



# **METHODOLOGICAL ANNEX**

## Symbols and abbreviations

### Country codes

BE	Belgium	EU	European Union
BG	Bulgaria	IS	Iceland
CZ	Czech Republic	NO	Norway
DK	Denmark	CH	Switzerland
DE	Germany	ME	Montenegro
EE	Estonia	MK	The former Yugoslav Republic of Macedonia
IE	Ireland	AL	Albania
EL	Greece	RS	Serbia
ES	Spain	TR	Turkey
FR	France	BA	Bosnia and Herzegovina
HR	Croatia	MD	Moldova
IT	Italy	UA	Ukraine
CY	Cyprus	AM	Armenia
LV	Latvia	GE	Georgia
LT	Lithuania	IL	Israel
LU	Luxembourg	TN	Tunisia
HU	Hungary	ERA	European Research Area
MT	Malta	US	United States
NL	Netherlands	JP	Japan
AT	Austria	CN	China
PO	Poland	KR	South Korea
PT	Portugal	RU	Russian Federation
RO	Romania	IN	India
SI	Slovenia	BR	Brazil
SK	Slovakia	ZA	South Africa
FI	Finland	Row	Rest of the World
SE	Sweden		
UK	United Kingdom		

### Other abbreviations

- : 'not available'
- 'not applicable' or 'real zero' or 'zero by default'

## Science, Research and Innovation performance report

### Gross domestic product

*Definition:* Gross domestic product (GDP) data have been compiled in accordance with the European System of Accounts (ESA 2010).

*Source:* Eurostat

### Purchasing Power Standards (PPS)

*Definition:* Financial aggregates are sometimes expressed in Purchasing Power Standards (PPS), rather than in euro based on exchange rates. PPS are based on comparisons of the prices of representative and comparable goods or services in different countries in different currencies on a specific date.

*Source:* Eurostat

### Value Added

*Definition:* Value added is current gross value added measured at producer prices or at basic prices, depending on the valuation used in the national accounts. It represents the contribution of each industry to GDP.

*Sources:* Eurostat, OECD

### Venture capital

*Definition:* Venture capital is a form of private equity (equity investment into private companies not listed on the stock exchange) focused on start-up companies. It can be classified in three different stages:

*Seed:* Funding provided before the recipient company has started mass production and distribution, generally contributing to achieve a clear definition of the product.

*Start-up:* Funding provided to companies to start mass production and distribution to allow coverage of initial capital expenditure. This

stage of funding is provided once the product or service is already defined.

*Later-stage:* Funding provided for an operating company.

Venture capital figures provided in the report are **market statistics**, i.e. the aggregation is made according to the location of the recipient company regardless of the location of the source of funds.

*Source:* Invest Europe

### Investments in Information and Communication Technology (ICT)

*Definition:* ICT investment is defined as the acquisition of equipment and computer software that is used in production for more than one year. ICT has three components: information technology equipment (computers and related hardware); communications equipment; and software.

*Source:* OECD, DG JRC

### Multi-factor productivity (MFP) (or Total factor productivity – TFP)

*Definition:* Multi-factor productivity (MFP) relates a change in output to several types of inputs, notably labour and capital. It is a measure of the efficiency in the combination of production resources in output creation. MFP is often measured residually, as that change in output that cannot be accounted for by the change in combined inputs.

*Source:* OECD, Eurostat

### Labour share

*Definition:* The labour share is the part of national income which is allocated to labour income. It relates to the capital share, the part of national income which goes to capital.

*Source:* OECD

## Gini coefficient

*Definition:* The Gini coefficient is a measure of dispersion of the income distribution of a country to capture inequality.

## Economic competences

*Definition:* Economic competences are a category of intangible assets that include investments in brand equity, firm-specific human capital, organisational capital and market research.

*Source:* Corrado et al (2005)

## R&D intensity

*Definition:* Gross domestic expenditure on R&D (GERD) as % of gross domestic product (GDP).

*Source:* Eurostat, OECD

## Gross domestic expenditure on R&D

*Definition:* Gross domestic expenditure on R&D (GERD) is defined according to the OECD Frascati Manual definition. GERD can be broken down by four sectors of performance:

- ▶ (i) Business enterprise expenditure on R&D (BERD);
- ▶ (ii) Government intramural expenditure on R&D (GOVERD);
- ▶ (iii) Higher education expenditure on R&D (HERD);
- ▶ (iv) Private non-Profit expenditure on R&D (PNPERD).

GERD can also be broken down by four sources of funding:

- ▶ (i) Business enterprise;
- ▶ (ii) Government;
- ▶ (iii) Other national sources;
- ▶ (iv) Abroad.

*Source:* Eurostat, OECD

## Public expenditure on R&D

*Definition:* For the purposes of this publication, public expenditure on R&D is defined as

government intramural expenditure on R&D (GOVERD) plus higher education expenditure on R&D (HERD).

*Source:* Eurostat, OECD

## Business R&D intensity

*Definition:* Business enterprise expenditure on R&D (BERD) as % of gross domestic product (GDP).

*Sources:* Eurostat, OECD

## Inward BERD

*Definition:* The indicator refers to the R&D expenditures of foreign-owned firms.

## Public R&D intensity

*Definition:* Public expenditure on R&D (GOVERD plus HERD) as % of GDP.

*Source:* Eurostat, OECD

## Government budget appropriations for R&D

*Definition:* Government budget appropriations for R&D (GBARD) encompass all R&D spending allocations met from sources of government revenue foreseen within the budget.

*Source:* Eurostat

## Tax incentives for R&D

*Definition:* Governments in many countries provide tax support for R&D with the aim of promoting R&D investment in the economy by granting preferential tax treatment of eligible R&D expenditures, especially to business enterprises. Tax incentives reduce the amount of tax owed by business enterprises. The extent to which business enterprises can reduce their tax liability may be related to the amount of eligible R&D expenditures incurred in the reference period. In general, tax incentives can take the form of a tax allowance, an exemption, a deduction or a credit. Tax allowances,

exemptions and deductions are subtracted from the tax base before the tax liability is computed – they reduce the taxable amount before assessing the tax. A tax credit is an amount subtracted directly from the tax liability due from a business enterprise after the liability has been computed.

*Source:* OECD

## Framework Programme

*Definition:* The Framework Programme for Research and Technological Development is the EU's main instruments for supporting collaborative research, development and innovation in science, engineering and technology. The first Framework Programme was launched in 1984. The eight Framework Programme, known as Horizon 2020 (H2020) covers the period 2014–2020.

*Source:* DG Research and Innovation

## Structural Funds

*Definition:* Structural Funds are funds intended to facilitate structural adjustment of specific sectors, regions, or combinations of both, in the European Union. Structural Funds for RTDI include data from sectors involving research and development, technological innovation, entrepreneurship, innovative ICT and human capital.

*Source:* DG REGIO

## The NUTS classification of regions

*Definition:* The nomenclature of statistical territorial units (NUTS) is a single coherent system for dividing up the European Union's territory in order to produce regional statistics for the Community. NUTS subdivides each Member State into a whole number of regions at NUTS 1 level. Each of these is then subdivided into regions at NUTS level 2 and these in turn into regions at NUTS level 3.

*Source:* Eurostat

## High-tech and medium-high-tech manufacturing

*Definition:* High-tech manufacturing (HT) includes the following sectors (NACE Rev.2 codes – 2 digit level are given in brackets): manufacture of basic pharmaceutical products and pharmaceutical preparations (C21), manufacture of computer, electronic and optical products (C26). Medium-high-tech manufacturing includes the following sectors (NACE Rev. 2 codes – 2 digit level are given in brackets): manufacture of chemicals and chemical products (C20), manufacture of electrical equipment (C27), manufacture of machinery and equipment (C28), manufacture of motor vehicles, trailers and semi-trailers (C29), manufacture of other transport equipment (C30).

*Source:* Eurostat

## Knowledge-Intensive Activities (KIAs)

*Definition:* Knowledge-Intensive Activities (KIAs) are defined as economic sectors in which more than 33% of the employed labour force has completed academic-oriented tertiary education (i.e. at ISCED 5 and 6 levels). They cover all sectors in the economy, including manufacturing and services sectors, and can be defined at two and three-digit levels of the statistical classification of economic activities.

*Source:* Eurostat

## Knowledge-Intensive Services (KIS)

*Definition:* Knowledge-intensive services (KIS) includes the following sectors (NACE Rev.2 codes are given in brackets): water transport (H50), air transport (H51), information and communication (J), financial and insurance activities (K), professional, scientific and technical activities (M), employment activities (N78), public administration and defence; compulsory social security (O), education (P), human health and social work activities (Q), arts, entertainment and recreation (R).

*Source:* Eurostat, OECD

## Knowledge-Intensive Services exports

*Definition:* Exports of knowledge-intensive services are measured by the sum of credits in EBOPS (Extended Balance of Payments Services Classification) 207, 208, 211, 212, 218, 228, 229, 245, 253, 260, 263, 272, 274, 278, 279, 280, 284.

*Source:* UN

## Higher Education

ISCED (International Standard Classification of Education)

ISCED 5: Tertiary education (first stage) not leading directly to an advanced research qualification.

ISCED 5A: Tertiary education programmes with academic orientation.

ISCED 5B: Tertiary education programmes with occupation orientation.

ISCED 6: Tertiary education (second stage) leading to an advanced research qualification (PhD or doctorate).

*Source:* Eurostat

## Human Resources for Science and Technology (HRST), R&D personnel and researchers

The Canberra Manual proposes a definition of HRST as people who either have higher education or are employed in positions that normally require such education. HRST applies to people who fulfil one or other of the following conditions:

- ▶ a) Have successfully completed education at the tertiary level in an S&T field of study (HRSTE - Education);
- ▶ b) Not formally qualified as above, but employed in an S&T occupation where the above qualifications are normally required (HRSTO - Occupation).

HRST Core (HRSTC) refers to people with both tertiary-level education and an S&T occupation.

Scientists and engineers are defined as ISCO<sup>1</sup> categories 21 (physical, mathematical and engineering science professionals) and 22 (life science and health professionals).

The Frascati Manual proposes the following definitions of R&D personnel and researchers:

- ▶ R&D personnel: "R&D personnel in a statistical unit include all persons engaged directly in R&D, whether employed by the statistical unit or external contributors fully integrated into the statistical unit's R&D activities, as well as those providing direct services for the R&D activities (such as R&D managers, administrators, technicians and clerical staff).";
- ▶ Researchers: "Researchers are professionals engaged in the conception or creation of new knowledge. They conduct research and improve or develop concepts, theories, models, techniques instrumentation, software or operational methods.". R&D may be either the primary function or a secondary function. It may also be a significant part-time activity.

Therefore, the measurement of personnel employed in R&D involves two exercises:

- ▶ Measuring their number in headcounts (HC) whereby the total number of people who are mainly or partially employed in R&D are counted;
- ▶ Measuring their R&D activities in full-time equivalence (FTE): the number of people engaged in R&D is expressed in full-time equivalents on R&D activities (= person-years).

*Source:* Eurostat

## Job-to-job mobility

*Definition:* Mobility (job-to-job mobility) of employed HRST is built up by considering the number of HRST employed in the years T-1 and T, that have changed jobs during the

1 International Standard Classification of Occupations

twelve month period. It is expressed as a proportion of the total number of HRST employed in year T.

*Source:* Eurostat

## Public and Private sector researchers

*Definition:* For the purposes of this publication, Public sector researchers refer to researchers in the government and higher education sectors. Private sector researchers refer to researchers in the business enterprise and private non-profit sectors.

*Source:* Eurostat, OECD

## Patent Cooperation Treaty (PCT) Patents

*Definition:* The Patent Cooperation Treaty (PCT) is an international treaty, administered by the World Intellectual Property Organization (WIPO), signed by 133 Paris Convention countries. The PCT makes it possible to seek patent protection for an invention simultaneously in each of a large number of countries by filing a single “international” patent application instead of filing several separate national or regional applications. Indicators based on PCT applications are relatively free from the “home advantage” bias (proportionate to their inventive activity, domestic applicants tend to file more patents in their home country than non-resident applicants). The granting of patents remains under the control of the national or regional patent offices. The PCT patents considered are ‘PCT patents, at international phase, designating the European Patent Office’. The country of origin is defined as the country of the inventor. If one application has more than one inventor, the application is divided equally among all of them and subsequently among their countries of residence, thus avoiding double counting.

*Source:* OECD

## Scientific Publications

*Definition:* Scientific publications (articles and reviews only) published by the unit of analysis included in the Web of Science database. Several counting methods can be applied in the calculation of bibliometric indicators. For instance, when author affiliations in a publication involve several countries, the publication count per country can be done assigning a complete publication to each country participating in the publication (full counting), or another option could be to fractionalise the publication according to the total number of different countries (fractional counting).

*Source:* CWTS based on Web of Science database; treatments and calculations: CWTS

## Public-Private co-publications

*Definition:* Number of public-private co-authored research publications. For the calculation of this indicator CWTS identifies and classifies author affiliations belonging to the private sector. The ‘private sector’ is delineated as for-profit business companies, but excluding private-sector education institutions and hospitals/clinics. Most of the private sector organisations therefore operate in manufacturing industries. Any publication with the participation of a ‘private sector’ organisation in collaboration with at least another organisation non-classified as being part of the ‘private sector’, will be considered a ‘public-private co-publication’. The public-private co-publication has been assigned to the location/s of the business company(ies).

*Source:* CWTS based on Web of Science database

## Citations and highly cited publications

*Definition:* Scientific [citation](#) is providing detailed reference in a scientific publication, typically a [paper](#) or book, to previously published (or occasionally private) paper. The citation count includes the number of times the publication was



cited by specific articles from the journals that the CWTS publication-based classification system covers. The first indicator most used in this report refers to the scientific publications within the 10% (or 1%) most cited scientific publications worldwide as percentage of total scientific publications of the country. The second indicator refers to the world share of highly-cited scientific publications and examine the scientific publications within the 1% (or 10%) most cited scientific publications worldwide as % of total scientific publications of the country.

An important methodological aspect regarding the citation indicators (both citations and highly cited publications) has to do with the normalisation of citation counts by scientific field. The normalisation is based on the CWTS publication-based classification system, which leads to much more fine-grained delineation of fields than Web of Science classification scheme and therefore more accurate citation impact scores. The classification is an in-house developed and it is publicly available (through <http://www.leidenranking.com>).

*Source:* CWTS based on Web of Science database

### Open access publications

*Definition:* There is no commonly agreed definition on open access publication. However, the definition developed at the Budapest Open Access Initiative (2002) is often used as a reference:

'Free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. The only constraint on reproduction and distri-

bution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited.'

*Source:* Science-Metrics [Archambault, E; Amyot, D; Deschamps, P; Nivoli, A; Provencher, F; Rebout, L; Roberge, G (2014) Proportion of Open Access papers published in peer-reviewed journals at the European and World levels-1996-2013]

In this report, the two main Open Access categories ('Gold' and 'Green') are considered. A publication is categorise as Gold Open Access if it is published in journals included in the Directory of Open Access Journals (DOAJ), complemented with other Gold Open Access journal lists like CrossRef, etc. For the Green Open Access publications, a 'harvester' approach will be developed and implemented at CWTS, able to collect scientific publications from open directories and repositories.

### Gold open access

Open access publishing - payment of publication costs is shifted from readers (via subscriptions) to authors. These costs are usually borne by the university or research institute to which the researcher is affiliated, or by the funding agency supporting the research.

### Green open access

Self-archiving: the published article or the final peer-reviewed manuscript is archived by the researcher in an online repository before, after or alongside its publication. Access to this article is often delayed ('embargo period') at the request of the publisher so that subscribers retain an added benefit.

*Source:* CWTS based on Web of Science database

## Innovation Output Indicator

$$I = w_1 \times \text{PCT} + w_2 \times \text{KIA} + w_3 \times \text{COMP} + w_4 \times \text{DYN}$$

where

PCT = Number of patent applications filed under the Patent Cooperation Treaty per billion GDP; Patent counts are based on the priority date, the inventor's country of residence and fractional counts (Eurostat/OECD).

KIA = Employment in knowledge-intensive activities in business industries (including financial services) as % of total employment; Knowledge-intensive activities are defined, based on EU Labour Force Survey data, as all NACE Rev.2 industries at 2-digit level where at least 33 % of employment has a higher education degree (ISCED5 or ISCED6) (Eurostat).

$$\text{COMP} = 0.5 \times \text{GOOD} + 0.5 \times \text{SERV}$$

GOOD = High-tech and medium-high-tech products exports as % of total exports (Eurostat (COM-EXP)/UN(Comtrade))

SERV = Knowledge-intensive services exports as % of total service exports (exports of knowledge-intensive services are measured by the sum of credits in EBOPS (Extended Balance of Payments Services Classification) 207, 208, 211, 212, 218, 228, 229, 245, 253, 260, 263, 272, 274, 278, 279, 280 and 284 (UN/Eurostat))

DYN = Employment in fast-growing firms in innovative business industries, excluding financial services

$$\sum_s (CIS^{score} \times KIA^{score})_s \frac{E_{sC}^{HG}}{E_C^{HG}}$$

where

$(CIS^{score} \times KIA^{score})_s$  = Innovation coefficient of sector  $s$ , resulting from the product of Community Innovation Survey and Labour Force Survey scores for each sector at EU level.

$E_{sC}^{HG}$  = The employment in fast-growing firms in sector  $s$  and country  $C$ .

$E_C^{HG}$  = The employment in fast-growing firms in country  $C$ .

$w_1, w_2, w_3, w_4$  = The weights of the component indicators, fixed over time, and statistically computed in such a way that the component indicators are equally balanced.

Source: DG Research and Innovation – Unit for the Analysis and Monitoring of National Research and Innovation Policies

## Community Trademark System (CTM)

*Definition:* The Community trade mark system allows the uniform identification of products and services by enterprises throughout the EU. A unique procedure applied by the Office for Harmonization in the Internal Market (OHIM) allows them to register trademarks which will benefit from unitary protection and be fully applicable in every part of the Community. The CTM system is unitary in character. A CTM registration is enforceable in all member states.

*Source:* OHIM

## Community Design System (CD)

*Definition:* A design is the outward appearance of a product or part of it, resulting from the lines, contours, colours, shape, texture, materials and/or its ornamentation. The design or shape of a product can be synonymous with the branding and image of a company and can become an asset with increasing monetary value. A registered Community design (RCD) is an exclusive right that covers the outward appearance of a product or part of it. Community Trademarks and Design refer to trade mark and design protections throughout the European Union, which covers 28 countries. The Office for Harmonization in the Internal Market (OHIM) is the official office of the European Union for the registration of Community Trademarks and Designs.

*Source:* OHIM

## Small and medium-size enterprises (SMEs)

*Definition:* Small and medium-size enterprises (SMEs) are defined as enterprises having fewer than 250 employees.

*Source:* Eurostat, OECD

## High-growth enterprise

*Definition:* A high-growth enterprise (growth by 20 % or more) is an enterprise with an average

annualised growth greater than 20% per year over a three-year period. Growth can be measured by the number of employees or by turnover.

A high-growth enterprise (growth by 10 % or more) is an enterprise with average annualised growth in number of employees greater than 10% per year over a three-year period ( $t - 3$  to  $t$ ) and having at least 10 employees in the beginning of the growth ( $t - 3$ ).

*Source:* Eurostat

## Gazelle

*Definition:* A gazelle is a high-growth enterprise that is up to 5 years old.

*Source:* Eurostat

## Unicorn company

*Definition:* A unicorn is a private company with a post-money (i.e. "after funding") valuation at more than US\$ 1bn.

*Source:* Based on CrunchBase

## Innovative enterprises

*Definition:* These are enterprises that introduce new or significantly improved products (goods or services) to the market or those that implement new or significantly improved processes. Innovations are based on the results of new technological developments, new combinations of existing technology, or the use of other knowledge acquired by the enterprise.

Product innovative enterprises are those who introduced new or significantly improved goods and/or services with respect to their capabilities, user friendliness, components or sub-systems. Changes of a solely aesthetic nature and the simple resale of new goods and services purchased from other enterprises are not considered as innovation.

Process innovative enterprises implemented new or significantly improved production process, distribution method or supplying activity.

Organisational innovative enterprises implemented a new organisational method in the enterprise's business practices, workplace organisation or external relations.

Marketing innovative enterprises implemented a new marketing concept or strategy that differs significantly from enterprises' existing marketing methods and which has not been used before. It requires significant changes in product design or packaging, product placement, product promotion or pricing and excludes seasonal, regular and other routine changes in marketing methods.

*Source:* Eurostat

## Transformational entrepreneurship

*Definition:* Transformational entrepreneurship concerns those new businesses that from the onset have the ambition to become big and that provide "disproportionately large contributions to net job creation" (Haltiwanger, 2014) and that invest, proportionally, more in R&D than older ones (Surowiecki, 2016). Many times, transformational entrepreneurship is opposed to subsistence entrepreneurship, whose ambition is to gain some measure of financial independence, but not to scale up and grow in large numbers.

*Source:* Lerner, J and Stern, S (2010)

## Entrepreneurial intention

*Definition:* Percentage of population aged 18-64 who are latent entrepreneurs and intend to start a business within three years.

*Source:* Global Entrepreneurship Monitor

## Opportunity-driven entrepreneurship

*Definition:* The index is calculated as the ratio between the share of persons involved in improvement-driven entrepreneurship and the

share of persons involved in necessity-driven entrepreneurship.

*Source:* European Innovation Scoreboard 2017

## NASDAQ-100 Technology sector Index

*Definition:* equal weighted index based on the securities of the NASDAQ-100 Index that are classified as Technology according to the Industry Classification Benchmark (ICB) classification system.

*Source:* Nasdaq

## Ease of doing business

*Definition:* The Ease of doing business indicator is a composite indicator that ranks economies according to how conducive to business operation the regulatory environment is<sup>2</sup>. The index is obtained by aggregating 10 indicators covering different topics included in Doing Business by the World Bank<sup>3</sup>, namely:

1. Starting a business
2. Dealing with construction permits
3. Getting electricity
4. Registering property
5. Getting credit
6. Protecting minority investors
7. Paying taxes
8. Trading across borders
9. Enforcing contracts
10. Resolving insolvency

Overall, the index measures the time, the cost and the procedures involved in doing a business. The aggregate index and each indicator are reported as distance from the frontier on a scale 0-100, where a value of 100 represents the best possible outcome across all dimensions, therefore the higher the value, the better the performance of a country is.

<sup>2</sup> See <http://databank.worldbank.org/data/reports.aspx?source=2&type=metadata&series=IC.BUS.EASE.XQ>.

<sup>3</sup> See <http://www.doingbusiness.org/methodology>, including details on the assumptions made about the characteristics of business activities, on the limitations of using national data and on the subindicators contributing to define each of the ten indicators composing the aggregate index.

### Ease of starting a business

*Definition:* The indicator measures the costs, the time and the procedures required to start up and operate an industrial or commercial business<sup>4</sup>. It is one of the sub-indexes composing the Ease of doing business index.

### Ease of resolving insolvency

*Definition:* It measures "the time, cost and outcome of insolvency proceedings involving domestic entities as well as the strength of the legal framework applicable to judicial liquidation and reorganization proceedings"<sup>5</sup>. The time needed for creditors to recover their credit is expressed in calendar days, the cost is expressed as a share of the value of the debtor's estate. It accounts for the time needed for a creditor to recover their credit measured in calendar years while the cost is expressed as a share of the value of the debtor's estate. It is one of the sub-indexes composing the Ease of doing business index.

### Ease of enforcing contracts

*Definition:* It measures the time and cost needed to resolve a commercial dispute through a local court. The implementation of good practices to improve the court system is also considered to provide an assessment of the quality of the judicial process<sup>6</sup>. It is one of the sub-indexes composing the Ease of doing business index.

Source: World Bank

### The Global Competitiveness Index

*Definition:* The Global Competitiveness Index (GCI) is produced by the World Economic Forum as a summary measure of the competitiveness of economies. In particular, competitiveness is defined as "the set of institutions, policies, and factors that determine the level of productivity of a country"<sup>7</sup>. The index is obtained via the aggregation of 12 different dimensions of competitiveness and in turn each of them is composed by several indicators. Some caution needs to be taken when using these indicators, since most of them are obtained via a survey to business representatives.

Source: World Economic Forum

#### Global Competitiveness Index: public institutions

*Definition:* This index accounts for the public component of the institutions pillar, measuring the efficiency of the legal and administrative framework within business and individuals have social and economic interactions. The more efficient the public institutions are, the more the incentives for productive and growth enhancing investments in an economy. The index is constructed as a summary measure of 16 indicators representing 5 different dimensions of the quality of public institutions: Property rights (2 indicators), Ethics and corruption (3 indicators), Undue influence (2 indicators), Government efficiency (5 indicators) and Security (4 indicators).

4 See <http://www.doingbusiness.org/Methodology/Starting-a-Business>.

5 See <http://www.doingbusiness.org/Methodology/Resolving-Insolvency>.

6 See <http://www.doingbusiness.org/Methodology/Enforcing-Contracts>.

7 See <http://reports.weforum.org/global-competitiveness-index-2017-2018/appendix-a-methodology-and-computation-of-the-global-competitiveness-index-2017-2018/> for the Methodological and Computational appendix of the Index and as a technical reference for all the GCI indicators presented in this Appendix.

### **Global Competitiveness Index: government efficiency**

*Definition:* It is a sub-dimension of the public institutions index, and summarises five characteristics of the efficiency, accountability and burden of governmental provision of services: wastefulness of government spending, burden of government regulation, efficiency of legal framework in settling disputes, efficiency of legal framework in challenging regulations and transparency of government policy-making.

### **Global Competitiveness Index: goods market efficiency**

*Definition:* The index measures how efficiently good markets can produce and trade products and services. It is a summary measure of 16 indicators capturing the degree of competition, the legal and regulatory framework, taxation aspects and demand driven competitive advantage:

1. Intensity of local competition
2. Extent of market dominance
3. Effectiveness of anti-monopoly policy
4. Effect of taxation on incentives to invest
5. Total tax rate
6. Number of procedures required to start a business
7. Time required to start a business
8. Agricultural policy costs
9. Prevalence of trade barriers
10. Trade tariffs
11. Prevalence of foreign ownership
12. Business impact of rules on FDI
13. Burden of customs procedures
14. Imports as a percentage of GDP
15. Degree of customer orientation
16. Buyer sophistication

### **Global Competitiveness Index: competition environment**

*Definition:* It is a summary index of the degree of competition in an economy. While it draws from the "goods market efficiency" index of the GCI, it does not follow the original categorisation of competition which includes 14 out of 16 indicators. It is constructed by averaging three indicators only: intensity of local competition, extent of market dominance and effectiveness of anti-monopoly policy. The indicators selected above narrow the spectrum of analysis and allow for a stricter definition of competition.

### **Global Competitiveness Index: intellectual property rights protection**

*Definition:* The indicator measures the extent of protection of intellectual property rights in a country, based on a survey conducted on business representatives. It is one of the components of the public institutions index.

### **Global Competitiveness Index: labour market efficiency**

*Definition:* The index provides a measure of the efficiency and flexibility of labour markets in allocating workers to their most effective tasks in the economic system, as well in providing them with the right incentives on the job place while promoting workers performance and boosting the capacity of a country to attract and retain talents. The two sub-dimensions of the index are flexibility (5 indicators) and efficient use of talent (5 indicators).

**Global Competitiveness Index:  
ease of access to loans**

*Definition:* The indicator aims at measuring the capacity of a national financial sector to allocate resources to the investment with the higher returns to boost productivity and growth. It measures how easy is for business to have access to loans. It is part of the financial market dimension of the GCI index.

*Source:* World Economic Forum

**Summary index of single market  
integration in the EU**

*Definition:* The index provides a measure of integration of member states in the EU single market, by summarising freedoms in the Single Market, the adoption of EU legislation and comparing economic performance of member States with the overall EU economy<sup>8</sup>. It includes the following indicators:

1. Percentage of exports of goods to the EU to GDP
2. Percentage of imports of goods from the EU to GDP
3. Percentage of exports of services to the EU to GDP
4. Percentage of imports of services from the EU to GDP
5. Percentage of GDP of FDI inflow from the EU
6. Percentage of GDP of inward FDI stock from the EU
7. Percentage of GDP of outward FDI flow to the EU

8. Percentage of GDP of outward FDI stock to the EU
9. Percentage of EU Directives not implemented or implemented only partially or incorrectly into national law
10. Difference between unit nominal labour costs of Member State and the core EU average
11. Difference between per capita GDP of Member State and the core EU average 6%
12. Difference between interest rates of long-term bonds of Member State and the core EU average
13. Difference between VAT rates of Member State and the core EU average 8%
14. Difference between purchasing power in Member State and the core EU average

*Source:* LE Europe, based on Eurostat data

**Transposition deficit**

*Definition:* This index measures the share of Single Market directives non transposed in Member States over the total of directives adopted by the EU.

*Source:* Single Market Scoreboard 2017

**Compliance deficit**

*Definition:* This index measures the share of Single Market directives incorrectly transposed in Member States over the total of directives adopted by the EU.

*Source:* Single Market Scoreboard 2017

8 See [http://www.amchameu.eu/sites/default/files/amcham\\_eu\\_single\\_market\\_web.pdf](http://www.amchameu.eu/sites/default/files/amcham_eu_single_market_web.pdf).