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From: General Secretariat of the Council
To: Permanent Representatives Committee (Part 2)/Council

Subject: Monitoring Industrial Strategy - Indicator Framework regarding Industrial Competitiveness

1. In its Conclusions of 12 March 2018, the Council (Competitiveness) emphasised the need to monitor the implementation of the industrial policy objectives and the trends in the development of the EU industry by means of appropriate indicators.¹
2. The High-Level Working Group on Competitiveness and Growth (HLG) has been mandated by the Council to facilitate the establishment of a viable monitoring tool for assessing the EU's industrial competitiveness. Following this mandate, on 26 April 2018 the HLG discussed a general indicator framework, which should be considered as a contribution to work in progress regarding a fully-fledged monitoring mechanism on the basis of a paper from the Trio Presidencies (Estonia, Bulgaria, Austria).² Following this discussion, Member States also submitted comments in writing.

1 Doc. 7037/18

2 Doc. 7393/18

3. On 17 July 2018 the Trio Presidencies finalised a note reflecting as widely as possible the outcome of the extensive debate at the HLG and the feedback submitted by Member States. This note is set out in the Annex to this document.
 4. The Permanent Representatives Committee (Part 2) is therefore invited to recommend to the Council to approve, as an "A" item, the text as set out in the Annex to this document.
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MONITORING INDUSTRIAL STRATEGY -

INDICATOR FRAMEWORK REGARDING INDUSTRIAL COMPETITIVENESS

The Council welcomed the Commission`s Communication on “*Investing in a smart, innovative and sustainable Industry: A renewed EU Industrial Policy Strategy*” as a first step in the right direction³ and also emphasised the need to monitor the implementation of the industrial policy and the trends in the development of the EU industry by means of appropriate indicators.⁴ The High-Level Group on Competiveness and Growth (HLG) has been mandated by the Council to facilitate the establishment of a viable monitoring tool for assessing the EU`s industrial competitiveness.

This note provides input from the HLG for a general indicator framework and should be considered as a contribution to work in progress regarding a fully-fledged monitoring mechanism. It is structured as follows: 1. Principles, 2. Structure, 3. Proposal for Indicators. As the number of indicators used should be limited, the proposed list of indicators can only give some indications, and thus does not provide a comprehensive picture. Details and definitions are in the Annex.

1. Principles

The indicator framework shall be chosen based on existing Eurostat data and other official data sources and shall incorporate the following set of principles:

- focus on the most relevant dimensions of industrial competitiveness
- high statistical quality in terms of measurement and timeliness
- as far as data is available: focus on comparing the EU to the main global partners in addition to intra-EU comparison (may be added as a complementary element)

3 Doc. 15223/17

4 Doc. 7037/18

- also highlight areas with a need to improve competitiveness
- given its important communication role, the set of indicators shall consist of a limited number of simple and straightforward indicators.

An isolated interpretation of indicators would be misleading - especially as the ongoing digital transformation as well as automation change the nature of employment and economic growth. Meaningful conclusions can only be drawn from indicators used in combination. Therefore, the set of headline indicators should be complemented with targeted policy-related indicators. The HLG provides a proposal for a set of possible policy-related indicators, which should be regarded as a starting point for flexible future adaptations and amendments. Further efforts to improve the extra-EU comparison are urgently needed.

Considering the major role of services for the manufacturing sector (servitisation), this note also considers selected services in relevant areas. A lack of timely data on the joint-production of manufacturing and services⁵ does not allow for a direct monitoring of the role of services. Therefore, only a broad proxy for industry related services NACE/ISIC⁶ G-N (Services of the Business Economy) can be used at this stage (see table in Annex II). Further research in this area would be of utmost importance to provide for a better and more precise understanding of the increasing role of services, in order to guarantee for a viable monitoring tool, which would help to create an adequate policy response to support those structural developments. Therefore, work should continue towards a concrete conceptual base and development of proper indicators by Eurostat.

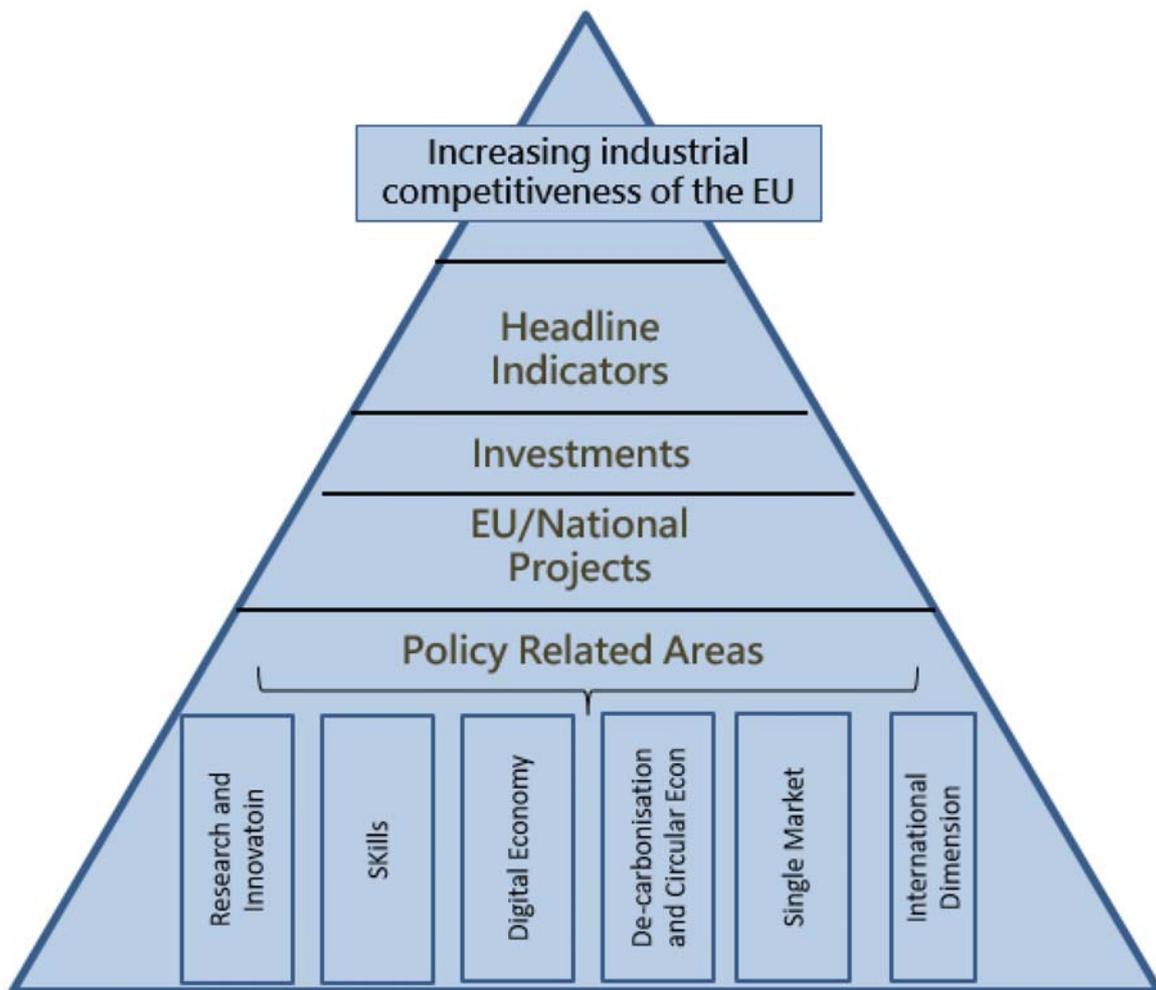
5 Data based on the World Input-Output Database (WIOD) is available only up to 2014 and thus does not meet the requirements for this exercise.

6 NACE: Nomenclature statistique des activités économiques dans la Communauté européenne
ISIC: International Standard Industrial Classification

2. Structure

We propose a multi-layered structure of indicators:

1. Headline indicators focusing on outcomes in the industrial sector
2. Investments as a key enabling factor
3. EU/national projects shall stimulate investment activities (e.g. CMU, EFSI, FP9, Cohesion Policy, IPCEIs on EU-Level.)
4. Policy related indicators to capture how the EU and its Member States perform in the areas based on the Communication on a renewed industrial policy strategy.⁷



⁷ COM (2017) 479 final

The pyramid should serve as a viable monitoring tool, which assesses the implementation of the industrial policy and the trends in the development of the EU industry. As far as data is available, the EU shall be compared with global competitors (i.e. China, USA, Japan and Korea). In order to draw profound conclusions and to keep the ongoing industrial transformation in mind, the different layers of the pyramid should complement each other.

3. List of Indicators

Based on a broad consultation with Member States, Stakeholders and the European Commission the set of indicators shall consist of the non-exhaustive list illustrated below:

I) **Headline Indicators:**

Manufacturing value added per capita (in current US-\$)
Gross value added annual % change Manufacturing (NACE/ISIC C); Services of the Business Economy (NACE/ISIC G-N)
Gross value added per person employed constant prices; % change (5-year moving average), Manufacturing (NACE/ISIC C); Services of the Business Economy (NACE/ISIC G-N)
Number of employees (domestic concept) (annual % change) Manufacturing (NACE/ISIC C), Services of the Business Economy (NACE/ISIC G-N)
Global market share of exported manufactures (%)

II) **Indicators on industry related investments**

Gross Fixed Capital Formation as a % of GDP - Total
Gross expenditure on R&D in % of GDP, Business Enterprise Sector and Total
Investment rate (investment/total value added at factor cost) in %, Manufacturing
Private gross investments in activities of circular economy sectors, % of GDP

III) Policy related Indicators

As regards the policy-related areas, the monitoring tool shall remain flexible, so as to reflect changes in the political priorities as well as the structure of the economy. We call on the European Commission to work on indicators related to current trends including digitalisation, globalisation, decarbonisation and demographics. The policy related areas shall reveal not only the strengths of the industrial sectors but - more importantly - point to the most pressing issues for the competitiveness of EU industries. A set of possible indicators for each policy area could include:

i) **Research and Innovation**

The innovation capacity is at the heart of a competitive industrial base. Besides investments in R&D (see investment-layer), access to knowledge (e.g. # of researchers), outcomes (e.g. patents, innovation of SMEs) and the degree of automatization (e.g. # industrial robot density) would serve the purpose of tracking the innovative strength of EU industries.

- **Total Researchers per 1.000 employees (total employment)**
- **Patent application (PCT) per billion GDP (in PPS €)**
- **Share of high growth enterprises in the manufacturing sector (growth by 10% or more, measured in employment)**
- **SMEs innovating in-house (relative to EU in 2010)**
- **Intellectual property products - Investments in % of total Investments**
- **ICT Investments in % of total Investments**
- **Number of installed industrial robots per 10.000 employees in the manufacturing industry**

ii) Skills

Industry relies heavily on employees with the right set of skills in order to stay competitive. The ongoing process of digitization and automatization will require a highly skilled labour force, as routine jobs will be replaced by machines/algorithms. There will be a number of new jobs and tasks in industry that are not known presently. However, STEM skills (science, technology, engineering and maths) and ICT related knowledge as well as life-long learning (LLL) will be necessary throughout production sectors to generate new, better and marketable products. Therefore, the set of indicators should track the employability of the labour force as well as employment shifts across skills levels.

- **Share of graduates in STEM (science, technology, engineering and mathematics)**
- **Adult participation in learning** (% of population aged 25 to 64)
- **Employment shifts in manufacturing by education**

iii) Digital Economy

Progress in digital technologies will continue to change the way we design, produce and commercialise products and related services. The combination of advanced sensors and big data in industrial processes will reduce energy consumption and the use of raw materials. Similarly, 3D-printing will shorten transportation routes, IoT (Internet of Things) and 5G mobile networks will trigger automated driving and efficient manufacturing. The Digital Economy and Society Index (DESI) as well as the Digital Transformation Enablers' Index (DTEI) summarise relevant indicators on digital performance. Related to industrial competitiveness the monitoring tool could include the following composite indices:

- **Digital Transformation Enablers' Index (DTEI)**
- **Human Capital/digital skills (Sub-index of DESI)**
- **Integration of digital Technology (Sub-index of DESI)**

iv) **De-carbonisation and Circular Economy**

Facing one of the megatrends of ours and next generations, climate change and sustainable development will affect the way we operate in our economy. The decarbonisation and the circular economy have the potential to substantially increase GDP and household income, while reducing CO2 emissions, by avoiding waste and increasing productivity. The opportunities from the circular economy are clear, but harnessing them is more difficult. It requires innovation by businesses, policymakers and households.

- **Air emission intensities (Greenhouse gases), kg per euro, chain linked volumes (2010), (% change) - Selected Sectors: NACE Rev. 2 C; G-N**
- **Trade in recyclable raw material (nominal % change, exports and imports)**
- **Energy productivity (GDP per Unit of TPES), %-change**
- **Eco-innovation related patents (per million population)**
- **Electricity price for medium sized industries (€/kWh)**

v) **Single Market**

A fully integrated European Single Market remains one of the key challenges to further improve standards for citizens and businesses throughout the EU. The internal Market aims at contributing to investments and economic growth, employment and reducing costs as well as the regulatory burden. The monitoring tool could track Intra-EU trade and price dispersion across Member States.

- **Intra-EU28 trade in goods and services (nominal % change, exports and imports)**
- **Intra-EU trade in intermediate goods (% share of total Intra-EU trade , imports and exports)**
- **Price dispersion across Member States**

vi) **International Dimension**

Globalisation and the growing integration of industrial value chains across borders and global regions are key to creating jobs and growth. A robust trade policy upholding an open and rules-based multilateral trading system are essential. In this respect, trade in value added and the stock of FDI (inward and outward) to measure the attractiveness as an investment location are key indicators of external competitiveness.

- **Domestic value added in gross exports (Trade in Value Added, in % of total value, change in p.p.)**
- **Stock of FDI inward, as a % of GDP (manufacturing)**
- **Stock of FDI outward, as % of GDP (manufacturing)**

Annex I to the ANNEX: RATIONALE UNDERLYING HEADLINE AND INVESTMENT INDICATORS

The choice of indicators depends on the significance for the purpose of monitoring industrial transformation and - in many instances - on the availability of data. The section below provides the economic rationale underlying the inclusion of each indicator.

1. HEADLINE INDICATORS

- **Manufacturing value added per capita (based on current US- $\text{\$}$)**

Manufacturing value added per capita (based on current US- $\text{\$}$) hints at the competitiveness of the manufacturing sector in each region, as it is affected not only by the share of manufacturing in GDP but also by the labour productivity in the sector.

- **Gross value added, annual % change** in manufacturing (Section C) and Services of the Business Economy (Sections G-N)

Whereas the share of manufacturing and related services addresses the sectoral composition of total GDP, the set of indicators shall capture the actual growth of the industrial sector in order to capture the dynamics.

- **Gross value added per person employed (constant prices) - % change (5-year moving average)** in manufacturing (Section C) and Services of the Business Economy (Sections G-N)⁸

8 no data for per hour worked (JP, USA)

This indicator shall analyse industry`s contribution to economy-wide labour productivity and economic growth. It shows the time profile of how productively labour is used to generate value added. Labour productivity changes reflect the joint influence of changes in capital, as well as technical, organizational and efficiency change within and between firms, the influence of economies of scale, varying degrees of capacity utilization and measurement errors. Because labour productivity measures reflect the combined effects of changes in capital inputs, intermediate inputs and overall productivity, they do not leave out any direct effects of technical change, be they embodied or disembodied. The average over 5 years is used so as to control for short-term fluctuations of the annual figures.

- **Number of employees; annual % change** in manufacturing (Section C) and Services of the Business Economy (Sections G-N)

Shows the impact of global shifts in manufacturing and related services as well as the ongoing digital transformation (automatization) on jobs. This indicator is calculated as the annual percentage change of persons employed. (Remark: data on hours worked - taking account of part time jobs - is not available, data on full-time equivalents (FTE) is not available for global competitors).

- **Global market share of exported manufactures (%)**

The global market share of exported products manufactured in a specific region measures the degree of importance of a region within the total manufactured exports of the world. Losses in market shares can occur not only because one country sees a decline in its exports but also when domestic exports and world exports do not grow at the same rate, creating a deterioration of the relative position at the global level. This indicator aims at capturing structural losses in competitiveness.

2. INVESTMENT RELATED INDICATORS

After several years of weak investment activity, we need to provide the right conditions to revive industrial investments. Hence, the set of indicators should track the success of the strategy in MS regarding both tangible and intangible capital formation. Monitoring the past and present evolution of investment is necessary to ensure that market incentives and policies channel capital to high productivity occupations avoiding the resource misallocations observed before the crisis. Low investment is not only a cyclical problem, but in the long run deteriorates competitiveness when enterprises do not upgrade, replace and expand their equipment and facilities sufficiently. Moreover, investments in intangibles (e.g. R&D) are vital in two ways: as a production factor and/or as a driver for innovation. Thus, the spending on intangibles has a direct (short-run/one-off) effect on output levels and an indirect (long-run) growth effect through capital accumulation and TFP (total factor productivity).

- **Gross Fixed Capital Formation in % of GDP - Total Economy**
- **Gross expenditure on R&D in % of GDP, business enterprise sector and total**
- **Investment rate in the manufacturing sector - Investment/total value added at factor costs**
- **Private gross investments in tangible goods related to circular economy sectors, % GDP**

Annex II to the ANNEX: SOURCES AND DEFINITIONS OF HEADLINE AND INVESTMENT INDICATORS

1. HEADLINE INDICATORS

The table below presents the economic sectors (NACE Rev.2, ISIC. Rev. 4) under analysis for the headline indicators.

C	Manufacturing
G-N	Services of the Business Economy
G-I	Wholesale and retail trade, transportation and storage, accommodation and food service activities
J	Information and communication
K	Financial and insurance activities
L	Real estate activities
M-N	Professional, scientific and technical activities; admin. a support service activities

Manufacturing value added per capita (based on current US-\$)

Source: World Bank - <https://data.worldbank.org/indicator/NV.IND.MANF.CD>

This Indicator is calculated as the ratio of manufacturing value added (in current US-\$) over total population. Manufacturing refers to industries belonging to ISIC divisions 15-37. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The origin of value added is determined by the International Standard Industrial Classification (ISIC), revision 3. Data are in current U.S. dollars. Data for OECD countries are based on ISIC, revision 4. Data may differ from those UNIDO uses to calculate shares of value added by industry, in part because of differences in exchange rates. Thus, value added in a particular industry estimated by applying the shares to total manufacturing value added will not match those from UNIDO sources.

Gross value added; % change, Manufacturing

Source: Eurostat; <http://ec.europa.eu/eurostat/data/database> [nama_10_a10]

NACE Rev 2: Section C Manufacturing.

For US, JP, Korea: ISIC Rev. 4 Section C Manufacturing

http://stats.oecd.org/index.aspx?DatasetCode=SNA_TABLE6A

Gross value added, % change; Services of the Business Economy (NACE G-N)

Source: Eurostat; <http://ec.europa.eu/eurostat/data/database> [nama_10_a10]

For US, JP, Korea: http://stats.oecd.org/index.aspx?DatasetCode=SNA_TABLE6A

Gross value added per person employed; Manufacturing

calculated based on constant prices; % change (5-year moving average)

Source: OECD http://stats.oecd.org/index.aspx?DatasetCode=PDBI_I4

ISIC Rev. 4 Section C Manufacturing

Gross value added per person employed, Business Sector Services excluding real estate -, constant prices; % change (5-year moving average)

Source: OECD http://stats.oecd.org/index.aspx?DatasetCode=PDBI_I4

ISIC Rev. 4 Sections G-N excluding real estate (L)

Number of employees (domestic concept), percentage change, Manufacturing

calculated as the yoy %-change

Source: Eurostat: [nama_10_a10_e](#); OECD: [STAN database for structural Analyses](#)

NACE Rev. 2; ISIC Rev. 4 Section C - Manufacturing; employment domestic concept,

Number of employees (domestic concept), percentage change, Business Services

calculated as the yoy %-change

Source: Eurostat: [nama_10_a10_e](#); OECD: [STAN database for structural Analyses](#)

NACE Rev. 2; ISIC Rev. 4 Section G-N - Services of the Business Economy; employment domestic concept

Global market share of exported manufactures (%)

Source: WTO - Merchandise trade by commodity

http://stat.wto.org/StatisticalProgram/WSDDBStatProgramTechNotes.aspx?Language=E#Def_Meth_TMV

Manufactures are defined according to SITC sections 5, 6, 7, 8 minus division 68 and group 891: Iron and steel; Chemicals; other semi-manufactures; Machinery and transport equipment; Textiles; Clothing, Other manufactures

2. Investment Indicators

Gross Fixed Capital Formation in % of GDP

Eurostat: nama_10_gdp - EU, MS

Source: OECD http://stats.oecd.org/viewhtml.aspx?datasetcode=SNA_TABLE1&lang=en

For US, JP, Korea the ratio is calculated based on current prices PPP. Gross fixed capital formation (GFCF) is defined as the acquisition (including purchases of new or second-hand assets) and creation of assets by producers for their own use, minus disposals of produced fixed assets. The relevant assets relate to products that are intended for use in the production of other goods and services for a period of more than a year. The term "produced assets" means that only those assets that come into existence as a result of a production process recognised in the national accounts are included.

Gross expenditure on R&D, % of GDP, total economy

Source: Eurostat/Europe 2020; <http://ec.europa.eu/eurostat/web/europe-2020-indicators/europe-2020-strategy/main-tables>

Total gross domestic expenditure on research and experimental development (GERD) as a percentage of gross domestic product (GDP). R&D data are compiled in accordance to the guidelines laid down in the proposed standard practice for surveys of research and experimental development - Frascati Manual (FM), OECD, 2015.

Gross expenditure on R&D, % of GDP, business enterprise sector,

Source: Eurostat sdg_09_10

The indicator is part of the EU Sustainable Development Goals (SDG) indicator set. The business enterprise sector includes all firms, organisations 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 institutes mainly serving them.

Investment rate in manufacturing in % of total value added

Source: Eurostat - Annual detailed enterprise statistics (sbs_na_ind_r2)

Calculated as the ratio of investment over total value added at factor cost in the manufacturing sector (NACE C)

Private gross investments in tangible goods related to circular economy sectors, % of GDP

Source: Eurostat - Circular Economy Indicators (cei-cie010)

“Gross investment in tangible goods” in the following two sectors: the recycling sector and repair and reuse sector. The recycling and repair and reuse sectors are defined and approximated in terms of economic activity branches of the NACE Rev. 2 classification.

Core Areas	Indicator	Source	Code	most recent data
Headline Indicators	Manufacturing value added per capita (in current US-\$)	World Bank	World Development	2017, USA, Japan 2016
	Gross value added annual % change Selected Sectors: C, G-N	Eurostat/OECD	[nama_10_a10]; [SNA_TABLE6A]	2017, USA, JP, Korea 2016, China n.a.
	Gross value added per person employed constant prices; % change (5 year MA) Selected Sectors: C; G-N excl. real estate	OECD	[PDBI_14]	2017, USA, JP 2016, China n.a.
	Number of employees (domestic concept), % change Selected Sectors: C; G-N	Eurostat/OECD	[nama_10_a10_e]; [STANI4_2016]	2017, Korea 2016, USA 2015, China n.a.
	Global Market share of exported manufactures (%)	WTO		2016, EU, USA, JP, China Korea
Investments	Gross Fixed Capital Formation - total % GDP	Eurostat/OECD	[nama_10_gdp]; [SNA_TABLE6A]	2017, USA, JP, Korea 2016, China n.a.
	Gross expenditure on R&D in % of GDP business enterprise sector and total	Eurostat	[t2020_20] [sdg_09_10]	2016, USA, Japan, Korea 2015, China n.a.
	Investment rate (investment/total value added at factor costs) in % NACE Sector C	Eurostat	[sbs_na_ind_r2]	2015, EU
	Private gross investments in activities of circular economy sectors in % of GDP	Eurostat	[cei_cie010]	2015, EU
Policy related Areas				
Research and Innovation	Total Researchers per 1.000 employees (total employment)	OECD	[MSTI]	2016, USA ,China 2015
	PCT Patent Applications per billion GDP (in PPS €) filed under the Patent Cooperation Treaty	EIS	Indicator 3.3.1	2013
	Share of high growth enterprises in the manufacturing sector (growth by 10% or more, measured in employment)	Eurostat	[bd_9pm_r2]	2016, EU
	SMEs innovating in-house (relative to EU in 2010)	EIS	Indicator 3.1.3	2016 EU
	Intellectual property products (total Economy) Investments in % of total Investments	Eurostat; OECD	[nama_10_an6]	2017, EU
	ICT investments (total Economy) Investments in % of total Investments	Eurostat; OECD	[nama_10_an6]	2017, EU
Skills	Number of installed industrial robots per 10.000 persons in the manufacturing industry (ISIC Rev. 4 - Section C)	IFR (International Federation of Robotics)	Executive_Summary	2016, no EU-aggregate, Europe available
	Share of graduates in STEM (Science, technology, engineering and mathematics) in % of all graduates	OECD	Education at a Glance	2015, OECD-MS excl. USA, Korea
	Adult participation in learning (% of population aged 25 to 64)	Eurostat	[sdg_04_60]	2017, EU
Digital Economy	Employment shifts in manufacturing by education	Eurofound		2016, EU
	Digital Transformation Enablers Index	DTEI	Digital Transformation Scoreboard	2017, EU
	Human Capital/digital skills	DESI	composite index	2017, EU
Decarbonisation and Circular Economy	Integration of digital Technology	DESI	composite index	2017, EU
	Air emission intensities (Greenhouse gases) Kilograms per euro, chain linked volumes (2010), % change Selected Sectors: NACE Rev. 2 C; G-N	Eurostat	[env_ac_aeint_r2]	2016, EU
	Trade in recyclable raw material nominal % change of Exports and Imports	Eurostat	[cei_srm020]	2016, EU
	Energy productivity GDP per unit of TPES, % change	OECD	Green Growth Indicators	2016, China 2015
	Eco-innovation related patents (per mln population)	Eco-Innovation Scoreboard		2017, EU
Single Market	Electricity price for medium sized industries Euro per kWh	Eurostat	[ten00117]	2017, EU
	Intra-EU28 trade in goods and services nominal % change, imports and exports	Eurostat	[ext_it_intratrd]	2017, EU
	Intra-EU trade in intermediate goods % share of total Intra-EU-trade, imports and exports	Eurostat	[ext_st_eu28bec]	2017, EU
International Dimension	Price dispersion across Member States Coefficient of variation	Eurostat	[prc_ppp_ind]	2017, EU
	Domestic value added in gross exports % Total Value, change in p.p.	OECD	doi: 10.1787/3959a0c6-en	2014, EU, n.a.
	Stock of FDI inward, % of GDP (manufacturing)	Eurostat	[bop_fdi6_pos]	2016; China, Korea n.a.
	Stock of FDI outward, % of GDP (manufacturing)	Eurostat	[bop_fdi6_pos]	2016; China, Korea n.a.