APPENDIX A

The Global Competitiveness Index 4.0 Methodology and Technical Notes

This appendix first presents the methodology and detailed structure of the Global Competitiveness Index 4.0 (GCI 4.0) in Section A. Section B lists the minor changes made to the methodology of the Index in 2019. Section C details the methods used to impute missing data points and reports the imputed values by indicator. Section D presents the methodology used to compute progress scores. Finally, Section E provides detailed descriptions and sources for each indicator included in the Index.

A. COMPUTATION AND COMPOSITION OF THE GCI 4.0

The computation of the GCI 4.0 is based on successive aggregations of scores, from the indicator level (the most disaggregated level) to the overall GCI 4.0 score (the highest level). At every aggregation level, each aggregated measure is computed by taking the average (i.e. arithmetic mean) of the scores of its components, with a few exceptions described in Section D. The overall GCI 4.0 score is the average of the scores of the 12 pillars.

For individual indicators, prior to aggregation, raw values are transformed into a progress score ranging from 0 to 100, with 100 being the ideal state. See Section D for more details.

In the list below, weights are rounded to one decimal place, but full precision is used in the computation.

Weight (%) within immediate parent category

ENABLING ENVIRONMENT
(not used in calculation)[1]

Pillar 1: Institutions 8.3%

A. Security 12.5%
- 1.01 Organized crime
- 1.02 Homicide rate
- 1.03 Terrorism incidence
- 1.04 Reliability of police services

B. Social capital 12.5%
- 1.05 Social capital

C. Checks and balances 12.5%
- 1.06 Budget transparency
- 1.07 Judicial independence
- 1.08 Efficiency of legal framework in challenging regulations
- 1.09 Freedom of the press

1 For presentation and analysis purposes, the 12 pillars are also organized into four overarching components—Enabling Environment, Human Capital, Markets, and Innovation Ecosystem—but these components do not enter into the computation of the GCI 4.0.

D. Public-sector performance 12.5%
- 1.10 Burden of government regulation
- 1.11 Efficiency of legal framework in settling disputes
- 1.12 E-Participation

E. Transparency 12.5%
- 1.13 Incidence of corruption

F. Property rights 12.5%
- 1.14 Property rights
- 1.15 Intellectual property protection
- 1.16 Quality of land administration

G. Corporate governance 12.5%
- 1.17 Strength of auditing and accounting standards
- 1.18 Conflict of interest regulation
- 1.19 Shareholder governance

H. Future orientation of government 12.5%

I. Government adaptability 50%
- 1.20 Government ensuring policy stability
- 1.21 Government's responsiveness to change
- 1.22 Legal framework's adaptability to digital business models
- 1.23 Government long-term vision

II. Commitment to sustainability 50%
- 1.24 Energy efficiency regulation
- 1.25 Renewable energy regulation
- 1.26 Environment-related treaties in force

Pillar 2: Infrastructure 8.3%

A. Transport infrastructure[2] 50%

I. Road 25%
- 2.01 Road connectivity
- 2.02 Quality of road infrastructure

II. Railroad[2] 25%
- 2.03 Railroad density
- 2.04 Efficiency of train services

III. Air 25%
- 2.05 Airport connectivity
- 2.06 Efficiency of air transport services

IV. Sea 25%
- 2.07 Liner shipping connectivity[3]
- 2.08 Efficiency of seaport services

B. Utility infrastructure 50%

I. Electricity 50%
- 2.09 Electricity access
- 2.10 Electricity supply quality

II. Water 50%
- 2.11 Exposure to unsafe drinking water
- 2.12 Reliability of water supply

Pillar 3: ICT adoption[4] 8.3%
- 3.01 Mobile-cellular telephone subscriptions
- 3.02 Mobile-broadband subscriptions
- 3.03 Fixed-broadband internet subscriptions
- 3.04 Fibre internet subscriptions
- 3.05 Internet users

Pillar 4: Macroeconomic stability 8.3%
- 4.01 Inflation
- 4.02 Debt dynamics

HUMAN CAPITAL
(not used in calculation)[5]

Pillar 5: Health 8.3%
- 5.01 Healthy life expectancy

Pillar 6: Skills 8.3%

A. Current workforce 50%

I. Education of current workforce 50%
- 6.01 Mean years of schooling

II. Skills of current workforce 50%
- 6.02 Extent of staff training
- 6.03 Quality of vocational training
- 6.04 Skillset of graduates
- 6.05 Digital skills among active population
- 6.06 Ease of finding skilled employees

B. Future workforce 50%

I. Education of future workforce 50%
- 6.07 School life expectancy

II. Skills of future workforce 50%
- 6.08 Critical thinking in teaching
- 6.09 Pupil-to-teacher ratio in primary education

MARKETS
(not used in calculation)[5]

Pillar 7: Product market 8.3%

A. Domestic market competition 50%
- 7.01 Distortive effect of taxes and subsidies on competition
- 7.02 Extent of market dominance
- 7.03 Competition in services

B. Trade openness 50%
- 7.04 Prevalence of non-tariff barriers
- 7.05 Trade tariffs
- 7.06 Complexity of tariffs
- 7.07 Border clearance efficiency

2 For economies where there is no regular train service or where the network covers only a negligible portion of the territory, the Transport infrastructure sub-pillar corresponds to the average score of the Road, Air and Sea components. Assessment of the existence of a network was conducted by the World Economic Forum based on various sources.

3 For landlocked countries, this indicator is not included in the computation and the Sea component score corresponds to the score of indicator 2.08.

4 In computing the score of this pillar, indicator 3.02 is not directly used in the calculation. Instead the ratio of indicator 3.02 to indicator 3.01 is used, as an approximation of the share of mobile-cellular telephone subscriptions that have broadband capability. The same approach is used for indicator 3.04, as a way to approximate the share of fixed broadband connections that are optical fibre subscriptions. In both cases, the ratios are converted onto 0–100 scale and used in the computation, as explained in Section C.

5 For presentation and analysis purposes, the 12 pillars are also organized into four overarching components—Enabling Environment, Human Capital, Markets, and Innovation Ecosystem—but these components do not enter into the computation of the GCI 4.0.

Pillar 8: Labour market 8.3%

A. Flexibility 50%
- 8.01 Redundancy costs
- 8.02 Hiring and firing practices
- 8.03 Cooperation in labour-employer relations
- 8.04 Flexibility of wage determination
- 8.05 Active labour market policies
- 8.06 Workers' rights
- 8.07 Ease of hiring foreign labour
- 8.08 Internal labour mobility

B. Meritocracy and incentivization 50%
- 8.09 Reliance on professional management
- 8.10 Pay and productivity
- 8.11 Ratio of wage and salaried female workers to male workers
- 8.12 Labour tax rate

Pillar 9: Financial system[6] 8.3%

A. Depth
- 9.01 Domestic credit to private sector
- 9.02 Financing of SMEs
- 9.03 Venture capital availability
- 9.04 Market capitalization
- 9.05 Insurance premium

B. Stability
- 9.06 Soundness of banks
- 9.07 Non-performing loans
- 9.08 Credit gap
- 9.09 Banks' regulatory capital ratio

Pillar 10: Market size[7] 8.3%
- 10.01 Gross domestic product
- 10.02 Imports of goods and services

INNOVATION ECOSYSTEM
(not used in calculation)[8]

Pillar 11: Business dynamism 8.3%

A. Administrative requirements 50%
- 11.01 Cost of starting a business
- 11.02 Time to start a business
- 11.03 Insolvency recovery rate
- 11.04 Insolvency regulatory framework

B. Entrepreneurial culture 50%
- 11.05 Attitudes towards entrepreneurial risk
- 11.06 Willingness to delegate authority
- 11.07 Growth of innovative companies
- 11.08 Companies embracing disruptive ideas

Pillar 12: Innovation capability[9] 8.3%

A. Diversity and collaboration
- 12.01 Diversity of workforce
- 12.02 State of cluster development
- 12.03 International co-inventions
- 12.04 Multistakeholder collaboration

B. Research and development
- 12.05 Scientific publications
- 12.06 Patent applications
- 12.07 R&D expenditures
- 12.08 Research institutions prominence index

C. Commercialization
- 12.09 Buyer sophistication
- 12.10 Trademark applications

B. CHANGES TO THE METHODOLOGY

Following the introduction of the GCI 4.0 methodology in the 2018 edition, minor changes have been made to the methodology this year. These changes are based on additional feedback received in the past year or made necessary as a result of data that is no longer being collected. They do not affect in any major way the comparability of results across the two editions.

Pillar 1: Institutions

- Budget transparency (indicator 1.06) is now assessed using the Open Budget Index, sourced from the International Budget Project. This indicator replaces the Open Budget Data score, which has been discontinued.

- Former indicator 1.13, Future orientation of government, which is comprised of four indicators derived from the Executive Opinion Survey, is now sub-pillar H of Pillar 1 (see Section A). The four indicators remain and are complemented by three new indicators: Energy efficiency regulation (indicator 1.24), Renewable energy regulation (1.25) and Environment-related treaties in force (1.26), which collectively measure a government's commitment to sustainability, an indication of its future orientation. As a result of these changes, the numbering of indicators in Pillar 1 was modified according to the new order.

6 The score of this pillar corresponds to the average of the scores of the nine individual indicators (9.01– 9.09). Components A and B are used for presentation purposes only, and do not enter the calculation.

7 The score of this pillar corresponds to the natural logarithm (LN) of the sum of GDP and imports, valued at purchasing power parity (PPP). Valuation of imports at PPP is estimated by multiplying the share of imports (indicator 10.02) by the value of GDP (indicator 10.01). Score of pillar 10 = LN (GDP+IMPORT/100*GDP).

8 For presentation and analysis purposes, the 12 pillars are also organized into four overarching components—Enabling environment, Human capital, Markets, and Innovation ecosystem—but these components do not enter into the computation of the GCI 4.0.

9 The score of this pillar corresponds to the average of the scores of the underlying 10 individual indicators (12.01–12.10). Components A, B and C are used for presentation purposes only and do not enter the calculation.

Pillar 7: Product market

The Service Trade Restrictiveness Index has been dropped owing both to the absence of updates to that index and to the fact that different methodologies are used to assess countries. These changes make any cross-country and time comparison impossible. By no means should this exclusion been interpreted as implying that services are no longer relevant for competitiveness.

Pillar 8: Labour market

Indicator 8.08, Internal labour mobility, no longer applies to city states, as the concept of internal mobility is of little relevance in such small economies. Bahrain, Brunei Darussalam, Hong Kong SAR, Kuwait, Malta, Qatar and Singapore were identified as city states.

C. MISSING DATA IMPUTATION

Missing and outdated values (the cut-off year varies by indicator) are imputed for the purpose of the calculation. Table 1 (page page 611) presents the imputation method and the imputed values by indicator. Note that the Economy Profiles and interactive ranking tables (available online at http://www.weforum.org/gcr) do not report imputed values.

D. COMPUTATION OF PROGRESS SCORES AND FRONTIER VALUES

To allow the aggregation of indicators of different nature and magnitude, each indicator entering the GCI 4.0 is converted into a unit-less score, called "progress score", ranging from 0 to 100 using a min-max transformation. Formally, each indicator is re-scaled according to the following formula:

$$score_{i,c} = \left(\frac{value_{i,c} - wp_i}{frontier_i - wp_i} \right) \times 100,$$

where $value_{i,c}$ *is the "raw" value of country* c *for indicator* i, *worst performance (*wp_i,) is the lowest acceptable value for indicator *i* and $frontier_i$ corresponds to the best possible outcome. Depending on the indicator, the frontier may be a policy target or aspiration, the maximum possible value, or a number derived from statistical analysis of the distribution (e.g. 90th or 95th percentile). If a value is below the worst performance value, its score is 0; if a value is above the frontier value, its score is capped at 100. When a logarithmic transformation is applied on an indicator, the same transformation is applied to the frontier and worst performance values displayed in Table 1.

In the case of indicators derived from the Executive Opinion Survey, $frontier_i$ and wp_i are always 7 and 1, respectively. These values correspond to the two extreme answers of any questions.

Table 2 (page page 631) rovides the actual floor and frontier values used for the normalization of each individual indicator. In a few cases, reported in the table, a logarithmic transformation is applied to the raw value prior to conversion.

E. INDICATOR DEFINITIONS AND SOURCES

The following notes provide sources for all the individual indicators included in the GCI 4.0. The title of each indicator appears on the first line, preceded by its number to allow for quick reference. Below is a description of each indicator or, in the case of Executive Opinion Survey data, the full question and associated answers. If necessary, additional information is provided underneath.

The interactive ranking tables at www.weforum.org/gcr/rankings provide information about the source and period for each individual data point. Select the indicator of interest from the selector and click on the "info" icon next to each economy to access the information. For indicators not sourced from the World Economic Forum, users are urged to refer to the original source for any additional information and exceptions for certain economies and/or data points. "Terms of Use and Disclaimer" on page ii of this report provide information about using the data.

The data used in the computation of the GCI 4.0 2019 represents the most recent and best data available at the time when it was collected (March–July 2019). It is possible that data was updated or revised subsequently.

Pillar 1: Institutions

1.01 Organized crime

Response to the survey question "In your country, to what extent does organized crime (mafia-oriented racketeering, extortion) impose costs on businesses?" [1 = to a great extent, imposes huge costs; 7 = not at all, imposes no costs] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

1.02 Homicide rate

Number of intentional homicides per 100,000 population | 2017 or most recent year available

"Intentional homicide" refers to unlawful death inflicted upon a person with the intent to cause death or serious injury. More details about the methodology can be found at https://dataunodc.un.org/crime/intentional-homicide-victims.

Sources: United Nations Office on Drugs and Crime, Homicide Dataset 2019 (https://data.unodc.org/); World Health Organization (WHO), WHO Global Health Estimates 2015 (http://apps.who.int/violence-info/).

1.03 Terrorism incidence

Assesses the frequency and severity of terror attacks. The scale ranges from 0 (highest incidence) to 100 (no incidence) | Weighted count 2013–2017

This indicator has two components: the number of terrorism-related casualties (injuries and fatalities) and the number of terrorist attacks over a five-year period, with each year assigned half the weight of the following year. Each component is normalized on a 0 to 100 scale, with 100 meaning "no casualty" and "no attack", respectively, and then averaged.

Source: World Economic Forum calculations based on National Consortium for the Study of Terrorism and Responses to Terrorism (https://www.start.umd.edu/).

1.04 Reliability of police services

Response to the survey question "In your country, to what extent can police services be relied upon to enforce law and order?" [1 = not at all; 7 = to a great extent] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

1.05 Social capital

Score on the Social Capital pillar of the Legatum Prosperity Index™, which assesses social cohesion and engagement, community and family networks, and political participation and institutional trust. The scale ranges from 0 (low) to 100 (high) | 2018 edition

This indicator measures national performance in three areas: social cohesion and engagement (bridging social capital), community and family networks (bonding social capital), and political participation and institutional trust (linking social capital). More details about the methodology can be found at http://www.prosperity.com/about/methodology.

Source: Legatum Institute, The Legatum Prosperity Index 2018 (http://www.prosperity.com/about/resources).

1.06 Budget transparency

Assesses the amount and timeliness of budget information that governments make publicly available | 2017

The index assigns countries covered by the Open Budget Survey a transparency score on a 100-point scale using a subset of questions that assess the amount and timeliness of budget information that governments make publicly available in eight key budget documents in accordance with international good practice standards. The eight key documents are: Pre-Budget Statement; Executive's Budget Proposal and Supporting Documents for the Executive's Budget Proposal; Enacted Budget; Citizens Budget; In-Year Reports; Mid-Year Review; Year-End Report; and Audit Report. For more information about the index and underlying survey methodologies, see https://www.internationalbudget.org/open-budget-survey/methodology/.

Source: International Budget Partnership, The Open Budget Survey 2017 (https://www.internationalbudget.org/open-budget-survey/).

1.07 Judicial independence

Response to the survey question "In your country, how independent is the judicial system from influences of the government, individuals, or companies?" [1 = not independent at all; 7 = entirely independent] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

1.08 Efficiency of legal framework in challenging regulations

Response to the survey question "In your country, how easy is it for private businesses to challenge government actions and/or regulations through the legal system?" [1 = extremely difficult; 7 = extremely easy] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

1.09 Freedom of the press

Score on the World Press Freedom Index, which measures the level of freedom available to journalists. The scale ranges from 0 (good) to 100 (very bad) | 2019 edition

The index measures media independence, the quality of the infrastructure that supports the production of news, and information and acts of violence against journalists. It is based on two sources: (1) a database of the level of abuses and violence against journalists and media; and (2) an expert opinion survey on pluralism, media independence, self-censorship, transparency and infrastructure in each country. More details about the methodology can be found at https://rsf.org/en/world-press-freedom-index.

Source: Reporters Without Borders (RSF), World Press Freedom Index 2019 (https://rsf.org/en/world-press-freedom-index).

1.10 Burden of government regulation

Response to the survey question "In your country, how burdensome is it for companies to comply with public administration's requirements (e.g. permits, regulations, reporting)?" [1 = extremely burdensome; 7 = not burdensome at all] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

1.11 Efficiency of legal framework in settling disputes

Response to the survey question "In your country, how efficient are the legal and judicial systems for companies in settling disputes?" [1 = extremely inefficient; 7 = extremely efficient] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

1.12 E-Participation

Score on the E-Participation Index, which assesses the use of online services to facilitate the provision of information by governments to citizens. The scale ranges from 0 to 1 (best) | 2018 edition

The E-Participation Index measures the use of online services to facilitate provision of information by governments to citizens ("e-information sharing"), interaction with stakeholders ("e-consultation") and engagement in decision-making processes ("e-decision making"). More details about the methodology can be found at https://publicadministration.un.org.

Source: United Nations, Department of Economic and Social Affairs, *E-Government Survey 2018: Gearing E-Government To Support Transformation Towards Sustainable And Resilient Societies* (July 2018).

1.13 Incidence of corruption

Score on the Corruption Perceptions Index, which measures perceptions of corruption in the public sector. This is a composite indicator, and the scale ranges from 0 (highly corrupt) to 100 (very clean) | 2018 edition

The index aggregates data from a number of different sources that provide perceptions of business people and country experts of the level of corruption in the public sector. More details about the methodology can be found at https://www.transparency.org/cpi.

Source: Transparency International, Corruption Perceptions Index 2018 (https://www.transparency.org/cpi2018).

1.14 Property rights

Response to the survey question "In your country, to what extent are property rights, including financial assets, protected?" [1 = not at all; 7 = to a great extent] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

1.15 Intellectual property protection

Response to the survey question "In your country, to what extent is intellectual property protected?" [1 = not at all; 7 = to a great extent] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

1.16 Quality of land administration

Score on the quality of land administration index, which assesses the reliability of infrastructure, transparency of information, geographic coverage, land dispute resolution and equal access to property rights. The scale ranges from 0 to 30 (best) | 2018

The index has five components: reliability of infrastructure, transparency of information, geographic coverage, land dispute resolution, and equal access to property rights. Data is collected for each economy's largest business city. More details about the methodology can be found at http://www.doingbusiness.org/Methodology.

Source: World Bank Group, *Doing Business 2019: Training for Reform*.

1.17 Strength of auditing and accounting standards

Response to the survey question "In your country, how strong are financial auditing and reporting standards?" [1 = extremely weak; 7 = extremely strong] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

1.18 Conflict of interest regulation

Score on the extent of conflict of interest regulation index, which measures the protection of shareholders against directors' misuse of corporate assets for personal gain. The scale ranges from 0 to 10 (best) | 2018

The index assesses three dimensions of regulation that address conflicts of interest: 1) transparency of related-party transactions, 2) shareholders' ability to sue and hold directors liable for self-dealing, and 3) access to evidence and allocation of legal expenses in shareholder litigation. More details about the methodology can be found at http://www.doingbusiness.org/Methodology.

Source: World Bank Group, *Doing Business 2019: Training for Reform*.

1.19 Shareholder governance

Score on the extent of shareholder governance index, which measures shareholders' rights in corporate governance. The scale ranges from 0 to 10 (best) | 2018

The index assesses three dimensions of good governance: (1) shareholders' rights and role in major corporate decisions, (2) governance safeguards protecting shareholders from undue board control and entrenchment, and (3) corporate transparency on ownership stakes, compensation, audits and financial prospects. More details about the methodology can be found at http://www.doingbusiness.org/Methodology.

Source: World Bank Group, *Doing Business 2019: Training for Reform*.

1.20 Government ensuring policy stability

Response to the survey question "In your country, to what extent does the government ensure a stable policy environment for doing business?" [1 = not at all; 7 = to a great extent] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

1.21 Government's responsiveness to change

Response to the survey question "In your country, to what extent does the government respond effectively to change (e.g. technological changes, societal and demographic trends, security and economic challenges)?" [1 = not at all; 7 = to a great extent] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

1.22 Legal framework's adaptability to digital business models

Response to the survey question "In your country, how fast is the legal framework of your country adapting to digital business models (e.g. e-commerce, sharing economy, fintech, etc.)?" [1 = not fast at all; 7 = very fast] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

1.23 Government long-term vision

Response to the survey question "In your country, to what extent does the government have a long-term vision in place?" [1 = not at all; 7 = to a great extent] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

1.24 Energy efficiency regulation

Assesses a country's policies and regulations to promote energy efficiency. The score ranges from 0 (not conducive) to 100 (very conducive) | 2017

The score is based on a country's performance on 12 indicators: National energy efficiency planning; Energy efficiency entities; Information provided to consumers about electricity usage; EE incentives from electricity rate structures; Incentives & mandates: Industrial and Commercial End users; Incentives & mandates: Public sector; Incentives & mandates: Utilities; Financing mechanisms for energy efficiency; Minimum energy efficiency performance standards; Energy labelling systems; Building energy codes; Transport; and Carbon Pricing and Monitoring. For more information, see https://rise.worldbank.org/indicators#pillar-energy-efficiency.

Source: The World Bank/ESMAP, *Policy Matters: Regulatory Indicators for Sustainable Energy (RISE) 2018* (https://rise.worldbank.org/reports, https://rise.worldbank.org/scores).

1.25 Renewable energy regulation

Assesses a country's policies and regulations to promote renewable energies. The score ranges from 0 (not conducive) to 100 (very conducive) | 2017

The score is based on a country's performance in seven indicators: Legal framework for renewable energy; Planning for renewable energy expansion; Incentives and regulatory support for renewable energy; Attributes of financial and regulatory incentives; Network connection and use; Counterparty risk; Carbon Pricing; and Monitoring. For more information, see https://rise.worldbank.org/indicators#pillar-renewable-energy.

Source: The World Bank/ESMAP, *Policy Matters: Regulatory Indicators for Sustainable Energy (RISE) 2018* (https://rise.worldbank.org/reports, https://rise.worldbank.org/scores).

1.26 Environment-related treaties in force

Total number of ratified environmental treaties (0–29 scale, where 29 is best) | Status as of 25 February 2019

This indicator measures the total number of international treaties from a set of 29 for which a state is a participant. A state is acknowledged as a participant whenever is status for each treaty appears as Ratified, Accession, or In Force. The treaties included are: the International Convention for the Regulation of Whaling, 1946 Washington; the Convention on Wetlands of International Importance especially as Waterfowl Habitat, 1971 Ramsar; the Convention Concerning the Protection of the World Cultural and Natural Heritage, 1972 Paris; the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 London, Mexico City, Moscow, Washington; the Convention on International Trade in Endangered Species of Wild Fauna and Flora, 1973 Washington; the International Convention for the Prevention of Pollution from Ships (MARPOL) as modified by the Protocol of 1978, London; the Convention on the Conservation of Migratory Species of Wild Animals, 1979 Bonn; the United Nations Convention on the Law of the Sea, 1982 Montego Bay; the Convention on the Protection of the Ozone Layer, 1985 Vienna; the Protocol on Substances that Deplete the Ozone Layer, 1987 Montreal; the Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, 1989 Basel; the International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990 London; the United Nations Framework Convention on Climate Change, 1992 New York; the Convention on Biological Diversity, 1992 Rio de Janeiro; the International Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, particularly Africa, 1994 Paris; the Agreement relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982, 1994 New York; the Agreement relating to the Provisions of the United Nations Convention on the Law of the Sea relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, 1995 New York; the Kyoto Protocol to the United Nations Framework Convention on the Climate Change, Kyoto 1997; the Convention on the Law of the Non-navigational Uses of International Watercourses, 1997; the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, 1998 Rotterdam; the Cartagena Protocol of Biosafety to the Convention on Biological Diversity, 2000 Montreal; the Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances, 2000 London; the Stockholm Convention on Persistent Organic Pollutants, 2001 Stockholm; the International Treaty on Plant Genetic Resources for Food and Agriculture, 2001 Rome; the International Tropical Timber Agreement, 2006 Geneva; the Supplementary Protocol on Liability and Redress to the Cartagena Protocol on Biosafety, 2010 Nagoya – Kuala Lumpur; the Protocol on Access to Genetic Resources and their Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity, Nagoya 2010; the Convention on Mercury, Minamata, 2013; and the Paris Agreement 2015.

Source: The International Union for Conservation of Nature (IUCN) Environmental Law Centre ELIS Treaty Database (data received through direct communication).

Pillar 2: Infrastructure

2.01 Road connectivity

Score on the Road Connectivity Index, which measures average speed and straightness of a driving itinerary connecting the 10 or more largest cities that together account for at least 15% of the economy's total population. The scale ranges from 0 to 100 (excellent) | 43612

This Index, developed by the World Economic Forum, comprises two elements: (1) a measure of the average speed of a driving itinerary connecting the 10 or more largest cities in an economy accounting for at least 15% of the economy's total population; and (2) a measure of road straightness. The itinerary was not optimized and connects the cities from the largest to the smallest. Any leg involving a ferry was excluded from the average speed calculation. As a first step to the identification of cities to include in the itinerary, pairwise distances ("as the crow flies") were calculated, and when the distance was less than 20 kilometres, the smallest city in the pair was excluded. The road straightness corresponds to the ratio of the sum of driving distances between each city in the journey to the sum of crow-fly distances between each city in the journey. For this component, legs involving a ferry were included. The APIs of Google Directions and Open Street Map were used to compute the itinerary. The Geonames database (accessed on 8 May 2019) was used for city populations and coordinates. For more information about this indicator, please contact gcp@weforum.org.

Source: World Economic Forum's calculations.

2.02 Quality of road infrastructure

Response to the survey question "In your country, what is the quality (extensiveness and condition) of road infrastructure?" [1 = extremely poor—among the worst in the world; 7 = extremely good—among the best in the world] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

2.03 Railroad density

Kilometres of railroad per 1,000 square kilometres of land | 2017 or most recent year available

Source: The World Bank Group, *World Development Indicators* database (https://data.worldbank.org/, accessed 29 April 2019) and national sources.

2.04 Efficiency of train services

Response to the survey question "In your country, how efficient (i.e. frequency, punctuality, speed, price) are train transport services?" [1 = extremely inefficient, among the worst in the world; 7 = extremely efficient, among the best in the world] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

2.05 Airport connectivity

This represents the IATA airport connectivity indicator, which measures the degree of integration of a country within the global air transport network | 2018

For each airport, the number of available seats to each destination is weighted by the size of the destination airport (in terms of number of passengers handled). The weighted totals are then summed for all destinations, then for all airports in the country to produce a score. A log transformation is applied to the raw value before converting it to the 0 to 100 score.

Source: International Air Transport Association (IATA) (data received through direct communication).

2.06 Efficiency of air transport services

Response to the survey question "In your country, how efficient (i.e. frequency, punctuality, speed, price) are air transport services?" [1 = extremely inefficient, among the worst in the world; 7 = extremely efficient, among the best in the world] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

2.07 Liner shipping connectivity

Score on the Liner Shipping Connectivity Index, which assesses a country's connectivity to global shipping networks. The index uses an open scale, with the benchmark score of 100 corresponding to the most connected country in 2004 (China), Does not apply to land-locked countries. | 2017

The index is based on five components of the maritime transport sector: the number of ships, their container-carrying capacity, the maximum vessel size, the number of services and the number of companies that deploy container ships in a country's ports.

Source: United Nations Conference on Trade and Development (UNCTAD), UNCTAD, Division on Technology and Logistics (http://stats.unctad.org/LSCI, accessed 4 April 2019).

2.08 Efficiency of seaport services

Response to the survey question "In your country, how efficient (i.e. frequency, punctuality, speed, price) are seaport services (ferries, boats)?" [1 = extremely inefficient, among the worst in the world; 7 = extremely efficient, among the best in the world]. Does not apply to land-locked countries. | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

2.09 Electricity access

Percentage of population with access to electricity | 2017 estimate

Electricity access entails a household having initial access to sufficient electricity to power a basic bundle of energy services—at a minimum, several lightbulbs, task lighting (such as a flashlight), phone.

Sources: International Energy Agency, World Energy Outlook 2018 (https://www.iea.org/weo2018/); The World Bank Group, *Sustainable Energy for All* database (https://datacatalog.worldbank.org/dataset/sustainable-energy-all, accessed 21 March 2019); national sources.

2.10 Electricity supply quality

Electric power transmission and distribution losses as a percentage of domestic supply | 2016 estimate

Electric power transmission and distribution losses are losses in transmission between sources of supply and points of distribution and in the distribution to consumers, including pilferage.

Source: International Energy Agency, Energy Data Centre (data received through direct communication).

2.11 Exposure to unsafe drinking water

Risk-weighted percentage of population exposed to unsafe drinking water | 2017 estimate

This indicator is reported as a summary exposure value (SEV): it measures a population's exposure to unsafe drinking water, taking into account the extent of exposure by risk level and the severity of that risk's contribution to disease burden. The indicator ranges from 0, when no excess risk for a population exists, to 1, when the population is at the highest level of risk.

Source: Institute for Health Metrics and Evaluation, *Global Burden of Disease 2017* (http://www.healthdata.org/gbd/).

2.12 Reliability of water supply

Response to the survey question "In your country, how reliable is the water supply (lack of interruptions and flow fluctuations)?" [1 = extremely unreliable; 7 = extremely reliable] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

Pillar 3: ICT adoption

3.01 Mobile-cellular telephone subscriptions

Number of mobile-cellular telephone subscriptions per 100 population | 2018 or most recent period available

This indicator includes post-paid subscriptions, active prepaid accounts (i.e. that have been active during the past three months) and all mobile-cellular subscriptions that offer voice communications.

Source: International Telecommunication Union, *World Telecommunication/ICT Indicators* database (June 2019 edition).

3.02 Mobile-broadband subscriptions

Number of active mobile-broadband subscriptions per 100 population | 2018 or most recent period available

This indicator includes standard mobile-broadband subscriptions and dedicated mobile-broadband data subscriptions to the public internet.

Source: International Telecommunication Union, *World Telecommunication/ICT Indicators* database (June 2019 edition).

3.03 Fixed-broadband internet subscriptions

Number of fixed-broadband internet subscriptions per 100 population | 2018 or most recent period available

This indicator refers to the number of subscriptions for high-speed access to the public internet (a TCP/IP connection), including cable modem, DSL, fibre, and other fixed (wired)-broadband technologies—such as Ethernet, LAN and broadband over powerline communications.

Source: International Telecommunication Union, *World Telecommunication/ICT Indicators* database (June 2019 edition).

3.04 Fibre internet subscriptions

Fibre-to-the-home/building internet subscriptions per 100 population | 2017 or most recent period available

This indicator refers to the number of internet subscriptions using fibre-to-the-home or fibre-to-the-building at downstream speeds equal to or greater than 256 kb/s. This should include subscriptions where fibre goes directly to the subscriber's premises or fibre-to-the-building subscriptions that terminate no more than two metres from an external wall of the building. Fibre-to-the-cabinet and fibre-to-the-node are excluded.

Source: International Telecommunication Union, *World Telecommunication/ICT Indicators* database (June 2019 edition).

3.05 Internet users

Percentage of individuals who used the internet from any location and for any purpose, irrespective of the device and network used, in the last three months | 2018 or most recent period available

Source: International Telecommunication Union, *World Telecommunication/ICT Indicators* database (June 2019 edition).

Pillar 4: Macroeconomic stability

4.01 Inflation

Annual percentage change in the Consumer Price Index | Average 2017–2018

Inflation is normalized in a U-shaped function to capture the detrimental effects of high inflation and deflation. Countries with inflation rates between 0.5% and 4% receive the highest possible score of 100. Outside this range, scores decrease linearly as the distance between the optimal value and the actual value increases. Because of the special conversion applied to this indicator, the ranking for this indicator is based on progress scores rather than raw values.

Source: International Monetary Fund, *World Economic Outlook* database (April 2019 edition).

4.02 Debt dynamics

Index measuring the change in public debt, weighted by a country's credit rating and debt level in relation to its GDP | 2018–2019

This indicator is a category-based min-max normalization of the debt change. The debt change is the difference between the 2017 and 2018 of the debt-to-GDP ratio expected values. To transform the debt change value into a 0 to 100 score, each country was assigned to a specific category that determined the value boundaries. Categories are based on three criteria: general credit rating, government debt-to-GDP level for the year 2017, and country classification (1 if country is considered advanced, 0 otherwise, according to IMF's classification). The general credit rating for each country is computed as the average of Fitch, Standard and Poor's (S&P) and Moody's credit ratings. A country's rating is considered "investment grade 1" for S&P's grades AAA to A, Moody's grades Aaa to A1, and Fitch's grades AAA to A. A country's rating is considered "investment grade 2" for S&P's grades A– to BBB–, Moody's grades Baa3 to Baa1, and Fitch's grades A– to BBB+. A country's rating is considered "speculative" for S&P's grades BB+ to CCC+, Moody's grades Ba3 to Caa2, and Fitch's grades BBB– to B–. A country credit rating is considered "default" for S&P's grade SD, Moody's grades Caa1 and C, and Fitch's grades CC and RD. Based on these criteria, 12 cases were identified: (1) if a country's average rating is rated as "investment grade 1" and its debt-to-GDP level is less than 60%, its debt change is normalized 100; (2) if a country's average rating is rated as "investment grade 1" and its debt-to-GDP level is less than 110%, its debt change is normalized to a score between 90 and 100; (3) if a country's average rating is graded as "investment grade 1" and its debt-to-GDP level is greater than 110%, its debt change is normalized to a score between 80 and 90; (4) if the average credit rating is rated as "investment grade 2" and the debt level is lower than 110%, its debt change is normalized to a score between 70 and 80; (5) if the average credit rating is "investment grade 2" and the debt level is greater than 110%, its debt change is normalized to a score between 60 and 70; (6) if the average credit rating is "speculative", the debt level is less than 110% and the country classification is "advanced", its debt change is normalized to a score between 50 and 60; (7) if the average credit rating is "speculative", the debt level is greater than 110% and the country classification is "advanced", its debt change is normalized to a score between 40 and 50; (8) if the average credit rating is "speculative", the debt level is less than 60% and the country classification is "developing", its debt change is normalized to a score between 40 and 50; (9) if the average credit rating is "speculative", the debt level is greater than 60% and the country classification is "developing", its debt change is normalized to a score between 30 and 40; (10) if the average credit rating is "default", the debt change is normalized to a score between 0 and 30; (11) if a country does not receive a credit rating from any rating agency and its debt level is below 60%, its debt change is normalized to a score between 40 and 50; and (12) if a country does not receive a credit rating from a rating agency and its debt is above 60% of GDP, its debt change is normalized to a score between 30 and 40. To determine the final value of the debt dynamics indicator within the assigned boundaries, we've calculated the normalized debt change, which ranges from a minimum observed value of 0 and the maximum observed value of 20. As part of the normalization process, we assigned a score equivalent to the minimum value of each bracket if the debt change was 20% or higher; assigned the maximum value of the bracket if the debt change was 0% or lower; and assigned a score between the two values if the debt change was between 0% and 20%.

Sources: World Economic Forum; calculations based on data from International Monetary Fund and rating agencies.

Pillar 5: Health

5.01 Healthy life expectancy

Number of years that a newborn can expect to live in good health, taking into account mortality and disability | 2017 estimate

More details about the methodology can be found at http://www.healthdata.org/research-article/gbd-2015-dalys-hale.

Source: Institute for Health Metrics and Evaluation, Global Burden of Disease 2017 (http://www.healthdata.org/gbd/).

Pillar 6: Skills

6.01 Mean years of schooling

Mean years of schooling | 2016 or most recent year available

Average number of completed years of education of a country's population aged 25 years and older, excluding years spent repeating individual grades.

Sources: United Nations Educational, Scientific and Cultural Organization (UNESCO); Wittgenstein Centre for Demography and Global Human Capital (http://www.oeaw.ac.at/vid/dataexplorer/ accessed through the World Bank Data Catalog).

6.02 Extent of staff training

Response to the survey question "In your country, to what extent do companies invest in training and employee development?" [1 = not at all; 7 = to a great extent] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

6.03 Quality of vocational training

Response to the survey question "In your country, how do you assess the quality of vocational training?" [1 = extremely poor among the worst in the world; 7 = excellent among the best in the world] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

6.04 Skillset of graduates

Average score of the following two Executive Opinion Survey questions: "In your country, to what extent do graduating students from secondary education possess the skills needed by businesses?" and "In your country, to what extent do graduating students from university possess the skills needed by businesses?" In each case, the answer ranges from 1 (not at all) to 7 (to a great extent). | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

6.05 Digital skills among active population

Response to the survey question "In your country, to what extent does the active population possess sufficient digital skills (e.g. computer skills, basic coding, digital reading)?" [1 = not all; 7 = to a great extent] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

6.06 Ease of finding skilled employees

Response to the survey question "In your country, to what extent can companies find people with the skills required to fill their vacancies?" [1 = not at all; 7 = to a great extent] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

6.07 School life expectancy

Total number of years of schooling (primary through tertiary) that a child of school entrance age can expect to receive | 2017 or most recent period available

This indicator assumes that the probability of a person being enrolled in school at any particular future age is equal to the current enrolment ratio at that age. More details about the methodology can be found at http://uis.unesco.org/en/glossary.

Source: United Nations Educational, Scientific and Cultural Organization (UNESCO), UNESCO Institute for Statistics (UIS) (http://data.uis.unesco.org, accessed 18 April 2019).

6.08 Critical thinking in teaching

Response to the survey question "In your country, how do you assess the style of teaching?" [1 = frontal, teacher based, and focused on memorizing; 7 = encourages creative and critical individual thinking] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

6.09 Pupil-to-teacher ratio in primary education

Average number of pupils per teacher, based on headcounts of both pupils and teachers | 2017 or most recent period available

Source: The World Bank Group, *World Development Indicators* (https://data.worldbank.org/, accessed 18 April 2019).

Pillar 7: Product market

7.01 Distortive effect of taxes and subsidies on competition

Response to the survey question "In your country, to what extent do fiscal measures (subsidies, tax breaks, etc.) distort competition?" [1 = distort competition to a great extent; 7 = do not distort competition at all] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

7.02 Extent of market dominance

Response to the survey question "In your country, how do you characterize corporate activity?" [1 = dominated by a few business groups; 7 = spread among many firms]. | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

7.03 Competition in services

Average of the scores of the three components of the following Executive Opinion Survey question: "In your country, how competitive is the provision of the following services: professional services (legal services, accounting, engineering, etc.); retail services; and network sector (telecommunications, utilities, postal, transport, etc.)?" In each case, the answer ranges from 1 (not at all competitive) to 7 (extremely competitive). | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

7.04 Prevalence of non-tariff barriers

Response to the survey question "In your country, to what extent do non-tariff barriers (e.g. health and product standards, technical and labelling requirements, etc.) limit the ability of imported goods to compete in the domestic market?" [1 = strongly limit; 7 = do not limit at all] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

7.05 Trade tariffs

Weighted average applied tariff rate, expressed in percentage points | 2018 or most recent period available

The weighted mean applied tariff is the average of effectively applied rates weighted by the product import shares corresponding to each partner country. Applied tariffs are considered to be the tariff rates applied by a customs administration on imported goods. They are the rates published by national customs authorities for duty administration purposes.

Source: International Trade Centre (data received through direct communication).

7.06 Complexity of tariffs

Measures the complexity of a country's tariff regime. The score ranges from 1 (very complex) to 7 (not complex) | 2018 or most recent period available

Tariff complexity is assessed on four criteria: tariff dispersion, the prevalence of tariff peaks, the prevalence of specific tariffs and the number of distinct tariffs. This index is calculated as the simple average of the normalized score of these four criteria.

Source: International Trade Centre (data received through direct communication).

7.07 Border clearance efficiency

Assesses the effectiveness and efficiency of the clearance process by customs and other border control agencies in the eight major trading partners of each country. The scale ranges from 1 (worst) to 5 (best). | 2018

More details about the methodology can be found at https://lpi.worldbank.org/about.

Source: The World Bank GroupTurku School of Economics, Logistics Performance Index 2018.

Pillar 8: Labour market

8.01 Redundancy costs

Measures the cost of advance notice requirements and severance payments due when terminating a redundant worker, expressed in weeks of salary | 2018

The average value of notice requirements and severance payments applicable to a worker with 1 year of tenure, 5 years of tenure, and 10 years of tenure is considered.

Source: World Bank Group, *Doing Business 2019: Training for Reform*.

8.02 Hiring and firing practices

Response to the survey question "In your country, to what extent do regulations allow for the flexible hiring and firing of workers?" [1 = not at all; 7 = to a great extent] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

8.03 Cooperation in labour-employer relations

Response to the survey question "In your country, how do you characterize labour-employer relations?" [1 = generally confrontational; 7 = generally cooperative] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

8.04 Flexibility of wage determination

Response to the survey question "In your country, how are wages generally set?" [1 = by a centralized bargaining process; 7 = by each individual company] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

8.05 Active labour market policies

Response to the survey question "In your country, to what extent do labour market policies help unemployed people to reskill and find new employment (including skills matching, retraining, etc.)?" [1 = not at all; 7 = to a great extent] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

8.06 Workers' rights

Score adapted from the ITUC Global Rights Index, which measures the level of protection of internationally recognized core labour standards. The scale of this indicator ranges from 0 (no protection) to 100 (high protection) | 2019

Dimensions of labour protection include civil rights, the right to bargain collectively, the right to strike, the right to associate freely, and access to due process rights. The indicator does not consider firing regulations. Among countries rated as "D5" we distinguish between countries where workers have "non-access to rights" (Greece, Hong Kong SAR, Kuwait, Qatar, Saudi Arabia and the United Arab Emirates) and countries experiencing "breakdown of institution" (Afghanistan, Libya) or murders (Guatemala). We assign a score of 10 to the former case and 3 to the latter. More details about the methodology of the Global Rights Index can be found at https://survey.ituc-csi.org/ITUC-Global-Rights-Index.html.

Source: World Economic Forum calculations based on International Trade Union Confederation, 2019 Global Rights Index (https://www.ituc-csi.org/rights-index-2019).

8.07 Ease of hiring foreign labour

Response to the survey question "In your country, how restrictive are regulations related to the hiring of foreign labour?" [1 = highly restrictive; 7 = not restrictive at all] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

8.08 Internal labour mobility

Response to the survey question "In your country, to what extent do people move to other parts of the country for professional reasons?" [1 = not at all; 7 = to a great extent] | 2018–2019 weighted average or most recent period available

This indicator does not apply to economies identified as city states: Bahrain, Brunei Darussalam, Hong Kong SAR, Kuwait, Malta, Qatar and Singapore.

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

8.09 Reliance on professional management

Response to the survey question "In your country, who holds senior management positions in companies?" [1 = usually relatives or friends without regard to merit; 7 = mostly professional managers chosen for merit and qualifications] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

8.10 Pay and productivity

Response to the survey question "In your country, to what extent is pay related to employee productivity?" [1 = not at all; 7 = to a great extent] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

8.11 Ratio of wage and salaried female workers to male workers

Illustrates the ratio of the percentage of women aged 15–64 participating in the labour force as wage and salaried workers to the percentage of men aged 15–64 participating in the labour force as wage and salaried workers | 2018 or most recent period available

Wage and salaried workers (employees) are those workers who hold the type of jobs defined as "paid employment jobs," where the incumbents hold explicit (written or oral) or implicit employment contracts that give them a basic remuneration that is not directly dependent upon the revenue of the unit for which they work.

Source: World Economic Forum calculation based on International Labour Organization (ILO), *ILOSTAT* (https://ilostat.ilo.org/, accessed 22 April 2019).

8.12 Labour tax rate

Labour tax and contributions are the amount of taxes (at any level—federal, state or local) and mandatory contributions on labour paid by the business, expressed as a percentage of commercial profits | 2018

This measure includes government-mandated contributions paid by the employer to a required private pension fund or workers' insurance fund. More details about this indicator can be found at http://www.doingbusiness.org/Methodology/Paying-Taxes.

Source: World Bank Group, *Doing Business 2019: Training for Reform*.

Pillar 9: Financial system

9.01 Domestic credit to private sector

The total value of financial resources provided to the private sector, expressed as a percentage of GDP | 2015–2017 moving average

This indicator is computed as the sum of loans, purchases of non-equity securities, trade credits and other accounts receivable that establish a claim for repayment provided by financial corporations to firms and households.

Source: World Bank Group, *World Development Indicators* database (https://data.worldbank.org/, accessed 02 April 2019).

9.02 Financing of SMEs

Response to the survey question "In your country, to what extent can small- and medium-sized enterprises (SMEs) access finance they need for their business operations through the financial sector?" [1 = not at all; 7 = to a great extent] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

9.03 Venture capital availability

Response to the survey question "In your country, how easy is it for start-up entrepreneurs with innovative but risky projects to obtain equity funding?" [1 = extremely difficult; 7 = extremely easy] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

9.04 Market capitalization

The total value of listed domestic companies, expressed as a percentage of GDP | 2014–2016 moving average

Calculated as the share price of all listed domestic companies multiplied by the number of their outstanding shares. Investment funds, unit trusts and companies whose only business goal is to hold shares of other listed companies are excluded. Data are end-of-year values.

Sources: World Bank Group, *World Development Indicators* database (https://data.worldbank.org/, accessed 02 April 2019) and Global Financial Development Database (July 2017 edition); national sources.

9.05 Insurance premium

Life and non-life insurance premium volumes, expressed as a percentage of GDP | 2014–2016 moving average

Computed as the sum of life and non-life insurance premium volume divided by GDP. The premium volume is the insurer's direct premiums earned (if property/casualty) or received (if life/health) during the previous calendar year.

Source: World Bank Group, *Global Financial Development Database* (2017 edition); national sources.

9.06 Soundness of banks

Response to the survey question "In your country, how do you assess the soundness of banks?" [1 = extremely low—banks may require recapitalization; 7 = extremely high—banks are generally healthy with sound balance sheets] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

9.07 Non-performing loans

The ratio of the value of non-performing loans divided by the total value of the loan portfolio of all banks operating in a country | 2017

Defaulting loans are payments of interest and principal past due by 90 days or more. The loan amount recorded as non-performing includes the gross value of the loan as recorded on the balance sheet, not just the amount that is overdue.

Sources: International Monetary Fund, Financial Soundness Indicators (data.imf.org/FSI, accessed 29 March 2019); World Bank Group, *Global Financial Development Database* (accessed 28 March 2019); national sources.

9.08 Credit gap

Measures the difference between the credit-to-GDP ratio and its long-term trend | 2017

Computed as the difference between the latest "Domestic credit to private sector (as a percentage of GDP)" and its trend. Following the methodology from Bank of International Settlements, the trend value is calculated by applying a Hodrick–Prescott filter to the 15-year time series of the "Domestic credit to private sector (% of GDP)" indicator. More details about the methodology can be found at https://www.bis.org/publ/qtrpdf/r_qt1403g.htm. Because of the special conversion applied to this indicator, the ranking for this indicator is based on progress scores rather than raw values.

Source: Author's calculations based on World Bank, *World Development Indicators* database (https://data.worldbank.org/, accessed 02 April 2019).

9.09 Banks' regulatory capital ratio

Banks' regulatory capital ratio | 2015–2017 moving average

This indicator measures the capital adequacy of deposit takers. It is a ratio of total banks' regulatory capital (shareholders' equity, disclosed and undisclosed reserves, revaluation reserves, general provisions and other instruments) to total banks' assets, weighted according to the risk of these assets. A log transformation is applied to the raw score before it is normalized to a 0-to-100 scale.

Sources: International Monetary Fund, Financial Soundness Indicators (data.imf.org/FSI, accessed 29 March 2019); World Bank Group, *Global Financial Development Database* (accessed 28 March 2019); national sources.

Pillar 10: Market size

10.01 Gross domestic product

Gross domestic product (GDP) valued at purchasing power parity in billions of international dollars (constant 2011 prices) | 2018 or most recent period available

Source: International Monetary Fund, *World Economic Outlook* database (April 2019 edition).

10.02 Imports of goods and services

Imports of goods and services, expressed as a percentage of GDP | 2017

This indicator illustrates the value of all goods and other market services received from the rest of the world, as a percentage of the country's GDP. Imports include the value of merchandise, freight, insurance, transport, travel, royalties, license fees and other services, such as communication, construction, financial, information, business, personal and government services. They exclude compensation of employees and investment income (formerly called "factor services") and transfer payments.

Source: World Trade Organization (WTO), *WTO Statistics Database*, accessed 01 May 2019.

Pillar 11: Business dynamism

11.01 Cost of starting a business

Expressed as a percentage of the economy's income per capita | 2018

The costs include all official fees and fees for legal or professional services if such services are required by law or commonly used in practice. Fees for purchasing and legalizing company books are included if these transactions are required by law. Although value-added tax registration can be counted as a separate procedure, value-added tax is not part of the incorporation cost. More details of the methodology can be found at http://www.doingbusiness.org/Methodology/Starting-a-Business.

Source: World Bank Group, *Doing Business 2019: Training for Reform*.

11.02 Time to start a business

Number of calendar days needed to complete the procedures to legally operate a business | 2018

The measure captures the median duration that incorporation lawyers or notaries indicate is necessary in practice to complete a procedure with minimum follow-up with government agencies and no unofficial payments. If a procedure can be sped up at additional cost, the fastest procedure, independent of cost, is chosen. More details about the methodology can be found at http://www.doingbusiness.org/Methodology/Starting-a-Business.

Source: World Bank Group, *Doing Business 2019: Training for Reform*.

11.03 Insolvency recovery rate

Recorded as cents on the dollar recovered by secured creditors through judicial reorganization, liquidation or debt enforcement (foreclosure or receivership) proceedings | 2018

The calculation takes into account the outcome—whether the business emerges from the proceedings as a going concern or the assets are sold piecemeal. Then the costs of the proceedings are deducted (1 cent for each percentage point of the value of the debtor's estate). Finally, the value lost as a result of the time the money remains tied up in insolvency proceedings is taken into account. More details about the methodology can be found at http://www.doingbusiness.org/Methodology/Resolving-Insolvency.

Source: World Bank Group, *Doing Business 2019: Training for Reform*.

11.04 Insolvency regulatory framework

Score on an index that measures the adequacy and integrity of the legal framework applicable to liquidation and reorganization proceedings. Scores range from 0 to 16, with higher values indicating insolvency legislation that is better designed for rehabilitating viable firms and liquidating non-viable ones. | 2018

The index is calculated as the sum of the scores on the commencement of proceedings index, management of debtor's assets index, reorganization proceedings index and creditor participation index. More details about the methodology can be found at http://www.doingbusiness.org/Methodology/Resolving-Insolvency.

Source: World Bank Group, *Doing Business 2019: Training for Reform*.

11.05 Attitudes towards entrepreneurial risk

Response to the survey question "In your country, to what extent do people have an appetite for entrepreneurial risk?" [1 = not at all; 7 = to a great extent] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

11.06 Willingness to delegate authority

Response to the survey question "In your country, to what extent does senior management delegate authority to subordinates?" [1 = not at all; 7 = to a great extent] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

11.07 Growth of innovative companies

Response to the survey question "In your country, to what extent do new companies with innovative ideas grow rapidly?" [1 = not at all; 7 = to a great extent] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

11.08 Companies embracing disruptive ideas

Response to the survey question "In your country, to what extent do companies embrace risky or disruptive business ideas?" [1 = not at all; 7 = to a great extent] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

Pillar 12: Innovation capability

12.01 Diversity of workforce

Response to the survey question "In your country, to what extent do companies have a diverse workforce (e.g. in terms of ethnicity, religion, sexual orientation, gender)?" [1 = not at all; 7 = to a great extent] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

12.02 State of cluster development

Response to the survey question "In your country, how widespread are well-developed and deep clusters (geographic concentrations of firms, suppliers, producers of related products and services, and specialized institutions in a particular field)?" [1 = non-existent; 7 = widespread in many fields] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

12.03 International co-inventions

Number of patent family applications with co-inventors located abroad per million population | 2013–2015 average

Computed as the sum of the patent family applications with at least one co-inventor located abroad, filed in at least two of the major five (IP5) offices in the World: the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), and the United States Patent and Trademark Office (USPTO). Data is extracted from the PATSTAT database by earliest filing date and inventor country, using fractional counts, and expressed in applications per million population. A log transformation is applied to the raw score before it is normalized to a 0 to 100 scale.

Source: Organisation for Economic Co-operation and Development (OECD), STI Micro-data Lab: Intellectual Property database, (http://oe.cd/ipstats, May 2019).

12.04 Multistakeholder collaboration

Average score of the following three Executive Opinion Survey questions: "In your country, to what extent do people collaborate and share ideas within a company?" [1 = not at all; 7 = to a great extent]; "In your country, to what extent do companies collaborate in sharing ideas and innovating?" [1 = not at all; 7 = to a great extent]; "In your country, to what extent do business and universities collaborate on research and development (R&D)?" [1 = do not collaborate at all; 7 = collaborate extensively] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

12.05 Scientific publications

Measures the number of publications and their citations, expressed at the country level | 2016–2018 average

The Index measures the number of published papers cited in other papers at least *h* times. The H-index reflects both the number of publications and the number of citations per publication. Only articles, reviews and conference papers are considered. The document universe is defined by those tracked by Scopus, an abstract and citation database of peer-reviewed literature: scientific journals, books and conference proceedings. A log transformation is applied to the raw score before it is normalized to a 0 to 100 scale.

Source: SCImago, Journal & Country Rank (http://www.scimagojr.com/countryrank.php, accessed 16 June 2019).

12.06 Patent applications

Total number of patent family applications per million population | 2013–2015 average

Computed as the sum of the patent family applications filed in at least two of the major five (IP5) offices in the World: the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), and the United States Patent and Trademark Office (USPTO). Data is extracted from the PATSTAT database by earliest filing date and inventor country, using fractional counts and expressed in applications per million population. A log transformation is applied to the raw score before it is normalized to a 0-to-100 scale.

Source: Organisation for Economic Co-operation and Development (OECD), STI Micro-data Lab: Intellectual Property database (http://oe.cd/ipstats, May 2019).

12.07 R&D expenditures

Expenditures on research and development (R&D), expressed as a percentage of GDP | 2016 or most recent year available

Expenditures for research and development are current and capital expenditures (both public and private) on creative work undertaken systematically to increase knowledge—including knowledge of humanity, culture and society—and the use of knowledge for new applications. R&D covers basic research, applied research and experimental development.

Source: World Bank, *World Development Indicators* database (https://data.worldbank.org/, accessed 24 April 2019).

12.08 Research institutions prominence

Measures the prominence and standing of private and public research institutions. | 2019

The score is computed as the sum of the inverse ranks of all research institutions in a country included in the SCImago Institutions Rankings (SIR). It comprises private and public universities, governmental agencies, corporate entities and health institutes. A log transformation is applied to the raw score before it is normalized to a 0 to 100 scale. More details about the SIR methodology can be found at https://www.scimagoir.com/methodology.php.

Source: World Economic Forum calculations based on SCImago (https://www.scimagoir.com/, accessed 16 June 2019).

12.09 Buyer sophistication

Response to the survey question "In your country, on what basis do buyers make purchasing decisions?" [1 = based solely on the lowest price; 7 = based on sophisticated performance attributes] | 2018–2019 weighted average or most recent period available

Source: World Economic Forum, Executive Opinion Survey (various editions). For more details, refer to Appendix B of this report.

12.10 Trademark applications

Number of trademark applications per million population | 2015–2017 moving average

Number of international trademark applications issued directly or through the Madrid System by country of origin per million population. The residence of the first-named applicant is used to determine the origin of an application. When there are multiple applicants, only the first one is considered. This indicator is based on the concept of "equivalent count". That is, an application filed at a regional IP office is counted multiple times according to the number of its members. A log transformation is applied to the raw score before it is normalized to a 0 to 100 scale.

Source: World Intellectual Property Organization, WIPO statistics database (https://www3.wipo.int/ipstats/IpsStatsResultvalue, December 2018).

Table 1: GCI 4.0 imputation methodology and imputed values

Indicator	Imputation method	Economy	Imputed value
1.05 Social capital (0–100, high)	Linear regression estimation. Regressors: Mean years of schooling, Incidence of corruption, GDP (log), regional dummies.	Barbados	57.78
		Bosnia and Herzegovina	48.84
		Brunei Darussalam	55.76
		Cape Verde	53.49
		Gambia, The	48.89
		Haiti	45.69
		Serbia	49.88
		Seychelles	58.53
		Taiwan, China	57.43
1.06 Open Budget Index (0–100, best)	Linear regression estimation. Regressors: Corruption Perceptions Index (Transparency International), E-Participation Index (UNPAN), Open Budget Data score (World Bank), regional dummies.	Armenia	53.14
		Austria	63.15
		Bahrain	33.71
		Barbados	34.37
		Belgium	63.13
		Brunei Darussalam	28.08
		Cape Verde	41.76
		Cyprus	52.79
		Denmark	74.05
		Estonia	69.49
		Ethiopia	27.74
		Finland	76.74
		Gabon	28.49
		Gambia, The	29.30
		Greece	50.01
		Guinea	8.68
		Haiti	26.26
		Hong Kong SAR	70.75
		Iceland	56.46
		Iran, Islamic Rep.	5.84
		Ireland	73.55
		Israel	38.12
		Jamaica	24.09
		Kuwait	20.33
		Lao PDR	17.49
		Latvia	51.27
		Lithuania	64.85
		Luxembourg	56.45
		Malta	38.25
		Mauritania	20.48
		Mauritius	53.04
		Montenegro	36.34
		Netherlands	77.40
		Oman	33.75
		Panama	31.11
		Seychelles	26.17
		Singapore	77.98
		Switzerland	67.90
		Taiwan, China	70.75
		United Arab Emirates	43.23
		Uruguay	62.78
1.09 World Press Freedom Index (0 = most free; 100 = least free)	Peer group mean. "Group" is defined as the combination of the World Bank income group and the IMF regional group.	Barbados	24.06
1.12 E-Participation Index (0–1, best)	Peer group mean. "Group" is defined as the combination of the World Bank income group and the IMF regional group.	Hong Kong SAR	0.92
		Taiwan, China	0.92

(Continued)

Table 1: GCI 4.0 imputation methodology and imputed values *(cont'd.)*

Indicator	Imputation method	Economy	Imputed value
1.24 **Energy efficiency regulation (0–100, best)**	Peer group mean. "Group" is defined as the combination of the World Bank income group and the IMF regional group..	Albania	71.40
		Barbados	58.07
		Bosnia and Herzegovina	71.40
		Botswana	76.15
		Brunei Darussalam	72.29
		Cape Verde	28.42
		Cyprus	75.08
		Estonia	75.08
		Eswatini	28.42
		Gabon	76.15
		Gambia, The	18.63
		Georgia	50.71
		Hong Kong SAR	72.29
		Iceland	75.08
		Latvia	75.08
		Lesotho	28.42
		Lithuania	75.08
		Luxembourg	75.08
		Malta	43.65
		Mauritius	76.15
		Moldova	42.36
		Montenegro	71.40
		Namibia	76.15
		North Macedonia	71.40
		Seychelles	76.15
		Slovenia	75.08
		Taiwan, China	72.29
		Trinidad and Tobago	58.07
1.25 **Renewable energy regulation (0–100, best)**	Peer group mean. "Group" is defined as the combination of the World Bank income group and the IMF regional group.	Albania	69.61
		Barbados	61.24
		Bosnia and Herzegovina	69.61
		Botswana	76.14
		Brunei Darussalam	68.97
		Cape Verde	45.57
		Cyprus	76.54
		Estonia	76.54
		Eswatini	45.57
		Gabon	76.14
		Gambia, The	34.55
		Georgia	52.74
		Hong Kong SAR	68.97
		Iceland	76.54
		Latvia	76.54
		Lesotho	45.57
		Lithuania	76.54
		Luxembourg	76.54
		Malta	36.25
		Mauritius	76.14
		Moldova	43.62
		Montenegro	69.61
		Namibia	76.14
		North Macedonia	69.61
		Seychelles	76.14
		Slovenia	76.54
		Taiwan, China	68.97
		Trinidad and Tobago	61.24
1.26 **Environment-related treaties in force (out of 29 treaties)**	Estimated as the China figure plus the Convention on the Conservation of Migratory Species of Wild Animals not in force in China but applicable to Hong Kong SAR.	Hong Kong SAR	25.00

(Continued)

Table 1: GCI 4.0 imputation methodology and imputed values *(cont'd.)*

Indicator	Imputation method	Economy	Imputed value
2.10 Electric power losses (% of output)	Linear regression estimation. Regressors: Electrification rate, GDP (log), regional dummies.	Barbados	17.13
		Burkina Faso	23.12
		Burundi	25.57
		Cape Verde	10.45
		Chad	25.11
		Eswatini	13.45
		Gambia, The	19.37
		Guinea	23.39
		Lao PDR	8.57
		Lesotho	21.28
		Madagascar	22.06
		Malawi	24.70
		Mali	19.31
		Mauritania	21.40
		Rwanda	18.83
		Seychelles	10.15
		Uganda	22.14
2.11 Exposure to unsafe drinking water (% of population)	Peer group mean. "Group" is defined as the combination of the World Bank income group and the IMF regional group.	Hong Kong SAR	2.20 3.04
3.04 Ratio fibre subs. to fixed-broadband subs.	Peer group mean. "Group" is defined as the combination of the World Bank income group and the IMF regional group.	Congo, Dem. Rep.	10.07
		Eswatini	21.10
		Ghana	21.10
		Guinea	10.07
		Lebanon	23.15
		Mauritania	21.10
		Nicaragua	21.10
		Philippines	21.10
		Seychelles	23.15
		Tajikistan	21.10
		Uganda	10.07
5.01 Health-adjusted life expectancy (years)	Linear regression estimation. Regressors: Life expectancy, regional dummies.	Hong Kong SAR	72.63
6.07 School life expectancy (years)	Linear regression estimation. Regressors: Mean years of schooling, GDP (log), regional dummies. Regressors: Mean years of schooling, GDP (log), regional dummies.	Azerbaijan	13.60
		Bolivia	14.11
		Bosnia and Herzegovina	15.17
		Botswana	12.31
		Cambodia	11.84
		Gabon	11.63
		Haiti	12.14
		Jamaica	14.21
		Jordan	14.58
		Kenya	12.32
		Namibia	12.04
		Nicaragua	12.60
		Trinidad and Tobago	14.51
		Uganda	10.86
		Venezuela	15.08
		Viet Nam	13.82
		Zambia	11.90
6.09 Pupil-to-teacher ratio in primary education	Peer group mean. "Group" is defined as the combination of the World Bank income group and the IMF regional group.	Canada	14.46
		Venezuela	20.21
7.07 Border clearance efficiency (1–5, best)	Peer group mean. "Group" is defined as the combination of the World Bank income group and the IMF regional group.	Barbados	2.77
		Cape Verde	2.25
		Eswatini	2.25
		Seychelles	2.71

(Continued)

Indicator		Imputation method	Economy	Imputed value
8.06	**Workers' Rights Index (0–100, best)**	Peer group mean. "Group" is defined as the combination of the World Bank income group and the IMF regional group.	Armenia	71.50
			Austria	87.42
			Azerbaijan	71.50
			Brunei Darussalam	72.57
			Cape Verde	68.92
			Cyprus	87.42
			Gabon	78.25
			Gambia, The	69.20
			Guinea	69.20
			Kyrgyz Republic	73.50
			Luxembourg	87.42
			Malta	36.86
			Mongolia	63.00
			Nicaragua	72.00
			Seychelles	78.25
			Slovenia	87.42
			Tajikistan	73.50
8.11	**Ratio of wage and salaried female workers to male workers (%)**	Peer group mean. "Group" is defined as the combination of the World Bank income group and the IMF regional group.	Seychelles	0.69
9.01	**Domestic credit to private sector (% GDP)**	Peer group mean. "Group" is defined as the combination of the World Bank income group and the IMF regional group.	Lao PDR	52.98
			Barbados	65.93
9.04	**Market capitalization (% GDP)**	Peer group mean. "Group" is defined as the combination of the World Bank income group and the IMF regional group.	Madagascar	4.86
9.05	**Life and non-life insurance premium (volume of GDP)**	Peer group mean. "Group" is defined as the combination of the World Bank income group and the IMF regional group.	Angola	1.24
			Armenia	2.28
			Congo, Dem. Rep.	0.75
			Gambia, The	0.75
			Guinea	0.75
			Kyrgyz Republic	1.24
			Lesotho	1.24
			Mauritania	1.24
			Montenegro	2.28
			Qatar	4.90
			Romania	2.28
			Tajikistan	1.24
			Zimbabwe	1.24
9.08	**Credit gap (%)**	Peer group mean. "Group" is defined as the combination of the World Bank income group and the IMF regional group.	Barbados	3.53
11.03	**Insolvency recovery rate (cents to the dollar)**	Peer group mean. "Group" is defined as the combination of the World Bank income group and the IMF regional group.	Eswatini	21.69
12.03	**IP 5 international patent applications (per million pop.)**	Peer group mean. "Group" is defined as the combination of the World Bank income group and the IMF regional group.	Mozambique	0.01
12.06	**IP 5 patent applications (per million pop.)**	Peer group mean. "Group" is defined as the combination of the World Bank income group and the IMF regional group.	Mozambique	0.02

(Continued)

Indicator	Imputation method	Economy	Imputed value
12.07 R&D expenditures (% GDP)	Peer group mean. "Group" is defined as the combination of the World Bank income group and the IMF regional group.	Bangladesh	0.32
		Barbados	0.23
		Benin	0.31
		Brunei Darussalam	2.38
		Cameroon	0.33
		Côte d'Ivoire	0.33
		Dominican Republic	0.36
		Guinea	0.31
		Lao PDR	0.18
		Lebanon	0.37
		Malawi	0.31
		Mauritania	0.33
		Nigeria	0.33
		Yemen	0.64
		Zimbabwe	0.33
12.10 Trademark applications (per million pop.)	Peer group mean. "Group" is defined as the combination of the World Bank income group and the IMF regional group.	Greece	7,797.25
		Nicaragua	447.01
		Nigeria	99.37
		North Macedonia	1,291.35
		Slovenia	7,797.25
		Taiwan, China	3,925.29

Table 2: Normalization of indicators

Indicator	title and units	Frontier	Worst performance	Applied transformation	Guiding principle
1.02	Homicides per 100,000 pop.	0.5	30	—	Winsorization
1.03	Terrorism incidence (0 = very high; 100 = no incidence)	100	0	—	Range of possible values
1.05	Social capital (0–100, high)	100	0	—	Range of possible values
1.06	Open Budget Index (0–100, best)	100	0	—	Range of possible values
1.09	World Press Freedom Index (0 = most free; 100 = least free)	0	100	—	Range of possible values
1.12	E-Participation Index (0–1, best)	1	0	—	Range of possible values
1.13	Corruption Perceptions Index (0 = highly corrupt; 100 = very clean)	100	0	—	Range of possible values
1.16	Quality of land administration index (0–30, best)	30	0	—	Range of possible values
1.18	Extent of conflict of interest regulation (0–10, best)	10	0	—	Range of possible values
1.19	Extent of shareholder governance (0–10, best)	10	0	—	Range of possible values
1.24	Energy efficiency regulation (0–100, best)	100	0	—	Range of possible values
1.25	Renewable energy regulation (0–100, best)	100	0	—	Range of possible values
1.26	Environment-related treaties in force (out of 29 treaties)	29	0	—	Range of possible values
2.01	Road Connectivity Index (0–100, best)	100	0	—	Range of possible values
2.03	Railroad density (km/1,000 km^2)	40	0	—	Winsorization
2.05	Airport connectivity score	200	0	Cubic power of logarithm	Winsorization
2.07	Liner Shipping Connectivity Index (0–100, best)	100	0	—	Range of possible values
2.09	Electrification rate (% of population)	100	0	—	Winsorization
2.10	Electric power losses (% of output)	4	100	—	Winsorization
2.11	Exposure to unsafe drinking water (% of population)	2	100	—	Winsorization
3.01	Mobile-cellular telephone subscriptions (per 100 pop.)	120	0	—	120 is the value above which mobile broadband technology is considered sufficiently widespread not to consitute a constraint for the average user
—	Ratio mobile broadband subs. to total mobile subs.	0.9	0	Ratio of mobile broadband subscription and minum between actual mobile broadband subcription and 120 (see indicator 3.01)	Winsorization
3.03	Fixed-broadband internet subscriptions (per 100 pop.)	50	0	—	50 is the value above which fixed broadband is considered sufficiently widespread not to constitute a constraint for the average user
—	Ratio fibre subs. to fixed-broadband subs.	0.9	0	Ratio of fiber broadband subscription and minum between actual fixed broadband subcription and 50 (See indicator 3.03)	Winsorization
3.05	Internet users (% of adult population)	100	0	—	Based on ITU practice
4.01	Inflation (%)	4	40	Any value between 0.5 and 4 is assigned a value of 0.5. Values lower than 0.5 are transformed into 4+(0.5-value)	Central banks' target and winsorization
4.02	Debt dynamics (0–100, best)	100	0	—	Winsorization
5.01	Health-adjusted life expectancy (years)	72	40	—	Winsorization
6.01	Mean years of schooling (years)	15	0	—	Based on Human Development Report 2016 practice

(Continued)

Table 2: Normalization of indicators *(cont'd.)*

Indicator title and units		Frontier	Worst performance	Applied transformation	Guiding principle
6.07	School life expectancy (years)	18	0	—	Based on Human Development Report 2016 practice
6.09	Pupil-to-teacher ratio in primary education	10	50	—	Winsorization
7.05	Trade tariffs (%)	0	15	—	Frontier set at minimum possible value, winsorization for worst performance
7.06	Complexity of tariffs (1–7, best)	7	1	—	Range of possible values
7.07	Border clearance efficiency (1–5, best)	5	1	—	Range of possible values
8.01	Redundancy costs (weeks of salary)	4	52	—	Frontier set at minimum possible value, winsorization for worst performance
8.06	Workers' Rights Index (0–100, best)	100	0	—	Range of possible values
8.11	Ratio of wage and salaried female workers to male workers (%)	1	0.2	—	Winsorization
8.12	Total tax on labour (%)	8	80	—	Winsorization
9.01	Domestic credit to private sector (% GDP)	95	0	—	Winsorization for frontier, worst performance set at minimum possible value
9.04	Market capitalization (% GDP)	100	0	—	Winsorization for frontier, worst performance set at minimum possible value
9.05	Life and non-life insurance premium (volume of GDP)	6	0	—	Winsorization for frontier, worst performance set at minimum possible value
9.07	Bank non-performing loans (% of gross total loans)	0.5	50	—	Winsorization
9.08	Credit gap (%)	2	40	—	Winsorization
9.09	Banks' regulatory capital ratio (% of total risk-weighted assets)	17	0	Logarithmic (log[1+x])	Winsorization for frontier, worst performance set at minimum possible value
10th pillar	Market size	10	0	Logarithm of (GDP + Imports)	Winsorization for frontier, worst performance set at minimum possible value
11.01	Cost required to start a business (% of GNI per capita)	0	200	—	Frontier set at minimum possible value, winsorization for worst performance
11.02	Time required to start a business (days)	0.5	100	—	Winsorization
11.03	Insolvency recovery rate (cents to the dollar)	92.9	0	—	Winsorization for frontier, worst performance set at minimum possible value
11.04	Strength of insolvency framework (0–16, best)	16	0	—	Range of possible values
12.03	IP5 international patent applications (per million pop.)	25	0	Logarithmic (log[1+x])	Winsorization for frontier, worst performance set at minimum possible value
12.05	Scientific publications H Index	855	0	Logarithmic (log[1+x])	Winsorization for frontier, worst performance set at minimum possible value
12.06	IP 5 patent applications (per million pop.)	230	0	Logarithmic (log[1+x])	Winsorization for frontier, worst performance set at minimum possible value
12.07	R&D expenditures (% GDP)	3	0	—	Winsorization for frontier, worst performance set at minimum possible value
12.08	Research institutions prominence score (0–100, best)	0.43	0	Logarithmic (log[1+x])	Winsorization for frontier, worst performance set at minimum possible value
12.10	Trademark applications (per million pop.)	10,890	0	Logarithmic	Winsorization for frontier, worst performance set at minimum possible value