

# Appendix III

Sources and Definitions



## Sources and Definitions

This appendix complements the data tables by providing, for each of the 79 indicators included in the Global Innovation Index (GII), its title, its description, its definition, and its source. For each indicator for each country/economy, the most recent value within the period 2004–14 was used. The single year given next to the description corresponds to the most frequent year for which data were available; when more than one year is considered, the period is indicated at the end of the indicator's source in parentheses.

Some indicators received special treatment in the computation. A few variables required scaling by some other indicator to be comparable across countries, through division by gross domestic product (GDP) in current US dollars, purchasing power parity GDP in international dollars (PPP\$ GDP), population, total exports, total trade, and so on. Details are provided in this appendix. The scaling factor was in each case the value corresponding to the same year of the particular indicator. In addition, 36 indicators that were assigned half weight are singled out with an 'a'. Finally, indicators for which higher scores indicate worse outcomes, commonly known as 'bads', are differentiated with a 'b' (details on the computation can be found in Appendix IV Technical Notes).

A total of 55 variables are hard data; 19 are composite indicators from international agencies, distinguished with an asterisk (\*); and 5 are survey questions from the World Economic Forum's Executive Opinion Survey (EOS), singled out with a dagger (†).

# Institutions

## 1.1 Political environment

### 1.1.1 Political stability and absence of violence/terrorism

Political stability and absence of violence/terrorism index\* | 2013

Index that captures perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically motivated violence and terrorism. Scores are standardized.

Source: World Bank, World Governance Indicators, 2013 update. (<http://info.worldbank.org/governance/wgi/index.aspx#home>)

### 1.1.2 Government effectiveness

Government effectiveness index\* | 2013

Index that captures perceptions of the quality of public and civil services and the degree of their independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Scores are standardized.

Source: World Bank, World Governance Indicators, 2013 update. (<http://info.worldbank.org/governance/wgi/index.aspx#home>)

## 1.2 Regulatory environment

### 1.2.1 Regulatory quality

Regulatory quality index\*\* | 2013

Index that captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private-sector development. Scores are standardized.

Source: World Bank, World Governance Indicators, 2013 update. (<http://info.worldbank.org/governance/wgi/index.aspx#home>)

### 1.2.2 Rule of law

Rule of law index\*\* | 2013

Index that captures perceptions of the extent to which agents have confidence in and abide by the rules of society, in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Scores are standardized.

Source: World Bank, World Governance Indicators, 2013 update. (<http://info.worldbank.org/governance/wgi/index.aspx#home>)

### 1.2.3 Cost of redundancy dismissal

Sum of notice period and severance pay for redundancy dismissal (in salary weeks, averages for workers with 1, 5, and 10 years of tenure, with a minimum threshold of 8 weeks)<sup>b</sup> | 2014

*Doing Business*, in its indicators on employing workers, measures flexibility in the regulation of redundancy in a manner consistent with relevant ILO conventions to strike a better balance between labour market flexibility and social protection (including unemployment protection). The redundancy cost indicator is the sum of the cost of advance notice requirements added to severance payments due when terminating a redundant worker, expressed in weeks of salary. The average value of notice requirements and severance payments applicable to a worker with 1 year of tenure, a worker with 5 years of tenure, and a worker with 10 years of tenure is used to assign the score. If the redundancy cost adds up to 8 or fewer weeks of salary, a value of 8 is assigned but the actual number of weeks is published. If the cost adds up to more than 8 weeks of salary, the score is the number of weeks. One month is recorded as 4 and 1/3 weeks. Assumptions about the worker: the worker earns a salary plus benefits equal to the economy's average wage during the entire period of his employment; has a pay period that is the most common for workers in the economy; is a lawful citizen who belongs to the same race and religion as the majority of the economy's population; resides in the economy's largest business city; and is not a member of a labour union, unless membership is mandatory. Assumptions about the business: the business is a limited liability company; it operates in the economy's largest business city; it is 100% domestically owned; it operates in the manufacturing sector; it has 60 employees; it is subject to collective bargaining agreements in economies where such agreements cover more than half the manufacturing sector and apply even to firms not party to them; and it abides by every law and regulation but does not grant workers more benefits than mandated by law, regulation, or (if applicable) collective bargaining agreement.

Note: The methodology was improved for *Doing Business 2015*, which has affected the year-on-year comparability of these indicators. Read about the changes at <http://www.doingbusiness.org/methodology/methodology-note>

Source: World Bank, *Doing Business 2015: Going Beyond Efficiency*. (<http://www.doingbusiness.org/reports/global-reports/doing-business-2015>)

## 1.3 Business environment

### 1.3.1 Ease of starting a business

Ease of starting a business (distance to frontier)\* | 2014

The ranking is the simple average of the percentile rankings on the component indicators of the ease of starting a business index: procedures (number); time (days); cost to complete each procedure (% of income per capita); and paid-in minimum capital (% of income per capita). *Doing Business* records all procedures that are officially required for an entrepreneur to start up and formally operate an industrial or commercial business. These include obtaining all necessary licenses and permits and completing any required notifications, verifications, or inscriptions for the company and employees with relevant authorities. To make the data comparable across economies, *Doing Business* uses a standardized business that is a limited liability company (or its legal equivalent); operates in the economy's largest business city; is 100% domestically owned and has 5 owners (none of whom is a legal entity); has start-up capital of 10 times income per capita, paid in cash; performs general industrial or commercial activities; it is not using heavily polluting production processes; leases the commercial plant or offices and is not a proprietor of real estate; does not qualify for investment incentives or any special benefits; has at least 10 and up to 50 employees 1 month after the commencement of operations, all of them domestic nationals; has a turnover of at least 100 times income per capita, and has a company deed 10 pages long. The distance to frontier measure benchmarks economies to the frontier in regulatory practice, measuring the absolute distance to the best performance on each indicator and showing how much the regulatory environment for local entrepreneurs in each economy has changed over time in absolute terms.

Note: The methodology was improved for *Doing Business 2015*, which has affected the year-on-year comparability of these indicators. Read about the changes at <http://www.doingbusiness.org/methodology/methodology-note>

Source: World Bank, *Ease of Doing Business Index 2015*, *Doing Business 2015*. (<http://www.doingbusiness.org/reports/global-reports/doing-business-2015>)

### 1.3.2 Ease of resolving insolvency

Ease of resolving insolvency (distance to frontier)\* | 2014

The ranking on the ease of resolving insolvency is based on the recovery rate (cents on the dollar). To make the data comparable across economies, several assumptions about the business and the case are used: the recovery rate is recorded as cents on the dollar recouped by creditors through reorganization, liquidation, or debt enforcement (foreclosure) proceedings. 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, including the loss of value due to depreciation of furniture, etc. The recovery rate is the present value of the remaining proceeds, based on end-2013 lending rates from the International Monetary Fund's *International Financial Statistics*, supplemented with data from central banks and the Economist Intelligence Unit. If an economy had zero cases a year over the past 5 years involving a judicial reorganization, judicial liquidation, or debt enforcement procedure (foreclosure), the economy receives a 'no practice' ranking. This means that creditors are unlikely to recover their money through a formal legal process (in or out of court). The recovery rate for 'no practice' economies is zero. Indicators resolving insolvency—time (in years) and cost (% of estate), while also computed by *Doing Business*, are not taken into account for the ranking on the ease of resolving insolvency. Refer to indicator 1.3.1 for details regarding the distance to frontier measure.

Note: The methodology was improved for *Doing Business 2015*, which has affected the year-on-year comparability of these indicators. Read about the changes at <http://www.doingbusiness.org/methodology/methodology-note>

Source: World Bank, *Ease of Doing Business Index 2015*, *Doing Business 2015*. (<http://www.doingbusiness.org/reports/global-reports/doing-business-2015>)

### 1.3.3 Ease of paying taxes

Ease of paying taxes (distance to frontier)\* | 2014

The ranking is the simple average of the percentile rankings on the component indicators of the ease of paying taxes: payments (number per year); time (hours

per year); profit tax (%); labour tax and contributions (%); other taxes (%); and total tax rate (% profit). Since 2012, a threshold calculated and adjusted on a yearly basis is applied to the total tax rate. The threshold is equivalent to the highest total tax rate among the top 15% of economies in the ranking on the total tax rate; this year the threshold is 26.1% (i.e., for all economies with a total tax rate below this threshold, the total tax rate is set at 26.1%). The threshold is not based on any underlying theory, but is intended to mitigate the effect of very low tax rates on the ranking of the ease of paying taxes. To make the data comparable across economies, several assumptions about the business and the taxes and contributions are used. The methodology benefited from discussion with members of the International Tax Dialogue and other stakeholders, which led to a refinement of the survey questions on the time to pay taxes, the collection of additional data on the labour tax wedge for further research, and the introduction of a threshold applied to the total tax rate for the purpose of calculating the ranking on the ease of paying taxes. Refer to indicator 1.3.1 for details regarding the distance to frontier measure.

Note: The methodology was improved for *Doing Business 2015*, which has affected the year-on-year comparability of these indicators. Read about the changes at <http://www.doingbusiness.org/methodology/methodology-note>

Source: World Bank, *Ease of Doing Business Index 2015*, *Doing Business 2015*. (<http://www.doingbusiness.org/reports/global-reports/doing-business-2015>)

## 2 Human capital and research

### 2.1 Education

#### 2.1.1 Expenditure on education

Government expenditure on education (% of GDP) | 2011

Government operating expenditures in education, including wages and salaries and excluding capital investments in buildings and equipment, as a percentage of gross domestic product (GDP).

Source: UNESCO Institute for Statistics, *UIS online database (2005–13)*. (<http://stats.uis.unesco.org>)

#### 2.1.2 Government expenditure on education per pupil, secondary

Government expenditure per pupil, secondary (% of GDP per capita) | 2011

Government spending on education divided by the total number of secondary students, as a percentage of GDP per capita. Government expenditure (current and capital) includes government spending on educational institutions (both public and private), education administration, and subsidies for private entities (students/households and other private entities).

Source: UNESCO Institute for Statistics, *UIS online database (2005–13)*. (<http://stats.uis.unesco.org>)

#### 2.1.3 School life expectancy

School life expectancy, primary to tertiary education (years) | 2012

Total number of years of schooling that a child of a certain age can expect to receive in the future, assuming that the probability of his or her being enrolled in school at any particular age is equal to the current enrolment ratio for that age.

Source: UNESCO Institute for Statistics, *UIS online database (2004–13)*. (<http://stats.uis.unesco.org>)

#### 2.1.4 Assessment in reading, mathematics, and science

PISA average scales in reading, mathematics, and science<sup>a</sup> | 2012

The Organisation for Economic Co-operation and Development (OECD) Programme for International Student Assessment (PISA) develops three-yearly surveys that examine 15-year-old students' performance in reading, mathematics, and science. The scores are calculated in each year so that the mean is 500 and the standard deviation 100. The scores for China come from Shanghai; those for India from Himachal Pradesh and Tamil Nadu (average); those for the United Arab Emirates from Dubai; and those for the Bolivarian Republic of Venezuela from Miranda. These scores are those from the GII 2014 report.

Source: OECD Programme for International Student Assessment (PISA) (2010–12). ([www.pisa.oecd.org/](http://www.pisa.oecd.org/))

#### 2.1.5 Pupil-teacher ratio, secondary

Pupil-teacher ratio, secondary<sup>a,b</sup> | 2012

The number of pupils enrolled in secondary school divided by the number of secondary school teachers (regardless of their teaching assignment). Where the

data are missing for some countries, the ratios for upper-secondary are reported; if these are also missing, the ratios for lower-secondary are reported instead.

Source: UNESCO Institute for Statistics, UIS online database (2005–13). (<http://stats.uis.unesco.org>)

## 2.2 Tertiary education

### 2.2.1 Tertiary enrolment

School enrolment, tertiary (% gross)<sup>a</sup> | 2012

The ratio of total tertiary enrolment, regardless of age, to the population of the age group that officially corresponds to the tertiary level of education. Tertiary education, whether or not to an advanced research qualification, normally requires, as a minimum condition of admission, the successful completion of education at the secondary level.

Source: UNESCO Institute for Statistics, UIS online database (2005–13). (<http://stats.uis.unesco.org>)

### 2.2.2 Graduates in science and engineering

Tertiary graduates in engineering, manufacturing, and construction (% of total tertiary graduates) | 2012

The share of all tertiary graduates in manufacturing, engineering, and construction over all tertiary graduates.

Source: UNESCO Institute for Statistics, UIS online database (2005–13). (<http://stats.uis.unesco.org>)

### 2.2.3 Tertiary inbound mobility

Tertiary inbound mobility ratio (%<sup>a</sup>) | 2012

The number of students from abroad studying in a given country, as a percentage of the total tertiary enrolment in that country.

Source: UNESCO Institute for Statistics, UIS online database (2005–13). (<http://stats.uis.unesco.org>)

## 2.3 Research and development (R&D)

### 2.3.1 Researchers

Researchers, full-time equivalence (FTE) (per million population) | 2013

Researchers per million population, full-time equivalence. Researchers in R&D are professionals engaged in the conception or creation of new knowledge, products, processes, methods, or systems and in the management of the projects concerned. Postgraduate PhD students (ISCED97 level 6) engaged in R&D are included.

Source: UNESCO Institute for Statistics, UIS online database (2005–13). (<http://stats.uis.unesco.org>)

### 2.3.2 Gross expenditure on R&D (GERD)

GERD: Gross expenditure on R&D (% of GDP) | 2013

Total domestic intramural expenditure on R&D during a given period as a percentage of GDP. Intramural R&D expenditure is all expenditure for R&D performed within a statistical unit or sector of the economy during a specific period, whatever the source of funds.

Source: UNESCO Institute for Statistics, UIS online database (2005–13). (<http://stats.uis.unesco.org>)

### 2.3.3 QS university ranking average score of top 3 universities

Average score of the top 3 universities at the QS world university ranking\* | 2014

Average score of the top three universities per country. If fewer than three universities are listed in the QS ranking of the global top 700 universities, the sum of the scores of the listed universities is divided by three, thus implying a score of zero for the non-listed universities.

Source: QS Quacquarelli Symonds Ltd, QS World University Ranking 2014/2015, Top Universities. (<http://www.topuniversities.com/university-rankings/world-university-rankings/2014>)

### 3.1.2 ICT use

ICT use index\* | 2013

The ICT use index is a composite index that weights three ICT indicators (33% each): (1) Percentage of individuals using the Internet; (2) Fixed (wired)-broadband Internet subscriptions per 100 inhabitants; (3) Active mobile-broadband subscriptions per 100 inhabitants. It is the second sub-index in ITU's ICT Development Index (IDI).

Source: International Telecommunication Union, Measuring the Information Society 2014, ICT Development Index 2014. (<http://www.itu.int/en/ITU-D/Statistics/Pages/publications/mis2014.aspx>)

### 3.1.3 Government's online service

Government's online service index\* | 2014

To arrive at a set of Online Service Index values, research teams assessed each country's national website, including the national central portal, e-services portal, and e-participation portal as well as the websites of the related ministries of education, labour, social services, health, finance, and environment, as applicable. In addition to being assessed for content and features, the national sites were tested for a minimal level of web content accessibility as described in the *Web Content Accessibility Guidelines* of the World Wide Web Consortium. The survey covers four stages of government's online service development, with points assigned for (1) an emerging presence, providing limited and basic information; (2) an enhanced presence, providing greater public policy and governance sources of information, such as policies, laws and regulation, downloadable databases, etc.; (3) a transactional presence, allowing two-way interactions between government and citizens (G2C and C2G), including paying taxes and applying for ID cards, birth certificates, passports, license renewals, etc.; and (4) a connected presence, characterized by G2G, G2C, and C2G interactions; participatory deliberative policy- and decision-making. A citizen-centric approach was followed. It is the first of three components of the E-Government Development Index (EGDI) of the United Nations Public Administration Network (UNPAN), together with components on telecommunication infrastructure and human capital.

Note: The precise meaning of these values varies from one edition of the Survey to the next as understanding of the potential of e-government changes and the underlying technology evolves. Read about the methodology

## 3 Infrastructure

### 3.1 Information and communication technologies (ICTs)

#### 3.1.1 ICT access

ICT access index\* | 2013

The ICT access index is a composite index that weights five ICT indicators (20% each): (1) Fixed telephone lines per 100 inhabitants; (2) Mobile cellular telephone subscriptions per 100 inhabitants; (3) International Internet bandwidth (bit/s) per Internet user; (4) Percentage of households with a computer; and (5) Percentage of households with Internet access. It is the first sub-index in ITU's ICT Development Index (IDI).

Source: International Telecommunication Union, Measuring the Information Society 2014, ICT Development Index 2014. (<http://www.itu.int/en/ITU-D/Statistics/Pages/publications/mis2014.aspx>)

at <http://unpan3.un.org/egovkb/en-us/About/Methodology>

Source: United Nations Public Administration Network, e-Government Survey 2014. (<http://unpan3.un.org/egovkb/Reports/UN-E-Government-Survey-2014>)

### 3.1.4 Online e-participation

E-Participation Index\* | 2014

The United Nations E-Participation Index is based on the survey used for the UN Online Service Index. The survey was expanded with questions emphasizing quality in the connected presence stage of e-government. These questions focus on the use of the Internet to facilitate the provision of information by governments to citizens ('e-information sharing'), interaction with stakeholders ('e-consultation'), and engagement in decision-making processes ('e-decision making'). A country's E-Participation Index value reflects how useful these features are and the extent to which they have been deployed by the government compared with all other countries. The purpose of this measure is to offer insight into how different countries are using online tools to promote interaction between citizens and government, as well as among citizens, for the benefit of all. The index ranges from 0 to 1, with 1 showing greater e-participation.

Note: The precise meaning of these values varies from one edition of the Survey to the next as understanding of the potential of e-government changes and the underlying technology evolves. Read about the methodology at <http://unpan3.un.org/egovkb/en-us/About/Methodology>

Source: United Nations Public Administration Network, e-Government Survey 2014. (<http://unpan3.un.org/egovkb/Reports/UN-E-Government-Survey-2014>)

## 3.2 General infrastructure

### 3.2.1 Electricity output

Electricity output (kWh per capita)<sup>a</sup> | 2012

Electricity production, measured at the terminals of all alternator sets in a station. In addition to hydropower, coal, oil, gas, and nuclear power generation, this indicator covers generation by geothermal, solar, wind, and tide and wave energy, as well as that from combustible renewables and waste. Production includes the output of electricity plants that are designed to produce electricity only as well as that of combined heat and power plants. Electricity output in kWh is scaled by population.

Source: International Energy Agency, World Energy Balances online data service (2012–13). (<http://www.iea.org/stats/>)

### 3.2.2 Logistics performance

Logistics Performance Index\*<sup>a</sup> | 2014

A multidimensional assessment of logistics performance, the Logistics Performance Index (LPI) compares the trade logistics profiles of 160 countries and rates them on a scale of 1 (worst) to 5 (best). The ratings are based on 6,000 individual country assessments by nearly 1,000 international freight forwarders, who rated the eight foreign countries their company serves most frequently. The LPI's six components include: (1) the efficiency of the clearance process (speed, simplicity, and predictability of formalities) by border control agencies, including customs; (2) the quality of trade- and transport-related infrastructure (ports, railroads, roads, information technology); (3) the ease of arranging competitively priced shipments; (4) the competence and quality of logistics services (transport operators, customs brokers); (5) the ability to track and trace consignments; and (6) the frequency with which shipments reach the consignee within the scheduled or expected delivery time. Details of the survey methodology are in Arvis et al.'s *Connecting to Compete 2014: Trade Logistics in the Global Economy* (2014). Scores are averaged across all respondents.

Source: World Bank and Turku School of Economics, Logistics Performance Index 2014; Arvis et al., 2014, *Connecting to Compete 2014: Trade Logistics in the Global Economy*. (<http://lpi.worldbank.org/>)

### 3.2.3 Gross capital formation

Gross capital formation (% of GDP) | 2014

Ratio of total gross capital formation in current local currency to GDP in current local currency. Gross capital formation or investment is measured by the total value of the gross fixed capital formation and changes in inventories and acquisitions less disposals of valuables for a unit or sector, on the basis of the System of National Accounts (SNA) of 1993. Gross fixed capital formation consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets include land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. Inventories are stocks

of goods held by firms to meet temporary or unexpected fluctuations in production or sales and 'work in progress'. Net acquisitions of valuables are also considered capital formation.

Source: International Monetary Fund, World Economic Outlook 2014 database, April 2015 (PPP\$ GDP). (<http://www.imf.org/external/pubs/ft/weo/2013/01/weodata/weoselgr.aspx>)

## 3.3 Ecological sustainability

### 3.3.1 GDP per unit of energy use

GDP per unit of energy use (2005 PPP\$ per kg of oil equivalent) | 2012

Purchasing power parity gross domestic product (PPP\$ GDP) per kilogram of oil equivalent of energy use. Energy use or total primary energy supply (TPES) is calculated as the production of fuels + inputs from other sources + imports – exports – international marine bunkers +/- stock changes. It includes coal, crude oil, natural gas liquids, refinery feedstocks, additives, petroleum products, gases, combustible renewables and waste, electricity, and heat. Domestic supply (also called 'energy apparent consumption') differs from final consumption in that it does not take account of distribution losses. The supply (or use) of energy commodities is converted to kilograms or tons of oil equivalent (koe, toe) using standard coefficients for each energy source.

Source: International Energy Agency, World Energy Balances online data service (2012–13). (<http://www.iea.org/stats/>)

### 3.3.2 Environmental performance

Environmental Performance Index\* | 2014

This index ranks countries on 20 performance indicators tracked across policy categories that cover both environmental public health and ecosystem vitality. These indicators gauge how close countries are to established environmental policy goals. The index ranges from 0 to 100, with 100 indicating best performance.

Source: Yale University and Columbia University, Environmental Performance Index 2014. (<http://epi.yale.edu/>)

### 3.3.3 ISO 14001 environmental certificates

ISO 14001 Environmental management systems—Requirements with guidance for use: Number of certificates issued (per billion PPP\$ GDP)<sup>a</sup> | 2013

Number of certificates of conformity to 'ISO 14001:2004 Environmental management systems: Requirements with guidance for use' issued, according to the



ISO survey. Single-site and multiple-site certificates are not distinguished. The ISO survey is published on an annual basis by the International Organization for Standardization (ISO). Only certification bodies accredited by national members of the International Accreditation Forum (<http://www.iaf.nu>) were used as sources (except for certificates in the Russian Federation, which were accredited locally). Certification of conformity with standards is not a requirement and the standards can be implemented without certification, but certification is perceived as adding value and trust. ISO is a network of the national standards institutes of 162 countries, and it is the world's largest developer of voluntary International Standards for business, government, and society, with a portfolio of more than 19,500 standards in almost every sector of economic activity and technology. ISO itself does not perform certification to its standards, does not issue certificates, and does not control certification performed independently of ISO by other organizations. The data are reported per billion PPP\$ GDP.

Source: International Organization for Standardization (ISO), *The ISO Survey of Management System Standard Certifications, 1999–2013*; International Monetary Fund, *World Economic Outlook 2014 database, April 2015* (PPP\$ GDP). (<http://www.iso.org>; <http://www.imf.org/external/pubs/ft/weo/2013/01/weodata/weoselgr.aspx>)

## 4 Market sophistication

### 4.1 Credit

#### 4.1.1 Ease of getting credit

Ease of getting credit (distance to frontier)\* | 2014

The ranking is the simple average of the percentile rankings on the component indicators of the ease of getting credit index: strength of legal rights index (range 0–10); and depth of credit information index (range 0–6). *Doing Business* measures the legal rights of borrowers and lenders with respect to secured transactions through one set of indicators and the sharing of credit information through another. The first set of indicators describes how well collateral and bankruptcy laws facilitate lending. The second set measures the coverage, scope, and accessibility of credit information available through public credit registries and private credit bureaus. Although *Doing Business* compiles data on getting credit for public registry coverage (% of

adults) and for private bureau coverage (% of adults), these indicators are not included in the ranking. Refer to indicator 1.3.1 for details regarding the distance to frontier measure.

Note: The methodology was improved for *Doing Business 2015*, which has affected the year-on-year comparability of these indicators. Read about the changes at <http://www.doingbusiness.org/methodology/methodology-note>

Source: World Bank, *Ease of Doing Business Index 2015*, *Doing Business 2015*. (<http://www.doingbusiness.org/reports/global-reports/doing-business-2015>)

#### 4.1.2 Domestic credit to private sector

Domestic credit to private sector (% of GDP) | 2013

Financial resources provided to the private sector, such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries, these claims include credit to public enterprises.

Source: International Monetary Fund, *International Financial Statistics and data files*; and World Bank and OECD GDP estimates; extracted from the World Bank's World Development Indicators database (2004–13). (<http://data.worldbank.org/>)

#### 4.1.3 Microfinance institutions' gross loan portfolio

Microfinance institutions: Gross loan portfolio (% of GDP) | 2013

Combined gross loan balances per microfinance institution (current US\$), divided by GDP (current US\$) and multiplied by 100.

Source: Microfinance Information Exchange, *Mix Market database*; International Monetary Fund, *World Economic Outlook 2014 database, April 2015* (PPP\$ GDP). (<http://www.mixmarket.org/crossmarket-analysis-report/download>; <http://www.imf.org/external/pubs/ft/weo/2013/01/weodata/download.aspx>)

### 4.2 Investment

#### 4.2.1 Ease of protecting investors

Ease of protecting investors (distance to frontier)\* | 2014

The ranking is the simple average of the percentile rankings on the component indicators of the ease of protecting investors index: the extent of disclosure index (0–10); the extent of director liability index (0–10); the ease of shareholder suits index (0–10); and the strength of investor protection index (0–10). *Doing Business* measures the strength of

minority shareholder protections against directors' misuse of corporate assets for personal gain. The indicators distinguish three dimensions of investor protections: transparency of related-party transactions (extent of disclosure index), liability for self-dealing (extent of director liability index), and shareholders' ability to sue officers and directors for misconduct (ease of shareholder suits index). The data come from a survey of corporate and securities lawyers and are based on securities regulations, company laws, civil procedure codes, and court rules of evidence. Refer to indicator 1.3.1 for details regarding the distance to frontier measure.

Note: The methodology was improved for *Doing Business 2015*, which has affected the year-on-year comparability of these indicators. Read about the changes at <http://www.doingbusiness.org/methodology/methodology-note>

Source: World Bank, *Ease of Doing Business Index 2015*, *Doing Business 2015*. (<http://www.doingbusiness.org/reports/global-reports/doing-business-2015>)

#### 4.2.2 Market capitalization

Market capitalization of listed companies (% of GDP)<sup>a</sup> | 2012

Market capitalization (also known as 'market value') is the share price times the number of shares outstanding. Listed domestic companies are the domestically incorporated companies listed on the country's stock exchanges at the end of the year. Listed companies do not include investment companies, mutual funds, or other collective investment vehicles.

Source: Standard and Poor's and World Bank and OECD GDP estimates; extracted from the World Bank's World Development Indicators database (2006–12). (<http://data.worldbank.org/>)

#### 4.2.3 Total value of stocks traded

Stocks traded, total value (% of GDP)<sup>a</sup> | 2012

Total value of shares traded during the period. This indicator complements the market capitalization ratio by showing whether market size is matched by trading.

Source: Standard and Poor's and World Bank and OECD GDP estimates; extracted from the World Bank's World Development Indicators database (2006–12). (<http://data.worldbank.org/>)



#### 4.2.4 Venture capital deals

Venture capital per investment location: Number of deals (per trillion PPP\$ GDP)<sup>a</sup> | 2014

Thomson Reuters data on private equity deals, per deal, with information on the location of investment, investment company, investor firms, and funds, among other details. The series corresponds to a query on venture capital deals from 1 January 2014 to 31 December 2014, with the data collected by investment location, for a total of 19,309 deals in 73 countries in 2014. The data are reported per trillion PPP\$ GDP.

Source: Thomson Reuters, Thomson One Banker Private Equity database; International Monetary Fund, World Economic Outlook 2014 database, April 2015 (PPP\$ GDP). (<http://banker.thomsonib.com>; <http://www.imf.org/external/pubs/ft/weo/2013/01/weodata/download.aspx>)

### 4.3 Trade and competition

#### 4.3.1 Applied tariff rate, weighted mean

Tariff rate, applied, weighted mean, all products (%)<sup>a,b</sup> | 2012

The average of effectively applied rates weighted by the product import shares corresponding to each partner country. Data are classified using the Harmonized System of trade at the six- or eight-digit level. Tariff line data were matched to Standard International Trade Classification (SITC) revision 3 codes to define commodity groups and import weights. To the extent possible, specific rates have been converted to their ad valorem equivalent rates and have been included in the calculation of weighted mean tariffs. Effectively applied tariff rates at the six- and eight-digit product level are averaged for products in each commodity group. When the effectively applied rate is unavailable, the most-favoured nation rate is used instead. World Bank estimates use the World Integrated Trade Solution (WITS) system, based on tariff data from the UNCTAD Trade Analysis and Information System (TRAINS) database and import weights calculated using the UN Comtrade database.

Source: World Bank, based on WITS, UNCTAD TRAINS, and UN COMTRADE; extracted from the World Bank's World Development Indicators database (2005–12). (<http://data.worldbank.org/>)

#### 4.3.2 Intensity of local competition

Average answer to the survey question: In your country, how intense is competition in the local markets? [1 = not intense at all; 7 = extremely intense]<sup>†</sup> | 2014

Source: World Economic Forum, Executive Opinion Survey 2014–2015. (<https://wefsurvey.org>)

#### 5.1.4 GERD financed by business enterprise

GERD: Financed by business enterprise (% of total GERD)<sup>a</sup> | 2013

Percentage of gross expenditure on R&D financed by business enterprise.

Source: UNESCO Institute for Statistics, UIS online database (2007–14). (<http://stats.uis.unesco.org>)

## 5 Business sophistication

### 5.1 Knowledge workers

#### 5.1.1 Employment in knowledge-intensive services

Employment in knowledge-intensive services (% of workforce) | 2013

Sum of people in categories 1 to 3 as a percentage of total people employed, according to the International Standard Classification of Occupations (ISCO). Categories included: ISCO-08: 1 Managers, 2 Professionals, and 3 Technicians and associate professionals (years 2004–14); ISCO-88: 1 Legislators, senior officials and managers, 2 Professionals, 3 Technicians and associate professionals (2004–13); ISCO-1968: 1 Professional, technical and related workers (category 0 Armed forces is excluded), 2 Administrative and managerial workers, 3 Clerical and related workers (years 2004–08).

Source: International Labour Organization ILOSTAT Database of Labour Statistics (2004–14). (<http://www.ilo.org/ilostat/>)

#### 5.1.2 Firms offering formal training

Firms offering formal training (% of firms) | 2013

The percentage of firms offering formal training programmes for their permanent, full-time employees.

Source: International Finance Corporation and World Bank, Enterprise Surveys (2005–13). (<http://www.enterprisesurveys.org/>)

#### 5.1.3 GERD performed by business enterprise

GERD: Performed by business enterprise (% of GDP)<sup>a</sup> | 2013

Gross expenditure on R&D performed by business enterprise as a percentage of GDP.

Source: UNESCO Institute for Statistics, UIS online database (2004–13). (<http://stats.uis.unesco.org>)

#### 5.1.5 Females employed with advanced degrees

Females employed with advanced degrees, % total employed (scaled by million population 25+ years old)<sup>a</sup> | 2013

The percentage of females employed with advanced degrees out of total employed. The employed comprise all persons of working age who, during a specified brief period, were in one of the following categories: (1) paid employment (whether at work or with a job but not at work); or (2) self-employment (whether at work or with an enterprise but not at work). Data are disaggregated by level of education, which refers to the highest level of education completed, classified according to the International Standard Classification of Education (ISCED). With special tabulation for Canada from Statistics Canada, Table 282-0004: Labour force survey estimates (LFS), by educational attainment, sex, and age group, annual (persons unless otherwise noted).

Source: International Labour Organization, ILOSTAT Annual Indicators (2005–14) and Statistics Canada, Table 282-0004; extracted from CANSIM, the Canadian socioeconomics database from Statistics Canada, accessed 22 April 2015. (<http://www.ilo.org/ilostat/>; <http://laborsta.ilo.org/>)

### 5.2 Innovation linkages

#### 5.2.1 University/industry research collaboration

Average answer to the survey question: 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]<sup>†a</sup> | 2014

Source: World Economic Forum, Executive Opinion Survey 2014–2015. (<https://wefsurvey.org>)

### 5.2.2 State of cluster development

Average answer to the survey question on the role of clusters in the economy: In your country, how widespread are well-developed and deep clusters (geographic concentrations of firms, suppliers, producers of related products and services, and specialized institutions in a particular field)? [1 = nonexistent; 7 = widespread in many fields] † | 2014

Source: World Economic Forum, *Executive Opinion Survey 2014–2015*. (<https://wefsurvey.org>)

### 5.2.3 GERD financed by abroad

GERD: Financed by abroad (% of total GERD) | 2013

Percentage of gross expenditure on R&D financed by abroad—i.e., with foreign financing.

Source: UNESCO Institute for Statistics, *UIS online database (2007–14)*. (<http://stats.uis.unesco.org>)

### 5.2.4 Joint venture/strategic alliance deals

Joint ventures/strategic alliances: Number of deals, fractional counting (per trillion PPP\$ GDP)<sup>a</sup> | 2014

Thomson Reuters data on joint ventures/strategic alliances deals, per deal, with details on the country of origin of partner firms, among others. The series corresponds to a query on joint venture/strategic alliance deals from 1 January 2014 to 31 December 2014, for a total of 1,623 deals announced in 2014, with firms headquartered in 104 participating economies. Each participating nation of each company in a deal ( $n$  countries per deal) gets, per deal, a score equivalent to  $1/n$  (with the effect that all country scores add up to 1,623). The data are reported per trillion PPP\$ GDP.

Source: Thomson Reuters, *Thomson One Banker Private Equity, SDC Platinum database; International Monetary Fund World Economic Outlook database, April 2015 (PPP\$ GDP) (2014)*. (<http://banker.thomsonib.com>); <http://www.imf.org/external/pubs/ft/weo/2013/01/weodata/download.aspx>)

### 5.2.5 Patent families filed in at least three offices

Number of patent families filed by residents in at least three offices (per billion PPP\$ GDP)<sup>a</sup> | 2011

A 'patent family' is defined as a set of interrelated patent applications filed in one or more countries/jurisdictions to protect the same invention. In this report, 'patent families data' refers to patent applications filed by residents in at least three IP offices; the data are scaled by PPP\$ GDP (billions). A 'patent' is a set of exclusive rights granted by law to applicants for inventions that are new, non-obvious, and commercially

applicable. It is valid for a limited period of time (generally 20 years), during which patent holders can commercially exploit their inventions on an exclusive basis. In return, applicants are obliged to disclose their inventions to the public in a manner that enables others, skilled in the art, to replicate the invention. The patent system is designed to encourage innovation by providing innovators with time-limited exclusive legal rights, thus enabling innovators to appropriate a return on their innovative activity.

Source: World Intellectual Property Organization, *WIPO Statistics Database; International Monetary Fund, World Economic Outlook database, April 2015 (PPP\$ GDP) (2004–11)*. (<http://www.wipo.int/ipstats/>; <http://www.imf.org/external/pubs/ft/weo/2013/01/weodata/download.aspx>)

## 5.3 Knowledge absorption

### 5.3.1 Royalties and license fees payments

Royalty and license fees, payments (% of total trade)<sup>a</sup> | 2013

Royalties and license fees payments (% of total trade) according to the Extended Balance of Payments Services Classification EBOPS 2002—i.e., code 266 Royalties and license fees (including franchises and similar rights) as a percentage of total trade. 'Total trade' is defined as the sum of total imports code G100 goods and code S200CS commercial services (excluding government services) plus total exports of code G100 goods and code S200CS commercial services (excluding government services), divided by 2. According to the fifth edition of the International Monetary Fund's *Balance of Payments Manual*, the item 'Goods' covers general merchandise, goods for processing, repairs on goods, goods procured in ports by carriers, and nonmonetary gold. The 'commercial services' category is defined as being equal to 'services' minus 'government services, not included elsewhere'. Receipts are between residents and nonresidents for the authorized use of intangible, nonproduced, nonfinancial assets and proprietary rights (such as patents, copyrights, trademarks, industrial processes, and franchises) and for the use, through licensing agreements, of produced originals of prototypes (such as films and manuscripts).

Note: There has been a change in the data source from the International Monetary Fund to the Organisation for Economic Co-operation and Development, which has affected the year-on-year comparability of this indicator.

Source: World Trade Organization, *Trade in Commercial Services database*, itself based on the fifth (1993) edition of the *International Monetary Fund's Balance of Payments Manual and Balance of Payments database (2009–13)*. (<http://stat.wto.org/StatisticalProgram/WSDStatProgramSeries.aspx?Language=E>; [http://unstats.un.org/unsd/tradeserv/EBOPS2002\\_eng.pdf](http://unstats.un.org/unsd/tradeserv/EBOPS2002_eng.pdf))

### 5.3.2 High-tech imports

High-tech net imports (% of total trade) | 2013

High-technology imports minus re-imports (% of total trade). The list of commodities contains technical products with a high intensity of R&D, based on the Eurostat classification, itself based on SITC Rev.4 and the Organisation for Economic Co-operation and Development (OECD) definition. Commodities belong to the following sectors: aerospace; computers & office machines; electronics, telecommunications; pharmacy; scientific instruments; electrical machinery; chemistry; non-electrical machinery; and armament.

Source: United Nations, *COMTRADE database; Eurostat, 'High-technology' aggregations based on SITC Rev. 4, April 2009 (2011–13)*. (<http://comtrade.un.org/>; [http://epp.eurostat.ec.europa.eu/cache/ITY\\_SDDS/Annexes/htec\\_esms\\_an5.pdf](http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/Annexes/htec_esms_an5.pdf))

### 5.3.3 Communications, computer and information services imports

Communications, computer and information services imports (% of total trade) | 2013

Communication, computer and information services imports (% of total trade) according to the Extended Balance of Payments Services Classification EBOPS 2002, including codes 245 Communications services (postal, courier services, and telecommunications services); and 262 Computer and information services, as a percentage of total trade.

Source: World Trade Organization, *Trade in Commercial Services database*, itself based on the fifth (1993) edition of the *International Monetary Fund's Balance of Payments Manual and Balance of Payments database (2008–13)*. (<http://stat.wto.org/StatisticalProgram/WSDStatProgramSeries.aspx?Language=E>; [http://unstats.un.org/unsd/tradeserv/EBOPS2002\\_eng.pdf](http://unstats.un.org/unsd/tradeserv/EBOPS2002_eng.pdf))

### 5.3.4 Foreign direct investment net inflows

Foreign direct investment (FDI), net inflows (% of GDP) | 2013

Net inflows of investment to acquire a lasting management interest (10% or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors, and is divided by GDP.

Source: International Monetary Fund, International Financial Statistics and data files, and World Bank and OECD GDP estimates; extracted from the World Bank's World Development Indicators database (2012–13). (<http://data.worldbank.org/>)

Source: World Intellectual Property Organization, WIPO Statistics Database; International Monetary Fund, World Economic Outlook database, April 2015 (PPP\$ GDP) (2010–13). (<http://www.wipo.int/ipstats/>; <http://www.imf.org/external/pubs/ft/weo/2013/01/weodata/download.aspx>)

### 6.1.2 Patent Cooperation Treaty resident applications

Number of international patent applications filed by residents at the Patent Cooperation Treaty (per billion PPP\$ GDP)<sup>a</sup> | 2014

Number of international patent applications filed by residents under the World Intellectual Property Organization (WIPO)-administered Patent Cooperation Treaty (PCT). Data are reported for PCT member countries only, and scaled by PPP\$ GDP (billions). PCT applications are assigned to a particular country of origin according to the country of residence of the first-named applicant. The PCT system simplifies the process of multiple national patent filings by reducing the requirement to file a separate application in each jurisdiction. However, the decision of whether to grant patent rights remains in the hands of national and regional patent offices, and the patent rights remain limited to the jurisdiction of the patent-granting authority. The PCT international application process starts with the international phase, during which an international search and, possibly, a preliminary examination are performed, and concludes with the national phase, during which national and regional patent offices decide on the patentability of an invention according to national law.

Source: World Intellectual Property Organization, WIPO Statistics Database; International Monetary Fund, World Economic Outlook database, April 2015 (PPP\$ GDP) (2012–14). (<http://www.wipo.int/ipstats/>; <http://www.imf.org/external/pubs/ft/weo/2013/01/weodata/download.aspx>)

### 6.1.3 National office resident utility model applications

Number of utility model applications filed by residents at the national patent office (per billion PPP\$ GDP) | 2013

Number of utility model (UM) applications filed by residents at the national patent office. Resident UM data are scaled by PPP\$ GDP (billions). UM is a special form of patent right granted by a state/jurisdiction to an inventor or inventor's assignee for a fixed period of time. The terms and conditions for granting a utility model are slightly different

from those for normal patents (including a shorter term of protection and less stringent patentability requirements). The term 'utility model' can also describe what are known in certain countries as 'petty patents', 'short-term patents', or 'innovation patents'.

Source: World Intellectual Property Organization, WIPO Statistics Database; International Monetary Fund, World Economic Outlook database, April 2015 (PPP\$ GDP) (2010–13). (<http://www.wipo.int/ipstats/>; <http://www.imf.org/external/pubs/ft/weo/2013/01/weodata/download.aspx>)

### 6.1.4 Scientific and technical publications

Number of scientific and technical journal articles (per billion PPP\$ GDP)<sup>a</sup> | 2014

The number of scientific and engineering articles published in the following fields: physics, biology, chemistry, mathematics, clinical medicine, biomedical research, engineering and technology, and earth and space sciences. Article counts are from a set of journals covered by the Science Citation Index (SCI) and the Social Sciences Citation Index (SSCI). Articles are classified by year of publication and assigned to each country/economy on basis of the institutional address(es) listed on the article. Articles are counted on a count basis (rather than a fractional basis)—that is, for articles with collaborating institutions from multiple countries/economies, each country/economy receives credit on the basis of its participating institutions. The data are reported per trillion PPP\$ GDP.

Source: Special tabulations from Thomson Reuters, Web of Science, Science Citation Index (SCI) and Social Sciences Citation Index (SSCI); International Monetary Fund, World Economic Outlook 2014 database, April 2015 (PPP\$ GDP). ([http://thomsonreuters.com/products\\_services/science/](http://thomsonreuters.com/products_services/science/); <http://www.imf.org/external/pubs/ft/weo/2013/01/weodata/download.aspx>)

### 6.1.5 Citable documents H index

The H index is the economy's number of published articles (H) that have received at least H citations in the period 1996–2013.<sup>a</sup> | 2013

The H index is an economy's number of published articles (H) that have received at least H citations in the period 1996–2013. It quantifies both country scientific productivity and scientific impact and is also applicable to scientists, journals, etc. The SCImago Journal & Country Rank is a portal that includes journal and economy scientific indicators developed from the information contained in the Scopus® database (Elsevier B.V.). This platform takes its name from the SCImago Journal

## 6 Knowledge and technology outputs

### 6.1 Knowledge creation

#### 6.1.1 National office resident patent applications

Number of patent applications filed by residents at the national patent office (per billion PPP\$ GDP)<sup>a</sup> | 2013

Number of patent applications filed by residents at the national patent office. Data are scaled by PPP\$ GDP (billions). 'Patent' is defined in the description of indicator 5.2.5. Patent applications by resident data are based on 'equivalent count', where applications at regional offices are equivalent to multiple applications, one in each of the states that is a member of those offices. To calculate the number of equivalent patent applications for the Eurasian Patent Office (EAPO) and the African Intellectual Property Organization (OAPI), each application is multiplied by the corresponding number of member states. For the European Patent Office (EPO) and the African Regional Intellectual Property Organization (ARIPO), each application is counted as one application abroad if the applicant does not reside in a member state or as one resident and one application abroad if the applicant resides in a member state. The equivalent applications concept is used only for reporting data by origin. A resident application refers to an application filed with the IP office of or acting for the state or jurisdiction in which the first-named applicant in the application has residence.

Rank (SJR), developed by SCImago from the algorithm Google PageRank™. The H index is tabulated from the number of citations received in subsequent years by articles published in a given year, divided by the number of articles published that year.

Source: SCImago (2007) SJR—SCImago Journal & Country Rank. Retrieved February 2014. (<http://www.scimagojr.com>)

## 6.2 Knowledge impact

### 6.2.1 Growth rate of GDP per person engaged

Growth rate of GDP per person engaged (constant 1990 PPP\$) | 2013

Growth of gross domestic product (GDP) per person engaged provides a measure of labour productivity (defined as output per unit of labour input). GDP per person employed is GDP divided by total employment in the economy. PPP\$ GDP is converted to 1990 constant international dollars using PPP rates. An international dollar has the same purchasing power over GDP that a US dollar has in the United States of America.

Source: The Conference Board Total Economy Database™ Output, Labor and Labor Productivity Country Details, 1950–2013, January 2014. (<https://www.conference-board.org/data/economydatabase/>).

### 6.2.2 New business density

New business density (new registrations per thousand population 15–64 years old)<sup>a</sup> | 2012

Number of new firms, defined as firms registered in the current year of reporting, per thousand population aged 15–64 years old.

Source: World Bank, *Doing Business 2014, Entrepreneurship* (2007–12). (<http://www.doingbusiness.org/data/exploretopics/entrepreneurship>)

### 6.2.3 Total computer software spending

Total computer software spending (% of GDP)<sup>a</sup> | 2013

Computer software spending includes the total value of purchased or leased packaged software such as operating systems, database systems, programming tools, utilities, and applications. It excludes expenditures for internal software development and outsourced custom software development. The data are a combination of actual figures and estimates. Data are reported as a percentage of GDP.

Source: IHS Global Insight, *Information and Communication Technology Database*; International Monetary Fund, *World Economic Outlook 2014 database*, April 2015 (current US\$ GDP). (<http://www.ihsglobalinsight.com/ProductsServices/ProductDetail2370.htm>; <http://www.imf.org/external/pubs/ft/weo/2013/01/weodata/download.aspx>)

### 6.2.4 ISO 9001 quality certificates

ISO 9001 Quality management systems—Requirements: Number of certificates issued (per billion PPP\$ GDP)<sup>a</sup> | 2013

Number of certificates of conformity to standard 'ISO 9001:2008 Quality management systems—Requirements' issued, according to the ISO Survey. Single-site and multiple-site certificates are not distinguished. The data are reported per billion PPP\$ GDP. Refer to indicator 3.3.3 for details.

Source: International Organization for Standardization (ISO), *The ISO Survey of Management System Standard Certifications, 1999–2012*; International Monetary Fund, *World Economic Outlook database*, April 2015 (PPP\$ GDP) (2013). (<http://www.iso.org>; <http://www.imf.org/external/pubs/ft/weo/2013/01/weodata/weoselgr.aspx>)

### 6.2.5 High-tech and medium-high-tech output

High-tech and medium-high-tech output (% of total manufactures output)<sup>a</sup> | 2011

High-tech and medium-high-tech output as a percentage of total manufactures output, on the basis of the Organisation for Economic Co-operation and Development (OECD) classification of Technology Intensity Definition, itself based on International Standard Industrial Classification ISIC Revision 3.

Source: United Nations Industrial Development Organization (UNIDO), *Industrial Statistics Database*, 3- and 4-digit level of International Standard Industrial Classification ISIC Revision 3 (INDSTAT4 2012); OECD, Directorate for Science, Technology and Industry, *Economic Analysis and Statistics Division, 'ISIC REV. 3 Technology Intensity Definition: Classification of Manufacturing Industries into Categories Based on R&D Intensities'*, 7 July 2011 (2004–11). (<http://www.unido.org/statistics.html>; <http://unstats.un.org/unsd/cr/registry/regcst.asp?cl=27>; <http://www.oecd.org/sti/ind/48350231.pdf>)

## 6.3 Knowledge diffusion

### 6.3.1 Royalties and license fees receipts

Royalty and license fees, receipts (% of total trade)<sup>a</sup> | 2013

Royalties and license fees receipts (% of total trade) according to the Extended Balance of Payments Services Classification EBOPS 2002—i.e., code 266 Royalties and license fees (including franchises and similar rights) as a percentage of total trade. Receipts are between residents and nonresidents for the authorized use of intangible, nonproduced, nonfinancial assets and proprietary rights (such as patents, copyrights, trademarks, industrial processes, and franchises) and for the use, through licensing agreements, of produced originals of prototypes (such as films and manuscripts).

Note: There has been a change in data source from the International Monetary Fund to the Organisation for Economic Co-operation and Development, which has affected the year-on-year comparability of this indicators.

Source: World Trade Organization, *Trade in Commercial Services database*, itself based on the fifth (1993) edition of the International Monetary Fund's *Balance of Payments Manual and Balance of Payments database* (2007–13). (<http://stat.wto.org/StatisticalProgram/WSDStatProgramSeries.aspx?Language=E>; [http://unstats.un.org/unsd/tradeserv/EBOPS2002\\_eng.pdf](http://unstats.un.org/unsd/tradeserv/EBOPS2002_eng.pdf))

### 6.3.2 High-tech exports

High-tech net exports (% of total trade)<sup>a</sup> | 2013

High-technology exports minus re-exports (% of total trade). See indicator 5.3.2 for details.

Source: United Nations, COMTRADE database; Eurostat 'High-technology' aggregations based on SITC Rev. 4, April 2009 (2011–13). (<http://comtrade.un.org/>; [http://epp.eurostat.ec.europa.eu/cache/ITY\\_SDDS/Annexes/htec\\_esms\\_an5.pdf](http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/Annexes/htec_esms_an5.pdf))

### 6.3.3 Communications, computer and information services exports

Communications, computer and information services exports (% of total trade)<sup>a</sup> | 2013

Communication, computer and information services exports (% of total trade) according to the Extended Balance of Payments Services Classification EBOPS 2002, including codes 245 Communications services (postal, courier services, and telecommunications services) and 262 Computer and information services, as a percentage of total trade.



Source: World Trade Organization, *Trade in Commercial Services database*, itself based on the fifth (1993) edition of the *International Monetary Fund's Balance of Payments Manual and Balance of Payments database (2006–13)*. ([http://stat.wto.org/StatisticalProgram/WSDStatProgramSeries.aspx?Language=E;http://unstats.un.org/unsd/tradeserv/EBOPS2002\\_eng.pdf](http://stat.wto.org/StatisticalProgram/WSDStatProgramSeries.aspx?Language=E;http://unstats.un.org/unsd/tradeserv/EBOPS2002_eng.pdf))

#### 6.3.4 Foreign direct investment net outflows

Foreign direct investment (FDI), net outflows (% of GDP) | 2013

Net outflows of investment to acquire a lasting management interest (10% or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net outflows of investment from the reporting economy to the rest of the world and is divided by GDP.

Source: International Monetary Fund, *International Financial Statistics and data files*, and World Bank and OECD GDP estimates; extracted from the World Bank's *World Development Indicators database (2010–13)*. (<http://data.worldbank.org/>)

## 7 Creative outputs

### 7.1 Intangible assets

#### 7.1.1 National office resident trademark applications

Number of trademark applications issued to residents by the national office (per billion PPP\$ GDP) | 2013

Number of trademark applications at the national trademark office, based on equivalent class counts. 'Class count' refers to the number of classes specified in a trademark application or registration. Data are scaled by PPP\$ GDP (billions). A 'trademark' is a distinctive sign that identifies certain goods or services as those produced or provided by a specific person or enterprise. The holder of a trademark application has the legal right to exclusive use of the mark in relation to the products or services for which it is registered. The owner can prevent unauthorized use of the trademark, or a confusingly similar mark, so as to prevent consumers and the public in general from being misled. Unlike patents, trademarks can be maintained indefinitely by paying renewal fees. The procedures for registering trademarks are governed by the rules and regulations of national and regional

IP offices. Trademark rights are limited to the jurisdiction of the authority that registers the trademark. Resident trademark registrations are based on equivalent class counts. In the international trademark system and at certain offices, an applicant can file a trademark application that specifies one or more of the 45 goods and services classes of the Nice Classification. Offices use either a single- or multi-class filing system. For example, the offices of Japan, the Republic of Korea, and the United States of America as well as many European offices have multi-class filing systems. The offices of Brazil, Mexico, and South Africa follow a single-class filing system, requiring a separate application for each class in which applicants seek trademark protection. To capture the differences in application numbers across offices, it is useful to compare their respective registration class counts. 'Equivalent registrations' refers to registrations at regional offices and are equivalent to multiple registrations, one in each of the states that is a member of those offices. To calculate the number of equivalent registrations for regional office data, each registration is multiplied by the corresponding number of member states.

Source: World Intellectual Property Organization, *WIPO Statistics Database*; International Monetary Fund, *World Economic Outlook database*, April 2015 (PPP\$ GDP) (2010–13). (<http://www.wipo.int/ipstats/>; <http://www.imf.org/external/pubs/ft/weo/2013/01/weodata/download.aspx>)

#### 7.1.2 Madrid System trademark applications by country of origin

Number of international trademark applications issued through the Madrid System by country of origin (per billion PPP\$ GDP)<sup>a</sup> | 2014

Number of international trademark applications by country of origin under the WIPO-administered Madrid System. Data are reported for Madrid member countries only, and scaled by PPP\$ GDP (billions). 'Trademark' is defined in the description of indicator 7.1.1. The Madrid System for the International Registration of Marks, established under the Madrid Agreement and the Madrid Protocol and administered by WIPO, makes it possible for an applicant to register a trademark in a large number of countries by filing a single application at their national or regional IP office that is party to the System. The Madrid System simplifies the process of multinational trademark registration by reducing the requirement to file separate applications at each office. It also simplifies the subsequent management of the mark, since

it is possible to record changes or to renew the registration through a single procedural step. Registration through the Madrid System does not create an 'international' trademark, and the decision to register or refuse the trademark remains in the hands of national and/or regional office(s). Trademark rights are limited to the jurisdiction of the trademark registration office(s).

Source: World Intellectual Property Organization, *WIPO Statistics Database*; International Monetary Fund, *World Economic Outlook database*, April 2015 (PPP\$ GDP) (2013–14). (<http://www.wipo.int/ipstats/>; <http://www.imf.org/external/pubs/ft/weo/2013/01/weodata/download.aspx>)

#### 7.1.3 ICTs and business model creation

Average answer to the question: In your country, to what extent do ICTs enable new business models? [1 = not at all; 7 = to a great extent]<sup>†</sup> | 2014

Source: World Economic Forum, *Executive Opinion Survey 2013–2014*. (<https://wefsurvey.org>)

#### 7.1.4 ICTs and organizational models creation

Average answer to the question: In your country, to what extent do ICTs enable new organizational models (e.g. virtual teams, remote working, telecommuting) within businesses? [1 = not at all; 7 = to a great extent]<sup>†</sup> | 2014

Source: World Economic Forum, *Executive Opinion Survey 2013–2014*. (<https://wefsurvey.org>)

### 7.2 Creative goods and services

#### 7.2.1 Cultural and creative services exports

Cultural and creative services exports (% of total trade)<sup>a</sup> | 2012

Creative services exports (% of total exports) according to the Extended Balance of Payments Services Classification EBOPS 2002—that is, EBOPS code 264 Information services; code 278 Advertising, market research and public opinion polling; code 288 Audiovisual and related services; and code 897 Other, personal, cultural and recreational services as a percentage of total trade. The score for the United States of America (USA) includes the category Film and TV tape distribution in the absence of available data for code 288 Audiovisual and related services. The category Film and tape distribution is specific to the USA and does not have a code. However, these transactions have been classified by the USA under the EBOPS item 266 (Royalties and licence fees).

Source: World Trade Organization, *Trade in Commercial Services database*, itself based on the fifth (1993) edition of the *International Monetary Fund's Balance of Payments Manual and Balance of Payments database (2004–13)*. (<http://stat.wto.org/StatisticalProgram/WSDStatProgramSeries.aspx?Language=E>; [http://unstats.un.org/unsd/tradeserv/EBOPS2002\\_eng.pdf](http://unstats.un.org/unsd/tradeserv/EBOPS2002_eng.pdf))

### 7.2.2 National feature films produced

Number of national feature films produced (per million population 15–69 years old)<sup>a</sup> | 2013

A film with a running time of 60 minutes or longer. It includes works of fiction, animation, and documentaries. It is intended for commercial exhibition in cinemas. Feature films produced exclusively for television broadcasting, as well as news-reels and advertising films, are excluded. Data are reported per million population 15–69 years old. For Cambodia and Cameroon, this indicator covers only feature films in video format; for Slovenia, feature films with a running time of 75 minutes or longer.

Source: UNESCO Institute for Statistics, *UIS online database*; United Nations, Department of Economic and Social Affairs, Population Division, *World Population Prospects: The 2012 Revision (population data) (2008–13)*. (<http://stats.uis.unesco.org>; <http://esa.un.org/unpd/wpp/Excel-Data/population.htm>)

### 7.2.3 Global entertainment and media output

Global entertainment and media output (per thousand population 15–69 years old)<sup>a</sup> | 2013

The Global entertainment and media outlook (the Outlook) provides global analysis for consumer and advertising spend with like-for-like, five-year historical and forecast data across 13 industry segments in 59 countries. The Outlook allows one to compare and contrast regional growth rates and consumer and advertising spend. The segments covered by the Outlook are: TV subscriptions and license fees; TV advertising; Internet access; radio; out-of-home advertising; video games; filmed entertainment; newspaper publishing; consumer magazine publishing; business-to-business markets; Internet advertising; and consumer and educational book publishing and music. The score and rankings for the Global Media Expenditures for the 59 countries considered in this report are based on advertising and consumer digital and non-digital data in US\$ millions at average 2012 exchange rates for the year 2012. These results are reported normalized per thousand population, 15–69 years old, for the year 2013. The figures for Algeria, Bahrain, Egypt, Jordan,

Kuwait, Lebanon, Morocco, Oman, Qatar, Saudi Arabia, and United Arab Emirates were estimated from a total corresponding to Middle East and North Africa (MENA) countries using a breakdown of total GDP (current US\$) for the above-mentioned countries to define referential percentages.

Source: The source of the data for the base of these calculations was derived from PwC's *Global entertainment and media outlook, 2013–2017*; United Nations, Department of Economic and Social Affairs, Population Division, *World Population Prospects: The 2012 Revision (population data)*. (<http://www.pwc.com/outlook>; <http://stats.uis.unesco.org>; <http://esa.un.org/unpd/wpp/Excel-Data/population.htm>)

### 7.2.4 Printing and publishing output

Printing and publishing manufactures output (% of manufactures total output) | 2011

Publishing, printing, and reproduction of recorded media output (ISIC Rev. 3 code 22) as a percentage of total manufacturing output (ISIC rev.3 code D).

Source: United Nations Industrial Development Organization, *Industrial Statistics Database: 2-digit level of International Standard Industrial Classification ISIC Revision 3 (INDSTAT4 2012) (2004–11)*. (<http://www.unido.org/statistics.html>; <http://unstats.un.org/unsd/cr/registry/regcst.asp?cl=2>)

### 7.2.5 Creative goods exports

Creative goods exports (% of total trade) | 2013

Total value of creative goods exports, net of re-exports (current US\$) over total trade. 'Total trade' is defined as the sum of total imports code G100 goods and code S200CS commercial services (excluding government services) plus total exports of code G100 goods and code S200CS commercial services (excluding government services), divided by 2. According to the fifth edition of the *International Monetary Fund's Balance of Payments Manual*, the category 'goods' covers general merchandise, goods for processing, repairs on goods, goods procured in ports by carriers, and non-monetary gold. The 'commercial services' category is defined as being equal to 'services' minus 'government services, not included elsewhere'.

Source: United Nations, COMTRADE database; 2009 UNESCO Framework for Cultural Statistics, Table 3, *International trade of cultural goods and services based on the 2007 Harmonised System (HS 2007)*; World Trade Organization, *Trade in Commercial Services database*, itself based on the fifth (1993) edition of the *International Monetary Fund's Balance of Payments Manual and Balance of Payments database (2008–13)*. (<http://unctadstat.unctad.org/>; <http://www.uis.unesco.org/culture/Documents/framework-cultural-statistics-culture-2009-en.pdf>; <http://stat.wto.org/StatisticalProgram/WSDStatProgramSeries.aspx?Language=E>)

## 7.3 Online creativity

### 7.3.1 Generic top-level domains (gTLDs)

Generic top-level domains gTLDs (per thousand population 15–69 years old) | 2014

A generic top-level domain (gTLD) is one of the categories of top-level domains (TLDs) maintained by the Internet Assigned Numbers Authority (IANA) for use in the Internet. Generic TLDs can be unrestricted (com, info, net, and org) or restricted—that is, used on the basis of fulfilling eligibility criteria (biz, name, and pro). Of these, the statistic covers the five generic domains biz, info, org, net, and com. Generic domains .name and .pro, and sponsored domains (arpa, aero, asia, cat, coop, edu, gov, int, jobs, mil, museum, tel, travel, and xxx) are not included. Neither are country-code top-level domains (refer to indicator 7.3.2). The statistic represents the total number of registered domains (i.e., net totals by December 2014, existing domains + new registrations – expired domains). Data are collected on the basis of a 4% random sample of the total population of domains drawn from the root zone files (a complete listing of active domains) for each TLD. The geographic location of a domain is determined by the registration address for the domain name registrant that is returned from a whois query. These registration data are parsed by country and postal code and then aggregated to any number of geographic levels such as county, city, or country/economy. The original hard data were scaled by thousand population 15–69 years old. For confidentiality reasons, only normalized values are reported; while relative positions are preserved, magnitudes are not.

Source: ZookNIC Inc; United Nations, Department of Economic and Social Affairs, Population Division, *World Population Prospects: The 2012 Revision (population data)*. (<http://www.zooknic.com>; <http://esa.un.org/unpd/wpp/Excel-Data/population.htm>)



### 7.3.2 Country-code top-level domains (ccTLDs)

Country-code top-level domains ccTLDs (per thousand population 15–69 years old) | 2014

A country-code top-level domain (ccTLD) is one of the categories of top-level domains (TLDs) maintained by the Internet Assigned Numbers Authority (IANA) for use in the Internet. Country-code TLDs are two-letter domains especially designated for a particular economy, country, or autonomous territory (there are 324 ccTLDs, in various alphabets/characters). The statistic represents the total number of registered domains (i.e., net totals by December 2014, existing domains + new registrations – expired domains). Data are collected from the registry responsible for each ccTLD and represent the total number of domain registrations in the ccTLD. Each ccTLD is assigned to the country with which it is associated rather than based on the registration address of the registrant. ZookNIC reports that, for the ccTLDs it covers, 85–100% of domains are registered in the same country; the only exceptions are the ccTLDs that have been licensed for commercial worldwide use. Of this year's GII sample of countries, this is the case for the ccTLDs of the following economies: Armenia am, Austria at, Belarus by, Belgium be, Canada ca, Colombia co, Denmark dk, Finland fi, Iceland is, India in, Iran ir, Italy it, Latvia lv, Mauritius mu, Moldova md, Mongolia mn, Montenegro me, Nicaragua ni, Serbia rs, Seychelles sc, Slovenia si, Spain es, and Switzerland ch (this list is based on [www.wikipedia.org](http://www.wikipedia.org)). Data are reported per thousand population 15–69 years old. For confidentiality reasons, only normalized values are reported; while relative positions are preserved, magnitudes are not.

Source: ZookNIC Inc; United Nations, Department of Economic and Social Affairs, Population Division, *World Population Prospects: The 2012 Revision (population data)*. (<http://www.zooknic.com>; <http://esa.un.org/unpd/wpp/Excel-Data/population.htm>)

### 7.3.3 Wikipedia monthly edits

Wikipedia monthly page edits (per million population 15–69 years old) | 2014

Data extracted from Wikimedia Traffic Analysis Report, Wikipedia Page Edits per Country, Overview on the portal <http://www.wikipedia.org>. The count of monthly page edits data is based on a 1:1,000 sampled server log (squids), averages of quarterly reports. Countries are included only if the number of page edits in the period exceeds 100,000 (100 matching records in 1:1,000 sampled log). Page edits by bots are not included. Also all IP

addresses that occur more than once on a given day are discarded for that day. A few false negatives are taken for granted. Data are reported per million population 15–69 years old.

Source: Wikimedia Foundation; United Nations, Department of Economic and Social Affairs, Population Division, *World Population Prospects: The 2012 Revision (population data)*. (<http://stats.wikimedia.org/wikimedia/squids/SquidReportsCountriesLanguagesVisitsEdits.htm>; <http://esa.un.org/unpd/wpp/Excel-Data/population.htm>)

### 7.3.4 Video uploads on YouTube

Number of video uploads on YouTube (scaled by population 15–69 years old)\* | 2014

Total number of video uploads on YouTube, per country, scaled by population 15–69 years old. The raw data are survey based: the country of affiliation is chosen by each user on the basis of a multi-choice selection. This metric counts all video upload events by users. The following countries are reported with n/a because of total or partial service blockage: China (YouTube blocked for 2,711 days) and Iran (YouTube blocked for 2,095 days). For confidentiality reasons, only normalized values are reported; while relative positions are preserved, magnitudes are not.

Source: Google, parent company of YouTube; United Nations, Department of Economic and Social Affairs, Population Division, *World Population Prospects: The 2012 Revision (population data)*. (<http://www.youtube.com>; <http://esa.un.org/unpd/wpp/Excel-Data/population.htm>; <http://www.comscore.com/Industries/Media>)

