/mn pop. 15–69	38.4	30
7.3.3	Mobile app creation/bn PPP$ GDP	72.7	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Sri Lanka

GII 2024 rank **89**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
82	100	Lower middle	CSA	23.0	NA	NA

			Score/Value	Rank	
	Institutions		**32.7**	**101**	
1.1	**Institutional environment**		**31.2**	**112**	
1.1.1	Operational stability for businesses*		28.7	120	○
1.1.2	Government effectiveness*		33.8	94	
1.2	**Regulatory environment**		**33.4**	**88**	
1.2.1	Regulatory quality*		24.7	109	
1.2.2	Rule of law*		42.2	63	◆
1.3	**Business environment**		**33.3**	**[93]**	
1.3.1	Policy stability for doing business†		33.3	98	
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**17.5**	**110**	
2.1	**Education**		**30.5**	**120**	
2.1.1	Expenditure on education, % GDP		1.2	127	○◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	⏲	6.3	93	○◇
2.1.3	School life expectancy, years	⏲	13.6	73	
2.1.4	PISA scales in reading, maths and science		n/a	n/a	
2.1.5	Pupil–teacher ratio, secondary	⏲	16.7	88	
2.2	**Tertiary education**		**21.3**	**91**	
2.2.1	Tertiary enrolment, % gross		23.0	96	
2.2.2	Graduates in science and engineering, %		24.7	48	●
2.2.3	Tertiary inbound mobility, %		0.4	101	
2.3	**Research and development (R&D)**		**0.7**	**105**	
2.3.1	Researchers, FTE/mn pop.	⏲	104.6	92	
2.3.2	Gross expenditure on R&D, % GDP	⏲	0.1	100	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**41.7**	**66**	◆
3.1	**Information and communication technologies (ICTs)**		**58.3**	**91**	
3.1.1	ICT access*		73.4	88	
3.1.2	ICT use*		74.2	76	
3.1.3	Government's online service*		51.9	89	
3.1.4	E-participation*		33.7	98	
3.2	**General infrastructure**		**32.9**	**60**	
3.2.1	Electricity output, GWh/mn pop.	⏲	742.5	102	
3.2.2	Logistics performance*		31.8	71	
3.2.3	Gross capital formation, % GDP	⏲	34.7	12	●
3.3	**Ecological sustainability**		**34.0**	**30**	●◆
3.3.1	GDP/unit of energy use		24.9	6	●◆
3.3.2	Low-carbon energy use, %		24.0	53	●
3.3.3	ISO 14001 environment/bn PPP$ GDP		2.0	52	●◆
	Market sophistication		**20.2**	**109**	
4.1	**Credit**		**15.1**	**[96]**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP	⏲	47.0	74	
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**2.5**	**105**	
4.2.1	Market capitalization, % GDP		21.2	59	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	⏲	0.0	97	○
4.2.3	VC recipients, deals/bn PPP$ GDP	⏲	0.0	98	
4.2.4	VC received, value, % GDP	⏲	0.0	101	○
4.3	**Trade, diversification and market scale**		**42.9**	**95**	
4.3.1	Applied tariff rate, weighted avg., %		6.1	106	
4.3.2	Domestic industry diversification	⏲	70.5	77	
4.3.3	Domestic market scale, bn PPP$	⏲	319.5	60	

			Score/Value	Rank	
	Business sophistication		**22.5**	**87**	
5.1	**Knowledge workers**		**23.1**	**96**	
5.1.1	Knowledge-intensive employment, %		20.0	79	
5.1.2	Firms offering formal training, %		n/a	n/a	
5.1.3	GERD performed by business, % GDP	⏲	0.1	71	
5.1.4	GERD financed by business, %	⏲	40.3	44	◆
5.1.5	Females employed w/advanced degrees, %	⏲	4.2	98	
5.2	**Innovation linkages**		**21.7**	**75**	
5.2.1	Public research–industry co-publications, %		0.9	96	
5.2.2	University–industry R&D collaboration†		45.6	63	
5.2.3	State of cluster development†		41.8	79	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	⏲	0.0	39	●◆
5.2.5	Patent families/bn PPP$ GDP		0.1	68	
5.3	**Knowledge absorption**		**22.7**	**79**	
5.3.1	Intellectual property payments, % total trade		n/a	n/a	
5.3.2	High-tech imports, % total trade		5.6	104	
5.3.3	ICT services imports, % total trade		0.9	85	
5.3.4	FDI net inflows, % GDP		0.8	103	
5.3.5	Research talent, % in businesses	⏲	20.0	54	
	Knowledge and technology outputs		**18.2**	**79**	
6.1	**Knowledge creation**		**7.9**	**94**	
6.1.1	Patents by origin/bn PPP$ GDP		0.5	73	
6.1.2	PCT patents by origin/bn PPP$ GDP	⏲	0.1	70	
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP	⏲	5.0	105	
6.1.5	Citable documents H-index		10.8	70	
6.2	**Knowledge impact**		**20.3**	**98**	
6.2.1	Labor productivity growth, %		–2.7	129	○◇
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.5	21	●◆
6.2.4	High-tech manufacturing, %	⏲	7.9	93	
6.3	**Knowledge diffusion**		**26.3**	**50**	●◆
6.3.1	Intellectual property receipts, % total trade		n/a	n/a	
6.3.2	Production and export complexity		36.9	76	
6.3.3	High-tech exports, % total trade		0.7	87	
6.3.4	ICT services exports, % total trade		6.2	14	●◆
6.3.5	ISO 9001 quality/bn PPP$ GDP		4.8	61	◆
	Creative outputs		**18.4**	**84**	
7.1	**Intangible assets**		**21.0**	**77**	
7.1.1	Intangible asset intensity, top 15, %		27.6	67	
7.1.2	Trademarks by origin/bn PPP$ GDP		19.5	89	
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.4	80	
7.2	**Creative goods and services**		**8.0**	**[81]**	
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	Creative goods exports, % total trade		0.6	57	●
7.3	**Online creativity**		**23.6**	**77**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.7	103	
7.3.2	GitHub commits/mn pop. 15–69		13.4	51	●◆
7.3.3	Mobile app creation/bn PPP$ GDP	⏲	56.6	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Sweden

GII 2024 rank

2

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
2	3	High	EUR	10.6	716.0	66,209

			Score/Value	Rank
	Institutions		**76.3**	**16**
1.1	**Institutional environment**		**84.5**	**12**
1.1.1	Operational stability for businesses*		84.0	12
1.1.2	Government effectiveness*		85.1	10
1.2	**Regulatory environment**		**89.2**	**8**
1.2.1	Regulatory quality*		86.0	8
1.2.2	Rule of law*		92.3	10
1.3	**Business environment**		**55.3**	**45**
1.3.1	Policy stability for doing business†		70.4	27
1.3.2	Entrepreneurship policies and culture†		40.3	42 ○◇
	Human capital and research		**62.7**	**3 ●◆**
2.1	**Education**		**68.3**	**8 ◆**
2.1.1	Expenditure on education, % GDP	⏲	6.7	7 ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap		24.2	25
2.1.3	School life expectancy, years		19.0	8
2.1.4	PISA scales in reading, maths and science		487.4	18
2.1.5	Pupil–teacher ratio, secondary		13.1	60 ○
2.2	**Tertiary education**		**45.6**	**24**
2.2.1	Tertiary enrolment, % gross		83.9	18
2.2.2	Graduates in science and engineering, %		29.0	27
2.2.3	Tertiary inbound mobility, %		7.0	42 ○
2.3	**Research and development (R&D)**		**74.2**	**3 ●◆**
2.3.1	Researchers, FTE/mn pop.		9,929.2	1 ●◆
2.3.2	Gross expenditure on R&D, % GDP		3.4	5 ●
2.3.3	Global corporate R&D investors, top 3, mn USD$		76.7	10
2.3.4	QS university ranking, top 3*		63.6	14
	Infrastructure		**67.2**	**1 ●◆**
3.1	**Information and communication technologies (ICTs)**		**87.8**	**15**
3.1.1	ICT access*		98.3	29
3.1.2	ICT use*		91.9	14
3.1.3	Government's online service*		89.0	13
3.1.4	E-participation*		72.1	32
3.2	**General infrastructure**		**63.2**	**6 ◆**
3.2.1	Electricity output, GWh/mn pop.		16,506.2	7 ◆
3.2.2	Logistics performance*		86.4	7
3.2.3	Gross capital formation, % GDP		27.3	34
3.3	**Ecological sustainability**		**50.6**	**2 ●◆**
3.3.1	GDP/unit of energy use		12.2	49 ○
3.3.2	Low-carbon energy use, %		70.4	4 ●◆
3.3.3	ISO 14001 environment/bn PPP$ GDP		5.3	19
	Market sophistication		**61.3**	**9**
4.1	**Credit**		**58.9**	**12**
4.1.1	Finance for startups and scaleups†		69.3	16
4.1.2	Domestic credit to private sector, % GDP		132.3	12
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a
4.2	**Investment**		**57.7**	**12**
4.2.1	Market capitalization, % GDP		n/a	n/a
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.4	14
4.2.3	VC recipients, deals/bn PPP$ GDP		0.2	10
4.2.4	VC received, value, % GDP		0.0	7 ◆
4.3	**Trade, diversification and market scale**		**67.3**	**25**
4.3.1	Applied tariff rate, weighted avg., %		1.1	21 ○
4.3.2	Domestic industry diversification		96.9	8
4.3.3	Domestic market scale, bn PPP$		716.0	39

			Score/Value	Rank
	Business sophistication		**74.1**	**1 ●◆**
5.1	**Knowledge workers**		**80.4**	**3 ●◆**
5.1.1	Knowledge-intensive employment, %		57.1	3 ●◆
5.1.2	Firms offering formal training, %	⏲	61.9	6
5.1.3	GERD performed by business, % GDP		2.5	6
5.1.4	GERD financed by business, %		60.7	12
5.1.5	Females employed w/advanced degrees, %		28.9	5 ●
5.2	**Innovation linkages**		**69.0**	**4 ●◆**
5.2.1	Public research–industry co-publications, %		5.4	11
5.2.2	University–industry R&D collaboration†		80.1	13
5.2.3	State of cluster development†		81.8	17
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.2	7 ◆
5.2.5	Patent families/bn PPP$ GDP		7.2	5 ●◆
5.3	**Knowledge absorption**		**72.8**	**1 ●◆**
5.3.1	Intellectual property payments, % total trade		4.4	1 ●◆
5.3.2	High-tech imports, % total trade		8.9	54 ○
5.3.3	ICT services imports, % total trade		4.8	3 ●◆
5.3.4	FDI net inflows, % GDP		6.7	17
5.3.5	Research talent, % in businesses		77.4	4 ●◆
	Knowledge and technology outputs		**63.7**	**2 ●◆**
6.1	**Knowledge creation**		**74.6**	**2 ●◆**
6.1.1	Patents by origin/bn PPP$ GDP		9.8	9
6.1.2	PCT patents by origin/bn PPP$ GDP		6.0	1 ●◆
6.1.3	Utility models by origin/bn PPP$ GDP		-	-
6.1.4	Scientific and technical articles/bn PPP$ GDP		38.9	7 ◆
6.1.5	Citable documents H-index		59.1	13
6.2	**Knowledge impact**		**58.9**	**6**
6.2.1	Labor productivity growth, %		0.8	61 ○
6.2.2	Unicorn valuation, % GDP		3.5	10
6.2.3	Software spending, % GDP		0.6	16
6.2.4	High-tech manufacturing, %		47.1	13
6.3	**Knowledge diffusion**		**57.5**	**6**
6.3.1	Intellectual property receipts, % total trade		3.3	1 ●◆
6.3.2	Production and export complexity		81.7	10
6.3.3	High-tech exports, % total trade		8.4	22
6.3.4	ICT services exports, % total trade		6.9	11
6.3.5	ISO 9001 quality/bn PPP$ GDP		5.7	50 ○
	Creative outputs		**57.8**	**6**
7.1	**Intangible assets**		**55.4**	**12**
7.1.1	Intangible asset intensity, top 15, %		75.2	11
7.1.2	Trademarks by origin/bn PPP$ GDP		34.0	59 ○
7.1.3	Global brand value, top 5,000, % GDP		19.4	3 ●◆
7.1.4	Industrial designs by origin/bn PPP$ GDP		2.7	32
7.2	**Creative goods and services**		**49.9**	**7 ◆**
7.2.1	Cultural and creative services exports, % total trade		3.6	1 ●◆
7.2.2	National feature films/mn pop. 15–69		4.2	32 ○
7.2.3	Entertainment and media market/th pop. 15–69		53.7	10
7.2.4	Creative goods exports, % total trade		1.6	30
7.3	**Online creativity**		**70.4**	**6**
7.3.1	Top-level domains (TLDs)/th pop. 15–69		46.0	14
7.3.2	GitHub commits/mn pop. 15–69		85.7	6
7.3.3	Mobile app creation/bn PPP$ GDP		79.4	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Switzerland

GII 2024 rank **1**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
1	2	High	EUR	8.9	788.3	89,537

		Score/ Value	Rank
	Institutions	**87.7**	**3 ● ◆**
1.1	**Institutional environment**	**92.4**	**4 ◆**
1.1.1	Operational stability for businesses*	87.3	8
1.1.2	Government effectiveness*	97.5	2 ● ◆
1.2	**Regulatory environment**	**89.2**	**7**
1.2.1	Regulatory quality*	84.4	11
1.2.2	Rule of law*	94.1	6
1.3	**Business environment**	**81.5**	**3 ● ◆**
1.3.1	Policy stability for doing business†	98.2	2 ● ◆
1.3.2	Entrepreneurship policies and culture†	64.7	16
	Human capital and research	**61.8**	**4**
2.1	**Education**	**65.1**	**14**
2.1.1	Expenditure on education, % GDP	⏲ 5.6	26
2.1.2	Government funding/pupil, secondary, % GDP/cap	24.2	26
2.1.3	School life expectancy, years	16.7	26
2.1.4	PISA scales in reading, maths and science	497.9	9
2.1.5	Pupil–teacher ratio, secondary	9.5	27
2.2	**Tertiary education**	**50.0**	**14**
2.2.1	Tertiary enrolment, % gross	74.2	31
2.2.2	Graduates in science and engineering, %	25.3	44 ○
2.2.3	Tertiary inbound mobility, %	19.1	9
2.3	**Research and development (R&D)**	**70.4**	**4**
2.3.1	Researchers, FTE/mn pop.	⏲ 5,999.4	11
2.3.2	Gross expenditure on R&D, % GDP	⏲ 3.3	7
2.3.3	Global corporate R&D investors, top 3, mn USD$	87.2	4
2.3.4	QS university ranking, top 3*	79.4	7
	Infrastructure	**60.8**	**7**
3.1	**Information and communication technologies (ICTs)**	**82.1**	**40 ◇**
3.1.1	ICT access*	⏲ 100.0	1 ●
3.1.2	ICT use*	84.3	36
3.1.3	Government's online service*	74.3	49 ○ ◇
3.1.4	E-participation*	69.8	41
3.2	**General infrastructure**	**50.4**	**15**
3.2.1	Electricity output, GWh/mn pop.	6,957.4	25
3.2.2	Logistics performance*	90.9	3 ● ◆
3.2.3	Gross capital formation, % GDP	25.0	51 ○
3.3	**Ecological sustainability**	**49.9**	**4 ◆**
3.3.1	GDP/unit of energy use	26.7	4 ◆
3.3.2	Low-carbon energy use, %	52.3	12 ◆
3.3.3	ISO 14001 environment/bn PPP$ GDP	3.1	30
	Market sophistication	**66.5**	**5**
4.1	**Credit**	**70.8**	**4 ◆**
4.1.1	Finance for startups and scaleups†	78.1	9
4.1.2	Domestic credit to private sector, % GDP	⏲ 170.4	7
4.1.3	Loans from microfinance institutions, % GDP	n/a	n/a
4.2	**Investment**	**64.9**	**8**
4.2.1	Market capitalization, % GDP	259.9	5 ◆
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	0.8	9
4.2.3	VC recipients, deals/bn PPP$ GDP	0.3	8
4.2.4	VC received, value, % GDP	0.0	19
4.3	**Trade, diversification and market scale**	**63.9**	**33**
4.3.1	Applied tariff rate, weighted avg., %	0.7	10
4.3.2	Domestic industry diversification	82.2	59 ○
4.3.3	Domestic market scale, bn PPP$	788.3	34

		Score/ Value	Rank
	Business sophistication	**67.2**	**4 ◆**
5.1	**Knowledge workers**	**71.2**	**6**
5.1.1	Knowledge-intensive employment, %	50.7	10
5.1.2	Firms offering formal training, %	n/a	n/a
5.1.3	GERD performed by business, % GDP	⏲ 2.3	7
5.1.4	GERD financed by business, %	65.9	7
5.1.5	Females employed w/advanced degrees, %	21.6	27
5.2	**Innovation linkages**	**80.4**	**1 ● ◆**
5.2.1	Public research–industry co-publications, %	8.0	2 ● ◆
5.2.2	University–industry R&D collaboration†	100.0	1 ● ◆
5.2.3	State of cluster development†	97.3	4 ◆
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.1	10
5.2.5	Patent families/bn PPP$ GDP	9.4	4 ◆
5.3	**Knowledge absorption**	**50.1**	**10**
5.3.1	Intellectual property payments, % total trade	6.3	1 ● ◆
5.3.2	High-tech imports, % total trade	8.0	72 ○
5.3.3	ICT services imports, % total trade	3.2	11
5.3.4	FDI net inflows, % GDP	–15.3	131 ○ ◇
5.3.5	Research talent, % in businesses	⏲ 48.7	28 ○
	Knowledge and technology outputs	**65.1**	**1 ● ◆**
6.1	**Knowledge creation**	**78.7**	**1 ● ◆**
6.1.1	Patents by origin/bn PPP$ GDP	13.6	5
6.1.2	PCT patents by origin/bn PPP$ GDP	6.8	1 ● ◆
6.1.3	Utility models by origin/bn PPP$ GDP	-	-
6.1.4	Scientific and technical articles/bn PPP$ GDP	40.0	3 ● ◆
6.1.5	Citable documents H-index	66.1	11
6.2	**Knowledge impact**	**55.9**	**7**
6.2.1	Labor productivity growth, %	0.6	69 ○
6.2.2	Unicorn valuation, % GDP	1.3	29
6.2.3	Software spending, % GDP	0.6	7
6.2.4	High-tech manufacturing, %	71.5	2 ● ◆
6.3	**Knowledge diffusion**	**60.7**	**2 ● ◆**
6.3.1	Intellectual property receipts, % total trade	5.5	1 ● ◆
6.3.2	Production and export complexity	96.9	2 ● ◆
6.3.3	High-tech exports, % total trade	14.7	10
6.3.4	ICT services exports, % total trade	2.7	47 ○
6.3.5	ISO 9001 quality/bn PPP$ GDP	9.9	28
	Creative outputs	**67.1**	**1 ● ◆**
7.1	**Intangible assets**	**61.7**	**9**
7.1.1	Intangible asset intensity, top 15, %	77.2	8
7.1.2	Trademarks by origin/bn PPP$ GDP	52.4	31
7.1.3	Global brand value, top 5,000, % GDP	18.9	4 ◆
7.1.4	Industrial designs by origin/bn PPP$ GDP	4.0	21
7.2	**Creative goods and services**	**59.7**	**1 ● ◆**
7.2.1	Cultural and creative services exports, % total trade	0.6	48 ○
7.2.2	National feature films/mn pop. 15–69	16.2	1 ● ◆
7.2.3	Entertainment and media market/th pop. 15–69	85.6	2 ● ◆
7.2.4	Creative goods exports, % total trade	2.9	18
7.3	**Online creativity**	**85.4**	**2 ● ◆**
7.3.1	Top-level domains (TLDs)/th pop. 15–69	81.0	4 ◆
7.3.2	GitHub commits/mn pop. 15–69	100.0	1 ● ◆
7.3.3	Mobile app creation/bn PPP$ GDP	75.3	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Tajikistan

GII 2024 rank

107

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
104	106	Lower middle	CSA	10.4	53.7	5,361

			Score/Value	Rank	
	Institutions		**31.7**	**104**	
1.1	**Institutional environment**		**30.5**	**116**	
1.1.1	Operational stability for businesses*		36.7	116	
1.1.2	Government effectiveness*		24.2	114	
1.2	**Regulatory environment**		**9.1**	**128**	◇
1.2.1	Regulatory quality*		10.4	128	◇
1.2.2	Rule of law*		7.8	129	◇
1.3	**Business environment**		**55.5**	**[44]**	
1.3.1	Policy stability for doing business†	⏲	55.5	49	●
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**25.1**	**92**	
2.1	**Education**		**54.1**	**[60]**	
2.1.1	Expenditure on education, % GDP		5.4	29	●
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**		**20.8**	**92**	
2.2.1	Tertiary enrolment, % gross	⏲	31.1	90	
2.2.2	Graduates in science and engineering, %	⏲	22.0	65	
2.2.3	Tertiary inbound mobility, %	⏲	0.8	92	
2.3	**Research and development (R&D)**		**0.4**	**110**	
2.3.1	Researchers, FTE/mn pop.		n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP	⏲	0.1	103	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**26.3**	**109**	
3.1	**Information and communication technologies (ICTs)**		**33.1**	**118**	◇
3.1.1	ICT access*	⏲	42.7	115	
3.1.2	ICT use*		n/a	n/a	
3.1.3	Government's online service*		33.3	117	
3.1.4	E-participation*		23.3	116	
3.2	**General infrastructure**		**13.3**	**118**	
3.2.1	Electricity output, GWh/mn pop.	⏲	2,125.1	76	
3.2.2	Logistics performance*		18.2	89	
3.2.3	Gross capital formation, % GDP		18.4	109	
3.3	**Ecological sustainability**		**32.4**	**34**	●◆
3.3.1	GDP/unit of energy use		10.4	67	
3.3.2	Low-carbon energy use, %		63.7	6	●◆
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.1	132	○
	Market sophistication		**23.2**	**96**	
4.1	**Credit**		**14.7**	**98**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		10.6	128	○
4.1.3	Loans from microfinance institutions, % GDP		2.6	16	●
4.2	**Investment**		**4.9**	**[80]**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	79	
4.2.4	VC received, value, % GDP		0.0	75	
4.3	**Trade, diversification and market scale**		**49.9**	**82**	
4.3.1	Applied tariff rate, weighted avg., %		2.4	70	
4.3.2	Domestic industry diversification	⏲	67.8	82	
4.3.3	Domestic market scale, bn PPP$		53.7	110	

			Score/Value	Rank	
	Business sophistication		**20.4**	**101**	
5.1	**Knowledge workers**		**29.2**	**[75]**	
5.1.1	Knowledge-intensive employment, %		n/a	n/a	
5.1.2	Firms offering formal training, %	⏲	24.3	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, %		n/a	n/a	
5.2	**Innovation linkages**		**14.9**	**108**	
5.2.1	Public research–industry co-publications, %		1.8	49	●◆
5.2.2	University–industry R&D collaboration†	⏲	29.9	99	
5.2.3	State of cluster development†	⏲	18.9	122	◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	⏲	0.0	63	●
5.2.5	Patent families/bn PPP$ GDP		0.0	102	○◇
5.3	**Knowledge absorption**		**16.9**	**113**	
5.3.1	Intellectual property payments, % total trade		0.0	120	◇
5.3.2	High-tech imports, % total trade		9.3	51	●
5.3.3	ICT services imports, % total trade		0.3	124	
5.3.4	FDI net inflows, % GDP		1.3	95	
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**16.6**	**84**	
6.1	**Knowledge creation**		**22.6**	**47**	●◆
6.1.1	Patents by origin/bn PPP$ GDP	⏲	0.4	80	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	99	○◇
6.1.3	Utility models by origin/bn PPP$ GDP		3.3	1	●◆
6.1.4	Scientific and technical articles/bn PPP$ GDP		2.4	120	
6.1.5	Citable documents H-index		1.3	128	◇
6.2	**Knowledge impact**		**22.1**	**83**	
6.2.1	Labor productivity growth, %		4.7	4	●◆
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.1	105	
6.2.4	High-tech manufacturing, %	⏲	2.6	106	◇
6.3	**Knowledge diffusion**		**5.1**	**120**	
6.3.1	Intellectual property receipts, % total trade		0.0	112	
6.3.2	Production and export complexity		24.8	96	
6.3.3	High-tech exports, % total trade		0.1	123	
6.3.4	ICT services exports, % total trade		0.1	130	
6.3.5	ISO 9001 quality/bn PPP$ GDP		0.1	132	○◇
	Creative outputs		**7.1**	**115**	
7.1	**Intangible assets**		**3.0**	**119**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP	⏲	13.2	103	
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○◇
7.1.4	Industrial designs by origin/bn PPP$ GDP	⏲	0.0	126	
7.2	**Creative goods and services**		**0.3**	**[130]**	
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		n/a	n/a	
7.2.4	Creative goods exports, % total trade		0.0	110	
7.3	**Online creativity**		**22.2**	**88**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69	⏲	0.2	119	
7.3.2	GitHub commits/mn pop. 15–69		0.6	121	
7.3.3	Mobile app creation/bn PPP$ GDP		65.8	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Thailand

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Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
39	41	Upper middle	SEAO	71.7	1,578.5	22,491

			Score/ Value	Rank	
Institutions			**44.8**	**74**	
1.1	**Institutional environment**		**55.0**	**63**	
1.1.1	Operational stability for businesses*		62.7	65	
1.1.2	Government effectiveness*		47.3	59	
1.2	**Regulatory environment**		**46.0**	**61**	
1.2.1	Regulatory quality*		46.2	62	
1.2.2	Rule of law*		45.8	60	
1.3	**Business environment**		**33.5**	**92**	
1.3.1	Policy stability for doing business†		34.9	97	
1.3.2	Entrepreneurship policies and culture†		32.0	51	
Human capital and research			**30.7**	**71**	
2.1	**Education**		**39.3**	**100**	
2.1.1	Expenditure on education, % GDP		2.6	112	○◇
2.1.2	Government funding/pupil, secondary, % GDP/cap		n/a	n/a	
2.1.3	School life expectancy, years	⏲	15.4	46	
2.1.4	PISA scales in reading, maths and science		394.0	67	○
2.1.5	Pupil–teacher ratio, secondary		23.6	107	○◇
2.2	**Tertiary education**		**35.7**	**56**	
2.2.1	Tertiary enrolment, % gross		48.8	71	
2.2.2	Graduates in science and engineering, %		31.7	14	●◆
2.2.3	Tertiary inbound mobility, %		1.4	84	
2.3	**Research and development (R&D)**		**17.2**	**47**	
2.3.1	Researchers, FTE/mn pop.	⏲	1,699.1	44	
2.3.2	Gross expenditure on R&D, % GDP	⏲	1.2	34	◆
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		31.7	39	
Infrastructure			**45.8**	**50**	
3.1	**Information and communication technologies (ICTs)**		**83.2**	**32**	◆
3.1.1	ICT access*		93.7	53	
3.1.2	ICT use*		85.9	29	◆
3.1.3	Government's online service*		75.3	47	
3.1.4	E-participation*		77.9	18	◆
3.2	**General infrastructure**		**37.4**	**43**	◆
3.2.1	Electricity output, GWh/mn pop.		2,537.6	71	
3.2.2	Logistics performance*		63.6	33	◆
3.2.3	Gross capital formation, % GDP		26.5	39	
3.3	**Ecological sustainability**		**16.8**	**84**	
3.3.1	GDP/unit of energy use		9.2	83	
3.3.2	Low-carbon energy use, %		5.8	101	○
3.3.3	ISO 14001 environment/bn PPP$ GDP		3.2	29	
Market sophistication			**50.6**	**25**	◆
4.1	**Credit**		**54.0**	**19**	●◆
4.1.1	Finance for startups and scaleups†		50.1	39	
4.1.2	Domestic credit to private sector, % GDP		156.4	8	●◆
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**30.0**	**27**	◆
4.2.1	Market capitalization, % GDP		116.3	13	◆
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.2	34	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.2	15	●◆
4.2.4	VC received, value, % GDP		0.0	44	
4.3	**Trade, diversification and market scale**		**67.8**	**23**	
4.3.1	Applied tariff rate, weighted avg., %		2.6	74	
4.3.2	Domestic industry diversification	⏲	93.0	25	
4.3.3	Domestic market scale, bn PPP$		1,578.5	22	

			Score/ Value	Rank	
Business sophistication			**35.4**	**41**	◆
5.1	**Knowledge workers**		**39.0**	**51**	
5.1.1	Knowledge-intensive employment, %		14.2	94	◇
5.1.2	Firms offering formal training, %	⏲	18.0	83	
5.1.3	GERD performed by business, % GDP	⏲	0.8	30	◆
5.1.4	GERD financed by business, %	⏲	80.8	1	●◆
5.1.5	Females employed w/advanced degrees, %	⏲	11.3	68	
5.2	**Innovation linkages**		**24.7**	**60**	
5.2.1	Public research–industry co-publications, %		1.2	80	
5.2.2	University–industry R&D collaboration†		54.2	48	
5.2.3	State of cluster development†		45.9	68	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	50	
5.2.5	Patent families/bn PPP$ GDP		0.1	57	
5.3	**Knowledge absorption**		**42.4**	**26**	◆
5.3.1	Intellectual property payments, % total trade		1.8	14	●◆
5.3.2	High-tech imports, % total trade		17.8	12	●◆
5.3.3	ICT services imports, % total trade		0.3	122	○◇
5.3.4	FDI net inflows, % GDP		1.3	94	
5.3.5	Research talent, % in businesses	⏲	60.8	13	●◆
Knowledge and technology outputs			**29.8**	**39**	
6.1	**Knowledge creation**		**23.6**	**42**	
6.1.1	Patents by origin/bn PPP$ GDP		0.5	74	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.1	63	
6.1.3	Utility models by origin/bn PPP$ GDP		2.2	5	●◆
6.1.4	Scientific and technical articles/bn PPP$ GDP		8.0	85	
6.1.5	Citable documents H-index		21.5	41	
6.2	**Knowledge impact**		**33.2**	**44**	
6.2.1	Labor productivity growth, %		−0.5	108	○
6.2.2	Unicorn valuation, % GDP		0.6	37	
6.2.3	Software spending, % GDP		0.3	45	
6.2.4	High-tech manufacturing, %	⏲	43.8	20	◆
6.3	**Knowledge diffusion**		**32.5**	**36**	
6.3.1	Intellectual property receipts, % total trade		0.1	60	
6.3.2	Production and export complexity		71.2	23	◆
6.3.3	High-tech exports, % total trade		16.3	8	●◆
6.3.4	ICT services exports, % total trade		0.1	129	○◇
6.3.5	ISO 9001 quality/bn PPP$ GDP		9.2	32	
Creative outputs			**34.9**	**38**	◆
7.1	**Intangible assets**		**39.6**	**38**	
7.1.1	Intangible asset intensity, top 15, %		65.1	28	
7.1.2	Trademarks by origin/bn PPP$ GDP		21.3	83	
7.1.3	Global brand value, top 5,000, % GDP		7.9	26	◆
7.1.4	Industrial designs by origin/bn PPP$ GDP		2.6	33	
7.2	**Creative goods and services**		**35.8**	**19**	●◆
7.2.1	Cultural and creative services exports, % total trade		n/a	n/a	
7.2.2	National feature films/mn pop. 15–69		0.8	69	○
7.2.3	Entertainment and media market/th pop. 15–69		8.7	38	
7.2.4	Creative goods exports, % total trade		7.5	7	●◆
7.3	**Online creativity**		**24.4**	**70**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		2.4	75	
7.3.2	GitHub commits/mn pop. 15–69		4.5	82	
7.3.3	Mobile app creation/bn PPP$ GDP		66.3	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Togo

GII 2024 rank

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Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
108	122	Low	SSA	9.3	25.1	2,768

			Score/Value	Rank	
	Institutions		**29.8**	**112**	
1.1	**Institutional environment**		**38.3**	**101**	
1.1.1	Operational stability for businesses*		49.3	95	
1.1.2	Government effectiveness*		27.2	108	
1.2	**Regulatory environment**		**27.4**	**102**	
1.2.1	Regulatory quality*		27.1	103	
1.2.2	Rule of law*		27.8	98	
1.3	**Business environment**		**23.8**	**[112]**	
1.3.1	Policy stability for doing business†		n/a	n/a	
1.3.2	Entrepreneurship policies and culture†	⏲	23.8	62	
	Human capital and research		**16.4**	**[116]**	
2.1	**Education**		**40.8**	**[92]**	
2.1.1	Expenditure on education, % GDP		3.8	81	●
2.1.2	Government funding/pupil, secondary, % GDP/cap		n/a	n/a	
2.1.3	School life expectancy, years	⏲	12.6	90	◆
2.1.4	PISA scales in reading, maths and science		n/a	n/a	
2.1.5	Pupil–teacher ratio, secondary	⏲	25.9	110	
2.2	**Tertiary education**		**7.4**	**[115]**	
2.2.1	Tertiary enrolment, % gross	⏲	15.1	107	◆
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)**		**0.8**	**102**	
2.3.1	Researchers, FTE/mn pop.		44.4	99	
2.3.2	Gross expenditure on R&D, % GDP	⏲	0.2	87	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**20.4**	**126**	
3.1	**Information and communication technologies (ICTs)**		**38.6**	**114**	◆
3.1.1	ICT access*		61.3	101	◆
3.1.2	ICT use*		18.4	121	
3.1.3	Government's online service*		37.4	112	
3.1.4	E-participation*		37.2	92	
3.2	**General infrastructure**		**16.1**	**111**	
3.2.1	Electricity output, GWh/mn pop.	⏲	98.3	122	
3.2.2	Logistics performance*		18.2	89	
3.2.3	Gross capital formation, % GDP		23.6	66	●
3.3	**Ecological sustainability**		**6.6**	**122**	
3.3.1	GDP/unit of energy use		4.8	118	
3.3.2	Low-carbon energy use, %		7.1	97	
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.6	88	●
	Market sophistication		**20.6**	**108**	
4.1	**Credit**		**29.2**	**59**	●◆
4.1.1	Finance for startups and scaleups†	⏲	17.8	79	
4.1.2	Domestic credit to private sector, % GDP		27.5	103	
4.1.3	Loans from microfinance institutions, % GDP		5.7	5	●◆
4.2	**Investment**		**n/a**	**[n/a]**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP		n/a	n/a	
4.2.4	VC received, value, % GDP		n/a	n/a	
4.3	**Trade, diversification and market scale**		**12.0**	**130**	○◇
4.3.1	Applied tariff rate, weighted avg., %		9.7	126	
4.3.2	Domestic industry diversification		n/a	n/a	
4.3.3	Domestic market scale, bn PPP$		25.1	129	○

			Score/Value	Rank	
	Business sophistication		**15.5**	**[121]**	
5.1	**Knowledge workers**		**22.9**	**[97]**	
5.1.1	Knowledge-intensive employment, %	⏲	14.1	96	◆
5.1.2	Firms offering formal training, %		37.9	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, %	⏲	0.6	124	○
5.2	**Innovation linkages**		**8.0**	**[127]**	
5.2.1	Public research–industry co-publications, %		1.8	52	●
5.2.2	University–industry R&D collaboration†		n/a	n/a	
5.2.3	State of cluster development†		n/a	n/a	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	72	●
5.2.5	Patent families/bn PPP$ GDP		0.0	102	○◇
5.3	**Knowledge absorption**		**15.7**	**124**	
5.3.1	Intellectual property payments, % total trade		0.0	121	○◇
5.3.2	High-tech imports, % total trade		6.1	98	
5.3.3	ICT services imports, % total trade		0.8	89	
5.3.4	FDI net inflows, % GDP		−1.7	127	
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**10.6**	**111**	
6.1	**Knowledge creation**		**3.3**	**118**	
6.1.1	Patents by origin/bn PPP$ GDP		0.2	96	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	99	○◇
6.1.3	Utility models by origin/bn PPP$ GDP	⏲	0.0	74	○◇
6.1.4	Scientific and technical articles/bn PPP$ GDP		5.5	100	
6.1.5	Citable documents H-index		1.3	128	○◇
6.2	**Knowledge impact**		**22.0**	**86**	●◆
6.2.1	Labor productivity growth, %		2.0	27	●
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.1	99	◆
6.2.4	High-tech manufacturing, %		n/a	n/a	
6.3	**Knowledge diffusion**		**6.6**	**111**	
6.3.1	Intellectual property receipts, % total trade		0.0	114	
6.3.2	Production and export complexity		17.1	110	
6.3.3	High-tech exports, % total trade		0.2	112	
6.3.4	ICT services exports, % total trade		1.4	69	●
6.3.5	ISO 9001 quality/bn PPP$ GDP		1.5	103	
	Creative outputs		**10.7**	**107**	
7.1	**Intangible assets**		**2.1**	**120**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		8.6	112	
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.1	113	
7.2	**Creative goods and services**		**19.1**	**[56]**	
7.2.1	Cultural and creative services exports, % total trade		1.3	18	●◆
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	Creative goods exports, % total trade		0.0	111	
7.3	**Online creativity**		**19.6**	**100**	◆
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.3	115	◆
7.3.2	GitHub commits/mn pop. 15–69		0.9	116	
7.3.3	Mobile app creation/bn PPP$ GDP		57.5	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Trinidad and Tobago **108**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
119	93	High	LCN	1.5	43.7	30,719

			Score/Value	Rank	
	Institutions		**45.0**	**72**	●◇
1.1	**Institutional environment**		**54.3**	**64**	●◇
1.1.1	Operational stability for businesses*		65.3	55	●◇
1.1.2	Government effectiveness*		43.3	70	●◇
1.2	**Regulatory environment**		**39.5**	**72**	●◇
1.2.1	Regulatory quality*		39.9	76	◇
1.2.2	Rule of law*		39.0	74	●◇
1.3	**Business environment**		**41.1**	**[77]**	
1.3.1	Policy stability for doing business†	⏲	41.1	86	
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	

			Score/Value	Rank	
	Human capital and research		**41.9**	**37**	●
2.1	**Education**		**39.8**	**96**	◇
2.1.1	Expenditure on education, % GDP		2.9	107	◇
2.1.2	Government funding/pupil, secondary, % GDP/cap		13.9	74	◇
2.1.3	School life expectancy, years		n/a	n/a	
2.1.4	PISA scales in reading, maths and science	⏲	423.0	50	
2.1.5	Pupil–teacher ratio, secondary		11.8	51	●
2.2	**Tertiary education**		**84.4**	**[1]**	
2.2.1	Tertiary enrolment, % gross		n/a	n/a	
2.2.2	Graduates in science and engineering, %		35.4	6	●◆
2.2.3	Tertiary inbound mobility, %		n/a	n/a	
2.3	**Research and development (R&D)**		**1.5**	**95**	◇
2.3.1	Researchers, FTE/mn pop.	⏲	525.5	72	◇
2.3.2	Gross expenditure on R&D, % GDP	⏲	0.1	110	○◇
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇

			Score/Value	Rank	
	Infrastructure		**25.9**	**110**	◇
3.1	**Information and communication technologies (ICTs)**		**56.0**	**93**	◇
3.1.1	ICT access*		86.9	77	◇
3.1.2	ICT use*		71.4	83	◇
3.1.3	Government's online service*		43.5	104	◇
3.1.4	E-participation*		22.1	121	◇
3.2	**General infrastructure**		**20.4**	**98**	◇
3.2.1	Electricity output, GWh/mn pop.	⏲	6,068.2	33	●
3.2.2	Logistics performance*		18.2	89	◇
3.2.3	Gross capital formation, % GDP		n/a	n/a	
3.3	**Ecological sustainability**		**1.4**	**133**	○◇
3.3.1	GDP/unit of energy use		2.1	127	○◇
3.3.2	Low-carbon energy use, %		0.0	133	○◇
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.6	91	◇

			Score/Value	Rank	
	Market sophistication		**11.2**	**[128]**	
4.1	**Credit**		**10.4**	**[110]**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		35.0	88	◇
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**2.8**	**[101]**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.0	68	
4.2.3	VC recipients, deals/bn PPP$ GDP		n/a	n/a	
4.2.4	VC received, value, % GDP		n/a	n/a	
4.3	**Trade, diversification and market scale**		**20.5**	**124**	◇
4.3.1	Applied tariff rate, weighted avg., %		7.6	117	◇
4.3.2	Domestic industry diversification		n/a	n/a	
4.3.3	Domestic market scale, bn PPP$		43.7	118	

			Score/Value	Rank	
	Business sophistication		**18.6**	**111**	◇
5.1	**Knowledge workers**		**26.7**	**83**	◇
5.1.1	Knowledge-intensive employment, %		32.3	46	●
5.1.2	Firms offering formal training, %		n/a	n/a	
5.1.3	GERD performed by business, % GDP	⏲	0.0	85	◇
5.1.4	GERD financed by business, %	⏲	4.6	83	◇
5.1.5	Females employed w/advanced degrees, %	⏲	16.1	45	●
5.2	**Innovation linkages**		**16.0**	**102**	◇
5.2.1	Public research–industry co-publications, %		1.3	74	●
5.2.2	University–industry R&D collaboration†	⏲	22.0	115	◇
5.2.3	State of cluster development†	⏲	35.5	93	◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	⏲	0.0	51	●
5.2.5	Patent families/bn PPP$ GDP		0.0	102	○◇
5.3	**Knowledge absorption**		**13.1**	**131**	○◇
5.3.1	Intellectual property payments, % total trade		0.4	78	
5.3.2	High-tech imports, % total trade		5.9	102	
5.3.3	ICT services imports, % total trade		0.4	113	◇
5.3.4	FDI net inflows, % GDP		−0.6	125	
5.3.5	Research talent, % in businesses	⏲	1.4	82	◇

			Score/Value	Rank	
	Knowledge and technology outputs		**11.0**	**104**	◇
6.1	**Knowledge creation**		**3.2**	**119**	◇
6.1.1	Patents by origin/bn PPP$ GDP		0.0	125	◇
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	99	○◇
6.1.3	Utility models by origin/bn PPP$ GDP	⏲	0.0	65	
6.1.4	Scientific and technical articles/bn PPP$ GDP		5.3	102	◇
6.1.5	Citable documents H-index		4.4	107	◇
6.2	**Knowledge impact**		**21.1**	**93**	◇
6.2.1	Labor productivity growth, %		−0.2	101	
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.2	74	●
6.2.4	High-tech manufacturing, %		n/a	n/a	
6.3	**Knowledge diffusion**		**8.8**	**97**	◇
6.3.1	Intellectual property receipts, % total trade		0.0	83	
6.3.2	Production and export complexity		31.3	86	◇
6.3.3	High-tech exports, % total trade	⏲	1.0	77	
6.3.4	ICT services exports, % total trade		0.3	112	◇
6.3.5	ISO 9001 quality/bn PPP$ GDP		2.1	89	◇

			Score/Value	Rank	
	Creative outputs		**5.6**	**121**	◇
7.1	**Intangible assets**		**4.6**	**117**	◇
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		16.0	98	◇
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.3	94	
7.2	**Creative goods and services**		**0.9**	**[122]**	
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	Creative goods exports, % total trade		0.1	104	
7.3	**Online creativity**		**12.3**	**123**	◇
7.3.1	Top-level domains (TLDs)/th pop. 15–69		2.0	81	◇
7.3.2	GitHub commits/mn pop. 15–69		4.2	87	◇
7.3.3	Mobile app creation/bn PPP$ GDP		30.6	123	○◇

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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Tunisia

GII 2024 rank

81

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
64	96	Lower middle	NAWA	12.2	162.1	13,249

			Score/Value	Rank	
	Institutions		**31.9**	**102**	
1.1	**Institutional environment**		**40.1**	**98**	
1.1.1	Operational stability for businesses*		44.0	106	
1.1.2	Government effectiveness*		36.2	85	
1.2	**Regulatory environment**		**36.2**	**83**	
1.2.1	Regulatory quality*		31.0	93	
1.2.2	Rule of law*		41.4	66	◆
1.3	**Business environment**		**19.6**	**120**	○◇
1.3.1	Policy stability for doing business†		28.7	106	
1.3.2	Entrepreneurship policies and culture†	⌚	10.5	76	○◇
	Human capital and research		**36.8**	**47**	◆
2.1	**Education**		**62.1**	**29**	●◆
2.1.1	Expenditure on education, % GDP	⌚	6.2	12	
2.1.2	Government funding/pupil, secondary, % GDP/cap	⌚	51.1	1	●◆
2.1.3	School life expectancy, years	⌚	14.4	62	
2.1.4	PISA scales in reading, maths and science	⌚	371.4	74	
2.1.5	Pupil–teacher ratio, secondary		14.6	76	
2.2	**Tertiary education**		**41.0**	**37**	●◆
2.2.1	Tertiary enrolment, % gross		37.8	84	
2.2.2	Graduates in science and engineering, %		37.9	4	●◆
2.2.3	Tertiary inbound mobility, %		2.9	67	
2.3	**Research and development (R&D)**		**7.2**	**66**	
2.3.1	Researchers, FTE/mn pop.		1,672.0	46	◆
2.3.2	Gross expenditure on R&D, % GDP	⌚	0.7	50	◆
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**27.0**	**107**	
3.1	**Information and communication technologies (ICTs)**		**64.3**	**81**	
3.1.1	ICT access*		71.6	93	
3.1.2	ICT use*		75.9	72	
3.1.3	Government's online service*		56.1	85	
3.1.4	E-participation*		53.5	67	◆
3.2	**General infrastructure**		**3.2**	**132**	○◇
3.2.1	Electricity output, GWh/mn pop.		1,734.4	87	
3.2.2	Logistics performance*		n/a	n/a	
3.2.3	Gross capital formation, % GDP		13.9	127	○◇
3.3	**Ecological sustainability**		**13.7**	**100**	
3.3.1	GDP/unit of energy use		11.0	61	
3.3.2	Low-carbon energy use, %		2.3	117	○
3.3.3	ISO 14001 environment/bn PPP$ GDP		2.0	51	◆
	Market sophistication		**26.9**	**84**	
4.1	**Credit**		**22.8**	**78**	
4.1.1	Finance for startups and scaleups†	⌚	27.3	71	◇
4.1.2	Domestic credit to private sector, % GDP	⌚	81.7	36	●
4.1.3	Loans from microfinance institutions, % GDP		1.1	28	
4.2	**Investment**		**5.3**	**76**	
4.2.1	Market capitalization, % GDP		18.1	65	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.1	59	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	61	
4.2.4	VC received, value, % GDP		0.0	86	
4.3	**Trade, diversification and market scale**		**52.7**	**75**	
4.3.1	Applied tariff rate, weighted avg., %		3.1	82	
4.3.2	Domestic industry diversification	⌚	79.5	66	
4.3.3	Domestic market scale, bn PPP$		162.1	79	

			Score/Value	Rank	
	Business sophistication		**16.8**	**119**	○
5.1	**Knowledge workers**		**21.9**	**100**	
5.1.1	Knowledge-intensive employment, %	⌚	20.5	77	
5.1.2	Firms offering formal training, %	⌚	19.1	82	
5.1.3	GERD performed by business, % GDP	⌚	0.1	58	
5.1.4	GERD financed by business, %	⌚	18.9	71	
5.1.5	Females employed w/advanced degrees, %		10.0	76	
5.2	**Innovation linkages**		**12.9**	**113**	
5.2.1	Public research–industry co-publications, %		0.3	130	○◇
5.2.2	University–industry R&D collaboration†		26.4	103	
5.2.3	State of cluster development†		29.2	109	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	68	
5.2.5	Patent families/bn PPP$ GDP		0.0	89	
5.3	**Knowledge absorption**		**15.7**	**122**	○
5.3.1	Intellectual property payments, % total trade		0.1	106	
5.3.2	High-tech imports, % total trade		8.4	63	
5.3.3	ICT services imports, % total trade		0.6	106	
5.3.4	FDI net inflows, % GDP		1.4	92	
5.3.5	Research talent, % in businesses	⌚	5.2	72	
	Knowledge and technology outputs		**23.2**	**54**	◆
6.1	**Knowledge creation**		**24.9**	**38**	●◆
6.1.1	Patents by origin/bn PPP$ GDP		1.3	44	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	74	
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		31.7	14	●◆
6.1.5	Citable documents H-index		11.9	67	
6.2	**Knowledge impact**		**23.3**	**75**	
6.2.1	Labor productivity growth, %		−0.4	106	
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.3	43	●
6.2.4	High-tech manufacturing, %	⌚	21.9	55	
6.3	**Knowledge diffusion**		**21.4**	**56**	
6.3.1	Intellectual property receipts, % total trade		0.1	57	
6.3.2	Production and export complexity		52.9	45	◆
6.3.3	High-tech exports, % total trade		4.2	42	●
6.3.4	ICT services exports, % total trade		1.7	64	
6.3.5	ISO 9001 quality/bn PPP$ GDP		7.6	36	●◆
	Creative outputs		**22.4**	**73**	
7.1	**Intangible assets**		**30.6**	**62**	
7.1.1	Intangible asset intensity, top 15, %		41.6	56	
7.1.2	Trademarks by origin/bn PPP$ GDP		27.4	68	
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		3.1	27	●
7.2	**Creative goods and services**		**6.8**	**87**	
7.2.1	Cultural and creative services exports, % total trade		0.3	69	
7.2.2	National feature films/mn pop. 15–69		0.7	72	
7.2.3	Entertainment and media market/th pop. 15–69		1.3	55	○
7.2.4	Creative goods exports, % total trade		1.1	44	●
7.3	**Online creativity**		**21.7**	**93**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		2.1	79	◆
7.3.2	GitHub commits/mn pop. 15–69		8.7	60	
7.3.3	Mobile app creation/bn PPP$ GDP		54.3	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Türkiye

37

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
28	51	Upper middle	NAWA	87.3	3,613.5	41,888

		Score/Value	Rank	
	Institutions	**33.3**	**100**	○
1.1	**Institutional environment**	**40.4**	**97**	○
1.1.1	Operational stability for businesses*	42.0	109	○◇
1.1.2	Government effectiveness*	38.8	81	
1.2	**Regulatory environment**	**33.1**	**90**	
1.2.1	Regulatory quality*	35.4	86	
1.2.2	Rule of law*	30.7	90	
1.3	**Business environment**	**26.5**	**108**	○
1.3.1	Policy stability for doing business†	25.6	111	○
1.3.2	Entrepreneurship policies and culture† ⏲	27.3	56	

		Score/Value	Rank	
	Human capital and research	**40.0**	**40**	◆
2.1	**Education**	**50.7**	**67**	
2.1.1	Expenditure on education, % GDP	2.6	111	○◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	12.9	78	○
2.1.3	School life expectancy, years ⏲	19.7	3	●◆
2.1.4	PISA scales in reading, maths and science	461.7	38	◆
2.1.5	Pupil–teacher ratio, secondary ⏲	15.3	82	
2.2	**Tertiary education**	**37.4**	**48**	
2.2.1	Tertiary enrolment, % gross ⏲	125.8	2	●◆
2.2.2	Graduates in science and engineering, %	15.8	98	○
2.2.3	Tertiary inbound mobility, % ⏲	2.7	70	
2.3	**Research and development (R&D)**	**31.8**	**32**	◆
2.3.1	Researchers, FTE/mn pop.	2,536.1	37	◆
2.3.2	Gross expenditure on R&D, % GDP	1.3	33	◆
2.3.3	Global corporate R&D investors, top 3, mn USD$	51.0	28	◆
2.3.4	QS university ranking, top 3*	29.0	43	

		Score/Value	Rank	
	Infrastructure	**50.2**	**40**	◆
3.1	**Information and communication technologies (ICTs)**	**85.6**	**23**	◆
3.1.1	ICT access*	99.8	15	●◆
3.1.2	ICT use*	80.1	53	
3.1.3	Government's online service*	84.5	24	◆
3.1.4	E-participation*	77.9	18	◆
3.2	**General infrastructure**	**41.4**	**33**	◆
3.2.1	Electricity output, GWh/mn pop.	3,836.3	57	
3.2.2	Logistics performance*	59.1	37	◆
3.2.3	Gross capital formation, % GDP	30.3	24	◆
3.3	**Ecological sustainability**	**23.7**	**53**	
3.3.1	GDP/unit of energy use	18.2	15	◆
3.3.2	Low-carbon energy use, %	18.8	59	
3.3.3	ISO 14001 environment/bn PPP$ GDP	1.1	69	

		Score/Value	Rank	
	Market sophistication	**43.4**	**37**	
4.1	**Credit**	**36.7**	**39**	
4.1.1	Finance for startups and scaleups† ⏲	55.3	32	
4.1.2	Domestic credit to private sector, % GDP	54.5	57	
4.1.3	Loans from microfinance institutions, % GDP	n/a	n/a	
4.2	**Investment**	**10.7**	**58**	
4.2.1	Market capitalization, % GDP	28.7	50	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	0.0	71	
4.2.3	VC recipients, deals/bn PPP$ GDP	0.0	66	
4.2.4	VC received, value, % GDP	0.0	36	
4.3	**Trade, diversification and market scale**	**82.7**	**11**	●◆
4.3.1	Applied tariff rate, weighted avg., %	2.5	72	
4.3.2	Domestic industry diversification	96.4	9	●◆
4.3.3	Domestic market scale, bn PPP$	3,613.5	11	●◆

		Score/Value	Rank	
	Business sophistication	**31.1**	**48**	
5.1	**Knowledge workers**	**38.9**	**52**	
5.1.1	Knowledge-intensive employment, %	24.1	62	
5.1.2	Firms offering formal training, % ⏲	30.7	56	
5.1.3	GERD performed by business, % GDP	0.8	28	◆
5.1.4	GERD financed by business, %	50.2	29	◆
5.1.5	Females employed w/advanced degrees, %	12.3	63	
5.2	**Innovation linkages**	**20.9**	**79**	
5.2.1	Public research–industry co-publications, %	1.4	70	
5.2.2	University–industry R&D collaboration†	36.6	87	
5.2.3	State of cluster development†	45.4	70	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	110	○
5.2.5	Patent families/bn PPP$ GDP	0.3	40	
5.3	**Knowledge absorption**	**33.5**	**48**	
5.3.1	Intellectual property payments, % total trade	0.9	40	
5.3.2	High-tech imports, % total trade	7.5	75	
5.3.3	ICT services imports, % total trade	0.8	97	○
5.3.4	FDI net inflows, % GDP	1.4	91	
5.3.5	Research talent, % in businesses	61.6	11	◆

		Score/Value	Rank	
	Knowledge and technology outputs	**28.6**	**43**	
6.1	**Knowledge creation**	**29.5**	**34**	◆
6.1.1	Patents by origin/bn PPP$ GDP	2.8	25	◆
6.1.2	PCT patents by origin/bn PPP$ GDP	0.5	32	
6.1.3	Utility models by origin/bn PPP$ GDP	1.6	9	●
6.1.4	Scientific and technical articles/bn PPP$ GDP	12.0	58	
6.1.5	Citable documents H-index	29.4	33	◆
6.2	**Knowledge impact**	**39.7**	**24**	◆
6.2.1	Labor productivity growth, %	2.8	14	●
6.2.2	Unicorn valuation, % GDP	1.0	32	
6.2.3	Software spending, % GDP	0.4	25	◆
6.2.4	High-tech manufacturing, %	27.8	43	
6.3	**Knowledge diffusion**	**16.5**	**70**	
6.3.1	Intellectual property receipts, % total trade	0.1	55	
6.3.2	Production and export complexity	58.5	40	
6.3.3	High-tech exports, % total trade	1.9	65	
6.3.4	ICT services exports, % total trade	0.7	93	○
6.3.5	ISO 9001 quality/bn PPP$ GDP	2.8	80	

		Score/Value	Rank	
	Creative outputs	**48.3**	**16**	◆
7.1	**Intangible assets**	**74.0**	**4**	●◆
7.1.1	Intangible asset intensity, top 15, %	76.4	9	●
7.1.2	Trademarks by origin/bn PPP$ GDP	133.2	1	●◆
7.1.3	Global brand value, top 5,000, % GDP	0.8	57	
7.1.4	Industrial designs by origin/bn PPP$ GDP	23.4	1	●◆
7.2	**Creative goods and services**	**15.4**	**63**	
7.2.1	Cultural and creative services exports, % total trade	0.2	82	○
7.2.2	National feature films/mn pop. 15–69	3.0	44	
7.2.3	Entertainment and media market/th pop. 15–69	2.3	51	○◇
7.2.4	Creative goods exports, % total trade	2.9	21	
7.3	**Online creativity**	**29.6**	**54**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69	6.7	51	
7.3.2	GitHub commits/mn pop. 15–69	7.3	65	
7.3.3	Mobile app creation/bn PPP$ GDP	74.8	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Uganda

GII 2024 rank

121

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
117	119	Low	SSA	48.7	145.2	3,222

			Score/Value	Rank	
	Institutions		**41.1**	**84**	
1.1	**Institutional environment**		**35.7**	**106**	
1.1.1	Operational stability for businesses*		42.7	108	
1.1.2	Government effectiveness*		28.7	102	
1.2	**Regulatory environment**		**30.9**	**93**	
1.2.1	Regulatory quality*		29.0	100	
1.2.2	Rule of law*		32.8	86	
1.3	**Business environment**		**56.8**	**[41]**	
1.3.1	Policy stability for doing business†	◷	56.8	47	●
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**13.5**	**[123]**	
2.1	**Education**		**39.5**	**[98]**	
2.1.1	Expenditure on education, % GDP		2.6	113	◇
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	◷	20.5	99	
2.2	**Tertiary education**		**0.3**	**[129]**	
2.2.1	Tertiary enrolment, % gross	◷	4.8	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)**		**0.6**	**107**	
2.3.1	Researchers, FTE/mn pop.	◷	28.7	104	
2.3.2	Gross expenditure on R&D, % GDP	◷	0.1	97	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**23.5**	**120**	
3.1	**Information and communication technologies (ICTs)**		**28.7**	**125**	
3.1.1	ICT access*		5.0	130	○
3.1.2	ICT use*		23.7	117	
3.1.3	Government's online service*		46.6	99	
3.1.4	E-participation*		39.5	89	
3.2	**General infrastructure**		**22.2**	**92**	
3.2.1	Electricity output, GWh/mn pop.	◷	113.0	121	
3.2.2	Logistics performance*		n/a	n/a	
3.2.3	Gross capital formation, % GDP		28.2	31	●
3.3	**Ecological sustainability**		**19.7**	**68**	●
3.3.1	GDP/unit of energy use		4.9	117	
3.3.2	Low-carbon energy use, %		37.6	20	●
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.9	73	●◆
	Market sophistication		**13.3**	**124**	
4.1	**Credit**		**2.8**	**129**	○◇
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP	◷	14.8	122	◇
4.1.3	Loans from microfinance institutions, % GDP		0.3	50	
4.2	**Investment**		**8.6**	**65**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.0	98	○
4.2.3	VC recipients, deals/bn PPP$ GDP		0.1	43	●
4.2.4	VC received, value, % GDP		0.0	62	
4.3	**Trade, diversification and market scale**		**28.4**	**115**	
4.3.1	Applied tariff rate, weighted avg., %	◷	5.8	103	
4.3.2	Domestic industry diversification		n/a	n/a	
4.3.3	Domestic market scale, bn PPP$		145.2	81	

			Score/Value	Rank	
	Business sophistication		**12.7**	**129**	○
5.1	**Knowledge workers**		**4.4**	**132**	○
5.1.1	Knowledge-intensive employment, %	◷	4.5	121	
5.1.2	Firms offering formal training, %		n/a	n/a	
5.1.3	GERD performed by business, % GDP	◷	0.0	88	
5.1.4	GERD financed by business, %	◷	3.4	87	
5.1.5	Females employed w/advanced degrees, %	◷	3.3	102	◆
5.2	**Innovation linkages**		**17.6**	**94**	
5.2.1	Public research–industry co-publications, %		1.4	71	●
5.2.2	University–industry R&D collaboration†	◷	38.2	79	
5.2.3	State of cluster development†	◷	34.6	94	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	114	◇
5.2.5	Patent families/bn PPP$ GDP		0.0	102	○◇
5.3	**Knowledge absorption**		**16.1**	**116**	
5.3.1	Intellectual property payments, % total trade		0.0	121	○◇
5.3.2	High-tech imports, % total trade	◷	10.2	37	●
5.3.3	ICT services imports, % total trade		0.4	115	◇
5.3.4	FDI net inflows, % GDP		2.8	51	●
5.3.5	Research talent, % in businesses	◷	4.0	76	
	Knowledge and technology outputs		**11.2**	**102**	
6.1	**Knowledge creation**		**8.5**	**90**	
6.1.1	Patents by origin/bn PPP$ GDP		0.1	111	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	90	◆
6.1.3	Utility models by origin/bn PPP$ GDP		0.1	46	
6.1.4	Scientific and technical articles/bn PPP$ GDP		12.8	53	●◆
6.1.5	Citable documents H-index		10.0	75	◆
6.2	**Knowledge impact**		**16.2**	**119**	
6.2.1	Labor productivity growth, %		0.5	74	
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.0	129	○
6.2.4	High-tech manufacturing, %		n/a	n/a	
6.3	**Knowledge diffusion**		**8.8**	**98**	
6.3.1	Intellectual property receipts, % total trade		0.1	51	●◆
6.3.2	Production and export complexity		29.7	90	◆
6.3.3	High-tech exports, % total trade	◷	0.2	106	
6.3.4	ICT services exports, % total trade		0.5	101	
6.3.5	ISO 9001 quality/bn PPP$ GDP		2.1	90	◆
	Creative outputs		**6.9**	**116**	
7.1	**Intangible assets**		**4.8**	**116**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		15.3	99	
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.4	82	
7.2	**Creative goods and services**		**0.9**	**[121]**	
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		n/a	n/a	
7.2.4	Creative goods exports, % total trade	◷	0.1	103	
7.3	**Online creativity**		**17.2**	**107**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.1	124	
7.3.2	GitHub commits/mn pop. 15–69		1.6	109	
7.3.3	Mobile app creation/bn PPP$ GDP		49.8	105	

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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Ukraine

60

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
54	78	Lower middle	EUR	37.7	474.8	14,304

			Score/ Value	Rank	
	Institutions		**30.8**	**107**	
1.1	**Institutional environment**		**28.8**	**117**	○
1.1.1	Operational stability for businesses*		26.7	123	○◇
1.1.2	Government effectiveness*		31.0	99	
1.2	**Regulatory environment**		**25.3**	**106**	
1.2.1	Regulatory quality*		33.1	90	
1.2.2	Rule of law*		17.5	115	
1.3	**Business environment**		**38.2**	**84**	
1.3.1	Policy stability for doing business†		46.0	72	
1.3.2	Entrepreneurship policies and culture†		30.3	54	
	Human capital and research		**34.3**	**54**	◆
2.1	**Education**		**58.9**	**43**	◆
2.1.1	Expenditure on education, % GDP		5.9	16	●◆
2.1.2	Government funding/pupil, secondary, % GDP/cap		28.5	10	●◆
2.1.3	School life expectancy, years	⏲	13.3	76	
2.1.4	PISA scales in reading, maths and science		439.5	43	◆
2.1.5	Pupil–teacher ratio, secondary	⏲	8.3	18	●◆
2.2	**Tertiary education**		**37.2**	**49**	◆
2.2.1	Tertiary enrolment, % gross		70.7	44	◆
2.2.2	Graduates in science and engineering, %		25.7	40	
2.2.3	Tertiary inbound mobility, %	⏲	4.9	50	
2.3	**Research and development (R&D)**		**7.0**	**69**	
2.3.1	Researchers, FTE/mn pop.		580.8	66	
2.3.2	Gross expenditure on R&D, % GDP		0.3	70	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		16.9	56	
	Infrastructure		**35.5**	**82**	
3.1	**Information and communication technologies (ICTs)**		**75.6**	**56**	◆
3.1.1	ICT access*	⏲	87.9	74	◆
3.1.2	ICT use*		n/a	n/a	
3.1.3	Government's online service*		79.5	34	◆
3.1.4	E-participation*		59.3	57	◆
3.2	**General infrastructure**		**13.8**	**117**	○
3.2.1	Electricity output, GWh/mn pop.	⏲	3,605.8	60	◆
3.2.2	Logistics performance*		27.3	76	
3.2.3	Gross capital formation, % GDP		14.1	125	○◇
3.3	**Ecological sustainability**		**17.3**	**81**	
3.3.1	GDP/unit of energy use		5.5	115	○◇
3.3.2	Low-carbon energy use, %		31.3	32	
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.8	81	
	Market sophistication		**25.7**	**85**	
4.1	**Credit**		**13.8**	**100**	
4.1.1	Finance for startups and scaleups†		34.8	60	
4.1.2	Domestic credit to private sector, % GDP		23.5	109	
4.1.3	Loans from microfinance institutions, % GDP		0.1	57	○
4.2	**Investment**		**2.6**	**103**	○
4.2.1	Market capitalization, % GDP	⏲	4.3	80	○
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.1	47	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	95	○
4.2.4	VC received, value, % GDP		0.0	81	
4.3	**Trade, diversification and market scale**		**60.7**	**50**	◆
4.3.1	Applied tariff rate, weighted avg., %		1.6	59	◆
4.3.2	Domestic industry diversification	⏲	85.6	51	
4.3.3	Domestic market scale, bn PPP$		474.8	48	

			Score/ Value	Rank	
	Business sophistication		**31.8**	**45**	◆
5.1	**Knowledge workers**		**45.8**	**39**	◆
5.1.1	Knowledge-intensive employment, %	⏲	37.9	37	◆
5.1.2	Firms offering formal training, %	⏲	24.3	70	
5.1.3	GERD performed by business, % GDP	⏲	0.3	49	◆
5.1.4	GERD financed by business, %	⏲	30.5	61	
5.1.5	Females employed w/advanced degrees, %	⏲	30.0	2	●◆
5.2	**Innovation linkages**		**23.7**	**63**	
5.2.1	Public research–industry co-publications, %		2.5	29	●◆
5.2.2	University–industry R&D collaboration†		43.9	67	
5.2.3	State of cluster development†		44.0	71	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	120	○◇
5.2.5	Patent families/bn PPP$ GDP		0.1	50	◆
5.3	**Knowledge absorption**		**25.8**	**69**	
5.3.1	Intellectual property payments, % total trade		0.7	54	◆
5.3.2	High-tech imports, % total trade		8.3	67	
5.3.3	ICT services imports, % total trade		1.0	79	
5.3.4	FDI net inflows, % GDP		1.5	88	
5.3.5	Research talent, % in businesses	⏲	27.3	49	
	Knowledge and technology outputs		**31.1**	**34**	◆
6.1	**Knowledge creation**		**32.8**	**29**	●◆
6.1.1	Patents by origin/bn PPP$ GDP		1.8	34	◆
6.1.2	PCT patents by origin/bn PPP$ GDP		0.2	50	◆
6.1.3	Utility models by origin/bn PPP$ GDP		5.2	1	●◆
6.1.4	Scientific and technical articles/bn PPP$ GDP		9.6	73	
6.1.5	Citable documents H-index		16.5	50	
6.2	**Knowledge impact**		**27.8**	**60**	
6.2.1	Labor productivity growth, %		−2.8	130	○◇
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.7	4	●◆
6.2.4	High-tech manufacturing, %	⏲	17.4	67	
6.3	**Knowledge diffusion**		**32.5**	**35**	◆
6.3.1	Intellectual property receipts, % total trade		0.1	58	
6.3.2	Production and export complexity		51.2	49	◆
6.3.3	High-tech exports, % total trade		1.6	68	
6.3.4	ICT services exports, % total trade		11.0	5	●◆
6.3.5	ISO 9001 quality/bn PPP$ GDP		3.6	70	
	Creative outputs		**23.7**	**68**	
7.1	**Intangible assets**		**25.8**	**69**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		52.3	32	
7.1.3	Global brand value, top 5,000, % GDP		0.4	65	
7.1.4	Industrial designs by origin/bn PPP$ GDP		4.0	20	●
7.2	**Creative goods and services**		**6.6**	**89**	
7.2.1	Cultural and creative services exports, % total trade		0.5	53	
7.2.2	National feature films/mn pop. 15–69		0.7	73	
7.2.3	Entertainment and media market/th pop. 15–69		n/a	n/a	
7.2.4	Creative goods exports, % total trade		0.2	82	
7.3	**Online creativity**		**36.4**	**39**	◆
7.3.1	Top-level domains (TLDs)/th pop. 15–69		4.7	56	◆
7.3.2	GitHub commits/mn pop. 15–69		26.2	39	◆
7.3.3	Mobile app creation/bn PPP$ GDP		78.4	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

United Arab Emirates 32

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
50	19	High	NAWA	10.7	895.2	88,962

			Score/Value	Rank	
	Institutions		**79.9**	**10**	●
1.1	**Institutional environment**		**78.3**	**22**	
1.1.1	Operational stability for businesses*		78.7	25	
1.1.2	Government effectiveness*		77.9	20	
1.2	**Regulatory environment**		**68.4**	**31**	
1.2.1	Regulatory quality*		69.0	30	
1.2.2	Rule of law*		67.8	32	
1.3	**Business environment**		**92.9**	**2**	●◆
1.3.1	Policy stability for doing business†		85.8	5	●◆
1.3.2	Entrepreneurship policies and culture†		100.0	1	●◆
	Human capital and research		**54.4**	**17**	
2.1	**Education**		**56.2**	**53**	
2.1.1	Expenditure on education, % GDP	⏲	3.9	77	○
2.1.2	Government funding/pupil, secondary, % GDP/cap		25.6	19	
2.1.3	School life expectancy, years	⏲	17.2	20	
2.1.4	PISA scales in reading, maths and science		426.8	48	◇
2.1.5	Pupil–teacher ratio, secondary	⏲	9.6	29	
2.2	**Tertiary education**		**70.2**	**3**	●◆
2.2.1	Tertiary enrolment, % gross	⏲	52.7	69	◇
2.2.2	Graduates in science and engineering, %	⏲	33.1	11	◆
2.2.3	Tertiary inbound mobility, %	⏲	73.0	1	●◆
2.3	**Research and development (R&D)**		**36.7**	**28**	
2.3.1	Researchers, FTE/mn pop.	⏲	2,666.0	35	
2.3.2	Gross expenditure on R&D, % GDP	⏲	1.5	25	
2.3.3	Global corporate R&D investors, top 3, mn USD$		58.8	24	
2.3.4	QS university ranking, top 3*		36.4	36	
	Infrastructure		**55.3**	**17**	
3.1	**Information and communication technologies (ICTs)**		**89.8**	**13**	
3.1.1	ICT access*		100.0	10	●
3.1.2	ICT use*		92.2	13	
3.1.3	Government's online service*		89.1	12	
3.1.4	E-participation*		77.9	18	
3.2	**General infrastructure**		**60.3**	**9**	●◆
3.2.1	Electricity output, GWh/mn pop.	⏲	15,915.6	8	●◆
3.2.2	Logistics performance*		86.4	7	◆
3.2.3	Gross capital formation, % GDP		25.2	47	
3.3	**Ecological sustainability**		**15.9**	**87**	○◇
3.3.1	GDP/unit of energy use		7.8	96	○
3.3.2	Low-carbon energy use, %		4.9	106	○
3.3.3	ISO 14001 environment/bn PPP$ GDP		3.4	28	
	Market sophistication		**48.9**	**26**	
4.1	**Credit**		**53.5**	**20**	
4.1.1	Finance for startups and scaleups†		84.4	4	●◆
4.1.2	Domestic credit to private sector, % GDP		66.0	49	
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**32.2**	**25**	
4.2.1	Market capitalization, % GDP		130.1	9	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.4	18	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.1	34	
4.2.4	VC received, value, % GDP		0.0	28	
4.3	**Trade, diversification and market scale**		**61.0**	**47**	
4.3.1	Applied tariff rate, weighted avg., %		3.0	81	○
4.3.2	Domestic industry diversification		89.4	41	
4.3.3	Domestic market scale, bn PPP$		895.2	33	

			Score/Value	Rank	
	Business sophistication		**49.9**	**24**	
5.1	**Knowledge workers**		**55.2**	**27**	
5.1.1	Knowledge-intensive employment, %		37.8	38	
5.1.2	Firms offering formal training, %		n/a	n/a	
5.1.3	GERD performed by business, % GDP	⏲	0.8	31	
5.1.4	GERD financed by business, %	⏲	74.3	5	
5.1.5	Females employed w/advanced degrees, %	⏲	16.1	46	
5.2	**Innovation linkages**		**51.9**	**19**	
5.2.1	Public research–industry co-publications, %		1.4	69	
5.2.2	University–industry R&D collaboration†		74.6	18	
5.2.3	State of cluster development†		94.8	5	●◆
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.2	4	●◆
5.2.5	Patent families/bn PPP$ GDP		0.1	53	
5.3	**Knowledge absorption**		**42.5**	**24**	
5.3.1	Intellectual property payments, % total trade		0.6	62	
5.3.2	High-tech imports, % total trade		12.8	20	
5.3.3	ICT services imports, % total trade		1.1	70	
5.3.4	FDI net inflows, % GDP		5.1	21	
5.3.5	Research talent, % in businesses	⏲	77.9	3	●◆
	Knowledge and technology outputs		**23.1**	**56**	
6.1	**Knowledge creation**		**7.9**	**93**	○◇
6.1.1	Patents by origin/bn PPP$ GDP		0.1	105	○◇
6.1.2	PCT patents by origin/bn PPP$ GDP		0.2	53	
6.1.3	Utility models by origin/bn PPP$ GDP		0.0	73	○
6.1.4	Scientific and technical articles/bn PPP$ GDP		9.1	76	◇
6.1.5	Citable documents H-index		14.9	55	
6.2	**Knowledge impact**		**33.2**	**43**	
6.2.1	Labor productivity growth, %		1.6	36	◆
6.2.2	Unicorn valuation, % GDP		1.4	26	
6.2.3	Software spending, % GDP		0.2	57	
6.2.4	High-tech manufacturing, %		20.0	62	
6.3	**Knowledge diffusion**		**28.2**	**47**	
6.3.1	Intellectual property receipts, % total trade		0.9	20	
6.3.2	Production and export complexity		46.2	56	◇
6.3.3	High-tech exports, % total trade		9.4	21	
6.3.4	ICT services exports, % total trade		1.7	63	
6.3.5	ISO 9001 quality/bn PPP$ GDP		6.8	39	
	Creative outputs		**32.8**	**40**	
7.1	**Intangible assets**		**35.5**	**47**	
7.1.1	Intangible asset intensity, top 15, %		53.5	41	
7.1.2	Trademarks by origin/bn PPP$ GDP		9.8	110	○◇
7.1.3	Global brand value, top 5,000, % GDP		13.2	12	
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.1	114	○
7.2	**Creative goods and services**		**27.4**	**43**	
7.2.1	Cultural and creative services exports, % total trade		0.3	68	○
7.2.2	National feature films/mn pop. 15–69		1.8	58	○◇
7.2.3	Entertainment and media market/th pop. 15–69		22.4	28	
7.2.4	Creative goods exports, % total trade		5.4	10	●◆
7.3	**Online creativity**		**32.7**	**47**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		7.9	45	
7.3.2	GitHub commits/mn pop. 15–69		13.2	52	◇
7.3.3	Mobile app creation/bn PPP$ GDP		76.9	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

United Kingdom

GII 2024 rank

5

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
3	10	High	EUR	68.7	3,871.8	56,836

			Score/Value	Rank	
	Institutions		**69.9**	**26**	
1.1	**Institutional environment**		**72.2**	**32**	◇
1.1.1	Operational stability for businesses*		68.0	43	◇
1.1.2	Government effectiveness*		76.3	23	
1.2	**Regulatory environment**		**83.7**	**18**	
1.2.1	Regulatory quality*		83.0	13	
1.2.2	Rule of law*		84.4	18	
1.3	**Business environment**		**53.8**	**50**	◇
1.3.1	Policy stability for doing business†		64.0	35	
1.3.2	Entrepreneurship policies and culture†		43.5	38	○
	Human capital and research		**60.6**	**7**	●
2.1	**Education**		**61.3**	**32**	
2.1.1	Expenditure on education, % GDP	⏲	5.4	32	
2.1.2	Government funding/pupil, secondary, % GDP/cap		23.9	31	
2.1.3	School life expectancy, years		17.6	15	
2.1.4	PISA scales in reading, maths and science		494.3	13	
2.1.5	Pupil–teacher ratio, secondary	⏲	17.3	90	○◇
2.2	**Tertiary education**		**50.8**	**12**	
2.2.1	Tertiary enrolment, % gross		82.7	20	
2.2.2	Graduates in science and engineering, %		22.3	64	○
2.2.3	Tertiary inbound mobility, %		21.6	8	◆
2.3	**Research and development (R&D)**		**69.8**	**5**	●
2.3.1	Researchers, FTE/mn pop.	⏲	4,763.5	24	
2.3.2	Gross expenditure on R&D, % GDP	⏲	2.9	11	
2.3.3	Global corporate R&D investors, top 3, mn USD$		83.5	7	●
2.3.4	QS university ranking, top 3*		99.8	2	●◆
	Infrastructure		**55.0**	**18**	
3.1	**Information and communication technologies (ICTs)**		**92.2**	**11**	
3.1.1	ICT access*		99.9	13	
3.1.2	ICT use*		86.3	27	
3.1.3	Government's online service*		87.4	17	
3.1.4	E-participation*		95.3	6	●
3.2	**General infrastructure**		**34.8**	**51**	◇
3.2.1	Electricity output, GWh/mn pop.		4,748.7	46	
3.2.2	Logistics performance*		72.7	18	
3.2.3	Gross capital formation, % GDP		18.5	107	○◇
3.3	**Ecological sustainability**		**38.0**	**22**	
3.3.1	GDP/unit of energy use		19.5	11	
3.3.2	Low-carbon energy use, %		24.2	52	○
3.3.3	ISO 14001 environment/bn PPP$ GDP		5.1	21	
	Market sophistication		**68.7**	**3**	●◆
4.1	**Credit**		**54.6**	**17**	
4.1.1	Finance for startups and scaleups†		61.5	26	
4.1.2	Domestic credit to private sector, % GDP		129.9	13	
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**61.5**	**10**	
4.2.1	Market capitalization, % GDP		110.6	15	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.7	11	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.3	6	●◆
4.2.4	VC received, value, % GDP		0.0	9	
4.3	**Trade, diversification and market scale**		**90.0**	**5**	●◆
4.3.1	Applied tariff rate, weighted avg., %		0.8	11	
4.3.2	Domestic industry diversification		99.6	2	●◆
4.3.3	Domestic market scale, bn PPP$		3,871.8	9	◆

			Score/Value	Rank	
	Business sophistication		**56.4**	**14**	
5.1	**Knowledge workers**		**69.4**	**12**	
5.1.1	Knowledge-intensive employment, %	⏲	50.6	11	
5.1.2	Firms offering formal training, %		n/a	n/a	
5.1.3	GERD performed by business, % GDP		2.0	11	
5.1.4	GERD financed by business, %		58.5	14	
5.1.5	Females employed w/advanced degrees, %	⏲	24.1	21	
5.2	**Innovation linkages**		**61.3**	**11**	
5.2.1	Public research–industry co-publications, %		5.2	13	
5.2.2	University–industry R&D collaboration†		82.4	11	
5.2.3	State of cluster development†		81.8	18	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.1	11	
5.2.5	Patent families/bn PPP$ GDP		2.1	19	
5.3	**Knowledge absorption**		**38.6**	**31**	
5.3.1	Intellectual property payments, % total trade		1.9	12	
5.3.2	High-tech imports, % total trade		11.1	31	
5.3.3	ICT services imports, % total trade		1.5	52	○
5.3.4	FDI net inflows, % GDP		2.2	72	○
5.3.5	Research talent, % in businesses	⏲	41.8	35	○◇
	Knowledge and technology outputs		**58.7**	**5**	●
6.1	**Knowledge creation**		**59.1**	**7**	●
6.1.1	Patents by origin/bn PPP$ GDP		4.5	16	
6.1.2	PCT patents by origin/bn PPP$ GDP		1.4	20	
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		30.4	16	
6.1.5	Citable documents H-index		100.0	1	●◆
6.2	**Knowledge impact**		**63.5**	**3**	●◆
6.2.1	Labor productivity growth, %		0.5	75	○
6.2.2	Unicorn valuation, % GDP		4.9	1	●◆
6.2.3	Software spending, % GDP		0.6	15	
6.2.4	High-tech manufacturing, %		40.0	26	
6.3	**Knowledge diffusion**		**53.4**	**12**	
6.3.1	Intellectual property receipts, % total trade		2.8	8	●
6.3.2	Production and export complexity		83.6	8	
6.3.3	High-tech exports, % total trade		7.8	25	
6.3.4	ICT services exports, % total trade		4.2	27	
6.3.5	ISO 9001 quality/bn PPP$ GDP		11.8	21	
	Creative outputs		**61.3**	**3**	●◆
7.1	**Intangible assets**		**65.7**	**7**	●◆
7.1.1	Intangible asset intensity, top 15, %		86.0	4	●◆
7.1.2	Trademarks by origin/bn PPP$ GDP		50.0	36	
7.1.3	Global brand value, top 5,000, % GDP		13.8	10	
7.1.4	Industrial designs by origin/bn PPP$ GDP		7.7	10	◆
7.2	**Creative goods and services**		**50.4**	**6**	●◆
7.2.1	Cultural and creative services exports, % total trade		3.2	6	●◆
7.2.2	National feature films/mn pop. 15–69		3.8	35	○
7.2.3	Entertainment and media market/th pop. 15–69		64.5	6	
7.2.4	Creative goods exports, % total trade		1.9	27	
7.3	**Online creativity**		**63.3**	**12**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		56.3	9	
7.3.2	GitHub commits/mn pop. 15–69		58.8	18	
7.3.3	Mobile app creation/bn PPP$ GDP		74.8	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

United Republic of Tanzania

120

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
118	115	Lower middle	SSA	66.6	227.7	3,595

			Score/Value	Rank	
	Institutions		**43.3**	**79**	●
1.1	**Institutional environment**		**41.1**	**96**	
1.1.1	Operational stability for businesses*		49.3	95	
1.1.2	Government effectiveness*		32.8	97	
1.2	**Regulatory environment**		**29.1**	**96**	
1.2.1	Regulatory quality*		27.0	104	
1.2.2	Rule of law*		31.1	88	●
1.3	**Business environment**		**59.8**	**[33]**	
1.3.1	Policy stability for doing business†		59.8	41	● ◆
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**10.0**	**132**	○ ◇
2.1	**Education**		**28.6**	**124**	
2.1.1	Expenditure on education, % GDP		3.3	96	
2.1.2	Government funding/pupil, secondary, % GDP/cap	⌚	15.2	70	
2.1.3	School life expectancy, years	⌚	8.6	108	◇
2.1.4	PISA scales in reading, maths and science		n/a	n/a	
2.1.5	Pupil–teacher ratio, secondary	⌚	23.3	105	
2.2	**Tertiary education**		**1.3**	**127**	○ ◇
2.2.1	Tertiary enrolment, % gross		5.4	125	○ ◇
2.2.2	Graduates in science and engineering, %	⌚	9.5	112	○ ◇
2.2.3	Tertiary inbound mobility, %		n/a	n/a	
2.3	**Research and development (R&D)**		**0.0**	**[120]**	
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 USD$		0.0	41	○ ◇
2.3.4	QS university ranking, top 3*		0.0	75	○ ◇
	Infrastructure		**25.8**	**111**	
3.1	**Information and communication technologies (ICTs)**		**31.1**	**121**	◇
3.1.1	ICT access*		31.1	123	◇
3.1.2	ICT use*		26.5	116	◇
3.1.3	Government's online service*		41.4	108	
3.1.4	E-participation*		25.6	112	
3.2	**General infrastructure**		**38.3**	**41**	●
3.2.1	Electricity output, GWh/mn pop.		137.7	119	
3.2.2	Logistics performance*		n/a	n/a	
3.2.3	Gross capital formation, % GDP		38.5	8	● ◆
3.3	**Ecological sustainability**		**8.0**	**115**	◇
3.3.1	GDP/unit of energy use		6.6	105	
3.3.2	Low-carbon energy use, %		8.7	88	●
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.4	103	
	Market sophistication		**15.2**	**120**	
4.1	**Credit**		**2.0**	**131**	○ ◇
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		15.2	120	
4.1.3	Loans from microfinance institutions, % GDP		0.1	55	
4.2	**Investment**		**3.5**	**93**	
4.2.1	Market capitalization, % GDP		9.4	76	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	⌚	0.0	99	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	83	
4.2.4	VC received, value, % GDP		0.0	70	●
4.3	**Trade, diversification and market scale**		**40.1**	**100**	
4.3.1	Applied tariff rate, weighted avg., %		6.6	110	
4.3.2	Domestic industry diversification		68.0	81	
4.3.3	Domestic market scale, bn PPP$		227.7	68	●

			Score/Value	Rank	
	Business sophistication		**16.9**	**118**	
5.1	**Knowledge workers**		**7.9**	**[125]**	
5.1.1	Knowledge-intensive employment, %	⌚	3.2	126	○ ◇
5.1.2	Firms offering formal training, %		20.0	80	
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, %	⌚	0.2	127	○ ◇
5.2	**Innovation linkages**		**25.7**	**58**	●
5.2.1	Public research–industry co-publications, %		0.9	92	
5.2.2	University–industry R&D collaboration†		58.4	40	● ◆
5.2.3	State of cluster development†		58.6	41	●
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	101	
5.2.5	Patent families/bn PPP$ GDP		0.0	102	○ ◇
5.3	**Knowledge absorption**		**17.0**	**112**	
5.3.1	Intellectual property payments, % total trade		0.0	112	
5.3.2	High-tech imports, % total trade		9.3	49	●
5.3.3	ICT services imports, % total trade		0.3	126	
5.3.4	FDI net inflows, % GDP		1.3	93	
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**8.9**	**129**	
6.1	**Knowledge creation**		**4.7**	**113**	
6.1.1	Patents by origin/bn PPP$ GDP	⌚	0.0	127	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	99	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	⌚	0.0	71	
6.1.4	Scientific and technical articles/bn PPP$ GDP		6.9	91	
6.1.5	Citable documents H-index		9.6	79	●
6.2	**Knowledge impact**		**17.0**	**117**	
6.2.1	Labor productivity growth, %		2.0	26	●
6.2.2	Unicorn valuation, % GDP		0.0	49	○ ◇
6.2.3	Software spending, % GDP		0.0	131	○ ◇
6.2.4	High-tech manufacturing, %		6.9	95	
6.3	**Knowledge diffusion**		**4.9**	**123**	
6.3.1	Intellectual property receipts, % total trade		0.0	113	
6.3.2	Production and export complexity		20.0	105	
6.3.3	High-tech exports, % total trade		0.2	113	
6.3.4	ICT services exports, % total trade		0.3	115	
6.3.5	ISO 9001 quality/bn PPP$ GDP		0.8	117	
	Creative outputs		**7.9**	**[113]**	
7.1	**Intangible assets**		**7.8**	**[103]**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP	⌚	11.4	108	
7.1.3	Global brand value, top 5,000, % GDP		n/a	n/a	
7.1.4	Industrial designs by origin/bn PPP$ GDP		n/a	n/a	
7.2	**Creative goods and services**		**1.1**	**[117]**	
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	Creative goods exports, % total trade		0.1	99	
7.3	**Online creativity**		**15.1**	**115**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.2	121	
7.3.2	GitHub commits/mn pop. 15–69		0.4	126	
7.3.3	Mobile app creation/bn PPP$ GDP		44.9	112	

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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

United States of America **3**

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
5	4	High	NAC	343.0	26,949.6	80,412

		Score/ Value	Rank	
	Institutions	**74.9**	**17**	
1.1	**Institutional environment**	**78.4**	**21**	
1.1.1	Operational stability for businesses*	80.0	23	
1.1.2	Government effectiveness*	76.8	22	
1.2	**Regulatory environment**	**81.2**	**20**	
1.2.1	Regulatory quality*	79.3	18	
1.2.2	Rule of law*	83.2	19	
1.3	**Business environment**	**65.0**	**25**	
1.3.1	Policy stability for doing business†	75.0	17	
1.3.2	Entrepreneurship policies and culture†	55.1	20	
	Human capital and research	**56.7**	**12**	
2.1	**Education**	**59.5**	**40**	
2.1.1	Expenditure on education, % GDP	5.4	30	
2.1.2	Government funding/pupil, secondary, % GDP/cap	22.6	35	
2.1.3	School life expectancy, years	15.9	39	
2.1.4	PISA scales in reading, maths and science	489.4	17	
2.1.5	Pupil–teacher ratio, secondary	14.5	71	○ ◇
2.2	**Tertiary education**	**33.2**	**67**	○ ◇
2.2.1	Tertiary enrolment, % gross	79.4	23	
2.2.2	Graduates in science and engineering, %	20.1	75	○
2.2.3	Tertiary inbound mobility, %	4.9	51	
2.3	**Research and development (R&D)**	**77.3**	**2**	● ◆
2.3.1	Researchers, FTE/mn pop.	🕒 4,932.3	20	
2.3.2	Gross expenditure on R&D, % GDP	3.6	3	●
2.3.3	Global corporate R&D investors, top 3, mn USD$	100.0	1	● ◆
2.3.4	QS university ranking, top 3*	100.0	1	● ◆
	Infrastructure	**52.3**	**30**	
3.1	**Information and communication technologies (ICTs)**	**93.3**	**9**	
3.1.1	ICT access*	97.9	30	
3.1.2	ICT use*	92.4	9	◆
3.1.3	Government's online service*	92.3	9	
3.1.4	E-participation*	90.7	10	
3.2	**General infrastructure**	**49.9**	**17**	
3.2.1	Electricity output, GWh/mn pop.	13,427.7	9	
3.2.2	Logistics performance*	77.3	16	
3.2.3	Gross capital formation, % GDP	21.1	93	○
3.3	**Ecological sustainability**	**13.7**	**98**	○ ◇
3.3.1	GDP/unit of energy use	9.8	73	○
3.3.2	Low-carbon energy use, %	17.3	66	○
3.3.3	ISO 14001 environment/bn PPP$ GDP	0.2	119	○ ◇
	Market sophistication	**81.5**	**1**	● ◆
4.1	**Credit**	**78.7**	**3**	● ◆
4.1.1	Finance for startups and scaleups†	76.0	11	
4.1.2	Domestic credit to private sector, % GDP	🕒 216.3	2	● ◆
4.1.3	Loans from microfinance institutions, % GDP	n/a	n/a	
4.2	**Investment**	**69.9**	**5**	◆
4.2.1	Market capitalization, % GDP	188.0	6	◆
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP	0.4	17	
4.2.3	VC recipients, deals/bn PPP$ GDP	0.3	7	◆
4.2.4	VC received, value, % GDP	0.0	5	◆
4.3	**Trade, diversification and market scale**	**95.9**	**1**	● ◆
4.3.1	Applied tariff rate, weighted avg., %	1.2	51	
4.3.2	Domestic industry diversification	97.6	7	
4.3.3	Domestic market scale, bn PPP$	26,949.6	1	● ◆

		Score/ Value	Rank	
	Business sophistication	**70.6**	**2**	● ◆
5.1	**Knowledge workers**	**81.8**	**2**	● ◆
5.1.1	Knowledge-intensive employment, %	52.0	8	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	2.8	3	● ◆
5.1.4	GERD financed by business, %	70.0	6	◆
5.1.5	Females employed w/advanced degrees, %	28.1	9	
5.2	**Innovation linkages**	**77.1**	**2**	● ◆
5.2.1	Public research–industry co-publications, %	7.9	3	● ◆
5.2.2	University–industry R&D collaboration†	91.3	3	● ◆
5.2.3	State of cluster development†	97.5	3	● ◆
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.2	6	◆
5.2.5	Patent families/bn PPP$ GDP	3.4	13	
5.3	**Knowledge absorption**	**52.8**	**7**	
5.3.1	Intellectual property payments, % total trade	1.6	17	
5.3.2	High-tech imports, % total trade	19.4	10	◆
5.3.3	ICT services imports, % total trade	1.5	47	
5.3.4	FDI net inflows, % GDP	1.4	90	○
5.3.5	Research talent, % in businesses	🕒 81.3	2	● ◆
	Knowledge and technology outputs	**60.2**	**4**	◆
6.1	**Knowledge creation**	**56.9**	**10**	
6.1.1	Patents by origin/bn PPP$ GDP	9.9	8	
6.1.2	PCT patents by origin/bn PPP$ GDP	2.1	15	
6.1.3	Utility models by origin/bn PPP$ GDP	-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP	12.6	56	◇
6.1.5	Citable documents H-index	100.0	1	● ◆
6.2	**Knowledge impact**	**77.1**	**1**	● ◆
6.2.1	Labor productivity growth, %	1.5	40	
6.2.2	Unicorn valuation, % GDP	7.6	1	● ◆
6.2.3	Software spending, % GDP	1.0	1	● ◆
6.2.4	High-tech manufacturing, %	43.2	22	
6.3	**Knowledge diffusion**	**46.6**	**16**	
6.3.1	Intellectual property receipts, % total trade	4.2	1	● ◆
6.3.2	Production and export complexity	78.4	14	
6.3.3	High-tech exports, % total trade	9.4	20	
6.3.4	ICT services exports, % total trade	1.9	58	
6.3.5	ISO 9001 quality/bn PPP$ GDP	1.2	110	○ ◇
	Creative outputs	**54.9**	**8**	
7.1	**Intangible assets**	**52.3**	**18**	
7.1.1	Intangible asset intensity, top 15, %	89.9	1	● ◆
7.1.2	Trademarks by origin/bn PPP$ GDP	19.4	91	○ ◇
7.1.3	Global brand value, top 5,000, % GDP	21.4	2	● ◆
7.1.4	Industrial designs by origin/bn PPP$ GDP	0.8	65	○
7.2	**Creative goods and services**	**49.1**	**8**	◆
7.2.1	Cultural and creative services exports, % total trade	1.5	17	
7.2.2	National feature films/mn pop. 15–69	3.5	40	
7.2.3	Entertainment and media market/th pop. 15–69	100.0	1	● ◆
7.2.4	Creative goods exports, % total trade	2.6	23	
7.3	**Online creativity**	**65.9**	**10**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69	58.4	8	
7.3.2	GitHub commits/mn pop. 15–69	64.5	14	
7.3.3	Mobile app creation/bn PPP$ GDP	74.8	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Uruguay

GII 2024 rank

62

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
75	56	High	LCN	3.4	103.4	28,984

			Score/Value	Rank	
	Institutions		**67.4**	**31**	
1.1	**Institutional environment**		**74.8**	**30**	
1.1.1	Operational stability for businesses*		83.3	15	●
1.1.2	Government effectiveness*		66.2	34	
1.2	**Regulatory environment**		**63.2**	**36**	
1.2.1	Regulatory quality*		60.6	40	
1.2.2	Rule of law*		65.9	36	
1.3	**Business environment**		**64.3**	**27**	●
1.3.1	Policy stability for doing business†		88.9	4	● ◆
1.3.2	Entrepreneurship policies and culture†		39.8	44	

			Score/Value	Rank	
	Human capital and research		**26.2**	**83**	◇
2.1	**Education**		**42.5**	**88**	◇
2.1.1	Expenditure on education, % GDP		4.4	59	
2.1.2	Government funding/pupil, secondary, % GDP/cap		13.7	76	○ ◇
2.1.3	School life expectancy, years	⏲	17.4	17	●
2.1.4	PISA scales in reading, maths and science		424.8	49	◇
2.1.5	Pupil–teacher ratio, secondary		n/a	n/a	
2.2	**Tertiary education**		**28.4**	**78**	◇
2.2.1	Tertiary enrolment, % gross	⏲	75.2	30	
2.2.2	Graduates in science and engineering, %		18.6	88	
2.2.3	Tertiary inbound mobility, %	⏲	2.3	78	◇
2.3	**Research and development (R&D)**		**7.8**	**64**	◇
2.3.1	Researchers, FTE/mn pop.	⏲	838.5	56	◇
2.3.2	Gross expenditure on R&D, % GDP	⏲	0.4	64	◇
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○ ◇
2.3.4	QS university ranking, top 3*		15.9	58	

			Score/Value	Rank	
	Infrastructure		**46.5**	**48**	
3.1	**Information and communication technologies (ICTs)**		**75.9**	**54**	
3.1.1	ICT access*		89.4	67	◇
3.1.2	ICT use*		82.2	44	
3.1.3	Government's online service*		73.9	52	
3.1.4	E-participation*		58.1	61	
3.2	**General infrastructure**		**24.3**	**89**	◇
3.2.1	Electricity output, GWh/mn pop.		4,440.5	50	
3.2.2	Logistics performance*		40.9	60	◇
3.2.3	Gross capital formation, % GDP		18.9	106	○ ◇
3.3	**Ecological sustainability**		**39.3**	**19**	●
3.3.1	GDP/unit of energy use		13.7	37	
3.3.2	Low-carbon energy use, %		53.7	10	● ◆
3.3.3	ISO 14001 environment/bn PPP$ GDP		3.0	33	

			Score/Value	Rank	
	Market sophistication		**23.4**	**94**	◇
4.1	**Credit**		**16.3**	**95**	◇
4.1.1	Finance for startups and scaleups†		25.5	73	○ ◇
4.1.2	Domestic credit to private sector, % GDP		26.4	105	○ ◇
4.1.3	Loans from microfinance institutions, % GDP		n/a	n/a	
4.2	**Investment**		**10.2**	**59**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.1	66	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.1	51	
4.2.4	VC received, value, % GDP		0.0	51	
4.3	**Trade, diversification and market scale**		**43.9**	**92**	◇
4.3.1	Applied tariff rate, weighted avg., %		4.5	92	◇
4.3.2	Domestic industry diversification		65.5	86	◇
4.3.3	Domestic market scale, bn PPP$		103.4	89	

			Score/Value	Rank	
	Business sophistication		**25.6**	**70**	◇
5.1	**Knowledge workers**		**29.7**	**74**	◇
5.1.1	Knowledge-intensive employment, %		24.7	58	◇
5.1.2	Firms offering formal training, %	⏲	53.3	14	
5.1.3	GERD performed by business, % GDP	⏲	0.1	60	◇
5.1.4	GERD financed by business, %		4.2	84	○ ◇
5.1.5	Females employed w/advanced degrees, %	⏲	10.4	73	◇
5.2	**Innovation linkages**		**20.8**	**82**	◇
5.2.1	Public research–industry co-publications, %		0.7	107	○ ◇
5.2.2	University–industry R&D collaboration†		45.8	62	
5.2.3	State of cluster development†		41.6	81	◇
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	⏲	0.0	54	
5.2.5	Patent families/bn PPP$ GDP		0.1	60	◇
5.3	**Knowledge absorption**		**26.3**	**65**	
5.3.1	Intellectual property payments, % total trade		1.0	39	
5.3.2	High-tech imports, % total trade		7.0	88	
5.3.3	ICT services imports, % total trade		2.1	28	●
5.3.4	FDI net inflows, % GDP		6.7	16	●
5.3.5	Research talent, % in businesses	⏲	2.2	79	○ ◇

			Score/Value	Rank	
	Knowledge and technology outputs		**20.5**	**69**	◇
6.1	**Knowledge creation**		**12.3**	**73**	◇
6.1.1	Patents by origin/bn PPP$ GDP	⏲	0.3	91	◇
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	37	
6.1.4	Scientific and technical articles/bn PPP$ GDP		11.5	62	◇
6.1.5	Citable documents H-index		10.4	73	
6.2	**Knowledge impact**		**20.5**	**96**	◇
6.2.1	Labor productivity growth, %		0.6	70	
6.2.2	Unicorn valuation, % GDP		0.0	49	○ ◇
6.2.3	Software spending, % GDP		0.2	77	
6.2.4	High-tech manufacturing, %		12.9	80	◇
6.3	**Knowledge diffusion**		**28.6**	**44**	
6.3.1	Intellectual property receipts, % total trade		0.3	37	
6.3.2	Production and export complexity		49.0	51	
6.3.3	High-tech exports, % total trade		0.9	80	
6.3.4	ICT services exports, % total trade		5.9	15	●
6.3.5	ISO 9001 quality/bn PPP$ GDP		11.6	24	●

			Score/Value	Rank	
	Creative outputs		**20.3**	**81**	◇
7.1	**Intangible assets**		**14.2**	**93**	◇
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		49.2	37	
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○ ◇
7.1.4	Industrial designs by origin/bn PPP$ GDP	⏲	0.7	71	
7.2	**Creative goods and services**		**18.6**	**57**	
7.2.1	Cultural and creative services exports, % total trade		1.1	23	●
7.2.2	National feature films/mn pop. 15–69		3.8	36	
7.2.3	Entertainment and media market/th pop. 15–69		n/a	n/a	
7.2.4	Creative goods exports, % total trade		0.1	106	
7.3	**Online creativity**		**34.4**	**45**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		8.6	42	
7.3.2	GitHub commits/mn pop. 15–69		22.8	43	
7.3.3	Mobile app creation/bn PPP$ GDP		71.8	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Uzbekistan

83

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
91	71	Lower middle	CSA	35.7	371.6	10,316

			Score/Value	Rank	
	Institutions		**49.2**	**62**	◆
1.1	**Institutional environment**		**45.0**	**85**	
1.1.1	Operational stability for businesses*		54.7	85	
1.1.2	Government effectiveness*		35.4	91	
1.2	**Regulatory environment**		**23.4**	**107**	
1.2.1	Regulatory quality*		27.4	102	
1.2.2	Rule of law*		19.3	111	
1.3	**Business environment**		**79.1**	**7**	●◆
1.3.1	Policy stability for doing business†	⏲	73.2	20	●◆
1.3.2	Entrepreneurship policies and culture†		85.0	4	●◆
	Human capital and research		**25.1**	**93**	
2.1	**Education**		**38.9**	**104**	
2.1.1	Expenditure on education, % GDP		5.3	34	●
2.1.2	Government funding/pupil, secondary, % GDP/cap		13.8	75	
2.1.3	School life expectancy, years	⏲	12.0	92	
2.1.4	PISA scales in reading, maths and science		351.4	84	○
2.1.5	Pupil–teacher ratio, secondary		13.1	62	
2.2	**Tertiary education**		**34.4**	**62**	
2.2.1	Tertiary enrolment, % gross		41.2	81	
2.2.2	Graduates in science and engineering, %		32.8	12	●◆
2.2.3	Tertiary inbound mobility, %	⏲	0.7	95	
2.3	**Research and development (R&D)**		**2.0**	**91**	
2.3.1	Researchers, FTE/mn pop.		547.5	69	
2.3.2	Gross expenditure on R&D, % GDP		0.2	94	
2.3.3	Global corporate R&D investors, top 3, mn USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**40.4**	**70**	◆
3.1	**Information and communication technologies (ICTs)**		**73.4**	**63**	◆
3.1.1	ICT access*		87.2	76	◆
3.1.2	ICT use*		74.2	77	
3.1.3	Government's online service*		71.7	57	◆
3.1.4	E-participation*		60.5	55	◆
3.2	**General infrastructure**		**35.7**	**49**	
3.2.1	Electricity output, GWh/mn pop.	⏲	2,043.8	78	
3.2.2	Logistics performance*		22.7	82	
3.2.3	Gross capital formation, % GDP		38.7	7	●◆
3.3	**Ecological sustainability**		**12.3**	**103**	
3.3.1	GDP/unit of energy use		5.8	112	○◇
3.3.2	Low-carbon energy use, %		2.4	116	○
3.3.3	ISO 14001 environment/bn PPP$ GDP		3.1	32	●◆
	Market sophistication		**28.9**	**78**	
4.1	**Credit**		**26.4**	**66**	
4.1.1	Finance for startups and scaleups†		65.8	19	●◆
4.1.2	Domestic credit to private sector, % GDP		36.7	84	
4.1.3	Loans from microfinance institutions, % GDP		0.2	51	
4.2	**Investment**		**2.4**	**106**	○
4.2.1	Market capitalization, % GDP	⏲	8.1	78	○
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.0	87	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	90	
4.2.4	VC received, value, % GDP		0.0	85	
4.3	**Trade, diversification and market scale**		**57.9**	**61**	
4.3.1	Applied tariff rate, weighted avg., %		2.7	77	
4.3.2	Domestic industry diversification		87.8	44	
4.3.3	Domestic market scale, bn PPP$		371.6	56	

			Score/Value	Rank	
	Business sophistication		**25.2**	**71**	
5.1	**Knowledge workers**		**24.6**	**89**	
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	69	
5.1.4	GERD financed by business, %	⏲	42.4	42	◆
5.1.5	Females employed w/advanced degrees, %	⏲	8.1	84	
5.2	**Innovation linkages**		**29.0**	**51**	◆
5.2.1	Public research–industry co-publications, %		0.9	91	
5.2.2	University–industry R&D collaboration†	⏲	60.3	37	◆
5.2.3	State of cluster development†	⏲	72.7	30	●◆
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	95	
5.2.5	Patent families/bn PPP$ GDP		0.0	102	○◇
5.3	**Knowledge absorption**		**21.9**	**84**	
5.3.1	Intellectual property payments, % total trade		0.5	74	
5.3.2	High-tech imports, % total trade		9.8	42	
5.3.3	ICT services imports, % total trade		0.8	92	
5.3.4	FDI net inflows, % GDP		3.1	47	
5.3.5	Research talent, % in businesses	⏲	12.9	58	
	Knowledge and technology outputs		**18.4**	**78**	
6.1	**Knowledge creation**		**14.1**	**66**	
6.1.1	Patents by origin/bn PPP$ GDP		1.3	42	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	95	
6.1.3	Utility models by origin/bn PPP$ GDP		1.3	14	●
6.1.4	Scientific and technical articles/bn PPP$ GDP		3.2	116	○
6.1.5	Citable documents H-index		4.1	111	
6.2	**Knowledge impact**		**29.4**	**56**	
6.2.1	Labor productivity growth, %		3.9	7	●◆
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.2	82	
6.2.4	High-tech manufacturing, %		23.1	52	
6.3	**Knowledge diffusion**		**11.8**	**87**	
6.3.1	Intellectual property receipts, % total trade		0.0	107	
6.3.2	Production and export complexity		38.6	71	
6.3.3	High-tech exports, % total trade		0.3	99	
6.3.4	ICT services exports, % total trade		0.9	85	
6.3.5	ISO 9001 quality/bn PPP$ GDP		4.2	69	
	Creative outputs		**12.9**	**103**	
7.1	**Intangible assets**		**11.3**	**97**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		36.2	57	
7.1.3	Global brand value, top 5,000, % GDP		0.2	70	
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.7	69	
7.2	**Creative goods and services**		**5.8**	**94**	
7.2.1	Cultural and creative services exports, % total trade		0.1	91	
7.2.2	National feature films/mn pop. 15–69		1.7	60	
7.2.3	Entertainment and media market/th pop. 15–69		3.3	49	◆
7.2.4	Creative goods exports, % total trade		0.5	65	
7.3	**Online creativity**		**23.2**	**80**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.7	102	
7.3.2	GitHub commits/mn pop. 15–69		3.2	94	
7.3.3	Mobile app creation/bn PPP$ GDP		65.6	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

GII 2024 rank

Viet Nam

44

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
36	53	Lower middle	SEAO	100.4	1,434.2	14,285

			Score/Value	Rank	
	Institutions		**50.5**	**58**	◆
1.1	**Institutional environment**		**59.3**	**52**	◆
1.1.1	Operational stability for businesses*		70.0	40	◆
1.1.2	Government effectiveness*		48.6	57	◆
1.2	**Regulatory environment**		**34.9**	**86**	
1.2.1	Regulatory quality*		30.5	95	
1.2.2	Rule of law*		39.3	72	◆
1.3	**Business environment**		**57.3**	**38**	
1.3.1	Policy stability for doing business†		59.8	42	◆
1.3.2	Entrepreneurship policies and culture†	⏲	54.7	21	
	Human capital and research		**29.3**	**73**	
2.1	**Education**		**45.3**	**[79]**	
2.1.1	Expenditure on education, % GDP		2.9	106	○
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		467.9	36	◆
2.1.5	Pupil–teacher ratio, secondary		21.1	102	○
2.2	**Tertiary education**		**23.5**	**88**	
2.2.1	Tertiary enrolment, % gross		42.2	78	
2.2.2	Graduates in science and engineering, %	⏲	22.7	63	
2.2.3	Tertiary inbound mobility, %		0.3	105	○
2.3	**Research and development (R&D)**		**19.2**	**45**	◆
2.3.1	Researchers, FTE/mn pop.	⏲	779.3	59	
2.3.2	Gross expenditure on R&D, % GDP	⏲	0.4	63	
2.3.3	Global corporate R&D investors, top 3, mn USD$		45.2	36	◆
2.3.4	QS university ranking, top 3*		17.0	55	
	Infrastructure		**44.9**	**56**	◆
3.1	**Information and communication technologies (ICTs)**		**70.6**	**72**	◆
3.1.1	ICT access*		87.6	75	◆
3.1.2	ICT use*		81.3	48	◆
3.1.3	Government's online service*		61.1	75	
3.1.4	E-participation*		52.3	71	◆
3.2	**General infrastructure**		**41.1**	**34**	
3.2.1	Electricity output, GWh/mn pop.	⏲	2,600.0	70	◆
3.2.2	Logistics performance*		54.5	42	◆
3.2.3	Gross capital formation, % GDP		33.1	14	●
3.3	**Ecological sustainability**		**23.0**	**55**	
3.3.1	GDP/unit of energy use		10.2	68	
3.3.2	Low-carbon energy use, %		26.8	46	
3.3.3	ISO 14001 environment/bn PPP$ GDP		2.1	49	◆
	Market sophistication		**39.0**	**43**	◆
4.1	**Credit**		**31.7**	**53**	
4.1.1	Finance for startups and scaleups†	⏲	47.9	46	
4.1.2	Domestic credit to private sector, % GDP		126.4	15	●◆
4.1.3	Loans from microfinance institutions, % GDP	⏲	0.1	56	○
4.2	**Investment**		**14.4**	**50**	
4.2.1	Market capitalization, % GDP		57.1	33	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		0.1	50	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.1	44	
4.2.4	VC received, value, % GDP		0.0	48	
4.3	**Trade, diversification and market scale**		**70.9**	**19**	●◆
4.3.1	Applied tariff rate, weighted avg., %	⏲	1.2	48	◆
4.3.2	Domestic industry diversification		93.7	23	◆
4.3.3	Domestic market scale, bn PPP$		1,434.2	25	

			Score/Value	Rank	
	Business sophistication		**31.4**	**46**	◆
5.1	**Knowledge workers**		**26.4**	**84**	
5.1.1	Knowledge-intensive employment, %		10.4	109	○
5.1.2	Firms offering formal training, %		8.7	97	○◇
5.1.3	GERD performed by business, % GDP	⏲	0.4	46	◆
5.1.4	GERD financed by business, %	⏲	64.1	9	●◆
5.1.5	Females employed w/advanced degrees, %	⏲	7.5	88	
5.2	**Innovation linkages**		**32.2**	**41**	◆
5.2.1	Public research–industry co-publications, %		1.5	66	
5.2.2	University–industry R&D collaboration†		63.8	32	◆
5.2.3	State of cluster development†		76.2	24	●◆
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	84	
5.2.5	Patent families/bn PPP$ GDP		0.1	67	
5.3	**Knowledge absorption**		**35.6**	**39**	◆
5.3.1	Intellectual property payments, % total trade		0.4	80	
5.3.2	High-tech imports, % total trade		29.4	1	●◆
5.3.3	ICT services imports, % total trade		0.2	129	○◇
5.3.4	FDI net inflows, % GDP		4.4	30	
5.3.5	Research talent, % in businesses	⏲	24.1	52	
	Knowledge and technology outputs		**28.5**	**44**	◆
6.1	**Knowledge creation**		**9.7**	**84**	
6.1.1	Patents by origin/bn PPP$ GDP		0.7	68	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	91	○
6.1.3	Utility models by origin/bn PPP$ GDP		0.3	34	
6.1.4	Scientific and technical articles/bn PPP$ GDP		5.9	97	
6.1.5	Citable documents H-index		14.3	58	
6.2	**Knowledge impact**		**43.3**	**22**	●◆
6.2.1	Labor productivity growth, %		4.7	3	●◆
6.2.2	Unicorn valuation, % GDP		1.1	31	
6.2.3	Software spending, % GDP		0.2	63	
6.2.4	High-tech manufacturing, %		38.3	28	◆
6.3	**Knowledge diffusion**		**32.5**	**37**	◆
6.3.1	Intellectual property receipts, % total trade		0.0	105	○
6.3.2	Production and export complexity		43.9	61	
6.3.3	High-tech exports, % total trade		36.1	1	●◆
6.3.4	ICT services exports, % total trade		0.6	95	
6.3.5	ISO 9001 quality/bn PPP$ GDP		4.8	62	◆
	Creative outputs		**38.2**	**34**	◆
7.1	**Intangible assets**		**42.6**	**29**	◆
7.1.1	Intangible asset intensity, top 15, %		41.2	57	
7.1.2	Trademarks by origin/bn PPP$ GDP		62.1	24	◆
7.1.3	Global brand value, top 5,000, % GDP		8.8	22	●◆
7.1.4	Industrial designs by origin/bn PPP$ GDP		1.5	44	
7.2	**Creative goods and services**		**35.8**	**18**	●◆
7.2.1	Cultural and creative services exports, % total trade		0.2	81	
7.2.2	National feature films/mn pop. 15–69		0.5	76	○
7.2.3	Entertainment and media market/th pop. 15–69		n/a	n/a	
7.2.4	Creative goods exports, % total trade		8.8	1	●◆
7.3	**Online creativity**		**31.7**	**51**	◆
7.3.1	Top-level domains (TLDs)/th pop. 15–69		2.2	76	◆
7.3.2	GitHub commits/mn pop. 15–69		9.9	56	◆
7.3.3	Mobile app creation/bn PPP$ GDP		83.1	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Zambia

GII 2024 rank

116

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
131	103	Lower middle	SSA	20.7	83.7	4,068

			Score/ Value	Rank	
	Institutions		**36.5**	**92**	
1.1	**Institutional environment**		**36.7**	**104**	
1.1.1	Operational stability for businesses*		46.7	100	
1.1.2	Government effectiveness*		26.8	109	
1.2	**Regulatory environment**		**28.4**	**98**	
1.2.1	Regulatory quality*		27.9	101	
1.2.2	Rule of law*		28.9	96	
1.3	**Business environment**		**44.4**	**[67]**	
1.3.1	Policy stability for doing business†	◷	44.4	78	●
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	

			Score/ Value	Rank	
	Human capital and research		**22.6**	**[97]**	
2.1	**Education**		**45.2**	**[80]**	
2.1.1	Expenditure on education, % GDP		3.6	88	
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	103	
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)**		**0.0**	**[120]**	
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 USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇

			Score/ Value	Rank	
	Infrastructure		**31.9**	**91**	
3.1	**Information and communication technologies (ICTs)**		**40.1**	**112**	
3.1.1	ICT access*		46.1	111	
3.1.2	ICT use*		n/a	n/a	
3.1.3	Government's online service*		38.3	111	
3.1.4	E-participation*		36.0	94	
3.2	**General infrastructure**		**27.7**	**81**	●
3.2.1	Electricity output, GWh/mn pop.		969.1	97	
3.2.2	Logistics performance*		n/a	n/a	
3.2.3	Gross capital formation, % GDP		30.7	22	●
3.3	**Ecological sustainability**		**27.8**	**43**	●◆
3.3.1	GDP/unit of energy use		5.3	116	◇
3.3.2	Low-carbon energy use, %		62.3	8	●◆
3.3.3	ISO 14001 environment/bn PPP$ GDP		0.2	123	

			Score/ Value	Rank	
	Market sophistication		**19.3**	**112**	
4.1	**Credit**		**12.1**	**108**	
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		13.0	125	○
4.1.3	Loans from microfinance institutions, % GDP		2.0	21	●
4.2	**Investment**		**5.6**	**75**	
4.2.1	Market capitalization, % GDP		15.7	68	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	71	
4.2.4	VC received, value, % GDP		0.0	73	
4.3	**Trade, diversification and market scale**		**40.2**	**99**	
4.3.1	Applied tariff rate, weighted avg., %		5.8	101	
4.3.2	Domestic industry diversification	◷	64.8	88	
4.3.3	Domestic market scale, bn PPP$		83.7	93	

			Score/ Value	Rank	
	Business sophistication		**20.9**	**95**	
5.1	**Knowledge workers**		**24.5**	**[90]**	
5.1.1	Knowledge-intensive employment, %		12.4	101	
5.1.2	Firms offering formal training, %	◷	36.6	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, %	◷	3.4	100	
5.2	**Innovation linkages**		**22.2**	**71**	●
5.2.1	Public research–industry co-publications, %		2.2	39	●◆
5.2.2	University–industry R&D collaboration†	◷	37.3	82	●
5.2.3	State of cluster development†	◷	43.2	72	●
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	◷	0.0	62	●
5.2.5	Patent families/bn PPP$ GDP		0.0	102	○◇
5.3	**Knowledge absorption**		**15.9**	**119**	
5.3.1	Intellectual property payments, % total trade		0.2	93	
5.3.2	High-tech imports, % total trade		5.8	103	
5.3.3	ICT services imports, % total trade		0.5	109	
5.3.4	FDI net inflows, % GDP		0.1	117	
5.3.5	Research talent, % in businesses		n/a	n/a	

			Score/ Value	Rank	
	Knowledge and technology outputs		**7.2**	**131**	○◇
6.1	**Knowledge creation**		**5.9**	**107**	
6.1.1	Patents by origin/bn PPP$ GDP		0.1	106	
6.1.2	PCT patents by origin/bn PPP$ GDP		0.0	99	○◇
6.1.3	Utility models by origin/bn PPP$ GDP		-	-	
6.1.4	Scientific and technical articles/bn PPP$ GDP		7.4	88	
6.1.5	Citable documents H-index		6.0	93	
6.2	**Knowledge impact**		**10.8**	**129**	○◇
6.2.1	Labor productivity growth, %		−1.8	126	○◇
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.0	119	◇
6.2.4	High-tech manufacturing, %	◷	10.1	86	
6.3	**Knowledge diffusion**		**5.0**	**121**	
6.3.1	Intellectual property receipts, % total trade		0.0	116	○◇
6.3.2	Production and export complexity		21.9	101	
6.3.3	High-tech exports, % total trade		0.1	118	
6.3.4	ICT services exports, % total trade		0.2	118	
6.3.5	ISO 9001 quality/bn PPP$ GDP		0.5	124	◇

			Score/ Value	Rank	
	Creative outputs		**3.0**	**131**	○◇
7.1	**Intangible assets**		**5.5**	**111**	
7.1.1	Intangible asset intensity, top 15, %		n/a	n/a	
7.1.2	Trademarks by origin/bn PPP$ GDP		13.3	101	
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.8	66	●
7.2	**Creative goods and services**		**0.5**	**[126]**	
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	Creative goods exports, % total trade		0.0	112	
7.3	**Online creativity**		**0.3**	**130**	○◇
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.1	126	○
7.3.2	GitHub commits/mn pop. 15–69		0.6	120	
7.3.3	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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Zimbabwe

GII 2024 rank

118

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
96	131	Lower middle	SSA	16.3	44.4	2,750

			Score/ Value	Rank	
	Institutions		**13.8**	**130**	○◇
1.1	**Institutional environment**		**11.6**	**131**	○◇
1.1.1	Operational stability for businesses*		12.0	132	○◇
1.1.2	Government effectiveness*		11.2	130	○◇
1.2	**Regulatory environment**		**6.4**	**132**	○◇
1.2.1	Regulatory quality*		4.4	132	○◇
1.2.2	Rule of law*		8.4	128	◇
1.3	**Business environment**		**23.3**	**[113]**	
1.3.1	Policy stability for doing business†		23.3	117	
1.3.2	Entrepreneurship policies and culture†		n/a	n/a	
	Human capital and research		**11.7**	**[127]**	
2.1	**Education**		**10.8**	**[133]**	
2.1.1	Expenditure on education, % GDP	◷	2.1	121	◇
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**		**24.3**	**86**	
2.2.1	Tertiary enrolment, % gross	◷	9.7	119	◇
2.2.2	Graduates in science and engineering, %	◷	30.2	19	
2.2.3	Tertiary inbound mobility, %	◷	0.5	100	
2.3	**Research and development (R&D)**		**0.0**	**[120]**	
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 USD$		0.0	41	○◇
2.3.4	QS university ranking, top 3*		0.0	75	○◇
	Infrastructure		**19.5**	**128**	◇
3.1	**Information and communication technologies (ICTs)**		**30.0**	**123**	◇
3.1.1	ICT access*		36.0	120	◇
3.1.2	ICT use*		30.9	114	◇
3.1.3	Government's online service*		32.0	120	
3.1.4	E-participation*		20.9	123	
3.2	**General infrastructure**		**10.1**	**124**	
3.2.1	Electricity output, GWh/mn pop.		541.6	109	
3.2.2	Logistics performance*		18.2	89	
3.2.3	Gross capital formation, % GDP		n/a	n/a	
3.3	**Ecological sustainability**		**18.6**	**71**	
3.3.1	GDP/unit of energy use		3.3	125	○◇
3.3.2	Low-carbon energy use, %		31.9	31	●
3.3.3	ISO 14001 environment/bn PPP$ GDP		1.9	54	●◆
	Market sophistication		**15.3**	**119**	
4.1	**Credit**		**2.7**	**130**	○◇
4.1.1	Finance for startups and scaleups†		n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP		8.8	129	○
4.1.3	Loans from microfinance institutions, % GDP		0.5	42	
4.2	**Investment**		**4.7**	**[81]**	
4.2.1	Market capitalization, % GDP		n/a	n/a	
4.2.2	Venture capital (VC) investors, deals/bn PPP$ GDP		n/a	n/a	
4.2.3	VC recipients, deals/bn PPP$ GDP		0.0	68	
4.2.4	VC received, value, % GDP		0.0	90	
4.3	**Trade, diversification and market scale**		**38.4**	**103**	
4.3.1	Applied tariff rate, weighted avg., %		5.9	104	
4.3.2	Domestic industry diversification	◷	60.8	98	
4.3.3	Domestic market scale, bn PPP$		44.4	116	

			Score/ Value	Rank	
	Business sophistication		**22.1**	**91**	
5.1	**Knowledge workers**		**25.2**	**[87]**	
5.1.1	Knowledge-intensive employment, %		10.1	110	
5.1.2	Firms offering formal training, %	◷	26.4	64	
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, %	◷	9.7	78	
5.2	**Innovation linkages**		**21.9**	**74**	
5.2.1	Public research–industry co-publications, %		1.7	55	●
5.2.2	University–industry R&D collaboration†		43.2	71	
5.2.3	State of cluster development†		37.5	90	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP		0.0	42	●◆
5.2.5	Patent families/bn PPP$ GDP		0.0	102	○◇
5.3	**Knowledge absorption**		**19.1**	**98**	
5.3.1	Intellectual property payments, % total trade		0.1	110	
5.3.2	High-tech imports, % total trade		6.1	97	
5.3.3	ICT services imports, % total trade		1.2	66	●
5.3.4	FDI net inflows, % GDP		0.9	99	
5.3.5	Research talent, % in businesses		n/a	n/a	
	Knowledge and technology outputs		**12.5**	**97**	
6.1	**Knowledge creation**		**11.6**	**74**	
6.1.1	Patents by origin/bn PPP$ GDP		0.9	62	●
6.1.2	PCT patents by origin/bn PPP$ GDP		0.1	65	
6.1.3	Utility models by origin/bn PPP$ GDP		0.2	38	●
6.1.4	Scientific and technical articles/bn PPP$ GDP		12.8	54	●
6.1.5	Citable documents H-index		7.4	87	
6.2	**Knowledge impact**		**18.8**	**109**	
6.2.1	Labor productivity growth, %		−1.2	122	
6.2.2	Unicorn valuation, % GDP		0.0	49	○◇
6.2.3	Software spending, % GDP		0.2	73	
6.2.4	High-tech manufacturing, %	◷	17.2	68	
6.3	**Knowledge diffusion**		**7.1**	**106**	
6.3.1	Intellectual property receipts, % total trade		0.0	104	
6.3.2	Production and export complexity		17.7	109	
6.3.3	High-tech exports, % total trade		0.1	121	
6.3.4	ICT services exports, % total trade		0.5	98	
6.3.5	ISO 9001 quality/bn PPP$ GDP		4.7	64	●◆
	Creative outputs		**16.8**	**90**	
7.1	**Intangible assets**		**25.0**	**70**	
7.1.1	Intangible asset intensity, top 15, %	◷	46.5	53	
7.1.2	Trademarks by origin/bn PPP$ GDP		24.0	76	
7.1.3	Global brand value, top 5,000, % GDP		0.0	75	○◇
7.1.4	Industrial designs by origin/bn PPP$ GDP		0.7	72	
7.2	**Creative goods and services**		**1.1**	**[118]**	
7.2.1	Cultural and creative services exports, % total trade		n/a	n/a	
7.2.2	National feature films/mn pop. 15–69		0.1	83	
7.2.3	Entertainment and media market/th pop. 15–69		n/a	n/a	
7.2.4	Creative goods exports, % total trade		0.1	90	
7.3	**Online creativity**		**16.4**	**110**	
7.3.1	Top-level domains (TLDs)/th pop. 15–69		0.8	99	
7.3.2	GitHub commits/mn pop. 15–69		1.0	115	
7.3.3	Mobile app creation/bn PPP$ GDP		47.3	106	

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 is outdated. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level; n/a represents missing values; a dash - indicates an indicator which is not relevant to this economy and thus not considered for DMC thresholds.

Appendices

Appendix I - Conceptual and measurement framework of the Global Innovation Index

Rationale and origins

The Global Innovation Index (GII) was launched in 2007 by Prof. Soumitra Dutta (then at INSEAD) with the aim of identifying and determining 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 – for both 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. The concept of innovation has become more general and horizontal in nature, and now 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.

Now in its 17th edition, the GII helps to create an environment in which these innovation factors are subject to continual evaluation. It provides a key tool for decision-makers and a rich database of detailed metrics, offering a convenient source of information for refining innovation policies.

Measuring innovation outputs and their impact remains a challenging task, hence great emphasis is placed on measuring the climate and infrastructure for innovation and assessing related outcomes.

Although the final results are presented as a ranking, the primary aim of the GII is to improve the "journey" to more accurate methods of 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 definition of innovation, originally elaborated in the *Oslo Manual* developed by the Statistical Office of the European Communities and the Organisation for Economic Co-operation and Development (OECD). In its fourth edition, in 2018, the *Oslo Manual* introduced a more general definition of innovation: "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)." (OECD and Eurostat, 2018

This update of the *Oslo Manual* also introduced 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 new services, or any combination of these. While the GII focuses on a more general definition of innovation, it is important to highlight how these specific definitions capture the evolution of the way in which innovation has been perceived and understood over the past two decades.

Economists and policymakers previously focused on R&D-based technological product innovation, largely produced in-house and mainly 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 able to play "catch-up."

Today, innovation capability is increasingly seen as the ability to exploit new technological combinations; it embraces the concept 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, and that innovation occurs in the informal economy of developing countries, too (Kraemer-Mbula and Wunsch-Vincent, 2016).

Furthermore, the process of innovation itself has changed significantly. Investment in innovation-related activity and intangible assets has intensified consistently 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, collaborative and geographically dispersed than ever.

Since its inception, the GII has also made a special effort to cover creativity and creative outputs, taking a fresh view of the previously siloed approach to innovation versus creativity. In the opinion of the GII Editors, innovation and creativity are simply two faces of the same coin.

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. Most measurements also struggle to appropriately capture the innovation outputs of a wider spectrum of innovation actors, such as users or the public and services sectors, or more informal means, which are often the drivers of innovation in developing countries.

The GII aims to improve the measurement of innovation in order to provide a more complete picture of innovation ecosystems across the globe. It explores new metrics regularly to reflect the changing nature of innovation and the increasingly sprawling field of new (big data) innovation indicators.

Interest in applying the GII framework and indicators to develop complementary and mutually reinforcing sub-national innovation indices is also growing among WIPO member states.[1] WIPO has been supporting these exercises since 2022 with work that strives to better measure and understand sub-national innovation activity (WIPO, 2024a).

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:

1 See Box 2 in the main results and the events "WIPO General Assemblies 2024 – Side Event Global Innovation Index: Measuring and Promoting Sub-national Innovation Performance: The Role of Regional Innovation Indices", July 12, 2024, and "Workshop – Global Innovation Index Sharing of Experiences in the Creation & Implementation of Regional Innovation Indices", June 7, 2022.

- Innovation Input Sub-Index: Five input pillars capture elements of the economy that enable and facilitate innovative activities. The idea is that the innovation inputs of today – and corresponding efforts to develop the science, innovation and human capital base, and the associated innovation environment – prepare the ground for the innovation outputs of tomorrow.
- 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. In other words, innovation output pillars and indicators have a disproportionally greater weight compared to innovation inputs.
- The overall GII score is the average of the Input and Output Sub-Indices, from which the GII economy rankings are 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 78 this year (see the Economy profiles section for the Framework of the Global Innovation Index 2024). Each sub-pillar is calculated by taking the weighted average of its individual indicators' scores, which are normalized to again produce *scores* between 0 and 100. Pillar scores are calculated using the weighted average of each pillar's sub-pillar scores.

When WIPO became the sole editor of the GII, the development of a robust and modern data infrastructure was part of the larger plan for GII development, in view of increasing the data quality and data quality control, and the robustness and replicability of the GII model (Appendix Box 1).

Appendix Box 1 Building a robust data infrastructure for the Global Innovation Index

To facilitate and permit a comprehensive workflow of the GII model, from data storage to the GII calculations, a robust data infrastructure was developed in 2021 and improved progressively since. The data infrastructure comprises three parts.

Data storage – the GII database: All GII data are stored, maintained and managed in the GII database. The database stores all collected data in a structured manner for all WIPO member states (not only the ranked GII economies) and for all indicators (those already included in the GII model and the new ones). It also stores data on outlier analysis (generated by the data quality checks that the GII team carries out after data collection – see below), as well as all the data queries sent to the GII data providers following an outlier analysis. As of 2024, the database will be expanded to also include country level and global aggregate data related to the Global Innovation Tracker. In addition, the micro-level data, often related to companies, used in the aggregation of certain GII indicators (e.g., Global corporate R&D investors, companies' Unicorn valuation, companies' Intangible asset intensity, Global brand value, etc.) has been further expanded and standardized.

The GII repository of collaborative codes: The GII repository of collaborative codes is on GitHub, which is one of the largest code-hosting platforms for version control and collaboration. The GII repository contains eight repositories in the statistical programming language R (R-codes), which are linked to diverse elements of the GII workflow and the GII report, enabling data collection, data calculation and data quality control of all GII indicators. In 2024, an updated repository for the Global Innovation Tracker – including for trends calculations at the country level, was further developed and expanded.

The GII R-package for the calculation of the GII model: The GII R-package is a custom-built package of tools, created using R, to calculate the GII model and analyze its results. The structure of the tailor-made GII R-package follows the general COINr R-package, which was developed by the European Commission Joint Research Centre (JRC) and follows the steps in the OECD/JRC Handbook for constructing composite indicators.[2] The R-package (called GII2)

2 OECD and EC JRC (2008).

has been improved over the years. In 2024, a new suite has been developed to analyze the GII results over time for research purposes.

Assuring data quality control is at the center of the GII methodology and processes. Each collected indicator for the GII undergoes a data quality control and data audit process every year. Several data tests and analyses are performed on all collected indicators, including the analysis of means, identification of outliers based on mean and z-scores for both unscaled and scaled data, analysis of rank changes, analysis of missing data and analysis of outdated data. Following these analyses, the GII team goes back to the data providers for any necessary clarification and, when required, the data providers themselves correct the data at the source. These additional exhaustive checks ensure the reliability of all data used in the GII.

This infrastructure enables a complete workflow that links data storage and data quality control with data analysis (GII rankings and the GII report) in a fully integrated way, increasing the overall robustness of the GII data and model.

In 2024, emphasis has been given to the visualization and improved presentation of the GII data and results through the new GII Innovation Ecosystems and Data Explorer 2024. In collaboration with OneTandem, the data explorer lets users dynamically generate GII economy briefs, profiles and country comparisons seamlessly, and to look into the time series of all GII indicators, including into individual data and micro-data on intangible assets, top universities, the most valuable brands and others. In 2024, data on the Clusters Ranking, including individual Cluster briefs have been added to the website. The Data Explorer is also available for use on mobile phones.

Moving ahead, the GII team will continue exploring and improving the measurement of innovation through the GII Data Lab. By experimenting with data and novel data-driven approaches, the GII Data Lab aims to improve the measurement of innovation performance through the GII model, and to help innovation stakeholders and policymakers to make more informed decisions about innovation policy, funding, and strategy. As of 2024, the GII Data Lab focuses on three thematic research lines: (1) Innovation Finance; (2) Entrepreneurship, startups, and gazelles; and (3) Innovation impact; and a transversal line on big data and new computational methods.[3]

Adjustments to the GII model in 2024

Appendix Table 1 summarizes the adjustments made to the GII 2024 framework. Two indicators are combined into a single indicator, creating a change in methodology. In addition, there are two new indicators and three indicators have been dropped from the framework. Due to the addition and removal of these indicators, the numbering of four remaining indicators have been adjusted, but without altering their methodology. Lastly, the name of one indicator has been modified under request of the data provider.

3 More information on the GII Data Lab is available at: www.wipo.int/global_innovation_index.

Appendix Table 1 Changes to the GII 2024 framework

	GII 2023	Adjustment		GII 2024
1.2.3	Cost of redundancy dismissal	Removed		
1.3.1	Policies for doing business†	Name changed	1.3.1	Policy stability for doing business†
3.3.2	Environmental performance*	Removed		
		New indicator	3.3.2	Low-carbon energy use, %
		New indicator	5.2.1	Public Research–Industry co-publications, %
5.2.1	University-industry R&D collaboration†	New indicator numbering	5.2.2	University–industry R&D collaboration†
5.2.2	State of cluster development†	New indicator numbering	5.2.3	State of cluster development†
5.2.3	GERD financed by abroad, % GDP	Removed		
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	Methodology changed	7.3.1	Top-level domains (TLDs)/th pop. 15–69
7.3.2	Country-code TLDs/th pop. 15–69	Methodology changed	7.3.1	Top-level domains (TLDs)/th pop. 15–69
7.3.3	GitHub commits/mn pop. 15–69	New indicator numbering	7.3.2	GitHub commits/mn pop. 15–69
7.3.4	Mobile app creation/bn PPP$ GDP	New indicator numbering	7.3.3	Mobile app creation/bn PPP$ GDP

Notes: Refer to Appendix III: Sources and definitions for a detailed explanation of terminology and acronyms.
Source: Global Innovation Index 2024, WIPO.

Data limitations and treatment

This year, the GII model includes 133 economies, which represent 92.8 percent of the world's population and 97.5 percent of the world's GDP in purchasing power parity current international dollars.

The timeliest possible indicators are used for the GII 2024: from the non-missing data, 2.7 percent are from 2024, 32.2 percent are from 2023, 45.8 percent are from 2022, 9.5 percent are from 2021, 3.9 percent are from 2020, 1.6 percent are from 2019 and the small remainder of 4.3 percent are from earlier years.[4]

The GII 2024 model includes 78 indicators, which fall into three categories:

- quantitative/objective/hard data (63 indicators);
- composite indicators/index data (10 indicators); and
- survey/qualitative/subjective/soft data (5 indicators).

This year, for an economy to feature in the GII 2024, the minimum data coverage requirement is at least 35 indicators in the Innovation Input Sub-Index (66 percent) and 16 indicators in the Innovation Output Sub-Index (66 percent), with scores for at least two sub-pillars per pillar. This year, 6.1.3 – Utility models by origin/bn PPP$ GDP has been excluded from the minimum data coverage (DMC) requirement. In the GII 2024, 133 economies had sufficient data available to be included in the Index. A total of 117 economies did not make it into the GII 2024 due to a lack of

4 The GII is calculated based on 9,275 data points out of a possible 10,374 (133 economies multiplied by 78 indicators), implying that 10.6 percent of data points are missing. The GII 2024 database includes the data year used for each indicator and economy, downloadable at www.wipo.int/global_innovation_index/en/2024. If an indicator for an economy is missing, it is marked as "n/a" in the economy profiles and "–" for cases where the indicator is not treated as missing.

available data. For each economy, only the most recent yearly data were considered. As a rule, the GII indicators consider data from as far back as 2014.

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 other words, missing indicators do not translate into a zero for the country in question; the indicator is simply not taken into consideration in the aggregation process.

That said, the audit undertaken by the European Commission's Competence Centre on Composite Indicators and Scoreboards at the Joint Research Centre (JRC-COIN) (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 sets of perturbed 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 for 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

Indicators were classified as problematic if they had:

– an absolute value of skewness greater than 2.25; and
– kurtosis greater than 3.5.[5]

Second rule: treatment

Indicators with between one and five outliers (27 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.[6]

Indicators with five or more outliers, and for which skewness or kurtosis did not fall within the ranges specified above, were transformed using natural logarithms after multiplication by a given factor *f*.[7] Since only "goods" were affected (i.e., indicators for which higher values indicate better outcomes, as opposed to "bads"), the following formula was used:

$$\ln\left[\frac{(\max \times f - 1)\,(\textit{economy value} - \min)}{\max - \min} + 1\right]$$

where "min" and "max" are the minimum and maximum indicator sample values, respectively.

This formula achieves two things: it converts all series into "goods" and scales the series within 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:

5 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 accommodate the small sample under consideration (133 economies).
6 The indicators treated using winsorization are: 3.2.1, 5.1.3, 5.3.2, 5.3.3, 6.1.5, 7.2.2, 7.3.1 and 7.3.2 (one outlier); 2.2.3, 4.1.3, 4.2.1 and 6.1.3 (two outliers); 4.2.4, 6.3.4 and 7.1.2 (three outliers); 4.2.3, 6.3.3 and 7.2.1 (four outliers); and 4.3.3, 5.3.1, 6.1.2, 6.2.2, 6.3.1, 7.1.4 and 7.2.4 (five outliers). Finally, indicator 7.1.1 was winsorized from the bottom of the distribution, on one outlier and 5.3.4 on two outlier observations.
7 Indicators 2.3.3, 4.2.2, 5.2.5, 6.1.1 and 7.3.3 were treated using log-transformation (factor fof 1).

$$\ln\left[\frac{(\max \times f - 1)(\max - \mathit{economy\ value})}{\max - \min} + 1\right]$$

Normalization

The 78 indicators were then normalized into the [0, 100] range, with higher scores representing better outcomes. Normalization was undertaken according to the min–max method, where the “min” and “max” values were the minimum and maximum indicator sample values, respectively. Following the recommendation of the JRC-COIN, all indicators, including index and survey data, were normalized to a 0–100 range. This normalization ensures that all indicators share the same range, facilitating their individual contribution to the overall index score.

Weights

In 2012, the JRC-COIN and GII team made a joint decision that scaling coefficients of 0.5 or 1.0 should be used instead of importance coefficients. This decision aimed to achieve balanced sub-pillar and pillar scores by considering the underlying components. In other words, the goal was to ensure that indicators and sub-pillars contribute a similar amount of variance to their respective sub-pillars/pillars.

To prevent multicollinearity during the aggregation process, any indicators within a sub-index that exhibited a high correlation, exceeding an absolute correlation of 0.95, were assigned a weight of 0.5. In 2024, there were no indicators that received a 0.5 weight, and thus all indicators had a weight of 1. Additionally, two sub-pillars – 7.2 Creative goods and services and 7.3 Online creativity – were also assigned a weight of 0.5.

Strengths and weaknesses

Strengths and weaknesses are calculated for all economies covered in the GII and are presented in the individual economy profiles (see the explanatory section Economy profiles). In simple terms, strengths and weaknesses are the top- and bottom-ranked indicators for each country. In addition, income group strengths and weaknesses are also provided, which are the respective high- and low-performing indicators within income groups.

The methodology for the calculation of strengths and weaknesses is as follows:

– The scores of each indicator are converted to percentile ranks.
– Strengths are defined as the indicators of an economy that have a percentile rank greater than or equal to the 10th percentile rank (across the indicators of that economy). Note that this can result in more than 10 strengths in the event of tied results.
– Weaknesses are defined in an equivalent manner for the bottom 10 indicators.
– If a country has an indicator that ranks equal to or lower than three, it is automatically a strength, regardless of the percentile rank.
– Importantly, although the cut-off value used to define the strengths (i.e., the 10th highest percentile rank) is calculated using only indicator percentile ranks, it is also applied to sub-pillars and pillars.
– In addition, for pillars and sub-pillars that do not meet the Data Minimum Coverage (DMC) criteria, strengths and weaknesses are not signaled. Pillars and sub-pillars that do not meet the DMC show the pillars and sub-pillars in brackets in the economy profiles.
– Income group strengths and weaknesses are somewhat similar to overall strengths and weaknesses but are defined within income groups and use means and standard deviations. The methodology for the calculation of income group strengths and weaknesses is as follows:

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

    - The only exceptions to the income group strengths and weaknesses are the top 25 high-income economies, where these strengths and weaknesses are computed within the top 25 group.
    - As the only non-high-income economy in the top 25, China's income group strengths and weaknesses are computed within the non-top 25 group.

- Since, occasionally, the low threshold for weaknesses is below zero, any score of zero is automatically marked as a weakness.
- Finally, as of 2023 and following the recommendation of the audit by the WIPO Internal Oversight Section,[8] strengths and weaknesses are reset, or not signaled, where the data year for a given indicator is older than the indicator mode minus five years. In practice, for the GII 2024, this means that for indicators with a data year mode of 2023, the data year of an economy must be 2018 or later to qualify as a strength or weakness.

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.

It is important to note that scores and rankings are not directly comparable between one year and another. Each ranking reflects the relative position of a particular economy based on the conceptual framework, the data coverage and the sample of economies of that specific GII edition, and also reflects changes in the underlying indicators at source and in data availability.

A number of factors influence the 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 overtime.
- **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, due to measures to limit the number of missing data points.
- **Scaling factors**: Most GII variables are scaled using either GDP or population, with the intention of enabling cross-economy comparability. However, this implies that year-on-year changes in individual indicators may be driven either by the variable (numerator) or by its scaling 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 identifying possible avenues for improvement.

8 IOD Ref: IA 2022-03, April 14, 2023: www.wipo.int/export/sites/www/about-wipo/en/oversight/docs/iaod/audit/audit-gii.pdf.

Appendix II - Joint Research Centre (JRC) statistical audit of the 2024 Global Innovation Index

This statistical audit was conducted by **Jaime Lagüera González**, **Panagiotis Ravanos**, **Michaela Saisana**, **Oscar Smallenbroek** and **Carlos Tacao Moura**, European Commission, JRC, Ispra, Italy.

The process of understanding and modeling the fundamentals of innovation at the national level and across the globe inevitably entails conceptual and practical challenges. Now in its 17th edition, the Global Innovation Index (GII) 2024, considers these conceptual challenges and deals with practical issues – related to data quality and methodological choices – by grouping economy-level data for 133 economies across 78 indicators into 21 sub-pillars, seven pillars, two sub-indices and, finally, an overall index. This appendix offers detailed insights into the practical challenges related to the construction of the GII. In particular, it analyzes the statistical soundness of the conceptual framework and the robustness of calculations and modeling assumptions used to arrive at the final index rankings.

Statistical soundness should be regarded as a necessary but not sufficient condition for a sound GII, since the correlations underpinning the majority of the statistical analyses carried out herein need not "necessarily represent the real influence of the individual indicators on the phenomenon being measured" (OECD and EC JRC, 2008: 26). Consequently, the development of the GII must be informed by a dynamic, iterative dialogue between the principles of statistical and conceptual soundness; or, to put it another way, a process in which the theoretical understanding of innovation and the empirical observation of the data underlying the variables complement and strengthen each other.

The European Commission's Competence Centre on Composite Indicators and Scoreboards (COIN) at the Joint Research Centre (JRC) in Ispra, Italy, has been invited to audit the GII for a 14th consecutive year. As in previous editions, the present JRC-COIN audit focuses on the statistical soundness of the multilevel structure of the index, as well as on the impact of key modeling assumptions on the results.[1] 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 the previous GII reports, the JRC-COIN analysis complements the economy rankings of the GII, the Innovation Input Sub-Index and the Innovation Output Sub-index with confidence intervals, in order to allow a better appreciation of the robustness of these rankings to the choice of computation methodology. The JRC-COIN analysis also includes an assessment of the added value of the GII and it supplements the GII scores with a measure of the "distance to the performance frontier" of innovation through the use of data envelopment analysis.

1 The JRC analysis was based on the recommendations of the OECD/EC JRC (2008) *Handbook on Constructing Composite Indicators* and on more recent research from the JRC. The JRC audits on composite indicators are conducted at the request of the index developers and are available at: https://knowledge4policy.ec.europa.eu/composite-indicators_en and https://composite-indicators.jrc.ec.europa.eu.

Box 1 Conceptual and statistical coherence in the GII 2024 framework

Step 1 Conceptual consistency
- compatibility with existing literature on innovation and pillar definition
- use of scaling factors per indicator to present a fair picture of economy differences (e.g., GDP, population)

Step 2 Data checks
- check for data timeliness (90 percent of available data refer to 2021 or a later year)
- inclusion requirements per economy (availability of 66 percent for the Input and the Output Sub-Indices separately and data availability for at least two sub-pillars per pillar)
- check for reporting errors (interquartile range)
- outlier identification (skewness and kurtosis) and treatment (winsorization or logarithmic transformation)
- direct contact with data providers

Step 3 Statistical coherence
- treatment of pairs of highly collinear variables as a single indicator
- assessment of grouping of indicators into sub-pillars, pillars, sub-indices and the GII
- use of weights as scaling coefficients to ensure statistical coherence
- assessment of arithmetic average assumption
- assessment of potential redundancy of information in the overall GII

Step 4 Qualitative review
- internal qualitative review (by WIPO in partnership with the Portulans Institute, the GII Corporate and Academic Network partners, as well as the GII Advisory Board members)
- a one-off qualitative audit (by the WIPO Internal Oversight Section)[2]
- external qualitative review (by JRC-COIN and international experts)

Source: European Commission, Joint Research Centre, 2024.

Conceptual and statistical coherence within the GII framework

The GII model was assessed by the JRC-COIN in June 2024. Suggestions for fine-tuning certain aspects were taken into account in the final computation of the rankings during an iterative process with the JRC-COIN aiming to set the foundations for a balanced index. This four-step process is outlined in Box 1.

Step 1: Conceptual consistency

A total of 78 indicators were selected for their relevance to specific innovation pillars, based on a literature review, expert opinion, economy coverage and timeliness. To present a fair picture of economy differences, indicators were scaled either at source or by the GII team, as appropriate and where needed. For example, Expenditure on education (indicator 2.1.1) is expressed as a percentage of GDP, while Government funding per pupil at secondary level (indicator 2.1.2) is expressed as a percentage of GDP per capita. On the advice of JRC-COIN, the GII developers normalized nine more indicators to a 0–100 range in the 2023 edition, so that all indicators have the same range, which facilitates their individual contributions to the overall index score.

The 2024 edition of the GII includes some changes to the indicators.

- The number of indicators considered is 78 instead of 80. The Cost of redundancy dismissal, indicator 1.2.3. in last year's edition, was dropped from the Regulatory environment sub-

2 Available at: www.wipo.int/export/sites/www/about-wipo/en/oversight/docs/iaod/audit/audit-gii-exec-summary.pdf, IOD Ref: IA 2022-03, April 14, 2023.

pillar (1.2). This change was informed by a thorough literature review revealing weak fitness of the indicator with the concept of innovation, as well as concerns about its timeliness. The sub-pillar now includes two equal-weighted indicators (1.2.1 Regulatory quality and 1.2.2 Rule of law). Additionally, Generic top-level domains (TLDs) and Country-code TLDs (indicators 7.3.1 and 7.3.2 of the Online creativity sub-pillar 7.3 in the 2023 edition) have been merged into a single indicator representing the sum of generic top-level domains (TLDs) and country-code TLDs.
- In sub-pillar 3.3 Ecological sustainability a new indicator, Low-carbon energy use (3.3.2), has replaced the Environmental performance indicator based on a more stringent fit with the concept of innovation.
- In sub-pillar 5.2 Innovation linkages, indicator Public Research–Industry co-publications (5.2.1), has replaced the Gross domestic Expenditure on R&D (GERD) financed by abroad indicator, based on concerns about the timeliness and future data availability of the latter.
- The computation methodology of indicators 3.1.1 ICT access and 3.1.2 ICT use has changed. These two variables are themselves composite indices computed by WIPO and their composition has been changed slightly to better reflect the current discussions at the International Telecommunications Union (ITU), which provides the raw data for these indicators.
- The source of data for the indicator 4.3.1 Applied tariff rate has changed from the World Bank to the World Trade Organization.
- Finally, indicator 1.3.1 Policies for doing business has been renamed Policy stability for doing business.

The above changes highlight the developer's meticulous attention to the monitoring, evaluating and updating of the theoretical framework and the data sources used for the index, with an aim to provide an even more robust and timely measure of innovation performance.

Step 2: Data checks

The data used for each economy were those most recently released within the period 2013 to 2024, with 90 percent of the available data refer to 2021 or a later year. With regards to the inclusion of countries in the GII, the 2024 edition follows the criteria adopted in 2016,[3] according to which economies are only included if (i) data availability is at least 66 percent within each of the two sub-indices (i.e. 35 out of 53 variables within the Input Sub-Index and 17 out of the 25 variables in the Output Sub-Index) and (ii) at least two of the three sub-pillars in each pillar can be computed. These criteria aim to ensure that economy scores for the GII and for the two Input and Output Sub-Indices are not overly sensitive to missing values (as was the case for the Output Sub-Index scores of several economies in previous editions). In the current edition of the Index, these criteria resulted in the exclusion of one country (Guinea) compared to the previous edition, while two countries were added (Barbados and Myanmar) compared to the 2023 edition. This increased the number of countries in this version by one (from 132 in 2023 to 133).

In practice, data availability for all economies included in the GII 2024 is quite satisfactory: At least 80 percent of data is available for 81 percent of the economies covered (equivalent to 108 economies out of 133), while 75% of the considered indicators are available for 95% of the economies covered.

Potentially problematic indicators that could bias the overall results were identified on the basis of two measures related to the shape of the data distributions: skewness and kurtosis. In 2011, a joint decision by the GII team and the JRC-COIN determined that values would be treated if an indicator had absolute skewness greater than 2.0 and kurtosis greater than 3.5.[4] In 2017, having analyzed data in the GIIs compiled between 2011 and 2017, less stringent criteria were adopted. An indicator was only treated if the absolute skewness was greater than 2.25 and kurtosis greater than 3.5. Such indicators were treated either by winsorization or by natural logarithm (in cases of more than five outliers; see Appendix I). In 2018, exceptional behavior by foreign direct investment (FDI) net outflows (indicator 6.3.4 at the time) was observed (Annex 3, JRC Audit, GII

3 These criteria were adopted following a JRC-COIN recommendation based on previous GII audits.
4 Groeneveld and Meeden (1984) set the criteria for absolute skewness above 1 and for kurtosis above 3.5. The skewness criterion was relaxed in the GII case after ad hoc tests were conducted in the GII 2008–GII 2018 series range.

2018) and, from 2018 onward, it was recommended that the GII rule for the treatment of outliers be amended as follows:

- for indicators with absolute skewness greater than 2.25 and kurtosis greater than 3.5, apply either winsorization or the natural logarithm (in cases of more than five outliers);
- for indicators with absolute skewness less than 2.25 and kurtosis greater than 10.0, produce scatterplots to identify potentially problematic values that need to be considered as outliers and treated accordingly.

For a total of 27 indicators, one up to 5 values were winsorised, while for an additional 5 indicators (2.3.3 Global corporate R&D investors, 4.2.2 Venture capital investors, 5.2.5. Patent families, 6.1.1 Patents by origin and 7.3.3 Mobile app creation) the natural logarithm was applied. For two of these five indicators (4.2.2 Venture capital investors and 5.2.5. Patent families) the values of skewness and kurtosis did not abide by the set thresholds after applying the natural logarithm transformation.

Step 3: Statistical coherence

Weights as scaling coefficients

The JRC-COIN and GII team jointly decided in 2012 that weights of 0.5 or 1.0 were to be used as scaling coefficients and not importance coefficients, with the aim of arriving at sub-pillar and pillar scores that were balanced in their underlying components (i.e., that indicators and sub-pillars can explain a similar amount of variance in their respective sub-pillars/pillars). Becker *et al.* (2017) and Paruolo, Saisana and Saltelli (2013) show that, in weighted arithmetic averages, the ratio of two nominal weights gives the rate of substitutability between two indicators, and hence can be used to reveal the relative importance of individual indicators. This importance can then be compared with *ex-post* measures of a variable's importance, such as the non-linear Pearson correlation ratio.

As a result of this analysis, two sub-pillars are also given a weight of 0.5 – 7.2 Creative goods and services and 7.3 Online creativity. In the previous edition of the GII, a weight of 0.5 was also applied to two indicators of the input sub-pillar 1.2 Regulatory environment – 1.2.1 Regulatory quality and 1.2.2 Rule of law – but this was amended in this edition of the index. This change is due to the removal of indicator 1.2.3 from the same sub-pillar (which in the previous edition of the index had a weight of 1).

Despite this weighting adjustment, two indicators (5.3.4 FDI net inflows and 6.2.1 Labor productivity growth) were found to be non-influential in this year's GII framework, meaning that they could not explain at least 9 percent of economies' overall variation in the respective sub-pillar scores.[5] These two indicators also remain non-influential at both the sub-index and the index level, while there are five additional indicators (2.1.1 Expenditure on education, 2.2.2 Graduates in science and engineering, 3.2.3 Gross capital formation, 3.3.2 Low-carbon energy use, 4.1.3 Loans from microfinance institutions) which are not sufficiently correlated with the Input Sub-Index level. This means that, at least for 5.3.4 FDI net inflows and 6.2.1 Labor productivity growth, there is evidence of a weak relationship between a country's level of innovation and its FDI net inflows or Labor productivity growth. JRC-COIN echoes its recommendation in the previous audit (WIPO, 2023a) and encourages the developers to investigate potential alternatives for measuring the underlying concepts of those metrics linked to innovation performance. The remaining 71 indicators out of the 78 in total were found to be sufficiently influential in the GII framework.

Principal component analysis and reliability item analysis

Principal component analysis (PCA) was used to assess the extent to which the conceptual framework is confirmed by statistical approaches. PCA results confirm the presence of a single latent dimension in each of the seven pillars (one component with an eigenvalue greater

5 An indicator can explain 9 percent of the economy's variation in the GII sub-pillar scores if the Pearson correlation coefficient between the two series is 0.3.

than 1.0) that captures between approximately 59 percent (pillar 3: Infrastructure) and up to 83 percent (pillar 5: Business sophistication) of the total variance in the three underlying sub-pillars. Furthermore, results confirm the expectation that in the majority of the cases, the sub-pillars are more closely correlated with their own pillar than with any other pillar and that all correlation coefficients are close to or greater than 0.70 (Appendix Table 2).

The five input pillars share a single statistical dimension that summarizes 81 percent of the total variance and the five loadings (correlation coefficients) of these pillars are very similar to each other. This similarity suggests that the five pillars make a roughly equal contribution to the variation of the Innovation Input Sub-Index scores, as envisaged by the development team. Consequently, the reliability of the Input Sub-Index, measured by Cronbach's alpha value, is very high at 0.93 – well above the 0.70 threshold for a reliable aggregate (Nunally, 1978).

The two output pillars – Knowledge and technology outputs and Creative outputs – are strongly correlated with each other (0.86); they are also both strongly correlated with the Innovation Output Sub-Index (0.96 and 0.97).

Finally, the two sub-indices are equally important in the overall GII. The GII is built as a simple arithmetic average of the Input Sub-Index and the Output Sub-Index. In fact, the Pearson correlation coefficients of the two sub-indices with the GII (0.97 in both cases), and the correlation between themselves (0.90), suggests that they are effectively placed on an equal footing.

Concluding remarks

Overall, the statistical analysis in this section demonstrates that the grouping of variables into sub-pillars, pillars and an overall index is statistically coherent within the GII 2024 framework and that the GII has a balanced structure at each aggregation level. Furthermore, in this edition of the index, the JRC-COIN found robust evidence of insufficient influence on the GII framework only for two of the 78 indicators (5.3.4 FDI net inflows and 6.2.1 Labor productivity growth) – that is, each of these two indicators explains less than 9 percent of countries' variation in their respective sub-pillar scores.[6] Thus, the JRC-COIN recommends investigating potential alternatives for these two indicators. These alternatives could capture the same or similar underlying concept that is currently captured by 5.3.4 FDI net inflows and 6.2.1 Labor productivity growth, but would be correlated with economies' innovation levels as measured by their Input and Output Sub-Indices and the GII. The changes made to indicators by the GII team for the 2024 edition resulted in adequate or good statistical coherence in terms of correlations between indicators and their correlation with aggregates. This demonstrates that the GII team has continued dedication to improving the statistical soundness of the GII.

6 An indicator can explain 9 percent of the economy's variation in the GII sub-pillar scores if the Pearson correlation coefficient between the two series is 0.3.

Appendix Table 2 Statistical coherence in the GII: correlations between sub-pillars and pillars

	Pillars						
Sub-pillar	Institutions	Human capital and research	Infrastructure	Market sophistication	Business sophistication	Knowledge and technology outputs	Creative outputs
1.1 Institutional environment	0.96	0.75	0.8	0.64	0.78	0.67	0.69
1.2 Regulatory environment	0.94	0.79	0.81	0.67	0.82	0.72	0.74
1.3 Business environment	0.81	0.38	0.41	0.33	0.47	0.34	0.29
2.1 Education	0.54	0.8	0.63	0.58	0.64	0.6	0.62
2.2 Tertiary education	0.55	0.81	0.64	0.58	0.58	0.56	0.59
2.3 Research and development (R&D)	0.69	0.89	0.74	0.8	0.91	0.9	0.84
3.1 Information and communication technologies (ICTs)	0.69	0.8	0.89	0.72	0.73	0.71	0.78
3.2 General infrastructure	0.64	0.58	0.74	0.51	0.58	0.55	0.5
3.3 Ecological sustainability	0.37	0.4	0.66	0.37	0.49	0.5	0.47
4.1 Credit	0.58	0.68	0.6	0.85	0.65	0.62	0.66
4.2 Investment	0.58	0.61	0.51	0.8	0.66	0.62	0.64
4.3 Trade, diversification, and market scale	0.41	0.67	0.67	0.75	0.63	0.7	0.68
5.1 Knowledge workers	0.66	0.86	0.77	0.71	0.93	0.83	0.8
5.2 Innovation linkages	0.82	0.78	0.7	0.73	0.9	0.81	0.76
5.3 Knowledge absorption	0.61	0.72	0.69	0.68	0.89	0.8	0.78
6.1 Knowledge creation	0.6	0.83	0.68	0.72	0.86	0.91	0.82
6.2 Knowledge impact	0.6	0.72	0.68	0.74	0.77	0.88	0.73
6.3 Knowledge diffusion	0.55	0.73	0.73	0.66	0.78	0.91	0.76
7.1 Intangible assets	0.45	0.67	0.61	0.66	0.67	0.7	0.91
7.2 Creative goods and services	0.66	0.73	0.74	0.71	0.82	0.79	0.8
7.3 Online creativity	0.69	0.8	0.74	0.7	0.83	0.79	0.81

Source: European Commission, Joint Research Centre, 2024.

Added value of the GII

High statistical association between the components of a composite index could be interpreted by some as a sign of redundancy of information within the composite index. For the case of the GII, the Input and Output Sub-Indices correlate strongly with each other and with the overall GII, while the five pillars in the Input Sub-Index have a very high statistical reliability. However, the tests conducted by the JRC-COIN confirm that this high statistical reliability does not result in redundancy of information. In particular, a country's GII ranking differs from that in any of the seven pillars by 10 positions or more at least 39 percent (up to 70 percent) of the 133 economies included in the GII 2024 (Appendix Table 3). This serves as a demonstration of the added value of the GII ranking, which helps to highlight other aspects of innovation within individual countries that are not immediately apparent from analysis of the seven pillars individually. It also highlights the usefulness of taking due account of the information contained in each of the GII pillars, sub-pillars and indicators individually. By doing so, economy-specific strengths and bottlenecks in terms of innovation can be identified and serve as a basis for evidence-based policymaking.

Appendix Table 3 Distribution of differences between pillar and GII rankings

	Innovation Input Sub-Index					Innovation Output Sub-Index	
Rank differences (positions)	**Insti-tutions (%)**	**Human capital and research (%)**	**Infra-structure (%)**	**Market sophist-ication (%)**	**Business sophist-ication (%)**	**Knowledge and technology outputs (%)**	**Creative outputs (%)**
More than 30	21.8	8.3	8.3	9.8	7.5	4.5	3.8
20–29	21.1	13.5	14.3	11.3	9.0	8.3	6.8
10–19	27.1	24.1	30.1	32.3	24.8	26.3	29.3
10 or more*	70.0	45.9	52.7	53.4	41.3	39.1	39.9
5–9	13.5	24.1	23.3	21.1	21.1	24.1	29.3
Less than 5	13.5	28.6	21.8	22.6	32.3	30.8	27.8
Same rank	3.0	1.5	2.3	3.0	5.3	6.0	3.0
Total**	100	100	100	100	100	100	100
Spearman rank correlation coefficient with the GII	0.79	0.92	0.87	0.86	0.95	0.94	0.94

Notes: * This row is the sum of the previous three rows. ** This row is the sum of all white rows.
Source: European Commission, Joint Research Centre, 2024.

Step 4: Qualitative review

Lastly, JRC-COIN evaluated the GII results – in particular, the overall economy classifications and relative performances in terms of the Innovation Input or Output Sub-Indices – with the aim to verify that the overall results are robust with respect to the modeling assumptions made during the construction of the GII. Robustness is a powerful characteristic for a composite index as it verifies its reliability as a monitoring framework of the underlying phenomenon that is being measured. Overall, the results in this section verify the robustness of GII with respect to modeling assumptions and its reliability as a monitoring framework for innovation performance. Notwithstanding these positive results, the structure of the GII model is, and has to remain, open to future improvements which may be needed as better data, more comprehensive surveys and assessments, and new, relevant research studies become available.

The impact of modeling assumptions on the GII results

An important part of the GII statistical audit is to check the effect of varying assumptions within plausible ranges. Modeling assumptions with a direct impact on GII scores and rankings relate to:

- the underlying structure selected for the index based on pillars;
- the choice of individual variables to be used as indicators;
- decisions regarding whether (and how) to impute missing data;
- decisions regarding whether (and how) to treat outliers;
- the selection of the normalization formula to be used;
- the choice of aggregation weights for indicators and their aggregates; and
- the aggregation rule to be used at each different level of the index structure.

The rationale for the choices made by the GII developers regarding each of these issues is well-grounded: for instance, expert opinion coupled with statistical analysis informs the selection of the individual indicators; common practice and easier interpretation suggest the use of a minimum–maximum normalization approach in the [0–100] range; statistical analysis guides the treatment of outliers; while simplicity and parsimony criteria advocate for the developers' choice for not imputing missing data. The uncertainty that naturally stems from the above-mentioned modeling choices is accounted for in the robustness assessment carried out by the JRC-COIN. In particular, the methodology applied allows for the joint and simultaneous analysis of the impact of such choices on the aggregate scores. The analysis carried out by JRC-COIN supplements the GII 2024 individual economy rankings with confidence intervals, to better appreciate the robustness of these ranks to the modeling choices.

As suggested by the relevant literature on composite indicators,[7] the robustness assessment is based on Monte Carlo simulation and multi-modeling approaches, applied to the "error-free" data where potential outliers, errors and typos have already been corrected at a preliminary stage. In particular, the three key modeling issues considered in the assessment of the GII were the treatment of missing data, the aggregation weights applied to pillars and the aggregation formula used at the pillar level.

The Monte Carlo simulation comprised 5,000 runs of different sets of weights for the seven GII pillars. Weights were assigned to the pillars based on random perturbations centered on the reference values. The ranges of simulated weights were defined by considering both the need for a wide enough interval to allow for meaningful robustness checks and the need to respect the underlying principle of the GII that the Input and the Output Sub-Indices should be placed on an equal footing. As a result of these considerations, the limit values of uncertainty for the five input pillars are between 10 and 30 percent, whereas the limit values for the two output pillars are between 40 and 60 percent (Appendix Table 4).

7 See Saisana, Saltelli and Tarantola (2005); Vertesy and Deiss (2016); Vertesy (2011); Saisana, Hombres and Saltelli (2011); Montalto *et al.* (2019).

Appendix Table 4 Uncertainty parameters: missing values, aggregation and weights

	Reference	Alternative(s)
I. Uncertainty in the treatment of missing values	No estimation of missing data	Expectation–maximization (EM)
		k-nearest neighbour imputation (kNN, k= 5)
II. Uncertainty in the aggregation formula at pillar level	Arithmetic average	Geometric average
III. Uncertainty intervals for the GII pillar weights		
Pillar	Reference value for the weight	Distribution assigned for robustness analysis
Institutions	0.2	U[0.1,0.3]
Human capital and research	0.2	U[0.1,0.3]
Infrastructure	0.2	U[0.1,0.3]
Market sophistication	0.2	U[0.1,0.3]
Business sophistication	0.2	U[0.1,0.3]
Knowledge and technology outputs	0.5	U[0.4,0.6]
Creative outputs	0.5	U[0.4,0.6]

Note: The R package mice was used to create an imputed data set for the uncertainty analysis.
Source: European Commission, Joint Research Centre, 2024.

For transparency and replicability purposes, the GII team has always opted not to estimate missing data. In the cases where missing data exist, the score of the aggregate containing the missing value is based on the other elements of the aggregate for which values are observed. This "no imputation" choice is common in similar contexts and is usually selected to improve transparency and avoid any methodological black box in the imputation of data. Technically, this constitutes a form of "shadow" imputation (for example, in an arithmetic average it is equivalent to replacing the missing value with the arithmetic average of the elements for which values are observed). Hence, the available data (indicators) in the incomplete pillar may dominate, sometimes biasing the ranks up or down. To test the impact of not imputing missing values, the JRC-COIN estimated missing data using two different data imputation approaches: (a) the expectation–maximization (EM) algorithm and (b) the nearest neighbor (k-NN) approach (using the five nearest neighbors). Both these were applied within each GII pillar and then compared to the no-imputation approach (see Appendix Table 6).[8]

Regarding the aggregation formula, decision-theory practitioners challenge the use of simple arithmetic averages because of their fully compensatory nature, where a country's high comparative advantage on a few indicators can compensate for its comparative disadvantage on many other indicators (Munda, 2008). To assess the impact of this modeling choice the JRC-COIN considered the geometric average as an alternative to the arithmetic average. The geometric average is a partially compensatory approach that rewards economies with balanced

8 The expectation–maximization (EM) algorithm (Little and Rubin, 2002; Schneider, 2001) is an iterative procedure that finds the maximum likelihood estimates of the parameter vector by repeating two steps: (a) The expectation step (E-step): given a set of parameter estimates, such as a mean vector and covariance matrix for a multivariate normal distribution, the E-step calculates the conditional expectation of the complete-data log likelihood, given the observed data and the parameter estimates. (b) The maximization step (M-step): given a complete-data log likelihood, the M-step finds the parameter estimates to maximize the complete-data log likelihood from the E-step. The two steps are iterated until the iterations converge. The k-nearest neighbor approach replaces a missing value for a country A with the average of the values observed for the same indicator in k (which in this case equal to five) other sample countries which are identified as country A's "nearest neighbors", in the sense that their performance in the other indicators is similar to that of country A. This involves 2 steps: (a) estimating measure of distance between country A and all other sample countries (e.g., the Euclidean distance) based on the indicators for which country A has observed data and selecting the k countries with the smaller distance to country A, and (b) obtaining the average of the indicator values for the selected countries and using it to fill the missing value for country A.

profiles and motivates economies to improve in the GII pillars in which they perform poorly, and not just in any GII pillar.[9]

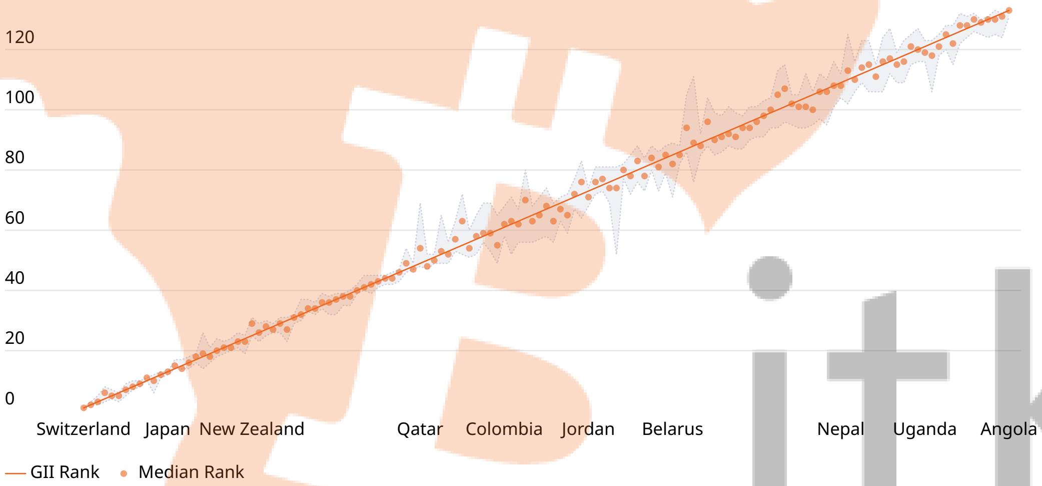
Six models were tested based on the combination of no imputation versus EM or k-NN imputation and arithmetic versus geometric average. A random combination of these choices plus a random set of perturbed weights were used in a total of 5,000 simulations for the GII and each of the two sub-indices (see Appendix Table 4 for a summary of the uncertainties considered).

Uncertainty analysis results

The main results of the robustness analysis are shown in Appendix Figure 1, with median ranks and 90 percent confidence intervals computed across the 5,000 Monte Carlo simulations for the GII and the two sub-indices. Economies are in ascending order (best to worst performing) according to their reference rank (black line), with the dot representing the median rank over the simulations.

Appendix Figure 1 Robustness analysis of the GII, Input and Output Sub-Indices

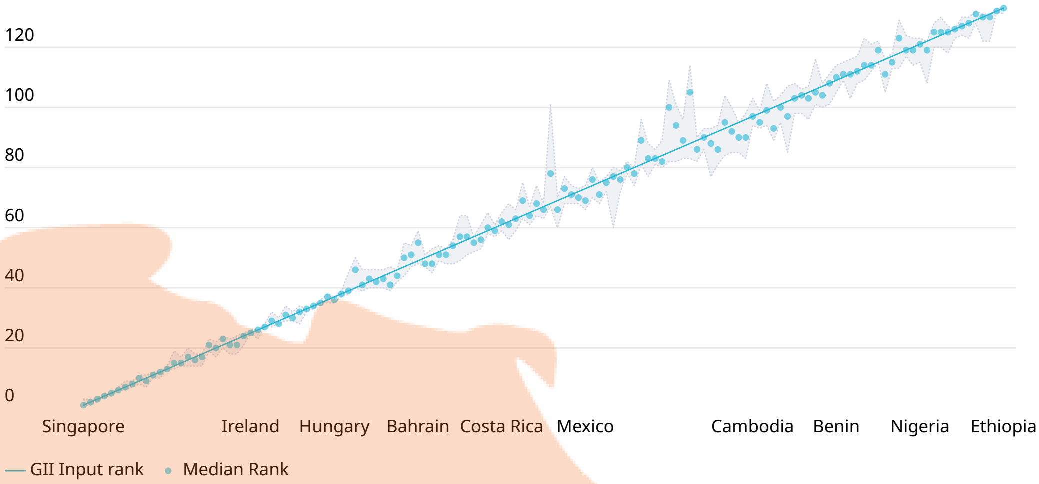
(a) GII ranks, median ranks and 90 percent confidence intervals



Source: European Commission, Joint Research Centre, 2024.

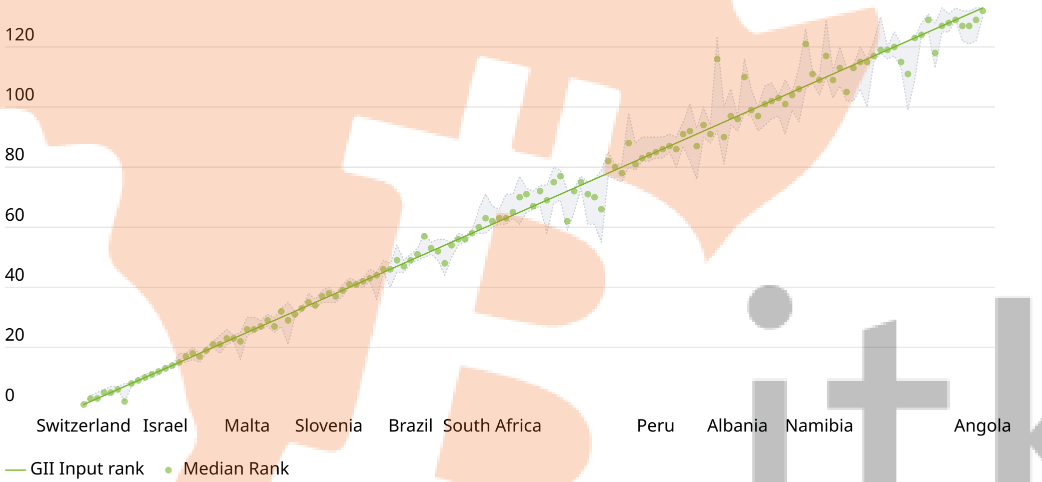
9 In the geometric average, pillars are multiplied as opposed to summed in the arithmetic average. Pillar weights appear as exponents in the multiplication. All pillar scores were greater than zero, hence there was no reason to rescale them to avoid zero values that would have led to zero geometric averages.

(b) Input ranks, median ranks and 90 percent confidence intervals



Source: European Commission, Joint Research Centre, 2024.

(c) Output ranks, median ranks and 90 percent confidence intervals



Notes: Median ranks and intervals are calculated over 5,000 simulated scenarios combining simulated weights, imputation (based on EM or k-NN) versus no imputation of missing values, and geometric versus arithmetic average at the pillar level. The Spearman rank correlation between the median rank and the GII 2024 rank is 0.998; between the median rank and the Innovation Input 2024 rank is 0.997; and between the median rank and the Innovation Output 2024 rank is 0.995.

Source: European Commission, Joint Research Centre, 2024.

All published GII 2024 ranks lie within the simulated 90 percent confidence intervals and for most economies these intervals are sufficiently narrow to allow meaningful inferences to be drawn: For 72 of the 133 economies the width of the 90% GII rank confidence interval is less than 10 positions in rank, while this holds for 94 of the 133 economies in the case of the Input Sub-Index and for 96 economies in the case of the Output Sub-Index. However, it is also true that a few economies experience significant changes in rank with variations in weights and aggregation formula and when imputing missing data. Five economies – Qatar, Madagascar, the Islamic Republic of Iran, Barbados and Brunei Darussalam – have 90 percent confidence interval widths of more than 20 positions (21, 23, 24, 29 and 35 positions, respectively). Consequently, their rankings (49th, 110th, 64th, 77th and 88th) in the GII classification should be interpreted cautiously and not taken at face value. However, 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 2024 ranking 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.

In a similar fashion, some caution is also warranted with regards to the ranking of four economies (Belarus, Iran, Bolivia and Cabo Verde) for the Input sub-index, for which the 90 percent confidence interval has a width of more than 20 positions (22, 27, 31, and 34). A similar degree of caution is needed in the Output sub-index for three economies – Guatemala, Barbados, and Ghana – which have 90 percent confidence interval widths of more than 20 positions (up to 31 for Ghana). The higher data availability in the Output sub-index in the latest GII editions has contributed to reducing the number of countries with very wide intervals compared to previous editions (e.g., the GII 2019 edition in which there were 13 countries with confidence intervals wider than 20 positions).

Although the rankings for a few economies in the GII or in the two sub-indices appear to be sensitive to methodological choices, the published rankings for the vast majority of the 133 countries included in the 2024 GII can be considered as 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, 81 percent of the economies are found to shift fewer than three positions with respect to the median rank in the GII; the percentage for the Input and the Output Sub-Indices is similarly large (at 78 and 76 percent respectively).

In order to offer full transparency and complete information, Appendix Table 5 reports the GII 2024 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).

Appendix Table 5 GII 2024 and Input/Output Sub-Indices: rankings and 90 percent confidence intervals

Appendix Table 5 *Continued*

Australia	23	21, 26	18	14, 18	30	27, 33
Belgium	24	19, 25	26	23, 26	22	21, 26
New Zealand	25	25, 31	21	20, 24	34	34, 38
Italy	26	23, 29	34	33, 34	18	15, 18
Cyprus	27	25, 30	35	35, 36	17	16, 20
Spain	28	26, 29	29	28, 30	23	22, 24
Malta	29	26, 31	27	27, 28	25	24, 30
Czech Republic	30	23, 31	32	28, 34	24	16, 25
Portugal	31	29, 32	31	29, 32	27	26, 29
United Arab Emirates	32	30, 37	19	19, 23	50	49, 53
Malaysia	33	33, 37	28	27, 32	41	40, 42
Slovenia	34	32, 36	33	32, 33	37	35, 40
Lithuania	35	34, 39	30	29, 34	42	40, 43
Hungary	36	32, 38	37	35, 37	35	33, 36
Türkiye	37	32, 39	51	45, 53	28	27, 31
Bulgaria	38	35, 39	50	47, 51	32	30, 32
India	39	35, 40	44	40, 46	33	32, 33
Poland	40	39, 42	45	39, 47	38	35, 38
Thailand	41	40, 45	41	39, 46	39	37, 41
Latvia	42	39, 45	38	37, 39	46	40, 48
Croatia	43	41, 45	42	40, 46	40	40, 43
Viet Nam	44	42, 45	53	48, 53	36	35, 39
Greece	45	42, 46	43	40, 46	43	42, 46
Slovakia	46	43, 47	52	49, 54	44	36, 45
Saudi Arabia	47	46, 54	36	35, 38	66	65, 73
Romania	48	47, 49	57	52, 57	45	45, 49
Qatar	49	48, 69	39	38, 45	71	69, 79
Brazil	50	47, 52	58	53, 61	49	48, 51
Chile	51	49, 52	46	42, 46	58	58, 59
Serbia	52	49, 65	47	44, 55	60	58, 71
Philippines	53	49, 56	67	63, 68	53	49, 56
Indonesia	54	53, 63	54	48, 56	67	66, 72
Mauritius	55	52, 72	40	40, 50	79	76, 81
Mexico	56	51, 60	73	66, 74	52	51, 55
Georgia	57	52, 65	48	47, 54	73	65, 73
North Macedonia	58	56, 69	60	57, 61	63	61, 71
Russian Federation	59	53, 69	76	72, 77	56	54, 58
Ukraine	60	49, 65	78	72, 79	54	44, 56
Colombia	61	58, 68	65	61, 67	62	61, 66
Uruguay	62	52, 71	56	51, 64	75	61, 75
Armenia	63	56, 67	79	78, 82	55	50, 55
Iran (Islamic Republic of)	64	56, 80	85	82, 109	48	45, 49
Montenegro	65	56, 68	62	56, 68	72	59, 72

Appendix Table 5 *Continued*

Morocco	66	57, 71	89	82, 90	47	45, 54
Mongolia	67	58, 74	84	80, 89	51	50, 58
Republic of Moldova	68	56, 69	80	74, 80	57	55, 57
South Africa	69	63, 71	75	68, 75	61	60, 67
Costa Rica	70	59, 72	61	59, 65	76	61, 76
Kuwait	71	67, 77	70	68, 77	68	67, 74
Bahrain	72	64, 83	49	48, 59	93	88, 94
Jordan	73	68, 74	69	60, 70	74	73, 77
Oman	74	72, 81	59	58, 65	86	83, 90
Peru	75	73, 81	63	59, 66	85	83, 90
Argentina	76	69, 81	92	81, 94	59	58, 66
Barbados	77	52, 81	77	60, 80	77	55, 79
Kazakhstan	78	77, 82	72	68, 73	83	82, 90
Jamaica	79	72, 85	91	77, 93	65	61, 77
Bosnia and Herzegovina	80	76, 88	74	70, 80	84	82, 90
Tunisia	81	73, 84	96	83, 98	64	63, 71
Panama	82	80, 88	83	81, 86	78	77, 85
Uzbekistan	83	73, 86	71	68, 74	91	76, 93
Albania	84	79, 88	66	64, 74	97	92, 97
Belarus	85	71, 89	102	85, 107	69	58, 74
Egypt	86	82, 88	95	85, 95	80	75, 81
Botswana	87	86, 105	64	63, 75	110	110, 129
Brunei Darussalam	88	76, 111	55	49, 64	123	109, 123
Sri Lanka	89	85, 92	100	89, 102	82	79, 88
Cabo Verde	90	88, 104	68	67, 101	113	102, 113
Pakistan	91	85, 99	116	105, 116	70	68, 80
Senegal	92	86, 98	90	86, 93	95	81, 100
Paraguay	93	88, 101	98	93, 99	90	82, 101
Lebanon	94	87, 99	101	95, 104	88	80, 90
Azerbaijan	95	87, 98	82	77, 88	101	94, 107
Kenya	96	90, 101	105	96, 107	87	85, 91
Dominican Republic	97	91, 101	94	85, 100	99	97, 106
El Salvador	98	91, 103	107	100, 108	89	87, 95
Kyrgyzstan	99	94, 104	86	82, 101	105	99, 105
Bolivia (Plurinational State of)	100	94, 113	88	83, 114	106	95, 113
Ghana	101	96, 115	108	101, 111	94	92, 123
Namibia	102	95, 105	87	83, 96	109	104, 110
Cambodia	103	94, 105	97	94, 103	103	97, 104
Rwanda	104	94, 112	81	81, 96	116	100, 116
Ecuador	105	95, 106	104	98, 106	100	92, 100
Bangladesh	106	97, 112	114	112, 121	92	90, 100

Appendix Table 5 *Continued*

Tajikistan	107	95, 110	106	101, 116	104	91, 109
Trinidad and Tobago	108	101, 116	93	84, 104	119	116, 120
Nepal	109	104, 112	110	109, 115	102	96, 108
Madagascar	110	102, 125	129	128, 132	81	80, 98
Lao People's Democratic Republic	111	106, 116	99	94, 108	121	113, 121
Côte d'Ivoire	112	109, 123	111	103, 116	107	106, 126
Nigeria	113	106, 123	121	115, 123	98	98, 116
Honduras	114	106, 115	112	108, 117	111	103, 112
Algeria	115	106, 124	113	109, 123	115	106, 120
Zambia	116	112, 127	103	98, 108	131	121, 132
Togo	117	109, 119	122	108, 122	108	108, 112
Zimbabwe	118	109, 123	131	122, 131	96	94, 106
Benin	119	115, 125	109	105, 114	125	125, 131
United Republic of Tanzania	120	116, 127	115	115, 122	118	118, 130
Uganda	121	116, 123	119	117, 124	117	115, 122
Guatemala	122	106, 123	117	113, 118	122	99, 122
Cameroon	123	118, 125	120	114, 123	120	117, 125
Nicaragua	124	120, 128	118	113, 129	126	113, 128
Myanmar	125	115, 128	128	123, 130	114	102, 114
Mauritania	126	122, 132	125	118, 127	127	125, 133
Burundi	127	124, 131	124	120, 130	128	125, 131
Mozambique	128	126, 132	123	120, 128	129	129, 133
Burkina Faso	129	125, 130	127	124, 130	124	124, 128
Ethiopia	130	124, 131	133	131, 133	112	107, 120
Mali	131	125, 133	126	123, 126	132	122, 133
Niger	132	124, 132	130	122, 131	130	122, 132
Angola	133	131, 133	132	132, 133	133	130, 133

Notes: Median ranks and intervals are calculated over 5,000 simulated scenarios combining simulated weights, imputation (based on EM or k-NN) versus no imputation of missing values, and geometric versus arithmetic average at the pillar level.

Source: European Commission, Joint Research Centre, 2024.

Sensitivity analysis results

Complementary to the uncertainty analysis, sensitivity analysis has been used to identify which of the modeling assumptions have the greatest impact on certain country rankings. Appendix Table 6 summarizes the impact of changes in the imputation method (EM or k-NN imputation) and/or the aggregation formula (geometric aggregation), keeping the aggregation weights fixed at their reference values (as in the nominal GII). Similar to the results of previous audits, neither the GII nor the Input or Output Sub-Indices are found to be heavily influenced by the imputation of missing data, or by the aggregation formula. In the case of the Input Sub-Index, there exists a group of three economies, Bolivia, Cabo Verde and the Islamic Republic of Iran – that shift rank by more than 20 positions when a different imputation method is used (EM or k-NN instead of no imputation). For Bolivia and Cabo Verde, this can be, at least in part, attributed to their large share of missing data for the Input Sub-Index, as data are available for less than 72 percent of the Input Sub-Index indicators for these economies. The Islamic Republic of Iran on the other hand has a better data availability (86 percent). The choice of the imputation method appears to also be crucial for the ranking of two other countries in the case of the Output Sub-Index, namely Ghana and Côte d'Ivoire. For these countries, missing data account for 16 and 12 percent of the Output Sub-Index indicators.

Overall, the analysis carried out by JRC-COIN verifies that the rankings of the 2024 GII are reliable and, for most economies, the simulated 90 percent confidence intervals are narrow enough to allow meaningful inferences to be drawn for their relative performance. There are a few countries that appear to be sensitive to the way missing values are treated, most of which have a rather large share of missing data. It is however suggested that the readers of the GII 2024 report consider an economy's ranking in the GII 2024 and in the Input and Output Sub-Indices not only at face value, but also within the 90 percent confidence intervals, in order to better appreciate the degree to which an economy's rank depends on modeling choices.

These confidence intervals also have to be taken into account when comparing economy rank changes from one year to the next at the GII or Innovation Sub-Index level in order to avoid drawing erroneous conclusions about an economy's rise or fall in the overall classifications. Since 2016, following the JRC-COIN recommendation in past GII audits, the developers' decision to apply the 66 percent indicator coverage threshold separately to the Input and Output Sub-Indices in the GII has led to a net increase in the reliability of economy rankings for both the GII and the two sub-indices. Furthermore, the adoption in 2017 of less stringent criteria for skewness and kurtosis (greater than 2.25 in absolute value and greater than 3.5, respectively) has not introduced any bias into the estimates.

Appendix Table 6 Sensitivity analysis: impact of modeling choices on countries with the most sensitive rankings

			Number of countries that:			
Index or Sub-Index	Uncertainty tested (pillar level only)	Spearman rank correlation between the two series	improve by more than 20 positions	improve between 10 and 20 positions	deteriorate by more than 20 positions	deteriorate between 10 and 20 positions
GII	Geometric vs. arithmetic average	0.995	0	0	0	2
	EM imputation vs. no imputation of missing data	0.991	1	2	0	1
	k-NN imputation vs. no imputation of missing data	0.995	0	1	0	2
	Geometric average and EM imputation vs. arithmetic average and no imputation of missing data	0.989	1	4	0	2
	Geometric average and k-NN imputation vs. arithmetic average and no imputation of missing data	0.992	0	2	0	6
Input Sub-Index	Geometric vs. arithmetic average	0.996	0	0	0	1
	EM imputation vs. no imputation of missing data	0.991	0	2	3*	1
	k-NN imputation vs. no imputation of missing data	0.990	0	3	3*	1
	Geometric average and EM imputation vs. arithmetic average and no imputation of missing data	0.990	0	2	3*	2
	Geometric average and k-NN imputation vs. arithmetic average and no imputation of missing data	0.988	0	5	3*	1
Output Sub-Index	Geometric vs. arithmetic average	0.999	0	0	0	0
	EM imputation vs. no imputation of missing data	0.980	1	14	1**	6
	k-NN imputation vs. no imputation of missing data	0.988	0	8	1**	3
	Geometric average and EM imputation vs. arithmetic average and no imputation of missing data	0.980	2	11	2***	7
	Geometric average and k-NN imputation vs. arithmetic average and no imputation of missing data	0.986	0	7	1**	5

Notes: EM is the expectation–maximization algorithm and k-NN is the k-nearest neighbor approach. * Bolivia, Cabo Verde and the Islamic Republic of Iran. ** Ghana. *** Ghana and Côte d'Ivoire.

Source: European Commission, Joint Research Centre, 2024.

Best-practice frontier in the GII by data envelopment analysis

Is there a way to benchmark economies' multidimensional performance on innovation without imposing a fixed and common set of weights that may be unfair to a particular economy?

Several policy-related aspects of innovation activity at the national level entail an intricate balance between global priorities or drivers and economy-specific strategies and challenges. Comparing multidimensional performance on innovation by subjecting all economies to a common set of weights may prevent acceptance of an innovation index on the grounds that the selected weighting scheme may be unfair to a particular economy, in the sense that it does not reflect its national priorities or the particular challenges that it may be facing vis-à-vis other economies. An appealing feature of the data envelopment analysis (DEA) literature applied in real decision-making settings is the determination of endogenous weights that maximize the overall score of each decision-making unit given a set of other observations. In the absence of a global consensus or strategy regarding the priorities of innovation activity, and with a plethora of national innovation strategies taking place under the effect of various country-specific factors, this approach appears as a reasonable alternative to that of common weights across economies.

In this section, the assumption of fixed pillar weights common to all economies is relaxed once more and, this time, economy-specific weights that maximize an economy's global innovation score are determined endogenously by means of the Benefit-of-the-Doubt (BoD) model, a tailored DEA model that is suitable for the case of composite indicators construction.

A question that arises from the GII approach is whether there is a way to benchmark economies' multidimensional performance on innovation without imposing a fixed and common set of weights that might not be fair to a particular economy. The original question in the DEA literature was how to measure each unit's relative efficiency in production compared to a sample of peers, given observations on input and output quantities and, often, no reliable information on prices (Charnes and Cooper, 1985). A notable difference between the original DEA question and the one applied in the BoD model and used here is that no differentiation between inputs and outputs is made (Cherchye *et al.*, 2008; Melyn and Moesen, 1991). Thus, along the lines of Cook *et al*. (2014), the BoD model evaluates countries with respect to a best-practice frontier formed by the countries with the relatively best achievements in the considered Pillars, rather than an efficiency frontier formed by the countries that transform inputs to outputs in the most efficient way. To estimate DEA-BoD-based distance to the best-practice frontier scores, we consider the m = 7 pillars in the GII 2024 for n = 133 economies, with y_{ij} the value of pillar j in economy i. The objective is to combine the pillar scores per economy into a single number, calculated as the weighted average of the m pillars, where w_j represents the weight of the j-th pillar. In the absence of reliable information about the true weights, the weights that maximize the DEA-BoD-based scores are endogenously determined. This gives the following linear programming problem for each economy i:

$$Y_i = \max_{w_{ij}} \frac{\sum_{j=1}^{7} y_{ij} w_{ij}}{\max\limits_{y_c \in \{\text{dataset}\}} \sum_{j=1}^{7} y_{ij} w_{ij}}$$

(bounding constraint), subject to$w_{ij} \geq 0$, where, $j = 1,\dots,7$, $i = 1,\dots,133$ *(non-negativity constraint)*.In this basic programming problem, the weights are non-negative and an economy's score is between 0 (worst) and 1 (best). The programming problem used to calculate the DEA-BoD socres in this audit included also the restrictions:$0.2 \geq (w_{ij} * y_{ij}) / \Sigma(w_{ij} * y_{ij}) \geq 0.05$, $j = 1,\dots,7$ *(contribution restrictions)*.

In theory, each economy is free to decide on the relative *weight* of each innovation pillar to its score, so as to achieve the best possible score in a computation that reflects its innovation strategy. In practice, the DEA-BoD method assigns a higher (lower) *weight*to those pillars in which an economy is relatively strong (weak). Reasonable constraints are applied to the weights to preclude the possibility of an economy achieving a perfect score by assigning a zero weight to weak pillars: for each economy, the share of each pillar score (i.e., the pillar score multiplied by the DEA-BoD weight over the total score) has lower and upper bounds of 5 percent and 20 percent, respectively. The DEA-BoD score is then measured as the weighted average of all seven innovation pillar scores, where the weights are the economy-specific DEA-BoD weights, compared to the best performance among all other economies with those same weights. The DEA-BoD score can be interpreted as a measure of the "distance to the best-practice frontier."

Appendix Table 7 presents pie shares and DEA scores for the top 25 economies in the GII 2024 alongside their respective GII 2024 rankings. All pie shares are in accordance with the starting point of granting leeway to each economy when assigning shares, while not violating the (relative) upper and lower bounds. In this year, Switzerland, Sweden and Singapore are the only economies to obtain a perfect DEA-BoD score of 1.00, indicating that they define the best-practice frontier (in the 2023 GII, the United States was a frontier economy as well). The United States (0.98), the Republic of Korea (0.95) and Finland (0.95) follow in terms of relative performance, very close to the best-practice frontier.

The contribution of the seven pillars to the performance score is quite diverse across the top-25 economies, reflecting the likely different priorities within national innovation strategies. These pie shares can also be seen to reflect different economies' comparative advantage in certain GII pillars vis-à-vis all other economies and all pillars. For example, China, France and Japan, obtain the same performance score (0.87) but China allocates 20 percent of its DEA score to the Knowledge and technology outputs pillar and 7 percent in the Creative outputs pillar, while quite the opposite holds for France (5 and 20 percent respectively). On the other hand, Japan allocates 5 percent of its DEA-BoD score to both Output pillars, while it allocates between 12 and 20 percent to the five Input pillars. In addition, the Business Sophistication pillar contributes 20 percent of China and Japan's performance score while only 10 percent of France's, while Human capital and Research accounts for 18 to 20 percent in the case of France and Japan but 8 percent in the case of China. Appendix Figure 2 shows how close the DEA scores and the GII 2024 scores are for all 133 economies (Pearson correlation of 0.995).[10]

10 For one country (Mali) the DEA-BoD score is lower than the (rescaled) GII score because the restrictions appended in the DEA-BoD model to restrict the contribution of each of the seven pillars to no less than 5 percent and no more than 20 percent result in the country selecting a set of aggregation weights that is less favorable compared to the nominal GII weights.

Appendix Table 7a Pie shares (absolute terms) and efficiency scores for the top 25 GII 2024 economies - input pillars

	Institutions	Human capital and research	Infrastructure	Market sophistication	Business sophistication
Switzerland	0.05	0.20	0.10	0.20	0.05
Sweden	0.05	0.16	0.20	0.05	0.20
Singapore	0.20	0.20	0.10	0.20	0.20
United States	0.05	0.20	0.10	0.20	0.20
Republic of Korea	0.05	0.20	0.20	0.10	0.20
Finland	0.20	0.20	0.20	0.05	0.19
United Kingdom	0.05	0.20	0.20	0.20	0.05
Denmark	0.20	0.20	0.20	0.07	0.20
Netherlands	0.20	0.20	0.20	0.05	0.20
Canada	0.20	0.20	0.20	0.20	0.10
Germany	0.10	0.20	0.20	0.20	0.05
China	0.05	0.08	0.20	0.20	0.20
Japan	0.12	0.18	0.20	0.20	0.20
France	0.05	0.20	0.20	0.20	0.10
Hong Kong China SAR	0.20	0.20	0.20	0.20	0.05
Estonia	0.20	0.10	0.20	0.20	0.05
Israel	0.05	0.20	0.10	0.20	0.20
Austria	0.20	0.20	0.20	0.10	0.20
Norway	0.20	0.20	0.20	0.10	0.20
Australia	0.20	0.20	0.20	0.20	0.10
Iceland	0.20	0.10	0.20	0.20	0.20
Ireland	0.20	0.20	0.20	0.05	0.20
Luxembourg	0.20	0.20	0.10	0.05	0.20
Belgium	0.20	0.20	0.20	0.05	0.20
New Zealand	0.20	0.20	0.20	0.10	0.20

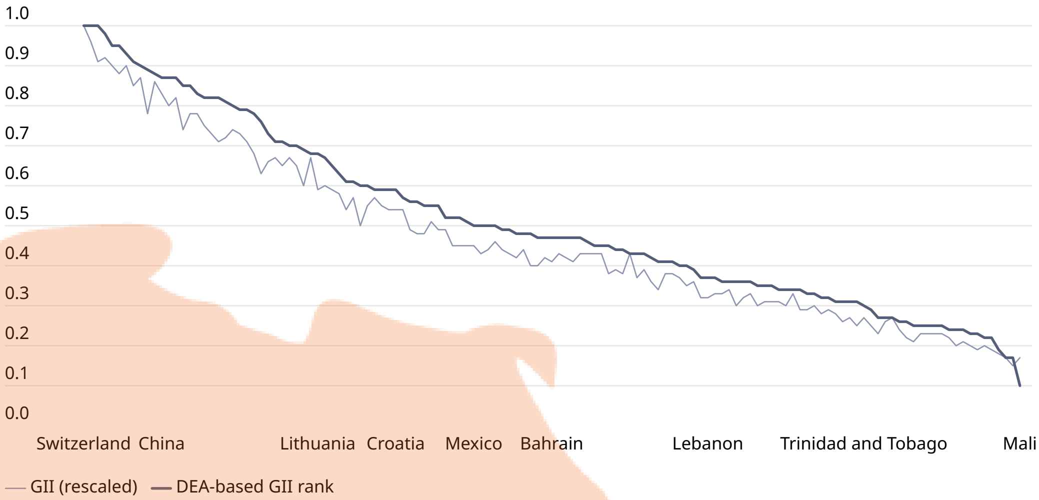
Appendix Table 7b Pie shares (absolute terms) and efficiency scores for the top 25 GII 2024 economies - output pillars

	Knowledge and technology outputs	Creative outputs	Best-practice frontier score (DEA)	Best-practice frontier rank (DEA)	GII rank	Difference from GII rank
Switzerland	0.20	0.20	1.00	1.00	1.00	0.00
Sweden	0.20	0.14	1.00	1.00	2.00	1.00
Singapore	0.05	0.05	1.00	3.00	4.00	1.00
United States	0.20	0.05	0.98	4.00	3.00	−1.00
Republic of Korea	0.05	0.20	0.95	5.00	6.00	1.00
Finland	0.11	0.05	0.95	6.00	7.00	1.00
United Kingdom	0.10	0.20	0.93	7.00	5.00	−2.00
Denmark	0.05	0.08	0.91	8.00	10.00	2.00
Netherlands	0.06	0.09	0.90	9.00	8.00	−1.00
Canada	0.05	0.05	0.89	10.00	14.00	4.00
Germany	0.05	0.20	0.88	11.00	9.00	−2.00
China	0.20	0.07	0.87	12.00	11.00	−1.00
Japan	0.05	0.05	0.87	13.00	13.00	0.00
France	0.05	0.20	0.87	14.00	12.00	−2.00
Hong Kong China SAR	0.05	0.10	0.85	15.00	18.00	3.00
Estonia	0.05	0.20	0.85	16.00	16.00	0.00
Israel	0.20	0.05	0.83	17.00	15.00	−2.00
Austria	0.05	0.05	0.82	18.00	17.00	−1.00
Norway	0.05	0.05	0.82	19.00	21.00	2.00
Australia	0.05	0.05	0.82	20.00	23.00	3.00
Iceland	0.05	0.05	0.81	21.00	22.00	1.00
Ireland	0.10	0.05	0.80	22.00	19.00	−3.00
Luxembourg	0.05	0.20	0.79	23.00	20.00	−3.00
Belgium	0.10	0.05	0.79	24.00	24.00	0.00
New Zealand	0.05	0.05	0.78	25.00	25.00	0.00

Notes: Pie shares are in absolute terms, bounded by 0.05 and 0.20 for all seven innovation pillars. In the GII 2024 ranking, however, each of the five input pillars has a fixed weight of 0.10 while each of the two output pillars has a fixed weight of 0.25. Darker colors represent a higher contribution by those pillars to the overall DEA score, as a result of a country's stronger performance in those pillars, which may help to provide evidence for economy-specific strategies. Countries are ordered according to the DEA-BoD ranking. For countries with a DEA-BoD score equal to 1, there usually exist multiple alternative sets of pillar weights resulting in the same score (i.e., 1). The pillar shares depicted in this table for the first three countries (Switzerland, Sweden and Singapore) were derived based on one of these alternative sets of weights. Different sets of pillar weights for these countries may arise from the use of different software for solving the DEA linear program, all of which, however, correspond to a DEA efficient frontier score of 1.

Source: European Commission, Joint Research Centre, 2024.

Appendix Figure 2 GII 2024 scores and DEA "distance to the best-practice frontier" scores



Notes: For comparison purposes, the GII scores were rescaled by dividing them by the result of the best performer in the overall GII 2024 (Switzerland).

Source: European Commission, Joint Research Centre, 2024.

Conclusion

The JRC-COIN analysis suggests that the conceptualized multilevel structure of the GII 2024 – with its 78 indicators, 21 sub-pillars, seven pillars and two 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 over the years have helped to enhance the already strong statistical coherence within the GII framework, in which the capacity of the 78 indicators to distinguish between economies' performances is maintained at the sub-pillar level or lower 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 economies' 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) has notably improved confidence in the economy ranking for the GII and the two sub-indices. Moreover, the results of the analysis carried out by JRC-COIN suggest that the developer's decision not to impute missing values has a notable impact in the rankings of only a very small set of countries and only for the case of the Input or the Output Sub-Indices.

Additionally, the GII team's decision, in 2012, to use weights as scaling coefficients during 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 JRC-COIN analysis also verified that the strong correlations observed between the GII components do not result in a redundancy of information within the GII. For more than 39 percent (up to 70 percent) of the 133 economies included in the GII 2024, the GII ranking and the rankings of any of the seven pillars differ by 10 positions or more. This demonstrates the added value of the GII ranking, which helps to highlight other components of innovation not immediately apparent from a separate analysis of each pillar. At the same time, this finding points to the value of paying particular attention to 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.

All published GII 2024 rankings lie within the simulated 90 percent confidence intervals that take into consideration the unavoidable uncertainties inherent in an estimation of missing data, the weights (fixed vs. simulated) and the aggregation formula (arithmetic vs. geometric average) at the pillar level. For the majority of economies, such intervals are narrow enough for meaningful inferences to be drawn: the intervals comprise 10 or fewer positions for 72 out of the 133 considered economies. The GII rankings of five countries – Qatar, Madagascar, the Islamic Republic of Iran, Barbados and Brunei Darussalam – should however be interpreted with some caution, as they appear to be highly sensitive to the methodological choices. The Input and Output Sub-Indices have the same modest degree of sensitivity to the methodological choices relating to the imputation method, weights or aggregation formula. Economy ranks, either in the GII 2024 or in the two sub-indices, can be considered to be representative of the many possible scenarios: 81 percent of the economies shift fewer than three positions with respect to the median rank within the GII, 78 percent within the Input Sub-Index and 76 percent within the Output Sub-Index.

All things considered, the present JRC-COIN audit findings confirm that the GII 2024 meets international quality standards for statistical soundness, which indicates that it is a reliable benchmarking tool for innovation practices at the economy level around the world.

Finally, the “distance to the best-practice frontier” measure, calculated using data envelopment analysis, can be used as a suitable alternative approach to benchmarking economies’ multidimensional performance on innovation, without imposing a fixed and common set of weights that may be unfair to a particular economy. The results of this analysis are very closely correlated with the nominal GII ranking, while at the same time allowing economies to select their best-possible pillar weights that better highlight their relative strengths and potential national priorities.

The GII should not be considered as 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 17 years of constant refinement, to pave the way for better and more informed innovation policies worldwide.

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 78 indicators included in the Global Innovation Index (GII) this year.

For all 133 economies in the GII in 2024, the most recent values, within the period 2013 to 2024, were used for each indicator.

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 78 indicators, 63 variables are hard data, 10 are composite indicators, marked with an asterisk (*), and five are survey questions from the World Economic Forum's Executive Opinion Survey (three) and from the Global Entrepreneurship Monitor's National Expert Survey (NES) (two), marked with a dagger (†). Instances marked with [a] signal indicators that were assigned half weights and those marked with [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 US 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. Institutional environment

1.1.1 Operational stability for businesses*

Political, legal, operational or security risk index*b **| 2023**

Index that measures the likelihood and severity of political, legal, operational or security risks affecting business operations. Scores are annualized, standardized and aggregated for end Q1, Q2, Q3 and Q4.

Source: S&P Global, Market Intelligence, Country Risk Dataset (www.marketplace.spglobal.com/en/datasets/country-risk-(255)). Data year: 2023.

1.1.2 Government effectiveness*

Government effectiveness index* | 2022

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 (www.govindicators.org). Data year: 2022.

1.2 Regulatory environment

1.2.1 Regulatory quality*

Regulatory quality index*a **| 2022**

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 (www.govindicators.org). Data year: 2022.

1.2.2 Rule of law*

Rule of law index*a **| 2022**

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 (www.govindicators.org). Data year: 2022.

1.3 Business environment

1.3.1 Policy stability for doing business†

The extent to which governments ensure a stable policy environment for doing business† | 2023

Average answer to the survey question: In your country, to what extent does the government ensure a stable policy environment for doing business? [1 = not at all; 7 = to a great extent].

Source: World Economic Forum, Executive Opinion Survey 2023: “Government ensuring policy stability” indicator (EOSQ434) (www.weforum.org). Data years: 2015–2023.

1.3.2 Entrepreneurship policies and culture†

Entrepreneurship policies and culture index† | 2023

Average perception scores (five-year average) of experts on entrepreneurial policies and entrepreneurial culture (Items B, C and I3 and I4 of the GEM National Expert Survey). Experts in different fields (purposive sampling, minimum 36 experts per year) assess conditions for entrepreneurship in their country via statements (0= completely false; 10 = completely true). Country participation in GEM varies and therefore the number of experts and years on which this item is based differs according to the country. To be eligible for inclusion in this indicator, countries must have participated in the GEM survey starting from 2016 onwards. Participation in surveys conducted before 2016 will result in exclusion from this indicator.

Source: Global Entrepreneurship Monitor (GEM), National Expert Survey (NES) (www.gemconsortium.org/wiki/1142). Data years: 2016–2023.

2. Human capital and research

2.1 Education

2.1.1 Expenditure on education, % GDP

Government expenditure on education (% of GDP) | 2022

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 (http://data.uis.unesco.org). Data years: 2015–2023.

2.1.2 Government funding/pupil, secondary, % GDP/cap

Government funding per secondary pupil (% of GDP per capita) | 2020

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 (http://data.uis.unesco.org). Data years: 2014–2022.

2.1.3 School life expectancy, years

School life expectancy, primary to tertiary education, both sexes (years) | 2022

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 (http://data.uis.unesco.org). Data years: 2015–2023.

2.1.4 PISA scales in reading, maths and science

PISA scales in reading, mathematics and science | 2022

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 2022 PISA survey is the eighth 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. China did not participate in the 2022 PISA Survey. As a result, China's scores correspond to their 2018 PISA results and are only based on the provinces/municipalities of Beijing, Shanghai, Jiangsu and Zhejiang. The 2022 scores for Azerbaijan correspond only to the capital Baku.

Source: OECD Programme for International Student Assessment (PISA) (www.oecd.org/pisa). Data years: 2015–2022.

2.1.5 Pupil–teacher ratio, secondary

Pupil–teacher ratio, secondaryb**| 2022**

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 (http://data.uis.unesco.org). Data years: 2014–2023.

2.2 Tertiary education

2.2.1 Tertiary enrolment, % gross

School enrolment, tertiary (% gross) | 2022

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 level, normally requires, as a minimum condition of admission, the successful completion of education at the secondary level. The school enrolment ratio can exceed 100 percent 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 (http://data.uis.unesco.org). Data years: 2015–2023.

2.2.2 Graduates in science and engineering, %

Graduates from science, technology, engineering and mathematics programs (% of total tertiary graduates) | 2021

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.

Source: UNESCO Institute for Statistics (UIS) online database (http://data.uis.unesco.org); Eurostat database (https://ec.europa.eu/eurostat/data/database); and OECD, Education at a Glance (https://stats.oecd.org/Index.aspx?DatasetCode=RGRADSTY). Data years: 2015–2023.

2.2.3 Tertiary inbound mobility, %

Tertiary inbound mobility rate (%) | 2022

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 (http://data.uis.unesco.org). Data years: 2015–2023.

2.3 Research and development (R&D)

2.3.1 Researchers, FTE/mn pop.

Researchers, full-time equivalent (FTE) (per million population) | 2022

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.

Source: UNESCO Institute for Statistics (UIS) online database (http://data.uis.unesco.org); Eurostat database (https://ec.europa.eu/eurostat/data/database); OECD, Main Science and Technology Indicators (MSTI) database (https://data-explorer.oecd.org); and Ibero-American and Inter-American Network of Science and Technology Indicators (RICYT) (www.ricyt.org/en). Data years: 2014–2022.

2.3.2 Gross expenditure on R&D, % GDP

Gross expenditure on R&D (% of GDP) | 2022

Gross expenditure on R&D (GERD) is the 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.

Source: UNESCO Institute for Statistics (UIS) online database (http://data.uis.unesco.org); Eurostat database (https://ec.europa.eu/eurostat/data/database); OECD, Main Science and Technology Indicators (MSTI) database (https://data-explorer.oecd.org); and Ibero-American and Inter-American Network of Science and Technology Indicators (RICYT) (www.ricyt.org/en). Data years: 2014–2022.

2.3.3 Global corporate R&D investors, top 3, mn USD

Average expenditure of a country's top three global companies on R&D, million USD | 2023

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 2023 EU Industrial R&D Investment Scoreboard (https://iri.jrc.ec.europa.eu/scoreboard/2023-eu-industrial-rd-investment-scoreboard). Data year: 2023.

2.3.4 QS university ranking, top 3*

Average score of the top three universities according to the QS world university ranking* | 2023

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 2024 ranking corresponds to data published in June 2023. Note: the 2024 QS release included a large methodological enhancement, with the addition of three new metrics: Sustainability, Employment Outcomes and International Research Network.

Source: QS Quacquarelli Symonds Ltd, QS World University Rankings, Top Universities (www.topuniversities.com/university-rankings/world-university-rankings/2024). Data year: 2023.

3. Infrastructure

3.1 Information and communication technologies (ICTs)

3.1.1 ICT access*

ICT access index* | 2022

The ICT access index is a composite index that assigns weights to three ICT indicators (33 percent each): (1) Individuals who own a mobile cellular telephone; (2) Households with Internet access at home; and (3) Percentage of the population covered by mobile networks (at least 3G, at least LTE/WiMax). The ICT indicator (3) Percentage of the population covered by mobile networks (at least 3G, at least LTE/WiMax) is calculated by assigning a weight of 40 percent to Population covered by at least 3G and a weight of 60 percent to Population covered by at least LTE/WiMax.

Source: WIPO (www.wipo.int); and WIPO based on ITU (https://datahub.itu.int). Data years: 2021–2022.

3.1.2 ICT use*

ICT use index* | 2022

The ICT use index is a composite index that assigns weights to five ICT indicators (20 percent each): (1) Fixed-broadband Internet basket (% GNI per capita); (2) Fixed-broadband Internet traffic (GB per subscription); (3) Mobile data and voice high-consumption basket (% GNI per capita); (4) Mobile-broadband Internet traffic within the country (GB per subscription); and (5) Active mobile-broadband subscriptions per 100 people.

Source: WIPO (www.wipo.int); and WIPO based on ITU (https://datahub.itu.int). Data year: 2022.

3.1.3 Government's online service*

Government online service index* | 2022

The Online Service Index (OSI) is a component of the E-Government Development Index. The OSI is a composite indicator that assesses how well governments use technology to deliver public services at the national level. It is based on a survey of national websites and e-government policies, with scores normalized to a range of 0 to 1. In the 2022 edition, the OSI is now calculated based on five weighted sub-indices: services provision (45%), technology (5%), institutional framework (10%), content provision (5%), and e-participation (35%), with the overall score calculated from the normalized values of each sub-index.

Source: Division for Public Institutions and Digital Government (DPIDG) of the United Nations Department of Economic and Social Affairs (UNDESA), E-Government Survey 2022 (https://publicadministration.un.org/egovkb/en-us/Reports/UN-E-Government-Survey-2022). Data year: 2022.

3.1.4 E-participation*

E-Participation Index* | 2022

The E-Participation Index (EPI) is a measure of citizen engagement in public policy making through e-government programs. It's a supplement to the United Nations E-Government Survey that assesses how well governments use online services to provide information, interact with stakeholders, and engage in decision-making. Scores range from 0 to 1, with higher values indicating greater e-participation. The index questions are periodically updated to reflect changes in e-government trends and technologies. In the 2022 Survey, the e-participation questions were further expanded to reflect current trends and modalities on how governments engage their people in public policy-making, implementation and evaluation.

Source: Division for Public Institutions and Digital Government (DPIDG) of the United Nations Department of Economic and Social Affairs (UNDESA), E-Government Survey 2022 (https://publicadministration.un.org/egovkb/en-us/Reports/UN-E-Government-Survey-2022). Data year: 2022.

3.2 General infrastructure

3.2.1 Electricity output, GWh/mn pop.

Electricity output (GWh per million population) | 2022

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, 2023 edition and 2024 edition (Population) (www.iea.org/reports/world-energy-balances-overview). Data years: 2021–2022.

3.2.2 Logistics performance*

Logistics Performance Index* | 2023

A multidimensional assessment of logistics performance, the 2023 Logistics Performance Index (LPI) ranks 139 countries, combining data on six core performance components into a single aggregate measure that includes 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.

Source: World Bank, Logistics Performance Index 2023 (https://lpi.worldbank.org); and World Bank (2023) *Connecting to Compete 2023: Trade Logistics in the Global Economy – The Logistics Performance Index and its Indicators* (https://lpi.worldbank.org/sites/default/files/2023-04/LPI_2023_report_with_layout.pdf). Data year: 2023.

3.2.3 Gross capital formation, % GDP

Gross capital formation (% of GDP, three-year average) | 2023

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 2023 (www.imf.org/en/Publications/WEO/weo-database/2023/October). Data years: 2022–2023.

3.3 Ecological sustainability

3.3.1 GDP/unit of energy use

GDP per total energy supply (per thousand 2015 PPP$ GDP) | 2021

Purchasing power parity gross domestic product (2015 PPP$ GDP) per total energy supply (TES). TES is made up 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, 2023 edition (www.iea.org/reports/world-energy-balances-overview). Data years: 2021–2022.

3.3.2 Low-carbon energy use, %

The share of a country's total primary energy consumption that is from low-carbon intensive sources | 2022

The low-carbon intensive energy share is calculated based on its share of a country's total primary energy consumption (expressed in petajoules). Primary energy is the energy available in raw, unprocessed natural resources that serve as inputs into the energy system. It measures total energy consumed before any significant efficiency losses due to converting it to secondary energy (a transportable form) or final energy (delivered to the consumer). The full energy mix is considered, comprising high-carbon intensive fossil fuel sources; oil, coal, and natural gas; as well as low-carbon intensive sources; hydro, nuclear, wind, biomass, solar, geothermal, etc. The calculation of total primary energy consumed by each country factors in energy that is imported and consumed (as opposed to imported but transited to another country) and primary energy that is produced but exported abroad to be consumed elsewhere. All energy sources are expressed in petajoules. To allow low-carbon intensive primary energy sources to be compared on a consistent basis with fossil fuels, the "fossil fuel equivalency" (or full/partial substitution) methodology is used. This is because primary energy that goes into renewables such as wind and solar is not recorded. This approach converts electrical output from non-combustible renewable and nuclear energy sources into the equivalent primary energy inputs that would be needed if the same quantity of electricity was to be generated using fossil fuels. Consequently, non-fossil fuel electricity generation is divided by a "thermal efficiency factor", which is an assumed average efficiency of the global fossil-fueled power plant fleet. For 2022 data this was 40.7%. This factor changes over time as the composition of the global fossil fuel mix changes and efficiency improvements in thermal power plants are made.

Source: The Energy Institute, Statistical Review of World Energy (www.energyinst.org/statistical-review). Data year: 2022.

3.3.3 ISO 14001 environment/bn PPP$ GDP

ISO 14001 Environmental management systems – Number of certificates issued (per billion PPP$ GDP) | 2022

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, 2022 (www.iso.org/the-iso-survey.html); and International Monetary Fund, World Economic Outlook Database, October 2023 (www.imf.org/en/Publications/WEO/weo-database/2023/October). Data year: 2022.

4. Market sophistication

4.1 Credit

4.1.1 Finance for startups and scaleups†

Finance for startups and scaleups† | 2023

Average perception scores (five-year average) of experts on finance for starting and growing firms (item A1 of the GEM National Expert Survey). Experts in different fields (purposive sampling, minimum 36 experts per year) assess conditions for entrepreneurship in their country via statements (0=completely false; 10 = completely true). Country participation in GEM varies and therefore the number of experts and years on which this item is based differs according to the country. To be eligible for inclusion in this indicator, countries must have participated in the GEM survey starting from 2016 onwards. Participation in surveys conducted before 2016 will be excluded from this indicator.

Source: Global Entrepreneurship Monitor (GEM), National Expert Survey (NES) (www.gemconsortium.org/wiki/1142). Data years: 2016–2023.

4.1.2 Domestic credit to private sector, % GDP

Domestic credit to private sector (% of GDP) | 2022

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 (https://data.imf.org); and World Bank and OECD GDP estimates, extracted from the World Bank's World Development Indicators database (https://databank.worldbank.org/source/world-development-indicators). Data years: 2015–2022.

4.1.3 Loans from microfinance institutions, % GDP

Loans from all microfinance institutions (% of GDP) | 2022

Outstanding loans from all microfinance institutions in a country as a percentage of its GDP.

Source: International Monetary Fund, Financial Access Survey (https://data.imf.org/?sk=E5DCAB7E-A5CA-4892-A6EA-598B5463A34C). Data years: 2016–2022.

4.2 Investment

4.2.1 Market capitalization, % GDP

Market capitalization of listed domestic companies (% of GDP, three-year average) | 2022

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 (www.world-exchanges.org/our-work/statistics); and extracted from the World Bank's World Development Indicators database (https://databank.worldbank.org/source/world-development-indicators). Data years: 2014–2022.

4.2.2 Venture capital (VC) investors, deals/bn PPP$ GDP

Number of venture capital deals invested in (per billion PPP$ GDP, three-year average) | 2023

Refinitiv 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, 2021, and December 31, 2023 with the data aggregated by the location of the investing firm. The data represent the three-year average of 2021–23 deals invested in and are reported per billion PPP$ GDP.

Source: Refinitiv (a London Stock Exchange Group (LSEG) business) Eikon (private equity screener) accessed March 2024 (https://solutions.refinitiv.com/eikon-trading-software); and International Monetary Fund World Economic Outlook Database, October 2023 (www.imf.org/en/Publications/WEO/weo-database/2023/October). Data years: 2021–2023.

4.2.3 VC recipients, deals/bn PPP$ GDP

Number of venture capital deals received (per billion PPP$ GDP, three-year average) | 2023

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 extraction corresponds to a query on VC deals between January 1, 2021 and December 31, 2023, with the data aggregated by the location invested in. The data represent the three-year average of 2021–23 deals received and are reported per billion PPP$ GDP.

Source: Refinitiv (an LSEG business) Eikon (private equity screener) accessed March 2024 (https://solutions.refinitiv.com/eikon-trading-software); and International Monetary Fund, World Economic Outlook Database, October 2023 (www.imf.org/en/Publications/WEO/weo-database/2023/October). Data years: 2021–2023.

4.2.4 VC received, value, % GDP

Total value of venture capital received (% of GDP, three-year average) | 2023

Refinitiv data on the monetary value of private equity deals, per deal, with information on the location of the firm receiving the VC investment, among other details. The data extraction corresponds to a query on VC deals between January 1, 2021 and December 31, 2023, with the data aggregated by the location invested in. The data represent the three year average of reported deal value, in current USD (billions), received and are reported.

Source: Refinitiv (an LSEG business) Eikon (private equity screener) accessed March 2024 (https://solutions.refinitiv.com/eikon-trading-software); and International Monetary Fund, World Economic Outlook Database, October 2023 (www.imf.org/en/Publications/SPROLLs/world-economic-outlook-databases). Data years: 2021–2023.

4.3 Trade, diversification and market scale

4.3.1 Applied tariff rate, weighted avg., %

Tariff rate, applied, weighted average, all products (%)b **| 2022**

The Effectively applied tariff is the minimum tariff imposed by one country to another representing the most advantageous tariff, encompassing all preferential trade agreements and most-favoured-nation (MFN) tariffs, and weighted by the import values of the product and country of origin pairings. All calculations have been conducted based on imported products at the Harmonized System (HS) subheading level. Tariffs include both ad valorem duties and ad valorem equivalents in the calculations. Any missing tariffs or Ad Valorem equivalents not calculated at the subheading level have been omitted. The European Union (27) is treated as a unified entity, thus intra-EU trade has been disregarded.

Source: World Trade Organization's Analytical database (www.wto.org/english/tratop_e/tariffs_e/tariffs_e.htm). Data years: 2017–2022.

4.3.2 Domestic industry diversification

Domestic industry diversification (based on manufacturing output)b **| 2021**

The Herfindahl-Hirschman Index (HHI) for the domestic industry is defined as the sum of the squared shares of industries in total manufacturing output.

Source: United Nations Industrial Development Organization (UNIDO), Industrial Statistics Database, two-digit level of the International Standard Industrial Classification (ISIC) Revision 3 (INDSTAT 2 2022), Enhancing the Quality of Industrial Policies (EQuIP) Tool 4: Diversification – Domestic and Export Dimensions, 2015 (https://stat.unido.org). Data years: 2014–2022.

4.3.3 Domestic market scale, bn PPP$

Domestic market scale as measured by GDP, bn PPP$ | 2023

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 2023 (www.imf.org/en/Publications/WEO/weo-database/2023/October). Data years: 2022–2023.

5. Business sophistication

5.1 Knowledge workers

5.1.1 Knowledge-intensive employment, %

Employment in knowledge-intensive services (% of workforce, 15+ years old) | 2022

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 (https://ilostat.ilo.org). Data years: 2014–2023.

5.1.2 Firms offering formal training, %

Firms offering formal training (% of firms) | 2023

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. Data for Bangladesh, India, Iraq and Madagascar, published in 2022, and covering the COVID-19 period are not being used after discussions with the Enterprise Survey World Bank staff.

Source: World Bank Enterprise Surveys (www.enterprisesurveys.org). Data years: 2013–2023.

5.1.3 GERD performed by business, % GDP

GERD performed by business enterprises (% of GDP) | 2022

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 (http://data.uis.unesco.org); Eurostat database (https://ec.europa.eu/eurostat/data/database); OECD, Main Science and Technology Indicators (MSTI) database (https://data-explorer.oecd.org); and Ibero-American and Inter-American Network of Science and Technology Indicators (RICYT) (www.ricyt.org/en). Data years: 2014–2022.

5.1.4 GERD financed by business, %

GERD financed by business enterprises (% of GERD) | 2021

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.

Source: UNESCO Institute for Statistics (UIS) online database (http://data.uis.unesco.org); Eurostat database (https://ec.europa.eu/eurostat/data/database); OECD, Main Science and Technology Indicators (MSTI) database (https://data-explorer.oecd.org); and Ibero-American and Inter-American Network of Science and Technology Indicators (RICYT) (www.ricyt.org/en). Data years: 2014–2023.

5.1.5 Females employed w/advanced degrees, %

Females employed with advanced degrees (% total employed, 25+ years old) | 2023

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 (https://ilostat.ilo.org); and Statistics Canada, Table 14-10-0020-01 Unemployment rate, participation rate and employment rate by educational attainment, annual (www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410002001). Data years: 2014–2023.

5.2 Innovation linkages

5.2.1 Public research–industry co-publications, %

Public–private co-authored research publications (% of total research publications, five-year average) | 2023

Public–private co-authored research publications as a percentage of all research publications. Research publications are limited to the following four main fields of science: Biomedical and health sciences, Life and earth sciences, Mathematics and computer science, and Physical sciences and engineering. The definition of the "private sector" includes all for profit business enterprises, covering all manufacturing and services sectors. This includes research institutes and other corporate R&D laboratories that are fully funded or owned by for profit business enterprises. Organizations in the private education sector and private healthcare sector organizations (including hospitals and clinics) are not classified as private sector.

Source: Centre for Science and Technology Studies (CWTS), Leiden University, based on Clarivate Web of Science (www.cwts.nl). Data year: 2023.

5.2.2 University–industry R&D collaboration†

The extent to which businesses and universities collaborate on R&D† | 2023

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 2023 (www.weforum.org). Data years: 2014–2023.

5.2.3 State of cluster development†

How widespread clusters are† | 2023

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 2023 (www.weforum.org). Data years: 2015–2023.

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) | 2023

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, 2021 and December 31, 2023 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: Refinitiv (an LSEG business) SDC Platinum database (www.refinitiv.com/en/financial-data/deals-data/joint-venture-deals); and International Monetary Fund World Economic Outlook Database, October 2023 (www.imf.org/en/Publications/WEO/weo-database/2023/October). Data years: 2020–2023.

5.2.5 Patent families/bn PPP$ GDP

Number of patent families filed in at least two offices (per billion PPP$ GDP) | 2020

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 (www.wipo.int/ipstats); and International Monetary Fund, World Economic Outlook Database, October 2023 (www.imf.org/en/Publications/WEO/weo-database/2023/October). Data year: 2020.

5.3 Knowledge absorption

5.3.1 Intellectual property payments, % total trade

Charges for use of intellectual property, i.e., payments (% of total trade, three-year average) | 2022

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 year. 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 and International Investment Position Manual (BPM6)*, 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: WTO | Statistics - Global Services Trade Data Hub. Trade in Services by Mode of Supply dataset (www.wto.org/english/res_e/statis_e/services_trade_data_hub_e.htm). Data year: 2022.

5.3.2 High-tech imports, % total trade

High-tech imports (% of total trade) | 2022

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 (see http://ec.europa.eu/eurostat/cache/metadata/Annexes/htec_esms_an5.pdf). Commodities belong to the following sectors: aerospace; computers and office machines; electronics and telecommunications; pharmacy; scientific instruments; electrical machinery; chemistry; non-electrical machinery; and armament.

Source: United Nations Comtrade Database (http://comtrade.un.org); and World Trade Organization and United Nations Conference on Trade and Development (https://stats.wto.org). Data years: 2015–2022.

5.3.3 ICT services imports, % total trade

Telecommunications, computer and information services imports (% of total trade) | 2022

Telecommunications, computer and information services imports 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. Values are 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. For the definition of total trade, see indicator 5.3.1.

Source: WTO | Statistics - Global Services Trade Data Hub. Trade in Services by Mode of Supply dataset (www.wto.org/english/res_e/statis_e/services_trade_data_hub_e.htm). Data years: 2021–2022.

5.3.4 FDI net inflows, % GDP

Foreign direct investment (FDI) net inflows (% of GDP, three-year average) | 2022

FDI net inflow 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. Data extracted from the World Bank's World Development Indicators database.

Source: International Monetary Fund, International Financial Statistics and Balance of Payments databases (https://data.imf.org); World Bank, International Debt Statistics (www.worldbank.org/en/programs/debt-statistics); and OECD GDP estimates (https://data.oecd.org). Data years: 2021–2022.

5.3.5 Research talent, % in businesses

Researchers in business enterprise (%) | 2022

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 (http://data.uis.unesco.org); Eurostat database (https://ec.europa.eu/eurostat/data/database); OECD, Main Science and Technology Indicators (MSTI) database (https://data-explorer.oecd.org); and Ibero-American and Inter-American Network of Science and Technology Indicators (RICYT) (www.ricyt.org/en). Data years: 2014–2022.

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) | 2022

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 to be 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 to be a resident application for that member state (Germany). Data are scaled by PPP$ GDP (billions).

Source: World Intellectual Property Organization, Intellectual Property Statistics (www.wipo.int/ipstats); and International Monetary Fund, World Economic Outlook Database, October 2023 (www.imf.org/en/Publications/WEO/weo-database/2023/October). Data years: 2014–2022.

6.1.2 PCT patents by origin/bn PPP$ GDP

Number of Patent Cooperation Treaty (PCT) applications (per billion PPP$ GDP) | 2023

A PCT application refers to an international patent application filed through the WIPO-administered Patent Cooperation Treaty. 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 (157 to date). Data are scaled by PPP$ GDP (billions).

Source: World Intellectual Property Organization, Intellectual Property Statistics (www.wipo.int/ipstats); and International Monetary Fund, World Economic Outlook Database, October 2023 (www.imf.org/en/Publications/WEO/weo-database/2023/October). Data years: 2022–2023.

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) | 2022

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 (www.wipo.int/ipstats); and International Monetary Fund, World Economic Outlook Database, October 2023 (www.imf.org/en/Publications/WEO/weo-database/2023/October). Data years: 2017–2022.

6.1.4 Scientific and technical articles/bn PPP$ GDP

Number of scientific and technical journal articles (per billion PPP$ GDP) | 2023

The number of articles published in the fields of 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 April 17, 2024 (https://clarivate.com/webofsciencegroup/solutions/web-of-science); and International Monetary Fund, World Economic Outlook Database, October 2023 (www.imf.org/en/Publications/WEO/weo-database/2023/October). Data years: 2022–2023.

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 | 2023

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, SJR SCImago Journal & Country Rank, retrieved April 2024 (www.scimagojr.com). Data year: 2023.

6.2 Knowledge impact

6.2.1 Labor productivity growth, %

Growth rate of GDP per person employed (%, five-year average) | 2023

Growth rate of real GDP per person employed, average of five most recent available years (2019–2023). 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, April 2024 (www.conference-board.org/data/economydatabase). Data years: 2021–2023.

6.2.2 Unicorn valuation, % GDP

Combined valuation of a country's unicorns (% of GDP) | 2024

Total valuation of all unicorns in a country as a percentage of GDP. A unicorn company is a private company with a valuation over $1 billion. Unicorn companies as of March 20, 2024, with 1,229 unicorns worldwide.

Source: CBInsights, Tracker – The Complete list of Unicorn Companies (www.cbinsights.com/research-unicorn-companies); and International Monetary Fund, World Economic Outlook Database, October 2023 (www.imf.org/en/Publications/WEO/weo-database/2023/October). Data year: 2024.

6.2.3 Software spending, % GDP

Total computer software spending (% of GDP) | 2023

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. The data are estimated based on software and services industry sales data. Data are reported as a percentage of GDP.

Source: S&P Global, Market Intelligence (www.marketplace.spglobal.com/en/datasets). Data year: 2023.

6.2.4 High-tech manufacturing, %

High-tech and medium-high-tech manufacturing (% of total manufacturing output) | 2021

High technology and medium-high technology (MHT) 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) Rev.4 and Rev.3.

Source: United Nations Industrial Development Organization (UNIDO), Industrial Statistics

Database (INDSTAT) Rev.3 and 4 (https://stat.unido.org); 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” (https://one.oecd.org/document/OCDE/GD(97)216/en/pdf); Fernando Galindo-Rueda and Fabien Verger (2016) “OECD Taxonomy of Economic Activities Based on R&D Intensity” (www.oecd-ilibrary.org/science-and-technology/oecd-taxonomy-of-economic-activities-based-on-r-d-intensity_5jlv73sqqp8r-en). Data years: 2014–2022.

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) | 2022

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 year. 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). Values are 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. For the definition of total trade, see indicator 5.3.1.

Source: WTO | Statistics – Global Services Trade Data Hub. Trade in Services by Mode of Supply dataset (www.wto.org/english/res_e/statis_e/services_trade_data_hub_e.htm). Data year: 2022.

6.3.2 Production and export complexity

The Economic Complexity Index | 2021

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 import those products) 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). Data year: 2021.

6.3.3 High-tech exports, % total trade

High-tech exports (% of total trade) | 2022

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: United Nations Comtrade Database (http://comtrade.un.org); World Trade Organization and United Nations Conference on Trade and Development (https://stats.wto.org); and Trade Data Monitor (www.tradedatamonitor.com). Data years: 2015–2022.

6.3.4 ICT services exports, % total trade

Telecommunications, computer and information services exports (% of total trade) | 2022

Telecommunications, computer and information services exports as a percentage of total trade according to the Extended Balance of Payments Services Classification EBOPS 2010, coded SI: Telecommunications, computer, and information services. Values are 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. For the definition of total trade, see indicator 5.3.1.

Source: WTO | Statistics – Global Services Trade Data Hub. Trade in Services by Mode of Supply dataset (www.wto.org/english/res_e/statis_e/services_trade_data_hub_e.htm). Data year: 2022.

6.3.5 ISO 9001 quality/bn PPP$ GDP

ISO 9001 Quality management systems – number of certificates issued (per billion PPP$ GDP) | 2022

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 Survey of Certifications to Management System Standards, 2022 (www.iso.org/the-iso-survey.html); and International Monetary Fund, World Economic Outlook Database, October 2023 (www.imf.org/en/Publications/WEO/weo-database/2023/October). Data year: 2022.

7. Creative outputs

7.1 Intangible assets

7.1.1 Intangible asset intensity, top 15, %

Intangible asset value as a percentage of the firm's total value, average of the top 15 firms | 2023

The data cover a global list of firms for which intangible asset value and total firm value are observed. Only the top 15 firms of each economy are considered, ranked by intangible assets in absolute terms (in USD). Countries with fewer than 15 firms are not considered. For each firm, the intangible asset value is divided by the firm's total value before computing the arithmetic mean across the top 15 firms for each economy.

Source: Brand Finance Global Intangible Finance Tracker (https://brandirectory.com/reports/gift-2023). Data years: 2022–2023.

7.1.2 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) | 2022

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 (www.wipo.int/ipstats); and International Monetary Fund, World Economic Outlook Database, October 2023 (www.imf.org/en/Publications/WEO/weo-database/2023/October). Data years: 2015–2022.

7.1.3 Global brand value, top 5,000, % GDP

Global brand value of the top 5,000 brands (% of GDP) | 2024

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 (https://brandirectory.com); and International Monetary Fund, World Economic Outlook Database, October 2023 (www.imf.org/en/Publications/WEO/weo-database/2023/October). Data year: 2024.

7.1.4 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) | 2022

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 (www.wipo.int/ipstats); and International Monetary Fund, World Economic Outlook Database, October 2023 (www.imf.org/en/Publications/WEO/weo-database/2023/October). Data years: 2014–2022.

7.2 Creative goods and services

7.2.1 Cultural and creative services exports, % total trade

Cultural and creative services exports (% of total trade) | 2022

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. Values are 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. See indicator 5.3.1 for the full definition of total trade.

Source: World Trade Organization Global Services Trade Data Hub, Trade in Services by Mode of Supply dataset (www.wto.org/english/res_e/statis_e/services_trade_data_hub_e.htm). Data years: 2014–2022.

7.2.2 National feature films/mn pop. 15–69

Number of national feature films produced (per million population, 15–69 years old) | 2022

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: OMDIA (https://omdia.tech.informa.com/products/cinema-and-movies-intelligence-service); and United Nations, Department of Economic and Social Affairs, Population Division, World Population Prospects 2024 (April 2024 update) (https://population.un.org/wpp). Data years: 2015–2022.

7.2.3 Entertainment and media market/th pop. 15–69

Global telecom and entertainment & media outlook (per thousand population, 15–69 years old) | 2023

The Global Telecom and Entertainment & Media 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 figures for Algeria, Bahrain, the Islamic Republic of Iran, Jordan, Kuwait, Lebanon, Malta, Morocco, Oman, Qatar, Tunisia and Yemen were estimated from a total corresponding to Middle East and North Africa (MENA) countries using a breakdown of total GDP (current USD) for the above-mentioned countries to define referential percentages.

Source: PwC, Global Telecom and Entertainment and Media Outlook, 2023–2027 (www.pwc.com/gx/en/industries/tmt/media/outlook.html); United Nations Department of Economic and Social Affairs, Population Division, World Population Prospects 2024 (April 2024 update) (https://population.un.org/wpp); and International Monetary Fund, World Economic Outlook Database, October 2023 (www.imf.org/en/Publications/WEO/weo-database/2023/October). Data years: 2022–2023.

7.2.4. Creative goods exports, % total trade

Creative goods exports (% of total trade) | 2022

Total value of creative goods exports (current USD) over total trade. Creative goods exports based on the 2009 UNESCO Framework for Cultural Statistics, Table 3, International trade of cultural goods and services defined with the Harmonized System (HS) 2007 codes; World Trade Organization and United Nations Conference on Trade and Development, 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. For the definition of total trade, see indicator 5.3.1.

Source: United Nations Comtrade Database (http://comtrade.un.org); and World Trade Organization and United Nations Conference on Trade and Development (https://stats.wto.org). Data years: 2015–2022.

7.3 Online creativity

7.3.1 Top-level domains (TLDs)/th pop. 15–69

Generic top-level domains (TLDs) and country-code TLDs (per thousand population, 15–69 years old) | 2023

The sum of Generic top-level domains (TLDs) and country-code TLDs as a proportion of thousand population, 15-69 years old. A top-level domain (TLD) encompasses various categories maintained by the Internet Assigned Numbers Authority (IANA) for internet use. Generic TLDs cover five generic domains (.biz, .info, .org, .net, and .com), excluding sponsored domains such as .name or .pro, and all new generic TLDs. Country-code TLDs are assigned to specific economies, countries, or territories and represent total domain registrations within each country-code TLD, with exceptions for ccTLDs licensed for global commercial use. For confidentiality reasons, only normalized values are reported; while relative positions are preserved, magnitudes are not.

Source: ZookNIC Inc (www.zooknic.com); and United Nations, Department of Economic and Social Affairs, Population Division, World Population Prospects 2024 (April 2024 update) (https://population.un.org/wpp). Data years: 2021–2023.

7.3.2 GitHub commits/mn pop. 15–69

GitHub commits pushes received and sent (per million population, 15–69 years old) | 2023

GitHub is the world's largest host of source code, and a commit is the term used for a change on this platform. One or more commits can be saved (or pushed) to projects (or repositories). Thus, "GitHub commit pushes received and sent" refers to the sum of the number of batched changes received and sent by publicly-available projects on GitHub within a specific economy. Automated activity resulting in non-productive commits are excluded.

Source: GitHub (https://github.com); and United Nations, Department of Economic and Social Affairs, Population Division, World Population Prospects 2024 (April 2024 update) (https://population.un.org/wpp). Data year: 2023.

7.3.3 Mobile app creation/bn PPP$ GDP

Global downloads of mobile apps (per billion PPP$ GDP, two-year average) | 2023

Global downloads of mobile apps, by origin of the headquarters of the developer/firm, scaled by PPP$ GDP (billions). Global downloads are compiled by data.ia, public data sources and the company's proprietary forecast model based on data from Google Play Store and iOS App Store in each country. 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: data.ia (a Sensor Tower company) (www.data.ai/en); and International Monetary Fund, World Economic Outlook Database, October 2023 (www.imf.org/en/Publications/WEO/weo-database/2023/October). Data years: 2021–2023.

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 that show a high density of inventors and scientific authors. The resulting clusters often encompass several municipal districts, sub-federal states and sometimes even two or more countries. Two innovation metrics are employed in the compilation of the top 100 GII S&T clusters worldwide: location of inventors listed on published patent applications and authors listed on published scientific articles.

For patents, this method relies on applications under WIPO's Patent Cooperation Treaty (PCT). PCT patents offer a useful basis for analyzing patents globally. The PCT system applies a single set of procedural rules and collects information based on uniform filing standards. This reduces potential biases that could arise from using data collected from multiple national sources. The patents selected were published over the most recent five-year period available, between 2019 and 2023, to minimize the effects of volatility that can occur between years.[1]

To widen the range of innovation included, scientific publications from the Web of Science's Science Citation Index Expanded (SCIE) are incorporated. The SCIE provides detailed coverage of the world's most impactful academic journals. For the analysis presented here, science and technology fields are the focus, while articles from the fields of social sciences and humanities are disregarded. In addition, scientific publications are limited solely to articles of original research. This excludes other published items, such as meeting abstracts, conference summaries or paper briefs. As with PCT filings, the most recent five-year period according to data availability was also used for the SCIE – publication years 2018 to 2022.

The WIPO PCT patent data set consists of approximately 1.3 million patent applications published between 2019 and 2023, containing 4.1 million inventor addresses. For the SCIE, the data set comprises 7.9 million articles published between 2018 and 2022, containing 27 million listed author addresses.

The process for 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.[2] In cases where the ESRI address matches proved either ambiguous or insufficiently accurate, the city name in the address string was extracted and matched using records in the city-level data set from the GeoNames Gazetteer database.[3] This latter database gives the geolocation of cities around the globe and contains 48,000 geocoded cities. If the extracted city does not match any known city in the GeoNames database, we attempt to geocode just the extracted city string using the World Geocoder service. This same city-matching approach was applied to all SCIE author addresses.

1 In previous editions, PCT publications years were aligned with SCIE publication years, as SCIE data is available with a one-year lag. Since 2023 we have used the "most recently available data" in order to more accurately reflect the most recent innovation.
2 ESRI ArcGIS World Geocoder service: www.esri.com/en-us/arcgis/products/arcgis-world-geocoder.
3 GeoNames: http://geonames.org.

Overall, 98 percent of inventor addresses were geocoded at either the city level or a more accurate level, while 99.6 percent of scientific author addresses were geocoded at the city level. Appendix Table 10 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 PCT inventor addresses across all 20 countries is above 99 percent. Similarly, coverage of scientific author addresses is also high, above 99% in all but one instance. This marks an improvement in geocoding coverage as compared to previous years. Two reasons account for this. First there was noticeable improvement in ESRI's World Geocoder service, especially in Japan and Republic of Korea. Second, we made a stronger effort to match addresses that were previously not matched to any geocode through increased utilization of ESRI's geocoder and manual geocoding.

Addresses were clustered by applying the density-based spatial clustering of applications with noise (DBSCAN) algorithm. This algorithm requires predefined radius and density parameters. As in previous years, a radius of 15 km and a density of 4,500 listed inventors/authors 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 242 clusters. After review, neighboring clusters were merged if the edge of one cluster was within 3–5 km of another and where the co-author/co-inventor relationships were higher than for any other relationship with any other cluster or non-cluster points. A total of 20 clusters met these criteria, with mergers reducing the overall number of clusters identified to 232.[4]

The remaining 232 clusters were then ranked by counting the number of patents and scientific articles in a given cluster. Numbers were aggregated using fractional counting, in which 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 (Schiavina et al., 2023) Just as with inventor/author geocoded locations, these population data allowed us to define the total population of a cluster using a bottom up approach. We chose to define a cluster's area as 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 each polygon gave a total population estimate for each cluster.[5]

Due to the increase in geocoding accuracy and coverage, it was necessary to rerun the clustering process for last year's S&T clusters. The above steps were repeated for PCT publication years 2018–2022 and SCIE publication years 2017–2021 to form the 2023 clusters and their corresponding rankings anew. These updated rankings are the basis for the "Rank Change" indicators referred to in the section.

The African clusters were created using a process similar to that used for the overall clusters. Inventor addresses and author affiliations were filtered to include only those within the African continent. We selected the parameters for DBSCAN through multiple iterations, adjusting distance and density values to minimize the number of points clustered that are at extreme distances and maximize the number of points clustered that were close to each other. This process resulted in a distance parameter of 15 km and a density parameter of 300 creating a total of 50 clusters. The African clusters went through the same review process as the overall

4 The mergers involved the following clusters: Aurora with Chicago; Baltimore with Washington DC; Boulder with Denver; Cheonan-si with Seoul; Irvine with Los Angeles; Jerusalem with Tel Aviv; Matsudo with Tokyo–Yokohama; Rotterdam with Amsterdam; Wilmington with Philadelphia; Worcester with Boston–Cambridge, MA.

5 See Bergquist and Fink (2020: 61–63) for a more detailed description of how population data were matched to clusters. The clusters were then ranked by dividing the total S&T share by population.

clusters, where clusters near each other were checked if they met the merging criteria. No clusters were merged

The same distance parameter of 15 km as in the overall clustering was preferred as to both maintain consistency and because many data points are geocoded only at the city level, so a relatively large radius is necessary to accommodate this level of geocoding accuracy. The lower density parameter of 300 for the African clusters, compared to 4,500 for the overall clusters, reflects the expected patent filing and publication rate from the African continent compared to other regions.

Appendix Table 8 Top 100 S&T clusters, 2024

Rank	Cluster name	Economy	PCT applications	Scientific publications	Share total PCT filings, %	Share of total pubs, %	Total	Previous rank	Rank change (a)
1	Tokyo–Yokohama	JP	134,769	117,294	10.5	1.5	11.9	1	0
2	Shenzhen–Hong Kong–Guangzhou	CN / HK	116,411	175,364	9.0	2.2	11.2	2	0
3	Beijing	CN	42,490	308,561	3.3	3.9	7.2	4	1
4	Seoul	KR	67,082	140,385	5.2	1.8	7.0	3	-1
5	Shanghai–Suzhou	CN	38,699	191,074	3.0	2.4	5.4	5	0
6	San Jose–San Francisco, CA	US	49,299	57,589	3.8	0.7	4.6	6	0
7	Osaka–Kobe–Kyoto	JP	38,478	52,800	3.0	0.7	3.7	7	0
8	Boston–Cambridge, MA	US	18,973	76,250	1.5	1.0	2.4	8	0
9	Nanjing	CN	7,857	125,607	0.6	1.6	2.2	12	3
10	San Diego, CA	US	24,555	20,292	1.9	0.3	2.2	9	-1
11	New York City, NY	US	13,945	75,727	1.1	1.0	2.0	10	-1
12	Paris	FR	15,648	61,985	1.2	0.8	2.0	11	-1
13	Wuhan	CN	7,403	101,372	0.6	1.3	1.9	13	0
14	Hangzhou	CN	11,225	72,226	0.9	0.9	1.8	15	1
15	Nagoya	JP	17,184	21,160	1.3	0.3	1.6	14	-1
16	Los Angeles, CA	US	11,847	43,464	0.9	0.5	1.5	16	0
17	Daejeon	KR	14,021	26,426	1.1	0.3	1.4	18	1
18	Xi’an	CN	2,018	98,853	0.2	1.2	1.4	19	1
19	Washington, DC–Baltimore, MD	US	5,897	72,703	0.5	0.9	1.4	17	-2
20	Qingdao	CN	8,442	47,000	0.7	0.6	1.2	23	3
21	London	GB	6,558	58,419	0.5	0.7	1.2	20	-1
22	Munich	DE	10,697	27,205	0.8	0.3	1.2	21	-1
23	Chengdu	CN	2,331	77,466	0.2	1.0	1.2	24	1
24	Seattle, WA	US	11,165	19,697	0.9	0.2	1.1	22	-2
25	Taipei–Hsinchu	TW*	3,887	55,401	0.3	0.7	1.0	27	2

Appendix Table 8 *Continued*

Rank	Cluster name	Economy	PCT applications	Scientific publications	Share total PCT filings, %	Share of total pubs, %	Total	Previous rank	Rank change (a)
26	Amsterdam–Rotterdam	NL	4,322	52,439	0.3	0.7	1.0	25	-1
27	Cologne	DE	7,024	33,269	0.5	0.4	1.0	26	-1
28	Houston, TX	US	8,066	23,789	0.6	0.3	0.9	28	0
29	Stuttgart	DE	9,346	14,517	0.7	0.2	0.9	29	0
30	Tel Aviv–Jerusalem	IL	7,286	24,955	0.6	0.3	0.9	30	0
31	Moscow	RU	1,946	57,524	0.2	0.7	0.9	31	0
32	Changsha	CN	1,256	60,712	0.1	0.8	0.9	37	5
33	Singapore	SG / MY	5,234	35,784	0.4	0.5	0.9	34	1
34	Tianjin	CN	1,378	59,459	0.1	0.7	0.9	36	2
35	Philadelphia, PA	US	5,669	32,941	0.4	0.4	0.9	33	-2
36	Hefei	CN	3,848	44,040	0.3	0.6	0.9	40	4
37	Chicago, IL	US	5,571	30,658	0.4	0.4	0.8	32	-5
38	Tehran	IR	388	61,774	0.0	0.8	0.8	35	-3
39	Chongqing	CN	1,502	48,120	0.1	0.6	0.7	43	4
40	Stockholm	SE	6,044	19,682	0.5	0.2	0.7	38	-2
41	Minneapolis, MN	US	6,633	14,869	0.5	0.2	0.7	39	-2
42	Eindhoven	NL	7,893	5,249	0.6	0.1	0.7	41	-1
43	Frankfurt am Main	DE	5,499	18,242	0.4	0.2	0.7	46	3
44	Sydney	AU	2,747	35,053	0.2	0.4	0.7	44	0
45	Berlin	DE	3,483	29,903	0.3	0.4	0.6	42	-3
46	Melbourne	AU	2,017	38,564	0.2	0.5	0.6	45	-1
47	Harbin	CN	276	47,569	0.0	0.6	0.6	54	7
48	Madrid	ES	1,636	39,016	0.1	0.5	0.6	47	-1
49	Jinan	CN	1,601	38,277	0.1	0.5	0.6	56	7
50	Zürich	CH	3,862	24,162	0.3	0.3	0.6	49	-1
51	Raleigh, NC	US	3,046	28,922	0.2	0.4	0.6	48	-3
52	Milan	IT	2,628	31,473	0.2	0.4	0.6	51	-1
53	Brussels–Antwerp	BE	3,045	27,565	0.2	0.3	0.6	50	-3
54	Toronto, ON	CA	2,827	28,693	0.2	0.4	0.6	52	-2
55	Barcelona	ES	2,341	30,502	0.2	0.4	0.6	53	-2
56	Bengaluru	IN	4,654	16,029	0.4	0.2	0.6	57	1
57	Copenhagen	DK	3,125	24,936	0.2	0.3	0.6	55	-2
58	Changchun	CN	542	40,289	0.0	0.5	0.5	59	1
59	Istanbul	TR	2,383	28,135	0.2	0.4	0.5	60	1
60	Denver, CO	US	3,264	21,608	0.3	0.3	0.5	58	-2
61	Shenyang	CN	689	36,914	0.1	0.5	0.5	63	2
62	Montréal, QC	CA	2,343	24,753	0.2	0.3	0.5	61	-1
63	Delhi	IN	1,131	31,795	0.1	0.4	0.5	65	2
64	Heidelberg–Mannheim	DE	3,929	13,411	0.3	0.2	0.5	62	-2
65	Dalian	CN	1,027	30,602	0.1	0.4	0.5	69	4

Appendix Table 8 *Continued*

Rank	Cluster name	Economy	PCT applications	Scientific publications	Share total PCT filings, %	Share of total pubs, %	Total	Previous rank	Rank change (a)
66	Cambridge	GB	3,124	17,141	0.2	0.2	0.5	64	-2
67	Rome	IT	981	30,214	0.1	0.4	0.5	67	0
68	Zhengzhou	CN	743	31,295	0.1	0.4	0.5	73	5
69	Atlanta, GA	US	1,902	22,741	0.1	0.3	0.4	68	-1
70	Dallas, TX	US	3,459	9,845	0.3	0.1	0.4	70	0
71	Helsinki	FI	2,911	13,122	0.2	0.2	0.4	72	1
72	Xiamen	CN	2,133	17,812	0.2	0.2	0.4	79	7
73	São Paulo	BR	727	25,214	0.1	0.3	0.4	71	-2
74	Vienna	AT	1,575	19,895	0.1	0.3	0.4	75	1
75	Nuremberg–Erlangen	DE	3,397	8,287	0.3	0.1	0.4	74	-1
76	Portland, OR	US	3,643	6,566	0.3	0.1	0.4	66	-10
77	Zhenjiang	CN	1,037	21,984	0.1	0.3	0.4	90	13
78	Oxford	GB	1,595	18,365	0.1	0.2	0.4	77	-1
79	Pittsburgh, PA	US	1,901	16,464	0.1	0.2	0.4	78	-1
80	Lanzhou	CN	235	26,701	0.0	0.3	0.4	88	8
81	Busan	KR	2,291	13,932	0.2	0.2	0.4	80	-1
82	Chennai	IN	1,199	20,339	0.1	0.3	0.3	84	2
83	Ann Arbor, MI	US	1,247	19,413	0.1	0.2	0.3	81	-2
84	Mumbai	IN	1,705	16,146	0.1	0.2	0.3	82	-2
85	Fuzhou	CN	585	22,735	0.0	0.3	0.3	96	11
86	Ankara	TR	897	20,660	0.1	0.3	0.3	87	1
87	Cincinnati, OH	US	3,029	7,420	0.2	0.1	0.3	76	-11
88	Daegu	KR	1,852	14,667	0.1	0.2	0.3	85	-3
89	Vancouver, BC	CA	1,629	15,816	0.1	0.2	0.3	83	-6
90	Warsaw	PL	474	22,404	0.0	0.3	0.3	89	-1
91	Austin, TX	US	2,479	9,591	0.2	0.1	0.3	91	0
92	Lyon	FR	2,069	12,030	0.2	0.2	0.3	86	-6
93	Kuala Lumpur	MY	623	20,387	0.0	0.3	0.3	93	0
94	Nanchang	CN	459	21,353	0.0	0.3	0.3	106	12
95	Cairo	EG	166	23,062	0.0	0.3	0.3	103	8
96	Basel	CH / DE / FR	2,642	7,679	0.2	0.1	0.3	95	-1
97	Brisbane	AU	1,047	16,734	0.1	0.2	0.3	92	-5
98	Kunming	CN	387	20,725	0.0	0.3	0.3	113	15
99	Göteborg	SE	2,103	10,125	0.2	0.1	0.3	98	-1
100	Macao SAR–Zhuhai	CN	3,081	3,917	0.2	0.0	0.3	111	11

Notes:(a) This column represents the previous year's rankings, which have been adjusted to align with the updated methodology. The codes given in the tables in this appendix are the ISO alpha-2 country codes, with the following addition: TW* = Taiwan, Province of China.

Source: WIPO Statistics Database, April 2024.

Appendix Table 9 Ranking of S&T intensity

Rank per-capita	Cluster name	Economy	Estimated cluster population	PCT applications per capita (a)	Scientific publications per capita (a)	Total S&T share per capita (a)	Rank change (b)
1	Cambridge	GB	489,751	6,379	35,000	0.9	0
2	San Jose–San Francisco, CA	US	6,252,315	7,885	9,211	0.7	0
3	Eindhoven	NL	1,047,358	7,536	5,011	0.6	0
4	Oxford	GB	568,383	2,806	32,312	0.6	0
5	Boston–Cambridge, MA	US	4,251,769	4,462	17,934	0.6	0
6	San Diego, CA	US	3,910,684	6,279	5,189	0.6	1
7	Daejeon	KR	2,744,149	5,109	9,630	0.5	1
8	Ann Arbor, MI	US	659,434	1,891	29,439	0.5	-2
9	Seattle, WA	US	2,518,357	4,434	7,821	0.4	0
10	Munich	DE	2,794,775	3,828	9,734	0.4	1
11	Beijing	CN	19,415,177	2,189	15,893	0.4	3
12	Göteborg	SE	841,281	2,500	12,035	0.3	0
13	Raleigh, NC	US	1,755,703	1,735	16,473	0.3	0
14	Stockholm	SE	2,151,605	2,809	9,148	0.3	1
15	Tokyo–Yokohama	JP	36,304,277	3,712	3,231	0.3	2
16	Copenhagen	DK	1,699,974	1,838	14,669	0.3	0
17	Helsinki	FI	1,234,101	2,359	10,633	0.3	1
18	Zürich	CH	1,952,063	1,979	12,378	0.3	1
19	Basel	CH / DE / FR	1,021,114	2,588	7,521	0.3	1
20	Stuttgart	DE	3,214,610	2,907	4,516	0.3	1
21	Nuremberg–Erlangen	DE	1,354,796	2,507	6,117	0.3	1
22	Seoul	KR	26,388,052	2,542	5,320	0.3	3
23	Qingdao	CN	4,847,000	1,742	9,697	0.3	8
24	Minneapolis, MN	US	2,740,987	2,420	5,425	0.3	-1
25	Pittsburgh, PA	US	1,390,453	1,367	11,840	0.3	-1
26	Nanjing	CN	8,663,248	907	14,499	0.3	2
27	Hangzhou	CN	7,148,142	1,570	10,104	0.2	2
28	Heidelberg–Mannheim	DE	1,996,950	1,968	6,716	0.2	-2
29	Osaka–Kobe–Kyoto	JP	15,801,605	2,435	3,341	0.2	1
30	Shenzhen–Hong Kong–Guangzhou	CN / HK	50,546,829	2,303	3,469	0.2	2
31	Wuhan	CN	8,697,647	851	11,655	0.2	7
32	Xi□an	CN	6,591,384	306	14,997	0.2	4
33	Changsha	CN	4,060,044	309	14,953	0.2	4
34	Washington, DC–Baltimore, MD	US	7,040,225	838	10,327	0.2	0
35	Cincinnati, OH	US	1,836,936	1,649	4,040	0.2	0
36	Paris	FR	11,224,000	1,394	5,523	0.2	3

Appendix Table 9 *Continued*

Rank per-capita	Cluster name	Economy	Estimated cluster population	PCT app-lications per capita (a)	Scientific pub-lications per capita (a)	Total S&T share per capita (a)	Rank change (b)
37	Nagoya	JP	9,240,326	1,860	2,290	0.2	3
38	Frankfurt am Main	DE	3,805,907	1,445	4,793	0.2	3
39	Denver, CO	US	3,074,200	1,062	7,029	0.2	5
40	Vancouver, BC	CA	1,944,715	838	8,133	0.2	3
41	Philadelphia, PA	US	5,109,012	1,110	6,448	0.2	4
42	Lyon	FR	1,866,169	1,108	6,446	0.2	0
43	Sydney	AU	4,007,620	685	8,747	0.2	3
44	Portland, OR	US	2,237,730	1,628	2,934	0.2	-11
45	Austin, TX	US	1,964,534	1,262	4,882	0.2	4
46	Vienna	AT	2,413,662	653	8,243	0.2	2
47	Houston, TX	US	6,015,423	1,341	3,955	0.2	0
48	Hefei	CN	5,560,163	692	7,921	0.2	15
49	Changchun	CN	3,630,174	149	11,098	0.2	7
50	Atlanta, GA	US	2,867,637	663	7,930	0.2	1
51	Berlin	DE	4,276,247	814	6,993	0.2	-1
52	Chengdu	CN	7,771,586	300	9,968	0.1	7
53	Amsterdam–Rotterdam	NL	7,038,077	614	7,451	0.1	1
54	Melbourne	AU	4,546,212	444	8,483	0.1	-1
55	Jinan	CN	4,297,068	373	8,908	0.1	7
56	Montréal, QC	CA	3,511,027	667	7,050	0.1	-1
57	Brisbane	AU	2,089,547	501	8,008	0.1	-5
58	Brussels–Antwerp	BE	4,277,629	712	6,444	0.1	-1
59	Milan	IT	4,495,551	585	7,001	0.1	-1
60	Dalian	CN	3,555,305	289	8,607	0.1	8
61	Rome	IT	3,505,600	280	8,619	0.1	0
62	Harbin	CN	4,766,680	58	9,979	0.1	7
63	Toronto, ON	CA	4,485,090	630	6,397	0.1	-3
64	Lanzhou	CN	2,762,551	85	9,665	0.1	9
65	New York City, NY	US	16,136,315	864	4,693	0.1	-1
66	Warsaw	PL	2,558,954	185	8,755	0.1	1
67	Shanghai–Suzhou	CN	43,746,897	885	4,368	0.1	10
68	Tel Aviv–Jerusalem	IL	7,251,972	1,005	3,441	0.1	-2
69	Chicago, IL	US	6,776,544	822	4,524	0.1	-4
70	London	GB	10,354,543	633	5,642	0.1	0
71	Los Angeles, CA	US	12,260,563	966	3,545	0.1	0
72	Daegu	KR	2,837,234	653	5,169	0.1	2
73	Singapore	SG / MY	7,612,760	688	4,701	0.1	5
74	Zhenjiang	CN	3,187,823	325	6,896	0.1	6
75	Barcelona	ES	5,053,684	463	6,036	0.1	0

Appendix Table 9 *Continued*

Rank per-capita	Cluster name	Economy	Estimated cluster population	PCT app-lications per capita (a)	Scientific pub-lications per capita (a)	Total S&T share per capita (a)	Rank change (b)
76	Xiamen	CN	3,577,736	596	4,978	0.1	5
77	Tehran	IR	7,470,203	52	8,269	0.1	-1
78	Tianjin	CN	8,224,608	168	7,229	0.1	7
79	Cologne	DE	9,606,235	731	3,463	0.1	0
80	Madrid	ES	6,443,098	254	6,055	0.1	2
81	Dallas, TX	US	4,198,793	824	2,345	0.1	3
82	Macao SAR–Zhuhai	CN	3,100,328	994	1,263	0.1	n.a.
83	Taipei–Hsinchu	TW*	11,272,371	345	4,915	0.1	3
84	Fuzhou	CN	3,802,578	154	5,979	0.1	5
85	Busan	KR	4,138,551	554	3,366	0.1	2
86	Chongqing	CN	8,598,002	175	5,597	0.1	4
87	Zhengzhou	CN	5,404,356	138	5,791	0.1	4
88	Kunming	CN	3,507,173	110	5,909	0.1	n.a.
89	Shenyang	CN	6,275,156	110	5,883	0.1	-1
90	Nanchang	CN	4,035,084	114	5,292	0.1	n.a.
91	Ankara	TR	5,013,614	179	4,121	0.1	1
92	Moscow	RU	14,081,728	138	4,085	0.1	1
93	Istanbul	TR	12,724,837	187	2,211	0.0	1
94	Bengaluru	IN	14,876,070	313	1,077	0.0	2
95	Kuala Lumpur	MY	8,461,712	74	2,409	0.0	0
96	Chennai	IN	10,869,934	110	1,871	0.0	1
97	São Paulo	BR	18,612,849	39	1,355	0.0	1
98	Delhi	IN	28,845,689	39	1,102	0.0	1
99	Mumbai	IN	21,362,863	80	756	0.0	1
100	Cairo	EG	22,096,805	8	1,044	0.0	n.a.

Notes: (a) Per capita figures refer to 1,000,000 of population. (b) This column represents the previous year's rankings, which have been adjusted to align with the updated methodology. n.a. indicates not applicable. The codes given in the tables in this appendix are the ISO alpha-2 country codes, with the following addition: TW* = Taiwan, Province of China.

Source: WIPO Statistics Database, April 2024.

Source: WIPO Statistics Database, April 2024.

Appendix Table 10 Summary of geocoding results

	Scientific publications			PCT applications		
Country	**Number of addresses**	**City-level geolocation (%)**	**Publications covered (%)**	**Number of addresses**	**Block-level geolocation (%)**	**Sub-Cit level geolocat (%)**
China	6,846,428	99.9	99.9	1,025,503	84.9	2.6
United States of America	7,272,035	100.0	100.0	960,198	96.4	3.5
Japan	1,361,613	99.6	99.9	533,790	68.6	26.3
Germany	1,608,493	99.9	99.9	268,710	99.0	0.9
Republic of Korea	910,680	99.1	99.5	313,135	99.2	0.6
United Kingdom	1,621,460	99.4	99.6	88,654	54.1	45.6
France	1,173,788	99.1	99.5	106,896	93.8	5.3
Italy	1,395,964	99.9	99.9	47,678	95.0	4.6
India	1,047,506	99.0	99.3	50,617	37.6	60.9
Canada	1,031,392	99.9	99.9	48,766	97.0	2.8
Spain	1,052,056	99.4	99.7	28,297	87.3	12.2
Australia	1,003,923	99.8	99.9	21,331	93.7	5.4
Netherlands	581,502	99.8	99.9	44,609	98.9	0.5
Brazil	782,137	99.8	99.9	10,614	90.9	8.9
Switzerland	392,369	99.7	99.7	42,274	97.8	1.8
Russian Federation	454,048	99.7	99.8	16,063	95.8	3.9
Sweden	339,569	99.9	99.9	44,645	98.8	0.8
Türkiye	468,830	98.8	98.6	16,799	76.4	22.7
Israel	189,988	98.3	99.4	29,194	86.2	9.3
Belgium	287,322	99.8	99.9	19,779	98.1	1.8
World Total	**27,022,686**	**99.6**	**99.9**	**4,113,927**	**85.2**	**7.5**

Note: This list includes the top 20 countries that account for and ordered by the highest combined shares of patents and scientific articles. PCT inventor addresses were geocoded to the highest level of detail. Due to their much larger volume, scientific author addresses were geocoded to the city level only.

Source: WIPO Statistics Database, April 2024.

Appendix Table 11 African S&T clusters

Rank	Cluster name	Economy	PCT app-lications	Scientific pub-lications	Top applicant	Top scientific organization
1	Cairo	EG	168	23,062	Si-Ware Systems	Cairo University
2	Johannesburg	ZA	684	12,814	DETNET South Africa	University of Witwatersrand
3	Cape Town	ZA	296	8,804	Stellenbosch University	University of Cape Town
4	Tunis	TN	27	5,416	Della Toffola	Universite de Carthage
5	Alexandria	EG	27	4,284	Augmania	Alexandria University
6	Durban	ZA	42	3,722	University Of Kwazulu-Natal	University Of Kwazulu Natal
7	Mansoura	EG	7	3,409	Abd Elaal, Nasser Kamal	Mansoura University
8	Sfax	TN	2	3,201	Gargouri, Ahmed	Universite de Sfax
9	Nairobi	KE	23	2,942	IBM	University of Nairobi
10	Zagazig	EG	4	2,945	Abd Elwahab, Khaled, Mohamed	Zagazig University
11	Addis Ababa	ET	2	2,857	Endeshaw, Alexander, Skunder, Bekele	Addis Ababa University
12	Algiers	DZ	19	2,704	Dahmane, Smail	USTHB
13	Rabat	MA	65	2,344	Université Internationale de Rabat	Mohammed V University in Rabat
14	Banha–Shibin El Kom	EG	6	2,581	El-Gazzar, Basim Abd-El-Fattah	Menofia University
15	Asyut	EG	1	2,506	RIKEN	Assiut University
16	Tanta	EG	10	1,938	Elkazaz, Mohamed, Fadly, Abd El Ghany	Tanta University
17	Monastir	TN	7	1,880	Ghidhaoui, Abir	Universite de Monastir
18	Kampala	UG	3	1,901	KOPS	Makerere University
19	Accra	GH	3	1,651	mPedigree Technologies	University of Ghana
20	Casablanca	MA	71	1,204	PSA Automobiles	Hassan II University of Casablanca
21	Yaoundé	CM	4	1,510	Manga, Edouard	University of Yaounde I
22	Bloemfontein	ZA	11	1,386	De Wet, Christoffel Johannes Henze	University of the Free State

Appendix Table 11 *Continued*

Rank	Cluster name	Economy	PCT applications	Scientific publications	Top applicant	Top scientific organization
23	Beni Suef	EG	1	1,423	Pennsylvania State University	Beni Suef University
24	Marrakesh	MA	10	1,302	Mabrouk, Essaid	Cadi Ayyad University of Marrakech
25	Pietermaritzburg	ZA	9	1,302	Voss, Michael	University Of Kwazulu Natal
26	Ibadan	NG	0	1,312	Purdue University	University of Ibadan
27	Fès	MA	27	1,123	Université Sidi Mohamed Ben Abdellah	Université Sidi Mohamed Ben Abdellah
28	Potchefstroom	ZA	14	1,176	North West University - South Africa	North West University - South Africa
29	Minya	EG	3	1,225	Abd Elmoez, Mohamed, Hasan, Soliman	Minia University
30	Gondar	ET	0	1,173	n.a.	University of Gondar
31	Kafr El-Shaikh	EG	0	1,161	n.a.	Kafrelsheikh University
32	Grahamstown	ZA	4	1,075	Rhodes University	Rhodes University
33	Kumasi	GH	1	1,042	Okoh-Asamoah, Kwame	KNUST
34	Ismailia	EG	2	962	Salama, Ahmed Mostafa Mahmoud	Suez Canal University
35	Port Elizabeth	ZA	20	844	Nelson Mandela University	Nelson Mandela University
36	Dar es Salaam	TZ	0	965	n.a.	MUHAS
37	Nsukka	NG	0	877	n.a.	University of Nigeria
38	Lagos	NG	7	812	Mastercard	University of Lagos
39	Sousse	TN	0	823	n.a.	Universite de Sousse
40	Khartoum	SD	10	738	Abdelmonem, Mohamed Osman	University of Khartoum
41	Dakar	SN	8	678	Coly, Mohidine El Tamame	University Cheikh Anta Diop Dakar
42	Harare	ZW	1	658	MIT	University of Zimbabwe
43	Abuja	NG	1	635	Udeh, Oliver	African University of Science & Tech.

Appendix Table 11 *Continued*

Rank	Cluster name	Economy	PCT app-lications	Scientific pub-lications	Top applicant	Top scientific organization
44	Cotonou	BJ	1	612	Djogbenou, Luc	Univ Abomey Calavi
45	Lusaka	ZM	1	587	Kumwenda, Misheck Harris	University of Zambia
46	Kinshasa–Brazzaville	CD / CG	1	522	Kafuti Kanyembo, Dominique-Myrtille	Universite de Kinshasa
47	Abidjan	CI	2	500	Fofana, Mouramane	Univ Felix Houphouet Boigny
48	Ouagadougou	BF	1	497	Maia Africa	Univ Joseph Ki Zerbo
49	Oujda	MA	2	420	Madani, Zakaria	Mohammed First University of Oujda
50	Blantyre	MW	0	415	n.a.	University of Malawi

Note: n.a. indicates not applicable. IBM = International Business Machines, KNUST = Kwame Nkrumah University Science & Technology, KOPS = KAMATA Online Protection Services, MIT = Massachusetts Institute of Technology, MUHAS = Muhimbili University of Health & Allied Sciences, RIKEN = The Institute of Physical and Chemical Research (Japan), USTHB = University Science & Technology Houari Boumediene.

Source: WIPO Statistics Database, April 2024.

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The *Global Innovation Index 2024* (GII) takes the pulse of innovation against a background of steady but slow global economic growth, shrinking innovation finance and sluggish productivity.

Tracking the most recent global innovation trends, the GII finds that innovation investments have slowed in 2023, making the outlook for 2024 and 2025 more uncertain than ever. Yet, the picture is not entirely bleak. Technological progress and adoption continue unabated in fields as diverse as supercomputing, connectivity, health and green technologies.

The thematic focus of the 2024 report is social entrepreneurship. It looks at how a flurry of new ventures are finding innovative solutions directly addressing critical societal issues. Examples drawn from around the world showcase successful examples of social entrepreneurship, helping guide innovation policymakers and support schemes to better scale social entrepreneurship ventures for maximum systemic impact.

Core to its economic and social development mission, the GII 2024 reveals who is leading globally in innovation, ranking the innovation performance of 133 economies and highlighting their strengths and weaknesses. Governments around the world use the GII to benchmark innovation performance and improve innovation policy and its impact.

The underlying 133 GII economy profiles can be accessed at www.wipo.int/gii-ranking.

The full report can be downloaded at www.wipo.int/global_innovation_index.

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