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Who Will Finance Innovation?

EXECUTIVE VERSION

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Confederation of Indian Industry

DASSAULT SYSTEMES

CNI
Brazilian National Confederation of Industry
THE FUTURE OF INDUSTRY

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

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CONTENTS

v **Preface: Releasing the Global Innovation Index 2020: Who Will Finance Innovation?**
By Soumitra Dutta, SC Johnson College of Business, Cornell University; Francis Gurry, World Intellectual Property Organization (WIPO); and Bruno Lanvin, INSEAD

vii **Foreword: Financing Innovation in India**
By Chandrajit Banerjee, Director General, Confederation of Indian Industry (CII)

ix **Foreword: Building Virtual Infrastructures for the Age of Experience**
By Bernard Charlès, Chief Executive Officer and the Vice-Chairman of the Board of Directors of Dassault Systèmes

xi **Foreword: Challenges and Opportunities in Financing Innovation in Brazil**
By Robson Braga de Andrade, President of CNI, Director of SESI, and President of SENAI's National Council

KEY FINDINGS

xiv **Key Findings 2020**

GII 2020: MAIN FINDINGS AND RANKINGS

xxx **Global Innovation Index 2020 rankings**

xxxvii **Contributors to the Report**

xliii **Advisory Board to the Global Innovation Index**

1 **Chapter 1: The Global Innovation Index 2020**
By Soumitra Dutta and Rafael Escalona Reynoso, SC Johnson College of Business, Cornell University; Bruno Lanvin, INSEAD; Sacha Wunsch-Vincent, Lorena Rivera León, Antanina Garanasvili and Pamela Bayona, World Intellectual Property Organization (WIPO)

SPECIAL SECTION: CLUSTER RANKINGS

43 **The Top 100 Science and Technology Clusters**
By Kyle Bergquist and Carsten Fink, World Intellectual Property Organization (WIPO)

61 **Special Section: Appendix**

GII 2020: WHO WILL FINANCE INNOVATION?

67 **Introduction to the GII 2020 Theme Who Will Finance Innovation?**
By Francesca Guadagno, Independent Consultant, and Sacha Wunsch-Vincent, World Intellectual Property Organization (WIPO)

APPENDIX

77 **Appendix: Economy Profiles & Data Tables**

The full report is available online at https://globalinnovationindex.org

RELEASING THE GLOBAL INNOVATION INDEX 2020: WHO WILL FINANCE INNOVATION?

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We are pleased to present the 13th edition of the Global Innovation Index (GII) while commemorating a decade long partnership between the Cornell University, INSEAD, and the World Intellectual Property Organization (WIPO).

For more than 10 years, the GII has fostered innovation debates and policies. Again, the GII 2020 report presents global innovation trends and the innovation performance of 131 economies.

As this report goes to press, the world is struggling to cope with the economic and social implications of the coronavirus disease (COVID-19) crisis. Now more than ever, innovation—primarily in finding treatments and a vaccine—is humanity's best hope to overcome the economic lockdown. Echoing our call to support medical innovation in the GII 2019 report, this pandemic is a potent reminder that health-related research and development (R&D) and health system innovations are not a luxury, but a necessity.

The amplitude of the crisis created by COVID-19 has engulfed many countries in a wave of emergencies. In the years to come, financial resources will be strained. Risk aversion will be high. As a result, countries and corporations alike will find it harder to pursue investments and innovation.

It may be tempting to defer the pursuit of longer-term goals. Yet, as in the financial crisis of 2008–2009, we are calling on business and policy leaders around the world to continue to innovate beyond healthcare, despite the economic downturn.

With growing attention on innovation as the way to build a sustainable and inclusive future, now is a particularly relevant time for this year's special theme: *Who Will Finance Innovation*?

As long as innovation has existed, a central challenge facing innovators worldwide is the mobilization of stable and accessible financing mechanisms. Financing affects all stages of an innovation cycle, from ideation to commercialization, expansion, and, eventually, long-term business sustainability.

Even before the crisis, a range of new actors, such as sovereign wealth funds, and not-for-profit organizations, has been supporting innovation. Innovative mechanisms, such as corporate venturing, intellectual property (IP) marketplaces, crowdfunding, and fintech solutions, were present before the crisis and will not vanish. At the same time, public support schemes remain essential vehicles of innovation financing.

To conclude, every crisis brings opportunities and room for creative disruption. One side effect of the current crisis has been to stimulate interest in innovative solutions for health, naturally, but also for areas such as remote work, distance education, e-commerce, and mobility solutions. Unleashing these positive forces may well support societal goals, including reducing or reversing long-term climate change.

For this GII edition, we thank our Knowledge Partners; the Confederation of Indian Industry (CII); Dassault Systèmes, The 3DEXPERIENCE Company; and the National Confederation of Industry Brazil (CNI) for their support. We also thank the Competence Centre on Composite Indicators and Scoreboards of the Joint Research Centre at the European Commission.

Likewise, we recognize the contributions of our Advisory Board members, who have been joined by two members this year: Ms. C. Akamanzi, CEO of the Rwanda Development Board (Rwanda) and Mr. H. Takenaka, Director, Center for Global Innovation Studies, Toyo University and former Minister (Japan).

We—Soumitra Dutta and Bruno Lanvin—shall, in a break from tradition, have the last word in this preface, so that we may underline and pay tribute to the vital role played by Francis Gurry in the remarkable success of the GII over the last 10 years. Thanks to his vision and leadership, WIPO has become the central pillar of the GII. Thank you, Francis, and as you complete your second six-year mandate at the helm of WIPO, we wish you the best of luck in your future endeavors!

Soumitra Dutta
Professor of Management and Former Founding Dean, SC Johnson College of Business, Cornell University;
President, Portulans Institute

Francis Gurry
Director General,
World Intellectual Property Organization (WIPO)

Bruno Lanvin
Executive Director for Global Indices, INSEAD;
Director, Portulans Institute

FINANCING INNOVATION IN INDIA

India has embarked on a journey towards creating an enabling environment by putting in place an ecosystem that breeds innovation. The Government of India has launched several significant initiatives for propelling innovation, such as the Start-up India initiative, Accelerating Growth of New India's Innovations (AGNIi), Atal Tinkering Labs, new intellectual property rights (IPR) policy, Smart City Mission, Uchchatar Avishkaar Yojana, etc. All these initiatives, coupled with phenomenal research and innovation from the institutions, industry, and society, are cementing India's position as an innovation and knowledge hub. However, the financial dimension plays a critical role in fructifying these innovation efforts.

Various fiscal incentives are offered by the Government of India's Department of Scientific and Industrial Research (DSIR) for R&D activities performed by institutions, academia, and industry for supporting, nurturing, and leading their innovations towards fruition. Technology Development Board (TDB), an important stakeholder in the Indian innovation ecosystem, provides soft loans and promotes the equity of Indian industry through the development and commercialization of indigenous technology and by adapting imported technology for domestic applications. Biotechnology Industry Research Assistance Council (BIRAC) supports high-risk, early starters from academia, start-ups, or incubators that have exciting ideas in the nascent or planning stage. In India, there has been phenomenal growth of the private and foreign-owned private equity/venture capital (PE/VC) industry. The government has also played an important role in establishing and nurturing the industry segment by various fiscal concessions.

Financial institutions such as the Industrial Development Bank of India (IDBI) and the Small Industries Development Bank of India (SIDBI) lend support for innovation and commercialization of innovative technologies, in addition to entrepreneurship. SIDBI manages the India Innovation Fund—a registered venture capital fund that invests in innovation-led, early-stage Indian firms.

Despite the availability of several instruments, many brilliant ideas from entrepreneurs—especially at the grassroots level—do not come to fruition due to their inability to access the appropriate level of funding. Therefore, it is imperative that all potential ideas, even from the remotest corners of the world, have the opportunity to be harnessed and fostered. This era of globalization calls for developing a robust technology screening and funding mechanism through which the top 5000 ideas across the globe could be selected and nurtured from concept to commercialization. In addition, there is an ardent need for a large-scale government grant for supporting high-risk innovations with strong business potential.

This year's Global Innovation Index (GII) report provides valuable insight into country innovation models and each country's position on various innovation indicators. The Global Innovation Index has been instrumental to India in shaping its policies and designing an actionable agenda for innovation excellence. Last year, it was both a privilege and honor for the Confederation of Indian Industry (CII) to host, for the first time, the historic global launch of the Global Innovation Index in collaboration with the Department for Promotion of Industry and Internal Trade, the Government of India, and the World Intellectual Property Organization. The worldwide launch of the GII in India was a significant milestone for the country and a phenomenal recognition of our standing in innovation.

The coronavirus disease (COVID-19) pandemic has caused widespread disruption by adversely impacting global businesses and economies. As the world adjusts to its new normal, business leaders need to harness the most innovative technologies to help drive resilience and emerge from the crisis stronger. Governments across the world are in overdrive, designing fiscal incentives by slashing interest rates, tweaking taxes, and offering a moratorium on credit periods. The Government of India is also busy devising incentives for start-ups, entrepreneurs, and other high-risk businesses to help ease the impact of the coronavirus outbreak. All such initiatives will go a long way in assuaging the disruption of the Indian innovation ecosystem.

The GII report could be India's one-stop reference to plan and accelerate our journey toward the future we imagine for our people. I encourage you to refer to this report, discuss it with others, and consider the ways we can improve as individual nations and as a global community.

Chandrajit Banerjee
Director General
Confederation of Indian Industry (CII)

BUILDING VIRTUAL INFRASTRUCTURES FOR THE AGE OF EXPERIENCE

Today, new categories of innovators create new categories of solutions for new categories of customers, citizens, and patients. *Industry Renaissance* is emerging worldwide with new ways of inventing, learning, producing, healing, and trading. It comes with a new logic for financing the economy and supporting innovation. The large majority of investments are now intangible, in the form of intellectual property, data, and knowledge. Even tangible physical investments, such as bridges, buildings, factories, and hospitals, come with their *virtual twins*, opening new possibilities for the operations of these assets through their full lifecycle. Investments are shaping the unknown because the future is not just undefined: it has to become possible, we need to create it, and virtual reality is the key to it. The new assets for the 21st century are virtual ones because they connect the dots between domains and usages. Improving global health requires a holistic approach, which includes cities, food, and education. Developing global wealth in a sustainable manner involves new ways to connect data and territories. Dealing with ecological challenges requires an all-inclusive view of the balance between what we take (footprint) and what we give (handprint) to our planet.

Collaborative experience platforms are the infrastructures enabling this change. They provide a continuum of transformational disciplines to imagine, create, produce, and operate experiences from end to end. This is one of the primary values of Dassault Systèmes' **3D**EXPERIENCE platform. In addition to cross-disciplinary collaboration, the platform empowers teams to conduct in-silico 3D experiments, produce multiscale and multidisciplinary digital models, simulate scenarios, and turn big data into smart data. It connects biology, material sciences, multiscale, and multiphysics simulation with model data and communities. This translates into continuous improvements in industrial processes, enhanced and customized treatments, and the development of new services from the lab to the hospital nearby or the street outside. For example, a city platform like *Virtual Singapore* is useful not only in city management but also in developing new approaches for healthcare or innovating transportation services. In the not too distant future, we will be able to create the virtual twin of the human body—not just any body, but each individual's own body.

In the 21st century, our societies can now leverage the tremendous power of virtual universes, empowering the workforce of the future with knowledge and know-how. Because they remove the gap between experimentation and learning, virtual universes give everyone access to actionable knowledge and skills. Virtual worlds are revolutionizing our relationship with science and industry, just as the printing press did in the 15th century. The new book is the virtual experience.

Therefore, investing in virtual universes is the most valuable way to create sustainable paths for the future. Virtual twins are generative. They provide human organizations with a new level of agility and fluidity. They are game changers in providing shared representations and supporting large-scale cooperative behaviors. While our societies often seem to face sacrificial dilemmas, such intangible assets allow for opening new possibilities—creating additional value in spaces that were constrained by zero-sum games. In front of increasing pressure, such as resource scarcity and climate change, our societies invent new solutions, caring for future generations.

This new economy develops on ecosystems in territories. Public authorities can help to regulate and set the right conditions—those that allow for efficient use of data and real-life testing while reinforcing trust. These are new responsibilities that industry must take on in accordance with societies and policymakers. Moving forward, governments and industry will have to work together to jointly invent a new way of living in the era of massive personal data, automated transportation, and virtual reality. A new public-private relationship will emerge, where "investing together" will be the keyword. New measurements will become more and more necessary, like the Global Innovation Index. In order to make the right investments and invest right in the age of experience, we need virtual universes to make the invisible become visible.

Bernard Charlès
Vice-Chairman & Chief Executive Officer
Dassault Systèmes

CHALLENGES AND OPPORTUNITIES IN FINANCING INNOVATION IN BRAZIL

Technology and innovation are among the primary engines of a nation's growth and economic development. To boost the development of countries that are distant from the technological frontier, such as Brazil, it is essential to count on the use of foreign technologies as well as on the development of endogenous ones.

The challenges for Brazil are large. We have a diverse and uneven economy. Historically, islands of efficiency and prosperity have existed side by side with poverty and other social problems, such as access to quality education, health, and several basic public services. In a country with these characteristics, science, technology, and innovation often are considered secondary issues.

However, it is precisely because of its shortcomings and weaknesses that the country should reinforce its bets on scientific and technological development. New technologies can reduce chronic problems by improving public services and allowing the more efficient use of natural resources, for instance.

For that to happen, the country must ensure expressive, stable, and continuous investments in science and technology (S&T). The private sector must expand its investments in research and development (R&D) as well. The creation of Entrepreneurial Mobilization for Innovation (MEI) in 2008, under the coordination of the National Confederation of Industry–Brazil (CNI), aimed to incorporate innovation in the strategy of companies operating in Brazil, as well as to improve the effectiveness of innovation policies.

In 2004, CNI—through the National Service of Industrial Training (SENAI) and the Social Service for Industry (SESI)—launched the Edital de Inovação para a Indústria (Innovation Call for Industry), which aims to finance the development of innovations and increase the performance of Brazilian industrial companies. In March 2020, CNI created new calls that allocated 30 million Brazilian reais (R$) for solutions across categories, including problems generated by the coronavirus disease (COVID-19) pandemic.

Despite the importance of private investment, any country financing innovation demands direct and indirect participation of the public sector. Nations around the world invest public resources in research activities carried out by universities, research institutes, and companies. Public resources are essential to generate new knowledge and to share the risks of private research. In addition, there are also indirect mechanisms aimed to foster private R&D investment.

Over the past 20 years, Brazil has established several public policies and instruments for financing and supporting innovation. The government has created credit programs, tax incentives, grants for research projects in companies, seed capital lines, and equity investments in startups, in addition to traditional grants for research in universities and public institutes.

In health, for instance, Brazil has built a wide system of public research laboratories, such as the Oswaldo Cruz Foundation (Fiocruz), the Adolfo Lutz Institute, and the Butantan Institute, among others. This system has made the country an important center for epidemiological research, which has been critical in tackling the COVID-19 crisis.

Currently, the fiscal crisis jeopardizes the progress made by different governments in recent decades. The level of public investment in R&D is lower than it was 20 years ago, and many of the public policies for financing innovation are decreasing or at risk of suspension.

This year's Global Innovation Index has as its theme "Who will finance innovation?", which presents the current state and evolution of financial support mechanisms while exploring needed advances and remaining challenges. The discussion of the theme is of fundamental importance for business innovation efforts and for guiding public policies.

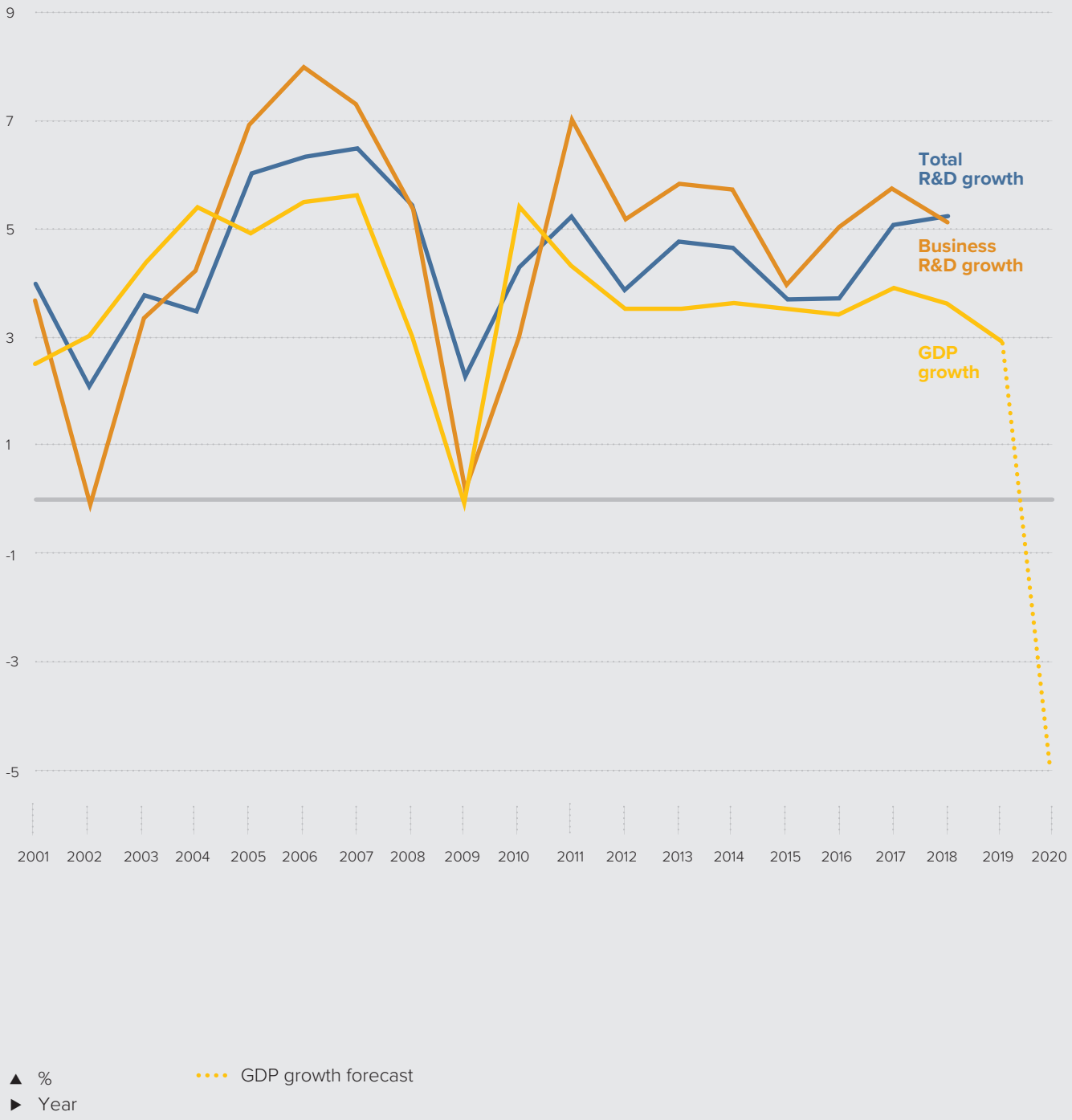
With the support of MEI leaders, CNI remains committed to ensuring resources for innovation and guaranteeing that public policies in the area are evaluated based on evidence and results. That is the only way to improve policies and make innovation the basis of the country's inclusive and sustainable development.

Robson Braga de Andrade
CNI President

KEY FINDINGS

FIGURE A

Bracing for a downturn? Cyclical R&D investments, 2001–2020



Source: Figure 1.1 in Chapter 1.

KEY FINDINGS 2020

These are the six key findings of the Global Innovation Index (GII) 2020.

1: The COVID-19 crisis will impact innovation—leaders need to act as they move from containment to recovery

The coronavirus disease (COVID-19) pandemic has triggered an unprecedented global economic shutdown. At the time of finalizing the GII 2020 edition, restrictive measures are only starting to be relaxed, while fears of a possible "second wave" remain high.

The current crisis hit the innovation landscape at a time when innovation was flourishing. In 2018, research and development (R&D) spending grew by 5.2%, i.e., significantly faster than global GDP growth, after rebounding strongly from the financial crisis of 2008-2009. Venture capital (VC) and the use of intellectual property (IP) were at an all-time high. In recent years, political determination to foster innovation has been strong, including in developing countries; this is a relatively new and promising trend toward democratizing innovation beyond a select number of top economies and clusters only.

Now that global economic growth will fall deeply in 2020, the question becomes—will R&D, VC, IP, and the political determination to foster innovation also slump (Figure A)?

As innovation is now central to corporate strategy and national economic growth strategies, there is hope ahead that innovation will not slump as deeply as foreshadowed.

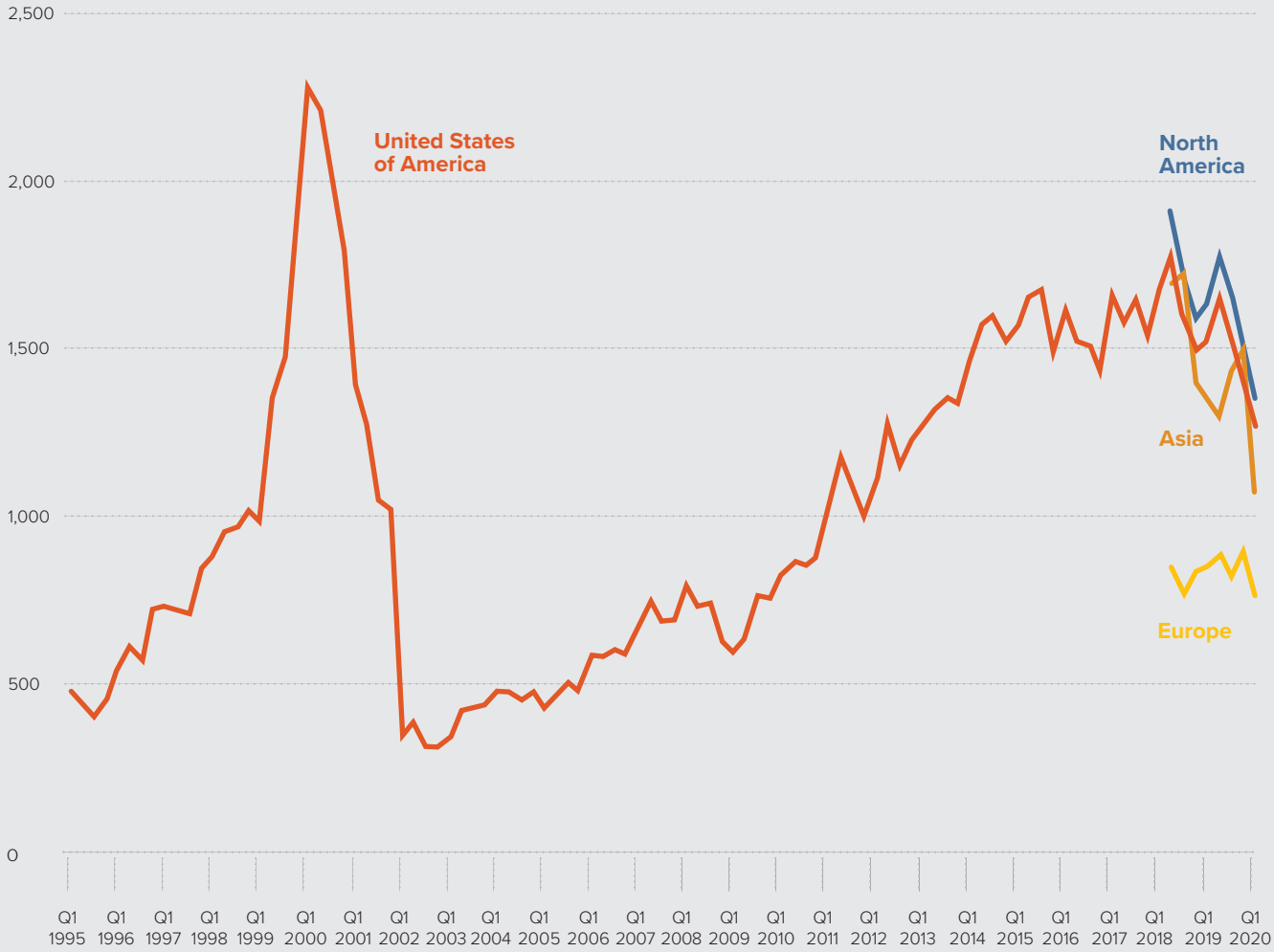
Fundamentally, the pandemic has not changed the fact that the potential for breakthrough technologies and innovation continues to abound. Clearly, the top companies and R&D spenders would be ill-advised to drop R&D, IP, and innovation in their quest to secure competitiveness in the future. Many top R&D firms in the information technology sector, for example, hold vast cash reserves, and the push to digitalization will fortify innovation. The pharmaceuticals and biotechnology sector, another top R&D spender, is likely to experience R&D growth boosted by the renewed focus on health R&D. Other key sectors, such as transport, will have to adapt faster as the quest for "clean energy" is receiving renewed interest. Further, the COVID-19 crisis might well catalyze innovation in many traditional sectors, such as tourism, education, and retail. It may also spark innovation in how work is organized at the firm- and at the individual level, and how production is (re)organized locally and globally.

Unleashing the above potential is now essential and requires government support as well as collaborative models and continued private sector investment in innovation.

What are policymakers doing to mitigate the possible negative effects of the COVID-19 crisis on innovation?

FIGURE B

Bracing for impact: venture capital decline in North America, Asia, and Europe, Q1 1995–Q1 2020



▲ Number of deals
► Year

Source: Figure 1.3 in Chapter 1.

Governments at the head of the largest economies worldwide are setting up emergency relief packages to cushion the impact of the lockdown and face the looming recession. These packages aim to prevent short- to medium-term harm to economies. This is sensible. The immediate focus is on supporting businesses via loan guarantees, for example.

Yet, these emergency relief measures are not explicitly directed to financing innovation and start-ups. Start-ups are facing hurdles as they try to access the above emergency measures.

Moreover, so far, governments have not made innovation and R&D a priority in current stimulus packages. There is one exception—health. Countries have injected large and unprecedented sums of money into the search for a coronavirus vaccine. Naturally, governments are first and foremost responsible for the well-being of their people, and the emphasis on health is understandable and commendable.

However, once the pandemic is brought under control, it is crucial that support for innovation becomes more broad and that it is conducted in a countercyclical way—i.e., as business innovation expenditures slump, governments strive to counteract that effect with their own expenditure boosts to innovation, even in the face of higher public debt.

In tandem, the impacts of the pandemic on the science and innovation systems have to be monitored. Some aspects are positive, such as the unexpected level of international collaboration in science and the reduction of red tape for scientists. Some aspects, however, are alarming, such as the standstill of major research projects and the possible (and uneven) reduction of R&D expenditures in some fields.

2: Innovation finance declines in the current crisis, but there is hope too

In the context of the GII 2020 theme "Who Will Finance Innovation?", a key question is the impact of the current crisis on start-ups, VC, and other sources of innovation financing.

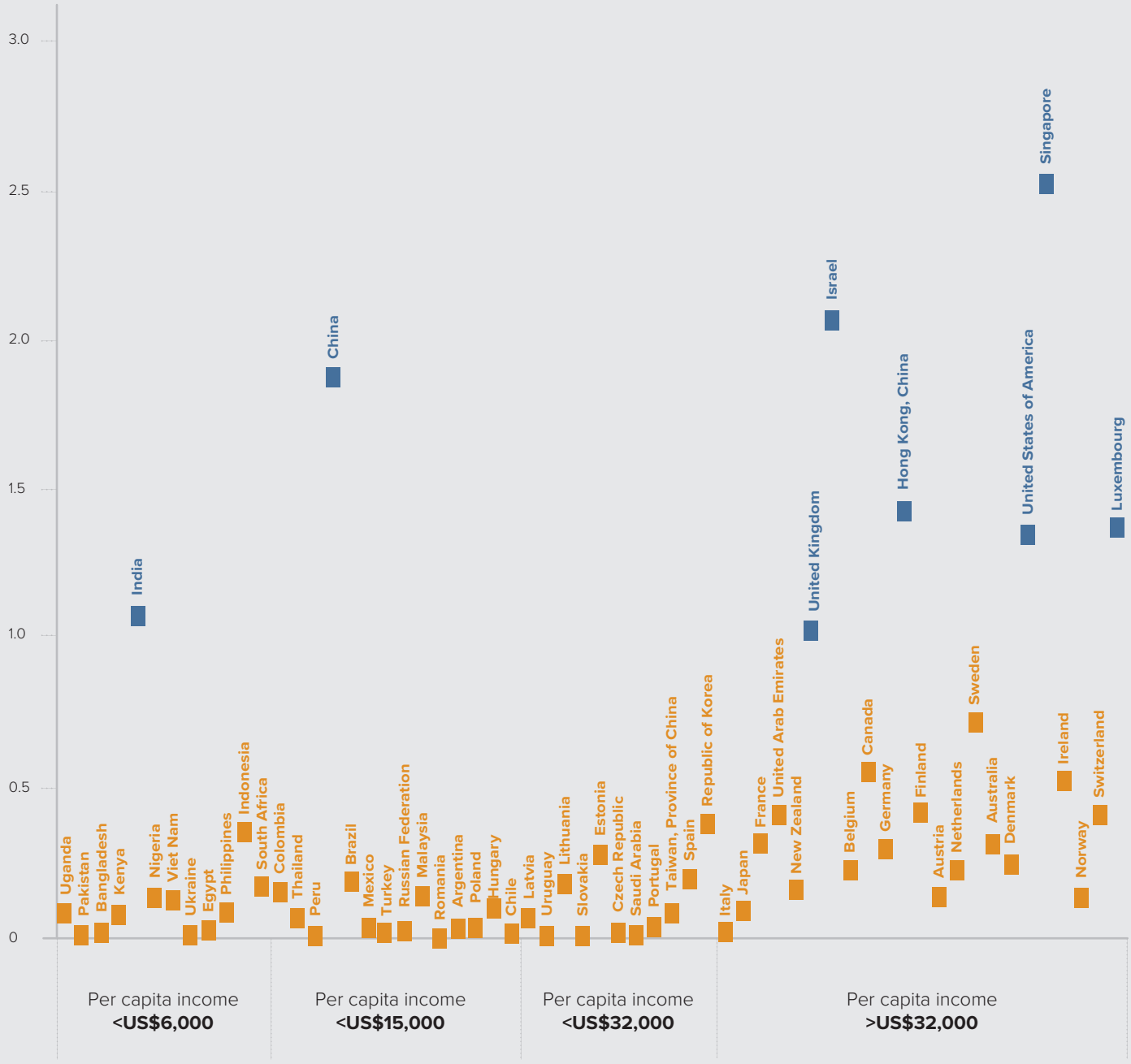
In contrast to 2009, the good news is that the financial system is sound so far. The bad news is that money to fund innovative ventures is drying up (Figure B). VC deals are in sharp decline across North America, Asia, and Europe. There are few initial public offerings (IPOs) in sight, and the start-ups that survive may grow less attractive to—and profitable for—venture capitalists, as exit strategies such as IPOs are compromised in 2020.

Interestingly, the crisis has only reinforced the decline in VC deals that had started before the pandemic. Rather than financing novel, small, and diverse start-ups, venture capitalists began focusing on so-called "mega-deals"—boosting a select number of large firms rather than giving fresh money to a broader base of start-ups. These investments, and the pursuit of so-called "unicorns", did not play out as positively as expected. What will happen to innovation finance in the near and longer term? The likely answer is that VC will take longer to recover than R&D spending. The impact of this shortage in innovation finance will be uneven, with the negative effects felt more heavily by early-stage VCs, by R&D-intensive start-ups with longer-term research interests in fields such as life sciences, and by ventures outside of the top VC hotspots. Indeed, current VC investments are concentrated in a few VC hot spots in the world, and only a few of those hot spots are in emerging economies—notably in China and India (Figure C and the Theme Section elaborate on the geographic and sectoral bias of VC).

Yet, there is hope here too. The key VC hot spots—Singapore, Israel, China, Hong Kong (China), Luxembourg, the United States of America (U.S.), India, and the United Kingdom (U.K.)—will continue to be magnets for VC. They are likely to bounce back quickly, in part due to the thirst for return on capital worldwide. Chinese VC deals, which halved earlier this year, are already rebounding strongly. Importantly, the direction of VC and innovation seems to have been redirected towards health, online education, big data, e-commerce, and robotics.

FIGURE C

Venture capital penetration in selected economies, 2016-2018



▲ %, Venture capital investments/GDP

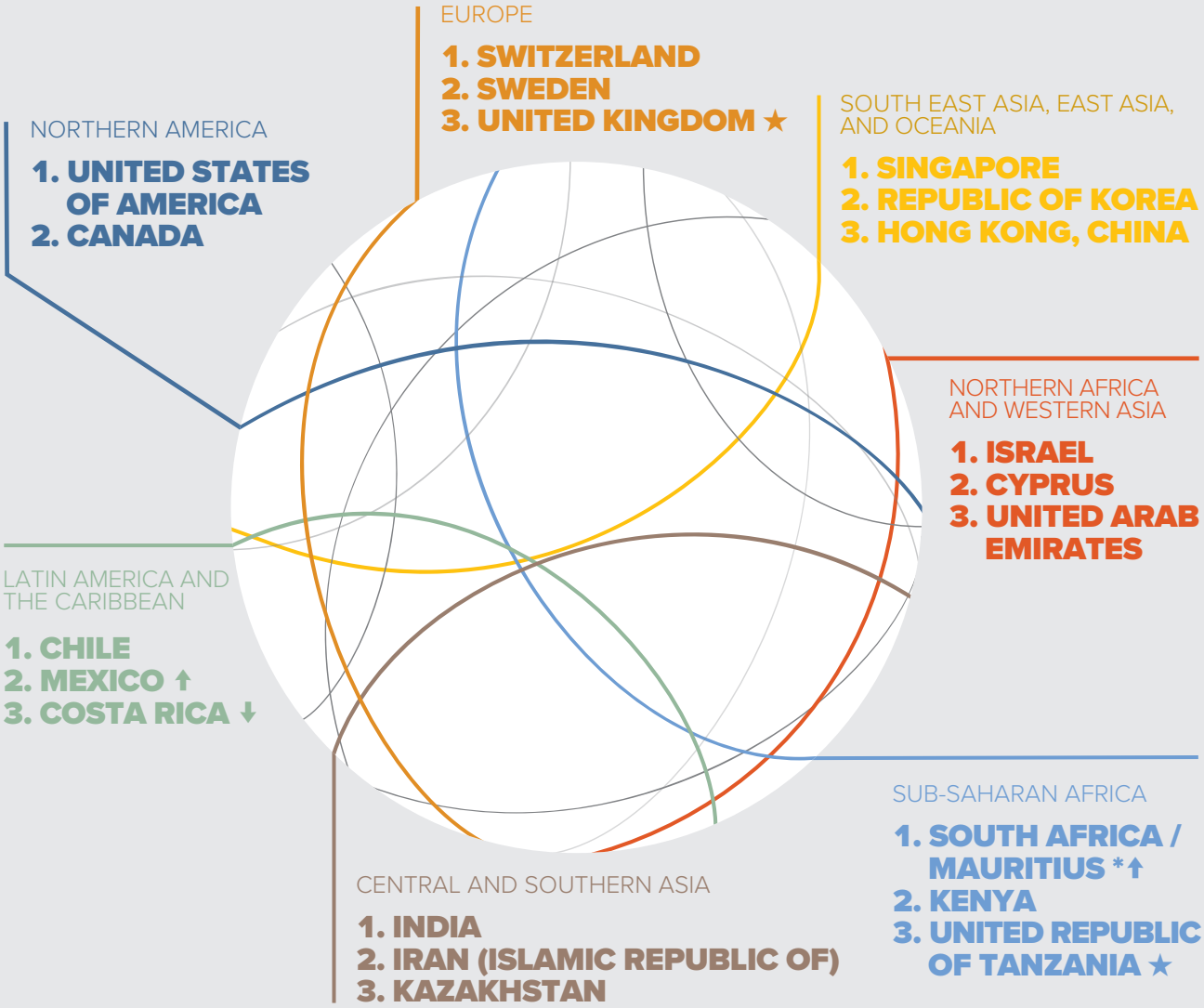
Source: Figure 2.3 in Chapter 2 and Figure T-1.1 in Theme Section.

FIGURE D

Global leaders in innovation in 2020

Every year, the Global Innovation Index ranks the innovation performance of more than 130 economies around the world.

Top 3 innovation economies by region



* Mauritius is ranked above South Africa this year but with wide significant data variability as compared to last year.
↑↓ indicates the movement of rank within the top 3 relative to 2019, and ★ indicates a new entrant into the top 3 in 2020.

Top 3 innovation economies by income group

HIGH-INCOME GROUP
1. SWITZERLAND
2. SWEDEN
3. UNITED STATES OF AMERICA

UPPER MIDDLE-INCOME GROUP
1. CHINA
2. MALAYSIA
3. BULGARIA

LOWER MIDDLE-INCOME GROUP
1. VIET NAM
2. UKRAINE
3. INDIA★

LOW-INCOME GROUP
1. UNITED REPUBLIC OF TANZANIA ↑
2. RWANDA ↓
3. NEPAL ★

Source: Figure 1.4 in Chapter 1.

TABLE A

10 best-ranked economies by income group (rank)

Rank	Global Innovation Index 2020
High-income economies (49 in total)	
1	Switzerland (1)
2	Sweden (2)
3	United States of America (3)
4	United Kingdom (4)
5	Netherlands (5)
6	Denmark (6)
7	Finland (7)
8	Singapore (8)
9	Germany (9)
10	Republic of Korea (10)

Rank	Global Innovation Index 2020
Upper middle-income economies (37 in total)	
1	China (14)
2	Malaysia (33)
3	Bulgaria (37)
4	Thailand (44)
5	Romania (46)
6	Russian Federation (47)
7	Montenegro (49)
8	Turkey (51)
9	Mauritius (52)
10	Serbia (53)

Lower middle-income economies (29 in total)	
1	Viet Nam (42)
2	Ukraine (45)
3	India (48)
4	Philippines (50)
5	Mongolia (58)
6	Republic of Moldova (59)
7	Tunisia (65)
8	Morocco (75)
9	Indonesia (85)
10	Kenya (86)

Low-income economies (16 in total)	
1	United Republic of Tanzania (88)
2	Rwanda (91)
3	Nepal (95)
4	Tajikistan (109)
5	Malawi (111)
6	Uganda (114)
7	Madagascar (115)
8	Burkina Faso (118)
9	Mali (123)
10	Mozambique (124)

Source: Table 1.2 in Chapter 1.

3: The global innovation landscape is shifting; China, Viet Nam, India, and the Philippines are consistently on the rise

This year, the geography of innovation is continuing to shift, as evidenced by the GII rankings. Over the years, China, Viet Nam, India, and the Philippines are the economies with the most significant progress in their GII innovation ranking over time. All four are now in the top 50.

Switzerland, Sweden, and the U.S. lead the innovation rankings (Figure D and Figure 1.5 in Chapter 1), followed by the U.K. and the Netherlands. This year marks the first time a second Asian economy—the Republic of Korea—cracks the top 10, next to Singapore.

The top-performing economies in the GII are still almost exclusively from the high-income group (Table A). China is the only exception, ranking 14th for the 2nd time in a row and remaining the only middle-income economy in the GII top 30. Malaysia (33rd) is the second-most innovative middle-income economy. India (48th) and the Philippines (50th) make it to the top 50 for the first time. India now ranks 3rd among the lower middle-income group—a new milestone (Figure D). The Philippines achieves its best rank ever—in 2014, it still ranked 100th. Viet Nam ranks 42nd for the second consecutive year—it ranked 71st in 2014. In the lower middle-income group, Indonesia (85th) joins the top 10.

The United Republic of Tanzania tops the low-income group (88th) (Figure D).

4: Stellar innovation performance found in developing economies

Beyond GII top-level rankings, innovation performance reveals itself in a few other ways, highlighting that some top innovation performance takes place in emerging markets too.

First, the GII 2020 assesses which economies consistently hold the top global spots on particular GII innovation facets, such as VC, R&D, entrepreneurship, or high-tech production. Hong Kong (China) and the U.S. lead on this count; Israel, Luxembourg, and China tie for 3rd place; Cyprus ranks 4th; and Singapore, Denmark, Japan, and Switzerland tie for 5th place (Figure E).

Some top spots on selected innovation indicators are not held by high-income economies. In South East Asia, for example, Thailand is 1st in business R&D globally, and Malaysia is top in High-tech net exports globally. In Sub-Saharan Africa, Botswana ranks 1st in Education spending globally and Mozambique leads in Investment globally. In Latin America, Mexico is the largest creative goods exporter worldwide.

Second, the GII 2020 assesses the balance of the innovation system within GII economies. Twelve economies boast top performance across all GII pillars (Table 1.1 in Chapter 1); this is rare. Even among the top 35, many economies have pillars in which they lag. For instance, Australia, Norway, and the United Arab Emirates (UAE) rank lower in Knowledge and technology outputs; and Israel and China are weaker in Infrastructure. The reverse is also true: several economies outside the top ranks are among the top performers in specific innovation pillars. For example, India's high ranks in Knowledge and technology outputs and Market sophistication far exceed its other GII rankings.

Third, the "GII Bubble Chart" continues to be the GII's most conspicuous means to identify innovation outperformance relative to an economy's level of development (Table B and Figure 1.6 in Chapter 1). Regionally, Africa shines on this count. Out of the 25 economies identified as outperformers, 8 are from Sub-Saharan Africa. India, Kenya, Moldova, and Viet Nam hold the record of being innovation achievers for 10 consecutive years (Table 1.3 in Chapter 1).

FIGURE E

GII economies with the most top-ranked GII indicators, 2020

Source: Global Innovation Index Database, Cornell, INSEAD, and WIPO, 2020.
Note: The GII methodology allows for multiple economies to rank first in an indicator; see Appendix II and Appendix IV.

TABLE B

Innovation performance at different income levels, 2020

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

Source: Global Innovation Index Database, Cornell, INSEAD, and WIPO, 2020.

5: Regional divides persist, yet some economies harbor significant innovation potential

Despite some innovation "catch-up", regional divides exist with respect to national innovation performance: Northern America and Europe lead, followed by South East Asia, East Asia, and Oceania, and more distantly by Northern Africa and Western Asia, Latin America and the Caribbean, Central and Southern Asia, and Sub-Saharan Africa, respectively.

Latin America and the Caribbean continues to be a region with significant imbalances (Figure 1.12 in Chapter 1). The region is characterized by its low investments in R&D and innovation, its incipient use of IP systems, and a disconnect between the public and private sectors in the prioritization of R&D and innovation. With low innovation inputs, the region also struggles to translate these efficiently into outputs. Only Chile, Uruguay, and Brazil produce high levels of Scientific and technical articles, and only Brazil ranks high in Patents by origin.

The African continent—comprising Sub-Saharan Africa and Northern Africa—has one of the most heterogeneous innovation performances across continents (Figure F). While some economies rank in the top 75 (e.g., South Africa, Tunisia, and Morocco), others rank much lower.

Innovation systems in Africa are broadly characterized by having low levels of science and technology activities, high reliance on government or foreign donors as a source of R&D, limited science-industry linkages, low absorptive capacity of firms, limited use of IP, and a challenging business environment.

But these are broad regional generalizations. Some economies within regions stand out because they harbor significant innovation potential.

For example, the typical innovation leader in Africa usually has higher expenditure on education (Botswana, Tunisia) and R&D (South Africa, Kenya, Egypt), strong financial market indicators such as venture capital deals (South Africa), openness to technology adoption and inward knowledge flows, an improving research base (Tunisia, Algeria, Morocco), active use of information and communication technologies (ICTs) and organizational model creation (Kenya), as well as a stronger use of their IP systems (Tunisia and Morocco). Innovation is also more pervasive in Africa than what existing innovation data suggest.

6: Innovation is concentrated at the level of science and technology clusters in select high-income economies, plus mainly China

Divides also exist as to the ranking of the global science and technology (S&T) clusters (Special Section: Cluster Rankings).

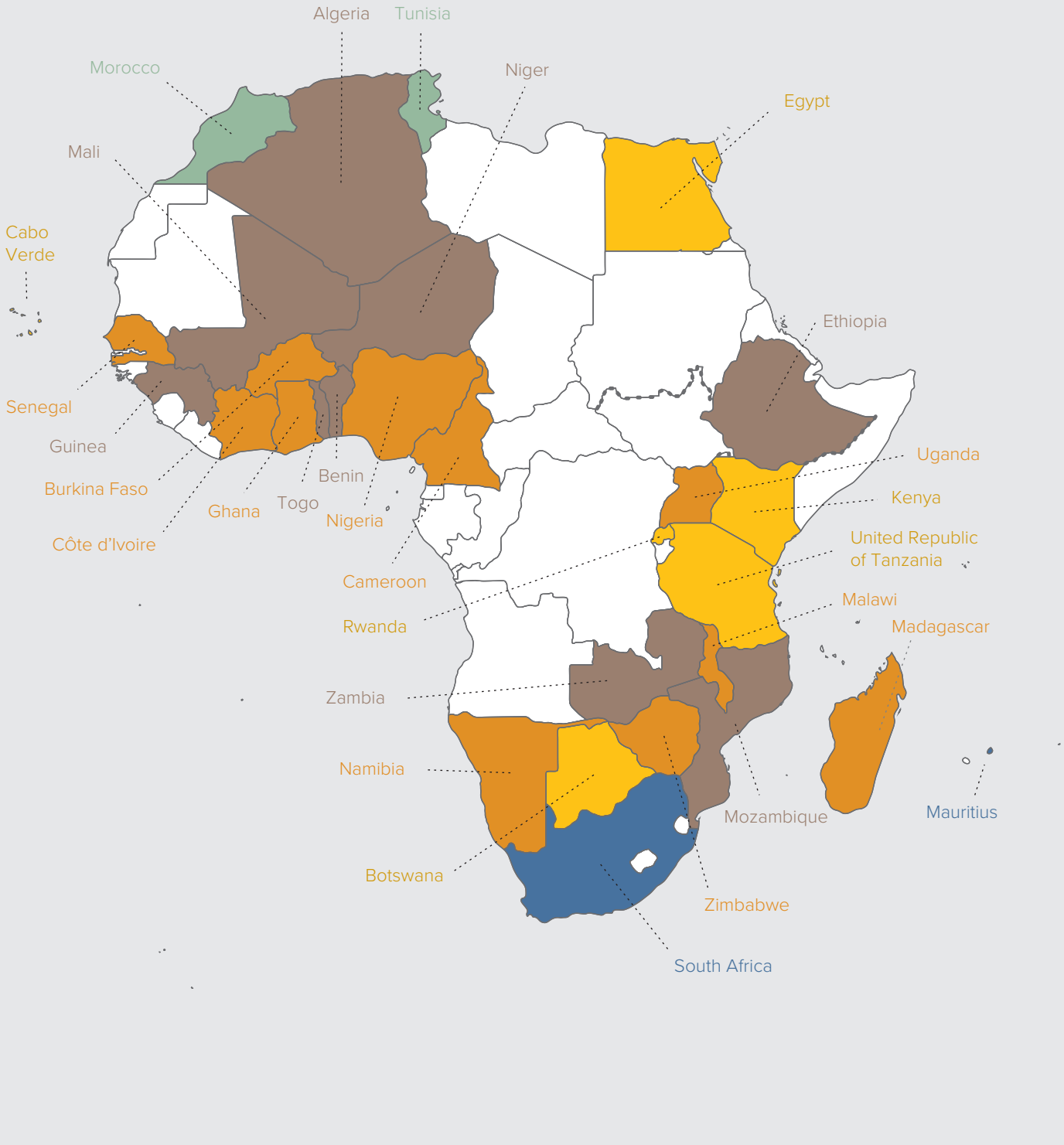
The top 100 clusters are located in 26 economies, of which 6—Brazil, China, India, Iran, Turkey, and the Russian Federation—are in middle-income economies. The U.S. continues to host the largest number of clusters (25), followed by China (17), Germany (10), and Japan (5).

In 2020, Tokyo-Yokohama is the top-performing cluster again, followed by Shenzhen-Hong Kong-Guangzhou, Seoul, Beijing, and San Jose-San Francisco (Table C).

For the first time, the GII 2020 presents the top 100 clusters ranked by their S&T intensity—that is, the sum of their patent and scientific publication shares divided by population. Through this fresh lens, many European and U.S. clusters show more intense S&T activity than their Asian counterparts. Cambridge and Oxford in the U.K. emerge as the most S&T-intensive clusters. These two clusters are followed by Eindhoven (the Netherlands) and San Jose-San Francisco (U.S.).

FIGURE F

GII 2020 rankings in Northern Africa and Sub-Saharan Africa



Source: Figure 1.11 in Chapter 1.

TABLE C

Top S&T cluster of each economy or cross-border regions, 2020

GII cluster rank	Cluster name	Economy	Rank change from GII 2019 to GII 2020
1	Tokyo-Yokohama	JP	0
2	Shenzhen-Hong Kong-Guangzhou	CN / HK	0
3	Seoul	KR	0
4	Beijing	CN	0
5	San Jose-San Francisco, CA	US	0
10	Paris	FR	-1
15	London	GB	0
18	Amsterdam-Rotterdam	NL	0
19	Cologne	DE	1
24	Tel Aviv-Jerusalem	IL	-1
27	Taipei-Hsinchu	TW	16
28	Singapore	SG	0
32	Moscow	RU	1
33	Stockholm	SE	-1
34	Eindhoven	BE / NL	-3
35	Melbourne	AU	0
39	Toronto, ON	CA	0
41	Brussels	BE	-1
43	Tehran	IR	3
45	Madrid	ES	-3
48	Milan	IT	0
49	Zürich	CH / DE	1
51	Istanbul	TR	3
54	Copenhagen	DK	1
60	Bengaluru	IN	5
61	São Paulo	BR	-2
68	Helsinki	FI	0
70	Vienna	AT	-1
89	Lausanne	CH / FR	-3
95	Basel	CH / DE / FR	-4
99	Warsaw	PL	1

Source: WIPO Statistics Database, March 2020.

Conclusion

In conclusion, the GII continues to support and foster innovation across changing times. The aim of the GII is to provide insightful data on innovation and, in turn, to assist policymakers in evaluating their innovation performance and making informed innovation policy decisions. The GII 2020 edition—with its main conclusions on innovation developments generally, in the context of COVID-19 currently, and with respect to innovation finance specifically—makes a contribution to this effect.

At this juncture, when we face an increase of unilateralism and nationalism, it is important to remember that most economies that have moved up the ranks in the GII over time have strongly benefited from their integration in global value chains and innovation networks. China, Viet Nam, India, and the Philippines are prime examples.

There are now genuine risks to international openness and collaboration on innovation, however. Yet, if anything, the joint search for medical solutions during the pandemic has demonstrated how powerful cooperation can be. The speed and efficacy of this collaboration shows that internationally coordinated R&D missions can effectively counteract the tendency for increased isolationism and address important societal topics—now and in the future.

Future editions of the GII will track this phenomenon closely and continue the journey towards enabling policy and business leaders by fostering a better understanding and measurement of innovation.

RANKINGS

Global Innovation Index 2020 rankings

Country/Economy	Score (0–100)	Rank	Income	Rank	Region	Rank	Median 30.94
Switzerland	66.08	1	HI	1	EUR	1	
Sweden	62.47	2	HI	2	EUR	2	
United States of America	60.56	3	HI	3	NAC	1	
United Kingdom	59.78	4	HI	4	EUR	3	
Netherlands	58.76	5	HI	5	EUR	4	
Denmark	57.53	6	HI	6	EUR	5	
Finland	57.02	7	HI	7	EUR	6	
Singapore	56.61	8	HI	8	SEAO	1	
Germany	56.55	9	HI	9	EUR	7	
Republic of Korea	56.11	10	HI	10	SEAO	2	
Hong Kong, China	54.24	11	HI	11	SEAO	3	
France	53.66	12	HI	12	EUR	8	
Israel	53.55	13	HI	13	NAWA	1	
China	53.28	14	UM	1	SEAO	4	
Ireland	53.05	15	HI	14	EUR	9	
Japan	52.70	16	HI	15	SEAO	5	
Canada	52.26	17	HI	16	NAC	2	
Luxembourg	50.84	18	HI	17	EUR	10	
Austria	50.13	19	HI	18	EUR	11	
Norway	49.29	20	HI	19	EUR	12	
Iceland	49.23	21	HI	20	EUR	13	
Belgium	49.13	22	HI	21	EUR	14	
Australia	48.35	23	HI	22	SEAO	6	
Czech Republic	48.34	24	HI	23	EUR	15	
Estonia	48.28	25	HI	24	EUR	16	
New Zealand	47.01	26	HI	25	SEAO	7	
Malta	46.39	27	HI	26	EUR	17	
Italy	45.74	28	HI	27	EUR	18	
Cyprus	45.67	29	HI	28	NAWA	2	
Spain	45.60	30	HI	29	EUR	19	
Portugal	43.51	31	HI	30	EUR	20	
Slovenia	42.91	32	HI	31	EUR	21	
Malaysia	42.42	33	UM	2	SEAO	8	
United Arab Emirates	41.79	34	HI	32	NAWA	3	
Hungary	41.53	35	HI	33	EUR	22	
Latvia	41.11	36	HI	34	EUR	23	
Bulgaria	39.98	37	UM	3	EUR	24	
Poland	39.95	38	HI	35	EUR	25	
Slovakia	39.70	39	HI	36	EUR	26	
Lithuania	39.18	40	HI	37	EUR	27	
Croatia	37.27	41	HI	38	EUR	28	
Viet Nam	37.12	42	LM	1	SEAO	9	
Greece	36.79	43	HI	39	EUR	29	
Thailand	36.68	44	UM	4	SEAO	10	
Ukraine	36.32	45	LM	2	EUR	30	
Romania	35.95	46	UM	5	EUR	31	
Russian Federation	35.63	47	UM	6	EUR	32	
India	35.59	48	LM	3	CSA	1	
Montenegro	35.39	49	UM	7	EUR	33	
Philippines	35.19	50	LM	4	SEAO	11	
Turkey	34.90	51	UM	8	NAWA	4	
Mauritius	34.35	52	UM	9	SSF	1	
Serbia	34.33	53	UM	10	EUR	34	
Chile	33.86	54	HI	40	LCN	1	
Mexico	33.60	55	UM	11	LCN	2	
Costa Rica	33.51	56	UM	12	LCN	3	
North Macedonia	33.43	57	UM	13	EUR	35	
Mongolia	33.41	58	LM	5	SEAO	12	
Republic of Moldova	32.98	59	LM	6	EUR	36	
South Africa	32.67	60	UM	14	SSF	2	
Armenia	32.64	61	UM	15	NAWA	5	
Brazil	31.94	62	UM	16	LCN	4	
Georgia	31.78	63	UM	17	NAWA	6	
Belarus	31.27	64	UM	18	EUR	37	
Tunisia	31.21	65	LM	7	NAWA	7	
Saudi Arabia	30.94	66	HI	41	NAWA	8	

CONTINUED

Global Innovation Index 2020 rankings, continued

Country/Economy	Score (0–100)	Rank	Income	Rank	Region	Rank	Median 30.94
Iran (Islamic Republic of)	30.89	67	UM	19	CSA	2	
Colombia	30.84	68	UM	20	LCN	5	
Uruguay	30.84	69	HI	42	LCN	6	
Qatar	30.81	70	HI	43	NAWA	9	
Brunei Darussalam	29.82	71	HI	44	SEAO	13	
Jamaica	29.10	72	UM	21	LCN	7	
Panama	29.04	73	HI	45	LCN	8	
Bosnia and Herzegovina	28.99	74	UM	22	EUR	38	
Morocco	28.97	75	LM	8	NAWA	10	
Peru	28.79	76	UM	23	LCN	9	
Kazakhstan	28.56	77	UM	24	CSA	3	
Kuwait	28.40	78	HI	46	NAWA	11	
Bahrain	28.37	79	HI	47	NAWA	12	
Argentina	28.33	80	UM	25	LCN	10	
Jordan	27.79	81	UM	26	NAWA	13	
Azerbaijan	27.23	82	UM	27	NAWA	14	
Albania	27.12	83	UM	28	EUR	39	
Oman	26.50	84	HI	48	NAWA	15	
Indonesia	26.49	85	LM	9	SEAO	14	
Kenya	26.13	86	LM	10	SSF	3	
Lebanon	26.02	87	UM	29	NAWA	16	
United Republic of Tanzania	25.57	88	LI	1	SSF	4	
Botswana	25.43	89	UM	30	SSF	5	
Dominican Republic	25.10	90	UM	31	LCN	11	
Rwanda	25.06	91	LI	2	SSF	6	
El Salvador	24.85	92	LM	11	LCN	12	
Uzbekistan	24.54	93	LM	12	CSA	4	
Kyrgyzstan	24.51	94	LM	13	CSA	5	
Nepal	24.35	95	LI	3	CSA	6	
Egypt	24.23	96	LM	14	NAWA	17	
Paraguay	24.14	97	UM	32	LCN	13	
Trinidad and Tobago	24.14	98	HI	49	LCN	14	
Ecuador	24.11	99	UM	33	LCN	15	
Cabo Verde	23.86	100	LM	15	SSF	7	
Sri Lanka	23.78	101	UM	34	CSA	7	
Senegal	23.75	102	LM	16	SSF	8	
Honduras	22.95	103	LM	17	LCN	16	
Namibia	22.51	104	UM	35	SSF	9	
Bolivia (Plurinational State of)	22.41	105	LM	18	LCN	17	
Guatemala	22.35	106	UM	36	LCN	18	
Pakistan	22.31	107	LM	19	CSA	8	
Ghana	22.28	108	LM	20	SSF	10	
Tajikistan	22.23	109	LI	4	CSA	9	
Cambodia	21.46	110	LM	21	SEAO	15	
Malawi	21.44	111	LI	5	SSF	11	
Côte d'Ivoire	21.24	112	LM	22	SSF	12	
Lao People's Democratic Republic	20.65	113	LM	23	SEAO	16	
Uganda	20.54	114	LI	6	SSF	13	
Madagascar	20.40	115	LI	7	SSF	14	
Bangladesh	20.39	116	LM	24	CSA	10	
Nigeria	20.13	117	LM	25	SSF	15	
Burkina Faso	20.00	118	LI	8	SSF	16	
Cameroon	19.98	119	LM	26	SSF	17	
Zimbabwe	19.97	120	LM	27	SSF	18	
Algeria	19.48	121	UM	37	NAWA	18	
Zambia	19.39	122	LM	28	SSF	19	
Mali	19.15	123	LI	9	SSF	20	
Mozambique	18.70	124	LI	10	SSF	21	
Togo	18.54	125	LI	11	SSF	22	
Benin	18.13	126	LI	12	SSF	23	
Ethiopia	18.06	127	LI	13	SSF	24	
Niger	17.82	128	LI	14	SSF	25	
Myanmar	17.74	129	LM	29	SEAO	17	
Guinea	17.32	130	LI	15	SSF	26	
Yemen	13.56	131	LI	16	NAWA	19	

Notes: World Bank Income Group Classification (July 2019): LI = low income; LM = lower-middle income; UM = upper-middle income; and HI = high income. Regions are based on the United Nations Classification: EUR = Europe; NAC = Northern America; LCN = Latin America and the Caribbean; CSA = Central and Southern Asia; SEAO = South East Asia, East Asia, and Oceania; NAWA = Northern Africa and Western Asia; SSF = Sub-Saharan Africa.

Innovation Input Sub-Index 2020 rankings

Country/Economy	Score (0–100)	Rank	Income	Rank	Region	Rank	Median 41.39
Singapore	70.20	1	HI	1	SEAO	1	
Switzerland	69.42	2	HI	2	EUR	1	
Sweden	69.19	3	HI	3	EUR	2	
United States of America	68.84	4	HI	4	NAC	1	
Denmark	66.77	5	HI	5	EUR	3	
United Kingdom	65.97	6	HI	6	EUR	4	
Hong Kong, China	65.79	7	HI	7	SEAO	2	
Finland	65.57	8	HI	8	EUR	5	
Canada	64.84	9	HI	9	NAC	2	
Republic of Korea	64.83	10	HI	10	SEAO	3	
Netherlands	64.45	11	HI	11	EUR	6	
Japan	63.59	12	HI	12	SEAO	4	
Australia	62.86	13	HI	13	SEAO	5	
Germany	62.71	14	HI	14	EUR	7	
Norway	62.67	15	HI	15	EUR	8	
France	61.43	16	HI	16	EUR	9	
Israel	61.36	17	HI	17	NAWA	1	
Austria	61.15	18	HI	18	EUR	10	
New Zealand	60.95	19	HI	19	SEAO	6	
Ireland	59.72	20	HI	20	EUR	11	
Belgium	59.62	21	HI	21	EUR	12	
United Arab Emirates	58.29	22	HI	22	NAWA	2	
Iceland	57.27	23	HI	23	EUR	13	
Luxembourg	57.23	24	HI	24	EUR	14	
Estonia	56.11	25	HI	25	EUR	15	
China	55.51	26	UM	1	SEAO	7	
Spain	54.85	27	HI	26	EUR	16	
Czech Republic	54.74	28	HI	27	EUR	17	
Slovenia	54.09	29	HI	28	EUR	18	
Cyprus	53.17	30	HI	29	NAWA	3	
Malta	52.63	31	HI	30	EUR	19	
Portugal	52.52	32	HI	31	EUR	20	
Italy	52.41	33	HI	32	EUR	21	
Malaysia	52.23	34	UM	2	SEAO	8	
Latvia	49.60	35	HI	33	EUR	22	
Lithuania	49.38	36	HI	34	EUR	23	
Hungary	49.25	37	HI	35	EUR	24	
Poland	49.09	38	HI	36	EUR	25	
Brunei Darussalam	48.16	39	HI	37	SEAO	9	
Greece	48.04	40	HI	38	EUR	26	
Chile	46.97	41	HI	39	LCN	1	
Russian Federation	46.64	42	UM	3	EUR	27	
Slovakia	46.54	43	HI	40	EUR	28	
Croatia	46.30	44	HI	41	EUR	29	
Bulgaria	45.98	45	UM	4	EUR	30	
North Macedonia	45.90	46	UM	5	EUR	31	
Mauritius	45.77	47	UM	6	SSF	1	
Thailand	45.45	48	UM	7	SEAO	10	
South Africa	44.85	49	UM	8	SSF	2	
Saudi Arabia	44.49	50	HI	42	NAWA	4	
Romania	44.44	51	UM	9	EUR	32	
Turkey	44.36	52	UM	10	NAWA	5	
Montenegro	44.17	53	UM	11	EUR	33	
Georgia	43.89	54	UM	12	NAWA	6	
Peru	43.82	55	UM	13	LCN	2	
Colombia	43.67	56	UM	14	LCN	3	
India	43.51	57	LM	1	CSA	1	
Serbia	43.41	58	UM	15	EUR	34	
Brazil	42.94	59	UM	16	LCN	4	
Kazakhstan	42.78	60	UM	17	CSA	2	
Mexico	42.40	61	UM	18	LCN	5	
Viet Nam	42.08	62	LM	2	SEAO	11	
Bahrain	42.05	63	HI	43	NAWA	7	
Qatar	42.00	64	HI	44	NAWA	8	
Mongolia	41.47	65	LM	3	SEAO	12	
Costa Rica	41.40	66	UM	19	LCN	6	

CONTINUED

Innovation Input Sub-Index 2020 rankings, continued

Country/Economy	Score (0–100)	Rank	Income	Rank	Region	Rank	Median 41.39
Belarus	41.32	67	UM	20	EUR	35	
Oman	41.15	68	HI	45	NAWA	9	
Uruguay	40.75	69	HI	46	LCN	7	
Philippines	40.75	70	LM	4	SEAO	13	
Ukraine	40.14	71	LM	5	EUR	36	
Bosnia and Herzegovina	39.98	72	UM	21	EUR	37	
Kuwait	39.63	73	HI	47	NAWA	10	
Albania	39.62	74	UM	22	EUR	38	
Republic of Moldova	39.18	75	LM	6	EUR	39	
Azerbaijan	39.17	76	UM	23	NAWA	11	
Jordan	39.01	77	UM	24	NAWA	12	
Tunisia	38.98	78	LM	7	NAWA	13	
Rwanda	38.59	79	LI	1	SSF	3	
Argentina	38.26	80	UM	25	LCN	8	
Uzbekistan	38.24	81	LM	8	CSA	3	
Panama	38.13	82	HI	48	LCN	9	
Armenia	38.13	83	UM	26	NAWA	14	
Botswana	38.09	84	UM	27	SSF	4	
Morocco	37.52	85	LM	9	NAWA	15	
Jamaica	37.19	86	UM	28	LCN	10	
Trinidad and Tobago	36.67	87	HI	49	LCN	11	
Kyrgyzstan	36.62	88	LM	10	CSA	4	
Nepal	36.17	89	LI	2	CSA	5	
Iran (Islamic Republic of)	35.92	90	UM	29	CSA	6	
Indonesia	35.13	91	LM	11	SEAO	14	
Kenya	35.03	92	LM	12	SSF	5	
Lebanon	34.96	93	UM	30	NAWA	16	
Dominican Republic	34.75	94	UM	31	LCN	12	
El Salvador	34.45	95	LM	13	LCN	13	
Ecuador	34.27	96	UM	32	LCN	14	
Bolivia (Plurinational State of)	33.87	97	LM	14	LCN	15	
Paraguay	33.82	98	UM	33	LCN	16	
Cabo Verde	33.09	99	LM	15	SSF	6	
Honduras	32.92	100	LM	16	LCN	17	
Namibia	32.20	101	UM	34	SSF	7	
Senegal	32.03	102	LM	17	SSF	8	
Uganda	32.01	103	LI	3	SSF	9	
Egypt	31.91	104	LM	18	NAWA	17	
Côte d'Ivoire	31.31	105	LM	19	SSF	10	
Burkina Faso	31.27	106	LI	4	SSF	11	
Sri Lanka	31.25	107	UM	35	CSA	7	
Tajikistan	31.04	108	LI	5	CSA	8	
Zambia	30.73	109	LM	20	SSF	12	
Guatemala	30.56	110	UM	36	LCN	18	
Algeria	30.46	111	UM	37	NAWA	18	
United Republic of Tanzania	30.41	112	LI	6	SSF	13	
Ghana	30.20	113	LM	21	SSF	14	
Malawi	30.02	114	LI	7	SSF	15	
Nigeria	29.81	115	LM	22	SSF	16	
Benin	29.78	116	LI	8	SSF	17	
Cambodia	29.63	117	LM	23	SEAO	15	
Pakistan	29.53	118	LM	24	CSA	9	
Bangladesh	29.48	119	LM	25	CSA	10	
Cameroon	29.18	120	LM	26	SSF	18	
Togo	29.03	121	LI	9	SSF	19	
Mozambique	28.84	122	LI	10	SSF	20	
Zimbabwe	28.00	123	LM	27	SSF	21	
Niger	27.94	124	LI	11	SSF	22	
Madagascar	27.40	125	LI	12	SSF	23	
Mali	27.34	126	LI	13	SSF	24	
Lao People's Democratic Republic	27.12	127	LM	28	SEAO	16	
Guinea	25.11	128	LI	14	SSF	25	
Myanmar	24.98	129	LM	29	SEAO	17	
Ethiopia	24.38	130	LI	15	SSF	26	
Yemen	19.85	131	LI	16	NAWA	19	

Notes: World Bank Income Group Classification (July 2019): LI = low income; LM = lower-middle income; UM = upper-middle income; and HI = high income. Regions are based on the United Nations Classification: EUR = Europe; NAC = Northern America; LCN = Latin America and the Caribbean; CSA = Central and Southern Asia; SEAO = South East Asia and Oceania; NAWA = Northern Africa and Western Asia; SSF = Sub-Saharan Africa.

Innovation Output Sub-Index 2020 rankings

Country/Economy	Score (0–100)	Rank	Income	Rank	Region	Rank	Median 20.74
Switzerland	62.75	1	HI	1	EUR	1	
Sweden	55.75	2	HI	2	EUR	2	
United Kingdom	53.59	3	HI	3	EUR	3	
Netherlands	53.08	4	HI	4	EUR	4	
United States of America	52.28	5	HI	5	NAC	1	
China	51.04	6	UM	1	SEAO	1	
Germany	50.39	7	HI	6	EUR	5	
Finland	48.47	8	HI	7	EUR	6	
Denmark	48.30	9	HI	8	EUR	7	
Republic of Korea	47.40	10	HI	9	SEAO	2	
Ireland	46.38	11	HI	10	EUR	8	
France	45.89	12	HI	11	EUR	9	
Israel	45.73	13	HI	12	NAWA	1	
Luxembourg	44.45	14	HI	13	EUR	10	
Singapore	43.02	15	HI	14	SEAO	3	
Hong Kong, China	42.68	16	HI	15	SEAO	4	
Czech Republic	41.95	17	HI	16	EUR	11	
Japan	41.80	18	HI	17	SEAO	5	
Iceland	41.18	19	HI	18	EUR	12	
Estonia	40.45	20	HI	19	EUR	13	
Malta	40.14	21	HI	20	EUR	14	
Canada	39.68	22	HI	21	NAC	2	
Austria	39.10	23	HI	22	EUR	15	
Italy	39.06	24	HI	23	EUR	16	
Belgium	38.64	25	HI	24	EUR	17	
Cyprus	38.17	26	HI	25	NAWA	2	
Spain	36.35	27	HI	26	EUR	18	
Norway	35.91	28	HI	27	EUR	19	
Portugal	34.50	29	HI	28	EUR	20	
Bulgaria	33.98	30	UM	2	EUR	21	
Australia	33.85	31	HI	29	SEAO	6	
Hungary	33.80	32	HI	30	EUR	22	
New Zealand	33.06	33	HI	31	SEAO	7	
Slovakia	32.86	34	HI	32	EUR	23	
Latvia	32.63	35	HI	33	EUR	24	
Malaysia	32.61	36	UM	3	SEAO	8	
Ukraine	32.49	37	LM	1	EUR	25	
Viet Nam	32.17	38	LM	2	SEAO	9	
Slovenia	31.73	39	HI	34	EUR	26	
Poland	30.81	40	HI	35	EUR	27	
Philippines	29.62	41	LM	3	SEAO	10	
Lithuania	28.98	42	HI	36	EUR	28	
Croatia	28.24	43	HI	37	EUR	29	
Thailand	27.91	44	UM	4	SEAO	11	
India	27.66	45	LM	4	CSA	1	
Romania	27.47	46	UM	5	EUR	30	
Armenia	27.15	47	UM	6	NAWA	3	
Republic of Moldova	26.79	48	LM	5	EUR	31	
Montenegro	26.62	49	UM	7	EUR	32	
Iran (Islamic Republic of)	25.86	50	UM	8	CSA	2	
Costa Rica	25.63	51	UM	9	LCN	1	
Greece	25.54	52	HI	38	EUR	33	
Turkey	25.44	53	UM	10	NAWA	4	
Mongolia	25.35	54	LM	6	SEAO	12	
United Arab Emirates	25.28	55	HI	39	NAWA	5	
Serbia	25.24	56	UM	11	EUR	34	
Mexico	24.80	57	UM	12	LCN	2	
Russian Federation	24.62	58	UM	13	EUR	35	
Tunisia	23.44	59	LM	7	NAWA	6	
Mauritius	22.94	60	UM	14	SSF	1	
Belarus	21.23	61	UM	15	EUR	36	
Jamaica	21.00	62	UM	16	LCN	3	
North Macedonia	20.96	63	UM	17	EUR	37	
Brazil	20.94	64	UM	18	LCN	4	
Uruguay	20.92	65	HI	40	LCN	5	
Chile	20.74	66	HI	41	LCN	6	

CONTINUED

Innovation Output Sub-Index 2020 rankings, continued

Country/Economy	Score (0–100)	Rank	Income	Rank	Region	Rank	Median 20.74
United Republic of Tanzania	20.73	67	LI	1	SSF	2	
South Africa	20.48	68	UM	19	SSF	3	
Morocco	20.42	69	LM	8	NAWA	7	
Panama	19.95	70	HI	42	LCN	7	
Georgia	19.66	71	UM	20	NAWA	8	
Qatar	19.62	72	HI	43	NAWA	9	
Argentina	18.40	73	UM	21	LCN	8	
Colombia	18.02	74	UM	22	LCN	9	
Bosnia and Herzegovina	18.00	75	UM	23	EUR	38	
Indonesia	17.85	76	LM	9	SEAO	13	
Saudi Arabia	17.40	77	HI	44	NAWA	10	
Kenya	17.22	78	LM	10	SSF	4	
Kuwait	17.17	79	HI	45	NAWA	11	
Lebanon	17.07	80	UM	24	NAWA	12	
Jordan	16.57	81	UM	25	NAWA	13	
Egypt	16.55	82	LM	11	NAWA	14	
Sri Lanka	16.32	83	UM	26	CSA	3	
Senegal	15.46	84	LM	12	SSF	5	
Dominican Republic	15.44	85	UM	27	LCN	10	
Azerbaijan	15.29	86	UM	28	NAWA	15	
El Salvador	15.25	87	LM	13	LCN	11	
Pakistan	15.08	88	LM	14	CSA	4	
Bahrain	14.69	89	HI	46	NAWA	16	
Cabo Verde	14.64	90	LM	15	SSF	6	
Albania	14.61	91	UM	29	EUR	39	
Paraguay	14.46	92	UM	30	LCN	12	
Ghana	14.35	93	LM	16	SSF	7	
Kazakhstan	14.34	94	UM	31	CSA	5	
Lao People's Democratic Republic	14.18	95	LM	17	SEAO	14	
Guatemala	14.14	96	UM	32	LCN	13	
Ecuador	13.94	97	UM	33	LCN	14	
Peru	13.76	98	UM	34	LCN	15	
Tajikistan	13.43	99	LI	2	CSA	6	
Madagascar	13.39	100	LI	3	SSF	8	
Cambodia	13.29	101	LM	18	SEAO	15	
Honduras	12.98	102	LM	19	LCN	16	
Malawi	12.86	103	LI	4	SSF	9	
Namibia	12.82	104	UM	35	SSF	10	
Botswana	12.77	105	UM	36	SSF	11	
Nepal	12.54	106	LI	5	CSA	7	
Kyrgyzstan	12.40	107	LM	20	CSA	8	
Zimbabwe	11.93	108	LM	21	SSF	12	
Oman	11.85	109	HI	47	NAWA	17	
Ethiopia	11.75	110	LI	6	SSF	13	
Trinidad and Tobago	11.60	111	HI	48	LCN	17	
Rwanda	11.52	112	LI	7	SSF	14	
Brunei Darussalam	11.48	113	HI	49	SEAO	16	
Bangladesh	11.29	114	LM	22	CSA	9	
Côte d'Ivoire	11.17	115	LM	23	SSF	15	
Mali	10.97	116	LI	8	SSF	16	
Bolivia (Plurinational State of)	10.95	117	LM	24	LCN	18	
Uzbekistan	10.83	118	LM	25	CSA	10	
Cameroon	10.78	119	LM	26	SSF	17	
Myanmar	10.51	120	LM	27	SEAO	17	
Nigeria	10.44	121	LM	28	SSF	18	
Guinea	9.53	122	LI	9	SSF	19	
Uganda	9.06	123	LI	10	SSF	20	
Burkina Faso	8.73	124	LI	11	SSF	21	
Mozambique	8.56	125	LI	12	SSF	22	
Algeria	8.51	126	UM	37	NAWA	18	
Togo	8.05	127	LI	13	SSF	23	
Zambia	8.04	128	LM	29	SSF	24	
Niger	7.70	129	LI	14	SSF	25	
Yemen	7.27	130	LI	15	NAWA	19	
Benin	6.47	131	LI	16	SSF	26	

Notes: World Bank Income Group Classification (July 2019): LI = low income; LM = lower-middle income; UM = upper-middle income; and HI = high income. Regions are based on the United Nations Classification: EUR = Europe; NAC = Northern America; LCN = Latin America and the Caribbean; CSA = Central and Southern Asia; SEAO = South East Asia and Oceania; NAWA = Northern Africa and Western Asia; SSF = Sub-Saharan Africa.

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In 2011, an Advisory Board was established to provide advice on the research underlying the Global Innovation Index (GII), generate synergies at its stages of development, and assist with the dissemination of its messages and results. The Advisory Board is a select group of leading international practitioners with expertise in the realm of innovation. Its members are from diverse geographical and institutional backgrounds and participate in their personal capacity. We extend our gratitude to all Advisory Board members for their continuous support and our collaboration.

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THE GLOBAL INNOVATION INDEX 2020

OVERVIEW OF RANKINGS

CHAPTER 1

THE GLOBAL INNOVATION INDEX 2020

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The last edition of the Global Innovation Index (GII), released in July 2019, relayed an upbeat message on innovation worldwide. Since then, the world economy and innovation have been confronted with an unprecedented challenge: the coronavirus disease (COVID-19) pandemic.

The COVID-19 pandemic has been triggering a global economic shutdown, which is only partially being relaxed as the last sentences of this chapter are written.

This scene-setting chapter of the GII 2020 provides an account of innovation contexts thus far. In light of the above events, the GII theme this year—Who Will Finance Innovation?—discusses how the state of innovation finance is changing rapidly.

This chapter reveals and analyzes the annual GII innovation rankings—by top-performing economies, regions, and innovation components.

Innovation and growth before COVID-19

The last nine editions of the GII have described a global economy struggling to fully recover from the global financial crisis of 2008–2009.

While certain years looked better than others, the world economy was never quite able to resume a cruising speed comparable to before the crisis. Uncertainty remained high. Investment and productivity growth around the world—of which innovation is an engine—were mostly sluggish by historical standards.

This rather bleak account, however, was met with an upbeat innovation outlook. Over the last decade, average innovation expenditures worldwide have, in fact, been growing faster than GDP. According to our 2020 estimates, in 2017 and 2018, research and development (R&D) grew by 5.0% and 5.2% respectively—in line with the strong growth of the pre-crisis period and significantly stronger than global GDP growth (Figure 1.1). This growth in R&D expenditure—the highest over a six-year period—was sustained by growth in key emerging markets, such as China and India, and by leaders in high-income economies.

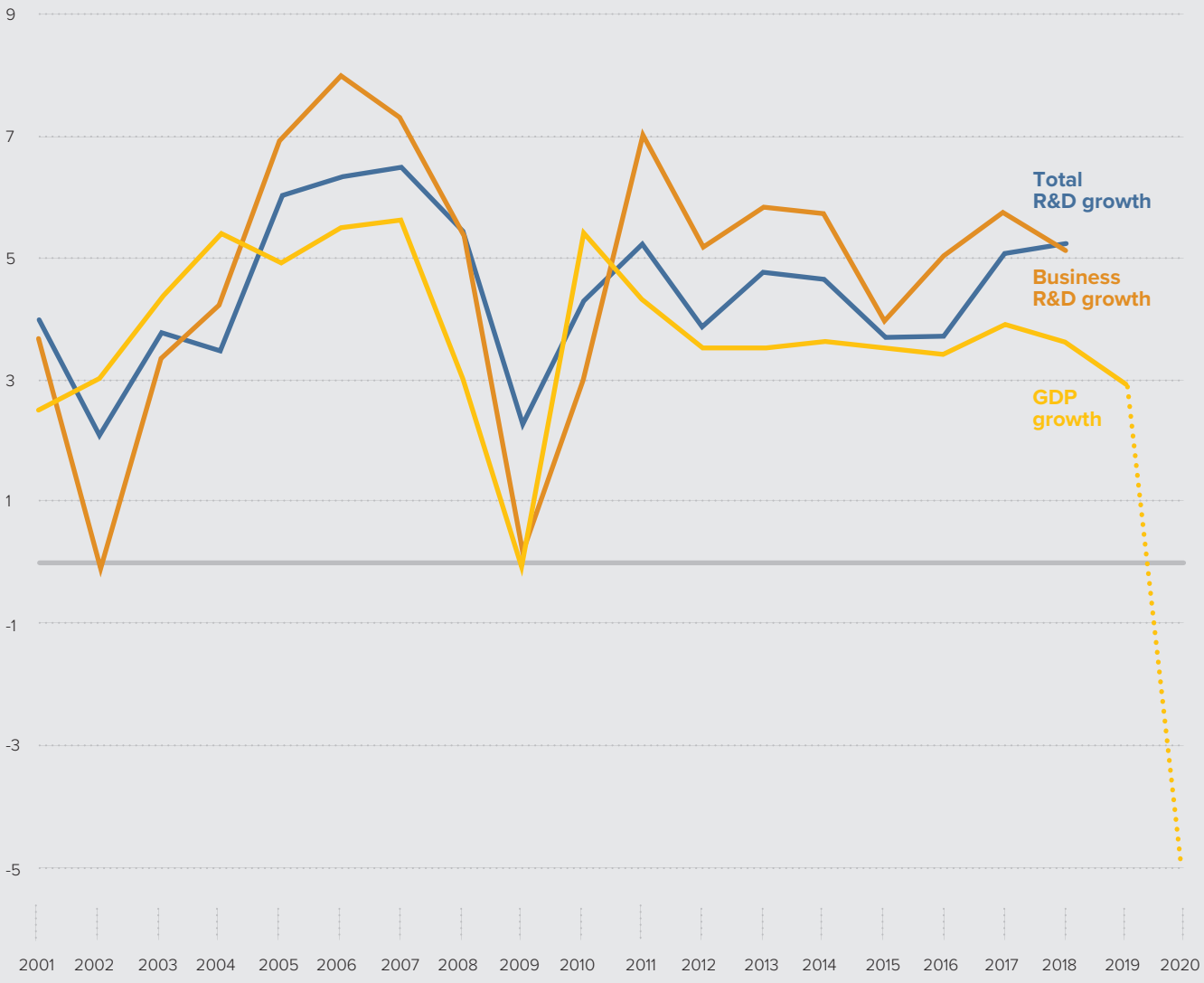
China's R&D expenditure grew 8.6% in 2018, higher than the prior year. India's R&D spending growth in 2018 is estimated at 5.5%. In high-income economies, real R&D expenditure grew 3.8% in 2018.[2] Expenditures grew 8.3% in the Republic of Korea, 3.4% in the United States of America (U.S.), 3.7% in Germany, and 2.4% in Japan.

Private sector funding drove much of this growth in innovation expenditure as governments phased out the innovation stimulus measures they set up after 2009.[3] The top 2,500 R&D companies invested 823 billion euros (EUR) in R&D in 2018, an increase of 8.9% with respect to the previous period.[4]

Before the pandemic, global intellectual property (IP) filing activity also grew at a rapid pace, setting new records in 2018

FIGURE 1.1

Bracing for a downturn? Cyclical R&D investments, 2001–2020



▲ %
► Year
GDP growth forecast

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

and 2019.[5] Worldwide patent filings grew by 5.2% in 2018; strong growth was also experienced in trademarks, industrial designs, and other forms of IP. The use of WIPO's IP systems also grew for the past decade, reaching a new peak in 2019.[6]

As described in the theme section, before the crisis, venture capital (VC) and other sources of innovation financing were at an all-time high (Figure 1.2). Venture capital deal activity in North America, Asia, and Europe was healthy, with aggregate deal values climbing. Novel innovation financing mechanisms, including sovereign wealth funds, IP marketplaces, crowdfunding, and financial technology (fintech) solutions, contributed to the spike in innovation finance.

Formal innovation statistics aside, political determination across the globe to foster innovation and related policies on the ground has been significant and growing. The practical work and policy advances stemming from the GII between 2010 and 2020 has indeed shown that both developed and developing economies increasingly monitor their innovation performance and work on improving it—through expenditures and a sustained willingness to remove roadblocks to strong national innovation systems. In short, formal and informal innovation has been blossoming globally.

What are the likely impacts of the pandemic recession on financing innovation and R&D?

According to the June forecast by the International Monetary Fund (IMF), global GDP will shrink by 4.9% in 2020, hitting the top global innovation actors—including high-income economies and China—particularly hard.[7] With quasi certainty, this forecast will be revised downward around and after the launch date of the GII.

Estimates of the speed of recovery from the COVID-19 pandemic are speculative.[8] Many forecasts are based on the assumption that the "pandemic fades in the second half of 2020", with short-lived declines in GDP for major economies. A recovery in 2021 is foreseen.[9] Other economists, however, suggest a decade-long slowdown, high unemployment rates, and lasting damage to globalized supply and value chains.[10]

What, if any, toll will the COVID-19 crisis take on innovation?

Effects on R&D, IP, and innovation

The impacts of the crisis on innovation are uncertain and highly dependent on recovery scenarios and the business and innovation practices and policies in place.

In any scenario, financial resources—both private and public—will be strained. Countries and corporations alike might find it harder to pursue investments and innovation. Historically, pandemics have been followed by sustained periods of depressed investment.[11] Investment rates are already low to date, including foreign direct investment, which is now expected to drop sharply in 2020 and 2021.[12]

As global economic growth declines in 2020, the question is whether R&D expenditures will fall or remain resilient despite the economic cycle?

Historically, business R&D expenditure, IP filings, and VC have moved in parallel with GDP, slowing markedly during the economic downturns of the early 1990s, early 2000s, and 2009 (Figure 1.1).[13] The main reasons for reduced innovation expenditure at the corporate level are reduced revenue and cash flow, across-the-board cost cutting, and more risk-averse investors and banks. Firms then face difficulties tapping into external sources of funding to support their investments in R&D.

Mirroring the economic downturn, R&D and other innovation expenditures are likely to fall in 2020. In line with historical trends, one should also expect a drop in all forms of IP in 2020—in particular, trademarks and, to a somewhat lesser extent, patents—both at national patent offices and via WIPO's Patent Co-operation Treaty (PCT).[14]

However, the short-term effect on R&D and IP will not be seen in data or corporate reports until the second or third quarter of 2020. Given the delays in R&D reporting, nationwide data documenting the extent of this effect won't truly be available until early 2022. In the case of IP filings, the little data that is available in the first quarter of 2020 is—for most countries—not a good predictor of the fall in IP filings.

Yet, based on the willingness of governments and firms to innovate independent of short-term economic cycles after the financial crisis of 2008–2009, the news might not be too alarming.

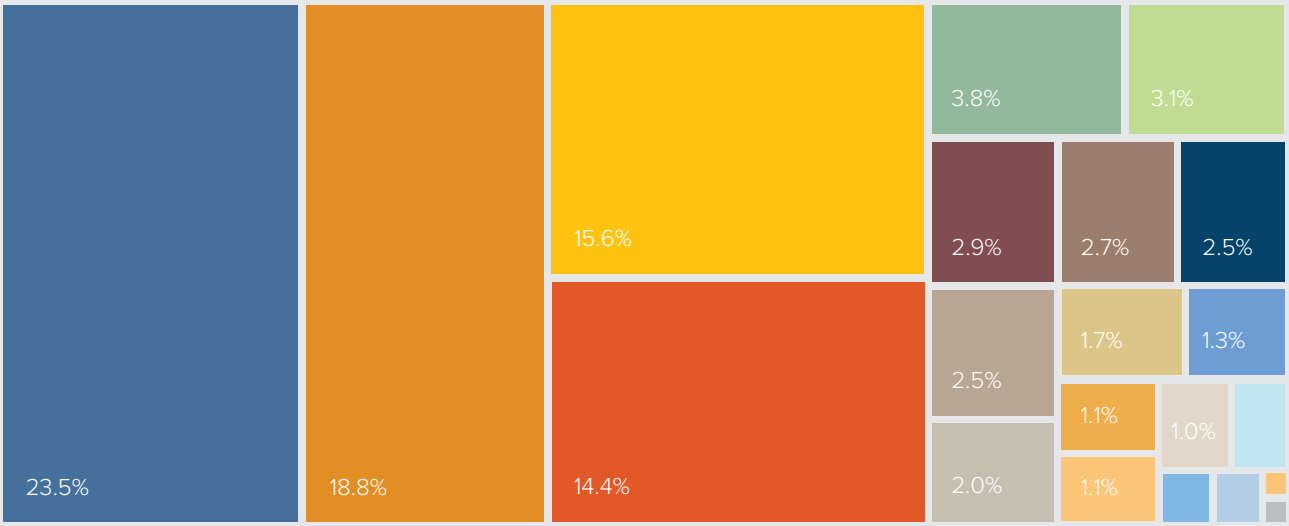
Following the 2008–2009 financial crisis, a number of economies never experienced aggregate R&D declines, including Argentina, China, Costa Rica, Egypt, France, India, the Republic of Korea, Mexico, Poland, and Turkey.[15] For other economies, including Brazil, Chile, Germany, Israel, the United Kingdom (U.K.), the U.S., Singapore, and South Africa, the fall was only short lived.[16] Judging by past crises, the impact of economic downturns on IP filings have been rather short lived too, underlining the central role that IP now plays.[17]

The medium-term impact on innovation activity will depend on the speed of economic recovery, whether R&D and IP filings will continue to mirror economic cycles or decouple, and on the public and corporate innovation policies which are adopted in the aftermath of the crisis.

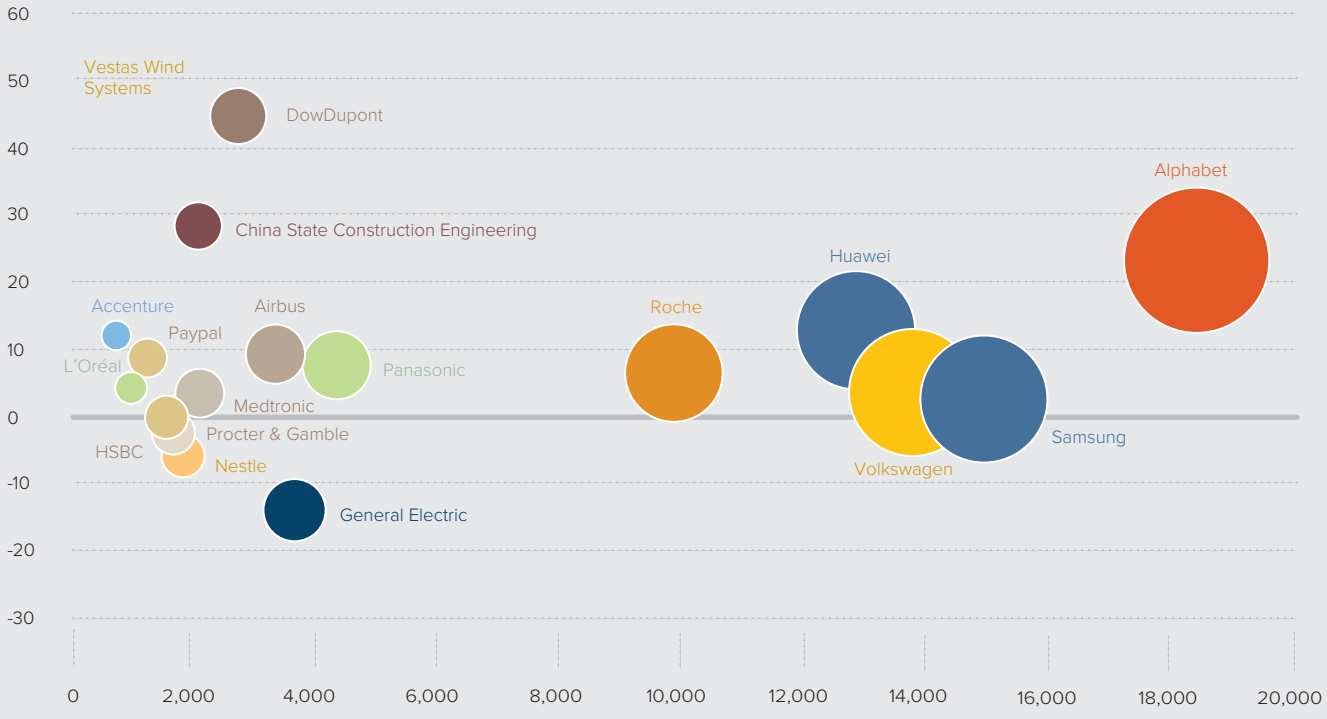
Past crises have had very heterogeneous effects on different sectors and countries, with some increasing innovation and others decreasing innovation and related expenditures after an economic downturn.[18] This is possible again today.

FIGURE 1.2

Top R&D-spending sectors as share of global top R&D spenders, 2018–2019



Top R&D-spending firm in each sector, 2018-2019



▲ R&D one-year growth (%), 2018
▶ R&D investment (€ million), 2018–2019
● Bubbles sized as total R&D volume per company

Sources: Authors' calculations based on the EU Industrial R&D Investment Scoreboard dataset, see also Hernández et al. (2020).
Notes: ALPHABET, Software & ITC services; SAMSUNG ELECTRONICS, ITC hardware & electrical equipment; VOLKSWAGEN, Automobiles; HUAWEI, ITC hardware & electrical equipment; ROCHE, Pharmaceuticals & biotechnology; PANASONIC, Travel, leisure, & personal goods; GENERAL ELECTRIC, General industrials; AIRBUS, Aerospace & defense; DOWDUPONT, Chemicals; MEDTRONIC, Healthcare equipment & services; CHINA STATE CONSTRUCTION ENGINEERING, Construction & industrial materials; NESTLE, Food and beverages; PROCTER & GAMBLE, Household Goods; HSBC, Banks & financial services; PAYPAL, Banks & financial services; L'ORÉAL, Travel, leisure, & personal goods; ACCENTURE, Support services; VESTAS WIND SYSTEMS, Alternative energy.

Indeed, R&D expenditures are heavily concentrated in a couple of thousand firms across the globe, with the top 2,500 R&D-spending companies responsible for 90% of the world's business funded R&D, and the top 100 R&D-spending companies accounting for more than 50% of all corporate global R&D expenditures (see GII indicator 2.3.3).[19] Figure 1.2 shows the distribution of global corporate R&D expenditures by sectors (top). It also shows the top spender in each sector and relative weight in overall R&D expenditure growth (bottom).

It is useful to note that, for most of these top R&D corporations, innovation is now a vital component of their business strategy in an internationally competitive environment.

Some top R&D spending firms are less negatively impacted by the COVID-19 crisis than others. An obvious example is software and ICT (information and communication technologies) services firms—the 4th ranked sector in Figure 1.2. Some of the top R&D spenders in this sector include ALPHABET (U.S.), Microsoft (U.S.), Facebook (U.S.), Oracle (U.S.), Alibaba (China), Tencent (China), Baidu (China), Softbank (Japan), and Ubisoft (France). These firms often hold vast cash reserves and, given the increased push to digitalization during this pandemic—namely the increase in Internet activity, cloud services, online gaming, and remote work—the revenue impact of the crisis on these firms might actually be positive. After the bursting of the dot-com bubble in the early 2000s and the financial crisis of 2008–2009, some of these firms reported strong growth in revenues and spent more on R&D—similar to reports in the first quarter of 2020.[20]

Yet software and ICT firms only represent about 15% of top spenders across all sectors.[21] The ICT hardware and electronic equipment sector, the largest spender of R&D (Figure 1.2), will see more direct revenue impact on its bottom line, due to falling consumer demand globally, and affects on its global supply chain. Firms such as Samsung (the Republic of Korea), Huawei (China), and Apple (U.S.) have seen their first quarter results impacted negatively with strong expected impacts in the second quarter of 2020.[22] Still, and in line with previous crises, most technology companies have significantly increased their first quarter 2020 R&D expenditures.

The pharmaceuticals and biotechnology sector is another top R&D spender, ranking 2nd in Figure 1.2. Judging by recent financial filings by top R&D spenders, such as Roche, this sector is also likely to experience resilient revenue and R&D growth in the current context, which is boosting health R&D.[23] The same is true for the alternative energy sector. While R&D volumes are comparatively low, growth is among the fastest across all R&D top spenders.

Some sectors are weighty in terms of R&D, but their future innovation propensity is more uncertain. A case in point is the automotive sector—the 3rd largest R&D spender—which was hit hard by the COVID-19 pandemic. Automotive firms expect R&D budgets to shrink with severe cuts in 2020 and 2021.[24] Yet, judging by existing surveys, automotive firms expect to be resilient R&D spenders over time, also in view of the transition to cleaner and safer vehicles. For example, Volkswagen, the carmaker spending the most on R&D so far, has increased R&D in the first quarter of 2020 in the context of steep revenue falls.[25]

All in all, the top corporate R&D firms by sector—such as Alphabet (software), Samsung (ICT hardware), Huawei (hardware & electrical equipment), Volkswagen (automotive), Roche (pharmaceuticals), DowDupont (chemicals), and alternative energy firms, such as Vestas, are unlikely to reduce their R&D expenditures anytime soon. The same is true for firms in more traditional sectors, such as construction (China State Construction Engineering) or financial services, where top spenders may be relatively young firms, such as PayPal.

The firms hit hardest by the economic lockdown, notably in household goods (retail and wholesale), travel & leisure (including restaurants), professional services, and real estate will see strong revenue falls and a temptation to cut R&D and other innovation expenditures. Yet, they are not among the most important actors with regard to formal innovation expenditures. These sectors—disproportionate to their economic weight—have a low propensity to use patents.[26] To weather the crisis and prepare for what is coming, these firms will strive to make greater, not less, use of digitization; those surviving could innovate more, not less.

One important question is how long the economic downturn will last, of course, and to what extent companies will adjust their expectations about future demand. The current upbeat scenario is that firms expect to become profitable again after the temporary downturn and once economic confidence returns. The downbeat scenario is that, if the downturn and the negative impact on demand last longer, future profitability expectations and corresponding corporate investment will be adjusted downward.

Effects on entrepreneurship and venture capital

In the context of the GII 2020 theme, another important question is the current impact on start-ups, venture capital (VC), and other sources of innovation financing.

The good news, in contrast to 2009, is that the current situation is not a crisis in the banking sector. The financial system is sound so far.

The bad news is that firms in general, and smaller ventures in particular, are penalized by declining revenue—if they have revenue in the first place. Initial evidence shows that young firms are seeing their access to capital stifled as risk aversion is growing. This corresponds to the economic literature showing that, over the last four decades, VC is pro-cyclical, particularly in early-stage VC investment.[27] Aggregate deal volume, capital investments, and deal size decline substantially in recessions.

Start-ups with fundraising cycles requiring them to raise money soon will be particularly concerned. New types of institutional investors and asset managers will hesitate to finance start-ups

for a while.[28] Investors who specialize in early-stage deals are significantly more responsive to business cycles than later-stage investors.[29] It is likely that many young start-ups, in particular, will cease their activities as a result.

Indeed, indicators on VC show that money to fund innovative ventures is drying up (Figure 1.3).[30] The first quarter of private market funding in 2020, measured both in deal volume and value, is down significantly—a stark decline relative to the last ten years. Deal activity and funding saw year-over-year declines in North America, Asia, and Europe—with Asia, and understandably China, experiencing the largest drop in both funding and deal activity in the first quarter of 2020.

Interestingly, the crisis has only reinforced the decline in deals that had set in before the pandemic, following a peak in 2018. Rather than financing many new and diverse start-ups, venture capitalists had already focused on so-called "mega-rounds"—deals worth US$100 million and more—to boost a more selective number of high-growth businesses. Large investments in start-ups, such as Uber and WeWork, are facing challenges—causing large investors, including sovereign wealth funds, to be more cautious (Theme Section).

Exit strategies, such as initial public offerings (IPOs), were already compromised in 2019, but have become even more compromised due to the pandemic crisis, with hardly any initial public offerings in sight.

In sum, equity markets are plummeting, and fundraising prospects are heavily compromised.

Again, the natural question is, are these medium-term or long-term effects?

The likely answer is that VC investing will take longer to recover than R&D spending. The evidence also points to an uneven negative impact, more so for early-stage than for later-stage VC. Recessions also negatively impact the number and quality of innovative VC-backed firms with outstanding patent filings and citations—and those with longer-term research and science-backed projects.[31] As a result, the decline of innovation finance to these firms also tends to affect the future development of major breakthrough innovations negatively.

Today, most VC is focused on a few economies, sectors, and firms (Theme Section, which elaborates on the regional and sectoral VC divide; Chapter 5–Nanda; Chapter 2–Cornelius). It is largely absent from many middle- and low-income economies and from specific world regions outside North America, as well as certain European and Asian countries. Due to the current crisis, this divide in innovation finance will become worse before it gets better. VC and innovation finance will likely be scarcer for sectors and firms with longer research horizons.

At the same time, key high-income economies, such as the U.S. and China, are magnets for VC and likely to rebound quickly. The thirst for innovation and the supply of capital in search of returns is large. Chinese VC deals, for example, contracted by about half earlier this year due to the pandemic, but they are already rebounding strongly.[32] As suggested later in this chapter, the direction of innovation seems to have been impacted too. The rebound in Chinese VC, for example, is catalyzing innovation in online education, big data, software, and robotics.[33]

There is also one final twist regarding the crisis and its impact on the relationship between innovation and competition. Big tech companies—who are either not negatively affected by the crisis or hold huge cash reserves—are currently stepping up their acquisitions of smaller tech companies, benefiting from better bargaining power and lower acquisition prices.[34] This could be positive in the sense that it ensures financing for young tech companies, but also negative in the sense that it eliminates competition.

Make innovation central after the transition from containment to recovery

What are policymakers doing to counteract the effects of the crisis on economies and innovation?

Most governments in high- and middle-income economies are setting up emergency relief packages to cushion the impact of the lockdown and face the looming recession.

Generally, these measures are being deployed rapidly. Some governments, such as China, the U.S., and the Republic of Korea, are indeed on their second or third package while the crisis is still only unfolding. The stimulus packages of other economies are in the making. Already, the sums allocated are large: around US$9 trillion so far and growing by the minute.[35]

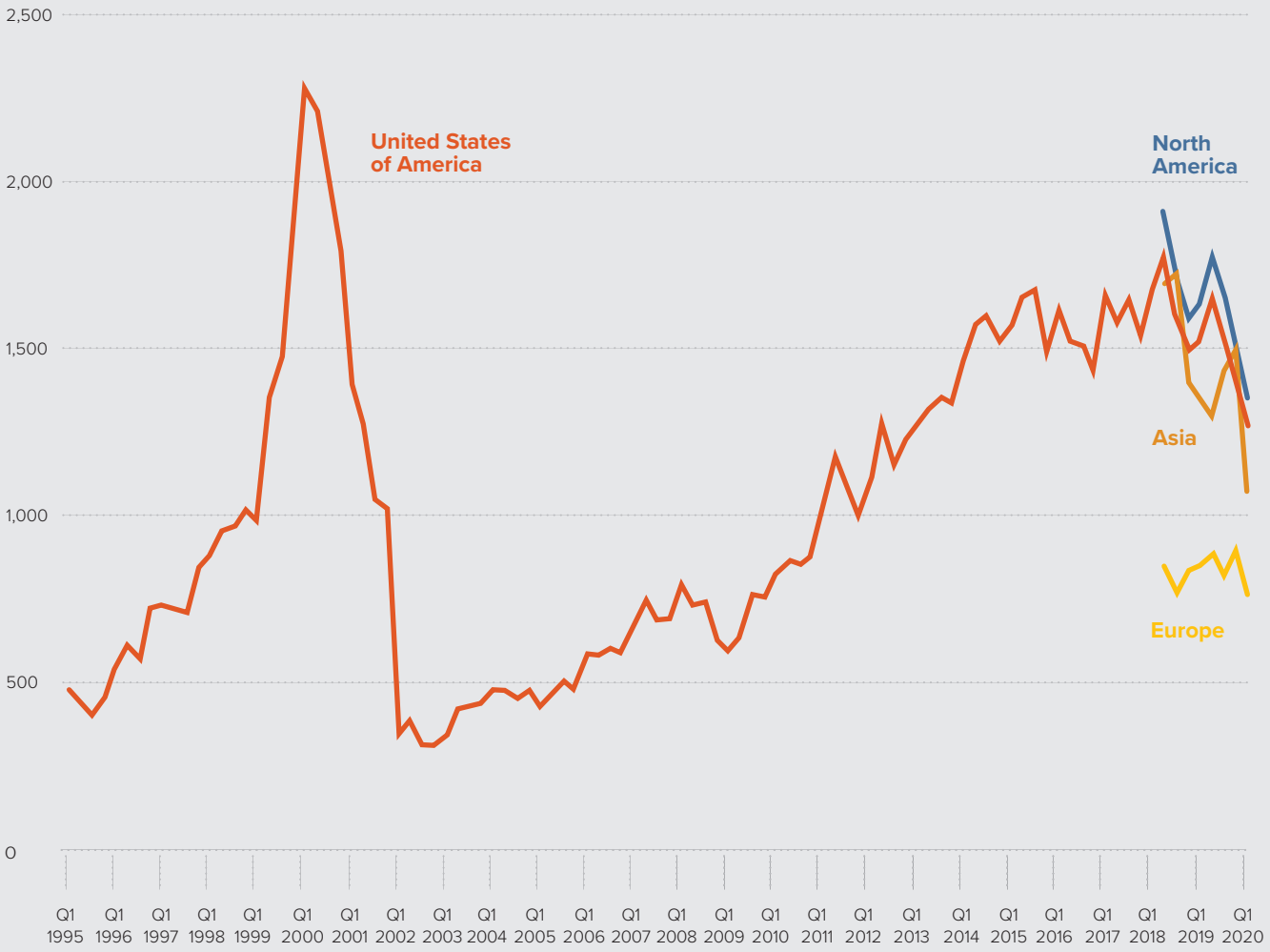
Most of the new spending packages are geared toward preventing short- to medium-term harm to economies. This is needed and sensible. The immediate focus is on 1) injecting liquidity, 2) supporting businesses via loan guarantees and other measures to avert bankruptcies, 3) helping households and workers via unemployment benefits, and 4) providing support to self-employed persons.[36] Some of these measures are similar to those deployed in 2009.

Mostly, however, these measures are not explicitly directed to financing innovation and start-ups. They are bridge loans or grants to pay salaries; they are not intended for innovation finance. Also, currently, many short-term measures to boost firm liquidity are not easily accessible to young firms without revenues; they do not meet the basic revenue or profitability criteria imposed.[37] Other measures depend on payroll expenses. And there are other hurdles for start-ups to access the funds too.[38] Governments might focus on these accessibility criteria to be inclusive of research-intensive and innovative start-ups. France, in turn, has already extended its liquidity scheme to start-ups.[39] The Chinese rescue package also includes guaranteed loans for start-ups.[40]

Some countries—mostly European—have started setting up special funds to support start-ups.

FIGURE 1.3

Bracing for impact: venture capital decline in North America, Asia, and Europe, Q1 1995–Q1 2020



▲ Number of deals
► Year

Source: Authors' calculations based on PwC/CBInsights MoneyTree data explorer.

- France is setting aside EUR 80 million, coupled with matched investments from the private sector to invest in start-ups and bridge the innovation finance gap.[41] This is complemented by EUR 1.5 billion to accelerate the reimbursement of allotted R&D tax credits, EUR 250 million to accelerate the payment of support for innovation, and an additional EUR 1.3 billion of support to innovating companies.[42]
- The U.K. has announced a boost of £40 million British pounds (US$50.3 million) for cutting-edge start-ups and, in particular, to fast-track the development of innovations born out of the COVID-19 crisis, such as virtual reality training platforms for surgeons, virtual farmers' markets, etc.[43]
- The Swiss government is launching a fund using government-guaranteed bank loans to help start-ups facing cash flow problems resulting from the coronavirus crisis. Swiss start-up companies are eligible to receive a maximum of 1 million Swiss francs (CHF), about US$ 1 million. In total, CHF 154 million are available as loans for start-ups.[44]

Understandably, ensuring innovation and R&D is not yet a priority in current stimulus packages—with one exception. Countries have donated large and unprecedented sums of money to inject into the search for a coronavirus vaccine. Health innovation—primarily in finding treatments and a COVID-19 vaccine—is essential to overcome the lockdown and to avoid a deeper recession. Echoing the Global Innovation Index 2019 report, *Creating Healthy Lives—The Future of Medical Innovation*, health-related innovation is key to the future.

To recall, in reaction to the 2009 financial crisis, governments put surprisingly forward-looking pro-growth policies in place.[45] To emerge stronger from that crisis, governments created post-2009 stimulus packages that contained integral innovation-related measures, including investments in infrastructure, research, green innovation, education, and support to innovation and innovative firms. These countercyclical innovation stimulus packages proved essential to stimulate R&D effectively and overcome shortages in innovation finance.[46] The same logic applies today. A crisis-induced decline in innovation expenditure will reduce opportunities for future long-term growth. After the worst scenarios of the lockdown have been averted, thanks to existing emergency measures, it will be crucial that support for innovation continues in an anti-cyclical way—even in the face of higher public debt.

Some countries are already anticipating the transition from containment to recovery measures. France has pledged to give 5 billion euros, a 25 % increase in its original R&D budget.[47] In addition, France is fast-tracking R&D tax credits—a measure which was effective in 2009. Germany has unveiled a second stimulus package of 50 billion euros on future-focused technologies.[48] The U.S. and China are considering spending large additional amounts of stimulus money geared to building infrastructure and boosting innovation.[49] China, for example, intends to focus on new fields of innovation and new forms of soft infrastructure, such as big data centers, 5G infrastructure, and new energy vehicles (NEVs).

Policy measures that stimulate investment, unlock future sources of growth, and encourage the pursuit of longer-term goals will be key going forward. This innovation orientation in future stimulus packages needs to be prioritized when the time is ripe—thus, when the most pernicious effects of the lockdown are averted by current short-term measures.[50]

Identifying which sectors or technologies need a boost will require work, however. As mentioned, the sectoral impact of the current crisis on innovation finance is uneven, with some sectors and firms doing well, whereas others are struggling. Evidence-based policymaking will need a clear understanding of these sectoral differences, to possibly act with sector-specific innovation support measures when required.

Finally, the impacts of the pandemic and the resulting economic crisis will also be uneven across countries. It will be important to closely monitor the innovation finance goals set as per the United Nations (UN) Sustainable Development Goals (SDGs) in that light (Box 1).

Moving forward post COVID-19—unleashing strong innovation potential

To conclude, we offer three main observations and possible pitfalls:

First, notwithstanding the current tragedy, crises are often a source of creativity and innovation, and, at times, industrial renewal. The COVID-19 crisis has already catalyzed innovation in many sectors, such as education, remote work, and retail. It might accelerate progress and industrial renewal more broadly. The opportunities for breakthrough technologies and innovation continue to abound. As described in other WIPO reports, abundant possibilities continue to exist in crosscutting innovation fields such as, for example, artificial intelligence, robotics, 3D printing, or nanotechnology.[54] Past editions of the GII have stressed the looming and sometimes pressing opportunities in fields such as agri-food, environmental technology, or medical technology. Hopefully, the pandemic will have a positive effect on how opportunities for such innovations—in particular, health innovations—are realized. Unleashing this new potential is key.

Second, to reduce damage and catalyze change, it will be essential to assess the short-term and longer-term impacts of the pandemic on the science and innovation systems. On the one hand, the crisis to date has halted ongoing research projects outside of COVID-19, including important clinical trials.[55] Universities, research institutes, and big science infrastructures are shut down. A survey of researchers has shown a decline in work hours, in particular for female researchers with children.[56] It will be important to kick-start dormant innovation projects and to assess the harm caused.[57] On the other hand, research teams worldwide have teamed up in an unprecedented effort to fight COVID-19. Research

BOX 1

Financing innovation—the United Nations Sustainable Development Goals in a post COVID-19 world

The 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (SDGs) set in motion the most ambitious global development agenda.[51] Intrinsic to the 2030 Agenda is the Addis Ababa Action Agenda (AAAA) adopted in 2015 as the internationally agreed framework for financing sustainable development. It also recognizes Science, Technology and Innovation (STI) as a key action area for the realization of the 2030 Agenda. The AAAA, which established a Technology Facilitation Mechanism to steer multi-stakeholder efforts to harness STI for SDGs, also touched on the question of financing innovation. Under its terms, Member States commit to set policies to incentivize the creation of new technologies and consider setting up innovation funds to support innovative enterprises.

Four years after the adoption of the 2030 Agenda, UN Member States gathered in 2019 to review progress. They adopted a Political Declaration renewing momentum for accelerated action, including action to promote innovation and to mobilize resources to close the financing gap to achieve the SDGs. In the same vein, the UN General Assembly (UNGA) adopted in December 2019 its bi-annual resolution on STI for sustainable development, which in turn recognized the need to mobilize and scale up financing for STI. As most of the SDGs rely on innovation for their achievement, financing innovation is not extraneous to the discussion on financing sustainable development.

The challenges in financing sustainable development have been the focus of much attention during the 2019 review process. In 2020, those challenges are compounded by the global crisis caused by the coronavirus disease (COVID-19) pandemic. In its resolution on International cooperation to ensure global access to medicines, vaccines, and medical equipment to face COVID-19, the UNGA encourages Member States to work in partnership to increase R&D funding for vaccines and medicines, for example.[52] The 2020 Economic and Social Council (ECOSOC) fora on Financing for Development also underlined the importance of investments for strengthening health systems.[53] And the 2020 High Level Political Forum for Sustainable Development will consider the impact of the COVID-19 pandemic, the response, and the recovery.

Against this backdrop, the GII continues to be relevant in the 2030 Agenda context to measure progress in innovation. The UNGA attested to this relevance in its 2019 resolution on STI for Sustainable Development by encouraging " [...] efforts to increase the availability of data to support the measurement of national innovation systems (such as the existing Global Innovation Index) and empirical research on innovation and development to assist policymakers in designing and implementing innovation strategies [...]".

collaboration, the sharing of research results, and the granting of open access to journals were part of the equation. Indeed, the increased coordination of health R&D around the world in the medical search for a COVID-19 vaccine has been exemplary. The speed and efficacy of this undertaking might well inspire internationally coordinated R&D missions on important societal topics in the future. The current effort has also led to the lifting of certain bureaucratic research and innovation finance procedures, allowing for shortened trials and testing cycles. It will be important to assess which adjustments made during this exceptional situation should become permanent.

Third, the crisis might further impact the international openness and knowledge flows so critical to the development of future innovation leaders from emerging economies and, more generally, to international innovation networks.[58] Restrictions in knowledge and technology diffusion, the unraveling of the global economy, and a return to nationalist policies are risks to innovation.[59] Policymakers are well advised to ensure that this scenario of more nationally-oriented innovation systems is averted.

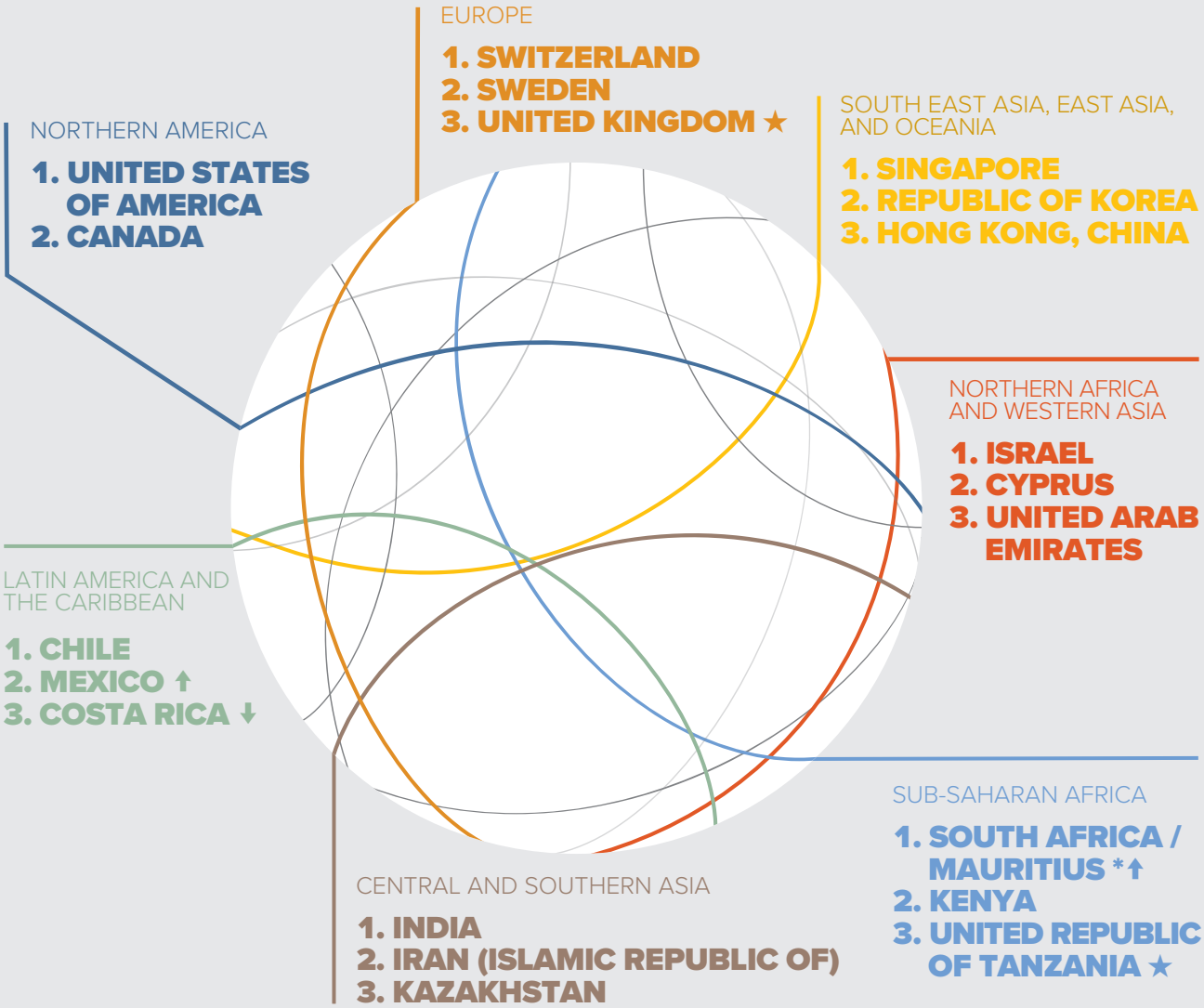
Now more than ever—in particular, as the world seeks a vaccine and/or treatment for COVID-19—innovation and the use of innovation policies in a countercyclical fashion is humanity's best hope to overcome the economic lockdown.

FIGURE 1.4

Global leaders in innovation in 2020

Every year, the Global Innovation Index ranks the innovation performance of more than 130 economies around the world.

Top 3 innovation economies by region



* Mauritius is ranked above South Africa this year but with wide significant data variability as compared to last year.
↑↓ indicates the movement of rank within the top 3 relative to 2019, and ★ indicates a new entrant into the top 3 in 2020.

Top 3 innovation economies by income group

HIGH-INCOME GROUP
1. SWITZERLAND
2. SWEDEN
3. UNITED STATES OF AMERICA

UPPER MIDDLE-INCOME GROUP
1. CHINA
2. MALAYSIA
3. BULGARIA

LOWER MIDDLE-INCOME GROUP
1. VIET NAM
2. UKRAINE
3. INDIA★

LOW-INCOME GROUP
1. UNITED REPUBLIC OF TANZANIA ↑
2. RWANDA ↓
3. NEPAL ★

Source: Global Innovation Index Database; Cornell, INSEAD, and WIPO, 2020.
Notes: World Bank Income Group Classification (June 2019); Year-on-year GII rank changes are influenced by performance and methodological considerations; some economy data are incomplete (Appendix IV).

The Global Innovation Index 2020 results

Conceptual framework

The GII helps create an environment that evaluates innovation factors continuously. This year, it provides detailed innovation metrics for 131 economies. All economies covered represent 93.5% of the world's population and 97.4% of the world's GDP.[60]

The GII is composed of three indices: the overall GII, the Innovation Input Sub-Index, and the Innovation Output Sub-Index (Appendix I).

- The overall GII score is the average of the scores of the Input and Output Sub-Indices.
- The Innovation Input Sub-Index is comprised of five pillars that capture elements of the national economy that enable innovative activities: 1) Institutions, 2) Human capital and research, 3) Infrastructure, 4) Market sophistication, and 5) Business sophistication.
- The Innovation Output Sub-Index provides information about outputs that are the result of the innovative activities of economies. There are two output pillars: 6) Knowledge and technology outputs and 7) Creative outputs.

Each pillar has three sub-pillars, and each sub-pillar is composed of individual indicators, totaling 80 this year.[61]

Results

The main GII 2020 findings are discussed in the following sections. The Rankings Section presents the GII results in tabular form for all economies covered this year, for the GII, and for the Innovation Input and Output Sub-Indices.

As always, it must be noted that year-on-year comparisons of the GII ranks are influenced by various factors, such as changes in the underlying indicators at source, changes in data availability, and changes to the GII model and measurement framework (Appendix IV).

Highlights: Switzerland, Sweden, and the United States continue to lead; the Republic of Korea makes it to the top 10; India and the Philippines ramp into the top 50

In the top 10 of the GII, Switzerland, Sweden, and the United States continue to lead the innovation ranking. Switzerland holds the number one position for the 10th consecutive year. The Republic of Korea ranks 10th, tapping into the top group of the GII for the first time, up from 11th in 2019. This makes it the second Asian country to enter the top 10.

Figure 1.5 shows movement in the top 10 ranked economies in the period 2016–2020.

In the top 25, there are three notable movers: France, Hong Kong (China), and Austria. France ranks 12th this year, a positive jump of four positions from last year, resulting from a combination of performance improvements and model changes. Hong Kong (China) ranks 11th, up from 13th in 2019, and reaches its best rank since 2016. Austria ranks 19th and is back in the top 20. The Czech Republic (24th) makes it into the top 25. Five of the countries in the top 10, and 12 in the top 25, are European Union countries.

China keeps its 14th place in 2020, after breaking into the GII top 15 last year. China is still the only middle-income economy that makes it to the top 30 (Box 3). The United Arab Emirates (34th) makes it into the top 35 this year.

India (48th) and the Philippines (50th) make it to the top 50 for the first time. India now ranks 3rd among the lower middle-income economy group, a new milestone. The Philippines achieves a large rise and its best rank ever, after continued rank increases since 2014 when it ranked 100th.

Viet Nam ranks 42nd for the second consecutive year, a considerable improvement from its average rank of 68th in the period 2013–2015.

Over the past seven years, and taken together, China, the Philippines, India, and Viet Nam are the GII economies in the top 50 with the most significant rank progress over time, possibly due in part to methodological factors but certainly also due to improved innovation performance.

The Russian Federation declines by one spot to 47th but remains in the top 50, while Turkey slightly drops, moving out of the top 50 (51st).

Among the top 100, Belarus ranks 64th, increasing eight places, and Serbia gets closer to the top 50, ranking 53rd.

Uzbekistan makes a comeback to the GII. After five years of not being included in the rankings because of a lack of data, it achieves the 93rd place this year. Nepal (95th) scores its best rank ever, and it is a newcomer to the top three among low-income economies (3rd).

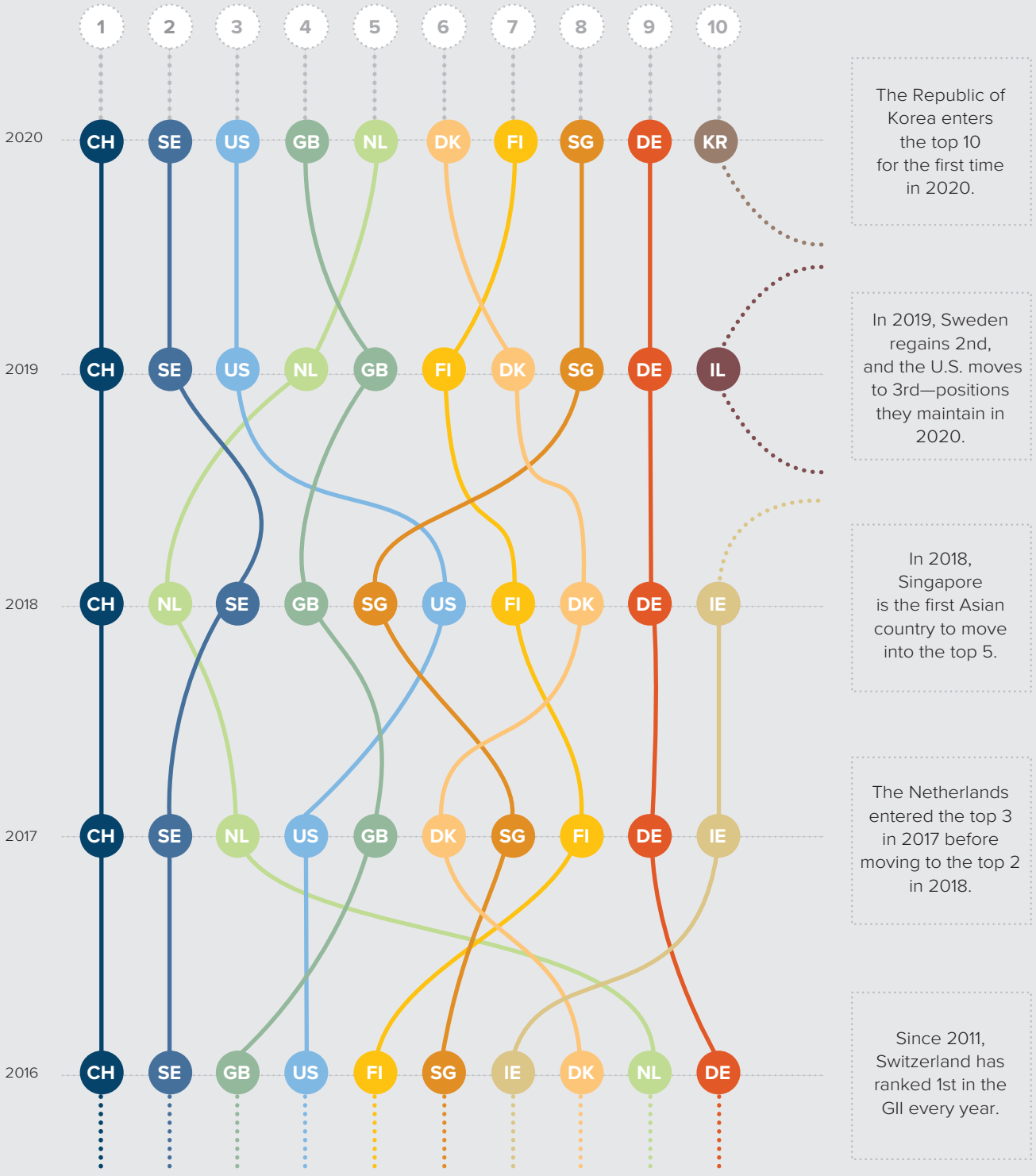
Some outlier rank movements, such as Mauritius (positive), Georgia (negative), and Kuwait (positive) are explained by a mix of new data availability, data revisions at the source, and performance effects.

Despite fast movers in terms of innovation "catch-up", the global innovation divide between income groups and regions remains (Box 3). The catching-up of economies from relatively emergent and fragmented innovation systems to more mature and functional ones is an arduous process.[62]

We share key insights on the characteristics and balance of innovation systems based on GII data for a selection of economies in the following sections.

FIGURE 1.5

Movement in the GII, top 10, 2016–2020



CH Switzerland
GB United Kingdom
SE Sweden
NL Netherlands
US United States of America
FI Finland
SG Singapore
IE Ireland
DK Denmark
DE Germany
IL Israel
KR Republic of Korea

Source: Global Innovation Index Database, Cornell, INSEAD, and WIPO, 2020.
Note: Year-on-year comparisons of the GII ranks are influenced by changes in the GII model and data availability.

The world's most innovative economies in the Global Innovation Index 2020

Movement in the top 10

The United Kingdom (U.K.) ranks 4th, increasing one spot since last year. It maintains its 6th position in the Innovation Input Sub-Index, and continues to increase its position in the Innovation Output Sub-Index to reach the 3rd rank worldwide (up by 1). The U.K. improves in two pillars: Infrastructure (6th) and Creative Outputs (5th). At the sub-pillar level, important increases are in General infrastructure (38th), Regulatory environment (8th), and Intangible assets (9th). The U.K.'s increase in Intangible assets (up by 3) is explained by a combination of performance improvements and changes to the GII model. The U.K. improves notably in the Industrial designs indicator (13th), and ranks 6th worldwide in the Global brands value indicator (new to the GII).

In addition, the country maintains its top three lead in the quality of its universities (2nd) and the quality of its scientific publications (1st). It ranks sixth in the quality of innovation, down by one ("Who is best in the quality of innovation?" in this chapter; Figure 1.7). In addition, the U.K. hosts four S&T clusters in the top 100: London (15th), Cambridge (57th), Oxford (71st) and Manchester (93rd). Cambridge and Oxford are also the world's most S&T-intensive clusters (Special Section: Cluster Rankings).

A frequent question these days is how the U.K.'s planned and now implemented withdrawal from the European Union (EU) is affecting the U.K.'s GII ranking. As noted in previous GII editions, the causal relations between the EU withdrawal and the U.K.'s innovation performance are complex and uncertain in size and direction.[63]

Denmark ranks 6th in the GII 2020, increasing by one rank from last year. It maintains its 5th spot in the Innovation Input Sub-Index and increases by three spots in the Innovation Output Sub-Index (9th). Denmark ranks in the top 12 in all GII pillars, and improves its position in five pillars: Human capital and research (2nd, up by 2), Infrastructure (4th, up by 2), Market sophistication (8th, up by 1), Knowledge and technology outputs (12th, up by 2), and Creative outputs (10th, up by 1). In Market sophistication, the Investment sub-pillar increases the most (16th), notably thanks to increases in the Ease of protecting minority investors (27th) indicator. In Knowledge and Technology outputs, the sub-pillar Knowledge creation increases by two spots (10th), thanks notably to increases in the productivity growth per worker (65th, up by 16). All sub-pillars in the Creative outputs pillar also increase. In addition, Denmark ranks 1st worldwide in a number of key indicators, including ICT use, Government's online service, E-participation, Environmental performance, and Scientific and technical articles. It continues to rank 2nd in Researchers.

The Republic of Korea ranks 10th, tapping into the top group of the GII for the first time, up from 11th in 2019. This makes Korea the second Asian economy to enter the top 10, after Singapore. It ranks 10th in both the Innovation Input and the Innovation Output (up from 13th) Sub-indices. On the input side, Korea improves the most in Business sophistication (7th, up by 3), and in Infrastructure (14th up by 1). In these pillars, the indicators that see the largest gains include Environmental performance (28th), Females employed with advanced degrees (31st), and State of cluster development (24th). Korea increases its rank in both of the innovation output pillars, and notably on the sub-pillars of Knowledge creation (7th), Knowledge diffusion (15th), and Creative goods and services (19th). The indicators with the most important gains in these sub-pillars include the quality of scientific publications (17th), National feature films (13th), Entertainment and media market (18th), and Creative goods exports (14th). The indicators of High- and medium-high-tech manufacturing (6th) and Trademarks (15th) also improve.

Korea remains 1st worldwide in a number of important indicators, including E-participation, Patents by origin—a top position that it shares with other five economies,[64] and Industrial designs. It reaches the 1st position in patent families (up from 4th), and ranks in the top three worldwide in indicators such as Gross expenditure on R&D, GERD performed by business, PCT patents, Tertiary enrolment, Researchers, and GERD financed by business. Korea hosts three clusters in the top 100, with Seoul ranking 3rd worldwide, followed by Daejeon (22nd), and Busan (75th) (Special Section: Cluster Rankings).

Movement in the top 20

In the top 20, there are three economies climbing up the rankings: Hong Kong (China), France, and Austria.

Hong Kong (China) edges closer to the top 10—ranking 11th this year (up from 13th), its best rank since 2016. Hong Kong's (China) most notable advances are in the Innovation Input Sub-Index (7th, up by 1), and in the pillars Institutions (5th, up by 2), Human capital and research (23rd, up by 5), and Market sophistication, where it achieves the 1st rank worldwide. In the latter, it also ranks 1st in the Investment sub-pillar (up by 10), and makes notable improvements in indicators Ease of protecting minority investors (7th) and Venture capital deals (4th). In Human capital and research, the sub-pillars Tertiary education (9th) and R&D (30th) increase the most, thanks to improvements in indicators Tertiary enrolment (22nd), Tertiary inbound mobility (15th), Researchers (25th), and Gross expenditure in R&D (42nd).

Austria makes it back to the top 20 after leaving the group in 2018. It increases two ranks in the Innovation Output Sub-Index (23rd) and one rank in the Innovation Input Sub-Index (18th). It goes up the ranks in five of the GII pillars: Knowledge and technology outputs (19th, up by 6), Creative Outputs (22nd, up by 3), Institutions (15th, up by 2), Human capital and research (7th, up by 1, and a relative strength), and Business sophistication (17th, up by 1). Indicators Mobile app creation

(28th), Rule of law (6th, and a relative strength), Government funding per pupil (16th), the quality of its universities (26th), Knowledge intensive employment (24th), GERD financed by business (18th), and ICT services imports (17th) improve notably.

China keeps its 14th place in 2020, after breaking into the GII top 15 last year and establishing itself as an innovation leader. It increases its ranks in two pillars: Human capital and research (21st, up by 4), and Market sophistication (19th, up by 2). It maintains its world leadership in several key output indicators, including Patents by origin, Utility models, Trademarks, Industrial designs, and Creative goods exports. China sustains its 12th rank in the Creative outputs pillar. It also maintains the 1st global place in sub-pillar Intangible assets. With 408 brands in the top 5,000, led by banks ICBC and China Construction Bank, and technology giant Huawei, it ranks 17th in the new GII indicator Global brand value. China also improves in sub-pillar Creative goods and services (12th, up by 2), moving up notably in indicators Cultural and creative services exports (46th), Entertainment & Media market (37th) and Printing and other media (72nd). It also maintains its top position worldwide in Creative goods exports (1st). China also keeps its 1st place in quality of innovation among middle-income economies for the eighth consecutive year (Figure 1.7).

Canada (17th) and **Luxembourg** (18th) each retain their position this year.

Finally, **Israel** (13th), **Ireland** (15th), **Japan** (16th), and **Norway** (20th) move down between one and three ranks each.

BOX 2

Is there a recipe to move up the GII rankings?

Over the years, the GII has been used by governments around the world to improve their innovation performance and to shape their evidence-based innovation policies.[65] While there is no recipe to move up the GII rankings, this box shares insights and sheds light on the process of using the GII to improve country innovation performance.

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

Some do's:

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

Some don'ts:

- Do not set overambitious and thus unrealistic GII rank targets—e.g., enter the top 20 by 2020 when the economy's rank is still far from that goal. GII rank increases are rarely large from year to year, in particular in the top echelons.
- Do not expect policy changes to result in improved GII indicator performance instantaneously. There are important lags between innovation policy formulation, execution, and impact. The latest available innovation data is also rarely current; it often lags by a few years.
- Do not treat the GII as a mathematical exercise—i.e. attempting to collect or focus on specific indicators to go up the rankings. At the end of the day, national development and progress are only partially captured by the GII rank alone.
- Do not overfocus on the GII year-on-year changes alone. These are influenced by the relative performance vis-à-vis other countries and other methodological considerations (Appendix IV)—of which many are outside the control of the economy in question. Setting objectives over a multiyear period—for example 3 to 5 years—and looking at the combined progress over a few years is a more fitting use of the GII.

Innovation leaders have balanced innovation systems; others should strive for them

Innovation leaders have complementarity and balance across the different areas of their innovation system. A successful innovation system balances the forces that push knowledge creation, exploration, and investments—the innovation inputs—with the forces that pull ideas and technologies towards application, exploitation, and impact—the innovation outputs.

Table 1.1 presents the overall GII rankings and the rankings in each of the GII pillars, colored according to where in the rankings each economy belongs. Pillars with strong performance are colored in dark blue, medium-high performance in green, medium-low performance in yellow, and low performance in orange.[66] In an ideal scenario, all pillars of a given country would be in dark blue. In reality, only a few economies achieve this. A majority of economies have pillars with high performance, while others have medium or low performance (i.e., a mix of colors). At the bottom of the rankings, most economies have low and medium-low performance across all pillars.

A balanced and strong performance across all seven pillars are most evident among the innovation leaders (top 25). Evidently, these leaders have strong and balanced innovation systems. Switzerland, the U.S., and Germany, for example, have strong performance across all GII pillars.

All in all, however, only 12 economies (9%) have all pillars in dark blue. Even among the top 25 or top 35, many economies have pillars that are outliers. For instance, in the top 10, Finland ranks lower in Market sophistication (33rd). In the top 20, Hong Kong (China) and Norway rank lower in Knowledge and technology outputs (54th and 33rd, respectively), Israel and China in Institutions and Infrastructure, Ireland and Austria in Market sophistication (35th and 48th, respectively) and Luxembourg in Human capital and research (41st). In the top 35, Iceland performs relatively lower in Market sophistication (54th) and Knowledge and technology outputs (34th), Belgium in Infrastructure (35th), Australia in Knowledge and technology outputs (40th), the Czech Republic and Cyprus in Human capital and research and Market sophistication, and New Zealand in both innovation output pillars—ranking 39th in Knowledge and technology outputs and 33rd in Creative outputs.

Similarly, the economies placed at the end of the rankings perform weakly across pillars—balanced, but at medium-low and low levels and without peaks. In fact, only Yemen, ranked the lowest this year at 131st, performs low in all GII pillars. Uganda, Malawi, and Tajikistan, for example, rank relatively higher in Market sophistication (63rd, 58th, and 60th, respectively), and the Plurinational State of Bolivia ranks relatively higher in Human capital and research (56th).

In contrast, economies ranked between the 33rd and the 98th place in the overall GII ranks show heterogeneous results, ranking high in some of the pillars—peak innovation performance—but low on others, hinting at more unbalanced innovation systems, but also at innovation systems that are on the move and positively in development.

Several economies outside the top ranks are among the top performers in specific pillars without bringing similar high performance in other pillars. For instance, the United Arab Emirates, ranked 34th overall, ranks within the top 30 in all innovation input pillars, but considerably lower in Knowledge and technology outputs (78th). India's high ranks in Knowledge and technology outputs (27th) and Market sophistication (31st) contrast with its relatively lower rank in Infrastructure (75th). Similarly, Thailand's high rank in Market sophistication (22nd) contrasts with its lower ranks in Human capital and research and Infrastructure (both ranked 67th). Market sophistication is also the best pillar for South Africa (15th), compared to its lower ranks in Human capital and research and Creative outputs (both at 70th), and Infrastructure (79th). Turkey also ranks high in Market sophistication (28th) compared to its lowest ranked pillar, Institutions (94th). Hungary—ranked 35th overall, ranks 22nd in Knowledge and technology outputs, in contrast to its lowest pillar, Market sophistication (89th).

Other interesting examples include Thailand (44th) ranking 22nd in Market sophistication. Qatar placed 70th overall and ranks 28th in Infrastructure; while Brunei Darussalam, ranked 71st in the GII, achieves the 25th place in the Institutions pillar. The Philippines ranks 50th overall, but has considerably higher ranks in the pillars Business sophistication (29th) and Knowledge and Technology outputs (26th) (see South East Asia, East Asia and Oceania); and the Islamic Republic of Iran, ranked 67th overall, is high ranked in pillars Human capital and research (46th) and Creative outputs (48th). Relative to its overall place, Kazakhstan ranks well in Institutions (49th), and so does Oman in Human capital and research (43rd). Despite ranking in the top 95, Rwanda, Uzbekistan, and Nepal rank well in Market sophistication.

TABLE 1.1

Heatmap: GII 2020 rankings overall and by pillar

Country/Economy	Overall GII rank	Institutions	Human capital & research	Infrastructure	Market sophistication	Business sophistication	Knowledge & technology outputs	Creative outputs
Switzerland	1	13	6	3	6	2	1	2
Sweden	2	11	3	2	12	1	2	7
United States of America	3	9	12	24	2	5	3	11
United Kingdom	4	16	10	6	5	19	9	5
Netherlands	5	7	14	18	23	4	8	6
Denmark	6	12	2	4	8	11	12	10
Finland	7	2	4	9	33	8	6	16
Singapore	8	1	8	13	4	6	14	18
Germany	9	18	5	12	24	12	10	9
Republic of Korea	10	29	1	14	11	7	11	14
Hong Kong, China	11	5	23	11	1	24	54	1
France	12	19	13	16	18	21	16	13
Israel	13	35	15	40	14	3	4	26
China	14	62	21	36	19	15	7	12
Ireland	15	17	22	10	35	14	5	21
Japan	16	8	24	8	9	10	13	24
Canada	17	6	19	29	3	20	21	17
Luxembourg	18	26	41	23	32	9	31	3
Austria	19	15	7	20	48	17	19	22
Norway	20	3	16	1	25	25	33	19
Iceland	21	14	28	31	54	18	34	8
Belgium	22	21	11	35	29	16	17	32
Australia	23	10	9	22	7	26	40	23
Czech Republic	24	32	33	21	47	23	15	20
Estonia	25	23	34	5	21	30	23	15
New Zealand	26	4	18	15	10	32	39	33
Malta	27	34	52	25	74	13	49	4
Italy	28	37	32	19	50	34	18	27
Cyprus	29	27	40	27	49	28	20	25
Spain	30	31	27	7	26	37	24	31
Portugal	31	24	25	26	65	45	32	29
Slovenia	32	20	26	32	77	27	35	41
Malaysia	33	40	29	48	20	31	38	35
United Arab Emirates	34	28	17	17	30	22	78	34
Hungary	35	43	36	34	89	33	22	46
Latvia	36	30	44	45	43	41	42	28
Bulgaria	37	48	64	30	97	40	29	37
Poland	38	39	35	42	69	38	36	47
Slovakia	39	41	62	33	82	46	30	39
Lithuania	40	33	45	38	46	47	48	40
Croatia	41	47	47	39	73	56	43	49
Viet Nam	42	83	79	73	34	39	37	38
Greece	43	52	20	41	75	62	47	59
Thailand	44	65	67	67	22	36	44	52
Ukraine	45	93	39	94	99	54	25	44
Romania	46	53	76	37	83	53	28	67
Russian Federation	47	71	30	60	55	42	50	60
India	48	61	60	75	31	55	27	64
Montenegro	49	44	54	53	61	78	66	36
Philippines	50	91	86	63	86	29	26	57
Turkey	51	94	42	54	28	57	57	50
Mauritius	52	22	69	64	16	117	79	43
Serbia	53	45	59	44	101	64	41	66
Chile	54	38	55	51	41	49	64	61
Mexico	55	74	58	59	59	59	55	54
Costa Rica	56	66	66	62	98	48	53	53
North Macedonia	57	50	72	49	17	66	58	76
Mongolia	58	76	80	87	13	81	84	30
Republic of Moldova	59	81	75	88	42	88	51	51
South Africa	60	55	70	79	15	50	62	70
Armenia	61	64	94	90	68	69	45	56
Brazil	62	82	49	61	91	35	56	77
Georgia	63	36	61	81	39	79	67	68
Belarus	64	84	37	58	107	67	46	97
Tunisia	65	75	38	74	112	110	52	63
Saudi Arabia	66	102	31	57	44	51	88	69

TABLE 1.1

Heatmap: GII 2020 rankings overall and by pillar, continued

Country/Economy	Overall GII rank	Institutions	Human capital & research	Infrastructure	Market sophistication	Business sophistication	Knowledge & technology outputs	Creative outputs
Iran (Islamic Republic of)	67	120	46	69	108	112	59	48
Colombia	68	57	82	50	45	52	72	80
Uruguay	69	46	71	52	114	85	63	62
Qatar	70	58	83	28	94	77	85	58
Brunei Darussalam	71	25	51	46	76	44	129	89
Jamaica	72	42	88	110	110	60	107	42
Panama	73	67	101	47	67	123	91	55
Bosnia and Herzegovina	74	80	50	84	51	102	61	96
Morocco	75	77	81	71	88	107	60	75
Peru	76	72	57	68	38	43	112	87
Kazakhstan	77	49	68	66	53	71	80	105
Kuwait	78	88	63	55	81	98	73	88
Bahrain	79	51	84	43	80	86	86	98
Argentina	80	97	48	70	120	61	75	71
Jordan	81	63	78	95	52	94	82	84
Azerbaijan	82	59	89	85	36	96	118	65
Albania	83	56	95	65	70	73	119	72
Oman	84	70	43	56	104	95	124	94
Indonesia	85	111	92	80	62	114	71	83
Kenya	86	78	110	114	57	68	70	91
Lebanon	87	103	85	98	90	80	76	85
United Republic of Tanzania	88	101	126	105	87	118	106	45
Botswana	89	60	53	103	96	99	89	111
Dominican Republic	90	98	100	77	105	83	99	82
Rwanda	91	54	112	93	37	63	103	114
El Salvador	92	100	105	101	71	76	110	74
Uzbekistan	93	95	77	72	27	127	90	127
Kyrgyzstan	94	92	73	97	66	105	81	117
Nepal	95	114	114	76	40	58	102	106
Egypt	96	115	90	99	106	103	65	101
Paraguay	97	109	98	89	93	84	115	78
Trinidad and Tobago	98	68	65	91	109	109	121	99
Ecuador	99	126	91	82	64	97	105	92
Cabo Verde	100	87	96	86	128	65	117	73
Sri Lanka	101	119	119	78	118	70	68	100
Senegal	102	73	106	106	95	130	74	103
Honduras	103	125	99	109	56	74	97	104
Namibia	104	69	115	112	103	111	127	79
Bolivia (Plurinational State of)	105	129	56	104	78	90	114	109
Guatemala	106	117	123	113	79	82	116	81
Pakistan	107	99	118	119	116	87	69	108
Ghana	108	121	104	96	111	113	104	90
Tajikistan	109	118	87	123	60	128	77	113
Cambodia	110	112	122	120	72	119	96	102
Malawi	111	106	124	128	58	92	92	107
Côte d'Ivoire	112	79	117	121	92	101	98	116
Lao People's Democratic Republic	113	130	113	118	117	72	108	86
Uganda	114	89	130	102	63	115	113	125
Madagascar	115	108	116	127	115	121	109	93
Bangladesh	116	124	129	92	100	122	95	115
Nigeria	117	110	121	124	102	75	120	110
Burkina Faso	118	86	102	111	113	116	111	129
Cameroon	119	113	103	117	123	100	94	123
Zimbabwe	120	128	93	131	84	108	101	112
Algeria	121	104	74	100	130	126	125	118
Zambia	122	122	111	107	85	91	123	126
Mali	123	107	120	125	119	106	93	120
Mozambique	124	127	108	83	125	124	122	122
Togo	125	90	109	116	121	129	126	121
Benin	126	85	97	122	122	125	130	128
Ethiopia	127	116	128	108	131	120	87	119
Niger	128	96	127	126	124	89	100	131
Myanmar	129	123	107	115	127	131	83	130
Guinea	130	105	131	130	126	93	131	95
Yemen	131	131	125	129	129	104	128	124

Source: Global Innovation Index Database, Cornell, INSEAD, and WIPO, 2020.
Note: Dark blue means the economy belongs to the 4th quartile (best performers) corresponding to ranks 1st to 32nd in the GII rank and its pillars; green = 3rd quartile (ranks 33rd to 65th); yellow = 2nd quartile (ranks 66th to 98th); and orange = 1st quartile (ranks 99th to 131st).

The top performers by income group

Table 1.2 shows the 10 best-ranked economies by income group in the GII 2020.

The top 10 economies in the GII are all high-income economies.

In the upper-middle income group, **China** (14th), **Malaysia** (33rd), and **Bulgaria** (37th) had held the top three positions since 2016 (GII 2020 Results: Highlights in this chapter and Box 3). **Thailand** (44th) remains the 4th economy in this group, while **Romania** (46th) ranks 5th (up from 8th last year). **The Russian Federation** (47th) keeps its 6th position among upper-middle income economies since 2017.

Among the lower middle-income group, **Viet Nam** (42nd) is at the top, followed by **Ukraine** (45th, up by 2) and **India** (48th, up by 4) (see Central and Southern Asia). The **Philippines** (50th, up by 4) moves up into the 4th position (see South East Asia, East Asia, and Oceania). **Indonesia** (85th) joins the top 10, ranked 9th.

The United Republic of Tanzania tops the low-income group (88th), gaining nine positions since last year and two positions within its income group. **Rwanda** (91st) goes down to 2nd place, which it held in 2017 and 2018. **Nepal** (95th) ranks 3rd (up from 6th last year). Two economies enter the low-income group top 10: **Madagascar** (115th) and **Mozambique** (124th), while Senegal[67] (102nd) and Ethiopia (127th) leave.

TABLE 1.2

10 best-ranked economies by income group (rank)

Rank	Global Innovation Index 2020
High-income economies (49 in total)	
1	Switzerland (1)
2	Sweden (2)
3	United States of America (3)
4	United Kingdom (4)
5	Netherlands (5)
6	Denmark (6)
7	Finland (7)
8	Singapore (8)
9	Germany (9)
10	Republic of Korea (10)

Rank	Global Innovation Index 2020
Upper middle-income economies (37 in total)	
1	China (14)
2	Malaysia (33)
3	Bulgaria (37)
4	Thailand (44)
5	Romania (46)
6	Russian Federation (47)
7	Montenegro (49)
8	Turkey (51)
9	Mauritius (52)
10	Serbia (53)

Lower middle-income economies (29 in total)	
1	Viet Nam (42)
2	Ukraine (45)
3	India (48)
4	Philippines (50)
5	Mongolia (58)
6	Republic of Moldova (59)
7	Tunisia (65)
8	Morocco (75)
9	Indonesia (85)
10	Kenya (86)

Low-income economies (16 in total)	
1	United Republic of Tanzania (88)
2	Rwanda (91)
3	Nepal (95)
4	Tajikistan (109)
5	Malawi (111)
6	Uganda (114)
7	Madagascar (115)
8	Burkina Faso (118)
9	Mali (123)
10	Mozambique (124)

Source: Global Innovation Index Database, Cornell, INSEAD, and WIPO, 2020.

BOX 3

The global and regional innovation divides—further deepening ahead?

China, Malaysia, and Bulgaria are still the only middle-income economies in the GII top 40; otherwise, the gap across income groups and regions largely perseveres

The top-performing economies in the GII are almost exclusively from the high-income group. The income group divides are large across all pillars and most innovation indicators—and growing as one moves from high income, to middle income, and finally to the low-income group.

Given the known relationship between innovation and development (Figure 1.6), this is generally not surprising. The innovation systems of low- and middle-income economies struggle with lower levels of education, science and technology investments, often weaker science and industry linkages, limited inward knowledge flows, lower absorptive and innovative capacity of domestic firms, challenging business environments with scarce access to financial resources, undersized venture capital markets (Theme Section), and limited use of intellectual property.[68]

China is the only exception, ranking 14th for the second time in a row and the only middle-income economy in the top 30. China edged into the top 25 in 2016, moved to 17th in 2018, and to 14th in 2019. Aside from China, Malaysia (33rd, up from 35th) and Bulgaria (37th, up from 40th) remain the only other middle-income economies that are close to the top 25. In addition to these three economies, there are only seven other middle-income economies in the top 50 of the GII 2020.

The divides are regional too; Northern America and Europe lead, while Asia is catching up

A regional innovation divide also persists. Northern America is the most innovative region–driven by the United States of America (3rd). Europe remains 2nd and South East Asia, East Asia, and Oceania comes in 3rd. Northern Africa and Western Asia remains 4th, Latin America and the Caribbean 5th, and Central and Southern Asia and Sub-Saharan Africa 6th and 7th, respectively ("Which countries lead their respective regions?" in this chapter).

Will the current economic crisis reverse the frail progress in innovation convergence?

The question regarding how the current pandemic will affect these innovation divides looms large. With a possible disintegration of global value chains, generally reduced trade, an economic slowdown, and increased debt, there is a real possibility that the little progress in terms of innovation convergence over the recent years might grind to a halt or even reverse ("What are the likely impacts of the pandemic recession on financing innovation and R&D?" in this chapter).

Which economies are outperforming on innovation relative to their peers?

The more developed an economy is, the more it innovates, and vice versa. The curve in the GII chart below illustrates this rather predictable relationship between innovation and development (Figure 1.6).

Yet, some economies break from this pattern. They perform above or below expectations, relative to their predicted performance—sometimes strongly so.

In this figure and analysis, the economies that rank in the GII top 25 are innovation leaders (in blue). The group of economies in this category is unchanged relative to last year with one exception: the Czech Republic joins this group. In return, New Zealand moves out.[69] With the exception of China, all innovation leaders are high-income economies.

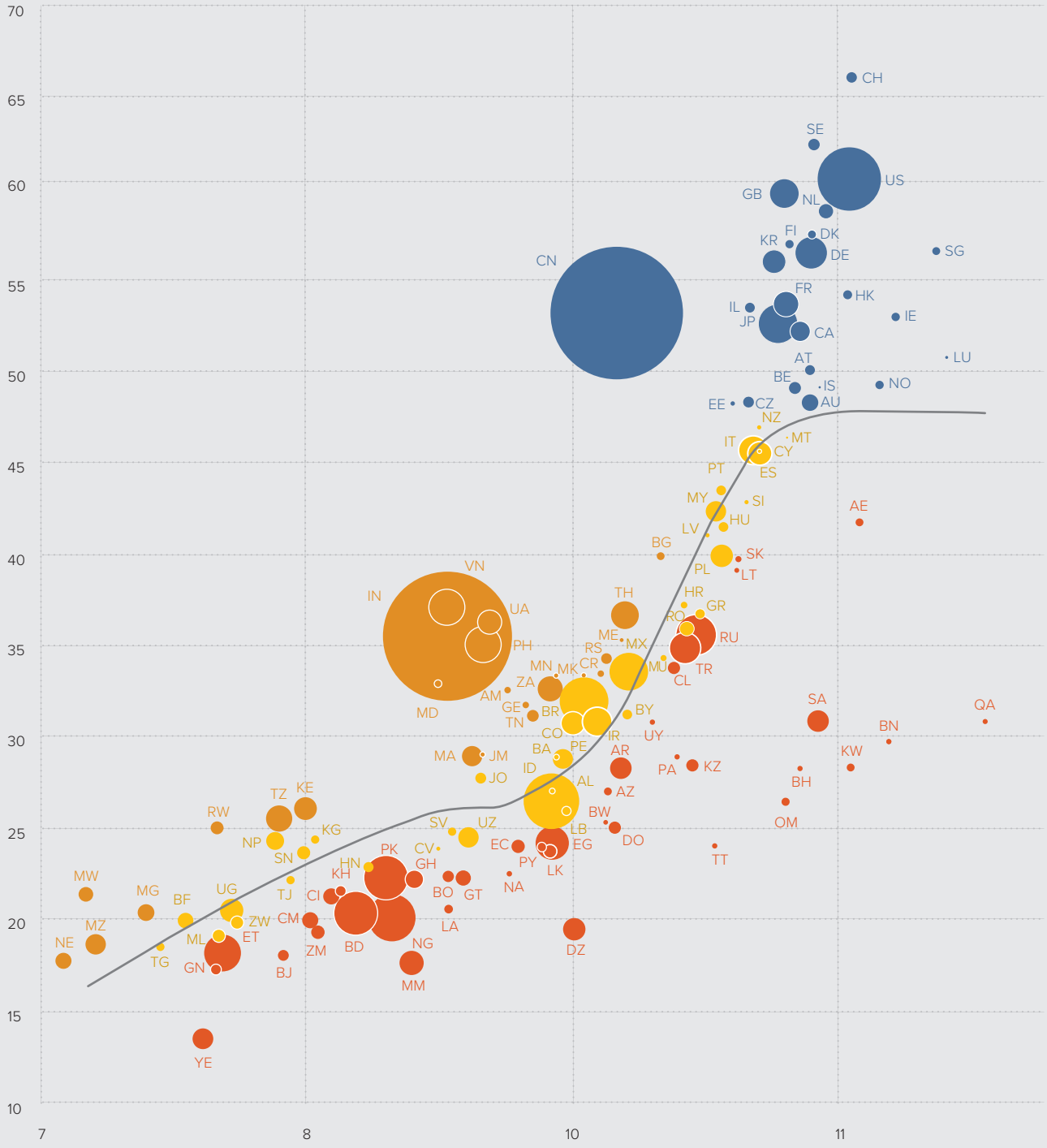
Innovation achievers are those economies that outperform their peers (in orange). There are 25 economies in this group this year, the largest number ever (Table 1.3). Jamaica and the Niger become innovation achievers for the first time.

Sub-Saharan Africa is the region with the largest number of economies performing above expectations for their level of development, thanks to three new (re)entries: the United Republic of Tanzania, Madagascar, and the Niger (8 economies in total). Europe is 2nd (with 6 economies), while Northern Africa and Western Asia (4) and South East Asia, East Asia, and Oceania (4) tie for 3rd. Latin America and the Caribbean (2) and Central and Southern Asia (1) are behind.[70]

India, Kenya, the Republic of Moldova, and Viet Nam hold the record of being innovation achievers for 10 consecutive years (Table 1.3). India ranks 3rd among the economies in the lower middle-income group and has an overall innovation performance that is above the average of the upper middle-

FIGURE 1.6

The positive relationship between innovation and development



▲ GII score
▶ GDP per capita in PPP$ logarithmic scale
● Bubbles sized by population

● Innovation leaders
● Performing above expectations for level of development

● Performing at expectations for level of development
● Performing below expectations for level of development

Source: Global Innovation Index Database, Cornell, INSEAD, and WIPO, 2020.
Notes: As in past editions, Figure 1.6 presents the GII scores plotted against GDP per capita in natural logs and in PPP US$. The main element of the figure is the trend line, which shows the expected levels of innovation performance for a given economy relative to its level of GDP per capita. The figure presents all economies covered in the GII 2020 against this trend line. The trend line is the cubic spline with five knots determined by Harrell's default percentiles (R2 = 0.6827). Economies that are close to the trend line are those whose innovation performance is in line with expectations given its level of development (yellow). The further above an economy is in relation to this trend line, the better its innovation performance is relative to its level of development and thus other peer economies at similar levels. In contrast, those economies located below the trend line are those whose innovation performance is below expectations (red).

ISO-2 codes

Country/Economy	Code
Albania	**AL**
Algeria	**DZ**
Argentina	**AR**
Armenia	**AM**
Australia	**AU**
Austria	**AT**
Azerbaijan	**AZ**
Bahrain	**BH**
Bangladesh	**BD**
Belarus	**BY**
Belgium	**BE**
Benin	**BJ**
Bolivia (Plurinational State of)	**BO**
Bosnia and Herzegovina	**BA**
Botswana	**BW**
Brazil	**BR**
Brunei Darussalam	**BN**
Bulgaria	**BG**
Burkina Faso	**BF**
Cabo Verde	**CV**
Cambodia	**KH**
Cameroon	**CM**
Canada	**CA**
Chile	**CL**
China	**CN**
Colombia	**CO**
Costa Rica	**CR**
Côte d'Ivoire	**CI**
Croatia	**HR**
Cyprus	**CY**
Czech Republic (the)	**CZ**
Denmark	**DK**
Dominican Republic (the)	**DO**
Ecuador	**EC**
Egypt	**EG**
El Salvador	**SV**
Estonia	**EE**
Ethiopia	**ET**
Finland	**FI**
France	**FR**
Georgia	**GE**
Germany	**DE**
Ghana	**GH**
Greece	**GR**

Country/Economy	Code
Guatemala	**GT**
Guinea	**GN**
Honduras	**HN**
Hong Kong, China	**HK**
Hungary	**HU**
Iceland	**IS**
India	**IN**
Indonesia	**ID**
Iran (Islamic Republic of)	**IR**
Ireland	**IE**
Israel	**IL**
Italy	**IT**
Jamaica	**JM**
Japan	**JP**
Jordan	**JO**
Kazakhstan	**KZ**
Kenya	**KE**
Kuwait	**KW**
Kyrgyzstan	**KG**
Lao People's Democratic Republic (the)	**LA**
Latvia	**LV**
Lebanon	**LB**
Lithuania	**LT**
Luxembourg	**LU**
Madagascar	**MG**
Malawi	**MW**
Malaysia	**MY**
Mali	**ML**
Malta	**MT**
Mauritius	**MU**
Mexico	**MX**
Mongolia	**MN**
Montenegro	**ME**
Morocco	**MA**
Mozambique	**MZ**
Myanmar	**MM**
Namibia	**NA**
Nepal	**NP**
Netherlands (the)	**NL**
New Zealand	**NZ**
Niger (the)	**NE**
Nigeria	**NG**
North Macedonia	**MK**
Norway	**NO**

Country/Economy	Code
Oman	**OM**
Pakistan	**PK**
Panama	**PA**
Paraguay	**PY**
Peru	**PE**
Philippines	**PH**
Poland	**PL**
Portugal	**PT**
Qatar	**QA**
Republic of Korea (the)	**KR**
Republic of Moldova (the)	**MD**
Romania	**RO**
Russian Federation (the)	**RU**
Rwanda	**RW**
Saudi Arabia	**SA**
Senegal	**SN**
Serbia	**RS**
Singapore	**SG**
Slovakia	**SK**
Slovenia	**SI**
South Africa	**ZA**
Spain	**ES**
Sri Lanka	**LK**
Sweden	**SE**
Switzerland	**CH**
Tajikistan	**TJ**
Thailand	**TH**
Togo	**TG**
Trinidad and Tobago	**TT**
Tunisia	**TN**
Turkey	**TR**
Uganda	**UG**
Ukraine	**UA**
United Arab Emirates (the)	**AE**
United Kingdom (the)	**GB**
United Republic of Tanzania (the)	**TZ**
United States of America (the)	**US**
Uruguay	**UY**
Uzbekistan	**UZ**
Viet Nam	**VN**
Yemen	**YE**
Zambia	**ZM**
Zimbabwe	**ZW**

income group in all innovation dimensions, with the exception of the pillars Infrastructure and Creative outputs. Kenya ranks 3rd in Sub-Saharan Africa and scores above its income and regional peers in Institutions, Market and Business sophistication, and Knowledge and technology outputs. Viet Nam continues to score above the lower middle-income group average in all pillars and has scores in Business and Market sophistication, as well as in both output pillars that are even above the average of the upper middle-income group.

Lastly, in red in Figure 1.6 are the economies whose innovation performance is below expectations for their level of development. This year, there are 42 economies in this group, also the largest-ever recorded number. Notably, six high-income economies are from Northern Africa and Western Asia (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates). All these economies have a large oil-related GDP, which sets the bar higher for them. Among the upper middle-income group, there are five economies that perform below expectations from Latin America and the Caribbean (Argentina, the Dominican Republic, Ecuador, Guatemala, and Paraguay).[71] In the lower middle-income group, twelve economies perform below expectations for their level of development, notably five from Sub-Saharan Africa (Cameroon, Côte d'Ivoire, Ghana, Nigeria, and Zambia) and three from South East Asia, East Asia, and Oceania (Cambodia, the Lao People's Democratic Republic, and Myanmar).

Relative to 2019, 24 economies change performance groups. The Czech Republic performed at expectations for its level of development in 2019, and it is an innovation leader this year. Eight economies—Bulgaria, Serbia, Tunisia, Jamaica, Morocco, the United Republic of Tanzania, Madagascar, and the Niger performed at expectations last year and are now innovation achievers (Figure 1.6, in orange). New Zealand moved out of the top 25 this year (ranked 26th) and is now part of the group of economies performing at expectations for their level of development. Mauritius, El Salvador, and Togo were performing

TABLE 1.3

Innovation achievers in 2020: income group, region, and years as an innovation achiever

Economy	Income group	Region	Years as an innovation achiever (total)
Viet Nam	Lower-middle income	South East Asia, East Asia, and Oceania	2020, 2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012, 2011 (10)
India	Lower-middle income	Central and Southern Asia	2020, 2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012, 2011 (10)
Republic of Moldova	Lower-middle income	Europe	2020, 2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012, 2011 (10)
Kenya	Lower-middle income	Sub-Saharan Africa	2020, 2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012, 2011 (10)
Armenia	Lower-middle income	Northern Africa and Western Asia	2020, 2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012 (9)
Ukraine	Lower-middle income	Europe	2020, 2019, 2018, 2017, 2016, 2015, 2014, 2012 (8)
Malawi	Low income	Sub-Saharan Africa	2020, 2019, 2018, 2017, 2016, 2015, 2014, 2012 (8)
Rwanda	Low income	Sub-Saharan Africa	2020, 2019, 2018, 2017, 2016, 2015, 2014, 2012 (8)
Mozambique	Low income	Sub-Saharan Africa	2020, 2019, 2018, 2017, 2016, 2015, 2014, 2012 (8)
Mongolia	Lower-middle income	South East Asia, East Asia, and Oceania	2020, 2019, 2018, 2015, 2014, 2013, 2012, 2011 (8)
Thailand	Upper-middle income	South East Asia, East Asia, and Oceania	2020, 2019, 2018, 2015, 2014, 2011 (6)
Montenegro	Upper-middle income	Europe	2020, 2019, 2018, 2015, 2013, 2012 (6)
Georgia	Upper-middle income	Northern Africa and Western Asia	2020, 2019, 2018, 2014, 2013, 2012 (6)
Costa Rica	Upper-middle income	Latin America and the Caribbean	2020, 2019, 2018, 2013 (4)
Madagascar	Low income	Sub-Saharan Africa	2020, 2018, 2017, 2016 (4)
Bulgaria	Upper-middle income	Europe	2020, 2018, 2017, 2015 (4)
South Africa	Upper-middle income	Sub-Saharan Africa	2020, 2019, 2018 (3)
Serbia	Upper-middle income	Europe	2020, 2018, 2012 (3)
Philippines	Lower-middle income	South East Asia, East Asia, and Oceania	2020, 2019 (2)
North Macedonia	Upper-middle income	Europe	2020, 2019 (2)
Tunisia	Lower-middle income	Northern Africa and Western Asia	2020, 2018 (2)
United Republic of Tanzania	Low income	Sub-Saharan Africa	2020, 2017 (2)
Morocco	Lower-middle income	Northern Africa and Western Asia	2020, 2015 (2)
Niger	Low income	Sub-Saharan Africa	2020 (1)
Jamaica	Upper-middle income	Latin America and the Caribbean	2020 (1)

Source: Global Innovation Index Database, Cornell, INSEAD, and WIPO, 2020.
Notes: Income group classification follows the World Bank Income Group Classification of June 2019. Geographic regions correspond to the United Nations publication on standard country or area codes for statistical use (M49).

below expectations last year, and now perform at expectations. Finally, eleven economies are now performing below expectations for their level of development (Figure 1.6, in red), while before they were performing at expectations: Sri Lanka, Uruguay, Cameroon, Egypt, Argentina, Azerbaijan, Ethiopia, Slovakia, Chile, Cote d'Ivoire, and Cambodia. In 2019, these eleven economies were already at the border of performing below expectations. With most of them decreasing their GII scores and ranks this year (with the exception of Azerbaijan, whose GII score decreases while its rank goes up), they swap out of the performing-at-expectations group.

Who is best in the quality of innovation?

Assessing the quality of innovation is a priority to the innovation policy community. As every year, three indicators are used to measure the quality of innovation. First, the quality of local universities is measured through the average score of the top 3 universities in each country in the QS university ranking (indicator 2.3.4). Second, patent families filed in at least two offices (indicator 5.2.5) are used as a proxy of the internationalization of local inventions. Third, the H-index (indicator 6.1.5), which is the number of citations that locally produced research documents receive abroad, is used to assess the quality of scientific publications.

As a complement to this section, Box 4 discusses different approaches to measure the quality of universities around the world.

Figure 1.7 shows the scores of these three indicators added together to capture the top 10 performing high- and middle-income economies in the quality of innovation.

Among the high-income group, the U.S. ranks 1st, followed by Switzerland, which moves up to 2nd position, and Japan, which ranks 3rd, as it did last year. Germany ranks 4th (down by 2), while the Netherlands moves up to 5th—its highest ranking in the quality of innovation to date. The U.K. ranks 6th, moving down one position, while Sweden is stable at 7th place.

China (16th), India (27th), and the Russian Federation (28th) take the top 3 positions among their middle-income peers (Figure 1.7). Brazil (29th), Malaysia (30th), and Mexico (32nd) are next in line, followed by Argentina (35th), South Africa (38th), Turkey (41st), and Thailand (44th). Argentina replaces Colombia in the group of top middle-income economies as the third economy from Latin America and the Caribbean to reach the top ranks.

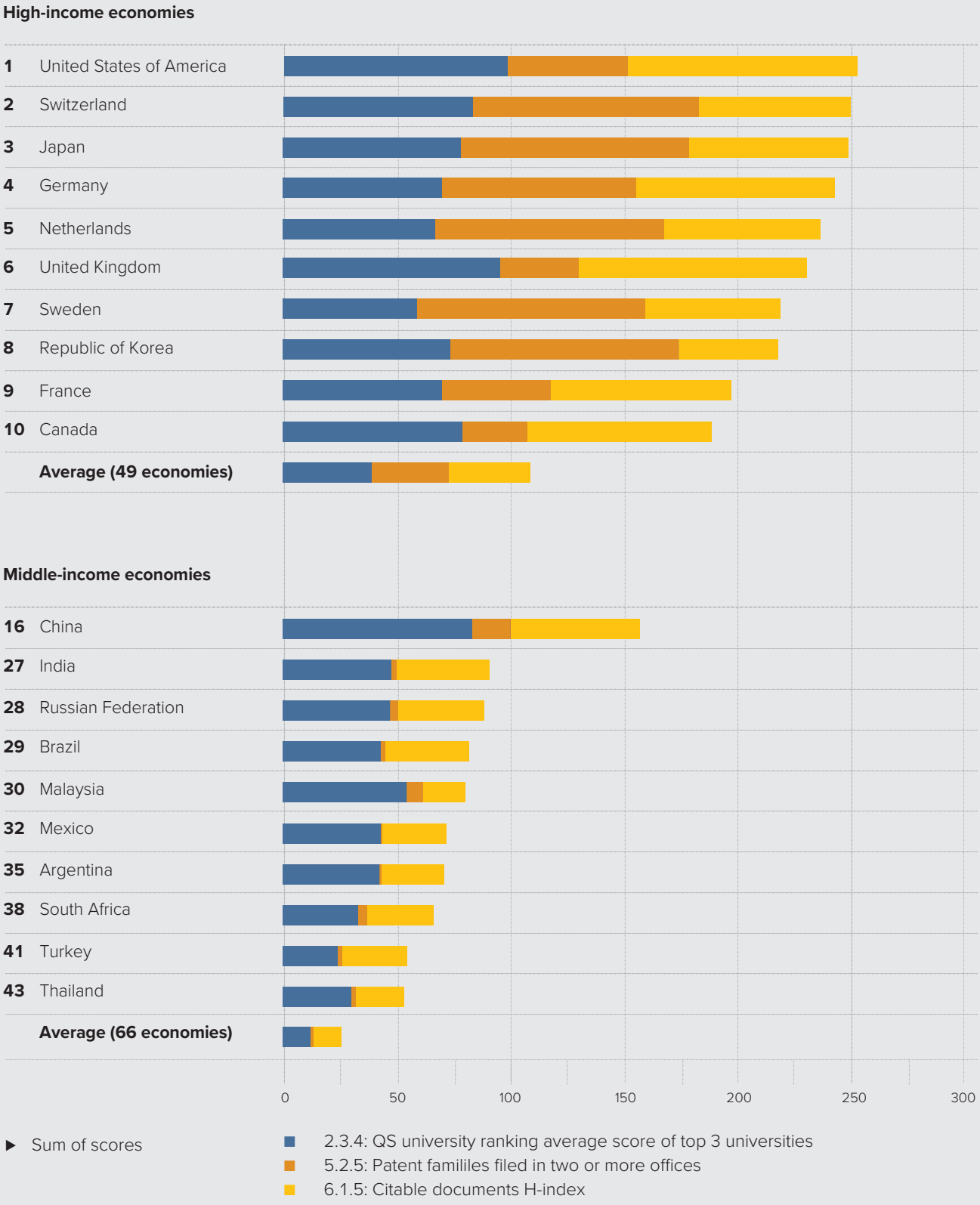
China remains the top middle-income economy in the quality of innovation for the eighth consecutive year. It ranks 3rd in the quality of its universities, with Tsinghua University, Peking University, and Fudan University ranking within the top 50 universities worldwide. **India** ranks 2nd for the fifth consecutive year, with top positions in the quality of scientific publications (21st globally) and the quality of its universities (22nd), thanks to its top three universities: the Indian Institute of Technology (Bombay and Delhi) and the Indian Institute of Science Bengaluru. The **Russian Federation** remains 3rd, a position it has held for four consecutive years. It ranks 22nd in the quality of its scientific publications and 21st in the quality of its universities, with three leading institutions: Lomonosov Moscow State University, Novosibirsk State University, and Saint-Petersburg State University.

The three indicators comprising innovation quality have different relative importance across economies and income groups. Among high-income economies, the three indicators have almost equal importance in the aggregate innovation quality score. Comparatively, high-income economies are more reliant on the internationalization of inventions and, on average, score higher in patent families than middle-income economies (Figure 1.7). Among high-income economies, patent families are critical to economies like Switzerland, Japan, the Netherlands, Sweden, the Republic of Korea, Austria, Finland, and Israel, accounting for more than 40% of their innovation quality score. The quality of universities is proportionately important for the U.K., Canada, Australia, Hong Kong (China), Singapore, Spain, New Zealand, and Ireland, representing nearly half of the innovation quality scores in these economies.

In contrast, the quality of universities and the quality of scientific publications weigh equally on innovation quality among middle-income economies—each comprising 48% of the average score. Patent families, on the other hand, define only 4% of the average innovation quality score among middle-income economies. China is an exception, investing heavily in the internationalization of its inventions; patent families account for 10% of China's innovation quality score. Malaysia is next in line with 8% of its score attributed to the internationalization of inventions, and South Africa is third with 5%. In comparison, patent families explain only 3% of innovation quality in India and the Russian Federation and 1% in Mexico and Argentina.

FIGURE 1.7

Quality of innovation: top 10 high- and middle-income economies, 2020



Source: Global Innovation Index Database, Cornell, INSEAD, and WIPO, 2020.
Notes: Numbers to the left of the economy name are the innovation quality rank. Economies are classified by income according to the World Bank Income Group Classification (June 2019). Upper- and lower middle-income categories are grouped together as middle-income economies.

BOX 4

The U.S. and U.K. remain uncontested leaders in university rankings; as a region Europe leads

Universities play a key role in modern innovation systems: as educators of the future work force, as a place of where research is conducted, and as an important vector for university-industry technology transfer.

To reflect their role in innovation, the GII uses data from the QS World University Ranking (QS) to assess the quality of universities in the economies covered (indicator 2.3.4). The U.S. (1st), U.K. (2nd), and China (3rd) are the leading three economies in the indicator of university quality.

A similar university ranking is the Academic Ranking of World Universities (ARWU)—the so-called Shanghai ranking.[72] It gives more weight to the quality of academic papers. Moreover, the Shanghai ranking attributes great importance to Nobel Prizes and Field Medals won by the respective university's alumni or staff.[73]

Nearly 80% of top universities identified by QS and 89% of top universities identified by Shanghai ranking are based in three world regions: Europe; South East Asia, East Asia and Oceania; and Northern America (by order of importance and thus top universities in the region). Around 9% of institutions ranked by QS index and 4% by ARWU are in Latin America and the Caribbean, and 5% (QS) to 3% (ARWU) are in Northern Africa and Western Asia or Central and Southern Asia. Slightly less than 1% of universities in the top-ranked institutions are located in Sub-Saharan Africa. Both QS and ARWU identify the same top 3 institutions in Sub-Saharan Africa: University of Cape Town (198th in QS, 301–400th in ARWU), University of Witwatersrand (400th in QS, 201–300th in ARWU), and Stellenbosch University (427th in QS, 401–500th in ARWU).

The U.S. and the U.K. harbor close to all universities occupying the top 10 ranks in the world. MIT (1st in QS, 3rd in ARWU), Harvard University (1st in ARWU, 3rd in QS), Stanford University (2nd in both QS and ARWU), University of Oxford (4th in QS, 7th in ARWU), and the University of Cambridge (3rd in ARWU, 7th in QS) are the top institutions in the world.

China is ranked 3rd in QS, while it ranks 8th in ARWU due to the weight that the Shanghai ranking gives to the quality of publications and Nobel prizes. China's top 5 institutions are Tsinghua University (1st in QS and ARWU), Peking University (2nd in QS and ARWU), Fudan University (3rd in QS), Zhejiang University (4th in QS, 3rd in ARWU), Shanghai Jiao Tong University (5th in QS, 4th in ARWU), and University of Science and Technology of China (5th in ARWU, 6th in QS).

Box 4, Table 1 shows the best-ranked universities in middle- or low-income economies outside China.

Ultimately, the above rankings are focused on the quality of science and research outputs and, to some extent, on their reputation with graduates and employers. Despite their richness, more statistical work is needed to properly assess the role of universities in innovation, in particular their role of fostering knowledge and technology transfer to the private sector—a key vector to foster growth and employment. Aside from countries, such as the U.S. or Israel, with solid data on knowledge transfer, currently available innovation indicators do not permit easily establishing which other countries and institutions do well on this innovation front. This is an important research agenda for the future.[74]

BOX 4, TABLE 1

Top 10 universities in middle- or low-income economies, excluding China

Rank	QS World University Rankings	ARWU—Academic Ranking of World Universities (Shanghai ranking)
1	University of Malaya, 70 (Malaysia)	Lomonosov Moscow State University, 87 (Russian Federation)
2	University of Buenos Aires, 74 (Argentina)	University of Sao Paulo, 101-150 (Brazil)
3	Lomonosov Moscow State University, 84 (Russian Federation)	University of Cape Town, 201-300 (South Africa)
4	National Autonomous University of Mexico, 103 (Mexico)	University of the Witwatersrand, 201-300 (South Africa)
5	University of Sao Paulo, 116 (Brazil)	National Autonomous University of Mexico, 201-300 (Mexico)
6	Indian Institute of Technology Bombay, 152 (India)	University of Buenos Aires, 201-300 (Argentina)
7	Monterrey Institute of Technology, 158 (Mexico)	University of Campinas, 301-400 (Brazil)
8	University Putra Malaysia, 159 (Malaysia)	University of Tehran, 301-400 (Iran)
9	The National University of Malaysia , 160 (Malaysia)	Saint Petersburg State University, 301-400 (Russia)
10	University of Science, Malaysia, 165 (Malaysia)	Sao Paulo State University, 301-400 (Brazil)

Source: QS World University Rankings 2019 (QS Quacquarelli Symonds Limited) and The 2019 Academic Ranking of World Universities (ARWU) (ShanghaiRanking Consultancy)
Note: The values after the university names refer to the rank of the institution in said ranking in 2019.

Which economies have the most valuable brands?

Brands are an important aspect of everyday life. They are also an important element of how a country scores on intangible assets.

On average, firms that invest more in innovation invest more in branding; it is an important way for firms to secure returns on their R&D investments.[75] To move up global value chains and to increase the possibility of capturing greater profit margins, companies in low- and middle-income economies increasingly seek to develop their own brands or to acquire them from abroad.[76]

As a result, global branding investments approached half a trillion dollars[77] and account for a growing share of GDP—equivalent to about one-third of global research and development (R&D).[78]

The GII already takes into account the importance of intangible assets to innovation in pillar 7.1, which captures trademarks (indicator 7.1.1)—another proxy for brands, designs (7.1.3), and organizational innovation (7.1.4).

In addition, the GII 2020 innovated this year to include a novel indicator showing which economies have the most valuable brands (7.1.2 Global brand value, top 5,000, % GDP). The Global brand value annual ranking of the top 5,000 most valuable brands in the world includes a distribution of brands and their values by economy and sector.[79] This novel GII indicator sums the values of all the top brands of each economy and then scales this brand value by GDP.

If one takes the value of all brands by economy without scaling, the U.S. is the clear leader. Out of the top 5,000 brands, it has US$4.3 trillion, followed by China with US$1.6 trillion, and Japan with US$0.7 trillion. The U.S. also leads by number of brands (1,359 out of 5,000), followed by China (408), and Japan (344). In both cases, the distance between the U.S., and now China, and the rest of the world is massive.

Figure 1.8 shows the top most valuable 25 brands and their origin. The U.S. scores highest with Amazon (1), Google (2), and Apple (3). China follows with Industrial and Commercial Bank of China (6), Ping An (9), and Huawei (10). The Republic of Korea has Samsung (5).[80]

North America is the uncontested region with the highest total brand value of top global brands. South East Asia, East Asia, and Oceania—which includes China—is second. Then follows Europe. Northern Africa and Western Asia come next—with Saudi Arabia oil and gas (Saudi Aramco) and telecommunications (Saudi Telecom Company); and both the United Arab Emirates and Turkey with airlines Emirates and Turkish Airlines, respectively. Central and Southern Asia follows—with India and its TATA Group (Engineering and Construction) leading. These are followed by Latin America and the Caribbean, with Mexico leading in beer (Corona and Victoria) and telecoms (Claro); and Brazil, with top brands in banking (Itaú, Bradesco, Caixa, and Banco do Brasil). Sub-Saharan Africa is last, led by South Africa, with brands in telecommunication (MTN and Vodacom); and Nigeria, with Dangote Industries in construction materials.

Indeed, with exceptions, the richer an economy is, the more top global brands it produces, and vice versa. In the GII, given a strong GDP to brand value correlation, we scale brand values by GDP. After scaling, Hong Kong (China) comes out on top, followed by Switzerland, Sweden, the U.S., France, the U.K., Malaysia, the Republic of Korea, the Netherlands, and Japan.

There is also another way to look at this brand data (Figure 1.9). When plotting the level of development of a country against its share of brand value in the top global brands, one can see economies which over- and underperform relative to their level of development. Most economies in the upper right quadrant are high income and, as expected, top-brand producers, while those in the lower right are also mostly high income but—somewhat less expected—weaker on producing top brands. Those in the upper left quadrant—the true outperformers in this graphical analysis—are a mix of large- and mid-sized middle-income economies. Nonetheless, they manage to have top brands. The outperformers are China, India, Mexico, Brazil, Indonesia, Thailand, South Africa, Vietnam, the Philippines, Colombia, and Argentina (by order of value of all brands in the top 5,000). The lower left quadrant are middle- and low-income economies which have brands that make it into the top 5,000 ranking, but their value is relatively weaker. That does not mean that these countries are underperformers. Economies with no top-valued brands do not make it into the figure. They are the economies which need to prioritize brand building most.

Thanks to this new dataset, brands—as intangible assets important to innovation—can be included in the GII. In the years to come, however, it will also be important to make more internationally comparable data available on other intangible assets as proposed in the currently existing measurement frameworks, such as firm-specific human capital and the strength of organizational structures.[81]

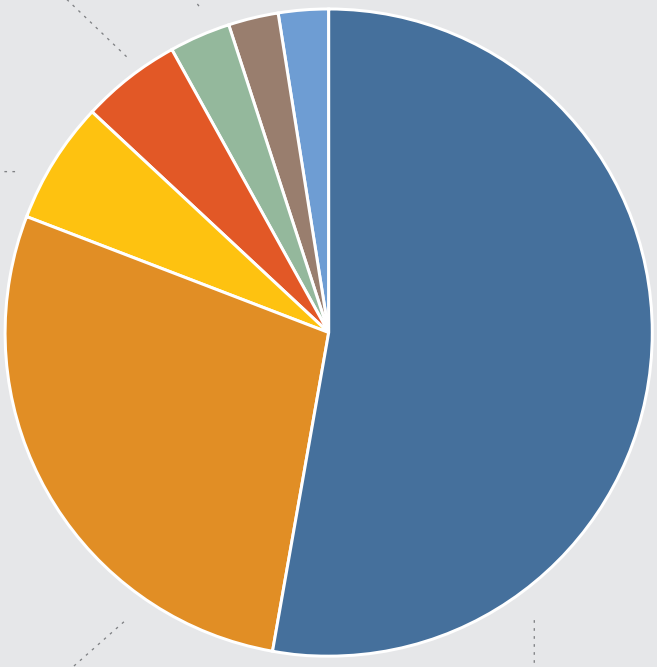
Which economies get the most bang for their buck on their innovation investments?

In 2018, the GII started plotting the input-output performance of economies against each other (Figure 1.10) following advice from the European Commission's Competence Centre on Composite Indicators and Scoreboards (COIN). Using this approach, some economies stand out in terms of their ability to translate more effectively innovation inputs into innovation outputs.

This analysis also groups high-income economies that show much higher outputs than other high-income economies with similar inputs and those with similar returns but using much less

FIGURE 1.8

Top 25 global brands, by value and origin, 2020



Japan
$58,076

15. Toyota

Netherlands
$47,529

23. Shell

Saudi Arabia
$46,768

24. Saudi Aramco

Republic of Korea
$94,494

5. Samsung Group

Germany
$109,938

11. Mercedes-Benz
25. Volkswagen

China
$542,940

6. ICBC
9. Ping An
10. Huawei
13. China Construction Bank
16. State Grid
18. Agricultural Bank of China
19. WeChat
20. Bank of China
22. China Mobile

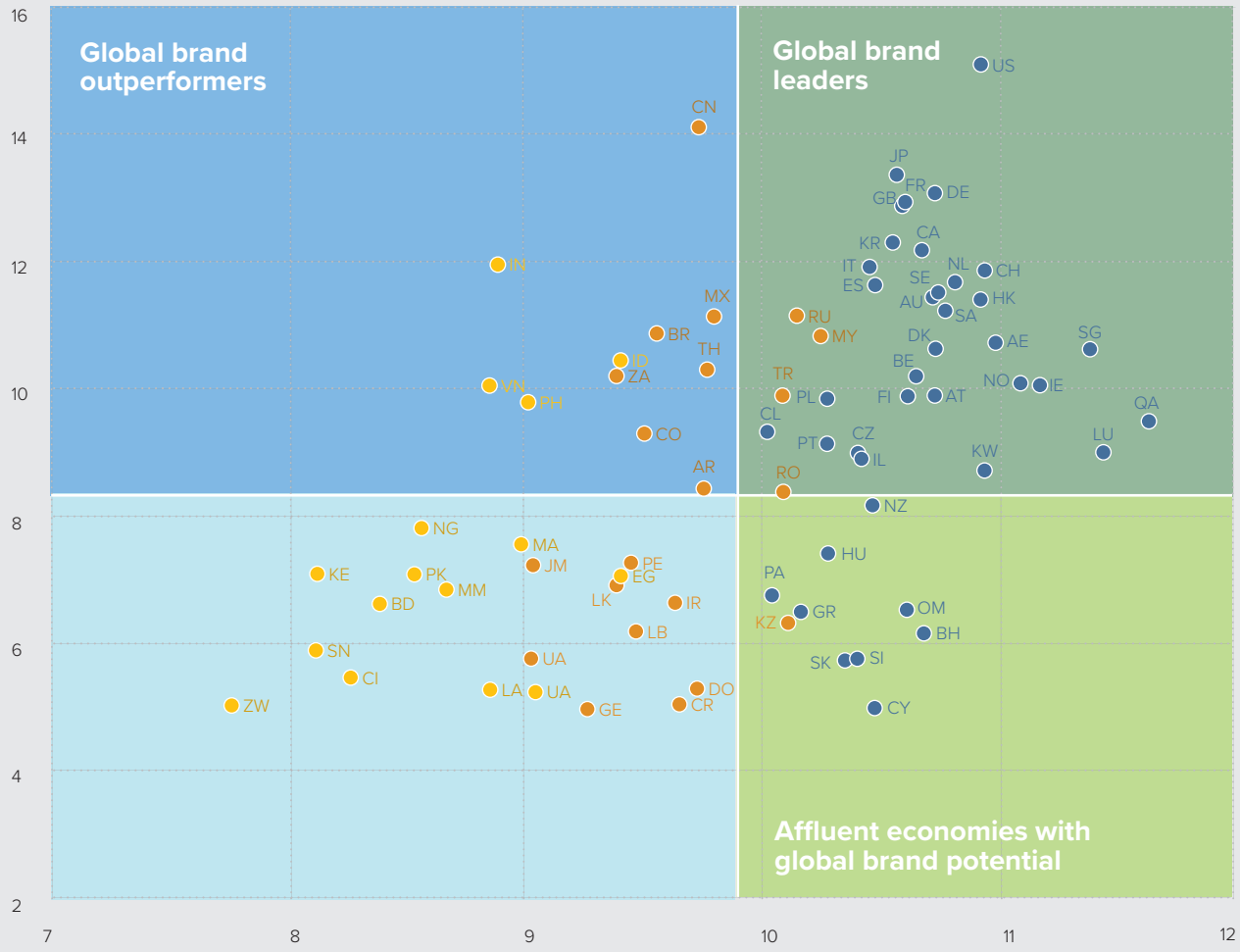
United States of America
$1,024,859

1. Amazon
2. Google
3. Apple
4. Microsoft
7. Facebook
8. Walmart
12. Verizon
14. AT&T
17. Disney
21. The Home Depot

Source: Brand Finance, 2020.
Note: Figures in US$ millions.

FIGURE 1.9

Brand value by level of economic development, 2020



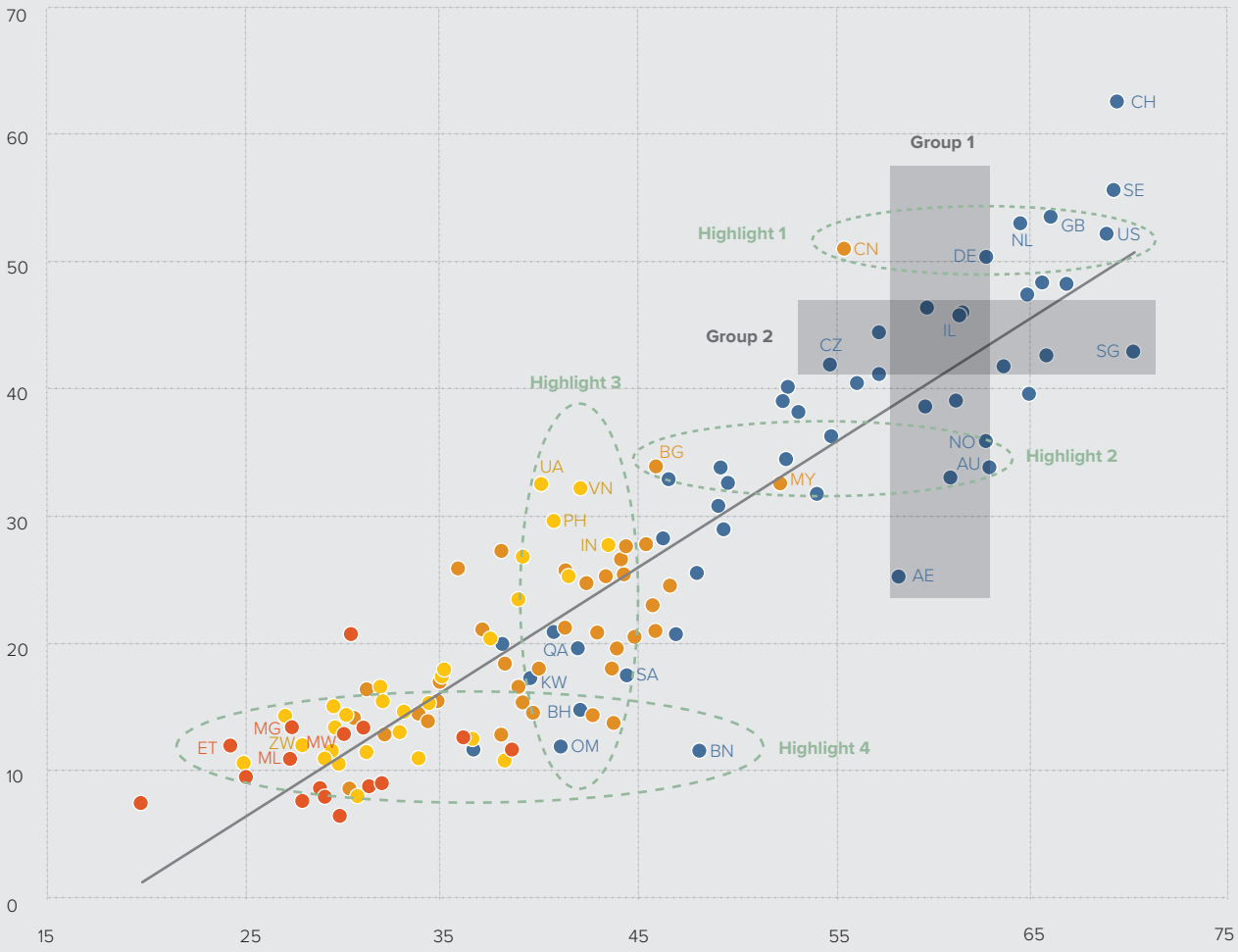
▲ Value of an economy's top brands, amongst the top 5,000 global brands (logarithmic scale)
▶ GDP per capita (logarithmic scale)

● High income group
● Upper middle-income group
● Lower middle-income group
● Low income group

Source: GII calculations based on data from Brand Finance and International Monetary Fund (IMF), 2019.

FIGURE 1.10

Innovation input to output performance, 2020



▲ Output score
▶ Input score

● High-income group
● Upper middle-income group
● Lower middle-income group
● Low-income group

— Fitted values

AU	Australia	IN	India	NL	Netherlands	CH	Switzerland
BH	Bahrain	IL	Israel	NO	Norway	UA	Ukraine
BN	Brunei Darussalam	KW	Kuwait	OM	Oman	AE	United Arab Emirates
BG	Bulgaria	MG	Madagascar	PH	Philippines	GB	United Kingdom
CN	China	MW	Malawi	QA	Qatar	US	United States of America
CZ	Czech Republic	ML	Mali	SA	Saudi Arabia	VN	Viet Nam
ET	Ethiopia	MY	Malaysia	SG	Singapore	ZW	Zimbabwe
DE	Germany			SE	Sweden		

Source: Global Innovation Index Database, Cornell, INSEAD, and WIPO, 2020.

inputs. Similarly, it highlights clusters that show lower-income economies that are getting comparable or higher returns on their innovation investments compared to other economies in higher-income groups.

Among the high-income group, the top ranked economies located more towards the right of Figure 1.8, such as Switzerland (CH), the U.K. (GB), Sweden (SE), and the U.S. (US), produce more outputs relative to their levels of innovation inputs. Group 1 in Figure 1.10 shows economies that at similar levels of inputs produce very different levels of outputs. Group 2 shows the mirroring situation: economies that at very different levels of inputs produce comparatively similar level of outputs. For instance, the Czech Republic (CZ) and Israel (IL) continue to achieve the same level of outputs as Singapore (SG) at much lower levels of inputs (Group 1), while Germany (DE) shows much higher outputs than the United Arab Emirates (AE) with similar level of inputs (Group 2).

Highlights 1 and 2 show the catching-up of some middle-income economies to the high-income group with respect to the levels of innovation outputs produced. China (CN) stands out for having innovation outputs that are comparable to those of the high-income group (Box 2), including to top 10 economies such as the Netherlands (NL), the U.K., and the U.S. (Figure 1.10, Highlight 1). Malaysia (MY) and Bulgaria (BG) are middle-income economies that have outputs comparable to high-income economies, like Norway (NO) and Australia (AU), with less inputs (Highlight 2).

Viet Nam (VN), Ukraine (UA), the Philippines (PH), and India (IN) stand out as lower middle-income economies that are getting much more outputs for their inputs. Their levels remain above those of high-income, oil-rich economies Kuwait (KW), Qatar (QA), Bahrain (BH), Saudi Arabia (SA), and Oman (OM) (Highlight 3). With significantly lower efforts on the input side, lower middle-income Zimbabwe (ZW), and low-income Ethiopia (ET), Madagascar (MG), Mali (ML), and Malawi (MW)–all economies from Sub-Saharan Africa–display the same level of outputs as Brunei Darussalam (BN), a high-income economy (Highlight 4).

This sort of efficiency analysis has proven useful in practical assessments with innovation practitioners and policymakers on the ground. The assumption, however, is that innovation inputs and output are perfectly measured, which is not the case. Besides, in real innovation systems, their relationship is not linear in any way. These facts need consideration in earnest. They are also a call for action to innovation statisticians and scholars.

Which countries lead their respective regions?

Regional innovation divides persist (Box 3). While Sub-Saharan Africa has historically occupied the last place in terms of innovation performance of all world regions, as shown in Figure 1.11, the Africa continent as a whole—comprising Sub-Saharan Africa and Northern Africa, has one of the most heterogeneous performances across continents. While some economies rank in the top 60, nine economies rank below the 120th place (Figure 1.11). Two Sub-Saharan African countries, Mauritius (52nd) and South Africa (60th) lead the continent, followed by Northern African Tunisia (65th) and Morocco (75th) in the top 80. All economies in the lowest ranks of the continent are Sub-Saharan African economies, with Ethiopia (127th), the Niger (128th) and Guinea (130th) trailing.

Innovation systems in Africa are broadly characterized for having low levels of science and technology activities, a high reliance on government or foreign donors as a source of R&D, limited science-industry linkages, low absorptive capacity of firms, limited use of IP, and a challenging business environment.

But this is a broad generalization; some economies stand out. In contrast, the typical innovation leader in Africa usually has higher expenditure on education (Botswana, Tunisia) and R&D (South Africa, Kenya, Egypt), strong financial market indicators such as Venture capital deals (South Africa), openness to technology adoption and inward knowledge flows, improving science and research base (Tunisia, Algeria, Morocco), active use of ICTs and organizational model creation (Kenya), as well as a stronger use of their IP systems (Kenya, Tunisia, South Africa, Namibia, Madagascar, Morocco). Thanks to innovation in the informal sector and the inability to measure innovation perfectly in these and similar developing country settings, innovation is also more pervasive in Africa than formal innovation metrics suggests.

Sub-Saharan Africa (26 economies)

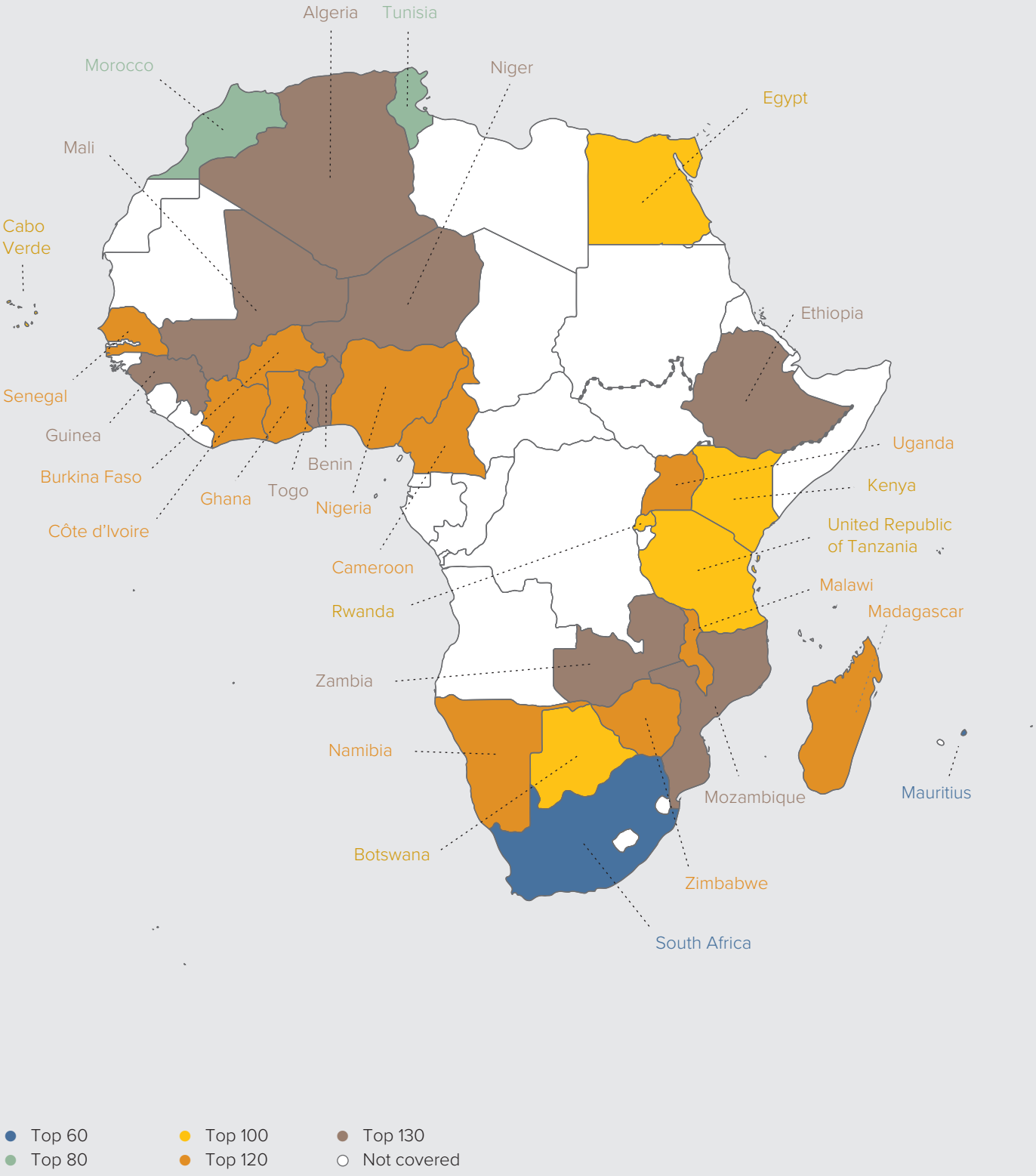
Figure 1.11 shows the regional performance differences in Sub-Saharan Africa: two economies rank in the top 60 (dark blue), while eight economies are in the top 130 (brown). The majority of all other economies covered in the region (11), rank in the top 120 (orange).

In 2020, the top 5 economies in the region are Mauritius (52nd), South Africa (60th), Kenya (86th), the United Republic of Tanzania (88th), and Botswana (89th) (Figure 1.11). With the exception of Kenya, all of these economies improve their GII ranking when compared to 2019. In particular, Mauritius displays the most notable rank change this year. More complete innovation data, data revisions at source, performance improvements, and model changes explain Mauritius's rise in the rankings. Rwanda (91st) and Cabo Verde (100th) round up the other economies in the region that are among the top 100. The other 19 economies in the region rank beyond the top 100, with only Malawi (111th), Madagascar (115th), Zimbabwe (120th), Zambia (122nd), and Togo (125th) improving their rankings this year. On average, the region performs the best in the pillars Institutions, and both Market and Business sophistication, while it trails the most in Creative outputs when compared to other regions.

Historically, Sub-Saharan Africa continues to host the largest number of economies that perform above expectations on innovation for their level of development (Figure 1.6 and Table 1.3).

FIGURE 1.11

GII 2020 rankings in Northern Africa and Sub-Saharan Africa



Source: Global Innovation Index Database, Cornell, INSEAD, and WIPO, 2020.

This year, Cabo Verde and the Niger improved their data coverage and are newcomers to the GII.

Rwanda ranks 91st (up by 3). It drops in the Innovation Input Sub-index (79th, down by 14) and moves up in the Innovation Output Sub-index (112th, up by 11). On innovation inputs, it improves modestly in the pillar Market sophistication (37th, up by 1, and a relative strength), where sub-pillar Credit (15th) as well as indicators Ease of getting credit (4th) and Microfinance gross loans (1st) are relative strengths for Rwanda. In the Market sophistication pillar, indicator Applied tariff rate (77th) increases the most. On the outputs-side, Rwanda improved the most in Knowledge and technology outputs (103rd, up by 22), where sub-pillar Knowledge impact (85th) increased mostly because the indicator productivity growth is available this year and Rwanda ranks in the top 15 worldwide (15th). This indicator is the only relative strength for Rwanda on innovation outputs. Rwanda continues to work closely with the GII to improve its data coverage, some of which will show in the GII 2021.

The United Republic of Tanzania ranks 88th this year (up by 9) and enters the top three in the region (Figure 1.4). It increases three positions in the Innovation Input sub-index (112th) and goes up six ranks in the Innovation Output Sub-Index (67th). It moves up the most in two pillars: Market sophistication (87th), and Creative outputs (45th). Overall, Tanzania's relative strengths are evenly split between innovation inputs and outputs. It ranks in the top 25 in indicators Cost of redundancy dismissal (25th) and Gross capital formation (13th). Conversely, Tertiary enrolment (123rd), Global R&D companies (42nd), the quality of local universities (77th), GERD financed by business (102nd), Patent families (101st), and Computer software spending (124th) remain relative weaknesses for the country. It is worth noting that although Tanzania's data coverage is satisfactory, it could benefit greatly from updating its innovation metrics more systematically.

Northern Africa and Western Asia (19 economies)

The top three of the most innovative economies in the Northern Africa and Western Asia region remains unchanged. Israel, ranking 13th worldwide (down by 3), continues to be the most innovative economy in the region ("What are the top 10 economies in innovation inputs?" in this chapter), followed by Cyprus (29th, down by 1), and the United Arab Emirates (34th, up by 2). These three economies are the only ones in the region that rank in the top 50 of the GII overall.

Seven economies in the region improve their GII ranks: the United Arab Emirates (34th), Armenia (61st), Tunisia (65th), Saudi Arabia (66th), Jordan (81st), Azerbaijan (82nd), and Lebanon (87th). Among the economies in Northern Africa, only Tunisia (65th) has a rank increase (Figure 1.11). Kuwait (78th) and Georgia (63rd) experience the largest drops in overall ranks in the region. For Kuwait, better data availability, notably on the innovation outputs side—and in particular in the Knowledge creation (109th) and the Intangible assets (76th) sub-pillars—explains a good part of the drop. In the case of Georgia, a mix of better data availability, changes to the GII model, and performance decreases both in innovation inputs and outputs explain the decrease.

Saudi Arabia (66th) increased its rank by two positions this year. It ramped up notably in the Innovation Output Sub-Index by eight ranks to reach the 77th place. The sub-pillar Intangible assets (51st) increased the most by a combination of performance improvements and model changes. It gained seven ranks in the indicator Trademarks by origin (111th). With 46 brands in the top 5,000, led by telecoms STC, Saudi Arabia ranks 18th in the novel GII indicator Global brands value. Other relative strengths include the Ease of protecting minority investors, where it ranks 3rd worldwide, Global R&D companies (22nd), ICT access (31st), ICT use (29th), and the quality of its universities (31st).

Jordan (81st) goes up by five positions–the largest move in the region, together with Tunisia (65th, up from 70th). Most of Jordan's improvements are on the Innovation Input Sub-Index (77th), where it goes up by 14 ranks. At the pillar level, Jordan improves in Institutions (63rd), Market sophistication (52nd), and Business sophistication (94th). In Market sophistication, the indicator Ease of getting credit (4th) is now a relative strength and remarkably improved. Jordan strengthened access to credit by introducing a new secured transactions law, amending their insolvency law, and improving access to credit information. Indicators Ease of resolving insolvency (98th), Ease of protecting minority investors (92nd), Domestic credit to private sector (35th), and Venture capital deals (17th) improved as well.

Central and Southern Asia (10 economies)

India (48th) retains the highest rank in the region. The Islamic Republic of Iran (67th) ranks 2nd, and Kazakhstan (77th) ranks 3rd. Uzbekistan (93rd) enters the GII rankings as the 4th economy in this region, thanks to better data availability, and Kyrgyzstan (94th) remains 5th, although losing three spots.

India (48th) moves up four positions since 2019 to retain the regional top rank and becomes 3rd in the rankings among the lower middle-income economies. For the 10th consecutive year, India is an innovation achiever (Table 1.2).

India increases the most in three pillars: Institutions (61st), Business sophistication (55th), and Creative outputs (64th). In Institutions, indicators Political and operational stability (83rd), Government effectiveness (55th), and most of all Ease of resolving insolvency (47th) improved remarkably. In Business sophistication, indicator GERD financed by business (48th) is available this year, while ranks also improved for both IP payments (27th) and Research talent (38th). In Creative outputs (64th), India increased by a combination of performance improvements and model changes. It gained several places in indicator Cultural and creative services exports (21st) and it ranks 31st in the new GII indicator on Global brands thanks to its164 brands in the top 5,000, led by TATA Group.

India shows relative strengths that are in the GII top 10 rankings in sub-pillar Knowledge diffusion (10th) and indicators ICT services exports (1st), Domestic market scale (3rd), and Government's online service (9th). Other relative strengths for India include sub-pillar Trade, competition, and market scale (15th) and indicators Graduates in science and engineering (12th), Global R&D companies (16th), E-participation (15th), Ease of protecting minority investors (13th), and the quality of both local universities (22nd) and scientific publications (21st).

India made great progress in its GII innovation statistics over the last years. A significant number of indicators were updated this year. Almost half of them are in the pillar Human capital and research–Pupil-teacher ratio, Researchers, and Gross expenditure on R&D—and others in the pillar Knowledge and technology outputs—Knowledge-intensive employment, GERD performed by business, Females employed with advanced degrees, and Research talent. Nevertheless, two indicators that relate to education and research, PISA scales and GERD financed by abroad, are not available and Expenditure on education and Government funding per pupil remain outdated.[82]

Uzbekistan ranks 93rd. With improved data availability above the 66% indicator coverage per sub-index threshold, it is the single Central Asia economy to enter the GII this year. Uzbekistan's highest ranks are in the Innovation Input Sub-Index (81st), in pillars Human capital and research (77th), Infrastructure (72th), and Market sophistication (27th). Indicators that are in the GII top 10 and are relative strengths for Uzbekistan include Graduates in science & engineering (7th), Ease of starting a business (8th), and Gross capital formation (8th). Other relative strengths in the GII top 50 for Uzbekistan include indicators Expenditure on education (31st), Pupil-teacher ratio (38th), Government's online service (48th), Ease of protecting minority investors (36th), Patents by origin (45th), productivity growth (12th), and Cultural & creative services exports (33rd).

Uzbekistan's continuous and systematic process to improve data coverage has resulted in the inclusion of the country in the GII this year.[83] Yet, additional progress in data collection, especially in the Innovation Input Sub-Index, are still required to further increase the reliability of the economy's overall rank.

Latin America and the Caribbean (18 economies)

Latin America and the Caribbean continues to be a region with great imbalances. The region is overall characterized for its low investments in R&D and innovation, its incipient use of IP systems, and the disconnection between the public and private sectors in the prioritization of R&D and innovation. Only Brazil, for instance, has an R&D intensity that is comparable to some European economies, such as Portugal and Spain. Brazil, Mexico, and Argentina are the only three economies in the region with global R&D companies. Moreover, most R&D investments are primarily public, with a low share of private sector financing. Overall, the economic sectors of the region are not technology-intensive and the labor productivity growth remains at low levels.

With low innovation inputs, the region also struggles to translate these efficiently into outputs. Only Chile, Uruguay, and Brazil produce high levels of Scientific and technical articles, and only Brazil does in Patents by origin. In contrast, Central America and the Caribbean economies have levels of Knowledge and technology outputs that are lower than the average of the Sub-Saharan Africa region.

Figure 1.12 shows the GII ranks of economies in the Latin America and the Caribbean region. The innovation performance of the region is divided into three broad groups. First, the regional leaders (in dark blue) ranking in the top 60: Chile (54th) is the most innovative economy in the region, followed by Mexico (55th, up by 1) and Costa Rica (56th, down by 1), which swap the 2nd and 3rd top ranks of the region this year. Second, a middle group of seven economies—mostly from South America and upper-middle income, with the exception of high-income Uruguay and Panama: Brazil (62nd, up by 4), Colombia (68th, down by 1), Uruguay (69th, down by 7), Jamaica (72nd, up by 9), Panama (73rd, up by 2), Peru (76th, down by 7), and Argentina (80th, down by 7). The third group, comprised of eight economies (in yellow and orange), ranks in the top 100 and top 110. These broad groups have remained largely unchanged, with two exceptions: Jamaica ranks in the top 80 this year (vs. in the top 100 in 2019), and El Salvador in the top 100 (92nd this year vs. 108th in 2019).

Eight economies in the region move up the GII ranks this year, while nine economies lose between one and seven positions in the ranking. Jamaica joins Costa Rica as the only two innovation achievers in the region–or those that perform on innovation above expectations relative to their level of development (Figure 1.6 and Table 1.3). Chile and Mexico are the only two economies that score above the regional average in all GII pillars. Colombia scores above the regional average in all innovation input pillars, while Costa Rica and Uruguay do so in all innovation output pillars, showing potential for take-off.

Mexico ranks 55th this year, up one place since last. It improves the most in Business sophistication (59th) and Creative outputs (54th). In the former, sub-pillar Knowledge absorption (41st) increases the most, thanks to performance improvements in indicators High-tech imports (9th, and a relative strength), FDI inflows (50th) and Research talent in business enterprise (35th). Mexico goes up in all Creative outputs sub-pillars, and especially in Creative goods and services (17th), which remains a relative strength for the country. In this sub-pillar, it continues leading in indicator Creative goods exports (1st), and it improves in indicators National feature films (65th) and Entertainment and media market (39th). Additionally, thanks to its leading brands, Corona and telecoms Claro and Telcel, Mexico ranks 30th worldwide in the new indicator Global brands value, with a total of 81 brands in the top 5,000. It also ranks in the top 10 worldwide in output indicators High- and medium-high-tech manufacturing (10th), and High-tech net exports (8th), as well as in input indicator Ease of getting credit (10th).

Brazil ranks 62nd this year, up four positions from 2019. It increases one rank in the Innovation Input Sub-Index (59th) and goes up three ranks in the Innovation Output Sub-Index

FIGURE 1.12

GII 2020 rankings in Latin America and the Caribbean

Source: Global Innovation Index Database, Cornell, INSEAD, and WIPO, 2020.

(64th). It ramps up in two of the input pillars: Infrastructure (61st, up by 3), and Business sophistication (35th, up by 5). In the latter, the Knowledge workers sub-pillar (32nd) increases the most by a combination of performance increases and lack of data: indicators Knowledge-intensive employment (64th), GERD financed by business (33rd) and Females employed with advanced degrees (50th) increase, while the indicator Firms offering formal training is not available this year. Brazil goes up in both innovation output pillars. Sub-pillars Knowledge impact (69th) and Knowledge diffusion (53rd) increase the most, notably because of improvements in indicators New businesses (76th), High- and medium-high-tech manufacturing (31st), IP receipts (30th) and ICT services exports (83rd).

South East Asia, East Asia, and Oceania (17 economies)

This year the two most innovative economies in the South East Asia, East Asia, and Oceania region—Singapore (8th) and the Republic of Korea (10th)—rank in the top 10. Hong Kong (China) (11th), stands just outside this group followed by China (14th), and Japan (16th). These economies continue to be the five most innovative in the region and, along with Australia (23rd), are those that rank in the top 25 of the GII.

Four economies in the region improve their GII ranks: The Republic of Korea, Hong Kong (China), Malaysia (33rd), and the Philippines (50th). The Lao People's Democratic Republic (113th) and Myanmar (129th), both economies from South East Asia, enter the GII this year.

Malaysia ranks 33rd, up by two positions. It increases its rank in the Innovation Output Sub-Index (36th, up by 3) and remains stable in the Innovation Input Sub-index (34th). It shows relative strengths at the sub-pillar level in both inputs and outputs. In the inputs-side, sub-pillar Tertiary education (8th) is a strength for Malaysia, where it ranks 4th in Graduates in science & engineering and 17th in the quality of top 3 universities. Conversely, in the outputs-side, it ranks 28th in sub-pillar Intangible assets and 7th in the new GII indicator Global brands value (and a relative strength), thanks to 60 brands in the top 5,000, led by Petronas. Other top 20 indicators are strengths for Malaysia including: Ease of protecting minority investors (2nd), Market capitalization (7th), University and industry research collaboration (14th), State of cluster development (7th), High-tech imports (3rd), High-tech net exports (1st), and Creative goods exports (1st).

The Philippines (50th) increases its ranking by four positions and enters the top 50 for the first time. It improved in both innovation sub-indices but does it more notably in the Innovation Input Sub-Index (70th, up by 6). The Philippines improves the most in Market sophistication (86th) with higher rankings in Investment (85th), derived mainly by an improved ranking in the indicator Ease of protecting minority investors (71st). At the sub-pillar level, strengths for the Philippines are in Trade, competition, and market scale (20th), Knowledge absorption (7th), and Knowledge diffusion (8th). Other relative strengths include indicators Utility models by origin (8th), productivity growth (6th), High-tech net exports (3rd), ICT services exports (8th), Firms offering formal training (7th), Creative goods exports (10th), E-participation (19th), and High-tech imports (1st). This year, data for PISA scores is available for the Philippines.

The Philippines is currently implementing a new innovation act in an effort to foster innovation in the country and to define it as a vital component of national development and sustainable economic growth. The act places innovation at the center of its development policies and it proposes the GII as a measurement rod.[84]

Europe (39 economies)

Europe continues to host a large number of innovative economies. Sixteen of the innovation leaders in the top 25 are European countries, with seven of them ranking in the top 10 (GII 2020 Results: Highlights in this chapter). The Czech Republic rejoins the top 25 this year (24th, up by 2). Seventeen economies rank in the top 50. Seven of them climb up the ranks: Italy (28th, up by 2), Portugal (31st, up by 1), Bulgaria (37th, up by 3), Poland (38th, up by 1), Croatia (41st, up by 3), Ukraine (45th, up by 2) and Romania (46th, up by 4). Six economies rank below the top 50, with four of them increasing their ranks this year: Serbia (53rd), North Macedonia (57th), Belarus (64th), and Bosnia and Herzegovina (74th).

France ranks 12th, up four spots from last year, thanks to a combination of performance improvements and changes to the GII model. It goes up by two ranks in the Innovation Output Sub-Index to achieve the 12th place, and sustains its 16th rank in the Innovation Input Sub-Index. The Creative Outputs pillar increases the most (13th), with sub-pillar Intangible assets (6th, up by 4) remaining a relative strength. The rank changes in this sub-pillar are a consequence of performance improvements and model changes. It improves in indicators Trademarks (9th, and a relative strength), and Industrial designs (21st). It also benefits from the use of the new GII indicator Global brands value: with 205 brands in the top 5,000, it ranks 5th worldwide with Total (Oil & gas), Orange (Telecoms) and Axa (Insurance) leading the country ranks. There are also improvements in input indicators Government effectiveness (16th), Ease of resolving insolvency (24th), Tertiary inbound mobility (19th), ICT access (10th, and a strength), GERD financed by business (17th), University/industry research collaboration (26th), and Research talent in business enterprise (10th). It also made remarkable improvements in output indicators New businesses (31st), High- and medium-high-tech manufacturing (12th), ICT services exports (48th) and FDI net outflows (20th). Additionally, it ranks in the top 10 in indicators such as Global R&D companies (7th), Environmental performance (5th), and the quality of its scientific publications (5th).

France sustains its ninth position overall in the quality of innovation, while it improves its score in the quality of its universities (11th, and a relative strength) (Figure 1.7). France hosts five S&T clusters in the top 100, with Paris ranked 10th worldwide (Special Section Cluster Rankings).

The Czech Republic ranks 24th this year (up by 2). It goes up in both the Innovation Input Sub-Index (28th, up by 1) and the Innovation Output Sub-Index (17th, up by 4). It goes up in three input pillars: Human capital and research (33rd, up by 1), Infrastructure (21st, up by 11), and Business sophistication (23rd, up by 2). In Infrastructure, sub-pillar Ecological sustainability (4th, and a relative strength) improved notably. It goes up in the two output pillars, ranking in the top 20 in both: 15th in Knowledge and technology outputs (up by 1), and 20th in Creative outputs (up by 1). In Knowledge and technology outputs, it moves up in sub-pillar Knowledge impact (4th, up by 6, and a relative strength). It remains in the top five in indicators ISO 9001 quality certificates (3rd) and High- and medium-high-tech manufacturing (5th). Other relative strengths in this pillar include Utility models (6th) and high-tech net exports (7th). In the Creative outputs pillar (20th), the Czech Republic improves in the sub-pillar Creative goods and services (4th, up by 2, and a relative strength), but goes down in sub-pillars Intangible assets (43rd, down by 7) and Online creativity (27th, down by 1). It upholds its global top position in Creative goods exports (1st).

Northern America (2 economies)

The Northern America region includes two economies—the U.S. and Canada—both in the top 20. The U.S. remains the 3rd most innovative economy in the world and ranks in the top 5 in both the Innovation Input (4th) and the Innovation Output (5th) Sub-Indices. Canada keeps its 17th rank overall, and ranks 9th in innovation inputs and 22nd in innovation outputs. Canada improves in indicators Tertiary enrollment, PCT patent applications, and ICT services exports.

Conclusions

Confronted with an unprecedented crisis, we need to fully leverage the power of innovation to collectively build a cohesive, dynamic, and sustainable recovery. In doing so, we need to emphasize the countercyclical role of policies to ensure the continuity of innovation financing.

This chapter presents the main GII 2020 results and analyzes how economies rank on innovation this year. It also provides an early assessment of the impact of the COVID-19 crisis on innovation. It is relatively clear from this analysis that R&D financing—particularly in some sectors, start-up financing, and related venture capital investments will take a severe hit in the months to come—making entrepreneurship funds even more limited in terms of geographical and sectoral access. Existing innovation finance divides will be harshly accentuated, if no action is taken.

Three important points deserve emphasis in this conclusion:

First, as noted in this chapter and in the preface to this report, one visible effect of the current crisis has been to stimulate interest in innovative solutions for health, naturally, but also for areas such as remote work, distance education, e-commerce, mobility, and others. Building on that experience may well support our collective pursuit of societal goals, including reducing or reversing long-term climate change.

Second, the short-term and longer-term impacts of the pandemic on the science and innovation systems have to be monitored and possibly acted on. Some aspects are mightily positive, for example, an unexpected level of international science collaboration and the reduction of red tape for scientists. Some aspects, however, are alarming, such as the standstill of major research projects, the possible (and uneven) reduction of R&D expenditures in some sectors, and the loss of employment prospects for junior researchers.

Finally, there are increased risks to international openness and knowledge flows. We already raised these concerns as of the 2018 edition of the GII. But with a significant fall in trade to come, the downturn of the global economy, and increasing protectionist pressures, this perspective is now seriously alarming and needs to be counteracted. If anything, the reaction of the economies and researchers to the COVID-19 crisis, and the joint search for medical solutions, has demonstrated how powerful openness and collaboration can be. As noted in this chapter, the speed and efficacy of this collaboration might well inspire internationally coordinated R&D missions on important societal topics—such as the development of new energy technologies—in the future.

Notes:

1 Ms. Bayona and Ms. Garanasvili are Consultants to WIPO.

2 MSTI in OECD (2020a).

3 See Dutta et al., 2017 for a longer discussion; OECD, 2020a.

4 Hernández et al., 2019. See also "Worldwide R&D spending among the world's 1000 largest corporate R&D spenders increased 11.4 percent in 2018 to $782 billion", at https://www.strategyand.pwc.com/gx/en/insights/innovation1000.html#GlobalKeyFindingsTabs4. Forward-looking projections done before the pandemic predicted that this positive innovation expenditure trend was going to continue over the following five years. R&D Magazine, 2019; R&D World Online, 2020.

5 WIPO, 2019b.

6 WIPO, 2020.

7 IMF, 2020.

8 Jackson et al., 2020.

9 Oxford Economics, 2020. If previous pandemics such as the Spanish 1918 flu or SARS are any guide, the fact that governments implemented lockdowns quickly has helped contain the growth impact to the short term. See Correla et al., 2020 on this latter point and Garret, 2007 for more background.

10 The WTO projects that global trade will fall steeply this year. See WTO Press Release 855, "Trade set to plunge as COVID-19 pandemic upends global economy" at https://www.wto.org/english/news_e/pres20_e/pres20_e.htm.

11 Jordà, 2020.

12 UNCTAD, 2019; UNCTAD, 2020. Global foreign direct investment (FDI) flows slid by 13% in 2018 to US$1.3 trillion from $1.5 trillion the previous year—the third consecutive annual decline, according to UNCTAD's World Investment Report 2019. The recent Global

Investment Trends Monitor of UNCTAD predicts a drastic drop in global foreign direct investment flows—up to 40%—during 2020-2021, reaching the lowest level in the past two decades.

13 Guellec et al., 2009; WIPO, 2010; Dutta et al., 2017; Hingley et al., 2017; Fatas et al., 2018, Dachs et al., 2020; Foray et al., 2020.

14 For a detailed analysis of a similar impact after the 2009 crisis, see WIPO, 2011. R&D and IP drops reflect the move of firms to cut costs at an organization-wide level and uniformly through all business departments. In the case of IP, during the last crisis and reflecting business uncertainty, firms also applied a more conservative stance towards filings abroad and towards a geographic reorientation of patent filings to a narrower set of countries.

15 Dutta et al., 2019.

16 Austria, Chile, Estonia, Germany, Greece, Israel, Italy, Slovak Republic, Sweden, U.K., U.S., Brazil, Singapore, and South Africa.

17 WIPO, 2011.

18 Archibugi et al., 2013.

19 Hernández et al., 2019.

20 Alphabet First Quarter 2020 Results, https://abc.xyz/investor/static/pdf/2020Q1_alphabet_earnings_release.pdf?cache=4690b9f; Microsoft Earnings Release FY20 Q3, https://www.microsoft.com/en-us/Investor/earnings/FY-2020-Q3/press-release-webcast.

21 Hernandez et al., 2019.

22 Samsung Electronics First Quarter 2020 Results at https://news.samsung.com/global/samsung-electronics-announces-first-quarter-2020-results; Huawei First Quarter Results at https://www.huawei.com/en/press-events/news/2020/4/huawei-announces-q1-2020-business-results and https://www.reuters.com/article/us-huawei-tech-results/huawei-first-quarter-revenue-growth-slows-sharply-amid-u-s-ban-virus-headwinds-idUSKBN2230WV; and Apple First Quarter Results at https://www.apple.com/newsroom/pdfs/FY20_Q2_Consolidated_Financial_Statements.pdf.

23 Roche First Quarter Results at https://s21.q4cdn.com/317678438/files/doc_financials/2020/q1/updated/Q1-2020-PFE-Earnings-Release-(1).pdf and https://www.roche.com/dam/jcr:f19ebc50-969f-4d22-b414-0a51ea25b41a/en/200422_IR_Roche_Q1_en.pdf.

24 IHS Markit, 2020.

25 Volkswagen First Quarter Results at https://www.volkswagenag.com/presence/investorrelation/publications/interim-reports/2020/Q1_2020_e.pdf.

26 WIPO, 2019b.

27 Howell et al., 2020. The authors provide the following reasons: downward shifts in investment opportunities, in entrepreneurs seeking capital, and frictions or constraints in the supply of venture capital financing. See also Townsend, 2015.

28 PwC and CB Insights' Q1 2020 MoneyTree report at https://www.cbinsights.com/research/report/venture-capital-q1-2020/.

29 Howell et al., 2020.

30 PwC and CB Insights' Q1 2020 MoneyTree report; Herbert Smith Freehills, 2020.

31 Howell et al., 2020.

32 "China's startups hit by 50% drop in Series A deals due to coronavirus" at https://thenextweb.com/growth-quarters/2020/03/24/chinas-startups-hit-by-50-drop-in-series-a-deals-due-to-coronavirus-COVID-19/; "This is what COVID-19 did to start-ups in China" at https://www.weforum.org/agenda/2020/05/COVID-19-s-coronavirus-startups-china-funding/; "China's VC industry bounces back after coronavirus-induced winter" at https://pitchbook.com/news/articles/chinas-vc-industry-bounces-back-after-coronavirus-induced-winter; "In March, China's VC deals come back, raising more than $2.5bn during the month", Financial Times, April 14, 2020; and data by the China VC & Private Equity Association at http://js-vc.org/article-34710-71390.html.

33 Online education, which attracts US$1 bn financing from start-up Yuanfudao, "China's venture capital funding rallies after coronavirus lockdown", Financial Times, April 14, 2020; "The venture capital market in China: Could the Coronavirus eventually revive startup investments?", Daxue Consulting, May 1, 2020 at https://daxueconsulting.com/venture-capital-market-in-china/.

34 "Big Tech goes on pandemic M&A spree despite political backlash", Financial Times, May 28, 2020.

35 Transcript of IMF Press Briefing, May 21, 2020 at https://www.imf.org/en/News/Articles/2020/05/21/tr052120-transcript-of-imf-press-briefing.

36 Bruegel, 2020 for a compilation of stimulus measures and related analyses; Tran, 2020 and IMF COVID Policy Tracker at https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19; OECD, 2020b; OECD, 2020c.

37 "UK start-ups call for emergency support to help them survive coronavirus crisis", CNBC, March 30, 2020.

38 In the U.S. Care Act, for example, the referenceable baseline average monthly payroll expense for employees is the eligibility criteria. As outlined in "Coronavirus Information and Resources for VCs and Startups" by the U.S. National VC Association at https://nvca.org/nvca-response-to-COVID-19/, venture-backed start-ups face trouble accessing available lending facilities. See also "CARES Act: What the Paycheck Protection Program Means for Startups", Fenwick, March 27, 2020, https://www.fenwick.com/publications/pages/cares-act-what-the-paycheck-protection-program-means-for-startups-.aspx.

39 Herbert Smith Freehills, 2020.

40 The People's Bank of China at http://www.pbc.gov.cn/goutongjiaoliu/113456/113469/3989149/index.htm, http://www.pbc.gov.cn/goutongjiaoliu/113456/113469/3989112/index.html and http://js.people.com.cn/n2/2020/0314/c359574-33875508.html.

41 This scheme is piloted by the Banque Publique d'Investissement.

42 "Start-up: Mesures de soutien économique", French Government Announcement, March 23, 2020, https://www.economie.gouv.fr/coronavirus-startup-mesures-de-soutien-economique.

43 "UK Support package for Innovative firms", U.K. Government Announcement, April 20, 2020, https://www.gov.uk/government/news/billion-pound-support-package-for-innovative-firms-hit-by-coronavirus.

44 COVID19: liquidity support for startups up and running", Swiss Government Announcement, May 4, 2020, https://www.seco.admin.ch/seco/en/home/seco/nsb-news.msg-id-79006.html.

45 Guellec et al., 2009.

46 Dutta et al., 2017.

47 "Coronavirus: Macron annonce 5 milliards d'euros en plus sur 10 ans pour la recherche", France Info, March 19, 2020.

48 "Pressekonferenz zu Konjunktur-/Krisenbewältigungspaket und Zukunftspaket", Germany Government Announcement, June 3, 2020, https://www.bundesregierung.de/breg-de/suche/pressekonferenz-zu-konjunktur-krisenbewaeltigungspaket-und-zukunftspaket-1757642

49 "Senate GOP crafting wish list for next coronavirus package", The Hill, May 13, 2020 at https://thehill.com/homenews/senate/497467-senate-gop-crafting-wishlist-for-next-coronavirus-package.

50 In addition, the problem—both in the short-term liquidity programs as well as longer-term stimulus packages on innovation and infrastructure—remains that coordinating the effective disbursements will be challenging. If the years after the 2009 crisis are any guide, announcing large spending bills and signing them into law is less complicated than actually spending the funds in a sound manner.

51 UNGA A/RES/70/1 Transforming our world: the 2030 Agenda for Sustainable Development.

52 United Nations General Assembly A/74/L.56, 8 April 2020.

53 Economic and Social Council forum on financing for development follow-up E/FFDF/2020/L.1/Rev.1, 23 April 2020.

54 WIPO, 2015 on future breakthrough technologies; WIPO, 2019a on artificial intelligence.

55 "Covid-19 Changed How the World Does Science, Together", New York Times, April 1, 2020 at https://www.nytimes.com/2020/04/01/world/europe/coronavirus-science-research-cooperation.html; "US research labs closing down for everything but coronavirus", World University Rankings, March 23, 2020 at https://www.timeshighereducation.com/news/us-research-labs-closing-down-everything-coronavirus; "Research on ice across Europe, as all resources are focused on COVID-19", Science Business, March 26, 2020 at https://sciencebusiness.net/covid-19/news/research-ice-across-europe-all-resources-are-focussed-covid-19; "Universities, research institutes, clinical trials and big science machines are shut down, as scientists are redeployed into critical research areas and medically-trained academic staff freed up to care for patients", Science Business, April 23, 2020 at https://sciencebusiness.net/news/researchers-debate-long-term-effects-COVID-19-induced-recession-rd-budgets.

56 Myers et al., 2020.

57 See related calls in EFI, 2020.

58 WIPO, 2017.

59 WIPO, 2019c; Dutta et al., 2019; Roubini, 2020a; Roubini, 2020b.

60 In current U.S. dollars.

61 Appendix I includes further details on the GII framework and the indicators used. A review and update of the GII measurement framework is conducted each year in order to provide the best and most current assessment of innovation. Methodological issues—such as missing data, the revision of scaling factors, and the number of economies covered—also affect the year-on-year comparability of the rankings. Appendix IV contains details on the changes done this year to the methodological framework and an analysis of the factors influencing year-on-year comparability. Since 2016, the Joint Research Centre (JRC) recommended a more stringent criterion for the inclusion of countries in the GII (Appendix IV). Economies were included in the GII 2020 only if 66% of data were available within each of the two sub-indices and if computations were possible for at least two sub-pillars in each pillar.

62 See also Chaminde et al., 2018; Lee, 2019.

63 To recall, the referendum took place in June 2016, but the U.K. has only effectively left the EU in January 2020. The withdrawal of January 2020 also only kicked off a transition period lasting to the end of the year, during which the U.K. remains part of the single market and the customs union. The GII 2020 data naturally cannot capture these effects. First, the impacts will only develop over time, and mostly after this transition period ends. Second, available GII data by far predate the actual exit of early 2020 or the said transition period. Specifically, 30% of the U.K.'s indicators are from 2019 (three years after the referendum but one year before actual withdrawal); 48% are from 2018, the remaining 22% reflect 2017 and earlier years. Even when full data will become available, the U.K.'s withdrawal from the EU will only be one parameter among many to consider in the mix of possible triggers of upward and downward movements of the U.K.'s GII rank.

64 Due to outlier treatment, the Republic of Korea shares first place in the indicator patents by origin with five other economies: Switzerland, the U.S., Germany, China, and Japan.

65 Between 2018 and early 2020, numerous GII workshops and missions took place in collaboration with different economies—including Algeria, Belarus, Brazil, Belgium, China, Colombia, the Czech Republic, Egypt, the European and African Union, Germany, Georgia, Hong Kong (China), India, Mexico, Morocco, Oman, Peru, the Philippines, Rwanda, Serbia, Thailand, Turkey, the U.S., Viet Nam, among others—often in the presence of key ministers.

66 Dark blue means the economy belongs to the 4th quartile (best performers) corresponding to ranks 1st to 32nd in the GII rank and its pillars; light blue = 3rd quartile (ranks 33rd to 65th); yellow = 2nd quartile (ranks 66th to 98th); and orange = 1st quartile (ranks 99th to 131st).

67 Senegal is since this year part of the lower middle-income group.

68 See Chapter 1, GII 2019. Most developing economies also have high shares of their innovative and other forms of economic activity in the informal sector, making innovation more difficult to measure but also to scale up, see Kraemer-Mbula and Wunsch-Vincent, 2016.

69 The Czech Republic scores above the high-income group average in Infrastructure, Business sophistication, Knowledge and technology outputs, and Creative outputs.

70 From Sub-Saharan Africa, Burundi is not anymore an innovation achiever/over-performer. It is not included in the GII rankings this year because of decreased data availability. The innovation achievers from Central and Southern Asia; and South East Asia, East Asia, and Oceania remain unchanged relative to 2019.

71 Argentina changes income group classification from high income to upper-middle income according to the 2020 World Bank Country and Lending Groups classification. See: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups

72 Both indexes are released annually since 2003-2004. QS Quacquarelli Symonds publishes the QS—the world's largest international higher education network, connecting universities, business schools & students. QS, in addition to quantitative data, relies on a survey to assess teaching and research quality and an employer survey. ARWU is conducted by Shanghai Ranking Consultancy—a fully independent organization dedicating to research on higher education intelligence and consultation. Both—QS and ARWU—comprise universities located in world's six continents and rank nearly 1000 Universities worldwide. The geographical allocation of universities is more diverse in the QS ranking system spanning 82 economies.

73 QS World University ranking index is constructed based on six measures: Academic reputation (40%), Employer reputation (10%), Faculty student ratio (20%), International faculty ratio (5%), International student ratio (5%), and Citations per faculty (20%). Academic Ranking of World Universities (ARWU) index is constructed based on the following six measures: Score on Alumni winning Nobel and Field Medals (10%), Score on Award - Staff winning Nobel and Field Medals (20%), Score on HiCi (highly cited researchers) (20%), Score on N&S (papers published in Nature and Science) (20%), Score on PUB (papers indexed in Science / Social Science Citation Index) (20%), and Score on PCP (per capita academic performance of an institution) (10%).

74 The OECD and WIPO have run multiple work streams on this front in the last years. See the WIPO project "Leveraging Public Research for Innovation and Growth—An international Comparison of Knowledge Transfer Policies and Practices", at https://www.wipo.int/edocs/mdocs/mdocs/en/wipo_ip_bei_16/wipo_ip_bei_16_ref_project.pdf. See also Arundel et al., 2020 (forthcoming).

75 WIPO, 2013.

76 WIPO, 2017a; WIPO, 2017b.

77 According to estimates for 2011, now outdated.

78 WIPO, 2013.

79 See Appendix III on Sources and Definitions, https://brandirectory.com/, https://brandfinance.com/ and Box 1.6, in WIPO, 2013 for methodologies.

80 Global 5,000, 2020. The annual report on the world's most valuable and strongest brands. January 2020.

81 Corrado et al., 2004; WIPO, 2017a.

82 India's expressed will to participate in OECD's Programme for International Students Assessment (PISA) in 2021.

83 More than half of the available data are in the pillar Knowledge and technology outputs—High- and medium-high-tech manufactures, Intellectual property receipts, High-tech net exports, ICT services exports, and FDI net outflows; and in pillar Creative outputs—ICTs and business model creation, Cultural and creative services exports, Printing and other media, and Creative goods exports. Additionally, three input-side indicators—Intellectual property payments, High-tech imports, and ICT services imports—are also now available for Uzbekistan.

84 The Philippines Innovation Act was enacted on 17 April 2019. See: http://www.neda.gov.ph/wp-content/uploads/2019/12/RA-11293-or-the-Philippine-Innovation-Act.pdf

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THE TOP 100 SCIENCE AND TECHNOLOGY CLUSTERS

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Measuring innovation performance across the world needs to go beyond national economies as the unit of analysis. For several years, the Global Innovation Index has provided a perspective on the spatial distribution of innovative activity. In particular, it has identified the world's most vibrant clusters of science and technology (S&T) activity and has ranked the top 100.

The approach towards identifying the most vibrant S&T clusters is "bottom up", meaning it ignores any existing administrative or political borders and instead pinpoints geographical areas showing a high density of inventors and scientific authors. While mostly associated with large urban agglomerations, the resulting S&T clusters often encompass several municipal districts, sub-federal states, and sometimes even two or more countries. The microdata underlying this measurement approach, in turn, enables a rich characterization of S&T clusters.

The compilation of this year's top 100 list relies on the same methodology as the one used last year. It thus allows for an assessment of how the performance of different clusters has evolved over time. In a nutshell, our methodology relies on:

- Inventors listed in patent applications under WIPO's Patent Cooperation Treaty (PCT), spanning the years 2014 to 2018.
- Authors listed in scientific publications in the Web of Science's Science Citation Index Expanded (SCIE) and covering the same period.
- The geocoding of inventor and author addresses and the use of density-based spatial clustering of applications with noise (DBSCAN) algorithm to the geocoded inventor and author points.[1]

Readers interested in a more detailed description of the cluster identification and performance measurement methodology are referred to last year's Special Section.[2]

This year's top 100 list

Table S-1.1 presents this year's top 100 S&T clusters. As in previous years, Tokyo-Yokohama comes out as the top-performing cluster. Its lead mainly reflects the cluster's strong patenting performance. Its overall total score—reflecting combined patenting and scientific publication performance—is still considerably higher than that of 2nd-ranked Shenzhen-Hong Kong-Guangzhou. However, Tokyo-Yokohama's lead has narrowed. This mainly reflects that the inclusion of the 2018 data led to a merger of the previously distinct Shenzhen-Hong Kong and Guangzhou clusters.[3] This enlarged cluster has, in turn, cemented its 2nd position, and it continues to be followed by Seoul, Beijing, and San Jose-San Francisco.

There is considerable stability among the top 100 clusters. This is partly due to the 5-year time window on which our ranking is based. It arguably also reflects the stability of local innovation ecosystems that often take a long time to form, but, once established, show remarkable persistence.

While the ranks of the first eight clusters have remained the same, Shanghai moved up from 11th to the 9th position. As a result, Paris and San Diego each moved down one position to rank 10th and 11th, respectively. More generally, all Chinese clusters—other than the already highly ranked Shenzhen-Hong Kong-Guangzhou and Beijing—saw rank improvements.

TABLE S-1.1

Top 100 cluster rankings

Rank	Cluster name	Economy	PCT applications	Scientific publications	Share of total PCT filings, %	Share of total pubs, %	Total	Rank 2013-17	Rank change
1	Tokyo-Yokohama	JP	113,244	143,822	10.81	1.66	12.47	1	0
2	Shenzhen-Hong Kong-Guangzhou	CN/HK	72,259	118,600	6.90	1.37	8.27	2	0
3	Seoul	KR	40,817	140,806	3.90	1.63	5.52	3	0
4	Beijing	CN	25,080	241,637	2.40	2.79	5.18	4	0
5	San Jose-San Francisco, CA	US	39,748	89,974	3.8	1.04	4.83	5	0
6	Osaka-Kobe-Kyoto	JP	29,464	67,514	2.81	0.78	3.59	6	0
7	Boston-Cambridge, MA	US	15,458	128,964	1.48	1.49	2.96	7	0
8	New York City, NY	US	12,302	137,263	1.17	1.58	2.76	8	0
9	Shanghai	CN	13,347	122,367	1.27	1.41	2.69	11	2
10	Paris	FR	13,561	93,003	1.30	1.07	2.37	9	-1
11	San Diego, CA	US	19,665	34,635	1.88	0.40	2.28	10	-1
12	Nagoya	JP	19,327	24,582	1.85	0.28	2.13	12	0
13	Washington, DC-Baltimore, MD	US	4,592	119,647	0.44	1.38	1.82	13	0
14	Los Angeles, CA	US	9,764	69,161	0.93	0.80	1.73	14	0
15	London	GB	4,281	107,680	0.41	1.24	1.65	15	0
16	Houston, TX	US	10,852	51,163	1.04	0.59	1.63	16	0
17	Seattle, WA	US	11,558	34,143	1.10	0.39	1.50	17	0
18	Amsterdam-Rotterdam	NL	4,409	78,602	0.42	0.91	1.33	18	0
19	Cologne	DE	7,827	47,161	0.75	0.54	1.29	20	1
20	Chicago, IL	US	6,167	57,976	0.59	0.67	1.26	19	-1
21	Nanjing	CN	1,662	84,789	0.16	0.98	1.14	25	4
22	Daejeon	KR	8,306	26,037	0.79	0.30	1.09	22	0
23	Munich	DE	7,532	31,259	0.72	0.36	1.08	24	1
24	Tel Aviv-Jerusalem	IL	7,076	31,086	0.68	0.36	1.03	23	-1
25	Hangzhou	CN	4,832	48,627	0.46	0.56	1.02	30	5
26	Stuttgart	DE	8,336	18,241	0.80	0.21	1.01	26	0
27	Taipei-Hsinchu	TW	2,721	62,420	0.26	0.72	0.98	43	16
28	Singapore	SG	4,019	46,037	0.38	0.53	0.92	28	0
29	Wuhan	CN	1,796	63,837	0.17	0.74	0.91	38	9
30	Minneapolis, MN	US	6,444	25,157	0.62	0.29	0.91	27	-3
31	Philadelphia, PA	US	3,173	50,847	0.30	0.59	0.89	29	-2
32	Moscow	RU	2,060	58,153	0.20	0.67	0.87	33	1
33	Stockholm	SE	5,736	27,409	0.55	0.32	0.86	32	-1
34	Eindhoven	BE/NL	8,226	6,067	0.79	0.07	0.86	31	-3
35	Melbourne	AU	1,975	56,632	0.19	0.65	0.84	35	0
36	Raleigh, NC	US	2,949	47,499	0.28	0.55	0.83	34	-2
37	Sydney	AU	2,498	49,298	0.24	0.57	0.81	37	0
38	Frankfurt Am Main	DE	5,167	24,848	0.49	0.29	0.78	36	-2
39	Toronto, ON	CA	2,336	48,017	0.22	0.55	0.78	39	0
40	Xi'an	CN	775	60,017	0.07	0.69	0.77	47	7
41	Brussels	BE	3,171	39,066	0.30	0.45	0.75	40	-1
42	Portland, OR	US	6,270	12,349	0.60	0.14	0.74	45	3
43	Tehran	IR	149	62,530	0.01	0.72	0.74	46	3
44	Berlin	DE	3,333	35,640	0.32	0.41	0.73	41	-3
45	Madrid	ES	1,521	50,547	0.15	0.58	0.73	42	-3
46	Barcelona	ES	2,326	43,209	0.22	0.50	0.72	44	-2
47	Chengdu	CN	1,449	48,095	0.14	0.56	0.69	52	5
48	Milan	IT	2,205	38,821	0.21	0.45	0.66	48	0
49	Zürich	CH/DE	3,117	29,945	0.30	0.35	0.64	50	1
50	Denver, CO	US	2,789	32,387	0.27	0.37	0.64	49	-1

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TABLE S-1.1

Top 100 cluster rankings, continued

Rank	Cluster name	Economy	PCT applications	Scientific publications	Share of total PCT filings, %	Share of total pubs, %	Total	Rank 2013-17	Rank change
51	Istanbul	TR	2,677	31,709	0.26	0.37	0.62	54	3
52	Montréal, QC	CA	2,027	36,816	0.19	0.42	0.62	51	-1
53	Heidelberg-Mannheim	DE	3,913	20,814	0.37	0.24	0.61	53	0
54	Copenhagen	DK	2,958	27,267	0.28	0.31	0.60	55	1
55	Atlanta, GA	US	1,646	36,533	0.16	0.42	0.58	56	1
56	Tianjin	CN	812	41,989	0.08	0.48	0.56	60	4
57	Cambridge	GB	2,623	26,033	0.25	0.30	0.55	58	1
58	Rome	IT	791	40,233	0.08	0.46	0.54	57	-1
59	Cincinnati, OH	US	3,900	14,133	0.37	0.16	0.54	61	2
60	Bengaluru	IN	3,289	17,021	0.31	0.20	0.51	65	5
61	São Paulo	BR	751	37,675	0.07	0.43	0.51	59	-2
62	Dallas, TX	US	3,157	17,340	0.3	0.20	0.50	64	2
63	Nuremberg-Erlangen	DE	3,729	12,515	0.36	0.14	0.50	62	-1
64	Pittsburgh, PA	US	1,617	29,864	0.15	0.34	0.50	63	-1
65	Ann Arbor, MI	US	1,355	30,856	0.13	0.36	0.49	66	1
66	Changsha	CN	502	37,115	0.05	0.43	0.48	67	1
67	Delhi	IN	855	33,570	0.08	0.39	0.47	70	3
68	Helsinki	FI	2,789	17,047	0.27	0.20	0.46	68	0
69	Qingdao	CN	2,074	22,957	0.20	0.26	0.46	80	11
70	Vienna	AT	1,551	27,119	0.15	0.31	0.46	69	-1
71	Oxford	GB	1,430	27,016	0.14	0.31	0.45	71	0
72	Suzhou	CN	2,627	15,129	0.25	0.17	0.43	81	9
73	Cleveland, OH	US	1,456	24,679	0.14	0.28	0.42	73	0
74	Vancouver, BC	CA	1,460	24,514	0.14	0.28	0.42	72	-2
75	Busan	KR	2,190	17,982	0.21	0.21	0.42	75	0
76	Lyon	FR	2,328	16,665	0.22	0.19	0.41	74	-2
77	Chongqing	CN	689	30,023	0.07	0.35	0.41	88	11
78	Phoenix, AZ	US	2,469	13,701	0.24	0.16	0.39	76	-2
79	Hefei	CN	536	29,536	0.05	0.34	0.39	90	11
80	Harbin	CN	168	31,980	0.02	0.37	0.39	87	7
81	Ottawa, ON	CA	1,964	16,842	0.19	0.19	0.38	78	-3
82	Jinan	CN	511	27,956	0.05	0.32	0.37	89	7
83	Brisbane	AU	1,174	22,184	0.11	0.26	0.37	83	0
84	Bridgeport-New Haven, CT	US	1,298	20,993	0.12	0.24	0.37	82	-2
85	Hamamatsu	JP	3,407	3,433	0.33	0.04	0.36	102	17
86	Austin, TX	US	2,184	13,501	0.21	0.16	0.36	79	-7
87	Changchun	CN	209	29,720	0.02	0.34	0.36	93	6
88	Ankara	TR	430	27,758	0.04	0.32	0.36	77	-11
89	Lausanne	CH/FR	1,921	14,682	0.18	0.17	0.35	86	-3
90	Hamburg	DE	1,806	15,146	0.17	0.17	0.35	84	-6
91	Kanazawa	JP	2,987	4,537	0.29	0.05	0.34	106	15
92	Grenoble	FR	1,950	12,854	0.19	0.15	0.33	85	-7
93	Manchester	GB	938	21,115	0.09	0.24	0.33	92	-1
94	St. Louis, MO	US	948	21,012	0.09	0.24	0.33	94	0
95	Basel	CH/DE/FR	2,020	12,133	0.19	0.14	0.33	91	-4
96	Lund-Malmö	SE	2,037	11,980	0.19	0.14	0.33	95	-1
97	Columbus, OH	US	961	20,411	0.09	0.24	0.33	96	-1
98	Mumbai	IN	1,196	18,213	0.11	0.21	0.32	97	-1
99	Warsaw	PL	436	23,981	0.04	0.28	0.32	100	1
100	Göteborg	SE	1,806	12,613	0.17	0.15	0.32	101	1

Source: WIPO Statistics Database, March 2020.

This reflects the relatively fast growth in patents and scientific publications attributable to these clusters.

Figure S-1.1 compares the net change in clusters' S&T output to their change in rank from last year to this year. The net change in cluster output reflects the S&T output for 2018 less the S&T output for 2013. As can be seen, rank changes correlate closely with output performance changes. In other words, movements up and down the ranks mostly reflect differences in S&T output growth rates. However, there are some notable exceptions. Taipei-Hsinchu, Hamamatsu, and Kanazawa see rank improvements that are disproportionately greater than their net change in S&T output. This is due to a substantial expansion in these three clusters' geography.[4] By contrast, the enlarged Shenzhen-Hong Kong-Guangzhou cluster did not see any rank improvement, which reflects the cluster's already high 2nd position. There are also a considerable number of clusters—such as Phoenix and Ottawa—that have registered increases in net S&T output but have nonetheless fallen in the ranking. This reflects the relative nature of the ranking, as those clusters were overtaken by others that registered even higher increases in net S&T output.

The composition of countries hosting S&T clusters is similar to that of last year—which, again, is a result of the overall stability of the top 100 clusters. The United States of America (U.S.) accounts for 25 clusters—one less compared to last year.[5] With 17 clusters, China's count remains the same, if one takes into account the Shenzhen-Hong Kong-Guangzhou merger. Germany follows with 10 clusters. Japan increased its count from 3 to 5, as 2 smaller clusters—Hamamatsu and Kanazawa—entered the ranking. The top 100 clusters are located in 26 countries, of which 6—Brazil, China, India, Iran, Turkey, and Russia—represent middle-income economies.[6]

S&T intensity of the top 100 clusters

Our top 100 clusters pinpoint the geographical areas accounting for most S&T activity in the world. However, they differ vastly in size and population density. For example, Istanbul (51st) and Montréal (52nd) show similar S&T performance, but the Istanbul metropolitan area has a population of 15.5 million, whereas the Montréal metropolitan area has a population of 4.1 million.[7] In other words, S&T activity is comparatively more intense in Montréal than in Istanbul.

To capture the S&T intensity of our top 100 clusters, we measure per capita S&T output. Given that we identify clusters using a bottom up method, this is not a straightforward exercise. The boundaries of our clusters do not coincide with municipal districts for which population data are readily available. We, therefore, need to draw on geospatial imagery that estimates population levels at a more granular level. In particular, we draw on the Global Human Settlement Population Grid dataset of the European Commission's Joint Research Centre that provides such imagery at a resolution of 250–300 square meters. The Appendix describes in detail how we match our clusters to the population imagery.

Table S-1.2 presents our top 100 clusters ranked by their S&T intensity. Our measure of S&T intensity is the sum of patent and scientific publication shares associated with a cluster, divided by its population. As can be seen, Cambridge and Oxford in the United Kingdom (U.K.) emerge as the most S&T-intensive clusters. Both clusters host highly productive scientific organizations in relatively small urban agglomerations. Cambridge additionally has a relatively large presence of tech companies—for example, ARM and Nokia—which results in a patent output normally seen in agglomerations with twice the population.[8] In the case of 3rd-ranked Eindhoven, the high S&T intensity principally stems from high patenting output. Interestingly, 4th-ranked San Jose-San Francisco illustrates that high S&T intensity does not have to be associated with small size. This cluster hosts a population of more than six million, and it is the fifth-largest S&T cluster in absolute terms (Table S-1.1).

Figure S-1.2 compares the absolute and per capita ranks of the 100 S&T clusters in a scatterplot. It confirms, first of all, that there is no obvious correlation between the rankings. There is wide variation in the S&T intensity of both small and large clusters. For example, Shanghai—ranked 9th in absolute size—holds only the 82nd position in the intensity ranking. By contrast, Lund-Malmö is only the 96th largest cluster but occupies the 10th position in the intensity ranking.

Another interesting pattern emerging from Figure S-1.2 is that many of the U.S. clusters appear in the upper right corner of the scatterplot—they are large in absolute and relative terms. Important exceptions are New York City and Los Angeles, which rank in the top 20 clusters mainly because of their large size and not their S&T intensity. Many Chinese clusters, in turn, do not exhibit high S&T intensity, which reflects the large populations covered by them.[9] One exception is the 4th ranked Beijing cluster, which still shows considerable S&T intensity and has a performance similar to that of Seoul. Interestingly, Tokyo-Yokohama—the top S&T and second most populous cluster—still shows high S&T intensity notwithstanding its large size.

Many of the European clusters show above-average S&T intensity, but do not necessarily feature among the top-ranked clusters. This reflects the different agglomeration patterns in Europe, which have resulted in smaller cities compared to North America and East Asia.

Finally, Figure S-1.3 plots the S&T intensity of clusters against their population levels. It also indicates whether a cluster's S&T output is mainly driven by patenting, mainly driven by scientific publication, or equally driven by both types of S&T output. Two insights emerge.

First, there is a negative correlation between S&T intensity and population, especially for populations below 3.3 million. This reflects the presence of select small and midsize cities specializing in S&T activities. In larger cities, this specialization effect seems less pronounced, and the S&T intensity of clusters becomes more similar. Again, San Jose-San Francisco emerges as the most significant outlier in this respect, suggesting a disproportionately high degree of S&T specialization notwithstanding the cluster's large size.

FIGURE S-1.1

Rank change versus net change in S&T output for the top 100 clusters

Source: WIPO Statistics Database, March 2020.
Notes: "Rank change" is the change in a cluster's rank compared to last year. "Net change in S&T output" is defined as the (new) S&T output for 2018 minus the (removed) S&T output for 2013, holding clusters' geographies constant using this year's geographies

TABLE S-1.2

Ranking of S&T intensity

Intensity rank	Cluster name	Economy	Estimated cluster population	PCT applications per capita (a)	Scientific publications per capita (a)	Total S&T share per capita (b)
1	Cambridge	GB	449,129	584	5,796	1.23
2	Oxford	GB	508,033	282	5,318	0.88
3	Eindhoven	BE/NL	1,008,639	816	602	0.85
4	San Jose-San Francisco, CA	US	6,056,626	656	1,486	0.80
5	Ann Arbor, MI	US	620,199	218	4,975	0.78
6	Boston-Cambridge, MA	US	4,029,151	384	3,201	0.74
7	Daejeon	KR	1,683,639	493	1,546	0.65
8	Seattle, WA	US	2,315,154	499	1,475	0.65
9	San Diego, CA	US	3,552,659	554	975	0.64
10	Lund-Malmö	SE	595,436	342	2,012	0.56
11	Raleigh, NC	US	1,554,250	190	3,056	0.53
12	Grenoble	FR	642,565	303	2,000	0.52
13	Lausanne	CH/FR	691,003	278	2,125	0.51
14	Stockholm	SE	1,905,106	301	1,439	0.45
15	Munich	DE	2,480,475	304	1,260	0.44
16	Göteborg	SE	781,819	231	1,613	0.41
17	Kanazawa	JP	859,213	348	528	0.39
18	Helsinki	FI	1,197,375	233	1,424	0.39
19	Nuremberg-Erlangen	DE	1,304,244	286	960	0.38
20	Copenhagen	DK	1,561,237	189	1,746	0.38
21	Portland, OR	US	2,073,296	302	596	0.36
22	Pittsburgh, PA	US	1,399,419	116	2,134	0.36
23	Minneapolis, MN	US	2,545,762	253	988	0.36
24	Zürich	CH/DE	1,831,070	170	1,635	0.35
25	Basel	CH/DE/FR	960,928	210	1,263	0.35
26	Tokyo-Yokohama	JP	36,229,685	313	397	0.34
27	Stuttgart	DE	3,015,276	276	605	0.33
28	Bridgeport-New Haven, CT	US	1,110,364	117	1,891	0.33
29	Ottawa, ON	CA	1,216,805	161	1,384	0.31
30	Heidelberg-Mannheim	DE	1,964,398	199	1,060	0.31
31	Houston, TX	US	5,227,899	208	979	0.31
32	Hamamatsu	JP	1,188,729	287	289	0.31
33	Cleveland, OH	US	1,385,879	105	1,781	0.31
34	Cincinnati, OH	US	1,776,679	220	795	0.30
35	Washington, DC-Baltimore, MD	US	6,231,144	74	1,920	0.29
36	Beijing	CN	19,661,686	128	1,229	0.26
37	Seoul	KR	21,845,038	187	645	0.25
38	Austin, TX	US	1,492,160	146	905	0.24
39	Nagoya	JP	8,785,429	220	280	0.24
40	St. Louis, MO	US	1,422,096	67	1,478	0.23
41	Sydney	AU	3,450,163	72	1,429	0.23
42	Atlanta, GA	US	2,529,174	65	1,444	0.23
43	Denver, CO	US	2,806,543	99	1,154	0.23
44	Vancouver, BC	CA	1,862,596	78	1,316	0.23
45	Columbus, OH	US	1,444,747	67	1,413	0.23
46	Lyon	FR	1,831,493	127	910	0.23
47	Osaka-Kobe-Kyoto	JP	16,182,399	182	417	0.22
48	Philadelphia, PA	US	4,023,359	79	1,264	0.22
49	Frankfurt Am Main	DE	3,562,097	145	698	0.22
50	Chicago, IL	US	5,777,498	107	1,003	0.22

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TABLE S-1.2

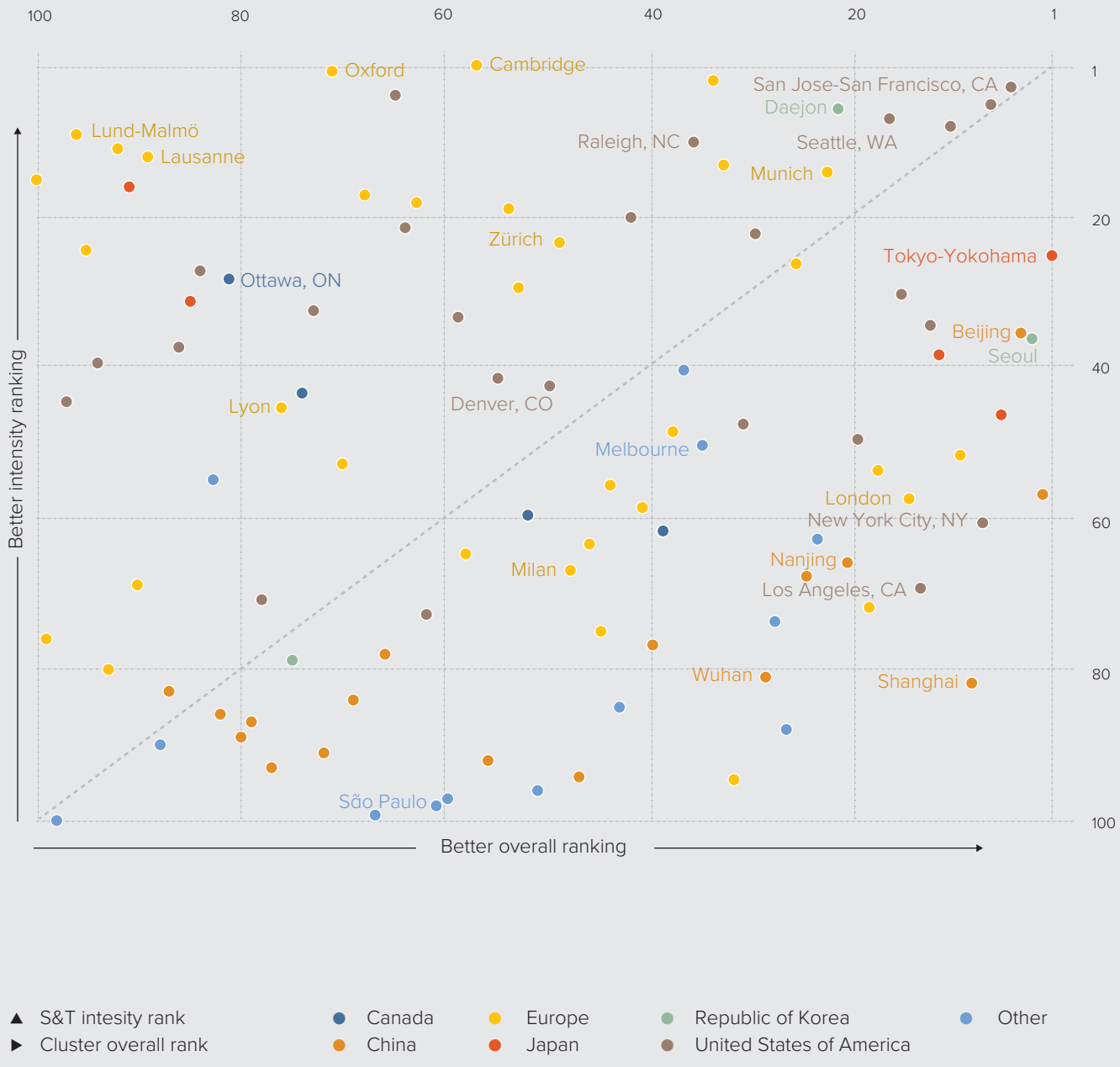
Ranking of S&T intensity, continued

Intensity rank	Cluster name	Economy	Estimated cluster population	PCT applications per capita (a)	Scientific publications per capita (a)	Total S&T share per capita (b)
51	Melbourne	AU	3,875,256	51	1,461	0.22
52	Paris	FR	10,986,036	123	847	0.22
53	Vienna	AT	2,220,257	70	1,221	0.21
54	Amsterdam-Rotterdam	NL	6,725,574	66	1,169	0.20
55	Brisbane	AU	1,907,143	62	1,163	0.19
56	Berlin	DE	3,874,431	86	920	0.19
57	Shenzhen-Hong Kong-Guangzhou	CN/HK	44,965,775	161	264	0.18
58	London	GB	9,015,343	47	1,194	0.18
59	Brussels	BE	4,159,224	76	939	0.18
60	Montréal, QC	CA	3,415,241	59	1,078	0.18
61	New York City, NY	US	15,539,937	79	883	0.18
62	Toronto, ON	CA	4,408,712	53	1,089	0.18
63	Tel Aviv-Jerusalem	IL	6,207,321	114	501	0.17
64	Barcelona	ES	4,349,072	53	994	0.17
65	Rome	IT	3,319,490	24	1,212	0.16
66	Nanjing	CN	7,029,606	24	1,206	0.16
67	Milan	IT	4,234,696	52	917	0.16
68	Hangzhou	CN	6,849,815	71	710	0.15
69	Hamburg	DE	2,364,204	76	641	0.15
70	Los Angeles, CA	US	11,851,722	82	584	0.15
71	Phoenix, AZ	US	2,707,525	91	506	0.15
72	Cologne	DE	9,057,074	86	521	0.14
73	Dallas, TX	US	3,763,640	84	461	0.13
74	Singapore	SG	6,993,405	57	658	0.13
75	Madrid	ES	5,570,432	27	907	0.13
76	Warsaw	PL	2,435,166	18	985	0.13
77	Xi'an	CN	6,203,467	12	967	0.12
78	Changsha	CN	3,912,227	13	949	0.12
79	Busan	KR	3,529,905	62	509	0.12
80	Manchester	GB	2,835,900	33	745	0.12
81	Wuhan	CN	8,107,626	22	787	0.11
82	Shanghai	CN	24,341,974	55	503	0.11
83	Changchun	CN	3,397,721	6	875	0.11
84	Qingdao	CN	4,346,522	48	528	0.11
85	Tehran	IR	7,000,893	2	893	0.11
86	Jinan	CN	3,668,439	14	762	0.10
87	Hefei	CN	4,232,996	13	698	0.09
88	Taipei-Hsinchu	TW	10,638,072	26	587	0.09
89	Harbin	CN	4,190,433	4	763	0.09
90	Ankara	TR	4,444,779	10	625	0.08
91	Suzhou	CN	5,238,169	50	289	0.08
92	Tianjin	CN	7,663,741	11	548	0.07
93	Chongqing	CN	5,630,242	12	533	0.07
94	Chengdu	CN	9,476,676	15	508	0.07
95	Moscow	RU	13,290,360	15	438	0.07
96	Istanbul	TR	14,429,857	19	220	0.04
97	Bengaluru	IN	11,892,944	28	143	0.04
98	São Paulo	BR	18,446,522	4	204	0.03
99	Delhi	IN	24,285,666	4	138	0.02
100	Mumbai	IN	19,808,326	6	92	0.02

Source: WIPO Statistics Database, March 2020.
Notes: (a) Per capita figures refer to 100,000 of population. (b) Per capita figures refer to 1,000,000 of population.

FIGURE S-1.2

Comparing cluster ranks to S&T intensity ranks



Source: WIPO Statistics Database, March 2020.
Notes: See Table S-1.1 for cluster ranks and Table S-1.2 for S&T intensity ranks.

FIGURE S-1.3

S&T intensity by population

Source: WIPO Statistics Database, March 2020.
Note: Cluster focus defined as any cluster where 60% or more of S&T output is from either academic publications or PCT patents.

Second, S&T intensity is, on average, higher if S&T output is mainly driven by patenting activity. This suggests that agglomeration effects associated with patenting activity may be stronger than those associated with scientific publishing. Again, however, a few outliers challenge this relationship—notably Cambridge in the U.K. and Boston-Cambridge in the U.S.—though, even in these cases, patenting is at least as important as scientific publication.

Conclusion

This chapter presented the latest ranking of the world's top 100 S&T clusters. Year-over-year changes in cluster ranks remain modest, though they are in line with the longer-term trend—namely, faster growth of S&T activity in East Asia and especially in China. Analyzing the S&T intensity of clusters provides a more nuanced perspective of the world's S&T cluster landscape. In particular, it suggests that many European and U.S. clusters show more intense S&T activity than their Asian counterparts, even though they show lower S&T activity in absolute terms.

As in previous years, it is important to point out that the shape of the clusters identified in this chapter and their measured performance depend on certain parameter choices. We have carefully rationalized the parameter values we have adopted and tested the sensitivity of our results to a plausible range of values.[10] While we are confident that the global patterns and trends discussed here would remain the same, it is nonetheless the case that different values may change the shape and output of certain clusters—especially those located in population-dense regions.

Notes:

1 Table SA-1.1 provides an overview of the geocoding results using the latest available data.

2 Bergquist et al., 2018.

3 Technically, the DBSCAN algorithm underlying the identification of clusters still identified Shenzhen-Hong Kong and Guangzhou as separate clusters. However, applying the same criteria for when to merge adjacent clusters as the ones used in the past (see Bergquist et al., 2018) leads—for the first time—to a merging of these two clusters. While this outcome is sensitive to the values of the DBSCAN parameters and merger criteria, the underlying phenomenon is real, in the sense that we observe many new inventor/author points at the periphery of the two previous separate clusters.

4 Note that the calculation of the net change in S&T output keeps the cluster geography constant using this year's geographies. This understates the true net change in S&T output for those clusters that have seen an expanding geography. In the case of Hamamatsu and Kanazawa, the larger cluster size emerged directly from the application of the DBSCAN algorithm to the updated data. The expansion of the Taipei-Hsinshu cluster, in turn, is due to a first-time merger of two previously separate clusters, similar to the Shenzhen-Hong Kong-Guangzhou cluster

5 Indianapolis dropped out of the top 100.

6 Ireland (Dublin) dropped out of the top 100.

7 These figures were taken from the Wikipedia pages of these two metropolitan areas.

8 See table S-1.3 for the full breakdown of the top scientific organizations and patent applicants per cluster.

9 We likely underestimate the current S&T output and intensity of Chinese clusters, because the data underlying our analysis go back to 2014, and the Chinese clusters have seen particularly fast growth since then.

10 Bergquist et al., 2018; Global Innovation Index 2020 (Appendix I).

References:

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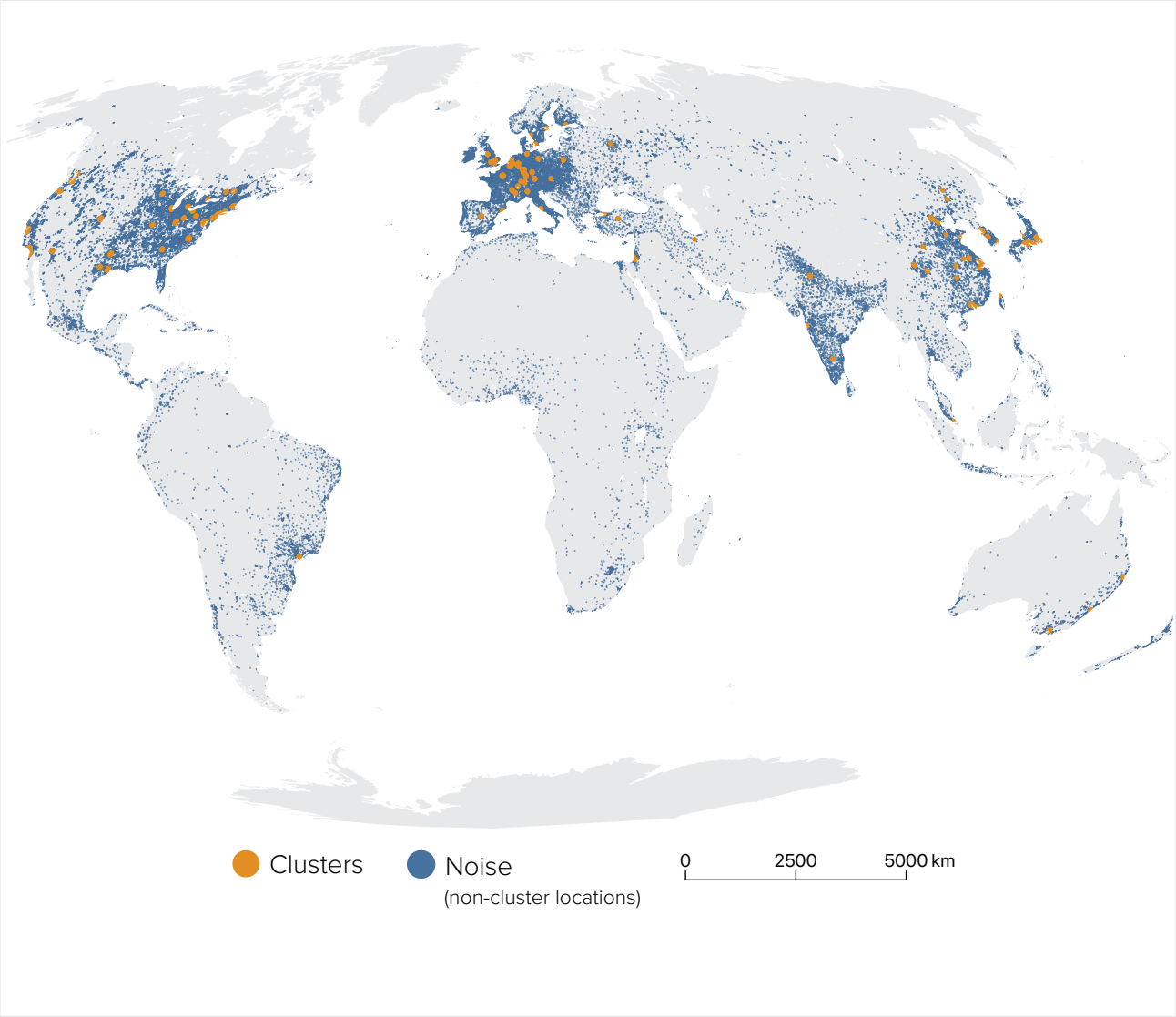
FIGURE S-1.4

Top 100 clusters worldwide



Source: WIPO Statistics Database, March 2020
Note: Noise refers to all inventor/author locations not classified in a cluster.

TABLE S-1.3

Top 100 cluster rankings by publishing and patent performance

			Scientific publishing performance		
Rank	Cluster name	Economy	Top science field	Share, %	Top scientific organization
1	Tokyo-Yokohama	JP	Physics	8.73	University of Tokyo
2	Shenzhen-Hong Kong-Guangzhou	CN/HK	Chemistry	9.42	Sun Yat Sen University
3	Seoul	KR	Engineering	7.56	Seoul National University
4	Beijing	CN	Chemistry	10.09	Chinese Academy of Sciences
5	San Jose-San Francisco, CA	US	Chemistry	6.11	University of California
6	Osaka-Kobe-Kyoto	JP	Chemistry	10.08	Kyoto University
7	Boston-Cambridge, MA	US	Neurosciences & Neurology	5.79	Harvard University
8	New York City, NY	US	Neurosciences & Neurology	6.19	Columbia University
9	Shanghai	CN	Chemistry	12.61	Shanghai Jiao Tong University
10	Paris	FR	Physics	7.26	CNRS
11	San Diego, CA	US	Science & Technology-Other Topics	6.07	University of California
12	Nagoya	JP	Physics	9.38	Nagoya University
13	Washington, DC-Baltimore, MD	US	Neurosciences & Neurology	5.45	Johns Hopkins University
14	Los Angeles, CA	US	Neurosciences & Neurology	5.50	University of California
15	London	GB	General & Internal Medicine	6.58	University of London
16	Houston, TX	US	Oncology	11.29	UTMD Anderson Cancer Center
17	Seattle, WA	US	General & Internal Medicine	4.62	University of Washington
18	Amsterdam-Rotterdam	NL	Cardiovascular System & Cardiology	5.67	University of Utrecht
19	Cologne	DE	Chemistry	7.16	University of Bonn
20	Chicago, IL	US	Chemistry	5.49	Northwestern University
21	Nanjing	CN	Chemistry	11.84	Nanjing University
22	Daejeon	KR	Engineering	13.37	KAIST
23	Munich	DE	Physics	7.59	University of Munich
24	Tel Aviv-Jerusalem	IL	Physics	5.89	Tel Aviv University
25	Hangzhou	CN	Chemistry	12.06	Zhejiang University
26	Stuttgart	DE	Chemistry	7.19	Eberhard Karls University of Tubingen
27	Taipei-Hsinchu	TW	Engineering	9.26	National Taiwan University
28	Singapore	SG	Engineering	10.42	National University of Singapore
29	Wuhan	CN	Chemistry	10.35	Huazhong University of Science & Tech.
30	Minneapolis, MN	US	Chemistry	6.03	University of Minnesota
31	Philadelphia, PA	US	Neurosciences & Neurology	6.31	University of Pennsylvania
32	Moscow	RU	Physics	17.18	Russian Academy of Sciences
33	Stockholm	SE	Science & Technology-Other Topics	5.78	Karolinska Institutet
34	Eindhoven	BE/NL	Engineering	14.64	Eindhoven University of Tech.
35	Melbourne	AU	General & Internal Medicine	5.19	University of Melbourne
36	Raleigh, NC	US	Science & Technology-Other Topics	4.54	University of North Carolina
37	Sydney	AU	General & Internal Medicine	5.17	University of Sydney
38	Frankfurt Am Main	DE	Physics	8.68	Goethe University Frankfurt
39	Toronto, ON	CA	Neurosciences & Neurology	7.20	University of Toronto
40	Xi'an	CN	Engineering	14.64	Xi'an Jiaotong University
41	Brussels	BE	Neurosciences & Neurology	4.73	KU Leuven
42	Portland, OR	US	Neurosciences & Neurology	6.67	Oregon University System
43	Tehran	IR	Engineering	16.01	University of Tehran
44	Berlin	DE	Chemistry	7.23	Free University Of Berlin
45	Madrid	ES	Chemistry	5.61	CSIC
46	Barcelona	ES	Chemistry	5.22	University of Barcelona
47	Chengdu	CN	Engineering	11.69	Sichuan University
48	Milan	IT	Neurosciences & Neurology	8.20	University of Milan
49	Zürich	CH/DE	Chemistry	7.61	ETH Zurich
50	Denver, CO	US	Meteorology & Atmospheric Sciences	4.85	University of Colorado

		Patent performance			
	Share, %	Top patenting field	Share, %	Top applicant	Share, %
	10.4	Electrical machinery, apparatus, energy	9.69	Mitsubishi Electric	8.79
	11.09	Digital communication	31.37	Huawei	23.46
	11.67	Digital communication	17.27	LG Electronics	19.31
	16.25	Digital communication	21.64	BOE Technology Group	28.24
	28.83	Computer technology	23.28	Google	8.61
	16.51	Electrical machinery, apparatus, energy	12.87	Murata Manufacturing	11.13
	38.37	Pharmaceuticals	16.57	M.I.T	6.30
	9.79	Pharmaceuticals	14.17	Honeywell	5.98
	16.58	Digital communication	21.45	ZTE Corp.	22.66
	17.03	Transport	11.19	L'Oréal	7.12
	38.51	Digital communication	31.94	Qualcomm	59.31
	26.37	Electrical machinery, apparatus, energy	18.26	DENSO Corp.	21.78
	18.4	Pharmaceuticals	17.79	Johns Hopkins University	12.86
	33.36	Medical technology	19.09	University of California	6.29
	36.89	Computer technology	12.90	British Telecom	9.21
	18.58	Civil engineering	34.54	Halliburton	19.44
	48.84	Computer technology	41.04	Microsoft	45.44
	11.97	Civil engineering	6.65	Shell	8.43
	11.22	Basic materials chemistry	9.77	Henkel	9.54
	20.24	Digital communication	7.80	Illinois Tool Works	15.65
	12.54	Electrical machinery, apparatus, energy	11.09	Southeast University	9.93
	17.84	Electrical machinery, apparatus, energy	21.46	LG Chem	44.06
	40.19	Transport	12.18	BMW	16.43
	25.13	Computer technology	17.16	Intel	5.54
	42.15	Computer technology	29.88	Alibaba Group	42.94
	32.84	Electrical machinery, apparatus, energy	12.45	Robert Bosch	45.67
	16.35	Computer technology	11.02	MediaTek	14.24
	27.5	Computer technology	8.12	A*Star	17.93
	21.05	Optics	15.25	Wuhan China Star Optoelectronics Tech.	27.15
	52.37	Medical technology	31.29	3M Innovative Properties	36.04
	37.54	Pharmaceuticals	21.35	University of Pennsylvania	10.42
	27.41	Computer technology	12.28	Yandex Europe	4.06
	36.17	Digital communication	40.83	LM Ericsson	46.18
	45.62	Medical technology	27.12	Philips Electronics	72.08
	17.92	Pharmaceuticals	9.08	Monash University	5.07
	37.04	Pharmaceuticals	14.09	Duke University	9.86
	29.53	Medical technology	12.24	Cochlear	4.84
	17.57	Medical technology	12.91	Merck Patent	9.89
	60.06	Medical technology	13.96	Synaptive Medical	5.88
	20.43	Digital communication	15.80	Xi'an Zhongxing New Software	11.35
	26.02	Basic materials chemistry	8.01	Procter & Gamble Company	5.92
	47.25	Computer technology	20.64	Intel	54.34
	7.86	Medical technology	14.93	Fanavaran Nano-Meghyas	2.69
	27.65	Electrical machinery, apparatus, energy	11.10	Siemens	13.76
	11.17	Digital communication	10.59	CSIC	9.24
	22.19	Pharmaceuticals	9.83	Hewlett-Packard	24.53
	30.2	Pharmaceuticals	11.66	Sichuan University	4.91
	18.24	Pharmaceuticals	7.02	Pirelli Tyre	7.63
	29.23	Medical technology	8.18	Sika Technology	5.14
	41.79	Medical technology	12.84	University of Colorado	7.09

CONTINUED

TABLE S-1.3

Top 100 cluster rankings by publishing and patent performance, continued

			Scientific publishing performance		
Rank	Cluster name	Economy	Top science field	Share, %	Top scientific organization
51	Istanbul	TR	Engineering	7.22	Istanbul University
52	Montréal, QC	CA	Engineering	7.29	McGill University
53	Heidelberg-Mannheim	DE	Oncology	9.86	Ruprecht Karl University Heidelberg
54	Copenhagen	DK	Neurosciences & Neurology	5.61	University of Copenhagen
55	Atlanta, GA	US	Public, Environmental & Occupational Health	6.92	Emory University
56	Tianjin	CN	Chemistry	17.49	Tianjin University
57	Cambridge	GB	Science & Technology-Other Topics	7.69	University of Cambridge
58	Rome	IT	Neurosciences & Neurology	6.75	Sapienza University Rome
59	Cincinnati, OH	US	Pediatrics	6.24	University of Cincinnati
60	Bengaluru	IN	Chemistry	12.62	IISC-Bangalore
61	São Paulo	BR	Neurosciences & Neurology	4.21	Universidade de Sao Paulo
62	Dallas, TX	US	Cardiovascular System & Cardiology	6.34	Univ. of Texas Southwestern Med. Center
63	Nuremberg-Erlangen	DE	Chemistry	7.75	University of Erlangen Nuremberg
64	Pittsburgh, PA	US	Neurosciences & Neurology	6.00	PCSHE
65	Ann Arbor, MI	US	Chemistry	4.47	University of Michigan
66	Changsha	CN	Engineering	11.43	Central South University
67	Delhi	IN	Chemistry	7.93	All India Institute of Medical Sciences
68	Helsinki	FI	Science & Technology-Other Topics	5.10	University of Helsinki
69	Qingdao	CN	Chemistry	13.08	Ocean University of China
70	Vienna	AT	Science & Technology-Other Topics	5.14	Medical University of Vienna
71	Oxford	GB	Physics	6.92	University of Oxford
72	Suzhou	CN	Chemistry	16.99	Suzhou University
73	Cleveland, OH	US	Cardiovascular System & Cardiology	7.32	Cleveland Clinic
74	Vancouver, BC	CA	Neurosciences & Neurology	5.18	University of British Columbia
75	Busan	KR	Engineering	9.82	Pusan National University
76	Lyon	FR	Chemistry	6.86	CNRS
77	Chongqing	CN	Chemistry	10.06	Chongqing University
78	Phoenix, AZ	US	Neurosciences & Neurology	7.51	Arizona State University
79	Hefei	CN	Chemistry	14.05	University of Science & Tech. of China
80	Harbin	CN	Engineering	13.04	Harbin Institute of Technology
81	Ottawa, ON	CA	Engineering	5.73	University of Ottawa
82	Jinan	CN	Chemistry	13.85	Shandong University
83	Brisbane	AU	Engineering	5.38	University of Queensland
84	Bridgeport-New Haven, CT	US	Neurosciences & Neurology	6.78	Yale University
85	Hamamatsu	JP	Physics	8.20	Hamamatsu University School of Medicine
86	Austin, TX	US	Chemistry	10.12	University Of Texas Austin
87	Changchun	CN	Chemistry	22.06	Jilin University
88	Ankara	TR	Engineering	5.81	Hacettepe University
89	Lausanne	CH/FR	Chemistry	7.91	EPFL
90	Hamburg	DE	Physics	7.64	University of Hamburg
91	Kanazawa	JP	Chemistry	7.75	Kanazawa University
92	Grenoble	FR	Physics	16.45	CNRS
93	Manchester	GB	Chemistry	6.71	University of Manchester
94	St. Louis, MO	US	Neurosciences & Neurology	6.70	Washington University (WUSTL)
95	Basel	CH/DE/FR	Neurosciences & Neurology	7.53	University of Basel
96	Lund-Malmö	SE	Science & Technology-Other Topics	5.55	Lund University
97	Columbus, OH	US	Oncology	5.23	Ohio State University
98	Mumbai	IN	Chemistry	16.43	Bhabha Atomic Research Center
99	Warsaw	PL	Chemistry	9.35	Polish Academy of Sciences
100	Göteborg	SE	Engineering	7.32	University of Gothenburg

Source: WIPO Statistics Database, March 2020.
Notes: Patent filing and scientific publication shares refer to the 2014–18 period and are based on fractional counts, as explained in the text. We use the location of inventors to associate patent applicants to clusters; note that addresses of applicants may be outside the cluster(s) to which they are associated. The identification of technology fields relies on the WIPO technology concordance table linking International Patent Classification (IPC) symbols with 35 fields of technology (available at http://www.wipo.int/ipstats/en/). The

		Patent performance			
	Share, %	Top patenting field	Share, %	Top applicant	Share, %
	14.63	Other consumer goods	18.69	Arcelik	47.68
	31.61	Digital communication	16.41	LM Ericsson	8.77
	44.55	Basic materials chemistry	13.42	BASF	42.23
	53.92	Biotechnology	14.95	Novozymes	10.76
	27.34	Medical technology	13.58	Georgia Tech	7.70
	20.57	Computer technology	10.47	Tianjin University	12.48
	54.77	Computer technology	16.20	ARM	11.54
	23.85	Pharmaceuticals	10.31	Bridgestone	7.58
	32.76	Medical technology	33.82	Procter & Gamble Company	41.62
	21.75	Computer technology	20.99	Hewlett-Packard	10.10
	35.24	Medical technology	8.77	Natura Cosmeticos	4.01
	36.11	Civil engineering	16.52	Halliburton	15.92
	49.35	Electrical machinery, apparatus, energy	17.10	Siemens	35.26
	50.15	Medical technology	12.69	University of Pittsburgh	14.15
	65.63	Pharmaceuticals	10.22	University of Michigan	29.52
	30.20	Electrical machinery, apparatus, energy	9.48	Zoomlion	7.97
	10.26	Pharmaceuticals	12.02	Sun Pharmaceutical Industries	4.36
	41.98	Digital communication	30.04	Nokia	11.79
	15.45	Other consumer goods	43.01	Qingdao Haier Washing Machine	27.04
	21.09	Electrical machinery, apparatus, energy	8.63	Technische Universitat Wien	4.28
	57.83	Biotechnology	13.74	Oxford University	12.90
	48.73	Digital communication	10.37	Fujitsu	11.76
	35.07	Medical technology	17.22	Case Western Reserve University	10.71
	52.55	Medical technology	9.44	University of British Columbia	5.99
	27.37	Medical technology	7.68	Pusan National University	5.59
	22.91	Basic materials chemistry	10.26	IFP Energies Nouvelles	11.29
	18.59	Optics	16.58	HKC Corp.	36.69
	37.63	Semiconductors	16.25	Intel	24.71
	29.14	Other consumer goods	14.76	Hefei Hualing	15.29
	30.20	Measurement	14.32	Harbin Institute of Technology	36.35
	43.04	Digital communication	48.28	Huawei	42.98
	42.47	Computer technology	17.85	Shandong University	18.35
	36.87	Civil engineering	12.37	University of Queensland	8.18
	63.11	Pharmaceuticals	15.69	Yale University	11.15
	21.75	Mechanical elements	14.92	NTN Corp.	26.17
	62.24	Computer technology	20.83	University Of Texas	13.94
	41.61	Measurement	15.58	Changchun Institute Of Applied Chemistry	14.38
	13.18	Medical technology	15.12	Aselsan	18.01
	34.89	Food chemistry	8.86	NESTEC	25.83
	42.84	Organic fine chemistry	14.60	Beiersdorf	8.75
	52.62	Computer technology	8.89	Fujifilm Corp.	31.04
	31.57	Electrical machinery, apparatus, energy	13.77	CEA	39.44
	49.75	Electrical machinery, apparatus, energy	15.46	Micromass	13.54
	51.25	Biotechnology	16.00	Monsanto Technology	17.65
	45.41	Pharmaceuticals	18.98	F. Hoffmann-La Roche	13.56
	64.26	Digital communication	25.61	LM Ericsson	24.18
	66.73	Pharmaceuticals	12.87	Ohio State Innovation Foundation	18.96
	17.00	Organic fine chemistry	17.71	Reliance Industries	4.90
	14.59	Medical technology	8.43	General Electric	4.49
	33.00	Digital communication	13.89	LM Ericsson	22.63

top scientific field is based on SCIE's Extended Ascatype subject field. An article can be assigned to more than one subject field. Fractional counting was used when more than one subject was assigned to an article. Codes refer to the ISO-2 codes. See chapter 1 for a full list, with the following addition: TW = Taiwan, Province of China. CNRS = Centre National De La Recherche Scientifique, KAIST = Korea Advanced Institute Of Science & Technology, CSIC = Consejo Superior De Investigaciones Cientificas, IISC - Bangalore = Indian Institute Of Science - Bangalore, PCSHE = Pennsylvania Commonwealth System Of Higher Education, EPFL = Ecole Polytechnique Federale De Lausanne, and CEA = Commissariat A L'Energie Atomique Et Aux Energies Alternatives.

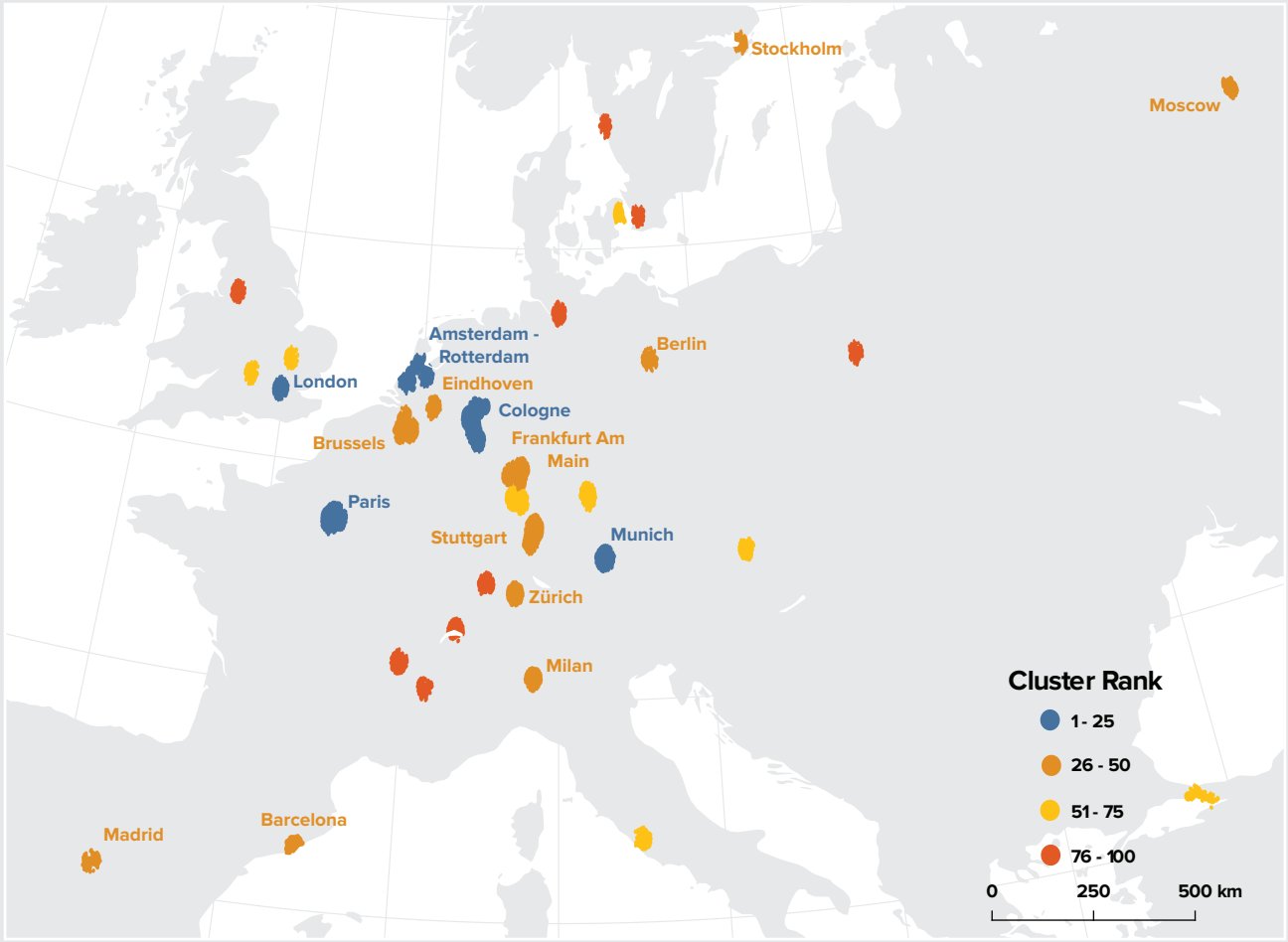
FIGURE S-1.5

Regional clusters: Asia

Source: WIPO Statistics Database, March 2020.
Note: Cluster rank is based on total share in patent filing and scientific publication using fractional counting and the publication period of 2014-2018, as explained in the text.

FIGURE S-1.6

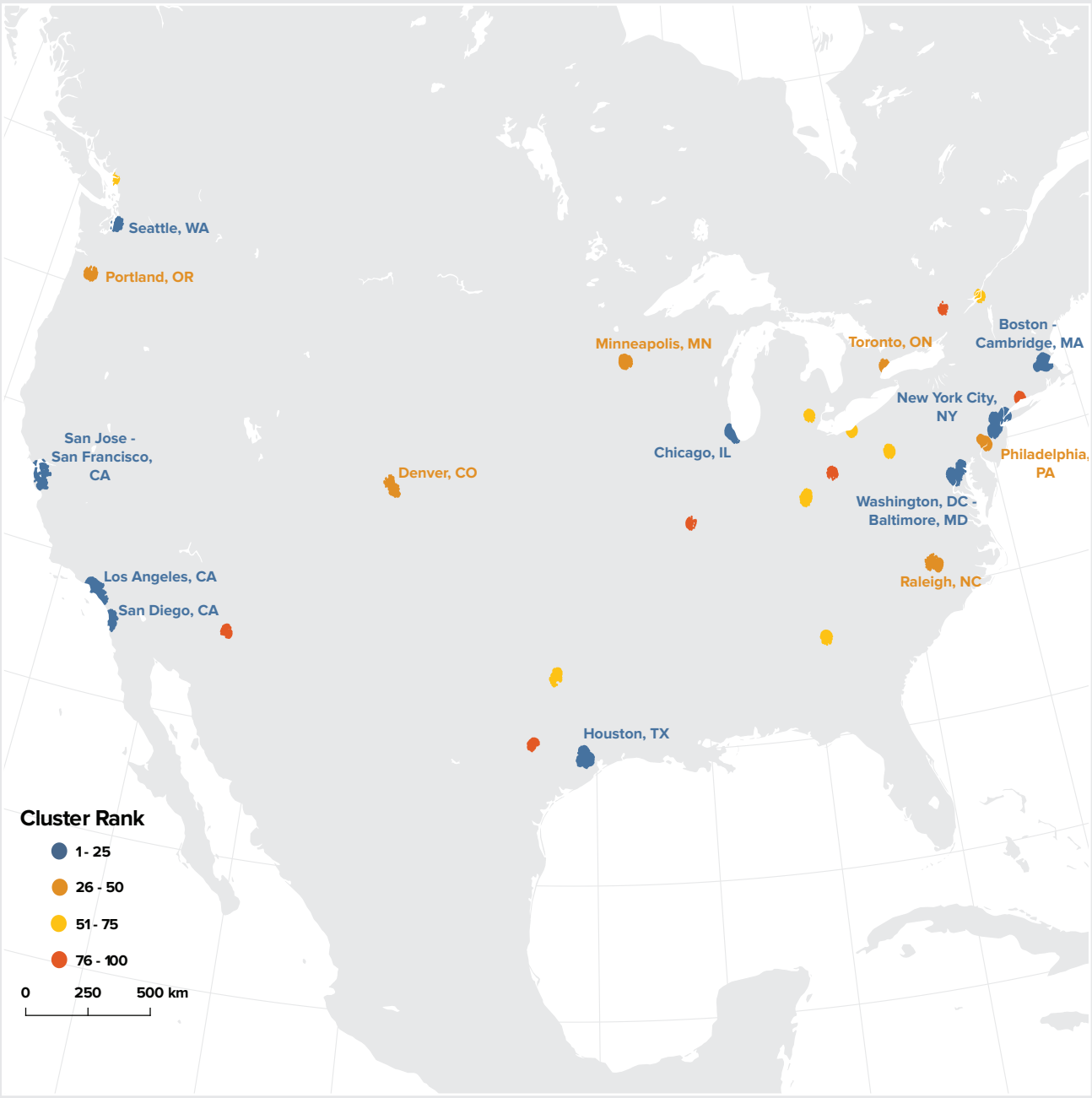
Regional clusters: Europe



Source: WIPO Statistics Database, March 2020.
Note: Cluster rank is based on total share in patent filing and scientific publication using fractional counting and the publication period of 2014-2018, as explained in the text.

FIGURE S-1.7

Regional clusters: Northern America



Source: WIPO Statistics Database, March 2020.
Note: Cluster rank is based on total share in patent filing and scientific publication using fractional counting and the publication period of 2014-2018, as explained in the text.

MATCHING S&T CLUSTERS TO POPULATION

Utilizing population data to enhance our cluster comparisons provides substantial improvement to our analysis. Unfortunately, aligning our "bottom up" clusters with typical population statistics is less than ideal. Our identified clusters almost never conform to standard administration boundaries with which we could find population statistics (for example, census blocks in the U.S. or NUTS—2/3 regions in the European Union). In addition, finding consistent administrative population data across multiple countries proved difficult.

To address these issues, we turned to the European Commission's Global Human Settlement population distribution data. This data provides an estimation of population for every 250–300 square meters. By disaggregating census population data based on satellite imagery, we are able to plot population based on where people actually live, rather than just on arbitrary political boundaries. Having the population distribution at such a high level of detail allows us to reaggregate population into custom geographies (i.e., our clusters). Thus, just like our inventor/author geocoded locations, this population data allows us to define total population from the bottom up.

Matching the population data with our clusters is done geographically by capturing all pixels that are contained within a cluster's area. For the purposes of aggregating population, we defined a cluster's area as all space within 0.05 degrees of each inventor's location.[1] Once the buffer radius was applied, we combined all areas of a cluster into one final polygon. We achieved the final total population by summing the values of all the population pixels that are contained in the final cluster polygon.[2]

The use of a buffer was preferred to possible alternative methods, due to its ability to capture nearby population pockets. For example, if we had limited our cluster area to edges defined only by our cluster points, we may have missed dense population areas that were just next to one of our points. This would have caused an underestimation of the population. As can be seen in Figure SA-1.1, if we had used only our cluster points to define the edges of San Jose-San Francisco, we would have missed the dense urban area of Concord, California. The use of buffers also minimizes errors that could occur from overreliance on imprecise geolocation. For example, our scientific publication data is only geocoded at the city level (see Table SA-1.1 for a full breakdown of our geocoding results). Thus, the use of a buffer for these points more appropriately reflects the lack of precision that some of our geolocated points have.

Buffers require a choice of radius size or how much area around the point should be included. Similar to choosing the radius and density parameters used for DBSCAN, we chose a buffer radius that minimizes the potential for false negatives (not capturing population areas that should be included in the cluster) and false positives (capturing areas that should not be included). Increasing the buffer radius decreases the risk of underestimating the population but increases the risk of overestimating it. This can be seen in Figure SA-1.1. If we had used 0.01 degrees as the radius, we would not have captured Concord, causing an underestimation. However, if we had chosen 0.10 degrees, we would have captured the city of Antioch, California, which is in the next valley over from Concord. This would have caused an overestimation of the

TABLE SA-1.1

Summary of geocoding results

	Scientific publications			PCT applications				
Country	Number of addresses	City-level address accuracy (%)	Publications covered (%)	Number of addresses	Block-level address accuracy (%)	Sub-City-level address accuracy (%)	City-level address accuracy (%)	Applications covered (%)
United States of America	5,925,624	97.55	98.64	861,743	94.25	5.40	0.15	99.86
China	3,454,935	99.04	99.47	451,848	92.35	0.05	4.90	97.38
Japan	1,117,078	94.96	97.02	548,970	32.50	28.20	37.73	98.76
Germany	1,262,920	97.36	98.18	258,816	97.47	0.41	1.68	99.74
United Kingdom	1,276,213	96.61	97.70	79,335	74.06	13.89	10.03	98.22
France	1,040,275	92.91	95.08	106,503	86.34	1.50	6.72	95.79
Italy	990,376	95.54	96.98	40,780	87.60	5.08	6.26	99.09
Republic of Korea	734,697	94.12	96.75	215,692	0.12	0.69	79.91	87.77
Canada	813,125	98.36	98.94	41,886	96.84	2.32	0.59	99.69
Australia	761,695	81.77	87.84	20,505	92.17	4.77	2.18	99.31
Spain	747,705	96.75	97.98	26,508	73.21	10.03	15.67	99.21
India	632,809	94.77	96.71	38,193	33.14	44.63	19.06	97.24
Brazil	572,348	98.65	99.54	9,304	80.48	12.25	6.30	99.45
Netherlands	471,728	97.38	98.48	50,790	87.47	0.38	11.79	99.66
Turkey	365,592	96.66	97.11	12,579	32.12	51.74	12.98	97.11
Iran (Islamic Republic of)	356,585	97.09	98.34	529	0.57	2.84	89.22	91.13
Russian Federation	341,968	99.00	99.26	14,542	85.57	5.35	7.35	99.26
Switzerland	300,307	90.67	92.37	35,888	89.74	3.71	4.34	98.55
Sweden	274,192	97.63	98.22	41,828	94.52	0.86	4.15	99.60
Israel	145,890	90.55	94.78	28,497	54.09	3.91	32.16	94.85

Source: WIPO Statistics Database, March 2020.
Note: This list includes the top 20 countries that account for the highest combined shares of patents and scientific articles. PCT inventor addresses were geocoded to the highest level of detail. Due to the much larger volume, scientific author addresses were geocoded to the city level only.

population. Therefore, we calculated population using a number of different radiuses for the buffer and looked at the changes in the population estimations, preferring the one that minimized large shifts. When compared to other distances, a radius of 0.05 degrees minimized large shifts in the total population calculated across all clusters as well as minimized the maximum population shift of any one cluster.

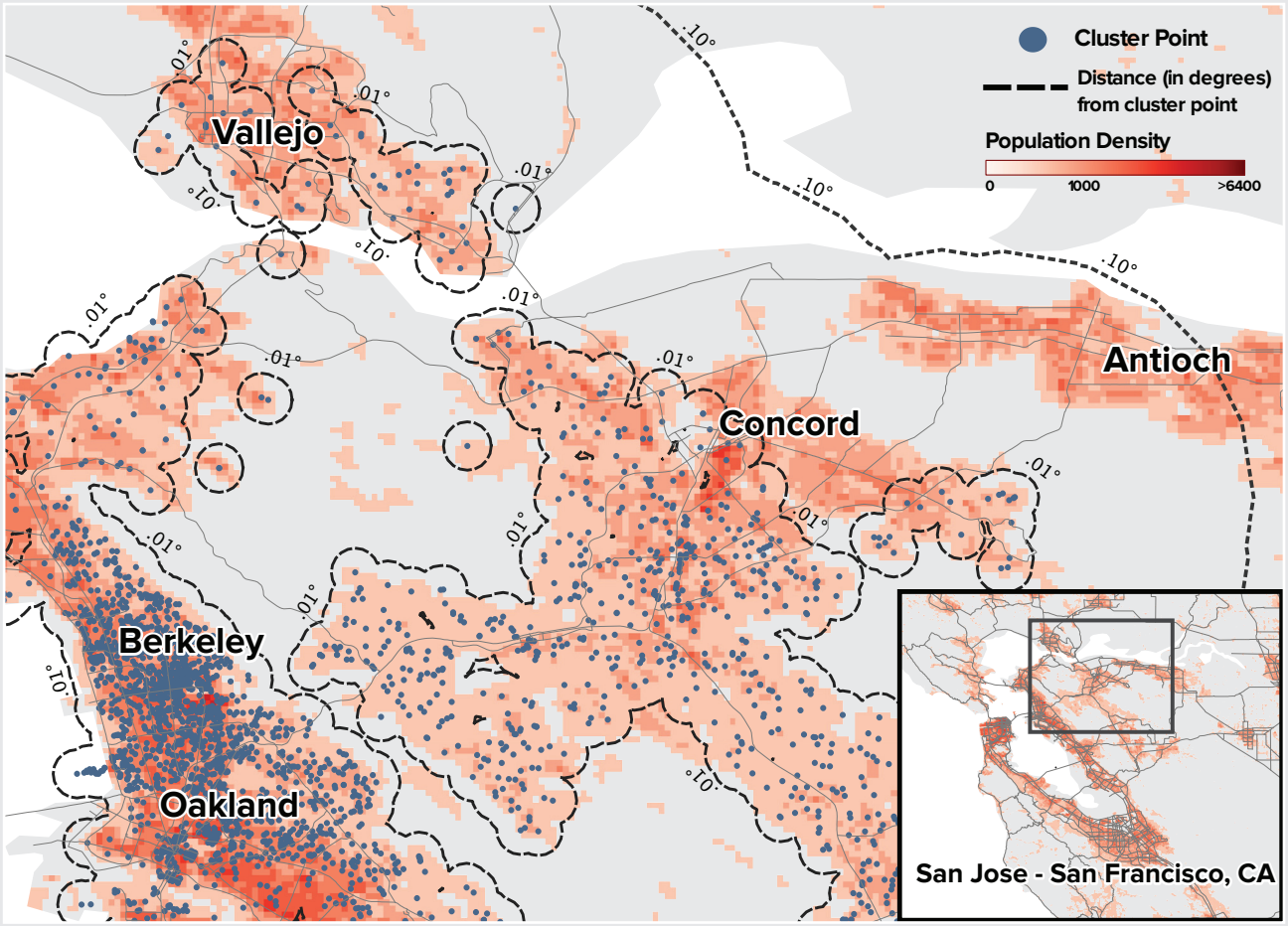
Notes:

1 When using degrees to define the radius, the actual distance will vary depending on the latitude of the center point. In this case, 0.05 degrees translates to between 4–5 kilometers for the vast majority of our points.

2 We utilized QGIS's Raster Analysis Zonal Statistics tool to perform the aggregation. A pixel was included in a polygon if at least its center point was included. Given the size of our clusters and the large number of population pixels typically contained, this binary in or out selection is acceptable.

FIGURE SA-1.1

Comparing buffer radius



Source: WIPO Statistics Database, March 2020; Schiavina et. al., 2019.

WHO WILL FINANCE INNOVATION?

INTRODUCTION TO THE GII 2020 THEME WHO WILL FINANCE INNOVATION?

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To boost entrepreneurship and economic growth, how best to finance innovation is a top business and policy concern in the 21st century—and these innovation finance ambitions are only more pressing amidst the personal and economic toll of the coronavirus disease (COVID-19) pandemic.

The GII 2020 and the following 15 chapters by leading policymakers, academic experts, and business leaders shed light on the state of innovation finance by investigating the evolution of existing financing mechanisms and by pointing to progress and remaining challenges.

Recent developments in innovation financing

The lack of financing sources—due to imperfections in the capital market, and other causes—can lead to a worrying underinvestment in innovation. This is particularly true when the technological risk associated with an innovation is too high for investors, when entrepreneurs have only intangible assets as collateral, or in emerging and developing economies where financial markets are still to be strengthened.

Today, innovators enjoy an increasingly broad spectrum of funding mechanisms, including from a range of new actors, such as not-for-profit organizations, sovereign wealth funds (SWFs), wealthy individuals, and celebrities.

- Traditional innovation financing mechanisms include public support schemes, firm-specific innovation investments, and market-based mechanisms targeting innovation specifically, such as loans, private equity, and venture capital (VC).
- New mechanisms include corporate venturing, intellectual property (IP) marketplaces, microfinance, crowdfunding, and technology solutions.

Despite the recent fall in VC deals caused by the COVID-19 pandemic, VC investments had surged in the past two decades (Chapter 1 and Chapter 5–Nanda). While VCs have usually been successful in selecting entrepreneurs, few winners usually take all (Chapters 1, 2–Cornelius, and 4–Lerner). Even in the United States of America (U.S.), VC funding is a rather uncommon event: only around a sixth of 1% of new businesses obtain VC financing (Chapter 2). In recent years, these "winners" are increasingly found among scale-ups, later-stage firms, and "unicorns"—young and generally tech-focused companies valued at US$1 billion or more.

Sovereign wealth funds have partly contributed to this trend with conspicuous rounds of financing to companies, such as Uber and WeWork. SWFs differ from many other investors in their character, risk tolerance, and time horizons—investing in disruptive technologies and early-stages companies while balancing technological investments with investments for economic competitiveness and well-being (Chapter 3–Engel et al.). While their financial resources have helped many start-ups flourish, their investments have raised national concerns in certain countries, related to the recent revival in economic nationalism (Chapter 3).

The following additional findings emerge on the topic of "Who Will Finance Innovation?".

Access to innovation finance is skewed across countries and sectors

While the U.S. has traditionally been the largest VC market globally, other countries have also embraced the VC model. New VC hotbeds have emerged, first in Israel (Chapter 12–Daniely) and Europe, more recently in China and India, and, to a lesser extent, in some countries in South East Asia, Latin America, and Africa.

Despite this welcome sign, VC penetration rates remain uneven across countries at different stages of development—and even across countries at similar income levels (Figure T-1.1 and Chapter 2). Within these countries, VC investments are concentrated in a few cities. For example, 11 cities—6 in the U.S., 3 in China, London, and Bengaluru—account for over 60% of total venture disbursements worldwide (Chapter 4). This divide is likely to become even more pronounced in the years following the current economic crisis (Chapter 1).

Other forms of financing, such as investments by SWFs, are also concentrated—mainly in the U.S. and Asia, and much less in Europe and elsewhere (Chapter 3). For this reason, some SWFs have been specifically created to invest in their domestic economies to foster economic development, diversification, and improved living standards. Examples include initiatives in France, Ireland, Turkey, Kazakhstan, Morocco, Oman, and Singapore (Chapter 3).

A subset of innovations—in particular, those that can generate returns in the short term—attract most VC investments (Chapter 5). By contrast, more complex nascent technologies that build on new science have received less capital, despite great societal need (Chapter 5 and Chapter 6–Dassault Systèmes). Indeed, VC investments are highly concentrated in IT software and services as well as consumer products and services, business products and services, and financial services. These sectors not only absorb the bulk of the financial resources available through VCs, but their growth has been quite fast in the last 10 years. Healthcare, IT hardware, and energy, materials, and resources have not kept up with the overall growth of VC investments (Figure T-1.2 and Chapter 5). The current crisis is likely to further deepen this tendency, with sectors and firms that have longer research horizon facing the most severe financial constraints (Chapter 1).

Interestingly, with much more patient capital at hand, SWFs are better suited to invest in firms with longer incubation times, including healthcare (Chapter 3). Beyond healthcare, SWFs have shown interest in business software, consumer services with high-tech elements (such as e-commerce), and consumer technology, while preferring practical technologies that solve daily problems and create new opportunities for customers (Chapter 3).

Currently, however, the need to finance disruptive innovations—"the unknown" referred to in Chapter 6—is stronger than ever. Significant societal changes call for large investments in science-intensive technological fields with long research horizons that can help shape the unknown (Chapter 6). Funding innovations that can contribute to societal challenges is a cornerstone of European innovation policies, as described in the case of, for example, the Czech Republic (Chapter 9–Havlíček et al.).

Sound innovation ecosystems must balance start-ups, scale-ups, and mature firms

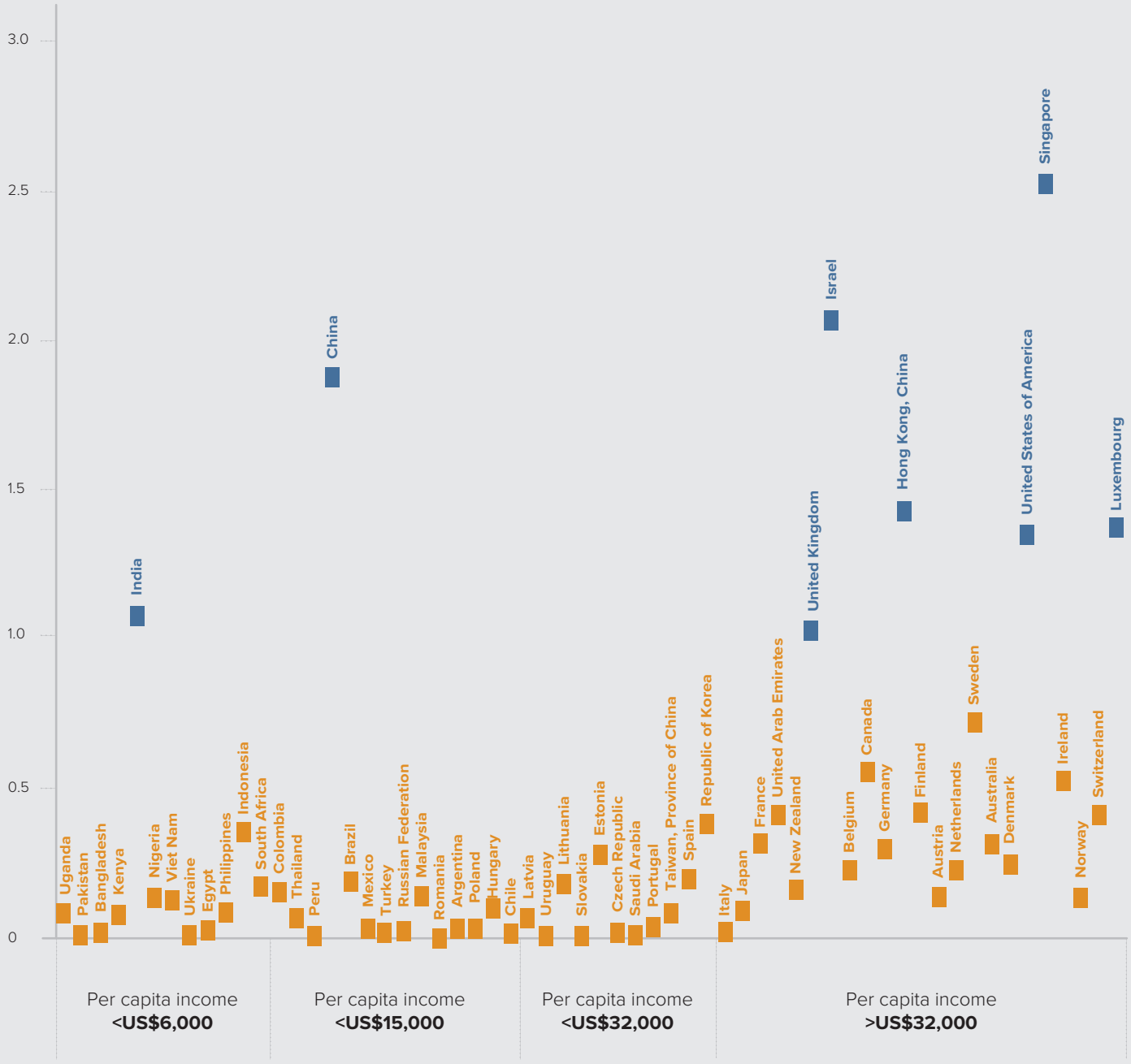
Since the emergence of the private equity industry, investing in innovation has been conflated with investing in start-ups (Chapter 7–Parpaleix et al.). Finding the right balance between financing start-ups, scale-ups, and mature firms, however, is crucial for innovation ecosystems (Chapters 2, 7, 11–Chattopadhyay, 12, and 13–Mwangi).

In many parts of the world, start-ups still attract most of the resources of innovation financiers, even though "scale-up" is the real litmus test for innovation (Chapter 7). In Israel, for example, the tendency of investors to push for early exits through acquisitions by foreign multinational companies contributes to a myopic situation where a brilliant entrepreneur is more interested in becoming a "start-upist" than in building a global multibillion-dollar company (Chapter 12). India also boasts a vibrant start-up ecosystem, hosting 6 of the top 100 most entrepreneurial cities in the world, with Bengaluru occupying the 11th position (Chapter 11). Even in other middle- and low-income economies, including Kenya, investing in start-ups has become a cornerstone of innovation policy, despite the fact that the "missing middle" phenomenon—i.e., the shortage of mid-sized firms—threatens innovation ecosystems (Chapters 7 and 13).

In recent years, a shift from seed funding to later-stage and expansion rounds has occurred, reflecting the interests of non-traditional investors, including SWFs and mutual funds (Chapters 2, 3, and 11, in the case of India). Thanks to easier access to expansion and growth capital, firms remain private longer than was previously the case (Chapters 2 and 3). Exits, which were already compromised in 2019, have become even more rare during the pandemic crisis (Chapter 1). While the void created by this shift has been partially bridged by angel investors, accelerators, and crowdfunding platforms, overall innovation financing has become disproportionally available to less risky and already successful later-stage companies. This tendency is further reinforced by the current crisis, as risk aversion grows and investors specialized in early-stage deals are more responsive to business cycles (Chapter 1).

FIGURE T-1.1

Venture capital penetration in selected economies, 2016-2018

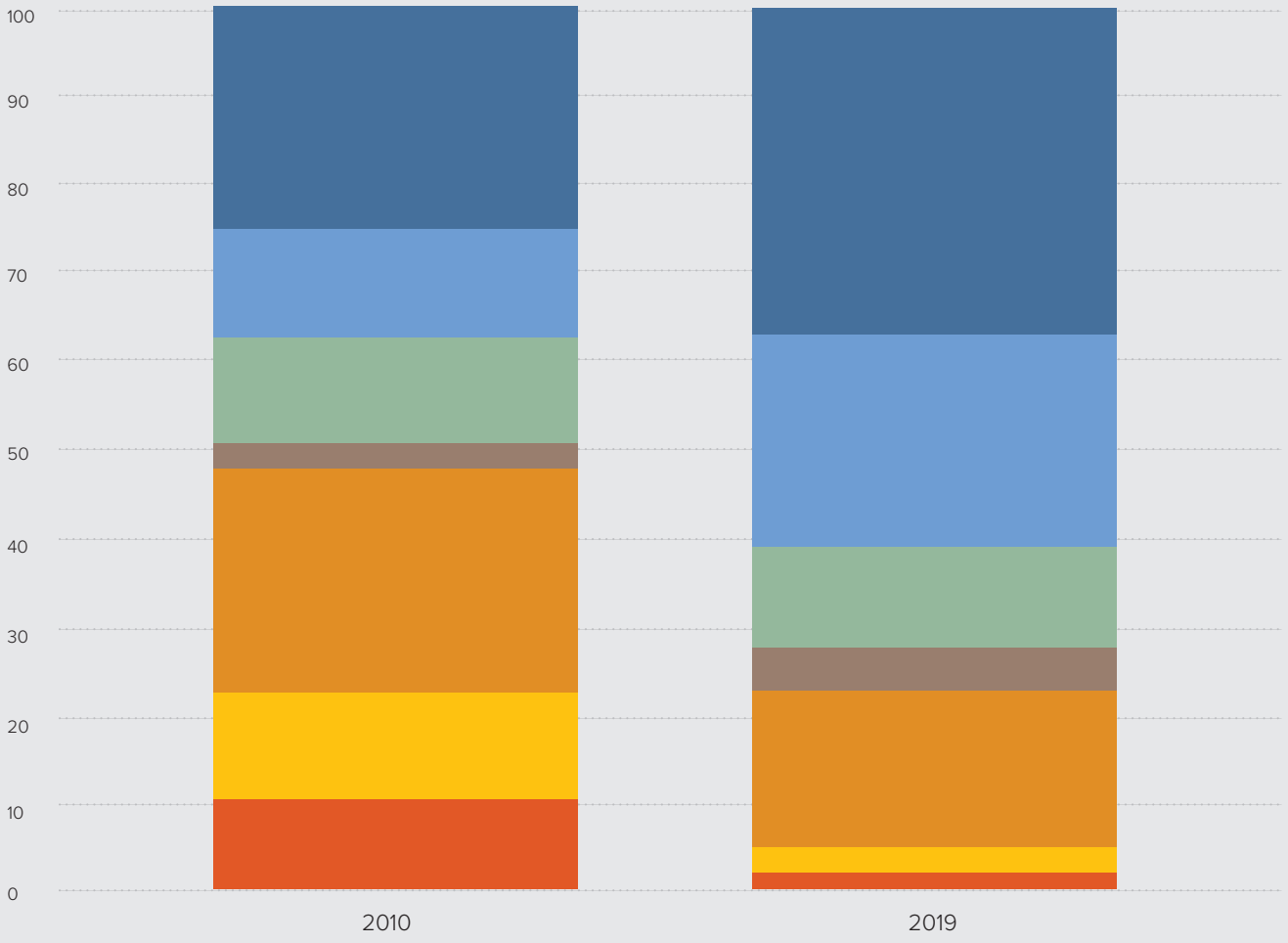


▲ %, Venture capital investments/GDP

Source: Figure 2.3 in Chapter 2.

FIGURE T-1.2

Share of global venture capital investment, by sector



▲ % share

- IT software and services
- Consumer products and services
- Business products and services
- Financial services
- Healthcare
- IT hardware
- Energy, materials, and resources

Source: Figure 5.2 in Chapter 5.

Mature, established firms also need access to finance to be able to introduce new innovations—including radical innovations—and to avoid growing obsolete. As Chapter 7 shows, these firms lack sources of finance who can support their regenerative strategies in the long run. Such strategies entail investments in new concepts, knowledge and shared imaginaries that are difficult to appraise on a financial market, leading to a risk of undervaluation and liquidity gaps (Chapter 7).

This need for mature and existing firms to be able to access innovation capital is a vital and often overseen point. Generally, policymakers and the financiers of innovation are obsessed with funding start-ups, and thus new ventures only. Recently that attention has shifted to unicorns as the sacred source of innovation. Existing, mature firms are in, in turn, regularly forgotten. That is a mistake. Many countries would first and foremost benefit from the innovation rate of firms on the market, be they in the technology sector or in more traditional sectors or linked to natural resource. Unfortunately, often that is not how support schemes are currently conceived. Often, and understandably, new ventures instead attract all the excitement and attention.

Finding the right balance between under and overinvestment in the search for unicorns

In recent years more and more VC has been available, specifically for later-stage ventures—with SWFs particularly focused on targeting the next unicorn (Chapters 2, 3, and 5). In 2018, megadeals accounted for 47% of total capital invested in the U.S. and unicorns for 35%.[1]

There are compelling reasons for the growth in unicorns: 1) greater ability of firms to raise capital as private entities, 2) technological changes that facilitate "winner takes all" markets (rise of technology platforms), 3) the poor experience of the late 1990s when too many very small companies went public and underperformed, 4) securities regulation, and 5) other reasons which are amply documented in the literature.[2] The winner-takes-all notion is backed by the idea that, due to network effects and economies of scale, only one or a few players are able to survive in some markets; hence, it is worth pouring large sums of money into those potential winners.

The fact that so much money is being invested in late-stage and growth capital transactions—including unicorns—is also, to a large extent, a reflection of a huge increase in private capital. With benchmark yields having been extremely low for more than a decade, private equity and VC funds have attracted substantially more capital. Even mutual funds have invested in VC transactions.

This development of vast amounts of money chasing a few winners comes with a number of risks:

First, overfunding of firms during booms might stimulate creativity, but it might also generate wasteful duplication of efforts as multiple companies pursue the same opportunity—with few followers adding concrete value and most, in fact, doomed to go out of business rapidly (Chapter 4). This is a problem of too much VC being spread indiscriminately to many similarly promising—and most likely failing—ventures. Before a slowdown in 2019 and, finally, in 2020 due to COVID-19, the Chinese VC market was said to have been significantly overheated with capital-backed business ventures that had no promising or original business plan or technology.

Second, and related to the first point, we have witnessed large investment funds and SWFs focusing on a limited number of unicorns or prominent venture-backed firms. Often this is fueled by the incentives of the winner-takes-all notion—a rationale for aggressive investment strategies aimed at gaining market share while running substantial losses at the expense of revenue or profits. Recently, however, that approach has led to investment bubbles which eventually burst, in particular when paired with significant governance failure.

While this heavy focus on one company enables that company to build market share while "burning cash", it also drives out competitors who cannot sustain this rate of loss, possibly inducing anti-competitive effects in the market place at the expense of smaller, more innovative ventures.

As with financial investments generally, it is important to maintain balanced investment strategies that encourage a healthy level of VC and unicorn investments, while avoiding combining enormous sums with bad governance to create bubbles. The recent months have provided an important wake-up call, which may help investors and regulators alike to find this critical balance.

New instruments—that have raised expectations—are helping, but have not fully eased financial constraints in developing economies

Microcredit has been hailed as a major financial innovation, helping to alleviate credit constraints faced by underserved communities. Microlending has made credit easily accessible to poor entrepreneurs, women, and rural areas. To this day, however, microcredit has not been used to foster transformational entrepreneurship and innovation. Many borrowers of microcredit lines are subsistence or "reluctant" entrepreneurs with limited interest in innovation (Chapter 2). Yet, as evidenced in the GII 2020, advances in digital finance could help microlenders become more efficient, thereby allowing them to achieve scale.

Indeed, advances in financial technology (fintech) are transforming the way capital is intermediated. Financial technologies have enormous potential, including the possibility of relaxing financial constraints on firms—especially small firms in developing countries. New technologies enable businesses and individuals to become connected to a digital payment infrastructure via mobile phones, computers, and point-of-sale devices. Employing new technologies in artificial intelligence (AI) and machine learning, fintech lenders provide loans through Internet-based platforms for individuals, called peer-to-peer (P2P) lending, or through institutional funders, referred to as marketplace lending.

Fintech is spreading across the board, affecting advanced economies as well as emerging and developing countries. Kenya, for example, is among the earliest and most prominent African innovators in mobile money, with ambitions to replicate its success in financial inclusion and small firms' financing in other sub-Saharan African countries (Chapter 13). Another example is India Stack, a set of technologies that allows governments and businesses to utilize a digital infrastructure to make cashless payments for service deliveries, helping to solve the challenges of digital and financial inclusion (Chapter 11).

Since the financial crisis of 2008-2009, crowdfunding has emerged as an alternative financial mechanism to fund innovation, especially for small and medium-sized enterprises (SMEs). Crowdfunding today is taking various forms—donations, rewards, loans, and equity—and is spreading geographically, from the U.S. to Europe, Asia, Australia, Latin America, and Africa. While some hoped that crowdfunding could "democratize" innovation, only a few projects account for the bulk of the financial resources raised in crowdfunding platforms (Chapter 2).[3] At the same time, crowdfunding is particularly suited to the pre-seed phase of an innovation project—which is also the phase where financing is drying up the most (Chapters 1 and 5). Crowdfunded projects often attract other investors too, including venture capitalists and angel investors.

Despite these encouraging prospects, the real impact of fintech and other instruments remains difficult to assess at this early stage. Data on new fintech adoptions across the world are of critical importance to understand if, where, and how these technologies are changing the global innovation finance landscape. Regulatory frameworks and other policies to encourage the development and uptake of fintech are paramount to fulfill the optimistic expectations that they have generated (Chapter 2). As shown in the case of Abu Dhabi, for example, the government can offer a regulated and controlled environment to fintech start-ups to safely test innovative solutions (Chapter 14–Bin Hendi).

The market for ideas and IP is growing, but barriers remain

IP has long been used to signal the quality and viability of an innovation project. This has proved useful to reduce financing costs, attract new investors, qualify for government programs, and enter international consortia. IP also constitutes a sort of "insurance policy": should the company go bust, its ideas and intangible assets can still be sold or licensed. IP is also increasingly used as collateral for loans, with many governments around the world facilitating these practices to reduce firms' difficulties in collateralizing their investments in IP (Chapter 15–Hall). As this edition of the GII argues, IP can also be used as a tool that directly generates money (Chapter 16–Radauer).

Today, there are still neither IP marketplaces that have the size and volume of the New York Stock Exchange nor large Internet platforms for trading physical goods—despite numerous initiatives to establish IP marketplaces emerging and some seemingly succeeding in niche markets (Chapter 16). So why do so many initiatives fail, and none reach a considerable size?

Several issues still endanger markets for ideas and IP (Chapters 15 and 16). The first and most important is valuation: IP differs from common stocks and commodities for which there are exchanges. The value of IP is highly context-specific and heterogeneous. This creates substantial information asymmetries, which essentially prevent "commoditized" trading. Valuation is also hampered by the fact that, to date, there is still no standard method for valuing IP that is uniformly accepted (Chapters 15 and 16). Until IP is properly and systematically valued, the potential asset value of innovative companies might be seriously undervalued—including, and especially, for companies that do not consider themselves technology or knowledge-based, such as creative brands and manufacturers (Chapter 15). Other barriers to the establishment of IP marketplaces include a lack of a clear inventory of IP and intangibles, lack of awareness of IP's role as a valuable asset, banking regulations, and other issues related to the re-deployability of intangible assets (Chapters 15 and 16).

Despite these challenges, there is, however, growing evidence that incentives to invest in IP-rich companies are strengthening (Chapter 15). Governments have a role to play in supporting this trend: IP audits, for example, can provide a good impression of the IP situation of a firm and identify potentially valuable assets. IP audits are currently implemented with various degrees of success in countries such as Austria, France, and the United Kingdom (U.K.) (Chapters 15 and 16). These instruments can and should be used more. In the U.K., for example, there are fewer than 5000 IP valuation reports commissioned per annum, and the market is somewhat underdeveloped versus what might be considered optimal (Chapter 15). At lower income levels, challenges are even more evident. Yet countries are becoming increasingly aware of the value of IP, as shown, for example, by the Philippine Innovation Act, which aims at promoting a vibrant intellectual property culture (Chapter 8–de la Peña).

A carefully designed policy mix is essential to improving the innovation finance landscape

An overarching policy message emerges from the chapters of this GII: no single innovation policy instrument can solve all the issues that a country might face in relation to its innovation financing landscape. Governments across the world should think of a carefully designed policy mix that tackles the various obstacles to innovation financing while maximizing complementarities between financing mechanisms and sources of funds. Indeed, government support can be direct or indirect. Similarly, sources of funds can be public, private, or a mix of the two (Chapter 4). Some combinations might stimulate innovation, while others might make related efforts useless.

Three additional policy actions are recommended in the GII 2020.

First, governments can play a significant role in de-risking technologies.

Historically, when start-ups with substantial technology risk were successfully commercialized by VCs, government helped with de-risking the technology and/or reducing market risk (Chapters 5, 6, and 11). This role of the government is even more important today, given the current decline in fundamental innovation coming from large corporations and the reduced appetite of VCs for early-stage ventures and science-based sectors (Chapters 5 and 6).

Examples of how governments can intervene in this area include the use of subsidies to finance prototyping, new firms, and SMEs—along with grants (including challenge grants, as in the case of India, Chapter 11), procurement, and advance purchase commitments (Chapters 4, 5, 8, 9, 10–Braga de Andrade, 11 and 13). These instruments can be used in developed and developing countries alike. In France, for example, a new legal status—the "profit-with-purpose company"—has been created to protect and reinforce the capacity of a company to explore less researched and highly strategic technological fields (Chapter 6). In the Czech Republic, together with funds for basic research, purpose-specific support is channeled into industry—in particular, towards science-intensive industries including medical sciences and biosciences (Chapter 9). Similarly, and as Chapter 11 on India shows, these instruments can effectively be used to foster investments in important sectors that are receiving relatively less funding, including biotech. In Kenya, procurement has helped micro and small enterprises to access new markets (Chapter 13).

As the work of the GII over the past years has shown, continuous investment in R&D and science, including from public organizations, is important to fuel innovation and counteract business cycles. Because "tough tech" ventures, as labeled in Chapter 5, are often based on new science or technology developed in universities, academic institutions can play a central role in helping to de-risk technologies prior to start-ups raising risk capital from investors (Chapter 5 and Chapters 8 and 9, in the cases of the Philippines and the Czech Republic). Investments in basic science are also a way to produce "unexpected knowledge" that, while not driven by daily problems or necessities, might still have a tangible impact on innovation processes (Chapter 6).

SWFs are also contributing to the effort of de-risking innovation. Examples include the Russian Direct Investment Fund, the Ireland Strategic Development Fund, and the Abu Dhabi Investment Authority, which are playing a pivotal role in implementing government's innovation policy (Chapters 3 and 14, in the case of the Abu Dhabi Investment Authority). Second, acknowledging the persistent financing gaps across the world, governments are making concrete efforts to develop vibrant VC markets (Chapter 12).

Beyond providing tax incentives to venture capitalists, governments might decide to become venture capitalists. Examples of governments that have set state-owned venture funds include Australia, Israel, China, Malaysia, Jordan, Morocco, and Senegal (Chapter 7). Brazil also has some public initiatives for venture capital investment funds, albeit still incipient (Chapter 10). Israel is among the earliest and most well-known cases of success in government-run venture capital funds. Established in the 1990s, the Israeli program managed to build a vibrant venture capital industry from scratch. After roughly seven years from its inception, private investments surpassed public ones (Chapter 12). While some of these programs, including those in Australia, Israel, China, and Singapore, have proved relatively successful, government VC funds are less effective than private VC.

The unfortunate outcomes from government attempts at promoting entrepreneurial activity can be reconnected to structural characteristics of government VC funds, which make them inherently different from private VC funds. First, lack of business and technical information on the part of the government makes it challenging to assess potential investees and permits opportunistic behavior. Second, over time, private venture capitalists have developed an efficient screening process that enables them to select the best investment opportunities. Third, private venture capitalists usually make investments with other investors, who provide a second opinion and help avoid mistakes. Finally, compared to government VCs, private VCs are free from political pressures (Chapter 4).

To overcome these bottlenecks, governments might decide to insulate entrepreneurial policymaking from policy pressures by, for example, establishing a separate organization dedicated to venture capital. Matching funds, including by foreign venture capitalists (as in the case of the Israeli program, Chapter 4), are another way to reduce risks and possibly improve the results of these programs.

Governments also support business angels by, for example, providing financial support for the creation and operation of business angel networks and federations. Policies of this sort are available in a variety of countries, including in Europe, Turkey, the Russian Federation, India, and Malaysia. As Brazil shows, angel investors can flourish where VC markets have still not taken off, providing important sources of innovation funding (Chapter 10).

Another innovation in entrepreneurial finance is accelerator and incubator programs (Chapters 2, 5, 11, and 12). On the rise since the mid-2000s, they provide short- or medium-term support and resources to start-ups, helping them speed up their product development and time to market. Today, China and India have particularly active accelerator ecosystems (Chapter 11, in the case of India). Accelerator programs are also proliferating in several countries in Africa, Asia—including in the United Arab Emirates (UAE) and the Philippines—and Latin America (Chapters 2, 8, and 14). In the UAE, for example, the Ghadan 21 accelerator program is investing US$13.6 billion to boost Abu Dhabi's knowledge- based economy, supporting over 50 initiatives that promote the establishment of start-ups and spur innovation and R&D efforts (Chapter 14). Another well-known initiative in this area is the Israel Innovation Authority's Incubators Program, which awards millions of dollars to promising start-ups, allowing them to access early- stage financing (Chapter 12).

Thirdly, and specifically in regard to developing and emerging economies, policies are needed to enable financial markets to become mechanisms that spur innovation.

For example, several legal and regulatory barriers to the development of the VC market persist, even in a large middle-income economy such as Brazil (Chapter 10). Inadequate taxation, the lack of tax incentives for venture capitalists, as well as lack of regulation for entrepreneurial capital and other business-related regulations are clear obstacles to the establishment of a fully functioning VC market in the country. But making progress in these areas is not "mission impossible". India, for example, has made great progress in nurturing its start-up ecosystem and, today, over 280 Indian investors are ready to support local start-ups (Chapter 11).

The GII 2020 identifies a number of specific policy actions that could help countries in these endeavors. First, to foster access to loans, lenders need to have access to accurate and timely credit information, with clearly defined legal rights in secured transactions. Turning to the equity side, and as shown by the GII over its history, the protection of minority shareholders is paramount to foster VC activity and innovation overall. Shareholder protection has to go hand in hand with developing a market for initial public offerings (Chapter 2, and Chapters 10 and 12, in the cases of Brazil and Israel).

Finally—and as shown in the cases of the Czech Republic (Chapter 9), the Philippines (Chapter 8), India (Chapter 11), Kenya (Chapter 13), and the UAE (Chapter 14)—entrepreneurship policies might aim at more than finance, and include initiatives to promote a culture of innovation and entrepreneurship and skills development. In this regard, financial literacy training is a key skill to develop financial capability and to understand and consume financial products. In the Philippines, for example, the Philippine Innovation Act is an action plan for the development of the country's capacity for, and success in, innovation through improvements in science, technology, and innovation (STI) culture, awareness of R&D activities, and improvements in human capital (Chapter 8). In the UAE, a key pillar of the National Innovation Strategy is promoting skills and establishing a national culture of ideas and entrepreneurship (Chapter 14). Spreading information about public and private instruments to finance innovation projects can also help to strengthen the innovation finance landscape. In Brazil, for example, a periodic publication summarizes the innovation support mechanisms available in the country (Chapter 10).

The current economic scenario poses a number of questions on the evolution of the innovation finance landscape in the short and long run. In this uncertain scenario, policies that stimulate investments and innovation and encourage the pursuit of longer-term goals will be key for future growth and well-being.

Notes:

1 NVCA, 2019.

2 This section has benefited importantly from comments and suggestion of Peter Cornelius (Chapter 2), Josh Lerner (Chapter 4), and Carsten Fink (WIPO).

3 For a review of this literature, see Guadagno, 2020.

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Guadagno, F. (2020). Financing for innovation [background study to GII 2020, produced for WIPO]. Retrieved from www.globalinnovationindex.org

National Venture Capital Association (NVCA). (2019). *NVCA 2019 Yearbook*.

APPENDIX: ECONOMY PROFILES & DATA TABLES

ECONOMY PROFILES & DATA TABLES

Economy profiles

The following tables provide detailed profiles for each of the 131 economies in the Global Innovation Index 2020. They are constructed around three sections.

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

2 The next section provides eight key metrics at the beginning of each profile that are intended to put the economy into context. They present the Innovation Output Sub-Index rank, Innovation Input Sub-Index rank, the income group to which the economy belongs, its geographical region,[1] population in millions,[2] GDP in billion US$ PPP, and GDP per capita in US$ PPP.[3] The last metric provides the GII 2019 rank for the economy.

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

All scores at the sub-index, pillar, sub-pillar, and indicator level are normalized in the 0–100 range. The Innovation Input Sub-Index score is calculated as the simple average of the scores in the first five pillars, while the Innovation Output Sub-Index is calculated as the simple average of the scores in the last two pillars. Each sub-index rank is then computed on the basis of these scores for each economy.

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

The 2020 GII includes 80 indicators and three types of data. Composite (or index) indicators are identified with an asterisk (*), survey questions from the World Economic Forum's Executive Opinion Survey are identified with a dagger (†), and the remaining indicators are all hard data series.

For hard data, the original value is provided (except for indicators in sub-pillar 7.3, for which the raw data were provided under the condition that only the normalized scores be published). Normalized scores in the 0–100 range are provided for everything else (index and survey data, sub-pillars, pillars, and indices).

When data are either not available or out of date, "n/a" is used with a cutoff year of 2010, with few exceptions (see Appendix IV for more details). The year of each data point is indicated in the Data Tables in Appendix II online at https://globalinnovationindex.org. To the right of the indicator title, a clock symbol indicates that the economy's data for that indicator are older than the base year. More details, including the year of the data in question, are available in the Data tables in Appendix II online at https://globalinnovationindex.org.

For further details, see Appendix III, Sources and Definitions, and Appendix IV, Adjustments to the Global Innovation Index Framework, Year-on-Year Comparability of Results, and Technical Notes.

4 To the far right of each column, strengths of the economy in question are indicated by a solid circle (●), weaknesses by a hollow circle (○). Strengths within the economy's income group are indicated with a solid diamond (◆), weaknesses by a hollow diamond (◇). 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.[4]

All ranks of 1, 2, and 3 are highlighted as strengths, except in particular instances at the sub-pillar level where strengths

and weaknesses are not signaled when the desired minimum indicator coverage (DMC) is not met for that sub-pillar.[5] For the remaining indicators, strengths and weaknesses of a particular economy are based on the percentage of economies with scores that fall below its score (i.e., percent ranks).

- For a given economy, strengths (●) are those scores with percent ranks greater than the 10th largest percent rank among the 80 indicators in that economy.
- For that economy, weaknesses (○) are those scores with percent ranks lower than the 10th smallest percent rank among the 80 indicators in that economy.
- Similarly, for a given economy, income group strengths (◆) are those scores that are above the income group average plus the standard deviation within the group.
- For that economy, weaknesses (◇) are those scores that are below the income group average minus the standard deviation within the group.

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

Percent ranks embed more information than ranks and allow for comparisons of ranks of series with missing data and ties in ranks. Examples from the Russian Federation and Benin illustrate this point:

1. Strengths for Russia are all indicators with percent ranks equal to or above 0.85 (10th largest percent rank for Russia); weaknesses are all indicators with percent ranks equal to or below 0.26 (Russia's 10th smallest percent rank).
2. Russia ranks 19th out of 131 economies in 2.1.5, Pupil-teacher ratio, secondary, with a percent rank of 0.85; this indicator is a strength for Russia.
3. Russia ranks 22nd in 6.1.5, Citable documents H index, but with a percent rank of 0.84, this indicator is not a strength for Russia.
4. The rank of 76 (percent rank of 0.24) in 7.2.4, Printing & other media, % manufacturing, is a weakness for Russia. By contrast, the similar rank of 75 for in 3.2.2, Logistics performance is a strength for Benin (with a percent rank of 0.40, this is equal to the cutoff for strengths for Benin, which is 0.40).

Percent ranks are not reported in the Economy Profiles but they are presented in the Data Tables online at https://globalinnovationindex.org.

Data Tables

This appendix provides a description of the tables for each of the 80 indicators that make up the Global Innovation Index 2020. These can be found online at https://globalinnovationindex.org.

Structure

Each table is identified by indicator number, with the first digit representing the pillar, the second representing the sub-pillar, and the final digit representing the indicator within that particular sub-pillar. For example, Table 5.1.4 shows results for indicator 5.1.4, GERD financed by business enterprise, which is the fourth indicator of sub-pillar 5.1, Knowledge workers, within pillar 5, Business sophistication.

The sub-heading text provides a detailed description of each indicator and includes information on the units of each variable, the scaling factor (if any), the question asked (for survey questions), and the most frequent year for which data were available.

For each indicator for each economy, the most recent value within the period 2010–19 was used (with few exceptions, which are further explained in Appendix IV). In instances where this base year does not correspond to the most frequent year reported in the sub-heading, the year of the value appears in parentheses after the economy name. These instances are noted in the Economy Profiles after the indicator name with a clock symbol.

A total of 58 variables are hard data. A total of 18 variables are composite indicators and 4 are survey questions from the World Economic Forum's *Executive Opinion Survey*.

The source of each indicator is indicated at the bottom of the page; details for each can be found in Appendix III, Sources and Definitions.

Explanation of scores

The tables list the economies by their rank order, with the best performers at the top. After the rank comes the economy name, the original value of the specific indicator for that economy (in the units specified in the sub-heading), the normalized score in the 0–100 range, and the percentage of economies with scores that fall below the normalized score (i.e., percent ranks). To the far right of each column, a solid circle indicates that an indicator

is a strength for the economy in question, and a hollow circle indicates that it is a weakness.

- Strengths (●) are all ranks of 1, 2, and 3, as well as all scores with percent ranks greater than the 10th highest percent rank among the 80 indicators in a specific economy.
- Weaknesses (○) are all scores with percent ranks lower than the 10th smallest percent rank among the 80 indicators in a specific economy.

For four hard data series (7.3.1, 7.3.2, 7.3.3, and 7.3.4), the raw data were provided under the condition that only the normalized scores be published and therefore the original value equals the normalized score. For indicators 1.3.1, 1.3.2, 2.3.4, 3.3.2, 4.1.1, and 4.2.1, the range for both measures is the same—(0–100)—and therefore both measures are also identical.

Details on the computation methodology can be found in Appendix IV.

Notes:

1 Countries/economies are classified according to the World Bank Income Group (June 2019; see https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups) and special classification based on the online version of the United Nations publication *Standard Country or Area Codes for Statistical Use*, originally published as Series M, No. 49, and now commonly referred to as the M49 standard (July 2019; see https://unstats.un.org/unsd/methodology/m49/). These are: EUR = Europe; NAC = Northern America; LCN = Latin America and the Caribbean; CSA = Central and Southern Asia; SEAO = South East Asia, East Asia, and Oceania; NAWA = Northern Africa and Western Asia; SSF = Sub-Saharan Africa.

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

3 Data for GDP and GDP per capita are from the International Monetary Fund *World Economic Outlook 2019* database.

4 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.

5 Data stringency requirements are used in the attribution of strengths and weaknesses at the sub-pillar level. These levels were revised in 2019. When economies do not meet a data minimum coverage (DMC) requirement at the sub-pillar level (for sub-pillars with two indicators, the DMC is 2; for three it is 2; for four it is 3; and for five it is 4), they are not attributed a strength or weakness at the sub-pillar either. Furthermore, if the economy in question does not meet the DMC requirements at the sub-pillar level, but it still obtains a ranking higher than or equal to 10 or a ranking equal to or lower than 100 at the sub-pillar level, for caution this rank is put in brackets. This procedure is to ensure that incomplete data coverage does not lead to erroneous conclusions about strengths or weaknesses, or particularly about strong or weak sub-pillar rankings.

Index of economy profiles

Economy	Page
Albania	83
Algeria	84
Argentina	85
Armenia	86
Australia	87
Austria	88
Azerbaijan	89
Bahrain	90
Bangladesh	91
Belarus	92
Belgium	93
Benin	94
Bolivia (Plurinational State of)	95
Bosnia and Herzegovina	96
Botswana	97
Brazil	98
Brunei Darussalam	99
Bulgaria	100
Burkina Faso	101
Cabo Verde	102
Cambodia	103
Cameroon	104
Canada	105
Chile	106
China	107
Colombia	108
Costa Rica	109
Côte d'Ivoire	110
Croatia	111
Cyprus	112
Czech Republic	113
Denmark	114
Dominican Republic	115
Ecuador	116
Egypt	117
El Salvador	118
Estonia	119
Ethiopia	120
Finland	121
France	122
Georgia	123
Germany	124
Ghana	125
Greece	126
Guatemala	127
Guinea	128
Honduras	129
Hong Kong, China	130
Hungary	131
Iceland	132
India	133
Indonesia	134
Iran (Islamic Republic of)	135
Ireland	136
Israel	137
Italy	138
Jamaica	139
Japan	140
Jordan	141
Kazakhstan	142
Kenya	143
Kuwait	144
Kyrgyzstan	145
Lao People's Democratic Republic	146
Latvia	147
Lebanon	148
Lithuania	149
Luxembourg	150
Madagascar	151
Malawi	152
Malaysia	153
Mali	154
Malta	155
Mauritius	156
Mexico	157
Mongolia	158
Montenegro	159
Morocco	160
Mozambique	161
Myanmar	162
Namibia	163
Nepal	164
Netherlands	165
New Zealand	166
Niger	167
Nigeria	168
North Macedonia	169
Norway	170
Oman	171
Pakistan	172
Panama	173
Paraguay	174
Peru	175
Philippines	176
Poland	177
Portugal	178
Qatar	179
Republic of Korea	180
Republic of Moldova	181
Romania	182
Russian Federation	183
Rwanda	184
Saudi Arabia	185
Senegal	186
Serbia	187
Singapore	188
Slovakia	189
Slovenia	190
South Africa	191
Spain	192
Sri Lanka	193
Sweden	194
Switzerland	195
Tajikistan	196
Thailand	197
Togo	198
Trinidad and Tobago	199
Tunisia	200
Turkey	201
Uganda	202
Ukraine	203
United Arab Emirates	204
United Kingdom	205
United Republic of Tanzania	206
United States of America	207
Uruguay	208
Uzbekistan	209
Viet Nam	210
Yemen	211
Zambia	212
Zimbabwe	213

ALBANIA

GII 2020 rank

83

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
91	**74**	**Upper middle**	**EUR**	**2.9**	**40.2**	**12,214.7**	**83**

		Score/Value	Rank	
	INSTITUTIONS	**66.0**	**56**	
1.1	**Political environment**	**59.5**	**61**	
1.1.1	Political and operational stability*	73.2	49	
1.1.2	Government effectiveness*	52.7	63	
1.2	**Regulatory environment**	**58.7**	**83**	
1.2.1	Regulatory quality*	49.2	58	
1.2.2	Rule of law*	36.4	85	
1.2.3	Cost of redundancy dismissal, salary weeks	20.8	89	
1.3	**Business environment**	**79.7**	**34**	● ◆
1.3.1	Ease of starting a business*	91.8	47	●
1.3.2	Ease of resolving insolvency*	67.7	36	●
	HUMAN CAPITAL & RESEARCH	**20.3**	**95**	◇
2.1	**Education**	**31.6**	**100**	
2.1.1	Expenditure on education, % GDP	2.5	110	○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	8.0	100	○ ◇
2.1.3	School life expectancy, years	14.7	58	
2.1.4	PISA scales in reading, maths, & science	419.8	56	
2.1.5	Pupil-teacher ratio, secondary	11.2	46	
2.2	**Tertiary education**	**29.3**	**76**	
2.2.1	Tertiary enrolment, % gross	55.0	52	
2.2.2	Graduates in science & engineering, %	20.6	69	
2.2.3	Tertiary inbound mobility, %	1.5	81	
2.3	**Research & development (R&D)**	**0.0**	**[121]**	
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 R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
	INFRASTRUCTURE	**40.9**	**65**	
3.1	**Information & communication technologies (ICTs)**	**61.7**	**78**	
3.1.1	ICT access*	45.5	98	◇
3.1.2	ICT use*	51.9	74	
3.1.3	Government's online service*	73.6	58	
3.1.4	E-participation*	75.8	59	
3.2	**General infrastructure**	**20.0**	**97**	
3.2.1	Electricity output, kWh/mn pop	1,577.1	87	
3.2.2	Logistics performance*	27.7	86	
3.2.3	Gross capital formation, % GDP	24.1	57	
3.3	**Ecological sustainability**	**41.0**	**35**	●
3.3.1	GDP/unit of energy use	13.9	16	●
3.3.2	Environmental performance*	49.0	59	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	3.8	26	●
	MARKET SOPHISTICATION	**46.8**	**70**	
4.1	**Credit**	**34.5**	**92**	
4.1.1	Ease of getting credit*	70.0	44	
4.1.2	Domestic credit to private sector, % GDP	33.1	90	
4.1.3	Microfinance gross loans, % GDP	0.5	37	
4.2	**Investment**	**46.0**	**[30]**	
4.2.1	Ease of protecting minority investors*	46.0	97	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**59.7**	**73**	
4.3.1	Applied tariff rate, weighted avg., %	1.0	12	●
4.3.2	Intensity of local competition†	67.4	72	
4.3.3	Domestic market scale, bn PPP$	40.2	112	◇

		Score/Value	Rank	
	BUSINESS SOPHISTICATION	**24.1**	**73**	
5.1	**Knowledge workers**	**37.9**	**[50]**	
5.1.1	Knowledge-intensive employment, %	17.5	88	
5.1.2	Firms offering formal training, %	46.2	21	●
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, %	9.9	67	
5.2	**Innovation linkages**	**15.5**	**109**	
5.2.1	University/industry research collaboration†	38.2	80	
5.2.2	State of cluster development†	30.4	123	○ ◇
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	95	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.1	68	
5.3	**Knowledge absorption**	**19.0**	**107**	
5.3.1	Intellectual property payments, % total trade	0.4	73	
5.3.2	High-tech imports, % total trade	2.0	129	○ ◇
5.3.3	ICT services imports, % total trade	1.3	57	
5.3.4	FDI net inflows, % GDP	8.2	13	● ◆
5.3.5	Research talent, % in business enterprise	n/a	n/a	
	KNOWLEDGE & TECHNOLOGY OUTPUTS	**9.7**	**119**	◇
6.1	**Knowledge creation**	**3.4**	**120**	
6.1.1	Patents by origin/bn PPP$ GDP	0.4	86	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	69	
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	65	
6.1.4	Scientific & technical articles/bn PPP$ GDP	3.4	102	
6.1.5	Citable documents H-index	2.7	124	○
6.2	**Knowledge impact**	**13.7**	**107**	
6.2.1	Growth rate of PPP$ GDP/worker, %	0.4	82	
6.2.2	New businesses/th pop. 15-64	1.5	66	
6.2.3	Computer software spending, % GDP	0.0	86	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	5.6	49	
6.2.5	High- and medium-high-tech manufacturing, %	3.3	102	○ ◇
6.3	**Knowledge diffusion**	**12.1**	**106**	
6.3.1	Intellectual property receipts, % total trade	0.2	42	◆
6.3.2	High-tech net exports, % total trade	0.0	127	○ ◇
6.3.3	ICT services exports, % total trade	1.4	73	
6.3.4	FDI net outflows, % GDP	-0.3	123	◇
	CREATIVE OUTPUTS	**19.5**	**72**	
7.1	**Intangible assets**	**16.6**	**108**	
7.1.1	Trademarks by origin/bn PPP$ GDP	40.3	67	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.5	83	
7.1.4	ICTs & organizational model creation†	39.5	114	◇
7.2	**Creative goods and services**	**20.2**	**53**	
7.2.1	Cultural & creative services exports, % total trade	1.4	17	● ◆
7.2.2	National feature films/mn pop. 15-69	3.3	56	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	2.6	8	● ◆
7.2.5	Creative goods exports, % total trade	0.2	84	
7.3	**Online creativity**	**24.6**	**46**	●
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	6.7	48	●
7.3.2	Country-code TLDs/th pop. 15-69	3.2	61	
7.3.3	Wikipedia edits/mn pop. 15-69	65.7	48	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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

ALGERIA

GII 2020 rank

121

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
126	111	Upper middle	NAWA	43.1	681.4	13,703.4	113

		Score/Value	Rank	
INSTITUTIONS		**52.2**	**104**	◇
1.1	**Political environment**	**43.5**	**110**	◇
1.1.1	Political and operational stability*	50.0	126	◇
1.1.2	Government effectiveness*	40.2	95	◇
1.2	**Regulatory environment**	**49.5**	**105**	
1.2.1	Regulatory quality*	8.4	128	○ ◇
1.2.2	Rule of law*	26.5	111	◇
1.2.3	Cost of redundancy dismissal, salary weeks	17.3	69	
1.3	**Business environment**	**63.6**	**92**	
1.3.1	Ease of starting a business*	78.0	113	
1.3.2	Ease of resolving insolvency*	49.2	73	
HUMAN CAPITAL & RESEARCH		**28.4**	**74**	
2.1	**Education**	**37.7**	**[85]**	
2.1.1	Expenditure on education, % GDP	n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	14.3	65	
2.1.4	PISA scales in reading, maths, & science	361.7	77	○
2.1.5	Pupil-teacher ratio, secondary	n/a	n/a	
2.2	**Tertiary education**	**42.3**	**36**	●
2.2.1	Tertiary enrolment, % gross	51.4	56	●
2.2.2	Graduates in science & engineering, %	34.2	9	● ◆
2.2.3	Tertiary inbound mobility, %	0.5	95	
2.3	**Research & development (R&D)**	**5.1**	**76**	
2.3.1	Researchers, FTE/mn pop.	819.3	55	●
2.3.2	Gross expenditure on R&D, % GDP	0.5	61	●
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**31.5**	**100**	◇
3.1	**Information & communication technologies (ICTs)**	**37.3**	**114**	◇
3.1.1	ICT access*	59.7	74	
3.1.2	ICT use*	47.6	79	
3.1.3	Government's online service*	21.5	126	◇
3.1.4	E-participation*	20.2	123	◇
3.2	**General infrastructure**	**31.9**	**42**	● ◆
3.2.1	Electricity output, kWh/mn pop	1,839.7	81	
3.2.2	Logistics performance*	17.7	109	◇
3.2.3	Gross capital formation, % GDP	43.5	5	● ◆
3.3	**Ecological sustainability**	**25.2**	**79**	
3.3.1	GDP/unit of energy use	10.1	53	●
3.3.2	Environmental performance*	44.8	74	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	116	
MARKET SOPHISTICATION		**24.6**	**130**	○ ◇
4.1	**Credit**	**9.3**	**129**	○ ◇
4.1.1	Ease of getting credit*	10.0	129	○ ◇
4.1.2	Domestic credit to private sector, % GDP	24.1	106	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**10.0**	**130**	○ ◇
4.2.1	Ease of protecting minority investors*	20.0	129	○ ◇
4.2.2	Market capitalization, % GDP	0.2	73	○ ◇
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**54.5**	**99**	◇
4.3.1	Applied tariff rate, weighted avg., %	10.0	114	◇
4.3.2	Intensity of local competition†	55.0	123	◇
4.3.3	Domestic market scale, bn PPP$	681.4	34	●

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**15.6**	**126**	◇
5.1	**Knowledge workers**	**13.5**	**115**	◇
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	79	
5.2	**Innovation linkages**	**15.1**	**111**	
5.2.1	University/industry research collaboration†	37.1	88	
5.2.2	State of cluster development†	48.3	58	●
5.2.3	GERD financed by abroad, % GDP	0.0	98	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	118	◇
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	99	
5.3	**Knowledge absorption**	**18.3**	**113**	◇
5.3.1	Intellectual property payments, % total trade	0.4	75	
5.3.2	High-tech imports, % total trade	8.9	49	●
5.3.3	ICT services imports, % total trade	0.7	94	
5.3.4	FDI net inflows, % GDP	0.9	116	◇
5.3.5	Research talent, % in business enterprise	0.5	82	◇
KNOWLEDGE & TECHNOLOGY OUTPUTS		**8.1**	**125**	◇
6.1	**Knowledge creation**	**6.9**	**90**	
6.1.1	Patents by origin/bn PPP$ GDP	0.2	95	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	94	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	5.2	86	
6.1.5	Citable documents H-index	9.7	77	
6.2	**Knowledge impact**	**9.5**	**119**	◇
6.2.1	Growth rate of PPP$ GDP/worker, %	0.7	69	
6.2.2	New businesses/th pop. 15-64	0.4	105	
6.2.3	Computer software spending, % GDP	0.0	122	○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.8	113	
6.2.5	High- and medium-high-tech manufacturing, %	4.7	98	◇
6.3	**Knowledge diffusion**	**7.9**	**128**	○ ◇
6.3.1	Intellectual property receipts, % total trade	0.0	100	◇
6.3.2	High-tech net exports, % total trade	0.0	126	◇
6.3.3	ICT services exports, % total trade	0.3	109	
6.3.4	FDI net outflows, % GDP	0.3	88	
CREATIVE OUTPUTS		**8.9**	**118**	◇
7.1	**Intangible assets**	**14.1**	**115**	◇
7.1.1	Trademarks by origin/bn PPP$ GDP	10.8	109	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.6	56	●
7.1.4	ICTs & organizational model creation†	41.3	111	◇
7.2	**Creative goods and services**	**1.1**	**125**	◇
7.2.1	Cultural & creative services exports, % total trade	0.0	105	
7.2.2	National feature films/mn pop. 15-69	0.4	101	
7.2.3	Entertainment & Media market/th pop. 15-69	1.7	55	◇
7.2.4	Printing and other media, % manufacturing	0.3	97	◇
7.2.5	Creative goods exports, % total trade	0.0	126	
7.3	**Online creativity**	**6.5**	**101**	◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.5	109	
7.3.2	Country-code TLDs/th pop. 15-69	0.1	115	
7.3.3	Wikipedia edits/mn pop. 15-69	29.3	96	◇
7.3.4	Mobile app creation/bn PPP$ GDP	0.0	100	○

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

ARGENTINA

GII 2020 rank

80

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
73	**80**	**Upper middle**	**LCN**	**44.8**	**903.5**	**17,508.9**	**73**

		Score/Value	Rank	
INSTITUTIONS		**54.3**	**97**	
1.1	**Political environment**	**55.8**	**71**	
1.1.1	Political and operational stability*	66.1	76	
1.1.2	Government effectiveness*	50.7	69	
1.2	**Regulatory environment**	**46.8**	**110**	◇
1.2.1	Regulatory quality*	35.4	92	
1.2.2	Rule of law*	40.4	76	
1.2.3	Cost of redundancy dismissal, salary weeks	30.3	118	○ ◇
1.3	**Business environment**	**60.2**	**106**	
1.3.1	Ease of starting a business*	80.4	109	
1.3.2	Ease of resolving insolvency*	40.0	97	
HUMAN CAPITAL & RESEARCH		**35.9**	**48**	
2.1	**Education**	**46.5**	**65**	
2.1.1	Expenditure on education, % GDP 🕘	5.5	24	●
2.1.2	Government funding/pupil, secondary, % GDP/cap	20.6	47	
2.1.3	School life expectancy, years	17.7	13	● ◆
2.1.4	PISA scales in reading, maths, & science	395.0	69	○
2.1.5	Pupil-teacher ratio, secondary	n/a	n/a	
2.2	**Tertiary education**	**33.1**	**65**	
2.2.1	Tertiary enrolment, % gross	90.0	4	● ◆
2.2.2	Graduates in science & engineering, % 🕘	13.6	98	○ ◇
2.2.3	Tertiary inbound mobility, %	2.8	67	
2.3	**Research & development (R&D)**	**28.1**	**39**	◆
2.3.1	Researchers, FTE/mn pop 🕘	1,192.2	50	
2.3.2	Gross expenditure on R&D, % GDP 🕘	0.5	62	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	45.5	34	● ◆
2.3.4	QS university ranking, average score top 3*	42.2	30	● ◆
INFRASTRUCTURE		**39.5**	**70**	
3.1	**Information & communication technologies (ICTs)**	**67.6**	**64**	
3.1.1	ICT access*	70.9	59	
3.1.2	ICT use*	62.3	55	
3.1.3	Government's online service*	75.0	57	
3.1.4	E-participation*	62.4	85	
3.2	**General infrastructure**	**20.2**	**96**	
3.2.1	Electricity output, kWh/mn pop	3,281.8	60	
3.2.2	Logistics performance*	38.3	60	
3.2.3	Gross capital formation, % GDP	18.5	108	○
3.3	**Ecological sustainability**	**30.7**	**60**	
3.3.1	GDP/unit of energy use	9.6	62	
3.3.2	Environmental performance*	52.2	52	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.5	53	
MARKET SOPHISTICATION		**34.6**	**120**	○ ◇
4.1	**Credit**	**21.9**	**121**	○ ◇
4.1.1	Ease of getting credit*	50.0	94	
4.1.2	Domestic credit to private sector, % GDP 🕘	16.0	116	○ ◇
4.1.3	Microfinance gross loans, % GDP	0.0	75	○
4.2	**Investment**	**22.9**	**123**	○ ◇
4.2.1	Ease of protecting minority investors*	62.0	60	
4.2.2	Market capitalization, % GDP	12.4	66	○
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	68	
4.3	**Trade, competition, and market scale**	**59.1**	**77**	
4.3.1	Applied tariff rate, weighted avg., %	7.4	100	
4.3.2	Intensity of local competition†	55.4	122	○ ◇
4.3.3	Domestic market scale, bn PPP$	903.5	28	●

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**26.9**	**61**	
5.1	**Knowledge workers**	**28.7**	**70**	
5.1.1	Knowledge-intensive employment, %	24.1	62	
5.1.2	Firms offering formal training, % 🕘	40.2	28	
5.1.3	GERD performed by business, % GDP 🕘	0.1	55	
5.1.4	GERD financed by business, %	16.5	71	
5.1.5	Females employed w/advanced degrees, %	14.7	46	
5.2	**Innovation linkages**	**16.0**	**103**	
5.2.1	University/industry research collaboration†	37.4	86	
5.2.2	State of cluster development†	40.8	93	
5.2.3	GERD financed by abroad, % GDP	0.0	51	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	91	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.1	67	
5.3	**Knowledge absorption**	**36.0**	**38**	
5.3.1	Intellectual property payments, % total trade	2.7	8	● ◆
5.3.2	High-tech imports, % total trade	9.1	43	
5.3.3	ICT services imports, % total trade	1.5	42	
5.3.4	FDI net inflows, % GDP	1.6	98	
5.3.5	Research talent, % in business enterprise 🕘	8.3	64	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**17.2**	**75**	
6.1	**Knowledge creation**	**12.9**	**68**	
6.1.1	Patents by origin/bn PPP$ GDP	0.5	83	
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP	0.2	51	
6.1.4	Scientific & technical articles/bn PPP$ GDP	7.1	68	
6.1.5	Citable documents H-index	27.2	36	◆
6.2	**Knowledge impact**	**13.6**	**108**	
6.2.1	Growth rate of PPP$ GDP/worker, %	-1.9	113	○ ◇
6.2.2	New businesses/th pop. 15-64	0.2	111	○
6.2.3	Computer software spending, % GDP	0.0	78	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	6.8	40	
6.2.5	High- and medium-high-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**25.2**	**62**	
6.3.1	Intellectual property receipts, % total trade	0.3	32	◆
6.3.2	High-tech net exports, % total trade 🕘	1.8	57	
6.3.3	ICT services exports, % total trade	2.3	45	
6.3.4	FDI net outflows, % GDP	0.3	90	
CREATIVE OUTPUTS		**19.6**	**71**	
7.1	**Intangible assets**	**24.0**	**77**	
7.1.1	Trademarks by origin/bn PPP$ GDP	60.6	34	●
7.1.2	Global brand value, top 5,000, % GDP	11.7	57	
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.0	67	
7.1.4	ICTs & organizational model creation†	50.6	80	
7.2	**Creative goods and services**	**12.4**	**70**	
7.2.1	Cultural & creative services exports, % total trade	1.1	24	●
7.2.2	National feature films/mn pop. 15-69	7.4	26	● ◆
7.2.3	Entertainment & Media market/th pop. 15-69	5.9	47	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.1	94	
7.3	**Online creativity**	**17.9**	**60**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	3.0	62	
7.3.2	Country-code TLDs/th pop. 15-69	5.4	51	
7.3.3	Wikipedia edits/mn pop. 15-69	57.4	55	
7.3.4	Mobile app creation/bn PPP$ GDP	8.1	47	

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

ARMENIA

GII 2020 rank

61

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
47	83	Upper middle	NAWA	3.0	32.9	9,675.8	64

		Score/Value	Rank	
INSTITUTIONS		**64.3**	**64**	
1.1	**Political environment**	**54.5**	**76**	
1.1.1	Political and operational stability*	64.3	83	
1.1.2	Government effectiveness*	49.6	74	
1.2	**Regulatory environment**	**68.0**	**54**	
1.2.1	Regulatory quality*	48.9	60	
1.2.2	Rule of law*	42.8	71	
1.2.3	Cost of redundancy dismissal, salary weeks	13.0	41	
1.3	**Business environment**	**70.3**	**70**	
1.3.1	Ease of starting a business*	96.1	10	● ◆
1.3.2	Ease of resolving insolvency*	44.6	86	
HUMAN CAPITAL & RESEARCH		**20.5**	**94**	
2.1	**Education**	**34.4**	**97**	
2.1.1	Expenditure on education, % GDP 🕘	2.7	105	○
2.1.2	Government funding/pupil, secondary, % GDP/cap 🕘	14.6	82	
2.1.3	School life expectancy, years	13.1	80	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	8.0	11	● ◆
2.2	**Tertiary education**	**25.8**	**79**	
2.2.1	Tertiary enrolment, % gross	54.6	53	
2.2.2	Graduates in science & engineering, %	15.2	96	○ ◇
2.2.3	Tertiary inbound mobility, %	4.5	51	
2.3	**Research & development (R&D)**	**1.2**	**105**	
2.3.1	Researchers, FTE/mn pop	n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP	0.2	91	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**34.4**	**90**	
3.1	**Information & communication technologies (ICTs)**	**58.6**	**83**	
3.1.1	ICT access*	68.1	62	
3.1.2	ICT use*	53.4	68	
3.1.3	Government's online service*	56.3	96	
3.1.4	E-participation*	56.7	98	
3.2	**General infrastructure**	**19.7**	**101**	
3.2.1	Electricity output, kWh/mn pop	2,650.3	70	
3.2.2	Logistics performance*	25.2	88	
3.2.3	Gross capital formation, % GDP	23.1	70	
3.3	**Ecological sustainability**	**24.8**	**82**	
3.3.1	GDP/unit of energy use	7.9	81	
3.3.2	Environmental performance*	52.3	51	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.1	126	○
MARKET SOPHISTICATION		**46.9**	**68**	
4.1	**Credit**	**39.0**	**78**	
4.1.1	Ease of getting credit*	70.0	44	
4.1.2	Domestic credit to private sector, % GDP	55.6	62	
4.1.3	Microfinance gross loans, % GDP	0.6	33	
4.2	**Investment**	**42.0**	**[47]**	
4.2.1	Ease of protecting minority investors*	42.0	102	◇
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**59.8**	**72**	
4.3.1	Applied tariff rate, weighted avg., % 🕘	2.2	59	
4.3.2	Intensity of local competition†	73.6	36	●
4.3.3	Domestic market scale, bn PPP$	32.9	118	○ ◇

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**24.6**	**69**	
5.1	**Knowledge workers**	**29.6**	**67**	
5.1.1	Knowledge-intensive employment, % 🕘	29.4	48	
5.1.2	Firms offering formal training, % 🕘	16.2	84	○ ◇
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	16.7	70	
5.1.5	Females employed w/advanced degrees, % 🕘	14.9	45	
5.2	**Innovation linkages**	**16.2**	**101**	
5.2.1	University/industry research collaboration†	35.5	97	
5.2.2	State of cluster development†	46.3	71	
5.2.3	GERD financed by abroad, % GDP	0.0	79	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	75	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.1	61	
5.3	**Knowledge absorption**	**28.0**	**[67]**	
5.3.1	Intellectual property payments, % total trade	n/a	n/a	
5.3.2	High-tech imports, % total trade	6.7	80	
5.3.3	ICT services imports, % total trade	0.6	100	
5.3.4	FDI net inflows, % GDP	2.5	69	
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**28.5**	**45**	
6.1	**Knowledge creation**	**27.2**	**37**	●
6.1.1	Patents by origin/bn PPP$ GDP	3.4	29	●
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	62	
6.1.3	Utility models by origin/bn PPP$ GDP	1.1	22	
6.1.4	Scientific & technical articles/bn PPP$ GDP	24.3	18	● ◆
6.1.5	Citable documents H-index	11.2	68	
6.2	**Knowledge impact**	**26.7**	**56**	
6.2.1	Growth rate of PPP$ GDP/worker, %	9.8	1	● ◆
6.2.2	New businesses/th pop. 15-64	3.1	47	
6.2.3	Computer software spending, % GDP	0.0	87	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.9	110	○
6.2.5	High- and medium-high-tech manufacturing, %	4.4	100	○ ◇
6.3	**Knowledge diffusion**	**31.6**	**40**	
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	High-tech net exports, % total trade	0.6	75	
6.3.3	ICT services exports, % total trade	4.5	14	● ◆
6.3.4	FDI net outflows, % GDP	0.3	85	
CREATIVE OUTPUTS		**25.8**	**56**	
7.1	**Intangible assets**	**28.6**	**59**	
7.1.1	Trademarks by origin/bn PPP$ GDP	95.0	14	●
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	2.0	50	
7.1.4	ICTs & organizational model creation†	52.8	67	
7.2	**Creative goods and services**	**20.9**	**51**	
7.2.1	Cultural & creative services exports, % total trade	0.6	41	
7.2.2	National feature films/mn pop. 15-69	13.2	12	● ◆
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.3	34	
7.2.5	Creative goods exports, % total trade	0.8	54	
7.3	**Online creativity**	**25.0**	**45**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	2.9	65	
7.3.2	Country-code TLDs/th pop. 15-69	5.2	53	
7.3.3	Wikipedia edits/mn pop. 15-69	90.9	7	● ◆
7.3.4	Mobile app creation/bn PPP$ GDP	1.5	66	

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

AUSTRALIA

GII 2020 rank

23

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
31	13	High	SEAO	25.2	1,364.8	46,601.0	22

		Score/Value	Rank	
INSTITUTIONS		**88.7**	**10**	●
1.1	**Political environment**	**86.4**	**13**	
1.1.1	Political and operational stability*	87.5	11	
1.1.2	Government effectiveness*	85.8	14	
1.2	**Regulatory environment**	**92.1**	**10**	●
1.2.1	Regulatory quality*	92.7	5	●
1.2.2	Rule of law*	91.4	14	
1.2.3	Cost of redundancy dismissal, salary weeks	12.0	38	
1.3	**Business environment**	**87.7**	**11**	
1.3.1	Ease of starting a business*	96.6	7	● ◆
1.3.2	Ease of resolving insolvency*	78.9	19	
HUMAN CAPITAL & RESEARCH		**59.0**	**9**	●
2.1	**Education**	**56.4**	**29**	
2.1.1	Expenditure on education, % GDP 🕘	5.3	33	
2.1.2	Government funding/pupil, secondary, % GDP/cap	15.0	79	○ ◇
2.1.3	School life expectancy, years	22.0	1	● ◆
2.1.4	PISA scales in reading, maths, & science	499.0	20	
2.1.5	Pupil-teacher ratio, secondary	n/a	n/a	
2.2	**Tertiary education**	**61.4**	**5**	● ◆
2.2.1	Tertiary enrolment, % gross	113.1	2	● ◆
2.2.2	Graduates in science & engineering, %	18.4	78	○
2.2.3	Tertiary inbound mobility, %	21.5	5	● ◆
2.3	**Research & development (R&D)**	**59.4**	**15**	
2.3.1	Researchers, FTE/mn pop 🕘	4,532.4	22	
2.3.2	Gross expenditure on R&D, % GDP 🕘	1.8	20	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	67.4	19	
2.3.4	QS university ranking, average score top 3*	79.8	6	●
INFRASTRUCTURE		**55.8**	**22**	
3.1	**Information & communication technologies (ICTs)**	**88.6**	**14**	
3.1.1	ICT access*	79.6	29	
3.1.2	ICT use*	79.2	22	
3.1.3	Government's online service*	97.2	7	●
3.1.4	E-participation*	98.3	5	●
3.2	**General infrastructure**	**39.7**	**22**	
3.2.1	Electricity output, kWh/mn pop	10,444.3	13	
3.2.2	Logistics performance*	78.9	18	
3.2.3	Gross capital formation, % GDP	22.5	72	○
3.3	**Ecological sustainability**	**39.0**	**37**	
3.3.1	GDP/unit of energy use	9.2	66	○
3.3.2	Environmental performance*	74.9	13	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.0	44	
MARKET SOPHISTICATION		**67.1**	**7**	●
4.1	**Credit**	**78.9**	**5**	● ◆
4.1.1	Ease of getting credit*	95.0	4	● ◆
4.1.2	Domestic credit to private sector, % GDP	139.6	13	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**43.7**	**40**	
4.2.1	Ease of protecting minority investors*	64.0	56	
4.2.2	Market capitalization, % GDP	102.1	11	
4.2.3	Venture capital deals/bn PPP$ GDP	0.1	22	
4.3	**Trade, competition, and market scale**	**78.8**	**9**	●
4.3.1	Applied tariff rate, weighted avg., %	0.9	10	●
4.3.2	Intensity of local competition†	79.2	11	
4.3.3	Domestic market scale, bn PPP$	1,364.8	21	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**43.6**	**26**	◇
5.1	**Knowledge workers**	**53.0**	**[24]**	
5.1.1	Knowledge-intensive employment, %	46.1	15	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP 🕘	0.9	22	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, % 🕘	22.6	19	
5.2	**Innovation linkages**	**44.1**	**20**	
5.2.1	University/industry research collaboration†	50.4	39	◇
5.2.2	State of cluster development†	54.2	38	◇
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.2	12	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	1.0	26	◇
5.3	**Knowledge absorption**	**33.8**	**47**	◇
5.3.1	Intellectual property payments, % total trade	1.2	30	
5.3.2	High-tech imports, % total trade	10.5	26	
5.3.3	ICT services imports, % total trade	1.0	73	○ ◇
5.3.4	FDI net inflows, % GDP	3.8	39	
5.3.5	Research talent, % in business enterprise 🕘	27.9	44	◇
KNOWLEDGE & TECHNOLOGY OUTPUTS		**30.4**	**40**	◇
6.1	**Knowledge creation**	**42.5**	**21**	
6.1.1	Patents by origin/bn PPP$ GDP	2.1	39	◇
6.1.2	PCT patents by origin/bn PPP$ GDP	1.3	24	◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.9	25	
6.1.4	Scientific & technical articles/bn PPP$ GDP	29.2	11	
6.1.5	Citable documents H-index	65.9	10	●
6.2	**Knowledge impact**	**28.2**	**48**	◇
6.2.1	Growth rate of PPP$ GDP/worker, %	-0.2	96	○
6.2.2	New businesses/th pop. 15-64	14.5	9	● ◆
6.2.3	Computer software spending, % GDP	0.0	53	◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	6.2	47	
6.2.5	High- and medium-high-tech manufacturing, %	27.0	39	
6.3	**Knowledge diffusion**	**20.3**	**74**	○ ◇
6.3.1	Intellectual property receipts, % total trade	0.3	29	◇
6.3.2	High-tech net exports, % total trade	1.7	62	◇
6.3.3	ICT services exports, % total trade	1.0	82	○
6.3.4	FDI net outflows, % GDP	0.1	101	○
CREATIVE OUTPUTS		**37.3**	**23**	◇
7.1	**Intangible assets**	**37.1**	**35**	
7.1.1	Trademarks by origin/bn PPP$ GDP	63.4	32	
7.1.2	Global brand value, top 5,000, % GDP	79.8	26	
7.1.3	Industrial designs by origin/bn PPP$ GDP	2.3	48	
7.1.4	ICTs & organizational model creation†	67.3	25	◇
7.2	**Creative goods and services**	**23.7**	**41**	◇
7.2.1	Cultural & creative services exports, % total trade	0.3	63	○
7.2.2	National feature films/mn pop. 15-69	3.2	58	○
7.2.3	Entertainment & Media market/th pop. 15-69	64.9	7	
7.2.4	Printing and other media, % manufacturing	2.3	10	◆
7.2.5	Creative goods exports, % total trade	0.6	59	
7.3	**Online creativity**	**51.5**	**16**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	61.3	10	●
7.3.2	Country-code TLDs/th pop. 15-69	54.7	14	
7.3.3	Wikipedia edits/mn pop. 15-69	79.5	26	
7.3.4	Mobile app creation/bn PPP$ GDP	11.6	41	

NOTES: ● indicates a strength; ○ a weakness; ◆ a strength relative to the other top 25-ranked GII economies; ◇ a weakness relative to the other top 25-ranked GII economies; * an index; † a survey question. 🕘 indicates that the economy's data are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

AUSTRIA

GII 2020 rank

19

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
23	18	High	EUR	9.0	479.4	46,758.1	21

		Score/Value	Rank	
INSTITUTIONS		**86.2**	**15**	
1.1	**Political environment**	**83.6**	**17**	
1.1.1	Political and operational stability*	85.7	17	
1.1.2	Government effectiveness*	82.6	18	
1.2	**Regulatory environment**	**94.5**	**6**	●
1.2.1	Regulatory quality*	82.6	18	
1.2.2	Rule of law*	95.6	6	●
1.2.3	Cost of redundancy dismissal, salary weeks	8.0	1	●
1.3	**Business environment**	**80.3**	**32**	
1.3.1	Ease of starting a business*	83.2	98	○ ◇
1.3.2	Ease of resolving insolvency*	77.4	21	
HUMAN CAPITAL & RESEARCH		**59.7**	**7**	●
2.1	**Education**	**58.5**	**18**	
2.1.1	Expenditure on education, % GDP 🕘	5.5	21	
2.1.2	Government funding/pupil, secondary, % GDP/cap	27.7	16	◆
2.1.3	School life expectancy, years	16.1	33	
2.1.4	PISA scales in reading, maths, & science	491.0	27	
2.1.5	Pupil-teacher ratio, secondary 🕘	9.3	25	◆
2.2	**Tertiary education**	**62.4**	**4**	● ◆
2.2.1	Tertiary enrolment, % gross	85.1	11	●
2.2.2	Graduates in science & engineering, % 🕘	30.3	13	◆
2.2.3	Tertiary inbound mobility, %	17.2	10	● ◆
2.3	**Research & development (R&D)**	**58.2**	**17**	
2.3.1	Researchers, FTE/mn pop	5,733.1	9	●
2.3.2	Gross expenditure on R&D, % GDP	3.2	6	●
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	55.6	26	
2.3.4	QS university ranking, average score top 3*	43.4	26	
INFRASTRUCTURE		**56.5**	**20**	
3.1	**Information & communication technologies (ICTs)**	**82.1**	**27**	◇
3.1.1	ICT access*	84.8	15	
3.1.2	ICT use*	74.2	31	◇
3.1.3	Government's online service*	86.8	32	
3.1.4	E-participation*	82.6	45	◇
3.2	**General infrastructure**	**42.5**	**17**	
3.2.1	Electricity output, kWh/mn pop	7,354.0	29	
3.2.2	Logistics performance*	91.8	4	●
3.2.3	Gross capital formation, % GDP	25.7	46	
3.3	**Ecological sustainability**	**45.0**	**30**	
3.3.1	GDP/unit of energy use	12.0	33	
3.3.2	Environmental performance*	79.6	6	●
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.3	35	
MARKET SOPHISTICATION		**51.1**	**48**	◇
4.1	**Credit**	**45.9**	**48**	
4.1.1	Ease of getting credit*	55.0	88	○
4.1.2	Domestic credit to private sector, % GDP	84.2	34	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**33.9**	**80**	○ ◇
4.2.1	Ease of protecting minority investors*	70.0	36	
4.2.2	Market capitalization, % GDP	30.8	46	○ ◇
4.2.3	Venture capital deals/bn PPP$ GDP	0.1	27	
4.3	**Trade, competition, and market scale**	**73.4**	**24**	
4.3.1	Applied tariff rate, weighted avg., %	1.7	22	
4.3.2	Intensity of local competition†	78.8	13	
4.3.3	Domestic market scale, bn PPP$	479.4	43	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**52.3**	**17**	
5.1	**Knowledge workers**	**60.9**	**13**	
5.1.1	Knowledge-intensive employment, %	41.9	24	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	2.2	6	●
5.1.4	GERD financed by business, %	54.4	18	
5.1.5	Females employed w/advanced degrees, %	17.0	38	◇
5.2	**Innovation linkages**	**55.1**	**12**	
5.2.1	University/industry research collaboration†	64.1	19	
5.2.2	State of cluster development†	65.7	15	
5.2.3	GERD financed by abroad, % GDP	0.5	3	● ◆
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	56	○ ◇
5.2.5	Patent families 2+ offices/bn PPP$ GDP	3.9	13	
5.3	**Knowledge absorption**	**40.9**	**29**	
5.3.1	Intellectual property payments, % total trade	0.8	51	
5.3.2	High-tech imports, % total trade	7.5	69	○
5.3.3	ICT services imports, % total trade	2.5	17	
5.3.4	FDI net inflows, % GDP	-1.1	125	○
5.3.5	Research talent, % in business enterprise	63.0	9	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**40.7**	**19**	
6.1	**Knowledge creation**	**48.5**	**15**	
6.1.1	Patents by origin/bn PPP$ GDP	9.3	12	
6.1.2	PCT patents by origin/bn PPP$ GDP	3.0	11	
6.1.3	Utility models by origin/bn PPP$ GDP	0.8	26	
6.1.4	Scientific & technical articles/bn PPP$ GDP	23.6	20	
6.1.5	Citable documents H-index	44.1	18	
6.2	**Knowledge impact**	**35.9**	**23**	
6.2.1	Growth rate of PPP$ GDP/worker, %	0.6	72	○
6.2.2	New businesses/th pop. 15-64	0.6	91	○ ◇
6.2.3	Computer software spending, % GDP	0.0	15	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	7.1	38	
6.2.5	High- and medium-high-tech manufacturing, %	43.2	16	
6.3	**Knowledge diffusion**	**37.6**	**28**	
6.3.1	Intellectual property receipts, % total trade	0.6	24	◇
6.3.2	High-tech net exports, % total trade	6.8	25	
6.3.3	ICT services exports, % total trade	3.0	31	
6.3.4	FDI net outflows, % GDP	-0.9	127	○
CREATIVE OUTPUTS		**37.5**	**22**	◇
7.1	**Intangible assets**	**36.7**	**36**	◇
7.1.1	Trademarks by origin/bn PPP$ GDP	55.4	42	
7.1.2	Global brand value, top 5,000, % GDP	51.1	34	◇
7.1.3	Industrial designs by origin/bn PPP$ GDP 🕘	8.1	16	
7.1.4	ICTs & organizational model creation†	64.9	29	◇
7.2	**Creative goods and services**	**26.7**	**36**	
7.2.1	Cultural & creative services exports, % total trade	1.1	22	
7.2.2	National feature films/mn pop. 15-69	7.0	30	
7.2.3	Entertainment & Media market/th pop. 15-69	63.2	9	
7.2.4	Printing and other media, % manufacturing	1.1	45	○
7.2.5	Creative goods exports, % total trade	0.9	48	
7.3	**Online creativity**	**50.1**	**19**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	35.4	19	
7.3.2	Country-code TLDs/th pop. 15-69	62.8	11	●
7.3.3	Wikipedia edits/mn pop. 15-69	85.8	14	
7.3.4	Mobile app creation/bn PPP$ GDP	17.2	28	

NOTES: ● indicates a strength; ○ a weakness; ◆ a strength relative to the other top 25-ranked GII economies; ◇ a weakness relative to the other top 25-ranked GII economies; * an index; † a survey question. 🕘 indicates that the economy's data are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

AZERBAIJAN

GII 2020 rank

82

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
86	**76**	**Upper middle**	**NAWA**	**10.0**	**187.3**	**16,252.1**	**84**

		Score/Value	Rank	
INSTITUTIONS		**65.0**	**59**	
1.1	**Political environment**	**55.1**	**73**	
1.1.1	Political and operational stability*	69.6	70	
1.1.2	Government effectiveness*	47.9	78	
1.2	**Regulatory environment**	**60.0**	**80**	
1.2.1	Regulatory quality*	31.7	98	
1.2.2	Rule of law*	31.0	102	
1.2.3	Cost of redundancy dismissal, salary weeks	13.7	51	
1.3	**Business environment**	**79.8**	**33**	● ◆
1.3.1	Ease of starting a business*	96.2	9	● ◆
1.3.2	Ease of resolving insolvency*	63.5	43	
HUMAN CAPITAL & RESEARCH		**21.8**	**89**	
2.1	**Education**	**37.8**	**84**	
2.1.1	Expenditure on education, % GDP 🕘	2.5	109	○ ◇
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, & science	402.2	65	
2.1.5	Pupil-teacher ratio, secondary	7.6	6	● ◆
2.2	**Tertiary education**	**25.2**	**82**	
2.2.1	Tertiary enrolment, % gross	27.7	85	◇
2.2.2	Graduates in science & engineering, %	23.5	44	
2.2.3	Tertiary inbound mobility, %	2.3	72	
2.3	**Research & development (R&D)**	**2.4**	**91**	
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 R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	3.9	71	
INFRASTRUCTURE		**36.1**	**85**	
3.1	**Information & communication technologies (ICTs)**	**66.3**	**68**	
3.1.1	ICT access*	67.2	63	
3.1.2	ICT use*	57.0	63	
3.1.3	Government's online service*	72.9	64	
3.1.4	E-participation*	68.0	78	
3.2	**General infrastructure**	**15.3**	**120**	○ ◇
3.2.1	Electricity output, kWh/mn pop	2,466.6	73	
3.2.2	Logistics performance*	n/a	n/a	
3.2.3	Gross capital formation, % GDP	20.7	92	
3.3	**Ecological sustainability**	**26.9**	**73**	
3.3.1	GDP/unit of energy use	10.6	47	
3.3.2	Environmental performance*	46.5	66	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.3	96	
MARKET SOPHISTICATION		**52.2**	**36**	●
4.1	**Credit**	**48.6**	**39**	
4.1.1	Ease of getting credit*	100.0	1	● ◆
4.1.2	Domestic credit to private sector, % GDP	20.8	113	◇
4.1.3	Microfinance gross loans, % GDP	1.9	14	●
4.2	**Investment**	**50.0**	**[23]**	
4.2.1	Ease of protecting minority investors*	50.0	92	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**58.1**	**86**	
4.3.1	Applied tariff rate, weighted avg., % 🕘	5.2	95	
4.3.2	Intensity of local competition†	61.3	103	◇
4.3.3	Domestic market scale, bn PPP$	187.3	71	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**20.6**	**96**	
5.1	**Knowledge workers**	**25.0**	**84**	
5.1.1	Knowledge-intensive employment, %	23.2	67	
5.1.2	Firms offering formal training, % 🕘	20.2	74	
5.1.3	GERD performed by business, % GDP	0.0	88	○ ◇
5.1.4	GERD financed by business, %	30.8	57	
5.1.5	Females employed w/advanced degrees, % 🕘	12.9	54	
5.2	**Innovation linkages**	**20.1**	**67**	
5.2.1	University/industry research collaboration†	59.5	23	● ◆
5.2.2	State of cluster development†	58.3	29	● ◆
5.2.3	GERD financed by abroad, % GDP	0.0	101	○ ◇
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	109	○
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	93	
5.3	**Knowledge absorption**	**16.8**	**119**	○ ◇
5.3.1	Intellectual property payments, % total trade 🕘	0.1	105	○
5.3.2	High-tech imports, % total trade	4.0	121	○
5.3.3	ICT services imports, % total trade	0.5	105	
5.3.4	FDI net inflows, % GDP	7.3	16	● ◆
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**10.0**	**118**	○ ◇
6.1	**Knowledge creation**	**6.0**	**98**	
6.1.1	Patents by origin/bn PPP$ GDP	1.0	64	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	74	
6.1.3	Utility models by origin/bn PPP$ GDP	0.2	50	
6.1.4	Scientific & technical articles/bn PPP$ GDP	3.8	98	
6.1.5	Citable documents H-index	5.7	97	
6.2	**Knowledge impact**	**12.7**	**112**	◇
6.2.1	Growth rate of PPP$ GDP/worker, %	0.4	83	
6.2.2	New businesses/th pop. 15-64	1.7	62	
6.2.3	Computer software spending, % GDP	0.0	94	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.2	97	
6.2.5	High- and medium-high-tech manufacturing, %	10.8	77	
6.3	**Knowledge diffusion**	**11.4**	**115**	◇
6.3.1	Intellectual property receipts, % total trade 🕘	0.0	106	○ ◇
6.3.2	High-tech net exports, % total trade	0.1	110	
6.3.3	ICT services exports, % total trade	0.4	104	
6.3.4	FDI net outflows, % GDP	5.6	8	● ◆
CREATIVE OUTPUTS		**20.5**	**65**	
7.1	**Intangible assets**	**29.1**	**56**	
7.1.1	Trademarks by origin/bn PPP$ GDP	21.2	91	
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.3	92	
7.1.4	ICTs & organizational model creation†	63.4	35	● ◆
7.2	**Creative goods and services**	**8.1**	**87**	
7.2.1	Cultural & creative services exports, % total trade	0.2	71	
7.2.2	National feature films/mn pop. 15-69	7.4	27	● ◆
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	0.7	78	
7.2.5	Creative goods exports, % total trade	0.0	120	○
7.3	**Online creativity**	**15.9**	**67**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	1.0	96	
7.3.2	Country-code TLDs/th pop. 15-69	1.4	76	
7.3.3	Wikipedia edits/mn pop. 15-69	63.2	50	
7.3.4	Mobile app creation/bn PPP$ GDP	0.0	97	○

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

BAHRAIN

GII 2020 rank

79

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
89	63	High	NAWA	1.6	77.0	44,464.7	78

		Score/Value	Rank	
INSTITUTIONS		**68.7**	**51**	◇
1.1	**Political environment**	**59.9**	**60**	◇
1.1.1	Political and operational stability*	71.4	59	◇
1.1.2	Government effectiveness*	54.2	60	◇
1.2	**Regulatory environment**	**72.2**	**40**	
1.2.1	Regulatory quality*	53.6	51	◇
1.2.2	Rule of law*	57.4	47	◇
1.2.3	Cost of redundancy dismissal, salary weeks	13.6	49	
1.3	**Business environment**	**73.9**	**56**	
1.3.1	Ease of starting a business*	89.6	57	
1.3.2	Ease of resolving insolvency*	58.2	55	
HUMAN CAPITAL & RESEARCH		**25.2**	**84**	◇
2.1	**Education**	**39.6**	**82**	◇
2.1.1	Expenditure on education, % GDP	2.3	112	○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	17.5	66	
2.1.3	School life expectancy, years	16.3	28	●
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	10.2	37	●
2.2	**Tertiary education**	**33.5**	**64**	◇
2.2.1	Tertiary enrolment, % gross	50.5	59	
2.2.2	Graduates in science & engineering, %	16.1	88	◇
2.2.3	Tertiary inbound mobility, %	13.4	12	●
2.3	**Research & development (R&D)**	**2.7**	**87**	◇
2.3.1	Researchers, FTE/mn pop.	369.0	74	◇
2.3.2	Gross expenditure on R&D, % GDP	0.1	106	○ ◇
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	4.6	70	◇
INFRASTRUCTURE		**49.0**	**43**	
3.1	**Information & communication technologies (ICTs)**	**78.5**	**36**	●
3.1.1	ICT access*	81.6	21	●
3.1.2	ICT use*	72.7	35	●
3.1.3	Government's online service*	79.9	45	
3.1.4	E-participation*	79.8	53	
3.2	**General infrastructure**	**44.8**	**12**	●
3.2.1	Electricity output, kWh/mn pop	19,614.3	3	● ◆
3.2.2	Logistics performance*	40.6	58	◇
3.2.3	Gross capital formation, % GDP	31.3	23	● ◆
3.3	**Ecological sustainability**	**23.6**	**85**	◇
3.3.1	GDP/unit of energy use	4.5	113	○ ◇
3.3.2	Environmental performance*	51.0	54	◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.4	54	
MARKET SOPHISTICATION		**45.3**	**80**	
4.1	**Credit**	**43.4**	**56**	
4.1.1	Ease of getting credit*	55.0	88	
4.1.2	Domestic credit to private sector, % GDP	73.7	43	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**33.2**	**83**	
4.2.1	Ease of protecting minority investors*	66.0	50	
4.2.2	Market capitalization, % GDP	59.8	27	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	40	
4.3	**Trade, competition, and market scale**	**59.3**	**76**	◇
4.3.1	Applied tariff rate, weighted avg., %	4.3	80	◇
4.3.2	Intensity of local competition†	70.1	60	
4.3.3	Domestic market scale, bn PPP$	77.0	90	◇

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**22.1**	**86**	◇
5.1	**Knowledge workers**	**20.5**	**[101]**	
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	80	◇
5.1.4	GERD financed by business, %	21.8	64	◇
5.1.5	Females employed w/advanced degrees, %	n/a	n/a	
5.2	**Innovation linkages**	**29.8**	**35**	●
5.2.1	University/industry research collaboration†	36.8	90	◇
5.2.2	State of cluster development†	55.8	32	●
5.2.3	GERD financed by abroad, % GDP	0.0	76	◇
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.2	14	●
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.1	63	
5.3	**Knowledge absorption**	**16.0**	**125**	○ ◇
5.3.1	Intellectual property payments, % total trade	n/a	n/a	
5.3.2	High-tech imports, % total trade	5.2	109	
5.3.3	ICT services imports, % total trade	0.4	111	◇
5.3.4	FDI net inflows, % GDP	0.8	118	○
5.3.5	Research talent, % in business enterprise	0.4	83	○ ◇
KNOWLEDGE & TECHNOLOGY OUTPUTS		**15.3**	**86**	◇
6.1	**Knowledge creation**	**3.0**	**123**	○ ◇
6.1.1	Patents by origin/bn PPP$ GDP	0.2	102	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	87	◇
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	2.2	116	◇
6.1.5	Citable documents H-index	3.9	115	◇
6.2	**Knowledge impact**	**22.3**	**71**	
6.2.1	Growth rate of PPP$ GDP/worker, %	2.3	40	
6.2.2	New businesses/th pop. 15-64	3.1	44	
6.2.3	Computer software spending, % GDP	0.0	41	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	5.0	55	
6.2.5	High- and medium-high-tech manufacturing, %	8.4	88	◇
6.3	**Knowledge diffusion**	**20.8**	**73**	
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	High-tech net exports, % total trade	0.0	122	○ ◇
6.3.3	ICT services exports, % total trade	3.0	30	●
6.3.4	FDI net outflows, % GDP	0.6	68	
CREATIVE OUTPUTS		**14.0**	**98**	◇
7.1	**Intangible assets**	**18.3**	**102**	◇
7.1.1	Trademarks by origin/bn PPP$ GDP	4.1	124	○ ◇
7.1.2	Global brand value, top 5,000, % GDP	13.3	53	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.1	114	○
7.1.4	ICTs & organizational model creation†	58.2	51	
7.2	**Creative goods and services**	**7.9**	**[89]**	
7.2.1	Cultural & creative services exports, % total trade	0.0	113	○ ◇
7.2.2	National feature films/mn pop. 15-69	n/a	n/a	
7.2.3	Entertainment & Media market/th pop. 15-69	10.3	36	◇
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.8	51	
7.3	**Online creativity**	**11.8**	**77**	◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	4.4	57	
7.3.2	Country-code TLDs/th pop. 15-69	0.5	99	◇
7.3.3	Wikipedia edits/mn pop. 15-69	45.2	71	◇
7.3.4	Mobile app creation/bn PPP$ GDP	0.0	89	

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

BANGLADESH

GII 2020 rank

116

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
114	119	Lower middle	CSA	163.0	837.6	4,389.6	116

		Score/Value	Rank	
INSTITUTIONS		**45.4**	**124**	◇
1.1	**Political environment**	**41.3**	**116**	
1.1.1	Political and operational stability*	57.1	110	
1.1.2	Government effectiveness*	33.4	117	
1.2	**Regulatory environment**	**39.7**	**120**	
1.2.1	Regulatory quality*	20.0	120	
1.2.2	Rule of law*	30.0	104	
1.2.3	Cost of redundancy dismissal, salary weeks	31.0	120	
1.3	**Business environment**	**55.3**	**117**	
1.3.1	Ease of starting a business*	82.4	101	
1.3.2	Ease of resolving insolvency*	28.1	123	
HUMAN CAPITAL & RESEARCH		**9.0**	**129**	○ ◇
2.1	**Education**	**15.4**	**129**	○ ◇
2.1.1	Expenditure on education, % GDP	2.0	115	○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	9.9	96	
2.1.3	School life expectancy, years	12.0	94	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	35.1	122	○ ◇
2.2	**Tertiary education**	**7.7**	**117**	◇
2.2.1	Tertiary enrolment, % gross	20.6	93	
2.2.2	Graduates in science & engineering, %	11.2	103	○ ◇
2.2.3	Tertiary inbound mobility, %	0.1	109	○
2.3	**Research & development (R&D)**	**3.8**	**[82]**	
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 R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	7.6	67	
INFRASTRUCTURE		**33.9**	**92**	
3.1	**Information & communication technologies (ICTs)**	**53.5**	**91**	
3.1.1	ICT access*	33.6	117	◇
3.1.2	ICT use*	21.5	113	◇
3.1.3	Government's online service*	78.5	52	● ◆
3.1.4	E-participation*	80.3	51	● ◆
3.2	**General infrastructure**	**23.2**	**81**	
3.2.1	Electricity output, kWh/mn pop	444.3	108	
3.2.2	Logistics performance*	23.8	96	
3.2.3	Gross capital formation, % GDP	31.2	25	●
3.3	**Ecological sustainability**	**25.1**	**81**	
3.3.1	GDP/unit of energy use	14.1	15	● ◆
3.3.2	Environmental performance*	29.0	123	○ ◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	112	
MARKET SOPHISTICATION		**42.1**	**100**	
4.1	**Credit**	**29.9**	**109**	
4.1.1	Ease of getting credit*	45.0	101	
4.1.2	Domestic credit to private sector, % GDP	46.9	73	
4.1.3	Microfinance gross loans, % GDP	1.4	23	●
4.2	**Investment**	**37.1**	**65**	
4.2.1	Ease of protecting minority investors*	60.0	71	
4.2.2	Market capitalization, % GDP	31.5	45	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**59.3**	**75**	
4.3.1	Applied tariff rate, weighted avg., %	10.7	118	◇
4.3.2	Intensity of local competition†	67.5	71	
4.3.3	Domestic market scale, bn PPP$	837.6	29	●

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**17.0**	**122**	
5.1	**Knowledge workers**	**13.0**	**[118]**	
5.1.1	Knowledge-intensive employment, %	8.3	109	
5.1.2	Firms offering formal training, %	21.9	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, %	1.3	108	
5.2	**Innovation linkages**	**18.2**	**85**	
5.2.1	University/industry research collaboration†	26.4	121	○ ◇
5.2.2	State of cluster development†	43.9	81	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	68	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	98	
5.3	**Knowledge absorption**	**19.7**	**102**	
5.3.1	Intellectual property payments, % total trade	0.1	106	◇
5.3.2	High-tech imports, % total trade	8.1	56	●
5.3.3	ICT services imports, % total trade	0.1	125	○ ◇
5.3.4	FDI net inflows, % GDP	1.0	111	
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**13.2**	**95**	
6.1	**Knowledge creation**	**6.0**	**[97]**	
6.1.1	Patents by origin/bn PPP$ GDP	0.1	114	
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	2.6	109	
6.1.5	Citable documents H-index	11.7	64	●
6.2	**Knowledge impact**	**21.6**	**76**	
6.2.1	Growth rate of PPP$ GDP/worker, %	5.7	5	● ◆
6.2.2	New businesses/th pop. 15-64	0.0	120	○
6.2.3	Computer software spending, % GDP	0.0	72	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.7	116	◇
6.2.5	High- and medium-high-tech manufacturing, %	9.4	85	
6.3	**Knowledge diffusion**	**12.0**	**108**	
6.3.1	Intellectual property receipts, % total trade	0.0	103	○
6.3.2	High-tech net exports, % total trade	0.2	95	
6.3.3	ICT services exports, % total trade	1.1	80	
6.3.4	FDI net outflows, % GDP	0.0	114	
CREATIVE OUTPUTS		**9.4**	**115**	
7.1	**Intangible assets**	**15.2**	**110**	
7.1.1	Trademarks by origin/bn PPP$ GDP	10.4	110	
7.1.2	Global brand value, top 5,000, % GDP	2.5	76	
7.1.3	Industrial designs by origin/bn PPP$ GDP	2.5	47	●
7.1.4	ICTs & organizational model creation†	42.1	108	
7.2	**Creative goods and services**	**1.2**	**124**	◇
7.2.1	Cultural & creative services exports, % total trade	0.1	80	
7.2.2	National feature films/mn pop. 15-69	0.3	104	○
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	0.2	99	○
7.2.5	Creative goods exports, % total trade	0.1	108	
7.3	**Online creativity**	**5.9**	**104**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.4	113	
7.3.2	Country-code TLDs/th pop. 15-69	0.1	122	
7.3.3	Wikipedia edits/mn pop. 15-69	26.8	99	
7.3.4	Mobile app creation/bn PPP$ GDP	0.4	73	

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

BELARUS

GII 2020 rank

64

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
61	67	Upper middle	EUR	9.5	195.6	18,022.5	72

		Score/Value	Rank	
INSTITUTIONS		**58.4**	**84**	
1.1	**Political environment**	**53.4**	**79**	
1.1.1	Political and operational stability*	73.2	49	
1.1.2	Government effectiveness*	43.4	89	
1.2	**Regulatory environment**	**48.8**	**106**	
1.2.1	Regulatory quality*	24.4	111	○ ◇
1.2.2	Rule of law*	25.0	116	○ ◇
1.2.3	Cost of redundancy dismissal, salary weeks	21.7	92	
1.3	**Business environment**	**73.2**	**58**	
1.3.1	Ease of starting a business*	93.5	28	
1.3.2	Ease of resolving insolvency*	52.9	68	
HUMAN CAPITAL & RESEARCH		**40.9**	**37**	◆
2.1	**Education**	**58.7**	**16**	● ◆
2.1.1	Expenditure on education, % GDP 🕘	4.8	51	
2.1.2	Government funding/pupil, secondary, % GDP/cap	35.7	8	● ◆
2.1.3	School life expectancy, years	15.4	43	
2.1.4	PISA scales in reading, maths, & science	472.3	36	◆
2.1.5	Pupil-teacher ratio, secondary	8.6	16	●
2.2	**Tertiary education**	**55.1**	**10**	● ◆
2.2.1	Tertiary enrolment, % gross	87.4	10	● ◆
2.2.2	Graduates in science & engineering, %	33.2	11	● ◆
2.2.3	Tertiary inbound mobility, %	4.3	53	
2.3	**Research & development (R&D)**	**9.0**	**61**	
2.3.1	Researchers, FTE/mn pop	n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP	0.6	55	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	14.9	57	
INFRASTRUCTURE		**43.2**	**58**	
3.1	**Information & communication technologies (ICTs)**	**79.5**	**34**	◆
3.1.1	ICT access*	82.1	19	● ◆
3.1.2	ICT use*	74.0	33	◆
3.1.3	Government's online service*	73.6	58	
3.1.4	E-participation*	88.2	33	
3.2	**General infrastructure**	**22.5**	**86**	
3.2.1	Electricity output, kWh/mn pop	3,629.3	55	
3.2.2	Logistics performance*	23.7	99	
3.2.3	Gross capital formation, % GDP	26.2	43	
3.3	**Ecological sustainability**	**27.7**	**69**	
3.3.1	GDP/unit of energy use	6.3	99	○ ◇
3.3.2	Environmental performance*	53.0	47	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.9	47	
MARKET SOPHISTICATION		**39.1**	**107**	○
4.1	**Credit**	**24.1**	**119**	○ ◇
4.1.1	Ease of getting credit*	50.0	94	
4.1.2	Domestic credit to private sector, % GDP	27.8	98	
4.1.3	Microfinance gross loans, % GDP	0.0	82	○ ◇
4.2	**Investment**	**29.2**	**97**	
4.2.1	Ease of protecting minority investors*	58.0	77	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	76	○
4.3	**Trade, competition, and market scale**	**64.0**	**59**	
4.3.1	Applied tariff rate, weighted avg., %	1.7	21	●
4.3.2	Intensity of local competition†	n/a	n/a	
4.3.3	Domestic market scale, bn PPP$	195.6	68	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**24.9**	**67**	
5.1	**Knowledge workers**	**47.6**	**30**	◆
5.1.1	Knowledge-intensive employment, %	40.1	27	◆
5.1.2	Firms offering formal training, % 🕘	31.5	47	
5.1.3	GERD performed by business, % GDP	0.4	40	
5.1.4	GERD financed by business, %	45.0	37	
5.1.5	Females employed w/advanced degrees, % 🕘	32.6	2	● ◆
5.2	**Innovation linkages**	**6.2**	**[127]**	
5.2.1	University/industry research collaboration†	n/a	n/a	
5.2.2	State of cluster development†	n/a	n/a	
5.2.3	GERD financed by abroad, % GDP	0.1	44	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	93	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.1	53	
5.3	**Knowledge absorption**	**20.7**	**96**	
5.3.1	Intellectual property payments, % total trade	0.4	72	
5.3.2	High-tech imports, % total trade	5.5	105	
5.3.3	ICT services imports, % total trade	0.7	93	
5.3.4	FDI net inflows, % GDP	2.4	70	
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**27.7**	**46**	
6.1	**Knowledge creation**	**17.2**	**58**	
6.1.1	Patents by origin/bn PPP$ GDP	3.0	31	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	66	
6.1.3	Utility models by origin/bn PPP$ GDP	1.5	16	
6.1.4	Scientific & technical articles/bn PPP$ GDP	5.7	78	
6.1.5	Citable documents H-index	10.8	72	
6.2	**Knowledge impact**	**34.7**	**29**	◆
6.2.1	Growth rate of PPP$ GDP/worker, %	3.0	28	
6.2.2	New businesses/th pop. 15-64	1.3	74	
6.2.3	Computer software spending, % GDP	0.0	104	○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	24.6	5	● ◆
6.2.5	High- and medium-high-tech manufacturing, %	26.1	41	
6.3	**Knowledge diffusion**	**31.2**	**41**	
6.3.1	Intellectual property receipts, % total trade	0.1	54	
6.3.2	High-tech net exports, % total trade	1.7	59	
6.3.3	ICT services exports, % total trade	4.5	15	● ◆
6.3.4	FDI net outflows, % GDP	0.2	97	
CREATIVE OUTPUTS		**14.8**	**97**	
7.1	**Intangible assets**	**4.9**	**130**	○ ◇
7.1.1	Trademarks by origin/bn PPP$ GDP	23.9	86	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.0	70	
7.1.4	ICTs & organizational model creation†	n/a	n/a	
7.2	**Creative goods and services**	**5.1**	**104**	
7.2.1	Cultural & creative services exports, % total trade	0.3	65	
7.2.2	National feature films/mn pop. 15-69 🕘	0.1	107	○ ◇
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	0.5	91	○ ◇
7.2.5	Creative goods exports, % total trade	0.5	63	
7.3	**Online creativity**	**44.1**	**26**	◆
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	1.7	82	
7.3.2	Country-code TLDs/th pop. 15-69	5.9	48	
7.3.3	Wikipedia edits/mn pop. 15-69	70.6	38	◆
7.3.4	Mobile app creation/bn PPP$ GDP	100.0	1	● ◆

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

BELGIUM

GII 2020 rank

22

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
25	21	High	EUR	11.5	567.5	43,240.2	23

		Score/Value	Rank	
INSTITUTIONS		**81.2**	**21**	
1.1	**Political environment**	**77.7**	**26**	◇
1.1.1	Political and operational stability*	80.4	33	
1.1.2	Government effectiveness*	76.3	27	◇
1.2	**Regulatory environment**	**77.6**	**32**	
1.2.1	Regulatory quality*	74.3	25	
1.2.2	Rule of law*	82.3	21	
1.2.3	Cost of redundancy dismissal, salary weeks	19.7	82	○
1.3	**Business environment**	**88.2**	**8**	●
1.3.1	Ease of starting a business*	92.3	44	
1.3.2	Ease of resolving insolvency*	84.1	9	●
HUMAN CAPITAL & RESEARCH		**57.8**	**11**	●
2.1	**Education**	**75.4**	**2**	● ◆
2.1.1	Expenditure on education, % GDP	6.5	9	●
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	19.8	2	● ◆
2.1.4	PISA scales in reading, maths, & science	499.9	19	
2.1.5	Pupil-teacher ratio, secondary	9.0	21	◆
2.2	**Tertiary education**	**38.4**	**49**	
2.2.1	Tertiary enrolment, % gross	79.7	19	
2.2.2	Graduates in science & engineering, %	16.7	83	○ ◇
2.2.3	Tertiary inbound mobility, %	8.5	24	
2.3	**Research & development (R&D)**	**59.6**	**14**	
2.3.1	Researchers, FTE/mn pop	5,023.3	16	
2.3.2	Gross expenditure on R&D, % GDP	2.8	10	●
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	66.3	20	
2.3.4	QS university ranking, average score top 3*	54.9	16	
INFRASTRUCTURE		**52.2**	**35**	◇
3.1	**Information & communication technologies (ICTs)**	**77.1**	**40**	◇
3.1.1	ICT access*	80.2	27	
3.1.2	ICT use*	76.6	27	
3.1.3	Government's online service*	75.7	56	◇
3.1.4	E-participation*	75.8	59	◇
3.2	**General infrastructure**	**41.4**	**20**	
3.2.1	Electricity output, kWh/mn pop	6,486.6	31	
3.2.2	Logistics performance*	92.4	3	●
3.2.3	Gross capital formation, % GDP	25.1	51	
3.3	**Ecological sustainability**	**38.0**	**41**	
3.3.1	GDP/unit of energy use	9.2	66	○
3.3.2	Environmental performance*	73.3	15	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.8	49	
MARKET SOPHISTICATION		**54.5**	**29**	
4.1	**Credit**	**47.5**	**46**	
4.1.1	Ease of getting credit*	65.0	61	○
4.1.2	Domestic credit to private sector, % GDP	69.5	45	◇
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**42.0**	**46**	
4.2.1	Ease of protecting minority investors*	68.0	44	
4.2.2	Market capitalization, % GDP	75.2	20	
4.2.3	Venture capital deals/bn PPP$ GDP	0.1	21	
4.3	**Trade, competition, and market scale**	**74.0**	**21**	
4.3.1	Applied tariff rate, weighted avg., %	1.7	22	
4.3.2	Intensity of local competition†	78.6	14	
4.3.3	Domestic market scale, bn PPP$	567.5	36	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**52.5**	**16**	
5.1	**Knowledge workers**	**68.7**	**6**	●
5.1.1	Knowledge-intensive employment, %	47.3	12	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	1.9	9	●
5.1.4	GERD financed by business, %	63.5	9	●
5.1.5	Females employed w/advanced degrees, %	25.4	12	
5.2	**Innovation linkages**	**50.5**	**15**	
5.2.1	University/industry research collaboration†	68.7	12	
5.2.2	State of cluster development†	64.9	17	
5.2.3	GERD financed by abroad, % GDP	0.3	6	●
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.1	29	◇
5.2.5	Patent families 2+ offices/bn PPP$ GDP	3.5	15	
5.3	**Knowledge absorption**	**38.3**	**34**	◇
5.3.1	Intellectual property payments, % total trade	0.8	52	
5.3.2	High-tech imports, % total trade	7.6	66	○
5.3.3	ICT services imports, % total trade	2.3	21	
5.3.4	FDI net inflows, % GDP	-2.2	128	○
5.3.5	Research talent, % in business enterprise	56.3	18	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**42.3**	**17**	
6.1	**Knowledge creation**	**52.6**	**13**	
6.1.1	Patents by origin/bn PPP$ GDP	5.9	18	
6.1.2	PCT patents by origin/bn PPP$ GDP	2.4	14	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	23.9	19	
6.1.5	Citable documents H-index	53.6	14	
6.2	**Knowledge impact**	**34.8**	**28**	
6.2.1	Growth rate of PPP$ GDP/worker, %	0.1	87	○
6.2.2	New businesses/th pop. 15-64	3.4	40	
6.2.3	Computer software spending, % GDP	0.0	7	●
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	5.7	48	
6.2.5	High- and medium-high-tech manufacturing, %	37.0	28	
6.3	**Knowledge diffusion**	**39.6**	**27**	
6.3.1	Intellectual property receipts, % total trade	0.8	21	
6.3.2	High-tech net exports, % total trade	7.9	21	
6.3.3	ICT services exports, % total trade	3.0	32	
6.3.4	FDI net outflows, % GDP	-1.2	128	○
CREATIVE OUTPUTS		**35.0**	**32**	◇
7.1	**Intangible assets**	**33.9**	**40**	◇
7.1.1	Trademarks by origin/bn PPP$ GDP	42.6	61	○
7.1.2	Global brand value, top 5,000, % GDP	58.9	32	◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	2.7	41	
7.1.4	ICTs & organizational model creation†	72.2	16	
7.2	**Creative goods and services**	**30.3**	**26**	
7.2.1	Cultural & creative services exports, % total trade	1.3	20	
7.2.2	National feature films/mn pop. 15-69	10.9	16	
7.2.3	Entertainment & Media market/th pop. 15-69	54.6	13	
7.2.4	Printing and other media, % manufacturing	1.1	43	
7.2.5	Creative goods exports, % total trade	1.4	38	
7.3	**Online creativity**	**41.7**	**28**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	21.0	27	◇
7.3.2	Country-code TLDs/th pop. 15-69	62.0	12	●
7.3.3	Wikipedia edits/mn pop. 15-69	81.0	21	
7.3.4	Mobile app creation/bn PPP$ GDP	3.7	59	○ ◇

NOTES: ● indicates a strength; ○ a weakness; ◆ a strength relative to the other top 25-ranked GII economies; ◇ a weakness relative to the other top 25-ranked GII economies; * an index; † a survey question. 🕘 indicates that the economy's data are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

BENIN

GII 2020 rank

126

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
131	116	Low	SSF	11.8	40.7	3,008.8	123

		Score/Value	Rank	
INSTITUTIONS		**57.8**	**85**	
1.1	**Political environment**	**45.8**	**101**	
1.1.1	Political and operational stability*	62.5	92	
1.1.2	Government effectiveness*	37.5	102	
1.2	**Regulatory environment**	**61.9**	**75**	●
1.2.1	Regulatory quality*	32.8	95	
1.2.2	Rule of law*	29.1	107	
1.2.3	Cost of redundancy dismissal, salary weeks	11.6	37	●
1.3	**Business environment**	**65.8**	**81**	
1.3.1	Ease of starting a business*	90.6	55	●
1.3.2	Ease of resolving insolvency*	41.0	95	
HUMAN CAPITAL & RESEARCH		**18.9**	**97**	◆
2.1	**Education**	**35.0**	**95**	
2.1.1	Expenditure on education, % GDP	4.0	71	●
2.1.2	Government funding/pupil, secondary, % GDP/cap. 🕘	10.8	92	
2.1.3	School life expectancy, years 🕘	12.6	86	◆
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary 🕘	11.0	42	● ◆
2.2	**Tertiary education**	**21.6**	**90**	◆
2.2.1	Tertiary enrolment, % gross	12.3	105	
2.2.2	Graduates in science & engineering, % 🕘	20.7	68	
2.2.3	Tertiary inbound mobility, %	7.0	34	● ◆
2.3	**Research & development (R&D)**	**0.0**	**[121]**	
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 R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**22.2**	**122**	
3.1	**Information & communication technologies (ICTs)**	**32.2**	**118**	
3.1.1	ICT access*	31.3	120	
3.1.2	ICT use*	13.4	124	
3.1.3	Government's online service*	47.2	110	
3.1.4	E-participation*	37.1	115	
3.2	**General infrastructure**	**21.5**	**91**	
3.2.1	Electricity output, kWh/mn pop	29.6	121	○
3.2.2	Logistics performance*	31.9	75	● ◆
3.2.3	Gross capital formation, % GDP	26.6	39	●
3.3	**Ecological sustainability**	**12.8**	**131**	○
3.3.1	GDP/unit of energy use	4.4	114	
3.3.2	Environmental performance*	30.0	120	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.1	128	○
MARKET SOPHISTICATION		**34.3**	**122**	
4.1	**Credit**	**21.5**	**122**	
4.1.1	Ease of getting credit*	30.0	122	
4.1.2	Domestic credit to private sector, % GDP	23.1	109	
4.1.3	Microfinance gross loans, % GDP	2.1	12	●
4.2	**Investment**	**42.0**	**[47]**	
4.2.1	Ease of protecting minority investors*	42.0	102	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**39.5**	**128**	○
4.3.1	Applied tariff rate, weighted avg., %	15.3	130	○ ◇
4.3.2	Intensity of local competition†	63.2	90	
4.3.3	Domestic market scale, bn PPP$	40.7	109	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**15.7**	**125**	
5.1	**Knowledge workers**	**13.4**	**[116]**	
5.1.1	Knowledge-intensive employment, %	n/a	n/a	
5.1.2	Firms offering formal training, % 🕘	20.0	75	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, % 🕘	0.8	112	
5.2	**Innovation linkages**	**17.1**	**94**	
5.2.1	University/industry research collaboration†	35.6	96	
5.2.2	State of cluster development†	36.5	108	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	81	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	101	○ ◇
5.3	**Knowledge absorption**	**16.6**	**121**	
5.3.1	Intellectual property payments, % total trade 🕘	0.0	117	○
5.3.2	High-tech imports, % total trade	4.0	120	
5.3.3	ICT services imports, % total trade 🕘	1.1	64	●
5.3.4	FDI net inflows, % GDP	1.9	85	
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**5.5**	**130**	○ ◇
6.1	**Knowledge creation**	**6.1**	**95**	
6.1.1	Patents by origin/bn PPP$ GDP	0.1	111	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	89	◆
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	6.3	72	●
6.1.5	Citable documents H-index	4.7	110	
6.2	**Knowledge impact**	**3.0**	**[128]**	
6.2.1	Growth rate of PPP$ GDP/worker, %	n/a	n/a	
6.2.2	New businesses/th pop. 15-64	0.5	94	
6.2.3	Computer software spending, % GDP	0.0	99	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.0	108	
6.2.5	High- and medium-high-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**7.4**	**129**	○ ◇
6.3.1	Intellectual property receipts, % total trade 🕘	0.0	108	○ ◇
6.3.2	High-tech net exports, % total trade	0.0	124	
6.3.3	ICT services exports, % total trade 🕘	0.1	120	
6.3.4	FDI net outflows, % GDP	0.2	94	
CREATIVE OUTPUTS		**7.4**	**128**	○
7.1	**Intangible assets**	**11.5**	**127**	○
7.1.1	Trademarks by origin/bn PPP$ GDP	4.6	120	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.1	113	
7.1.4	ICTs & organizational model creation†	39.2	115	
7.2	**Creative goods and services**	**0.4**	**[129]**	
7.2.1	Cultural & creative services exports, % total trade 🕘	0.0	96	
7.2.2	National feature films/mn pop. 15-69	n/a	n/a	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.0	121	
7.3	**Online creativity**	**6.3**	**103**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.6	103	◆
7.3.2	Country-code TLDs/th pop. 15-69	0.0	127	○
7.3.3	Wikipedia edits/mn pop. 15-69	22.5	103	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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

BOLIVIA (PLURINATIONAL STATE OF)

GII 2020 rank

105

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
117	**97**	**Lower middle**	**LCN**	**11.5**	**94.4**	**7,134.6**	**110**

		Score/Value	Rank	
INSTITUTIONS		**39.7**	**129**	○ ◇
1.1	**Political environment**	**45.9**	**100**	
1.1.1	Political and operational stability*	51.8	123	○ ◇
1.1.2	Government effectiveness*	42.9	90	
1.2	**Regulatory environment**	**17.4**	**131**	○ ◇
1.2.1	Regulatory quality*	18.2	124	◇
1.2.2	Rule of law*	16.7	127	○ ◇
1.2.3	Cost of redundancy dismissal, salary weeks	n/a	n/a	
1.3	**Business environment**	**55.8**	**116**	
1.3.1	Ease of starting a business*	69.4	125	○ ◇
1.3.2	Ease of resolving insolvency*	42.3	92	
HUMAN CAPITAL & RESEARCH		**33.1**	**[56]**	
2.1	**Education**	**65.0**	**[10]**	
2.1.1	Expenditure on education, % GDP	n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	n/a	n/a	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	18.5	91	
2.2	**Tertiary education**	**n/a**	**[n/a]**	
2.2.1	Tertiary enrolment, % gross	n/a	n/a	
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research & development (R&D)**	**1.2**	**106**	
2.3.1	Researchers, FTE/mn pop	163.8	83	
2.3.2	Gross expenditure on R&D, % GDP	0.2	96	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**29.1**	**104**	
3.1	**Information & communication technologies (ICTs)**	**50.1**	**97**	
3.1.1	ICT access*	42.2	103	
3.1.2	ICT use*	43.9	86	
3.1.3	Government's online service*	56.3	96	
3.1.4	E-participation*	57.9	94	
3.2	**General infrastructure**	**13.4**	**123**	◇
3.2.1	Electricity output, kWh/mn pop	901.8	97	
3.2.2	Logistics performance*	13.5	117	◇
3.2.3	Gross capital formation, % GDP	20.7	90	
3.3	**Ecological sustainability**	**23.8**	**84**	
3.3.1	GDP/unit of energy use	8.3	75	
3.3.2	Environmental performance*	44.3	77	◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.5	80	
MARKET SOPHISTICATION		**45.7**	**78**	
4.1	**Credit**	**42.1**	**64**	●
4.1.1	Ease of getting credit*	35.0	118	◇
4.1.2	Domestic credit to private sector, % GDP	65.9	51	●
4.1.3	Microfinance gross loans, % GDP	28.0	2	● ◆
4.2	**Investment**	**38.0**	**[64]**	
4.2.1	Ease of protecting minority investors*	38.0	115	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**57.0**	**89**	
4.3.1	Applied tariff rate, weighted avg., %	4.7	85	
4.3.2	Intensity of local competition†	63.8	85	
4.3.3	Domestic market scale, bn PPP$	94.4	85	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**21.8**	**90**	
5.1	**Knowledge workers**	**29.0**	**69**	●
5.1.1	Knowledge-intensive employment, %	14.4	93	
5.1.2	Firms offering formal training, %	49.9	17	● ◆
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	5.2	84	
5.1.5	Females employed w/advanced degrees, %	10.4	65	●
5.2	**Innovation linkages**	**13.3**	**121**	
5.2.1	University/industry research collaboration†	25.2	123	○ ◇
5.2.2	State of cluster development†	30.7	121	○ ◇
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	98	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	101	○ ◇
5.3	**Knowledge absorption**	**23.1**	**88**	
5.3.1	Intellectual property payments, % total trade	0.9	41	●
5.3.2	High-tech imports, % total trade	10.7	24	●
5.3.3	ICT services imports, % total trade	0.8	87	
5.3.4	FDI net inflows, % GDP	1.2	106	
5.3.5	Research talent, % in business enterprise	0.4	84	○
KNOWLEDGE & TECHNOLOGY OUTPUTS		**10.4**	**114**	
6.1	**Knowledge creation**	**4.4**	**111**	
6.1.1	Patents by origin/bn PPP$ GDP	0.7	74	
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP	0.1	54	
6.1.4	Scientific & technical articles/bn PPP$ GDP	1.7	120	
6.1.5	Citable documents H-index	6.9	91	
6.2	**Knowledge impact**	**15.0**	**100**	
6.2.1	Growth rate of PPP$ GDP/worker, %	0.0	92	◇
6.2.2	New businesses/th pop. 15-64	0.5	98	
6.2.3	Computer software spending, % GDP	0.0	52	●
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	2.4	82	
6.2.5	High- and medium-high-tech manufacturing, %	7.2	93	
6.3	**Knowledge diffusion**	**11.8**	**110**	
6.3.1	Intellectual property receipts, % total trade	0.2	34	●
6.3.2	High-tech net exports, % total trade	0.2	101	
6.3.3	ICT services exports, % total trade	0.8	87	
6.3.4	FDI net outflows, % GDP	0.1	105	
CREATIVE OUTPUTS		**11.5**	**109**	
7.1	**Intangible assets**	**14.3**	**112**	
7.1.1	Trademarks by origin/bn PPP$ GDP	41.8	64	●
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.2	100	
7.1.4	ICTs & organizational model creation†	31.7	122	○ ◇
7.2	**Creative goods and services**	**9.3**	**80**	
7.2.1	Cultural & creative services exports, % total trade	0.1	91	
7.2.2	National feature films/mn pop. 15-69	0.8	90	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.0	55	
7.2.5	Creative goods exports, % total trade	1.0	43	●
7.3	**Online creativity**	**8.0**	**96**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	1.7	81	
7.3.2	Country-code TLDs/th pop. 15-69	0.5	98	
7.3.3	Wikipedia edits/mn pop. 15-69	33.3	91	
7.3.4	Mobile app creation/bn PPP$ GDP	0.0	93	

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

BOSNIA AND HERZEGOVINA

GII 2020 rank

74

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
75	72	Upper middle	EUR	3.3	49.8	12,414.2	76

		Score/Value	Rank	
INSTITUTIONS		**59.3**	**80**	
1.1	**Political environment**	**45.6**	**103**	◇
1.1.1	Political and operational stability*	64.3	83	
1.1.2	Government effectiveness*	36.3	110	◇
1.2	**Regulatory environment**	**68.0**	**53**	
1.2.1	Regulatory quality*	36.3	87	
1.2.2	Rule of law*	40.6	74	
1.2.3	Cost of redundancy dismissal, salary weeks	9.2	24	●
1.3	**Business environment**	**64.1**	**88**	
1.3.1	Ease of starting a business*	60.0	130	○ ◇
1.3.2	Ease of resolving insolvency*	68.2	34	● ◆
HUMAN CAPITAL & RESEARCH		**35.0**	**50**	
2.1	**Education**	**70.8**	**[4]**	
2.1.1	Expenditure on education, % GDP	n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap	43.5	2	● ◆
2.1.3	School life expectancy, years	n/a	n/a	
2.1.4	PISA scales in reading, maths, & science	402.6	63	
2.1.5	Pupil-teacher ratio, secondary	9.1	23	●
2.2	**Tertiary education**	**32.0**	**68**	
2.2.1	Tertiary enrolment, % gross	n/a	n/a	
2.2.2	Graduates in science & engineering, %	21.2	61	
2.2.3	Tertiary inbound mobility, %	7.4	32	● ◆
2.3	**Research & development (R&D)**	**2.3**	**92**	
2.3.1	Researchers, FTE/mn pop	471.3	71	
2.3.2	Gross expenditure on R&D, % GDP	0.2	90	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**36.8**	**84**	
3.1	**Information & communication technologies (ICTs)**	**52.0**	**94**	
3.1.1	ICT access*	68.1	61	
3.1.2	ICT use*	53.4	67	
3.1.3	Government's online service*	43.1	114	○ ◇
3.1.4	E-participation*	43.3	110	◇
3.2	**General infrastructure**	**22.7**	**82**	
3.2.1	Electricity output, kWh/mn pop	4,683.2	46	
3.2.2	Logistics performance*	34.7	71	
3.2.3	Gross capital formation, % GDP	21.4	85	
3.3	**Ecological sustainability**	**35.9**	**47**	
3.3.1	GDP/unit of energy use	5.8	103	◇
3.3.2	Environmental performance*	45.4	70	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	6.1	15	● ◆
MARKET SOPHISTICATION		**50.1**	**51**	
4.1	**Credit**	**38.0**	**80**	
4.1.1	Ease of getting credit*	65.0	61	
4.1.2	Domestic credit to private sector, % GDP	58.6	59	
4.1.3	Microfinance gross loans, % GDP	0.7	29	
4.2	**Investment**	**56.0**	**[19]**	
4.2.1	Ease of protecting minority investors*	56.0	82	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**56.2**	**92**	
4.3.1	Applied tariff rate, weighted avg., %	2.8	63	
4.3.2	Intensity of local competition†	61.9	98	
4.3.3	Domestic market scale, bn PPP$	49.8	100	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**18.7**	**102**	◇
5.1	**Knowledge workers**	**27.4**	**76**	
5.1.1	Knowledge-intensive employment, %	21.8	71	
5.1.2	Firms offering formal training, %	37.9	34	
5.1.3	GERD performed by business, % GDP	0.1	65	
5.1.4	GERD financed by business, %	28.9	62	
5.1.5	Females employed w/advanced degrees, %	6.1	83	◇
5.2	**Innovation linkages**	**13.0**	**123**	○ ◇
5.2.1	University/industry research collaboration†	23.7	124	○ ◇
5.2.2	State of cluster development†	33.6	116	○ ◇
5.2.3	GERD financed by abroad, % GDP	0.0	54	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	77	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	82	
5.3	**Knowledge absorption**	**15.7**	**128**	○ ◇
5.3.1	Intellectual property payments, % total trade	0.1	102	○
5.3.2	High-tech imports, % total trade	5.5	106	
5.3.3	ICT services imports, % total trade	0.5	104	
5.3.4	FDI net inflows, % GDP	2.3	73	
5.3.5	Research talent, % in business enterprise	8.4	63	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**21.2**	**61**	
6.1	**Knowledge creation**	**11.0**	**76**	
6.1.1	Patents by origin/bn PPP$ GDP	1.8	42	●
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	84	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	8.0	60	
6.1.5	Citable documents H-index	4.8	106	
6.2	**Knowledge impact**	**27.4**	**53**	
6.2.1	Growth rate of PPP$ GDP/worker, %	-1.2	110	○
6.2.2	New businesses/th pop. 15-64	1.1	83	
6.2.3	Computer software spending, % GDP	0.0	91	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	28.3	4	● ◆
6.2.5	High- and medium-high-tech manufacturing, %	13.0	74	
6.3	**Knowledge diffusion**	**25.3**	**59**	
6.3.1	Intellectual property receipts, % total trade	0.2	40	◆
6.3.2	High-tech net exports, % total trade	2.7	50	
6.3.3	ICT services exports, % total trade	1.8	62	
6.3.4	FDI net outflows, % GDP	0.2	98	
CREATIVE OUTPUTS		**14.8**	**96**	
7.1	**Intangible assets**	**14.7**	**111**	◇
7.1.1	Trademarks by origin/bn PPP$ GDP	20.8	92	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.6	54	
7.1.4	ICTs & organizational model creation†	39.0	116	○ ◇
7.2	**Creative goods and services**	**11.6**	**73**	
7.2.1	Cultural & creative services exports, % total trade	0.0	94	
7.2.2	National feature films/mn pop. 15-69	8.4	24	● ◆
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.1	47	
7.2.5	Creative goods exports, % total trade	0.4	68	
7.3	**Online creativity**	**18.0**	**58**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	2.8	67	
7.3.2	Country-code TLDs/th pop. 15-69	2.8	62	
7.3.3	Wikipedia edits/mn pop. 15-69	68.2	41	● ◆
7.3.4	Mobile app creation/bn PPP$ GDP	0.1	83	

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

BOTSWANA

GII 2020 rank

89

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
105	**84**	**Upper middle**	**SSF**	**2.3**	**44.1**	**16,202.0**	**93**

		Score/Value	Rank	
INSTITUTIONS		**64.9**	**60**	
1.1	**Political environment**	**66.4**	**45**	◆
1.1.1	Political and operational stability*	83.9	21	● ◆
1.1.2	Government effectiveness*	57.6	52	
1.2	**Regulatory environment**	**66.0**	**62**	
1.2.1	Regulatory quality*	53.8	49	
1.2.2	Rule of law*	58.8	43	● ◆
1.2.3	Cost of redundancy dismissal, salary weeks	20.3	85	
1.3	**Business environment**	**62.2**	**95**	
1.3.1	Ease of starting a business*	76.2	116	◇
1.3.2	Ease of resolving insolvency*	48.2	76	
HUMAN CAPITAL & RESEARCH		**33.6**	**53**	
2.1	**Education**	**82.5**	**[1]**	
2.1.1	Expenditure on education, % GDP	9.6	1	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	35.9	7	● ◆
2.1.3	School life expectancy, years	n/a	n/a	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	n/a	n/a	
2.2	**Tertiary education**	**15.2**	**103**	◇
2.2.1	Tertiary enrolment, % gross	24.9	88	◇
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	2.4	71	
2.3	**Research & development (R&D)**	**3.2**	**86**	
2.3.1	Researchers, FTE/mn pop.	185.2	82	
2.3.2	Gross expenditure on R&D, % GDP	0.5	63	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**29.4**	**103**	◇
3.1	**Information & communication technologies (ICTs)**	**33.7**	**116**	◇
3.1.1	ICT access*	51.9	88	
3.1.2	ICT use*	42.5	95	◇
3.1.3	Government's online service*	20.8	127	○ ◇
3.1.4	E-participation*	19.7	125	○ ◇
3.2	**General infrastructure**	**27.4**	**61**	
3.2.1	Electricity output, kWh/mn pop.	1,319.4	91	◇
3.2.2	Logistics performance*	n/a	n/a	
3.2.3	Gross capital formation, % GDP	34.6	16	● ◆
3.3	**Ecological sustainability**	**27.0**	**72**	
3.3.1	GDP/unit of energy use	12.5	31	●
3.3.2	Environmental performance*	40.4	87	◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.3	100	
MARKET SOPHISTICATION		**42.2**	**96**	
4.1	**Credit**	**36.1**	**83**	
4.1.1	Ease of getting credit*	60.0	74	
4.1.2	Domestic credit to private sector, % GDP	31.8	93	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**31.8**	**91**	
4.2.1	Ease of protecting minority investors*	60.0	71	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	53	
4.3	**Trade, competition, and market scale**	**58.8**	**82**	
4.3.1	Applied tariff rate, weighted avg., %	0.3	4	● ◆
4.3.2	Intensity of local competition†	61.7	101	
4.3.3	Domestic market scale, bn PPP$	44.1	107	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**20.4**	**99**	
5.1	**Knowledge workers**	**28.1**	**75**	
5.1.1	Knowledge-intensive employment, %	17.9	85	
5.1.2	Firms offering formal training, %	51.9	15	●
5.1.3	GERD performed by business, % GDP	0.1	62	
5.1.4	GERD financed by business, %	17.7	69	
5.1.5	Females employed w/advanced degrees, %	9.1	72	
5.2	**Innovation linkages**	**18.9**	**78**	
5.2.1	University/industry research collaboration†	36.9	89	
5.2.2	State of cluster development†	36.3	109	◇
5.2.3	GERD financed by abroad, % GDP	0.1	34	● ◆
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	49	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	101	○ ◇
5.3	**Knowledge absorption**	**14.1**	**130**	○ ◇
5.3.1	Intellectual property payments, % total trade	0.1	96	
5.3.2	High-tech imports, % total trade	4.9	111	
5.3.3	ICT services imports, % total trade	1.0	69	
5.3.4	FDI net inflows, % GDP	1.0	109	◇
5.3.5	Research talent, % in business enterprise	1.0	79	○ ◇
KNOWLEDGE & TECHNOLOGY OUTPUTS		**14.5**	**89**	
6.1	**Knowledge creation**	**5.7**	**100**	
6.1.1	Patents by origin/bn PPP$ GDP	0.1	121	○
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	100	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.3	41	
6.1.4	Scientific & technical articles/bn PPP$ GDP	5.8	75	
6.1.5	Citable documents H-index	5.3	100	
6.2	**Knowledge impact**	**26.0**	**61**	
6.2.1	Growth rate of PPP$ GDP/worker, %	2.3	42	
6.2.2	New businesses/th pop. 15-64	20.1	3	● ◆
6.2.3	Computer software spending, % GDP	0.0	84	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.4	124	○
6.2.5	High- and medium-high-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**11.9**	**109**	
6.3.1	Intellectual property receipts, % total trade	0.0	92	
6.3.2	High-tech net exports, % total trade	0.6	78	
6.3.3	ICT services exports, % total trade	0.3	110	
6.3.4	FDI net outflows, % GDP	0.6	74	
CREATIVE OUTPUTS		**11.0**	**111**	◇
7.1	**Intangible assets**	**13.8**	**116**	◇
7.1.1	Trademarks by origin/bn PPP$ GDP	14.5	103	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.3	91	
7.1.4	ICTs & organizational model creation†	41.9	109	◇
7.2	**Creative goods and services**	**2.1**	**[118]**	
7.2.1	Cultural & 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 & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.2	77	
7.3	**Online creativity**	**14.3**	**70**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	1.1	94	
7.3.2	Country-code TLDs/th pop. 15-69	1.3	78	
7.3.3	Wikipedia edits/mn pop. 15-69	43.6	74	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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

BRAZIL

GII 2020 rank

62

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
64	59	Upper middle	LCN	211.0	3,456.4	14,371.6	66

		Score/Value	Rank	
INSTITUTIONS		**58.5**	**82**	
1.1	**Political environment**	**48.8**	**91**	
1.1.1	Political and operational stability*	66.1	76	
1.1.2	Government effectiveness*	40.1	97	◇
1.2	**Regulatory environment**	**60.9**	**77**	
1.2.1	Regulatory quality*	33.5	94	
1.2.2	Rule of law*	39.4	78	
1.2.3	Cost of redundancy dismissal, salary weeks	15.4	60	
1.3	**Business environment**	**65.9**	**80**	
1.3.1	Ease of starting a business*	81.3	106	○
1.3.2	Ease of resolving insolvency*	50.4	69	
HUMAN CAPITAL & RESEARCH		**35.8**	**49**	
2.1	**Education**	**49.2**	**56**	
2.1.1	Expenditure on education, % GDP 🕘	6.2	12	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap 🕘	21.5	41	
2.1.3	School life expectancy, years	15.4	42	
2.1.4	PISA scales in reading, maths, & science	400.0	68	○
2.1.5	Pupil-teacher ratio, secondary 🕘	16.7	82	
2.2	**Tertiary education**	**24.0**	**85**	
2.2.1	Tertiary enrolment, % gross	51.3	57	
2.2.2	Graduates in science & engineering, %	17.7	81	○
2.2.3	Tertiary inbound mobility, %	0.2	105	○ ◇
2.3	**Research & development (R&D)**	**34.3**	**34**	● ◆
2.3.1	Researchers, FTE/mn pop 🕘	887.7	53	
2.3.2	Gross expenditure on R&D, % GDP 🕘	1.3	30	● ◆
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	58.6	23	● ◆
2.3.4	QS university ranking, average score top 3*	42.7	28	● ◆
INFRASTRUCTURE		**41.8**	**61**	
3.1	**Information & communication technologies (ICTs)**	**77.5**	**38**	◆
3.1.1	ICT access*	59.2	76	
3.1.2	ICT use*	61.1	56	
3.1.3	Government's online service*	92.4	22	● ◆
3.1.4	E-participation*	97.2	12	● ◆
3.2	**General infrastructure**	**18.9**	**108**	○
3.2.1	Electricity output, kWh/mn pop	2,816.2	65	
3.2.2	Logistics performance*	43.0	55	
3.2.3	Gross capital formation, % GDP	15.7	118	○ ◇
3.3	**Ecological sustainability**	**29.0**	**65**	
3.3.1	GDP/unit of energy use	10.0	55	
3.3.2	Environmental performance*	51.2	53	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.9	66	
MARKET SOPHISTICATION		**42.7**	**91**	
4.1	**Credit**	**30.9**	**105**	○
4.1.1	Ease of getting credit*	50.0	94	○
4.1.2	Domestic credit to private sector, % GDP	61.8	56	
4.1.3	Microfinance gross loans, % GDP	0.1	59	
4.2	**Investment**	**28.6**	**99**	
4.2.1	Ease of protecting minority investors*	62.0	60	
4.2.2	Market capitalization, % GDP	45.9	34	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	55	
4.3	**Trade, competition, and market scale**	**68.8**	**36**	
4.3.1	Applied tariff rate, weighted avg., %	8.0	103	○ ◇
4.3.2	Intensity of local competition†	68.2	67	
4.3.3	Domestic market scale, bn PPP$	3,456.4	8	● ◆

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**35.8**	**35**	◆
5.1	**Knowledge workers**	**46.1**	**[32]**	
5.1.1	Knowledge-intensive employment, %	23.5	64	
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, %	47.5	33	
5.1.5	Females employed w/advanced degrees, %	13.8	50	
5.2	**Innovation linkages**	**21.4**	**62**	
5.2.1	University/industry research collaboration†	40.0	74	
5.2.2	State of cluster development†	48.7	55	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	87	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.1	55	
5.3	**Knowledge absorption**	**40.0**	**31**	● ◆
5.3.1	Intellectual property payments, % total trade	2.2	11	● ◆
5.3.2	High-tech imports, % total trade	10.0	32	●
5.3.3	ICT services imports, % total trade	1.7	35	
5.3.4	FDI net inflows, % GDP	3.9	38	
5.3.5	Research talent, % in business enterprise 🕘	26.6	49	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**23.3**	**56**	
6.1	**Knowledge creation**	**20.6**	**48**	
6.1.1	Patents by origin/bn PPP$ GDP	1.5	52	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.2	50	
6.1.3	Utility models by origin/bn PPP$ GDP	0.7	29	
6.1.4	Scientific & technical articles/bn PPP$ GDP	10.5	50	
6.1.5	Citable documents H-index	37.4	24	● ◆
6.2	**Knowledge impact**	**22.8**	**69**	
6.2.1	Growth rate of PPP$ GDP/worker, %	0.0	93	○
6.2.2	New businesses/th pop. 15-64	1.3	76	
6.2.3	Computer software spending, % GDP	0.0	75	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	4.9	56	
6.2.5	High- and medium-high-tech manufacturing, %	34.5	31	
6.3	**Knowledge diffusion**	**26.4**	**53**	
6.3.1	Intellectual property receipts, % total trade	0.3	30	◆
6.3.2	High-tech net exports, % total trade	4.2	38	
6.3.3	ICT services exports, % total trade	1.0	83	
6.3.4	FDI net outflows, % GDP	0.7	67	
CREATIVE OUTPUTS		**18.6**	**77**	
7.1	**Intangible assets**	**25.8**	**71**	
7.1.1	Trademarks by origin/bn PPP$ GDP	52.3	43	
7.1.2	Global brand value, top 5,000, % GDP	33.8	43	
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.1	66	
7.1.4	ICTs & organizational model creation†	52.6	69	
7.2	**Creative goods and services**	**6.5**	**98**	
7.2.1	Cultural & creative services exports, % total trade	0.5	52	
7.2.2	National feature films/mn pop. 15-69	1.1	86	○
7.2.3	Entertainment & Media market/th pop. 15-69	7.4	42	
7.2.4	Printing and other media, % manufacturing	0.6	82	○
7.2.5	Creative goods exports, % total trade	0.3	73	
7.3	**Online creativity**	**16.4**	**65**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	1.5	88	
7.3.2	Country-code TLDs/th pop. 15-69	8.1	43	
7.3.3	Wikipedia edits/mn pop. 15-69	46.4	67	
7.3.4	Mobile app creation/bn PPP$ GDP	12.3	39	

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

BRUNEI DARUSSALAM

GII 2020 rank

71

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
113	**39**	**High**	**SEAO**	**0.4**	**35.9**	**70,177.3**	**71**

		Score/Value	Rank	
INSTITUTIONS		**80.3**	**25**	
1.1	**Political environment**	**83.6**	**18**	●
1.1.1	Political and operational stability*	94.6	3	● ◆
1.1.2	Government effectiveness*	78.1	22	●
1.2	**Regulatory environment**	**80.7**	**30**	
1.2.1	Regulatory quality*	59.9	39	
1.2.2	Rule of law*	63.1	37	
1.2.3	Cost of redundancy dismissal, salary weeks	8.0	1	● ◆
1.3	**Business environment**	**76.6**	**43**	
1.3.1	Ease of starting a business*	94.9	15	●
1.3.2	Ease of resolving insolvency*	58.2	54	
HUMAN CAPITAL & RESEARCH		**34.3**	**51**	◇
2.1	**Education**	**46.9**	**63**	
2.1.1	Expenditure on education, % GDP 🕘	4.4	64	
2.1.2	Government funding/pupil, secondary, % GDP/cap	23.6	25	
2.1.3	School life expectancy, years	14.3	66	◇
2.1.4	PISA scales in reading, maths, & science	423.1	53	
2.1.5	Pupil-teacher ratio, secondary	8.3	12	● ◆
2.2	**Tertiary education**	**45.4**	**25**	
2.2.1	Tertiary enrolment, % gross	31.4	80	◇
2.2.2	Graduates in science & engineering, %	39.2	5	● ◆
2.2.3	Tertiary inbound mobility, %	4.6	49	
2.3	**Research & development (R&D)**	**10.6**	**[56]**	
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 R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	21.2	49	
INFRASTRUCTURE		**47.0**	**46**	◇
3.1	**Information & communication technologies (ICTs)**	**69.2**	**59**	◇
3.1.1	ICT access*	72.7	52	◇
3.1.2	ICT use*	71.4	38	
3.1.3	Government's online service*	72.2	68	◇
3.1.4	E-participation*	60.7	93	◇
3.2	**General infrastructure**	**44.0**	**14**	●
3.2.1	Electricity output, kWh/mn pop	9,668.3	14	●
3.2.2	Logistics performance*	29.9	79	◇
3.2.3	Gross capital formation, % GDP	46.2	3	● ◆
3.3	**Ecological sustainability**	**27.6**	**70**	◇
3.3.1	GDP/unit of energy use	8.3	75	
3.3.2	Environmental performance*	54.8	44	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.7	72	◇
MARKET SOPHISTICATION		**45.7**	**76**	
4.1	**Credit**	**56.9**	**19**	●
4.1.1	Ease of getting credit*	100.0	1	● ◆
4.1.2	Domestic credit to private sector, % GDP	35.0	86	◇
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**22.2**	**124**	○ ◇
4.2.1	Ease of protecting minority investors*	40.0	110	◇
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	47	
4.3	**Trade, competition, and market scale**	**58.1**	**87**	◇
4.3.1	Applied tariff rate, weighted avg., %	0.0	2	● ◆
4.3.2	Intensity of local competition†	61.2	105	◇
4.3.3	Domestic market scale, bn PPP$	35.9	114	◇

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**33.5**	**44**	
5.1	**Knowledge workers**	**56.9**	**[22]**	
5.1.1	Knowledge-intensive employment, % 🕘	40.7	25	
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, %	11.7	59	◇
5.2	**Innovation linkages**	**23.9**	**53**	
5.2.1	University/industry research collaboration†	39.4	78	◇
5.2.2	State of cluster development†	44.2	80	◇
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.1	35	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.2	46	
5.3	**Knowledge absorption**	**19.7**	**103**	◇
5.3.1	Intellectual property payments, % total trade 🕘	0.5	70	
5.3.2	High-tech imports, % total trade	4.4	115	○
5.3.3	ICT services imports, % total trade 🕘	0.8	88	
5.3.4	FDI net inflows, % GDP	2.1	81	
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**6.5**	**129**	○ ◇
6.1	**Knowledge creation**	**5.6**	**103**	◇
6.1.1	Patents by origin/bn PPP$ GDP	0.7	75	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	77	◇
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	4.3	95	◇
6.1.5	Citable documents H-index	3.3	119	○ ◇
6.2	**Knowledge impact**	**4.7**	**[125]**	
6.2.1	Growth rate of PPP$ GDP/worker, %	n/a	n/a	
6.2.2	New businesses/th pop. 15-64	2.4	53	
6.2.3	Computer software spending, % GDP	n/a	n/a	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	2.2	83	◇
6.2.5	High- and medium-high-tech manufacturing, % 🕘	2.7	106	○ ◇
6.3	**Knowledge diffusion**	**9.1**	**125**	○ ◇
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	High-tech net exports, % total trade	0.0	128	○ ◇
6.3.3	ICT services exports, % total trade 🕘	0.0	130	○ ◇
6.3.4	FDI net outflows, % GDP 🕘	2.1	35	
CREATIVE OUTPUTS		**16.5**	**89**	◇
7.1	**Intangible assets**	**19.6**	**93**	◇
7.1.1	Trademarks by origin/bn PPP$ GDP	5.5	116	○ ◇
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP 🕘	0.0	116	○
7.1.4	ICTs & organizational model creation†	47.5	90	◇
7.2	**Creative goods and services**	**2.6**	**[113]**	
7.2.1	Cultural & 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 & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing 🕘	0.5	89	○
7.2.5	Creative goods exports, % total trade	0.1	90	
7.3	**Online creativity**	**24.2**	**49**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	7.2	45	
7.3.2	Country-code TLDs/th pop. 15-69	0.9	88	◇
7.3.3	Wikipedia edits/mn pop. 15-69	66.2	46	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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

BULGARIA

GII 2020 rank

37

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
30	45	Upper middle	EUR	7.0	171.2	21,472.2	40

		Score/Value	Rank	
INSTITUTIONS		**69.1**	**48**	
1.1	**Political environment**	**60.7**	**56**	
1.1.1	Political and operational stability*	69.6	70	
1.1.2	Government effectiveness*	56.2	56	
1.2	**Regulatory environment**	**75.1**	**37**	◆
1.2.1	Regulatory quality*	57.0	43	◆
1.2.2	Rule of law*	45.9	65	
1.2.3	Cost of redundancy dismissal, salary weeks	8.6	16	●
1.3	**Business environment**	**71.6**	**64**	
1.3.1	Ease of starting a business*	85.4	86	○
1.3.2	Ease of resolving insolvency*	57.8	56	
HUMAN CAPITAL & RESEARCH		**31.0**	**64**	
2.1	**Education**	**43.5**	**73**	
2.1.1	Expenditure on education, % GDP 🕘	4.1	70	
2.1.2	Government funding/pupil, secondary, % GDP/cap 🕘	21.8	38	
2.1.3	School life expectancy, years	14.4	62	
2.1.4	PISA scales in reading, maths, & science	426.7	50	○
2.1.5	Pupil-teacher ratio, secondary 🕘	12.6	58	
2.2	**Tertiary education**	**37.4**	**54**	
2.2.1	Tertiary enrolment, % gross	71.0	26	◆
2.2.2	Graduates in science & engineering, %	20.5	70	○
2.2.3	Tertiary inbound mobility, %	5.5	40	
2.3	**Research & development (R&D)**	**12.1**	**51**	
2.3.1	Researchers, FTE/mn pop	2,339.8	37	◆
2.3.2	Gross expenditure on R&D, % GDP	0.8	48	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	5.0	68	
INFRASTRUCTURE		**53.2**	**30**	◆
3.1	**Information & communication technologies (ICTs)**	**76.2**	**44**	◆
3.1.1	ICT access*	71.3	58	
3.1.2	ICT use*	69.9	42	◆
3.1.3	Government's online service*	76.4	55	
3.1.4	E-participation*	87.1	35	
3.2	**General infrastructure**	**26.8**	**67**	
3.2.1	Electricity output, kWh/mn pop	6,348.6	32	◆
3.2.2	Logistics performance*	45.2	51	
3.2.3	Gross capital formation, % GDP	21.4	86	○
3.3	**Ecological sustainability**	**56.8**	**6**	● ◆
3.3.1	GDP/unit of energy use	6.8	92	○
3.3.2	Environmental performance*	57.0	39	◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	12.0	2	● ◆
MARKET SOPHISTICATION		**42.2**	**97**	○
4.1	**Credit**	**34.6**	**91**	○
4.1.1	Ease of getting credit*	65.0	61	
4.1.2	Domestic credit to private sector, % GDP	51.3	67	
4.1.3	Microfinance gross loans, % GDP	0.0	81	○
4.2	**Investment**	**28.0**	**102**	○
4.2.1	Ease of protecting minority investors*	74.0	24	
4.2.2	Market capitalization, % GDP 🕘	14.5	62	○
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	51	
4.3	**Trade, competition, and market scale**	**63.9**	**61**	
4.3.1	Applied tariff rate, weighted avg., %	1.7	22	
4.3.2	Intensity of local competition†	65.1	81	○
4.3.3	Domestic market scale, bn PPP$	171.2	72	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**34.3**	**40**	◆
5.1	**Knowledge workers**	**43.4**	**39**	
5.1.1	Knowledge-intensive employment, %	31.6	43	◆
5.1.2	Firms offering formal training, % 🕘	42.7	24	
5.1.3	GERD performed by business, % GDP	0.5	37	
5.1.4	GERD financed by business, %	43.2	39	
5.1.5	Females employed w/advanced degrees, %	19.1	32	◆
5.2	**Innovation linkages**	**26.9**	**40**	◆
5.2.1	University/industry research collaboration†	42.3	63	
5.2.2	State of cluster development†	52.8	41	
5.2.3	GERD financed by abroad, % GDP	0.2	14	● ◆
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	80	○
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.2	48	
5.3	**Knowledge absorption**	**32.7**	**49**	
5.3.1	Intellectual property payments, % total trade	0.5	64	
5.3.2	High-tech imports, % total trade	7.1	74	
5.3.3	ICT services imports, % total trade	1.1	68	
5.3.4	FDI net inflows, % GDP	2.7	62	
5.3.5	Research talent, % in business enterprise	48.5	26	◆
KNOWLEDGE & TECHNOLOGY OUTPUTS		**34.5**	**29**	◆
6.1	**Knowledge creation**	**19.9**	**50**	
6.1.1	Patents by origin/bn PPP$ GDP	1.3	57	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.3	43	
6.1.3	Utility models by origin/bn PPP$ GDP 🕘	1.7	13	●
6.1.4	Scientific & technical articles/bn PPP$ GDP	10.1	51	
6.1.5	Citable documents H-index	15.9	52	
6.2	**Knowledge impact**	**48.3**	**7**	● ◆
6.2.1	Growth rate of PPP$ GDP/worker, %	2.6	35	
6.2.2	New businesses/th pop. 15-64	10.1	14	● ◆
6.2.3	Computer software spending, % GDP	0.0	56	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	36.6	1	● ◆
6.2.5	High- and medium-high-tech manufacturing, %	23.5	47	
6.3	**Knowledge diffusion**	**35.3**	**30**	◆
6.3.1	Intellectual property receipts, % total trade	0.2	43	
6.3.2	High-tech net exports, % total trade	4.8	33	
6.3.3	ICT services exports, % total trade	3.4	25	◆
6.3.4	FDI net outflows, % GDP	1.3	49	
CREATIVE OUTPUTS		**33.5**	**37**	◆
7.1	**Intangible assets**	**43.8**	**21**	● ◆
7.1.1	Trademarks by origin/bn PPP$ GDP	91.9	16	●
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	5.8	23	●
7.1.4	ICTs & organizational model creation†	53.7	64	
7.2	**Creative goods and services**	**19.8**	**55**	
7.2.1	Cultural & creative services exports, % total trade	1.4	14	● ◆
7.2.2	National feature films/mn pop. 15-69	4.7	45	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.1	46	
7.2.5	Creative goods exports, % total trade	1.0	44	
7.3	**Online creativity**	**26.5**	**41**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	23.4	24	● ◆
7.3.2	Country-code TLDs/th pop. 15-69	3.7	59	
7.3.3	Wikipedia edits/mn pop. 15-69	74.3	33	◆
7.3.4	Mobile app creation/bn PPP$ GDP	6.1	52	

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

BURKINA FASO

GII 2020 rank

118

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
124	106	Low	SSF	20.3	42.2	1,813.5	117

		Score/Value	Rank	
INSTITUTIONS		**57.3**	**86**	
1.1	**Political environment**	**43.3**	**112**	
1.1.1	Political and operational stability*	55.4	116	
1.1.2	Government effectiveness*	37.2	105	
1.2	**Regulatory environment**	**64.2**	**68**	●
1.2.1	Regulatory quality*	31.6	100	
1.2.2	Rule of law*	35.1	93	
1.2.3	Cost of redundancy dismissal, salary weeks	10.5	33	●
1.3	**Business environment**	**64.5**	**85**	
1.3.1	Ease of starting a business*	88.2	71	●
1.3.2	Ease of resolving insolvency*	40.8	96	
HUMAN CAPITAL & RESEARCH		**18.1**	**102**	◆
2.1	**Education**	**35.8**	**94**	
2.1.1	Expenditure on education, % GDP	6.0	15	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	18.5	58	●
2.1.3	School life expectancy, years	9.3	111	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	23.1	104	
2.2	**Tertiary education**	**15.1**	**105**	
2.2.1	Tertiary enrolment, % gross	6.5	117	
2.2.2	Graduates in science & engineering, %	19.7	74	
2.2.3	Tertiary inbound mobility, %	2.7	70	
2.3	**Research & development (R&D)**	**3.6**	**83**	◆
2.3.1	Researchers, FTE/mn pop. 🕘	47.6	94	
2.3.2	Gross expenditure on R&D, % GDP 🕘	0.7	52	● ◆
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**26.4**	**111**	
3.1	**Information & communication technologies (ICTs)**	**41.0**	**107**	
3.1.1	ICT access*	32.9	118	
3.1.2	ICT use*	15.3	118	
3.1.3	Government's online service*	53.5	102	
3.1.4	E-participation*	62.4	85	
3.2	**General infrastructure**	**18.8**	**109**	
3.2.1	Electricity output, kWh/mn pop	n/a	n/a	
3.2.2	Logistics performance*	25.9	87	
3.2.3	Gross capital formation, % GDP	18.4	109	
3.3	**Ecological sustainability**	**19.5**	**105**	
3.3.1	GDP/unit of energy use	n/a	n/a	
3.3.2	Environmental performance*	38.3	93	◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.1	125	○
MARKET SOPHISTICATION		**36.9**	**113**	
4.1	**Credit**	**21.5**	**123**	
4.1.1	Ease of getting credit*	30.0	122	○
4.1.2	Domestic credit to private sector, % GDP	29.9	94	
4.1.3	Microfinance gross loans, % GDP	1.7	21	●
4.2	**Investment**	**42.0**	**[47]**	
4.2.1	Ease of protecting minority investors*	42.0	102	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**47.2**	**122**	
4.3.1	Applied tariff rate, weighted avg., %	7.8	102	
4.3.2	Intensity of local competition†	57.7	116	
4.3.3	Domestic market scale, bn PPP$	42.2	108	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**17.6**	**[116]**	
5.1	**Knowledge workers**	**10.2**	**[123]**	
5.1.1	Knowledge-intensive employment, %	n/a	n/a	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, % 🕘	11.9	73	◆
5.1.5	Females employed w/advanced degrees, % 🕘	0.5	116	○
5.2	**Innovation linkages**	**19.7**	**[70]**	
5.2.1	University/industry research collaboration†	30.2	110	
5.2.2	State of cluster development†	28.7	125	○ ◇
5.2.3	GERD financed by abroad, % GDP	0.0	58	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	n/a	n/a	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	n/a	n/a	
5.3	**Knowledge absorption**	**22.8**	**89**	
5.3.1	Intellectual property payments, % total trade 🕘	0.0	116	○
5.3.2	High-tech imports, % total trade	6.6	82	
5.3.3	ICT services imports, % total trade 🕘	2.2	24	●
5.3.4	FDI net inflows, % GDP	2.3	71	●
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**11.1**	**111**	
6.1	**Knowledge creation**	**5.5**	**105**	
6.1.1	Patents by origin/bn PPP$ GDP	0.2	105	
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	53	
6.1.4	Scientific & technical articles/bn PPP$ GDP	6.0	74	●
6.1.5	Citable documents H-index	5.6	98	
6.2	**Knowledge impact**	**15.9**	**94**	
6.2.1	Growth rate of PPP$ GDP/worker, %	3.0	27	●
6.2.2	New businesses/th pop. 15-64	0.3	107	
6.2.3	Computer software spending, % GDP	0.0	111	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.6	118	
6.2.5	High- and medium-high-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**12.0**	**107**	
6.3.1	Intellectual property receipts, % total trade 🕘	0.0	82	
6.3.2	High-tech net exports, % total trade	0.1	105	
6.3.3	ICT services exports, % total trade 🕘	1.2	75	
6.3.4	FDI net outflows, % GDP	0.3	83	
CREATIVE OUTPUTS		**6.3**	**[129]**	
7.1	**Intangible assets**	**11.8**	**124**	
7.1.1	Trademarks by origin/bn PPP$ GDP	5.3	117	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.2	104	
7.1.4	ICTs & organizational model creation†	39.5	113	
7.2	**Creative goods and services**	**1.7**	**[121]**	
7.2.1	Cultural & creative services exports, % total trade 🕘	0.2	69	
7.2.2	National feature films/mn pop. 15-69 🕘	0.5	100	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.0	117	
7.3	**Online creativity**	**0.0**	**[129]**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.1	125	○
7.3.2	Country-code TLDs/th pop. 15-69	0.0	125	○
7.3.3	Wikipedia edits/mn pop. 15-69	n/a	n/a	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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

CABO VERDE

GII 2020 rank

100

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
90	**99**	**Lower middle**	**SSF**	**0.5**	**4.3**	**6,747.9**	**n/a**

		Score/Value	Rank	
INSTITUTIONS		**56.9**	**87**	
1.1	**Political environment**	**64.4**	**48**	● ◆
1.1.1	Political and operational stability*	78.6	38	● ◆
1.1.2	Government effectiveness*	57.3	54	◆
1.2	**Regulatory environment**	**64.1**	**69**	◆
1.2.1	Regulatory quality*	35.4	90	
1.2.2	Rule of law*	58.3	45	● ◆
1.2.3	Cost of redundancy dismissal, salary weeks	17.4	73	
1.3	**Business environment**	**42.2**	**130**	○ ◇
1.3.1	Ease of starting a business*	84.5	93	
1.3.2	Ease of resolving insolvency*	0.0	129	○ ◇
HUMAN CAPITAL & RESEARCH		**19.4**	**96**	
2.1	**Education**	**42.8**	**74**	
2.1.1	Expenditure on education, % GDP 🕘	5.2	37	●
2.1.2	Government funding/pupil, secondary, % GDP/cap	19.7	50	
2.1.3	School life expectancy, years	12.7	84	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	15.4	77	
2.2	**Tertiary education**	**15.1**	**104**	
2.2.1	Tertiary enrolment, % gross	23.6	89	
2.2.2	Graduates in science & engineering, %	16.1	89	
2.2.3	Tertiary inbound mobility, %	1.4	82	
2.3	**Research & development (R&D)**	**0.4**	**114**	
2.3.1	Researchers, FTE/mn pop. 🕘	50.1	93	
2.3.2	Gross expenditure on R&D, % GDP 🕘	0.1	110	○ ◇
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**36.1**	**86**	
3.1	**Information & communication technologies (ICTs)**	**48.1**	**101**	
3.1.1	ICT access*	58.3	77	◆
3.1.2	ICT use*	42.9	93	
3.1.3	Government's online service*	48.6	107	
3.1.4	E-participation*	42.7	111	
3.2	**General infrastructure**	**42.9**	**[16]**	
3.2.1	Electricity output, kWh/mn pop	n/a	n/a	
3.2.2	Logistics performance*	n/a	n/a	
3.2.3	Gross capital formation, % GDP	37.5	14	● ◆
3.3	**Ecological sustainability**	**17.3**	**113**	
3.3.1	GDP/unit of energy use	n/a	n/a	
3.3.2	Environmental performance*	32.8	112	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	101	
MARKET SOPHISTICATION		**27.4**	**128**	○ ◇
4.1	**Credit**	**30.1**	**106**	
4.1.1	Ease of getting credit*	35.0	118	◇
4.1.2	Domestic credit to private sector, % GDP	59.6	58	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**24.0**	**[120]**	
4.2.1	Ease of protecting minority investors*	24.0	127	○ ◇
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**28.2**	**130**	○ ◇
4.3.1	Applied tariff rate, weighted avg., % 🕘	10.9	120	◇
4.3.2	Intensity of local competition†	56.1	120	○ ◇
4.3.3	Domestic market scale, bn PPP$	4.3	131	○ ◇

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**25.5**	**[65]**	
5.1	**Knowledge workers**	**26.2**	**[82]**	
5.1.1	Knowledge-intensive employment, %	17.6	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, %	9.3	70	
5.2	**Innovation linkages**	**24.5**	**[49]**	
5.2.1	University/industry research collaboration†	37.9	82	
5.2.2	State of cluster development†	42.3	87	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	n/a	n/a	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	101	○ ◇
5.3	**Knowledge absorption**	**25.9**	**74**	
5.3.1	Intellectual property payments, % total trade	0.6	61	
5.3.2	High-tech imports, % total trade	5.1	110	
5.3.3	ICT services imports, % total trade	1.9	30	● ◆
5.3.4	FDI net inflows, % GDP	6.5	18	● ◆
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**10.1**	**[117]**	
6.1	**Knowledge creation**	**5.7**	**[102]**	
6.1.1	Patents by origin/bn PPP$ GDP	0.7	73	
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	4.9	89	
6.1.5	Citable documents H-index	0.0	131	○ ◇
6.2	**Knowledge impact**	**10.5**	**[116]**	
6.2.1	Growth rate of PPP$ GDP/worker, %	n/a	n/a	
6.2.2	New businesses/th pop. 15-64	4.0	36	● ◆
6.2.3	Computer software spending, % GDP	n/a	n/a	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	5.2	53	◆
6.2.5	High- and medium-high-tech manufacturing, %	5.2	95	◇
6.3	**Knowledge diffusion**	**14.1**	**102**	
6.3.1	Intellectual property receipts, % total trade	0.0	96	
6.3.2	High-tech net exports, % total trade 🕘	0.0	130	○ ◇
6.3.3	ICT services exports, % total trade	2.1	52	
6.3.4	FDI net outflows, % GDP	0.8	63	
CREATIVE OUTPUTS		**19.2**	**[73]**	
7.1	**Intangible assets**	**31.3**	**44**	●
7.1.1	Trademarks by origin/bn PPP$ GDP	32.9	73	
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	7.7	17	●
7.1.4	ICTs & organizational model creation†	44.6	98	
7.2	**Creative goods and services**	**12.2**	**[71]**	
7.2.1	Cultural & creative services exports, % total trade	0.5	45	●
7.2.2	National feature films/mn pop. 15-69	n/a	n/a	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.8	19	●
7.2.5	Creative goods exports, % total trade 🕘	0.1	110	
7.3	**Online creativity**	**2.0**	**[121]**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	2.1	76	
7.3.2	Country-code TLDs/th pop. 15-69	1.8	71	
7.3.3	Wikipedia edits/mn pop. 15-69	n/a	n/a	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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

CAMBODIA

GII 2020 rank

110

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
101	**117**	**Lower middle**	**SEAO**	**16.5**	**76.9**	**4,072.2**	**98**

		Score/Value	Rank	
INSTITUTIONS		**50.0**	**112**	
1.1	**Political environment**	**49.4**	**90**	
1.1.1	Political and operational stability*	73.2	49	● ◆
1.1.2	Government effectiveness*	37.4	103	
1.2	**Regulatory environment**	**50.3**	**103**	
1.2.1	Regulatory quality*	28.5	104	
1.2.2	Rule of law*	17.6	126	○ ◇
1.2.3	Cost of redundancy dismissal, salary weeks	19.4	81	
1.3	**Business environment**	**50.5**	**127**	○ ◇
1.3.1	Ease of starting a business*	52.4	131	○ ◇
1.3.2	Ease of resolving insolvency*	48.5	74	
HUMAN CAPITAL & RESEARCH		**11.1**	**122**	◇
2.1	**Education**	**20.0**	**[127]**	
2.1.1	Expenditure on education, % GDP	2.2	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, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	21.9	102	
2.2	**Tertiary education**	**12.8**	**110**	
2.2.1	Tertiary enrolment, % gross	13.7	101	
2.2.2	Graduates in science & engineering, %	15.4	93	
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research & development (R&D)**	**0.6**	**111**	
2.3.1	Researchers, FTE/mn pop	30.4	102	
2.3.2	Gross expenditure on R&D, % GDP	0.1	102	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**23.1**	**120**	◇
3.1	**Information & communication technologies (ICTs)**	**32.7**	**117**	◇
3.1.1	ICT access*	46.8	95	
3.1.2	ICT use*	41.5	96	
3.1.3	Government's online service*	25.0	123	◇
3.1.4	E-participation*	17.4	126	○ ◇
3.2	**General infrastructure**	**17.6**	**114**	
3.2.1	Electricity output, kWh/mn pop	437.1	109	
3.2.2	Logistics performance*	23.9	94	
3.2.3	Gross capital formation, % GDP	23.5	64	
3.3	**Ecological sustainability**	**19.0**	**109**	
3.3.1	GDP/unit of energy use	7.1	88	
3.3.2	Environmental performance*	33.6	108	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.7	71	
MARKET SOPHISTICATION		**46.6**	**72**	
4.1	**Credit**	**66.4**	**11**	● ◆
4.1.1	Ease of getting credit*	80.0	23	●
4.1.2	Domestic credit to private sector, % GDP	99.6	24	● ◆
4.1.3	Microfinance gross loans, % GDP	38.3	2	● ◆
4.2	**Investment**	**25.6**	**114**	
4.2.1	Ease of protecting minority investors*	40.0	110	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	0.1	33	● ◆
4.3	**Trade, competition, and market scale**	**47.9**	**121**	
4.3.1	Applied tariff rate, weighted avg., %	9.8	113	
4.3.2	Intensity of local competition†	59.6	108	
4.3.3	Domestic market scale, bn PPP$	76.9	91	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**17.3**	**119**	
5.1	**Knowledge workers**	**11.8**	**121**	◇
5.1.1	Knowledge-intensive employment, %	5.3	114	◇
5.1.2	Firms offering formal training, %	22.2	66	
5.1.3	GERD performed by business, % GDP	0.0	82	
5.1.4	GERD financed by business, %	19.4	65	
5.1.5	Females employed w/advanced degrees, %	2.3	99	
5.2	**Innovation linkages**	**25.7**	**45**	● ◆
5.2.1	University/industry research collaboration†	36.7	91	
5.2.2	State of cluster development†	48.1	61	●
5.2.3	GERD financed by abroad, % GDP	0.0	53	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.1	36	● ◆
5.2.5	Patent families 2+ offices/bn PPP$ GDP	n/a	n/a	
5.3	**Knowledge absorption**	**14.3**	**129**	○ ◇
5.3.1	Intellectual property payments, % total trade	0.1	104	◇
5.3.2	High-tech imports, % total trade	2.8	127	○ ◇
5.3.3	ICT services imports, % total trade	0.8	85	
5.3.4	FDI net inflows, % GDP	12.6	7	● ◆
5.3.5	Research talent, % in business enterprise	4.3	73	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**13.2**	**96**	
6.1	**Knowledge creation**	**3.1**	**121**	
6.1.1	Patents by origin/bn PPP$ GDP	0.1	126	○
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	100	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	2.3	113	
6.1.5	Citable documents H-index	5.6	99	
6.2	**Knowledge impact**	**21.9**	**73**	
6.2.1	Growth rate of PPP$ GDP/worker, %	5.1	8	●
6.2.2	New businesses/th pop. 15-64	0.7	90	
6.2.3	Computer software spending, % GDP	0.0	113	◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	2.6	79	
6.2.5	High- and medium-high-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**14.6**	**97**	
6.3.1	Intellectual property receipts, % total trade	0.0	88	
6.3.2	High-tech net exports, % total trade	1.1	66	
6.3.3	ICT services exports, % total trade	0.3	108	
6.3.4	FDI net outflows, % GDP	0.5	78	
CREATIVE OUTPUTS		**13.4**	**102**	
7.1	**Intangible assets**	**21.6**	**88**	
7.1.1	Trademarks by origin/bn PPP$ GDP	34.2	71	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.2	105	
7.1.4	ICTs & organizational model creation†	60.6	41	● ◆
7.2	**Creative goods and services**	**7.2**	**[93]**	
7.2.1	Cultural & creative services exports, % total trade	n/a	n/a	
7.2.2	National feature films/mn pop. 15-69	3.2	57	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.4	66	
7.3	**Online creativity**	**3.1**	**116**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.8	100	
7.3.2	Country-code TLDs/th pop. 15-69	0.1	117	
7.3.3	Wikipedia edits/mn pop. 15-69	16.2	114	
7.3.4	Mobile app creation/bn PPP$ GDP	0.1	84	

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

CAMEROON

GII 2020 rank

119

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
119	120	Lower middle	SSF	25.9	100.9	3,453.0	115

		Score/Value	Rank	
INSTITUTIONS		**50.0**	**113**	
1.1	**Political environment**	**40.6**	**118**	◇
1.1.1	Political and operational stability*	57.1	110	
1.1.2	Government effectiveness*	32.3	120	
1.2	**Regulatory environment**	**48.1**	**109**	
1.2.1	Regulatory quality*	20.7	119	
1.2.2	Rule of law*	18.5	125	○ ◇
1.2.3	Cost of redundancy dismissal, salary weeks	19.9	83	
1.3	**Business environment**	**61.4**	**103**	
1.3.1	Ease of starting a business*	86.3	80	
1.3.2	Ease of resolving insolvency*	36.6	110	
HUMAN CAPITAL & RESEARCH		**17.4**	**103**	
2.1	**Education**	**31.4**	**103**	
2.1.1	Expenditure on education, % GDP	3.1	95	
2.1.2	Government funding/pupil, secondary, % GDP/cap.	17.8	62	
2.1.3	School life expectancy, years	12.1	91	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	19.3	95	
2.2	**Tertiary education**	**20.7**	**94**	
2.2.1	Tertiary enrolment, % gross	12.8	103	
2.2.2	Graduates in science & engineering, %	24.2	41	●
2.2.3	Tertiary inbound mobility, %	1.4	84	
2.3	**Research & development (R&D)**	**0.0**	**[121]**	
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 R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**24.1**	**117**	◇
3.1	**Information & communication technologies (ICTs)**	**30.9**	**121**	○ ◇
3.1.1	ICT access*	32.6	119	◇
3.1.2	ICT use*	12.5	125	○ ◇
3.1.3	Government's online service*	45.8	112	
3.1.4	E-participation*	32.6	117	◇
3.2	**General infrastructure**	**21.7**	**89**	
3.2.1	Electricity output, kWh/mn pop	340.8	112	
3.2.2	Logistics performance*	24.7	91	
3.2.3	Gross capital formation, % GDP	28.9	29	●
3.3	**Ecological sustainability**	**19.6**	**102**	
3.3.1	GDP/unit of energy use	8.6	71	
3.3.2	Environmental performance*	33.6	108	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	115	
MARKET SOPHISTICATION		**34.2**	**123**	○ ◇
4.1	**Credit**	**27.9**	**112**	
4.1.1	Ease of getting credit*	60.0	74	
4.1.2	Domestic credit to private sector, % GDP	15.2	117	
4.1.3	Microfinance gross loans, % GDP	0.7	28	●
4.2	**Investment**	**28.0**	**[103]**	
4.2.1	Ease of protecting minority investors*	28.0	123	○ ◇
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**46.6**	**125**	○ ◇
4.3.1	Applied tariff rate, weighted avg., %	12.7	127	○ ◇
4.3.2	Intensity of local competition†	63.2	89	
4.3.3	Domestic market scale, bn PPP$	100.9	81	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**20.3**	**100**	
5.1	**Knowledge workers**	**23.9**	**[86]**	
5.1.1	Knowledge-intensive employment, %	10.9	104	
5.1.2	Firms offering formal training, %	37.6	35	●
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, %	2.0	102	
5.2	**Innovation linkages**	**17.9**	**88**	
5.2.1	University/industry research collaboration†	40.5	71	●
5.2.2	State of cluster development†	40.0	97	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	111	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	81	
5.3	**Knowledge absorption**	**19.2**	**106**	
5.3.1	Intellectual property payments, % total trade	0.1	109	○ ◇
5.3.2	High-tech imports, % total trade	5.7	101	
5.3.3	ICT services imports, % total trade	1.1	67	●
5.3.4	FDI net inflows, % GDP	2.1	78	
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**13.4**	**94**	
6.1	**Knowledge creation**	**8.2**	**81**	
6.1.1	Patents by origin/bn PPP$ GDP	0.4	84	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	95	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	7.3	65	●
6.1.5	Citable documents H-index	7.3	89	
6.2	**Knowledge impact**	**17.0**	**[92]**	
6.2.1	Growth rate of PPP$ GDP/worker, %	0.8	64	● ◇
6.2.2	New businesses/th pop. 15-64	n/a	n/a	
6.2.3	Computer software spending, % GDP	0.0	76	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.6	117	◇
6.2.5	High- and medium-high-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**14.9**	**94**	
6.3.1	Intellectual property receipts, % total trade	0.0	89	
6.3.2	High-tech net exports, % total trade	0.2	98	
6.3.3	ICT services exports, % total trade	1.9	57	●
6.3.4	FDI net outflows, % GDP	0.1	107	
CREATIVE OUTPUTS		**8.2**	**123**	○ ◇
7.1	**Intangible assets**	**12.9**	**122**	○
7.1.1	Trademarks by origin/bn PPP$ GDP	6.1	115	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.4	89	
7.1.4	ICTs & organizational model creation†	42.4	107	
7.2	**Creative goods and services**	**3.8**	**[109]**	
7.2.1	Cultural & creative services exports, % total trade	0.3	59	●
7.2.2	National feature films/mn pop. 15-69	1.9	71	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.0	123	○
7.3	**Online creativity**	**3.2**	**115**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.2	119	
7.3.2	Country-code TLDs/th pop. 15-69	1.3	79	
7.3.3	Wikipedia edits/mn pop. 15-69	12.9	115	○ ◇
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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

CANADA

GII 2020 rank

17

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
22	9	High	NAC	37.4	1,899.9	44,284.8	17

		Score/Value	Rank	
INSTITUTIONS		**90.2**	**6**	●
1.1	**Political environment**	**88.2**	**12**	
1.1.1	Political and operational stability*	87.5	11	
1.1.2	Government effectiveness*	88.5	10	●
1.2	**Regulatory environment**	**92.7**	**9**	●
1.2.1	Regulatory quality*	85.7	14	
1.2.2	Rule of law*	92.8	12	
1.2.3	Cost of redundancy dismissal, salary weeks	10.0	29	
1.3	**Business environment**	**89.6**	**4**	●
1.3.1	Ease of starting a business*	98.2	3	● ◆
1.3.2	Ease of resolving insolvency*	81.0	12	
HUMAN CAPITAL & RESEARCH		**51.8**	**19**	
2.1	**Education**	**54.1**	**40**	
2.1.1	Expenditure on education, % GDP 🕘	5.3	32	
2.1.2	Government funding/pupil, secondary, % GDP/cap 🕘	18.3	59	○ ◇
2.1.3	School life expectancy, years	16.2	31	
2.1.4	PISA scales in reading, maths, & science	516.7	7	
2.1.5	Pupil-teacher ratio, secondary 🕘	9.7	28	
2.2	**Tertiary education**	**44.1**	**31**	
2.2.1	Tertiary enrolment, % gross	68.9	30	
2.2.2	Graduates in science & engineering, % 🕘	21.3	60	
2.2.3	Tertiary inbound mobility, %	12.9	13	
2.3	**Research & development (R&D)**	**57.2**	**18**	
2.3.1	Researchers, FTE/mn pop 🕘	4,263.8	24	
2.3.2	Gross expenditure on R&D, % GDP	1.5	23	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	67.7	17	
2.3.4	QS university ranking, average score top 3*	78.9	7	●
INFRASTRUCTURE		**53.3**	**29**	◇
3.1	**Information & communication technologies (ICTs)**	**85.3**	**22**	
3.1.1	ICT access*	79.6	30	
3.1.2	ICT use*	77.4	25	
3.1.3	Government's online service*	93.1	17	
3.1.4	E-participation*	91.0	27	
3.2	**General infrastructure**	**45.9**	**8**	●
3.2.1	Electricity output, kWh/mn pop	17,559.0	5	● ◆
3.2.2	Logistics performance*	77.7	20	
3.2.3	Gross capital formation, % GDP	22.6	71	○
3.3	**Ecological sustainability**	**28.7**	**66**	◇
3.3.1	GDP/unit of energy use	5.4	105	○ ◇
3.3.2	Environmental performance*	71.0	20	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.5	83	○ ◇
MARKET SOPHISTICATION		**78.5**	**3**	● ◆
4.1	**Credit**	**85.0**	**[4]**	
4.1.1	Ease of getting credit*	85.0	14	◆
4.1.2	Domestic credit to private sector, % GDP	n/a	n/a	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**73.0**	**6**	● ◆
4.2.1	Ease of protecting minority investors*	84.0	7	◆
4.2.2	Market capitalization, % GDP	129.1	6	●
4.2.3	Venture capital deals/bn PPP$ GDP	0.4	6	● ◆
4.3	**Trade, competition, and market scale**	**77.4**	**13**	
4.3.1	Applied tariff rate, weighted avg., %	1.5	17	
4.3.2	Intensity of local competition†	74.5	31	
4.3.3	Domestic market scale, bn PPP$	1,899.9	16	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**50.5**	**20**	
5.1	**Knowledge workers**	**48.3**	**28**	◇
5.1.1	Knowledge-intensive employment, % 🕘	43.7	20	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	0.8	29	◇
5.1.4	GERD financed by business, %	41.1	44	◇
5.1.5	Females employed w/advanced degrees, %	18.2	34	
5.2	**Innovation linkages**	**55.4**	**10**	●
5.2.1	University/industry research collaboration†	65.9	17	
5.2.2	State of cluster development†	63.8	21	
5.2.3	GERD financed by abroad, % GDP	0.1	29	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.3	1	● ◆
5.2.5	Patent families 2+ offices/bn PPP$ GDP	1.9	20	
5.3	**Knowledge absorption**	**47.7**	**21**	
5.3.1	Intellectual property payments, % total trade	2.2	10	
5.3.2	High-tech imports, % total trade	10.5	25	
5.3.3	ICT services imports, % total trade	0.9	83	○ ◇
5.3.4	FDI net inflows, % GDP	2.2	75	○
5.3.5	Research talent, % in business enterprise 🕘	56.7	16	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**39.1**	**21**	
6.1	**Knowledge creation**	**49.3**	**14**	
6.1.1	Patents by origin/bn PPP$ GDP	2.4	35	◇
6.1.2	PCT patents by origin/bn PPP$ GDP	1.4	22	◇
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	22.1	24	
6.1.5	Citable documents H-index	79.9	4	● ◆
6.2	**Knowledge impact**	**33.2**	**33**	
6.2.1	Growth rate of PPP$ GDP/worker, %	0.5	78	○
6.2.2	New businesses/th pop. 15-64	0.2	113	○ ◇
6.2.3	Computer software spending, % GDP	0.0	6	●
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	2.7	78	○ ◇
6.2.5	High- and medium-high-tech manufacturing, %	38.4	27	
6.3	**Knowledge diffusion**	**34.9**	**33**	
6.3.1	Intellectual property receipts, % total trade	0.8	20	
6.3.2	High-tech net exports, % total trade	5.4	30	
6.3.3	ICT services exports, % total trade	1.6	64	
6.3.4	FDI net outflows, % GDP	4.1	14	
CREATIVE OUTPUTS		**40.2**	**17**	
7.1	**Intangible assets**	**43.2**	**22**	
7.1.1	Trademarks by origin/bn PPP$ GDP	57.8	37	
7.1.2	Global brand value, top 5,000, % GDP	133.2	12	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.4	86	○
7.1.4	ICTs & organizational model creation†	77.0	11	
7.2	**Creative goods and services**	**24.0**	**39**	◇
7.2.1	Cultural & creative services exports, % total trade	0.8	34	
7.2.2	National feature films/mn pop. 15-69	3.4	54	
7.2.3	Entertainment & Media market/th pop. 15-69	60.1	10	
7.2.4	Printing and other media, % manufacturing	1.4	31	
7.2.5	Creative goods exports, % total trade	0.9	47	
7.3	**Online creativity**	**50.6**	**17**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	76.7	6	●
7.3.2	Country-code TLDs/th pop. 15-69	32.2	20	
7.3.3	Wikipedia edits/mn pop. 15-69	79.3	27	
7.3.4	Mobile app creation/bn PPP$ GDP	15.5	31	

NOTES: ● indicates a strength; ○ a weakness; ◆ a strength relative to the other top 25-ranked GII economies; ◇ a weakness relative to the other top 25-ranked GII economies; * an index; † a survey question. 🕘 indicates that the economy's data are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

CHILE

GII 2020 rank

54

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
66	41	High	LCN	19.0	502.8	22,975.6	51

		Score/Value	Rank	
INSTITUTIONS		**73.3**	**38**	
1.1	**Political environment**	**75.2**	**34**	
1.1.1	Political and operational stability*	76.8	43	
1.1.2	Government effectiveness*	74.4	29	
1.2	**Regulatory environment**	**69.0**	**50**	
1.2.1	Regulatory quality*	77.2	20	●
1.2.2	Rule of law*	75.7	25	●
1.2.3	Cost of redundancy dismissal, salary weeks	27.4	109	○ ◇
1.3	**Business environment**	**75.7**	**46**	
1.3.1	Ease of starting a business*	91.4	50	
1.3.2	Ease of resolving insolvency*	60.1	48	
HUMAN CAPITAL & RESEARCH		**33.1**	**55**	◇
2.1	**Education**	**47.9**	**61**	
2.1.1	Expenditure on education, % GDP 🕘	5.4	28	
2.1.2	Government funding/pupil, secondary, % GDP/cap	18.7	56	
2.1.3	School life expectancy, years	16.4	24	●
2.1.4	PISA scales in reading, maths, & science	437.8	46	
2.1.5	Pupil-teacher ratio, secondary 🕘	18.4	89	○ ◇
2.2	**Tertiary education**	**38.0**	**50**	
2.2.1	Tertiary enrolment, % gross	88.5	6	●
2.2.2	Graduates in science & engineering, %	20.5	71	
2.2.3	Tertiary inbound mobility, %	0.4	102	○ ◇
2.3	**Research & development (R&D)**	**13.4**	**50**	◇
2.3.1	Researchers, FTE/mn pop. 🕘	493.3	68	◇
2.3.2	Gross expenditure on R&D, % GDP 🕘	0.4	75	◇
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	40.9	32	
INFRASTRUCTURE		**46.4**	**51**	◇
3.1	**Information & communication technologies (ICTs)**	**76.2**	**43**	
3.1.1	ICT access*	72.0	55	◇
3.1.2	ICT use*	67.6	47	◇
3.1.3	Government's online service*	83.3	37	
3.1.4	E-participation*	82.0	46	
3.2	**General infrastructure**	**29.6**	**53**	
3.2.1	Electricity output, kWh/mn pop.	4,324.2	50	
3.2.2	Logistics performance*	58.5	33	
3.2.3	Gross capital formation, % GDP	23.2	68	
3.3	**Ecological sustainability**	**33.3**	**52**	
3.3.1	GDP/unit of energy use	10.2	52	
3.3.2	Environmental performance*	55.3	42	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.8	50	
MARKET SOPHISTICATION		**51.7**	**41**	
4.1	**Credit**	**45.1**	**52**	
4.1.1	Ease of getting credit*	55.0	88	○
4.1.2	Domestic credit to private sector, % GDP	116.6	19	●
4.1.3	Microfinance gross loans, % GDP	0.8	26	◆
4.2	**Investment**	**36.4**	**68**	
4.2.1	Ease of protecting minority investors*	66.0	50	
4.2.2	Market capitalization, % GDP	91.7	15	●
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	65	○
4.3	**Trade, competition, and market scale**	**73.5**	**23**	●
4.3.1	Applied tariff rate, weighted avg., %	0.5	5	● ◆
4.3.2	Intensity of local competition†	74.5	30	
4.3.3	Domestic market scale, bn PPP$	502.8	41	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**30.4**	**49**	
5.1	**Knowledge workers**	**37.1**	**54**	
5.1.1	Knowledge-intensive employment, %	26.4	55	◇
5.1.2	Firms offering formal training, % 🕘	57.5	8	● ◆
5.1.3	GERD performed by business, % GDP 🕘	0.1	57	◇
5.1.4	GERD financed by business, %	31.4	55	
5.1.5	Females employed w/advanced degrees, %	8.8	76	◇
5.2	**Innovation linkages**	**17.4**	**92**	◇
5.2.1	University/industry research collaboration†	41.2	66	
5.2.2	State of cluster development†	45.6	75	
5.2.3	GERD financed by abroad, % GDP	0.0	68	◇
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	72	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.2	44	
5.3	**Knowledge absorption**	**36.7**	**37**	
5.3.1	Intellectual property payments, % total trade	2.1	12	●
5.3.2	High-tech imports, % total trade	8.5	53	
5.3.3	ICT services imports, % total trade	0.7	95	○
5.3.4	FDI net inflows, % GDP	3.0	54	
5.3.5	Research talent, % in business enterprise 🕘	29.0	43	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**19.9**	**64**	◇
6.1	**Knowledge creation**	**17.4**	**57**	
6.1.1	Patents by origin/bn PPP$ GDP	0.8	69	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.5	34	
6.1.3	Utility models by origin/bn PPP$ GDP	0.2	43	
6.1.4	Scientific & technical articles/bn PPP$ GDP	14.0	38	
6.1.5	Citable documents H-index	24.0	37	
6.2	**Knowledge impact**	**27.6**	**52**	
6.2.1	Growth rate of PPP$ GDP/worker, %	0.6	74	
6.2.2	New businesses/th pop. 15-64	10.3	12	●
6.2.3	Computer software spending, % GDP	0.0	44	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	7.6	34	
6.2.5	High- and medium-high-tech manufacturing, %	21.4	53	
6.3	**Knowledge diffusion**	**14.6**	**98**	○ ◇
6.3.1	Intellectual property receipts, % total trade	0.1	65	
6.3.2	High-tech net exports, % total trade	0.8	71	
6.3.3	ICT services exports, % total trade	0.5	100	○
6.3.4	FDI net outflows, % GDP	1.8	41	
CREATIVE OUTPUTS		**21.6**	**61**	◇
7.1	**Intangible assets**	**29.6**	**53**	
7.1.1	Trademarks by origin/bn PPP$ GDP	68.3	29	
7.1.2	Global brand value, top 5,000, % GDP	43.6	37	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.1	109	○
7.1.4	ICTs & organizational model creation†	57.8	54	
7.2	**Creative goods and services**	**8.1**	**88**	◇
7.2.1	Cultural & creative services exports, % total trade	0.3	64	
7.2.2	National feature films/mn pop. 15-69	3.7	51	
7.2.3	Entertainment & Media market/th pop. 15-69	14.5	32	◇
7.2.4	Printing and other media, % manufacturing	0.7	79	○
7.2.5	Creative goods exports, % total trade	0.1	88	
7.3	**Online creativity**	**19.2**	**56**	◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	2.0	77	◇
7.3.2	Country-code TLDs/th pop. 15-69	13.2	36	
7.3.3	Wikipedia edits/mn pop. 15-69	61.5	51	
7.3.4	Mobile app creation/bn PPP$ GDP	2.2	64	

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

CHINA

GII 2020 rank

14

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
6	**26**	**Upper middle**	**SEAO**	**1,433.8**	**27,308.9**	**17,027.5**	**14**

		Score/Value	Rank	
INSTITUTIONS		**64.6**	**62**	
1.1	**Political environment**	**64.9**	**47**	◆
1.1.1	Political and operational stability*	73.2	49	
1.1.2	Government effectiveness*	60.8	45	◆
1.2	**Regulatory environment**	**50.7**	**102**	○
1.2.1	Regulatory quality*	38.2	82	
1.2.2	Rule of law*	41.4	72	
1.2.3	Cost of redundancy dismissal, salary weeks	27.4	109	○
1.3	**Business environment**	**78.1**	**39**	
1.3.1	Ease of starting a business*	94.1	25	◆
1.3.2	Ease of resolving insolvency*	62.1	46	
HUMAN CAPITAL & RESEARCH		**49.4**	**21**	◆
2.1	**Education**	**64.5**	**[12]**	
2.1.1	Expenditure on education, % GDP	n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	12.4	87	○ ◇
2.1.4	PISA scales in reading, maths, & science	579.0	1	● ◆
2.1.5	Pupil-teacher ratio, secondary	13.3	62	
2.2	**Tertiary education**	**25.0**	**83**	
2.2.1	Tertiary enrolment, % gross	50.6	58	
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	0.4	101	○ ◇
2.3	**Research & development (R&D)**	**58.8**	**16**	◆
2.3.1	Researchers, FTE/mn pop	1,307.1	48	
2.3.2	Gross expenditure on R&D, % GDP	2.2	13	◆
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	91.8	3	● ◆
2.3.4	QS university ranking, average score top 3*	83.8	3	● ◆
INFRASTRUCTURE		**52.1**	**36**	◆
3.1	**Information & communication technologies (ICTs)**	**75.8**	**45**	◆
3.1.1	ICT access*	61.5	71	
3.1.2	ICT use*	65.1	53	◆
3.1.3	Government's online service*	86.1	34	◆
3.1.4	E-participation*	90.5	29	◆
3.2	**General infrastructure**	**48.1**	**6**	◆
3.2.1	Electricity output, kWh/mn pop	4,762.1	45	
3.2.2	Logistics performance*	72.0	26	◆
3.2.3	Gross capital formation, % GDP	43.4	6	◆
3.3	**Ecological sustainability**	**32.5**	**54**	
3.3.1	GDP/unit of energy use	6.8	94	○
3.3.2	Environmental performance*	37.3	98	○ ◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	5.4	19	
MARKET SOPHISTICATION		**58.5**	**19**	◆
4.1	**Credit**	**53.1**	**25**	◆
4.1.1	Ease of getting credit*	60.0	74	
4.1.2	Domestic credit to private sector, % GDP	161.1	6	◆
4.1.3	Microfinance gross loans, % GDP	0.0	73	○
4.2	**Investment**	**37.1**	**66**	
4.2.1	Ease of protecting minority investors*	72.0	27	
4.2.2	Market capitalization, % GDP	61.3	24	
4.2.3	Venture capital deals/bn PPP$ GDP	0.1	32	
4.3	**Trade, competition, and market scale**	**85.3**	**3**	● ◆
4.3.1	Applied tariff rate, weighted avg., %	3.4	68	
4.3.2	Intensity of local competition†	74.4	32	◆
4.3.3	Domestic market scale, bn PPP$	27,308.9	1	● ◆

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**52.9**	**15**	◆
5.1	**Knowledge workers**	**77.9**	**[1]**	
5.1.1	Knowledge-intensive employment, %	n/a	n/a	
5.1.2	Firms offering formal training, %	79.2	1	● ◆
5.1.3	GERD performed by business, % GDP	1.7	12	◆
5.1.4	GERD financed by business, %	76.6	4	● ◆
5.1.5	Females employed w/advanced degrees, %	n/a	n/a	
5.2	**Innovation linkages**	**24.5**	**48**	◆
5.2.1	University/industry research collaboration†	56.5	29	◆
5.2.2	State of cluster development†	59.6	25	◆
5.2.3	GERD financed by abroad, % GDP	0.0	81	○
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	76	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	1.0	27	◆
5.3	**Knowledge absorption**	**56.3**	**6**	◆
5.3.1	Intellectual property payments, % total trade	1.2	28	
5.3.2	High-tech imports, % total trade	23.9	5	◆
5.3.3	ICT services imports, % total trade	0.9	78	
5.3.4	FDI net inflows, % GDP	1.5	100	○
5.3.5	Research talent, % in business enterprise	61.3	12	◆
KNOWLEDGE & TECHNOLOGY OUTPUTS		**55.1**	**7**	◆
6.1	**Knowledge creation**	**70.4**	**4**	● ◆
6.1.1	Patents by origin/bn PPP$ GDP	55.1	1	● ◆
6.1.2	PCT patents by origin/bn PPP$ GDP	2.2	15	◆
6.1.3	Utility models by origin/bn PPP$ GDP	81.6	1	● ◆
6.1.4	Scientific & technical articles/bn PPP$ GDP	13.8	39	
6.1.5	Citable documents H-index	57.0	13	◆
6.2	**Knowledge impact**	**50.4**	**6**	◆
6.2.1	Growth rate of PPP$ GDP/worker, %	6.6	2	● ◆
6.2.2	New businesses/th pop. 15-64	n/a	n/a	
6.2.3	Computer software spending, % GDP	0.0	23	◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	11.7	24	
6.2.5	High- and medium-high-tech manufacturing, %	46.4	13	◆
6.3	**Knowledge diffusion**	**44.5**	**21**	◆
6.3.1	Intellectual property receipts, % total trade	0.2	44	
6.3.2	High-tech net exports, % total trade	28.0	5	◆
6.3.3	ICT services exports, % total trade	1.8	61	
6.3.4	FDI net outflows, % GDP	1.3	48	
CREATIVE OUTPUTS		**47.0**	**12**	◆
7.1	**Intangible assets**	**72.1**	**1**	● ◆
7.1.1	Trademarks by origin/bn PPP$ GDP	281.9	1	● ◆
7.1.2	Global brand value, top 5,000, % GDP	118.3	17	◆
7.1.3	Industrial designs by origin/bn PPP$ GDP	27.3	1	● ◆
7.1.4	ICTs & organizational model creation†	59.7	46	◆
7.2	**Creative goods and services**	**39.7**	**12**	◆
7.2.1	Cultural & creative services exports, % total trade	0.5	46	
7.2.2	National feature films/mn pop. 15-69	0.8	93	○
7.2.3	Entertainment & Media market/th pop. 15-69	9.7	37	◆
7.2.4	Printing and other media, % manufacturing	0.8	72	○
7.2.5	Creative goods exports, % total trade	11.8	1	● ◆
7.3	**Online creativity**	**4.1**	**[113]**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	2.2	74	
7.3.2	Country-code TLDs/th pop. 15-69	6.1	47	
7.3.3	Wikipedia edits/mn pop. 15-69	n/a	n/a	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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

COLOMBIA

GII 2020 rank

68

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
74	56	Upper middle	LCN	50.3	783.0	13,567.9	67

		Score/Value	Rank	
INSTITUTIONS		**65.1**	**57**	
1.1	**Political environment**	**53.0**	**81**	
1.1.1	Political and operational stability*	62.5	92	○
1.1.2	Government effectiveness*	48.2	76	
1.2	**Regulatory environment**	**63.0**	**73**	
1.2.1	Regulatory quality*	50.4	55	
1.2.2	Rule of law*	36.0	87	
1.2.3	Cost of redundancy dismissal, salary weeks	16.7	66	
1.3	**Business environment**	**79.2**	**36**	
1.3.1	Ease of starting a business*	87.0	74	
1.3.2	Ease of resolving insolvency*	71.4	30	◆
HUMAN CAPITAL & RESEARCH		**25.9**	**82**	
2.1	**Education**	**36.7**	**89**	
2.1.1	Expenditure on education, % GDP	4.5	63	
2.1.2	Government funding/pupil, secondary, % GDP/cap	17.6	64	
2.1.3	School life expectancy, years	14.4	63	
2.1.4	PISA scales in reading, maths, & science	405.5	62	○
2.1.5	Pupil-teacher ratio, secondary	25.9	107	○ ◇
2.2	**Tertiary education**	**31.0**	**72**	
2.2.1	Tertiary enrolment, % gross	55.3	50	
2.2.2	Graduates in science & engineering, %	23.1	51	
2.2.3	Tertiary inbound mobility, %	0.2	107	○ ◇
2.3	**Research & development (R&D)**	**9.9**	**59**	
2.3.1	Researchers, FTE/mn pop. 🕘	88.0	90	○ ◇
2.3.2	Gross expenditure on R&D, % GDP	0.2	87	○
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	34.1	33	
INFRASTRUCTURE		**46.4**	**50**	
3.1	**Information & communication technologies (ICTs)**	**71.9**	**53**	
3.1.1	ICT access*	60.9	73	
3.1.2	ICT use*	46.3	81	
3.1.3	Government's online service*	88.2	30	◆
3.1.4	E-participation*	92.1	23	● ◆
3.2	**General infrastructure**	**21.7**	**88**	
3.2.1	Electricity output, kWh/mn pop.	1,609.4	86	
3.2.2	Logistics performance*	40.9	57	
3.2.3	Gross capital formation, % GDP	21.8	80	
3.3	**Ecological sustainability**	**45.5**	**29**	◆
3.3.1	GDP/unit of energy use	16.4	10	● ◆
3.3.2	Environmental performance*	52.9	48	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	3.8	27	●
MARKET SOPHISTICATION		**51.2**	**45**	
4.1	**Credit**	**49.7**	**35**	◆
4.1.1	Ease of getting credit*	90.0	10	● ◆
4.1.2	Domestic credit to private sector, % GDP	50.2	69	
4.1.3	Microfinance gross loans, % GDP	1.8	16	●
4.2	**Investment**	**32.2**	**87**	
4.2.1	Ease of protecting minority investors*	80.0	13	● ◆
4.2.2	Market capitalization, % GDP	35.7	41	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	72	○
4.3	**Trade, competition, and market scale**	**71.8**	**32**	
4.3.1	Applied tariff rate, weighted avg., %	3.3	67	
4.3.2	Intensity of local competition†	75.0	28	● ◆
4.3.3	Domestic market scale, bn PPP$	783.0	31	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**29.8**	**52**	
5.1	**Knowledge workers**	**46.0**	**33**	◆
5.1.1	Knowledge-intensive employment, %	n/a	n/a	
5.1.2	Firms offering formal training, % 🕘	63.0	6	● ◆
5.1.3	GERD performed by business, % GDP	0.1	61	
5.1.4	GERD financed by business, %	49.1	30	
5.1.5	Females employed w/advanced degrees, %	14.1	49	
5.2	**Innovation linkages**	**15.5**	**108**	○
5.2.1	University/industry research collaboration†	42.6	61	
5.2.2	State of cluster development†	43.2	83	
5.2.3	GERD financed by abroad, % GDP	0.0	95	○
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	85	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	73	
5.3	**Knowledge absorption**	**27.8**	**68**	
5.3.1	Intellectual property payments, % total trade	0.9	43	
5.3.2	High-tech imports, % total trade	13.4	17	●
5.3.3	ICT services imports, % total trade	1.4	51	
5.3.4	FDI net inflows, % GDP	4.3	35	
5.3.5	Research talent, % in business enterprise 🕘	2.4	75	○ ◇
KNOWLEDGE & TECHNOLOGY OUTPUTS		**17.9**	**72**	
6.1	**Knowledge creation**	**9.4**	**78**	
6.1.1	Patents by origin/bn PPP$ GDP	0.6	80	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.2	52	
6.1.3	Utility models by origin/bn PPP$ GDP	0.2	45	
6.1.4	Scientific & technical articles/bn PPP$ GDP	5.4	83	
6.1.5	Citable documents H-index	17.4	46	
6.2	**Knowledge impact**	**27.8**	**50**	
6.2.1	Growth rate of PPP$ GDP/worker, %	2.2	44	
6.2.2	New businesses/th pop. 15-64	2.0	55	
6.2.3	Computer software spending, % GDP	0.0	74	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	13.5	21	●
6.2.5	High- and medium-high-tech manufacturing, %	20.2	56	
6.3	**Knowledge diffusion**	**16.5**	**88**	
6.3.1	Intellectual property receipts, % total trade	0.1	51	
6.3.2	High-tech net exports, % total trade	1.0	68	
6.3.3	ICT services exports, % total trade	0.7	90	
6.3.4	FDI net outflows, % GDP	1.4	45	
CREATIVE OUTPUTS		**18.2**	**80**	
7.1	**Intangible assets**	**23.9**	**78**	
7.1.1	Trademarks by origin/bn PPP$ GDP	34.8	70	
7.1.2	Global brand value, top 5,000, % GDP	37.9	40	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.4	88	
7.1.4	ICTs & organizational model creation†	54.5	62	
7.2	**Creative goods and services**	**7.8**	**90**	
7.2.1	Cultural & creative services exports, % total trade	0.2	67	
7.2.2	National feature films/mn pop. 15-69	1.4	77	
7.2.3	Entertainment & Media market/th pop. 15-69	7.2	44	
7.2.4	Printing and other media, % manufacturing	1.3	33	
7.2.5	Creative goods exports, % total trade	0.2	76	
7.3	**Online creativity**	**16.9**	**63**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	2.8	66	
7.3.2	Country-code TLDs/th pop. 15-69	20.0	29	
7.3.3	Wikipedia edits/mn pop. 15-69	46.3	69	
7.3.4	Mobile app creation/bn PPP$ GDP	1.6	65	

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

COSTA RICA

GII 2020 rank

56

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
51	66	Upper middle	LCN	5.0	91.6	15,747.5	55

		Score/Value	Rank	
INSTITUTIONS		**62.6**	**66**	
1.1	**Political environment**	**62.9**	**50**	
1.1.1	Political and operational stability*	71.4	59	
1.1.2	Government effectiveness*	58.6	48	
1.2	**Regulatory environment**	**67.8**	**56**	
1.2.1	Regulatory quality*	54.4	48	
1.2.2	Rule of law*	59.1	42	◆
1.2.3	Cost of redundancy dismissal, salary weeks	18.7	76	
1.3	**Business environment**	**57.3**	**112**	○ ◇
1.3.1	Ease of starting a business*	79.9	110	○
1.3.2	Ease of resolving insolvency*	34.6	114	○ ◇
HUMAN CAPITAL & RESEARCH		**30.0**	**66**	
2.1	**Education**	**54.7**	**37**	
2.1.1	Expenditure on education, % GDP	7.0	6	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	21.1	45	
2.1.3	School life expectancy, years	15.9	37	
2.1.4	PISA scales in reading, maths, & science	414.8	59	
2.1.5	Pupil-teacher ratio, secondary	12.4	57	
2.2	**Tertiary education**	**28.1**	**78**	
2.2.1	Tertiary enrolment, % gross	55.2	51	
2.2.2	Graduates in science & engineering, %	15.5	92	○ ◇
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research & development (R&D)**	**7.2**	**67**	
2.3.1	Researchers, FTE/mn pop. 🕘	380.4	73	
2.3.2	Gross expenditure on R&D, % GDP 🕘	0.4	71	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	15.9	56	
INFRASTRUCTURE		**41.1**	**62**	
3.1	**Information & communication technologies (ICTs)**	**69.4**	**58**	
3.1.1	ICT access*	66.8	64	
3.1.2	ICT use*	66.4	50	◆
3.1.3	Government's online service*	67.4	75	
3.1.4	E-participation*	77.0	57	
3.2	**General infrastructure**	**18.0**	**113**	○
3.2.1	Electricity output, kWh/mn pop.	2,303.2	74	
3.2.2	Logistics performance*	33.9	72	
3.2.3	Gross capital formation, % GDP	18.3	110	○
3.3	**Ecological sustainability**	**36.0**	**46**	
3.3.1	GDP/unit of energy use	14.9	13	● ◆
3.3.2	Environmental performance*	52.5	50	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.9	63	
MARKET SOPHISTICATION		**42.1**	**98**	
4.1	**Credit**	**44.9**	**53**	
4.1.1	Ease of getting credit*	85.0	14	●
4.1.2	Domestic credit to private sector, % GDP	62.6	54	
4.1.3	Microfinance gross loans, % GDP	0.1	64	
4.2	**Investment**	**17.2**	**128**	○ ◇
4.2.1	Ease of protecting minority investors*	48.0	96	
4.2.2	Market capitalization, % GDP 🕘	5.1	69	○
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	66	
4.3	**Trade, competition, and market scale**	**64.3**	**55**	
4.3.1	Applied tariff rate, weighted avg., %	1.8	53	
4.3.2	Intensity of local competition†	72.9	39	
4.3.3	Domestic market scale, bn PPP$	91.6	86	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**31.1**	**48**	
5.1	**Knowledge workers**	**29.9**	**66**	
5.1.1	Knowledge-intensive employment, % 🕘	27.4	52	
5.1.2	Firms offering formal training, % 🕘	54.7	11	● ◆
5.1.3	GERD performed by business, % GDP 🕘	0.1	56	
5.1.4	GERD financed by business, %	3.7	88	○ ◇
5.1.5	Females employed w/advanced degrees, %	11.6	60	
5.2	**Innovation linkages**	**18.0**	**87**	
5.2.1	University/industry research collaboration†	42.5	62	
5.2.2	State of cluster development†	47.9	62	
5.2.3	GERD financed by abroad, % GDP	0.0	63	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	70	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	76	
5.3	**Knowledge absorption**	**45.4**	**23**	● ◆
5.3.1	Intellectual property payments, % total trade	2.8	7	● ◆
5.3.2	High-tech imports, % total trade	8.9	50	
5.3.3	ICT services imports, % total trade	1.5	44	
5.3.4	FDI net inflows, % GDP	4.7	31	
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**24.4**	**53**	
6.1	**Knowledge creation**	**6.8**	**91**	
6.1.1	Patents by origin/bn PPP$ GDP	0.1	120	○
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	57	
6.1.3	Utility models by origin/bn PPP$ GDP	0.2	49	
6.1.4	Scientific & technical articles/bn PPP$ GDP	5.3	84	
6.1.5	Citable documents H-index	10.9	70	
6.2	**Knowledge impact**	**21.2**	**78**	
6.2.1	Growth rate of PPP$ GDP/worker, %	-0.3	98	○
6.2.2	New businesses/th pop. 15-64	2.6	50	
6.2.3	Computer software spending, % GDP	0.0	47	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	2.8	77	
6.2.5	High- and medium-high-tech manufacturing, % 🕘	25.6	43	
6.3	**Knowledge diffusion**	**45.3**	**19**	● ◆
6.3.1	Intellectual property receipts, % total trade	0.0	75	
6.3.2	High-tech net exports, % total trade	5.7	28	●
6.3.3	ICT services exports, % total trade	6.2	6	● ◆
6.3.4	FDI net outflows, % GDP	0.8	64	
CREATIVE OUTPUTS		**26.8**	**53**	
7.1	**Intangible assets**	**28.4**	**62**	
7.1.1	Trademarks by origin/bn PPP$ GDP	79.7	22	●
7.1.2	Global brand value, top 5,000, % GDP	2.6	75	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.1	110	○
7.1.4	ICTs & organizational model creation†	63.0	36	◆
7.2	**Creative goods and services**	**31.2**	**23**	● ◆
7.2.1	Cultural & creative services exports, % total trade 🕘	3.7	1	● ◆
7.2.2	National feature films/mn pop. 15-69	3.6	52	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing 🕘	2.2	12	● ◆
7.2.5	Creative goods exports, % total trade	0.1	96	
7.3	**Online creativity**	**19.3**	**55**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	11.2	37	◆
7.3.2	Country-code TLDs/th pop. 15-69	1.5	75	
7.3.3	Wikipedia edits/mn pop. 15-69	59.5	53	
7.3.4	Mobile app creation/bn PPP$ GDP	7.3	50	

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

CROATIA

GII 2020 rank

41

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
43	44	High	EUR	4.1	112.6	24,207.9	44

		Score/Value	Rank	
INSTITUTIONS		**69.1**	**47**	
1.1	**Political environment**	**66.4**	**43**	◇
1.1.1	Political and operational stability*	78.6	38	
1.1.2	Government effectiveness*	60.4	46	◇
1.2	**Regulatory environment**	**70.1**	**46**	
1.2.1	Regulatory quality*	53.6	50	◇
1.2.2	Rule of law*	55.1	50	◇
1.2.3	Cost of redundancy dismissal, salary weeks	15.1	59	
1.3	**Business environment**	**70.9**	**68**	
1.3.1	Ease of starting a business*	85.3	87	○ ◇
1.3.2	Ease of resolving insolvency*	56.5	58	
HUMAN CAPITAL & RESEARCH		**36.5**	**47**	
2.1	**Education**	**56.2**	**30**	●
2.1.1	Expenditure on education, % GDP 🕘	4.6	61	
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	15.2	45	
2.1.4	PISA scales in reading, maths, & science	471.9	37	
2.1.5	Pupil-teacher ratio, secondary 🕘	6.7	1	● ◆
2.2	**Tertiary education**	**41.3**	**39**	
2.2.1	Tertiary enrolment, % gross	67.9	33	
2.2.2	Graduates in science & engineering, %	27.0	28	
2.2.3	Tertiary inbound mobility, %	2.9	66	◇
2.3	**Research & development (R&D)**	**11.8**	**53**	◇
2.3.1	Researchers, FTE/mn pop	1,921.1	41	
2.3.2	Gross expenditure on R&D, % GDP	1.0	38	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	5.0	69	◇
INFRASTRUCTURE		**51.1**	**39**	
3.1	**Information & communication technologies (ICTs)**	**72.2**	**52**	◇
3.1.1	ICT access*	77.2	35	
3.1.2	ICT use*	66.7	49	◇
3.1.3	Government's online service*	68.1	74	◇
3.1.4	E-participation*	77.0	57	
3.2	**General infrastructure**	**24.5**	**76**	◇
3.2.1	Electricity output, kWh/mn pop	2,853.1	64	◇
3.2.2	Logistics performance*	48.5	48	
3.2.3	Gross capital formation, % GDP	21.4	84	○
3.3	**Ecological sustainability**	**56.7**	**7**	● ◆
3.3.1	GDP/unit of energy use	10.3	51	
3.3.2	Environmental performance*	63.1	34	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	9.6	5	● ◆
MARKET SOPHISTICATION		**46.4**	**73**	
4.1	**Credit**	**36.8**	**81**	
4.1.1	Ease of getting credit*	50.0	94	○
4.1.2	Domestic credit to private sector, % GDP	55.9	61	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**43.6**	**41**	
4.2.1	Ease of protecting minority investors*	70.0	36	
4.2.2	Market capitalization, % GDP	38.0	39	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**59.0**	**79**	◇
4.3.1	Applied tariff rate, weighted avg., %	1.7	22	
4.3.2	Intensity of local competition†	57.1	117	○ ◇
4.3.3	Domestic market scale, bn PPP$	112.6	78	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**28.3**	**56**	◇
5.1	**Knowledge workers**	**39.6**	**46**	
5.1.1	Knowledge-intensive employment, %	37.0	33	
5.1.2	Firms offering formal training, %	26.2	59	○
5.1.3	GERD performed by business, % GDP	0.5	38	
5.1.4	GERD financed by business, %	42.6	41	
5.1.5	Females employed w/advanced degrees, %	17.6	36	
5.2	**Innovation linkages**	**16.6**	**98**	○ ◇
5.2.1	University/industry research collaboration†	28.3	118	○ ◇
5.2.2	State of cluster development†	30.7	122	○ ◇
5.2.3	GERD financed by abroad, % GDP	0.1	41	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	44	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.2	49	
5.3	**Knowledge absorption**	**28.7**	**63**	
5.3.1	Intellectual property payments, % total trade	1.1	34	
5.3.2	High-tech imports, % total trade	6.5	83	○
5.3.3	ICT services imports, % total trade	1.6	41	
5.3.4	FDI net inflows, % GDP	3.1	48	
5.3.5	Research talent, % in business enterprise	22.7	53	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**28.6**	**43**	
6.1	**Knowledge creation**	**24.3**	**43**	
6.1.1	Patents by origin/bn PPP$ GDP	1.3	59	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.4	38	
6.1.3	Utility models by origin/bn PPP$ GDP	0.6	34	
6.1.4	Scientific & technical articles/bn PPP$ GDP	24.9	17	●
6.1.5	Citable documents H-index	17.3	48	
6.2	**Knowledge impact**	**30.6**	**39**	
6.2.1	Growth rate of PPP$ GDP/worker, %	1.1	62	
6.2.2	New businesses/th pop. 15-64	5.9	28	●
6.2.3	Computer software spending, % GDP	0.0	98	○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	21.8	10	● ◆
6.2.5	High- and medium-high-tech manufacturing, %	21.0	54	
6.3	**Knowledge diffusion**	**30.9**	**42**	
6.3.1	Intellectual property receipts, % total trade	0.2	37	
6.3.2	High-tech net exports, % total trade	3.3	43	
6.3.3	ICT services exports, % total trade	3.0	34	●
6.3.4	FDI net outflows, % GDP	0.4	79	
CREATIVE OUTPUTS		**27.9**	**49**	
7.1	**Intangible assets**	**30.9**	**47**	
7.1.1	Trademarks by origin/bn PPP$ GDP	35.1	69	
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	4.0	31	●
7.1.4	ICTs & organizational model creation†	51.9	73	◇
7.2	**Creative goods and services**	**24.2**	**38**	
7.2.1	Cultural & creative services exports, % total trade	1.5	13	●
7.2.2	National feature films/mn pop. 15-69	2.0	67	◇
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	2.6	7	● ◆
7.2.5	Creative goods exports, % total trade	0.9	49	
7.3	**Online creativity**	**25.5**	**43**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	14.5	32	●
7.3.2	Country-code TLDs/th pop. 15-69	11.2	39	
7.3.3	Wikipedia edits/mn pop. 15-69	69.9	40	
7.3.4	Mobile app creation/bn PPP$ GDP	7.9	48	

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

CÔTE D'IVOIRE

GII 2020 rank

112

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
115	**105**	**Lower middle**	**SSF**	**25.7**	**117.1**	**3,891.2**	**103**

		Score/Value	Rank	
INSTITUTIONS		**59.5**	**79**	
1.1	**Political environment**	**45.8**	**102**	
1.1.1	Political and operational stability*	62.5	92	
1.1.2	Government effectiveness*	37.4	104	
1.2	**Regulatory environment**	**62.1**	**74**	◆
1.2.1	Regulatory quality*	36.8	85	
1.2.2	Rule of law*	31.6	99	
1.2.3	Cost of redundancy dismissal, salary weeks	13.1	46	●
1.3	**Business environment**	**70.8**	**69**	●
1.3.1	Ease of starting a business*	93.7	27	● ◆
1.3.2	Ease of resolving insolvency*	47.9	77	
HUMAN CAPITAL & RESEARCH		**12.2**	**117**	◇
2.1	**Education**	**28.9**	**109**	
2.1.1	Expenditure on education, % GDP	4.4	65	
2.1.2	Government funding/pupil, secondary, % GDP/cap	18.3	60	
2.1.3	School life expectancy, years	10.0	110	◇
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	27.3	113	◇
2.2	**Tertiary education**	**7.3**	**118**	◇
2.2.1	Tertiary enrolment, % gross	9.3	112	
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	2.2	76	
2.3	**Research & development (R&D)**	**0.5**	**113**	
2.3.1	Researchers, FTE/mn pop	n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP 🕘	0.1	108	○
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**22.4**	**121**	◇
3.1	**Information & communication technologies (ICTs)**	**27.8**	**125**	○ ◇
3.1.1	ICT access*	37.6	109	
3.1.2	ICT use*	33.9	102	
3.1.3	Government's online service*	22.2	125	○ ◇
3.1.4	E-participation*	17.4	126	○ ◇
3.2	**General infrastructure**	**22.5**	**84**	
3.2.1	Electricity output, kWh/mn pop	421.9	110	
3.2.2	Logistics performance*	47.5	49	● ◆
3.2.3	Gross capital formation, % GDP	22.1	78	
3.3	**Ecological sustainability**	**16.9**	**118**	◇
3.3.1	GDP/unit of energy use	8.2	77	
3.3.2	Environmental performance*	25.8	128	○ ◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.3	95	
MARKET SOPHISTICATION		**42.6**	**92**	
4.1	**Credit**	**32.6**	**100**	
4.1.1	Ease of getting credit*	70.0	44	●
4.1.2	Domestic credit to private sector, % GDP	26.2	101	
4.1.3	Microfinance gross loans, % GDP	0.3	44	●
4.2	**Investment**	**42.0**	**[47]**	
4.2.1	Ease of protecting minority investors*	42.0	102	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**53.3**	**101**	
4.3.1	Applied tariff rate, weighted avg., %	10.2	116	◇
4.3.2	Intensity of local competition†	70.2	57	●
4.3.3	Domestic market scale, bn PPP$	117.1	76	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**19.7**	**101**	
5.1	**Knowledge workers**	**21.9**	**[95]**	
5.1.1	Knowledge-intensive employment, % 🕘	10.3	106	
5.1.2	Firms offering formal training, % 🕘	35.5	40	●
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	107	
5.2	**Innovation linkages**	**15.9**	**104**	
5.2.1	University/industry research collaboration†	30.8	108	
5.2.2	State of cluster development†	38.3	102	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	110	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	101	○ ◇
5.3	**Knowledge absorption**	**21.3**	**95**	
5.3.1	Intellectual property payments, % total trade 🕘	0.0	115	○ ◇
5.3.2	High-tech imports, % total trade	6.1	95	
5.3.3	ICT services imports, % total trade 🕘	1.9	32	● ◆
5.3.4	FDI net inflows, % GDP	2.1	79	
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**13.1**	**98**	
6.1	**Knowledge creation**	**3.5**	**118**	
6.1.1	Patents by origin/bn PPP$ GDP	0.2	98	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	96	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	2.0	119	
6.1.5	Citable documents H-index	6.3	94	
6.2	**Knowledge impact**	**20.3**	**82**	
6.2.1	Growth rate of PPP$ GDP/worker, %	4.8	11	●
6.2.2	New businesses/th pop. 15-64	0.7	89	
6.2.3	Computer software spending, % GDP	0.0	119	○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.7	87	
6.2.5	High- and medium-high-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**15.4**	**92**	
6.3.1	Intellectual property receipts, % total trade 🕘	0.0	91	
6.3.2	High-tech net exports, % total trade	0.6	76	
6.3.3	ICT services exports, % total trade 🕘	1.2	78	
6.3.4	FDI net outflows, % GDP	1.3	47	●
CREATIVE OUTPUTS		**9.3**	**116**	
7.1	**Intangible assets**	**16.7**	**106**	
7.1.1	Trademarks by origin/bn PPP$ GDP	11.0	108	
7.1.2	Global brand value, top 5,000, % GDP	5.5	68	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.9	74	
7.1.4	ICTs & organizational model creation†	50.3	81	
7.2	**Creative goods and services**	**0.9**	**[127]**	
7.2.1	Cultural & 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 & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.0	113	
7.3	**Online creativity**	**2.9**	**117**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.4	112	
7.3.2	Country-code TLDs/th pop. 15-69	0.2	110	
7.3.3	Wikipedia edits/mn pop. 15-69	12.8	116	○ ◇
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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

CYPRUS

GII 2020 rank

29

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
26	30	High	NAWA	1.2	36.3	36,149.4	28

		Score/Value	Rank	
INSTITUTIONS		**80.0**	**27**	
1.1	**Political environment**	**73.9**	**36**	
1.1.1	Political and operational stability*	80.4	33	
1.1.2	Government effectiveness*	70.7	36	
1.2	**Regulatory environment**	**83.7**	**21**	
1.2.1	Regulatory quality*	68.6	32	
1.2.2	Rule of law*	66.3	35	
1.2.3	Cost of redundancy dismissal, salary weeks	8.0	1	● ◆
1.3	**Business environment**	**82.3**	**26**	
1.3.1	Ease of starting a business*	92.0	45	
1.3.2	Ease of resolving insolvency*	72.5	29	
HUMAN CAPITAL & RESEARCH		**39.3**	**40**	
2.1	**Education**	**63.4**	**13**	◆
2.1.1	Expenditure on education, % GDP 🕘	6.3	11	◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	39.3	4	● ◆
2.1.3	School life expectancy, years	15.2	48	
2.1.4	PISA scales in reading, maths, & science	438.0	45	
2.1.5	Pupil-teacher ratio, secondary 🕘	8.3	14	◆
2.2	**Tertiary education**	**48.0**	**20**	
2.2.1	Tertiary enrolment, % gross	75.9	23	
2.2.2	Graduates in science & engineering, %	15.0	97	○ ◇
2.2.3	Tertiary inbound mobility, %	23.1	1	● ◆
2.3	**Research & development (R&D)**	**6.5**	**72**	◇
2.3.1	Researchers, FTE/mn pop	1,255.9	49	◇
2.3.2	Gross expenditure on R&D, % GDP	0.6	59	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**53.6**	**27**	
3.1	**Information & communication technologies (ICTs)**	**81.4**	**28**	
3.1.1	ICT access*	83.4	17	
3.1.2	ICT use*	81.6	17	
3.1.3	Government's online service*	78.5	52	
3.1.4	E-participation*	82.0	46	
3.2	**General infrastructure**	**27.1**	**63**	◇
3.2.1	Electricity output, kWh/mn pop	5,819.0	34	
3.2.2	Logistics performance*	50.7	44	
3.2.3	Gross capital formation, % GDP	20.6	93	○
3.3	**Ecological sustainability**	**52.4**	**18**	
3.3.1	GDP/unit of energy use	12.5	29	
3.3.2	Environmental performance*	64.8	31	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	6.7	12	◆
MARKET SOPHISTICATION		**50.9**	**49**	
4.1	**Credit**	**62.0**	**14**	
4.1.1	Ease of getting credit*	60.0	74	
4.1.2	Domestic credit to private sector, % GDP	142.3	12	◆
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**28.7**	**98**	○
4.2.1	Ease of protecting minority investors*	76.0	21	
4.2.2	Market capitalization, % GDP	12.6	65	○
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	48	
4.3	**Trade, competition, and market scale**	**61.9**	**69**	
4.3.1	Applied tariff rate, weighted avg., %	1.7	22	
4.3.2	Intensity of local competition†	76.0	20	
4.3.3	Domestic market scale, bn PPP$	36.3	113	○ ◇

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**42.0**	**28**	
5.1	**Knowledge workers**	**41.4**	**42**	
5.1.1	Knowledge-intensive employment, %	35.6	37	
5.1.2	Firms offering formal training, %	39.7	30	
5.1.3	GERD performed by business, % GDP	0.2	51	
5.1.4	GERD financed by business, %	32.8	53	
5.1.5	Females employed w/advanced degrees, %	25.1	14	
5.2	**Innovation linkages**	**44.4**	**19**	
5.2.1	University/industry research collaboration†	39.7	75	◇
5.2.2	State of cluster development†	48.2	59	
5.2.3	GERD financed by abroad, % GDP	0.1	32	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.3	4	● ◆
5.2.5	Patent families 2+ offices/bn PPP$ GDP	1.8	22	
5.3	**Knowledge absorption**	**40.3**	**30**	
5.3.1	Intellectual property payments, % total trade	0.9	42	
5.3.2	High-tech imports, % total trade	3.9	124	○ ◇
5.3.3	ICT services imports, % total trade	6.7	1	● ◆
5.3.4	FDI net inflows, % GDP	47.6	1	● ◆
5.3.5	Research talent, % in business enterprise	27.3	46	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**40.3**	**20**	
6.1	**Knowledge creation**	**32.4**	**31**	
6.1.1	Patents by origin/bn PPP$ GDP	1.6	49	
6.1.2	PCT patents by origin/bn PPP$ GDP	1.2	25	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	28.0	12	
6.1.5	Citable documents H-index	12.3	60	
6.2	**Knowledge impact**	**34.2**	**30**	
6.2.1	Growth rate of PPP$ GDP/worker, %	-0.3	97	○
6.2.2	New businesses/th pop. 15-64	17.6	5	● ◆
6.2.3	Computer software spending, % GDP	0.0	70	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	22.3	9	◆
6.2.5	High- and medium-high-tech manufacturing, %	15.8	63	
6.3	**Knowledge diffusion**	**54.2**	**9**	◆
6.3.1	Intellectual property receipts, % total trade	0.0	85	○
6.3.2	High-tech net exports, % total trade	0.6	77	◇
6.3.3	ICT services exports, % total trade	14.6	1	● ◆
6.3.4	FDI net outflows, % GDP	30.5	1	● ◆
CREATIVE OUTPUTS		**36.1**	**25**	
7.1	**Intangible assets**	**33.1**	**41**	
7.1.1	Trademarks by origin/bn PPP$ GDP	79.3	23	
7.1.2	Global brand value, top 5,000, % GDP	6.2	67	◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	12.1	11	◆
7.1.4	ICTs & organizational model creation†	47.3	93	○ ◇
7.2	**Creative goods and services**	**15.1**	**64**	
7.2.1	Cultural & creative services exports, % total trade 🕘	0.2	73	
7.2.2	National feature films/mn pop. 15-69	6.9	32	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	2.1	13	
7.2.5	Creative goods exports, % total trade	0.3	72	
7.3	**Online creativity**	**62.9**	**9**	◆
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	74.3	7	● ◆
7.3.2	Country-code TLDs/th pop. 15-69	5.0	55	
7.3.3	Wikipedia edits/mn pop. 15-69	73.8	35	
7.3.4	Mobile app creation/bn PPP$ GDP	100.0	1	● ◆

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

CZECH REPUBLIC

GII 2020 rank

24

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
17	28	High	EUR	10.7	413.1	33,903.0	26

		Score/Value	Rank	
INSTITUTIONS		**77.1**	**32**	
1.1	**Political environment**	**75.1**	**35**	
1.1.1	Political and operational stability*	83.9	21	
1.1.2	Government effectiveness*	70.7	35	
1.2	**Regulatory environment**	**75.2**	**36**	
1.2.1	Regulatory quality*	75.1	23	
1.2.2	Rule of law*	74.0	28	
1.2.3	Cost of redundancy dismissal, salary weeks	20.2	84	○
1.3	**Business environment**	**81.1**	**29**	
1.3.1	Ease of starting a business*	82.1	103	○ ◇
1.3.2	Ease of resolving insolvency*	80.1	15	
HUMAN CAPITAL & RESEARCH		**43.4**	**33**	
2.1	**Education**	**56.5**	**27**	
2.1.1	Expenditure on education, % GDP 🕘	5.6	19	
2.1.2	Government funding/pupil, secondary, % GDP/cap	22.3	34	
2.1.3	School life expectancy, years	16.8	20	
2.1.4	PISA scales in reading, maths, & science	495.5	23	
2.1.5	Pupil-teacher ratio, secondary 🕘	11.5	52	
2.2	**Tertiary education**	**45.1**	**27**	
2.2.1	Tertiary enrolment, % gross	64.1	39	
2.2.2	Graduates in science & engineering, %	23.9	42	
2.2.3	Tertiary inbound mobility, %	12.5	14	
2.3	**Research & development (R&D)**	**28.8**	**38**	
2.3.1	Researchers, FTE/mn pop	3,862.7	26	
2.3.2	Gross expenditure on R&D, % GDP	1.9	19	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	29.9	40	
INFRASTRUCTURE		**55.8**	**21**	
3.1	**Information & communication technologies (ICTs)**	**68.1**	**63**	◇
3.1.1	ICT access*	72.3	53	◇
3.1.2	ICT use*	73.0	34	
3.1.3	Government's online service*	65.3	83	○ ◇
3.1.4	E-participation*	61.8	89	○ ◇
3.2	**General infrastructure**	**39.7**	**24**	
3.2.1	Electricity output, kWh/mn pop	8,171.8	20	
3.2.2	Logistics performance*	75.6	22	
3.2.3	Gross capital formation, % GDP	26.4	40	
3.3	**Ecological sustainability**	**59.6**	**4**	● ◆
3.3.1	GDP/unit of energy use	8.0	78	○
3.3.2	Environmental performance*	71.0	20	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	10.8	3	● ◆
MARKET SOPHISTICATION		**51.1**	**47**	
4.1	**Credit**	**45.9**	**49**	
4.1.1	Ease of getting credit*	70.0	44	
4.1.2	Domestic credit to private sector, % GDP	52.1	66	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**34.9**	**76**	○
4.2.1	Ease of protecting minority investors*	62.0	60	○
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	37	
4.3	**Trade, competition, and market scale**	**72.6**	**29**	
4.3.1	Applied tariff rate, weighted avg., %	1.7	22	
4.3.2	Intensity of local competition†	78.2	16	
4.3.3	Domestic market scale, bn PPP$	413.1	45	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**46.2**	**23**	
5.1	**Knowledge workers**	**48.2**	**29**	
5.1.1	Knowledge-intensive employment, %	38.0	31	
5.1.2	Firms offering formal training, % 🕘	55.1	10	● ◆
5.1.3	GERD performed by business, % GDP	1.2	17	
5.1.4	GERD financed by business, %	33.0	52	
5.1.5	Females employed w/advanced degrees, %	12.5	57	◇
5.2	**Innovation linkages**	**42.1**	**23**	
5.2.1	University/industry research collaboration†	51.0	37	
5.2.2	State of cluster development†	46.8	66	○
5.2.3	GERD financed by abroad, % GDP	0.6	1	● ◆
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	74	○
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.7	29	
5.3	**Knowledge absorption**	**48.4**	**17**	
5.3.1	Intellectual property payments, % total trade	0.8	50	
5.3.2	High-tech imports, % total trade	19.9	8	● ◆
5.3.3	ICT services imports, % total trade	1.3	53	
5.3.4	FDI net inflows, % GDP	4.7	30	
5.3.5	Research talent, % in business enterprise	51.3	22	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**45.2**	**15**	
6.1	**Knowledge creation**	**39.5**	**24**	
6.1.1	Patents by origin/bn PPP$ GDP	2.3	36	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.5	35	
6.1.3	Utility models by origin/bn PPP$ GDP	3.0	6	● ◆
6.1.4	Scientific & technical articles/bn PPP$ GDP	25.2	14	
6.1.5	Citable documents H-index	29.8	31	
6.2	**Knowledge impact**	**51.7**	**4**	● ◆
6.2.1	Growth rate of PPP$ GDP/worker, %	2.0	47	
6.2.2	New businesses/th pop. 15-64	4.4	34	
6.2.3	Computer software spending, % GDP	0.0	36	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	29.6	3	● ◆
6.2.5	High- and medium-high-tech manufacturing, %	57.1	5	● ◆
6.3	**Knowledge diffusion**	**44.4**	**22**	
6.3.1	Intellectual property receipts, % total trade	0.3	31	
6.3.2	High-tech net exports, % total trade	19.7	7	● ◆
6.3.3	ICT services exports, % total trade	2.3	46	
6.3.4	FDI net outflows, % GDP	2.6	27	
CREATIVE OUTPUTS		**38.7**	**20**	
7.1	**Intangible assets**	**32.7**	**43**	
7.1.1	Trademarks by origin/bn PPP$ GDP	58.1	36	
7.1.2	Global brand value, top 5,000, % GDP	36.1	41	
7.1.3	Industrial designs by origin/bn PPP$ GDP	3.8	33	
7.1.4	ICTs & organizational model creation†	66.3	26	
7.2	**Creative goods and services**	**46.5**	**4**	● ◆
7.2.1	Cultural & creative services exports, % total trade	0.5	47	
7.2.2	National feature films/mn pop. 15-69	7.0	29	
7.2.3	Entertainment & Media market/th pop. 15-69	25.5	26	
7.2.4	Printing and other media, % manufacturing 🕘	1.0	58	○
7.2.5	Creative goods exports, % total trade	10.8	1	● ◆
7.3	**Online creativity**	**42.8**	**27**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	16.5	30	
7.3.2	Country-code TLDs/th pop. 15-69	53.7	15	
7.3.3	Wikipedia edits/mn pop. 15-69	85.9	13	●
7.3.4	Mobile app creation/bn PPP$ GDP	15.9	30	

NOTES: ● indicates a strength; ○ a weakness; ◆ a strength relative to the other top 25-ranked GII economies; ◇ a weakness relative to the other top 25-ranked GII economies; * an index; † a survey question. 🕘 indicates that the economy's data are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

DENMARK

GII 2020 rank

6

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
9	5	High	EUR	5.8	312.8	47,040.4	7

		Score/Value	Rank	
INSTITUTIONS		**88.3**	**12**	
1.1	**Political environment**	**91.7**	**5**	●
1.1.1	Political and operational stability*	91.1	5	
1.1.2	Government effectiveness*	92.0	6	●
1.2	**Regulatory environment**	**84.5**	**19**	
1.2.1	Regulatory quality*	86.0	13	
1.2.2	Rule of law*	94.5	8	
1.2.3	Cost of redundancy dismissal, salary weeks	18.8	78	○
1.3	**Business environment**	**88.9**	**6**	●
1.3.1	Ease of starting a business*	92.7	42	
1.3.2	Ease of resolving insolvency*	85.1	6	●
HUMAN CAPITAL & RESEARCH		**62.9**	**2**	● ◆
2.1	**Education**	**71.6**	**3**	● ◆
2.1.1	Expenditure on education, % GDP 🕘	7.6	4	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap 🕘	31.1	10	◆
2.1.3	School life expectancy, years	18.9	7	
2.1.4	PISA scales in reading, maths, & science	501.1	17	
2.1.5	Pupil-teacher ratio, secondary 🕘	11.3	48	
2.2	**Tertiary education**	**45.3**	**26**	
2.2.1	Tertiary enrolment, % gross	80.6	18	
2.2.2	Graduates in science & engineering, %	21.0	65	○
2.2.3	Tertiary inbound mobility, %	10.8	17	
2.3	**Research & development (R&D)**	**71.8**	**8**	
2.3.1	Researchers, FTE/mn pop	8,065.9	2	● ◆
2.3.2	Gross expenditure on R&D, % GDP	3.1	8	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	71.3	15	
2.3.4	QS university ranking, average score top 3*	57.4	15	
INFRASTRUCTURE		**61.5**	**4**	● ◆
3.1	**Information & communication technologies (ICTs)**	**92.4**	**3**	● ◆
3.1.1	ICT access*	79.5	32	
3.1.2	ICT use*	90.3	1	● ◆
3.1.3	Government's online service*	100.0	1	● ◆
3.1.4	E-participation*	100.0	1	●
3.2	**General infrastructure**	**38.6**	**27**	
3.2.1	Electricity output, kWh/mn pop	5,179.9	40	
3.2.2	Logistics performance*	90.2	8	
3.2.3	Gross capital formation, % GDP	23.6	63	○
3.3	**Ecological sustainability**	**53.6**	**16**	◆
3.3.1	GDP/unit of energy use	15.9	11	
3.3.2	Environmental performance*	82.5	1	●
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	3.3	29	
MARKET SOPHISTICATION		**66.3**	**8**	
4.1	**Credit**	**72.0**	**7**	
4.1.1	Ease of getting credit*	70.0	44	○
4.1.2	Domestic credit to private sector, % GDP	163.4	5	●
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**58.3**	**16**	
4.2.1	Ease of protecting minority investors*	72.0	27	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	0.2	12	
4.3	**Trade, competition, and market scale**	**68.6**	**38**	
4.3.1	Applied tariff rate, weighted avg., %	1.7	22	
4.3.2	Intensity of local competition†	70.9	50	
4.3.3	Domestic market scale, bn PPP$	312.8	56	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**54.8**	**11**	
5.1	**Knowledge workers**	**65.6**	**9**	
5.1.1	Knowledge-intensive employment, %	47.0	13	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	1.9	10	
5.1.4	GERD financed by business, %	58.5	13	
5.1.5	Females employed w/advanced degrees, %	22.5	20	
5.2	**Innovation linkages**	**57.8**	**9**	
5.2.1	University/industry research collaboration†	69.1	10	
5.2.2	State of cluster development†	67.1	12	
5.2.3	GERD financed by abroad, % GDP	0.3	11	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.2	15	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	4.0	12	
5.3	**Knowledge absorption**	**40.9**	**28**	
5.3.1	Intellectual property payments, % total trade	0.9	40	
5.3.2	High-tech imports, % total trade	5.8	100	○
5.3.3	ICT services imports, % total trade	3.1	8	◆
5.3.4	FDI net inflows, % GDP	1.3	104	○
5.3.5	Research talent, % in business enterprise	60.5	14	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**48.3**	**12**	
6.1	**Knowledge creation**	**62.0**	**10**	
6.1.1	Patents by origin/bn PPP$ GDP	12.1	8	
6.1.2	PCT patents by origin/bn PPP$ GDP	4.6	8	
6.1.3	Utility models by origin/bn PPP$ GDP	0.2	44	○
6.1.4	Scientific & technical articles/bn PPP$ GDP	38.2	1	● ◆
6.1.5	Citable documents H-index	50.4	15	
6.2	**Knowledge impact**	**40.3**	**18**	
6.2.1	Growth rate of PPP$ GDP/worker, %	0.8	65	○
6.2.2	New businesses/th pop. 15-64	10.0	16	
6.2.3	Computer software spending, % GDP	0.0	12	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	7.4	36	
6.2.5	High- and medium-high-tech manufacturing, %	42.2	20	
6.3	**Knowledge diffusion**	**42.5**	**25**	
6.3.1	Intellectual property receipts, % total trade	1.8	13	
6.3.2	High-tech net exports, % total trade	5.3	31	
6.3.3	ICT services exports, % total trade	2.7	37	
6.3.4	FDI net outflows, % GDP	2.8	22	
CREATIVE OUTPUTS		**48.3**	**10**	
7.1	**Intangible assets**	**45.8**	**19**	
7.1.1	Trademarks by origin/bn PPP$ GDP	40.9	65	○
7.1.2	Global brand value, top 5,000, % GDP	131.1	14	
7.1.3	Industrial designs by origin/bn PPP$ GDP	6.5	20	
7.1.4	ICTs & organizational model creation†	78.9	7	
7.2	**Creative goods and services**	**33.1**	**20**	
7.2.1	Cultural & creative services exports, % total trade	0.6	43	
7.2.2	National feature films/mn pop. 15-69	13.4	10	
7.2.3	Entertainment & Media market/th pop. 15-69	81.6	4	◆
7.2.4	Printing and other media, % manufacturing 🕘	1.0	60	○
7.2.5	Creative goods exports, % total trade	1.5	35	
7.3	**Online creativity**	**68.6**	**4**	●
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	48.6	16	
7.3.2	Country-code TLDs/th pop. 15-69	100.0	1	● ◆
7.3.3	Wikipedia edits/mn pop. 15-69	83.2	17	
7.3.4	Mobile app creation/bn PPP$ GDP	43.6	12	

NOTES: ● indicates a strength; ○ a weakness; ◆ a strength relative to the other top 25-ranked GII economies; ◇ a weakness relative to the other top 25-ranked GII economies; * an index; † a survey question. 🕘 indicates that the economy's data are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

DOMINICAN REPUBLIC

GII 2020 rank

90

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
85	94	Upper middle	LCN	10.7	201.3	16,946.2	87

		Score/Value	Rank	
INSTITUTIONS		**54.3**	**98**	
1.1	**Political environment**	**50.1**	**89**	
1.1.1	Political and operational stability*	67.9	73	
1.1.2	Government effectiveness*	41.2	91	
1.2	**Regulatory environment**	**51.0**	**101**	
1.2.1	Regulatory quality*	39.8	78	
1.2.2	Rule of law*	36.3	86	
1.2.3	Cost of redundancy dismissal, salary weeks	26.2	105	
1.3	**Business environment**	**61.7**	**99**	
1.3.1	Ease of starting a business*	85.4	85	
1.3.2	Ease of resolving insolvency*	38.0	108	◇
HUMAN CAPITAL & RESEARCH		**18.5**	**100**	◇
2.1	**Education**	**34.4**	**96**	
2.1.1	Expenditure on education, % GDP	n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap	15.1	78	
2.1.3	School life expectancy, years	14.2	69	
2.1.4	PISA scales in reading, maths, & science	334.1	79	○ ◇
2.1.5	Pupil-teacher ratio, secondary	18.6	92	
2.2	**Tertiary education**	**21.1**	**93**	
2.2.1	Tertiary enrolment, % gross	59.9	47	●
2.2.2	Graduates in science & engineering, %	11.6	101	○ ◇
2.2.3	Tertiary inbound mobility, %	1.7	79	
2.3	**Research & development (R&D)**	**0.0**	**[121]**	
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 R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**37.9**	**77**	
3.1	**Information & communication technologies (ICTs)**	**57.2**	**85**	
3.1.1	ICT access*	45.4	99	◇
3.1.2	ICT use*	49.4	77	
3.1.3	Government's online service*	66.0	80	
3.1.4	E-participation*	68.0	78	
3.2	**General infrastructure**	**21.4**	**92**	
3.2.1	Electricity output, kWh/mn pop	1,767.6	83	
3.2.2	Logistics performance*	27.8	85	
3.2.3	Gross capital formation, % GDP	25.7	45	●
3.3	**Ecological sustainability**	**35.1**	**48**	●
3.3.1	GDP/unit of energy use	17.5	9	● ◆
3.3.2	Environmental performance*	46.3	68	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.1	120	
MARKET SOPHISTICATION		**40.6**	**105**	
4.1	**Credit**	**24.3**	**117**	◇
4.1.1	Ease of getting credit*	45.0	101	◇
4.1.2	Domestic credit to private sector, % GDP	28.6	95	
4.1.3	Microfinance gross loans, % GDP	0.7	30	●
4.2	**Investment**	**34.0**	**[78]**	
4.2.1	Ease of protecting minority investors*	34.0	118	◇
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**63.3**	**64**	
4.3.1	Applied tariff rate, weighted avg., %	4.2	79	
4.3.2	Intensity of local competition†	70.3	56	●
4.3.3	Domestic market scale, bn PPP$	201.3	66	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**22.5**	**83**	
5.1	**Knowledge workers**	**24.3**	**[85]**	
5.1.1	Knowledge-intensive employment, %	16.4	89	
5.1.2	Firms offering formal training, %	23.4	65	
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, %	9.1	73	
5.2	**Innovation linkages**	**19.7**	**69**	
5.2.1	University/industry research collaboration†	35.2	98	
5.2.2	State of cluster development†	50.2	48	●
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	119	○ ◇
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	86	
5.3	**Knowledge absorption**	**23.5**	**87**	
5.3.1	Intellectual property payments, % total trade	0.6	59	
5.3.2	High-tech imports, % total trade	6.7	78	
5.3.3	ICT services imports, % total trade	0.4	106	
5.3.4	FDI net inflows, % GDP	3.7	42	●
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**13.0**	**99**	
6.1	**Knowledge creation**	**1.3**	**130**	○ ◇
6.1.1	Patents by origin/bn PPP$ GDP	0.1	115	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	73	
6.1.3	Utility models by origin/bn PPP$ GDP	0.1	60	
6.1.4	Scientific & technical articles/bn PPP$ GDP	0.4	130	○ ◇
6.1.5	Citable documents H-index	2.9	123	○
6.2	**Knowledge impact**	**15.3**	**98**	
6.2.1	Growth rate of PPP$ GDP/worker, %	2.5	38	●
6.2.2	New businesses/th pop. 15-64	1.5	69	
6.2.3	Computer software spending, % GDP	0.0	116	○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.9	111	
6.2.5	High- and medium-high-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**22.5**	**68**	
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	High-tech net exports, % total trade	2.2	52	●
6.3.3	ICT services exports, % total trade	0.5	97	
6.3.4	FDI net outflows, % GDP	0.1	100	
CREATIVE OUTPUTS		**17.8**	**82**	
7.1	**Intangible assets**	**19.7**	**91**	
7.1.1	Trademarks by origin/bn PPP$ GDP	44.6	58	
7.1.2	Global brand value, top 5,000, % GDP	2.3	77	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.0	117	○
7.1.4	ICTs & organizational model creation†	48.9	85	
7.2	**Creative goods and services**	**22.7**	**[46]**	
7.2.1	Cultural & creative services exports, % total trade	n/a	n/a	
7.2.2	National feature films/mn pop. 15-69	3.5	53	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	2.2	26	●
7.3	**Online creativity**	**9.2**	**88**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	2.5	71	
7.3.2	Country-code TLDs/th pop. 15-69	1.3	80	
7.3.3	Wikipedia edits/mn pop. 15-69	36.7	85	◇
7.3.4	Mobile app creation/bn PPP$ GDP	0.0	96	○

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

ECUADOR

GII 2020 rank

99

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
97	96	Upper middle	LCN	17.4	202.8	10,251.7	99

		Score/Value	Rank	
INSTITUTIONS		**44.6**	**126**	○ ◇
1.1	**Political environment**	**48.0**	**94**	
1.1.1	Political and operational stability*	55.4	116	◇
1.1.2	Government effectiveness*	44.3	87	
1.2	**Regulatory environment**	**38.6**	**121**	◇
1.2.1	Regulatory quality*	18.3	123	○ ◇
1.2.2	Rule of law*	30.2	103	
1.2.3	Cost of redundancy dismissal, salary weeks	31.8	121	○ ◇
1.3	**Business environment**	**47.3**	**128**	○ ◇
1.3.1	Ease of starting a business*	69.1	127	○ ◇
1.3.2	Ease of resolving insolvency*	25.5	126	○ ◇
HUMAN CAPITAL & RESEARCH		**21.0**	**91**	
2.1	**Education**	**35.8**	**93**	
2.1.1	Expenditure on education, % GDP	5.0	41	●
2.1.2	Government funding/pupil, secondary, % GDP/cap	5.3	104	○ ◇
2.1.3	School life expectancy, years	15.2	47	●
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	20.6	99	◇
2.2	**Tertiary education**	**20.5**	**95**	
2.2.1	Tertiary enrolment, % gross	44.9	66	
2.2.2	Graduates in science & engineering, %	15.8	90	
2.2.3	Tertiary inbound mobility, %	0.8	92	
2.3	**Research & development (R&D)**	**6.8**	**70**	
2.3.1	Researchers, FTE/mn pop.	399.5	72	
2.3.2	Gross expenditure on R&D, % GDP	0.4	70	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	13.9	58	●
INFRASTRUCTURE		**37.3**	**82**	
3.1	**Information & communication technologies (ICTs)**	**57.9**	**84**	
3.1.1	ICT access*	47.6	94	◇
3.1.2	ICT use*	43.7	90	◇
3.1.3	Government's online service*	72.9	64	
3.1.4	E-participation*	67.4	80	
3.2	**General infrastructure**	**23.3**	**80**	
3.2.1	Electricity output, kWh/mn pop.	1,763.4	84	
3.2.2	Logistics performance*	38.1	61	
3.2.3	Gross capital formation, % GDP	24.7	54	●
3.3	**Ecological sustainability**	**30.8**	**58**	●
3.3.1	GDP/unit of energy use	11.9	34	●
3.3.2	Environmental performance*	51.0	54	●
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.6	73	
MARKET SOPHISTICATION		**47.8**	**64**	
4.1	**Credit**	**40.4**	**69**	
4.1.1	Ease of getting credit*	45.0	101	◇
4.1.2	Domestic credit to private sector, % GDP	35.7	85	
4.1.3	Microfinance gross loans, % GDP	6.1	2	● ◆
4.2	**Investment**	**44.0**	**[37]**	
4.2.1	Ease of protecting minority investors*	44.0	98	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**59.0**	**78**	
4.3.1	Applied tariff rate, weighted avg., %	7.4	99	
4.3.2	Intensity of local competition†	69.8	62	
4.3.3	Domestic market scale, bn PPP$	202.8	65	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**20.6**	**97**	
5.1	**Knowledge workers**	**28.2**	**74**	
5.1.1	Knowledge-intensive employment, %	13.1	98	◇
5.1.2	Firms offering formal training, %	73.7	2	● ◆
5.1.3	GERD performed by business, % GDP	0.2	53	
5.1.4	GERD financed by business, %	0.1	100	○ ◇
5.1.5	Females employed w/advanced degrees, %	8.7	77	
5.2	**Innovation linkages**	**13.4**	**119**	◇
5.2.1	University/industry research collaboration†	34.7	99	
5.2.2	State of cluster development†	39.0	100	
5.2.3	GERD financed by abroad, % GDP	0.0	78	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	112	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	90	
5.3	**Knowledge absorption**	**20.1**	**97**	
5.3.1	Intellectual property payments, % total trade	0.2	95	
5.3.2	High-tech imports, % total trade	8.2	54	●
5.3.3	ICT services imports, % total trade	0.0	128	○ ◇
5.3.4	FDI net inflows, % GDP	0.9	115	◇
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**12.3**	**105**	
6.1	**Knowledge creation**	**7.2**	**86**	
6.1.1	Patents by origin/bn PPP$ GDP	0.2	107	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	63	
6.1.3	Utility models by origin/bn PPP$ GDP	0.2	47	
6.1.4	Scientific & technical articles/bn PPP$ GDP	6.5	71	
6.1.5	Citable documents H-index	9.1	80	
6.2	**Knowledge impact**	**18.2**	**89**	
6.2.1	Growth rate of PPP$ GDP/worker, %	-0.5	103	
6.2.2	New businesses/th pop. 15-64	n/a	n/a	
6.2.3	Computer software spending, % GDP	0.0	65	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	4.3	59	
6.2.5	High- and medium-high-tech manufacturing, %	12.8	75	
6.3	**Knowledge diffusion**	**11.4**	**116**	◇
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	High-tech net exports, % total trade	0.3	92	
6.3.3	ICT services exports, % total trade	0.1	121	○
6.3.4	FDI net outflows, % GDP	0.9	59	
CREATIVE OUTPUTS		**15.6**	**92**	
7.1	**Intangible assets**	**23.1**	**81**	
7.1.1	Trademarks by origin/bn PPP$ GDP	57.1	39	●
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.2	62	
7.1.4	ICTs & organizational model creation†	52.9	66	
7.2	**Creative goods and services**	**5.2**	**103**	
7.2.1	Cultural & creative services exports, % total trade	0.0	93	
7.2.2	National feature films/mn pop. 15-69	2.1	64	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.0	59	
7.2.5	Creative goods exports, % total trade	0.1	109	
7.3	**Online creativity**	**11.0**	**81**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	2.0	79	
7.3.2	Country-code TLDs/th pop. 15-69	1.1	82	
7.3.3	Wikipedia edits/mn pop. 15-69	43.9	73	
7.3.4	Mobile app creation/bn PPP$ GDP	0.3	78	

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

EGYPT

GII 2020 rank

96

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
82	**104**	**Lower middle**	**NAWA**	**100.4**	**1,391.3**	**12,242.7**	**92**

		Score/Value	Rank	
INSTITUTIONS		**48.6**	**115**	○
1.1	**Political environment**	**45.6**	**104**	
1.1.1	Political and operational stability*	62.5	92	
1.1.2	Government effectiveness*	37.1	106	
1.2	**Regulatory environment**	**35.2**	**124**	○
1.2.1	Regulatory quality*	18.9	121	○ ◇
1.2.2	Rule of law*	35.9	89	
1.2.3	Cost of redundancy dismissal, salary weeks	36.8	124	○ ◇
1.3	**Business environment**	**65.0**	**84**	
1.3.1	Ease of starting a business*	87.8	72	
1.3.2	Ease of resolving insolvency*	42.2	93	
HUMAN CAPITAL & RESEARCH		**21.5**	**90**	
2.1	**Education**	**40.0**	**[80]**	
2.1.1	Expenditure on education, % GDP	n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap	13.8	85	
2.1.3	School life expectancy, years	13.3	77	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	15.2	74	
2.2	**Tertiary education**	**13.5**	**109**	
2.2.1	Tertiary enrolment, % gross	35.2	76	
2.2.2	Graduates in science & engineering, %	11.2	102	○ ◇
2.2.3	Tertiary inbound mobility, %	1.8	78	
2.3	**Research & development (R&D)**	**11.0**	**55**	
2.3.1	Researchers, FTE/mn pop	686.7	61	
2.3.2	Gross expenditure on R&D, % GDP	0.7	49	◆
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	21.5	48	● ◆
INFRASTRUCTURE		**31.5**	**99**	
3.1	**Information & communication technologies (ICTs)**	**50.3**	**96**	
3.1.1	ICT access*	56.3	81	◆
3.1.2	ICT use*	37.3	100	
3.1.3	Government's online service*	53.5	102	
3.1.4	E-participation*	53.9	101	
3.2	**General infrastructure**	**17.4**	**116**	○
3.2.1	Electricity output, kWh/mn pop	1,928.8	79	◆
3.2.2	Logistics performance*	35.4	66	
3.2.3	Gross capital formation, % GDP	17.3	114	○ ◇
3.3	**Ecological sustainability**	**26.8**	**74**	◆
3.3.1	GDP/unit of energy use	10.9	45	●
3.3.2	Environmental performance*	43.3	81	◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.6	76	
MARKET SOPHISTICATION		**39.3**	**106**	
4.1	**Credit**	**30.0**	**108**	
4.1.1	Ease of getting credit*	65.0	61	
4.1.2	Domestic credit to private sector, % GDP	25.5	103	
4.1.3	Microfinance gross loans, % GDP	0.1	62	
4.2	**Investment**	**24.0**	**119**	○
4.2.1	Ease of protecting minority investors*	64.0	56	
4.2.2	Market capitalization, % GDP	15.5	61	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	70	○
4.3	**Trade, competition, and market scale**	**63.9**	**62**	
4.3.1	Applied tariff rate, weighted avg., %	8.2	105	
4.3.2	Intensity of local competition†	65.7	77	
4.3.3	Domestic market scale, bn PPP$	1,391.3	19	● ◆

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**18.7**	**103**	
5.1	**Knowledge workers**	**15.2**	**108**	
5.1.1	Knowledge-intensive employment, %	30.3	45	● ◆
5.1.2	Firms offering formal training, %	10.0	93	○ ◇
5.1.3	GERD performed by business, % GDP	0.0	79	
5.1.4	GERD financed by business, %	3.9	87	
5.1.5	Females employed w/advanced degrees, %	5.5	88	
5.2	**Innovation linkages**	**19.3**	**74**	
5.2.1	University/industry research collaboration†	38.5	79	
5.2.2	State of cluster development†	63.6	22	● ◆
5.2.3	GERD financed by abroad, % GDP	0.0	86	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	96	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	94	
5.3	**Knowledge absorption**	**21.6**	**94**	
5.3.1	Intellectual property payments, % total trade	0.4	71	
5.3.2	High-tech imports, % total trade	9.0	45	●
5.3.3	ICT services imports, % total trade	1.0	70	
5.3.4	FDI net inflows, % GDP	2.8	61	
5.3.5	Research talent, % in business enterprise	6.3	69	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**19.7**	**65**	
6.1	**Knowledge creation**	**12.7**	**69**	
6.1.1	Patents by origin/bn PPP$ GDP	0.8	72	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	86	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	8.4	59	
6.1.5	Citable documents H-index	17.4	47	● ◆
6.2	**Knowledge impact**	**31.7**	**36**	● ◆
6.2.1	Growth rate of PPP$ GDP/worker, %	3.9	20	●
6.2.2	New businesses/th pop. 15-64	n/a	n/a	
6.2.3	Computer software spending, % GDP	0.0	21	● ◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.5	92	
6.2.5	High- and medium-high-tech manufacturing, %	21.9	50	
6.3	**Knowledge diffusion**	**14.6**	**99**	
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	High-tech net exports, % total trade	0.2	99	
6.3.3	ICT services exports, % total trade	1.2	77	
6.3.4	FDI net outflows, % GDP	0.1	103	
CREATIVE OUTPUTS		**13.4**	**101**	
7.1	**Intangible assets**	**19.2**	**95**	
7.1.1	Trademarks by origin/bn PPP$ GDP	16.3	98	
7.1.2	Global brand value, top 5,000, % GDP	4.2	71	
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.3	59	
7.1.4	ICTs & organizational model creation†	56.0	57	
7.2	**Creative goods and services**	**6.9**	**94**	
7.2.1	Cultural & creative services exports, % total trade	n/a	n/a	
7.2.2	National feature films/mn pop. 15-69	0.6	96	○
7.2.3	Entertainment & Media market/th pop. 15-69	0.4	61	○ ◇
7.2.4	Printing and other media, % manufacturing	0.5	85	
7.2.5	Creative goods exports, % total trade	0.9	45	●
7.3	**Online creativity**	**8.4**	**92**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	1.2	92	
7.3.2	Country-code TLDs/th pop. 15-69	0.0	123	○
7.3.3	Wikipedia edits/mn pop. 15-69	35.8	87	
7.3.4	Mobile app creation/bn PPP$ GDP	0.2	81	

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

EL SALVADOR

GII 2020 rank

92

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
87	95	Lower middle	LCN	6.5	55.7	7,257.4	108

		Score/Value	Rank	
INSTITUTIONS		**54.0**	**100**	
1.1	**Political environment**	**48.2**	**93**	
1.1.1	Political and operational stability*	64.3	83	
1.1.2	Government effectiveness*	40.2	96	
1.2	**Regulatory environment**	**51.8**	**100**	
1.2.1	Regulatory quality*	40.8	72	◆
1.2.2	Rule of law*	25.2	115	
1.2.3	Cost of redundancy dismissal, salary weeks	22.9	96	
1.3	**Business environment**	**62.1**	**96**	
1.3.1	Ease of starting a business*	78.6	111	
1.3.2	Ease of resolving insolvency*	45.6	83	
HUMAN CAPITAL & RESEARCH		**16.4**	**105**	
2.1	**Education**	**26.5**	**115**	
2.1.1	Expenditure on education, % GDP	3.6	87	
2.1.2	Government funding/pupil, secondary, % GDP/cap	14.3	84	
2.1.3	School life expectancy, years	11.6	95	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	27.6	114	◇
2.2	**Tertiary education**	**21.8**	**89**	
2.2.1	Tertiary enrolment, % gross	29.4	82	
2.2.2	Graduates in science & engineering, %	21.4	59	
2.2.3	Tertiary inbound mobility, %	0.5	97	
2.3	**Research & development (R&D)**	**1.0**	**107**	
2.3.1	Researchers, FTE/mn pop. 🕘	63.7	91	
2.3.2	Gross expenditure on R&D, % GDP 🕘	0.2	93	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**31.4**	**101**	
3.1	**Information & communication technologies (ICTs)**	**52.5**	**93**	
3.1.1	ICT access*	48.5	92	
3.1.2	ICT use*	33.7	103	
3.1.3	Government's online service*	62.5	90	
3.1.4	E-participation*	65.2	81	
3.2	**General infrastructure**	**15.4**	**118**	
3.2.1	Electricity output, kWh/mn pop	857.1	99	
3.2.2	Logistics performance*	23.7	97	
3.2.3	Gross capital formation, % GDP	20.0	98	
3.3	**Ecological sustainability**	**26.3**	**77**	◆
3.3.1	GDP/unit of energy use	11.1	43	●
3.3.2	Environmental performance*	43.1	82	◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.3	97	
MARKET SOPHISTICATION		**46.7**	**71**	
4.1	**Credit**	**42.1**	**62**	
4.1.1	Ease of getting credit*	80.0	23	●
4.1.2	Domestic credit to private sector, % GDP	52.5	65	
4.1.3	Microfinance gross loans, % GDP	0.4	38	
4.2	**Investment**	**36.0**	**[69]**	
4.2.1	Ease of protecting minority investors*	36.0	116	◇
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**62.1**	**68**	
4.3.1	Applied tariff rate, weighted avg., %	1.9	55	◆
4.3.2	Intensity of local competition†	72.8	40	● ◆
4.3.3	Domestic market scale, bn PPP$	55.7	98	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**23.7**	**76**	
5.1	**Knowledge workers**	**28.7**	**71**	
5.1.1	Knowledge-intensive employment, %	12.8	100	
5.1.2	Firms offering formal training, % 🕘	53.8	12	● ◆
5.1.3	GERD performed by business, % GDP 🕘	0.1	69	
5.1.4	GERD financed by business, %	31.2	56	
5.1.5	Females employed w/advanced degrees, %	4.8	91	
5.2	**Innovation linkages**	**10.8**	**125**	○ ◇
5.2.1	University/industry research collaboration†	27.2	120	○ ◇
5.2.2	State of cluster development†	32.1	117	◇
5.2.3	GERD financed by abroad, % GDP	0.0	74	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	121	○
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	101	○ ◇
5.3	**Knowledge absorption**	**31.5**	**56**	
5.3.1	Intellectual property payments, % total trade	1.3	24	● ◆
5.3.2	High-tech imports, % total trade	9.0	46	●
5.3.3	ICT services imports, % total trade	0.5	102	
5.3.4	FDI net inflows, % GDP	1.9	86	
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**11.3**	**110**	
6.1	**Knowledge creation**	**1.1**	**131**	○ ◇
6.1.1	Patents by origin/bn PPP$ GDP	0.1	125	○
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	85	
6.1.3	Utility models by origin/bn PPP$ GDP	0.1	61	
6.1.4	Scientific & technical articles/bn PPP$ GDP	0.5	128	○
6.1.5	Citable documents H-index	2.5	126	○
6.2	**Knowledge impact**	**5.0**	**[124]**	
6.2.1	Growth rate of PPP$ GDP/worker, %	n/a	n/a	
6.2.2	New businesses/th pop. 15-64	0.6	93	
6.2.3	Computer software spending, % GDP	0.0	103	◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	3.1	71	
6.2.5	High- and medium-high-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**27.8**	**50**	●
6.3.1	Intellectual property receipts, % total trade	0.5	27	● ◆
6.3.2	High-tech net exports, % total trade	2.8	49	●
6.3.3	ICT services exports, % total trade	2.2	51	●
6.3.4	FDI net outflows, % GDP	-0.9	126	○ ◇
CREATIVE OUTPUTS		**19.2**	**74**	
7.1	**Intangible assets**	**30.8**	**48**	●
7.1.1	Trademarks by origin/bn PPP$ GDP	75.6	25	●
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.4	90	
7.1.4	ICTs & organizational model creation†	42.7	103	
7.2	**Creative goods and services**	**5.6**	**[102]**	
7.2.1	Cultural & creative services exports, % total trade	0.0	107	
7.2.2	National feature films/mn pop. 15-69	n/a	n/a	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.7	57	
7.3	**Online creativity**	**9.6**	**85**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	2.4	73	◆
7.3.2	Country-code TLDs/th pop. 15-69	0.6	96	
7.3.3	Wikipedia edits/mn pop. 15-69	38.9	80	
7.3.4	Mobile app creation/bn PPP$ GDP 🕘	0.0	99	○

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

ESTONIA

GII 2020 rank

25

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
20	**25**	**High**	**EUR**	**1.3**	**47.3**	**31,300.6**	**24**

		Score/Value	Rank	
INSTITUTIONS		**80.8**	**23**	
1.1	**Political environment**	**79.2**	**23**	
1.1.1	Political and operational stability*	83.9	21	
1.1.2	Government effectiveness*	76.8	25	
1.2	**Regulatory environment**	**85.7**	**18**	
1.2.1	Regulatory quality*	83.0	17	
1.2.2	Rule of law*	79.0	22	
1.2.3	Cost of redundancy dismissal, salary weeks	12.9	39	
1.3	**Business environment**	**77.7**	**41**	
1.3.1	Ease of starting a business*	95.4	13	
1.3.2	Ease of resolving insolvency*	60.1	49	
HUMAN CAPITAL & RESEARCH		**42.3**	**34**	
2.1	**Education**	**54.6**	**39**	
2.1.1	Expenditure on education, % GDP 🕘	5.2	38	
2.1.2	Government funding/pupil, secondary, % GDP/cap	19.1	54	
2.1.3	School life expectancy, years	16.0	36	
2.1.4	PISA scales in reading, maths, & science	525.5	4	● ◆
2.1.5	Pupil-teacher ratio, secondary 🕘	9.2	24	
2.2	**Tertiary education**	**48.4**	**19**	
2.2.1	Tertiary enrolment, % gross	69.6	29	
2.2.2	Graduates in science & engineering, %	28.8	20	
2.2.3	Tertiary inbound mobility, %	8.2	27	
2.3	**Research & development (R&D)**	**23.9**	**43**	
2.3.1	Researchers, FTE/mn pop	3,755.3	27	
2.3.2	Gross expenditure on R&D, % GDP	1.4	25	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	22.0	46	
INFRASTRUCTURE		**61.2**	**5**	● ◆
3.1	**Information & communication technologies (ICTs)**	**86.0**	**20**	
3.1.1	ICT access*	81.2	24	
3.1.2	ICT use*	81.6	16	
3.1.3	Government's online service*	90.3	26	
3.1.4	E-participation*	91.0	27	
3.2	**General infrastructure**	**36.7**	**30**	
3.2.1	Electricity output, kWh/mn pop	9,318.8	16	
3.2.2	Logistics performance*	58.3	35	
3.2.3	Gross capital formation, % GDP	26.9	38	
3.3	**Ecological sustainability**	**60.9**	**1**	● ◆
3.3.1	GDP/unit of energy use	6.9	90	○
3.3.2	Environmental performance*	65.3	30	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	12.5	1	● ◆
MARKET SOPHISTICATION		**58.0**	**21**	
4.1	**Credit**	**48.3**	**41**	
4.1.1	Ease of getting credit*	70.0	44	
4.1.2	Domestic credit to private sector, % GDP	62.6	53	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**61.2**	**15**	◆
4.2.1	Ease of protecting minority investors*	58.0	77	○
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	0.4	8	◆
4.3	**Trade, competition, and market scale**	**64.5**	**52**	
4.3.1	Applied tariff rate, weighted avg., %	1.7	22	
4.3.2	Intensity of local competition†	79.7	10	
4.3.3	Domestic market scale, bn PPP$	47.3	101	○ ◇

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**38.1**	**30**	
5.1	**Knowledge workers**	**51.8**	**26**	
5.1.1	Knowledge-intensive employment, %	47.0	14	
5.1.2	Firms offering formal training, %	40.7	26	
5.1.3	GERD performed by business, % GDP	0.6	34	
5.1.4	GERD financed by business, %	43.6	38	
5.1.5	Females employed w/advanced degrees, %	26.4	7	● ◆
5.2	**Innovation linkages**	**29.9**	**34**	
5.2.1	University/industry research collaboration†	47.6	48	
5.2.2	State of cluster development†	43.9	82	○ ◇
5.2.3	GERD financed by abroad, % GDP	0.2	19	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.1	22	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.5	32	
5.3	**Knowledge absorption**	**32.7**	**50**	
5.3.1	Intellectual property payments, % total trade	0.3	79	○
5.3.2	High-tech imports, % total trade	9.7	37	
5.3.3	ICT services imports, % total trade	2.6	13	
5.3.4	FDI net inflows, % GDP	4.7	32	
5.3.5	Research talent, % in business enterprise	33.3	39	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**37.9**	**23**	
6.1	**Knowledge creation**	**29.6**	**33**	
6.1.1	Patents by origin/bn PPP$ GDP	1.6	50	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.8	29	
6.1.3	Utility models by origin/bn PPP$ GDP	0.6	33	
6.1.4	Scientific & technical articles/bn PPP$ GDP	30.7	9	◆
6.1.5	Citable documents H-index	17.0	49	
6.2	**Knowledge impact**	**42.4**	**13**	
6.2.1	Growth rate of PPP$ GDP/worker, %	3.2	24	◆
6.2.2	New businesses/th pop. 15-64	23.6	2	● ◆
6.2.3	Computer software spending, % GDP	0.0	80	○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	23.4	6	● ◆
6.2.5	High- and medium-high-tech manufacturing, %	17.8	60	○
6.3	**Knowledge diffusion**	**41.8**	**26**	
6.3.1	Intellectual property receipts, % total trade	0.1	63	○
6.3.2	High-tech net exports, % total trade	9.3	16	
6.3.3	ICT services exports, % total trade	4.0	21	
6.3.4	FDI net outflows, % GDP	1.0	54	
CREATIVE OUTPUTS		**43.0**	**15**	
7.1	**Intangible assets**	**39.4**	**29**	
7.1.1	Trademarks by origin/bn PPP$ GDP	100.6	10	◆
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	5.4	24	
7.1.4	ICTs & organizational model creation†	79.3	5	● ◆
7.2	**Creative goods and services**	**36.5**	**18**	
7.2.1	Cultural & creative services exports, % total trade	1.8	8	●
7.2.2	National feature films/mn pop. 15-69	19.5	5	● ◆
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	2.0	16	
7.2.5	Creative goods exports, % total trade	1.1	41	
7.3	**Online creativity**	**56.6**	**14**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	9.9	40	
7.3.2	Country-code TLDs/th pop. 15-69	42.0	17	
7.3.3	Wikipedia edits/mn pop. 15-69	99.5	2	● ◆
7.3.4	Mobile app creation/bn PPP$ GDP	75.0	6	● ◆

NOTES: ● indicates a strength; ○ a weakness; ◆ a strength relative to the other top 25-ranked GII economies; ◇ a weakness relative to the other top 25-ranked GII economies; * an index; † a survey question. 🕘 indicates that the economy's data are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

ETHIOPIA

GII 2020 rank

127

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
110	130	Low	SSF	112.1	240.2	2,192.2	111

		Score/Value	Rank	
INSTITUTIONS		**48.6**	**116**	
1.1	**Political environment**	**42.8**	**113**	
1.1.1	Political and operational stability*	55.4	116	
1.1.2	Government effectiveness*	36.6	108	
1.2	**Regulatory environment**	**51.9**	**99**	
1.2.1	Regulatory quality*	16.1	125	
1.2.2	Rule of law*	35.5	91	
1.2.3	Cost of redundancy dismissal, salary weeks	19.1	80	
1.3	**Business environment**	**51.0**	**126**	◇
1.3.1	Ease of starting a business*	71.7	121	◇
1.3.2	Ease of resolving insolvency*	30.3	119	◇
HUMAN CAPITAL & RESEARCH		**9.3**	**128**	
2.1	**Education**	**20.9**	**125**	
2.1.1	Expenditure on education, % GDP	4.7	52	●
2.1.2	Government funding/pupil, secondary, % GDP/cap	16.8	69	
2.1.3	School life expectancy, years	8.4	116	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	40.4	124	○ ◇
2.2	**Tertiary education**	**5.4**	**[124]**	
2.2.1	Tertiary enrolment, % gross	8.1	114	
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research & development (R&D)**	**1.6**	**101**	
2.3.1	Researchers, FTE/mn pop.	90.5	89	◆
2.3.2	Gross expenditure on R&D, % GDP	0.3	83	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**27.3**	**108**	
3.1	**Information & communication technologies (ICTs)**	**38.3**	**113**	
3.1.1	ICT access*	21.7	130	◇
3.1.2	ICT use*	10.9	128	
3.1.3	Government's online service*	63.2	88	◆
3.1.4	E-participation*	57.3	96	
3.2	**General infrastructure**	**29.8**	**52**	●
3.2.1	Electricity output, kWh/mn pop	132.8	119	
3.2.2	Logistics performance*	n/a	n/a	
3.2.3	Gross capital formation, % GDP	38.5	11	●
3.3	**Ecological sustainability**	**13.9**	**127**	
3.3.1	GDP/unit of energy use	4.2	116	
3.3.2	Environmental performance*	34.4	105	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.0	131	○ ◇
MARKET SOPHISTICATION		**19.6**	**131**	○ ◇
4.1	**Credit**	**10.1**	**128**	◇
4.1.1	Ease of getting credit*	15.0	127	◇
4.1.2	Domestic credit to private sector, % GDP	n/a	n/a	
4.1.3	Microfinance gross loans, % GDP	0.0	66	
4.2	**Investment**	**5.1**	**131**	○ ◇
4.2.1	Ease of protecting minority investors*	10.0	131	○ ◇
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	79	
4.3	**Trade, competition, and market scale**	**43.7**	**127**	
4.3.1	Applied tariff rate, weighted avg., %	12.1	125	◇
4.3.2	Intensity of local competition†	45.6	127	○ ◇
4.3.3	Domestic market scale, bn PPP$	240.2	61	● ◆

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**17.1**	**120**	
5.1	**Knowledge workers**	**5.5**	**128**	◇
5.1.1	Knowledge-intensive employment, %	4.5	115	
5.1.2	Firms offering formal training, %	20.8	72	
5.1.3	GERD performed by business, % GDP	0.0	87	
5.1.4	GERD financed by business, %	1.5	95	
5.1.5	Females employed w/advanced degrees, %	0.3	119	
5.2	**Innovation linkages**	**15.3**	**110**	
5.2.1	University/industry research collaboration†	39.6	76	
5.2.2	State of cluster development†	37.7	105	
5.2.3	GERD financed by abroad, % GDP	0.1	49	●
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	103	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	101	○ ◇
5.3	**Knowledge absorption**	**30.5**	**60**	●
5.3.1	Intellectual property payments, % total trade	0.0	113	
5.3.2	High-tech imports, % total trade	22.2	6	● ◆
5.3.3	ICT services imports, % total trade	0.7	91	
5.3.4	FDI net inflows, % GDP	4.8	28	●
5.3.5	Research talent, % in business enterprise	2.2	76	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**14.7**	**87**	◆
6.1	**Knowledge creation**	**14.2**	**66**	◆
6.1.1	Patents by origin/bn PPP$ GDP	0.1	124	
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP	1.8	12	●
6.1.4	Scientific & technical articles/bn PPP$ GDP	5.5	82	
6.1.5	Citable documents H-index	8.2	84	◆
6.2	**Knowledge impact**	**18.3**	**88**	◆
6.2.1	Growth rate of PPP$ GDP/worker, %	4.9	10	● ◆
6.2.2	New businesses/th pop. 15-64	0.5	97	
6.2.3	Computer software spending, % GDP	0.0	125	○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.2	128	◇
6.2.5	High- and medium-high-tech manufacturing, %	13.5	72	◆
6.3	**Knowledge diffusion**	**11.7**	**112**	
6.3.1	Intellectual property receipts, % total trade	0.0	105	
6.3.2	High-tech net exports, % total trade	0.1	115	
6.3.3	ICT services exports, % total trade	0.6	93	
6.3.4	FDI net outflows, % GDP	4.7	10	● ◆
CREATIVE OUTPUTS		**8.8**	**119**	
7.1	**Intangible assets**	**13.2**	**119**	
7.1.1	Trademarks by origin/bn PPP$ GDP	2.5	126	○ ◇
7.1.2	Global brand value, top 5,000, % GDP	4.2	70	
7.1.3	Industrial designs by origin/bn PPP$ GDP	n/a	n/a	
7.1.4	ICTs & organizational model creation†	38.2	117	
7.2	**Creative goods and services**	**8.7**	**[83]**	
7.2.1	Cultural & 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 & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.8	20	● ◆
7.2.5	Creative goods exports, % total trade	0.0	116	
7.3	**Online creativity**	**0.0**	**131**	○ ◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.0	130	
7.3.2	Country-code TLDs/th pop. 15-69	0.0	131	○ ◇
7.3.3	Wikipedia edits/mn pop. 15-69	n/a	n/a	
7.3.4	Mobile app creation/bn PPP$ GDP	0.0	102	○ ◇

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

FINLAND

GII 2020 rank

7

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
8	8	High	EUR	5.5	264.7	41,883.3	6

		Score/Value	Rank	
INSTITUTIONS		**93.5**	**2**	● ◆
1.1	**Political environment**	**92.2**	**3**	●
1.1.1	Political and operational stability*	87.5	11	
1.1.2	Government effectiveness*	94.5	3	● ◆
1.2	**Regulatory environment**	**95.1**	**5**	●
1.2.1	Regulatory quality*	88.9	7	
1.2.2	Rule of law*	100.0	1	● ◆
1.2.3	Cost of redundancy dismissal, salary weeks	10.1	31	
1.3	**Business environment**	**93.1**	**1**	● ◆
1.3.1	Ease of starting a business*	93.5	29	
1.3.2	Ease of resolving insolvency*	92.7	1	● ◆
HUMAN CAPITAL & RESEARCH		**61.5**	**4**	●
2.1	**Education**	**66.5**	**8**	◆
2.1.1	Expenditure on education, % GDP 🕘	6.9	7	◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	24.8	21	
2.1.3	School life expectancy, years	19.4	4	● ◆
2.1.4	PISA scales in reading, maths, & science	516.4	8	
2.1.5	Pupil-teacher ratio, secondary 🕘	13.6	65	○
2.2	**Tertiary education**	**52.2**	**14**	
2.2.1	Tertiary enrolment, % gross	88.2	7	
2.2.2	Graduates in science & engineering, %	27.3	27	
2.2.3	Tertiary inbound mobility, %	8.2	28	
2.3	**Research & development (R&D)**	**65.7**	**10**	
2.3.1	Researchers, FTE/mn pop	6,861.1	5	
2.3.2	Gross expenditure on R&D, % GDP	2.8	11	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	76.0	12	
2.3.4	QS university ranking, average score top 3*	48.6	19	
INFRASTRUCTURE		**59.9**	**9**	
3.1	**Information & communication technologies (ICTs)**	**87.7**	**18**	
3.1.1	ICT access*	73.7	48	◇
3.1.2	ICT use*	80.4	19	
3.1.3	Government's online service*	96.5	8	
3.1.4	E-participation*	100.0	1	●
3.2	**General infrastructure**	**45.3**	**9**	
3.2.1	Electricity output, kWh/mn pop	12,683.7	10	
3.2.2	Logistics performance*	89.1	10	
3.2.3	Gross capital formation, % GDP	23.8	61	
3.3	**Ecological sustainability**	**46.9**	**25**	
3.3.1	GDP/unit of energy use	6.6	95	○
3.3.2	Environmental performance*	78.9	7	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	5.7	17	◆
MARKET SOPHISTICATION		**53.1**	**33**	
4.1	**Credit**	**50.9**	**31**	
4.1.1	Ease of getting credit*	60.0	74	○
4.1.2	Domestic credit to private sector, % GDP	94.8	27	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**44.1**	**36**	
4.2.1	Ease of protecting minority investors*	62.0	60	○
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	0.1	18	
4.3	**Trade, competition, and market scale**	**64.3**	**56**	◇
4.3.1	Applied tariff rate, weighted avg., %	1.7	22	
4.3.2	Intensity of local competition†	61.7	100	○ ◇
4.3.3	Domestic market scale, bn PPP$	264.7	60	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**59.9**	**8**	
5.1	**Knowledge workers**	**66.9**	**8**	
5.1.1	Knowledge-intensive employment, %	47.8	10	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	1.8	11	
5.1.4	GERD financed by business, %	58.0	14	
5.1.5	Females employed w/advanced degrees, %	27.6	5	◆
5.2	**Innovation linkages**	**68.5**	**3**	● ◆
5.2.1	University/industry research collaboration†	75.8	3	● ◆
5.2.2	State of cluster development†	64.0	20	
5.2.3	GERD financed by abroad, % GDP	0.3	8	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.2	9	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	6.0	7	
5.3	**Knowledge absorption**	**44.2**	**24**	
5.3.1	Intellectual property payments, % total trade	1.0	35	
5.3.2	High-tech imports, % total trade	7.7	64	○
5.3.3	ICT services imports, % total trade	4.1	2	● ◆
5.3.4	FDI net inflows, % GDP	2.2	76	○
5.3.5	Research talent, % in business enterprise	56.3	17	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**55.1**	**6**	
6.1	**Knowledge creation**	**64.2**	**9**	
6.1.1	Patents by origin/bn PPP$ GDP	12.1	7	
6.1.2	PCT patents by origin/bn PPP$ GDP	6.3	5	◆
6.1.3	Utility models by origin/bn PPP$ GDP	1.4	17	
6.1.4	Scientific & technical articles/bn PPP$ GDP	33.5	5	● ◆
6.1.5	Citable documents H-index	43.3	19	
6.2	**Knowledge impact**	**35.2**	**25**	
6.2.1	Growth rate of PPP$ GDP/worker, %	0.4	81	○
6.2.2	New businesses/th pop. 15-64	4.3	35	
6.2.3	Computer software spending, % GDP	0.0	17	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	9.8	27	
6.2.5	High- and medium-high-tech manufacturing, %	34.2	32	
6.3	**Knowledge diffusion**	**65.9**	**3**	● ◆
6.3.1	Intellectual property receipts, % total trade	3.4	1	● ◆
6.3.2	High-tech net exports, % total trade	4.2	39	
6.3.3	ICT services exports, % total trade	7.6	5	● ◆
6.3.4	FDI net outflows, % GDP	4.6	12	
CREATIVE OUTPUTS		**41.8**	**16**	
7.1	**Intangible assets**	**38.9**	**30**	
7.1.1	Trademarks by origin/bn PPP$ GDP	40.8	66	○
7.1.2	Global brand value, top 5,000, % GDP	81.8	25	
7.1.3	Industrial designs by origin/bn PPP$ GDP	3.5	36	
7.1.4	ICTs & organizational model creation†	80.4	3	● ◆
7.2	**Creative goods and services**	**24.4**	**37**	
7.2.1	Cultural & creative services exports, % total trade	0.8	35	
7.2.2	National feature films/mn pop. 15-69	10.7	17	
7.2.3	Entertainment & Media market/th pop. 15-69	58.8	11	
7.2.4	Printing and other media, % manufacturing	1.0	57	○
7.2.5	Creative goods exports, % total trade	0.5	62	
7.3	**Online creativity**	**65.2**	**8**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	28.9	21	
7.3.2	Country-code TLDs/th pop. 15-69	38.8	18	
7.3.3	Wikipedia edits/mn pop. 15-69	93.3	6	◆
7.3.4	Mobile app creation/bn PPP$ GDP	100.0	1	● ◆

NOTES: ● indicates a strength; ○ a weakness; ◆ a strength relative to the other top 25-ranked GII economies; ◇ a weakness relative to the other top 25-ranked GII economies; * an index; † a survey question. 🕘 indicates that the economy's data are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

FRANCE

GII 2020 rank

12

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
12	16	High	EUR	65.1	3,061.1	41,226.7	16

		Score/Value	Rank	
INSTITUTIONS		**83.7**	**19**	
1.1	**Political environment**	**82.9**	**20**	
1.1.1	Political and operational stability*	82.1	29	
1.1.2	Government effectiveness*	83.2	16	
1.2	**Regulatory environment**	**84.3**	**20**	
1.2.1	Regulatory quality*	72.7	27	
1.2.2	Rule of law*	84.2	20	
1.2.3	Cost of redundancy dismissal, salary weeks	13.0	40	
1.3	**Business environment**	**83.9**	**22**	
1.3.1	Ease of starting a business*	93.1	35	
1.3.2	Ease of resolving insolvency*	74.6	24	
HUMAN CAPITAL & RESEARCH		**56.2**	**13**	
2.1	**Education**	**58.7**	**15**	
2.1.1	Expenditure on education, % GDP	5.3	30	
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	15.6	39	
2.1.4	PISA scales in reading, maths, & science	493.7	25	
2.1.5	Pupil-teacher ratio, secondary	12.9	60	○
2.2	**Tertiary education**	**45.4**	**24**	
2.2.1	Tertiary enrolment, % gross	65.6	37	
2.2.2	Graduates in science & engineering, %	25.6	33	
2.2.3	Tertiary inbound mobility, %	10.2	19	
2.3	**Research & development (R&D)**	**64.4**	**12**	
2.3.1	Researchers, FTE/mn pop	4,715.3	19	
2.3.2	Gross expenditure on R&D, % GDP	2.2	12	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	87.2	7	●
2.3.4	QS university ranking, average score top 3*	69.6	11	●
INFRASTRUCTURE		**57.7**	**16**	
3.1	**Information & communication technologies (ICTs)**	**90.8**	**6**	●
3.1.1	ICT access*	85.7	10	●
3.1.2	ICT use*	82.8	14	
3.1.3	Government's online service*	97.9	4	●
3.1.4	E-participation*	96.6	13	
3.2	**General infrastructure**	**39.7**	**23**	
3.2.1	Electricity output, kWh/mn pop	8,558.1	19	
3.2.2	Logistics performance*	83.3	16	
3.2.3	Gross capital formation, % GDP	23.3	66	○
3.3	**Ecological sustainability**	**42.5**	**33**	
3.3.1	GDP/unit of energy use	10.5	48	○
3.3.2	Environmental performance*	80.0	5	●
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.0	42	
MARKET SOPHISTICATION		**59.4**	**18**	
4.1	**Credit**	**48.2**	**42**	
4.1.1	Ease of getting credit*	50.0	94	○
4.1.2	Domestic credit to private sector, % GDP	104.7	23	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**48.8**	**27**	
4.2.1	Ease of protecting minority investors*	68.0	44	○
4.2.2	Market capitalization, % GDP	93.0	13	
4.2.3	Venture capital deals/bn PPP$ GDP	0.2	15	
4.3	**Trade, competition, and market scale**	**81.2**	**5**	●
4.3.1	Applied tariff rate, weighted avg., %	1.7	22	○
4.3.2	Intensity of local competition†	80.0	8	●
4.3.3	Domestic market scale, bn PPP$	3,061.1	10	●

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**50.2**	**21**	
5.1	**Knowledge workers**	**60.6**	**14**	
5.1.1	Knowledge-intensive employment, %	45.6	16	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	1.4	15	
5.1.4	GERD financed by business, %	56.1	17	
5.1.5	Females employed w/advanced degrees, %	22.5	21	
5.2	**Innovation linkages**	**42.0**	**24**	
5.2.1	University/industry research collaboration†	58.5	26	◇
5.2.2	State of cluster development†	62.1	23	
5.2.3	GERD financed by abroad, % GDP	0.2	23	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.1	26	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	3.2	16	
5.3	**Knowledge absorption**	**48.1**	**19**	
5.3.1	Intellectual property payments, % total trade	1.8	15	
5.3.2	High-tech imports, % total trade	9.4	41	
5.3.3	ICT services imports, % total trade	2.2	22	
5.3.4	FDI net inflows, % GDP	1.6	93	○
5.3.5	Research talent, % in business enterprise	62.3	10	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**45.1**	**16**	
6.1	**Knowledge creation**	**46.8**	**18**	
6.1.1	Patents by origin/bn PPP$ GDP	8.3	13	
6.1.2	PCT patents by origin/bn PPP$ GDP	2.6	13	
6.1.3	Utility models by origin/bn PPP$ GDP	0.1	57	○
6.1.4	Scientific & technical articles/bn PPP$ GDP	16.4	36	
6.1.5	Citable documents H-index	79.3	5	● ◆
6.2	**Knowledge impact**	**39.4**	**20**	
6.2.1	Growth rate of PPP$ GDP/worker, %	0.7	68	○
6.2.2	New businesses/th pop. 15-64	4.8	31	
6.2.3	Computer software spending, % GDP	0.0	11	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	7.1	37	
6.2.5	High- and medium-high-tech manufacturing, %	47.2	12	
6.3	**Knowledge diffusion**	**49.1**	**13**	
6.3.1	Intellectual property receipts, % total trade	1.9	11	
6.3.2	High-tech net exports, % total trade	12.9	11	
6.3.3	ICT services exports, % total trade	2.3	48	
6.3.4	FDI net outflows, % GDP	3.2	20	
CREATIVE OUTPUTS		**46.7**	**13**	
7.1	**Intangible assets**	**56.4**	**6**	●
7.1.1	Trademarks by origin/bn PPP$ GDP	103.9	9	●
7.1.2	Global brand value, top 5,000, % GDP	178.0	5	●
7.1.3	Industrial designs by origin/bn PPP$ GDP	6.3	21	
7.1.4	ICTs & organizational model creation†	70.9	19	
7.2	**Creative goods and services**	**28.4**	**31**	
7.2.1	Cultural & creative services exports, % total trade	1.3	19	
7.2.2	National feature films/mn pop. 15-69	6.8	33	
7.2.3	Entertainment & Media market/th pop. 15-69	53.3	15	
7.2.4	Printing and other media, % manufacturing	1.0	61	○
7.2.5	Creative goods exports, % total trade	1.7	32	
7.3	**Online creativity**	**45.6**	**25**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	40.5	18	
7.3.2	Country-code TLDs/th pop. 15-69	23.7	27	
7.3.3	Wikipedia edits/mn pop. 15-69	86.1	12	
7.3.4	Mobile app creation/bn PPP$ GDP	32.9	16	

NOTES: ● indicates a strength; ○ a weakness; ◆ a strength relative to the other top 25-ranked GII economies; ◇ a weakness relative to the other top 25-ranked GII economies; * an index; † a survey question. 🕘 indicates that the economy's data are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

GEORGIA

GII 2020 rank

63

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
71	**54**	**Upper middle**	**NAWA**	**4.0**	**45.4**	**10,674.9**	**48**

		Score/Value	Rank	
INSTITUTIONS		**75.1**	**36**	◆
1.1	**Political environment**	**66.4**	**44**	◆
1.1.1	Political and operational stability*	71.4	59	
1.1.2	Government effectiveness*	63.9	41	◆
1.2	**Regulatory environment**	**81.0**	**26**	◆
1.2.1	Regulatory quality*	71.4	28	◆
1.2.2	Rule of law*	55.2	48	◆
1.2.3	Cost of redundancy dismissal, salary weeks	8.6	16	●
1.3	**Business environment**	**77.9**	**40**	
1.3.1	Ease of starting a business*	99.6	2	● ◆
1.3.2	Ease of resolving insolvency*	56.2	59	
HUMAN CAPITAL & RESEARCH		**31.6**	**61**	
2.1	**Education**	**47.0**	**62**	
2.1.1	Expenditure on education, % GDP 🕘	3.8	78	
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	15.3	44	
2.1.4	PISA scales in reading, maths, & science	386.7	70	○
2.1.5	Pupil-teacher ratio, secondary	7.6	4	● ◆
2.2	**Tertiary education**	**42.0**	**38**	
2.2.1	Tertiary enrolment, % gross	63.9	41	
2.2.2	Graduates in science & engineering, %	24.6	40	
2.2.3	Tertiary inbound mobility, %	8.1	29	◆
2.3	**Research & development (R&D)**	**5.8**	**75**	
2.3.1	Researchers, FTE/mn pop	1,463.8	45	
2.3.2	Gross expenditure on R&D, % GDP	0.3	80	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**37.4**	**81**	
3.1	**Information & communication technologies (ICTs)**	**64.8**	**71**	
3.1.1	ICT access*	70.4	60	
3.1.2	ICT use*	57.1	62	
3.1.3	Government's online service*	69.4	71	
3.1.4	E-participation*	62.4	85	
3.2	**General infrastructure**	**26.3**	**71**	
3.2.1	Electricity output, kWh/mn pop	3,099.8	63	
3.2.2	Logistics performance*	17.5	111	○ ◇
3.2.3	Gross capital formation, % GDP	34.3	18	● ◆
3.3	**Ecological sustainability**	**21.2**	**93**	◇
3.3.1	GDP/unit of energy use	7.4	86	
3.3.2	Environmental performance*	41.3	86	◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.4	90	
MARKET SOPHISTICATION		**51.8**	**39**	
4.1	**Credit**	**50.9**	**30**	◆
4.1.1	Ease of getting credit*	85.0	14	●
4.1.2	Domestic credit to private sector, % GDP	68.0	48	
4.1.3	Microfinance gross loans, % GDP	1.8	17	
4.2	**Investment**	**45.7**	**32**	
4.2.1	Ease of protecting minority investors*	84.0	7	● ◆
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	38	
4.3	**Trade, competition, and market scale**	**58.8**	**81**	
4.3.1	Applied tariff rate, weighted avg., % 🕘	0.7	6	●
4.3.2	Intensity of local competition†	62.7	95	
4.3.3	Domestic market scale, bn PPP$	45.4	105	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**23.5**	**79**	
5.1	**Knowledge workers**	**30.0**	**65**	
5.1.1	Knowledge-intensive employment, %	25.6	56	
5.1.2	Firms offering formal training, %	32.0	44	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	1.7	92	○ ◇
5.1.5	Females employed w/advanced degrees, %	18.5	33	
5.2	**Innovation linkages**	**16.2**	**102**	
5.2.1	University/industry research collaboration† 🕘	32.0	104	○
5.2.2	State of cluster development† 🕘	34.8	113	○ ◇
5.2.3	GERD financed by abroad, % GDP	0.0	61	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.1	39	◆
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.1	59	
5.3	**Knowledge absorption**	**24.3**	**82**	
5.3.1	Intellectual property payments, % total trade	0.3	84	
5.3.2	High-tech imports, % total trade	7.6	67	
5.3.3	ICT services imports, % total trade	0.9	84	
5.3.4	FDI net inflows, % GDP	9.9	10	● ◆
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**19.0**	**67**	
6.1	**Knowledge creation**	**19.5**	**52**	
6.1.1	Patents by origin/bn PPP$ GDP	2.4	34	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	56	
6.1.3	Utility models by origin/bn PPP$ GDP	1.2	19	
6.1.4	Scientific & technical articles/bn PPP$ GDP	13.3	42	
6.1.5	Citable documents H-index	10.8	72	
6.2	**Knowledge impact**	**25.0**	**63**	
6.2.1	Growth rate of PPP$ GDP/worker, %	5.2	7	● ◆
6.2.2	New businesses/th pop. 15-64	10.4	11	● ◆
6.2.3	Computer software spending, % GDP	0.0	88	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	4.1	60	
6.2.5	High- and medium-high-tech manufacturing, %	7.6	90	○
6.3	**Knowledge diffusion**	**12.5**	**105**	
6.3.1	Intellectual property receipts, % total trade	0.0	93	○
6.3.2	High-tech net exports, % total trade	0.3	93	
6.3.3	ICT services exports, % total trade	0.9	85	
6.3.4	FDI net outflows, % GDP	1.9	38	
CREATIVE OUTPUTS		**20.3**	**68**	
7.1	**Intangible assets**	**25.1**	**73**	
7.1.1	Trademarks by origin/bn PPP$ GDP	65.1	31	
7.1.2	Global brand value, top 5,000, % GDP	9.1	62	
7.1.3	Industrial designs by origin/bn PPP$ GDP	4.8	25	
7.1.4	ICTs & organizational model creation†	43.6	101	○ ◇
7.2	**Creative goods and services**	**11.7**	**72**	
7.2.1	Cultural & creative services exports, % total trade	0.2	70	
7.2.2	National feature films/mn pop. 15-69	6.7	34	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.5	28	
7.2.5	Creative goods exports, % total trade	0.1	98	
7.3	**Online creativity**	**19.4**	**54**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	1.7	86	
7.3.2	Country-code TLDs/th pop. 15-69	3.9	58	
7.3.3	Wikipedia edits/mn pop. 15-69	70.7	37	◆
7.3.4	Mobile app creation/bn PPP$ GDP	3.0	62	

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

GERMANY

GII 2020 rank

9

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
7	14	High	EUR	83.5	4,444.4	46,765.5	9

		Score/Value	Rank	
INSTITUTIONS		**84.6**	**18**	
1.1	**Political environment**	**86.1**	**14**	
1.1.1	Political and operational stability*	85.7	17	
1.1.2	Government effectiveness*	86.3	13	
1.2	**Regulatory environment**	**80.9**	**28**	
1.2.1	Regulatory quality*	87.9	12	
1.2.2	Rule of law*	89.2	16	
1.2.3	Cost of redundancy dismissal, salary weeks	21.6	90	○ ◇
1.3	**Business environment**	**86.7**	**14**	
1.3.1	Ease of starting a business*	83.7	96	○ ◇
1.3.2	Ease of resolving insolvency*	89.8	4	● ◆
HUMAN CAPITAL & RESEARCH		**61.1**	**5**	●
2.1	**Education**	**54.6**	**38**	
2.1.1	Expenditure on education, % GDP 🕘	4.8	50	
2.1.2	Government funding/pupil, secondary, % GDP/cap	23.0	28	
2.1.3	School life expectancy, years	17.0	17	
2.1.4	PISA scales in reading, maths, & science	500.4	18	
2.1.5	Pupil-teacher ratio, secondary 🕘	12.0	54	
2.2	**Tertiary education**	**56.1**	**6**	●
2.2.1	Tertiary enrolment, % gross	70.2	28	
2.2.2	Graduates in science & engineering, %	35.6	6	● ◆
2.2.3	Tertiary inbound mobility, %	8.4	25	
2.3	**Research & development (R&D)**	**72.7**	**7**	●
2.3.1	Researchers, FTE/mn pop	5,211.9	15	
2.3.2	Gross expenditure on R&D, % GDP	3.1	7	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	95.6	2	● ◆
2.3.4	QS university ranking, average score top 3*	70.1	10	
INFRASTRUCTURE		**58.0**	**12**	
3.1	**Information & communication technologies (ICTs)**	**88.5**	**15**	
3.1.1	ICT access*	88.5	7	●
3.1.2	ICT use*	80.3	20	
3.1.3	Government's online service*	93.1	17	
3.1.4	E-participation*	92.1	23	
3.2	**General infrastructure**	**42.1**	**19**	
3.2.1	Electricity output, kWh/mn pop	7,764.6	27	
3.2.2	Logistics performance*	100.0	1	● ◆
3.2.3	Gross capital formation, % GDP	21.8	79	○
3.3	**Ecological sustainability**	**43.5**	**31**	
3.3.1	GDP/unit of energy use	12.3	32	
3.3.2	Environmental performance*	77.2	10	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.9	48	
MARKET SOPHISTICATION		**56.1**	**24**	
4.1	**Credit**	**51.9**	**29**	
4.1.1	Ease of getting credit*	70.0	44	○
4.1.2	Domestic credit to private sector, % GDP	77.7	38	◇
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**35.1**	**75**	○ ◇
4.2.1	Ease of protecting minority investors*	62.0	60	○
4.2.2	Market capitalization, % GDP	51.9	31	
4.2.3	Venture capital deals/bn PPP$ GDP	0.1	23	
4.3	**Trade, competition, and market scale**	**81.2**	**6**	●
4.3.1	Applied tariff rate, weighted avg., %	1.7	22	
4.3.2	Intensity of local competition†	76.3	18	
4.3.3	Domestic market scale, bn PPP$	4,444.4	5	●

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**53.7**	**12**	
5.1	**Knowledge workers**	**65.0**	**11**	
5.1.1	Knowledge-intensive employment, %	45.2	17	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	2.2	7	
5.1.4	GERD financed by business, %	66.2	7	
5.1.5	Females employed w/advanced degrees, %	13.5	51	◇
5.2	**Innovation linkages**	**53.7**	**13**	
5.2.1	University/industry research collaboration†	70.7	8	
5.2.2	State of cluster development†	73.5	3	● ◆
5.2.3	GERD financed by abroad, % GDP	0.2	21	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.1	30	◇
5.2.5	Patent families 2+ offices/bn PPP$ GDP	5.6	9	
5.3	**Knowledge absorption**	**42.5**	**26**	
5.3.1	Intellectual property payments, % total trade	0.8	49	
5.3.2	High-tech imports, % total trade	9.9	34	
5.3.3	ICT services imports, % total trade	2.1	25	
5.3.4	FDI net inflows, % GDP	2.3	74	○
5.3.5	Research talent, % in business enterprise	60.4	15	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**51.7**	**10**	
6.1	**Knowledge creation**	**68.0**	**5**	●
6.1.1	Patents by origin/bn PPP$ GDP	16.9	1	● ◆
6.1.2	PCT patents by origin/bn PPP$ GDP	4.4	9	
6.1.3	Utility models by origin/bn PPP$ GDP	2.0	11	
6.1.4	Scientific & technical articles/bn PPP$ GDP	16.8	34	
6.1.5	Citable documents H-index	87.4	3	● ◆
6.2	**Knowledge impact**	**41.3**	**15**	
6.2.1	Growth rate of PPP$ GDP/worker, %	0.3	84	○
6.2.2	New businesses/th pop. 15-64	1.4	73	○
6.2.3	Computer software spending, % GDP	0.0	18	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	11.5	25	
6.2.5	High- and medium-high-tech manufacturing, %	56.5	7	
6.3	**Knowledge diffusion**	**45.8**	**17**	
6.3.1	Intellectual property receipts, % total trade	1.3	17	
6.3.2	High-tech net exports, % total trade	12.1	12	
6.3.3	ICT services exports, % total trade	2.3	44	
6.3.4	FDI net outflows, % GDP	3.6	16	
CREATIVE OUTPUTS		**49.1**	**9**	
7.1	**Intangible assets**	**54.8**	**7**	●
7.1.1	Trademarks by origin/bn PPP$ GDP	61.1	33	
7.1.2	Global brand value, top 5,000, % GDP	143.4	11	
7.1.3	Industrial designs by origin/bn PPP$ GDP	13.7	7	◆
7.1.4	ICTs & organizational model creation†	78.0	8	
7.2	**Creative goods and services**	**27.6**	**33**	
7.2.1	Cultural & creative services exports, % total trade	0.9	31	
7.2.2	National feature films/mn pop. 15-69	4.0	49	○
7.2.3	Entertainment & Media market/th pop. 15-69	57.1	12	
7.2.4	Printing and other media, % manufacturing	1.0	56	○
7.2.5	Creative goods exports, % total trade	2.1	28	
7.3	**Online creativity**	**59.1**	**11**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	52.5	14	
7.3.2	Country-code TLDs/th pop. 15-69	84.5	6	● ◆
7.3.3	Wikipedia edits/mn pop. 15-69	86.4	11	
7.3.4	Mobile app creation/bn PPP$ GDP	13.7	35	

NOTES: ● indicates a strength; ○ a weakness; ◆ a strength relative to the other top 25-ranked GII economies; ◇ a weakness relative to the other top 25-ranked GII economies; * an index; † a survey question. 🕘 indicates that the economy's data are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

GHANA

GII 2020 rank

108

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
93	**113**	**Lower middle**	**SSF**	**30.4**	**209.8**	**6,072.6**	**106**

		Score/Value	Rank	
INSTITUTIONS		**46.3**	**121**	
1.1	**Political environment**	**52.9**	**83**	
1.1.1	Political and operational stability*	67.9	73	
1.1.2	Government effectiveness*	45.4	82	
1.2	**Regulatory environment**	**30.7**	**127**	◇
1.2.1	Regulatory quality*	39.7	79	
1.2.2	Rule of law*	48.5	59	◆
1.2.3	Cost of redundancy dismissal, salary weeks	49.8	126	○ ◇
1.3	**Business environment**	**55.2**	**118**	
1.3.1	Ease of starting a business*	85.0	89	
1.3.2	Ease of resolving insolvency*	25.4	127	
HUMAN CAPITAL & RESEARCH		**17.2**	**104**	
2.1	**Education**	**36.0**	**92**	
2.1.1	Expenditure on education, % GDP	4.0	73	
2.1.2	Government funding/pupil, secondary, % GDP/cap	19.3	53	
2.1.3	School life expectancy, years	11.5	97	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	15.2	75	
2.2	**Tertiary education**	**13.7**	**108**	
2.2.1	Tertiary enrolment, % gross	15.7	98	
2.2.2	Graduates in science & engineering, %	16.4	86	
2.2.3	Tertiary inbound mobility, %	2.2	74	
2.3	**Research & development (R&D)**	**1.9**	**97**	
2.3.1	Researchers, FTE/mn pop	38.0	98	
2.3.2	Gross expenditure on R&D, % GDP	0.4	72	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**32.5**	**96**	
3.1	**Information & communication technologies (ICTs)**	**55.6**	**87**	
3.1.1	ICT access*	46.2	97	
3.1.2	ICT use*	43.7	87	
3.1.3	Government's online service*	69.4	71	
3.1.4	E-participation*	62.9	83	
3.2	**General infrastructure**	**19.2**	**103**	
3.2.1	Electricity output, kWh/mn pop	488.0	106	
3.2.2	Logistics performance*	23.2	101	
3.2.3	Gross capital formation, % GDP	25.8	44	●
3.3	**Ecological sustainability**	**22.7**	**87**	
3.3.1	GDP/unit of energy use	12.5	29	● ◆
3.3.2	Environmental performance*	27.6	124	◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	105	
MARKET SOPHISTICATION		**37.1**	**111**	
4.1	**Credit**	**26.9**	**115**	
4.1.1	Ease of getting credit*	60.0	74	
4.1.2	Domestic credit to private sector, % GDP	11.7	124	◇
4.1.3	Microfinance gross loans, % GDP	0.6	32	●
4.2	**Investment**	**31.9**	**89**	
4.2.1	Ease of protecting minority investors*	60.0	71	
4.2.2	Market capitalization, % GDP	8.5	67	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**52.7**	**104**	
4.3.1	Applied tariff rate, weighted avg., %	10.3	117	◇
4.3.2	Intensity of local competition†	63.4	88	
4.3.3	Domestic market scale, bn PPP$	209.8	62	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**17.9**	**113**	
5.1	**Knowledge workers**	**15.1**	**109**	
5.1.1	Knowledge-intensive employment, %	12.2	102	
5.1.2	Firms offering formal training, %	40.1	29	●
5.1.3	GERD performed by business, % GDP	0.0	88	○ ◇
5.1.4	GERD financed by business, %	0.1	101	○ ◇
5.1.5	Females employed w/advanced degrees, %	3.5	96	
5.2	**Innovation linkages**	**21.5**	**61**	
5.2.1	University/industry research collaboration†	48.2	44	● ◆
5.2.2	State of cluster development†	49.5	50	
5.2.3	GERD financed by abroad, % GDP	0.1	33	●
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	90	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	101	○ ◇
5.3	**Knowledge absorption**	**17.1**	**[117]**	
5.3.1	Intellectual property payments, % total trade	n/a	n/a	
5.3.2	High-tech imports, % total trade	3.4	125	
5.3.3	ICT services imports, % total trade	n/a	n/a	
5.3.4	FDI net inflows, % GDP	5.5	22	●
5.3.5	Research talent, % in business enterprise	1.0	80	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**12.6**	**104**	
6.1	**Knowledge creation**	**4.4**	**112**	
6.1.1	Patents by origin/bn PPP$ GDP	0.1	122	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	100	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	70	○
6.1.4	Scientific & technical articles/bn PPP$ GDP	4.4	94	
6.1.5	Citable documents H-index	8.6	83	
6.2	**Knowledge impact**	**16.8**	**93**	
6.2.1	Growth rate of PPP$ GDP/worker, %	4.3	17	●
6.2.2	New businesses/th pop. 15-64	0.9	85	
6.2.3	Computer software spending, % GDP	0.0	123	○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.4	123	◇
6.2.5	High- and medium-high-tech manufacturing, %	10.6	78	
6.3	**Knowledge diffusion**	**16.7**	**[86]**	
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	High-tech net exports, % total trade	0.2	97	
6.3.3	ICT services exports, % total trade	n/a	n/a	
6.3.4	FDI net outflows, % GDP	0.1	110	
CREATIVE OUTPUTS		**16.1**	**90**	
7.1	**Intangible assets**	**24.5**	**75**	
7.1.1	Trademarks by origin/bn PPP$ GDP	4.3	122	
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	4.1	29	●
7.1.4	ICTs & organizational model creation†	49.7	84	
7.2	**Creative goods and services**	**10.0**	**[77]**	
7.2.1	Cultural & 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 & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.6	25	●
7.2.5	Creative goods exports, % total trade	0.0	127	○
7.3	**Online creativity**	**5.2**	**108**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.6	104	
7.3.2	Country-code TLDs/th pop. 15-69	0.1	121	
7.3.3	Wikipedia edits/mn pop. 15-69	19.3	109	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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

GREECE

GII 2020 rank

43

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
52	40	High	EUR	10.5	324.1	26,410.8	41

		Score/Value	Rank	
INSTITUTIONS		**68.0**	**52**	◇
1.1	**Political environment**	**62.3**	**53**	◇
1.1.1	Political and operational stability*	71.4	59	◇
1.1.2	Government effectiveness*	57.7	51	◇
1.2	**Regulatory environment**	**67.2**	**59**	◇
1.2.1	Regulatory quality*	49.6	57	◇
1.2.2	Rule of law*	50.7	55	◇
1.2.3	Cost of redundancy dismissal, salary weeks	15.9	64	
1.3	**Business environment**	**74.6**	**53**	
1.3.1	Ease of starting a business*	96.0	11	● ◆
1.3.2	Ease of resolving insolvency*	53.1	66	
HUMAN CAPITAL & RESEARCH		**49.9**	**20**	●
2.1	**Education**	**53.7**	**42**	
2.1.1	Expenditure on education, % GDP	3.9	77	
2.1.2	Government funding/pupil, secondary, % GDP/cap	22.4	32	
2.1.3	School life expectancy, years	19.1	5	● ◆
2.1.4	PISA scales in reading, maths, & science	453.5	43	
2.1.5	Pupil-teacher ratio, secondary ⓘ	8.6	15	●
2.2	**Tertiary education**	**64.6**	**3**	● ◆
2.2.1	Tertiary enrolment, % gross	136.6	1	● ◆
2.2.2	Graduates in science & engineering, %	29.4	17	●
2.2.3	Tertiary inbound mobility, %	3.4	61	
2.3	**Research & development (R&D)**	**31.3**	**37**	
2.3.1	Researchers, FTE/mn pop	3,482.7	28	
2.3.2	Gross expenditure on R&D, % GDP	1.2	34	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	38.4	40	
2.3.4	QS university ranking, average score top 3*	21.6	47	
INFRASTRUCTURE		**49.9**	**41**	
3.1	**Information & communication technologies (ICTs)**	**80.6**	**32**	
3.1.1	ICT access*	80.6	26	
3.1.2	ICT use*	72.4	36	
3.1.3	Government's online service*	81.9	41	
3.1.4	E-participation*	87.6	34	
3.2	**General infrastructure**	**22.0**	**87**	◇
3.2.1	Electricity output, kWh/mn pop	4,898.0	43	
3.2.2	Logistics performance*	53.2	41	
3.2.3	Gross capital formation, % GDP	13.9	122	○ ◇
3.3	**Ecological sustainability**	**46.9**	**26**	
3.3.1	GDP/unit of energy use	11.6	37	
3.3.2	Environmental performance*	69.1	25	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	4.5	21	●
MARKET SOPHISTICATION		**46.0**	**75**	
4.1	**Credit**	**42.1**	**63**	
4.1.1	Ease of getting credit*	45.0	101	○ ◇
4.1.2	Domestic credit to private sector, % GDP	89.2	29	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**28.5**	**101**	○
4.2.1	Ease of protecting minority investors*	70.0	36	
4.2.2	Market capitalization, % GDP	20.5	58	○
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	41	
4.3	**Trade, competition, and market scale**	**67.6**	**43**	
4.3.1	Applied tariff rate, weighted avg., %	1.7	22	
4.3.2	Intensity of local competition†	67.9	69	
4.3.3	Domestic market scale, bn PPP$	324.1	55	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**26.4**	**62**	◇
5.1	**Knowledge workers**	**36.0**	**56**	
5.1.1	Knowledge-intensive employment, %	30.0	46	
5.1.2	Firms offering formal training, % ⓘ	21.6	71	
5.1.3	GERD performed by business, % GDP	0.6	35	
5.1.4	GERD financed by business, %	42.6	41	
5.1.5	Females employed w/advanced degrees, %	18.0	35	
5.2	**Innovation linkages**	**18.8**	**80**	◇
5.2.1	University/industry research collaboration†	27.9	119	○ ◇
5.2.2	State of cluster development†	31.8	118	○ ◇
5.2.3	GERD financed by abroad, % GDP	0.2	24	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	62	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.3	38	
5.3	**Knowledge absorption**	**24.5**	**80**	◇
5.3.1	Intellectual property payments, % total trade	0.5	68	
5.3.2	High-tech imports, % total trade	5.5	104	○
5.3.3	ICT services imports, % total trade	1.1	66	
5.3.4	FDI net inflows, % GDP	1.6	94	
5.3.5	Research talent, % in business enterprise	27.4	45	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**27.3**	**47**	
6.1	**Knowledge creation**	**24.5**	**42**	
6.1.1	Patents by origin/bn PPP$ GDP	1.8	43	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.4	37	
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	62	○
6.1.4	Scientific & technical articles/bn PPP$ GDP	22.2	23	●
6.1.5	Citable documents H-index	32.7	29	
6.2	**Knowledge impact**	**35.0**	**26**	
6.2.1	Growth rate of PPP$ GDP/worker, %	0.0	91	○
6.2.2	New businesses/th pop. 15-64	1.4	71	
6.2.3	Computer software spending, % GDP	0.0	13	●
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	20.7	13	● ◆
6.2.5	High- and medium-high-tech manufacturing, %	13.3	73	◇
6.3	**Knowledge diffusion**	**22.3**	**69**	
6.3.1	Intellectual property receipts, % total trade	0.1	53	
6.3.2	High-tech net exports, % total trade	2.1	53	
6.3.3	ICT services exports, % total trade	1.5	69	
6.3.4	FDI net outflows, % GDP	-0.2	122	○
CREATIVE OUTPUTS		**23.8**	**59**	◇
7.1	**Intangible assets**	**22.1**	**87**	◇
7.1.1	Trademarks by origin/bn PPP$ GDP	n/a	n/a	
7.1.2	Global brand value, top 5,000, % GDP	3.3	73	◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	3.7	34	
7.1.4	ICTs & organizational model creation†	44.6	97	○ ◇
7.2	**Creative goods and services**	**23.4**	**43**	
7.2.1	Cultural & creative services exports, % total trade	0.8	32	
7.2.2	National feature films/mn pop. 15-69	11.5	14	●
7.2.3	Entertainment & Media market/th pop. 15-69	23.9	28	
7.2.4	Printing and other media, % manufacturing	1.2	39	
7.2.5	Creative goods exports, % total trade	1.3	39	
7.3	**Online creativity**	**27.4**	**38**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	12.8	35	
7.3.2	Country-code TLDs/th pop. 15-69	19.2	30	
7.3.3	Wikipedia edits/mn pop. 15-69	74.8	31	
7.3.4	Mobile app creation/bn PPP$ GDP	4.4	57	

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

GUATEMALA

GII 2020 rank

106

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
96	110	Upper middle	LCN	17.6	153.3	7,599.6	107

		Score/Value	Rank	
INSTITUTIONS		**48.0**	**117**	◇
1.1	**Political environment**	**41.7**	**115**	◇
1.1.1	Political and operational stability*	55.4	116	◇
1.1.2	Government effectiveness*	34.9	115	◇
1.2	**Regulatory environment**	**45.2**	**114**	◇
1.2.1	Regulatory quality*	36.6	86	
1.2.2	Rule of law*	19.3	123	◇
1.2.3	Cost of redundancy dismissal, salary weeks	27.0	106	
1.3	**Business environment**	**57.2**	**113**	◇
1.3.1	Ease of starting a business*	86.8	77	
1.3.2	Ease of resolving insolvency*	27.6	124	◇
HUMAN CAPITAL & RESEARCH		**10.8**	**123**	◇
2.1	**Education**	**24.3**	**118**	◇
2.1.1	Expenditure on education, % GDP	2.9	100	
2.1.2	Government funding/pupil, secondary, % GDP/cap	5.4	103	○ ◇
2.1.3	School life expectancy, years	10.8	102	◇
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	10.5	39	●
2.2	**Tertiary education**	**8.0**	**116**	◇
2.2.1	Tertiary enrolment, % gross	21.8	92	◇
2.2.2	Graduates in science & engineering, %	9.8	105	○ ◇
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research & development (R&D)**	**0.1**	**119**	
2.3.1	Researchers, FTE/mn pop	14.1	106	○ ◇
2.3.2	Gross expenditure on R&D, % GDP	0.0	114	○ ◇
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**25.9**	**113**	◇
3.1	**Information & communication technologies (ICTs)**	**50.8**	**95**	
3.1.1	ICT access*	47.8	93	◇
3.1.2	ICT use*	28.9	105	◇
3.1.3	Government's online service*	64.6	84	
3.1.4	E-participation*	61.8	89	
3.2	**General infrastructure**	**7.6**	**129**	◇
3.2.1	Electricity output, kWh/mn pop	766.4	101	◇
3.2.2	Logistics performance*	16.2	114	◇
3.2.3	Gross capital formation, % GDP	11.9	124	○ ◇
3.3	**Ecological sustainability**	**19.3**	**107**	◇
3.3.1	GDP/unit of energy use	9.0	69	
3.3.2	Environmental performance*	31.8	115	◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.1	124	
MARKET SOPHISTICATION		**45.5**	**79**	
4.1	**Credit**	**39.6**	**72**	
4.1.1	Ease of getting credit*	85.0	14	●
4.1.2	Domestic credit to private sector, % GDP	32.8	91	
4.1.3	Microfinance gross loans, % GDP	0.2	52	
4.2	**Investment**	**30.0**	**[94]**	
4.2.1	Ease of protecting minority investors*	30.0	121	◇
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**66.9**	**47**	●
4.3.1	Applied tariff rate, weighted avg., %	1.4	16	●
4.3.2	Intensity of local competition†	72.8	41	●
4.3.3	Domestic market scale, bn PPP$	153.3	73	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**22.6**	**82**	
5.1	**Knowledge workers**	**20.9**	**99**	
5.1.1	Knowledge-intensive employment, %	9.1	107	◇
5.1.2	Firms offering formal training, %	55.7	9	● ◆
5.1.3	GERD performed by business, % GDP	0.0	88	○ ◇
5.1.4	GERD financed by business, %	10.3	76	
5.1.5	Females employed w/advanced degrees, %	2.2	100	◇
5.2	**Innovation linkages**	**14.7**	**113**	
5.2.1	University/industry research collaboration†	37.7	85	
5.2.2	State of cluster development†	44.3	79	
5.2.3	GERD financed by abroad, % GDP	0.0	72	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	120	◇
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	91	
5.3	**Knowledge absorption**	**32.0**	**54**	●
5.3.1	Intellectual property payments, % total trade	1.1	33	●
5.3.2	High-tech imports, % total trade	10.0	30	●
5.3.3	ICT services imports, % total trade	0.9	79	
5.3.4	FDI net inflows, % GDP	1.5	102	
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**10.2**	**116**	◇
6.1	**Knowledge creation**	**1.4**	**129**	◇
6.1.1	Patents by origin/bn PPP$ GDP	0.0	128	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	100	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.1	58	
6.1.4	Scientific & technical articles/bn PPP$ GDP	0.4	129	○ ◇
6.1.5	Citable documents H-index	4.6	111	
6.2	**Knowledge impact**	**9.8**	**118**	◇
6.2.1	Growth rate of PPP$ GDP/worker, %	-0.1	94	
6.2.2	New businesses/th pop. 15-64	0.5	96	
6.2.3	Computer software spending, % GDP	0.0	120	◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.3	95	
6.2.5	High- and medium-high-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**19.3**	**82**	
6.3.1	Intellectual property receipts, % total trade	0.0	97	◇
6.3.2	High-tech net exports, % total trade	1.4	63	
6.3.3	ICT services exports, % total trade	1.4	72	
6.3.4	FDI net outflows, % GDP	0.1	109	
CREATIVE OUTPUTS		**18.1**	**81**	
7.1	**Intangible assets**	**30.7**	**49**	●
7.1.1	Trademarks by origin/bn PPP$ GDP	44.7	57	●
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.2	98	
7.1.4	ICTs & organizational model creation†	57.0	56	●
7.2	**Creative goods and services**	**3.2**	**[111]**	
7.2.1	Cultural & creative services exports, % total trade	0.1	88	
7.2.2	National feature films/mn pop. 15-69	1.2	82	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.3	74	
7.3	**Online creativity**	**7.7**	**97**	◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	4.1	58	●
7.3.2	Country-code TLDs/th pop. 15-69	0.5	97	
7.3.3	Wikipedia edits/mn pop. 15-69	30.1	93	◇
7.3.4	Mobile app creation/bn PPP$ GDP	0.0	101	○

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

GUINEA

GII 2020 rank

130

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
122	128	Low	SSF	12.8	33.3	2,131.2	125

		Score/Value	Rank	
INSTITUTIONS		**52.2**	**105**	
1.1	**Political environment**	**38.0**	**124**	
1.1.1	Political and operational stability*	57.1	110	
1.1.2	Government effectiveness*	28.5	123	
1.2	**Regulatory environment**	**57.0**	**88**	
1.2.1	Regulatory quality*	21.3	117	
1.2.2	Rule of law*	15.1	128	◇
1.2.3	Cost of redundancy dismissal, salary weeks	10.1	30	●
1.3	**Business environment**	**61.5**	**102**	
1.3.1	Ease of starting a business*	84.5	94	
1.3.2	Ease of resolving insolvency*	38.6	103	
HUMAN CAPITAL & RESEARCH		**6.1**	**131**	○ ◇
2.1	**Education**	**11.9**	**130**	○ ◇
2.1.1	Expenditure on education, % GDP	2.6	107	◇
2.1.2	Government funding/pupil, secondary, % GDP/cap.	8.2	99	◇
2.1.3	School life expectancy, years	9.0	113	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	33.1	120	
2.2	**Tertiary education**	**6.6**	**121**	
2.2.1	Tertiary enrolment, % gross	11.6	106	
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	0.9	90	
2.3	**Research & development (R&D)**	**0.0**	**[121]**	
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 R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**16.9**	**130**	○ ◇
3.1	**Information & communication technologies (ICTs)**	**27.9**	**124**	
3.1.1	ICT access*	31.0	121	
3.1.2	ICT use*	13.9	122	
3.1.3	Government's online service*	31.3	119	
3.1.4	E-participation*	35.4	116	
3.2	**General infrastructure**	**9.2**	**128**	◇
3.2.1	Electricity output, kWh/mn pop	n/a	n/a	
3.2.2	Logistics performance*	6.1	122	○ ◇
3.2.3	Gross capital formation, % GDP	15.4	120	
3.3	**Ecological sustainability**	**13.6**	**128**	
3.3.1	GDP/unit of energy use	n/a	n/a	
3.3.2	Environmental performance*	26.4	127	○ ◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.1	122	
MARKET SOPHISTICATION		**29.4**	**126**	
4.1	**Credit**	**13.3**	**127**	
4.1.1	Ease of getting credit*	30.0	122	
4.1.2	Domestic credit to private sector, % GDP	9.7	127	○
4.1.3	Microfinance gross loans, % GDP	0.2	50	●
4.2	**Investment**	**26.0**	**[110]**	
4.2.1	Ease of protecting minority investors*	26.0	125	◇
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**48.9**	**119**	
4.3.1	Applied tariff rate, weighted avg., %	11.3	122	
4.3.2	Intensity of local competition†	75.9	21	● ◆
4.3.3	Domestic market scale, bn PPP$	33.3	117	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**20.9**	**[93]**	
5.1	**Knowledge workers**	**13.8**	**[112]**	
5.1.1	Knowledge-intensive employment, %	n/a	n/a	
5.1.2	Firms offering formal training, %	16.0	85	◇
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**	**34.9**	**[30]**	
5.2.1	University/industry research collaboration†	68.5	13	● ◆
5.2.2	State of cluster development†	52.5	43	● ◆
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	n/a	n/a	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	74	● ◆
5.3	**Knowledge absorption**	**14.0**	**131**	○ ◇
5.3.1	Intellectual property payments, % total trade	0.0	111	
5.3.2	High-tech imports, % total trade	2.1	128	○ ◇
5.3.3	ICT services imports, % total trade	0.2	121	
5.3.4	FDI net inflows, % GDP	9.2	11	● ◆
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**4.0**	**131**	○ ◇
6.1	**Knowledge creation**	**1.4**	**128**	◇
6.1.1	Patents by origin/bn PPP$ GDP	0.0	129	○
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	100	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	1.3	121	◇
6.1.5	Citable documents H-index	2.5	126	◇
6.2	**Knowledge impact**	**1.6**	**[130]**	
6.2.1	Growth rate of PPP$ GDP/worker, %	n/a	n/a	
6.2.2	New businesses/th pop. 15-64	0.4	102	
6.2.3	Computer software spending, % GDP	0.0	107	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.3	125	
6.2.5	High- and medium-high-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**9.0**	**126**	◇
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	High-tech net exports, % total trade	0.1	108	
6.3.3	ICT services exports, % total trade	0.0	128	○ ◇
6.3.4	FDI net outflows, % GDP	0.1	106	
CREATIVE OUTPUTS		**15.0**	**95**	
7.1	**Intangible assets**	**25.8**	**72**	●
7.1.1	Trademarks by origin/bn PPP$ GDP	5.1	118	
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.3	60	●
7.1.4	ICTs & organizational model creation†	60.0	45	● ◆
7.2	**Creative goods and services**	**2.7**	**[112]**	
7.2.1	Cultural & creative services exports, % total trade	0.3	62	●
7.2.2	National feature films/mn pop. 15-69	0.9	88	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.0	122	
7.3	**Online creativity**	**5.8**	**105**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.1	126	
7.3.2	Country-code TLDs/th pop. 15-69	0.0	129	○
7.3.3	Wikipedia edits/mn pop. 15-69	21.7	104	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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

HONDURAS

GII 2020 rank

103

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
102	100	Lower middle	LCN	9.7	51.8	4,709.8	104

		Score/Value	Rank	
INSTITUTIONS		**45.3**	**125**	○ ◇
1.1	**Political environment**	**43.8**	**108**	
1.1.1	Political and operational stability*	58.9	104	
1.1.2	Government effectiveness*	36.3	111	
1.2	**Regulatory environment**	**40.2**	**119**	
1.2.1	Regulatory quality*	29.4	103	
1.2.2	Rule of law*	20.0	120	◇
1.2.3	Cost of redundancy dismissal, salary weeks	30.3	118	
1.3	**Business environment**	**52.0**	**123**	○
1.3.1	Ease of starting a business*	71.4	123	○ ◇
1.3.2	Ease of resolving insolvency*	32.6	116	
HUMAN CAPITAL & RESEARCH		**18.6**	**99**	
2.1	**Education**	**41.2**	**77**	
2.1.1	Expenditure on education, % GDP	6.1	14	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap. 🕘	20.3	48	
2.1.3	School life expectancy, years	10.1	108	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary 🕘	16.7	80	
2.2	**Tertiary education**	**14.4**	**107**	
2.2.1	Tertiary enrolment, % gross	26.2	87	
2.2.2	Graduates in science & engineering, %	15.2	95	
2.2.3	Tertiary inbound mobility, %	0.9	88	
2.3	**Research & development (R&D)**	**0.2**	**116**	
2.3.1	Researchers, FTE/mn pop. 🕘	34.7	99	
2.3.2	Gross expenditure on R&D, % GDP 🕘	0.0	112	○ ◇
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**27.2**	**109**	
3.1	**Information & communication technologies (ICTs)**	**42.2**	**104**	
3.1.1	ICT access*	39.5	105	
3.1.2	ICT use*	23.3	111	◇
3.1.3	Government's online service*	51.4	105	
3.1.4	E-participation*	54.5	99	
3.2	**General infrastructure**	**19.9**	**99**	
3.2.1	Electricity output, kWh/mn pop	1,008.1	94	
3.2.2	Logistics performance*	25.1	89	
3.2.3	Gross capital formation, % GDP	25.5	49	●
3.3	**Ecological sustainability**	**19.4**	**106**	
3.3.1	GDP/unit of energy use	6.8	92	
3.3.2	Environmental performance*	37.8	96	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.4	87	
MARKET SOPHISTICATION		**49.6**	**56**	
4.1	**Credit**	**48.2**	**43**	●
4.1.1	Ease of getting credit*	80.0	23	●
4.1.2	Domestic credit to private sector, % GDP	62.7	52	●
4.1.3	Microfinance gross loans, % GDP	1.9	15	●
4.2	**Investment**	**42.0**	**[47]**	
4.2.1	Ease of protecting minority investors*	42.0	102	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**58.5**	**84**	
4.3.1	Applied tariff rate, weighted avg., %	3.4	70	
4.3.2	Intensity of local competition†	69.5	63	
4.3.3	Domestic market scale, bn PPP$	51.8	99	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**23.9**	**74**	
5.1	**Knowledge workers**	**26.6**	**80**	
5.1.1	Knowledge-intensive employment, %	13.0	99	
5.1.2	Firms offering formal training, % 🕘	47.7	19	● ◆
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	10.4	75	
5.1.5	Females employed w/advanced degrees, %	4.0	94	
5.2	**Innovation linkages**	**16.8**	**96**	
5.2.1	University/industry research collaboration† 🕘	37.9	84	
5.2.2	State of cluster development† 🕘	46.0	72	
5.2.3	GERD financed by abroad, % GDP	0.0	94	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	53	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	101	○ ◇
5.3	**Knowledge absorption**	**28.3**	**65**	
5.3.1	Intellectual property payments, % total trade	0.7	58	
5.3.2	High-tech imports, % total trade 🕘	7.6	68	
5.3.3	ICT services imports, % total trade	1.6	39	● ◆
5.3.4	FDI net inflows, % GDP	5.1	26	●
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**13.1**	**97**	
6.1	**Knowledge creation**	**1.5**	**127**	○
6.1.1	Patents by origin/bn PPP$ GDP	0.2	108	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	100	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	63	
6.1.4	Scientific & technical articles/bn PPP$ GDP	1.3	122	○
6.1.5	Citable documents H-index	2.6	125	○
6.2	**Knowledge impact**	**15.0**	**[101]**	
6.2.1	Growth rate of PPP$ GDP/worker, %	n/a	n/a	
6.2.2	New businesses/th pop. 15-64	n/a	n/a	
6.2.3	Computer software spending, % GDP	0.0	60	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	3.4	68	
6.2.5	High- and medium-high-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**22.7**	**67**	
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	High-tech net exports, % total trade 🕘	0.5	79	
6.3.3	ICT services exports, % total trade	2.5	43	●
6.3.4	FDI net outflows, % GDP	1.0	55	
CREATIVE OUTPUTS		**12.9**	**104**	
7.1	**Intangible assets**	**22.3**	**86**	
7.1.1	Trademarks by origin/bn PPP$ GDP	51.9	44	●
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.1	112	○
7.1.4	ICTs & organizational model creation†	55.3	59	
7.2	**Creative goods and services**	**2.0**	**[119]**	
7.2.1	Cultural & creative services exports, % total trade	0.0	102	
7.2.2	National feature films/mn pop. 15-69	2.0	68	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade 🕘	0.1	107	
7.3	**Online creativity**	**4.9**	**110**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.5	107	
7.3.2	Country-code TLDs/th pop. 15-69	0.4	102	
7.3.3	Wikipedia edits/mn pop. 15-69	22.9	102	
7.3.4	Mobile app creation/bn PPP$ GDP	0.1	85	

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

HONG KONG, CHINA

GII 2020 rank

11

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
16	7	High	SEAO	7.4	490.9	56,683.7	13

		Score/Value	Rank	
INSTITUTIONS		**90.4**	**5**	
1.1	**Political environment**	**90.9**	**7**	
1.1.1	Political and operational stability*	87.5	11	
1.1.2	Government effectiveness*	92.7	4	
1.2	**Regulatory environment**	**98.2**	**1**	● ◆
1.2.1	Regulatory quality*	100.0	1	● ◆
1.2.2	Rule of law*	92.8	11	
1.2.3	Cost of redundancy dismissal, salary weeks	8.0	1	●
1.3	**Business environment**	**81.9**	**28**	
1.3.1	Ease of starting a business*	98.2	5	◆
1.3.2	Ease of resolving insolvency*	65.7	41	◇
HUMAN CAPITAL & RESEARCH		**47.6**	**23**	◇
2.1	**Education**	**51.1**	**48**	
2.1.1	Expenditure on education, % GDP	3.3	91	○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	22.0	37	
2.1.3	School life expectancy, years	16.9	18	
2.1.4	PISA scales in reading, maths, & science	530.7	3	● ◆
2.1.5	Pupil-teacher ratio, secondary	11.2	47	
2.2	**Tertiary education**	**55.4**	**9**	
2.2.1	Tertiary enrolment, % gross	76.9	22	
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	12.5	15	
2.3	**Research & development (R&D)**	**36.4**	**30**	◇
2.3.1	Researchers, FTE/mn pop	4,026.5	25	◇
2.3.2	Gross expenditure on R&D, % GDP	0.9	42	◇
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	80.1	5	
INFRASTRUCTURE		**59.1**	**11**	
3.1	**Information & communication technologies (ICTs)**	**88.2**	**[17]**	
3.1.1	ICT access*	92.5	2	● ◆
3.1.2	ICT use*	84.0	11	
3.1.3	Government's online service*	n/a	n/a	
3.1.4	E-participation*	n/a	n/a	
3.2	**General infrastructure**	**34.2**	**36**	◇
3.2.1	Electricity output, kWh/mn pop	5,010.4	41	
3.2.2	Logistics performance*	86.8	12	
3.2.3	Gross capital formation, % GDP	18.9	103	○ ◇
3.3	**Ecological sustainability**	**54.9**	**13**	◆
3.3.1	GDP/unit of energy use	28.6	1	● ◆
3.3.2	Environmental performance*	n/a	n/a	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.2	55	
MARKET SOPHISTICATION		**86.5**	**1**	● ◆
4.1	**Credit**	**87.5**	**2**	● ◆
4.1.1	Ease of getting credit*	75.0	34	
4.1.2	Domestic credit to private sector, % GDP	219.1	1	● ◆
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**93.6**	**1**	● ◆
4.2.1	Ease of protecting minority investors*	84.0	7	◆
4.2.2	Market capitalization, % GDP	1,107.2	1	● ◆
4.2.3	Venture capital deals/bn PPP$ GDP	0.5	4	◆
4.3	**Trade, competition, and market scale**	**78.5**	**10**	
4.3.1	Applied tariff rate, weighted avg., %	0.0	1	● ◆
4.3.2	Intensity of local competition†	85.6	2	● ◆
4.3.3	Domestic market scale, bn PPP$	490.9	42	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**45.4**	**24**	◇
5.1	**Knowledge workers**	**45.2**	**34**	◇
5.1.1	Knowledge-intensive employment, %	39.0	30	◇
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	0.4	41	◇
5.1.4	GERD financed by business, %	49.3	29	
5.1.5	Females employed w/advanced degrees, %	15.9	42	◇
5.2	**Innovation linkages**	**41.4**	**25**	◇
5.2.1	University/industry research collaboration†	65.8	18	
5.2.2	State of cluster development†	72.1	4	◆
5.2.3	GERD financed by abroad, % GDP	0.0	60	○ ◇
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.2	10	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.9	28	◇
5.3	**Knowledge absorption**	**49.6**	**14**	
5.3.1	Intellectual property payments, % total trade	0.3	77	○ ◇
5.3.2	High-tech imports, % total trade	52.1	1	● ◆
5.3.3	ICT services imports, % total trade	0.3	115	○ ◇
5.3.4	FDI net inflows, % GDP	34.1	2	● ◆
5.3.5	Research talent, % in business enterprise	35.6	36	◇
KNOWLEDGE & TECHNOLOGY OUTPUTS		**23.8**	**54**	◇
6.1	**Knowledge creation**	**20.9**	**[47]**	
6.1.1	Patents by origin/bn PPP$ GDP	0.7	77	○ ◇
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP	1.1	21	
6.1.4	Scientific & technical articles/bn PPP$ GDP	n/a	n/a	
6.1.5	Citable documents H-index	36.5	26	
6.2	**Knowledge impact**	**31.0**	**38**	
6.2.1	Growth rate of PPP$ GDP/worker, %	1.1	59	
6.2.2	New businesses/th pop. 15-64	28.6	1	● ◆
6.2.3	Computer software spending, % GDP	0.0	27	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	3.7	65	
6.2.5	High- and medium-high-tech manufacturing, %	8.6	87	○ ◇
6.3	**Knowledge diffusion**	**19.5**	**80**	○ ◇
6.3.1	Intellectual property receipts, % total trade	0.1	56	◇
6.3.2	High-tech net exports, % total trade	0.1	111	○ ◇
6.3.3	ICT services exports, % total trade	0.4	101	○ ◇
6.3.4	FDI net outflows, % GDP	24.7	1	● ◆
CREATIVE OUTPUTS		**61.6**	**1**	● ◆
7.1	**Intangible assets**	**58.1**	**5**	◆
7.1.1	Trademarks by origin/bn PPP$ GDP	66.0	30	
7.1.2	Global brand value, top 5,000, % GDP	278.5	1	● ◆
7.1.3	Industrial designs by origin/bn PPP$ GDP	2.6	44	
7.1.4	ICTs & organizational model creation†	67.6	23	◇
7.2	**Creative goods and services**	**64.4**	**1**	● ◆
7.2.1	Cultural & creative services exports, % total trade	0.1	77	○ ◇
7.2.2	National feature films/mn pop. 15-69	9.3	22	
7.2.3	Entertainment & Media market/th pop. 15-69	51.7	16	
7.2.4	Printing and other media, % manufacturing	5.0	1	● ◆
7.2.5	Creative goods exports, % total trade	11.1	1	● ◆
7.3	**Online creativity**	**65.7**	**7**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	72.1	8	
7.3.2	Country-code TLDs/th pop. 15-69	12.6	37	◇
7.3.3	Wikipedia edits/mn pop. 15-69	87.6	10	
7.3.4	Mobile app creation/bn PPP$ GDP	91.0	5	◆

NOTES: ● indicates a strength; ○ a weakness; ◆ a strength relative to the other top 25-ranked GII economies; ◇ a weakness relative to the other top 25-ranked GII economies; * an index; † a survey question. 🕘 indicates that the economy's data are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

HUNGARY

GII 2020 rank

35

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
32	37	High	EUR	9.7	332.2	29,723.4	33

		Score/Value	Rank	
INSTITUTIONS		**71.3**	**43**	
1.1	**Political environment**	**68.1**	**41**	
1.1.1	Political and operational stability*	82.1	29	
1.1.2	Government effectiveness*	61.0	44	◇
1.2	**Regulatory environment**	**74.3**	**38**	
1.2.1	Regulatory quality*	57.7	42	
1.2.2	Rule of law*	61.1	40	
1.2.3	Cost of redundancy dismissal, salary weeks	13.4	48	
1.3	**Business environment**	**71.6**	**63**	
1.3.1	Ease of starting a business*	88.2	70	
1.3.2	Ease of resolving insolvency*	55.0	61	
HUMAN CAPITAL & RESEARCH		**41.4**	**36**	
2.1	**Education**	**51.2**	**47**	
2.1.1	Expenditure on education, % GDP 🕘	4.7	55	
2.1.2	Government funding/pupil, secondary, % GDP/cap	23.1	27	
2.1.3	School life expectancy, years	15.2	46	
2.1.4	PISA scales in reading, maths, & science	479.3	33	
2.1.5	Pupil-teacher ratio, secondary 🕘	10.0	35	
2.2	**Tertiary education**	**37.7**	**52**	
2.2.1	Tertiary enrolment, % gross	48.5	62	◇
2.2.2	Graduates in science & engineering, %	23.3	50	
2.2.3	Tertiary inbound mobility, %	10.0	20	
2.3	**Research & development (R&D)**	**35.3**	**32**	
2.3.1	Researchers, FTE/mn pop	3,237.7	29	
2.3.2	Gross expenditure on R&D, % GDP	1.6	22	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	50.9	29	
2.3.4	QS university ranking, average score top 3*	20.4	52	
INFRASTRUCTURE		**52.4**	**34**	
3.1	**Information & communication technologies (ICTs)**	**71.5**	**54**	◇
3.1.1	ICT access*	75.8	40	
3.1.2	ICT use*	65.6	51	◇
3.1.3	Government's online service*	73.6	58	◇
3.1.4	E-participation*	70.8	68	◇
3.2	**General infrastructure**	**34.3**	**33**	
3.2.1	Electricity output, kWh/mn pop	3,265.6	61	
3.2.2	Logistics performance*	63.3	30	
3.2.3	Gross capital formation, % GDP	29.4	28	
3.3	**Ecological sustainability**	**51.5**	**19**	●
3.3.1	GDP/unit of energy use	10.1	53	
3.3.2	Environmental performance*	63.7	33	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	7.7	10	● ◆
MARKET SOPHISTICATION		**43.3**	**89**	◇
4.1	**Credit**	**44.0**	**55**	
4.1.1	Ease of getting credit*	75.0	34	
4.1.2	Domestic credit to private sector, % GDP	33.4	89	○ ◇
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**21.6**	**125**	○ ◇
4.2.1	Ease of protecting minority investors*	54.0	88	○ ◇
4.2.2	Market capitalization, % GDP	19.4	60	○
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	58	○
4.3	**Trade, competition, and market scale**	**64.2**	**57**	
4.3.1	Applied tariff rate, weighted avg., %	1.7	22	
4.3.2	Intensity of local competition†	59.3	110	○ ◇
4.3.3	Domestic market scale, bn PPP$	332.2	53	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**37.8**	**33**	
5.1	**Knowledge workers**	**40.9**	**44**	
5.1.1	Knowledge-intensive employment, %	34.4	38	
5.1.2	Firms offering formal training, % 🕘	15.8	86	○ ◇
5.1.3	GERD performed by business, % GDP	1.2	20	
5.1.4	GERD financed by business, %	52.7	21	
5.1.5	Females employed w/advanced degrees, %	15.1	44	
5.2	**Innovation linkages**	**24.5**	**51**	
5.2.1	University/industry research collaboration†	44.2	57	
5.2.2	State of cluster development†	47.2	65	
5.2.3	GERD financed by abroad, % GDP	0.2	18	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	86	○ ◇
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.3	36	
5.3	**Knowledge absorption**	**48.1**	**20**	
5.3.1	Intellectual property payments, % total trade	1.3	26	
5.3.2	High-tech imports, % total trade	13.7	15	●
5.3.3	ICT services imports, % total trade	1.3	56	
5.3.4	FDI net inflows, % GDP	1.6	96	○
5.3.5	Research talent, % in business enterprise	63.7	8	●
KNOWLEDGE & TECHNOLOGY OUTPUTS		**38.2**	**22**	
6.1	**Knowledge creation**	**23.2**	**44**	
6.1.1	Patents by origin/bn PPP$ GDP	1.7	46	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.5	33	
6.1.3	Utility models by origin/bn PPP$ GDP	0.7	32	
6.1.4	Scientific & technical articles/bn PPP$ GDP	16.4	35	
6.1.5	Citable documents H-index	29.2	33	
6.2	**Knowledge impact**	**46.8**	**8**	● ◆
6.2.1	Growth rate of PPP$ GDP/worker, %	2.7	32	◆
6.2.2	New businesses/th pop. 15-64	3.7	38	
6.2.3	Computer software spending, % GDP	0.0	38	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	21.3	11	● ◆
6.2.5	High- and medium-high-tech manufacturing, %	54.7	9	● ◆
6.3	**Knowledge diffusion**	**44.6**	**20**	
6.3.1	Intellectual property receipts, % total trade	1.5	15	●
6.3.2	High-tech net exports, % total trade	13.8	10	● ◆
6.3.3	ICT services exports, % total trade	1.9	59	
6.3.4	FDI net outflows, % GDP	-0.5	124	○
CREATIVE OUTPUTS		**29.4**	**46**	
7.1	**Intangible assets**	**23.6**	**80**	◇
7.1.1	Trademarks by origin/bn PPP$ GDP	28.1	81	
7.1.2	Global brand value, top 5,000, % GDP	10.5	59	
7.1.3	Industrial designs by origin/bn PPP$ GDP	2.7	42	
7.1.4	ICTs & organizational model creation†	60.3	42	
7.2	**Creative goods and services**	**37.6**	**15**	●
7.2.1	Cultural & creative services exports, % total trade	0.6	40	
7.2.2	National feature films/mn pop. 15-69	5.2	43	
7.2.3	Entertainment & Media market/th pop. 15-69	14.5	33	◇
7.2.4	Printing and other media, % manufacturing	0.8	71	○
7.2.5	Creative goods exports, % total trade	6.4	9	● ◆
7.3	**Online creativity**	**32.7**	**33**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	10.2	39	
7.3.2	Country-code TLDs/th pop. 15-69	33.2	19	●
7.3.3	Wikipedia edits/mn pop. 15-69	82.9	18	●
7.3.4	Mobile app creation/bn PPP$ GDP	5.3	54	

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

ICELAND

GII 2020 rank

21

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
19	**23**	**High**	**EUR**	**0.3**	**20.0**	**48,947.5**	**20**

		Score/Value	Rank	
INSTITUTIONS		**86.6**	**14**	
1.1	**Political environment**	**85.6**	**15**	
1.1.1	Political and operational stability*	91.1	5	
1.1.2	Government effectiveness*	82.9	17	
1.2	**Regulatory environment**	**87.7**	**16**	
1.2.1	Regulatory quality*	79.2	19	
1.2.2	Rule of law*	91.5	13	
1.2.3	Cost of redundancy dismissal, salary weeks	13.0	41	
1.3	**Business environment**	**86.3**	**15**	
1.3.1	Ease of starting a business*	90.6	54	
1.3.2	Ease of resolving insolvency*	82.0	11	
HUMAN CAPITAL & RESEARCH		**46.1**	**28**	◇
2.1	**Education**	**64.6**	**11**	
2.1.1	Expenditure on education, % GDP 🕘	7.5	5	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	19.4	52	
2.1.3	School life expectancy, years	19.1	6	
2.1.4	PISA scales in reading, maths, & science	481.4	30	◇
2.1.5	Pupil-teacher ratio, secondary 🕘	9.9	33	
2.2	**Tertiary education**	**33.6**	**63**	◇
2.2.1	Tertiary enrolment, % gross	71.8	25	
2.2.2	Graduates in science & engineering, % 🕘	15.7	91	○ ◇
2.2.3	Tertiary inbound mobility, %	6.9	36	
2.3	**Research & development (R&D)**	**40.1**	**24**	◇
2.3.1	Researchers, FTE/mn pop	6,088.3	8	
2.3.2	Gross expenditure on R&D, % GDP	2.0	16	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	46.3	32	◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**52.8**	**31**	◇
3.1	**Information & communication technologies (ICTs)**	**80.5**	**33**	◇
3.1.1	ICT access*	91.6	3	● ◆
3.1.2	ICT use*	88.9	2	● ◆
3.1.3	Government's online service*	72.9	64	◇
3.1.4	E-participation*	68.5	74	◇
3.2	**General infrastructure**	**47.8**	**7**	
3.2.1	Electricity output, kWh/mn pop	56,656.6	1	● ◆
3.2.2	Logistics performance*	54.2	39	◇
3.2.3	Gross capital formation, % GDP	20.7	91	○
3.3	**Ecological sustainability**	**30.0**	**62**	◇
3.3.1	GDP/unit of energy use	2.9	121	○ ◇
3.3.2	Environmental performance*	72.3	17	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.9	46	
MARKET SOPHISTICATION		**49.8**	**54**	◇
4.1	**Credit**	**47.8**	**45**	
4.1.1	Ease of getting credit*	55.0	88	○
4.1.2	Domestic credit to private sector, % GDP	92.2	28	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**44.8**	**34**	
4.2.1	Ease of protecting minority investors*	72.0	27	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	0.1	28	
4.3	**Trade, competition, and market scale**	**57.0**	**90**	◇
4.3.1	Applied tariff rate, weighted avg., % 🕘	1.6	19	
4.3.2	Intensity of local competition†	70.0	61	◇
4.3.3	Domestic market scale, bn PPP$	20.0	128	○ ◇

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**51.1**	**18**	
5.1	**Knowledge workers**	**58.0**	**20**	
5.1.1	Knowledge-intensive employment, %	50.0	6	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	1.3	16	
5.1.4	GERD financed by business, %	40.2	45	◇
5.1.5	Females employed w/advanced degrees, %	26.2	9	
5.2	**Innovation linkages**	**67.2**	**4**	● ◆
5.2.1	University/industry research collaboration†	59.1	25	◇
5.2.2	State of cluster development†	52.2	44	◇
5.2.3	GERD financed by abroad, % GDP	0.4	4	● ◆
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.3	6	● ◆
5.2.5	Patent families 2+ offices/bn PPP$ GDP	5.2	10	
5.3	**Knowledge absorption**	**28.2**	**66**	◇
5.3.1	Intellectual property payments, % total trade	1.1	31	
5.3.2	High-tech imports, % total trade	6.1	96	○
5.3.3	ICT services imports, % total trade	2.5	16	
5.3.4	FDI net inflows, % GDP	-11.8	131	○ ◇
5.3.5	Research talent, % in business enterprise	42.7	32	◇
KNOWLEDGE & TECHNOLOGY OUTPUTS		**33.0**	**34**	◇
6.1	**Knowledge creation**	**48.0**	**16**	
6.1.1	Patents by origin/bn PPP$ GDP	4.6	24	
6.1.2	PCT patents by origin/bn PPP$ GDP	2.1	16	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	35.1	4	● ◆
6.1.5	Citable documents H-index	19.6	41	◇
6.2	**Knowledge impact**	**24.8**	**64**	◇
6.2.1	Growth rate of PPP$ GDP/worker, %	1.1	61	
6.2.2	New businesses/th pop. 15-64	9.9	17	
6.2.3	Computer software spending, % GDP	0.0	35	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	4.0	62	
6.2.5	High- and medium-high-tech manufacturing, %	15.4	65	◇
6.3	**Knowledge diffusion**	**26.2**	**54**	◇
6.3.1	Intellectual property receipts, % total trade	2.1	10	
6.3.2	High-tech net exports, % total trade	1.2	65	◇
6.3.3	ICT services exports, % total trade	2.6	39	
6.3.4	FDI net outflows, % GDP	-12.7	130	○ ◇
CREATIVE OUTPUTS		**49.3**	**8**	
7.1	**Intangible assets**	**48.9**	**14**	
7.1.1	Trademarks by origin/bn PPP$ GDP	100.1	12	
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP 🕘	0.8	76	
7.1.4	ICTs & organizational model creation†	75.5	13	
7.2	**Creative goods and services**	**29.5**	**28**	
7.2.1	Cultural & creative services exports, % total trade	0.6	42	
7.2.2	National feature films/mn pop. 15-69	55.3	1	● ◆
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.6	27	
7.2.5	Creative goods exports, % total trade	0.1	101	○ ◇
7.3	**Online creativity**	**70.1**	**3**	● ◆
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	100.0	1	● ◆
7.3.2	Country-code TLDs/th pop. 15-69	91.0	5	● ◆
7.3.3	Wikipedia edits/mn pop. 15-69	89.0	8	
7.3.4	Mobile app creation/bn PPP$ GDP	1.0	68	◇

NOTES: ● indicates a strength; ○ a weakness; ◆ a strength relative to the other top 25-ranked GII economies; ◇ a weakness relative to the other top 25-ranked GII economies; * an index; † a survey question. 🕘 indicates that the economy's data are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

INDIA

GII 2020 rank

48

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
45	57	Lower middle	CSA	1,366.4	11,325.7	7,314.6	52

		Score/Value	Rank	
INSTITUTIONS		**64.7**	**61**	◆
1.1	**Political environment**	**59.1**	**63**	◆
1.1.1	Political and operational stability*	64.3	83	
1.1.2	Government effectiveness*	56.5	55	◆
1.2	**Regulatory environment**	**63.4**	**70**	◆
1.2.1	Regulatory quality*	36.9	84	
1.2.2	Rule of law*	47.3	62	◆
1.2.3	Cost of redundancy dismissal, salary weeks	15.8	61	
1.3	**Business environment**	**71.8**	**62**	
1.3.1	Ease of starting a business*	81.6	105	
1.3.2	Ease of resolving insolvency*	62.0	47	◆
HUMAN CAPITAL & RESEARCH		**31.6**	**60**	◆
2.1	**Education**	**29.6**	**107**	○
2.1.1	Expenditure on education, % GDP	3.8	79	
2.1.2	Government funding/pupil, secondary, % GDP/cap	16.9	68	
2.1.3	School life expectancy, years	12.2	90	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	28.5	118	○ ◇
2.2	**Tertiary education**	**32.4**	**66**	
2.2.1	Tertiary enrolment, % gross	28.1	84	
2.2.2	Graduates in science & engineering, %	31.7	12	● ◆
2.2.3	Tertiary inbound mobility, %	0.1	108	○
2.3	**Research & development (R&D)**	**32.9**	**35**	◆
2.3.1	Researchers, FTE/mn pop	252.7	78	
2.3.2	Gross expenditure on R&D, % GDP	0.6	57	◆
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	69.7	16	● ◆
2.3.4	QS university ranking, average score top 3*	47.2	22	● ◆
INFRASTRUCTURE		**38.1**	**75**	◆
3.1	**Information & communication technologies (ICTs)**	**63.3**	**74**	◆
3.1.1	ICT access*	37.9	108	○
3.1.2	ICT use*	24.7	108	○
3.1.3	Government's online service*	95.1	9	● ◆
3.1.4	E-participation*	95.5	15	● ◆
3.2	**General infrastructure**	**30.9**	**46**	◆
3.2.1	Electricity output, kWh/mn pop	1,144.2	92	
3.2.2	Logistics performance*	51.9	43	◆
3.2.3	Gross capital formation, % GDP	31.3	24	
3.3	**Ecological sustainability**	**20.2**	**98**	
3.3.1	GDP/unit of energy use	9.5	63	
3.3.2	Environmental performance*	27.6	124	○ ◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.7	70	
MARKET SOPHISTICATION		**53.7**	**31**	◆
4.1	**Credit**	**43.0**	**60**	
4.1.1	Ease of getting credit*	80.0	23	
4.1.2	Domestic credit to private sector, % GDP	49.9	70	
4.1.3	Microfinance gross loans, % GDP	0.9	25	
4.2	**Investment**	**40.8**	**59**	
4.2.1	Ease of protecting minority investors*	80.0	13	● ◆
4.2.2	Market capitalization, % GDP	77.6	19	◆
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	39	◆
4.3	**Trade, competition, and market scale**	**77.2**	**15**	● ◆
4.3.1	Applied tariff rate, weighted avg., %	4.9	90	
4.3.2	Intensity of local competition†	67.6	70	
4.3.3	Domestic market scale, bn PPP$	11,325.7	3	● ◆

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**29.4**	**55**	◆
5.1	**Knowledge workers**	**25.9**	**83**	
5.1.1	Knowledge-intensive employment, %	15.7	90	
5.1.2	Firms offering formal training, %	35.9	37	
5.1.3	GERD performed by business, % GDP	0.2	52	
5.1.4	GERD financed by business, %	36.8	48	◆
5.1.5	Females employed w/advanced degrees, %	2.2	101	○
5.2	**Innovation linkages**	**26.6**	**41**	◆
5.2.1	University/industry research collaboration†	47.7	45	◆
5.2.2	State of cluster development†	54.3	37	◆
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	47	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.2	47	◆
5.3	**Knowledge absorption**	**35.7**	**39**	◆
5.3.1	Intellectual property payments, % total trade	1.3	27	◆
5.3.2	High-tech imports, % total trade	10.1	29	
5.3.3	ICT services imports, % total trade	1.2	60	
5.3.4	FDI net inflows, % GDP	1.7	92	
5.3.5	Research talent, % in business enterprise	34.0	38	◆
KNOWLEDGE & TECHNOLOGY OUTPUTS		**34.7**	**27**	◆
6.1	**Knowledge creation**	**19.8**	**51**	
6.1.1	Patents by origin/bn PPP$ GDP	1.6	51	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.2	51	◆
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	5.8	76	
6.1.5	Citable documents H-index	40.4	21	● ◆
6.2	**Knowledge impact**	**30.4**	**41**	◆
6.2.1	Growth rate of PPP$ GDP/worker, %	5.0	9	●
6.2.2	New businesses/th pop. 15-64	0.1	115	○
6.2.3	Computer software spending, % GDP	0.0	64	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	3.0	72	
6.2.5	High- and medium-high-tech manufacturing, %	34.1	34	◆
6.3	**Knowledge diffusion**	**54.0**	**10**	● ◆
6.3.1	Intellectual property receipts, % total trade	0.1	50	
6.3.2	High-tech net exports, % total trade	3.4	42	
6.3.3	ICT services exports, % total trade	9.9	1	● ◆
6.3.4	FDI net outflows, % GDP	0.4	82	
CREATIVE OUTPUTS		**20.6**	**64**	
7.1	**Intangible assets**	**27.3**	**67**	
7.1.1	Trademarks by origin/bn PPP$ GDP	28.4	80	
7.1.2	Global brand value, top 5,000, % GDP	61.5	31	◆
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.9	75	
7.1.4	ICTs & organizational model creation†	59.6	47	◆
7.2	**Creative goods and services**	**18.7**	**58**	
7.2.1	Cultural & creative services exports, % total trade	1.3	21	◆
7.2.2	National feature films/mn pop. 15-69	2.2	63	
7.2.3	Entertainment & Media market/th pop. 15-69	0.8	60	○
7.2.4	Printing and other media, % manufacturing	0.6	81	○
7.2.5	Creative goods exports, % total trade	2.4	23	
7.3	**Online creativity**	**9.1**	**90**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.9	99	
7.3.2	Country-code TLDs/th pop. 15-69	0.7	94	
7.3.3	Wikipedia edits/mn pop. 15-69	28.1	98	○
7.3.4	Mobile app creation/bn PPP$ GDP	10.5	45	

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

INDONESIA

GII 2020 rank

85

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
76	91	Lower middle	SEAO	270.6	3,737.5	12,220.8	85

		Score/Value	Rank	
INSTITUTIONS		**51.0**	**111**	
1.1	**Political environment**	**58.1**	**66**	◆
1.1.1	Political and operational stability*	66.1	76	
1.1.2	Government effectiveness*	54.2	61	◆
1.2	**Regulatory environment**	**20.3**	**130**	○ ◇
1.2.1	Regulatory quality*	39.9	77	◆
1.2.2	Rule of law*	38.5	81	
1.2.3	Cost of redundancy dismissal, salary weeks	57.8	128	○ ◇
1.3	**Business environment**	**74.6**	**52**	◆
1.3.1	Ease of starting a business*	81.2	108	
1.3.2	Ease of resolving insolvency*	68.1	35	● ◆
HUMAN CAPITAL & RESEARCH		**21.0**	**92**	
2.1	**Education**	**31.4**	**102**	
2.1.1	Expenditure on education, % GDP	3.6	89	
2.1.2	Government funding/pupil, secondary, % GDP/cap	10.5	93	○
2.1.3	School life expectancy, years	13.6	75	
2.1.4	PISA scales in reading, maths, & science	381.9	72	○
2.1.5	Pupil-teacher ratio, secondary	15.2	76	
2.2	**Tertiary education**	**21.3**	**92**	
2.2.1	Tertiary enrolment, % gross	36.3	73	
2.2.2	Graduates in science & engineering, %	19.4	75	
2.2.3	Tertiary inbound mobility, %	0.1	110	○
2.3	**Research & development (R&D)**	**10.2**	**58**	
2.3.1	Researchers, FTE/mn pop	216.0	81	
2.3.2	Gross expenditure on R&D, % GDP	0.3	85	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	33.4	34	● ◆
INFRASTRUCTURE		**37.7**	**80**	◆
3.1	**Information & communication technologies (ICTs)**	**54.2**	**89**	
3.1.1	ICT access*	53.7	85	
3.1.2	ICT use*	44.2	85	
3.1.3	Government's online service*	56.9	93	
3.1.4	E-participation*	61.8	89	
3.2	**General infrastructure**	**32.8**	**40**	◆
3.2.1	Electricity output, kWh/mn pop	965.4	95	
3.2.2	Logistics performance*	50.7	45	◆
3.2.3	Gross capital formation, % GDP	34.5	17	●
3.3	**Ecological sustainability**	**26.2**	**78**	◆
3.3.1	GDP/unit of energy use	11.9	34	◆
3.3.2	Environmental performance*	37.8	96	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.6	79	
MARKET SOPHISTICATION		**48.1**	**62**	
4.1	**Credit**	**34.3**	**93**	
4.1.1	Ease of getting credit*	70.0	44	
4.1.2	Domestic credit to private sector, % GDP	38.8	82	
4.1.3	Microfinance gross loans, % GDP	0.0	67	
4.2	**Investment**	**31.3**	**93**	
4.2.1	Ease of protecting minority investors*	70.0	36	
4.2.2	Market capitalization, % GDP	47.9	33	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	59	
4.3	**Trade, competition, and market scale**	**78.8**	**8**	● ◆
4.3.1	Applied tariff rate, weighted avg., %	2.0	57	◆
4.3.2	Intensity of local competition†	73.2	37	◆
4.3.3	Domestic market scale, bn PPP$	3,737.5	7	● ◆

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**17.8**	**114**	
5.1	**Knowledge workers**	**8.9**	**125**	○ ◇
5.1.1	Knowledge-intensive employment, %	14.5	92	
5.1.2	Firms offering formal training, %	7.7	94	○ ◇
5.1.3	GERD performed by business, % GDP	0.0	81	
5.1.4	GERD financed by business, %	6.8	81	
5.1.5	Females employed w/advanced degrees, %	5.9	85	
5.2	**Innovation linkages**	**19.6**	**71**	
5.2.1	University/industry research collaboration†	53.5	33	● ◆
5.2.2	State of cluster development†	59.4	26	● ◆
5.2.3	GERD financed by abroad, % GDP	0.0	97	○
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	108	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	100	
5.3	**Knowledge absorption**	**24.9**	**78**	
5.3.1	Intellectual property payments, % total trade	0.9	38	◆
5.3.2	High-tech imports, % total trade	8.9	47	
5.3.3	ICT services imports, % total trade	1.4	50	
5.3.4	FDI net inflows, % GDP	1.5	101	
5.3.5	Research talent, % in business enterprise	7.5	66	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**17.9**	**71**	
6.1	**Knowledge creation**	**5.7**	**101**	
6.1.1	Patents by origin/bn PPP$ GDP	0.4	85	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	98	
6.1.3	Utility models by origin/bn PPP$ GDP	0.4	38	
6.1.4	Scientific & technical articles/bn PPP$ GDP	0.7	126	○
6.1.5	Citable documents H-index	14.0	56	
6.2	**Knowledge impact**	**27.0**	**55**	
6.2.1	Growth rate of PPP$ GDP/worker, %	2.9	30	●
6.2.2	New businesses/th pop. 15-64	0.3	106	
6.2.3	Computer software spending, % GDP	0.0	32	●
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.6	88	
6.2.5	High- and medium-high-tech manufacturing, %	29.6	38	◆
6.3	**Knowledge diffusion**	**21.1**	**72**	
6.3.1	Intellectual property receipts, % total trade	0.0	76	
6.3.2	High-tech net exports, % total trade	3.0	45	
6.3.3	ICT services exports, % total trade	0.6	94	
6.3.4	FDI net outflows, % GDP	-0.1	121	○
CREATIVE OUTPUTS		**17.8**	**83**	
7.1	**Intangible assets**	**24.7**	**74**	
7.1.1	Trademarks by origin/bn PPP$ GDP	16.8	97	
7.1.2	Global brand value, top 5,000, % GDP	35.8	42	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.7	78	
7.1.4	ICTs & organizational model creation†	65.4	27	● ◆
7.2	**Creative goods and services**	**12.9**	**69**	
7.2.1	Cultural & creative services exports, % total trade	0.0	98	
7.2.2	National feature films/mn pop. 15-69	0.6	97	○
7.2.3	Entertainment & Media market/th pop. 15-69	2.4	51	◆
7.2.4	Printing and other media, % manufacturing	0.8	74	
7.2.5	Creative goods exports, % total trade	2.3	25	●
7.3	**Online creativity**	**8.6**	**91**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	1.5	89	
7.3.2	Country-code TLDs/th pop. 15-69	0.6	95	
7.3.3	Wikipedia edits/mn pop. 15-69	31.7	92	
7.3.4	Mobile app creation/bn PPP$ GDP	4.6	56	

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

IRAN (ISLAMIC REPUBLIC OF)

GII 2020 rank

67

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
50	90	Upper middle	CSA	82.9	1,470.7	15,419.0	61

		Score/Value	Rank	
INSTITUTIONS		**46.6**	**120**	○ ◇
1.1	**Political environment**	**44.3**	**106**	◇
1.1.1	Political and operational stability*	51.8	123	○ ◇
1.1.2	Government effectiveness*	40.5	94	◇
1.2	**Regulatory environment**	**44.1**	**117**	◇
1.2.1	Regulatory quality*	7.6	129	○ ◇
1.2.2	Rule of law*	28.6	108	◇
1.2.3	Cost of redundancy dismissal, salary weeks	23.1	97	
1.3	**Business environment**	**51.4**	**125**	○ ◇
1.3.1	Ease of starting a business*	67.8	128	○ ◇
1.3.2	Ease of resolving insolvency*	35.1	111	◇
HUMAN CAPITAL & RESEARCH		**36.6**	**46**	
2.1	**Education**	**39.3**	**83**	
2.1.1	Expenditure on education, % GDP	4.0	74	
2.1.2	Government funding/pupil, secondary, % GDP/cap	17.5	65	
2.1.3	School life expectancy, years	14.8	55	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	19.0	94	
2.2	**Tertiary education**	**55.9**	**7**	● ◆
2.2.1	Tertiary enrolment, % gross	68.1	31	●
2.2.2	Graduates in science & engineering, %	42.1	3	● ◆
2.2.3	Tertiary inbound mobility, %	0.5	96	◇
2.3	**Research & development (R&D)**	**14.5**	**48**	
2.3.1	Researchers, FTE/mn pop	1,474.9	44	
2.3.2	Gross expenditure on R&D, % GDP	0.8	44	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	24.0	44	
INFRASTRUCTURE		**39.7**	**69**	
3.1	**Information & communication technologies (ICTs)**	**61.1**	**80**	
3.1.1	ICT access*	75.9	39	● ◆
3.1.2	ICT use*	52.7	73	
3.1.3	Government's online service*	63.2	88	
3.1.4	E-participation*	52.8	103	
3.2	**General infrastructure**	**36.5**	**31**	● ◆
3.2.1	Electricity output, kWh/mn pop	3,794.6	53	
3.2.2	Logistics performance*	36.7	63	
3.2.3	Gross capital formation, % GDP	40.8	10	● ◆
3.3	**Ecological sustainability**	**21.3**	**92**	◇
3.3.1	GDP/unit of energy use	5.8	104	◇
3.3.2	Environmental performance*	48.0	61	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.4	92	
MARKET SOPHISTICATION		**38.8**	**108**	◇
4.1	**Credit**	**39.2**	**77**	
4.1.1	Ease of getting credit*	50.0	94	
4.1.2	Domestic credit to private sector, % GDP	66.1	50	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**25.5**	**115**	
4.2.1	Ease of protecting minority investors*	40.0	110	◇
4.2.2	Market capitalization, % GDP	24.6	52	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**51.8**	**107**	◇
4.3.1	Applied tariff rate, weighted avg., %	15.2	129	○ ◇
4.3.2	Intensity of local competition†	58.0	113	◇
4.3.3	Domestic market scale, bn PPP$	1,470.7	18	● ◆

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**17.9**	**112**	◇
5.1	**Knowledge workers**	**17.5**	**[103]**	
5.1.1	Knowledge-intensive employment, %	19.8	77	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	0.2	50	
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**	**16.4**	**100**	
5.2.1	University/industry research collaboration†	28.7	117	○ ◇
5.2.2	State of cluster development†	42.1	88	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	122	○ ◇
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.1	64	
5.3	**Knowledge absorption**	**19.8**	**99**	
5.3.1	Intellectual property payments, % total trade	0.2	94	
5.3.2	High-tech imports, % total trade	6.2	92	
5.3.3	ICT services imports, % total trade	0.5	101	
5.3.4	FDI net inflows, % GDP	0.8	119	◇
5.3.5	Research talent, % in business enterprise	19.2	56	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**23.0**	**59**	
6.1	**Knowledge creation**	**39.3**	**25**	● ◆
6.1.1	Patents by origin/bn PPP$ GDP	7.5	14	● ◆
6.1.2	PCT patents by origin/bn PPP$ GDP	0.2	53	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	23.5	21	● ◆
6.1.5	Citable documents H-index	19.7	40	
6.2	**Knowledge impact**	**18.3**	**86**	
6.2.1	Growth rate of PPP$ GDP/worker, %	-3.0	115	○ ◇
6.2.2	New businesses/th pop. 15-64	0.4	101	
6.2.3	Computer software spending, % GDP	0.0	58	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.3	96	
6.2.5	High- and medium-high-tech manufacturing, %	38.5	26	● ◆
6.3	**Knowledge diffusion**	**11.4**	**117**	◇
6.3.1	Intellectual property receipts, % total trade	0.0	86	
6.3.2	High-tech net exports, % total trade	0.3	90	
6.3.3	ICT services exports, % total trade	0.6	92	
6.3.4	FDI net outflows, % GDP	0.8	60	
CREATIVE OUTPUTS		**28.7**	**48**	
7.1	**Intangible assets**	**49.1**	**13**	● ◆
7.1.1	Trademarks by origin/bn PPP$ GDP	222.0	1	● ◆
7.1.2	Global brand value, top 5,000, % GDP	1.9	78	
7.1.3	Industrial designs by origin/bn PPP$ GDP	9.2	14	● ◆
7.1.4	ICTs & organizational model creation†	47.4	92	
7.2	**Creative goods and services**	**2.5**	**114**	◇
7.2.1	Cultural & creative services exports, % total trade	0.1	74	
7.2.2	National feature films/mn pop. 15-69	1.7	74	
7.2.3	Entertainment & Media market/th pop. 15-69	2.1	53	◇
7.2.4	Printing and other media, % manufacturing	0.3	96	○ ◇
7.2.5	Creative goods exports, % total trade	0.0	119	○
7.3	**Online creativity**	**14.1**	**71**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	1.8	80	
7.3.2	Country-code TLDs/th pop. 15-69	6.1	46	
7.3.3	Wikipedia edits/mn pop. 15-69	50.8	59	
7.3.4	Mobile app creation/bn PPP$ GDP	0.5	72	

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

IRELAND

GII 2020 rank

15

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
11	20	High	EUR	4.9	412.8	72,810.0	12

		Score/Value	Rank	
INSTITUTIONS		**85.3**	**17**	
1.1	**Political environment**	**83.2**	**19**	
1.1.1	Political and operational stability*	85.7	17	
1.1.2	Government effectiveness*	81.9	20	
1.2	**Regulatory environment**	**85.9**	**17**	
1.2.1	Regulatory quality*	83.9	15	
1.2.2	Rule of law*	84.8	18	
1.2.3	Cost of redundancy dismissal, salary weeks	14.3	54	
1.3	**Business environment**	**86.8**	**13**	
1.3.1	Ease of starting a business*	94.4	21	
1.3.2	Ease of resolving insolvency*	79.2	18	
HUMAN CAPITAL & RESEARCH		**48.5**	**22**	◇
2.1	**Education**	**45.5**	**67**	○ ◇
2.1.1	Expenditure on education, % GDP 🕘	3.7	84	○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	15.8	73	○ ◇
2.1.3	School life expectancy, years	18.7	9	●
2.1.4	PISA scales in reading, maths, & science	504.6	10	
2.1.5	Pupil-teacher ratio, secondary	n/a	n/a	
2.2	**Tertiary education**	**47.5**	**22**	
2.2.1	Tertiary enrolment, % gross	77.8	21	
2.2.2	Graduates in science & engineering, % 🕘	25.2	37	
2.2.3	Tertiary inbound mobility, %	8.9	23	
2.3	**Research & development (R&D)**	**52.5**	**20**	
2.3.1	Researchers, FTE/mn pop	5,243.1	14	
2.3.2	Gross expenditure on R&D, % GDP	1.1	35	◇
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	77.2	11	
2.3.4	QS university ranking, average score top 3*	47.0	23	
INFRASTRUCTURE		**59.2**	**10**	
3.1	**Information & communication technologies (ICTs)**	**83.8**	**23**	
3.1.1	ICT access*	81.2	25	
3.1.2	ICT use*	78.0	24	
3.1.3	Government's online service*	82.6	39	◇
3.1.4	E-participation*	93.3	22	
3.2	**General infrastructure**	**34.3**	**34**	◇
3.2.1	Electricity output, kWh/mn pop	6,314.5	33	
3.2.2	Logistics performance*	67.6	28	◇
3.2.3	Gross capital formation, % GDP	24.1	58	○
3.3	**Ecological sustainability**	**59.6**	**5**	● ◆
3.3.1	GDP/unit of energy use	25.0	2	● ◆
3.3.2	Environmental performance*	72.8	16	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.5	32	
MARKET SOPHISTICATION		**52.5**	**35**	◇
4.1	**Credit**	**43.3**	**58**	◇
4.1.1	Ease of getting credit*	70.0	44	
4.1.2	Domestic credit to private sector, % GDP	41.1	79	○ ◇
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**45.1**	**33**	
4.2.1	Ease of protecting minority investors*	80.0	13	
4.2.2	Market capitalization, % GDP	37.5	40	○ ◇
4.2.3	Venture capital deals/bn PPP$ GDP	0.2	13	
4.3	**Trade, competition, and market scale**	**69.1**	**34**	
4.3.1	Applied tariff rate, weighted avg., %	1.7	22	
4.3.2	Intensity of local competition†	69.4	64	○ ◇
4.3.3	Domestic market scale, bn PPP$	412.8	46	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**53.1**	**14**	
5.1	**Knowledge workers**	**55.8**	**23**	
5.1.1	Knowledge-intensive employment, %	43.4	21	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	0.9	24	
5.1.4	GERD financed by business, %	52.2	24	
5.1.5	Females employed w/advanced degrees, %	26.3	8	●
5.2	**Innovation linkages**	**43.2**	**21**	
5.2.1	University/industry research collaboration†	67.3	15	
5.2.2	State of cluster development†	58.3	28	◇
5.2.3	GERD financed by abroad, % GDP	0.3	9	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.1	20	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	1.5	24	◇
5.3	**Knowledge absorption**	**60.3**	**3**	● ◆
5.3.1	Intellectual property payments, % total trade	21.9	1	● ◆
5.3.2	High-tech imports, % total trade	9.2	42	
5.3.3	ICT services imports, % total trade	1.6	38	
5.3.4	FDI net inflows, % GDP	20.2	6	● ◆
5.3.5	Research talent, % in business enterprise	48.3	27	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**55.1**	**5**	●
6.1	**Knowledge creation**	**24.6**	**41**	◇
6.1.1	Patents by origin/bn PPP$ GDP	2.3	37	◇
6.1.2	PCT patents by origin/bn PPP$ GDP	1.6	21	◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.3	40	○
6.1.4	Scientific & technical articles/bn PPP$ GDP	13.4	41	◇
6.1.5	Citable documents H-index	34.3	28	
6.2	**Knowledge impact**	**54.3**	**1**	● ◆
6.2.1	Growth rate of PPP$ GDP/worker, %	4.1	19	◆
6.2.2	New businesses/th pop. 15-64	7.1	23	
6.2.3	Computer software spending, % GDP	0.0	2	● ◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	6.4	42	
6.2.5	High- and medium-high-tech manufacturing, % 🕘	65.3	2	● ◆
6.3	**Knowledge diffusion**	**86.4**	**1**	● ◆
6.3.1	Intellectual property receipts, % total trade	3.1	7	● ◆
6.3.2	High-tech net exports, % total trade	9.3	17	
6.3.3	ICT services exports, % total trade	25.8	1	● ◆
6.3.4	FDI net outflows, % GDP	19.9	1	● ◆
CREATIVE OUTPUTS		**37.6**	**21**	◇
7.1	**Intangible assets**	**39.7**	**27**	
7.1.1	Trademarks by origin/bn PPP$ GDP	n/a	n/a	
7.1.2	Global brand value, top 5,000, % GDP	70.0	27	◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.3	58	○
7.1.4	ICTs & organizational model creation†	70.8	20	
7.2	**Creative goods and services**	**21.2**	**49**	◇
7.2.1	Cultural & creative services exports, % total trade	0.1	79	○ ◇
7.2.2	National feature films/mn pop. 15-69 🕘	8.9	23	
7.2.3	Entertainment & Media market/th pop. 15-69	50.7	19	
7.2.4	Printing and other media, % manufacturing	0.5	88	○
7.2.5	Creative goods exports, % total trade	1.4	37	
7.3	**Online creativity**	**49.9**	**20**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	59.5	12	
7.3.2	Country-code TLDs/th pop. 15-69	25.7	26	
7.3.3	Wikipedia edits/mn pop. 15-69	79.1	28	
7.3.4	Mobile app creation/bn PPP$ GDP	36.4	14	

NOTES: ● indicates a strength; ○ a weakness; ◆ a strength relative to the other top 25-ranked GII economies; ◇ a weakness relative to the other top 25-ranked GII economies; * an index; † a survey question. 🕘 indicates that the economy's data are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

ISRAEL

GII 2020 rank

13

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
13	17	High	NAWA	8.5	354.2	34,153.8	10

		Score/Value	Rank	
INSTITUTIONS		**75.6**	**35**	◇
1.1	**Political environment**	**75.8**	**32**	◇
1.1.1	Political and operational stability*	73.2	49	◇
1.1.2	Government effectiveness*	77.1	24	◇
1.2	**Regulatory environment**	**67.6**	**57**	◇
1.2.1	Regulatory quality*	74.7	24	
1.2.2	Rule of law*	72.6	29	◇
1.2.3	Cost of redundancy dismissal, salary weeks	27.4	113	○ ◇
1.3	**Business environment**	**83.4**	**24**	
1.3.1	Ease of starting a business*	94.1	26	
1.3.2	Ease of resolving insolvency*	72.7	27	
HUMAN CAPITAL & RESEARCH		**55.1**	**15**	
2.1	**Education**	**53.5**	**43**	
2.1.1	Expenditure on education, % GDP	5.8	17	
2.1.2	Government funding/pupil, secondary, % GDP/cap	18.7	57	○
2.1.3	School life expectancy, years	16.2	30	
2.1.4	PISA scales in reading, maths, & science	465.2	39	○ ◇
2.1.5	Pupil-teacher ratio, secondary	9.8	30	
2.2	**Tertiary education**	**34.7**	**59**	○
2.2.1	Tertiary enrolment, % gross	63.4	42	
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	2.8	68	○ ◇
2.3	**Research & development (R&D)**	**77.0**	**3**	● ◆
2.3.1	Researchers, FTE/mn pop	8,341.7	1	● ◆
2.3.2	Gross expenditure on R&D, % GDP	4.9	1	● ◆
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	65.8	21	
2.3.4	QS university ranking, average score top 3*	42.2	29	
INFRASTRUCTURE		**51.1**	**40**	◇
3.1	**Information & communication technologies (ICTs)**	**80.7**	**31**	◇
3.1.1	ICT access*	79.7	28	
3.1.2	ICT use*	77.4	26	
3.1.3	Government's online service*	82.6	39	◇
3.1.4	E-participation*	83.2	43	◇
3.2	**General infrastructure**	**31.5**	**43**	◇
3.2.1	Electricity output, kWh/mn pop	7,768.4	26	
3.2.2	Logistics performance*	58.1	36	◇
3.2.3	Gross capital formation, % GDP	21.7	81	○
3.3	**Ecological sustainability**	**41.0**	**36**	
3.3.1	GDP/unit of energy use	12.8	26	
3.3.2	Environmental performance*	65.8	29	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.2	38	
MARKET SOPHISTICATION		**61.4**	**14**	
4.1	**Credit**	**49.3**	**38**	
4.1.1	Ease of getting credit*	70.0	44	○
4.1.2	Domestic credit to private sector, % GDP	66.7	49	◇
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**64.1**	**12**	
4.2.1	Ease of protecting minority investors*	78.0	18	
4.2.2	Market capitalization, % GDP	61.0	25	
4.2.3	Venture capital deals/bn PPP$ GDP	0.5	5	◆
4.3	**Trade, competition, and market scale**	**70.7**	**33**	
4.3.1	Applied tariff rate, weighted avg., %	1.9	54	
4.3.2	Intensity of local competition†	75.4	24	
4.3.3	Domestic market scale, bn PPP$	354.2	51	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**63.7**	**3**	● ◆
5.1	**Knowledge workers**	**61.4**	**12**	
5.1.1	Knowledge-intensive employment, %	48.4	8	
5.1.2	Firms offering formal training, %	18.6	76	○ ◇
5.1.3	GERD performed by business, % GDP	4.4	1	● ◆
5.1.4	GERD financed by business, %	35.8	49	○ ◇
5.1.5	Females employed w/advanced degrees, %	22.3	23	
5.2	**Innovation linkages**	**81.6**	**1**	● ◆
5.2.1	University/industry research collaboration†	78.5	1	● ◆
5.2.2	State of cluster development†	56.8	31	◇
5.2.3	GERD financed by abroad, % GDP	2.5	1	● ◆
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.3	5	◆
5.2.5	Patent families 2+ offices/bn PPP$ GDP	5.9	8	
5.3	**Knowledge absorption**	**48.2**	**18**	
5.3.1	Intellectual property payments, % total trade	0.5	65	○ ◇
5.3.2	High-tech imports, % total trade	9.9	35	
5.3.3	ICT services imports, % total trade	2.0	29	
5.3.4	FDI net inflows, % GDP	4.8	27	
5.3.5	Research talent, % in business enterprise	83.7	1	● ◆
KNOWLEDGE & TECHNOLOGY OUTPUTS		**55.6**	**4**	●
6.1	**Knowledge creation**	**52.9**	**12**	
6.1.1	Patents by origin/bn PPP$ GDP	4.5	25	
6.1.2	PCT patents by origin/bn PPP$ GDP	5.7	6	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	24.9	16	
6.1.5	Citable documents H-index	47.4	16	
6.2	**Knowledge impact**	**40.9**	**17**	
6.2.1	Growth rate of PPP$ GDP/worker, %	1.6	53	
6.2.2	New businesses/th pop. 15-64	3.3	42	
6.2.3	Computer software spending, % GDP	0.0	57	◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	23.3	7	◆
6.2.5	High- and medium-high-tech manufacturing, %	41.3	22	
6.3	**Knowledge diffusion**	**72.9**	**2**	● ◆
6.3.1	Intellectual property receipts, % total trade	1.8	14	
6.3.2	High-tech net exports, % total trade	11.9	14	
6.3.3	ICT services exports, % total trade	13.2	1	● ◆
6.3.4	FDI net outflows, % GDP	2.7	25	
CREATIVE OUTPUTS		**35.9**	**26**	◇
7.1	**Intangible assets**	**27.6**	**65**	○ ◇
7.1.1	Trademarks by origin/bn PPP$ GDP	12.3	105	○ ◇
7.1.2	Global brand value, top 5,000, % GDP	21.2	46	◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	2.9	38	
7.1.4	ICTs & organizational model creation†	77.0	12	
7.2	**Creative goods and services**	**30.8**	**24**	
7.2.1	Cultural & creative services exports, % total trade	2.6	4	● ◆
7.2.2	National feature films/mn pop. 15-69	5.3	41	
7.2.3	Entertainment & Media market/th pop. 15-69	35.0	21	◇
7.2.4	Printing and other media, % manufacturing	1.2	41	
7.2.5	Creative goods exports, % total trade	1.6	34	
7.3	**Online creativity**	**57.6**	**13**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	21.9	26	◇
7.3.2	Country-code TLDs/th pop. 15-69	13.8	34	◇
7.3.3	Wikipedia edits/mn pop. 15-69	94.9	3	● ◆
7.3.4	Mobile app creation/bn PPP$ GDP	100.0	1	● ◆

NOTES: ● indicates a strength; ○ a weakness; ◆ a strength relative to the other top 25-ranked GII economies; ◇ a weakness relative to the other top 25-ranked GII economies; * an index; † a survey question. 🕘 indicates that the economy's data are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

ITALY

GII 2020 rank

28

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
24	33	High	EUR	60.6	2,442.8	35,331.7	30

		Score/Value	Rank	
INSTITUTIONS		**74.6**	**37**	
1.1	**Political environment**	**63.4**	**49**	◇
1.1.1	Political and operational stability*	71.4	59	◇
1.1.2	Government effectiveness*	59.4	47	◇
1.2	**Regulatory environment**	**78.2**	**31**	
1.2.1	Regulatory quality*	59.5	41	
1.2.2	Rule of law*	53.1	51	◇
1.2.3	Cost of redundancy dismissal, salary weeks	8.0	1	● ◆
1.3	**Business environment**	**82.1**	**27**	
1.3.1	Ease of starting a business*	86.8	76	○ ◇
1.3.2	Ease of resolving insolvency*	77.5	20	
HUMAN CAPITAL & RESEARCH		**43.7**	**32**	
2.1	**Education**	**49.6**	**53**	
2.1.1	Expenditure on education, % GDP 🕘	3.8	80	○
2.1.2	Government funding/pupil, secondary, % GDP/cap 🕘	22.9	30	
2.1.3	School life expectancy, years	16.1	34	
2.1.4	PISA scales in reading, maths, & science	477.0	34	
2.1.5	Pupil-teacher ratio, secondary 🕘	10.0	34	
2.2	**Tertiary education**	**37.6**	**53**	
2.2.1	Tertiary enrolment, % gross	61.9	44	
2.2.2	Graduates in science & engineering, % 🕘	23.3	49	
2.2.3	Tertiary inbound mobility, %	5.3	42	
2.3	**Research & development (R&D)**	**44.1**	**23**	
2.3.1	Researchers, FTE/mn pop	2,306.8	38	
2.3.2	Gross expenditure on R&D, % GDP	1.4	26	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	72.8	14	●
2.3.4	QS university ranking, average score top 3*	47.9	20	
INFRASTRUCTURE		**56.6**	**19**	
3.1	**Information & communication technologies (ICTs)**	**83.7**	**25**	
3.1.1	ICT access*	73.6	49	◇
3.1.2	ICT use*	70.4	40	
3.1.3	Government's online service*	95.1	9	●
3.1.4	E-participation*	95.5	15	
3.2	**General infrastructure**	**30.9**	**48**	
3.2.1	Electricity output, kWh/mn pop	4,780.6	44	
3.2.2	Logistics performance*	78.3	19	
3.2.3	Gross capital formation, % GDP	17.6	113	○ ◇
3.3	**Ecological sustainability**	**55.1**	**12**	● ◆
3.3.1	GDP/unit of energy use	13.9	16	
3.3.2	Environmental performance*	71.0	20	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	6.3	14	●
MARKET SOPHISTICATION		**50.5**	**50**	
4.1	**Credit**	**39.3**	**74**	○
4.1.1	Ease of getting credit*	45.0	101	○ ◇
4.1.2	Domestic credit to private sector, % GDP	77.4	39	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**35.3**	**74**	○
4.2.1	Ease of protecting minority investors*	66.0	50	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	46	○
4.3	**Trade, competition, and market scale**	**76.9**	**17**	
4.3.1	Applied tariff rate, weighted avg., %	1.7	22	
4.3.2	Intensity of local competition†	71.4	47	
4.3.3	Domestic market scale, bn PPP$	2,442.8	12	● ◆

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**36.7**	**34**	
5.1	**Knowledge workers**	**38.8**	**48**	
5.1.1	Knowledge-intensive employment, %	36.4	35	
5.1.2	Firms offering formal training, %	12.6	90	○ ◇
5.1.3	GERD performed by business, % GDP	0.9	23	
5.1.4	GERD financed by business, %	53.7	20	
5.1.5	Females employed w/advanced degrees, %	13.0	53	
5.2	**Innovation linkages**	**37.4**	**27**	
5.2.1	University/industry research collaboration†	50.0	40	
5.2.2	State of cluster development†	74.9	1	● ◆
5.2.3	GERD financed by abroad, % GDP	0.2	25	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	50	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	2.0	18	
5.3	**Knowledge absorption**	**33.9**	**46**	
5.3.1	Intellectual property payments, % total trade	0.8	44	
5.3.2	High-tech imports, % total trade	7.1	73	○
5.3.3	ICT services imports, % total trade	1.6	40	
5.3.4	FDI net inflows, % GDP	1.3	105	○
5.3.5	Research talent, % in business enterprise	43.6	31	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**42.3**	**18**	
6.1	**Knowledge creation**	**41.9**	**22**	
6.1.1	Patents by origin/bn PPP$ GDP	5.6	19	
6.1.2	PCT patents by origin/bn PPP$ GDP	1.4	23	
6.1.3	Utility models by origin/bn PPP$ GDP	0.7	28	
6.1.4	Scientific & technical articles/bn PPP$ GDP	18.3	30	
6.1.5	Citable documents H-index	68.8	8	● ◆
6.2	**Knowledge impact**	**52.7**	**2**	● ◆
6.2.1	Growth rate of PPP$ GDP/worker, %	0.1	90	○
6.2.2	New businesses/th pop. 15-64	3.0	49	
6.2.3	Computer software spending, % GDP	0.0	14	●
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	36.6	2	● ◆
6.2.5	High- and medium-high-tech manufacturing, %	39.0	24	
6.3	**Knowledge diffusion**	**32.1**	**39**	
6.3.1	Intellectual property receipts, % total trade	0.7	22	
6.3.2	High-tech net exports, % total trade	5.2	32	
6.3.3	ICT services exports, % total trade	1.5	67	
6.3.4	FDI net outflows, % GDP	1.1	52	
CREATIVE OUTPUTS		**35.9**	**27**	
7.1	**Intangible assets**	**44.9**	**20**	
7.1.1	Trademarks by origin/bn PPP$ GDP	48.8	50	
7.1.2	Global brand value, top 5,000, % GDP	87.3	23	
7.1.3	Industrial designs by origin/bn PPP$ GDP	19.2	1	● ◆
7.1.4	ICTs & organizational model creation†	54.6	61	◇
7.2	**Creative goods and services**	**22.1**	**47**	
7.2.1	Cultural & creative services exports, % total trade	0.4	58	
7.2.2	National feature films/mn pop. 15-69	4.1	48	
7.2.3	Entertainment & Media market/th pop. 15-69	33.0	23	
7.2.4	Printing and other media, % manufacturing	1.1	44	
7.2.5	Creative goods exports, % total trade	2.2	27	
7.3	**Online creativity**	**31.6**	**34**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	22.7	25	
7.3.2	Country-code TLDs/th pop. 15-69	23.4	28	
7.3.3	Wikipedia edits/mn pop. 15-69	78.2	30	
7.3.4	Mobile app creation/bn PPP$ GDP	3.4	60	○

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

JAMAICA

GII 2020 rank

72

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
62	86	Upper middle	LCN	2.9	27.9	8,461.3	81

		Score/Value	Rank	
INSTITUTIONS		**71.8**	**42**	◆
1.1	**Political environment**	**65.2**	**46**	◆
1.1.1	Political and operational stability*	73.2	49	
1.1.2	Government effectiveness*	61.2	43	◆
1.2	**Regulatory environment**	**66.5**	**61**	
1.2.1	Regulatory quality*	49.1	59	
1.2.2	Rule of law*	40.5	75	
1.2.3	Cost of redundancy dismissal, salary weeks	14.0	52	
1.3	**Business environment**	**83.7**	**23**	● ◆
1.3.1	Ease of starting a business*	97.4	6	● ◆
1.3.2	Ease of resolving insolvency*	70.1	32	◆
HUMAN CAPITAL & RESEARCH		**22.6**	**[88]**	
2.1	**Education**	**48.5**	**59**	
2.1.1	Expenditure on education, % GDP	5.4	27	●
2.1.2	Government funding/pupil, secondary, % GDP/cap	29.6	13	● ◆
2.1.3	School life expectancy, years 🕘	12.3	88	◇
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	16.7	81	
2.2	**Tertiary education**	**19.4**	**[97]**	
2.2.1	Tertiary enrolment, % gross 🕘	27.1	86	◇
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research & development (R&D)**	**0.0**	**[121]**	
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 R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**26.4**	**110**	◇
3.1	**Information & communication technologies (ICTs)**	**39.7**	**109**	◇
3.1.1	ICT access*	54.6	82	
3.1.2	ICT use*	40.8	99	◇
3.1.3	Government's online service*	31.9	118	○ ◇
3.1.4	E-participation*	31.5	119	○ ◇
3.2	**General infrastructure**	**14.5**	**121**	○ ◇
3.2.1	Electricity output, kWh/mn pop	1,515.2	89	
3.2.2	Logistics performance*	21.1	106	○ ◇
3.2.3	Gross capital formation, % GDP	18.8	104	
3.3	**Ecological sustainability**	**25.1**	**80**	
3.3.1	GDP/unit of energy use	8.6	71	
3.3.2	Environmental performance*	48.2	60	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.4	89	
MARKET SOPHISTICATION		**38.0**	**110**	◇
4.1	**Credit**	**39.5**	**73**	
4.1.1	Ease of getting credit*	85.0	14	●
4.1.2	Domestic credit to private sector, % GDP 🕘	32.0	92	
4.1.3	Microfinance gross loans, % GDP	0.2	53	
4.2	**Investment**	**27.5**	**105**	
4.2.1	Ease of protecting minority investors*	62.0	60	
4.2.2	Market capitalization, % GDP 🕘	32.0	43	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	42	
4.3	**Trade, competition, and market scale**	**47.1**	**123**	○ ◇
4.3.1	Applied tariff rate, weighted avg., % 🕘	10.8	119	○ ◇
4.3.2	Intensity of local competition†	72.1	45	
4.3.3	Domestic market scale, bn PPP$	27.9	121	○ ◇

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**27.0**	**60**	
5.1	**Knowledge workers**	**30.5**	**[64]**	
5.1.1	Knowledge-intensive employment, % 🕘	21.6	72	
5.1.2	Firms offering formal training, % 🕘	25.9	60	
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**	**25.8**	**44**	◆
5.2.1	University/industry research collaboration†	44.8	53	
5.2.2	State of cluster development†	46.5	69	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.1	27	● ◆
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.1	60	
5.3	**Knowledge absorption**	**24.8**	**79**	
5.3.1	Intellectual property payments, % total trade	0.8	45	
5.3.2	High-tech imports, % total trade 🕘	4.5	114	○
5.3.3	ICT services imports, % total trade	1.2	59	
5.3.4	FDI net inflows, % GDP	5.8	21	● ◆
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**12.0**	**107**	
6.1	**Knowledge creation**	**6.4**	**[94]**	
6.1.1	Patents by origin/bn PPP$ GDP	1.0	65	
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	3.1	104	
6.1.5	Citable documents H-index	5.2	102	
6.2	**Knowledge impact**	**15.6**	**96**	
6.2.1	Growth rate of PPP$ GDP/worker, %	-1.8	112	○ ◇
6.2.2	New businesses/th pop. 15-64	1.6	64	
6.2.3	Computer software spending, % GDP	0.0	26	● ◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.1	104	
6.2.5	High- and medium-high-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**14.1**	**101**	
6.3.1	Intellectual property receipts, % total trade	0.1	59	
6.3.2	High-tech net exports, % total trade 🕘	0.0	123	○ ◇
6.3.3	ICT services exports, % total trade	1.9	58	
6.3.4	FDI net outflows, % GDP	0.7	65	
CREATIVE OUTPUTS		**30.0**	**42**	◆
7.1	**Intangible assets**	**52.5**	**10**	● ◆
7.1.1	Trademarks by origin/bn PPP$ GDP	185.8	4	● ◆
7.1.2	Global brand value, top 5,000, % GDP	95.0	20	● ◆
7.1.3	Industrial designs by origin/bn PPP$ GDP	4.2	27	●
7.1.4	ICTs & organizational model creation†	55.2	60	
7.2	**Creative goods and services**	**2.2**	**[116]**	
7.2.1	Cultural & creative services exports, % total trade	0.1	90	
7.2.2	National feature films/mn pop. 15-69	n/a	n/a	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade 🕘	0.2	78	
7.3	**Online creativity**	**12.7**	**74**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	1.7	83	
7.3.2	Country-code TLDs/th pop. 15-69	1.0	83	
7.3.3	Wikipedia edits/mn pop. 15-69	38.5	81	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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

JAPAN

GII 2020 rank

16

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
18	12	High	SEAO	126.9	5,747.5	39,763.1	15

		Score/Value	Rank	
INSTITUTIONS		**89.3**	**8**	
1.1	**Political environment**	**88.7**	**11**	
1.1.1	Political and operational stability*	91.1	5	
1.1.2	Government effectiveness*	87.6	11	
1.2	**Regulatory environment**	**90.9**	**12**	
1.2.1	Regulatory quality*	76.9	22	
1.2.2	Rule of law*	86.7	17	
1.2.3	Cost of redundancy dismissal, salary weeks	8.0	1	●
1.3	**Business environment**	**88.2**	**9**	
1.3.1	Ease of starting a business*	86.1	82	○ ◇
1.3.2	Ease of resolving insolvency*	90.2	3	● ◆
HUMAN CAPITAL & RESEARCH		**47.3**	**[24]**	
2.1	**Education**	**48.6**	**[57]**	
2.1.1	Expenditure on education, % GDP 🕘	3.2	93	○ ◇
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, & science	520.0	5	
2.1.5	Pupil-teacher ratio, secondary 🕘	11.1	45	
2.2	**Tertiary education**	**18.4**	**[99]**	
2.2.1	Tertiary enrolment, % gross	n/a	n/a	
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	4.3	54	
2.3	**Research & development (R&D)**	**74.9**	**5**	●
2.3.1	Researchers, FTE/mn pop	5,331.2	13	
2.3.2	Gross expenditure on R&D, % GDP	3.3	5	●
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	91.1	6	
2.3.4	QS university ranking, average score top 3*	78.6	8	
INFRASTRUCTURE		**60.0**	**8**	
3.1	**Information & communication technologies (ICTs)**	**90.2**	**10**	
3.1.1	ICT access*	85.6	11	
3.1.2	ICT use*	81.9	15	
3.1.3	Government's online service*	95.1	9	
3.1.4	E-participation*	98.3	5	
3.2	**General infrastructure**	**42.3**	**18**	
3.2.1	Electricity output, kWh/mn pop	8,054.7	21	
3.2.2	Logistics performance*	91.8	5	●
3.2.3	Gross capital formation, % GDP	24.6	55	
3.3	**Ecological sustainability**	**47.5**	**23**	
3.3.1	GDP/unit of energy use	11.4	40	
3.3.2	Environmental performance*	75.1	12	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	4.1	25	
MARKET SOPHISTICATION		**64.3**	**9**	
4.1	**Credit**	**65.7**	**12**	
4.1.1	Ease of getting credit*	55.0	88	○
4.1.2	Domestic credit to private sector, % GDP	168.8	4	● ◆
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**41.5**	**56**	
4.2.1	Ease of protecting minority investors*	64.0	56	
4.2.2	Market capitalization, % GDP	111.7	8	
4.2.3	Venture capital deals/bn PPP$ GDP	0.1	35	◇
4.3	**Trade, competition, and market scale**	**85.6**	**2**	● ◆
4.3.1	Applied tariff rate, weighted avg., %	2.5	61	
4.3.2	Intensity of local competition†	87.2	1	● ◆
4.3.3	Domestic market scale, bn PPP$	5,747.5	4	● ◆

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**57.1**	**10**	
5.1	**Knowledge workers**	**65.1**	**10**	
5.1.1	Knowledge-intensive employment, %	24.8	60	○ ◇
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	2.6	3	●
5.1.4	GERD financed by business, %	79.1	2	● ◆
5.1.5	Females employed w/advanced degrees, %	21.8	24	
5.2	**Innovation linkages**	**47.7**	**17**	
5.2.1	University/industry research collaboration†	62.4	20	
5.2.2	State of cluster development†	67.7	11	
5.2.3	GERD financed by abroad, % GDP	0.0	66	○ ◇
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	43	◇
5.2.5	Patent families 2+ offices/bn PPP$ GDP	13.2	1	● ◆
5.3	**Knowledge absorption**	**58.6**	**4**	●
5.3.1	Intellectual property payments, % total trade	2.5	9	
5.3.2	High-tech imports, % total trade	13.6	16	
5.3.3	ICT services imports, % total trade	1.7	36	
5.3.4	FDI net inflows, % GDP	0.6	121	○
5.3.5	Research talent, % in business enterprise	74.4	4	● ◆
KNOWLEDGE & TECHNOLOGY OUTPUTS		**46.4**	**13**	
6.1	**Knowledge creation**	**57.2**	**11**	
6.1.1	Patents by origin/bn PPP$ GDP	45.3	1	● ◆
6.1.2	PCT patents by origin/bn PPP$ GDP	9.2	1	● ◆
6.1.3	Utility models by origin/bn PPP$ GDP	0.7	31	
6.1.4	Scientific & technical articles/bn PPP$ GDP	9.7	53	◇
6.1.5	Citable documents H-index	69.9	6	
6.2	**Knowledge impact**	**32.1**	**35**	
6.2.1	Growth rate of PPP$ GDP/worker, %	-0.1	95	○
6.2.2	New businesses/th pop. 15-64	0.4	103	○ ◇
6.2.3	Computer software spending, % GDP	0.0	46	◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	7.4	35	
6.2.5	High- and medium-high-tech manufacturing, % 🕘	55.1	8	
6.3	**Knowledge diffusion**	**49.8**	**12**	
6.3.1	Intellectual property receipts, % total trade	4.9	1	● ◆
6.3.2	High-tech net exports, % total trade	12.0	13	
6.3.3	ICT services exports, % total trade	0.5	99	○ ◇
6.3.4	FDI net outflows, % GDP	3.5	17	
CREATIVE OUTPUTS		**37.2**	**24**	◇
7.1	**Intangible assets**	**47.3**	**17**	
7.1.1	Trademarks by origin/bn PPP$ GDP	78.3	24	
7.1.2	Global brand value, top 5,000, % GDP	146.2	10	
7.1.3	Industrial designs by origin/bn PPP$ GDP	4.2	28	
7.1.4	ICTs & organizational model creation†	67.8	22	
7.2	**Creative goods and services**	**30.0**	**27**	
7.2.1	Cultural & creative services exports, % total trade	0.3	60	○
7.2.2	National feature films/mn pop. 15-69	6.9	31	
7.2.3	Entertainment & Media market/th pop. 15-69	68.9	5	
7.2.4	Printing and other media, % manufacturing 🕘	1.7	24	
7.2.5	Creative goods exports, % total trade	1.9	30	
7.3	**Online creativity**	**24.2**	**48**	◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	14.9	31	◇
7.3.2	Country-code TLDs/th pop. 15-69	5.7	50	◇
7.3.3	Wikipedia edits/mn pop. 15-69	65.3	49	◇
7.3.4	Mobile app creation/bn PPP$ GDP	13.0	37	

NOTES: ● indicates a strength; ○ a weakness; ◆ a strength relative to the other top 25-ranked GII economies; ◇ a weakness relative to the other top 25-ranked GII economies; * an index; † a survey question. 🕘 indicates that the economy's data are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

JORDAN

GII 2020 rank

81

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
81	**77**	**Upper middle**	**NAWA**	**10.1**	**97.2**	**8,423.6**	**86**

		Score/Value	Rank	
INSTITUTIONS		**64.3**	**63**	
1.1	**Political environment**	**56.5**	**69**	
1.1.1	Political and operational stability*	64.3	83	
1.1.2	Government effectiveness*	52.7	64	
1.2	**Regulatory environment**	**74.2**	**39**	◆
1.2.1	Regulatory quality*	44.0	66	
1.2.2	Rule of law*	52.8	53	◆
1.2.3	Cost of redundancy dismissal, salary weeks	8.0	1	● ◆
1.3	**Business environment**	**62.1**	**97**	
1.3.1	Ease of starting a business*	84.5	92	
1.3.2	Ease of resolving insolvency*	39.7	98	
HUMAN CAPITAL & RESEARCH		**27.2**	**78**	
2.1	**Education**	**31.8**	**99**	
2.1.1	Expenditure on education, % GDP	3.6	88	
2.1.2	Government funding/pupil, secondary, % GDP/cap	15.6	74	
2.1.3	School life expectancy, years	10.4	105	○ ◇
2.1.4	PISA scales in reading, maths, & science	416.0	58	
2.1.5	Pupil-teacher ratio, secondary	12.3	56	
2.2	**Tertiary education**	**40.4**	**41**	
2.2.1	Tertiary enrolment, % gross	34.4	78	
2.2.2	Graduates in science & engineering, %🕘	26.4	30	●
2.2.3	Tertiary inbound mobility, %	14.0	11	● ◆
2.3	**Research & development (R&D)**	**9.5**	**60**	
2.3.1	Researchers, FTE/mn pop🕘	596.0	63	
2.3.2	Gross expenditure on R&D, % GDP🕘	0.7	51	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	16.8	54	
INFRASTRUCTURE		**32.8**	**95**	
3.1	**Information & communication technologies (ICTs)**	**52.7**	**92**	
3.1.1	ICT access*	59.3	75	
3.1.2	ICT use*	53.7	66	
3.1.3	Government's online service*	49.3	106	◇
3.1.4	E-participation*	48.3	106	
3.2	**General infrastructure**	**17.5**	**115**	○
3.2.1	Electricity output, kWh/mn pop	2,140.2	75	
3.2.2	Logistics performance*	29.0	83	
3.2.3	Gross capital formation, % GDP	19.5	100	
3.3	**Ecological sustainability**	**28.3**	**68**	
3.3.1	GDP/unit of energy use	8.5	73	
3.3.2	Environmental performance*	53.4	46	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.0	62	
MARKET SOPHISTICATION		**50.1**	**52**	
4.1	**Credit**	**53.2**	**24**	● ◆
4.1.1	Ease of getting credit*	95.0	4	● ◆
4.1.2	Domestic credit to private sector, % GDP	80.4	35	●
4.1.3	Microfinance gross loans, % GDP	0.4	40	
4.2	**Investment**	**34.6**	**77**	
4.2.1	Ease of protecting minority investors*	50.0	92	
4.2.2	Market capitalization, % GDP	58.5	29	
4.2.3	Venture capital deals/bn PPP$ GDP	0.2	17	●
4.3	**Trade, competition, and market scale**	**62.4**	**67**	
4.3.1	Applied tariff rate, weighted avg., %🕘	4.4	84	
4.3.2	Intensity of local competition†	76.0	19	● ◆
4.3.3	Domestic market scale, bn PPP$	97.2	83	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**20.7**	**94**	
5.1	**Knowledge workers**	**15.0**	**[110]**	
5.1.1	Knowledge-intensive employment, %	n/a	n/a	
5.1.2	Firms offering formal training, %	16.9	82	○ ◇
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**	**27.5**	**38**	◆
5.2.1	University/industry research collaboration†	44.5	55	
5.2.2	State of cluster development†	57.5	30	● ◆
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.1	38	◆
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	83	
5.3	**Knowledge absorption**	**19.5**	**104**	
5.3.1	Intellectual property payments, % total trade	0.1	100	○
5.3.2	High-tech imports, % total trade	6.8	76	
5.3.3	ICT services imports, % total trade	0.3	113	○ ◇
5.3.4	FDI net inflows, % GDP	3.7	41	
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**15.6**	**82**	
6.1	**Knowledge creation**	**16.8**	**60**	
6.1.1	Patents by origin/bn PPP$ GDP	0.3	91	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.2	48	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	17.0	33	● ◆
6.1.5	Citable documents H-index	9.7	78	
6.2	**Knowledge impact**	**19.6**	**84**	
6.2.1	Growth rate of PPP$ GDP/worker, %	-1.0	106	○
6.2.2	New businesses/th pop. 15-64	0.5	95	
6.2.3	Computer software spending, % GDP	0.0	50	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	5.5	50	
6.2.5	High- and medium-high-tech manufacturing, %🕘	21.6	52	
6.3	**Knowledge diffusion**	**10.5**	**120**	○ ◇
6.3.1	Intellectual property receipts, % total trade	0.1	45	
6.3.2	High-tech net exports, % total trade	0.4	83	
6.3.3	ICT services exports, % total trade	0.1	125	○
6.3.4	FDI net outflows, % GDP	0.0	117	○
CREATIVE OUTPUTS		**17.5**	**84**	
7.1	**Intangible assets**	**19.9**	**90**	
7.1.1	Trademarks by origin/bn PPP$ GDP	31.9	76	
7.1.2	Global brand value, top 5,000, % GDP	7.8	63	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.3	96	
7.1.4	ICTs & organizational model creation†	52.6	68	
7.2	**Creative goods and services**	**14.3**	**68**	
7.2.1	Cultural & 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 & Media market/th pop. 15-69	1.8	54	○ ◇
7.2.4	Printing and other media, % manufacturing🕘	2.4	9	● ◆
7.2.5	Creative goods exports, % total trade	0.9	46	
7.3	**Online creativity**	**16.0**	**66**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	4.9	54	
7.3.2	Country-code TLDs/th pop. 15-69	0.2	108	
7.3.3	Wikipedia edits/mn pop. 15-69	48.6	63	
7.3.4	Mobile app creation/bn PPP$ GDP	13.1	36	

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

KAZAKHSTAN

GII 2020 rank

77

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
94	60	Upper middle	CSA	18.6	537.7	25,186.2	79

		Score/Value	Rank	
INSTITUTIONS		**69.0**	**49**	
1.1	**Political environment**	**57.0**	**68**	
1.1.1	Political and operational stability*	69.6	70	
1.1.2	Government effectiveness*	50.6	70	
1.2	**Regulatory environment**	**69.6**	**48**	
1.2.1	Regulatory quality*	45.5	63	
1.2.2	Rule of law*	35.4	92	
1.2.3	Cost of redundancy dismissal, salary weeks	8.7	18	●
1.3	**Business environment**	**80.6**	**31**	● ◆
1.3.1	Ease of starting a business*	94.4	20	● ◆
1.3.2	Ease of resolving insolvency*	66.7	39	
HUMAN CAPITAL & RESEARCH		**29.7**	**68**	
2.1	**Education**	**41.4**	**76**	
2.1.1	Expenditure on education, % GDP	2.8	104	○
2.1.2	Government funding/pupil, secondary, % GDP/cap	21.2	43	
2.1.3	School life expectancy, years	15.6	40	
2.1.4	PISA scales in reading, maths, & science	402.4	64	
2.1.5	Pupil-teacher ratio, secondary	7.7	8	● ◆
2.2	**Tertiary education**	**37.4**	**55**	
2.2.1	Tertiary enrolment, % gross	61.7	45	
2.2.2	Graduates in science & engineering, %	24.7	39	
2.2.3	Tertiary inbound mobility, %	3.3	62	
2.3	**Research & development (R&D)**	**10.4**	**57**	
2.3.1	Researchers, FTE/mn pop	666.9	62	
2.3.2	Gross expenditure on R&D, % GDP	0.1	101	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	31.6	37	
INFRASTRUCTURE		**40.8**	**66**	
3.1	**Information & communication technologies (ICTs)**	**76.3**	**42**	◆
3.1.1	ICT access*	75.2	42	◆
3.1.2	ICT use*	59.6	58	
3.1.3	Government's online service*	86.8	32	● ◆
3.1.4	E-participation*	83.7	42	
3.2	**General infrastructure**	**26.6**	**69**	
3.2.1	Electricity output, kWh/mn pop	5,716.6	36	◆
3.2.2	Logistics performance*	34.7	70	
3.2.3	Gross capital formation, % GDP	25.5	48	
3.3	**Ecological sustainability**	**19.6**	**103**	◇
3.3.1	GDP/unit of energy use	5.0	111	○ ◇
3.3.2	Environmental performance*	44.7	75	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.5	82	
MARKET SOPHISTICATION		**50.0**	**53**	
4.1	**Credit**	**36.7**	**82**	
4.1.1	Ease of getting credit*	80.0	23	●
4.1.2	Domestic credit to private sector, % GDP	27.3	100	
4.1.3	Microfinance gross loans, % GDP	0.2	48	
4.2	**Investment**	**47.8**	**28**	●
4.2.1	Ease of protecting minority investors*	84.0	7	● ◆
4.2.2	Market capitalization, % GDP	25.7	51	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**65.5**	**50**	
4.3.1	Applied tariff rate, weighted avg., %	2.4	60	
4.3.2	Intensity of local competition†	60.0	107	◇
4.3.3	Domestic market scale, bn PPP$	537.7	40	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**24.3**	**71**	
5.1	**Knowledge workers**	**37.3**	**52**	
5.1.1	Knowledge-intensive employment, %	34.3	39	◆
5.1.2	Firms offering formal training, %	21.8	69	
5.1.3	GERD performed by business, % GDP	0.1	70	
5.1.4	GERD financed by business, %	47.4	34	
5.1.5	Females employed w/advanced degrees, %	20.7	27	● ◆
5.2	**Innovation linkages**	**13.0**	**124**	○ ◇
5.2.1	University/industry research collaboration†	40.9	68	
5.2.2	State of cluster development†	33.9	114	○ ◇
5.2.3	GERD financed by abroad, % GDP	0.0	89	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	99	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	89	
5.3	**Knowledge absorption**	**22.6**	**91**	
5.3.1	Intellectual property payments, % total trade	0.3	80	
5.3.2	High-tech imports, % total trade	7.1	72	
5.3.3	ICT services imports, % total trade	0.7	92	
5.3.4	FDI net inflows, % GDP	5.2	25	●
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**15.8**	**80**	
6.1	**Knowledge creation**	**11.7**	**72**	
6.1.1	Patents by origin/bn PPP$ GDP	1.7	44	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	79	
6.1.3	Utility models by origin/bn PPP$ GDP	1.5	15	●
6.1.4	Scientific & technical articles/bn PPP$ GDP	2.1	117	○
6.1.5	Citable documents H-index	5.1	103	
6.2	**Knowledge impact**	**15.6**	**97**	
6.2.1	Growth rate of PPP$ GDP/worker, %	3.0	25	●
6.2.2	New businesses/th pop. 15-64	2.0	56	
6.2.3	Computer software spending, % GDP	0.0	118	○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.1	100	
6.2.5	High- and medium-high-tech manufacturing, %	9.6	84	
6.3	**Knowledge diffusion**	**20.2**	**76**	
6.3.1	Intellectual property receipts, % total trade	0.0	99	○ ◇
6.3.2	High-tech net exports, % total trade	3.2	44	
6.3.3	ICT services exports, % total trade	0.2	115	○
6.3.4	FDI net outflows, % GDP	0.2	95	
CREATIVE OUTPUTS		**12.9**	**105**	◇
7.1	**Intangible assets**	**16.6**	**107**	
7.1.1	Trademarks by origin/bn PPP$ GDP	20.8	93	
7.1.2	Global brand value, top 5,000, % GDP	3.6	72	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.2	106	
7.1.4	ICTs & organizational model creation†	48.2	88	
7.2	**Creative goods and services**	**6.6**	**96**	
7.2.1	Cultural & creative services exports, % total trade	0.1	89	
7.2.2	National feature films/mn pop. 15-69	6.1	38	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	0.5	90	○ ◇
7.2.5	Creative goods exports, % total trade	0.2	87	
7.3	**Online creativity**	**11.6**	**79**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.3	115	
7.3.2	Country-code TLDs/th pop. 15-69	3.7	60	
7.3.3	Wikipedia edits/mn pop. 15-69	45.4	70	
7.3.4	Mobile app creation/bn PPP$ GDP	0.0	94	○

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

KENYA

GII 2020 rank

86

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
78	**92**	**Lower middle**	**SSF**	**52.6**	**191.3**	**3,382.6**	**77**

		Score/Value	Rank	
INSTITUTIONS		**59.9**	**78**	
1.1	**Political environment**	**47.0**	**97**	
1.1.1	Political and operational stability*	58.9	104	
1.1.2	Government effectiveness*	41.0	92	
1.2	**Regulatory environment**	**60.3**	**79**	
1.2.1	Regulatory quality*	35.8	89	
1.2.2	Rule of law*	36.0	88	
1.2.3	Cost of redundancy dismissal, salary weeks	15.8	61	
1.3	**Business environment**	**72.6**	**60**	
1.3.1	Ease of starting a business*	82.7	100	
1.3.2	Ease of resolving insolvency*	62.4	45	◆
HUMAN CAPITAL & RESEARCH		**15.8**	**110**	
2.1	**Education**	**31.5**	**[101]**	
2.1.1	Expenditure on education, % GDP	5.3	29	●
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	10.3	106	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	33.4	121	○ ◇
2.2	**Tertiary education**	**11.5**	**112**	
2.2.1	Tertiary enrolment, % gross	11.5	107	
2.2.2	Graduates in science & engineering, %	16.5	85	
2.2.3	Tertiary inbound mobility, %	0.9	89	
2.3	**Research & development (R&D)**	**4.5**	**77**	
2.3.1	Researchers, FTE/mn pop	221.4	80	
2.3.2	Gross expenditure on R&D, % GDP	0.8	47	◆
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**25.5**	**114**	
3.1	**Information & communication technologies (ICTs)**	**44.8**	**102**	
3.1.1	ICT access*	43.0	102	
3.1.2	ICT use*	20.3	114	◇
3.1.3	Government's online service*	62.5	90	
3.1.4	E-participation*	53.4	102	
3.2	**General infrastructure**	**15.4**	**119**	○
3.2.1	Electricity output, kWh/mn pop	207.7	114	○ ◇
3.2.2	Logistics performance*	35.0	67	
3.2.3	Gross capital formation, % GDP	16.9	116	○ ◇
3.3	**Ecological sustainability**	**16.3**	**119**	○ ◇
3.3.1	GDP/unit of energy use	5.4	105	◇
3.3.2	Environmental performance*	34.7	103	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.3	93	
MARKET SOPHISTICATION		**49.1**	**57**	
4.1	**Credit**	**54.6**	**20**	● ◆
4.1.1	Ease of getting credit*	95.0	4	● ◆
4.1.2	Domestic credit to private sector, % GDP	28.0	97	
4.1.3	Microfinance gross loans, % GDP	4.2	10	● ◆
4.2	**Investment**	**36.6**	**67**	
4.2.1	Ease of protecting minority investors*	92.0	1	● ◆
4.2.2	Market capitalization, % GDP	30.2	47	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	49	
4.3	**Trade, competition, and market scale**	**56.1**	**93**	
4.3.1	Applied tariff rate, weighted avg., %	10.1	115	◇
4.3.2	Intensity of local competition†	72.0	46	◆
4.3.3	Domestic market scale, bn PPP$	191.3	70	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**24.8**	**68**	
5.1	**Knowledge workers**	**14.8**	**111**	
5.1.1	Knowledge-intensive employment, %	n/a	n/a	
5.1.2	Firms offering formal training, %	37.4	36	
5.1.3	GERD performed by business, % GDP	0.1	67	
5.1.4	GERD financed by business, %	4.3	86	
5.1.5	Females employed w/advanced degrees, %	1.5	106	
5.2	**Innovation linkages**	**33.4**	**31**	● ◆
5.2.1	University/industry research collaboration†	51.5	36	● ◆
5.2.2	State of cluster development†	53.5	39	◆
5.2.3	GERD financed by abroad, % GDP	0.4	5	● ◆
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	52	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	101	○ ◇
5.3	**Knowledge absorption**	**26.2**	**73**	
5.3.1	Intellectual property payments, % total trade	1.2	29	● ◆
5.3.2	High-tech imports, % total trade	9.4	40	
5.3.3	ICT services imports, % total trade	0.3	118	○ ◇
5.3.4	FDI net inflows, % GDP	1.1	107	
5.3.5	Research talent, % in business enterprise	11.4	61	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**18.4**	**70**	
6.1	**Knowledge creation**	**13.8**	**67**	
6.1.1	Patents by origin/bn PPP$ GDP	1.4	55	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	83	
6.1.3	Utility models by origin/bn PPP$ GDP	1.0	23	
6.1.4	Scientific & technical articles/bn PPP$ GDP	6.7	69	
6.1.5	Citable documents H-index	15.4	53	
6.2	**Knowledge impact**	**17.9**	**90**	
6.2.1	Growth rate of PPP$ GDP/worker, %	2.2	43	
6.2.2	New businesses/th pop. 15-64	1.5	68	
6.2.3	Computer software spending, % GDP	0.0	77	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	3.1	70	
6.2.5	High- and medium-high-tech manufacturing, %	9.6	83	
6.3	**Knowledge diffusion**	**23.6**	**65**	
6.3.1	Intellectual property receipts, % total trade	0.6	25	● ◆
6.3.2	High-tech net exports, % total trade	0.4	86	
6.3.3	ICT services exports, % total trade	3.3	26	●
6.3.4	FDI net outflows, % GDP	0.8	62	
CREATIVE OUTPUTS		**16.0**	**91**	
7.1	**Intangible assets**	**23.1**	**83**	
7.1.1	Trademarks by origin/bn PPP$ GDP	32.6	74	
7.1.2	Global brand value, top 5,000, % GDP	13.1	54	
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.0	71	
7.1.4	ICTs & organizational model creation†	60.0	44	◆
7.2	**Creative goods and services**	**17.3**	**59**	
7.2.1	Cultural & creative services exports, % total trade	0.0	104	○
7.2.2	National feature films/mn pop. 15-69	n/a	n/a	
7.2.3	Entertainment & Media market/th pop. 15-69	1.6	56	
7.2.4	Printing and other media, % manufacturing	4.1	3	● ◆
7.2.5	Creative goods exports, % total trade	0.2	85	
7.3	**Online creativity**	**0.5**	**124**	○ ◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.9	97	
7.3.2	Country-code TLDs/th pop. 15-69	1.0	87	
7.3.3	Wikipedia edits/mn pop. 15-69	5.2	121	○ ◇
7.3.4	Mobile app creation/bn PPP$ GDP	0.0	92	○

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

KUWAIT

GII 2020 rank

78

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
79	**73**	**High**	**NAWA**	**4.2**	**312.1**	**57,957.5**	**60**

		Score/Value	Rank	
INSTITUTIONS		**56.7**	**88**	◇
1.1	**Political environment**	**53.0**	**82**	◇
1.1.1	Political and operational stability*	62.5	92	◇
1.1.2	Government effectiveness*	48.2	77	◇
1.2	**Regulatory environment**	**53.3**	**97**	◇
1.2.1	Regulatory quality*	40.9	71	◇
1.2.2	Rule of law*	52.2	54	◇
1.2.3	Cost of redundancy dismissal, salary weeks	28.1	115	○ ◇
1.3	**Business environment**	**63.8**	**90**	◇
1.3.1	Ease of starting a business*	88.4	67	
1.3.2	Ease of resolving insolvency*	39.2	101	◇
HUMAN CAPITAL & RESEARCH		**31.0**	**[63]**	
2.1	**Education**	**51.0**	**[49]**	
2.1.1	Expenditure on education, % GDP	n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap.	17.3	67	
2.1.3	School life expectancy, years	14.7	59	◇
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	7.6	5	● ◆
2.2	**Tertiary education**	**39.4**	**[44]**	
2.2.1	Tertiary enrolment, % gross	54.4	54	
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research & development (R&D)**	**2.7**	**88**	◇
2.3.1	Researchers, FTE/mn pop	513.9	67	◇
2.3.2	Gross expenditure on R&D, % GDP	0.1	111	○ ◇
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	3.6	72	◇
INFRASTRUCTURE		**44.7**	**55**	◇
3.1	**Information & communication technologies (ICTs)**	**73.4**	**51**	◇
3.1.1	ICT access*	77.6	34	●
3.1.2	ICT use*	67.9	46	◇
3.1.3	Government's online service*	79.2	48	
3.1.4	E-participation*	69.1	71	◇
3.2	**General infrastructure**	**34.2**	**35**	●
3.2.1	Electricity output, kWh/mn pop	17,581.6	4	● ◆
3.2.2	Logistics performance*	37.1	62	◇
3.2.3	Gross capital formation, % GDP	20.4	95	
3.3	**Ecological sustainability**	**26.5**	**75**	◇
3.3.1	GDP/unit of energy use	7.8	83	
3.3.2	Environmental performance*	53.6	45	◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.6	74	◇
MARKET SOPHISTICATION		**45.3**	**81**	
4.1	**Credit**	**41.9**	**65**	
4.1.1	Ease of getting credit*	45.0	101	◇
4.1.2	Domestic credit to private sector, % GDP	88.7	30	●
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**35.3**	**73**	
4.2.1	Ease of protecting minority investors*	66.0	50	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	45	
4.3	**Trade, competition, and market scale**	**58.6**	**83**	◇
4.3.1	Applied tariff rate, weighted avg., %	4.8	86	◇
4.3.2	Intensity of local competition†	56.0	121	○ ◇
4.3.3	Domestic market scale, bn PPP$	312.1	57	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**20.4**	**[98]**	
5.1	**Knowledge workers**	**18.3**	**[102]**	
5.1.1	Knowledge-intensive employment, %	22.7	68	◇
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	96	○ ◇
5.1.5	Females employed w/advanced degrees, %	n/a	n/a	
5.2	**Innovation linkages**	**18.9**	**79**	◇
5.2.1	University/industry research collaboration†	44.6	54	
5.2.2	State of cluster development†	51.3	46	
5.2.3	GERD financed by abroad, % GDP	0.0	99	○ ◇
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	51	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	79	
5.3	**Knowledge absorption**	**24.0**	**[84]**	
5.3.1	Intellectual property payments, % total trade	n/a	n/a	
5.3.2	High-tech imports, % total trade	5.2	108	
5.3.3	ICT services imports, % total trade	0.5	103	◇
5.3.4	FDI net inflows, % GDP	0.1	123	○
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**17.8**	**73**	◇
6.1	**Knowledge creation**	**4.6**	**109**	◇
6.1.1	Patents by origin/bn PPP$ GDP	0.0	127	○ ◇
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	93	◇
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	2.9	106	◇
6.1.5	Citable documents H-index	8.9	82	◇
6.2	**Knowledge impact**	**20.2**	**83**	◇
6.2.1	Growth rate of PPP$ GDP/worker, %	-2.0	114	○ ◇
6.2.2	New businesses/th pop. 15-64	5.9	27	●
6.2.3	Computer software spending, % GDP	0.0	25	●
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.6	89	◇
6.2.5	High- and medium-high-tech manufacturing, %	22.8	48	
6.3	**Knowledge diffusion**	**28.6**	**46**	
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	High-tech net exports, % total trade	0.3	89	◇
6.3.3	ICT services exports, % total trade	3.8	22	●
6.3.4	FDI net outflows, % GDP	4.6	13	●
CREATIVE OUTPUTS		**16.5**	**88**	◇
7.1	**Intangible assets**	**24.2**	**76**	◇
7.1.1	Trademarks by origin/bn PPP$ GDP	11.6	106	◇
7.1.2	Global brand value, top 5,000, % GDP	49.1	36	●
7.1.3	Industrial designs by origin/bn PPP$ GDP	n/a	n/a	
7.1.4	ICTs & organizational model creation†	50.9	79	◇
7.2	**Creative goods and services**	**5.7**	**101**	◇
7.2.1	Cultural & creative services exports, % total trade	n/a	n/a	
7.2.2	National feature films/mn pop. 15-69	1.9	70	◇
7.2.3	Entertainment & Media market/th pop. 15-69	15.0	31	◇
7.2.4	Printing and other media, % manufacturing	0.4	94	○ ◇
7.2.5	Creative goods exports, % total trade	0.1	97	
7.3	**Online creativity**	**11.9**	**76**	◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	7.6	44	●
7.3.2	Country-code TLDs/th pop. 15-69	0.3	105	◇
7.3.3	Wikipedia edits/mn pop. 15-69	42.3	78	◇
7.3.4	Mobile app creation/bn PPP$ GDP	0.6	71	

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

KYRGYZSTAN

GII 2020 rank

94

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
107	**88**	**Lower middle**	**CSA**	**6.4**	**25.9**	**3,541.3**	**90**

		Score/Value	Rank	
INSTITUTIONS		**56.1**	**92**	
1.1	**Political environment**	**42.2**	**114**	
1.1.1	Political and operational stability*	53.6	120	○ ◇
1.1.2	Government effectiveness*	36.5	109	
1.2	**Regulatory environment**	**54.7**	**93**	
1.2.1	Regulatory quality*	32.6	97	
1.2.2	Rule of law*	23.0	119	
1.2.3	Cost of redundancy dismissal, salary weeks	17.3	69	
1.3	**Business environment**	**71.5**	**66**	
1.3.1	Ease of starting a business*	93.0	40	●
1.3.2	Ease of resolving insolvency*	50.0	70	
HUMAN CAPITAL & RESEARCH		**29.0**	**73**	
2.1	**Education**	**55.7**	**[33]**	
2.1.1	Expenditure on education, % GDP 🕘	6.0	16	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	13.0	81	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	10.6	40	● ◆
2.2	**Tertiary education**	**30.8**	**74**	
2.2.1	Tertiary enrolment, % gross	41.3	68	
2.2.2	Graduates in science & engineering, %	20.8	67	
2.2.3	Tertiary inbound mobility, %	7.6	31	● ◆
2.3	**Research & development (R&D)**	**0.6**	**109**	
2.3.1	Researchers, FTE/mn pop	n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP 🕘	0.1	104	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**32.3**	**97**	
3.1	**Information & communication technologies (ICTs)**	**56.6**	**86**	
3.1.1	ICT access*	46.3	96	
3.1.2	ICT use*	47.1	80	
3.1.3	Government's online service*	64.6	84	
3.1.4	E-participation*	68.5	74	
3.2	**General infrastructure**	**22.5**	**85**	
3.2.1	Electricity output, kWh/mn pop	2,502.2	71	◆
3.2.2	Logistics performance*	22.3	102	
3.2.3	Gross capital formation, % GDP	28.1	34	●
3.3	**Ecological sustainability**	**17.6**	**112**	
3.3.1	GDP/unit of energy use	5.4	105	◇
3.3.2	Environmental performance*	39.8	89	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	111	
MARKET SOPHISTICATION		**47.1**	**66**	
4.1	**Credit**	**50.4**	**34**	● ◆
4.1.1	Ease of getting credit*	85.0	14	● ◆
4.1.2	Domestic credit to private sector, % GDP	23.9	107	
4.1.3	Microfinance gross loans, % GDP	4.4	8	● ◆
4.2	**Investment**	**40.0**	**[60]**	
4.2.1	Ease of protecting minority investors*	40.0	110	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**51.0**	**110**	
4.3.1	Applied tariff rate, weighted avg., %	2.9	64	
4.3.2	Intensity of local competition†	56.5	118	◇
4.3.3	Domestic market scale, bn PPP$	25.9	124	○ ◇

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**18.6**	**105**	
5.1	**Knowledge workers**	**22.4**	**92**	
5.1.1	Knowledge-intensive employment, %	18.8	80	
5.1.2	Firms offering formal training, %	41.4	25	●
5.1.3	GERD performed by business, % GDP 🕘	0.0	78	
5.1.4	GERD financed by business, %	6.4	83	
5.1.5	Females employed w/advanced degrees, % 🕘	10.8	62	
5.2	**Innovation linkages**	**10.7**	**126**	○ ◇
5.2.1	University/industry research collaboration†	28.9	115	
5.2.2	State of cluster development†	29.1	124	○ ◇
5.2.3	GERD financed by abroad, % GDP	0.0	87	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	92	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	101	○ ◇
5.3	**Knowledge absorption**	**22.7**	**90**	
5.3.1	Intellectual property payments, % total trade 🕘	0.2	92	
5.3.2	High-tech imports, % total trade	8.6	52	
5.3.3	ICT services imports, % total trade	0.6	98	
5.3.4	FDI net inflows, % GDP	3.2	47	
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**15.6**	**81**	
6.1	**Knowledge creation**	**16.9**	**59**	
6.1.1	Patents by origin/bn PPP$ GDP 🕘	6.0	16	● ◆
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	68	
6.1.3	Utility models by origin/bn PPP$ GDP 🕘	0.9	24	
6.1.4	Scientific & technical articles/bn PPP$ GDP	4.7	92	
6.1.5	Citable documents H-index	3.0	122	○
6.2	**Knowledge impact**	**14.8**	**103**	
6.2.1	Growth rate of PPP$ GDP/worker, %	3.4	23	●
6.2.2	New businesses/th pop. 15-64 🕘	1.3	77	
6.2.3	Computer software spending, % GDP	0.0	90	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.4	121	◇
6.2.5	High- and medium-high-tech manufacturing, %	2.7	105	○ ◇
6.3	**Knowledge diffusion**	**15.2**	**93**	
6.3.1	Intellectual property receipts, % total trade 🕘	0.0	68	
6.3.2	High-tech net exports, % total trade	1.0	69	
6.3.3	ICT services exports, % total trade	0.7	91	
6.3.4	FDI net outflows, % GDP	0.1	104	
CREATIVE OUTPUTS		**9.2**	**117**	
7.1	**Intangible assets**	**12.9**	**121**	
7.1.1	Trademarks by origin/bn PPP$ GDP	22.5	88	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP 🕘	0.5	84	
7.1.4	ICTs & organizational model creation†	34.8	121	○ ◇
7.2	**Creative goods and services**	**4.3**	**106**	
7.2.1	Cultural & creative services exports, % total trade	0.4	55	
7.2.2	National feature films/mn pop. 15-69	0.2	105	○
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	0.6	83	
7.2.5	Creative goods exports, % total trade	0.1	104	
7.3	**Online creativity**	**6.5**	**102**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.2	118	
7.3.2	Country-code TLDs/th pop. 15-69	0.8	91	
7.3.3	Wikipedia edits/mn pop. 15-69	28.7	97	
7.3.4	Mobile app creation/bn PPP$ GDP	0.1	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 are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

LAO PEOPLE'S DEMOCRATIC REPUBLIC

GII 2020 rank

113

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
95	127	Lower middle	SEAO	7.2	58.1	7,079.9	n/a

		Score/Value	Rank	
INSTITUTIONS		**38.2**	**130**	○ ◇
1.1	**Political environment**	**47.8**	**95**	
1.1.1	Political and operational stability*	73.2	49	● ◆
1.1.2	Government effectiveness*	35.1	114	
1.2	**Regulatory environment**	**35.5**	**123**	
1.2.1	Regulatory quality*	20.9	118	
1.2.2	Rule of law*	24.7	117	
1.2.3	Cost of redundancy dismissal, salary weeks	34.2	122	
1.3	**Business environment**	**31.3**	**131**	○ ◇
1.3.1	Ease of starting a business*	62.7	129	○ ◇
1.3.2	Ease of resolving insolvency*	0.0	129	○ ◇
HUMAN CAPITAL & RESEARCH		**14.6**	**113**	
2.1	**Education**	**25.2**	**117**	
2.1.1	Expenditure on education, % GDP	2.9	99	◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	12.5	86	
2.1.3	School life expectancy, years	10.6	104	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	18.2	88	
2.2	**Tertiary education**	**18.7**	**98**	
2.2.1	Tertiary enrolment, % gross	15.0	99	
2.2.2	Graduates in science & engineering, %	22.5	55	
2.2.3	Tertiary inbound mobility, %	0.5	98	
2.3	**Research & development (R&D)**	**0.0**	**[121]**	
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 R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**23.7**	**118**	◇
3.1	**Information & communication technologies (ICTs)**	**23.6**	**127**	◇
3.1.1	ICT access*	37.4	110	
3.1.2	ICT use*	22.9	112	◇
3.1.3	Government's online service*	16.7	128	○ ◇
3.1.4	E-participation*	17.4	126	○ ◇
3.2	**General infrastructure**	**29.6**	**[54]**	
3.2.1	Electricity output, kWh/mn pop	n/a	n/a	
3.2.2	Logistics performance*	29.6	81	
3.2.3	Gross capital formation, % GDP	n/a	n/a	
3.3	**Ecological sustainability**	**17.9**	**111**	
3.3.1	GDP/unit of energy use	n/a	n/a	
3.3.2	Environmental performance*	34.8	102	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.1	119	
MARKET SOPHISTICATION		**34.9**	**117**	◇
4.1	**Credit**	**29.0**	**110**	
4.1.1	Ease of getting credit*	60.0	74	
4.1.2	Domestic credit to private sector, % GDP	20.9	112	
4.1.3	Microfinance gross loans, % GDP	0.7	27	●
4.2	**Investment**	**20.0**	**[126]**	
4.2.1	Ease of protecting minority investors*	20.0	129	○ ◇
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**55.7**	**97**	
4.3.1	Applied tariff rate, weighted avg., %	0.7	8	● ◆
4.3.2	Intensity of local competition†	52.4	125	○ ◇
4.3.3	Domestic market scale, bn PPP$	58.1	97	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**24.2**	**[72]**	
5.1	**Knowledge workers**	**26.3**	**[81]**	
5.1.1	Knowledge-intensive employment, %	21.3	74	
5.1.2	Firms offering formal training, %	24.4	62	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, %	5.4	89	
5.2	**Innovation linkages**	**22.1**	**57**	●
5.2.1	University/industry research collaboration†	44.4	56	●
5.2.2	State of cluster development†	50.8	47	●
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	88	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	101	○ ◇
5.3	**Knowledge absorption**	**24.2**	**[83]**	
5.3.1	Intellectual property payments, % total trade	n/a	n/a	
5.3.2	High-tech imports, % total trade	4.3	118	
5.3.3	ICT services imports, % total trade	0.2	120	◇
5.3.4	FDI net inflows, % GDP	7.8	15	● ◆
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**11.5**	**108**	
6.1	**Knowledge creation**	**2.0**	**125**	
6.1.1	Patents by origin/bn PPP$ GDP	0.0	130	○ ◇
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	100	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	67	
6.1.4	Scientific & technical articles/bn PPP$ GDP	2.2	115	
6.1.5	Citable documents H-index	4.0	114	
6.2	**Knowledge impact**	**2.6**	**[129]**	
6.2.1	Growth rate of PPP$ GDP/worker, %	n/a	n/a	
6.2.2	New businesses/th pop. 15-64	0.0	121	○ ◇
6.2.3	Computer software spending, % GDP	n/a	n/a	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.7	114	
6.2.5	High- and medium-high-tech manufacturing, %	4.7	97	◇
6.3	**Knowledge diffusion**	**30.0**	**44**	●
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	High-tech net exports, % total trade	4.8	34	● ◆
6.3.3	ICT services exports, % total trade	0.4	102	
6.3.4	FDI net outflows, % GDP	2.5	29	● ◆
CREATIVE OUTPUTS		**16.8**	**[86]**	
7.1	**Intangible assets**	**19.1**	**97**	
7.1.1	Trademarks by origin/bn PPP$ GDP	4.6	119	
7.1.2	Global brand value, top 5,000, % GDP	10.6	58	
7.1.3	Industrial designs by origin/bn PPP$ GDP	n/a	n/a	
7.1.4	ICTs & organizational model creation†	52.5	71	
7.2	**Creative goods and services**	**26.8**	**[35]**	
7.2.1	Cultural & creative services exports, % total trade	n/a	n/a	
7.2.2	National feature films/mn pop. 15-69	1.3	79	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	0.1	100	○ ◇
7.2.5	Creative goods exports, % total trade	4.0	13	● ◆
7.3	**Online creativity**	**2.3**	**[120]**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	2.0	78	
7.3.2	Country-code TLDs/th pop. 15-69	2.6	64	● ◆
7.3.3	Wikipedia edits/mn pop. 15-69	n/a	n/a	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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

LATVIA

GII 2020 rank

36

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
35	35	High	EUR	1.9	60.6	27,415.1	34

		Score/Value	Rank	
INSTITUTIONS		**78.0**	**30**	
1.1	**Political environment**	**75.8**	**33**	
1.1.1	Political and operational stability*	80.4	33	
1.1.2	Government effectiveness*	73.5	32	
1.2	**Regulatory environment**	**81.2**	**25**	
1.2.1	Regulatory quality*	73.2	26	
1.2.2	Rule of law*	71.6	32	
1.2.3	Cost of redundancy dismissal, salary weeks	13.0	41	
1.3	**Business environment**	**77.0**	**42**	
1.3.1	Ease of starting a business*	94.1	24	
1.3.2	Ease of resolving insolvency*	59.8	50	
HUMAN CAPITAL & RESEARCH		**37.3**	**44**	
2.1	**Education**	**55.4**	**34**	
2.1.1	Expenditure on education, % GDP 🕘	4.7	53	
2.1.2	Government funding/pupil, secondary, % GDP/cap	26.0	19	
2.1.3	School life expectancy, years	16.2	29	
2.1.4	PISA scales in reading, maths, & science	487.4	28	
2.1.5	Pupil-teacher ratio, secondary 🕘	8.3	13	● ◆
2.2	**Tertiary education**	**44.5**	**30**	
2.2.1	Tertiary enrolment, % gross	88.1	9	●
2.2.2	Graduates in science & engineering, %	20.9	66	○
2.2.3	Tertiary inbound mobility, %	7.4	33	
2.3	**Research & development (R&D)**	**12.0**	**52**	◇
2.3.1	Researchers, FTE/mn pop	1,912.9	42	
2.3.2	Gross expenditure on R&D, % GDP	0.6	54	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	12.7	60	
INFRASTRUCTURE		**47.0**	**45**	◇
3.1	**Information & communication technologies (ICTs)**	**70.8**	**55**	◇
3.1.1	ICT access*	71.5	56	◇
3.1.2	ICT use*	76.3	28	
3.1.3	Government's online service*	66.7	76	◇
3.1.4	E-participation*	68.5	74	◇
3.2	**General infrastructure**	**23.8**	**79**	◇
3.2.1	Electricity output, kWh/mn pop	3,484.4	57	
3.2.2	Logistics performance*	34.7	69	◇
3.2.3	Gross capital formation, % GDP	24.5	56	
3.3	**Ecological sustainability**	**46.4**	**27**	
3.3.1	GDP/unit of energy use	10.5	48	
3.3.2	Environmental performance*	61.6	36	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	5.8	16	●
MARKET SOPHISTICATION		**51.4**	**43**	
4.1	**Credit**	**49.6**	**36**	
4.1.1	Ease of getting credit*	85.0	14	◆
4.1.2	Domestic credit to private sector, % GDP	36.1	84	○ ◇
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**41.2**	**57**	
4.2.1	Ease of protecting minority investors*	68.0	44	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	0.1	29	
4.3	**Trade, competition, and market scale**	**63.3**	**63**	
4.3.1	Applied tariff rate, weighted avg., %	1.7	22	
4.3.2	Intensity of local competition†	74.3	33	
4.3.3	Domestic market scale, bn PPP$	60.6	96	○ ◇

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**34.3**	**41**	
5.1	**Knowledge workers**	**44.8**	**35**	
5.1.1	Knowledge-intensive employment, %	40.7	26	
5.1.2	Firms offering formal training, %	52.9	14	◆
5.1.3	GERD performed by business, % GDP	0.2	54	
5.1.4	GERD financed by business, %	24.1	63	◇
5.1.5	Females employed w/advanced degrees, %	24.9	15	●
5.2	**Innovation linkages**	**27.1**	**39**	
5.2.1	University/industry research collaboration†	49.5	41	
5.2.2	State of cluster development†	48.6	57	
5.2.3	GERD financed by abroad, % GDP	0.2	27	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.1	28	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.2	43	
5.3	**Knowledge absorption**	**31.1**	**57**	
5.3.1	Intellectual property payments, % total trade	0.3	85	○ ◇
5.3.2	High-tech imports, % total trade	14.2	14	● ◆
5.3.3	ICT services imports, % total trade	2.1	26	
5.3.4	FDI net inflows, % GDP	2.1	82	○
5.3.5	Research talent, % in business enterprise	18.5	58	○ ◇
KNOWLEDGE & TECHNOLOGY OUTPUTS		**29.5**	**42**	
6.1	**Knowledge creation**	**17.5**	**56**	
6.1.1	Patents by origin/bn PPP$ GDP	1.7	47	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.6	31	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	11.9	45	
6.1.5	Citable documents H-index	9.3	79	◇
6.2	**Knowledge impact**	**28.3**	**47**	
6.2.1	Growth rate of PPP$ GDP/worker, %	2.9	29	◆
6.2.2	New businesses/th pop. 15-64	8.0	20	
6.2.3	Computer software spending, % GDP	0.0	85	○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	15.5	18	●
6.2.5	High- and medium-high-tech manufacturing, %	9.9	81	○ ◇
6.3	**Knowledge diffusion**	**42.7**	**24**	
6.3.1	Intellectual property receipts, % total trade	0.0	67	
6.3.2	High-tech net exports, % total trade	9.0	18	
6.3.3	ICT services exports, % total trade	4.4	17	●
6.3.4	FDI net outflows, % GDP	0.6	73	
CREATIVE OUTPUTS		**35.7**	**28**	
7.1	**Intangible assets**	**34.0**	**39**	
7.1.1	Trademarks by origin/bn PPP$ GDP	100.4	11	● ◆
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	4.5	26	
7.1.4	ICTs & organizational model creation†	62.7	37	
7.2	**Creative goods and services**	**42.1**	**9**	● ◆
7.2.1	Cultural & creative services exports, % total trade	1.4	16	
7.2.2	National feature films/mn pop. 15-69	15.4	8	●
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	2.6	6	● ◆
7.2.5	Creative goods exports, % total trade	2.7	21	
7.3	**Online creativity**	**32.9**	**32**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	9.6	41	
7.3.2	Country-code TLDs/th pop. 15-69	28.6	23	
7.3.3	Wikipedia edits/mn pop. 15-69	81.4	20	
7.3.4	Mobile app creation/bn PPP$ GDP	12.9	38	

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

LEBANON

GII 2020 rank

87

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
80	93	Upper middle	NAWA	6.9	91.3	13,138.2	88

		Score/Value	Rank	
INSTITUTIONS		**52.2**	**103**	◇
1.1	**Political environment**	**38.8**	**123**	○ ◇
1.1.1	Political and operational stability*	44.6	130	○ ◇
1.1.2	Government effectiveness*	35.8	113	○ ◇
1.2	**Regulatory environment**	**64.2**	**67**	
1.2.1	Regulatory quality*	32.8	96	
1.2.2	Rule of law*	26.7	110	◇
1.2.3	Cost of redundancy dismissal, salary weeks	8.7	20	●
1.3	**Business environment**	**53.6**	**121**	○ ◇
1.3.1	Ease of starting a business*	78.2	112	
1.3.2	Ease of resolving insolvency*	29.1	121	○ ◇
HUMAN CAPITAL & RESEARCH		**24.7**	**85**	
2.1	**Education**	**21.9**	**123**	○ ◇
2.1.1	Expenditure on education, % GDP	2.4	111	○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	6.4	102	○ ◇
2.1.3	School life expectancy, years	n/a	n/a	
2.1.4	PISA scales in reading, maths, & science	376.8	73	○
2.1.5	Pupil-teacher ratio, secondary	7.7	7	● ◆
2.2	**Tertiary education**	**38.7**	**48**	
2.2.1	Tertiary enrolment, % gross	n/a	n/a	
2.2.2	Graduates in science & engineering, %	23.4	47	
2.2.3	Tertiary inbound mobility, %	9.3	22	● ◆
2.3	**Research & development (R&D)**	**13.4**	**[49]**	
2.3.1	Researchers, FTE/mn pop	n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP	n/a	n/a	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	26.8	43	
INFRASTRUCTURE		**31.6**	**98**	◇
3.1	**Information & communication technologies (ICTs)**	**48.9**	**100**	◇
3.1.1	ICT access*	62.6	70	
3.1.2	ICT use*	41.2	98	◇
3.1.3	Government's online service*	47.2	110	◇
3.1.4	E-participation*	44.4	108	◇
3.2	**General infrastructure**	**21.2**	**93**	
3.2.1	Electricity output, kWh/mn pop	3,329.1	59	
3.2.2	Logistics performance*	30.3	78	
3.2.3	Gross capital formation, % GDP	n/a	n/a	
3.3	**Ecological sustainability**	**24.7**	**83**	
3.3.1	GDP/unit of energy use	8.7	70	
3.3.2	Environmental performance*	45.4	70	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.6	78	
MARKET SOPHISTICATION		**43.1**	**90**	
4.1	**Credit**	**35.2**	**88**	
4.1.1	Ease of getting credit*	40.0	113	○ ◇
4.1.2	Domestic credit to private sector, % GDP	105.8	21	● ◆
4.1.3	Microfinance gross loans, % GDP	0.2	54	
4.2	**Investment**	**26.2**	**109**	
4.2.1	Ease of protecting minority investors*	44.0	98	
4.2.2	Market capitalization, % GDP	20.8	56	
4.2.3	Venture capital deals/bn PPP$ GDP	0.1	20	●
4.3	**Trade, competition, and market scale**	**67.8**	**41**	
4.3.1	Applied tariff rate, weighted avg., %	1.1	13	●
4.3.2	Intensity of local competition†	79.0	12	● ◆
4.3.3	Domestic market scale, bn PPP$	91.3	87	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**23.3**	**80**	
5.1	**Knowledge workers**	**28.2**	**[73]**	
5.1.1	Knowledge-intensive employment, %	n/a	n/a	
5.1.2	Firms offering formal training, %	26.6	57	
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**	**21.8**	**60**	
5.2.1	University/industry research collaboration†	43.2	58	
5.2.2	State of cluster development†	48.8	53	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	82	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	77	
5.3	**Knowledge absorption**	**19.9**	**98**	
5.3.1	Intellectual property payments, % total trade	0.1	101	
5.3.2	High-tech imports, % total trade	3.9	123	○
5.3.3	ICT services imports, % total trade	1.8	33	◆
5.3.4	FDI net inflows, % GDP	4.8	29	●
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**17.0**	**[76]**	
6.1	**Knowledge creation**	**18.3**	**[53]**	
6.1.1	Patents by origin/bn PPP$ GDP	1.3	56	
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	12.9	43	
6.1.5	Citable documents H-index	12.2	61	
6.2	**Knowledge impact**	**14.9**	**[102]**	
6.2.1	Growth rate of PPP$ GDP/worker, %	-1.1	107	○
6.2.2	New businesses/th pop. 15-64	n/a	n/a	
6.2.3	Computer software spending, % GDP	0.0	101	◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	6.9	39	
6.2.5	High- and medium-high-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**17.8**	**85**	
6.3.1	Intellectual property receipts, % total trade	0.1	62	
6.3.2	High-tech net exports, % total trade	0.2	102	
6.3.3	ICT services exports, % total trade	2.5	41	
6.3.4	FDI net outflows, % GDP	2.2	34	◆
CREATIVE OUTPUTS		**17.2**	**85**	
7.1	**Intangible assets**	**17.2**	**104**	
7.1.1	Trademarks by origin/bn PPP$ GDP	15.1	102	
7.1.2	Global brand value, top 5,000, % GDP	9.6	61	
7.1.3	Industrial designs by origin/bn PPP$ GDP	n/a	n/a	
7.1.4	ICTs & organizational model creation†	42.4	106	◇
7.2	**Creative goods and services**	**15.6**	**62**	
7.2.1	Cultural & creative services exports, % total trade	1.9	7	● ◆
7.2.2	National feature films/mn pop. 15-69	3.3	55	
7.2.3	Entertainment & Media market/th pop. 15-69	3.6	49	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.5	60	
7.3	**Online creativity**	**18.6**	**57**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	6.0	51	
7.3.2	Country-code TLDs/th pop. 15-69	0.3	106	
7.3.3	Wikipedia edits/mn pop. 15-69	46.9	66	
7.3.4	Mobile app creation/bn PPP$ GDP	24.2	23	●

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

LITHUANIA

GII 2020 rank

40

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
42	36	High	EUR	2.8	102.2	32,040.8	38

		Score/Value	Rank	
INSTITUTIONS		**76.0**	**33**	
1.1	**Political environment**	**77.4**	**29**	
1.1.1	Political and operational stability*	83.9	21	
1.1.2	Government effectiveness*	74.1	31	
1.2	**Regulatory environment**	**80.7**	**29**	
1.2.1	Regulatory quality*	71.2	29	
1.2.2	Rule of law*	71.6	31	
1.2.3	Cost of redundancy dismissal, salary weeks	13.0	41	
1.3	**Business environment**	**70.0**	**71**	
1.3.1	Ease of starting a business*	93.3	32	
1.3.2	Ease of resolving insolvency*	46.7	81	◇
HUMAN CAPITAL & RESEARCH		**36.9**	**45**	
2.1	**Education**	**49.2**	**55**	
2.1.1	Expenditure on education, % GDP 🕘	4.0	72	
2.1.2	Government funding/pupil, secondary, % GDP/cap	17.7	63	
2.1.3	School life expectancy, years	16.6	21	●
2.1.4	PISA scales in reading, maths, & science	479.7	32	
2.1.5	Pupil-teacher ratio, secondary 🕘	7.8	9	● ◆
2.2	**Tertiary education**	**42.7**	**35**	
2.2.1	Tertiary enrolment, % gross	72.4	24	
2.2.2	Graduates in science & engineering, %	25.7	32	
2.2.3	Tertiary inbound mobility, %	4.6	48	
2.3	**Research & development (R&D)**	**18.8**	**45**	
2.3.1	Researchers, FTE/mn pop	3,131.8	30	
2.3.2	Gross expenditure on R&D, % GDP	0.9	41	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	20.1	53	
INFRASTRUCTURE		**51.3**	**38**	
3.1	**Information & communication technologies (ICTs)**	**77.4**	**39**	
3.1.1	ICT access*	74.4	45	
3.1.2	ICT use*	75.1	30	
3.1.3	Government's online service*	79.9	45	
3.1.4	E-participation*	80.3	51	
3.2	**General infrastructure**	**19.9**	**98**	○ ◇
3.2.1	Electricity output, kWh/mn pop	1,065.2	93	○ ◇
3.2.2	Logistics performance*	44.5	53	◇
3.2.3	Gross capital formation, % GDP	18.8	105	○
3.3	**Ecological sustainability**	**56.5**	**8**	● ◆
3.3.1	GDP/unit of energy use	10.5	48	
3.3.2	Environmental performance*	62.9	35	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	9.4	6	● ◆
MARKET SOPHISTICATION		**51.2**	**46**	
4.1	**Credit**	**43.2**	**59**	
4.1.1	Ease of getting credit*	70.0	44	
4.1.2	Domestic credit to private sector, % GDP	40.7	80	○ ◇
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**44.5**	**35**	
4.2.1	Ease of protecting minority investors*	70.0	36	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	0.1	24	
4.3	**Trade, competition, and market scale**	**65.8**	**48**	
4.3.1	Applied tariff rate, weighted avg., %	1.7	22	
4.3.2	Intensity of local competition†	75.1	26	
4.3.3	Domestic market scale, bn PPP$	102.2	80	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**31.5**	**47**	
5.1	**Knowledge workers**	**42.7**	**40**	
5.1.1	Knowledge-intensive employment, %	42.2	23	
5.1.2	Firms offering formal training, %	27.5	55	
5.1.3	GERD performed by business, % GDP	0.3	45	
5.1.4	GERD financed by business, %	35.4	50	
5.1.5	Females employed w/advanced degrees, %	28.1	4	● ◆
5.2	**Innovation linkages**	**27.8**	**37**	
5.2.1	University/industry research collaboration†	53.4	34	
5.2.2	State of cluster development†	40.8	92	○ ◇
5.2.3	GERD financed by abroad, % GDP	0.2	15	●
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.1	34	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.3	35	
5.3	**Knowledge absorption**	**24.0**	**85**	○ ◇
5.3.1	Intellectual property payments, % total trade	0.2	91	○ ◇
5.3.2	High-tech imports, % total trade	6.1	94	○
5.3.3	ICT services imports, % total trade	0.8	86	○
5.3.4	FDI net inflows, % GDP	2.1	77	
5.3.5	Research talent, % in business enterprise	30.4	42	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**27.1**	**48**	
6.1	**Knowledge creation**	**22.4**	**46**	
6.1.1	Patents by origin/bn PPP$ GDP	1.2	61	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.3	40	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	19.7	28	
6.1.5	Citable documents H-index	13.1	58	
6.2	**Knowledge impact**	**28.9**	**44**	
6.2.1	Growth rate of PPP$ GDP/worker, %	3.6	22	◆
6.2.2	New businesses/th pop. 15-64	3.3	41	
6.2.3	Computer software spending, % GDP	0.0	96	○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	15.1	20	●
6.2.5	High- and medium-high-tech manufacturing, %	18.0	59	
6.3	**Knowledge diffusion**	**30.0**	**43**	
6.3.1	Intellectual property receipts, % total trade	0.1	61	
6.3.2	High-tech net exports, % total trade	5.8	27	
6.3.3	ICT services exports, % total trade	1.5	70	
6.3.4	FDI net outflows, % GDP	1.5	44	
CREATIVE OUTPUTS		**30.9**	**40**	
7.1	**Intangible assets**	**27.6**	**66**	
7.1.1	Trademarks by origin/bn PPP$ GDP	47.7	53	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	2.9	39	
7.1.4	ICTs & organizational model creation†	68.4	21	●
7.2	**Creative goods and services**	**19.0**	**57**	
7.2.1	Cultural & creative services exports, % total trade	0.6	39	
7.2.2	National feature films/mn pop. 15-69	5.4	40	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.1	51	
7.2.5	Creative goods exports, % total trade	1.6	33	
7.3	**Online creativity**	**49.3**	**21**	●
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	13.7	33	
7.3.2	Country-code TLDs/th pop. 15-69	31.2	21	●
7.3.3	Wikipedia edits/mn pop. 15-69	81.0	22	●
7.3.4	Mobile app creation/bn PPP$ GDP	72.1	8	● ◆

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

LUXEMBOURG

GII 2020 rank

18

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
14	24	High	EUR	0.6	66.8	95,117.1	18

		Score/Value	Rank	
INSTITUTIONS		**80.2**	**26**	
1.1	**Political environment**	**91.5**	**6**	
1.1.1	Political and operational stability*	94.6	3	● ◆
1.1.2	Government effectiveness*	89.9	9	
1.2	**Regulatory environment**	**82.0**	**24**	
1.2.1	Regulatory quality*	88.2	11	
1.2.2	Rule of law*	93.9	10	
1.2.3	Cost of redundancy dismissal, salary weeks	21.7	92	○ ◇
1.3	**Business environment**	**67.2**	**77**	◇
1.3.1	Ease of starting a business*	88.8	61	
1.3.2	Ease of resolving insolvency*	45.5	84	◇
HUMAN CAPITAL & RESEARCH		**38.6**	**41**	◇
2.1	**Education**	**45.6**	**66**	◇
2.1.1	Expenditure on education, % GDP 🕘	4.0	75	
2.1.2	Government funding/pupil, secondary, % GDP/cap. 🕘	19.4	51	
2.1.3	School life expectancy, years	14.3	68	◇
2.1.4	PISA scales in reading, maths, & science	476.7	35	◇
2.1.5	Pupil-teacher ratio, secondary 🕘	8.8	20	◆
2.2	**Tertiary education**	**34.5**	**61**	
2.2.1	Tertiary enrolment, % gross	19.2	95	○ ◇
2.2.2	Graduates in science & engineering, % 🕘	17.9	80	○ ◇
2.2.3	Tertiary inbound mobility, %	46.7	1	● ◆
2.3	**Research & development (R&D)**	**35.6**	**31**	◇
2.3.1	Researchers, FTE/mn pop	4,941.7	17	
2.3.2	Gross expenditure on R&D, % GDP	1.2	32	◇
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	58.5	24	
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**54.9**	**23**	
3.1	**Information & communication technologies (ICTs)**	**90.8**	**5**	
3.1.1	ICT access*	92.8	1	● ◆
3.1.2	ICT use*	84.3	10	
3.1.3	Government's online service*	92.4	22	
3.1.4	E-participation*	93.8	19	
3.2	**General infrastructure**	**27.1**	**64**	◇
3.2.1	Electricity output, kWh/mn pop	1,536.6	88	○ ◇
3.2.2	Logistics performance*	73.2	24	
3.2.3	Gross capital formation, % GDP	18.2	111	○ ◇
3.3	**Ecological sustainability**	**46.9**	**24**	
3.3.1	GDP/unit of energy use	13.5	19	
3.3.2	Environmental performance*	82.3	2	●
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.0	45	
MARKET SOPHISTICATION		**53.4**	**32**	
4.1	**Credit**	**31.9**	**102**	○ ◇
4.1.1	Ease of getting credit*	15.0	127	○ ◇
4.1.2	Domestic credit to private sector, % GDP	109.8	20	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**65.3**	**11**	
4.2.1	Ease of protecting minority investors*	54.0	88	◇
4.2.2	Market capitalization, % GDP	92.5	14	
4.2.3	Venture capital deals/bn PPP$ GDP	1.3	1	● ◆
4.3	**Trade, competition, and market scale**	**63.0**	**66**	◇
4.3.1	Applied tariff rate, weighted avg., %	1.7	22	
4.3.2	Intensity of local competition†	72.4	43	
4.3.3	Domestic market scale, bn PPP$	66.8	94	◇

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**59.0**	**9**	
5.1	**Knowledge workers**	**59.7**	**15**	
5.1.1	Knowledge-intensive employment, %	57.7	1	● ◆
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	0.7	33	◇
5.1.4	GERD financed by business, %	49.6	27	
5.1.5	Females employed w/advanced degrees, %	22.7	18	
5.2	**Innovation linkages**	**63.3**	**6**	
5.2.1	University/industry research collaboration†	69.4	9	
5.2.2	State of cluster development†	68.8	10	
5.2.3	GERD financed by abroad, % GDP	0.1	45	◇
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.2	8	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	7.0	1	● ◆
5.3	**Knowledge absorption**	**54.0**	**9**	
5.3.1	Intellectual property payments, % total trade	4.4	1	● ◆
5.3.2	High-tech imports, % total trade	1.6	130	○ ◇
5.3.3	ICT services imports, % total trade	3.4	5	◆
5.3.4	FDI net inflows, % GDP	11.3	8	
5.3.5	Research talent, % in business enterprise	43.9	30	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**33.9**	**31**	◇
6.1	**Knowledge creation**	**43.7**	**19**	
6.1.1	Patents by origin/bn PPP$ GDP	9.4	11	
6.1.2	PCT patents by origin/bn PPP$ GDP	5.3	7	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	13.5	40	◇
6.1.5	Citable documents H-index	10.9	70	◇
6.2	**Knowledge impact**	**21.1**	**79**	◇
6.2.1	Growth rate of PPP$ GDP/worker, %	-1.1	108	○ ◇
6.2.2	New businesses/th pop. 15-64	17.2	7	◆
6.2.3	Computer software spending, % GDP	0.0	69	◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	4.0	63	
6.2.5	High- and medium-high-tech manufacturing, %	14.2	67	◇
6.3	**Knowledge diffusion**	**37.0**	**29**	
6.3.1	Intellectual property receipts, % total trade	1.9	12	
6.3.2	High-tech net exports, % total trade	0.7	74	◇
6.3.3	ICT services exports, % total trade	3.1	28	
6.3.4	FDI net outflows, % GDP	11.3	5	◆
CREATIVE OUTPUTS		**55.0**	**3**	● ◆
7.1	**Intangible assets**	**51.5**	**11**	
7.1.1	Trademarks by origin/bn PPP$ GDP	89.8	19	
7.1.2	Global brand value, top 5,000, % GDP	129.9	15	
7.1.3	Industrial designs by origin/bn PPP$ GDP	8.4	15	
7.1.4	ICTs & organizational model creation†	72.2	15	
7.2	**Creative goods and services**	**43.2**	**8**	
7.2.1	Cultural & creative services exports, % total trade	4.5	1	● ◆
7.2.2	National feature films/mn pop. 15-69	29.6	1	● ◆
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	0.8	69	
7.2.5	Creative goods exports, % total trade	0.1	100	○ ◇
7.3	**Online creativity**	**73.6**	**1**	● ◆
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	86.0	4	● ◆
7.3.2	Country-code TLDs/th pop. 15-69	68.1	9	
7.3.3	Wikipedia edits/mn pop. 15-69	87.8	9	
7.3.4	Mobile app creation/bn PPP$ GDP	53.1	11	

NOTES: ● indicates a strength; ○ a weakness; ◆ a strength relative to the other top 25-ranked GII economies; ◇ a weakness relative to the other top 25-ranked GII economies; * an index; † a survey question. 🕘 indicates that the economy's data are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

MADAGASCAR

GII 2020 rank

115

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
100	125	Low	SSF	27.0	46.0	1,483.5	121

		Score/Value	Rank	
INSTITUTIONS		**51.4**	**108**	
1.1	**Political environment**	**37.1**	**125**	
1.1.1	Political and operational stability*	62.5	92	
1.1.2	Government effectiveness*	24.4	129	○
1.2	**Regulatory environment**	**55.4**	**91**	
1.2.1	Regulatory quality*	22.4	114	
1.2.2	Rule of law*	25.4	113	
1.2.3	Cost of redundancy dismissal, salary weeks	14.7	57	●
1.3	**Business environment**	**61.6**	**100**	
1.3.1	Ease of starting a business*	88.5	65	
1.3.2	Ease of resolving insolvency*	34.8	113	
HUMAN CAPITAL & RESEARCH		**13.6**	**116**	
2.1	**Education**	**22.5**	**121**	
2.1.1	Expenditure on education, % GDP	3.2	92	
2.1.2	Government funding/pupil, secondary, % GDP/cap. 🕘	8.4	98	◇
2.1.3	School life expectancy, years	10.2	107	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	19.3	96	
2.2	**Tertiary education**	**18.2**	**100**	◆
2.2.1	Tertiary enrolment, % gross	5.4	118	
2.2.2	Graduates in science & engineering, %	23.8	43	● ◆
2.2.3	Tertiary inbound mobility, %	1.4	83	
2.3	**Research & development (R&D)**	**0.1**	**120**	
2.3.1	Researchers, FTE/mn pop	34.0	100	
2.3.2	Gross expenditure on R&D, % GDP 🕘	0.0	115	○ ◇
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**18.8**	**127**	
3.1	**Information & communication technologies (ICTs)**	**23.5**	**128**	○
3.1.1	ICT access*	22.5	129	○ ◇
3.1.2	ICT use*	8.5	129	○
3.1.3	Government's online service*	30.6	120	
3.1.4	E-participation*	32.6	117	
3.2	**General infrastructure**	**19.0**	**106**	
3.2.1	Electricity output, kWh/mn pop	n/a	n/a	
3.2.2	Logistics performance*	15.0	115	
3.2.3	Gross capital formation, % GDP	22.4	75	
3.3	**Ecological sustainability**	**14.0**	**126**	
3.3.1	GDP/unit of energy use	n/a	n/a	
3.3.2	Environmental performance*	26.5	126	○ ◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	107	
MARKET SOPHISTICATION		**36.2**	**115**	
4.1	**Credit**	**22.7**	**120**	
4.1.1	Ease of getting credit*	40.0	113	
4.1.2	Domestic credit to private sector, % GDP	14.7	118	
4.1.3	Microfinance gross loans, % GDP	1.7	20	●
4.2	**Investment**	**36.0**	**[69]**	
4.2.1	Ease of protecting minority investors*	36.0	116	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**50.0**	**117**	
4.3.1	Applied tariff rate, weighted avg., %	7.7	101	
4.3.2	Intensity of local competition† 🕘	63.7	87	
4.3.3	Domestic market scale, bn PPP$	46.0	104	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**17.0**	**[121]**	
5.1	**Knowledge workers**	**4.9**	**[130]**	
5.1.1	Knowledge-intensive employment, % 🕘	3.7	119	○
5.1.2	Firms offering formal training, % 🕘	12.7	89	◇
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, % 🕘	1.9	103	
5.2	**Innovation linkages**	**22.1**	**[58]**	
5.2.1	University/industry research collaboration†	32.3	102	
5.2.2	State of cluster development†	39.1	99	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	n/a	n/a	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	101	○ ◇
5.3	**Knowledge absorption**	**24.0**	**86**	
5.3.1	Intellectual property payments, % total trade 🕘	0.4	74	
5.3.2	High-tech imports, % total trade 🕘	4.2	119	
5.3.3	ICT services imports, % total trade 🕘	2.5	15	● ◆
5.3.4	FDI net inflows, % GDP	4.2	36	●
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**11.4**	**109**	
6.1	**Knowledge creation**	**4.0**	**114**	
6.1.1	Patents by origin/bn PPP$ GDP	0.2	101	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	100	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	3.3	103	
6.1.5	Citable documents H-index	4.8	106	
6.2	**Knowledge impact**	**13.8**	**106**	
6.2.1	Growth rate of PPP$ GDP/worker, %	1.7	51	●
6.2.2	New businesses/th pop. 15-64	0.1	116	
6.2.3	Computer software spending, % GDP	0.0	114	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.6	90	◆
6.2.5	High- and medium-high-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**16.4**	**89**	
6.3.1	Intellectual property receipts, % total trade 🕘	0.2	35	● ◆
6.3.2	High-tech net exports, % total trade 🕘	0.1	112	
6.3.3	ICT services exports, % total trade 🕘	2.3	49	●
6.3.4	FDI net outflows, % GDP	0.8	61	
CREATIVE OUTPUTS		**15.4**	**[93]**	
7.1	**Intangible assets**	**28.4**	**[63]**	
7.1.1	Trademarks by origin/bn PPP$ GDP	57.0	40	● ◆
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	6.8	19	● ◆
7.1.4	ICTs & organizational model creation†	n/a	n/a	
7.2	**Creative goods and services**	**2.3**	**[115]**	
7.2.1	Cultural & creative services exports, % total trade 🕘	0.1	76	
7.2.2	National feature films/mn pop. 15-69	0.8	92	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade 🕘	0.1	91	
7.3	**Online creativity**	**2.5**	**118**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.1	123	
7.3.2	Country-code TLDs/th pop. 15-69	0.1	118	
7.3.3	Wikipedia edits/mn pop. 15-69	12.1	117	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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

MALAWI

GII 2020 rank

111

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
103	**114**	**Low**	**SSF**	**18.6**	**25.2**	**1,082.9**	**118**

		Score/Value	Rank	
INSTITUTIONS		**52.2**	**106**	
1.1	**Political environment**	**43.4**	**111**	
1.1.1	Political and operational stability*	62.5	92	
1.1.2	Government effectiveness*	33.9	116	
1.2	**Regulatory environment**	**56.6**	**89**	
1.2.1	Regulatory quality*	24.1	112	
1.2.2	Rule of law*	36.8	84	
1.2.3	Cost of redundancy dismissal, salary weeks	16.7	65	
1.3	**Business environment**	**56.4**	**115**	
1.3.1	Ease of starting a business*	77.9	114	
1.3.2	Ease of resolving insolvency*	34.9	112	
HUMAN CAPITAL & RESEARCH		**10.5**	**124**	
2.1	**Education**	**29.9**	**105**	
2.1.1	Expenditure on education, % GDP	4.7	54	●
2.1.2	Government funding/pupil, secondary, % GDP/cap	24.0	23	●
2.1.3	School life expectancy, years	10.9	101	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	72.3	124	○ ◇
2.2	**Tertiary education**	**1.6**	**129**	○ ◇
2.2.1	Tertiary enrolment, % gross	0.8	124	○ ◇
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	1.1	86	
2.3	**Research & development (R&D)**	**0.2**	**117**	
2.3.1	Researchers, FTE/mn pop.	50.4	92	
2.3.2	Gross expenditure on R&D, % GDP	n/a	n/a	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**17.4**	**128**	◇
3.1	**Information & communication technologies (ICTs)**	**20.3**	**129**	○ ◇
3.1.1	ICT access*	21.4	131	○ ◇
3.1.2	ICT use*	13.7	123	
3.1.3	Government's online service*	25.7	122	
3.1.4	E-participation*	20.2	123	◇
3.2	**General infrastructure**	**12.3**	**124**	
3.2.1	Electricity output, kWh/mn pop	n/a	n/a	
3.2.2	Logistics performance*	24.2	93	
3.2.3	Gross capital formation, % GDP	12.3	123	○ ◇
3.3	**Ecological sustainability**	**19.5**	**104**	
3.3.1	GDP/unit of energy use	n/a	n/a	
3.3.2	Environmental performance*	38.3	93	◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.1	123	
MARKET SOPHISTICATION		**48.9**	**58**	● ◆
4.1	**Credit**	**38.4**	**79**	
4.1.1	Ease of getting credit*	90.0	10	● ◆
4.1.2	Domestic credit to private sector, % GDP	10.5	126	○
4.1.3	Microfinance gross loans, % GDP	0.5	36	●
4.2	**Investment**	**58.0**	**[17]**	
4.2.1	Ease of protecting minority investors*	58.0	77	◆
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**50.3**	**114**	
4.3.1	Applied tariff rate, weighted avg., %	4.8	86	◆
4.3.2	Intensity of local competition†	61.1	106	
4.3.3	Domestic market scale, bn PPP$	25.2	126	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**21.2**	**[92]**	
5.1	**Knowledge workers**	**15.3**	**[107]**	
5.1.1	Knowledge-intensive employment, %	3.7	118	○
5.1.2	Firms offering formal training, %	32.9	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, %	0.6	115	
5.2	**Innovation linkages**	**20.9**	**[66]**	
5.2.1	University/industry research collaboration†	31.0	105	
5.2.2	State of cluster development†	35.9	110	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	n/a	n/a	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	71	◆
5.3	**Knowledge absorption**	**27.4**	**71**	
5.3.1	Intellectual property payments, % total trade	0.2	88	
5.3.2	High-tech imports, % total trade	10.7	23	●
5.3.3	ICT services imports, % total trade	1.5	45	●
5.3.4	FDI net inflows, % GDP	1.7	91	
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**13.4**	**92**	
6.1	**Knowledge creation**	**9.3**	**79**	
6.1.1	Patents by origin/bn PPP$ GDP	0.1	109	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	100	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	9.3	56	● ◆
6.1.5	Citable documents H-index	8.1	85	
6.2	**Knowledge impact**	**10.7**	**115**	
6.2.1	Growth rate of PPP$ GDP/worker, %	0.5	75	
6.2.2	New businesses/th pop. 15-64	0.1	119	○
6.2.3	Computer software spending, % GDP	0.0	110	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.8	112	
6.2.5	High- and medium-high-tech manufacturing, %	8.6	86	
6.3	**Knowledge diffusion**	**20.3**	**75**	
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	High-tech net exports, % total trade	0.5	81	
6.3.3	ICT services exports, % total trade	2.1	53	●
6.3.4	FDI net outflows, % GDP	-0.1	120	
CREATIVE OUTPUTS		**12.3**	**[107]**	
7.1	**Intangible assets**	**19.2**	**[96]**	
7.1.1	Trademarks by origin/bn PPP$ GDP	23.6	87	
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	n/a	n/a	
7.1.4	ICTs & organizational model creation†	28.7	124	○ ◇
7.2	**Creative goods and services**	**6.6**	**[97]**	
7.2.1	Cultural & 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 & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.2	35	●
7.2.5	Creative goods exports, % total trade	0.1	103	
7.3	**Online creativity**	**4.2**	**112**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.2	117	
7.3.2	Country-code TLDs/th pop. 15-69	0.0	124	
7.3.3	Wikipedia edits/mn pop. 15-69	17.0	113	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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

MALAYSIA

GII 2020 rank

33

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
36	34	Upper middle	SEAO	31.9	1,078.5	28,705.9	35

		Score/Value	Rank	
INSTITUTIONS		**72.5**	**40**	◆
1.1	**Political environment**	**77.4**	**28**	◆
1.1.1	Political and operational stability*	83.9	21	◆
1.1.2	Government effectiveness*	74.2	30	◆
1.2	**Regulatory environment**	**64.9**	**64**	
1.2.1	Regulatory quality*	59.8	40	◆
1.2.2	Rule of law*	62.9	38	◆
1.2.3	Cost of redundancy dismissal, salary weeks	23.9	102	○
1.3	**Business environment**	**75.2**	**50**	
1.3.1	Ease of starting a business*	83.3	97	○
1.3.2	Ease of resolving insolvency*	67.0	37	
HUMAN CAPITAL & RESEARCH		**46.0**	**29**	◆
2.1	**Education**	**45.1**	**68**	
2.1.1	Expenditure on education, % GDP	4.5	62	
2.1.2	Government funding/pupil, secondary, % GDP/cap	22.8	31	
2.1.3	School life expectancy, years	13.7	74	
2.1.4	PISA scales in reading, maths, & science	430.9	48	
2.1.5	Pupil-teacher ratio, secondary	11.4	49	
2.2	**Tertiary education**	**55.4**	**8**	● ◆
2.2.1	Tertiary enrolment, % gross	45.1	65	
2.2.2	Graduates in science & engineering, %	40.8	4	● ◆
2.2.3	Tertiary inbound mobility, %	9.6	21	◆
2.3	**Research & development (R&D)**	**37.4**	**29**	◆
2.3.1	Researchers, FTE/mn pop. 🕘	2,396.5	35	◆
2.3.2	Gross expenditure on R&D, % GDP 🕘	1.4	24	◆
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	37.4	41	◆
2.3.4	QS university ranking, average score top 3*	54.6	17	● ◆
INFRASTRUCTURE		**46.4**	**48**	
3.1	**Information & communication technologies (ICTs)**	**79.4**	**35**	◆
3.1.1	ICT access*	74.8	44	◆
3.1.2	ICT use*	65.2	52	◆
3.1.3	Government's online service*	88.9	27	◆
3.1.4	E-participation*	88.8	32	◆
3.2	**General infrastructure**	**28.8**	**59**	
3.2.1	Electricity output, kWh/mn pop.	5,202.5	38	◆
3.2.2	Logistics performance*	54.0	40	◆
3.2.3	Gross capital formation, % GDP	22.5	73	
3.3	**Ecological sustainability**	**31.0**	**56**	
3.3.1	GDP/unit of energy use	9.8	58	
3.3.2	Environmental performance*	47.9	62	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.1	40	
MARKET SOPHISTICATION		**58.3**	**20**	◆
4.1	**Credit**	**52.1**	**26**	◆
4.1.1	Ease of getting credit*	75.0	34	
4.1.2	Domestic credit to private sector, % GDP	121.8	18	◆
4.1.3	Microfinance gross loans, % GDP 🕘	0.1	57	○
4.2	**Investment**	**50.0**	**25**	
4.2.1	Ease of protecting minority investors*	88.0	2	● ◆
4.2.2	Market capitalization, % GDP	124.4	7	● ◆
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	44	
4.3	**Trade, competition, and market scale**	**72.8**	**28**	◆
4.3.1	Applied tariff rate, weighted avg., % 🕘	4.0	76	
4.3.2	Intensity of local competition†	76.7	17	◆
4.3.3	Domestic market scale, bn PPP$	1,078.5	25	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**38.0**	**31**	◆
5.1	**Knowledge workers**	**37.3**	**53**	
5.1.1	Knowledge-intensive employment, %	27.2	54	
5.1.2	Firms offering formal training, % 🕘	18.5	77	○ ◇
5.1.3	GERD performed by business, % GDP 🕘	0.8	25	◆
5.1.4	GERD financed by business, % 🕘	56.9	15	◆
5.1.5	Females employed w/advanced degrees, % 🕘	12.5	56	
5.2	**Innovation linkages**	**30.3**	**33**	◆
5.2.1	University/industry research collaboration†	68.3	14	● ◆
5.2.2	State of cluster development†	69.8	7	● ◆
5.2.3	GERD financed by abroad, % GDP 🕘	0.0	73	○
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.1	25	◆
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.4	33	◆
5.3	**Knowledge absorption**	**46.3**	**22**	◆
5.3.1	Intellectual property payments, % total trade	0.8	47	
5.3.2	High-tech imports, % total trade	27.0	3	● ◆
5.3.3	ICT services imports, % total trade	1.4	47	
5.3.4	FDI net inflows, % GDP	3.3	45	
5.3.5	Research talent, % in business enterprise 🕘	21.9	55	○
KNOWLEDGE & TECHNOLOGY OUTPUTS		**31.3**	**38**	◆
6.1	**Knowledge creation**	**12.1**	**70**	
6.1.1	Patents by origin/bn PPP$ GDP	1.1	63	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.2	49	
6.1.3	Utility models by origin/bn PPP$ GDP	0.1	55	○
6.1.4	Scientific & technical articles/bn PPP$ GDP	8.6	58	
6.1.5	Citable documents H-index	18.9	42	
6.2	**Knowledge impact**	**36.2**	**22**	◆
6.2.1	Growth rate of PPP$ GDP/worker, %	2.6	36	
6.2.2	New businesses/th pop. 15-64	2.4	52	
6.2.3	Computer software spending, % GDP	0.0	28	◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	9.4	29	
6.2.5	High- and medium-high-tech manufacturing, %	43.1	17	◆
6.3	**Knowledge diffusion**	**45.5**	**18**	◆
6.3.1	Intellectual property receipts, % total trade	0.1	57	
6.3.2	High-tech net exports, % total trade	38.6	1	● ◆
6.3.3	ICT services exports, % total trade	1.2	76	
6.3.4	FDI net outflows, % GDP	2.2	32	◆
CREATIVE OUTPUTS		**33.9**	**35**	◆
7.1	**Intangible assets**	**39.5**	**28**	
7.1.1	Trademarks by origin/bn PPP$ GDP	19.6	96	○
7.1.2	Global brand value, top 5,000, % GDP	158.9	7	● ◆
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.5	82	○
7.1.4	ICTs & organizational model creation†	71.9	17	◆
7.2	**Creative goods and services**	**40.9**	**11**	● ◆
7.2.1	Cultural & creative services exports, % total trade	0.2	66	
7.2.2	National feature films/mn pop. 15-69	3.8	50	
7.2.3	Entertainment & Media market/th pop. 15-69	12.4	35	◆
7.2.4	Printing and other media, % manufacturing	0.8	68	○
7.2.5	Creative goods exports, % total trade	9.8	1	● ◆
7.3	**Online creativity**	**15.9**	**68**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	6.3	50	
7.3.2	Country-code TLDs/th pop. 15-69	4.0	57	
7.3.3	Wikipedia edits/mn pop. 15-69	52.5	57	
7.3.4	Mobile app creation/bn PPP$ GDP	3.3	61	

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

MALI

GII 2020 rank

123

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
116	**126**	**Low**	**SSF**	**19.7**	**47.2**	**2,157.1**	**112**

		Score/Value	Rank	
INSTITUTIONS		**52.0**	**107**	
1.1	**Political environment**	**34.5**	**128**	○
1.1.1	Political and operational stability*	48.2	128	○
1.1.2	Government effectiveness*	27.7	124	
1.2	**Regulatory environment**	**57.7**	**85**	
1.2.1	Regulatory quality*	27.3	106	
1.2.2	Rule of law*	25.9	112	
1.2.3	Cost of redundancy dismissal, salary weeks	13.6	50	●
1.3	**Business environment**	**63.8**	**89**	
1.3.1	Ease of starting a business*	84.3	95	
1.3.2	Ease of resolving insolvency*	43.4	91	
HUMAN CAPITAL & RESEARCH		**11.6**	**120**	
2.1	**Education**	**30.6**	**104**	
2.1.1	Expenditure on education, % GDP	3.8	81	
2.1.2	Government funding/pupil, secondary, % GDP/cap	25.4	20	●
2.1.3	School life expectancy, years	7.5	119	○ ◇
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	17.4	85	◆
2.2	**Tertiary education**	**2.6**	**125**	◇
2.2.1	Tertiary enrolment, % gross	4.5	120	
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	0.6	94	
2.3	**Research & development (R&D)**	**1.5**	**103**	
2.3.1	Researchers, FTE/mn pop.	32.9	101	
2.3.2	Gross expenditure on R&D, % GDP	0.3	82	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**19.8**	**125**	
3.1	**Information & communication technologies (ICTs)**	**25.4**	**126**	
3.1.1	ICT access*	36.4	113	◆
3.1.2	ICT use*	14.8	121	
3.1.3	Government's online service*	26.4	121	
3.1.4	E-participation*	24.2	121	◇
3.2	**General infrastructure**	**18.5**	**111**	
3.2.1	Electricity output, kWh/mn pop	n/a	n/a	
3.2.2	Logistics performance*	24.4	92	
3.2.3	Gross capital formation, % GDP	18.6	106	
3.3	**Ecological sustainability**	**15.4**	**124**	
3.3.1	GDP/unit of energy use	n/a	n/a	
3.3.2	Environmental performance*	29.4	122	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	110	
MARKET SOPHISTICATION		**34.8**	**119**	
4.1	**Credit**	**16.7**	**125**	
4.1.1	Ease of getting credit*	30.0	122	
4.1.2	Domestic credit to private sector, % GDP	25.4	104	
4.1.3	Microfinance gross loans, % GDP	0.3	41	●
4.2	**Investment**	**42.0**	**[47]**	
4.2.1	Ease of protecting minority investors*	42.0	102	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**45.8**	**126**	
4.3.1	Applied tariff rate, weighted avg., %	9.4	111	
4.3.2	Intensity of local competition†	58.3	112	
4.3.3	Domestic market scale, bn PPP$	47.2	103	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**18.5**	**106**	
5.1	**Knowledge workers**	**5.5**	**127**	◇
5.1.1	Knowledge-intensive employment, %	4.3	116	
5.1.2	Firms offering formal training, %	17.7	80	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	0.8	97	
5.1.5	Females employed w/advanced degrees, %	0.5	117	○
5.2	**Innovation linkages**	**21.1**	**65**	●
5.2.1	University/industry research collaboration†	40.2	72	
5.2.2	State of cluster development†	44.5	78	
5.2.3	GERD financed by abroad, % GDP	0.1	28	● ◆
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	71	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	101	○ ◇
5.3	**Knowledge absorption**	**28.8**	**62**	●
5.3.1	Intellectual property payments, % total trade	0.1	107	
5.3.2	High-tech imports, % total trade	6.8	75	
5.3.3	ICT services imports, % total trade	3.1	9	● ◆
5.3.4	FDI net inflows, % GDP	3.0	58	●
5.3.5	Research talent, % in business enterprise	31.4	40	● ◆
KNOWLEDGE & TECHNOLOGY OUTPUTS		**13.4**	**93**	
6.1	**Knowledge creation**	**3.5**	**119**	
6.1.1	Patents by origin/bn PPP$ GDP	0.2	104	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	100	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	2.6	110	◇
6.1.5	Citable documents H-index	5.0	104	
6.2	**Knowledge impact**	**12.7**	**111**	
6.2.1	Growth rate of PPP$ GDP/worker, %	1.5	54	●
6.2.2	New businesses/th pop. 15-64	0.3	108	
6.2.3	Computer software spending, % GDP	0.0	112	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.3	126	
6.2.5	High- and medium-high-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**24.0**	**64**	● ◆
6.3.1	Intellectual property receipts, % total trade	0.0	94	
6.3.2	High-tech net exports, % total trade	0.1	116	
6.3.3	ICT services exports, % total trade	5.0	11	● ◆
6.3.4	FDI net outflows, % GDP	0.3	91	
CREATIVE OUTPUTS		**8.5**	**120**	
7.1	**Intangible assets**	**13.3**	**118**	
7.1.1	Trademarks by origin/bn PPP$ GDP	4.4	121	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.3	94	
7.1.4	ICTs & organizational model creation†	45.0	96	
7.2	**Creative goods and services**	**0.9**	**[126]**	
7.2.1	Cultural & creative services exports, % total trade	0.1	75	
7.2.2	National feature films/mn pop. 15-69	0.1	109	○ ◇
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.0	129	○
7.3	**Online creativity**	**6.6**	**100**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.1	122	
7.3.2	Country-code TLDs/th pop. 15-69	7.0	45	● ◆
7.3.3	Wikipedia edits/mn pop. 15-69	17.1	112	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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

MALTA

GII 2020 rank

27

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
21	31	High	EUR	0.4	23.0	41,386.0	27

		Score/Value	Rank	
INSTITUTIONS		**75.6**	**34**	
1.1	**Political environment**	**75.8**	**31**	
1.1.1	Political and operational stability*	83.9	21	
1.1.2	Government effectiveness*	71.8	34	
1.2	**Regulatory environment**	**87.8**	**15**	
1.2.1	Regulatory quality*	77.1	21	
1.2.2	Rule of law*	74.1	27	
1.2.3	Cost of redundancy dismissal, salary weeks	8.0	1	● ◆
1.3	**Business environment**	**63.3**	**93**	◇
1.3.1	Ease of starting a business*	88.2	69	
1.3.2	Ease of resolving insolvency*	38.3	105	○ ◇
HUMAN CAPITAL & RESEARCH		**33.6**	**52**	◇
2.1	**Education**	**57.7**	**21**	
2.1.1	Expenditure on education, % GDP 🕘	5.2	36	
2.1.2	Government funding/pupil, secondary, % GDP/cap 🕘	29.5	14	◆
2.1.3	School life expectancy, years	16.1	32	
2.1.4	PISA scales in reading, maths, & science	458.8	42	
2.1.5	Pupil-teacher ratio, secondary 🕘	7.1	2	● ◆
2.2	**Tertiary education**	**34.7**	**60**	
2.2.1	Tertiary enrolment, % gross	54.3	55	
2.2.2	Graduates in science & engineering, %	20.3	72	
2.2.3	Tertiary inbound mobility, %	8.3	26	
2.3	**Research & development (R&D)**	**8.5**	**63**	◇
2.3.1	Researchers, FTE/mn pop	1,937.4	40	
2.3.2	Gross expenditure on R&D, % GDP	0.6	60	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**54.4**	**25**	
3.1	**Information & communication technologies (ICTs)**	**86.3**	**19**	
3.1.1	ICT access*	91.4	5	● ◆
3.1.2	ICT use*	84.8	9	
3.1.3	Government's online service*	84.0	36	
3.1.4	E-participation*	84.8	39	
3.2	**General infrastructure**	**20.9**	**94**	◇
3.2.1	Electricity output, kWh/mn pop	3,499.0	56	
3.2.2	Logistics performance*	34.9	68	◇
3.2.3	Gross capital formation, % GDP	20.3	97	○
3.3	**Ecological sustainability**	**56.1**	**9**	◆
3.3.1	GDP/unit of energy use	24.4	3	● ◆
3.3.2	Environmental performance*	70.7	23	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.7	51	
MARKET SOPHISTICATION		**46.4**	**74**	
4.1	**Credit**	**34.2**	**94**	◇
4.1.1	Ease of getting credit*	35.0	118	○ ◇
4.1.2	Domestic credit to private sector, % GDP	77.1	40	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**43.3**	**43**	
4.2.1	Ease of protecting minority investors*	66.0	50	
4.2.2	Market capitalization, % GDP	38.0	38	
4.2.3	Venture capital deals/bn PPP$ GDP	0.3	11	
4.3	**Trade, competition, and market scale**	**61.6**	**70**	
4.3.1	Applied tariff rate, weighted avg., %	1.7	22	
4.3.2	Intensity of local competition†	80.4	7	◆
4.3.3	Domestic market scale, bn PPP$	23.0	127	○ ◇

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**53.1**	**13**	
5.1	**Knowledge workers**	**51.9**	**25**	
5.1.1	Knowledge-intensive employment, %	43.8	19	
5.1.2	Firms offering formal training, %	49.9	17	
5.1.3	GERD performed by business, % GDP	0.3	46	
5.1.4	GERD financed by business, %	56.4	16	
5.1.5	Females employed w/advanced degrees, %	15.6	43	
5.2	**Innovation linkages**	**55.2**	**11**	
5.2.1	University/industry research collaboration†	45.1	52	
5.2.2	State of cluster development†	53.1	40	
5.2.3	GERD financed by abroad, % GDP	0.1	46	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.3	2	● ◆
5.2.5	Patent families 2+ offices/bn PPP$ GDP	4.3	11	
5.3	**Knowledge absorption**	**52.2**	**11**	
5.3.1	Intellectual property payments, % total trade	3.3	4	● ◆
5.3.2	High-tech imports, % total trade	5.7	102	○
5.3.3	ICT services imports, % total trade	1.2	61	
5.3.4	FDI net inflows, % GDP	30.4	3	● ◆
5.3.5	Research talent, % in business enterprise	52.6	20	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**26.8**	**49**	
6.1	**Knowledge creation**	**25.5**	**39**	
6.1.1	Patents by origin/bn PPP$ GDP 🕘	5.1	21	
6.1.2	PCT patents by origin/bn PPP$ GDP	1.7	20	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	9.8	52	
6.1.5	Citable documents H-index	6.5	93	◇
6.2	**Knowledge impact**	**27.4**	**54**	
6.2.1	Growth rate of PPP$ GDP/worker, %	-0.5	102	○
6.2.2	New businesses/th pop. 15-64	17.5	6	● ◆
6.2.3	Computer software spending, % GDP	0.0	33	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	8.2	31	
6.2.5	High- and medium-high-tech manufacturing, %	12.5	76	◇
6.3	**Knowledge diffusion**	**27.5**	**52**	
6.3.1	Intellectual property receipts, % total trade	2.1	9	
6.3.2	High-tech net exports, % total trade	4.4	36	
6.3.3	ICT services exports, % total trade	0.5	98	○
6.3.4	FDI net outflows, % GDP	-51.5	130	○ ◇
CREATIVE OUTPUTS		**53.5**	**4**	● ◆
7.1	**Intangible assets**	**60.1**	**4**	● ◆
7.1.1	Trademarks by origin/bn PPP$ GDP 🕘	117.5	7	◆
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP 🕘	12.9	9	◆
7.1.4	ICTs & organizational model creation†	64.4	31	
7.2	**Creative goods and services**	**45.6**	**5**	● ◆
7.2.1	Cultural & creative services exports, % total trade	11.0	1	● ◆
7.2.2	National feature films/mn pop. 15-69	15.7	7	◆
7.2.3	Entertainment & Media market/th pop. 15-69	15.6	29	◇
7.2.4	Printing and other media, % manufacturing	12.9	1	● ◆
7.2.5	Creative goods exports, % total trade	0.2	79	
7.3	**Online creativity**	**48.1**	**22**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	94.9	3	● ◆
7.3.2	Country-code TLDs/th pop. 15-69	17.9	31	
7.3.3	Wikipedia edits/mn pop. 15-69	66.6	44	
7.3.4	Mobile app creation/bn PPP$ GDP	14.8	33	

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

MAURITIUS

GII 2020 rank

52

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
60	47	Upper middle	SSF	1.3	31.7	21,822.3	82

		Score/Value	Rank	
INSTITUTIONS		**81.1**	**22**	◆
1.1	**Political environment**	**76.2**	**30**	◆
1.1.1	Political and operational stability*	89.3	10	● ◆
1.1.2	Government effectiveness*	69.7	37	◆
1.2	**Regulatory environment**	**83.1**	**23**	◆
1.2.1	Regulatory quality*	68.9	31	◆
1.2.2	Rule of law*	67.0	34	◆
1.2.3	Cost of redundancy dismissal, salary weeks	8.9	23	
1.3	**Business environment**	**84.1**	**21**	● ◆
1.3.1	Ease of starting a business*	94.5	19	● ◆
1.3.2	Ease of resolving insolvency*	73.8	26	◆
HUMAN CAPITAL & RESEARCH		**29.6**	**69**	
2.1	**Education**	**54.8**	**36**	
2.1.1	Expenditure on education, % GDP	4.8	48	
2.1.2	Government funding/pupil, secondary, % GDP/cap	31.3	9	● ◆
2.1.3	School life expectancy, years	15.1	50	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	11.0	41	
2.2	**Tertiary education**	**31.4**	**70**	
2.2.1	Tertiary enrolment, % gross	40.6	69	
2.2.2	Graduates in science & engineering, %	23.3	48	
2.2.3	Tertiary inbound mobility, %	5.4	41	
2.3	**Research & development (R&D)**	**2.5**	**90**	
2.3.1	Researchers, FTE/mn pop	288.1	77	
2.3.2	Gross expenditure on R&D, % GDP	0.3	78	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**41.0**	**64**	
3.1	**Information & communication technologies (ICTs)**	**67.0**	**66**	
3.1.1	ICT access*	72.8	50	◆
3.1.2	ICT use*	53.3	70	
3.1.3	Government's online service*	72.9	64	
3.1.4	E-participation*	69.1	71	
3.2	**General infrastructure**	**19.2**	**104**	
3.2.1	Electricity output, kWh/mn pop	2,485.8	72	
3.2.2	Logistics performance*	31.1	77	
3.2.3	Gross capital formation, % GDP	20.6	94	
3.3	**Ecological sustainability**	**36.7**	**44**	
3.3.1	GDP/unit of energy use	17.9	8	● ◆
3.3.2	Environmental performance*	45.1	73	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.7	69	
MARKET SOPHISTICATION		**59.8**	**16**	● ◆
4.1	**Credit**	**49.5**	**37**	
4.1.1	Ease of getting credit*	65.0	61	
4.1.2	Domestic credit to private sector, % GDP	78.0	37	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**69.6**	**9**	● ◆
4.2.1	Ease of protecting minority investors*	78.0	18	● ◆
4.2.2	Market capitalization, % GDP	68.2	21	
4.2.3	Venture capital deals/bn PPP$ GDP	0.8	1	● ◆
4.3	**Trade, competition, and market scale**	**60.2**	**71**	
4.3.1	Applied tariff rate, weighted avg., %	0.8	9	●
4.3.2	Intensity of local competition†	70.5	54	
4.3.3	Domestic market scale, bn PPP$	31.7	119	○ ◇

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**17.4**	**117**	○ ◇
5.1	**Knowledge workers**	**16.2**	**106**	◇
5.1.1	Knowledge-intensive employment, %	25.0	59	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	0.0	83	○
5.1.4	GERD financed by business, %	3.2	90	○ ◇
5.1.5	Females employed w/advanced degrees, %	8.9	75	
5.2	**Innovation linkages**	**17.2**	**93**	
5.2.1	University/industry research collaboration†	30.8	107	○ ◇
5.2.2	State of cluster development†	48.8	52	
5.2.3	GERD financed by abroad, % GDP	0.0	85	○
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	57	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.2	45	
5.3	**Knowledge absorption**	**18.9**	**108**	
5.3.1	Intellectual property payments, % total trade	0.3	82	
5.3.2	High-tech imports, % total trade	6.5	84	
5.3.3	ICT services imports, % total trade	2.0	28	◆
5.3.4	FDI net inflows, % GDP	3.0	52	
5.3.5	Research talent, % in business enterprise	2.2	77	○ ◇
KNOWLEDGE & TECHNOLOGY OUTPUTS		**16.0**	**79**	
6.1	**Knowledge creation**	**7.1**	**[88]**	
6.1.1	Patents by origin/bn PPP$ GDP	0.5	82	
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	5.7	77	
6.1.5	Citable documents H-index	3.6	117	○
6.2	**Knowledge impact**	**22.5**	**70**	
6.2.1	Growth rate of PPP$ GDP/worker, %	3.0	26	
6.2.2	New businesses/th pop. 15-64	9.3	18	● ◆
6.2.3	Computer software spending, % GDP	0.0	73	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	6.2	46	
6.2.5	High- and medium-high-tech manufacturing, %	3.2	103	○ ◇
6.3	**Knowledge diffusion**	**18.3**	**83**	
6.3.1	Intellectual property receipts, % total trade	0.0	77	
6.3.2	High-tech net exports, % total trade	0.5	80	
6.3.3	ICT services exports, % total trade	2.0	55	
6.3.4	FDI net outflows, % GDP	3.0	21	● ◆
CREATIVE OUTPUTS		**29.9**	**43**	◆
7.1	**Intangible assets**	**38.7**	**32**	
7.1.1	Trademarks by origin/bn PPP$ GDP	84.1	21	●
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	2.5	46	
7.1.4	ICTs & organizational model creation†	53.2	65	
7.2	**Creative goods and services**	**21.2**	**50**	
7.2.1	Cultural & creative services exports, % total trade	0.7	38	
7.2.2	National feature films/mn pop. 15-69	9.5	21	◆
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.8	18	
7.2.5	Creative goods exports, % total trade	0.8	50	
7.3	**Online creativity**	**20.8**	**53**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	13.0	34	◆
7.3.2	Country-code TLDs/th pop. 15-69	2.4	65	
7.3.3	Wikipedia edits/mn pop. 15-69	49.9	60	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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

MEXICO

GII 2020 rank

55

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
57	61	Upper middle	LCN	127.6	2,627.9	18,218.1	56

		Score/Value	Rank	
INSTITUTIONS		**61.3**	**74**	
1.1	**Political environment**	**50.8**	**88**	
1.1.1	Political and operational stability*	58.9	104	○
1.1.2	Government effectiveness*	46.7	80	
1.2	**Regulatory environment**	**54.9**	**92**	
1.2.1	Regulatory quality*	45.8	62	
1.2.2	Rule of law*	29.1	106	◇
1.2.3	Cost of redundancy dismissal, salary weeks	22.0	95	
1.3	**Business environment**	**78.2**	**37**	
1.3.1	Ease of starting a business*	86.1	83	
1.3.2	Ease of resolving insolvency*	70.3	31	◆
HUMAN CAPITAL & RESEARCH		**32.1**	**58**	
2.1	**Education**	**40.8**	**78**	
2.1.1	Expenditure on education, % GDP	4.9	45	
2.1.2	Government funding/pupil, secondary, % GDP/cap	14.4	83	
2.1.3	School life expectancy, years	14.8	56	
2.1.4	PISA scales in reading, maths, & science	416.2	57	
2.1.5	Pupil-teacher ratio, secondary	16.9	83	
2.2	**Tertiary education**	**29.2**	**77**	
2.2.1	Tertiary enrolment, % gross	40.2	70	
2.2.2	Graduates in science & engineering, %	25.2	36	
2.2.3	Tertiary inbound mobility, %	0.6	93	
2.3	**Research & development (R&D)**	**26.3**	**41**	◆
2.3.1	Researchers, FTE/mn pop	315.3	76	
2.3.2	Gross expenditure on R&D, % GDP	0.3	79	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	52.6	27	◆
2.3.4	QS university ranking, average score top 3*	42.8	27	◆
INFRASTRUCTURE		**43.0**	**59**	
3.1	**Information & communication technologies (ICTs)**	**74.1**	**50**	
3.1.1	ICT access*	56.5	79	
3.1.2	ICT use*	53.3	69	
3.1.3	Government's online service*	92.4	22	● ◆
3.1.4	E-participation*	94.4	17	● ◆
3.2	**General infrastructure**	**23.9**	**78**	
3.2.1	Electricity output, kWh/mn pop	2,738.1	66	
3.2.2	Logistics performance*	46.0	50	
3.2.3	Gross capital formation, % GDP	21.7	82	
3.3	**Ecological sustainability**	**31.0**	**57**	
3.3.1	GDP/unit of energy use	11.8	36	
3.3.2	Environmental performance*	52.6	49	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.6	77	
MARKET SOPHISTICATION		**48.4**	**59**	
4.1	**Credit**	**42.1**	**61**	
4.1.1	Ease of getting credit*	90.0	10	● ◆
4.1.2	Domestic credit to private sector, % GDP	34.5	87	
4.1.3	Microfinance gross loans, % GDP	0.2	46	
4.2	**Investment**	**25.9**	**113**	○
4.2.1	Ease of protecting minority investors*	62.0	60	
4.2.2	Market capitalization, % GDP	33.4	42	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	74	○
4.3	**Trade, competition, and market scale**	**77.3**	**14**	● ◆
4.3.1	Applied tariff rate, weighted avg., %	1.2	14	●
4.3.2	Intensity of local competition†	70.1	59	
4.3.3	Domestic market scale, bn PPP$	2,627.9	11	● ◆

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**27.1**	**59**	
5.1	**Knowledge workers**	**28.5**	**72**	
5.1.1	Knowledge-intensive employment, %	19.5	78	
5.1.2	Firms offering formal training, %	50.8	16	●
5.1.3	GERD performed by business, % GDP	0.1	64	
5.1.4	GERD financed by business, %	18.6	68	
5.1.5	Females employed w/advanced degrees, %	9.0	74	
5.2	**Innovation linkages**	**17.8**	**89**	
5.2.1	University/industry research collaboration†	42.1	64	
5.2.2	State of cluster development†	54.7	35	◆
5.2.3	GERD financed by abroad, % GDP	0.0	92	○
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	100	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.1	70	
5.3	**Knowledge absorption**	**35.0**	**41**	
5.3.1	Intellectual property payments, % total trade	0.1	108	○
5.3.2	High-tech imports, % total trade	17.5	9	● ◆
5.3.3	ICT services imports, % total trade	0.0	127	○ ◇
5.3.4	FDI net inflows, % GDP	3.1	50	
5.3.5	Research talent, % in business enterprise	37.3	35	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**23.4**	**55**	
6.1	**Knowledge creation**	**11.4**	**74**	
6.1.1	Patents by origin/bn PPP$ GDP	0.6	78	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	64	
6.1.3	Utility models by origin/bn PPP$ GDP	0.3	42	
6.1.4	Scientific & technical articles/bn PPP$ GDP	4.8	91	
6.1.5	Citable documents H-index	28.6	34	◆
6.2	**Knowledge impact**	**26.4**	**58**	
6.2.1	Growth rate of PPP$ GDP/worker, %	-0.8	105	○
6.2.2	New businesses/th pop. 15-64	1.0	84	
6.2.3	Computer software spending, % GDP	0.0	66	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	2.5	81	
6.2.5	High- and medium-high-tech manufacturing, %	52.6	10	● ◆
6.3	**Knowledge diffusion**	**32.3**	**38**	
6.3.1	Intellectual property receipts, % total trade	0.0	102	○ ◇
6.3.2	High-tech net exports, % total trade	15.6	8	● ◆
6.3.3	ICT services exports, % total trade	0.0	127	○
6.3.4	FDI net outflows, % GDP	0.6	70	
CREATIVE OUTPUTS		**26.2**	**54**	
7.1	**Intangible assets**	**28.6**	**60**	
7.1.1	Trademarks by origin/bn PPP$ GDP	42.5	62	
7.1.2	Global brand value, top 5,000, % GDP	61.8	30	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.6	80	
7.1.4	ICTs & organizational model creation†	57.9	53	
7.2	**Creative goods and services**	**36.7**	**17**	● ◆
7.2.1	Cultural & creative services exports, % total trade	0.0	110	○
7.2.2	National feature films/mn pop. 15-69	2.1	65	
7.2.3	Entertainment & Media market/th pop. 15-69	8.2	39	
7.2.4	Printing and other media, % manufacturing	0.4	93	○ ◇
7.2.5	Creative goods exports, % total trade	9.6	1	● ◆
7.3	**Online creativity**	**11.1**	**80**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	2.6	70	
7.3.2	Country-code TLDs/th pop. 15-69	4.2	56	
7.3.3	Wikipedia edits/mn pop. 15-69	40.3	79	
7.3.4	Mobile app creation/bn PPP$ GDP	0.7	69	

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

MONGOLIA

GII 2020 rank

58

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
54	65	Lower middle	SEAO	3.2	47.2	12,492.2	53

		Score/Value	Rank	
INSTITUTIONS		**61.0**	**76**	◆
1.1	**Political environment**	**55.0**	**74**	
1.1.1	Political and operational stability*	75.0	44	◆
1.1.2	Government effectiveness*	44.9	83	
1.2	**Regulatory environment**	**69.5**	**49**	◆
1.2.1	Regulatory quality*	41.0	70	◆
1.2.2	Rule of law*	39.7	77	
1.2.3	Cost of redundancy dismissal, salary weeks	8.7	18	● ◆
1.3	**Business environment**	**58.4**	**110**	
1.3.1	Ease of starting a business*	86.7	78	
1.3.2	Ease of resolving insolvency*	30.1	120	○
HUMAN CAPITAL & RESEARCH		**26.0**	**80**	
2.1	**Education**	**40.0**	**79**	
2.1.1	Expenditure on education, % GDP	4.1	69	
2.1.2	Government funding/pupil, secondary, % GDP/cap.	15.4	75	
2.1.3	School life expectancy, years	14.6	60	◆
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	14.5	71	
2.2	**Tertiary education**	**37.2**	**56**	◆
2.2.1	Tertiary enrolment, % gross	65.6	38	◆
2.2.2	Graduates in science & engineering, %	25.3	34	
2.2.3	Tertiary inbound mobility, %	1.1	87	
2.3	**Research & development (R&D)**	**0.6**	**110**	
2.3.1	Researchers, FTE/mn pop	n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP	0.1	105	○
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**35.6**	**87**	
3.1	**Information & communication technologies (ICTs)**	**59.0**	**81**	
3.1.1	ICT access*	53.7	84	
3.1.2	ICT use*	49.0	78	◆
3.1.3	Government's online service*	59.7	92	
3.1.4	E-participation*	73.6	64	
3.2	**General infrastructure**	**30.9**	**47**	◆
3.2.1	Electricity output, kWh/mn pop	1,956.9	78	◆
3.2.2	Logistics performance*	14.2	116	○
3.2.3	Gross capital formation, % GDP	43.2	7	● ◆
3.3	**Ecological sustainability**	**17.0**	**116**	
3.3.1	GDP/unit of energy use	6.9	90	
3.3.2	Environmental performance*	32.2	114	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	109	
MARKET SOPHISTICATION		**61.6**	**13**	● ◆
4.1	**Credit**	**58.2**	**18**	● ◆
4.1.1	Ease of getting credit*	80.0	23	
4.1.2	Domestic credit to private sector, % GDP	56.2	60	
4.1.3	Microfinance gross loans, % GDP	13.0	2	● ◆
4.2	**Investment**	**74.0**	**[4]**	
4.2.1	Ease of protecting minority investors*	74.0	24	● ◆
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**52.7**	**105**	
4.3.1	Applied tariff rate, weighted avg., %	5.3	96	
4.3.2	Intensity of local competition†	61.9	99	
4.3.3	Domestic market scale, bn PPP$	47.2	102	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**23.2**	**81**	
5.1	**Knowledge workers**	**36.6**	**55**	◆
5.1.1	Knowledge-intensive employment, %	25.1	58	◆
5.1.2	Firms offering formal training, %	66.2	4	● ◆
5.1.3	GERD performed by business, % GDP	0.0	84	
5.1.4	GERD financed by business, %	8.1	79	
5.1.5	Females employed w/advanced degrees, %	22.8	17	● ◆
5.2	**Innovation linkages**	**14.3**	**116**	
5.2.1	University/industry research collaboration†	30.4	109	
5.2.2	State of cluster development†	33.7	115	○ ◇
5.2.3	GERD financed by abroad, % GDP	0.0	84	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	n/a	n/a	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	78	
5.3	**Knowledge absorption**	**18.6**	**112**	
5.3.1	Intellectual property payments, % total trade	0.3	81	
5.3.2	High-tech imports, % total trade	4.8	112	
5.3.3	ICT services imports, % total trade	1.3	52	
5.3.4	FDI net inflows, % GDP	-3.0	130	○ ◇
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**15.5**	**84**	
6.1	**Knowledge creation**	**29.3**	**34**	◆
6.1.1	Patents by origin/bn PPP$ GDP	1.9	40	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	100	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	5.1	1	● ◆
6.1.4	Scientific & technical articles/bn PPP$ GDP	5.6	79	
6.1.5	Citable documents H-index	4.8	106	
6.2	**Knowledge impact**	**7.9**	**122**	○ ◇
6.2.1	Growth rate of PPP$ GDP/worker, %	n/a	n/a	
6.2.2	New businesses/th pop. 15-64	5.5	29	◆
6.2.3	Computer software spending, % GDP	0.0	81	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.1	103	
6.2.5	High- and medium-high-tech manufacturing, %	4.3	101	○ ◇
6.3	**Knowledge diffusion**	**9.3**	**124**	○ ◇
6.3.1	Intellectual property receipts, % total trade	0.0	79	
6.3.2	High-tech net exports, % total trade	0.1	114	
6.3.3	ICT services exports, % total trade	0.6	96	
6.3.4	FDI net outflows, % GDP	0.3	92	
CREATIVE OUTPUTS		**35.2**	**30**	◆
7.1	**Intangible assets**	**50.5**	**12**	● ◆
7.1.1	Trademarks by origin/bn PPP$ GDP	199.8	3	● ◆
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	17.0	4	● ◆
7.1.4	ICTs & organizational model creation†	42.8	102	
7.2	**Creative goods and services**	**30.4**	**[25]**	
7.2.1	Cultural & creative services exports, % total trade	n/a	n/a	
7.2.2	National feature films/mn pop. 15-69	26.1	3	● ◆
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.7	22	
7.2.5	Creative goods exports, % total trade	0.0	115	
7.3	**Online creativity**	**9.4**	**86**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.6	105	
7.3.2	Country-code TLDs/th pop. 15-69	2.4	66	◆
7.3.3	Wikipedia edits/mn pop. 15-69	38.0	82	
7.3.4	Mobile app creation/bn PPP$ GDP	0.1	86	

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

MONTENEGRO

GII 2020 rank

49

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
49	53	Upper middle	EUR	0.6	12.5	17,533.9	45

		Score/Value	Rank	
INSTITUTIONS		**69.6**	**44**	
1.1	**Political environment**	**60.4**	**57**	
1.1.1	Political and operational stability*	75.0	44	
1.1.2	Government effectiveness*	53.1	62	
1.2	**Regulatory environment**	**72.0**	**41**	
1.2.1	Regulatory quality*	51.4	54	
1.2.2	Rule of law*	49.2	58	
1.2.3	Cost of redundancy dismissal, salary weeks	11.2	35	
1.3	**Business environment**	**76.4**	**44**	
1.3.1	Ease of starting a business*	86.7	79	
1.3.2	Ease of resolving insolvency*	66.1	40	
HUMAN CAPITAL & RESEARCH		**33.5**	**[54]**	
2.1	**Education**	**55.9**	**[32]**	
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	15.0	52	
2.1.4	PISA scales in reading, maths, & science	421.9	55	
2.1.5	Pupil-teacher ratio, secondary	14.4	70	
2.2	**Tertiary education**	**40.7**	**[40]**	
2.2.1	Tertiary enrolment, % gross	56.1	49	
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research & development (R&D)**	**4.0**	**81**	
2.3.1	Researchers, FTE/mn pop	734.3	57	
2.3.2	Gross expenditure on R&D, % GDP	0.4	73	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**46.0**	**53**	
3.1	**Information & communication technologies (ICTs)**	**70.0**	**57**	
3.1.1	ICT access*	76.9	36	◆
3.1.2	ICT use*	62.3	54	
3.1.3	Government's online service*	66.7	76	
3.1.4	E-participation*	74.2	63	
3.2	**General infrastructure**	**28.9**	**56**	
3.2.1	Electricity output, kWh/mn pop	4,004.5	51	
3.2.2	Logistics performance*	31.7	76	
3.2.3	Gross capital formation, % GDP	31.8	20	● ◆
3.3	**Ecological sustainability**	**39.0**	**38**	
3.3.1	GDP/unit of energy use	9.8	58	
3.3.2	Environmental performance*	46.3	68	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	5.3	20	●
MARKET SOPHISTICATION		**48.2**	**61**	
4.1	**Credit**	**45.2**	**51**	
4.1.1	Ease of getting credit*	85.0	14	●
4.1.2	Domestic credit to private sector, % GDP	49.6	72	
4.1.3	Microfinance gross loans, % GDP	1.0	24	
4.2	**Investment**	**49.7**	**26**	
4.2.1	Ease of protecting minority investors*	62.0	60	
4.2.2	Market capitalization, % GDP	82.6	18	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**49.8**	**118**	○ ◇
4.3.1	Applied tariff rate, weighted avg., %	3.1	65	
4.3.2	Intensity of local competition†	62.9	93	
4.3.3	Domestic market scale, bn PPP$	12.5	130	○ ◇

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**23.6**	**78**	
5.1	**Knowledge workers**	**27.3**	**77**	
5.1.1	Knowledge-intensive employment, %	36.6	34	◆
5.1.2	Firms offering formal training, %	15.8	86	○ ◇
5.1.3	GERD performed by business, % GDP	0.1	71	
5.1.4	GERD financed by business, %	18.7	67	
5.1.5	Females employed w/advanced degrees, %	17.0	37	
5.2	**Innovation linkages**	**19.0**	**76**	
5.2.1	University/industry research collaboration†	45.3	51	
5.2.2	State of cluster development†	44.8	77	
5.2.3	GERD financed by abroad, % GDP	0.0	56	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	45	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	101	○ ◇
5.3	**Knowledge absorption**	**24.3**	**81**	
5.3.1	Intellectual property payments, % total trade	0.2	86	
5.3.2	High-tech imports, % total trade	6.4	86	
5.3.3	ICT services imports, % total trade	3.2	6	● ◆
5.3.4	FDI net inflows, % GDP	8.5	12	● ◆
5.3.5	Research talent, % in business enterprise	11.1	62	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**19.6**	**66**	
6.1	**Knowledge creation**	**15.9**	**61**	
6.1.1	Patents by origin/bn PPP$ GDP	0.3	94	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	67	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	19.5	29	◆
6.1.5	Citable documents H-index	1.9	128	○ ◇
6.2	**Knowledge impact**	**26.4**	**57**	
6.2.1	Growth rate of PPP$ GDP/worker, %	n/a	n/a	
6.2.2	New businesses/th pop. 15-64	11.3	10	● ◆
6.2.3	Computer software spending, % GDP	0.0	24	● ◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	11.5	26	
6.2.5	High- and medium-high-tech manufacturing, %	7.3	91	○
6.3	**Knowledge diffusion**	**16.5**	**87**	
6.3.1	Intellectual property receipts, % total trade	0.0	81	
6.3.2	High-tech net exports, % total trade	0.1	104	○
6.3.3	ICT services exports, % total trade	2.7	36	
6.3.4	FDI net outflows, % GDP	-0.7	125	○ ◇
CREATIVE OUTPUTS		**33.6**	**36**	◆
7.1	**Intangible assets**	**28.6**	**58**	
7.1.1	Trademarks by origin/bn PPP$ GDP	43.7	59	
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.1	111	○
7.1.4	ICTs & organizational model creation†	52.6	70	
7.2	**Creative goods and services**	**23.8**	**40**	
7.2.1	Cultural & creative services exports, % total trade	0.5	50	
7.2.2	National feature films/mn pop. 15-69	13.3	11	● ◆
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	3.0	4	● ◆
7.2.5	Creative goods exports, % total trade	0.1	95	
7.3	**Online creativity**	**53.5**	**15**	● ◆
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	1.4	90	
7.3.2	Country-code TLDs/th pop. 15-69	100.0	1	● ◆
7.3.3	Wikipedia edits/mn pop. 15-69	61.1	52	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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

MOROCCO

GII 2020 rank

75

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
69	85	Lower middle	NAWA	36.5	328.7	8,062.6	74

		Score/Value	Rank	
INSTITUTIONS		**60.8**	**77**	◆
1.1	**Political environment**	**52.3**	**86**	
1.1.1	Political and operational stability*	66.1	76	
1.1.2	Government effectiveness*	45.5	81	
1.2	**Regulatory environment**	**57.0**	**87**	
1.2.1	Regulatory quality*	35.4	91	
1.2.2	Rule of law*	43.1	69	
1.2.3	Cost of redundancy dismissal, salary weeks	20.7	87	
1.3	**Business environment**	**73.0**	**59**	◆
1.3.1	Ease of starting a business*	93.0	41	●
1.3.2	Ease of resolving insolvency*	52.9	67	
HUMAN CAPITAL & RESEARCH		**25.9**	**81**	
2.1	**Education**	**48.5**	**58**	
2.1.1	Expenditure on education, % GDP	5.3	34	●
2.1.2	Government funding/pupil, secondary, % GDP/cap	36.4	5	● ◆
2.1.3	School life expectancy, years	13.7	73	◆
2.1.4	PISA scales in reading, maths, & science	367.9	75	○
2.1.5	Pupil-teacher ratio, secondary	19.4	97	
2.2	**Tertiary education**	**22.4**	**88**	
2.2.1	Tertiary enrolment, % gross	35.9	74	
2.2.2	Graduates in science & engineering, %	19.0	76	
2.2.3	Tertiary inbound mobility, %	1.9	77	
2.3	**Research & development (R&D)**	**6.7**	**71**	
2.3.1	Researchers, FTE/mn pop	1,073.5	51	◆
2.3.2	Gross expenditure on R&D, % GDP	0.7	50	◆
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**39.3**	**71**	◆
3.1	**Information & communication technologies (ICTs)**	**63.2**	**75**	◆
3.1.1	ICT access*	65.1	67	◆
3.1.2	ICT use*	43.7	88	
3.1.3	Government's online service*	66.7	76	
3.1.4	E-participation*	77.5	56	
3.2	**General infrastructure**	**25.5**	**73**	
3.2.1	Electricity output, kWh/mn pop	918.1	96	
3.2.2	Logistics performance*	22.0	103	○
3.2.3	Gross capital formation, % GDP	34.3	19	●
3.3	**Ecological sustainability**	**29.2**	**64**	◆
3.3.1	GDP/unit of energy use	13.0	24	● ◆
3.3.2	Environmental performance*	42.3	85	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.6	75	
MARKET SOPHISTICATION		**43.3**	**88**	
4.1	**Credit**	**33.6**	**95**	
4.1.1	Ease of getting credit*	45.0	101	○
4.1.2	Domestic credit to private sector, % GDP	84.9	33	● ◆
4.1.3	Microfinance gross loans, % GDP	0.2	47	
4.2	**Investment**	**31.8**	**90**	
4.2.1	Ease of protecting minority investors*	70.0	36	●
4.2.2	Market capitalization, % GDP	56.2	30	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	81	○ ◇
4.3	**Trade, competition, and market scale**	**64.5**	**53**	
4.3.1	Applied tariff rate, weighted avg., %	3.9	75	
4.3.2	Intensity of local competition†	67.2	73	
4.3.3	Domestic market scale, bn PPP$	328.7	54	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**18.4**	**107**	
5.1	**Knowledge workers**	**22.3**	**94**	
5.1.1	Knowledge-intensive employment, %	6.9	110	○ ◇
5.1.2	Firms offering formal training, %	35.7	39	
5.1.3	GERD performed by business, % GDP	0.2	49	◆
5.1.4	GERD financed by business, %	29.9	60	
5.1.5	Females employed w/advanced degrees, %	n/a	n/a	
5.2	**Innovation linkages**	**14.0**	**117**	○
5.2.1	University/industry research collaboration†	29.2	113	○
5.2.2	State of cluster development†	42.9	84	
5.2.3	GERD financed by abroad, % GDP	0.0	77	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	105	○
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	72	
5.3	**Knowledge absorption**	**18.8**	**110**	○
5.3.1	Intellectual property payments, % total trade	0.3	78	
5.3.2	High-tech imports, % total trade	7.6	65	
5.3.3	ICT services imports, % total trade	0.6	99	
5.3.4	FDI net inflows, % GDP	2.5	67	
5.3.5	Research talent, % in business enterprise	7.0	67	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**21.9**	**60**	
6.1	**Knowledge creation**	**10.3**	**77**	
6.1.1	Patents by origin/bn PPP$ GDP	0.6	79	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	61	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	7.5	63	
6.1.5	Citable documents H-index	11.4	66	
6.2	**Knowledge impact**	**27.7**	**51**	
6.2.1	Growth rate of PPP$ GDP/worker, %	2.3	41	
6.2.2	New businesses/th pop. 15-64	1.9	57	
6.2.3	Computer software spending, % GDP	0.0	59	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	2.9	75	
6.2.5	High- and medium-high-tech manufacturing, %	36.7	29	● ◆
6.3	**Knowledge diffusion**	**27.6**	**51**	
6.3.1	Intellectual property receipts, % total trade	0.0	84	
6.3.2	High-tech net exports, % total trade	1.7	58	
6.3.3	ICT services exports, % total trade	3.5	24	●
6.3.4	FDI net outflows, % GDP	0.7	66	
CREATIVE OUTPUTS		**19.0**	**75**	
7.1	**Intangible assets**	**31.3**	**45**	
7.1.1	Trademarks by origin/bn PPP$ GDP	46.4	55	
7.1.2	Global brand value, top 5,000, % GDP	17.5	49	
7.1.3	Industrial designs by origin/bn PPP$ GDP	12.3	10	● ◆
7.1.4	ICTs & organizational model creation†	51.3	77	
7.2	**Creative goods and services**	**5.1**	**105**	
7.2.1	Cultural & creative services exports, % total trade	0.4	56	
7.2.2	National feature films/mn pop. 15-69	1.5	76	
7.2.3	Entertainment & Media market/th pop. 15-69	1.1	58	○
7.2.4	Printing and other media, % manufacturing	0.7	77	
7.2.5	Creative goods exports, % total trade	0.1	99	
7.3	**Online creativity**	**8.2**	**95**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	1.5	87	
7.3.2	Country-code TLDs/th pop. 15-69	1.0	86	
7.3.3	Wikipedia edits/mn pop. 15-69	33.4	90	
7.3.4	Mobile app creation/bn PPP$ GDP	0.3	76	

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

MOZAMBIQUE

GII 2020 rank

124

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
125	**122**	**Low**	**SSF**	**30.4**	**40.6**	**1,137.6**	**119**

		Score/Value	Rank	
INSTITUTIONS		**43.1**	**127**	◇
1.1	**Political environment**	**39.5**	**121**	
1.1.1	Political and operational stability*	57.1	110	
1.1.2	Government effectiveness*	30.6	121	
1.2	**Regulatory environment**	**31.3**	**125**	◇
1.2.1	Regulatory quality*	22.6	113	
1.2.2	Rule of law*	19.5	122	
1.2.3	Cost of redundancy dismissal, salary weeks	37.5	125	◇
1.3	**Business environment**	**58.5**	**108**	
1.3.1	Ease of starting a business*	69.3	126	◇
1.3.2	Ease of resolving insolvency*	47.8	78	● ◆
HUMAN CAPITAL & RESEARCH		**16.1**	**108**	
2.1	**Education**	**44.3**	**72**	● ◆
2.1.1	Expenditure on education, % GDP	5.6	18	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	42.5	3	● ◆
2.1.3	School life expectancy, years	10.0	109	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	36.5	123	○ ◇
2.2	**Tertiary education**	**2.2**	**128**	○ ◇
2.2.1	Tertiary enrolment, % gross	7.3	115	
2.2.2	Graduates in science & engineering, %	9.6	106	○ ◇
2.2.3	Tertiary inbound mobility, %	0.4	103	
2.3	**Research & development (R&D)**	**1.7**	**99**	
2.3.1	Researchers, FTE/mn pop	43.0	95	
2.3.2	Gross expenditure on R&D, % GDP	0.3	77	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**37.0**	**83**	◆
3.1	**Information & communication technologies (ICTs)**	**30.2**	**122**	
3.1.1	ICT access*	25.7	126	
3.1.2	ICT use*	8.5	130	○ ◇
3.1.3	Government's online service*	42.4	115	
3.1.4	E-participation*	44.4	108	
3.2	**General infrastructure**	**67.3**	**1**	● ◆
3.2.1	Electricity output, kWh/mn pop	572.7	105	
3.2.2	Logistics performance*	n/a	n/a	
3.2.3	Gross capital formation, % GDP	76.8	1	● ◆
3.3	**Ecological sustainability**	**13.5**	**129**	○
3.3.1	GDP/unit of energy use	3.1	120	○
3.3.2	Environmental performance*	33.9	106	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.5	84	◆
MARKET SOPHISTICATION		**32.2**	**125**	
4.1	**Credit**	**13.8**	**126**	
4.1.1	Ease of getting credit*	25.0	126	
4.1.2	Domestic credit to private sector, % GDP	23.0	110	
4.1.3	Microfinance gross loans, % GDP	0.2	51	
4.2	**Investment**	**32.0**	**[88]**	
4.2.1	Ease of protecting minority investors*	32.0	120	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**50.6**	**113**	
4.3.1	Applied tariff rate, weighted avg., %	4.2	78	● ◆
4.3.2	Intensity of local competition†	54.9	124	○
4.3.3	Domestic market scale, bn PPP$	40.6	110	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**15.8**	**124**	
5.1	**Knowledge workers**	**5.0**	**129**	○ ◇
5.1.1	Knowledge-intensive employment, %	3.9	117	
5.1.2	Firms offering formal training, %	20.7	73	
5.1.3	GERD performed by business, % GDP	0.0	88	○ ◇
5.1.4	GERD financed by business, %	0.5	98	
5.1.5	Females employed w/advanced degrees, %	0.7	113	
5.2	**Innovation linkages**	**26.2**	**42**	●
5.2.1	University/industry research collaboration†	34.0	100	
5.2.2	State of cluster development†	35.0	112	
5.2.3	GERD financed by abroad, % GDP	0.1	31	●
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.1	33	● ◆
5.2.5	Patent families 2+ offices/bn PPP$ GDP	n/a	n/a	
5.3	**Knowledge absorption**	**16.3**	**122**	
5.3.1	Intellectual property payments, % total trade	0.2	89	
5.3.2	High-tech imports, % total trade	4.3	117	
5.3.3	ICT services imports, % total trade	1.0	71	●
5.3.4	FDI net inflows, % GDP	20.6	5	● ◆
5.3.5	Research talent, % in business enterprise	0.3	85	○
KNOWLEDGE & TECHNOLOGY OUTPUTS		**8.9**	**122**	
6.1	**Knowledge creation**	**5.9**	**99**	
6.1.1	Patents by origin/bn PPP$ GDP	0.9	68	● ◆
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	88	◆
6.1.3	Utility models by origin/bn PPP$ GDP	0.1	56	
6.1.4	Scientific & technical articles/bn PPP$ GDP	5.1	87	
6.1.5	Citable documents H-index	5.3	101	
6.2	**Knowledge impact**	**10.9**	**[114]**	
6.2.1	Growth rate of PPP$ GDP/worker, %	-0.3	100	
6.2.2	New businesses/th pop. 15-64	n/a	n/a	
6.2.3	Computer software spending, % GDP	0.0	115	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.4	94	◆
6.2.5	High- and medium-high-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**9.9**	**122**	◇
6.3.1	Intellectual property receipts, % total trade	0.0	98	
6.3.2	High-tech net exports, % total trade	0.3	88	
6.3.3	ICT services exports, % total trade	0.2	116	
6.3.4	FDI net outflows, % GDP	0.1	102	
CREATIVE OUTPUTS		**8.2**	**122**	
7.1	**Intangible assets**	**14.1**	**113**	
7.1.1	Trademarks by origin/bn PPP$ GDP	31.8	77	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.1	108	
7.1.4	ICTs & organizational model creation†	35.8	120	
7.2	**Creative goods and services**	**2.2**	**[117]**	
7.2.1	Cultural & creative services exports, % total trade	n/a	n/a	
7.2.2	National feature films/mn pop. 15-69	2.0	66	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.0	125	
7.3	**Online creativity**	**2.3**	**119**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.0	129	○
7.3.2	Country-code TLDs/th pop. 15-69	0.2	109	
7.3.3	Wikipedia edits/mn pop. 15-69	11.5	118	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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

MYANMAR

GII 2020 rank

129

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
120	129	Lower middle	SEAO	54.0	355.6	5,855.6	n/a

		Score/Value	Rank	
INSTITUTIONS		**45.6**	**123**	◇
1.1	**Political environment**	**36.6**	**127**	◇
1.1.1	Political and operational stability*	57.1	110	
1.1.2	Government effectiveness*	26.3	127	◇
1.2	**Regulatory environment**	**45.5**	**112**	
1.2.1	Regulatory quality*	21.9	116	
1.2.2	Rule of law*	19.8	121	◇
1.2.3	Cost of redundancy dismissal, salary weeks	23.1	97	
1.3	**Business environment**	**54.9**	**119**	
1.3.1	Ease of starting a business*	89.3	58	●
1.3.2	Ease of resolving insolvency*	20.4	128	◇
HUMAN CAPITAL & RESEARCH		**16.1**	**107**	
2.1	**Education**	**16.4**	**128**	◇
2.1.1	Expenditure on education, % GDP	2.0	116	○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	10.3	95	
2.1.3	School life expectancy, years	10.7	103	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	27.2	112	◇
2.2	**Tertiary education**	**31.7**	**69**	
2.2.1	Tertiary enrolment, % gross	18.8	96	
2.2.2	Graduates in science & engineering, %	33.7	10	● ◆
2.2.3	Tertiary inbound mobility, %	0.0	111	○
2.3	**Research & development (R&D)**	**0.1**	**118**	
2.3.1	Researchers, FTE/mn pop. 🕘	29.1	103	
2.3.2	Gross expenditure on R&D, % GDP 🕘	0.0	113	◇
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**25.0**	**115**	
3.1	**Information & communication technologies (ICTs)**	**29.0**	**123**	◇
3.1.1	ICT access*	38.5	106	
3.1.2	ICT use*	41.3	97	
3.1.3	Government's online service*	22.9	124	◇
3.1.4	E-participation*	13.5	129	○ ◇
3.2	**General infrastructure**	**24.3**	**77**	
3.2.1	Electricity output, kWh/mn pop	420.1	111	
3.2.2	Logistics performance*	10.7	119	◇
3.2.3	Gross capital formation, % GDP	37.2	15	● ◆
3.3	**Ecological sustainability**	**21.8**	**89**	
3.3.1	GDP/unit of energy use	12.8	26	● ◆
3.3.2	Environmental performance*	25.1	129	○ ◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.0	129	◇
MARKET SOPHISTICATION		**27.7**	**127**	◇
4.1	**Credit**	**8.6**	**130**	○ ◇
4.1.1	Ease of getting credit*	10.0	129	○ ◇
4.1.2	Domestic credit to private sector, % GDP	25.3	105	
4.1.3	Microfinance gross loans, % GDP	0.3	42	
4.2	**Investment**	**11.2**	**129**	◇
4.2.1	Ease of protecting minority investors*	22.0	128	◇
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	75	
4.3	**Trade, competition, and market scale**	**63.3**	**65**	
4.3.1	Applied tariff rate, weighted avg., % 🕘	1.7	51	● ◆
4.3.2	Intensity of local competition† 🕘	56.4	119	◇
4.3.3	Domestic market scale, bn PPP$	355.6	50	●

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**10.4**	**131**	○ ◇
5.1	**Knowledge workers**	**3.3**	**131**	○ ◇
5.1.1	Knowledge-intensive employment, %	5.5	113	◇
5.1.2	Firms offering formal training, % 🕘	5.9	95	○ ◇
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	0.0	103	○ ◇
5.1.5	Females employed w/advanced degrees, %	5.5	87	
5.2	**Innovation linkages**	**2.6**	**[130]**	
5.2.1	University/industry research collaboration†	n/a	n/a	
5.2.2	State of cluster development†	n/a	n/a	
5.2.3	GERD financed by abroad, % GDP	0.0	82	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	69	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	101	○ ◇
5.3	**Knowledge absorption**	**25.4**	**76**	
5.3.1	Intellectual property payments, % total trade	0.7	57	
5.3.2	High-tech imports, % total trade	6.2	91	
5.3.3	ICT services imports, % total trade	1.2	62	
5.3.4	FDI net inflows, % GDP	4.3	34	●
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**15.6**	**83**	
6.1	**Knowledge creation**	**1.9**	**[126]**	
6.1.1	Patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	0.6	127	
6.1.5	Citable documents H-index	3.3	119	
6.2	**Knowledge impact**	**25.1**	**62**	
6.2.1	Growth rate of PPP$ GDP/worker, %	6.3	3	● ◆
6.2.2	New businesses/th pop. 15-64	0.4	104	
6.2.3	Computer software spending, % GDP	n/a	n/a	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.5	119	◇
6.2.5	High- and medium-high-tech manufacturing, % 🕘	9.7	82	
6.3	**Knowledge diffusion**	**19.7**	**79**	
6.3.1	Intellectual property receipts, % total trade	0.0	72	
6.3.2	High-tech net exports, % total trade	1.7	60	
6.3.3	ICT services exports, % total trade	0.4	103	
6.3.4	FDI net outflows, % GDP	5.4	9	● ◆
CREATIVE OUTPUTS		**5.5**	**130**	○ ◇
7.1	**Intangible assets**	**7.2**	**[129]**	
7.1.1	Trademarks by origin/bn PPP$ GDP 🕘	22.2	89	
7.1.2	Global brand value, top 5,000, % GDP	15.3	51	
7.1.3	Industrial designs by origin/bn PPP$ GDP	n/a	n/a	
7.1.4	ICTs & organizational model creation†	n/a	n/a	
7.2	**Creative goods and services**	**7.3**	**91**	
7.2.1	Cultural & creative services exports, % total trade	0.2	72	
7.2.2	National feature films/mn pop. 15-69 🕘	0.9	89	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing 🕘	0.4	95	
7.2.5	Creative goods exports, % total trade	1.0	42	●
7.3	**Online creativity**	**0.0**	**130**	○ ◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.1	127	◇
7.3.2	Country-code TLDs/th pop. 15-69	0.0	126	
7.3.3	Wikipedia edits/mn pop. 15-69	n/a	n/a	
7.3.4	Mobile app creation/bn PPP$ GDP	0.0	91	

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

NAMIBIA

GII 2020 rank

104

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
104	**101**	**Upper middle**	**SSF**	**2.5**	**27.7**	**9,835.4**	**101**

		Score/Value	Rank	
INSTITUTIONS		**62.1**	**69**	
1.1	**Political environment**	**60.0**	**59**	●
1.1.1	Political and operational stability*	75.0	44	●
1.1.2	Government effectiveness*	52.5	66	
1.2	**Regulatory environment**	**71.7**	**42**	●
1.2.1	Regulatory quality*	40.4	76	
1.2.2	Rule of law*	53.1	52	● ◆
1.2.3	Cost of redundancy dismissal, salary weeks	9.7	28	●
1.3	**Business environment**	**54.6**	**120**	◇
1.3.1	Ease of starting a business*	72.2	119	◇
1.3.2	Ease of resolving insolvency*	36.9	109	◇
HUMAN CAPITAL & RESEARCH		**13.6**	**115**	◇
2.1	**Education**	**24.1**	**[119]**	
2.1.1	Expenditure on education, % GDP	3.1	97	
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, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	25.9	108	◇
2.2	**Tertiary education**	**14.6**	**106**	◇
2.2.1	Tertiary enrolment, % gross	22.9	90	◇
2.2.2	Graduates in science & engineering, %	12.1	100	○ ◇
2.2.3	Tertiary inbound mobility, %	6.1	39	●
2.3	**Research & development (R&D)**	**2.1**	**93**	
2.3.1	Researchers, FTE/mn pop	149.5	84	◇
2.3.2	Gross expenditure on R&D, % GDP	0.3	76	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**26.4**	**112**	◇
3.1	**Information & communication technologies (ICTs)**	**43.2**	**103**	◇
3.1.1	ICT access*	45.4	100	◇
3.1.2	ICT use*	42.9	94	◇
3.1.3	Government's online service*	45.1	113	◇
3.1.4	E-participation*	39.3	113	◇
3.2	**General infrastructure**	**9.6**	**127**	○ ◇
3.2.1	Electricity output, kWh/mn pop	655.9	104	◇
3.2.2	Logistics performance*	n/a	n/a	
3.2.3	Gross capital formation, % GDP	17.1	115	○ ◇
3.3	**Ecological sustainability**	**26.3**	**76**	
3.3.1	GDP/unit of energy use	11.6	37	●
3.3.2	Environmental performance*	40.2	88	◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.4	86	
MARKET SOPHISTICATION		**41.0**	**103**	
4.1	**Credit**	**34.6**	**90**	
4.1.1	Ease of getting credit*	60.0	74	
4.1.2	Domestic credit to private sector, % GDP	62.0	55	●
4.1.3	Microfinance gross loans, % GDP	0.0	65	
4.2	**Investment**	**32.4**	**86**	
4.2.1	Ease of protecting minority investors*	56.0	82	
4.2.2	Market capitalization, % GDP	19.7	59	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**56.0**	**94**	
4.3.1	Applied tariff rate, weighted avg., %	1.0	11	●
4.3.2	Intensity of local competition†	62.0	97	
4.3.3	Domestic market scale, bn PPP$	27.7	122	○ ◇

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**17.9**	**111**	◇
5.1	**Knowledge workers**	**17.5**	**104**	◇
5.1.1	Knowledge-intensive employment, %	18.1	84	
5.1.2	Firms offering formal training, %	25.4	61	
5.1.3	GERD performed by business, % GDP	0.0	75	
5.1.4	GERD financed by business, %	11.1	74	
5.1.5	Females employed w/advanced degrees, %	7.4	81	
5.2	**Innovation linkages**	**18.7**	**82**	
5.2.1	University/industry research collaboration†	43.1	59	●
5.2.2	State of cluster development†	45.4	76	
5.2.3	GERD financed by abroad, % GDP	0.1	48	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	63	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	75	
5.3	**Knowledge absorption**	**17.6**	**115**	◇
5.3.1	Intellectual property payments, % total trade	0.0	112	○
5.3.2	High-tech imports, % total trade	7.4	71	
5.3.3	ICT services imports, % total trade	0.9	81	
5.3.4	FDI net inflows, % GDP	2.5	68	
5.3.5	Research talent, % in business enterprise	6.9	68	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**7.3**	**127**	○ ◇
6.1	**Knowledge creation**	**7.8**	**83**	
6.1.1	Patents by origin/bn PPP$ GDP	0.8	71	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	59	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	6.1	73	
6.1.5	Citable documents H-index	4.8	106	
6.2	**Knowledge impact**	**6.1**	**123**	○ ◇
6.2.1	Growth rate of PPP$ GDP/worker, %	-3.1	116	○ ◇
6.2.2	New businesses/th pop. 15-64	1.2	79	
6.2.3	Computer software spending, % GDP	0.0	82	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.2	98	
6.2.5	High- and medium-high-tech manufacturing, %	4.7	99	○ ◇
6.3	**Knowledge diffusion**	**8.1**	**127**	○ ◇
6.3.1	Intellectual property receipts, % total trade	0.0	87	
6.3.2	High-tech net exports, % total trade	0.1	120	○ ◇
6.3.3	ICT services exports, % total trade	0.3	111	
6.3.4	FDI net outflows, % GDP	0.0	112	
CREATIVE OUTPUTS		**18.3**	**79**	
7.1	**Intangible assets**	**26.7**	**70**	
7.1.1	Trademarks by origin/bn PPP$ GDP	75.5	26	●
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	n/a	n/a	
7.1.4	ICTs & organizational model creation†	46.7	95	
7.2	**Creative goods and services**	**3.4**	**[110]**	
7.2.1	Cultural & creative services exports, % total trade	0.1	85	
7.2.2	National feature films/mn pop. 15-69	n/a	n/a	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.3	70	
7.3	**Online creativity**	**16.6**	**64**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	9.0	42	● ◆
7.3.2	Country-code TLDs/th pop. 15-69	0.9	90	
7.3.3	Wikipedia edits/mn pop. 15-69	43.1	76	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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

NEPAL

GII 2020 rank

95

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
106	89	Low	CSA	28.6	94.4	2,896.9	109

		Score/Value	Rank	
INSTITUTIONS		**49.9**	**114**	
1.1	**Political environment**	**40.2**	**119**	
1.1.1	Political and operational stability*	60.7	103	
1.1.2	Government effectiveness*	30.0	122	
1.2	**Regulatory environment**	**45.1**	**115**	
1.2.1	Regulatory quality*	22.1	115	
1.2.2	Rule of law*	34.2	95	
1.2.3	Cost of redundancy dismissal, salary weeks	27.2	107	◇
1.3	**Business environment**	**64.4**	**86**	
1.3.1	Ease of starting a business*	81.7	104	
1.3.2	Ease of resolving insolvency*	47.2	79	
HUMAN CAPITAL & RESEARCH		**13.6**	**114**	
2.1	**Education**	**31.8**	**98**	
2.1.1	Expenditure on education, % GDP	5.2	39	●
2.1.2	Government funding/pupil, secondary, % GDP/cap. ⏲	10.5	94	
2.1.3	School life expectancy, years	12.8	83	◆
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	28.3	117	○
2.2	**Tertiary education**	**7.1**	**119**	
2.2.1	Tertiary enrolment, % gross	12.4	104	
2.2.2	Graduates in science & engineering, %	12.9	99	
2.2.3	Tertiary inbound mobility, % ⏲	0.0	112	○ ◇
2.3	**Research & development (R&D)**	**1.9**	**95**	
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 R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**38.0**	**76**	◆
3.1	**Information & communication technologies (ICTs)**	**54.2**	**88**	◆
3.1.1	ICT access*	41.1	104	◆
3.1.2	ICT use*	28.7	106	◆
3.1.3	Government's online service*	68.8	73	◆
3.1.4	E-participation*	78.1	55	● ◆
3.2	**General infrastructure**	**44.8**	**13**	● ◆
3.2.1	Electricity output, kWh/mn pop	158.3	117	○
3.2.2	Logistics performance*	20.8	107	
3.2.3	Gross capital formation, % GDP	62.3	2	● ◆
3.3	**Ecological sustainability**	**15.1**	**125**	○
3.3.1	GDP/unit of energy use	5.2	108	
3.3.2	Environmental performance*	32.7	113	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	108	
MARKET SOPHISTICATION		**51.8**	**40**	● ◆
4.1	**Credit**	**50.6**	**33**	● ◆
4.1.1	Ease of getting credit*	75.0	34	●
4.1.2	Domestic credit to private sector, % GDP	87.7	31	● ◆
4.1.3	Microfinance gross loans, % GDP	1.8	18	●
4.2	**Investment**	**58.0**	**[17]**	
4.2.1	Ease of protecting minority investors*	58.0	77	◆
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**46.7**	**124**	○
4.3.1	Applied tariff rate, weighted avg., %	12.4	126	○ ◇
4.3.2	Intensity of local competition†	63.1	92	
4.3.3	Domestic market scale, bn PPP$	94.4	84	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**27.5**	**[58]**	
5.1	**Knowledge workers**	**23.5**	**[88]**	
5.1.1	Knowledge-intensive employment, % ⏲	13.8	96	◆
5.1.2	Firms offering formal training, % ⏲	31.9	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, % ⏲	3.0	97	◆
5.2	**Innovation linkages**	**23.7**	**[54]**	
5.2.1	University/industry research collaboration†	32.8	101	
5.2.2	State of cluster development†	37.6	106	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	83	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	n/a	n/a	
5.3	**Knowledge absorption**	**35.3**	**[40]**	
5.3.1	Intellectual property payments, % total trade	n/a	n/a	
5.3.2	High-tech imports, % total trade ⏲	11.6	20	●
5.3.3	ICT services imports, % total trade ⏲	0.2	122	○
5.3.4	FDI net inflows, % GDP	0.5	122	
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**12.8**	**102**	
6.1	**Knowledge creation**	**8.6**	**[80]**	
6.1.1	Patents by origin/bn PPP$ GDP ⏲	0.3	92	
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	6.6	70	
6.1.5	Citable documents H-index	7.6	86	
6.2	**Knowledge impact**	**3.9**	**127**	○ ◇
6.2.1	Growth rate of PPP$ GDP/worker, %	n/a	n/a	
6.2.2	New businesses/th pop. 15-64	1.3	75	◆
6.2.3	Computer software spending, % GDP	0.0	117	○
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.1	102	
6.2.5	High- and medium-high-tech manufacturing, % ⏲	6.7	94	
6.3	**Knowledge diffusion**	**25.9**	**57**	● ◆
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	High-tech net exports, % total trade ⏲	0.1	113	
6.3.3	ICT services exports, % total trade ⏲	4.2	20	● ◆
6.3.4	FDI net outflows, % GDP	0.5	76	
CREATIVE OUTPUTS		**12.3**	**106**	
7.1	**Intangible assets**	**17.2**	**103**	
7.1.1	Trademarks by origin/bn PPP$ GDP ⏲	50.5	47	● ◆
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP ⏲	0.2	101	
7.1.4	ICTs & organizational model creation†	37.9	118	○
7.2	**Creative goods and services**	**4.0**	**[107]**	
7.2.1	Cultural & 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 & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing ⏲	0.4	92	◇
7.2.5	Creative goods exports, % total trade ⏲	0.2	75	
7.3	**Online creativity**	**10.8**	**83**	◆
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.5	110	
7.3.2	Country-code TLDs/th pop. 15-69	1.0	84	
7.3.3	Wikipedia edits/mn pop. 15-69	35.8	88	◆
7.3.4	Mobile app creation/bn PPP$ GDP	9.3	46	● ◆

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

NETHERLANDS

GII 2020 rank

5

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
4	**11**	**High**	**EUR**	**17.1**	**1,005.3**	**50,933.1**	**4**

		Score/Value	Rank	
INSTITUTIONS		**89.7**	**7**	
1.1	**Political environment**	**90.2**	**9**	
1.1.1	Political and operational stability*	87.5	11	
1.1.2	Government effectiveness*	91.5	7	
1.2	**Regulatory environment**	**89.5**	**14**	
1.2.1	Regulatory quality*	95.0	3	●
1.2.2	Rule of law*	94.0	9	
1.2.3	Cost of redundancy dismissal, salary weeks	15.8	63	○
1.3	**Business environment**	**89.4**	**5**	●
1.3.1	Ease of starting a business*	94.3	22	
1.3.2	Ease of resolving insolvency*	84.4	7	
HUMAN CAPITAL & RESEARCH		**55.3**	**14**	
2.1	**Education**	**58.5**	**19**	
2.1.1	Expenditure on education, % GDP 🕘	5.5	23	
2.1.2	Government funding/pupil, secondary, % GDP/cap	23.1	26	
2.1.3	School life expectancy, years	18.5	10	
2.1.4	PISA scales in reading, maths, & science	502.5	15	
2.1.5	Pupil-teacher ratio, secondary 🕘	14.5	72	○ ◇
2.2	**Tertiary education**	**42.0**	**37**	
2.2.1	Tertiary enrolment, % gross	85.0	12	
2.2.2	Graduates in science & engineering, %	16.6	84	○ ◇
2.2.3	Tertiary inbound mobility, %	11.0	16	
2.3	**Research & development (R&D)**	**65.3**	**11**	
2.3.1	Researchers, FTE/mn pop	5,604.5	10	
2.3.2	Gross expenditure on R&D, % GDP	2.2	14	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	83.0	9	
2.3.4	QS university ranking, average score top 3*	67.4	13	
INFRASTRUCTURE		**57.4**	**18**	
3.1	**Information & communication technologies (ICTs)**	**91.0**	**4**	●
3.1.1	ICT access*	86.0	9	
3.1.2	ICT use*	86.0	8	
3.1.3	Government's online service*	93.1	17	
3.1.4	E-participation*	98.9	4	●
3.2	**General infrastructure**	**38.4**	**28**	
3.2.1	Electricity output, kWh/mn pop	6,589.6	30	
3.2.2	Logistics performance*	91.5	6	
3.2.3	Gross capital formation, % GDP	21.2	87	○
3.3	**Ecological sustainability**	**42.9**	**32**	
3.3.1	GDP/unit of energy use	11.6	37	
3.3.2	Environmental performance*	75.3	11	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.2	37	
MARKET SOPHISTICATION		**56.5**	**23**	
4.1	**Credit**	**46.0**	**47**	
4.1.1	Ease of getting credit*	45.0	101	○ ◇
4.1.2	Domestic credit to private sector, % GDP	105.8	22	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**46.5**	**29**	
4.2.1	Ease of protecting minority investors*	58.0	77	○ ◇
4.2.2	Market capitalization, % GDP 🕘	110.1	9	
4.2.3	Venture capital deals/bn PPP$ GDP	0.2	16	
4.3	**Trade, competition, and market scale**	**77.0**	**16**	
4.3.1	Applied tariff rate, weighted avg., %	1.7	22	○
4.3.2	Intensity of local competition†	80.5	5	●
4.3.3	Domestic market scale, bn PPP$	1,005.3	27	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**63.4**	**4**	● ◆
5.1	**Knowledge workers**	**59.3**	**17**	
5.1.1	Knowledge-intensive employment, %	47.7	11	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	1.5	13	
5.1.4	GERD financed by business, %	51.6	26	
5.1.5	Females employed w/advanced degrees, %	20.3	28	
5.2	**Innovation linkages**	**62.6**	**7**	
5.2.1	University/industry research collaboration†	74.4	5	● ◆
5.2.2	State of cluster development†	70.4	6	
5.2.3	GERD financed by abroad, % GDP	0.3	10	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.1	23	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	7.8	1	● ◆
5.3	**Knowledge absorption**	**68.3**	**1**	● ◆
5.3.1	Intellectual property payments, % total trade	7.9	1	● ◆
5.3.2	High-tech imports, % total trade	11.3	22	
5.3.3	ICT services imports, % total trade	2.4	19	
5.3.4	FDI net inflows, % GDP	5.4	23	
5.3.5	Research talent, % in business enterprise	70.0	7	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**54.5**	**8**	
6.1	**Knowledge creation**	**65.7**	**8**	
6.1.1	Patents by origin/bn PPP$ GDP	9.5	10	
6.1.2	PCT patents by origin/bn PPP$ GDP	4.0	10	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	22.3	22	
6.1.5	Citable documents H-index	69.1	7	
6.2	**Knowledge impact**	**35.9**	**24**	
6.2.1	Growth rate of PPP$ GDP/worker, %	0.3	85	○
6.2.2	New businesses/th pop. 15-64	6.4	25	
6.2.3	Computer software spending, % GDP	0.0	9	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	8.1	32	
6.2.5	High- and medium-high-tech manufacturing, %	32.6	35	
6.3	**Knowledge diffusion**	**61.8**	**5**	●
6.3.1	Intellectual property receipts, % total trade	7.2	1	● ◆
6.3.2	High-tech net exports, % total trade	11.1	15	
6.3.3	ICT services exports, % total trade	3.5	23	
6.3.4	FDI net outflows, % GDP	8.2	7	
CREATIVE OUTPUTS		**51.7**	**6**	
7.1	**Intangible assets**	**47.9**	**16**	
7.1.1	Trademarks by origin/bn PPP$ GDP	49.6	49	○
7.1.2	Global brand value, top 5,000, % GDP	153.4	9	
7.1.3	Industrial designs by origin/bn PPP$ GDP	4.1	30	
7.1.4	ICTs & organizational model creation†	80.2	4	● ◆
7.2	**Creative goods and services**	**38.6**	**13**	
7.2.1	Cultural & creative services exports, % total trade	1.8	9	
7.2.2	National feature films/mn pop. 15-69	7.6	25	
7.2.3	Entertainment & Media market/th pop. 15-69	51.5	17	
7.2.4	Printing and other media, % manufacturing	1.1	53	○
7.2.5	Creative goods exports, % total trade	3.4	17	
7.3	**Online creativity**	**72.4**	**2**	● ◆
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	78.4	5	● ◆
7.3.2	Country-code TLDs/th pop. 15-69	100.0	1	● ◆
7.3.3	Wikipedia edits/mn pop. 15-69	93.4	5	● ◆
7.3.4	Mobile app creation/bn PPP$ GDP	18.1	27	

NOTES: ● indicates a strength; ○ a weakness; ◆ a strength relative to the other top 25-ranked GII economies; ◇ a weakness relative to the other top 25-ranked GII economies; * an index; † a survey question. 🕘 indicates that the economy's data are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

NEW ZEALAND

GII 2020 rank

26

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
33	19	High	SEAO	4.8	206.2	35,744.0	25

		Score/Value	Rank	
INSTITUTIONS		**90.9**	**4**	● ◆
1.1	**Political environment**	**90.5**	**8**	● ◆
1.1.1	Political and operational stability*	96.4	2	● ◆
1.1.2	Government effectiveness*	87.5	12	
1.2	**Regulatory environment**	**97.4**	**3**	● ◆
1.2.1	Regulatory quality*	94.0	4	● ◆
1.2.2	Rule of law*	95.6	5	● ◆
1.2.3	Cost of redundancy dismissal, salary weeks	8.0	1	● ◆
1.3	**Business environment**	**84.7**	**19**	
1.3.1	Ease of starting a business*	100.0	1	● ◆
1.3.2	Ease of resolving insolvency*	69.5	33	
HUMAN CAPITAL & RESEARCH		**54.4**	**18**	
2.1	**Education**	**61.5**	**14**	
2.1.1	Expenditure on education, % GDP 🕘	6.4	10	◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	21.1	46	
2.1.3	School life expectancy, years	18.8	8	● ◆
2.1.4	PISA scales in reading, maths, & science	502.9	13	
2.1.5	Pupil-teacher ratio, secondary 🕘	13.6	68	○ ◇
2.2	**Tertiary education**	**53.6**	**11**	
2.2.1	Tertiary enrolment, % gross	82.0	15	
2.2.2	Graduates in science & engineering, %	21.2	62	○
2.2.3	Tertiary inbound mobility, %	19.6	6	● ◆
2.3	**Research & development (R&D)**	**48.1**	**21**	
2.3.1	Researchers, FTE/mn pop 🕘	5,529.5	11	
2.3.2	Gross expenditure on R&D, % GDP 🕘	1.4	27	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	47.9	31	
2.3.4	QS university ranking, average score top 3*	50.7	18	
INFRASTRUCTURE		**57.7**	**15**	
3.1	**Information & communication technologies (ICTs)**	**90.5**	**8**	● ◆
3.1.1	ICT access*	85.6	12	
3.1.2	ICT use*	82.9	13	
3.1.3	Government's online service*	95.1	9	
3.1.4	E-participation*	98.3	5	◆
3.2	**General infrastructure**	**41.0**	**21**	
3.2.1	Electricity output, kWh/mn pop	9,023.2	17	
3.2.2	Logistics performance*	84.7	15	
3.2.3	Gross capital formation, % GDP	24.1	59	
3.3	**Ecological sustainability**	**41.5**	**34**	
3.3.1	GDP/unit of energy use	8.5	73	○
3.3.2	Environmental performance*	71.3	19	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	3.7	28	
MARKET SOPHISTICATION		**63.9**	**10**	
4.1	**Credit**	**85.8**	**3**	● ◆
4.1.1	Ease of getting credit*	100.0	1	● ◆
4.1.2	Domestic credit to private sector, % GDP	158.3	7	● ◆
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**38.6**	**63**	
4.2.1	Ease of protecting minority investors*	86.0	3	● ◆
4.2.2	Market capitalization, % GDP	43.8	35	
4.2.3	Venture capital deals/bn PPP$ GDP	0.1	34	
4.3	**Trade, competition, and market scale**	**67.4**	**44**	
4.3.1	Applied tariff rate, weighted avg., % 🕘	1.4	15	
4.3.2	Intensity of local competition†	70.8	52	
4.3.3	Domestic market scale, bn PPP$	206.2	63	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**37.9**	**32**	
5.1	**Knowledge workers**	**41.0**	**[43]**	
5.1.1	Knowledge-intensive employment, %	n/a	n/a	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP 🕘	0.8	30	
5.1.4	GERD financed by business, %	46.4	36	
5.1.5	Females employed w/advanced degrees, % 🕘	19.5	29	
5.2	**Innovation linkages**	**35.7**	**29**	
5.2.1	University/industry research collaboration†	59.5	24	
5.2.2	State of cluster development†	49.5	49	
5.2.3	GERD financed by abroad, % GDP	0.1	35	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.1	19	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	1.9	21	
5.3	**Knowledge absorption**	**37.2**	**35**	
5.3.1	Intellectual property payments, % total trade	1.6	18	
5.3.2	High-tech imports, % total trade	10.2	28	
5.3.3	ICT services imports, % total trade	1.5	43	
5.3.4	FDI net inflows, % GDP	1.0	108	○
5.3.5	Research talent, % in business enterprise 🕘	31.2	41	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**31.2**	**39**	
6.1	**Knowledge creation**	**47.5**	**17**	
6.1.1	Patents by origin/bn PPP$ GDP	5.1	22	
6.1.2	PCT patents by origin/bn PPP$ GDP	1.2	26	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	29.7	10	◆
6.1.5	Citable documents H-index	34.8	27	
6.2	**Knowledge impact**	**26.3**	**60**	
6.2.1	Growth rate of PPP$ GDP/worker, %	0.7	71	○
6.2.2	New businesses/th pop. 15-64	17.8	4	● ◆
6.2.3	Computer software spending, % GDP	0.0	55	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	5.1	54	
6.2.5	High- and medium-high-tech manufacturing, % 🕘	14.1	69	○
6.3	**Knowledge diffusion**	**19.9**	**77**	○
6.3.1	Intellectual property receipts, % total trade	0.7	23	
6.3.2	High-tech net exports, % total trade	1.1	67	○
6.3.3	ICT services exports, % total trade	1.1	79	○
6.3.4	FDI net outflows, % GDP	0.0	119	○
CREATIVE OUTPUTS		**34.9**	**33**	
7.1	**Intangible assets**	**35.4**	**37**	
7.1.1	Trademarks by origin/bn PPP$ GDP	90.1	18	◆
7.1.2	Global brand value, top 5,000, % GDP	18.8	48	
7.1.3	Industrial designs by origin/bn PPP$ GDP	2.3	49	
7.1.4	ICTs & organizational model creation†	71.3	18	
7.2	**Creative goods and services**	**21.5**	**48**	
7.2.1	Cultural & creative services exports, % total trade	0.4	57	
7.2.2	National feature films/mn pop. 15-69	6.1	37	
7.2.3	Entertainment & Media market/th pop. 15-69	53.5	14	
7.2.4	Printing and other media, % manufacturing 🕘	1.8	21	
7.2.5	Creative goods exports, % total trade	0.5	65	○
7.3	**Online creativity**	**47.1**	**23**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	32.1	20	
7.3.2	Country-code TLDs/th pop. 15-69	64.6	10	◆
7.3.3	Wikipedia edits/mn pop. 15-69	80.4	24	
7.3.4	Mobile app creation/bn PPP$ GDP	12.3	40	

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

NIGER

GII 2020 rank

128

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
129	**124**	**Low**	**SSF**	**23.3**	**25.8**	**965.5**	**127**

		Score/Value	Rank	
INSTITUTIONS		**54.9**	**96**	
1.1	**Political environment**	**41.1**	**117**	
1.1.1	Political and operational stability*	57.1	110	
1.1.2	Government effectiveness*	33.0	119	
1.2	**Regulatory environment**	**58.2**	**84**	
1.2.1	Regulatory quality*	24.9	108	
1.2.2	Rule of law*	31.5	100	
1.2.3	Cost of redundancy dismissal, salary weeks	14.0	53	●
1.3	**Business environment**	**65.4**	**83**	
1.3.1	Ease of starting a business*	91.5	49	●
1.3.2	Ease of resolving insolvency*	39.3	100	
HUMAN CAPITAL & RESEARCH		**9.5**	**127**	
2.1	**Education**	**22.0**	**122**	
2.1.1	Expenditure on education, % GDP	4.9	44	●
2.1.2	Government funding/pupil, secondary, % GDP/cap	16.1	71	
2.1.3	School life expectancy, years	6.4	120	○ ◇
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	29.7	119	
2.2	**Tertiary education**	**6.5**	**122**	
2.2.1	Tertiary enrolment, % gross	4.4	121	
2.2.2	Graduates in science & engineering, %	10.4	104	◇
2.2.3	Tertiary inbound mobility, %	5.2	43	●
2.3	**Research & development (R&D)**	**0.0**	**[121]**	
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 R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**19.6**	**126**	
3.1	**Information & communication technologies (ICTs)**	**15.9**	**130**	○ ◇
3.1.1	ICT access*	23.1	128	◇
3.1.2	ICT use*	3.1	131	○ ◇
3.1.3	Government's online service*	16.0	129	○ ◇
3.1.4	E-participation*	21.4	122	◇
3.2	**General infrastructure**	**27.3**	**62**	
3.2.1	Electricity output, kWh/mn pop	25.7	122	○ ◇
3.2.2	Logistics performance*	0.0	124	○ ◇
3.2.3	Gross capital formation, % GDP	45.5	4	●
3.3	**Ecological sustainability**	**15.6**	**123**	
3.3.1	GDP/unit of energy use	6.2	100	
3.3.2	Environmental performance*	30.8	118	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	117	
MARKET SOPHISTICATION		**33.9**	**124**	
4.1	**Credit**	**30.0**	**107**	
4.1.1	Ease of getting credit*	70.0	44	●
4.1.2	Domestic credit to private sector, % GDP	14.2	120	
4.1.3	Microfinance gross loans, % GDP	0.1	55	
4.2	**Investment**	**42.0**	**[47]**	
4.2.1	Ease of protecting minority investors*	42.0	102	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**29.6**	**129**	◇
4.3.1	Applied tariff rate, weighted avg., %	11.0	121	
4.3.2	Intensity of local competition†	n/a	n/a	
4.3.3	Domestic market scale, bn PPP$	25.8	125	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**21.9**	**[89]**	
5.1	**Knowledge workers**	**20.8**	**[100]**	
5.1.1	Knowledge-intensive employment, %	15.3	91	◆
5.1.2	Firms offering formal training, %	27.5	55	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, %	0.7	114	
5.2	**Innovation linkages**	**1.5**	**[131]**	
5.2.1	University/industry research collaboration†	n/a	n/a	
5.2.2	State of cluster development†	n/a	n/a	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	104	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	101	○ ◇
5.3	**Knowledge absorption**	**43.3**	**[25]**	
5.3.1	Intellectual property payments, % total trade	n/a	n/a	
5.3.2	High-tech imports, % total trade	7.5	70	
5.3.3	ICT services imports, % total trade	3.5	4	● ◆
5.3.4	FDI net inflows, % GDP	9.9	9	● ◆
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**13.0**	**100**	
6.1	**Knowledge creation**	**3.5**	**117**	
6.1.1	Patents by origin/bn PPP$ GDP	0.3	93	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	100	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	3.0	105	
6.1.5	Citable documents H-index	3.6	117	
6.2	**Knowledge impact**	**13.2**	**110**	
6.2.1	Growth rate of PPP$ GDP/worker, %	1.9	49	●
6.2.2	New businesses/th pop. 15-64	0.1	118	
6.2.3	Computer software spending, % GDP	0.0	109	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.2	130	○ ◇
6.2.5	High- and medium-high-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**22.2**	**70**	◆
6.3.1	Intellectual property receipts, % total trade	0.0	107	
6.3.2	High-tech net exports, % total trade	0.1	107	
6.3.3	ICT services exports, % total trade	4.3	18	● ◆
6.3.4	FDI net outflows, % GDP	0.4	80	
CREATIVE OUTPUTS		**2.4**	**[131]**	
7.1	**Intangible assets**	**4.1**	**[131]**	
7.1.1	Trademarks by origin/bn PPP$ GDP	15.9	99	
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.0	119	
7.1.4	ICTs & organizational model creation†	n/a	n/a	
7.2	**Creative goods and services**	**1.2**	**[123]**	
7.2.1	Cultural & creative services exports, % total trade	0.1	81	
7.2.2	National feature films/mn pop. 15-69	0.7	94	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.0	124	
7.3	**Online creativity**	**0.3**	**127**	◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.9	98	◆
7.3.2	Country-code TLDs/th pop. 15-69	0.0	130	○
7.3.3	Wikipedia edits/mn pop. 15-69	n/a	n/a	
7.3.4	Mobile app creation/bn PPP$ GDP	0.0	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 are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

NIGERIA

GII 2020 rank

117

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
121	115	Lower middle	SSF	201.0	1,216.8	5,286.0	114

		Score/Value	Rank	
INSTITUTIONS		**51.1**	**110**	
1.1	**Political environment**	**34.3**	**129**	○ ◇
1.1.1	Political and operational stability*	48.2	128	○ ◇
1.1.2	Government effectiveness*	27.3	125	◇
1.2	**Regulatory environment**	**60.6**	**78**	
1.2.1	Regulatory quality*	18.5	122	◇
1.2.2	Rule of law*	23.7	118	
1.2.3	Cost of redundancy dismissal, salary weeks	8.0	1	● ◆
1.3	**Business environment**	**58.4**	**109**	
1.3.1	Ease of starting a business*	86.2	81	
1.3.2	Ease of resolving insolvency*	30.6	118	
HUMAN CAPITAL & RESEARCH		**11.2**	**[121]**	
2.1	**Education**	**26.8**	**[113]**	
2.1.1	Expenditure on education, % GDP	n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	8.7	114	◇
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	23.2	105	
2.2	**Tertiary education**	**6.9**	**[120]**	
2.2.1	Tertiary enrolment, % gross	10.2	108	
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research & development (R&D)**	**0.0**	**[121]**	
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 R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**21.3**	**124**	◇
3.1	**Information & communication technologies (ICTs)**	**38.3**	**112**	
3.1.1	ICT access*	27.9	123	◇
3.1.2	ICT use*	24.2	109	
3.1.3	Government's online service*	52.8	104	
3.1.4	E-participation*	48.3	106	
3.2	**General infrastructure**	**10.1**	**126**	◇
3.2.1	Electricity output, kWh/mn pop	168.9	116	◇
3.2.2	Logistics performance*	21.7	104	
3.2.3	Gross capital formation, % GDP	14.2	121	○ ◇
3.3	**Ecological sustainability**	**15.6**	**122**	◇
3.3.1	GDP/unit of energy use	6.4	98	
3.3.2	Environmental performance*	31.0	117	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.1	127	○
MARKET SOPHISTICATION		**41.6**	**102**	
4.1	**Credit**	**35.3**	**87**	
4.1.1	Ease of getting credit*	85.0	14	● ◆
4.1.2	Domestic credit to private sector, % GDP	10.9	125	○ ◇
4.1.3	Microfinance gross loans, % GDP	0.1	60	
4.2	**Investment**	**25.4**	**116**	
4.2.1	Ease of protecting minority investors*	72.0	27	●
4.2.2	Market capitalization, % GDP	8.4	68	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	78	
4.3	**Trade, competition, and market scale**	**64.1**	**58**	●
4.3.1	Applied tariff rate, weighted avg., %	8.5	106	
4.3.2	Intensity of local competition†	68.7	66	●
4.3.3	Domestic market scale, bn PPP$	1,216.8	23	● ◆

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**23.8**	**75**	
5.1	**Knowledge workers**	**34.7**	**[57]**	
5.1.1	Knowledge-intensive employment, %	28.4	51	● ◆
5.1.2	Firms offering formal training, %	30.7	48	●
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, %	5.0	90	
5.2	**Innovation linkages**	**18.2**	**86**	
5.2.1	University/industry research collaboration†	26.4	122	○ ◇
5.2.2	State of cluster development†	46.3	70	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	89	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	97	
5.3	**Knowledge absorption**	**18.6**	**111**	
5.3.1	Intellectual property payments, % total trade	0.5	67	
5.3.2	High-tech imports, % total trade	4.0	122	
5.3.3	ICT services imports, % total trade	0.6	97	
5.3.4	FDI net inflows, % GDP	0.8	117	
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**9.4**	**120**	◇
6.1	**Knowledge creation**	**4.9**	**108**	
6.1.1	Patents by origin/bn PPP$ GDP	0.1	113	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	99	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	2.3	114	
6.1.5	Citable documents H-index	11.5	65	●
6.2	**Knowledge impact**	**13.4**	**109**	
6.2.1	Growth rate of PPP$ GDP/worker, %	0.8	66	● ◇
6.2.2	New businesses/th pop. 15-64	0.8	87	
6.2.3	Computer software spending, % GDP	0.0	83	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.2	127	○ ◇
6.2.5	High- and medium-high-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**10.0**	**121**	
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	High-tech net exports, % total trade	0.1	119	
6.3.3	ICT services exports, % total trade	0.3	107	
6.3.4	FDI net outflows, % GDP	0.3	84	
CREATIVE OUTPUTS		**11.5**	**110**	
7.1	**Intangible assets**	**17.2**	**105**	
7.1.1	Trademarks by origin/bn PPP$ GDP	19.8	95	
7.1.2	Global brand value, top 5,000, % GDP	6.3	66	
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.0	68	
7.1.4	ICTs & organizational model creation†	47.5	89	
7.2	**Creative goods and services**	**9.7**	**[78]**	
7.2.1	Cultural & creative services exports, % total trade	n/a	n/a	
7.2.2	National feature films/mn pop. 15-69	11.3	15	● ◆
7.2.3	Entertainment & Media market/th pop. 15-69	0.8	59	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.0	128	○
7.3	**Online creativity**	**1.8**	**122**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.5	108	
7.3.2	Country-code TLDs/th pop. 15-69	0.4	101	
7.3.3	Wikipedia edits/mn pop. 15-69	10.8	119	○ ◇
7.3.4	Mobile app creation/bn PPP$ GDP	0.2	79	

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NORTH MACEDONIA

GII 2020 rank

57

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
63	46	Upper middle	EUR	2.1	34.3	14,393.0	59

		Score/Value	Rank	
INSTITUTIONS		**68.9**	**50**	
1.1	**Political environment**	**58.6**	**65**	
1.1.1	Political and operational stability*	71.4	59	
1.1.2	Government effectiveness*	52.2	67	
1.2	**Regulatory environment**	**67.3**	**58**	
1.2.1	Regulatory quality*	55.6	44	
1.2.2	Rule of law*	39.3	79	
1.2.3	Cost of redundancy dismissal, salary weeks	14.4	55	
1.3	**Business environment**	**80.7**	**30**	● ◆
1.3.1	Ease of starting a business*	88.6	63	
1.3.2	Ease of resolving insolvency*	72.7	28	● ◆
HUMAN CAPITAL & RESEARCH		**29.1**	**72**	
2.1	**Education**	**53.3**	**[44]**	
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	13.6	76	
2.1.4	PISA scales in reading, maths, & science	400.1	67	○
2.1.5	Pupil-teacher ratio, secondary	8.7	18	●
2.2	**Tertiary education**	**29.8**	**75**	
2.2.1	Tertiary enrolment, % gross	42.5	67	
2.2.2	Graduates in science & engineering, %	21.9	58	
2.2.3	Tertiary inbound mobility, %	4.7	47	
2.3	**Research & development (R&D)**	**4.1**	**79**	
2.3.1	Researchers, FTE/mn pop	799.3	56	
2.3.2	Gross expenditure on R&D, % GDP	0.4	74	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**46.4**	**49**	
3.1	**Information & communication technologies (ICTs)**	**66.2**	**69**	
3.1.1	ICT access*	63.8	68	
3.1.2	ICT use*	59.4	60	
3.1.3	Government's online service*	71.5	70	
3.1.4	E-participation*	70.2	70	
3.2	**General infrastructure**	**19.7**	**100**	
3.2.1	Electricity output, kWh/mn pop	2,692.4	69	
3.2.2	Logistics performance*	29.8	80	
3.2.3	Gross capital formation, % GDP	n/a	n/a	
3.3	**Ecological sustainability**	**53.2**	**17**	● ◆
3.3.1	GDP/unit of energy use	10.0	55	
3.3.2	Environmental performance*	55.4	41	◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	9.4	7	● ◆
MARKET SOPHISTICATION		**59.7**	**17**	● ◆
4.1	**Credit**	**41.2**	**68**	
4.1.1	Ease of getting credit*	80.0	23	●
4.1.2	Domestic credit to private sector, % GDP	50.3	68	
4.1.3	Microfinance gross loans, % GDP	0.3	43	
4.2	**Investment**	**82.0**	**[3]**	
4.2.1	Ease of protecting minority investors*	82.0	12	● ◆
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**55.9**	**95**	
4.3.1	Applied tariff rate, weighted avg., %	1.9	55	
4.3.2	Intensity of local competition†	62.5	96	
4.3.3	Domestic market scale, bn PPP$	34.3	115	○ ◇

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**25.4**	**66**	
5.1	**Knowledge workers**	**33.4**	**60**	
5.1.1	Knowledge-intensive employment, %	28.7	49	
5.1.2	Firms offering formal training, %	39.0	31	
5.1.3	GERD performed by business, % GDP	0.1	60	
5.1.4	GERD financed by business, %	30.1	59	
5.1.5	Females employed w/advanced degrees, %	13.4	52	
5.2	**Innovation linkages**	**13.4**	**120**	○ ◇
5.2.1	University/industry research collaboration†	30.2	112	○ ◇
5.2.2	State of cluster development†	38.6	101	○
5.2.3	GERD financed by abroad, % GDP	0.0	69	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	102	○
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.1	65	
5.3	**Knowledge absorption**	**29.5**	**61**	
5.3.1	Intellectual property payments, % total trade	1.4	23	●
5.3.2	High-tech imports, % total trade	5.5	103	
5.3.3	ICT services imports, % total trade	1.3	55	
5.3.4	FDI net inflows, % GDP	4.5	33	●
5.3.5	Research talent, % in business enterprise	24.1	50	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**23.0**	**58**	
6.1	**Knowledge creation**	**12.0**	**71**	
6.1.1	Patents by origin/bn PPP$ GDP	1.6	48	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	58	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	8.8	57	
6.1.5	Citable documents H-index	6.1	95	
6.2	**Knowledge impact**	**28.7**	**46**	
6.2.1	Growth rate of PPP$ GDP/worker, %	-1.1	109	○
6.2.2	New businesses/th pop. 15-64	3.6	39	
6.2.3	Computer software spending, % GDP	0.0	79	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	13.4	22	●
6.2.5	High- and medium-high-tech manufacturing, %	41.6	21	● ◆
6.3	**Knowledge diffusion**	**28.3**	**48**	
6.3.1	Intellectual property receipts, % total trade	0.1	48	
6.3.2	High-tech net exports, % total trade	2.8	48	
6.3.3	ICT services exports, % total trade	2.6	40	
6.3.4	FDI net outflows, % GDP	1.0	57	
CREATIVE OUTPUTS		**18.9**	**76**	
7.1	**Intangible assets**	**18.4**	**99**	
7.1.1	Trademarks by origin/bn PPP$ GDP	n/a	n/a	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.9	51	
7.1.4	ICTs & organizational model creation†	41.1	112	○ ◇
7.2	**Creative goods and services**	**16.7**	**61**	
7.2.1	Cultural & creative services exports, % total trade	0.9	29	●
7.2.2	National feature films/mn pop. 15-69	5.1	44	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	2.1	14	● ◆
7.2.5	Creative goods exports, % total trade	0.2	86	
7.3	**Online creativity**	**22.0**	**51**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	6.8	47	
7.3.2	Country-code TLDs/th pop. 15-69	5.7	49	
7.3.3	Wikipedia edits/mn pop. 15-69	66.2	45	
7.3.4	Mobile app creation/bn PPP$ GDP	11.3	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 are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

NORWAY

GII 2020 rank

20

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
28	15	High	EUR	5.4	410.7	66,947.8	19

		Score/Value	Rank	
INSTITUTIONS		**92.5**	**3**	● ◆
1.1	**Political environment**	**91.9**	**4**	●
1.1.1	Political and operational stability*	91.1	5	
1.1.2	Government effectiveness*	92.3	5	●
1.2	**Regulatory environment**	**95.9**	**4**	●
1.2.1	Regulatory quality*	88.2	10	
1.2.2	Rule of law*	97.9	2	●
1.2.3	Cost of redundancy dismissal, salary weeks	8.7	20	
1.3	**Business environment**	**89.9**	**3**	●
1.3.1	Ease of starting a business*	94.3	23	
1.3.2	Ease of resolving insolvency*	85.4	5	●
HUMAN CAPITAL & RESEARCH		**55.1**	**16**	
2.1	**Education**	**69.9**	**5**	● ◆
2.1.1	Expenditure on education, % GDP 🕘	8.0	2	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	26.8	18	◆
2.1.3	School life expectancy, years	18.1	11	
2.1.4	PISA scales in reading, maths, & science	496.9	22	
2.1.5	Pupil-teacher ratio, secondary 🕘	8.6	17	◆
2.2	**Tertiary education**	**40.3**	**42**	
2.2.1	Tertiary enrolment, % gross	82.0	16	
2.2.2	Graduates in science & engineering, %	22.1	56	○
2.2.3	Tertiary inbound mobility, %	3.2	64	○ ◇
2.3	**Research & development (R&D)**	**55.0**	**19**	
2.3.1	Researchers, FTE/mn pop	6,466.7	7	●
2.3.2	Gross expenditure on R&D, % GDP	2.1	15	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	56.2	25	
2.3.4	QS university ranking, average score top 3*	44.4	25	
INFRASTRUCTURE		**64.6**	**1**	● ◆
3.1	**Information & communication technologies (ICTs)**	**89.3**	**12**	
3.1.1	ICT access*	76.2	38	◇
3.1.2	ICT use*	88.2	5	● ◆
3.1.3	Government's online service*	95.1	9	
3.1.4	E-participation*	97.8	11	
3.2	**General infrastructure**	**58.8**	**3**	● ◆
3.2.1	Electricity output, kWh/mn pop	27,634.6	1	● ◆
3.2.2	Logistics performance*	76.3	21	
3.2.3	Gross capital formation, % GDP	28.2	33	
3.3	**Ecological sustainability**	**45.7**	**28**	
3.3.1	GDP/unit of energy use	11.0	44	
3.3.2	Environmental performance*	77.7	9	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	3.3	30	
MARKET SOPHISTICATION		**56.1**	**25**	
4.1	**Credit**	**59.9**	**16**	
4.1.1	Ease of getting credit*	55.0	88	○
4.1.2	Domestic credit to private sector, % GDP	144.0	11	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**41.2**	**58**	
4.2.1	Ease of protecting minority investors*	76.0	21	
4.2.2	Market capitalization, % GDP	65.5	23	
4.2.3	Venture capital deals/bn PPP$ GDP	0.1	26	
4.3	**Trade, competition, and market scale**	**67.1**	**46**	◇
4.3.1	Applied tariff rate, weighted avg., %	3.2	66	◇
4.3.2	Intensity of local competition†	69.3	65	○ ◇
4.3.3	Domestic market scale, bn PPP$	410.7	47	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**45.1**	**25**	◇
5.1	**Knowledge workers**	**58.1**	**19**	
5.1.1	Knowledge-intensive employment, %	52.2	5	●
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	1.1	21	
5.1.4	GERD financed by business, %	42.8	40	◇
5.1.5	Females employed w/advanced degrees, %	25.2	13	
5.2	**Innovation linkages**	**43.1**	**22**	
5.2.1	University/industry research collaboration† 🕘	61.7	21	
5.2.2	State of cluster development† 🕘	64.6	19	
5.2.3	GERD financed by abroad, % GDP	0.2	20	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.1	17	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	1.9	19	
5.3	**Knowledge absorption**	**34.1**	**44**	◇
5.3.1	Intellectual property payments, % total trade	0.5	69	○ ◇
5.3.2	High-tech imports, % total trade	6.7	79	○
5.3.3	ICT services imports, % total trade	2.8	11	
5.3.4	FDI net inflows, % GDP	-2.5	129	○
5.3.5	Research talent, % in business enterprise	48.9	25	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**33.1**	**33**	◇
6.1	**Knowledge creation**	**42.6**	**20**	
6.1.1	Patents by origin/bn PPP$ GDP	4.3	26	
6.1.2	PCT patents by origin/bn PPP$ GDP	1.9	17	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	21.1	26	
6.1.5	Citable documents H-index	41.1	20	
6.2	**Knowledge impact**	**30.5**	**40**	
6.2.1	Growth rate of PPP$ GDP/worker, %	0.1	86	○
6.2.2	New businesses/th pop. 15-64	8.6	19	
6.2.3	Computer software spending, % GDP	0.0	16	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	6.3	44	
6.2.5	High- and medium-high-tech manufacturing, %	19.6	57	○ ◇
6.3	**Knowledge diffusion**	**26.2**	**55**	◇
6.3.1	Intellectual property receipts, % total trade	0.3	28	◇
6.3.2	High-tech net exports, % total trade	2.8	47	
6.3.3	ICT services exports, % total trade	1.6	65	
6.3.4	FDI net outflows, % GDP	1.2	50	
CREATIVE OUTPUTS		**38.7**	**19**	
7.1	**Intangible assets**	**34.1**	**38**	◇
7.1.1	Trademarks by origin/bn PPP$ GDP	35.2	68	○
7.1.2	Global brand value, top 5,000, % GDP	65.2	28	◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.4	57	
7.1.4	ICTs & organizational model creation†	77.4	10	
7.2	**Creative goods and services**	**28.7**	**30**	
7.2.1	Cultural & creative services exports, % total trade	0.5	51	
7.2.2	National feature films/mn pop. 15-69	10.1	19	
7.2.3	Entertainment & Media market/th pop. 15-69	94.0	3	● ◆
7.2.4	Printing and other media, % manufacturing	1.1	42	
7.2.5	Creative goods exports, % total trade	0.5	64	
7.3	**Online creativity**	**57.9**	**12**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	50.6	15	
7.3.2	Country-code TLDs/th pop. 15-69	61.7	13	
7.3.3	Wikipedia edits/mn pop. 15-69	100.0	1	● ◆
7.3.4	Mobile app creation/bn PPP$ GDP	19.4	26	

NOTES: ● indicates a strength; ○ a weakness; ◆ a strength relative to the other top 25-ranked GII economies; ◇ a weakness relative to the other top 25-ranked GII economies; * an index; † a survey question. 🕘 indicates that the economy's data are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

OMAN

GII 2020 rank

84

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
109	**68**	**High**	**NAWA**	**5.0**	**204.0**	**41,351.8**	**80**

		Score/Value	Rank	
INSTITUTIONS		**61.8**	**70**	◇
1.1	**Political environment**	**62.4**	**52**	◇
1.1.1	Political and operational stability*	78.6	38	
1.1.2	Government effectiveness*	54.3	59	◇
1.2	**Regulatory environment**	**54.4**	**94**	◇
1.2.1	Regulatory quality*	50.0	56	◇
1.2.2	Rule of law*	58.8	44	◇
1.2.3	Cost of redundancy dismissal, salary weeks	n/a	n/a	
1.3	**Business environment**	**68.7**	**73**	◇
1.3.1	Ease of starting a business*	93.5	30	●
1.3.2	Ease of resolving insolvency*	44.0	88	◇
HUMAN CAPITAL & RESEARCH		**38.1**	**43**	
2.1	**Education**	**56.8**	**24**	●
2.1.1	Expenditure on education, % GDP 🕘	5.0	42	
2.1.2	Government funding/pupil, secondary, % GDP/cap	36.0	6	● ◆
2.1.3	School life expectancy, years	14.1	70	◇
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	10.2	36	●
2.2	**Tertiary education**	**53.3**	**12**	●
2.2.1	Tertiary enrolment, % gross	38.0	72	◇
2.2.2	Graduates in science & engineering, %	46.1	1	● ◆
2.2.3	Tertiary inbound mobility, %	2.7	69	◇
2.3	**Research & development (R&D)**	**4.1**	**80**	◇
2.3.1	Researchers, FTE/mn pop	236.0	79	◇
2.3.2	Gross expenditure on R&D, % GDP	0.2	89	◇
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	9.6	64	◇
INFRASTRUCTURE		**44.5**	**56**	◇
3.1	**Information & communication technologies (ICTs)**	**75.2**	**47**	
3.1.1	ICT access*	76.6	37	●
3.1.2	ICT use*	60.0	57	◇
3.1.3	Government's online service*	81.3	43	
3.1.4	E-participation*	83.2	43	
3.2	**General infrastructure**	**37.6**	**29**	●
3.2.1	Electricity output, kWh/mn pop	7,785.8	23	●
3.2.2	Logistics performance*	52.9	42	
3.2.3	Gross capital formation, % GDP	31.8	21	● ◆
3.3	**Ecological sustainability**	**20.6**	**97**	◇
3.3.1	GDP/unit of energy use	6.5	97	
3.3.2	Environmental performance*	38.5	91	◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.9	64	
MARKET SOPHISTICATION		**40.7**	**104**	◇
4.1	**Credit**	**32.7**	**99**	◇
4.1.1	Ease of getting credit*	35.0	118	○ ◇
4.1.2	Domestic credit to private sector, % GDP	70.5	44	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**24.4**	**118**	○ ◇
4.2.1	Ease of protecting minority investors*	56.0	82	
4.2.2	Market capitalization, % GDP	29.7	48	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	50	
4.3	**Trade, competition, and market scale**	**65.0**	**51**	
4.3.1	Applied tariff rate, weighted avg., %	1.7	52	
4.3.2	Intensity of local competition†	66.2	76	
4.3.3	Domestic market scale, bn PPP$	204.0	64	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**20.7**	**95**	◇
5.1	**Knowledge workers**	**22.9**	**[90]**	
5.1.1	Knowledge-intensive employment, % 🕘	18.5	81	◇
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	0.1	66	◇
5.1.4	GERD financed by business, %	31.8	54	
5.1.5	Females employed w/advanced degrees, %	n/a	n/a	
5.2	**Innovation linkages**	**22.1**	**59**	◇
5.2.1	University/industry research collaboration†	50.7	38	●
5.2.2	State of cluster development†	59.4	27	●
5.2.3	GERD financed by abroad, % GDP	0.0	88	○ ◇
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	42	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	95	
5.3	**Knowledge absorption**	**17.0**	**118**	○ ◇
5.3.1	Intellectual property payments, % total trade	n/a	n/a	
5.3.2	High-tech imports, % total trade 🕘	5.3	107	○
5.3.3	ICT services imports, % total trade 🕘	0.3	116	○ ◇
5.3.4	FDI net inflows, % GDP	5.2	24	●
5.3.5	Research talent, % in business enterprise	0.3	86	○ ◇
KNOWLEDGE & TECHNOLOGY OUTPUTS		**8.4**	**124**	○ ◇
6.1	**Knowledge creation**	**5.0**	**107**	◇
6.1.1	Patents by origin/bn PPP$ GDP	0.1	117	○
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	81	◇
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	3.7	99	◇
6.1.5	Citable documents H-index	7.3	88	◇
6.2	**Knowledge impact**	**8.8**	**121**	○ ◇
6.2.1	Growth rate of PPP$ GDP/worker, %	-3.4	118	○ ◇
6.2.2	New businesses/th pop. 15-64	1.4	72	
6.2.3	Computer software spending, % GDP	0.0	97	◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	2.6	80	
6.2.5	High- and medium-high-tech manufacturing, %	16.5	62	
6.3	**Knowledge diffusion**	**11.5**	**114**	○ ◇
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	High-tech net exports, % total trade 🕘	0.1	106	◇
6.3.3	ICT services exports, % total trade 🕘	0.3	106	
6.3.4	FDI net outflows, % GDP	1.6	43	
CREATIVE OUTPUTS		**15.2**	**94**	◇
7.1	**Intangible assets**	**23.1**	**82**	◇
7.1.1	Trademarks by origin/bn PPP$ GDP	57.3	38	●
7.1.2	Global brand value, top 5,000, % GDP	9.7	60	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.0	118	○
7.1.4	ICTs & organizational model creation†	52.5	72	◇
7.2	**Creative goods and services**	**6.4**	**99**	◇
7.2.1	Cultural & creative services exports, % total trade	n/a	n/a	
7.2.2	National feature films/mn pop. 15-69	1.1	84	◇
7.2.3	Entertainment & Media market/th pop. 15-69	7.3	43	◇
7.2.4	Printing and other media, % manufacturing	0.5	86	○
7.2.5	Creative goods exports, % total trade 🕘	0.5	61	
7.3	**Online creativity**	**8.3**	**94**	◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	1.7	85	◇
7.3.2	Country-code TLDs/th pop. 15-69	0.3	107	◇
7.3.3	Wikipedia edits/mn pop. 15-69	30.0	94	◇
7.3.4	Mobile app creation/bn PPP$ GDP	5.0	55	

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

PAKISTAN

GII 2020 rank

107

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
88	118	Lower middle	CSA	216.6	1,202.1	5,126.1	105

		Score/Value	Rank	
INSTITUTIONS		**54.1**	**99**	
1.1	**Political environment**	**43.6**	**109**	
1.1.1	Political and operational stability*	58.9	104	
1.1.2	Government effectiveness*	36.0	112	
1.2	**Regulatory environment**	**44.5**	**116**	
1.2.1	Regulatory quality*	24.8	109	
1.2.2	Rule of law*	29.1	105	
1.2.3	Cost of redundancy dismissal, salary weeks	27.2	107	
1.3	**Business environment**	**74.1**	**55**	◆
1.3.1	Ease of starting a business*	89.3	59	
1.3.2	Ease of resolving insolvency*	59.0	53	◆
HUMAN CAPITAL & RESEARCH		**12.2**	**118**	◇
2.1	**Education**	**21.9**	**124**	○ ◇
2.1.1	Expenditure on education, % GDP	2.9	101	◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	16.0	72	
2.1.3	School life expectancy, years	8.3	117	○ ◇
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	20.4	98	
2.2	**Tertiary education**	**6.0**	**[123]**	
2.2.1	Tertiary enrolment, % gross	9.0	113	○
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research & development (R&D)**	**8.8**	**62**	
2.3.1	Researchers, FTE/mn pop.	335.6	75	
2.3.2	Gross expenditure on R&D, % GDP	0.2	88	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	26.9	42	● ◆
INFRASTRUCTURE		**23.3**	**119**	○ ◇
3.1	**Information & communication technologies (ICTs)**	**38.7**	**111**	
3.1.1	ICT access*	34.7	115	◇
3.1.2	ICT use*	15.4	117	◇
3.1.3	Government's online service*	54.9	101	
3.1.4	E-participation*	50.0	105	
3.2	**General infrastructure**	**10.1**	**125**	○ ◇
3.2.1	Electricity output, kWh/mn pop	666.3	103	
3.2.2	Logistics performance*	16.4	112	○
3.2.3	Gross capital formation, % GDP	15.4	119	○ ◇
3.3	**Ecological sustainability**	**21.0**	**94**	
3.3.1	GDP/unit of energy use	9.3	65	
3.3.2	Environmental performance*	33.1	111	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.4	88	
MARKET SOPHISTICATION		**36.0**	**116**	◇
4.1	**Credit**	**21.1**	**124**	○ ◇
4.1.1	Ease of getting credit*	45.0	101	
4.1.2	Domestic credit to private sector, % GDP	19.0	114	
4.1.3	Microfinance gross loans, % GDP	0.2	49	
4.2	**Investment**	**28.5**	**100**	
4.2.1	Ease of protecting minority investors*	72.0	27	●
4.2.2	Market capitalization, % GDP	29.2	50	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	77	○
4.3	**Trade, competition, and market scale**	**58.5**	**85**	
4.3.1	Applied tariff rate, weighted avg., %	9.5	112	
4.3.2	Intensity of local competition†	57.7	115	○ ◇
4.3.3	Domestic market scale, bn PPP$	1,202.1	24	● ◆

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**22.0**	**87**	
5.1	**Knowledge workers**	**21.1**	**[98]**	
5.1.1	Knowledge-intensive employment, %	11.6	103	
5.1.2	Firms offering formal training, %	32.0	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, %	1.6	105	
5.2	**Innovation linkages**	**18.5**	**83**	
5.2.1	University/industry research collaboration†	47.7	46	● ◆
5.2.2	State of cluster development†	48.8	54	
5.2.3	GERD financed by abroad, % GDP	0.0	90	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	55	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	88	
5.3	**Knowledge absorption**	**26.6**	**72**	
5.3.1	Intellectual property payments, % total trade	0.5	66	
5.3.2	High-tech imports, % total trade	9.5	39	●
5.3.3	ICT services imports, % total trade	1.0	75	
5.3.4	FDI net inflows, % GDP	0.9	114	
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**18.6**	**69**	
6.1	**Knowledge creation**	**15.3**	**[63]**	
6.1.1	Patents by origin/bn PPP$ GDP	0.3	90	
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	10.9	47	● ◆
6.1.5	Citable documents H-index	16.4	51	●
6.2	**Knowledge impact**	**20.8**	**81**	
6.2.1	Growth rate of PPP$ GDP/worker, %	2.0	46	●
6.2.2	New businesses/th pop. 15-64	0.1	117	○
6.2.3	Computer software spending, % GDP	0.0	51	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	2.0	84	
6.2.5	High- and medium-high-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**19.5**	**81**	
6.3.1	Intellectual property receipts, % total trade	0.0	80	
6.3.2	High-tech net exports, % total trade	0.8	72	
6.3.3	ICT services exports, % total trade	2.3	47	●
6.3.4	FDI net outflows, % GDP	0.0	115	
CREATIVE OUTPUTS		**11.6**	**108**	
7.1	**Intangible assets**	**18.6**	**98**	
7.1.1	Trademarks by origin/bn PPP$ GDP	26.7	83	
7.1.2	Global brand value, top 5,000, % GDP	4.4	69	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.4	87	
7.1.4	ICTs & organizational model creation†	51.6	76	
7.2	**Creative goods and services**	**0.8**	**128**	○ ◇
7.2.1	Cultural & creative services exports, % total trade	0.1	83	
7.2.2	National feature films/mn pop. 15-69	0.1	108	○
7.2.3	Entertainment & Media market/th pop. 15-69	0.0	62	○ ◇
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.1	106	
7.3	**Online creativity**	**8.4**	**93**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.5	106	
7.3.2	Country-code TLDs/th pop. 15-69	0.2	111	
7.3.3	Wikipedia edits/mn pop. 15-69	20.3	106	
7.3.4	Mobile app creation/bn PPP$ GDP	16.9	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 are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

PANAMA

GII 2020 rank

73

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
70	**82**	**High**	**LCN**	**4.2**	**113.2**	**23,416.2**	**75**

		Score/Value	Rank	
INSTITUTIONS		**62.6**	**67**	◇
1.1	**Political environment**	**57.5**	**67**	◇
1.1.1	Political and operational stability*	73.2	49	◇
1.1.2	Government effectiveness*	49.7	73	◇
1.2	**Regulatory environment**	**64.3**	**65**	◇
1.2.1	Regulatory quality*	52.4	53	◇
1.2.2	Rule of law*	45.1	66	◇
1.2.3	Cost of redundancy dismissal, salary weeks	18.1	75	
1.3	**Business environment**	**65.8**	**82**	◇
1.3.1	Ease of starting a business*	92.0	46	
1.3.2	Ease of resolving insolvency*	39.5	99	◇
HUMAN CAPITAL & RESEARCH		**18.3**	**101**	◇
2.1	**Education**	**27.9**	**111**	◇
2.1.1	Expenditure on education, % GDP	3.2	94	◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	9.2	97	○ ◇
2.1.3	School life expectancy, years	12.9	82	◇
2.1.4	PISA scales in reading, maths, & science	364.8	76	○
2.1.5	Pupil-teacher ratio, secondary	13.6	66	◇
2.2	**Tertiary education**	**25.3**	**81**	◇
2.2.1	Tertiary enrolment, % gross	47.8	63	◇
2.2.2	Graduates in science & engineering, %	15.4	94	◇
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research & development (R&D)**	**1.7**	**100**	◇
2.3.1	Researchers, FTE/mn pop	39.1	96	◇
2.3.2	Gross expenditure on R&D, % GDP	0.1	98	◇
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	3.6	72	◇
INFRASTRUCTURE		**46.8**	**47**	◇
3.1	**Information & communication technologies (ICTs)**	**63.6**	**73**	◇
3.1.1	ICT access*	63.8	69	◇
3.1.2	ICT use*	52.9	72	◇
3.1.3	Government's online service*	66.0	80	◇
3.1.4	E-participation*	71.9	65	◇
3.2	**General infrastructure**	**38.7**	**26**	●
3.2.1	Electricity output, kWh/mn pop	2,695.5	68	◇
3.2.2	Logistics performance*	56.6	37	●
3.2.3	Gross capital formation, % GDP	38.5	12	● ◆
3.3	**Ecological sustainability**	**37.9**	**42**	
3.3.1	GDP/unit of energy use	19.2	7	● ◆
3.3.2	Environmental performance*	47.3	64	◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.3	99	◇
MARKET SOPHISTICATION		**47.1**	**67**	
4.1	**Credit**	**48.4**	**40**	
4.1.1	Ease of getting credit*	80.0	23	●
4.1.2	Domestic credit to private sector, % GDP	86.7	32	●
4.1.3	Microfinance gross loans, % GDP	0.4	39	
4.2	**Investment**	**33.4**	**82**	
4.2.1	Ease of protecting minority investors*	56.0	82	
4.2.2	Market capitalization, % GDP	23.9	53	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**59.6**	**74**	◇
4.3.1	Applied tariff rate, weighted avg., %	5.4	98	◇
4.3.2	Intensity of local competition†	70.7	53	
4.3.3	Domestic market scale, bn PPP$	113.2	77	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**15.9**	**123**	○ ◇
5.1	**Knowledge workers**	**13.7**	**113**	◇
5.1.1	Knowledge-intensive employment, %	24.0	63	◇
5.1.2	Firms offering formal training, %	11.0	92	○ ◇
5.1.3	GERD performed by business, % GDP	0.0	88	○ ◇
5.1.4	GERD financed by business, %	1.5	94	○ ◇
5.1.5	Females employed w/advanced degrees, %	10.6	63	◇
5.2	**Innovation linkages**	**18.3**	**84**	◇
5.2.1	University/industry research collaboration†	36.6	92	◇
5.2.2	State of cluster development†	45.8	74	
5.2.3	GERD financed by abroad, % GDP	0.1	50	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	79	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.2	39	
5.3	**Knowledge absorption**	**15.8**	**127**	○ ◇
5.3.1	Intellectual property payments, % total trade	0.2	93	◇
5.3.2	High-tech imports, % total trade	2.9	126	○ ◇
5.3.3	ICT services imports, % total trade	0.3	114	◇
5.3.4	FDI net inflows, % GDP	8.2	14	●
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**13.7**	**91**	◇
6.1	**Knowledge creation**	**7.3**	**85**	◇
6.1.1	Patents by origin/bn PPP$ GDP	1.3	58	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.2	54	◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	64	○
6.1.4	Scientific & technical articles/bn PPP$ GDP	3.5	101	◇
6.1.5	Citable documents H-index	12.0	63	
6.2	**Knowledge impact**	**9.3**	**120**	○ ◇
6.2.1	Growth rate of PPP$ GDP/worker, %	n/a	n/a	
6.2.2	New businesses/th pop. 15-64	4.8	32	●
6.2.3	Computer software spending, % GDP	0.0	71	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.7	86	◇
6.2.5	High- and medium-high-tech manufacturing, %	4.7	96	◇
6.3	**Knowledge diffusion**	**24.4**	**63**	
6.3.1	Intellectual property receipts, % total trade	0.0	73	
6.3.2	High-tech net exports, % total trade	3.6	40	
6.3.3	ICT services exports, % total trade	1.1	81	
6.3.4	FDI net outflows, % GDP	0.6	69	
CREATIVE OUTPUTS		**26.2**	**55**	
7.1	**Intangible assets**	**23.8**	**79**	◇
7.1.1	Trademarks by origin/bn PPP$ GDP	48.8	51	
7.1.2	Global brand value, top 5,000, % GDP	13.5	52	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.0	115	○
7.1.4	ICTs & organizational model creation†	57.4	55	
7.2	**Creative goods and services**	**27.2**	**34**	●
7.2.1	Cultural & creative services exports, % total trade	0.5	49	
7.2.2	National feature films/mn pop. 15-69	0.4	102	○ ◇
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	3.0	5	● ◆
7.2.5	Creative goods exports, % total trade	2.5	22	●
7.3	**Online creativity**	**30.1**	**36**	●
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	66.7	9	● ◆
7.3.2	Country-code TLDs/th pop. 15-69	1.3	81	◇
7.3.3	Wikipedia edits/mn pop. 15-69	49.5	61	◇
7.3.4	Mobile app creation/bn PPP$ GDP	5.6	53	

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

PARAGUAY

GII 2020 rank

97

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
92	98	Upper middle	LCN	7.0	97.2	11,859.3	95

		Score/Value	Rank	
INSTITUTIONS		**51.1**	**109**	◇
1.1	**Political environment**	**47.7**	**96**	
1.1.1	Political and operational stability*	66.1	76	
1.1.2	Government effectiveness*	38.6	99	◇
1.2	**Regulatory environment**	**46.6**	**111**	◇
1.2.1	Regulatory quality*	38.5	81	
1.2.2	Rule of law*	32.6	97	
1.2.3	Cost of redundancy dismissal, salary weeks	29.4	116	◇
1.3	**Business environment**	**59.0**	**107**	◇
1.3.1	Ease of starting a business*	76.0	117	◇
1.3.2	Ease of resolving insolvency*	42.1	94	
HUMAN CAPITAL & RESEARCH		**18.7**	**98**	◇
2.1	**Education**	**29.4**	**108**	◇
2.1.1	Expenditure on education, % GDP	3.4	90	
2.1.2	Government funding/pupil, secondary, % GDP/cap	11.9	87	
2.1.3	School life expectancy, years	12.2	89	◇
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	18.4	90	
2.2	**Tertiary education**	**24.9**	**[84]**	
2.2.1	Tertiary enrolment, % gross	34.6	77	
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research & development (R&D)**	**1.9**	**96**	
2.3.1	Researchers, FTE/mn pop.	135.1	85	◇
2.3.2	Gross expenditure on R&D, % GDP	0.1	97	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	3.5	74	
INFRASTRUCTURE		**34.8**	**89**	
3.1	**Information & communication technologies (ICTs)**	**50.0**	**98**	◇
3.1.1	ICT access*	43.6	101	◇
3.1.2	ICT use*	43.4	92	◇
3.1.3	Government's online service*	55.6	99	
3.1.4	E-participation*	57.3	96	
3.2	**General infrastructure**	**26.8**	**66**	●
3.2.1	Electricity output, kWh/mn pop	8,764.4	18	● ◆
3.2.2	Logistics performance*	33.4	73	
3.2.3	Gross capital formation, % GDP	22.4	74	
3.3	**Ecological sustainability**	**27.5**	**71**	
3.3.1	GDP/unit of energy use	11.2	42	●
3.3.2	Environmental performance*	46.4	67	●
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.3	98	
MARKET SOPHISTICATION		**42.3**	**93**	
4.1	**Credit**	**35.5**	**85**	
4.1.1	Ease of getting credit*	40.0	113	◇
4.1.2	Domestic credit to private sector, % GDP	42.9	77	
4.1.3	Microfinance gross loans, % GDP	4.2	9	● ◆
4.2	**Investment**	**34.0**	**[78]**	
4.2.1	Ease of protecting minority investors*	34.0	118	◇
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**57.5**	**88**	
4.3.1	Applied tariff rate, weighted avg., %	5.0	91	
4.3.2	Intensity of local competition†	65.6	78	
4.3.3	Domestic market scale, bn PPP$	97.2	82	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**22.2**	**84**	
5.1	**Knowledge workers**	**21.4**	**96**	
5.1.1	Knowledge-intensive employment, %	18.3	82	
5.1.2	Firms offering formal training, %	46.4	20	●
5.1.3	GERD performed by business, % GDP	0.0	88	○ ◇
5.1.4	GERD financed by business, %	0.2	99	○ ◇
5.1.5	Females employed w/advanced degrees, %	9.6	69	
5.2	**Innovation linkages**	**14.3**	**115**	
5.2.1	University/industry research collaboration†	23.3	125	○ ◇
5.2.2	State of cluster development†	35.6	111	◇
5.2.3	GERD financed by abroad, % GDP	0.0	67	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	n/a	n/a	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	101	○ ◇
5.3	**Knowledge absorption**	**30.7**	**58**	●
5.3.1	Intellectual property payments, % total trade	0.1	97	
5.3.2	High-tech imports, % total trade	16.6	11	● ◆
5.3.3	ICT services imports, % total trade	0.0	129	○ ◇
5.3.4	FDI net inflows, % GDP	1.3	103	
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**10.4**	**115**	◇
6.1	**Knowledge creation**	**2.7**	**[124]**	
6.1.1	Patents by origin/bn PPP$ GDP	0.3	88	
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	1.2	124	○ ◇
6.1.5	Citable documents H-index	4.2	113	
6.2	**Knowledge impact**	**14.3**	**104**	
6.2.1	Growth rate of PPP$ GDP/worker, %	0.5	76	
6.2.2	New businesses/th pop. 15-64	0.2	110	
6.2.3	Computer software spending, % GDP	0.0	100	◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	3.6	66	●
6.2.5	High- and medium-high-tech manufacturing, %	14.1	70	
6.3	**Knowledge diffusion**	**14.1**	**100**	
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	High-tech net exports, % total trade	0.7	73	
6.3.3	ICT services exports, % total trade	0.1	123	○
6.3.4	FDI net outflows, % GDP	0.1	111	
CREATIVE OUTPUTS		**18.5**	**78**	
7.1	**Intangible assets**	**29.5**	**55**	●
7.1.1	Trademarks by origin/bn PPP$ GDP	127.9	6	● ◆
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.7	52	●
7.1.4	ICTs & organizational model creation†	41.8	110	◇
7.2	**Creative goods and services**	**5.8**	**100**	
7.2.1	Cultural & creative services exports, % total trade	0.0	109	○
7.2.2	National feature films/mn pop. 15-69	1.3	80	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.3	32	●
7.2.5	Creative goods exports, % total trade	0.0	118	
7.3	**Online creativity**	**9.3**	**87**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	1.7	84	
7.3.2	Country-code TLDs/th pop. 15-69	1.4	77	
7.3.3	Wikipedia edits/mn pop. 15-69	37.5	83	
7.3.4	Mobile app creation/bn PPP$ GDP	0.0	95	

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

PERU

GII 2020 rank

76

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
98	**55**	**Upper middle**	**LCN**	**32.5**	**478.3**	**12,850.2**	**69**

		Score/Value	Rank	
INSTITUTIONS		**61.4**	**72**	
1.1	**Political environment**	**51.2**	**87**	
1.1.1	Political and operational stability*	64.3	83	
1.1.2	Government effectiveness*	44.7	85	
1.2	**Regulatory environment**	**68.8**	**51**	
1.2.1	Regulatory quality*	55.5	45	
1.2.2	Rule of law*	33.2	96	
1.2.3	Cost of redundancy dismissal, salary weeks	11.4	36	●
1.3	**Business environment**	**64.3**	**87**	
1.3.1	Ease of starting a business*	82.1	102	
1.3.2	Ease of resolving insolvency*	46.6	82	
HUMAN CAPITAL & RESEARCH		**32.3**	**57**	
2.1	**Education**	**37.6**	**86**	
2.1.1	Expenditure on education, % GDP	3.7	83	
2.1.2	Government funding/pupil, secondary, % GDP/cap	14.6	81	
2.1.3	School life expectancy, years	15.0	53	
2.1.4	PISA scales in reading, maths, & science	401.5	66	○
2.1.5	Pupil-teacher ratio, secondary	14.2	69	
2.2	**Tertiary education**	**53.2**	**13**	● ◆
2.2.1	Tertiary enrolment, % gross	70.7	27	● ◆
2.2.2	Graduates in science & engineering, %	29.6	16	●
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research & development (R&D)**	**6.1**	**74**	
2.3.1	Researchers, FTE/mn pop	n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP	0.1	100	○
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	16.0	55	
INFRASTRUCTURE		**39.7**	**68**	
3.1	**Information & communication technologies (ICTs)**	**65.7**	**70**	
3.1.1	ICT access*	50.9	89	◇
3.1.2	ICT use*	43.5	91	◇
3.1.3	Government's online service*	81.9	41	
3.1.4	E-participation*	86.5	36	●
3.2	**General infrastructure**	**19.1**	**105**	
3.2.1	Electricity output, kWh/mn pop	1,645.0	85	
3.2.2	Logistics performance*	29.2	82	
3.2.3	Gross capital formation, % GDP	22.1	77	
3.3	**Ecological sustainability**	**34.2**	**50**	
3.3.1	GDP/unit of energy use	15.6	12	● ◆
3.3.2	Environmental performance*	44.0	79	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.0	61	
MARKET SOPHISTICATION		**51.9**	**38**	●
4.1	**Credit**	**53.9**	**23**	● ◆
4.1.1	Ease of getting credit*	75.0	34	
4.1.2	Domestic credit to private sector, % GDP	44.0	75	
4.1.3	Microfinance gross loans, % GDP	5.8	2	● ◆
4.2	**Investment**	**29.5**	**95**	
4.2.1	Ease of protecting minority investors*	68.0	44	
4.2.2	Market capitalization, % GDP	43.8	36	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	73	○
4.3	**Trade, competition, and market scale**	**72.2**	**31**	● ◆
4.3.1	Applied tariff rate, weighted avg., %	0.7	7	●
4.3.2	Intensity of local competition†	72.5	42	
4.3.3	Domestic market scale, bn PPP$	478.3	44	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**33.8**	**43**	◆
5.1	**Knowledge workers**	**57.4**	**[21]**	
5.1.1	Knowledge-intensive employment, %	24.4	61	
5.1.2	Firms offering formal training, %	65.9	5	● ◆
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, %	16.3	41	
5.2	**Innovation linkages**	**16.5**	**99**	
5.2.1	University/industry research collaboration†	30.9	106	○ ◇
5.2.2	State of cluster development†	40.1	96	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	114	○
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	85	
5.3	**Knowledge absorption**	**27.6**	**70**	
5.3.1	Intellectual property payments, % total trade	0.7	56	
5.3.2	High-tech imports, % total trade	8.1	57	
5.3.3	ICT services imports, % total trade	1.2	58	
5.3.4	FDI net inflows, % GDP	3.2	46	
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**10.9**	**112**	○ ◇
6.1	**Knowledge creation**	**6.7**	**92**	
6.1.1	Patents by origin/bn PPP$ GDP	0.2	103	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	78	
6.1.3	Utility models by origin/bn PPP$ GDP	0.5	37	
6.1.4	Scientific & technical articles/bn PPP$ GDP	2.1	118	○
6.1.5	Citable documents H-index	13.8	57	
6.2	**Knowledge impact**	**15.3**	**99**	
6.2.1	Growth rate of PPP$ GDP/worker, %	-0.8	104	○
6.2.2	New businesses/th pop. 15-64	3.8	37	●
6.2.3	Computer software spending, % GDP	0.0	67	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	2.9	74	
6.2.5	High- and medium-high-tech manufacturing, %	10.5	79	
6.3	**Knowledge diffusion**	**10.8**	**118**	○ ◇
6.3.1	Intellectual property receipts, % total trade	0.0	74	
6.3.2	High-tech net exports, % total trade	0.4	84	
6.3.3	ICT services exports, % total trade	0.3	113	○
6.3.4	FDI net outflows, % GDP	0.3	89	
CREATIVE OUTPUTS		**16.6**	**87**	
7.1	**Intangible assets**	**21.2**	**89**	
7.1.1	Trademarks by origin/bn PPP$ GDP	51.6	45	
7.1.2	Global brand value, top 5,000, % GDP	6.8	64	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.3	95	
7.1.4	ICTs & organizational model creation†	48.6	86	
7.2	**Creative goods and services**	**10.1**	**76**	
7.2.1	Cultural & creative services exports, % total trade	0.1	82	
7.2.2	National feature films/mn pop. 15-69	1.1	85	
7.2.3	Entertainment & Media market/th pop. 15-69	8.1	40	
7.2.4	Printing and other media, % manufacturing	2.0	15	● ◆
7.2.5	Creative goods exports, % total trade	0.3	71	
7.3	**Online creativity**	**14.0**	**72**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	5.2	53	
7.3.2	Country-code TLDs/th pop. 15-69	1.6	73	
7.3.3	Wikipedia edits/mn pop. 15-69	51.8	58	
7.3.4	Mobile app creation/bn PPP$ GDP	0.1	88	○

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

PHILIPPINES

GII 2020 rank

50

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
41	70	Lower middle	SEAO	108.1	1,025.8	8,268.3	54

		Score/Value	Rank	
INSTITUTIONS		**56.3**	**91**	
1.1	**Political environment**	**55.6**	**72**	◆
1.1.1	Political and operational stability*	64.3	83	
1.1.2	Government effectiveness*	51.3	68	◆
1.2	**Regulatory environment**	**50.1**	**104**	
1.2.1	Regulatory quality*	43.0	67	◆
1.2.2	Rule of law*	34.2	94	
1.2.3	Cost of redundancy dismissal, salary weeks	27.4	113	○
1.3	**Business environment**	**63.2**	**94**	
1.3.1	Ease of starting a business*	71.3	124	○ ◇
1.3.2	Ease of resolving insolvency*	55.1	60	
HUMAN CAPITAL & RESEARCH		**23.9**	**86**	
2.1	**Education**	**26.6**	**114**	○
2.1.1	Expenditure on education, % GDP	2.7	106	○ ◇
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, & science	349.7	78	○
2.1.5	Pupil-teacher ratio, secondary	23.9	106	
2.2	**Tertiary education**	**39.0**	**47**	◆
2.2.1	Tertiary enrolment, % gross	35.5	75	
2.2.2	Graduates in science & engineering, %	28.7	22	
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research & development (R&D)**	**6.2**	**73**	
2.3.1	Researchers, FTE/mn pop.	105.7	87	
2.3.2	Gross expenditure on R&D, % GDP	0.2	95	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	20.6	51	◆
INFRASTRUCTURE		**41.1**	**63**	◆
3.1	**Information & communication technologies (ICTs)**	**68.9**	**62**	◆
3.1.1	ICT access*	48.8	91	
3.1.2	ICT use*	44.9	84	
3.1.3	Government's online service*	88.2	30	◆
3.1.4	E-participation*	93.8	19	● ◆
3.2	**General infrastructure**	**24.6**	**75**	
3.2.1	Electricity output, kWh/mn pop	899.5	98	
3.2.2	Logistics performance*	39.1	59	
3.2.3	Gross capital formation, % GDP	27.2	37	
3.3	**Ecological sustainability**	**29.7**	**63**	◆
3.3.1	GDP/unit of energy use	13.5	19	● ◆
3.3.2	Environmental performance*	38.4	92	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.0	60	◆
MARKET SOPHISTICATION		**43.9**	**86**	
4.1	**Credit**	**24.3**	**118**	○ ◇
4.1.1	Ease of getting credit*	40.0	113	○ ◇
4.1.2	Domestic credit to private sector, % GDP	49.9	71	
4.1.3	Microfinance gross loans, % GDP	0.0	70	○
4.2	**Investment**	**32.9**	**85**	
4.2.1	Ease of protecting minority investors*	60.0	71	
4.2.2	Market capitalization, % GDP	83.1	17	◆
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	69	
4.3	**Trade, competition, and market scale**	**74.4**	**20**	● ◆
4.3.1	Applied tariff rate, weighted avg., %	2.1	58	◆
4.3.2	Intensity of local competition†	75.0	27	◆
4.3.3	Domestic market scale, bn PPP$	1,025.8	26	●

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**38.6**	**29**	◆
5.1	**Knowledge workers**	**40.0**	**45**	◆
5.1.1	Knowledge-intensive employment, %	25.5	57	◆
5.1.2	Firms offering formal training, %	59.8	7	● ◆
5.1.3	GERD performed by business, % GDP	0.1	68	
5.1.4	GERD financed by business, %	38.0	47	◆
5.1.5	Females employed w/advanced degrees, %	12.4	58	
5.2	**Innovation linkages**	**21.3**	**64**	
5.2.1	University/industry research collaboration†	57.5	27	◆
5.2.2	State of cluster development†	48.1	60	
5.2.3	GERD financed by abroad, % GDP	0.0	91	○
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.1	32	◆
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	84	
5.3	**Knowledge absorption**	**54.5**	**7**	● ◆
5.3.1	Intellectual property payments, % total trade	0.7	55	
5.3.2	High-tech imports, % total trade	27.7	1	● ◆
5.3.3	ICT services imports, % total trade	0.9	77	
5.3.4	FDI net inflows, % GDP	3.0	57	
5.3.5	Research talent, % in business enterprise	51.8	21	◆
KNOWLEDGE & TECHNOLOGY OUTPUTS		**35.1**	**26**	● ◆
6.1	**Knowledge creation**	**14.9**	**65**	
6.1.1	Patents by origin/bn PPP$ GDP	0.6	81	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	91	
6.1.3	Utility models by origin/bn PPP$ GDP	2.4	8	●
6.1.4	Scientific & technical articles/bn PPP$ GDP	1.1	125	○
6.1.5	Citable documents H-index	14.7	54	
6.2	**Knowledge impact**	**33.1**	**34**	◆
6.2.1	Growth rate of PPP$ GDP/worker, %	5.2	6	●
6.2.2	New businesses/th pop. 15-64	0.3	109	○
6.2.3	Computer software spending, % GDP	0.0	54	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	3.9	64	
6.2.5	High- and medium-high-tech manufacturing, %	38.6	25	◆
6.3	**Knowledge diffusion**	**57.2**	**8**	● ◆
6.3.1	Intellectual property receipts, % total trade	0.0	78	
6.3.2	High-tech net exports, % total trade	31.4	3	● ◆
6.3.3	ICT services exports, % total trade	5.5	8	● ◆
6.3.4	FDI net outflows, % GDP	1.0	56	
CREATIVE OUTPUTS		**24.2**	**57**	◆
7.1	**Intangible assets**	**28.2**	**64**	
7.1.1	Trademarks by origin/bn PPP$ GDP	32.4	75	
7.1.2	Global brand value, top 5,000, % GDP	58.3	33	◆
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.0	69	
7.1.4	ICTs & organizational model creation†	61.7	39	◆
7.2	**Creative goods and services**	**29.3**	**29**	◆
7.2.1	Cultural & creative services exports, % total trade	0.1	78	
7.2.2	National feature films/mn pop. 15-69	0.8	91	
7.2.3	Entertainment & Media market/th pop. 15-69	3.3	50	◆
7.2.4	Printing and other media, % manufacturing	0.6	80	
7.2.5	Creative goods exports, % total trade	6.1	10	● ◆
7.3	**Online creativity**	**11.0**	**82**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	1.1	93	
7.3.2	Country-code TLDs/th pop. 15-69	0.4	104	
7.3.3	Wikipedia edits/mn pop. 15-69	44.1	72	◆
7.3.4	Mobile app creation/bn PPP$ GDP	1.5	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 are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

POLAND

GII 2020 rank

38

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
40	**38**	**High**	**EUR**	**37.9**	**1,286.9**	**29,587.4**	**39**

		Score/Value	Rank	
INSTITUTIONS		**73.1**	**39**	
1.1	**Political environment**	**69.5**	**40**	
1.1.1	Political and operational stability*	78.6	38	
1.1.2	Government effectiveness*	64.9	39	
1.2	**Regulatory environment**	**70.0**	**47**	
1.2.1	Regulatory quality*	65.1	36	
1.2.2	Rule of law*	57.8	46	◇
1.2.3	Cost of redundancy dismissal, salary weeks	18.8	77	○
1.3	**Business environment**	**79.7**	**35**	
1.3.1	Ease of starting a business*	82.9	99	○ ◇
1.3.2	Ease of resolving insolvency*	76.5	23	●
HUMAN CAPITAL & RESEARCH		**41.6**	**35**	
2.1	**Education**	**54.1**	**41**	
2.1.1	Expenditure on education, % GDP	4.6	58	
2.1.2	Government funding/pupil, secondary, % GDP/cap	22.4	33	
2.1.3	School life expectancy, years	16.1	35	
2.1.4	PISA scales in reading, maths, & science	512.8	9	●
2.1.5	Pupil-teacher ratio, secondary	9.1	22	●
2.2	**Tertiary education**	**37.9**	**51**	
2.2.1	Tertiary enrolment, % gross	67.8	34	
2.2.2	Graduates in science & engineering, %	22.9	52	
2.2.3	Tertiary inbound mobility, %	4.1	57	
2.3	**Research & development (R&D)**	**32.8**	**36**	
2.3.1	Researchers, FTE/mn pop	3,106.1	31	
2.3.2	Gross expenditure on R&D, % GDP	1.2	33	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	41.3	37	
2.3.4	QS university ranking, average score top 3*	28.5	41	
INFRASTRUCTURE		**49.4**	**42**	
3.1	**Information & communication technologies (ICTs)**	**81.1**	**30**	
3.1.1	ICT access*	73.8	46	◇
3.1.2	ICT use*	68.1	45	
3.1.3	Government's online service*	93.1	17	●
3.1.4	E-participation*	89.3	31	
3.2	**General infrastructure**	**30.7**	**49**	
3.2.1	Electricity output, kWh/mn pop	4,411.2	49	
3.2.2	Logistics performance*	68.9	27	
3.2.3	Gross capital formation, % GDP	21.0	89	○
3.3	**Ecological sustainability**	**36.4**	**45**	
3.3.1	GDP/unit of energy use	10.0	55	
3.3.2	Environmental performance*	60.9	37	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.4	34	
MARKET SOPHISTICATION		**46.8**	**69**	
4.1	**Credit**	**39.2**	**76**	
4.1.1	Ease of getting credit*	75.0	34	
4.1.2	Domestic credit to private sector, % GDP	52.7	64	
4.1.3	Microfinance gross loans, % GDP	0.1	58	○
4.2	**Investment**	**27.4**	**107**	○
4.2.1	Ease of protecting minority investors*	66.0	50	
4.2.2	Market capitalization, % GDP	31.7	44	○
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	62	○
4.3	**Trade, competition, and market scale**	**73.9**	**22**	●
4.3.1	Applied tariff rate, weighted avg., %	1.7	22	
4.3.2	Intensity of local competition†	70.2	58	
4.3.3	Domestic market scale, bn PPP$	1,286.9	22	●

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**34.6**	**38**	
5.1	**Knowledge workers**	**44.7**	**37**	
5.1.1	Knowledge-intensive employment, %	39.5	28	
5.1.2	Firms offering formal training, %	21.7	70	○
5.1.3	GERD performed by business, % GDP	0.8	28	
5.1.4	GERD financed by business, %	52.5	22	
5.1.5	Females employed w/advanced degrees, %	21.1	25	
5.2	**Innovation linkages**	**19.6**	**72**	◇
5.2.1	University/industry research collaboration†	37.2	87	○ ◇
5.2.2	State of cluster development†	46.8	67	
5.2.3	GERD financed by abroad, % GDP	0.1	47	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	65	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.3	34	
5.3	**Knowledge absorption**	**39.4**	**33**	
5.3.1	Intellectual property payments, % total trade	1.1	32	
5.3.2	High-tech imports, % total trade	9.7	36	
5.3.3	ICT services imports, % total trade	1.4	49	
5.3.4	FDI net inflows, % GDP	3.0	55	
5.3.5	Research talent, % in business enterprise	48.2	28	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**32.7**	**36**	
6.1	**Knowledge creation**	**28.9**	**35**	
6.1.1	Patents by origin/bn PPP$ GDP	3.9	27	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.3	44	
6.1.3	Utility models by origin/bn PPP$ GDP	0.8	27	
6.1.4	Scientific & technical articles/bn PPP$ GDP	17.5	32	
6.1.5	Citable documents H-index	36.6	25	●
6.2	**Knowledge impact**	**33.8**	**31**	
6.2.1	Growth rate of PPP$ GDP/worker, %	4.2	18	● ◆
6.2.2	New businesses/th pop. 15-64	1.4	70	
6.2.3	Computer software spending, % GDP	0.0	43	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	9.3	30	
6.2.5	High- and medium-high-tech manufacturing, %	31.7	37	
6.3	**Knowledge diffusion**	**35.3**	**31**	
6.3.1	Intellectual property receipts, % total trade	0.2	38	
6.3.2	High-tech net exports, % total trade	7.0	24	●
6.3.3	ICT services exports, % total trade	2.5	42	
6.3.4	FDI net outflows, % GDP	1.3	46	
CREATIVE OUTPUTS		**28.9**	**47**	
7.1	**Intangible assets**	**26.7**	**69**	
7.1.1	Trademarks by origin/bn PPP$ GDP	34.2	72	
7.1.2	Global brand value, top 5,000, % GDP	38.4	39	
7.1.3	Industrial designs by origin/bn PPP$ GDP	n/a	n/a	
7.1.4	ICTs & organizational model creation†	51.9	74	○ ◇
7.2	**Creative goods and services**	**31.8**	**22**	●
7.2.1	Cultural & creative services exports, % total trade	1.1	23	
7.2.2	National feature films/mn pop. 15-69	1.8	72	○ ◇
7.2.3	Entertainment & Media market/th pop. 15-69	12.6	34	◇
7.2.4	Printing and other media, % manufacturing	1.1	48	
7.2.5	Creative goods exports, % total trade	4.8	12	● ◆
7.3	**Online creativity**	**30.5**	**35**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	7.0	46	
7.3.2	Country-code TLDs/th pop. 15-69	26.8	25	●
7.3.3	Wikipedia edits/mn pop. 15-69	74.5	32	
7.3.4	Mobile app creation/bn PPP$ GDP	15.1	32	

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

PORTUGAL

GII 2020 rank

31

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
29	32	High	EUR	10.2	345.6	29,390.9	32

		Score/Value	Rank	
INSTITUTIONS		**80.7**	**24**	
1.1	**Political environment**	**80.0**	**22**	
1.1.1	Political and operational stability*	85.7	17	●
1.1.2	Government effectiveness*	77.2	23	
1.2	**Regulatory environment**	**76.5**	**34**	
1.2.1	Regulatory quality*	65.3	35	
1.2.2	Rule of law*	76.4	24	
1.2.3	Cost of redundancy dismissal, salary weeks	17.0	67	○
1.3	**Business environment**	**85.5**	**18**	●
1.3.1	Ease of starting a business*	90.9	53	
1.3.2	Ease of resolving insolvency*	80.2	14	●
HUMAN CAPITAL & RESEARCH		**47.2**	**25**	
2.1	**Education**	**57.2**	**22**	
2.1.1	Expenditure on education, % GDP	4.9	46	
2.1.2	Government funding/pupil, secondary, % GDP/cap	27.7	17	●
2.1.3	School life expectancy, years	16.5	22	
2.1.4	PISA scales in reading, maths, & science	492.0	26	
2.1.5	Pupil-teacher ratio, secondary	9.5	26	
2.2	**Tertiary education**	**45.5**	**23**	
2.2.1	Tertiary enrolment, % gross	63.9	40	
2.2.2	Graduates in science & engineering, %	29.1	19	
2.2.3	Tertiary inbound mobility, %	6.4	38	
2.3	**Research & development (R&D)**	**39.0**	**26**	
2.3.1	Researchers, FTE/mn pop	4,537.6	21	
2.3.2	Gross expenditure on R&D, % GDP	1.4	28	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	44.1	35	
2.3.4	QS university ranking, average score top 3*	30.3	39	
INFRASTRUCTURE		**54.2**	**26**	
3.1	**Information & communication technologies (ICTs)**	**83.8**	**24**	
3.1.1	ICT access*	82.1	18	●
3.1.2	ICT use*	70.0	41	
3.1.3	Government's online service*	93.1	17	●
3.1.4	E-participation*	89.9	30	
3.2	**General infrastructure**	**31.3**	**45**	
3.2.1	Electricity output, kWh/mn pop	5,699.3	37	
3.2.2	Logistics performance*	73.8	23	
3.2.3	Gross capital formation, % GDP	18.6	107	○
3.3	**Ecological sustainability**	**47.6**	**22**	
3.3.1	GDP/unit of energy use	13.5	19	
3.3.2	Environmental performance*	67.0	27	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	4.1	24	
MARKET SOPHISTICATION		**47.4**	**65**	
4.1	**Credit**	**44.3**	**54**	
4.1.1	Ease of getting credit*	45.0	101	○ ◇
4.1.2	Domestic credit to private sector, % GDP	98.7	26	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**29.2**	**96**	○
4.2.1	Ease of protecting minority investors*	62.0	60	○
4.2.2	Market capitalization, % GDP	29.2	49	○
4.2.3	Venture capital deals/bn PPP$ GDP	0.1	30	
4.3	**Trade, competition, and market scale**	**68.8**	**37**	
4.3.1	Applied tariff rate, weighted avg., %	1.7	22	
4.3.2	Intensity of local competition†	70.3	55	
4.3.3	Domestic market scale, bn PPP$	345.6	52	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**33.0**	**45**	
5.1	**Knowledge workers**	**41.8**	**41**	
5.1.1	Knowledge-intensive employment, %	35.8	36	
5.1.2	Firms offering formal training, %	29.0	51	○
5.1.3	GERD performed by business, % GDP	0.7	32	
5.1.4	GERD financed by business, %	46.5	35	
5.1.5	Females employed w/advanced degrees, %	16.8	39	
5.2	**Innovation linkages**	**25.5**	**47**	
5.2.1	University/industry research collaboration†	53.6	32	
5.2.2	State of cluster development†	54.6	36	
5.2.3	GERD financed by abroad, % GDP	0.1	38	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	64	○
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.7	30	
5.3	**Knowledge absorption**	**31.7**	**55**	
5.3.1	Intellectual property payments, % total trade	0.9	39	
5.3.2	High-tech imports, % total trade	7.8	59	
5.3.3	ICT services imports, % total trade	1.1	65	
5.3.4	FDI net inflows, % GDP	3.6	43	
5.3.5	Research talent, % in business enterprise	34.1	37	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**33.7**	**32**	
6.1	**Knowledge creation**	**33.2**	**29**	
6.1.1	Patents by origin/bn PPP$ GDP	2.6	33	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.6	32	
6.1.3	Utility models by origin/bn PPP$ GDP	0.2	48	○
6.1.4	Scientific & technical articles/bn PPP$ GDP	32.6	6	● ◆
6.1.5	Citable documents H-index	32.0	30	
6.2	**Knowledge impact**	**42.0**	**14**	●
6.2.1	Growth rate of PPP$ GDP/worker, %	0.6	73	○
6.2.2	New businesses/th pop. 15-64	6.5	24	
6.2.3	Computer software spending, % GDP	0.0	8	●
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	19.9	14	● ◆
6.2.5	High- and medium-high-tech manufacturing, %	26.6	40	
6.3	**Knowledge diffusion**	**26.0**	**56**	
6.3.1	Intellectual property receipts, % total trade	0.1	47	
6.3.2	High-tech net exports, % total trade	2.9	46	
6.3.3	ICT services exports, % total trade	1.8	60	
6.3.4	FDI net outflows, % GDP	0.9	58	
CREATIVE OUTPUTS		**35.3**	**29**	
7.1	**Intangible assets**	**40.9**	**26**	
7.1.1	Trademarks by origin/bn PPP$ GDP	99.1	13	● ◆
7.1.2	Global brand value, top 5,000, % GDP	43.5	38	
7.1.3	Industrial designs by origin/bn PPP$ GDP	7.2	18	●
7.1.4	ICTs & organizational model creation†	64.8	30	
7.2	**Creative goods and services**	**20.8**	**52**	
7.2.1	Cultural & creative services exports, % total trade	0.5	44	
7.2.2	National feature films/mn pop. 15-69	5.2	42	
7.2.3	Entertainment & Media market/th pop. 15-69	34.2	22	
7.2.4	Printing and other media, % manufacturing	1.2	38	
7.2.5	Creative goods exports, % total trade	1.5	36	
7.3	**Online creativity**	**38.5**	**30**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	19.2	29	
7.3.2	Country-code TLDs/th pop. 15-69	52.4	16	●
7.3.3	Wikipedia edits/mn pop. 15-69	80.9	23	
7.3.4	Mobile app creation/bn PPP$ GDP	2.4	63	○

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

QATAR

GII 2020 rank

70

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
72	64	High	NAWA	2.8	365.8	116,013.7	65

		Score/Value	Rank	
INSTITUTIONS		**65.0**	**58**	◇
1.1	**Political environment**	**67.8**	**42**	
1.1.1	Political and operational stability*	75.0	44	
1.1.2	Government effectiveness*	64.2	40	
1.2	**Regulatory environment**	**65.2**	**63**	◇
1.2.1	Regulatory quality*	55.4	46	◇
1.2.2	Rule of law*	65.8	36	
1.2.3	Cost of redundancy dismissal, salary weeks	23.2	99	◇
1.3	**Business environment**	**62.0**	**98**	◇
1.3.1	Ease of starting a business*	86.1	84	◇
1.3.2	Ease of resolving insolvency*	38.0	107	○ ◇
HUMAN CAPITAL & RESEARCH		**25.4**	**83**	◇
2.1	**Education**	**29.9**	**106**	◇
2.1.1	Expenditure on education, % GDP	2.9	102	○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	10.9	91	○ ◇
2.1.3	School life expectancy, years	12.0	93	◇
2.1.4	PISA scales in reading, maths, & science	413.5	60	
2.1.5	Pupil-teacher ratio, secondary	11.0	43	
2.2	**Tertiary education**	**39.2**	**46**	
2.2.1	Tertiary enrolment, % gross	17.9	97	◇
2.2.2	Graduates in science & engineering, %	22.5	54	
2.2.3	Tertiary inbound mobility, %	34.2	1	● ◆
2.3	**Research & development (R&D)**	**7.3**	**66**	◇
2.3.1	Researchers, FTE/mn pop	584.0	64	◇
2.3.2	Gross expenditure on R&D, % GDP	0.5	65	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	11.9	62	
INFRASTRUCTURE		**53.6**	**28**	●
3.1	**Information & communication technologies (ICTs)**	**75.2**	**46**	
3.1.1	ICT access*	78.6	33	
3.1.2	ICT use*	71.9	37	
3.1.3	Government's online service*	79.2	48	
3.1.4	E-participation*	71.4	66	◇
3.2	**General infrastructure**	**64.1**	**2**	● ◆
3.2.1	Electricity output, kWh/mn pop	17,255.6	6	● ◆
3.2.2	Logistics performance*	65.9	29	
3.2.3	Gross capital formation, % GDP	n/a	n/a	
3.3	**Ecological sustainability**	**21.3**	**91**	◇
3.3.1	GDP/unit of energy use	7.0	89	
3.3.2	Environmental performance*	37.1	99	◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.2	56	
MARKET SOPHISTICATION		**42.3**	**94**	◇
4.1	**Credit**	**39.2**	**75**	
4.1.1	Ease of getting credit*	45.0	101	○ ◇
4.1.2	Domestic credit to private sector, % GDP	76.8	41	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**23.3**	**122**	○ ◇
4.2.1	Ease of protecting minority investors*	28.0	123	○ ◇
4.2.2	Market capitalization, % GDP	88.5	16	●
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	60	
4.3	**Trade, competition, and market scale**	**64.5**	**54**	
4.3.1	Applied tariff rate, weighted avg., %	3.7	74	
4.3.2	Intensity of local competition†	65.6	79	◇
4.3.3	Domestic market scale, bn PPP$	365.8	49	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**23.6**	**77**	◇
5.1	**Knowledge workers**	**12.6**	**119**	○ ◇
5.1.1	Knowledge-intensive employment, %	18.1	83	◇
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	0.1	63	◇
5.1.4	GERD financed by business, %	7.1	80	◇
5.1.5	Females employed w/advanced degrees, %	4.5	92	◇
5.2	**Innovation linkages**	**25.7**	**46**	
5.2.1	University/industry research collaboration†	66.1	16	●
5.2.2	State of cluster development†	65.5	16	●
5.2.3	GERD financed by abroad, % GDP	0.0	80	◇
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	41	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.1	69	
5.3	**Knowledge absorption**	**32.6**	**51**	
5.3.1	Intellectual property payments, % total trade	n/a	n/a	
5.3.2	High-tech imports, % total trade	7.8	61	
5.3.3	ICT services imports, % total trade	2.9	10	●
5.3.4	FDI net inflows, % GDP	0.0	124	○
5.3.5	Research talent, % in business enterprise	18.6	57	◇
KNOWLEDGE & TECHNOLOGY OUTPUTS		**15.4**	**85**	◇
6.1	**Knowledge creation**	**6.5**	**93**	◇
6.1.1	Patents by origin/bn PPP$ GDP	0.1	119	○ ◇
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	71	◇
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	4.9	88	◇
6.1.5	Citable documents H-index	9.0	81	◇
6.2	**Knowledge impact**	**26.4**	**59**	
6.2.1	Growth rate of PPP$ GDP/worker, %	0.5	77	
6.2.2	New businesses/th pop. 15-64	6.3	26	●
6.2.3	Computer software spending, % GDP	0.0	31	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	2.0	85	◇
6.2.5	High- and medium-high-tech manufacturing, %	31.8	36	
6.3	**Knowledge diffusion**	**13.3**	**104**	◇
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	High-tech net exports, % total trade	0.0	129	○ ◇
6.3.3	ICT services exports, % total trade	0.9	84	
6.3.4	FDI net outflows, % GDP	2.7	24	●
CREATIVE OUTPUTS		**23.9**	**58**	◇
7.1	**Intangible assets**	**31.2**	**46**	
7.1.1	Trademarks by origin/bn PPP$ GDP	3.3	125	○ ◇
7.1.2	Global brand value, top 5,000, % GDP	82.1	24	●
7.1.3	Industrial designs by origin/bn PPP$ GDP	n/a	n/a	
7.1.4	ICTs & organizational model creation†	63.9	33	
7.2	**Creative goods and services**	**23.1**	**44**	
7.2.1	Cultural & creative services exports, % total trade	0.4	54	
7.2.2	National feature films/mn pop. 15-69	23.0	4	● ◆
7.2.3	Entertainment & Media market/th pop. 15-69	27.8	25	
7.2.4	Printing and other media, % manufacturing	0.9	62	
7.2.5	Creative goods exports, % total trade	0.2	83	
7.3	**Online creativity**	**9.8**	**84**	◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	3.5	60	◇
7.3.2	Country-code TLDs/th pop. 15-69	2.7	63	◇
7.3.3	Wikipedia edits/mn pop. 15-69	36.3	86	◇
7.3.4	Mobile app creation/bn PPP$ GDP	0.3	75	

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

REPUBLIC OF KOREA

GII 2020 rank

10

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
10	10	High	SEAO	51.2	2,319.6	39,059.7	11

		Score/Value	Rank	
INSTITUTIONS		**78.4**	**29**	◇
1.1	**Political environment**	**79.0**	**24**	
1.1.1	Political and operational stability*	83.9	21	
1.1.2	Government effectiveness*	76.6	26	◇
1.2	**Regulatory environment**	**68.2**	**52**	◇
1.2.1	Regulatory quality*	70.7	30	◇
1.2.2	Rule of law*	78.9	23	
1.2.3	Cost of redundancy dismissal, salary weeks	27.4	109	○ ◇
1.3	**Business environment**	**88.1**	**10**	
1.3.1	Ease of starting a business*	93.4	31	
1.3.2	Ease of resolving insolvency*	82.9	10	
HUMAN CAPITAL & RESEARCH		**65.2**	**1**	● ◆
2.1	**Education**	**56.4**	**28**	
2.1.1	Expenditure on education, % GDP 🕘	4.6	60	○
2.1.2	Government funding/pupil, secondary, % GDP/cap	28.2	15	◆
2.1.3	School life expectancy, years	16.5	23	
2.1.4	PISA scales in reading, maths, & science	519.7	6	
2.1.5	Pupil-teacher ratio, secondary 🕘	13.3	63	
2.2	**Tertiary education**	**51.1**	**16**	
2.2.1	Tertiary enrolment, % gross	94.3	3	● ◆
2.2.2	Graduates in science & engineering, %	29.3	18	
2.2.3	Tertiary inbound mobility, %	2.3	73	○ ◇
2.3	**Research & development (R&D)**	**88.1**	**1**	● ◆
2.3.1	Researchers, FTE/mn pop	7,980.4	3	● ◆
2.3.2	Gross expenditure on R&D, % GDP	4.5	2	● ◆
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	91.4	4	●
2.3.4	QS university ranking, average score top 3*	73.6	9	
INFRASTRUCTURE		**57.7**	**14**	
3.1	**Information & communication technologies (ICTs)**	**93.5**	**2**	● ◆
3.1.1	ICT access*	87.8	8	
3.1.2	ICT use*	88.5	4	● ◆
3.1.3	Government's online service*	97.9	4	
3.1.4	E-participation*	100.0	1	●
3.2	**General infrastructure**	**45.2**	**10**	
3.2.1	Electricity output, kWh/mn pop	11,149.2	11	
3.2.2	Logistics performance*	72.4	25	
3.2.3	Gross capital formation, % GDP	31.4	22	◆
3.3	**Ecological sustainability**	**34.4**	**49**	◇
3.3.1	GDP/unit of energy use	6.6	95	○
3.3.2	Environmental performance*	66.5	28	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.6	31	
MARKET SOPHISTICATION		**62.5**	**11**	
4.1	**Credit**	**66.4**	**10**	
4.1.1	Ease of getting credit*	65.0	61	○
4.1.2	Domestic credit to private sector, % GDP	150.3	8	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**43.5**	**42**	
4.2.1	Ease of protecting minority investors*	74.0	24	
4.2.2	Market capitalization, % GDP	97.2	12	
4.2.3	Venture capital deals/bn PPP$ GDP	0.1	31	◇
4.3	**Trade, competition, and market scale**	**77.6**	**12**	
4.3.1	Applied tariff rate, weighted avg., %	4.8	88	○ ◇
4.3.2	Intensity of local competition†	83.9	4	● ◆
4.3.3	Domestic market scale, bn PPP$	2,319.6	14	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**60.3**	**7**	
5.1	**Knowledge workers**	**77.7**	**2**	● ◆
5.1.1	Knowledge-intensive employment, %	39.5	29	◇
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	3.6	2	● ◆
5.1.4	GERD financed by business, %	76.6	3	● ◆
5.1.5	Females employed w/advanced degrees, %	19.3	31	
5.2	**Innovation linkages**	**48.8**	**16**	
5.2.1	University/industry research collaboration†	57.4	28	◇
5.2.2	State of cluster development†	60.0	24	
5.2.3	GERD financed by abroad, % GDP	0.1	43	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.1	37	◇
5.2.5	Patent families 2+ offices/bn PPP$ GDP	11.3	1	● ◆
5.3	**Knowledge absorption**	**54.3**	**8**	
5.3.1	Intellectual property payments, % total trade	1.5	20	
5.3.2	High-tech imports, % total trade	14.8	13	
5.3.3	ICT services imports, % total trade	0.4	108	○ ◇
5.3.4	FDI net inflows, % GDP	1.0	110	○
5.3.5	Research talent, % in business enterprise	82.0	2	● ◆
KNOWLEDGE & TECHNOLOGY OUTPUTS		**49.0**	**11**	
6.1	**Knowledge creation**	**65.8**	**7**	
6.1.1	Patents by origin/bn PPP$ GDP	72.7	1	● ◆
6.1.2	PCT patents by origin/bn PPP$ GDP	8.2	2	● ◆
6.1.3	Utility models by origin/bn PPP$ GDP	2.6	7	
6.1.4	Scientific & technical articles/bn PPP$ GDP	20.8	27	
6.1.5	Citable documents H-index	44.4	17	
6.2	**Knowledge impact**	**34.8**	**27**	
6.2.1	Growth rate of PPP$ GDP/worker, %	1.7	50	
6.2.2	New businesses/th pop. 15-64 🕘	2.6	51	
6.2.3	Computer software spending, % GDP	0.0	62	◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	6.3	45	
6.2.5	High- and medium-high-tech manufacturing, %	56.7	6	
6.3	**Knowledge diffusion**	**46.3**	**15**	
6.3.1	Intellectual property receipts, % total trade	1.1	18	
6.3.2	High-tech net exports, % total trade	28.4	4	● ◆
6.3.3	ICT services exports, % total trade	0.7	89	○
6.3.4	FDI net outflows, % GDP	2.2	33	
CREATIVE OUTPUTS		**45.8**	**14**	
7.1	**Intangible assets**	**60.4**	**2**	● ◆
7.1.1	Trademarks by origin/bn PPP$ GDP	93.0	15	
7.1.2	Global brand value, top 5,000, % GDP	156.9	8	
7.1.3	Industrial designs by origin/bn PPP$ GDP	26.9	1	● ◆
7.1.4	ICTs & organizational model creation†	64.0	32	◇
7.2	**Creative goods and services**	**34.6**	**19**	
7.2.1	Cultural & creative services exports, % total trade	0.5	53	
7.2.2	National feature films/mn pop. 15-69	12.5	13	
7.2.3	Entertainment & Media market/th pop. 15-69	50.9	18	
7.2.4	Printing and other media, % manufacturing	0.3	98	○ ◇
7.2.5	Creative goods exports, % total trade	3.9	14	
7.3	**Online creativity**	**27.8**	**37**	◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	8.2	43	◇
7.3.2	Country-code TLDs/th pop. 15-69	8.5	42	◇
7.3.3	Wikipedia edits/mn pop. 15-69	58.8	54	◇
7.3.4	Mobile app creation/bn PPP$ GDP	37.9	13	

NOTES: ● indicates a strength; ○ a weakness; ◆ a strength relative to the other top 25-ranked GII economies; ◇ a weakness relative to the other top 25-ranked GII economies; * an index; † a survey question. 🕘 indicates that the economy's data are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

REPUBLIC OF MOLDOVA

GII 2020 rank

59

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
48	75	Lower middle	EUR	4.0	27.3	6,725.2	58

		Score/Value	Rank	
INSTITUTIONS		**59.1**	**81**	
1.1	**Political environment**	**48.5**	**92**	
1.1.1	Political and operational stability*	66.1	76	
1.1.2	Government effectiveness*	39.7	98	
1.2	**Regulatory environment**	**53.6**	**96**	
1.2.1	Regulatory quality*	40.5	75	◆
1.2.2	Rule of law*	35.9	90	
1.2.3	Cost of redundancy dismissal, salary weeks	23.7	100	
1.3	**Business environment**	**75.2**	**49**	◆
1.3.1	Ease of starting a business*	95.7	12	● ◆
1.3.2	Ease of resolving insolvency*	54.8	62	
HUMAN CAPITAL & RESEARCH		**27.9**	**75**	
2.1	**Education**	**49.3**	**54**	
2.1.1	Expenditure on education, % GDP	5.5	20	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	30.8	11	● ◆
2.1.3	School life expectancy, years	11.5	96	
2.1.4	PISA scales in reading, maths, & science	424.4	51	
2.1.5	Pupil-teacher ratio, secondary	9.9	32	◆
2.2	**Tertiary education**	**31.1**	**71**	
2.2.1	Tertiary enrolment, % gross	39.8	71	
2.2.2	Graduates in science & engineering, %	23.5	45	
2.2.3	Tertiary inbound mobility, %	5.1	46	◆
2.3	**Research & development (R&D)**	**3.3**	**85**	
2.3.1	Researchers, FTE/mn pop	696.1	60	
2.3.2	Gross expenditure on R&D, % GDP	0.3	86	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**35.4**	**88**	
3.1	**Information & communication technologies (ICTs)**	**69.0**	**61**	◆
3.1.1	ICT access*	61.3	72	◆
3.1.2	ICT use*	51.8	75	◆
3.1.3	Government's online service*	77.1	54	◆
3.1.4	E-participation*	86.0	37	◆
3.2	**General infrastructure**	**18.3**	**112**	○
3.2.1	Electricity output, kWh/mn pop	1,398.6	90	
3.2.2	Logistics performance*	18.1	108	○
3.2.3	Gross capital formation, % GDP	25.2	50	
3.3	**Ecological sustainability**	**18.8**	**110**	
3.3.1	GDP/unit of energy use	4.7	112	○ ◇
3.3.2	Environmental performance*	44.4	76	◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.4	91	
MARKET SOPHISTICATION		**51.5**	**42**	◆
4.1	**Credit**	**33.3**	**97**	
4.1.1	Ease of getting credit*	70.0	44	
4.1.2	Domestic credit to private sector, % GDP	23.5	108	○
4.1.3	Microfinance gross loans, % GDP	0.6	31	
4.2	**Investment**	**68.0**	**[10]**	
4.2.1	Ease of protecting minority investors*	68.0	44	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**53.3**	**100**	
4.3.1	Applied tariff rate, weighted avg., % 🕘	3.5	73	
4.3.2	Intensity of local competition†	63.8	86	
4.3.3	Domestic market scale, bn PPP$	27.3	123	○ ◇

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**22.0**	**88**	
5.1	**Knowledge workers**	**30.8**	**62**	
5.1.1	Knowledge-intensive employment, %	31.2	44	◆
5.1.2	Firms offering formal training, %	38.1	33	
5.1.3	GERD performed by business, % GDP	0.0	74	
5.1.4	GERD financed by business, %	15.5	72	
5.1.5	Females employed w/advanced degrees, %	16.3	40	◆
5.2	**Innovation linkages**	**13.1**	**122**	○
5.2.1	University/industry research collaboration†	28.7	116	○
5.2.2	State of cluster development†	26.1	126	○ ◇
5.2.3	GERD financed by abroad, % GDP	0.0	75	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	n/a	n/a	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.2	41	◆
5.3	**Knowledge absorption**	**22.2**	**93**	
5.3.1	Intellectual property payments, % total trade	0.5	63	
5.3.2	High-tech imports, % total trade	8.0	58	
5.3.3	ICT services imports, % total trade	1.8	34	◆
5.3.4	FDI net inflows, % GDP	1.8	87	
5.3.5	Research talent, % in business enterprise	6.2	71	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**26.3**	**51**	◆
6.1	**Knowledge creation**	**31.7**	**32**	◆
6.1.1	Patents by origin/bn PPP$ GDP	3.6	28	● ◆
6.1.2	PCT patents by origin/bn PPP$ GDP	0.3	46	◆
6.1.3	Utility models by origin/bn PPP$ GDP	4.5	4	● ◆
6.1.4	Scientific & technical articles/bn PPP$ GDP	7.4	64	
6.1.5	Citable documents H-index	5.9	96	
6.2	**Knowledge impact**	**21.8**	**74**	
6.2.1	Growth rate of PPP$ GDP/worker, %	4.4	14	●
6.2.2	New businesses/th pop. 15-64	1.9	59	
6.2.3	Computer software spending, % GDP	0.0	92	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	3.4	69	
6.2.5	High- and medium-high-tech manufacturing, %	14.5	66	
6.3	**Knowledge diffusion**	**25.4**	**58**	
6.3.1	Intellectual property receipts, % total trade	0.1	49	
6.3.2	High-tech net exports, % total trade	0.4	85	
6.3.3	ICT services exports, % total trade	4.5	13	● ◆
6.3.4	FDI net outflows, % GDP	0.2	93	
CREATIVE OUTPUTS		**27.3**	**51**	◆
7.1	**Intangible assets**	**41.1**	**25**	● ◆
7.1.1	Trademarks by origin/bn PPP$ GDP	116.7	8	● ◆
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	16.7	5	● ◆
7.1.4	ICTs & organizational model creation†	48.3	87	
7.2	**Creative goods and services**	**9.0**	**82**	
7.2.1	Cultural & creative services exports, % total trade	0.9	27	◆
7.2.2	National feature films/mn pop. 15-69 🕘	0.3	103	○
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	0.9	64	
7.2.5	Creative goods exports, % total trade	0.1	93	
7.3	**Online creativity**	**18.0**	**59**	◆
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	2.1	75	
7.3.2	Country-code TLDs/th pop. 15-69	2.2	68	◆
7.3.3	Wikipedia edits/mn pop. 15-69	43.0	77	◆
7.3.4	Mobile app creation/bn PPP$ GDP	27.7	20	● ◆

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

ROMANIA

GII 2020 rank

46

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
46	**51**	**Upper middle**	**EUR**	**19.4**	**546.6**	**24,442.9**	**50**

		Score/Value	Rank	
INSTITUTIONS		**68.0**	**53**	
1.1	**Political environment**	**53.5**	**78**	
1.1.1	Political and operational stability*	71.4	59	
1.1.2	Government effectiveness*	44.5	86	
1.2	**Regulatory environment**	**77.2**	**33**	◆
1.2.1	Regulatory quality*	53.5	52	
1.2.2	Rule of law*	55.1	49	◆
1.2.3	Cost of redundancy dismissal, salary weeks	8.0	1	● ◆
1.3	**Business environment**	**73.4**	**57**	
1.3.1	Ease of starting a business*	87.7	73	
1.3.2	Ease of resolving insolvency*	59.1	51	
HUMAN CAPITAL & RESEARCH		**27.7**	**76**	
2.1	**Education**	**36.4**	**91**	
2.1.1	Expenditure on education, % GDP 🕘	3.0	98	○
2.1.2	Government funding/pupil, secondary, % GDP/cap	15.2	77	○
2.1.3	School life expectancy, years	14.3	67	
2.1.4	PISA scales in reading, maths, & science	427.8	49	
2.1.5	Pupil-teacher ratio, secondary 🕘	12.1	55	
2.2	**Tertiary education**	**39.8**	**43**	
2.2.1	Tertiary enrolment, % gross	49.4	60	
2.2.2	Graduates in science & engineering, % 🕘	28.8	21	
2.2.3	Tertiary inbound mobility, %	5.2	45	
2.3	**Research & development (R&D)**	**7.0**	**68**	
2.3.1	Researchers, FTE/mn pop	882.4	54	
2.3.2	Gross expenditure on R&D, % GDP	0.5	67	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	7.7	66	
INFRASTRUCTURE		**51.9**	**37**	◆
3.1	**Information & communication technologies (ICTs)**	**69.1**	**60**	
3.1.1	ICT access*	72.1	54	
3.1.2	ICT use*	67.4	48	◆
3.1.3	Government's online service*	66.0	80	
3.1.4	E-participation*	70.8	68	
3.2	**General infrastructure**	**26.6**	**68**	
3.2.1	Electricity output, kWh/mn pop	3,263.8	62	
3.2.2	Logistics performance*	49.2	47	◆
3.2.3	Gross capital formation, % GDP	23.6	62	
3.3	**Ecological sustainability**	**60.1**	**3**	● ◆
3.3.1	GDP/unit of energy use	13.3	23	
3.3.2	Environmental performance*	64.7	32	◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	9.2	8	● ◆
MARKET SOPHISTICATION		**44.9**	**83**	
4.1	**Credit**	**35.8**	**84**	
4.1.1	Ease of getting credit*	80.0	23	
4.1.2	Domestic credit to private sector, % GDP	25.9	102	○
4.1.3	Microfinance gross loans, % GDP	0.0	72	○
4.2	**Investment**	**31.4**	**92**	
4.2.1	Ease of protecting minority investors*	62.0	60	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	71	○
4.3	**Trade, competition, and market scale**	**67.6**	**42**	
4.3.1	Applied tariff rate, weighted avg., %	1.7	22	
4.3.2	Intensity of local competition†	62.9	94	○
4.3.3	Domestic market scale, bn PPP$	546.6	39	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**29.6**	**53**	
5.1	**Knowledge workers**	**38.6**	**49**	
5.1.1	Knowledge-intensive employment, %	23.3	66	
5.1.2	Firms offering formal training, % 🕘	40.7	26	
5.1.3	GERD performed by business, % GDP	0.3	47	
5.1.4	GERD financed by business, %	54.4	18	● ◆
5.1.5	Females employed w/advanced degrees, %	11.0	61	
5.2	**Innovation linkages**	**15.6**	**106**	○
5.2.1	University/industry research collaboration†	40.9	69	
5.2.2	State of cluster development†	38.2	103	○
5.2.3	GERD financed by abroad, % GDP	0.0	55	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	94	○
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.1	57	
5.3	**Knowledge absorption**	**34.4**	**43**	
5.3.1	Intellectual property payments, % total trade	1.0	37	
5.3.2	High-tech imports, % total trade	10.2	27	
5.3.3	ICT services imports, % total trade	2.3	20	● ◆
5.3.4	FDI net inflows, % GDP	3.1	51	
5.3.5	Research talent, % in business enterprise	27.0	48	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**34.6**	**28**	◆
6.1	**Knowledge creation**	**15.3**	**62**	
6.1.1	Patents by origin/bn PPP$ GDP	2.2	38	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	65	
6.1.3	Utility models by origin/bn PPP$ GDP	0.1	59	○
6.1.4	Scientific & technical articles/bn PPP$ GDP	12.4	44	
6.1.5	Citable documents H-index	18.2	44	
6.2	**Knowledge impact**	**45.2**	**11**	● ◆
6.2.1	Growth rate of PPP$ GDP/worker, %	4.3	16	● ◆
6.2.2	New businesses/th pop. 15-64	7.3	21	●
6.2.3	Computer software spending, % GDP	0.0	45	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	18.8	16	● ◆
6.2.5	High- and medium-high-tech manufacturing, %	42.5	19	● ◆
6.3	**Knowledge diffusion**	**43.3**	**23**	● ◆
6.3.1	Intellectual property receipts, % total trade	0.1	58	
6.3.2	High-tech net exports, % total trade	6.4	26	◆
6.3.3	ICT services exports, % total trade	5.3	10	● ◆
6.3.4	FDI net outflows, % GDP	0.5	77	
CREATIVE OUTPUTS		**20.3**	**67**	
7.1	**Intangible assets**	**22.7**	**85**	
7.1.1	Trademarks by origin/bn PPP$ GDP	41.8	63	
7.1.2	Global brand value, top 5,000, % GDP	20.1	47	
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.7	53	
7.1.4	ICTs & organizational model creation†	50.0	82	
7.2	**Creative goods and services**	**14.9**	**66**	
7.2.1	Cultural & creative services exports, % total trade	1.6	11	● ◆
7.2.2	National feature films/mn pop. 15-69	2.0	69	
7.2.3	Entertainment & Media market/th pop. 15-69	6.1	46	
7.2.4	Printing and other media, % manufacturing	0.9	65	
7.2.5	Creative goods exports, % total trade	0.7	56	
7.3	**Online creativity**	**21.0**	**52**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	4.5	55	
7.3.2	Country-code TLDs/th pop. 15-69	13.2	35	
7.3.3	Wikipedia edits/mn pop. 15-69	57.2	56	
7.3.4	Mobile app creation/bn PPP$ GDP	11.6	42	

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

RUSSIAN FEDERATION

GII 2020 rank

47

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
58	42	Upper middle	EUR	145.9	4,349.4	25,878.7	46

		Score/Value	Rank	
INSTITUTIONS		**61.5**	**71**	
1.1	**Political environment**	**54.5**	**75**	
1.1.1	Political and operational stability*	66.1	76	
1.1.2	Government effectiveness*	48.8	75	
1.2	**Regulatory environment**	**54.0**	**95**	
1.2.1	Regulatory quality*	27.5	105	○ ◇
1.2.2	Rule of law*	25.4	114	○ ◇
1.2.3	Cost of redundancy dismissal, salary weeks	17.3	69	
1.3	**Business environment**	**76.1**	**45**	
1.3.1	Ease of starting a business*	93.1	38	
1.3.2	Ease of resolving insolvency*	59.1	52	
HUMAN CAPITAL & RESEARCH		**45.6**	**30**	◆
2.1	**Education**	**51.9**	**46**	
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	15.0	51	
2.1.4	PISA scales in reading, maths, & science	481.3	31	◆
2.1.5	Pupil-teacher ratio, secondary	8.8	19	●
2.2	**Tertiary education**	**49.9**	**17**	● ◆
2.2.1	Tertiary enrolment, % gross	81.9	17	● ◆
2.2.2	Graduates in science & engineering, %	30.0	15	●
2.2.3	Tertiary inbound mobility, %	4.3	56	
2.3	**Research & development (R&D)**	**34.9**	**33**	◆
2.3.1	Researchers, FTE/mn pop	2,784.3	34	◆
2.3.2	Gross expenditure on R&D, % GDP	1.0	37	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	39.1	39	◆
2.3.4	QS university ranking, average score top 3*	47.5	21	● ◆
INFRASTRUCTURE		**42.4**	**60**	
3.1	**Information & communication technologies (ICTs)**	**81.2**	**29**	◆
3.1.1	ICT access*	72.8	51	◆
3.1.2	ICT use*	68.3	44	◆
3.1.3	Government's online service*	91.7	25	◆
3.1.4	E-participation*	92.1	23	◆
3.2	**General infrastructure**	**25.9**	**72**	
3.2.1	Electricity output, kWh/mn pop	7,558.3	28	◆
3.2.2	Logistics performance*	32.2	74	
3.2.3	Gross capital formation, % GDP	23.1	69	
3.3	**Ecological sustainability**	**20.0**	**100**	○ ◇
3.3.1	GDP/unit of energy use	4.4	115	○ ◇
3.3.2	Environmental performance*	50.5	56	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	106	○
MARKET SOPHISTICATION		**49.7**	**55**	
4.1	**Credit**	**45.2**	**50**	
4.1.1	Ease of getting credit*	80.0	23	
4.1.2	Domestic credit to private sector, % GDP	76.0	42	
4.1.3	Microfinance gross loans, % GDP	0.0	77	○
4.2	**Investment**	**27.4**	**106**	○
4.2.1	Ease of protecting minority investors*	60.0	71	
4.2.2	Market capitalization, % GDP	40.9	37	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	52	
4.3	**Trade, competition, and market scale**	**76.5**	**18**	● ◆
4.3.1	Applied tariff rate, weighted avg., %	3.5	71	
4.3.2	Intensity of local competition†	70.9	51	
4.3.3	Domestic market scale, bn PPP$	4,349.4	6	● ◆

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**34.0**	**42**	◆
5.1	**Knowledge workers**	**44.8**	**36**	◆
5.1.1	Knowledge-intensive employment, %	44.1	18	● ◆
5.1.2	Firms offering formal training, %	11.8	91	○ ◇
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	29.5	61	
5.1.5	Females employed w/advanced degrees, %	26.2	10	● ◆
5.2	**Innovation linkages**	**17.6**	**90**	
5.2.1	University/industry research collaboration†	46.8	49	
5.2.2	State of cluster development†	40.3	95	○
5.2.3	GERD financed by abroad, % GDP	0.0	62	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	60	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.1	51	
5.3	**Knowledge absorption**	**39.7**	**32**	◆
5.3.1	Intellectual property payments, % total trade	1.6	17	● ◆
5.3.2	High-tech imports, % total trade	9.1	44	
5.3.3	ICT services imports, % total trade	1.3	54	
5.3.4	FDI net inflows, % GDP	1.6	95	
5.3.5	Research talent, % in business enterprise	44.2	29	◆
KNOWLEDGE & TECHNOLOGY OUTPUTS		**26.4**	**50**	
6.1	**Knowledge creation**	**32.7**	**30**	◆
6.1.1	Patents by origin/bn PPP$ GDP	6.0	17	● ◆
6.1.2	PCT patents by origin/bn PPP$ GDP	0.3	45	
6.1.3	Utility models by origin/bn PPP$ GDP	2.2	9	● ◆
6.1.4	Scientific & technical articles/bn PPP$ GDP	7.3	66	
6.1.5	Citable documents H-index	38.2	22	◆
6.2	**Knowledge impact**	**23.0**	**68**	
6.2.1	Growth rate of PPP$ GDP/worker, %	1.9	48	
6.2.2	New businesses/th pop. 15-64	3.3	43	
6.2.3	Computer software spending, % GDP	0.0	63	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.1	105	○
6.2.5	High- and medium-high-tech manufacturing, %	25.6	44	
6.3	**Knowledge diffusion**	**23.6**	**66**	
6.3.1	Intellectual property receipts, % total trade	0.2	39	◆
6.3.2	High-tech net exports, % total trade	2.4	51	
6.3.3	ICT services exports, % total trade	1.2	74	
6.3.4	FDI net outflows, % GDP	2.0	36	
CREATIVE OUTPUTS		**22.8**	**60**	
7.1	**Intangible assets**	**28.4**	**61**	
7.1.1	Trademarks by origin/bn PPP$ GDP	48.2	52	
7.1.2	Global brand value, top 5,000, % GDP	49.6	35	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.9	72	
7.1.4	ICTs & organizational model creation†	58.4	49	
7.2	**Creative goods and services**	**9.1**	**81**	
7.2.1	Cultural & creative services exports, % total trade	0.9	28	
7.2.2	National feature films/mn pop. 15-69	1.2	81	○
7.2.3	Entertainment & Media market/th pop. 15-69	6.3	45	
7.2.4	Printing and other media, % manufacturing	0.8	76	○
7.2.5	Creative goods exports, % total trade	0.3	69	
7.3	**Online creativity**	**25.3**	**44**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	3.5	61	
7.3.2	Country-code TLDs/th pop. 15-69	14.2	33	
7.3.3	Wikipedia edits/mn pop. 15-69	65.9	47	
7.3.4	Mobile app creation/bn PPP$ GDP	19.4	25	

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

RWANDA

GII 2020 rank

91

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
112	**79**	**Low**	**SSF**	**12.6**	**30.3**	**2,140.6**	**94**

		Score/Value	Rank	
INSTITUTIONS		**66.8**	**54**	◆
1.1	**Political environment**	**60.9**	**54**	◆
1.1.1	Political and operational stability*	73.2	49	◆
1.1.2	Government effectiveness*	54.8	57	◆
1.2	**Regulatory environment**	**64.2**	**66**	
1.2.1	Regulatory quality*	44.0	65	◆
1.2.2	Rule of law*	49.7	57	◆
1.2.3	Cost of redundancy dismissal, salary weeks	17.3	68	
1.3	**Business environment**	**75.2**	**48**	● ◆
1.3.1	Ease of starting a business*	93.2	33	● ◆
1.3.2	Ease of resolving insolvency*	57.2	57	◆
HUMAN CAPITAL & RESEARCH		**14.7**	**112**	
2.1	**Education**	**28.1**	**110**	
2.1.1	Expenditure on education, % GDP	3.1	96	◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	21.7	39	●
2.1.3	School life expectancy, years	11.2	100	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	28.2	116	○
2.2	**Tertiary education**	**12.5**	**111**	
2.2.1	Tertiary enrolment, % gross	6.7	116	○
2.2.2	Graduates in science & engineering, %	16.3	87	
2.2.3	Tertiary inbound mobility, %	4.0	59	
2.3	**Research & development (R&D)**	**3.3**	**84**	◆
2.3.1	Researchers, FTE/mn pop. 🕘	12.4	107	○ ◇
2.3.2	Gross expenditure on R&D, % GDP 🕘	0.7	53	◆
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**33.2**	**93**	◆
3.1	**Information & communication technologies (ICTs)**	**49.3**	**99**	◆
3.1.1	ICT access*	28.8	122	○
3.1.2	ICT use*	20.3	115	◆
3.1.3	Government's online service*	72.2	68	◆
3.1.4	E-participation*	75.8	59	◆
3.2	**General infrastructure**	**33.4**	**37**	●
3.2.1	Electricity output, kWh/mn pop	n/a	n/a	
3.2.2	Logistics performance*	42.4	56	◆
3.2.3	Gross capital formation, % GDP	27.8	35	●
3.3	**Ecological sustainability**	**16.9**	**117**	
3.3.1	GDP/unit of energy use	n/a	n/a	
3.3.2	Environmental performance*	33.8	107	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.0	130	○
MARKET SOPHISTICATION		**51.9**	**37**	● ◆
4.1	**Credit**	**61.0**	**15**	● ◆
4.1.1	Ease of getting credit*	95.0	4	● ◆
4.1.2	Domestic credit to private sector, % GDP	21.7	111	
4.1.3	Microfinance gross loans, % GDP 🕘	6.7	1	● ◆
4.2	**Investment**	**44.0**	**[37]**	
4.2.1	Ease of protecting minority investors*	44.0	98	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**50.7**	**112**	
4.3.1	Applied tariff rate, weighted avg., %	4.1	77	◆
4.3.2	Intensity of local competition†	57.9	114	
4.3.3	Domestic market scale, bn PPP$	30.3	120	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**26.4**	**63**	◆
5.1	**Knowledge workers**	**16.4**	**105**	
5.1.1	Knowledge-intensive employment, %	8.9	108	
5.1.2	Firms offering formal training, %	35.9	37	● ◆
5.1.3	GERD performed by business, % GDP 🕘	0.0	73	◆
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, %	3.9	95	◆
5.2	**Innovation linkages**	**37.0**	**[28]**	
5.2.1	University/industry research collaboration†	38.1	81	
5.2.2	State of cluster development†	47.7	63	◆
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.1	24	● ◆
5.2.5	Patent families 2+ offices/bn PPP$ GDP	n/a	n/a	
5.3	**Knowledge absorption**	**25.8**	**75**	
5.3.1	Intellectual property payments, % total trade	n/a	n/a	
5.3.2	High-tech imports, % total trade 🕘	10.0	31	●
5.3.3	ICT services imports, % total trade 🕘	0.6	96	
5.3.4	FDI net inflows, % GDP	3.1	49	●
5.3.5	Research talent, % in business enterprise 🕘	6.2	70	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**12.7**	**103**	
6.1	**Knowledge creation**	**5.1**	**106**	
6.1.1	Patents by origin/bn PPP$ GDP	0.2	97	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	100	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.2	46	
6.1.4	Scientific & technical articles/bn PPP$ GDP	5.5	81	
6.1.5	Citable documents H-index	3.9	116	
6.2	**Knowledge impact**	**19.6**	**85**	◆
6.2.1	Growth rate of PPP$ GDP/worker, %	4.4	15	● ◆
6.2.2	New businesses/th pop. 15-64	1.5	67	◆
6.2.3	Computer software spending, % GDP	0.0	102	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.4	122	○
6.2.5	High- and medium-high-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**13.5**	**103**	
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	High-tech net exports, % total trade 🕘	0.2	96	
6.3.3	ICT services exports, % total trade 🕘	0.8	86	
6.3.4	FDI net outflows, % GDP	0.3	87	
CREATIVE OUTPUTS		**10.3**	**114**	
7.1	**Intangible assets**	**15.9**	**109**	
7.1.1	Trademarks by origin/bn PPP$ GDP	11.5	107	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.2	103	
7.1.4	ICTs & organizational model creation†	51.0	78	◆
7.2	**Creative goods and services**	**3.9**	**[108]**	
7.2.1	Cultural & creative services exports, % total trade	0.0	101	
7.2.2	National feature films/mn pop. 15-69	3.2	59	◆
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade 🕘	0.2	81	
7.3	**Online creativity**	**5.7**	**106**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.1	121	
7.3.2	Country-code TLDs/th pop. 15-69	0.1	114	
7.3.3	Wikipedia edits/mn pop. 15-69	21.0	105	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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

SAUDI ARABIA

GII 2020 rank

66

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
77	**50**	**High**	**NAWA**	**34.3**	**1,898.5**	**48,631.5**	**68**

		Score/Value	Rank	
INSTITUTIONS		**53.3**	**102**	◇
1.1	**Political environment**	**56.1**	**70**	◇
1.1.1	Political and operational stability*	53.6	120	○ ◇
1.1.2	Government effectiveness*	57.4	53	◇
1.2	**Regulatory environment**	**57.2**	**86**	◇
1.2.1	Regulatory quality*	40.6	73	◇
1.2.2	Rule of law*	50.4	56	◇
1.2.3	Cost of redundancy dismissal, salary weeks	23.7	101	◇
1.3	**Business environment**	**46.6**	**129**	○ ◇
1.3.1	Ease of starting a business*	93.1	36	
1.3.2	Ease of resolving insolvency*	0.0	129	○ ◇
HUMAN CAPITAL & RESEARCH		**43.9**	**31**	●
2.1	**Education**	**56.6**	**[26]**	
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	15.7	38	
2.1.4	PISA scales in reading, maths, & science	386.2	71	○
2.1.5	Pupil-teacher ratio, secondary	11.5	51	
2.2	**Tertiary education**	**36.4**	**57**	
2.2.1	Tertiary enrolment, % gross	68.0	32	
2.2.2	Graduates in science & engineering, %	21.1	64	
2.2.3	Tertiary inbound mobility, %	4.6	50	
2.3	**Research & development (R&D)**	**38.8**	**27**	●
2.3.1	Researchers, FTE/mn pop	n/a	n/a	
2.3.2	Gross expenditure on R&D, % GDP 🕘	0.8	46	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	58.8	22	●
2.3.4	QS university ranking, average score top 3*	41.5	31	●
INFRASTRUCTURE		**43.7**	**57**	◇
3.1	**Information & communication technologies (ICTs)**	**76.4**	**41**	
3.1.1	ICT access*	79.5	31	●
3.1.2	ICT use*	75.7	29	●
3.1.3	Government's online service*	79.2	48	
3.1.4	E-participation*	71.4	66	◇
3.2	**General infrastructure**	**32.9**	**39**	
3.2.1	Electricity output, kWh/mn pop	10,560.2	12	●
3.2.2	Logistics performance*	44.2	54	◇
3.2.3	Gross capital formation, % GDP	24.9	53	
3.3	**Ecological sustainability**	**21.7**	**90**	◇
3.3.1	GDP/unit of energy use	7.5	84	
3.3.2	Environmental performance*	44.0	79	◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	113	○ ◇
MARKET SOPHISTICATION		**51.3**	**44**	
4.1	**Credit**	**41.3**	**67**	
4.1.1	Ease of getting credit*	60.0	74	
4.1.2	Domestic credit to private sector, % GDP 🕘	54.0	63	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**39.6**	**62**	
4.2.1	Ease of protecting minority investors*	86.0	3	● ◆
4.2.2	Market capitalization, % GDP	66.1	22	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	56	
4.3	**Trade, competition, and market scale**	**73.1**	**26**	●
4.3.1	Applied tariff rate, weighted avg., % 🕘	4.9	89	◇
4.3.2	Intensity of local competition†	74.8	29	●
4.3.3	Domestic market scale, bn PPP$	1,898.5	17	● ◆

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**30.2**	**[51]**	
5.1	**Knowledge workers**	**34.5**	**[58]**	
5.1.1	Knowledge-intensive employment, % 🕘	27.3	53	◇
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, % 🕘	5.5	86	◇
5.2	**Innovation linkages**	**28.4**	**36**	
5.2.1	University/industry research collaboration†	52.8	35	
5.2.2	State of cluster development†	66.1	13	●
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	84	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.1	54	
5.3	**Knowledge absorption**	**27.8**	**[69]**	
5.3.1	Intellectual property payments, % total trade	n/a	n/a	
5.3.2	High-tech imports, % total trade	6.3	90	
5.3.3	ICT services imports, % total trade	0.9	80	
5.3.4	FDI net inflows, % GDP	0.6	120	○
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**14.6**	**88**	◇
6.1	**Knowledge creation**	**14.9**	**64**	
6.1.1	Patents by origin/bn PPP$ GDP	0.9	67	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.3	42	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	7.8	62	◇
6.1.5	Citable documents H-index	21.0	39	
6.2	**Knowledge impact**	**18.3**	**87**	◇
6.2.1	Growth rate of PPP$ GDP/worker, %	-3.3	117	○ ◇
6.2.2	New businesses/th pop. 15-64	0.5	99	◇
6.2.3	Computer software spending, % GDP	0.0	29	●
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.0	109	◇
6.2.5	High- and medium-high-tech manufacturing, %	34.1	33	
6.3	**Knowledge diffusion**	**10.6**	**119**	○ ◇
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	High-tech net exports, % total trade	0.1	109	◇
6.3.3	ICT services exports, % total trade	0.2	119	○ ◇
6.3.4	FDI net outflows, % GDP	1.8	40	
CREATIVE OUTPUTS		**20.2**	**69**	◇
7.1	**Intangible assets**	**30.2**	**51**	
7.1.1	Trademarks by origin/bn PPP$ GDP	10.0	111	○ ◇
7.1.2	Global brand value, top 5,000, % GDP	111.8	18	●
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.2	102	○
7.1.4	ICTs & organizational model creation†	61.5	40	
7.2	**Creative goods and services**	**8.3**	**86**	◇
7.2.1	Cultural & 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 & Media market/th pop. 15-69	15.4	30	◇
7.2.4	Printing and other media, % manufacturing	1.2	37	
7.2.5	Creative goods exports, % total trade	0.2	82	
7.3	**Online creativity**	**12.1**	**75**	◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	2.7	69	◇
7.3.2	Country-code TLDs/th pop. 15-69	0.8	93	◇
7.3.3	Wikipedia edits/mn pop. 15-69	47.3	65	◇
7.3.4	Mobile app creation/bn PPP$ GDP	0.3	77	

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

SENEGAL

GII 2020 rank

102

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
84	102	Lower middle	SSF	16.3	64.6	3,363.7	96

		Score/Value	Rank	
INSTITUTIONS		**61.4**	**73**	◆
1.1	**Political environment**	**53.2**	**80**	
1.1.1	Political and operational stability*	71.4	59	◆
1.1.2	Government effectiveness*	44.2	88	
1.2	**Regulatory environment**	**63.3**	**71**	◆
1.2.1	Regulatory quality*	39.0	80	
1.2.2	Rule of law*	41.2	73	
1.2.3	Cost of redundancy dismissal, salary weeks	14.8	58	
1.3	**Business environment**	**67.7**	**76**	
1.3.1	Ease of starting a business*	91.2	51	●
1.3.2	Ease of resolving insolvency*	44.3	87	
HUMAN CAPITAL & RESEARCH		**16.2**	**106**	
2.1	**Education**	**26.8**	**112**	
2.1.1	Expenditure on education, % GDP	4.7	57	
2.1.2	Government funding/pupil, secondary, % GDP/cap	11.4	89	
2.1.3	School life expectancy, years	8.6	115	○ ◇
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	18.9	93	
2.2	**Tertiary education**	**17.1**	**102**	
2.2.1	Tertiary enrolment, % gross	12.8	102	
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	7.8	30	● ◆
2.3	**Research & development (R&D)**	**4.5**	**78**	
2.3.1	Researchers, FTE/mn pop.	564.3	65	
2.3.2	Gross expenditure on R&D, % GDP	0.6	58	◆
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**27.5**	**106**	
3.1	**Information & communication technologies (ICTs)**	**41.7**	**105**	
3.1.1	ICT access*	38.4	107	
3.1.2	ICT use*	29.8	104	
3.1.3	Government's online service*	47.9	108	
3.1.4	E-participation*	50.6	104	
3.2	**General infrastructure**	**18.6**	**110**	
3.2.1	Electricity output, kWh/mn pop	301.3	113	
3.2.2	Logistics performance*	8.6	121	○ ◇
3.2.3	Gross capital formation, % GDP	30.3	26	●
3.3	**Ecological sustainability**	**22.3**	**88**	
3.3.1	GDP/unit of energy use	11.4	40	●
3.3.2	Environmental performance*	30.7	119	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	103	
MARKET SOPHISTICATION		**42.3**	**95**	
4.1	**Credit**	**34.7**	**89**	
4.1.1	Ease of getting credit*	65.0	61	
4.1.2	Domestic credit to private sector, % GDP	28.3	96	
4.1.3	Microfinance gross loans, % GDP	1.5	22	●
4.2	**Investment**	**44.0**	**[37]**	
4.2.1	Ease of protecting minority investors*	44.0	98	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**48.2**	**120**	
4.3.1	Applied tariff rate, weighted avg., %	11.5	123	○ ◇
4.3.2	Intensity of local competition†	68.0	68	
4.3.3	Domestic market scale, bn PPP$	64.6	95	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**12.7**	**130**	○ ◇
5.1	**Knowledge workers**	**5.8**	**126**	○ ◇
5.1.1	Knowledge-intensive employment, %	6.4	111	◇
5.1.2	Firms offering formal training, %	17.4	81	◇
5.1.3	GERD performed by business, % GDP	0.0	88	○ ◇
5.1.4	GERD financed by business, %	2.1	91	
5.1.5	Females employed w/advanced degrees, %	1.8	104	
5.2	**Innovation linkages**	**15.6**	**107**	
5.2.1	University/industry research collaboration†	37.9	83	
5.2.2	State of cluster development†	42.4	85	
5.2.3	GERD financed by abroad, % GDP	0.0	52	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	115	○
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	101	○ ◇
5.3	**Knowledge absorption**	**16.7**	**120**	
5.3.1	Intellectual property payments, % total trade	0.1	99	
5.3.2	High-tech imports, % total trade	4.7	113	
5.3.3	ICT services imports, % total trade	2.6	12	● ◆
5.3.4	FDI net inflows, % GDP	2.6	66	
5.3.5	Research talent, % in business enterprise	0.1	87	○ ◇
KNOWLEDGE & TECHNOLOGY OUTPUTS		**17.7**	**74**	
6.1	**Knowledge creation**	**6.1**	**96**	
6.1.1	Patents by origin/bn PPP$ GDP	0.3	87	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	75	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	4.5	93	
6.1.5	Citable documents H-index	7.0	90	
6.2	**Knowledge impact**	**21.6**	**75**	
6.2.1	Growth rate of PPP$ GDP/worker, %	2.7	33	●
6.2.2	New businesses/th pop. 15-64	0.5	100	
6.2.3	Computer software spending, % GDP	0.0	40	●
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.1	101	
6.2.5	High- and medium-high-tech manufacturing, %	15.5	64	
6.3	**Knowledge diffusion**	**25.2**	**61**	
6.3.1	Intellectual property receipts, % total trade	0.1	60	
6.3.2	High-tech net exports, % total trade	0.4	82	
6.3.3	ICT services exports, % total trade	4.4	16	● ◆
6.3.4	FDI net outflows, % GDP	0.6	72	
CREATIVE OUTPUTS		**13.3**	**103**	
7.1	**Intangible assets**	**19.7**	**92**	
7.1.1	Trademarks by origin/bn PPP$ GDP	8.5	112	
7.1.2	Global brand value, top 5,000, % GDP	15.8	50	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.9	73	
7.1.4	ICTs & organizational model creation†	58.1	52	
7.2	**Creative goods and services**	**8.7**	**84**	
7.2.1	Cultural & creative services exports, % total trade	1.0	25	● ◆
7.2.2	National feature films/mn pop. 15-69	0.2	106	○
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	0.8	67	
7.2.5	Creative goods exports, % total trade	0.1	105	
7.3	**Online creativity**	**5.1**	**109**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	1.0	95	
7.3.2	Country-code TLDs/th pop. 15-69	0.1	113	
7.3.3	Wikipedia edits/mn pop. 15-69	18.5	110	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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

SERBIA

GII 2020 rank

53

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
56	58	Upper middle	EUR	8.8	129.3	16,207.3	57

		Score/Value	Rank	
INSTITUTIONS		**69.4**	**45**	
1.1	**Political environment**	**58.9**	**64**	
1.1.1	Political and operational stability*	71.4	59	
1.1.2	Government effectiveness*	52.6	65	
1.2	**Regulatory environment**	**71.2**	**44**	
1.2.1	Regulatory quality*	42.0	68	
1.2.2	Rule of law*	42.8	70	
1.2.3	Cost of redundancy dismissal, salary weeks	8.0	1	● ◆
1.3	**Business environment**	**78.1**	**38**	
1.3.1	Ease of starting a business*	89.3	60	
1.3.2	Ease of resolving insolvency*	67.0	38	
HUMAN CAPITAL & RESEARCH		**31.7**	**59**	
2.1	**Education**	**39.8**	**81**	
2.1.1	Expenditure on education, % GDP 🕘	3.7	85	
2.1.2	Government funding/pupil, secondary, % GDP/cap 🕘	11.1	90	○
2.1.3	School life expectancy, years	14.7	57	
2.1.4	PISA scales in reading, maths, & science	442.5	44	
2.1.5	Pupil-teacher ratio, secondary	7.9	10	● ◆
2.2	**Tertiary education**	**43.7**	**34**	
2.2.1	Tertiary enrolment, % gross	67.2	35	
2.2.2	Graduates in science & engineering, %	28.1	23	
2.2.3	Tertiary inbound mobility, %	4.4	52	
2.3	**Research & development (R&D)**	**11.6**	**54**	
2.3.1	Researchers, FTE/mn pop	2,087.2	39	◆
2.3.2	Gross expenditure on R&D, % GDP	0.9	40	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	3.0	76	
INFRASTRUCTURE		**48.6**	**44**	◆
3.1	**Information & communication technologies (ICTs)**	**70.7**	**56**	
3.1.1	ICT access*	71.4	57	
3.1.2	ICT use*	56.3	64	
3.1.3	Government's online service*	73.6	58	
3.1.4	E-participation*	81.5	48	
3.2	**General infrastructure**	**25.0**	**74**	
3.2.1	Electricity output, kWh/mn pop	5,191.8	39	◆
3.2.2	Logistics performance*	36.2	64	
3.2.3	Gross capital formation, % GDP	23.4	65	
3.3	**Ecological sustainability**	**50.0**	**20**	● ◆
3.3.1	GDP/unit of energy use	6.0	101	○ ◇
3.3.2	Environmental performance*	55.2	43	◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	10.1	4	● ◆
MARKET SOPHISTICATION		**41.6**	**101**	○
4.1	**Credit**	**33.5**	**96**	
4.1.1	Ease of getting credit*	65.0	61	
4.1.2	Domestic credit to private sector, % GDP	41.5	78	
4.1.3	Microfinance gross loans, % GDP	0.2	45	
4.2	**Investment**	**35.8**	**71**	
4.2.1	Ease of protecting minority investors*	70.0	36	
4.2.2	Market capitalization, % GDP 🕘	3.7	72	○
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**55.7**	**96**	
4.3.1	Applied tariff rate, weighted avg., %	n/a	n/a	
4.3.2	Intensity of local competition†	64.1	84	
4.3.3	Domestic market scale, bn PPP$	129.3	75	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**25.8**	**64**	
5.1	**Knowledge workers**	**29.3**	**68**	
5.1.1	Knowledge-intensive employment, %	28.4	50	
5.1.2	Firms offering formal training, %	38.3	32	
5.1.3	GERD performed by business, % GDP	0.4	43	
5.1.4	GERD financed by business, %	10.0	77	○
5.1.5	Females employed w/advanced degrees, %	14.7	47	
5.2	**Innovation linkages**	**22.6**	**56**	
5.2.1	University/industry research collaboration†	39.6	77	
5.2.2	State of cluster development†	40.0	98	○
5.2.3	GERD financed by abroad, % GDP	0.2	17	● ◆
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	61	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.1	56	
5.3	**Knowledge absorption**	**25.4**	**77**	
5.3.1	Intellectual property payments, % total trade	1.0	36	
5.3.2	High-tech imports, % total trade	5.9	98	○
5.3.3	ICT services imports, % total trade	2.2	23	● ◆
5.3.4	FDI net inflows, % GDP	6.8	17	● ◆
5.3.5	Research talent, % in business enterprise	8.2	65	○
KNOWLEDGE & TECHNOLOGY OUTPUTS		**30.0**	**41**	◆
6.1	**Knowledge creation**	**27.8**	**36**	
6.1.1	Patents by origin/bn PPP$ GDP	1.4	53	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.3	41	
6.1.3	Utility models by origin/bn PPP$ GDP	0.6	35	
6.1.4	Scientific & technical articles/bn PPP$ GDP	32.3	7	● ◆
6.1.5	Citable documents H-index	14.4	55	
6.2	**Knowledge impact**	**29.1**	**43**	
6.2.1	Growth rate of PPP$ GDP/worker, %	1.5	55	
6.2.2	New businesses/th pop. 15-64	1.9	58	
6.2.3	Computer software spending, % GDP	0.0	105	○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	19.8	15	● ◆
6.2.5	High- and medium-high-tech manufacturing, %	24.2	46	
6.3	**Knowledge diffusion**	**33.0**	**37**	
6.3.1	Intellectual property receipts, % total trade	0.2	36	◆
6.3.2	High-tech net exports, % total trade	1.7	61	
6.3.3	ICT services exports, % total trade	4.9	12	● ◆
6.3.4	FDI net outflows, % GDP	0.6	75	
CREATIVE OUTPUTS		**20.5**	**66**	
7.1	**Intangible assets**	**19.4**	**94**	
7.1.1	Trademarks by origin/bn PPP$ GDP	28.8	78	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.6	55	
7.1.4	ICTs & organizational model creation†	51.7	75	
7.2	**Creative goods and services**	**19.0**	**56**	
7.2.1	Cultural & creative services exports, % total trade	1.6	12	● ◆
7.2.2	National feature films/mn pop. 15-69	5.6	39	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.1	50	
7.2.5	Creative goods exports, % total trade	0.6	58	
7.3	**Online creativity**	**24.3**	**47**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	1.3	91	
7.3.2	Country-code TLDs/th pop. 15-69	5.2	52	
7.3.3	Wikipedia edits/mn pop. 15-69	72.5	36	◆
7.3.4	Mobile app creation/bn PPP$ GDP	19.6	24	

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

SINGAPORE

GII 2020 rank

8

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
15	1	High	SEAO	5.8	585.1	90,080.2	8

		Score/Value	Rank	
INSTITUTIONS		**94.8**	**1**	● ◆
1.1	**Political environment**	**100.0**	**1**	● ◆
1.1.1	Political and operational stability*	100.0	1	● ◆
1.1.2	Government effectiveness*	100.0	1	● ◆
1.2	**Regulatory environment**	**98.2**	**2**	● ◆
1.2.1	Regulatory quality*	98.0	2	● ◆
1.2.2	Rule of law*	94.8	7	
1.2.3	Cost of redundancy dismissal, salary weeks	8.0	1	●
1.3	**Business environment**	**86.3**	**17**	
1.3.1	Ease of starting a business*	98.2	4	● ◆
1.3.2	Ease of resolving insolvency*	74.3	25	
HUMAN CAPITAL & RESEARCH		**59.5**	**8**	
2.1	**Education**	**49.8**	**51**	○ ◇
2.1.1	Expenditure on education, % GDP 🕘	2.9	103	○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	21.6	40	○
2.1.3	School life expectancy, years	16.4	25	
2.1.4	PISA scales in reading, maths, & science	556.5	2	● ◆
2.1.5	Pupil-teacher ratio, secondary 🕘	11.5	50	○
2.2	**Tertiary education**	**69.1**	**1**	● ◆
2.2.1	Tertiary enrolment, % gross	84.8	13	
2.2.2	Graduates in science & engineering, %	34.9	8	◆
2.2.3	Tertiary inbound mobility, % 🕘	19.2	7	◆
2.3	**Research & development (R&D)**	**59.7**	**13**	
2.3.1	Researchers, FTE/mn pop 🕘	6,802.5	6	
2.3.2	Gross expenditure on R&D, % GDP 🕘	1.9	17	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	48.6	30	◇
2.3.4	QS university ranking, average score top 3*	69.5	12	
INFRASTRUCTURE		**57.9**	**13**	
3.1	**Information & communication technologies (ICTs)**	**90.6**	**7**	
3.1.1	ICT access*	88.9	6	
3.1.2	ICT use*	78.3	23	
3.1.3	Government's online service*	98.6	2	●
3.1.4	E-participation*	96.6	13	
3.2	**General infrastructure**	**45.0**	**11**	
3.2.1	Electricity output, kWh/mn pop	9,338.0	15	
3.2.2	Logistics performance*	90.4	7	
3.2.3	Gross capital formation, % GDP	27.2	36	
3.3	**Ecological sustainability**	**38.2**	**40**	
3.3.1	GDP/unit of energy use	12.8	26	
3.3.2	Environmental performance*	58.1	38	◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.1	41	
MARKET SOPHISTICATION		**78.0**	**4**	● ◆
4.1	**Credit**	**64.7**	**13**	
4.1.1	Ease of getting credit*	75.0	34	
4.1.2	Domestic credit to private sector, % GDP	121.9	17	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**93.4**	**2**	● ◆
4.2.1	Ease of protecting minority investors*	86.0	3	● ◆
4.2.2	Market capitalization, % GDP	207.6	4	◆
4.2.3	Venture capital deals/bn PPP$ GDP	0.6	1	● ◆
4.3	**Trade, competition, and market scale**	**76.0**	**19**	
4.3.1	Applied tariff rate, weighted avg., %	0.2	3	● ◆
4.3.2	Intensity of local competition†	78.4	15	
4.3.3	Domestic market scale, bn PPP$	585.1	35	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**60.7**	**6**	
5.1	**Knowledge workers**	**68.5**	**7**	
5.1.1	Knowledge-intensive employment, %	56.9	2	● ◆
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP 🕘	1.2	19	
5.1.4	GERD financed by business, %	52.2	23	
5.1.5	Females employed w/advanced degrees, %	35.1	1	● ◆
5.2	**Innovation linkages**	**47.1**	**18**	
5.2.1	University/industry research collaboration†	71.3	6	
5.2.2	State of cluster development†	69.2	9	
5.2.3	GERD financed by abroad, % GDP	0.1	30	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.2	11	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	1.5	23	◇
5.3	**Knowledge absorption**	**66.5**	**2**	● ◆
5.3.1	Intellectual property payments, % total trade	2.9	6	
5.3.2	High-tech imports, % total trade	22.0	7	◆
5.3.3	ICT services imports, % total trade	2.6	14	
5.3.4	FDI net inflows, % GDP	24.6	4	● ◆
5.3.5	Research talent, % in business enterprise 🕘	49.9	23	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**46.1**	**14**	
6.1	**Knowledge creation**	**35.8**	**28**	◇
6.1.1	Patents by origin/bn PPP$ GDP	2.8	32	◇
6.1.2	PCT patents by origin/bn PPP$ GDP	1.8	19	◇
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	18.0	31	
6.1.5	Citable documents H-index	37.8	23	
6.2	**Knowledge impact**	**45.1**	**12**	
6.2.1	Growth rate of PPP$ GDP/worker, %	2.2	45	○
6.2.2	New businesses/th pop. 15-64	10.0	15	
6.2.3	Computer software spending, % GDP	0.0	42	◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	5.4	51	○
6.2.5	High- and medium-high-tech manufacturing, %	77.7	1	● ◆
6.3	**Knowledge diffusion**	**57.5**	**7**	
6.3.1	Intellectual property receipts, % total trade	1.5	16	
6.3.2	High-tech net exports, % total trade	26.4	6	◆
6.3.3	ICT services exports, % total trade	2.2	50	○
6.3.4	FDI net outflows, % GDP	11.8	4	● ◆
CREATIVE OUTPUTS		**39.9**	**18**	
7.1	**Intangible assets**	**37.6**	**34**	
7.1.1	Trademarks by origin/bn PPP$ GDP	20.1	94	○ ◇
7.1.2	Global brand value, top 5,000, % GDP	132.3	13	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.6	81	○
7.1.4	ICTs & organizational model creation†	74.6	14	
7.2	**Creative goods and services**	**37.6**	**16**	
7.2.1	Cultural & creative services exports, % total trade	2.6	5	◆
7.2.2	National feature films/mn pop. 15-69	2.8	61	○
7.2.3	Entertainment & Media market/th pop. 15-69	41.3	20	
7.2.4	Printing and other media, % manufacturing	0.6	84	○
7.2.5	Creative goods exports, % total trade	3.8	16	
7.3	**Online creativity**	**46.8**	**24**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	24.7	23	
7.3.2	Country-code TLDs/th pop. 15-69	11.8	38	◇
7.3.3	Wikipedia edits/mn pop. 15-69	78.8	29	
7.3.4	Mobile app creation/bn PPP$ GDP	73.0	7	◆

NOTES: ● indicates a strength; ○ a weakness; ◆ a strength relative to the other top 25-ranked GII economies; ◇ a weakness relative to the other top 25-ranked GII economies; * an index; † a survey question. 🕘 indicates that the economy's data are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

SLOVAKIA

GII 2020 rank

39

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
34	43	High	EUR	5.5	199.7	31,988.0	37

		Score/Value	Rank	
INSTITUTIONS		**72.0**	**41**	
1.1	**Political environment**	**70.8**	**38**	
1.1.1	Political and operational stability*	80.4	33	
1.1.2	Government effectiveness*	66.0	38	
1.2	**Regulatory environment**	**70.2**	**45**	
1.2.1	Regulatory quality*	63.2	37	
1.2.2	Rule of law*	60.5	41	
1.2.3	Cost of redundancy dismissal, salary weeks	18.8	78	
1.3	**Business environment**	**75.1**	**51**	
1.3.1	Ease of starting a business*	84.8	91	○ ◇
1.3.2	Ease of resolving insolvency*	65.5	42	
HUMAN CAPITAL & RESEARCH		**31.2**	**62**	◇
2.1	**Education**	**44.9**	**69**	◇
2.1.1	Expenditure on education, % GDP 🕘	3.9	76	○
2.1.2	Government funding/pupil, secondary, % GDP/cap	20.0	49	
2.1.3	School life expectancy, years	14.5	61	◇
2.1.4	PISA scales in reading, maths, & science	469.4	38	
2.1.5	Pupil-teacher ratio, secondary 🕘	11.1	44	
2.2	**Tertiary education**	**32.2**	**67**	◇
2.2.1	Tertiary enrolment, % gross	46.6	64	◇
2.2.2	Graduates in science & engineering, %	21.2	63	
2.2.3	Tertiary inbound mobility, %	6.9	35	
2.3	**Research & development (R&D)**	**16.5**	**47**	
2.3.1	Researchers, FTE/mn pop	2,996.0	33	
2.3.2	Gross expenditure on R&D, % GDP	0.8	43	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	13.5	59	
INFRASTRUCTURE		**52.5**	**33**	
3.1	**Information & communication technologies (ICTs)**	**74.8**	**48**	
3.1.1	ICT access*	73.7	47	◇
3.1.2	ICT use*	70.9	39	
3.1.3	Government's online service*	73.6	58	◇
3.1.4	E-participation*	80.9	50	
3.2	**General infrastructure**	**27.0**	**65**	◇
3.2.1	Electricity output, kWh/mn pop	4,599.3	47	
3.2.2	Logistics performance*	44.9	52	◇
3.2.3	Gross capital formation, % GDP	24.0	60	
3.3	**Ecological sustainability**	**55.8**	**10**	● ◆
3.3.1	GDP/unit of energy use	9.8	58	
3.3.2	Environmental performance*	68.3	26	●
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	8.8	9	● ◆
MARKET SOPHISTICATION		**45.3**	**82**	
4.1	**Credit**	**48.1**	**44**	
4.1.1	Ease of getting credit*	70.0	44	
4.1.2	Domestic credit to private sector, % GDP	61.5	57	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**19.8**	**127**	○ ◇
4.2.1	Ease of protecting minority investors*	56.0	82	○
4.2.2	Market capitalization, % GDP 🕘	5.1	70	○
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	67	○
4.3	**Trade, competition, and market scale**	**68.0**	**40**	
4.3.1	Applied tariff rate, weighted avg., %	1.7	22	
4.3.2	Intensity of local competition†	73.7	35	
4.3.3	Domestic market scale, bn PPP$	199.7	67	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**31.7**	**46**	
5.1	**Knowledge workers**	**43.6**	**38**	
5.1.1	Knowledge-intensive employment, %	32.6	42	
5.1.2	Firms offering formal training, % 🕘	43.5	23	
5.1.3	GERD performed by business, % GDP	0.5	39	
5.1.4	GERD financed by business, %	48.8	31	
5.1.5	Females employed w/advanced degrees, %	14.5	48	
5.2	**Innovation linkages**	**19.0**	**77**	◇
5.2.1	University/industry research collaboration†	36.0	94	○ ◇
5.2.2	State of cluster development†	46.6	68	
5.2.3	GERD financed by abroad, % GDP	0.1	40	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	116	○ ◇
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.3	37	
5.3	**Knowledge absorption**	**32.5**	**52**	
5.3.1	Intellectual property payments, % total trade	0.8	53	
5.3.2	High-tech imports, % total trade	12.8	19	●
5.3.3	ICT services imports, % total trade	0.9	76	
5.3.4	FDI net inflows, % GDP	4.0	37	
5.3.5	Research talent, % in business enterprise	24.0	52	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**34.4**	**30**	
6.1	**Knowledge creation**	**23.0**	**45**	
6.1.1	Patents by origin/bn PPP$ GDP	1.4	54	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.2	47	◇
6.1.3	Utility models by origin/bn PPP$ GDP	1.7	14	● ◆
6.1.4	Scientific & technical articles/bn PPP$ GDP	15.3	37	
6.1.5	Citable documents H-index	17.6	45	
6.2	**Knowledge impact**	**45.8**	**9**	● ◆
6.2.1	Growth rate of PPP$ GDP/worker, %	1.3	58	
6.2.2	New businesses/th pop. 15-64	5.3	30	
6.2.3	Computer software spending, % GDP	0.0	39	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	21.0	12	● ◆
6.2.5	High- and medium-high-tech manufacturing, %	58.1	4	● ◆
6.3	**Knowledge diffusion**	**34.3**	**35**	
6.3.1	Intellectual property receipts, % total trade	0.0	69	
6.3.2	High-tech net exports, % total trade	8.9	19	●
6.3.3	ICT services exports, % total trade	1.7	63	
6.3.4	FDI net outflows, % GDP	2.6	28	●
CREATIVE OUTPUTS		**31.3**	**39**	
7.1	**Intangible assets**	**27.0**	**68**	
7.1.1	Trademarks by origin/bn PPP$ GDP	50.4	48	
7.1.2	Global brand value, top 5,000, % GDP	3.2	74	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	2.5	45	
7.1.4	ICTs & organizational model creation†	65.0	28	
7.2	**Creative goods and services**	**44.6**	**6**	● ◆
7.2.1	Cultural & creative services exports, % total trade	0.3	61	
7.2.2	National feature films/mn pop. 15-69	6.6	35	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	0.5	87	○
7.2.5	Creative goods exports, % total trade	7.2	7	● ◆
7.3	**Online creativity**	**26.7**	**40**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	3.0	64	◇
7.3.2	Country-code TLDs/th pop. 15-69	30.3	22	●
7.3.3	Wikipedia edits/mn pop. 15-69	67.9	42	
7.3.4	Mobile app creation/bn PPP$ GDP	7.5	49	

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

SLOVENIA

GII 2020 rank

32

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
39	29	High	EUR	2.1	79.6	33,578.8	31

		Score/Value	Rank	
INSTITUTIONS		**82.4**	**20**	
1.1	**Political environment**	**77.6**	**27**	
1.1.1	Political and operational stability*	82.1	29	
1.1.2	Government effectiveness*	75.3	28	
1.2	**Regulatory environment**	**80.9**	**27**	
1.2.1	Regulatory quality*	60.1	38	
1.2.2	Rule of law*	74.3	26	
1.2.3	Cost of redundancy dismissal, salary weeks	10.7	34	
1.3	**Business environment**	**88.7**	**7**	● ◆
1.3.1	Ease of starting a business*	93.0	39	
1.3.2	Ease of resolving insolvency*	84.4	8	●
HUMAN CAPITAL & RESEARCH		**47.2**	**26**	
2.1	**Education**	**56.6**	**25**	
2.1.1	Expenditure on education, % GDP 🕘	4.8	49	
2.1.2	Government funding/pupil, secondary, % GDP/cap	22.9	29	
2.1.3	School life expectancy, years	17.6	15	●
2.1.4	PISA scales in reading, maths, & science	503.7	11	●
2.1.5	Pupil-teacher ratio, secondary 🕘	9.7	29	
2.2	**Tertiary education**	**44.9**	**29**	
2.2.1	Tertiary enrolment, % gross	78.6	20	
2.2.2	Graduates in science & engineering, %	26.6	29	
2.2.3	Tertiary inbound mobility, %	3.9	60	
2.3	**Research & development (R&D)**	**40.0**	**25**	
2.3.1	Researchers, FTE/mn pop	4,854.6	18	
2.3.2	Gross expenditure on R&D, % GDP	1.9	18	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	51.3	28	
2.3.4	QS university ranking, average score top 3*	11.6	63	
INFRASTRUCTURE		**52.5**	**32**	
3.1	**Information & communication technologies (ICTs)**	**77.9**	**37**	
3.1.1	ICT access*	81.5	22	
3.1.2	ICT use*	68.9	43	
3.1.3	Government's online service*	79.9	45	
3.1.4	E-participation*	81.5	48	
3.2	**General infrastructure**	**31.4**	**44**	
3.2.1	Electricity output, kWh/mn pop	7,784.0	24	
3.2.2	Logistics performance*	58.4	34	
3.2.3	Gross capital formation, % GDP	21.4	83	○
3.3	**Ecological sustainability**	**48.3**	**21**	
3.3.1	GDP/unit of energy use	9.5	63	
3.3.2	Environmental performance*	72.0	18	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	5.7	18	●
MARKET SOPHISTICATION		**45.7**	**77**	○
4.1	**Credit**	**31.3**	**103**	○ ◇
4.1.1	Ease of getting credit*	45.0	101	○ ◇
4.1.2	Domestic credit to private sector, % GDP	43.2	76	○ ◇
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**41.8**	**55**	
4.2.1	Ease of protecting minority investors*	78.0	18	
4.2.2	Market capitalization, % GDP	12.8	64	○
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**64.0**	**60**	
4.3.1	Applied tariff rate, weighted avg., %	1.7	22	
4.3.2	Intensity of local competition†	73.0	38	
4.3.3	Domestic market scale, bn PPP$	79.6	89	○

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**42.6**	**27**	
5.1	**Knowledge workers**	**59.0**	**18**	●
5.1.1	Knowledge-intensive employment, %	42.6	22	
5.1.2	Firms offering formal training, %	44.0	22	
5.1.3	GERD performed by business, % GDP	1.4	14	
5.1.4	GERD financed by business, %	63.1	10	●
5.1.5	Females employed w/advanced degrees, %	21.1	26	
5.2	**Innovation linkages**	**31.7**	**32**	
5.2.1	University/industry research collaboration†	49.1	42	
5.2.2	State of cluster development†	45.9	73	○
5.2.3	GERD financed by abroad, % GDP	0.2	13	●
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	46	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	1.3	25	
5.3	**Knowledge absorption**	**37.2**	**36**	
5.3.1	Intellectual property payments, % total trade	0.6	60	
5.3.2	High-tech imports, % total trade	6.0	97	○
5.3.3	ICT services imports, % total trade	1.4	48	
5.3.4	FDI net inflows, % GDP	2.8	60	
5.3.5	Research talent, % in business enterprise	62.1	11	●
KNOWLEDGE & TECHNOLOGY OUTPUTS		**32.7**	**35**	
6.1	**Knowledge creation**	**37.9**	**26**	
6.1.1	Patents by origin/bn PPP$ GDP	4.7	23	
6.1.2	PCT patents by origin/bn PPP$ GDP	1.1	27	
6.1.3	Utility models by origin/bn PPP$ GDP 🕘	0.2	52	○
6.1.4	Scientific & technical articles/bn PPP$ GDP	38.0	2	● ◆
6.1.5	Citable documents H-index	18.7	43	
6.2	**Knowledge impact**	**31.6**	**37**	
6.2.1	Growth rate of PPP$ GDP/worker, %	0.9	63	
6.2.2	New businesses/th pop. 15-64	3.1	45	
6.2.3	Computer software spending, % GDP	0.0	89	○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	22.5	8	● ◆
6.2.5	High- and medium-high-tech manufacturing, %	25.1	45	
6.3	**Knowledge diffusion**	**28.7**	**45**	
6.3.1	Intellectual property receipts, % total trade	0.2	41	
6.3.2	High-tech net exports, % total trade	4.8	35	
6.3.3	ICT services exports, % total trade	1.5	71	
6.3.4	FDI net outflows, % GDP	1.1	53	
CREATIVE OUTPUTS		**30.7**	**41**	
7.1	**Intangible assets**	**29.6**	**54**	
7.1.1	Trademarks by origin/bn PPP$ GDP	72.7	28	
7.1.2	Global brand value, top 5,000, % GDP	6.4	65	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	2.8	40	
7.1.4	ICTs & organizational model creation†	61.9	38	
7.2	**Creative goods and services**	**23.5**	**42**	
7.2.1	Cultural & creative services exports, % total trade	0.8	36	
7.2.2	National feature films/mn pop. 15-69	14.1	9	●
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.5	29	
7.2.5	Creative goods exports, % total trade	0.8	53	
7.3	**Online creativity**	**40.3**	**29**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	20.4	28	
7.3.2	Country-code TLDs/th pop. 15-69	27.8	24	
7.3.3	Wikipedia edits/mn pop. 15-69	82.9	19	
7.3.4	Mobile app creation/bn PPP$ GDP	30.9	18	

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

SOUTH AFRICA

GII 2020 rank

60

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
68	49	Upper middle	SSF	58.6	809.0	12,007.5	63

		Score/Value	Rank	
INSTITUTIONS		**66.2**	**55**	
1.1	**Political environment**	**59.3**	**62**	
1.1.1	Political and operational stability*	62.5	92	○
1.1.2	Government effectiveness*	57.7	50	
1.2	**Regulatory environment**	**71.3**	**43**	
1.2.1	Regulatory quality*	46.3	61	
1.2.2	Rule of law*	44.0	67	
1.2.3	Cost of redundancy dismissal, salary weeks	9.3	25	●
1.3	**Business environment**	**67.9**	**75**	
1.3.1	Ease of starting a business*	81.2	107	○
1.3.2	Ease of resolving insolvency*	54.6	63	
HUMAN CAPITAL & RESEARCH		**29.4**	**70**	
2.1	**Education**	**44.4**	**71**	
2.1.1	Expenditure on education, % GDP	6.2	13	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	21.4	42	
2.1.3	School life expectancy, years	13.8	72	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	27.6	115	○ ◇
2.2	**Tertiary education**	**19.7**	**96**	○
2.2.1	Tertiary enrolment, % gross	22.4	91	○ ◇
2.2.2	Graduates in science & engineering, %	18.6	77	
2.2.3	Tertiary inbound mobility, %	4.1	58	
2.3	**Research & development (R&D)**	**24.2**	**42**	
2.3.1	Researchers, FTE/mn pop	492.0	69	
2.3.2	Gross expenditure on R&D, % GDP	0.8	45	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	41.4	36	◆
2.3.4	QS university ranking, average score top 3*	33.1	35	
INFRASTRUCTURE		**37.9**	**79**	
3.1	**Information & communication technologies (ICTs)**	**66.5**	**67**	
3.1.1	ICT access*	52.1	87	
3.1.2	ICT use*	45.6	83	
3.1.3	Government's online service*	83.3	37	
3.1.4	E-participation*	84.8	39	
3.2	**General infrastructure**	**26.4**	**70**	
3.2.1	Electricity output, kWh/mn pop	4,419.2	48	
3.2.2	Logistics performance*	61.3	32	◆
3.2.3	Gross capital formation, % GDP	17.6	112	○
3.3	**Ecological sustainability**	**20.8**	**96**	◇
3.3.1	GDP/unit of energy use	5.2	109	○ ◇
3.3.2	Environmental performance*	43.1	82	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.1	59	
MARKET SOPHISTICATION		**60.5**	**15**	● ◆
4.1	**Credit**	**50.6**	**32**	◆
4.1.1	Ease of getting credit*	60.0	74	
4.1.2	Domestic credit to private sector, % GDP	147.5	9	● ◆
4.1.3	Microfinance gross loans, % GDP	0.0	69	○
4.2	**Investment**	**62.0**	**14**	● ◆
4.2.1	Ease of protecting minority investors*	80.0	13	● ◆
4.2.2	Market capitalization, % GDP	302.7	1	● ◆
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	43	
4.3	**Trade, competition, and market scale**	**69.0**	**35**	
4.3.1	Applied tariff rate, weighted avg., %	4.3	81	
4.3.2	Intensity of local competition†	71.2	48	
4.3.3	Domestic market scale, bn PPP$	809.0	30	●

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**30.3**	**50**	
5.1	**Knowledge workers**	**30.9**	**61**	
5.1.1	Knowledge-intensive employment, %	23.4	65	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	0.3	44	
5.1.4	GERD financed by business, %	39.4	46	
5.1.5	Females employed w/advanced degrees, %	10.5	64	
5.2	**Innovation linkages**	**25.9**	**43**	◆
5.2.1	University/industry research collaboration†	54.7	30	● ◆
5.2.2	State of cluster development†	55.1	34	◆
5.2.3	GERD financed by abroad, % GDP	0.1	39	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.1	40	◆
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.2	42	
5.3	**Knowledge absorption**	**34.0**	**45**	
5.3.1	Intellectual property payments, % total trade	2.0	13	● ◆
5.3.2	High-tech imports, % total trade	9.6	38	
5.3.3	ICT services imports, % total trade	1.2	63	
5.3.4	FDI net inflows, % GDP	0.9	112	○ ◇
5.3.5	Research talent, % in business enterprise	17.3	59	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**21.2**	**62**	
6.1	**Knowledge creation**	**20.4**	**49**	
6.1.1	Patents by origin/bn PPP$ GDP	0.8	70	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.4	39	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	11.6	46	
6.1.5	Citable documents H-index	29.5	32	◆
6.2	**Knowledge impact**	**23.3**	**66**	
6.2.1	Growth rate of PPP$ GDP/worker, %	-0.4	101	○
6.2.2	New businesses/th pop. 15-64	10.2	13	● ◆
6.2.3	Computer software spending, % GDP	0.0	48	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	4.1	61	
6.2.5	High- and medium-high-tech manufacturing, %	20.5	55	
6.3	**Knowledge diffusion**	**19.9**	**78**	
6.3.1	Intellectual property receipts, % total trade	0.1	52	
6.3.2	High-tech net exports, % total trade	2.0	54	
6.3.3	ICT services exports, % total trade	0.6	95	
6.3.4	FDI net outflows, % GDP	1.6	42	
CREATIVE OUTPUTS		**19.8**	**70**	
7.1	**Intangible assets**	**30.1**	**52**	
7.1.1	Trademarks by origin/bn PPP$ GDP	28.6	79	
7.1.2	Global brand value, top 5,000, % GDP	87.5	22	● ◆
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.2	61	
7.1.4	ICTs & organizational model creation†	58.7	48	
7.2	**Creative goods and services**	**7.3**	**92**	
7.2.1	Cultural & creative services exports, % total trade	0.2	68	
7.2.2	National feature films/mn pop. 15-69	0.6	98	○
7.2.3	Entertainment & Media market/th pop. 15-69	7.8	41	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.8	52	
7.3	**Online creativity**	**11.7**	**78**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	3.0	63	
7.3.2	Country-code TLDs/th pop. 15-69	9.6	41	
7.3.3	Wikipedia edits/mn pop. 15-69	37.3	84	
7.3.4	Mobile app creation/bn PPP$ GDP	0.3	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 are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

SPAIN

GII 2020 rank

30

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
27	27	High	EUR	46.7	1,940.5	36,311.3	29

		Score/Value	Rank	
INSTITUTIONS		**77.3**	**31**	
1.1	**Political environment**	**73.4**	**37**	
1.1.1	Political and operational stability*	75.0	44	
1.1.2	Government effectiveness*	72.5	33	
1.2	**Regulatory environment**	**75.4**	**35**	
1.2.1	Regulatory quality*	66.7	33	
1.2.2	Rule of law*	71.9	30	
1.2.3	Cost of redundancy dismissal, salary weeks	17.4	73	○
1.3	**Business environment**	**83.1**	**25**	
1.3.1	Ease of starting a business*	86.9	75	○ ◇
1.3.2	Ease of resolving insolvency*	79.2	17	
HUMAN CAPITAL & RESEARCH		**46.5**	**27**	
2.1	**Education**	**50.8**	**50**	
2.1.1	Expenditure on education, % GDP 🕘	4.2	66	○
2.1.2	Government funding/pupil, secondary, % GDP/cap	18.9	55	○
2.1.3	School life expectancy, years	17.6	14	●
2.1.4	PISA scales in reading, maths, & science	482.3	29	
2.1.5	Pupil-teacher ratio, secondary 🕘	11.6	53	
2.2	**Tertiary education**	**43.9**	**33**	
2.2.1	Tertiary enrolment, % gross	88.9	5	●
2.2.2	Graduates in science & engineering, %	23.5	46	
2.2.3	Tertiary inbound mobility, %	3.2	63	○
2.3	**Research & development (R&D)**	**44.9**	**22**	
2.3.1	Researchers, FTE/mn pop	3,000.9	32	
2.3.2	Gross expenditure on R&D, % GDP	1.2	31	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	73.1	13	●
2.3.4	QS university ranking, average score top 3*	45.9	24	
INFRASTRUCTURE		**60.1**	**7**	● ◆
3.1	**Information & communication technologies (ICTs)**	**88.2**	**16**	
3.1.1	ICT access*	81.3	23	
3.1.2	ICT use*	79.6	21	
3.1.3	Government's online service*	93.8	16	
3.1.4	E-participation*	98.3	5	● ◆
3.2	**General infrastructure**	**36.3**	**32**	
3.2.1	Electricity output, kWh/mn pop	5,816.0	35	
3.2.2	Logistics performance*	82.6	17	
3.2.3	Gross capital formation, % GDP	22.2	76	○
3.3	**Ecological sustainability**	**55.7**	**11**	● ◆
3.3.1	GDP/unit of energy use	13.0	24	
3.3.2	Environmental performance*	74.3	14	●
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	6.5	13	●
MARKET SOPHISTICATION		**55.1**	**26**	
4.1	**Credit**	**51.9**	**28**	
4.1.1	Ease of getting credit*	60.0	74	○
4.1.2	Domestic credit to private sector, % GDP	99.2	25	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**35.7**	**72**	○
4.2.1	Ease of protecting minority investors*	72.0	27	
4.2.2	Market capitalization, % GDP	58.7	28	
4.2.3	Venture capital deals/bn PPP$ GDP	0.1	36	
4.3	**Trade, competition, and market scale**	**77.7**	**11**	●
4.3.1	Applied tariff rate, weighted avg., %	1.7	22	
4.3.2	Intensity of local competition†	75.8	22	
4.3.3	Domestic market scale, bn PPP$	1,940.5	15	● ◆

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**35.3**	**37**	
5.1	**Knowledge workers**	**46.3**	**31**	
5.1.1	Knowledge-intensive employment, %	33.3	40	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	0.7	31	
5.1.4	GERD financed by business, %	47.8	32	
5.1.5	Females employed w/advanced degrees, %	22.4	22	
5.2	**Innovation linkages**	**24.5**	**50**	
5.2.1	University/industry research collaboration†	41.0	67	○
5.2.2	State of cluster development†	55.3	33	
5.2.3	GERD financed by abroad, % GDP	0.1	37	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	54	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.5	31	
5.3	**Knowledge absorption**	**35.0**	**42**	
5.3.1	Intellectual property payments, % total trade	1.3	25	
5.3.2	High-tech imports, % total trade	6.6	81	○
5.3.3	ICT services imports, % total trade	1.7	37	
5.3.4	FDI net inflows, % GDP	3.0	56	
5.3.5	Research talent, % in business enterprise	38.8	34	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**37.7**	**24**	
6.1	**Knowledge creation**	**37.1**	**27**	
6.1.1	Patents by origin/bn PPP$ GDP	1.8	41	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.8	30	
6.1.3	Utility models by origin/bn PPP$ GDP	1.4	18	
6.1.4	Scientific & technical articles/bn PPP$ GDP	21.6	25	
6.1.5	Citable documents H-index	59.7	11	●
6.2	**Knowledge impact**	**41.3**	**16**	
6.2.1	Growth rate of PPP$ GDP/worker, %	0.1	88	○
6.2.2	New businesses/th pop. 15-64	3.1	46	
6.2.3	Computer software spending, % GDP	0.0	5	● ◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	15.8	17	
6.2.5	High- and medium-high-tech manufacturing, %	36.1	30	
6.3	**Knowledge diffusion**	**34.7**	**34**	
6.3.1	Intellectual property receipts, % total trade	0.5	26	
6.3.2	High-tech net exports, % total trade	3.6	41	
6.3.3	ICT services exports, % total trade	3.0	29	
6.3.4	FDI net outflows, % GDP	3.2	19	
CREATIVE OUTPUTS		**35.0**	**31**	
7.1	**Intangible assets**	**42.7**	**24**	
7.1.1	Trademarks by origin/bn PPP$ GDP	51.3	46	
7.1.2	Global brand value, top 5,000, % GDP	92.7	21	
7.1.3	Industrial designs by origin/bn PPP$ GDP	11.8	12	● ◆
7.1.4	ICTs & organizational model creation†	63.4	34	
7.2	**Creative goods and services**	**20.0**	**54**	
7.2.1	Cultural & creative services exports, % total trade	0.9	30	
7.2.2	National feature films/mn pop. 15-69	7.3	28	
7.2.3	Entertainment & Media market/th pop. 15-69	30.9	24	
7.2.4	Printing and other media, % manufacturing	1.2	40	
7.2.5	Creative goods exports, % total trade	0.8	55	
7.3	**Online creativity**	**34.6**	**31**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	27.6	22	
7.3.2	Country-code TLDs/th pop. 15-69	17.7	32	
7.3.3	Wikipedia edits/mn pop. 15-69	80.4	25	
7.3.4	Mobile app creation/bn PPP$ GDP	13.7	34	

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

SRI LANKA

GII 2020 rank

101

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
83	**107**	**Upper middle**	**CSA**	**21.3**	**304.8**	**12,132.7**	**89**

		Score/Value	Rank	
INSTITUTIONS		**46.8**	**119**	○ ◇
1.1	**Political environment**	**52.5**	**85**	
1.1.1	Political and operational stability*	67.9	73	
1.1.2	Government effectiveness*	44.9	84	
1.2	**Regulatory environment**	**21.3**	**129**	○ ◇
1.2.1	Regulatory quality*	37.8	83	
1.2.2	Rule of law*	47.4	61	
1.2.3	Cost of redundancy dismissal, salary weeks	58.5	129	○ ◇
1.3	**Business environment**	**66.6**	**79**	
1.3.1	Ease of starting a business*	88.2	68	
1.3.2	Ease of resolving insolvency*	45.0	85	
HUMAN CAPITAL & RESEARCH		**12.2**	**119**	○ ◇
2.1	**Education**	**25.2**	**116**	◇
2.1.1	Expenditure on education, % GDP	2.1	114	○ ◇
2.1.2	Government funding/pupil, secondary, % GDP/cap	6.7	101	○ ◇
2.1.3	School life expectancy, years	14.1	71	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	17.5	86	
2.2	**Tertiary education**	**9.8**	**115**	◇
2.2.1	Tertiary enrolment, % gross	19.6	94	◇
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	0.4	100	◇
2.3	**Research & development (R&D)**	**1.5**	**102**	
2.3.1	Researchers, FTE/mn pop.	106.0	86	◇
2.3.2	Gross expenditure on R&D, % GDP	0.1	103	○ ◇
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	3.2	75	
INFRASTRUCTURE		**37.9**	**78**	
3.1	**Information & communication technologies (ICTs)**	**53.9**	**90**	
3.1.1	ICT access*	48.8	90	◇
3.1.2	ICT use*	37.1	101	◇
3.1.3	Government's online service*	66.7	76	
3.1.4	E-participation*	62.9	83	
3.2	**General infrastructure**	**21.7**	**90**	
3.2.1	Electricity output, kWh/mn pop	737.1	102	◇
3.2.2	Logistics performance*	24.8	90	
3.2.3	Gross capital formation, % GDP	28.4	31	●
3.3	**Ecological sustainability**	**38.2**	**39**	●
3.3.1	GDP/unit of energy use	20.4	4	● ◆
3.3.2	Environmental performance*	39.0	90	◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.9	67	
MARKET SOPHISTICATION		**34.9**	**118**	○ ◇
4.1	**Credit**	**25.0**	**116**	◇
4.1.1	Ease of getting credit*	40.0	113	○ ◇
4.1.2	Domestic credit to private sector, % GDP	45.4	74	
4.1.3	Microfinance gross loans, % GDP	0.5	35	●
4.2	**Investment**	**27.1**	**108**	
4.2.1	Ease of protecting minority investors*	72.0	27	●
4.2.2	Market capitalization, % GDP	20.6	57	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	80	○
4.3	**Trade, competition, and market scale**	**52.6**	**106**	◇
4.3.1	Applied tariff rate, weighted avg., %	12.1	124	○ ◇
4.3.2	Intensity of local competition†	65.3	80	
4.3.3	Domestic market scale, bn PPP$	304.8	58	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**24.4**	**70**	
5.1	**Knowledge workers**	**21.3**	**97**	
5.1.1	Knowledge-intensive employment, %	20.4	76	
5.1.2	Firms offering formal training, %	18.4	78	◇
5.1.3	GERD performed by business, % GDP	0.0	76	
5.1.4	GERD financed by business, %	34.4	51	
5.1.5	Females employed w/advanced degrees, %	2.9	98	◇
5.2	**Innovation linkages**	**19.5**	**73**	
5.2.1	University/industry research collaboration†	40.2	73	
5.2.2	State of cluster development†	48.7	56	
5.2.3	GERD financed by abroad, % GDP	0.0	93	○
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.1	31	● ◆
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	80	
5.3	**Knowledge absorption**	**32.5**	**53**	●
5.3.1	Intellectual property payments, % total trade	n/a	n/a	
5.3.2	High-tech imports, % total trade	7.7	62	
5.3.3	ICT services imports, % total trade	2.1	27	● ◆
5.3.4	FDI net inflows, % GDP	1.5	99	
5.3.5	Research talent, % in business enterprise	22.5	54	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**18.9**	**68**	
6.1	**Knowledge creation**	**7.1**	**89**	
6.1.1	Patents by origin/bn PPP$ GDP	1.2	62	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	76	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	2.4	111	
6.1.5	Citable documents H-index	10.1	75	
6.2	**Knowledge impact**	**21.3**	**77**	
6.2.1	Growth rate of PPP$ GDP/worker, %	2.7	34	●
6.2.2	New businesses/th pop. 15-64	0.7	88	
6.2.3	Computer software spending, % GDP	0.0	30	● ◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	2.9	76	
6.2.5	High- and medium-high-tech manufacturing, %	7.2	92	
6.3	**Knowledge diffusion**	**28.3**	**49**	●
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	High-tech net exports, % total trade	0.4	87	
6.3.3	ICT services exports, % total trade	4.2	19	● ◆
6.3.4	FDI net outflows, % GDP	0.1	99	
CREATIVE OUTPUTS		**13.8**	**100**	◇
7.1	**Intangible assets**	**18.4**	**100**	
7.1.1	Trademarks by origin/bn PPP$ GDP	25.2	84	
7.1.2	Global brand value, top 5,000, % GDP	12.8	55	
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.8	77	
7.1.4	ICTs & organizational model creation†	47.5	91	
7.2	**Creative goods and services**	**11.2**	**74**	
7.2.1	Cultural & creative services exports, % total trade	0.0	114	○
7.2.2	National feature films/mn pop. 15-69	1.0	87	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	2.3	11	● ◆
7.2.5	Creative goods exports, % total trade	0.4	67	
7.3	**Online creativity**	**7.0**	**98**	◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.7	101	
7.3.2	Country-code TLDs/th pop. 15-69	0.8	92	
7.3.3	Wikipedia edits/mn pop. 15-69	29.6	95	◇
7.3.4	Mobile app creation/bn PPP$ GDP	0.7	70	

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

SWEDEN

GII 2020 rank

2

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
2	3	High	EUR	10.0	563.9	47,691.9	2

		Score/Value	Rank	
INSTITUTIONS		**88.7**	**11**	
1.1	**Political environment**	**89.9**	**10**	
1.1.1	Political and operational stability*	87.5	11	
1.1.2	Government effectiveness*	91.1	8	
1.2	**Regulatory environment**	**90.0**	**13**	
1.2.1	Regulatory quality*	89.3	6	
1.2.2	Rule of law*	96.1	4	●
1.2.3	Cost of redundancy dismissal, salary weeks	14.4	55	○
1.3	**Business environment**	**86.3**	**16**	
1.3.1	Ease of starting a business*	93.1	37	
1.3.2	Ease of resolving insolvency*	79.5	16	
HUMAN CAPITAL & RESEARCH		**62.4**	**3**	● ◆
2.1	**Education**	**68.2**	**6**	◆
2.1.1	Expenditure on education, % GDP 🕘	7.7	3	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	23.8	24	
2.1.3	School life expectancy, years	19.5	3	● ◆
2.1.4	PISA scales in reading, maths, & science	502.5	14	
2.1.5	Pupil-teacher ratio, secondary 🕘	13.1	61	○
2.2	**Tertiary education**	**44.9**	**28**	
2.2.1	Tertiary enrolment, % gross	67.0	36	
2.2.2	Graduates in science & engineering, %	27.5	26	
2.2.3	Tertiary inbound mobility, %	6.7	37	
2.3	**Research & development (R&D)**	**74.0**	**6**	
2.3.1	Researchers, FTE/mn pop	7,536.5	4	◆
2.3.2	Gross expenditure on R&D, % GDP	3.3	3	●
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	79.0	10	
2.3.4	QS university ranking, average score top 3*	59.3	14	
INFRASTRUCTURE		**64.6**	**2**	● ◆
3.1	**Information & communication technologies (ICTs)**	**89.0**	**13**	
3.1.1	ICT access*	81.7	20	
3.1.2	ICT use*	86.2	7	
3.1.3	Government's online service*	94.4	14	
3.1.4	E-participation*	93.8	19	
3.2	**General infrastructure**	**50.7**	**4**	● ◆
3.2.1	Electricity output, kWh/mn pop	15,643.3	7	
3.2.2	Logistics performance*	93.0	2	●
3.2.3	Gross capital formation, % GDP	26.2	42	
3.3	**Ecological sustainability**	**54.0**	**15**	◆
3.3.1	GDP/unit of energy use	9.7	61	○
3.3.2	Environmental performance*	78.7	8	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	6.9	11	◆
MARKET SOPHISTICATION		**62.3**	**12**	
4.1	**Credit**	**59.8**	**17**	
4.1.1	Ease of getting credit*	60.0	74	○
4.1.2	Domestic credit to private sector, % GDP	133.1	16	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**54.5**	**21**	
4.2.1	Ease of protecting minority investors*	72.0	27	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	0.2	14	
4.3	**Trade, competition, and market scale**	**72.6**	**30**	
4.3.1	Applied tariff rate, weighted avg., %	1.7	22	○
4.3.2	Intensity of local competition†	75.1	25	
4.3.3	Domestic market scale, bn PPP$	563.9	38	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**68.0**	**1**	● ◆
5.1	**Knowledge workers**	**76.8**	**3**	● ◆
5.1.1	Knowledge-intensive employment, %	53.5	4	
5.1.2	Firms offering formal training, % 🕘	70.3	3	●
5.1.3	GERD performed by business, % GDP	2.3	4	
5.1.4	GERD financed by business, %	60.8	12	
5.1.5	Females employed w/advanced degrees, %	25.6	11	
5.2	**Innovation linkages**	**76.2**	**2**	● ◆
5.2.1	University/industry research collaboration†	71.0	7	
5.2.2	State of cluster development†	64.8	18	
5.2.3	GERD financed by abroad, % GDP	0.3	7	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.3	3	● ◆
5.2.5	Patent families 2+ offices/bn PPP$ GDP	6.6	1	● ◆
5.3	**Knowledge absorption**	**51.0**	**13**	
5.3.1	Intellectual property payments, % total trade	1.5	22	
5.3.2	High-tech imports, % total trade	8.6	51	○
5.3.3	ICT services imports, % total trade	3.1	7	◆
5.3.4	FDI net inflows, % GDP	2.9	59	○
5.3.5	Research talent, % in business enterprise	72.8	5	◆
KNOWLEDGE & TECHNOLOGY OUTPUTS		**59.8**	**2**	● ◆
6.1	**Knowledge creation**	**76.0**	**2**	● ◆
6.1.1	Patents by origin/bn PPP$ GDP	10.7	9	
6.1.2	PCT patents by origin/bn PPP$ GDP	7.4	4	◆
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	31.9	8	◆
6.1.5	Citable documents H-index	59.3	12	
6.2	**Knowledge impact**	**39.7**	**19**	
6.2.1	Growth rate of PPP$ GDP/worker, %	0.4	80	○
6.2.2	New businesses/th pop. 15-64	7.2	22	
6.2.3	Computer software spending, % GDP	0.0	10	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	7.6	33	
6.2.5	High- and medium-high-tech manufacturing, %	45.4	14	
6.3	**Knowledge diffusion**	**63.9**	**4**	● ◆
6.3.1	Intellectual property receipts, % total trade	3.3	6	◆
6.3.2	High-tech net exports, % total trade	7.0	23	
6.3.3	ICT services exports, % total trade	6.1	7	◆
6.3.4	FDI net outflows, % GDP	3.5	18	
CREATIVE OUTPUTS		**51.7**	**7**	
7.1	**Intangible assets**	**54.1**	**8**	
7.1.1	Trademarks by origin/bn PPP$ GDP	45.9	56	○
7.1.2	Global brand value, top 5,000, % GDP	214.0	3	● ◆
7.1.3	Industrial designs by origin/bn PPP$ GDP	3.9	32	
7.1.4	ICTs & organizational model creation†	82.7	2	● ◆
7.2	**Creative goods and services**	**31.9**	**21**	
7.2.1	Cultural & creative services exports, % total trade	1.0	26	
7.2.2	National feature films/mn pop. 15-69	10.0	20	
7.2.3	Entertainment & Media market/th pop. 15-69	66.8	6	
7.2.4	Printing and other media, % manufacturing	1.1	54	○
7.2.5	Creative goods exports, % total trade	1.8	31	
7.3	**Online creativity**	**66.4**	**6**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	42.9	17	
7.3.2	Country-code TLDs/th pop. 15-69	68.6	8	
7.3.3	Wikipedia edits/mn pop. 15-69	93.8	4	● ◆
7.3.4	Mobile app creation/bn PPP$ GDP	60.7	9	

NOTES: ● indicates a strength; ○ a weakness; ◆ a strength relative to the other top 25-ranked GII economies; ◇ a weakness relative to the other top 25-ranked GII economies; * an index; † a survey question. 🕘 indicates that the economy's data are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

SWITZERLAND

GII 2020 rank

1

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
1	2	High	EUR	8.6	565.6	57,791.1	1

		Score/Value	Rank	
INSTITUTIONS		**88.0**	**13**	
1.1	**Political environment**	**94.2**	**2**	● ◆
1.1.1	Political and operational stability*	91.1	5	
1.1.2	Government effectiveness*	95.7	2	● ◆
1.2	**Regulatory environment**	**94.4**	**7**	
1.2.1	Regulatory quality*	88.8	8	
1.2.2	Rule of law*	97.0	3	●
1.2.3	Cost of redundancy dismissal, salary weeks	10.1	31	
1.3	**Business environment**	**75.5**	**47**	○ ◇
1.3.1	Ease of starting a business*	88.4	66	○ ◇
1.3.2	Ease of resolving insolvency*	62.6	44	◇
HUMAN CAPITAL & RESEARCH		**60.7**	**6**	
2.1	**Education**	**56.1**	**31**	
2.1.1	Expenditure on education, % GDP	5.1	40	
2.1.2	Government funding/pupil, secondary, % GDP/cap	24.5	22	
2.1.3	School life expectancy, years	16.3	26	
2.1.4	PISA scales in reading, maths, & science	498.2	21	
2.1.5	Pupil-teacher ratio, secondary	9.8	31	
2.2	**Tertiary education**	**49.4**	**18**	
2.2.1	Tertiary enrolment, % gross	59.6	48	○
2.2.2	Graduates in science & engineering, %	24.9	38	○
2.2.3	Tertiary inbound mobility, %	17.8	9	◆
2.3	**Research & development (R&D)**	**76.6**	**4**	◆
2.3.1	Researchers, FTE/mn pop	5,450.5	12	
2.3.2	Gross expenditure on R&D, % GDP	3.3	4	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	91.3	5	
2.3.4	QS university ranking, average score top 3*	83.0	4	
INFRASTRUCTURE		**62.0**	**3**	● ◆
3.1	**Information & communication technologies (ICTs)**	**85.8**	**21**	
3.1.1	ICT access*	85.2	14	
3.1.2	ICT use*	88.8	3	● ◆
3.1.3	Government's online service*	84.7	35	
3.1.4	E-participation*	84.3	41	
3.2	**General infrastructure**	**39.6**	**25**	
3.2.1	Electricity output, kWh/mn pop	7,783.9	25	
3.2.2	Logistics performance*	85.9	13	
3.2.3	Gross capital formation, % GDP	23.3	67	○
3.3	**Ecological sustainability**	**60.7**	**2**	● ◆
3.3.1	GDP/unit of energy use	20.0	5	◆
3.3.2	Environmental performance*	81.5	3	●
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	4.2	23	
MARKET SOPHISTICATION		**72.3**	**6**	
4.1	**Credit**	**72.1**	**6**	
4.1.1	Ease of getting credit*	65.0	61	○
4.1.2	Domestic credit to private sector, % GDP	174.9	3	● ◆
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**71.9**	**7**	◆
4.2.1	Ease of protecting minority investors*	50.0	92	○ ◇
4.2.2	Market capitalization, % GDP	220.5	1	● ◆
4.2.3	Venture capital deals/bn PPP$ GDP	0.4	7	
4.3	**Trade, competition, and market scale**	**72.8**	**27**	
4.3.1	Applied tariff rate, weighted avg., %	1.7	50	○
4.3.2	Intensity of local competition†	75.5	23	
4.3.3	Domestic market scale, bn PPP$	565.6	37	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**64.1**	**2**	● ◆
5.1	**Knowledge workers**	**74.0**	**4**	◆
5.1.1	Knowledge-intensive employment, %	53.8	3	● ◆
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	2.3	5	
5.1.4	GERD financed by business, %	68.6	6	◆
5.1.5	Females employed w/advanced degrees, %	19.5	30	
5.2	**Innovation linkages**	**66.2**	**5**	
5.2.1	University/industry research collaboration†	77.5	2	● ◆
5.2.2	State of cluster development†	71.9	5	◆
5.2.3	GERD financed by abroad, % GDP	0.2	22	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.2	13	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	8.0	1	● ◆
5.3	**Knowledge absorption**	**52.0**	**12**	
5.3.1	Intellectual property payments, % total trade	3.0	5	
5.3.2	High-tech imports, % total trade	6.4	87	○
5.3.3	ICT services imports, % total trade	3.8	3	● ◆
5.3.4	FDI net inflows, % GDP	3.7	40	
5.3.5	Research talent, % in business enterprise	49.7	24	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**65.5**	**1**	● ◆
6.1	**Knowledge creation**	**87.9**	**1**	● ◆
6.1.1	Patents by origin/bn PPP$ GDP	16.7	1	● ◆
6.1.2	PCT patents by origin/bn PPP$ GDP	8.2	3	● ◆
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	35.8	3	● ◆
6.1.5	Citable documents H-index	66.3	9	
6.2	**Knowledge impact**	**50.8**	**5**	◆
6.2.1	Growth rate of PPP$ GDP/worker, %	0.8	67	○
6.2.2	New businesses/th pop. 15-64	4.5	33	
6.2.3	Computer software spending, % GDP	0.0	3	● ◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	15.1	19	◆
6.2.5	High- and medium-high-tech manufacturing, %	60.0	3	● ◆
6.3	**Knowledge diffusion**	**57.9**	**6**	
6.3.1	Intellectual property receipts, % total trade	5.6	1	● ◆
6.3.2	High-tech net exports, % total trade	7.2	22	
6.3.3	ICT services exports, % total trade	3.0	33	
6.3.4	FDI net outflows, % GDP	10.9	6	
CREATIVE OUTPUTS		**60.0**	**2**	● ◆
7.1	**Intangible assets**	**60.3**	**3**	● ◆
7.1.1	Trademarks by origin/bn PPP$ GDP	75.2	27	
7.1.2	Global brand value, top 5,000, % GDP	234.5	2	● ◆
7.1.3	Industrial designs by origin/bn PPP$ GDP	6.2	22	
7.1.4	ICTs & organizational model creation†	77.4	9	
7.2	**Creative goods and services**	**51.1**	**3**	● ◆
7.2.1	Cultural & creative services exports, % total trade	0.8	37	
7.2.2	National feature films/mn pop. 15-69	19.4	6	◆
7.2.3	Entertainment & Media market/th pop. 15-69	100.0	1	● ◆
7.2.4	Printing and other media, % manufacturing	1.2	36	○
7.2.5	Creative goods exports, % total trade	3.9	15	
7.3	**Online creativity**	**68.3**	**5**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	58.4	13	
7.3.2	Country-code TLDs/th pop. 15-69	100.0	1	● ◆
7.3.3	Wikipedia edits/mn pop. 15-69	84.0	16	
7.3.4	Mobile app creation/bn PPP$ GDP	31.8	17	

NOTES: ● indicates a strength; ○ a weakness; ◆ a strength relative to the other top 25-ranked GII economies; ◇ a weakness relative to the other top 25-ranked GII economies; * an index; † a survey question. 🕘 indicates that the economy's data are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

TAJIKISTAN

GII 2020 rank

109

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
99	108	Low	CSA	9.3	33.4	3,133.4	100

		Score/Value	Rank	
INSTITUTIONS		**47.0**	**118**	
1.1	**Political environment**	**36.7**	**126**	
1.1.1	Political and operational stability*	58.9	104	
1.1.2	Government effectiveness*	25.6	128	
1.2	**Regulatory environment**	**43.3**	**118**	◇
1.2.1	Regulatory quality*	14.1	126	◇
1.2.2	Rule of law*	13.2	130	○ ◇
1.2.3	Cost of redundancy dismissal, salary weeks	21.7	92	
1.3	**Business environment**	**60.8**	**105**	
1.3.1	Ease of starting a business*	93.2	34	● ◆
1.3.2	Ease of resolving insolvency*	28.4	122	◇
HUMAN CAPITAL & RESEARCH		**22.8**	**87**	◆
2.1	**Education**	**44.7**	**[70]**	
2.1.1	Expenditure on education, % GDP 🕘	5.2	35	●
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years 🕘	11.4	98	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary 🕘	15.4	78	◆
2.2	**Tertiary education**	**23.3**	**86**	◆
2.2.1	Tertiary enrolment, % gross	31.3	81	◆
2.2.2	Graduates in science & engineering, %	22.0	57	●
2.2.3	Tertiary inbound mobility, %	0.8	91	
2.3	**Research & development (R&D)**	**0.6**	**112**	
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 R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**21.8**	**123**	
3.1	**Information & communication technologies (ICTs)**	**31.2**	**119**	
3.1.1	ICT access* 🕘	37.0	111	◆
3.1.2	ICT use* 🕘	15.0	120	
3.1.3	Government's online service*	34.0	116	
3.1.4	E-participation*	38.8	114	
3.2	**General infrastructure**	**13.4**	**122**	
3.2.1	Electricity output, kWh/mn pop	2,030.7	77	◆
3.2.2	Logistics performance*	12.6	118	
3.2.3	Gross capital formation, % GDP	19.6	99	
3.3	**Ecological sustainability**	**20.8**	**95**	
3.3.1	GDP/unit of energy use	7.8	82	
3.3.2	Environmental performance*	38.2	95	◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.4	85	◆
MARKET SOPHISTICATION		**48.4**	**60**	● ◆
4.1	**Credit**	**54.0**	**22**	● ◆
4.1.1	Ease of getting credit*	90.0	10	● ◆
4.1.2	Domestic credit to private sector, % GDP	12.3	123	
4.1.3	Microfinance gross loans, % GDP	5.7	2	● ◆
4.2	**Investment**	**40.0**	**[60]**	
4.2.1	Ease of protecting minority investors*	40.0	110	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**51.3**	**109**	
4.3.1	Applied tariff rate, weighted avg., % 🕘	5.0	91	◆
4.3.2	Intensity of local competition†	61.2	104	
4.3.3	Domestic market scale, bn PPP$	33.4	116	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**15.1**	**[128]**	
5.1	**Knowledge workers**	**13.1**	**[117]**	
5.1.1	Knowledge-intensive employment, %	n/a	n/a	
5.1.2	Firms offering formal training, %	24.3	63	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, % 🕘	1.6	93	
5.1.5	Females employed w/advanced degrees, % 🕘	4.0	93	◆
5.2	**Innovation linkages**	**15.0**	**112**	
5.2.1	University/industry research collaboration†	49.0	43	●
5.2.2	State of cluster development†	36.8	107	
5.2.3	GERD financed by abroad, % GDP	0.0	100	◇
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	78	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	101	○ ◇
5.3	**Knowledge absorption**	**17.4**	**[116]**	
5.3.1	Intellectual property payments, % total trade	0.0	118	○ ◇
5.3.2	High-tech imports, % total trade	n/a	n/a	
5.3.3	ICT services imports, % total trade	0.3	119	
5.3.4	FDI net inflows, % GDP	3.0	53	●
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**16.4**	**77**	◆
6.1	**Knowledge creation**	**17.7**	**55**	● ◆
6.1.1	Patents by origin/bn PPP$ GDP 🕘	0.1	118	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	100	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP 🕘	3.7	5	● ◆
6.1.4	Scientific & technical articles/bn PPP$ GDP	2.4	112	◇
6.1.5	Citable documents H-index	1.2	130	○ ◇
6.2	**Knowledge impact**	**15.8**	**95**	
6.2.1	Growth rate of PPP$ GDP/worker, %	4.6	13	● ◆
6.2.2	New businesses/th pop. 15-64	0.2	114	
6.2.3	Computer software spending, % GDP	0.0	93	◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.1	131	○ ◇
6.2.5	High- and medium-high-tech manufacturing, %	2.8	104	◇
6.3	**Knowledge diffusion**	**15.7**	**[90]**	
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	High-tech net exports, % total trade	n/a	n/a	
6.3.3	ICT services exports, % total trade	0.3	112	
6.3.4	FDI net outflows, % GDP	0.6	71	
CREATIVE OUTPUTS		**10.4**	**113**	
7.1	**Intangible assets**	**13.2**	**120**	
7.1.1	Trademarks by origin/bn PPP$ GDP 🕘	6.1	114	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP 🕘	0.0	120	○ ◇
7.1.4	ICTs & organizational model creation†	44.4	99	
7.2	**Creative goods and services**	**8.6**	**[85]**	
7.2.1	Cultural & creative services exports, % total trade	0.0	95	
7.2.2	National feature films/mn pop. 15-69 🕘	1.8	73	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.1	52	●
7.2.5	Creative goods exports, % total trade	n/a	n/a	
7.3	**Online creativity**	**6.9**	**99**	◆
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.0	128	
7.3.2	Country-code TLDs/th pop. 15-69	0.4	103	
7.3.3	Wikipedia edits/mn pop. 15-69	24.4	100	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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

THAILAND

GII 2020 rank

44

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
44	48	Upper middle	SEAO	69.6	1,383.0	17,778.8	43

		Score/Value	Rank	
INSTITUTIONS		**64.1**	**65**	
1.1	**Political environment**	**62.5**	**51**	
1.1.1	Political and operational stability*	71.4	59	
1.1.2	Government effectiveness*	58.0	49	
1.2	**Regulatory environment**	**45.3**	**113**	○ ◇
1.2.1	Regulatory quality*	44.7	64	
1.2.2	Rule of law*	47.3	63	
1.2.3	Cost of redundancy dismissal, salary weeks	36.0	123	○ ◇
1.3	**Business environment**	**84.6**	**20**	◆
1.3.1	Ease of starting a business*	92.4	43	
1.3.2	Ease of resolving insolvency*	76.8	22	◆
HUMAN CAPITAL & RESEARCH		**29.9**	**67**	
2.1	**Education**	**37.6**	**87**	
2.1.1	Expenditure on education, % GDP	4.1	68	
2.1.2	Government funding/pupil, secondary, % GDP/cap	18.0	61	
2.1.3	School life expectancy, years	15.4	41	
2.1.4	PISA scales in reading, maths, & science	412.4	61	
2.1.5	Pupil-teacher ratio, secondary	25.9	109	○ ◇
2.2	**Tertiary education**	**35.4**	**58**	
2.2.1	Tertiary enrolment, % gross	49.3	61	
2.2.2	Graduates in science & engineering, %	27.9	24	
2.2.3	Tertiary inbound mobility, %	1.3	85	
2.3	**Research & development (R&D)**	**16.7**	**46**	
2.3.1	Researchers, FTE/mn pop	1,350.3	47	
2.3.2	Gross expenditure on R&D, % GDP	1.0	36	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	30.6	38	
INFRASTRUCTURE		**40.1**	**67**	
3.1	**Information & communication technologies (ICTs)**	**61.3**	**79**	
3.1.1	ICT access*	56.4	80	
3.1.2	ICT use*	59.6	59	
3.1.3	Government's online service*	63.9	86	
3.1.4	E-participation*	65.2	81	
3.2	**General infrastructure**	**30.5**	**50**	
3.2.1	Electricity output, kWh/mn pop	2,702.0	67	
3.2.2	Logistics performance*	62.9	31	◆
3.2.3	Gross capital formation, % GDP	24.9	52	
3.3	**Ecological sustainability**	**28.4**	**67**	
3.3.1	GDP/unit of energy use	8.0	78	
3.3.2	Environmental performance*	45.4	70	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.3	36	
MARKET SOPHISTICATION		**57.8**	**22**	◆
4.1	**Credit**	**54.0**	**21**	◆
4.1.1	Ease of getting credit*	70.0	44	
4.1.2	Domestic credit to private sector, % GDP	144.6	10	● ◆
4.1.3	Microfinance gross loans, % GDP	0.0	80	○
4.2	**Investment**	**45.9**	**31**	
4.2.1	Ease of protecting minority investors*	86.0	3	● ◆
4.2.2	Market capitalization, % GDP	108.2	10	● ◆
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	57	
4.3	**Trade, competition, and market scale**	**73.4**	**25**	◆
4.3.1	Applied tariff rate, weighted avg., %	3.5	72	
4.3.2	Intensity of local competition†	74.2	34	
4.3.3	Domestic market scale, bn PPP$	1,383.0	20	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**35.4**	**36**	◆
5.1	**Knowledge workers**	**37.3**	**51**	
5.1.1	Knowledge-intensive employment, %	13.8	95	○ ◇
5.1.2	Firms offering formal training, %	18.0	79	○ ◇
5.1.3	GERD performed by business, % GDP	0.8	27	◆
5.1.4	GERD financed by business, %	80.8	1	● ◆
5.1.5	Females employed w/advanced degrees, %	9.8	68	
5.2	**Innovation linkages**	**20.0**	**68**	
5.2.1	University/industry research collaboration†	54.1	31	◆
5.2.2	State of cluster development†	51.4	45	
5.2.3	GERD financed by abroad, % GDP	0.0	83	○
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	58	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.1	66	
5.3	**Knowledge absorption**	**49.0**	**15**	● ◆
5.3.1	Intellectual property payments, % total trade	1.6	16	● ◆
5.3.2	High-tech imports, % total trade	15.6	12	● ◆
5.3.3	ICT services imports, % total trade	0.2	123	○ ◇
5.3.4	FDI net inflows, % GDP	1.7	90	
5.3.5	Research talent, % in business enterprise	60.8	13	◆
KNOWLEDGE & TECHNOLOGY OUTPUTS		**28.6**	**44**	
6.1	**Knowledge creation**	**18.1**	**54**	
6.1.1	Patents by origin/bn PPP$ GDP	0.7	76	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	60	
6.1.3	Utility models by origin/bn PPP$ GDP	2.1	10	● ◆
6.1.4	Scientific & technical articles/bn PPP$ GDP	4.8	90	
6.1.5	Citable documents H-index	21.2	38	
6.2	**Knowledge impact**	**33.5**	**32**	
6.2.1	Growth rate of PPP$ GDP/worker, %	3.6	21	
6.2.2	New businesses/th pop. 15-64	1.1	80	
6.2.3	Computer software spending, % GDP	0.0	61	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	6.4	43	
6.2.5	High- and medium-high-tech manufacturing, %	43.8	15	◆
6.3	**Knowledge diffusion**	**34.0**	**36**	◆
6.3.1	Intellectual property receipts, % total trade	0.0	71	
6.3.2	High-tech net exports, % total trade	14.4	9	● ◆
6.3.3	ICT services exports, % total trade	0.2	117	○
6.3.4	FDI net outflows, % GDP	3.8	15	● ◆
CREATIVE OUTPUTS		**27.3**	**52**	
7.1	**Intangible assets**	**29.0**	**57**	
7.1.1	Trademarks by origin/bn PPP$ GDP	24.9	85	
7.1.2	Global brand value, top 5,000, % GDP	63.9	29	
7.1.3	Industrial designs by origin/bn PPP$ GDP	3.1	37	
7.1.4	ICTs & organizational model creation†	60.3	43	◆
7.2	**Creative goods and services**	**37.9**	**14**	● ◆
7.2.1	Cultural & creative services exports, % total trade	0.0	103	○
7.2.2	National feature films/mn pop. 15-69	1.5	75	
7.2.3	Entertainment & Media market/th pop. 15-69	9.3	38	
7.2.4	Printing and other media, % manufacturing	0.8	75	
7.2.5	Creative goods exports, % total trade	7.8	1	● ◆
7.3	**Online creativity**	**13.2**	**73**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	5.4	52	
7.3.2	Country-code TLDs/th pop. 15-69	0.4	100	
7.3.3	Wikipedia edits/mn pop. 15-69	46.3	68	
7.3.4	Mobile app creation/bn PPP$ GDP	3.8	58	

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

TOGO

GII 2020 rank

125

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
127	**121**	**Low**	**SSF**	**8.1**	**15.0**	**1,594.0**	**126**

		Score/Value	Rank	
INSTITUTIONS		**56.3**	**90**	
1.1	**Political environment**	**39.1**	**122**	
1.1.1	Political and operational stability*	64.3	83	
1.1.2	Government effectiveness*	26.5	126	
1.2	**Regulatory environment**	**58.9**	**81**	
1.2.1	Regulatory quality*	24.6	110	
1.2.2	Rule of law*	31.3	101	
1.2.3	Cost of redundancy dismissal, salary weeks	13.1	47	●
1.3	**Business environment**	**71.1**	**67**	◆
1.3.1	Ease of starting a business*	95.1	14	● ◆
1.3.2	Ease of resolving insolvency*	47.0	80	
HUMAN CAPITAL & RESEARCH		**16.0**	**109**	
2.1	**Education**	**36.4**	**90**	
2.1.1	Expenditure on education, % GDP	5.4	25	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap.	15.3	76	
2.1.3	School life expectancy, years	12.7	85	◆
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	26.2	110	
2.2	**Tertiary education**	**10.1**	**[114]**	
2.2.1	Tertiary enrolment, % gross	14.5	100	
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research & development (R&D)**	**1.4**	**104**	
2.3.1	Researchers, FTE/mn pop.	38.8	97	
2.3.2	Gross expenditure on R&D, % GDP	0.3	84	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**24.3**	**116**	
3.1	**Information & communication technologies (ICTs)**	**40.3**	**108**	
3.1.1	ICT access*	36.3	114	◆
3.1.2	ICT use*	15.0	119	
3.1.3	Government's online service*	55.6	99	
3.1.4	E-participation*	54.5	99	
3.2	**General infrastructure**	**19.2**	**102**	
3.2.1	Electricity output, kWh/mn pop.	29.7	120	○
3.2.2	Logistics performance*	17.7	110	
3.2.3	Gross capital formation, % GDP	28.3	32	●
3.3	**Ecological sustainability**	**13.2**	**130**	○
3.3.1	GDP/unit of energy use	3.2	118	○
3.3.2	Environmental performance*	29.5	121	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.9	65	◆
MARKET SOPHISTICATION		**34.3**	**121**	
4.1	**Credit**	**39.8**	**71**	
4.1.1	Ease of getting credit*	70.0	44	
4.1.2	Domestic credit to private sector, % GDP	36.9	83	
4.1.3	Microfinance gross loans, % GDP	2.0	13	●
4.2	**Investment**	**42.0**	**[47]**	
4.2.1	Ease of protecting minority investors*	42.0	102	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**21.3**	**131**	○ ◇
4.3.1	Applied tariff rate, weighted avg., %	12.9	128	○ ◇
4.3.2	Intensity of local competition†	n/a	n/a	
4.3.3	Domestic market scale, bn PPP$	15.0	129	○ ◇

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**14.2**	**[129]**	
5.1	**Knowledge workers**	**23.5**	**[89]**	
5.1.1	Knowledge-intensive employment, %	14.1	94	◆
5.1.2	Firms offering formal training, %	33.7	42	● ◆
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, %	0.9	110	
5.2	**Innovation linkages**	**3.1**	**[129]**	
5.2.1	University/industry research collaboration†	n/a	n/a	
5.2.2	State of cluster development†	n/a	n/a	
5.2.3	GERD financed by abroad, % GDP	0.0	71	◇
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	67	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	101	○ ◇
5.3	**Knowledge absorption**	**16.2**	**123**	
5.3.1	Intellectual property payments, % total trade	0.0	110	
5.3.2	High-tech imports, % total trade	4.4	116	
5.3.3	ICT services imports, % total trade	0.8	89	
5.3.4	FDI net inflows, % GDP	0.9	113	
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**7.8**	**126**	
6.1	**Knowledge creation**	**4.6**	**110**	
6.1.1	Patents by origin/bn PPP$ GDP	0.2	99	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	100	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	5.3	85	
6.1.5	Citable documents H-index	1.8	129	○ ◇
6.2	**Knowledge impact**	**4.0**	**[126]**	
6.2.1	Growth rate of PPP$ GDP/worker, %	n/a	n/a	
6.2.2	New businesses/th pop. 15-64	0.6	92	
6.2.3	Computer software spending, % GDP	0.0	95	◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.1	99	
6.2.5	High- and medium-high-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**14.8**	**95**	
6.3.1	Intellectual property receipts, % total trade	0.0	104	○
6.3.2	High-tech net exports, % total trade	0.0	125	
6.3.3	ICT services exports, % total trade	2.0	54	●
6.3.4	FDI net outflows, % GDP	2.3	30	● ◆
CREATIVE OUTPUTS		**8.3**	**[121]**	
7.1	**Intangible assets**	**11.7**	**125**	
7.1.1	Trademarks by origin/bn PPP$ GDP	43.0	60	◆
7.1.2	Global brand value, top 5,000, % GDP	28.3	45	● ◆
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.2	99	
7.1.4	ICTs & organizational model creation†	n/a	n/a	
7.2	**Creative goods and services**	**9.6**	**[79]**	
7.2.1	Cultural & creative services exports, % total trade	1.3	18	● ◆
7.2.2	National feature films/mn pop. 15-69	0.7	95	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.0	114	
7.3	**Online creativity**	**0.3**	**[125]**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.6	102	◆
7.3.2	Country-code TLDs/th pop. 15-69	0.1	120	
7.3.3	Wikipedia edits/mn pop. 15-69	n/a	n/a	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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

TRINIDAD AND TOBAGO

GII 2020 rank

98

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
111	**87**	**High**	**LCN**	**1.4**	**45.2**	**28,561.4**	**91**

		Score/Value	Rank	
INSTITUTIONS		**62.5**	**68**	◇
1.1	**Political environment**	**60.1**	**58**	● ◇
1.1.1	Political and operational stability*	71.4	59	◇
1.1.2	Government effectiveness*	54.4	58	● ◇
1.2	**Regulatory environment**	**58.8**	**82**	◇
1.2.1	Regulatory quality*	41.2	69	◇
1.2.2	Rule of law*	43.5	68	◇
1.2.3	Cost of redundancy dismissal, salary weeks	20.5	86	
1.3	**Business environment**	**68.5**	**74**	◇
1.3.1	Ease of starting a business*	88.6	64	●
1.3.2	Ease of resolving insolvency*	48.4	75	◇
HUMAN CAPITAL & RESEARCH		**30.0**	**[65]**	
2.1	**Education**	**58.1**	**[20]**	
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, & science	423.0	54	
2.1.5	Pupil-teacher ratio, secondary	13.5	64	◇
2.2	**Tertiary education**	**n/a**	**[n/a]**	
2.2.1	Tertiary enrolment, % gross	n/a	n/a	
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research & development (R&D)**	**1.9**	**98**	◇
2.3.1	Researchers, FTE/mn pop	517.3	66	◇
2.3.2	Gross expenditure on R&D, % GDP	0.1	109	○ ◇
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**34.1**	**91**	◇
3.1	**Information & communication technologies (ICTs)**	**62.6**	**77**	◇
3.1.1	ICT access*	75.7	41	●
3.1.2	ICT use*	53.0	71	◇
3.1.3	Government's online service*	63.9	86	◇
3.1.4	E-participation*	57.9	94	◇
3.2	**General infrastructure**	**22.6**	**83**	◇
3.2.1	Electricity output, kWh/mn pop	8,053.5	22	●
3.2.2	Logistics performance*	16.2	113	○ ◇
3.2.3	Gross capital formation, % GDP	n/a	n/a	
3.3	**Ecological sustainability**	**17.1**	**114**	◇
3.3.1	GDP/unit of energy use	2.3	122	○ ◇
3.3.2	Environmental performance*	47.5	63	● ◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.5	81	◇
MARKET SOPHISTICATION		**38.7**	**109**	◇
4.1	**Credit**	**32.4**	**101**	◇
4.1.1	Ease of getting credit*	65.0	61	
4.1.2	Domestic credit to private sector, % GDP	39.7	81	◇
4.1.3	Microfinance gross loans, % GDP	0.0	74	
4.2	**Investment**	**33.7**	**81**	
4.2.1	Ease of protecting minority investors*	64.0	56	●
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	54	
4.3	**Trade, competition, and market scale**	**50.1**	**116**	◇
4.3.1	Applied tariff rate, weighted avg., %	8.6	108	◇
4.3.2	Intensity of local competition†	66.9	74	
4.3.3	Domestic market scale, bn PPP$	45.2	106	◇

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**18.0**	**109**	◇
5.1	**Knowledge workers**	**23.8**	**87**	◇
5.1.1	Knowledge-intensive employment, %	29.8	47	●
5.1.2	Firms offering formal training, %	28.0	54	
5.1.3	GERD performed by business, % GDP	0.0	85	◇
5.1.4	GERD financed by business, %	8.2	78	◇
5.1.5	Females employed w/advanced degrees, %	12.8	55	●
5.2	**Innovation linkages**	**14.4**	**114**	◇
5.2.1	University/industry research collaboration†	32.3	103	◇
5.2.2	State of cluster development†	42.3	86	◇
5.2.3	GERD financed by abroad, % GDP	0.0	70	◇
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	107	◇
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.1	58	●
5.3	**Knowledge absorption**	**15.9**	**126**	○ ◇
5.3.1	Intellectual property payments, % total trade	0.5	62	
5.3.2	High-tech imports, % total trade	6.5	85	
5.3.3	ICT services imports, % total trade	0.4	112	◇
5.3.4	FDI net inflows, % GDP	-1.6	127	○
5.3.5	Research talent, % in business enterprise	1.1	78	◇
KNOWLEDGE & TECHNOLOGY OUTPUTS		**9.2**	**121**	○ ◇
6.1	**Knowledge creation**	**3.1**	**122**	○ ◇
6.1.1	Patents by origin/bn PPP$ GDP	0.1	116	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	72	◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	66	○
6.1.4	Scientific & technical articles/bn PPP$ GDP	2.9	107	◇
6.1.5	Citable documents H-index	5.0	105	◇
6.2	**Knowledge impact**	**17.2**	**[91]**	
6.2.1	Growth rate of PPP$ GDP/worker, %	0.1	89	
6.2.2	New businesses/th pop. 15-64	n/a	n/a	
6.2.3	Computer software spending, % GDP	n/a	n/a	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.6	91	◇
6.2.5	High- and medium-high-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**7.4**	**130**	○ ◇
6.3.1	Intellectual property receipts, % total trade	0.0	83	
6.3.2	High-tech net exports, % total trade	0.0	121	○ ◇
6.3.3	ICT services exports, % total trade	0.1	122	○ ◇
6.3.4	FDI net outflows, % GDP	0.0	113	
CREATIVE OUTPUTS		**14.0**	**99**	◇
7.1	**Intangible assets**	**18.4**	**101**	◇
7.1.1	Trademarks by origin/bn PPP$ GDP	14.0	104	◇
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	3.6	35	●
7.1.4	ICTs & organizational model creation†	49.8	83	◇
7.2	**Creative goods and services**	**1.8**	**[120]**	
7.2.1	Cultural & 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 & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.1	89	
7.3	**Online creativity**	**17.3**	**62**	● ◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	4.1	59	● ◇
7.3.2	Country-code TLDs/th pop. 15-69	1.5	74	◇
7.3.3	Wikipedia edits/mn pop. 15-69	49.0	62	◇
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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

TUNISIA

GII 2020 rank

65

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
59	78	Lower middle	NAWA	11.7	149.2	11,053.7	70

		Score/Value	Rank	
INSTITUTIONS		**61.1**	**75**	◆
1.1	**Political environment**	**52.7**	**84**	
1.1.1	Political and operational stability*	62.5	92	
1.1.2	Government effectiveness*	47.8	79	
1.2	**Regulatory environment**	**56.2**	**90**	
1.2.1	Regulatory quality*	30.9	101	
1.2.2	Rule of law*	47.7	60	◆
1.2.3	Cost of redundancy dismissal, salary weeks	21.6	91	
1.3	**Business environment**	**74.4**	**54**	◆
1.3.1	Ease of starting a business*	94.6	18	● ◆
1.3.2	Ease of resolving insolvency*	54.2	64	
HUMAN CAPITAL & RESEARCH		**40.7**	**38**	● ◆
2.1	**Education**	**66.0**	**9**	● ◆
2.1.1	Expenditure on education, % GDP	6.6	8	● ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	52.4	1	● ◆
2.1.3	School life expectancy, years	15.1	49	◆
2.1.4	PISA scales in reading, maths, & science	371.4	74	○
2.1.5	Pupil-teacher ratio, secondary	13.6	67	
2.2	**Tertiary education**	**47.8**	**21**	● ◆
2.2.1	Tertiary enrolment, % gross	31.7	79	
2.2.2	Graduates in science & engineering, %	43.3	2	● ◆
2.2.3	Tertiary inbound mobility, %	2.2	75	
2.3	**Research & development (R&D)**	**8.3**	**64**	
2.3.1	Researchers, FTE/mn pop	1,771.6	43	◆
2.3.2	Gross expenditure on R&D, % GDP	0.6	56	◆
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**38.2**	**74**	◆
3.1	**Information & communication technologies (ICTs)**	**67.5**	**65**	◆
3.1.1	ICT access*	58.0	78	◆
3.1.2	ICT use*	51.6	76	◆
3.1.3	Government's online service*	80.6	44	◆
3.1.4	E-participation*	79.8	53	◆
3.2	**General infrastructure**	**16.5**	**117**	○
3.2.1	Electricity output, kWh/mn pop	1,785.7	82	
3.2.2	Logistics performance*	23.4	100	
3.2.3	Gross capital formation, % GDP	20.3	96	
3.3	**Ecological sustainability**	**30.5**	**61**	◆
3.3.1	GDP/unit of energy use	10.9	45	
3.3.2	Environmental performance*	46.7	65	◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.6	52	◆
MARKET SOPHISTICATION		**37.0**	**112**	○
4.1	**Credit**	**33.2**	**98**	
4.1.1	Ease of getting credit*	50.0	94	
4.1.2	Domestic credit to private sector, % GDP	68.0	47	
4.1.3	Microfinance gross loans, % GDP	0.5	34	
4.2	**Investment**	**24.5**	**117**	○
4.2.1	Ease of protecting minority investors*	62.0	60	
4.2.2	Market capitalization, % GDP	21.2	55	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	61	
4.3	**Trade, competition, and market scale**	**53.3**	**102**	
4.3.1	Applied tariff rate, weighted avg., %	9.4	110	○
4.3.2	Intensity of local competition†	65.0	82	
4.3.3	Domestic market scale, bn PPP$	149.2	74	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**18.0**	**110**	○
5.1	**Knowledge workers**	**22.3**	**93**	
5.1.1	Knowledge-intensive employment, %	20.9	75	
5.1.2	Firms offering formal training, %	28.9	52	
5.1.3	GERD performed by business, % GDP	0.1	58	
5.1.4	GERD financed by business, %	18.9	66	
5.1.5	Females employed w/advanced degrees, %	7.6	80	
5.2	**Innovation linkages**	**13.7**	**118**	○
5.2.1	University/industry research collaboration†	35.7	95	
5.2.2	State of cluster development†	38.1	104	○
5.2.3	GERD financed by abroad, % GDP	0.0	64	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	117	○
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	92	
5.3	**Knowledge absorption**	**17.9**	**114**	○
5.3.1	Intellectual property payments, % total trade	0.1	103	○ ◇
5.3.2	High-tech imports, % total trade	8.9	48	
5.3.3	ICT services imports, % total trade	0.4	107	
5.3.4	FDI net inflows, % GDP	2.0	83	
5.3.5	Research talent, % in business enterprise	5.2	72	○
KNOWLEDGE & TECHNOLOGY OUTPUTS		**25.8**	**52**	◆
6.1	**Knowledge creation**	**25.8**	**38**	● ◆
6.1.1	Patents by origin/bn PPP$ GDP	1.2	60	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	70	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	26.5	13	● ◆
6.1.5	Citable documents H-index	11.0	69	
6.2	**Knowledge impact**	**23.3**	**67**	
6.2.1	Growth rate of PPP$ GDP/worker, %	1.4	56	
6.2.2	New businesses/th pop. 15-64	1.7	60	
6.2.3	Computer software spending, % GDP	0.0	34	●
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	6.5	41	● ◆
6.2.5	High- and medium-high-tech manufacturing, %	14.1	68	
6.3	**Knowledge diffusion**	**28.3**	**47**	
6.3.1	Intellectual property receipts, % total trade	0.1	55	
6.3.2	High-tech net exports, % total trade	4.3	37	●
6.3.3	ICT services exports, % total trade	1.5	68	
6.3.4	FDI net outflows, % GDP	2.3	31	● ◆
CREATIVE OUTPUTS		**21.1**	**[63]**	
7.1	**Intangible assets**	**30.4**	**[50]**	
7.1.1	Trademarks by origin/bn PPP$ GDP	n/a	n/a	
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.1	63	
7.1.4	ICTs & organizational model creation†	42.7	105	○
7.2	**Creative goods and services**	**14.4**	**[67]**	
7.2.1	Cultural & creative services exports, % total trade	n/a	n/a	
7.2.2	National feature films/mn pop. 15-69	1.4	78	
7.2.3	Entertainment & Media market/th pop. 15-69	1.2	57	○
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	2.0	29	●
7.3	**Online creativity**	**9.1**	**89**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	2.8	68	◆
7.3.2	Country-code TLDs/th pop. 15-69	1.6	72	
7.3.3	Wikipedia edits/mn pop. 15-69	35.3	89	
7.3.4	Mobile app creation/bn PPP$ GDP	0.1	82	

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

TURKEY

GII 2020 rank

51

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
53	52	Upper middle	NAWA	83.4	2,346.6	24,675.5	49

		Score/Value	Rank	
INSTITUTIONS		**55.4**	**94**	
1.1	**Political environment**	**54.4**	**77**	
1.1.1	Political and operational stability*	62.5	92	
1.1.2	Government effectiveness*	50.3	71	
1.2	**Regulatory environment**	**48.2**	**108**	○
1.2.1	Regulatory quality*	40.5	74	
1.2.2	Rule of law*	38.3	82	
1.2.3	Cost of redundancy dismissal, salary weeks	29.8	117	○ ◇
1.3	**Business environment**	**63.6**	**91**	
1.3.1	Ease of starting a business*	88.8	62	
1.3.2	Ease of resolving insolvency*	38.5	104	○ ◇
HUMAN CAPITAL & RESEARCH		**38.4**	**42**	◆
2.1	**Education**	**67.4**	**[7]**	
2.1.1	Expenditure on education, % GDP	n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	18.0	12	● ◆
2.1.4	PISA scales in reading, maths, & science	462.5	41	
2.1.5	Pupil-teacher ratio, secondary	17.3	84	
2.2	**Tertiary education**	**21.5**	**91**	
2.2.1	Tertiary enrolment, % gross	n/a	n/a	
2.2.2	Graduates in science & engineering, %	20.2	73	
2.2.3	Tertiary inbound mobility, %	1.5	80	
2.3	**Research & development (R&D)**	**26.4**	**40**	◆
2.3.1	Researchers, FTE/mn pop	1,379.4	46	
2.3.2	Gross expenditure on R&D, % GDP	1.0	39	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	45.9	33	◆
2.3.4	QS university ranking, average score top 3*	23.9	45	
INFRASTRUCTURE		**45.0**	**54**	
3.1	**Information & communication technologies (ICTs)**	**74.5**	**49**	
3.1.1	ICT access*	65.8	66	
3.1.2	ICT use*	57.5	61	
3.1.3	Government's online service*	88.9	27	◆
3.1.4	E-participation*	86.0	37	
3.2	**General infrastructure**	**28.8**	**57**	
3.2.1	Electricity output, kWh/mn pop	3,729.6	54	
3.2.2	Logistics performance*	50.5	46	◆
3.2.3	Gross capital formation, % GDP	25.6	47	
3.3	**Ecological sustainability**	**31.8**	**55**	
3.3.1	GDP/unit of energy use	13.9	16	●
3.3.2	Environmental performance*	42.6	84	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.1	57	
MARKET SOPHISTICATION		**54.7**	**28**	
4.1	**Credit**	**41.8**	**66**	
4.1.1	Ease of getting credit*	75.0	34	
4.1.2	Domestic credit to private sector, % GDP	68.5	46	
4.1.3	Microfinance gross loans, % GDP	0.0	76	○
4.2	**Investment**	**42.9**	**44**	
4.2.1	Ease of protecting minority investors*	76.0	21	●
4.2.2	Market capitalization, % GDP	22.0	54	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**79.3**	**7**	● ◆
4.3.1	Applied tariff rate, weighted avg., %	2.5	62	
4.3.2	Intensity of local competition†	80.5	6	● ◆
4.3.3	Domestic market scale, bn PPP$	2,346.6	13	● ◆

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**28.2**	**57**	
5.1	**Knowledge workers**	**34.2**	**59**	
5.1.1	Knowledge-intensive employment, %	21.6	73	
5.1.2	Firms offering formal training, %	30.7	48	
5.1.3	GERD performed by business, % GDP	0.5	36	
5.1.4	GERD financed by business, %	49.4	28	
5.1.5	Females employed w/advanced degrees, %	9.3	71	
5.2	**Innovation linkages**	**17.4**	**91**	
5.2.1	University/industry research collaboration†	40.6	70	
5.2.2	State of cluster development†	47.5	64	
5.2.3	GERD financed by abroad, % GDP	0.0	59	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	106	○
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.2	50	
5.3	**Knowledge absorption**	**33.1**	**48**	
5.3.1	Intellectual property payments, % total trade	0.3	76	
5.3.2	High-tech imports, % total trade	8.2	55	
5.3.3	ICT services imports, % total trade	0.2	124	○ ◇
5.3.4	FDI net inflows, % GDP	1.6	97	
5.3.5	Research talent, % in business enterprise	55.7	19	◆
KNOWLEDGE & TECHNOLOGY OUTPUTS		**23.2**	**57**	
6.1	**Knowledge creation**	**24.9**	**40**	
6.1.1	Patents by origin/bn PPP$ GDP	3.4	30	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.9	28	◆
6.1.3	Utility models by origin/bn PPP$ GDP	1.2	20	
6.1.4	Scientific & technical articles/bn PPP$ GDP	9.5	54	
6.1.5	Citable documents H-index	27.9	35	◆
6.2	**Knowledge impact**	**30.1**	**42**	
6.2.1	Growth rate of PPP$ GDP/worker, %	2.6	37	
6.2.2	New businesses/th pop. 15-64	1.6	65	
6.2.3	Computer software spending, % GDP	0.0	20	● ◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	3.5	67	
6.2.5	High- and medium-high-tech manufacturing, %	25.8	42	
6.3	**Knowledge diffusion**	**14.7**	**96**	
6.3.1	Intellectual property receipts, % total trade	0.0	90	○
6.3.2	High-tech net exports, % total trade	1.3	64	
6.3.3	ICT services exports, % total trade	0.1	124	○
6.3.4	FDI net outflows, % GDP	0.4	81	
CREATIVE OUTPUTS		**27.7**	**50**	
7.1	**Intangible assets**	**38.8**	**31**	
7.1.1	Trademarks by origin/bn PPP$ GDP	91.8	17	●
7.1.2	Global brand value, top 5,000, % GDP	30.4	44	
7.1.3	Industrial designs by origin/bn PPP$ GDP	15.4	6	● ◆
7.1.4	ICTs & organizational model creation†	44.2	100	○
7.2	**Creative goods and services**	**17.2**	**60**	
7.2.1	Cultural & creative services exports, % total trade	0.0	92	○
7.2.2	National feature films/mn pop. 15-69	2.6	62	
7.2.3	Entertainment & Media market/th pop. 15-69	4.5	48	
7.2.4	Printing and other media, % manufacturing	0.8	73	
7.2.5	Creative goods exports, % total trade	3.0	19	●
7.3	**Online creativity**	**15.8**	**69**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	11.5	36	◆
7.3.2	Country-code TLDs/th pop. 15-69	2.1	69	
7.3.3	Wikipedia edits/mn pop. 15-69	23.8	101	○ ◇
7.3.4	Mobile app creation/bn PPP$ GDP	29.9	19	● ◆

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

UGANDA

GII 2020 rank

114

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
123	**103**	**Low**	**SSF**	**44.3**	**104.8**	**2,296.5**	**102**

		Score/Value	Rank	
INSTITUTIONS		**56.5**	**89**	
1.1	**Political environment**	**44.0**	**107**	
1.1.1	Political and operational stability*	58.9	104	
1.1.2	Government effectiveness*	36.6	107	
1.2	**Regulatory environment**	**67.9**	**55**	● ◆
1.2.1	Regulatory quality*	35.2	93	◆
1.2.2	Rule of law*	39.0	80	
1.2.3	Cost of redundancy dismissal, salary weeks	8.7	20	● ◆
1.3	**Business environment**	**57.5**	**111**	
1.3.1	Ease of starting a business*	71.4	122	◇
1.3.2	Ease of resolving insolvency*	43.6	89	
HUMAN CAPITAL & RESEARCH		**8.5**	**130**	○ ◇
2.1	**Education**	**7.2**	**[131]**	
2.1.1	Expenditure on education, % GDP	2.5	108	◇
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, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	n/a	n/a	
2.2	**Tertiary education**	**17.4**	**101**	◆
2.2.1	Tertiary enrolment, % gross	4.8	119	○
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	10.7	18	● ◆
2.3	**Research & development (R&D)**	**0.8**	**108**	
2.3.1	Researchers, FTE/mn pop.	27.8	104	○
2.3.2	Gross expenditure on R&D, % GDP	0.2	94	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**29.7**	**102**	
3.1	**Information & communication technologies (ICTs)**	**41.2**	**106**	
3.1.1	ICT access*	26.6	124	○
3.1.2	ICT use*	19.1	116	
3.1.3	Government's online service*	56.9	93	
3.1.4	E-participation*	62.4	85	
3.2	**General infrastructure**	**28.7**	**60**	●
3.2.1	Electricity output, kWh/mn pop	n/a	n/a	
3.2.2	Logistics performance*	23.7	98	
3.2.3	Gross capital formation, % GDP	29.4	27	●
3.3	**Ecological sustainability**	**19.1**	**108**	
3.3.1	GDP/unit of energy use	n/a	n/a	
3.3.2	Environmental performance*	35.6	101	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.3	94	
MARKET SOPHISTICATION		**47.9**	**63**	◆
4.1	**Credit**	**31.1**	**104**	
4.1.1	Ease of getting credit*	60.0	74	
4.1.2	Domestic credit to private sector, % GDP	16.2	115	
4.1.3	Microfinance gross loans, % GDP	1.7	19	●
4.2	**Investment**	**56.0**	**[19]**	
4.2.1	Ease of protecting minority investors*	56.0	82	◆
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**56.5**	**91**	◆
4.3.1	Applied tariff rate, weighted avg., %	8.0	104	
4.3.2	Intensity of local competition†	72.4	44	● ◆
4.3.3	Domestic market scale, bn PPP$	104.8	79	◆

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**17.6**	**115**	
5.1	**Knowledge workers**	**12.5**	**120**	
5.1.1	Knowledge-intensive employment, %	10.3	105	
5.1.2	Firms offering formal training, %	34.7	41	● ◆
5.1.3	GERD performed by business, % GDP	0.0	86	
5.1.4	GERD financed by business, %	3.4	89	
5.1.5	Females employed w/advanced degrees, %	0.2	120	○ ◇
5.2	**Innovation linkages**	**24.1**	**52**	●
5.2.1	University/industry research collaboration†	42.9	60	●
5.2.2	State of cluster development†	42.0	89	
5.2.3	GERD financed by abroad, % GDP	0.1	42	●
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	73	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	n/a	n/a	
5.3	**Knowledge absorption**	**16.1**	**124**	○
5.3.1	Intellectual property payments, % total trade	0.3	83	
5.3.2	High-tech imports, % total trade	6.2	93	
5.3.3	ICT services imports, % total trade	0.4	110	
5.3.4	FDI net inflows, % GDP	3.5	44	●
5.3.5	Research talent, % in business enterprise	4.0	74	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**10.5**	**113**	
6.1	**Knowledge creation**	**7.1**	**87**	
6.1.1	Patents by origin/bn PPP$ GDP	0.1	123	○
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	92	◆
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	5.6	80	
6.1.5	Citable documents H-index	10.6	74	◆
6.2	**Knowledge impact**	**12.7**	**113**	
6.2.1	Growth rate of PPP$ GDP/worker, %	1.3	57	●
6.2.2	New businesses/th pop. 15-64	0.9	86	
6.2.3	Computer software spending, % GDP	0.0	121	○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.0	107	
6.2.5	High- and medium-high-tech manufacturing, %	n/a	n/a	
6.3	**Knowledge diffusion**	**11.6**	**113**	
6.3.1	Intellectual property receipts, % total trade	0.1	64	
6.3.2	High-tech net exports, % total trade	0.3	91	
6.3.3	ICT services exports, % total trade	0.8	88	
6.3.4	FDI net outflows, % GDP	0.0	118	
CREATIVE OUTPUTS		**7.6**	**125**	○
7.1	**Intangible assets**	**14.1**	**114**	
7.1.1	Trademarks by origin/bn PPP$ GDP	15.2	101	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.3	93	
7.1.4	ICTs & organizational model creation†	42.7	104	
7.2	**Creative goods and services**	**1.3**	**[122]**	
7.2.1	Cultural & 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 & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.1	102	
7.3	**Online creativity**	**1.1**	**123**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.2	116	
7.3.2	Country-code TLDs/th pop. 15-69	0.1	119	
7.3.3	Wikipedia edits/mn pop. 15-69	8.0	120	○ ◇
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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

UKRAINE

GII 2020 rank

45

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
37	71	Lower middle	EUR	44.0	409.3	8,533.5	47

		Score/Value	Rank	
INSTITUTIONS		**55.6**	**93**	
1.1	**Political environment**	**44.5**	**105**	○
1.1.1	Political and operational stability*	51.8	123	○ ◇
1.1.2	Government effectiveness*	40.9	93	
1.2	**Regulatory environment**	**61.0**	**76**	
1.2.1	Regulatory quality*	36.0	88	
1.2.2	Rule of law*	28.0	109	○
1.2.3	Cost of redundancy dismissal, salary weeks	13.0	41	
1.3	**Business environment**	**61.2**	**104**	○
1.3.1	Ease of starting a business*	91.1	52	
1.3.2	Ease of resolving insolvency*	31.4	117	○
HUMAN CAPITAL & RESEARCH		**40.5**	**39**	◆
2.1	**Education**	**56.9**	**23**	◆
2.1.1	Expenditure on education, % GDP	5.4	26	
2.1.2	Government funding/pupil, secondary, % GDP/cap	30.3	12	● ◆
2.1.3	School life expectancy, years	14.9	54	◆
2.1.4	PISA scales in reading, maths, & science	462.7	40	◆
2.1.5	Pupil-teacher ratio, secondary	7.3	3	● ◆
2.2	**Tertiary education**	**43.9**	**32**	◆
2.2.1	Tertiary enrolment, % gross	82.7	14	● ◆
2.2.2	Graduates in science & engineering, %	25.3	35	
2.2.3	Tertiary inbound mobility, %	3.1	65	
2.3	**Research & development (R&D)**	**20.5**	**44**	◆
2.3.1	Researchers, FTE/mn pop	988.1	52	◆
2.3.2	Gross expenditure on R&D, % GDP	0.5	69	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	39.8	38	◆
2.3.4	QS university ranking, average score top 3*	21.2	49	◆
INFRASTRUCTURE		**33.1**	**94**	
3.1	**Information & communication technologies (ICTs)**	**58.8**	**82**	
3.1.1	ICT access*	65.9	65	◆
3.1.2	ICT use*	43.7	89	
3.1.3	Government's online service*	56.9	93	
3.1.4	E-participation*	68.5	74	
3.2	**General infrastructure**	**20.2**	**95**	
3.2.1	Electricity output, kWh/mn pop	3,445.5	58	◆
3.2.2	Logistics performance*	35.7	65	
3.2.3	Gross capital formation, % GDP	19.3	102	○
3.3	**Ecological sustainability**	**20.2**	**99**	
3.3.1	GDP/unit of energy use	3.7	117	○ ◇
3.3.2	Environmental performance*	49.5	57	◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.7	68	
MARKET SOPHISTICATION		**42.1**	**99**	
4.1	**Credit**	**35.3**	**86**	
4.1.1	Ease of getting credit*	75.0	34	
4.1.2	Domestic credit to private sector, % GDP	34.1	88	
4.1.3	Microfinance gross loans, % GDP	0.0	78	○
4.2	**Investment**	**23.8**	**121**	○
4.2.1	Ease of protecting minority investors*	68.0	44	
4.2.2	Market capitalization, % GDP	4.0	71	○
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	64	○
4.3	**Trade, competition, and market scale**	**67.2**	**45**	
4.3.1	Applied tariff rate, weighted avg., %	1.6	18	● ◆
4.3.2	Intensity of local competition†	64.4	83	
4.3.3	Domestic market scale, bn PPP$	409.3	48	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**29.5**	**54**	◆
5.1	**Knowledge workers**	**39.0**	**47**	◆
5.1.1	Knowledge-intensive employment, %	37.7	32	◆
5.1.2	Firms offering formal training, %	24.3	63	
5.1.3	GERD performed by business, % GDP	0.3	48	◆
5.1.4	GERD financed by business, %	30.5	58	
5.1.5	Females employed w/advanced degrees, %	30.4	3	● ◆
5.2	**Innovation linkages**	**18.8**	**81**	
5.2.1	University/industry research collaboration†	45.5	50	
5.2.2	State of cluster development†	40.9	91	
5.2.3	GERD financed by abroad, % GDP	0.1	36	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	113	○
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.1	52	◆
5.3	**Knowledge absorption**	**30.6**	**59**	
5.3.1	Intellectual property payments, % total trade	0.8	48	
5.3.2	High-tech imports, % total trade	9.9	33	
5.3.3	ICT services imports, % total trade	1.0	74	
5.3.4	FDI net inflows, % GDP	2.7	63	
5.3.5	Research talent, % in business enterprise	27.3	47	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**35.1**	**25**	◆
6.1	**Knowledge creation**	**41.6**	**23**	◆
6.1.1	Patents by origin/bn PPP$ GDP	5.4	20	◆
6.1.2	PCT patents by origin/bn PPP$ GDP	0.5	36	◆
6.1.3	Utility models by origin/bn PPP$ GDP	23.0	1	● ◆
6.1.4	Scientific & technical articles/bn PPP$ GDP	9.5	55	
6.1.5	Citable documents H-index	16.8	50	
6.2	**Knowledge impact**	**28.7**	**45**	◆
6.2.1	Growth rate of PPP$ GDP/worker, %	2.4	39	
6.2.2	New businesses/th pop. 15-64	1.7	61	
6.2.3	Computer software spending, % GDP	0.0	19	◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	4.5	58	◆
6.2.5	High- and medium-high-tech manufacturing, %	16.8	61	
6.3	**Knowledge diffusion**	**35.0**	**32**	◆
6.3.1	Intellectual property receipts, % total trade	0.1	46	
6.3.2	High-tech net exports, % total trade	1.9	56	
6.3.3	ICT services exports, % total trade	5.4	9	● ◆
6.3.4	FDI net outflows, % GDP	0.2	96	
CREATIVE OUTPUTS		**29.9**	**44**	◆
7.1	**Intangible assets**	**42.8**	**23**	◆
7.1.1	Trademarks by origin/bn PPP$ GDP	131.1	5	● ◆
7.1.2	Global brand value, top 5,000, % GDP	1.3	79	
7.1.3	Industrial designs by origin/bn PPP$ GDP	13.5	8	● ◆
7.1.4	ICTs & organizational model creation†	55.6	58	
7.2	**Creative goods and services**	**6.6**	**95**	
7.2.1	Cultural & creative services exports, % total trade	0.5	48	
7.2.2	National feature films/mn pop. 15-69	0.6	99	○
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	0.8	70	
7.2.5	Creative goods exports, % total trade	0.2	80	
7.3	**Online creativity**	**27.3**	**39**	◆
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	4.5	56	◆
7.3.2	Country-code TLDs/th pop. 15-69	5.1	54	◆
7.3.3	Wikipedia edits/mn pop. 15-69	67.7	43	◆
7.3.4	Mobile app creation/bn PPP$ GDP	33.8	15	● ◆

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

UNITED ARAB EMIRATES

GII 2020 rank

34

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
55	22	High	NAWA	9.8	746.4	60,618.6	36

		Score/Value	Rank	
INSTITUTIONS		**78.8**	**28**	
1.1	**Political environment**	**80.9**	**21**	
1.1.1	Political and operational stability*	78.6	38	
1.1.2	Government effectiveness*	82.1	19	
1.2	**Regulatory environment**	**83.5**	**22**	
1.2.1	Regulatory quality*	66.4	34	
1.2.2	Rule of law*	67.7	33	
1.2.3	Cost of redundancy dismissal, salary weeks	8.0	1	● ◆
1.3	**Business environment**	**72.0**	**61**	
1.3.1	Ease of starting a business*	94.8	16	
1.3.2	Ease of resolving insolvency*	49.3	72	
HUMAN CAPITAL & RESEARCH		**54.6**	**17**	
2.1	**Education**	**58.6**	**[17]**	
2.1.1	Expenditure on education, % GDP	n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	14.3	64	◇
2.1.4	PISA scales in reading, maths, & science	433.5	47	○
2.1.5	Pupil-teacher ratio, secondary 🕘	9.5	27	
2.2	**Tertiary education**	**66.4**	**2**	● ◆
2.2.1	Tertiary enrolment, % gross	n/a	n/a	
2.2.2	Graduates in science & engineering, %	27.7	25	
2.2.3	Tertiary inbound mobility, % 🕘	48.6	1	● ◆
2.3	**Research & development (R&D)**	**38.7**	**28**	
2.3.1	Researchers, FTE/mn pop	2,378.9	36	
2.3.2	Gross expenditure on R&D, % GDP	1.3	29	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	67.6	18	
2.3.4	QS university ranking, average score top 3*	32.8	36	
INFRASTRUCTURE		**57.5**	**17**	
3.1	**Information & communication technologies (ICTs)**	**89.5**	**11**	●
3.1.1	ICT access*	85.5	13	●
3.1.2	ICT use*	83.6	12	●
3.1.3	Government's online service*	94.4	14	●
3.1.4	E-participation*	94.4	17	
3.2	**General infrastructure**	**50.1**	**5**	● ◆
3.2.1	Electricity output, kWh/mn pop	14,314.2	8	●
3.2.2	Logistics performance*	88.5	11	● ◆
3.2.3	Gross capital formation, % GDP	28.7	30	
3.3	**Ecological sustainability**	**32.9**	**53**	
3.3.1	GDP/unit of energy use	9.2	66	
3.3.2	Environmental performance*	55.6	40	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.1	39	
MARKET SOPHISTICATION		**54.2**	**30**	
4.1	**Credit**	**52.1**	**27**	
4.1.1	Ease of getting credit*	70.0	44	
4.1.2	Domestic credit to private sector, % GDP	78.7	36	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**42.0**	**45**	
4.2.1	Ease of protecting minority investors*	80.0	13	◆
4.2.2	Market capitalization, % GDP	60.7	26	
4.2.3	Venture capital deals/bn PPP$ GDP	0.1	25	
4.3	**Trade, competition, and market scale**	**68.5**	**39**	
4.3.1	Applied tariff rate, weighted avg., %	4.4	83	○ ◇
4.3.2	Intensity of local competition†	71.0	49	
4.3.3	Domestic market scale, bn PPP$	746.4	33	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**46.3**	**22**	
5.1	**Knowledge workers**	**50.4**	**27**	
5.1.1	Knowledge-intensive employment, %	32.6	41	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	0.8	26	
5.1.4	GERD financed by business, % 🕘	74.3	5	● ◆
5.1.5	Females employed w/advanced degrees, %	8.6	78	○ ◇
5.2	**Innovation linkages**	**39.9**	**26**	
5.2.1	University/industry research collaboration†	59.9	22	
5.2.2	State of cluster development†	69.5	8	● ◆
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.1	18	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.1	62	
5.3	**Knowledge absorption**	**48.7**	**16**	
5.3.1	Intellectual property payments, % total trade	0.8	54	
5.3.2	High-tech imports, % total trade	13.2	18	
5.3.3	ICT services imports, % total trade	1.0	72	
5.3.4	FDI net inflows, % GDP	2.6	65	
5.3.5	Research talent, % in business enterprise	77.9	3	● ◆
KNOWLEDGE & TECHNOLOGY OUTPUTS		**16.2**	**78**	○ ◇
6.1	**Knowledge creation**	**5.6**	**104**	○ ◇
6.1.1	Patents by origin/bn PPP$ GDP	0.1	112	○
6.1.2	PCT patents by origin/bn PPP$ GDP	0.1	55	◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	71	○ ◇
6.1.4	Scientific & technical articles/bn PPP$ GDP	3.9	97	○ ◇
6.1.5	Citable documents H-index	12.2	61	
6.2	**Knowledge impact**	**21.9**	**72**	
6.2.1	Growth rate of PPP$ GDP/worker, %	0.7	70	○
6.2.2	New businesses/th pop. 15-64	3.0	48	
6.2.3	Computer software spending, % GDP	0.0	49	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	4.6	57	
6.2.5	High- and medium-high-tech manufacturing, %	18.5	58	
6.3	**Knowledge diffusion**	**21.1**	**71**	
6.3.1	Intellectual property receipts, % total trade	1.0	19	
6.3.2	High-tech net exports, % total trade	0.2	100	○ ◇
6.3.3	ICT services exports, % total trade	1.9	56	
6.3.4	FDI net outflows, % GDP	2.6	26	
CREATIVE OUTPUTS		**34.4**	**34**	
7.1	**Intangible assets**	**33.1**	**42**	
7.1.1	Trademarks by origin/bn PPP$ GDP	6.5	113	○ ◇
7.1.2	Global brand value, top 5,000, % GDP	128.9	16	
7.1.3	Industrial designs by origin/bn PPP$ GDP 🕘	0.1	107	○
7.1.4	ICTs & organizational model creation†	67.3	24	
7.2	**Creative goods and services**	**53.8**	**2**	● ◆
7.2.1	Cultural & creative services exports, % total trade	n/a	n/a	
7.2.2	National feature films/mn pop. 15-69	10.6	18	
7.2.3	Entertainment & Media market/th pop. 15-69	24.9	27	
7.2.4	Printing and other media, % manufacturing	1.6	26	
7.2.5	Creative goods exports, % total trade	7.0	8	● ◆
7.3	**Online creativity**	**17.5**	**61**	◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	10.6	38	
7.3.2	Country-code TLDs/th pop. 15-69	7.8	44	
7.3.3	Wikipedia edits/mn pop. 15-69	47.9	64	◇
7.3.4	Mobile app creation/bn PPP$ GDP	6.4	51	

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

UNITED KINGDOM

GII 2020 rank

4

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
3	6	High	EUR	67.5	3,131.2	40,881.3	5

		Score/Value	Rank	
INSTITUTIONS		**86.1**	**16**	
1.1	**Political environment**	**77.8**	**25**	◇
1.1.1	Political and operational stability*	73.2	49	○ ◇
1.1.2	Government effectiveness*	80.1	21	
1.2	**Regulatory environment**	**93.1**	**8**	
1.2.1	Regulatory quality*	88.3	9	
1.2.2	Rule of law*	89.4	15	
1.2.3	Cost of redundancy dismissal, salary weeks	9.3	25	
1.3	**Business environment**	**87.4**	**12**	
1.3.1	Ease of starting a business*	94.6	17	
1.3.2	Ease of resolving insolvency*	80.3	13	
HUMAN CAPITAL & RESEARCH		**58.0**	**10**	
2.1	**Education**	**55.2**	**35**	
2.1.1	Expenditure on education, % GDP 🕘	5.5	22	
2.1.2	Government funding/pupil, secondary, % GDP/cap	21.2	44	○
2.1.3	School life expectancy, years	17.5	16	
2.1.4	PISA scales in reading, maths, & science	503.5	12	
2.1.5	Pupil-teacher ratio, secondary 🕘	16.6	79	○ ◇
2.2	**Tertiary education**	**51.3**	**15**	
2.2.1	Tertiary enrolment, % gross	60.0	46	○
2.2.2	Graduates in science & engineering, % 🕘	26.3	31	
2.2.3	Tertiary inbound mobility, %	17.9	8	◆
2.3	**Research & development (R&D)**	**67.6**	**9**	
2.3.1	Researchers, FTE/mn pop	4,603.3	20	
2.3.2	Gross expenditure on R&D, % GDP	1.7	21	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	84.8	8	
2.3.4	QS university ranking, average score top 3*	95.7	2	● ◆
INFRASTRUCTURE		**60.3**	**6**	●
3.1	**Information & communication technologies (ICTs)**	**93.6**	**1**	● ◆
3.1.1	ICT access*	91.5	4	● ◆
3.1.2	ICT use*	86.5	6	●
3.1.3	Government's online service*	97.9	4	●
3.1.4	E-participation*	98.3	5	
3.2	**General infrastructure**	**33.1**	**38**	◇
3.2.1	Electricity output, kWh/mn pop	4,986.0	42	○
3.2.2	Logistics performance*	89.9	9	
3.2.3	Gross capital formation, % GDP	16.4	117	○ ◇
3.3	**Ecological sustainability**	**54.2**	**14**	◆
3.3.1	GDP/unit of energy use	14.9	13	
3.3.2	Environmental performance*	81.3	4	●
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	4.2	22	
MARKET SOPHISTICATION		**74.4**	**5**	● ◆
4.1	**Credit**	**68.1**	**8**	
4.1.1	Ease of getting credit*	75.0	34	
4.1.2	Domestic credit to private sector, % GDP	136.2	14	
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**73.9**	**5**	● ◆
4.2.1	Ease of protecting minority investors*	84.0	7	◆
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	0.4	9	
4.3	**Trade, competition, and market scale**	**81.3**	**4**	●
4.3.1	Applied tariff rate, weighted avg., %	1.7	22	○
4.3.2	Intensity of local competition†	79.9	9	
4.3.3	Domestic market scale, bn PPP$	3,131.2	9	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**51.0**	**19**	
5.1	**Knowledge workers**	**59.6**	**16**	
5.1.1	Knowledge-intensive employment, %	49.2	7	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	1.2	18	
5.1.4	GERD financed by business, % 🕘	51.8	25	
5.1.5	Females employed w/advanced degrees, %	23.4	16	
5.2	**Innovation linkages**	**51.0**	**14**	
5.2.1	University/industry research collaboration†	69.0	11	
5.2.2	State of cluster development†	65.9	14	
5.2.3	GERD financed by abroad, % GDP 🕘	0.3	12	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.2	16	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	2.3	17	
5.3	**Knowledge absorption**	**42.5**	**27**	
5.3.1	Intellectual property payments, % total trade	1.5	21	
5.3.2	High-tech imports, % total trade	11.5	21	
5.3.3	ICT services imports, % total trade	1.9	31	
5.3.4	FDI net inflows, % GDP	5.9	20	
5.3.5	Research talent, % in business enterprise	40.6	33	○ ◇
KNOWLEDGE & TECHNOLOGY OUTPUTS		**54.4**	**9**	
6.1	**Knowledge creation**	**66.2**	**6**	●
6.1.1	Patents by origin/bn PPP$ GDP	6.1	15	
6.1.2	PCT patents by origin/bn PPP$ GDP	1.8	18	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	25.2	15	
6.1.5	Citable documents H-index	100.0	1	● ◆
6.2	**Knowledge impact**	**45.3**	**10**	
6.2.1	Growth rate of PPP$ GDP/worker, %	0.4	79	○
6.2.2	New businesses/th pop. 15-64	15.6	8	◆
6.2.3	Computer software spending, % GDP	0.0	4	●
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	9.7	28	
6.2.5	High- and medium-high-tech manufacturing, %	42.8	18	
6.3	**Knowledge diffusion**	**51.8**	**11**	
6.3.1	Intellectual property receipts, % total trade	2.5	8	
6.3.2	High-tech net exports, % total trade	8.8	20	
6.3.3	ICT services exports, % total trade	3.3	27	
6.3.4	FDI net outflows, % GDP	2.8	23	
CREATIVE OUTPUTS		**52.7**	**5**	●
7.1	**Intangible assets**	**53.9**	**9**	
7.1.1	Trademarks by origin/bn PPP$ GDP	56.9	41	
7.1.2	Global brand value, top 5,000, % GDP	167.2	6	●
7.1.3	Industrial designs by origin/bn PPP$ GDP	9.5	13	
7.1.4	ICTs & organizational model creation†	79.1	6	●
7.2	**Creative goods and services**	**41.6**	**10**	
7.2.1	Cultural & creative services exports, % total trade	2.1	6	● ◆
7.2.2	National feature films/mn pop. 15-69	6.2	36	○
7.2.3	Entertainment & Media market/th pop. 15-69	63.4	8	
7.2.4	Printing and other media, % manufacturing	1.9	17	
7.2.5	Creative goods exports, % total trade	2.9	20	
7.3	**Online creativity**	**61.6**	**10**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	60.3	11	
7.3.2	Country-code TLDs/th pop. 15-69	77.6	7	
7.3.3	Wikipedia edits/mn pop. 15-69	84.9	15	
7.3.4	Mobile app creation/bn PPP$ GDP	24.3	22	

NOTES: ● indicates a strength; ○ a weakness; ◆ a strength relative to the other top 25-ranked GII economies; ◇ a weakness relative to the other top 25-ranked GII economies; * an index; † a survey question. 🕘 indicates that the economy's data are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

UNITED REPUBLIC OF TANZANIA

GII 2020 rank

88

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
67	112	Low	SSF	58.0	191.6	2,970.4	97

		Score/Value	Rank	
INSTITUTIONS		**53.3**	**101**	
1.1	**Political environment**	**40.0**	**120**	
1.1.1	Political and operational stability*	53.6	120	
1.1.2	Government effectiveness*	33.2	118	
1.2	**Regulatory environment**	**63.1**	**72**	
1.2.1	Regulatory quality*	25.6	107	
1.2.2	Rule of law*	32.2	98	
1.2.3	Cost of redundancy dismissal, salary weeks	9.3	25	● ◆
1.3	**Business environment**	**56.7**	**114**	
1.3.1	Ease of starting a business*	74.4	118	◇
1.3.2	Ease of resolving insolvency*	39.1	102	
HUMAN CAPITAL & RESEARCH		**9.5**	**126**	
2.1	**Education**	**23.7**	**120**	
2.1.1	Expenditure on education, % GDP	3.7	86	
2.1.2	Government funding/pupil, secondary, % GDP/cap.	14.9	80	
2.1.3	School life expectancy, years	8.1	118	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	20.9	100	
2.2	**Tertiary education**	**2.3**	**[127]**	
2.2.1	Tertiary enrolment, % gross	4.0	123	○
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research & development (R&D)**	**2.6**	**89**	◆
2.3.1	Researchers, FTE/mn pop.	19.2	105	◇
2.3.2	Gross expenditure on R&D, % GDP	0.5	66	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**28.4**	**105**	
3.1	**Information & communication technologies (ICTs)**	**39.2**	**110**	
3.1.1	ICT access*	26.6	125	
3.1.2	ICT use*	12.2	126	
3.1.3	Government's online service*	56.3	96	
3.1.4	E-participation*	61.8	89	
3.2	**General infrastructure**	**28.8**	**58**	
3.2.1	Electricity output, kWh/mn pop	139.2	118	
3.2.2	Logistics performance*	n/a	n/a	
3.2.3	Gross capital formation, % GDP	37.5	13	●
3.3	**Ecological sustainability**	**17.1**	**115**	
3.3.1	GDP/unit of energy use	7.1	87	
3.3.2	Environmental performance*	31.1	116	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	102	
MARKET SOPHISTICATION		**43.6**	**87**	
4.1	**Credit**	**27.8**	**113**	
4.1.1	Ease of getting credit*	65.0	61	
4.1.2	Domestic credit to private sector, % GDP	13.1	122	
4.1.3	Microfinance gross loans, % GDP	0.1	56	
4.2	**Investment**	**50.0**	**[23]**	
4.2.1	Ease of protecting minority investors*	50.0	92	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**53.0**	**103**	
4.3.1	Applied tariff rate, weighted avg., %	8.6	107	
4.3.2	Intensity of local competition†	59.4	109	
4.3.3	Domestic market scale, bn PPP$	191.6	69	◆

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**17.3**	**118**	
5.1	**Knowledge workers**	**9.8**	**124**	
5.1.1	Knowledge-intensive employment, %	3.4	120	○ ◇
5.1.2	Firms offering formal training, %	30.7	48	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	0.1	102	○
5.1.5	Females employed w/advanced degrees, %	0.4	118	
5.2	**Innovation linkages**	**22.7**	**55**	●
5.2.1	University/industry research collaboration†	47.7	47	●
5.2.2	State of cluster development†	49.4	51	● ◆
5.2.3	GERD financed by abroad, % GDP	0.2	26	● ◆
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	97	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	101	○ ◇
5.3	**Knowledge absorption**	**19.3**	**105**	
5.3.1	Intellectual property payments, % total trade	0.0	114	
5.3.2	High-tech imports, % total trade	7.7	63	
5.3.3	ICT services imports, % total trade	0.3	117	
5.3.4	FDI net inflows, % GDP	1.8	88	
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**12.1**	**106**	
6.1	**Knowledge creation**	**4.4**	**113**	
6.1.1	Patents by origin/bn PPP$ GDP	0.1	110	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	100	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	0.0	68	
6.1.4	Scientific & technical articles/bn PPP$ GDP	3.6	100	
6.1.5	Citable documents H-index	10.0	76	◆
6.2	**Knowledge impact**	**13.8**	**105**	
6.2.1	Growth rate of PPP$ GDP/worker, %	2.9	31	●
6.2.2	New businesses/th pop. 15-64	0.2	112	
6.2.3	Computer software spending, % GDP	0.0	124	○ ◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.7	115	
6.2.5	High- and medium-high-tech manufacturing, %	8.4	89	
6.3	**Knowledge diffusion**	**18.0**	**84**	
6.3.1	Intellectual property receipts, % total trade	0.0	101	
6.3.2	High-tech net exports, % total trade	2.0	55	● ◆
6.3.3	ICT services exports, % total trade	0.2	118	
6.3.4	FDI net outflows, % GDP	1.8	39	●
CREATIVE OUTPUTS		**29.4**	**[45]**	
7.1	**Intangible assets**	**47.2**	**[18]**	
7.1.1	Trademarks by origin/bn PPP$ GDP	n/a	n/a	
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	n/a	n/a	
7.1.4	ICTs & organizational model creation†	47.2	94	
7.2	**Creative goods and services**	**23.0**	**[45]**	
7.2.1	Cultural & creative services exports, % total trade	0.0	115	○ ◇
7.2.2	National feature films/mn pop. 15-69	n/a	n/a	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.7	23	●
7.2.5	Creative goods exports, % total trade	2.3	24	● ◆
7.3	**Online creativity**	**0.1**	**128**	◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.2	120	
7.3.2	Country-code TLDs/th pop. 15-69	0.2	112	
7.3.3	Wikipedia edits/mn pop. 15-69	5.1	122	○ ◇
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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

UNITED STATES OF AMERICA

GII 2020 rank

3

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
5	4	High	NAC	329.1	21,439.5	56,844.3	3

		Score/Value	Rank	
INSTITUTIONS		**88.9**	**9**	
1.1	**Political environment**	**83.7**	**16**	
1.1.1	Political and operational stability*	80.4	33	
1.1.2	Government effectiveness*	85.4	15	
1.2	**Regulatory environment**	**92.0**	**11**	
1.2.1	Regulatory quality*	83.4	16	
1.2.2	Rule of law*	84.5	19	
1.2.3	Cost of redundancy dismissal, salary weeks	8.0	1	●
1.3	**Business environment**	**91.0**	**2**	● ◆
1.3.1	Ease of starting a business*	91.6	48	
1.3.2	Ease of resolving insolvency*	90.5	2	● ◆
HUMAN CAPITAL & RESEARCH		**56.3**	**12**	
2.1	**Education**	**52.4**	**45**	
2.1.1	Expenditure on education, % GDP 🕘	5.0	43	
2.1.2	Government funding/pupil, secondary, % GDP/cap	22.1	36	
2.1.3	School life expectancy, years	16.3	27	
2.1.4	PISA scales in reading, maths, & science	495.3	24	
2.1.5	Pupil-teacher ratio, secondary 🕘	14.6	73	○ ◇
2.2	**Tertiary education**	**39.3**	**45**	
2.2.1	Tertiary enrolment, % gross	88.2	8	
2.2.2	Graduates in science & engineering, % 🕘	17.9	79	○ ◇
2.2.3	Tertiary inbound mobility, %	5.2	44	
2.3	**Research & development (R&D)**	**77.1**	**2**	● ◆
2.3.1	Researchers, FTE/mn pop 🕘	4,412.4	23	
2.3.2	Gross expenditure on R&D, % GDP	2.8	9	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	100.0	1	● ◆
2.3.4	QS university ranking, average score top 3*	98.6	1	● ◆
INFRASTRUCTURE		**54.7**	**24**	
3.1	**Information & communication technologies (ICTs)**	**90.4**	**9**	
3.1.1	ICT access*	83.5	16	
3.1.2	ICT use*	81.2	18	
3.1.3	Government's online service*	98.6	2	●
3.1.4	E-participation*	98.3	5	
3.2	**General infrastructure**	**43.0**	**15**	
3.2.1	Electricity output, kWh/mn pop	13,455.1	9	
3.2.2	Logistics performance*	85.2	14	
3.2.3	Gross capital formation, % GDP	21.1	88	○
3.3	**Ecological sustainability**	**30.8**	**59**	◇
3.3.1	GDP/unit of energy use	8.0	78	○
3.3.2	Environmental performance*	69.3	24	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	114	○ ◇
MARKET SOPHISTICATION		**81.4**	**2**	● ◆
4.1	**Credit**	**89.7**	**1**	● ◆
4.1.1	Ease of getting credit*	95.0	4	◆
4.1.2	Domestic credit to private sector, % GDP	186.0	2	● ◆
4.1.3	Microfinance gross loans, % GDP	n/a	n/a	
4.2	**Investment**	**63.8**	**13**	
4.2.1	Ease of protecting minority investors*	71.6	35	
4.2.2	Market capitalization, % GDP	153.1	5	
4.2.3	Venture capital deals/bn PPP$ GDP	0.3	10	
4.3	**Trade, competition, and market scale**	**90.7**	**1**	● ◆
4.3.1	Applied tariff rate, weighted avg., %	1.6	20	
4.3.2	Intensity of local competition†	84.3	3	● ◆
4.3.3	Domestic market scale, bn PPP$	21,439.5	2	● ◆

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**62.8**	**5**	◆
5.1	**Knowledge workers**	**69.8**	**5**	
5.1.1	Knowledge-intensive employment, %	48.0	9	
5.1.2	Firms offering formal training, %	n/a	n/a	
5.1.3	GERD performed by business, % GDP	2.1	8	
5.1.4	GERD financed by business, %	62.4	11	
5.1.5	Females employed w/advanced degrees, %	26.8	6	
5.2	**Innovation linkages**	**60.6**	**8**	
5.2.1	University/industry research collaboration†	75.7	4	◆
5.2.2	State of cluster development†	74.8	2	● ◆
5.2.3	GERD financed by abroad, % GDP	0.2	16	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.2	7	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	3.5	14	
5.3	**Knowledge absorption**	**58.0**	**5**	
5.3.1	Intellectual property payments, % total trade	1.9	14	
5.3.2	High-tech imports, % total trade	17.3	10	
5.3.3	ICT services imports, % total trade	1.4	46	
5.3.4	FDI net inflows, % GDP	1.9	84	○
5.3.5	Research talent, % in business enterprise 🕘	71.3	6	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**56.8**	**3**	●
6.1	**Knowledge creation**	**72.8**	**3**	● ◆
6.1.1	Patents by origin/bn PPP$ GDP	13.9	1	● ◆
6.1.2	PCT patents by origin/bn PPP$ GDP	2.7	12	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	10.7	48	◇
6.1.5	Citable documents H-index	100.0	1	● ◆
6.2	**Knowledge impact**	**51.8**	**3**	● ◆
6.2.1	Growth rate of PPP$ GDP/worker, %	1.1	60	
6.2.2	New businesses/th pop. 15-64	n/a	n/a	
6.2.3	Computer software spending, % GDP	0.0	1	● ◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.1	106	○ ◇
6.2.5	High- and medium-high-tech manufacturing, %	52.0	11	
6.3	**Knowledge diffusion**	**45.9**	**16**	
6.3.1	Intellectual property receipts, % total trade	4.9	1	● ◆
6.3.2	High-tech net exports, % total trade	5.5	29	
6.3.3	ICT services exports, % total trade	1.6	66	
6.3.4	FDI net outflows, % GDP	1.1	51	
CREATIVE OUTPUTS		**47.7**	**11**	
7.1	**Intangible assets**	**48.1**	**15**	
7.1.1	Trademarks by origin/bn PPP$ GDP	21.7	90	○ ◇
7.1.2	Global brand value, top 5,000, % GDP	203.3	4	◆
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.1	65	○
7.1.4	ICTs & organizational model creation†	83.7	1	● ◆
7.2	**Creative goods and services**	**44.2**	**7**	◆
7.2.1	Cultural & creative services exports, % total trade	1.7	10	
7.2.2	National feature films/mn pop. 15-69	2.9	60	○
7.2.3	Entertainment & Media market/th pop. 15-69	99.7	2	● ◆
7.2.4	Printing and other media, % manufacturing	1.4	30	
7.2.5	Creative goods exports, % total trade	3.3	18	
7.3	**Online creativity**	**50.4**	**18**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	100.0	1	● ◆
7.3.2	Country-code TLDs/th pop. 15-69	2.1	70	◇
7.3.3	Wikipedia edits/mn pop. 15-69	73.9	34	◇
7.3.4	Mobile app creation/bn PPP$ GDP	27.1	21	

NOTES: ● indicates a strength; ○ a weakness; ◆ a strength relative to the other top 25-ranked GII economies; ◇ a weakness relative to the other top 25-ranked GII economies; * an index; † a survey question. 🕘 indicates that the economy's data are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

URUGUAY

GII 2020 rank

69

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
65	69	High	LCN	3.5	83.0	20,586.5	62

		Score/Value	Rank	
INSTITUTIONS		**69.3**	**46**	
1.1	**Political environment**	**69.7**	**39**	
1.1.1	Political and operational stability*	83.9	21	●
1.1.2	Government effectiveness*	62.6	42	
1.2	**Regulatory environment**	**66.6**	**60**	◇
1.2.1	Regulatory quality*	55.0	47	◇
1.2.2	Rule of law*	62.3	39	
1.2.3	Cost of redundancy dismissal, salary weeks	20.8	88	
1.3	**Business environment**	**71.6**	**65**	
1.3.1	Ease of starting a business*	89.6	56	
1.3.2	Ease of resolving insolvency*	53.6	65	
HUMAN CAPITAL & RESEARCH		**29.3**	**71**	◇
2.1	**Education**	**46.8**	**64**	
2.1.1	Expenditure on education, % GDP	4.8	47	
2.1.2	Government funding/pupil, secondary, % GDP/cap	16.2	70	◇
2.1.3	School life expectancy, years	16.8	19	●
2.1.4	PISA scales in reading, maths, & science	423.5	52	
2.1.5	Pupil-teacher ratio, secondary	12.7	59	
2.2	**Tertiary education**	**33.7**	**62**	◇
2.2.1	Tertiary enrolment, % gross	63.1	43	
2.2.2	Graduates in science & engineering, %	17.5	82	○ ◇
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research & development (R&D)**	**7.5**	**65**	◇
2.3.1	Researchers, FTE/mn pop	696.4	59	◇
2.3.2	Gross expenditure on R&D, % GDP	0.5	68	◇
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	12.4	61	
INFRASTRUCTURE		**46.2**	**52**	◇
3.1	**Information & communication technologies (ICTs)**	**82.4**	**26**	●
3.1.1	ICT access*	75.1	43	
3.1.2	ICT use*	74.0	32	
3.1.3	Government's online service*	88.9	27	●
3.1.4	E-participation*	91.6	26	●
3.2	**General infrastructure**	**19.0**	**107**	○ ◇
3.2.1	Electricity output, kWh/mn pop	3,941.1	52	
3.2.2	Logistics performance*	28.9	84	◇
3.2.3	Gross capital formation, % GDP	19.3	101	○
3.3	**Ecological sustainability**	**37.1**	**43**	
3.3.1	GDP/unit of energy use	13.5	19	●
3.3.2	Environmental performance*	49.1	58	◇
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.5	33	
MARKET SOPHISTICATION		**36.9**	**114**	○ ◇
4.1	**Credit**	**28.1**	**111**	○ ◇
4.1.1	Ease of getting credit*	60.0	74	
4.1.2	Domestic credit to private sector, % GDP	27.4	99	○ ◇
4.1.3	Microfinance gross loans, % GDP	0.0	68	○
4.2	**Investment**	**27.8**	**104**	○
4.2.1	Ease of protecting minority investors*	30.0	121	○ ◇
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	0.1	19	
4.3	**Trade, competition, and market scale**	**54.7**	**98**	◇
4.3.1	Applied tariff rate, weighted avg., %	5.4	97	◇
4.3.2	Intensity of local competition†	61.5	102	○ ◇
4.3.3	Domestic market scale, bn PPP$	83.0	88	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**22.1**	**85**	◇
5.1	**Knowledge workers**	**27.1**	**79**	◇
5.1.1	Knowledge-intensive employment, %	22.1	69	◇
5.1.2	Firms offering formal training, %	53.3	13	● ◆
5.1.3	GERD performed by business, % GDP	0.1	59	◇
5.1.4	GERD financed by business, %	4.6	85	○ ◇
5.1.5	Females employed w/advanced degrees, %	10.2	66	◇
5.2	**Innovation linkages**	**16.8**	**97**	◇
5.2.1	University/industry research collaboration†	36.2	93	◇
5.2.2	State of cluster development†	40.8	94	◇
5.2.3	GERD financed by abroad, % GDP	0.0	57	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	66	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.2	40	
5.3	**Knowledge absorption**	**22.4**	**92**	◇
5.3.1	Intellectual property payments, % total trade	0.8	46	
5.3.2	High-tech imports, % total trade	6.8	77	
5.3.3	ICT services imports, % total trade	2.5	18	●
5.3.4	FDI net inflows, % GDP	2.3	72	
5.3.5	Research talent, % in business enterprise	0.6	81	○ ◇
KNOWLEDGE & TECHNOLOGY OUTPUTS		**20.6**	**63**	
6.1	**Knowledge creation**	**11.7**	**73**	◇
6.1.1	Patents by origin/bn PPP$ GDP	0.3	89	
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP	0.3	39	
6.1.4	Scientific & technical articles/bn PPP$ GDP	10.7	49	
6.1.5	Citable documents H-index	11.4	66	
6.2	**Knowledge impact**	**24.7**	**65**	
6.2.1	Growth rate of PPP$ GDP/worker, %	1.6	52	
6.2.2	New businesses/th pop. 15-64	1.3	78	
6.2.3	Computer software spending, % GDP	0.0	68	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	12.6	23	●
6.2.5	High- and medium-high-tech manufacturing, %	13.9	71	
6.3	**Knowledge diffusion**	**25.3**	**60**	
6.3.1	Intellectual property receipts, % total trade	0.2	33	
6.3.2	High-tech net exports, % total trade	0.8	70	
6.3.3	ICT services exports, % total trade	2.9	35	
6.3.4	FDI net outflows, % GDP	4.7	11	●
CREATIVE OUTPUTS		**21.3**	**62**	◇
7.1	**Intangible assets**	**23.0**	**84**	◇
7.1.1	Trademarks by origin/bn PPP$ GDP	47.5	54	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.7	79	
7.1.4	ICTs & organizational model creation†	58.4	50	
7.2	**Creative goods and services**	**14.9**	**65**	
7.2.1	Cultural & creative services exports, % total trade	1.4	15	●
7.2.2	National feature films/mn pop. 15-69	4.7	46	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	1.1	49	
7.2.5	Creative goods exports, % total trade	0.1	111	○
7.3	**Online creativity**	**24.1**	**50**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	6.4	49	
7.3.2	Country-code TLDs/th pop. 15-69	11.0	40	
7.3.3	Wikipedia edits/mn pop. 15-69	70.3	39	
7.3.4	Mobile app creation/bn PPP$ GDP	10.5	44	

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

UZBEKISTAN

GII 2020 rank

93

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
118	**81**	**Lower middle**	**CSA**	**33.0**	**297.2**	**7,856.9**	**n/a**

		Score/Value	Rank	
INSTITUTIONS		**55.1**	**95**	
1.1	**Political environment**	**46.7**	**98**	
1.1.1	Political and operational stability*	64.3	83	
1.1.2	Government effectiveness*	37.9	100	
1.2	**Regulatory environment**	**48.6**	**107**	
1.2.1	Regulatory quality*	12.7	127	○ ◇
1.2.2	Rule of law*	18.7	124	○ ◇
1.2.3	Cost of redundancy dismissal, salary weeks	17.3	69	
1.3	**Business environment**	**69.8**	**72**	
1.3.1	Ease of starting a business*	96.2	8	● ◆
1.3.2	Ease of resolving insolvency*	43.5	90	
HUMAN CAPITAL & RESEARCH		**27.5**	**77**	
2.1	**Education**	**49.7**	**[52]**	
2.1.1	Expenditure on education, % GDP 🕘	5.3	31	●
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	12.1	92	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary 🕘	10.3	38	● ◆
2.2	**Tertiary education**	**30.9**	**73**	
2.2.1	Tertiary enrolment, % gross	10.1	110	
2.2.2	Graduates in science & engineering, %	35.2	7	● ◆
2.2.3	Tertiary inbound mobility, %	0.2	106	
2.3	**Research & development (R&D)**	**2.0**	**94**	
2.3.1	Researchers, FTE/mn pop	476.2	70	
2.3.2	Gross expenditure on R&D, % GDP	0.1	99	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**38.5**	**72**	◆
3.1	**Information & communication technologies (ICTs)**	**63.9**	**72**	◆
3.1.1	ICT access*	54.3	83	
3.1.2	ICT use*	46.2	82	
3.1.3	Government's online service*	79.2	48	● ◆
3.1.4	E-participation*	75.8	59	
3.2	**General infrastructure**	**32.0**	**41**	● ◆
3.2.1	Electricity output, kWh/mn pop	1,907.7	80	◆
3.2.2	Logistics performance*	23.8	95	
3.2.3	Gross capital formation, % GDP	41.4	8	● ◆
3.3	**Ecological sustainability**	**19.6**	**101**	
3.3.1	GDP/unit of energy use	5.9	102	
3.3.2	Environmental performance*	44.3	77	◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	118	
MARKET SOPHISTICATION		**54.9**	**27**	● ◆
4.1	**Credit**	**43.3**	**57**	
4.1.1	Ease of getting credit*	65.0	61	
4.1.2	Domestic credit to private sector, % GDP	n/a	n/a	
4.1.3	Microfinance gross loans, % GDP	0.0	79	○
4.2	**Investment**	**70.0**	**[8]**	
4.2.1	Ease of protecting minority investors*	70.0	36	●
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**51.3**	**108**	
4.3.1	Applied tariff rate, weighted avg., % 🕘	8.7	109	
4.3.2	Intensity of local competition†	n/a	n/a	
4.3.3	Domestic market scale, bn PPP$	297.2	59	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**15.2**	**[127]**	
5.1	**Knowledge workers**	**22.9**	**[91]**	
5.1.1	Knowledge-intensive employment, %	n/a	n/a	
5.1.2	Firms offering formal training, %	16.9	82	◇
5.1.3	GERD performed by business, % GDP	0.1	72	
5.1.4	GERD financed by business, %	42.4	43	◆
5.1.5	Females employed w/advanced degrees, %	n/a	n/a	
5.2	**Innovation linkages**	**3.9**	**[128]**	
5.2.1	University/industry research collaboration†	n/a	n/a	
5.2.2	State of cluster development†	n/a	n/a	
5.2.3	GERD financed by abroad, % GDP	0.0	96	○
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	48	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	96	
5.3	**Knowledge absorption**	**18.9**	**109**	
5.3.1	Intellectual property payments, % total trade	0.2	90	
5.3.2	High-tech imports, % total trade	7.8	60	
5.3.3	ICT services imports, % total trade	0.0	130	○ ◇
5.3.4	FDI net inflows, % GDP	2.1	80	
5.3.5	Research talent, % in business enterprise	12.9	60	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**14.1**	**90**	
6.1	**Knowledge creation**	**7.3**	**84**	
6.1.1	Patents by origin/bn PPP$ GDP	1.7	45	●
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	97	
6.1.3	Utility models by origin/bn PPP$ GDP	0.7	30	
6.1.4	Scientific & technical articles/bn PPP$ GDP	1.2	123	
6.1.5	Citable documents H-index	4.5	112	
6.2	**Knowledge impact**	**28.0**	**49**	●
6.2.1	Growth rate of PPP$ GDP/worker, %	4.7	12	●
6.2.2	New businesses/th pop. 15-64	1.6	63	
6.2.3	Computer software spending, % GDP	n/a	n/a	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.4	93	
6.2.5	High- and medium-high-tech manufacturing, %	22.8	49	
6.3	**Knowledge diffusion**	**7.1**	**131**	○ ◇
6.3.1	Intellectual property receipts, % total trade	0.0	95	
6.3.2	High-tech net exports, % total trade	0.1	117	
6.3.3	ICT services exports, % total trade	0.0	129	○
6.3.4	FDI net outflows, % GDP	0.0	116	
CREATIVE OUTPUTS		**7.5**	**127**	○ ◇
7.1	**Intangible assets**	**9.3**	**[128]**	
7.1.1	Trademarks by origin/bn PPP$ GDP	26.8	82	
7.1.2	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.3	Industrial designs by origin/bn PPP$ GDP	1.1	64	
7.1.4	ICTs & organizational model creation†	n/a	n/a	
7.2	**Creative goods and services**	**11.2**	**75**	
7.2.1	Cultural & creative services exports, % total trade	0.8	33	● ◆
7.2.2	National feature films/mn pop. 15-69	4.2	47	
7.2.3	Entertainment & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	0.9	63	
7.2.5	Creative goods exports, % total trade	0.1	92	
7.3	**Online creativity**	**0.3**	**126**	○ ◇
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.0	131	○ ◇
7.3.2	Country-code TLDs/th pop. 15-69	1.0	85	
7.3.3	Wikipedia edits/mn pop. 15-69	n/a	n/a	
7.3.4	Mobile app creation/bn PPP$ GDP	0.0	98	○

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

VIET NAM

GII 2020 rank

42

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
38	62	Lower middle	SEAO	96.5	770.2	7,041.6	42

		Score/Value	Rank	
INSTITUTIONS		**58.5**	**83**	
1.1	**Political environment**	**60.8**	**55**	◆
1.1.1	Political and operational stability*	82.1	29	◆
1.1.2	Government effectiveness*	50.1	72	◆
1.2	**Regulatory environment**	**53.2**	**98**	
1.2.1	Regulatory quality*	31.6	99	
1.2.2	Rule of law*	46.6	64	◆
1.2.3	Cost of redundancy dismissal, salary weeks	24.6	103	○
1.3	**Business environment**	**61.6**	**101**	
1.3.1	Ease of starting a business*	85.1	88	
1.3.2	Ease of resolving insolvency*	38.0	106	○
HUMAN CAPITAL & RESEARCH		**26.0**	**79**	
2.1	**Education**	**48.4**	**[60]**	
2.1.1	Expenditure on education, % GDP	4.2	67	
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, & science	502.0	16	◆
2.1.5	Pupil-teacher ratio, secondary	17.6	87	
2.2	**Tertiary education**	**22.7**	**87**	
2.2.1	Tertiary enrolment, % gross	28.5	83	
2.2.2	Graduates in science & engineering, %	22.7	53	
2.2.3	Tertiary inbound mobility, %	0.2	104	○
2.3	**Research & development (R&D)**	**7.0**	**69**	
2.3.1	Researchers, FTE/mn pop.	707.7	58	
2.3.2	Gross expenditure on R&D, % GDP	0.5	64	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	9.2	65	
INFRASTRUCTURE		**38.4**	**73**	◆
3.1	**Information & communication technologies (ICTs)**	**62.8**	**76**	◆
3.1.1	ICT access*	53.6	86	
3.1.2	ICT use*	55.0	65	◆
3.1.3	Government's online service*	73.6	58	
3.1.4	E-participation*	69.1	71	
3.2	**General infrastructure**	**29.3**	**55**	
3.2.1	Electricity output, kWh/mn pop.	2,079.3	76	◆
3.2.2	Logistics performance*	56.5	38	◆
3.2.3	Gross capital formation, % GDP	26.3	41	
3.3	**Ecological sustainability**	**23.0**	**86**	
3.3.1	GDP/unit of energy use	7.4	85	
3.3.2	Environmental performance*	33.4	110	○
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	2.0	43	◆
MARKET SOPHISTICATION		**53.0**	**34**	◆
4.1	**Credit**	**67.6**	**9**	● ◆
4.1.1	Ease of getting credit*	80.0	23	
4.1.2	Domestic credit to private sector, % GDP	133.3	15	● ◆
4.1.3	Microfinance gross loans, % GDP	3.9	11	● ◆
4.2	**Investment**	**25.9**	**112**	○
4.2.1	Ease of protecting minority investors*	54.0	88	
4.2.2	Market capitalization, % GDP	48.6	32	
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	63	
4.3	**Trade, competition, and market scale**	**65.5**	**49**	
4.3.1	Applied tariff rate, weighted avg., %	4.4	82	
4.3.2	Intensity of local competition†	63.2	91	
4.3.3	Domestic market scale, bn PPP$	770.2	32	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**34.5**	**39**	◆
5.1	**Knowledge workers**	**30.5**	**63**	
5.1.1	Knowledge-intensive employment, %	13.5	97	○
5.1.2	Firms offering formal training, %	22.2	66	
5.1.3	GERD performed by business, % GDP	0.4	42	◆
5.1.4	GERD financed by business, %	64.1	8	● ◆
5.1.5	Females employed w/advanced degrees, %	6.0	84	
5.2	**Innovation linkages**	**19.3**	**75**	
5.2.1	University/industry research collaboration†	42.0	65	
5.2.2	State of cluster development†	52.6	42	
5.2.3	GERD financed by abroad, % GDP	0.0	65	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	59	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	87	
5.3	**Knowledge absorption**	**53.6**	**10**	● ◆
5.3.1	Intellectual property payments, % total trade	n/a	n/a	
5.3.2	High-tech imports, % total trade	26.8	4	● ◆
5.3.3	ICT services imports, % total trade	0.0	126	○ ◇
5.3.4	FDI net inflows, % GDP	6.3	19	● ◆
5.3.5	Research talent, % in business enterprise	24.1	51	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**31.7**	**37**	◆
6.1	**Knowledge creation**	**11.1**	**75**	
6.1.1	Patents by origin/bn PPP$ GDP	0.9	66	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	82	
6.1.3	Utility models by origin/bn PPP$ GDP	0.5	36	
6.1.4	Scientific & technical articles/bn PPP$ GDP	7.9	61	
6.1.5	Citable documents H-index	12.8	59	
6.2	**Knowledge impact**	**37.2**	**21**	◆
6.2.1	Growth rate of PPP$ GDP/worker, %	6.1	4	● ◆
6.2.2	New businesses/th pop. 15-64	1.1	81	
6.2.3	Computer software spending, % GDP	0.0	37	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	5.3	52	◆
6.2.5	High- and medium-high-tech manufacturing, %	40.0	23	◆
6.3	**Knowledge diffusion**	**46.7**	**14**	● ◆
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	High-tech net exports, % total trade	33.2	2	● ◆
6.3.3	ICT services exports, % total trade	0.1	126	○
6.3.4	FDI net outflows, % GDP	0.3	86	
CREATIVE OUTPUTS		**32.7**	**38**	◆
7.1	**Intangible assets**	**38.7**	**33**	◆
7.1.1	Trademarks by origin/bn PPP$ GDP	85.5	20	● ◆
7.1.2	Global brand value, top 5,000, % GDP	100.8	19	◆
7.1.3	Industrial designs by origin/bn PPP$ GDP	2.7	43	
7.1.4	ICTs & organizational model creation†	54.4	63	
7.2	**Creative goods and services**	**27.7**	**32**	◆
7.2.1	Cultural & creative services exports, % total trade	0.0	97	○
7.2.2	National feature films/mn pop. 15-69	1.2	83	
7.2.3	Entertainment & Media market/th pop. 15-69	2.3	52	○
7.2.4	Printing and other media, % manufacturing	0.9	66	
7.2.5	Creative goods exports, % total trade	5.6	11	● ◆
7.3	**Online creativity**	**25.7**	**42**	◆
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	2.4	72	◆
7.3.2	Country-code TLDs/th pop. 15-69	2.2	67	◆
7.3.3	Wikipedia edits/mn pop. 15-69	43.5	75	◆
7.3.4	Mobile app creation/bn PPP$ GDP	57.6	10	● ◆

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

YEMEN

GII 2020 rank

131

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
130	131	Low	NAWA	29.2	72.2	1,990.8	129

		Score/Value	Rank	
INSTITUTIONS		**27.7**	**131**	○ ◇
1.1	**Political environment**	**0.0**	**131**	○ ◇
1.1.1	Political and operational stability*	0.0	131	○ ◇
1.1.2	Government effectiveness*	0.0	131	○ ◇
1.2	**Regulatory environment**	**31.1**	**126**	◇
1.2.1	Regulatory quality*	1.3	130	◇
1.2.2	Rule of law*	0.0	131	○ ◇
1.2.3	Cost of redundancy dismissal, salary weeks	27.4	109	◇
1.3	**Business environment**	**51.9**	**124**	◇
1.3.1	Ease of starting a business*	76.8	115	
1.3.2	Ease of resolving insolvency*	26.9	125	◇
HUMAN CAPITAL & RESEARCH		**10.4**	**[125]**	
2.1	**Education**	**20.5**	**[126]**	
2.1.1	Expenditure on education, % GDP	n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap. 🕘	11.8	88	
2.1.3	School life expectancy, years 🕘	9.1	112	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary 🕘	26.8	111	
2.2	**Tertiary education**	**10.7**	**113**	
2.2.1	Tertiary enrolment, % gross 🕘	10.2	109	
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, % 🕘	4.3	55	●
2.3	**Research & development (R&D)**	**0.0**	**[121]**	
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 R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**17.1**	**129**	◇
3.1	**Information & communication technologies (ICTs)**	**14.7**	**131**	○ ◇
3.1.1	ICT access*	25.5	127	
3.1.2	ICT use*	11.7	127	
3.1.3	Government's online service*	9.7	130	○ ◇
3.1.4	E-participation*	11.8	130	○ ◇
3.2	**General infrastructure**	**2.4**	**130**	◇
3.2.1	Electricity output, kWh/mn pop	188.2	115	
3.2.2	Logistics performance*	9.2	120	
3.2.3	Gross capital formation, % GDP	7.9	125	○ ◇
3.3	**Ecological sustainability**	**34.1**	**51**	● ◆
3.3.1	GDP/unit of energy use	20.0	5	● ◆
3.3.2	Environmental performance*	n/a	n/a	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.1	121	
MARKET SOPHISTICATION		**25.5**	**129**	◇
4.1	**Credit**	**0.2**	**131**	○ ◇
4.1.1	Ease of getting credit*	0.0	131	○ ◇
4.1.2	Domestic credit to private sector, % GDP 🕘	5.6	128	○ ◇
4.1.3	Microfinance gross loans, % GDP	0.1	61	
4.2	**Investment**	**26.0**	**[110]**	
4.2.1	Ease of protecting minority investors*	26.0	125	◇
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**50.1**	**115**	
4.3.1	Applied tariff rate, weighted avg., % 🕘	5.0	94	● ◆
4.3.2	Intensity of local competition†	50.4	126	◇
4.3.3	Domestic market scale, bn PPP$	72.2	93	●

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**18.7**	**[104]**	
5.1	**Knowledge workers**	**11.7**	**[122]**	
5.1.1	Knowledge-intensive employment, % 🕘	12.4	101	
5.1.2	Firms offering formal training, % 🕘	14.3	88	◇
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, % 🕘	1.1	109	
5.2	**Innovation linkages**	**15.9**	**[105]**	
5.2.1	University/industry research collaboration†	17.7	126	○ ◇
5.2.2	State of cluster development†	30.8	120	◇
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	n/a	n/a	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	101	○ ◇
5.3	**Knowledge absorption**	**28.4**	**64**	●
5.3.1	Intellectual property payments, % total trade 🕘	1.6	19	● ◆
5.3.2	High-tech imports, % total trade 🕘	6.3	88	●
5.3.3	ICT services imports, % total trade 🕘	0.4	109	
5.3.4	FDI net inflows, % GDP	-1.3	126	◇
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**6.7**	**128**	◇
6.1	**Knowledge creation**	**3.8**	**116**	
6.1.1	Patents by origin/bn PPP$ GDP 🕘	0.2	96	●
6.1.2	PCT patents by origin/bn PPP$ GDP	n/a	n/a	
6.1.3	Utility models by origin/bn PPP$ GDP 🕘	0.0	69	
6.1.4	Scientific & technical articles/bn PPP$ GDP	4.3	96	●
6.1.5	Citable documents H-index	3.3	121	
6.2	**Knowledge impact**	**0.8**	**131**	○ ◇
6.2.1	Growth rate of PPP$ GDP/worker, %	-4.2	119	○ ◇
6.2.2	New businesses/th pop. 15-64	n/a	n/a	
6.2.3	Computer software spending, % GDP	0.0	106	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.2	129	◇
6.2.5	High- and medium-high-tech manufacturing, % 🕘	1.2	107	○ ◇
6.3	**Knowledge diffusion**	**15.5**	**91**	●
6.3.1	Intellectual property receipts, % total trade 🕘	0.1	66	●
6.3.2	High-tech net exports, % total trade 🕘	0.1	118	
6.3.3	ICT services exports, % total trade 🕘	2.6	38	●
6.3.4	FDI net outflows, % GDP	-1.3	129	◇
CREATIVE OUTPUTS		**7.8**	**124**	
7.1	**Intangible assets**	**13.6**	**117**	
7.1.1	Trademarks by origin/bn PPP$ GDP	58.2	35	● ◆
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.2	97	
7.1.4	ICTs & organizational model creation†	21.7	125	○ ◇
7.2	**Creative goods and services**	**0.0**	**[131]**	
7.2.1	Cultural & 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 & Media market/th pop. 15-69	0.0	63	○ ◇
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade 🕘	0.0	130	○ ◇
7.3	**Online creativity**	**4.1**	**114**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.4	114	
7.3.2	Country-code TLDs/th pop. 15-69	0.0	128	
7.3.3	Wikipedia edits/mn pop. 15-69	20.2	107	
7.3.4	Mobile app creation/bn PPP$ GDP	0.2	80	

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

ZAMBIA

GII 2020 rank

122

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
128	109	Lower middle	SSF	17.9	76.0	3,621.3	124

		Score/Value	Rank	
INSTITUTIONS		**46.0**	**122**	
1.1	**Political environment**	**45.9**	**99**	
1.1.1	Political and operational stability*	62.5	92	
1.1.2	Government effectiveness*	37.6	101	
1.2	**Regulatory environment**	**24.8**	**128**	○ ◇
1.2.1	Regulatory quality*	30.1	102	
1.2.2	Rule of law*	37.7	83	●
1.2.3	Cost of redundancy dismissal, salary weeks	50.6	127	○ ◇
1.3	**Business environment**	**67.1**	**78**	●
1.3.1	Ease of starting a business*	84.9	90	
1.3.2	Ease of resolving insolvency*	49.3	71	●
HUMAN CAPITAL & RESEARCH		**15.0**	**[111]**	
2.1	**Education**	**42.5**	**[75]**	
2.1.1	Expenditure on education, % GDP	4.7	56	●
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, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	21.1	101	
2.2	**Tertiary education**	**2.4**	**[126]**	
2.2.1	Tertiary enrolment, % gross	4.1	122	○ ◇
2.2.2	Graduates in science & engineering, %	n/a	n/a	
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research & development (R&D)**	**0.0**	**[121]**	
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 R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**27.4**	**107**	
3.1	**Information & communication technologies (ICTs)**	**36.4**	**115**	
3.1.1	ICT access*	34.2	116	◇
3.1.2	ICT use*	23.8	110	◇
3.1.3	Government's online service*	47.9	108	
3.1.4	E-participation*	39.9	112	
3.2	**General infrastructure**	**30.2**	**51**	●
3.2.1	Electricity output, kWh/mn pop	830.0	100	
3.2.2	Logistics performance*	21.4	105	
3.2.3	Gross capital formation, % GDP	41.1	9	● ◆
3.3	**Ecological sustainability**	**15.7**	**121**	◇
3.3.1	GDP/unit of energy use	5.1	110	◇
3.3.2	Environmental performance*	34.7	103	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.2	104	
MARKET SOPHISTICATION		**43.9**	**85**	
4.1	**Credit**	**39.9**	**70**	●
4.1.1	Ease of getting credit*	95.0	4	● ◆
4.1.2	Domestic credit to private sector, % GDP	14.7	119	
4.1.3	Microfinance gross loans, % GDP	0.1	63	
4.2	**Investment**	**33.0**	**84**	
4.2.1	Ease of protecting minority investors*	60.0	71	●
4.2.2	Market capitalization, % GDP	13.6	63	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**58.9**	**80**	●
4.3.1	Applied tariff rate, weighted avg., %	3.4	68	●
4.3.2	Intensity of local competition†	66.4	75	●
4.3.3	Domestic market scale, bn PPP$	76.0	92	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**21.4**	**91**	
5.1	**Knowledge workers**	**27.2**	**[78]**	
5.1.1	Knowledge-intensive employment, %	19.1	79	
5.1.2	Firms offering formal training, %	28.2	53	●
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, %	6.2	82	
5.2	**Innovation linkages**	**17.1**	**95**	
5.2.1	University/industry research collaboration†	30.2	111	
5.2.2	State of cluster development†	41.7	90	
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	101	
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	101	○ ◇
5.3	**Knowledge absorption**	**19.7**	**100**	
5.3.1	Intellectual property payments, % total trade	0.1	98	
5.3.2	High-tech imports, % total trade	6.3	89	
5.3.3	ICT services imports, % total trade	0.7	90	
5.3.4	FDI net inflows, % GDP	2.7	64	●
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**8.5**	**123**	◇
6.1	**Knowledge creation**	**4.0**	**115**	
6.1.1	Patents by origin/bn PPP$ GDP	0.2	106	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	100	○ ◇
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	2.6	108	
6.1.5	Citable documents H-index	6.8	92	
6.2	**Knowledge impact**	**10.0**	**117**	◇
6.2.1	Growth rate of PPP$ GDP/worker, %	-0.3	99	◇
6.2.2	New businesses/th pop. 15-64	1.1	82	
6.2.3	Computer software spending, % GDP	0.0	108	◇
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	0.5	120	◇
6.2.5	High- and medium-high-tech manufacturing, %	10.1	80	
6.3	**Knowledge diffusion**	**11.7**	**111**	
6.3.1	Intellectual property receipts, % total trade	n/a	n/a	
6.3.2	High-tech net exports, % total trade	0.3	94	
6.3.3	ICT services exports, % total trade	0.4	105	
6.3.4	FDI net outflows, % GDP	0.1	108	
CREATIVE OUTPUTS		**7.5**	**126**	○ ◇
7.1	**Intangible assets**	**12.7**	**123**	◇
7.1.1	Trademarks by origin/bn PPP$ GDP	15.6	100	
7.1.2	Global brand value, top 5,000, % GDP	0.0	80	○ ◇
7.1.3	Industrial designs by origin/bn PPP$ GDP	0.4	85	
7.1.4	ICTs & organizational model creation†	37.3	119	○ ◇
7.2	**Creative goods and services**	**0.3**	**[130]**	
7.2.1	Cultural & 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 & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	0.0	112	
7.3	**Online creativity**	**4.5**	**111**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.1	124	○ ◇
7.3.2	Country-code TLDs/th pop. 15-69	0.1	116	
7.3.3	Wikipedia edits/mn pop. 15-69	17.6	111	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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

ZIMBABWE

GII 2020 rank

120

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2019 rank
108	123	Lower middle	SSF	14.6	40.3	2,358.9	122

		Score/Value	Rank	
INSTITUTIONS		**40.3**	**128**	○ ◇
1.1	**Political environment**	**32.2**	**130**	○ ◇
1.1.1	Political and operational stability*	50.0	126	◇
1.1.2	Government effectiveness*	23.4	130	○ ◇
1.2	**Regulatory environment**	**36.3**	**122**	
1.2.1	Regulatory quality*	0.0	131	○ ◇
1.2.2	Rule of law*	13.5	129	○ ◇
1.2.3	Cost of redundancy dismissal, salary weeks	25.3	104	
1.3	**Business environment**	**52.4**	**122**	
1.3.1	Ease of starting a business*	72.0	120	◇
1.3.2	Ease of resolving insolvency*	32.9	115	
HUMAN CAPITAL & RESEARCH		**20.9**	**93**	
2.1	**Education**	**36.8**	**88**	
2.1.1	Expenditure on education, % GDP	4.6	59	
2.1.2	Government funding/pupil, secondary, % GDP/cap.	22.2	35	●
2.1.3	School life expectancy, years	11.4	99	
2.1.4	PISA scales in reading, maths, & science	n/a	n/a	
2.1.5	Pupil-teacher ratio, secondary	22.5	103	
2.2	**Tertiary education**	**25.7**	**80**	
2.2.1	Tertiary enrolment, % gross	10.0	111	
2.2.2	Graduates in science & engineering, %	30.2	14	●
2.2.3	Tertiary inbound mobility, %	0.5	99	
2.3	**Research & development (R&D)**	**0.3**	**115**	
2.3.1	Researchers, FTE/mn pop.	99.5	88	
2.3.2	Gross expenditure on R&D, % GDP	n/a	n/a	
2.3.3	Global R&D companies, avg. exp. top 3, mn $US	0.0	42	○ ◇
2.3.4	QS university ranking, average score top 3*	0.0	77	○ ◇
INFRASTRUCTURE		**16.4**	**131**	○ ◇
3.1	**Information & communication technologies (ICTs)**	**31.0**	**120**	◇
3.1.1	ICT access*	36.8	112	
3.1.2	ICT use*	27.0	107	
3.1.3	Government's online service*	32.6	117	◇
3.1.4	E-participation*	27.5	120	◇
3.2	**General infrastructure**	**2.0**	**131**	○ ◇
3.2.1	Electricity output, kWh/mn pop.	456.4	107	
3.2.2	Logistics performance*	2.4	123	○ ◇
3.2.3	Gross capital formation, % GDP	n/a	n/a	
3.3	**Ecological sustainability**	**16.2**	**120**	◇
3.3.1	GDP/unit of energy use	3.2	119	○ ◇
3.3.2	Environmental performance*	37.0	100	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	1.1	58	● ◆
MARKET SOPHISTICATION		**44.1**	**84**	
4.1	**Credit**	**27.4**	**114**	
4.1.1	Ease of getting credit*	65.0	61	
4.1.2	Domestic credit to private sector, % GDP	13.1	121	◇
4.1.3	Microfinance gross loans, % GDP	0.0	71	
4.2	**Investment**	**54.0**	**[22]**	
4.2.1	Ease of protecting minority investors*	54.0	88	
4.2.2	Market capitalization, % GDP	n/a	n/a	
4.2.3	Venture capital deals/bn PPP$ GDP	n/a	n/a	
4.3	**Trade, competition, and market scale**	**50.9**	**111**	
4.3.1	Applied tariff rate, weighted avg., %	5.0	93	
4.3.2	Intensity of local competition†	58.4	111	◇
4.3.3	Domestic market scale, bn PPP$	40.3	111	

		Score/Value	Rank	
BUSINESS SOPHISTICATION		**18.2**	**108**	
5.1	**Knowledge workers**	**13.6**	**[114]**	
5.1.1	Knowledge-intensive employment, %	6.1	112	◇
5.1.2	Firms offering formal training, %	26.4	58	
5.1.3	GERD performed by business, % GDP	n/a	n/a	
5.1.4	GERD financed by business, %	n/a	n/a	
5.1.5	Females employed w/advanced degrees, %	0.9	111	
5.2	**Innovation linkages**	**21.3**	**63**	●
5.2.1	University/industry research collaboration†	29.0	114	
5.2.2	State of cluster development†	31.4	119	◇
5.2.3	GERD financed by abroad, % GDP	n/a	n/a	
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.1	21	● ◆
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	101	○ ◇
5.3	**Knowledge absorption**	**19.7**	**101**	
5.3.1	Intellectual property payments, % total trade	0.2	87	
5.3.2	High-tech imports, % total trade	5.8	99	
5.3.3	ICT services imports, % total trade	0.9	82	
5.3.4	FDI net inflows, % GDP	1.7	89	
5.3.5	Research talent, % in business enterprise	n/a	n/a	
KNOWLEDGE & TECHNOLOGY OUTPUTS		**12.9**	**101**	
6.1	**Knowledge creation**	**8.0**	**82**	
6.1.1	Patents by origin/bn PPP$ GDP	0.2	100	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	80	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific & technical articles/bn PPP$ GDP	7.2	67	
6.1.5	Citable documents H-index	7.6	87	
6.2	**Knowledge impact**	**21.0**	**80**	
6.2.1	Growth rate of PPP$ GDP/worker, %	-1.4	111	◇
6.2.2	New businesses/th pop. 15-64	2.1	54	●
6.2.3	Computer software spending, % GDP	0.0	22	● ◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	3.0	73	
6.2.5	High- and medium-high-tech manufacturing, %	21.7	51	●
6.3	**Knowledge diffusion**	**9.7**	**123**	
6.3.1	Intellectual property receipts, % total trade	0.0	70	
6.3.2	High-tech net exports, % total trade	0.1	103	
6.3.3	ICT services exports, % total trade	0.2	114	
6.3.4	FDI net outflows, % GDP	1.9	37	● ◆
CREATIVE OUTPUTS		**11.0**	**112**	
7.1	**Intangible assets**	**11.6**	**126**	◇
7.1.1	Trademarks by origin/bn PPP$ GDP	4.1	123	○
7.1.2	Global brand value, top 5,000, % GDP	12.2	56	●
7.1.3	Industrial designs by origin/bn PPP$ GDP	n/a	n/a	
7.1.4	ICTs & organizational model creation†	29.7	123	○ ◇
7.2	**Creative goods and services**	**15.2**	**[63]**	
7.2.1	Cultural & 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 & Media market/th pop. 15-69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	n/a	n/a	
7.2.5	Creative goods exports, % total trade	1.2	40	●
7.3	**Online creativity**	**5.6**	**107**	
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	0.5	111	
7.3.2	Country-code TLDs/th pop. 15-69	0.9	89	
7.3.3	Wikipedia edits/mn pop. 15-69	19.7	108	
7.3.4	Mobile app creation/bn PPP$ GDP	n/a	n/a	

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

In 2020, the Global Innovation Index (GII) presents its 13th edition dedicated to the theme *Who Will Finance Innovation?* This edition sheds light on the state of innovation financing by investigating the evolution of financing mechanisms for entrepreneurs and other innovators, and by pointing to progress and remaining challenges—including in the context of the economic slowdown induced by the coronavirus disease (COVID-19) crisis.

Innovation is widely recognized as a central driver of economic growth and development.

The aim of the Global Innovation Index is to provide insightful data on innovation and, in turn, to assist economies in evaluating their innovation performance and making informed innovation policy considerations.

Since its creation in 2007, the GII has been impactful on three fronts. First, policymakers are now referring regularly to innovation and their innovation rankings as part of their economic policy strategies. Additionally, the GII is now considered a yardstick for measuring innovation by the UN General Assembly, as noted in its resolution on Science, Technology and Innovation for achieving Sustainable Development Goals (SDGs) at its 74th session in 2019.

Second, the GII allows economies to assess their innovation performance. Economies invest resources to analyze their GII results in cross-ministerial task forces and use the GII to design appropriate innovation and intellectual property (IP) policies.

Third, the GII continues to give a strong impetus for economies to prioritize and collect innovation metrics. By experimenting with new data and evaluating existing innovation metrics, the GII also aims to shape the innovation measurement agenda.

The GII is co-published by Cornell University, INSEAD, and the World Intellectual Property Organization (WIPO), a specialized agency of the United Nations. The 2020 edition of the GII draws on the expertise of its Knowledge Partners: the Confederation of Indian Industry (CII), Dassault Systèmes—The 3DEXPERIENCE Company, and the Brazilian National Confederation of Industry (CNI), as well as an Advisory Board of eminent experts. For the tenth consecutive year, the Joint Research Centre (JRC) of the European Commission audited the GII rankings and associated calculations.

The full report and the GII Mobile Apps—Android and iOS—can be downloaded at **https://globalinnovationindex.org**.

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