Appendix III

Sources and Definitions

Sources and Definitions

This appendix complements the data tables by providing, for each of the 82 indicators included in the Global Innovation Index (GII) this year, its title, its description, its definition, and its source. For each indicator for each country/economy, the most recent value within the 10-year period 2006–15 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, or 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 58 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 (†).

1   Institutions

1.1   Political environment

1.1.1   Political stability and absence of violence/terrorism

Political stability and absence of violence/terrorism index* | 2014

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 2015. (http://info.worldbank.org/governance/wgi/index.aspx#home)

1.1.2   Government effectiveness

Government effectiveness index* | 2014

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 2015. (http://info.worldbank.org/governance/wgi/index.aspx#home)

1.2   Regulatory environment

1.2.1   Regulatory quality

Regulatory quality index*[a] | 2014

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 2015. (http://info.worldbank.org/governance/wgi/index.aspx#home)

1.2.2   Rule of law

Rule of law index*[a] | 2014

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 2015. (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)[b] | 2015

Doing Business has historically studied the flexibility of regulation of employment specifically as it relates to the areas of hiring, working hours, and redundancy. Over the period from 2007 to 2011 improvements were made to align the methodology for the labour market regulation indicators (formerly the employing workers indicators) with the letter and spirit of the International Labour Organization (ILO) conventions. Redundancy cost measures the cost of advance notice requirements and severance payments due when terminating a redundant worker, expressed in weeks of salary. The average value of notice requirements and severance payments applicable to a worker with 1 year of tenure: a worker with 5 years and a worker with 10 years is also considered. One month is recorded as 4 and 1/3 weeks. If the redundancy cost adds up to 8 or fewer weeks of salary, a value of 8 is assigned but the actual number of weeks is published. If the cost adds up to more than 8 weeks of salary, the score is the number of weeks. Assumptions about the worker: the worker is a cashier in a supermarket or grocery store, age 19, with one year of work experience; is a full-time employee; is not a member of the labour union, unless membership is mandatory. Assumptions about the business: the business is a limited liability company (or the equivalent in the economy); operates a supermarket or grocery store in the economy's largest business city (for 11 economies the data are also collected for the second largest business city); has 60 employees; is subject to collective bargaining agreements if such agreements cover more than 50% of the food retail sector and they apply even to firms that are not party to them; abides by every law and regulation but does not grant workers more benefits than those mandated by law, regulation or (if applicable) collective bargaining agreements.

Source: World Bank, Ease of Doing Business Index 2016: Measuring Regulatory Quality and Efficiency (2014–15). (http://www.doingbusiness.org/reports/global-reports/doing-business-2016)

1.3   Business environment

1.3.1   Ease of starting a business

Ease of starting a business (distance to frontier)* | 2015

The ranking of economies on the ease of starting a business is determined by sorting their distance to frontier scores for

starting a business. These scores are the simple average of the distance to frontier scores for each of the component indicators. *Doing Business* records all procedures officially required, or commonly done in practice, for an entrepreneur to start up and formally operate an industrial or commercial business, as well as the time and cost to complete these procedures and the paid-in minimum capital requirement. These procedures include obtaining all necessary licenses and permits and completing any required notifications, verifications, or inscriptions for the company and employees with relevant authorities. To make the data comparable across economies, several assumptions about the business and the procedures are used. The business: is a limited liability company (or its legal equivalent). If there is more than one type of limited liability company in the economy, the limited liability form most common among domestic firms is chosen. Information on the most common form is obtained from incorporation lawyers or the statistical office; operates in the economy's largest business city. For 11 economies the data are also collected for the second largest business city; the business is 100% domestically owned and has five owners, none of whom is a legal entity; has start-up capital of 10 times income per capita; performs general industrial or commercial activities, such as the production or sale to the public of products or services. The business does not perform foreign trade activities and does not handle products subject to a special tax regime, for example, liquor or tobacco. 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 one month after the commencement of operations, all of them domestic nationals; has a turnover of at least 100 times income per capita; has a company deed 10 pages long. The distance to frontier score shows the distance of an economy to the 'frontier', which is derived from the most efficient practice or highest score achieved on each indicator.

Source: World Bank, Doing Business 2016: Measuring Regulatory Quality and Efficiency. (http://www.doingbusiness.org/reports/global-reports/doing-business-2016)

1.3.2   Ease of resolving insolvency

Ease of resolving insolvency (distance to frontier)* | 2015

The ranking of economies on the ease of resolving insolvency is determined by

sorting their distance to frontier scores for resolving insolvency. These scores are the simple average of the distance to frontier scores for the recovery rate and the strength of insolvency framework index. The recovery rate is recorded as cents on the dollar recovered by secured creditors through reorganization, liquidation, or debt enforcement (foreclosure or receivership) 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 the hotel furniture. Consistent with international accounting practice, the annual depreciation rate for furniture is taken to be 20%. The furniture is assumed to account for a quarter of the total value of assets. The recovery rate is the present value of the remaining proceeds, based on end-2014 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 five years involving a judicial reorganization, judicial liquidation, or debt enforcement procedure (foreclosure or receivership), the economy receives a 'no practice' mark on the time, cost, and outcome indicators. This means that creditors are unlikely to recover their money through a formal legal process. The recovery rate for 'no practice' economies is zero. In addition, a 'no practice' economy receives a score of 0 on the strength of insolvency framework index even if its legal framework includes provisions related to insolvency proceedings (liquidation or reorganization). The strength of insolvency framework index is based on four other indices: commencement of proceedings index, management of debtor's assets index, reorganization proceedings index and creditor participation index. To make the data on the time, cost, and outcome of insolvency proceedings comparable across economies, several assumptions about the business and the case are used: the business is a limited liability company; operates in the economy's largest business city. For 11 economies the data are also collected for the second largest business city; is 100% domestically owned, with the founder, who is also chairman of the supervisory board, owning 51% (no other shareholder holds more than 5% of shares); has downtown real estate, where it runs a hotel, as

its major asset; has a professional general manager; has 201 employees and 50 suppliers, each of which is owed money for the last delivery; has a 10-year loan agreement with a domestic bank secured by a mortgage over the hotel's real estate property. A universal business charge (an enterprise charge) is also assumed in economies where such collateral is recognized. If the laws of the economy do not specifically provide for an enterprise charge but contracts commonly use some other provision to that effect, this provision is specified in the loan agreement; has observed the payment schedule and all other conditions of the loan up to now; has a market value, operating as a going concern, of 100 times income per capita or $200,000, whichever is greater. The market value of the company's assets, if sold piecemeal, is 70% of the market value of the business. Refer to indicator 1.3.1 for details regarding the distance to frontier measure.

Source: World Bank, Doing Business 2016: Measuring Regulatory Quality and Efficiency. (http://www.doingbusiness.org/reports/global-reports/doing-business-2016)

1.3.3 Ease of paying taxes
Ease of paying taxes (distance to frontier)* | 2015

The ranking of economies on the ease of paying taxes is determined by sorting their distance to frontier scores for paying taxes. These scores are the simple average of the distance to frontier scores for each of the component indicators, with a threshold and a nonlinear transformation applied to one of the component indicators, the total tax rate. The 'threshold' is defined as the total tax rate at the 15th percentile of the overall distribution of the total tax rate indicator for all years included in the analysis up to and including *Doing Business 2015*. The threshold is set at 26.1%. All economies with a total tax rate below this threshold receive the same score as the economy at the threshold. The threshold is not based on any economic theory of an 'optimal tax rate' that minimizes distortions or maximizes efficiency in an economy's overall tax system. Instead, it is mainly empirical in nature, set at the lower end of the distribution of tax rates levied on medium-size enterprises in the manufacturing sector as observed through the paying taxes indicators. To make the data comparable across economies, several assumptions about the business and the taxes and contributions are used. The business: is a limited liability, taxable company. If there is more than one type of limited liability company in the economy, the limited liability form

most common among domestic firms is chosen. The most common form is reported by incorporation lawyers or the statistical office; started operations on January 1, 2013. At that time the company purchased all the assets shown in its balance sheet and hired all its workers; operates in the economy's largest business city. For 11 economies the data are also collected for the second largest business city; the business is 100% domestically owned and has five owners, all of whom are natural persons; at the end of 2013, has a start-up capital of 102 times income per capita; performs general industrial or commercial activities. Specifically, it produces ceramic flowerpots and sells them at retail. It does not participate in foreign trade (no import or export) and does not handle products subject to a special tax regime, for example, liquor or tobacco; at the beginning of 2014, owns two plots of land, one building, machinery, office equipment, computers and one truck and leases one truck; does not qualify for investment incentives or any benefits apart from those related to the age or size of the company; has 60 employees—4 managers, 8 assistants, and 48 workers. All are nationals, and one manager is also an owner. The company pays for additional medical insurance for employees (not mandated by any law) as an additional benefit. In addition, in some economies reimbursable business travel and client entertainment expenses are considered fringe benefits. When applicable, it is assumed that the company pays the fringe benefit tax on this expense or that the benefit becomes taxable income for the employee. The case study assumes no additional salary for meals, transportation, education or others. Therefore, even when such benefits are frequent, they are not added to or removed from the taxable gross salaries to arrive at the labor tax or contribution calculation; has a turnover of 1,050 times income per capita; makes a loss in the first year of operation; has a gross margin (pretax) of 20% (that is, sales are 120% of the cost of goods sold); distributes 50% of its net profits as dividends to the owners at the end of the second year; sells one of its plots of land at a profit at the beginning of the second year; is subject to a series of detailed assumptions on expenses and transactions to further standardize the case. For example, the owner who is also a manager spends 10% of income per capita on traveling for the company (20% of this owner's expenses are purely private, 20% are for entertaining customers, and 60% are for business travel). All financial statement variables are proportional to 2012 income per capita as of and including *Doing Business 2014* (this is an update

from *Doing Business 2013* and previous years' reports, where the variables were proportional to 2005 income per capita). For some economies a multiple of two or three times the income per capita has been used to estimate the financial statement variables. The 2012 income per capita was not sufficient to bring the salaries of all the case study employees up to the minimum wage thresholds that exist in these economies. Assumptions about the taxes and contributions: all the taxes and contributions recorded are those paid in the second year of operation (calendar year 2014). A tax or contribution is considered distinct if it has a different name or is collected by a different agency. Taxes and contributions with the same name and agency, but charged at different rates depending on the business, are counted as the same tax or contribution; the number of times the company pays taxes and contributions in a year is the number of different taxes or contributions multiplied by the frequency of payment (or withholding) for each tax. The frequency of payment includes advance payments (or withholding) as well as regular payments (or withholding). Refer to indicator 1.3.1 for details regarding the distance to frontier measure.

Source: World Bank, Doing Business 2016: Measuring Regulatory Quality and Efficiency. (http://www.doingbusiness.org/reports/global-reports/doing-business-2016)

2 Human capital and research

2.1 Education

2.1.1 Expenditure on education
Government expenditure on education (% of GDP) | 2012

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 (2006–14). (http://stats.uis.unesco.org)

2.1.2 Government expenditure on education per pupil, secondary
Government expenditure per pupil, secondary (% of GDP per capita) | 2012

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 (2006–14). (http://stats.uis.unesco.org)

2.1.3 School life expectancy
School life expectancy, primary to tertiary education (years) | 2013

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 (2006–14). (http://stats.uis.unesco.org)

2.1.4 Assessment in reading, mathematics, and science
PISA average scales in reading, mathematics, and science[a] | 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 2015 report.

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

2.1.5 Pupil-teacher ratio, secondary
Pupil-teacher ratio, secondary[a,b] | 2014

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 (2007–14). (http://stats.uis.unesco.org)

2.2 Tertiary education

2.2.1 Tertiary enrolment
School enrolment, tertiary (% gross)[a] | 2013

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 (2007–14). (http://stats.uis.unesco.org)

2.2.2 Graduates in science and engineering
Tertiary graduates in science, engineering, manufacturing, and construction (% of total tertiary graduates) | 2013

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

Source: UNESCO Institute for Statistics, UIS online database (2006–14). (http://stats.uis.unesco.org)

2.2.3 Tertiary inbound mobility
Tertiary inbound mobility ratio (%)[a] | 2013

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 (2006–14). (http://stats.uis.unesco.org)

2.3 Research and development (R&D)

2.3.1 Researchers
Researchers, full-time equivalence (FTE) (per million population) | 2014

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 (2007–14). (http://stats.uis.unesco.org)

2.3.2 Gross expenditure on R&D (GERD)
GERD: Gross expenditure on R&D (% of GDP) | 2014

Total domestic intramural expenditure on R&D during a given period as a percent-

age 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 (2007–15). (http://stats.uis. unesco.org)

2.3.3 Global R&D companies, average expenditure top 3
Average expenditure of the top 3 global companies by R&D, mn $US* | 2013

Average expenditure on R&D of the top three global companies. If a country has fewer than three global companies listed, the figure is either the average of the sum of the two companies listed or the total for a single listed company. A score of zero is given to countries with no listed companies.

Source: EU JRC Industrial R&D Investment Scoreboard 2014. (http://iri.jrc.ec.europa.eu/ scoreboard14.html)

2.3.4 QS university ranking average score of top 3 universities.
Average score of the top 3 universities at the QS world university ranking* | 2015

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 2015/2016, Top Universities. (http://www.topuniversities. com/university-rankings/world-university-rankings/2015)

3   Infrastructure

3.1   Information and communication technologies (ICTs)

3.1.1   ICT access
ICT access index* | 2015

The ICT access index is a composite index that weights five ICT indicators (20% each): (1) Fixed telephone subscriptions per 100 inhabitants; (2) Mobile cellular telephone subscriptions per 100 inhabitants; (3) International Internet bandwidth (bit/s) per Internet user; (4) Percentage of households with a computer; and (5) Percentage of households with Internet

access. It is the first sub-index in ITU's ICT Development Index (IDI).

Source: International Telecommunication Union, Measuring the Information Society 2015, ICT Development Index 2015. (http:// www.itu.int/en/ITU-D/Statistics/Documents/ publications/misr2015/MISR2015-w5.pdf)

3.1.2   ICT use
ICT use index* | 2015

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 2015, ICT Development Index 2015. (http:// www.itu.int/en/ITU-D/Statistics/Documents/ publications/misr2015/MISR2015-w5.pdf)

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), togeth-

er 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 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)[a] | 2013

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 (IEA) World Energy Balances on-line data service, 2015 edition (2013–14). (http://www.iea.org/statistics/)

3.2.2 Logistics performance
Logistics Performance Index*[a] | 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) | 2015

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 Database, October 2015 (PPP$ GDP). (http://www.imf.org/external/pubs/ft/weo/2015/02/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) | 2013

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 (IEA) World Energy Balances on-line data service, 2015 edition (2013–14). (http://www.iea.org/statistics/)

3.3.2 Environmental performance
Environmental Performance Index* | 2015

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 2016. (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)[a] | 2014

ISO 14001:2015 sets out the criteria for an environmental management system and can be certified to. It maps out a framework that a company or organization can follow to set up an effective environmental management system. It can be used by any organization regardless of its activity or sector. Using ISO 14001:2015 can provide assurance to company management and employees as well as external stakeholders that environmental impact is being measured and improved. 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. 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 161 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.

Note: ISO 14001 Environmental Management Systems has recently been revised. Information about the key changes is available at http://www.iso.org/iso/home/standards/management-standards/iso14000/iso14001_revision.htm.

Source: International Organization for Standardization, The ISO Survey of Management System Standard Certifications 2014; International Monetary Fund, World Economic Outlook 2015 database, October 2015 (PPP$ GDP) (2013–14). (http://www.iso.org; http://www.imf.org/external/pubs/ft/weo/2015/02/weodata/weoselgr.aspx)

4 Market sophistication

4.1 Credit

4.1.1 Ease of getting credit
Ease of getting credit (distance to frontier)* | 2015

The ranking of economies on the ease of getting credit is determined by sorting their distance to frontier scores for getting credit. These scores are the distance to frontier score for the sum of the strength of legal rights index (range 0–10); and the depth of credit information index (range 0–8). *Doing Business* measures the legal rights of borrowers and lenders with respect to secured transactions through one set of indicators and the reporting of credit information through another. The first set of indicators measures whether certain features that facilitate lending exist within the applicable collateral and bankruptcy laws. The second set measures the coverage, scope and accessibility of credit information available through credit reporting service providers such as credit bureaus or credit registries. Although *Doing Business* compiles data on getting credit for public registry coverage (% of adults) and for private bureau coverage (% of adults), these indicators are not included in the ranking. Refer to indicator 1.3.1 for details regarding the distance to frontier measure.

Source: World Bank, Doing Business 2016: Measuring Regulatory Quality and Efficiency. (http://www.doingbusiness.org/reports/global-reports/doing-business-2016)

4.1.2 Domestic credit to private sector
Domestic credit to private sector (% of GDP) | 2014

Domestic credit to private sector refers to financial resources provided to the private sector by financial corporations, such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries these claims include credit to public enterprises. The financial corporations include monetary authorities and deposit money banks, as well as other financial corporations where data are available (including corporations that do not accept transferable deposits but do incur such liabilities as time and savings deposits). Examples of other financial corporations are finance and leasing companies, money lenders, insurance corporations, pension funds, and foreign exchange companies.

Source: International Monetary Fund, International Financial Statistics and data files; and World Bank and OECD GDP estimates; extracted from the World Bank's World Development Indicators database (2006–14). (http://data.worldbank.org/)

4.1.3 Microfinance institutions' gross loan portfolio
Microfinance institutions: Gross loan portfolio (% of GDP) | 2014

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 database, October 2015 (current US$ GDP) (2007–14). (https://reports.mixmarket.org/crossmarket; http://www.imf.org/external/pubs/ft/weo/2015/02/weodata/weoselgr.aspx)

4.2 Investment

4.2.1 Ease of protecting minority investors
Ease of protecting minority investors (distance to frontier)* | 2015

The ranking is the simple average of the distance to frontier scores for the extent of conflict of interest regulation index and the extent of shareholder governance index. The extent of conflict of interest regulation index measures the protection of shareholders against directors' misuse of corporate assets for personal gain by distinguishing three dimensions of regulation that address conflicts of interest: transparency of related-party transactions (extent of disclosure index), shareholders' ability to sue and hold directors liable for self-dealing (extent of director liability index), and access to evidence and allocation of legal expenses in shareholder litigation. The extent of shareholder governance index measures shareholders' rights in corporate governance by distinguishing three dimensions of good governance: shareholders' rights and role in major corporate decisions (extent of shareholder rights index); governance safeguards protecting shareholders from undue board control and entrenchment (extent of ownership and control index); and corporate transparency on ownership stakes, compensation, audits, and financial prospects (extent of corporate transparency index). The index also measures whether a subset of relevant rights and safeguards are available in limited companies. The data come from a questionnaire administered to corporate and securities lawyers and are based on securities regulations, company laws, civil procedure codes, and court rules of evidence. Refer to indicator 1.3.1 for details regarding the distance to frontier measure.

Source: World Bank, Doing Business 2016: Measuring Regulatory Quality and Efficiency. (http://www.doingbusiness.org/reports/global-reports/doing-business-2016)

4.2.2 Market capitalization
Market capitalization of listed companies (% of GDP)[a] | 2014

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.

Note: The methodology was changed for the total value of stocks traded because Standard & Poor's discontinued its *Global Stock Markets Factbook*. The current source of the data, the World Federation of Exchanges (WFE), uses a different methodology. The WFE provides data according to its membership list, available at http://www.world-exchanges.org/home/index.php/members/wfe-members.

Source: World Federation of Exchanges database; extracted from the World Bank's World Development Indicators database (2006–14). (http://data.worldbank.org/)

4.2.3 Total value of stocks traded
Stocks traded, total value (% of GDP)[a] | 2014

The value of shares traded is the total number of shares traded, both domestic and foreign, multiplied by their respective matching prices. Figures are single counted (only one side of the transaction is considered). Companies admitted to listing and admitted to trading are included in the data. Data are end-of-year values.

Note: The methodology was changed for the total value of stocks traded because Standard & Poor's discontinued its *Global Stock Markets Factbook*. The current source of the data, the World Federation of Exchanges (WFE), uses a different methodology. The WFE provides data according to its membership list, available at http://www.world-exchanges.org/home/index.php/members/wfe-members.

Source: World Federation of Exchanges database; extracted from the World Bank's World Development Indicators database (2008–14). (http://data.worldbank.org/)

4.2.4 Venture capital deals

Venture capital per investment location: Number of deals (per billion PPP$ GDP)[a] | 2015

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 2015 to 31 December 2015, with the data collected by investment location, for a total of 13,703 deals in 95 countries in 2015. The data are reported per billion PPP$ GDP.

Source: Thomson Reuters, Thomson One Banker Private Equity database; International Monetary Fund, World Economic Outlook database, October 2015 (PPP$ GDP). (http://banker.thomsonib.com; http://www.imf.org/external/pubs/ft/weo/2015/02/weodata/weoselgr.aspx)

4.3 Trade, competition, and market scale

4.3.1 Applied tariff rate, weighted mean

Tariff rate, applied, weighted mean, all products (%)[a,b] | 2013

Weighted mean applied tariff is the average of effectively applied rates weighted by the product import shares corresponding to each partner country. Data are classified using the Harmonized System of trade at the six- or eight-digit level. Tariff line data were matched to Standard International Trade Classification (SITC) revision 3 codes to define commodity groups and import weights. 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. 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. World Bank staff estimates use the World Integrated Trade Solution system, based on data from United Nations Conference on Trade and Development's Trade Analysis and Information System (TRAINS) database and the World Trade Organization's (WTO) Integrated Data Base (IDB) and Consolidated Tariff Schedules (CTS) database.

Source: World Bank, based on UNCTAD TRAINS, WTO, IDB, and UN COMTRADE databases; extracted from World Bank World Development Indicators database (2007–13). (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][†a] | 2015

Source: World Economic Forum, Executive Opinion Survey 2014–2015. (http://reports.weforum.org/global-competitiveness-report-2015-2016/)

4.3.3 Domestic market scale

Domestic market size as measured by GDP, bn PPP$ | 2014

The domestic market size is measured by gross domestic product (GDP) based on the purchasing-power-parity (PPP) valuation of country GDP, in current international dollar (billions).

Source: World Bank, International Monetary Fund, World Economic Outlook Database, 2015 (PPP$ GDP). (http://www.imf.org/external/pubs/ft/weo/2015/02/weodata/weoselgr.aspx)

5 Business sophistication

5.1 Knowledge workers

5.1.1 Employment in knowledge-intensive services

Employment in knowledge-intensive services (% of workforce) | 2014

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 2006–14); ISCO-88: 1 Legislators, senior officials and managers, 2 Professionals, 3 Technicians and associate professionals (2006–14); ISCO-68: 1 Professional, technical and related workers (category 0 Armed forces is excluded), 2 Administrative and managerial workers, 3 Clerical and related workers (years 2006–08).

Source: International Labour Organization ILOSTAT Database of Labour Statistics (2006–14). (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 programs for their permanent, full-time employees.

Source: World Bank, Enterprise Surveys (2006–15). (http://www.enterprisesurveys.org/).

5.1.3 GERD performed by business enterprise

GERD: Performed by business enterprise (% of GDP)[a] | 2014

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

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

5.1.4 GERD financed by business enterprise

GERD: Financed by business enterprise (% of total GERD)[a] | 2014

Gross expenditure on R&D financed by business enterprise as a percentage of total gross expenditure on R&D.

Source: UNESCO Institute for Statistics, UIS online database (2007–15). (http://stats.uis.unesco.org)

5.1.5 Females employed with advanced degrees

Females employed with advanced degrees, % total employed (25+ years old)[a] | 2014

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 (ISCE).

Source: International Labour Organization, ILOSTAT Annual Indicators (2009–14); and Statistics Canada, Table 282-0004; Labour Force Survey estimates (LFS) by educational attainment, sex and age group, annual, CANSIM, accessed 11 February 2016. (http://www.ilo.org/ilostat/; http://laborsta.ilo.org/; http://www5.statcan.gc.ca/)

5.2 Innovation linkages

5.2.1 University/industry research collaboration

Average answer to the survey question: In your country, to what extent do people collaborate and share ideas in between companies and universities/research institutions? [1 = not at all; 7 = to a great extent][†a] | 2015

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]† | 2015

5.2.3 GERD financed by abroad

GERD: Financed by abroad (% of total GERD) | 2014

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

5.2.4 Joint venture/strategic alliance deals

Joint ventures/strategic alliances: Number of deals, fractional counting (per billion PPP$ GDP)[a] | 2015

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 2015 to 31 December 2015, for a total of 1,512 deals announced in 2015, with firms headquartered in 92 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 1,512). The data are reported per billion PPP$ GDP.

5.2.5 Patent families filed in two offices

Number of patent families filed by residents in at least two offices (per billion PPP$ GDP)[a] | 2012

A 'patent family' is a set of interrelated patent applications filed in one or more countries or jurisdictions to protect the same invention. Patent families containing applications filed in at least two different offices is a subset of patent families where protection of the same invention is sought in at least two different countries. In this report, 'patent families data' refers to patent applications filed by residents in at least two 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. A patent 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 them to appropriate the returns from their innovative activity.

5.3 Knowledge absorption

5.3.1 Intellectual property payments

Charges for use of intellectual property n.i.e., payments (%, total trade)[a] | 2014

Charges for the use of intellectual property not included elsewhere payments (% of total trade) according to the Extended Balance of Payments Services Classification EBOPS 2010—that is, code SH Charges for the use of intellectual property not included elsewhere as a percentage of total trade. 'Total trade' is defined as the sum of total imports code G goods and code SOX commercial services (excluding government goods and services not included elsewhere) plus total exports of code G goods and code SOX commercial services (excluding government goods and services not included elsewhere), divided by 2. According to the sixth edition of the International Monetary Fund's *Balance of Payments Manual,* the item 'Goods' covers general merchandise, net exports of goods under merchanting and nonmonetary gold. The 'commercial services' category is defined as being equal to 'services' minus 'government goods and services not included elsewhere'. Receipts are between residents and nonresidents for the use of proprietary rights (such as patents, trademarks, copyrights, industrial processes and designs including trade secrets, franchises), and for licenses to reproduce or distribute (or both) intellectual property embodied in produced originals or prototypes (such as copyrights on books and manuscripts, computer software, cinematographic works, and sound recordings) and related rights (such as for live performances and television, cable, or satellite broadcast).

5.3.2 High-tech imports

High-tech net imports (% of total trade) | 2014

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.

5.3.3 ICT services imports

Telecommunications, computers, and information services imports (% of total trade) | 2014

Telecommunications, computer and information services (% of total trade) according to the Extended Balance of Payments Services Classification EBOPS 2010, coded SI: Telecommunications, computer and information services.

5.3.4 Foreign direct investment net inflows
Foreign direct investment (FDI), net inflows (% of GDP) | 2014

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

Source: International Monetary Fund, International Financial Statistics and data files, and World Bank and OECD GDP estimates; extracted from the World Bank's World Development Indicators database (2011–14). (http://data.worldbank.org/)

5.3.5 Research talent in business enterprise
Researchers in business enterprise, per thousand population (%) | 2014

Full-time equivalence (FTE) researchers in the business enterprise sector refers to 'researchers' as: professionals engaged in the conception or creation of new knowledge, products, processes, methods, and systems, as well as in the management of these projects, broken down by the sectors in which they are employed (business enterprise, government, higher education, and private non-profit organizations). In the context of R&D statistics, the business enterprise sector includes all firms, organizations, and institutions whose primary activity is the market production of goods or services (other than higher education) for sale to the general public at an economically significant price, and the private non-profit institutions mainly serving them; the core of this sector is made up of private enterprises. This also includes public enterprises.

Source: UNESCO Institute for Statistics, UIS online database (2007–14); World Population Prospects: The 2015 Revision (population). (http://stats.uis.unesco.org)

6 Knowledge and technology outputs

6.1 Knowledge creation

6.1.1 Patent applications by origin
Number of resident patent applications filed at a given national or regional patent office (per billion PPP$ GDP)[a] | 2014

'Patent' is defined in the description of indicator 5.2.5. A 'resident patent application' refers to an application filed with an IP office or an office acting on behalf of the state or jurisdiction in which the first-named applicant has residence. For example, an application filed with the Japan Patent Office (JPO) by a resident of Japan is considered a resident application for Japan. Similarly, an application filed with the European Patent Office (EPO) by an applicant who resides in any of the EPO member states, for example, Germany, is considered a resident application for that member state (Germany).

Source: World Intellectual Property Organization, WIPO Statistics Database; International Monetary Fund, World Economic Outlook Database, October 2015 (PPP$ GDP) (2010–14). (http://www.wipo.int//ipstats/; http://www.imf.org/external/pubs/ft/weo/2015/02/weodata/weoselgr.aspx)

6.1.2 PCT international applications by origin
Number of international patent applications filed by residents at the Patent Cooperation Treaty (per billion PPP$ GDP)[a] | 2015

These are the number of Patent Cooperation Treaty (PCT) international patent applications filed through the WIPO-administered Patent Cooperation Treaty in 2015. A 'PCT international application' refers to a patent application filed through the WIPO-administered Patent Cooperation Treaty (PCT) during the international phase outlined by the PCT System. The origin of PCT applications are defined by the residence of the first-named applicant. The PCT System facilitates the filing of patent applications worldwide, making it possible to seek patent protection for an invention simultaneously in each of a large number of countries by first filing a single international patent application.

Source: World Intellectual Property Organization, WIPO Statistics Database; International Monetary Fund, World Economic Outlook Database, October 2015 (PPP$ GDP) (2014–15). (http://www.wipo.int//ipstats/; http://www.imf.org/external/pubs/ft/weo/2015/02/weodata/weoselgr.aspx)

6.1.3 Utility model applications by origin
Number of utility model applications filed by residents at the national patent office (per billion PPP$ GDP) | 2014

These are the number of resident utility model applications filed at a given national or regional patent office in 2014. A 'resident UM application' refers to an application filed with an IP office of or an office acting on behalf of the state or jurisdiction in which the first-named applicant has residence. For example, an application filed with the IP office of Germany by a resident of Germany is considered a resident application for Germany. A utility model grant is a special form of patent right issued by a state or jurisdiction to an inventor or the 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 and include a shorter term of protection and less stringent patentability requirements. A utility model is sometimes referred to 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, October 2015 (PPP$ GDP) (2010–14). (http://www.wipo.int//ipstats/; http://www.imf.org/external/pubs/ft/weo/2015/02/weodata/weoselgr.aspx)

6.1.4 Scientific and technical publications
Number of scientific and technical journal articles (per billion PPP$ GDP)[a] | 2015

The number of scientific and engineering articles published in those fields, including: physics, chemistry, engineering, science technology, environmental sciences ecology, biochemistry molecular biology, mathematics, computer science, cell biology, biotechnology applied microbiology, metallurgy metallurgical engineering, veterinary sciences, meteorology atmospheric sciences, marine freshwater biology, life sciences biomedicine, dentistry oral surgery medicine, construction building technology, mathematical computational biology, evolutionary biology, general internal medicine, research experimental medicine, food science technology, plant sciences, radiology nuclear medicine medical imaging, microbiology, life sciences biomedicine, nuclear science technology, evolutionary biology, reproductive biology, and imaging science photographic technology. 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 in 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 billion 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 Database, October 2015 (PPP$ GDP). (http://thomsonreuters.com/en/products-services/scholarly-scientific-research.html; http://www.imf.org/external/pubs/ft/weo/2015/02/weodata/weoselgr.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 1996–2014*[a] | 2015

The H index is an economy's number of published articles (H) that have received at least H citations in the period 1996–2014. 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 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 (2016) SJR—SCImago Journal & Country Rank. Retrieved February 2016. (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$) | 2014

Growth of gross domestic product (GDP) per person engaged provides a measure of labor productivity (defined as output per unit of labor input). GDP per person employed is GDP divided by total employment in the economy. PPP$ GDP is converted to 1990 US$, converted at Geary Khamis PPPs.

Source: The Conference Board Total Economy Database™ Output, Labor and Labor Productivity, 1950–2015, September 2015. (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)[a] | 2014

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 2016, Entrepreneurship (2009–14). (http://www.doingbusiness.org/data/exploretopics/entrepreneurship)

6.2.3 Total computer software spending

Total computer software spending (% of GDP)[a] | 2015

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 2015 Database, October 2015 (current US$ GDP). (https://www.ihs.com/industry/economics-country-risk.html; http://www.imf.org/external/pubs/ft/weo/2015/02/weodata/weoselgr.aspx)

6.2.4 ISO 9001 quality certificates

ISO 9001 Quality management systems—Requirements: Number of certificates issued (per billion PPP$ GDP)[a] | 2014

ISO 9001:2015 sets out the criteria for a quality management system and is the only standard in the family that can be certified to (although this is not a requirement). It can be used by any organization, large or small, regardless of its field of activity. In fact, there are over 1 million companies and organizations in over 170 countries certified to ISO 9001. This standard is based on a number of quality management principles including a strong customer focus, the motivation and implication of top management, the process approach, and continual improvement. These principles are explained in more detail in the ISO 9001 Quality Management Principles. Using ISO 9001:2015 helps ensure that customers get consistent, good quality products

and services, which in turn brings many business benefits. Single-site and multiple-site certificates are not distinguished. The data are reported per billion PPP$ GDP. Refer to indicator 3.3.3 for more details.

Note: ISO 9001 Quality Management Systems has recently been revised. Information about the revision is available at http://www.iso.org/iso/home/standards/management-standards/iso_9000/iso9001_revision.htm.

Source: International Organization for Standardization (ISO), The ISO Survey of Management System Standard Certifications, 1993–2014; International Monetary Fund, World Economic Outlook database, October 2015 (PPP$ GDP) (2014). (http://www.iso.org; http://www.imf.org/external/pubs/ft/weo/2015/02/weodata/weoselgr.aspx)

6.2.5 High-tech and medium-high-tech output

High-tech and medium-high-tech output (% of total manufactures output)[a] | 2012

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 (2006–12). (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 Intellectual property receipts

Charges for use of intellectual property n.i.e., receipts (%, total trade)[a] | 2014

Charges for the use of intellectual property not included elsewhere receipts (% of total trade) according to the Extended Balance of Payments Services Classification EBOPS 2010—that is, code SH Charges for the use of intellectual property not included elsewhere as a percentage of total trade. 'Total trade' is defined as the sum of total imports code G goods and code SOX commercial services (excluding government goods

and services not included elsewhere) plus total exports of code G goods and code SOX commercial services (excluding government goods and services not included elsewhere), divided by 2. According to the sixth edition of the International Monetary Fund's *Balance of Payments Manual,* the item 'Goods' covers general merchandise, net exports of goods under merchanting and nonmonetary gold. The 'commercial services' category is defined as being equal to 'services' minus 'government goods and services not included elsewhere'. Receipts are between residents and nonresidents for the use of proprietary rights (such as patents, trademarks, copyrights, industrial processes, and designs including trade secrets, franchises), and for licenses to reproduce or distribute (or both) intellectual property embodied in produced originals or prototypes (such as copyrights on books and manuscripts, computer software, cinematographic works, and sound recordings) and related rights (such as for live performances and television, cable, or satellite broadcast).

Source: World Trade Organization, Trade in Commercial Services database, based on the sixth (2009) edition of the International Monetary Fund's Balance of Payments Manual and Balance of Payments database (2007–14). (http://stat.wto.org/StatisticalProgram/ WSDBStatProgramSeries.aspx; http://www. oecd.org/std/its/EBOPS-2010.pdf)

6.3.2 High-tech exports
High-tech net exports (% of total trade)[a] | 2014

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 (2008–14). (http://comtrade.un.org/; http://ec.europa. eu/eurostat/cache/metadata/Annexes/ htec_esms_an5.pdf)

6.3.3 ICT services exports
Telecommunications, computers, and information services exports (% of total trade)[a] | 2014

Telecommunications, computer and information services (% of total trade) according to the Extended Balance of Payments Services Classification EBOPS 2010, coded SI: Telecommunications, computer and information services.

Source: World Trade Organization, Trade in Commercial Services database, based on the sixth (2009) edition of the International Monetary Fund's Balance of Payments Manual and Balance of Payments database (2009–14). (http://stat.wto.org/StatisticalProgram/ WSDBStatProgramSeries.aspx; http://www. oecd.org/std/its/EBOPS-2010.pdf)

6.3.4 Foreign direct investment net outflows
Foreign direct investment (FDI), net outflows (% of GDP) | 2014

This refers to 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 data series shows net outflows of investment from the reporting economy to the rest of the world and is divided by GDP.

Source: World Trade Organization, Trade in Commercial Services database, based on the sixth (2009) edition of the International Monetary Fund's Balance of Payments Manual and Balance of Payments database (2010–14). (http://stat.wto.org/StatisticalProgram/ WSDBStatProgramSeries.aspx; http://www. oecd.org/std/its/EBOPS-2010.pdf)

7 Creative outputs

7.1 Intangible assets

7.1.1 Trademark application class count by origin
Number of trademark applications issued to residents at a given national or regional office (per billion PPP$ GDP) | 2014

The count of trademark applications is based on the total number of goods and services classes specified in resident trademark applications filed at a given national or regional office in 2015. Data refer to trademark application class counts—the number of classes specified in resident trademark applications—and include those filed at both the national office and the regional office, where applicable. Data are scaled by PPP$ GDP (billions). A 'trademark' is a sign used by the owner of certain products or provider of certain services to distinguish them from the products or services of other companies. A trademark can consist of words and/or combinations of words, such as slogans, names, logos, figures and images, letters, numbers, sounds and moving images, or a combination

thereof. The procedures for registering trademarks are governed by the legislation and procedures of national and regional IP offices. Trademark rights are limited to the jurisdiction of the IP office that registers the trademark. Trademarks can be registered by filing an application at the relevant national or regional office(s) or by filing an international application through the Madrid System. A resident trademark application is one that is filed with an IP office or an office acting on behalf of the state or jurisdiction in which the applicant has residence. For example, an application filed with the Japan Patent Office (JPO) by a resident of Japan is considered a resident application for Japan. Similarly, an application filed with the Office for Harmonization in the Internal Market (OHIM) by an applicant who resides in any of the EU member states, such as France, is considered a resident application for that member state (France).

Source: World Intellectual Property Organization, WIPO Statistics Database; International Monetary Fund, World Economic Outlook Database, October 2015 (PPP$ GDP) (2010–14). (http://www.wipo.int//ipstats/; http://www.imf.org/external/pubs/ft/ weo/2015/02/weodata/weoselgr.aspx)

7.1.2 Industrial designs by origin
Number of designs contained in industrial design applications filed at a given national or regional office (per billion PPP$ GDP)[a] | 2014

This indicator refers to the number of designs contained in industrial design applications filed at a given national or regional office in 2014. Data refer to industrial design application design counts—the number of designs contained in applications—and include designs contained in resident industrial design applications filed at both the national office and at the regional office, where applicable. 'Resident design counts' refers to the number of designs contained in applications filed with the IP office of or at an office acting on behalf of the state or jurisdiction in which the applicant has residence. For example, an application filed with the Japan Patent Office (JPO) by a resident of Japan is considered a resident application for Japan. Similarly, an application filed with OHIM by an applicant who resides in any of the OHIM member state, such as Italy, is considered as a resident application for that member state (Italy).

Source: World Intellectual Property Organization, WIPO Statistics Database; International Monetary Fund, World Economic Outlook Database, October 2015 (PPP$ GDP) (2010–14). (http://www.wipo.int/ipstats/; http://www.imf.org/external/pubs/ft/weo/2015/02/weodata/weoselgr.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]† | 2015

Source: World Economic Forum, Executive Opinion Survey 2014–2015. (http://reports.weforum.org/global-competitiveness-report-2015-2016/)

7.1.4 ICTs and organizational model 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 companies? [1 = not at all; 7 = to a great extent]† | 2015

Source: World Economic Forum, Executive Opinion Survey 2014–2015. (http://reports.weforum.org/global-competitiveness-report-2015-2016/)

7.2 Creative goods and services

7.2.1 Cultural and creative services exports

Cultural and creative services exports (% of total trade)[a] | 2014

Creative services exports (% of total exports) according to the Extended Balance of Payments Services Classification EBOPS 2010—that is, EBOPS code SI3 Information services; code SJ22 Advertising, market research, and public opinion polling services; code SK1 Audiovisual and related services; and code SK24 Other personal cultural and recreational services as a percentage of total trade. The score for the United States of America (USA) includes the category Movies & TV programming in the absence of available data for code SK1 Audiovisual and related services. The category Movies & TV programming is specific to the USA in BPM6 statistics and does not have a code.

Source: World Trade Organization, Trade in Commercial Services database, based on the sixth (2009) edition of the International Monetary Fund's Balance of Payments Manual and Balance of Payments database (2011–14). (http://stat.wto.org/StatisticalProgram/WSDBStatProgramSeries.aspx; http://www.oecd.org/std/its/EBOPS-2010.pdf)

7.2.2 National feature films produced

Number of national feature films produced (per million population 15–69 years old)[a] | 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 newsreels 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 2015 Revision (population) (2006–13). (http://stats.uis.unesco.org; http://esa.un.org/unpd/wpp/)

7.2.3 Global entertainment and media market

Global entertainment and media market (per thousand population 15–69 years old)*[a] | 2014

The Global entertainment and media outlook (the Outlook) provides a single comparable source of five-year forecast and five-year historic consumer and advertiser spending data and commentary, for 13 entertainment and media segments, across 61 countries. The data and intuitive online functionality allows one to easily browse, compare and contrast spending, and create charts and graphs. The segments covered by the Outlook are book publishing, business-to-business, filmed entertainment, Internet access, Internet advertising, magazine publishing, music, newspaper publishing, out-of-home advertising, radio, TV advertising, TV subscriptions and license fees, and video games. The score and rankings for the Global Media Expenditures for the 60 countries considered in the Outlook report are based on advertising and consumer digital and non-digital data in US$ millions at average 2014 exchange rates for the year 2014. These results are reported normalized per thousand population, 15–69 years old, for the year 2014. The figures for Algeria, Bahrain, Jordan, Kuwait, Lebanon, Morocco, Oman, and Qatar 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, 2015–2019; United Nations, Department of Economic and Social Affairs, Population Division, World Population Prospects: The 2015 Revision (population). (http://www.pwc.com/outlook; http://stats.uis.unesco.org; http://esa.un.org/unpd/wpp/)

7.2.4 Printing and publishing output

Printing and publishing manufactures output (% of manufactures total output) | 2012

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 (INDSTAT2 2015) (2006–12). (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) | 2014

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 G goods and code SOX commercial services (excluding government goods and services not included elsewhere) plus total exports of code G goods and code SOX commercial services (excluding government goods and services not included elsewhere), divided by 2. According to the sixth edition of the International Monetary Fund's *Balance of Payments Manual,* the item 'Goods' covers general merchandise, net exports of goods under merchanting and non-monetary gold. The 'commercial services' category is defined as being equal to 'services' minus 'government goods and services not included elsewhere'.

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 sixth (2009) edition of the International Monetary Fund's Balance of Payments Manual and Balance of Payments database (2011–14). (http://unctadstat.unctad.org/; http://www.uis.unesco.org/culture/Documents/framework-cultural-statistics-culture-2009-en.pdf; http://stat.wto.org/StatisticalProgram/WSDBStatProgramSeries.aspx)

7.3 Online creativity

7.3.1 Generic top-level domains (gTLDs)

Generic top-level domains (gTLDs) (per thousand population 15–69 years old) | 2015

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 2015, 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 2015 Revision (population). (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) | 2015

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 2015, existing domains + new registra-

tions – 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, Finland fi, Iceland is, India in, Iran ir, Italy it, Latvia lv, Mauritius mu, Moldova md, Mongolia mn, Montenegro me, Nicaragua ni, Serbia rs, Slovenia si, Spain es, and Switzerland ch (this list is based on 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 2015 Revision (population). (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). (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) | 2015

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. 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 2015 Revision (population). (http://www.youtube.com; http://esa.un.org/unpd/wpp/Excel-Data/population.htm; http://www.comscore.com/Industries/Media)