

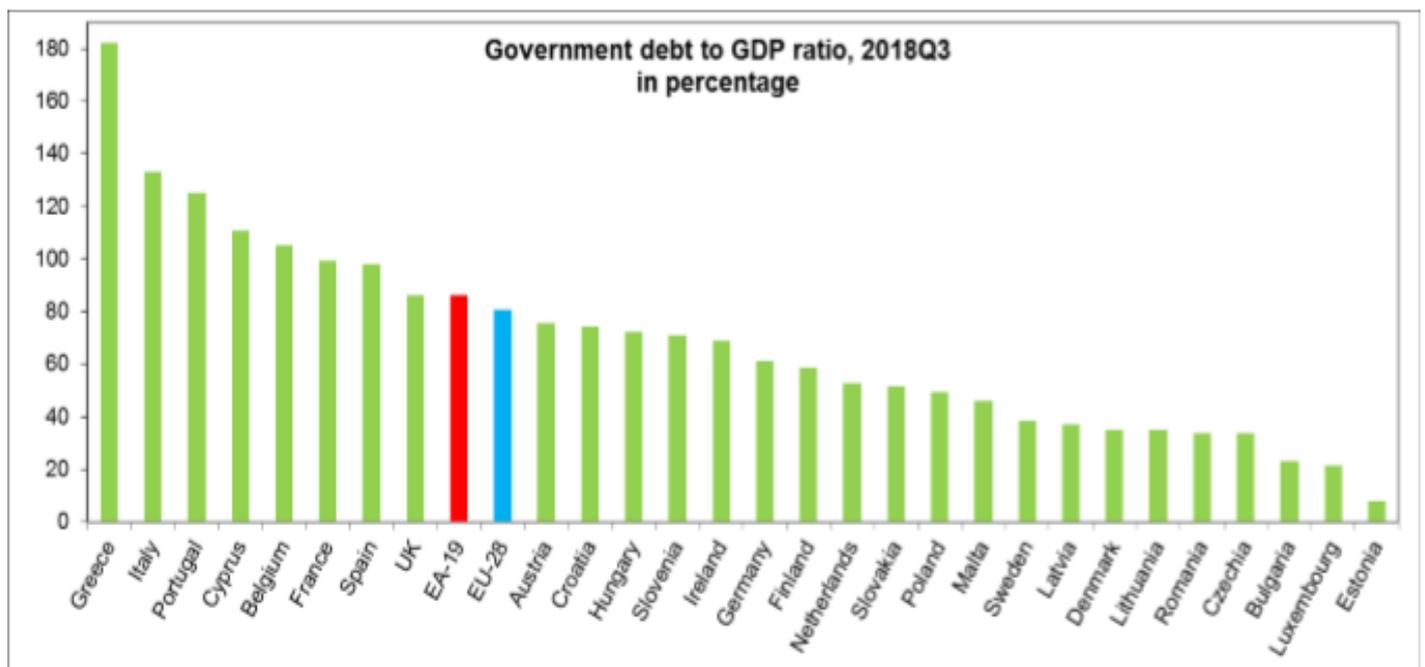
NEWSLETTER on STI Data and Indicators

DG RTD, A4, Analysis and monitoring of national research policies

1. Eurostat data on government debt

On 21 January 2019, Eurostat published a *news release* on government debt in EU Member States and Norway. According to the release, Greece had the highest gross government debt as a % of GDP in the third quarter of 2018 (182.2%), followed by Italy (133%), Portugal (125%), Cyprus (110.9%), Belgium (105.4%), France (99.5%) and Spain (98.3%). Estonia (8.0%), Luxembourg (21.7%) and Bulgaria (23.1%) were the Member States with the lowest government debt levels. Compared to the same quarter in 2017 gross government debt as a % of GDP increased the most in Cyprus (+9.7 percentage points) and Greece (+7.4). At the same time government debt decreased the most in Slovenia (-8.0), Malta (-6.8), Portugal (-4.6) and Austria (-4.3). In EU28 it fell since Q3 2017 from 82.5% of GDP

to 80.8% (-1.7 pp), in the Euro area from 88.2% to 86.3% (-2.1 pp). In absolute terms, however, government debt in the EU increased from € 12.6 trillion in Q3 2017 to € 12.7 trillion in Q3 2018 (EU GDP in the same period increased from € 15.2 trillion to € 15.7 trillion). As regards the components of government debt, at EU28 level the item *currency and deposits* represented 3.4% of GDP in Q3 2018, *debt securities* 66.3% and *loans* 11.2% of GDP. *Loans* represent the largest part of government debt in Greece (149.3% of GDP), the Member State with the highest debt level and in Estonia (6.8% of GDP), the country with the lowest debt level in the EU.



More info: <https://ec.europa.eu/eurostat/documents/2995521/9510404/2-21012019-AP-EN.pdf/97de2ad5-5b7e-4de9-ab36-7bbf8773aad0>

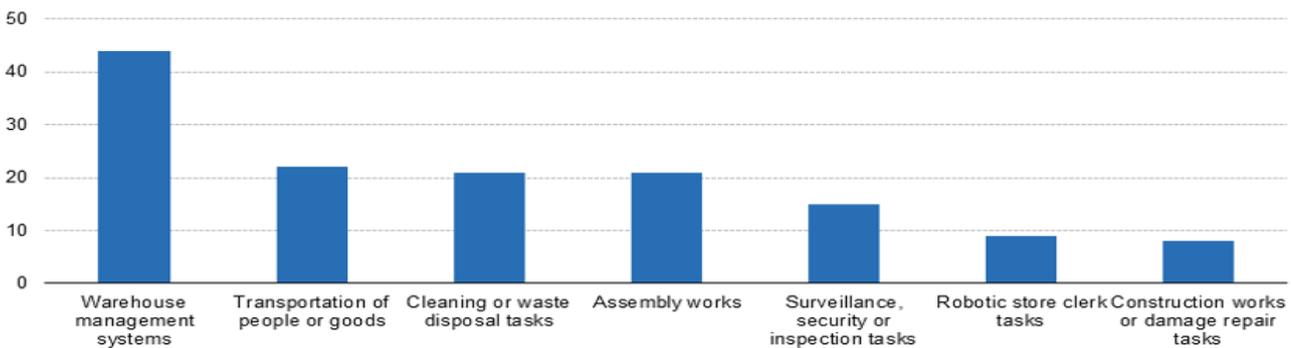
2. Eurostat data on the use of robots by enterprises

On 21 January, Eurostat published data on the use of robots in enterprises in 2018. According to Eurostat 7% of enterprises (employing at least 10 persons) used industrial or service robots. Robot usage increases with enterprise size. While 5% of small enterprises (10-49 persons employed) use robots, 12% of medium sized enterprises (50-249 persons employed) and 25% of large enterprises (250 or more persons employed) use robots. According to the Eurostat survey the largest shares of enterprises using industrial robots were recorded in Spain (11%), Denmark and Finland (both 10%), and Italy

(9%). Cyprus, Estonia, Greece, Lithuania, Hungary and Romania on the other hand show a low share of enterprises using robots (3% or less).

Industrial robots (5%) were more commonly used by enterprises than service robots (2%). The manufacturing sector leads in the use of industrial robots (16% of companies), while service robots are most frequently used in manufacturing and retail trade (both 4%). Enterprises use service robots mainly for warehouse management (44% of enterprises using service robots, see graph below).

Use of service robots by enterprises in the EU, by purpose
(% of enterprises using service robots)



ec.europa.eu/eurostat

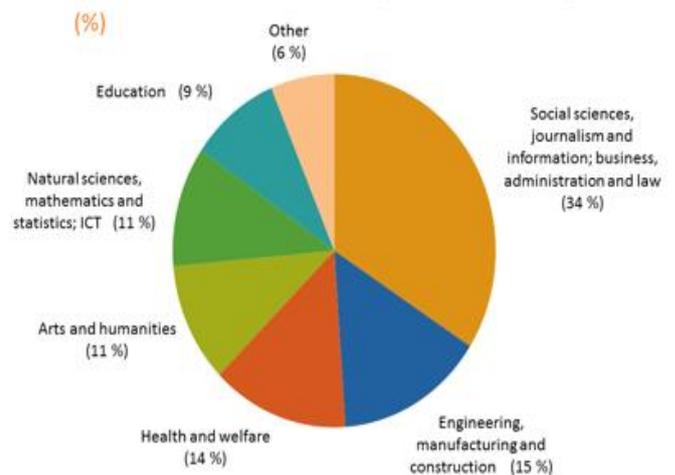
More info: <https://ec.europa.eu/eurostat/web/products-eurostat-news/-/DDN-20190121-1?inheritRedirect=true&redirect=%2Fnews%2Fwhats-new>

3. Eurostat data on tertiary graduates by field of study

On 25 January, Eurostat published an info-graph on tertiary graduates by field of study. Eurostat estimates that about 4.7 million students graduated from tertiary education establishments in the European Union (EU) in 2016.

About 15% of the students graduated in the field of *engineering, manufacturing and construction*. This share was relatively low in Luxembourg, the Netherlands (2015 data), Malta and the United Kingdom (all below 10%), and relatively high in Austria (20%), Portugal (21%) and Germany (22%).

The share of graduates in the field of *natural science, mathematics, statistics and ICT* was under 7% in Belgium, Cyprus, Lithuania and Bulgaria, and was highest in Germany (14%), Ireland (15%) and the United Kingdom (17%). With regard to ICT graduates, the shares were highest in Malta (8.5%), Finland (6.7%), Ireland (6.5%) and Luxembourg (5.9%).



ec.europa.eu/eurostat

More info: <https://ec.europa.eu/eurostat/web/products-eurostat-news/-/DDN-20190125-1?inheritRedirect=true&redirect=%2Fnews%2Fwhats-new>

4. Bloomberg Innovation Index

On 22 January, Bloomberg published the 2019 edition of its annual *Innovation Index*. The index is based on 7 indicator areas (some with several sub-indicators), including R&D intensity, manufacturing value added, productivity, high-tech density, tertiary efficiency, researcher concentration and patent activity.

Some of the indicators, such as the number of domestically domiciled high-tech companies as a share of world total and patent filing growth as a share of world total are not size-normalised and hence are biased towards larger countries. Manufacturing value added and patents, furthermore, imply a bias in favour of manufacturing oriented countries. As a consequence of this bias Poland ranks higher than Luxembourg in the Bloomberg Index.

As in the 2018 ranking, South Korea tops the list. Germany ranks second, followed by Finland. Other EU Member States in the top 10 are Sweden and France. Croatia and Cyprus are the lowest ranked EU countries on the list.

When it comes to changes in ranking, EU Member States that improved by 3 ranks and more include Finland (+4), Luxembourg (+4) and Romania (+6), while there was a decline by 4 or more ranks for Sweden (-5), Hungary (-5), Portugal, Greece and Malta (all -4).

As regards the different indicator areas, Israel leads in R&D intensity, followed by South Korea and Switzerland.

In manufacturing value-added, Ireland leads, followed by South Korea and Germany.

With regard to productivity, Ireland leads again, followed by Iceland and Luxembourg. When it comes to high-tech density (partially not normalised and hence size-biased) the US leads, followed by France and Germany. With regard to tertiary efficiency, Singapore leads, followed by Slovenia and Lithuania (which has a very high tertiary attainment). As regards researcher concentration, Denmark leads, followed by Israel and Switzerland.

When it comes to patent activity the US ranks first, followed by China and, despite a size bias, Luxembourg.

More info: <https://www.bloomberg.com/news/articles/2019-01-22/germany-nearly-catches-korea-as-innovation-champ-u-s-rebounds>

Bloomberg 2019 Innovation Index

2019 Rank	2018 Rank	YoY Change	Economy	Total Score	R&D Intensity
1	1	0	S. Korea	87.38	2
2	4	+2	Germany	87.30	7
3	7	+4	Finland	85.57	9
4	5	+1	Switzerland	85.49	3
5	10	+5	Israel	84.78	1
6	3	-3	Singapore	84.49	13
7	2	-5	Sweden	84.15	4
8	11	+3	U.S.	83.21	10
9	6	-3	Japan	81.96	5
10	9	-1	France	81.67	12
11	8	-3	Denmark	81.66	8
12	12	0	Austria	80.98	6
13	14	+1	Belgium	80.43	11
14	13	-1	Ireland	80.08	32
15	16	+1	Netherlands	79.54	16
16	19	+3	China	78.35	14
17	15	-2	Norway	77.79	17
18	17	-1	U.K.	75.87	20
19	18	-1	Australia	75.38	19
20	22	+2	Canada	73.65	22
21	20	-1	Italy	72.85	24
22	21	-1	Poland	69.10	36

23	24	+1	Iceland	68.41	15
24	23	-1	New Zealand	68.12	26
25	28	+3	Czech Rep.	68.09	21
26	26	0	Malaysia	67.61	23
27	25	-2	Russia	66.81	33
28	32	+4	Luxembourg	66.37	29
29	35	+6	Romania	64.78	55
30	29	-1	Spain	64.52	31
31	NR	-	Slovenia	64.11	18
32	27	-5	Hungary	63.05	30
33	33	0	Turkey	62.89	38
34	30	-4	Portugal	62.79	28
35	31	-4	Greece	62.05	34
36	36	0	Estonia	61.79	25
37	34	-3	Lithuania	59.73	40
38	37	-1	Hong Kong	58.90	43
39	38	-1	Slovakia	58.03	44
40	45	+5	Thailand	57.77	48
41	41	0	Bulgaria	56.36	45
42	40	-2	Latvia	55.46	56
43	39	-4	Malta	55.43	49
44	42	-2	Croatia	54.98	39
45	NR	-	Brazil	53.62	27
46	NR	-	U.A.E.	52.93	35
47	49	+2	Iran	52.81	60
48	47	-1	Cyprus	52.05	52
49	44	-5	Serbia	51.35	37
50	NR	-	Argentina	51.31	46

51	48	-3	S. Africa	51.03	42
52	43	-9	Tunisia	48.92	50
53	46	-7	Ukraine	48.05	54
54	NR	-	India	47.93	47
55	NR	-	Kuwait	47.27	58
56	NR	-	Saudi Arabia	47.18	41
57	NR	-	Qatar	46.58	51
58	NR	-	Chile	46.40	59
59	NR	-	Mexico	46.00	53
60	NR	-	Vietnam	45.92	57

5. INSEAD World's most talent competitive countries

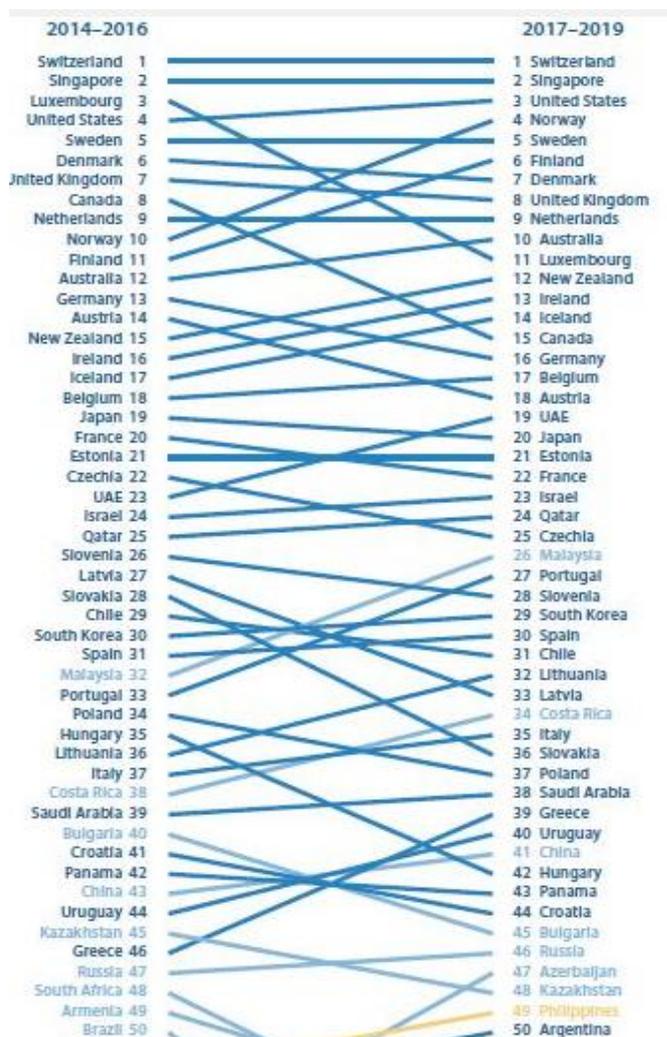
On 21 January, INSEAD published a ranking of the world's most talent competitive countries. The Global Talent Competitiveness Index (GTCI) is based on 68 indicators and the following 6 pillars: enable, attract, grow, retain, vocational and technical skills, global knowledge skills. Switzerland is the best performer worldwide, followed by Singapore, the United States and Norway. Sweden is the top EU performer, followed by Finland, Denmark, the United Kingdom and the Netherlands. The lowest ranked EU Member State is Romania (rank 69). Other EU countries below rank 50 are Hungary (53), Bulgaria (54) and Croatia (55). The ranking report has a graph showing the change between 2014-2016 and 2017-2019. While the top countries Switzerland and Singapore kept their rank, Luxembourg, Germany, Austria, France, Czechia, Slovenia, Latvia, Slovakia, Poland, Hungary and Croatia are among the EU Member States ranking lower than in the previous period. Member States improving their ranking include Finland, Ireland, Portugal and Italy.

As regards the pillar *attract*, Singapore leads with only two EU Member States in the top 10: Luxembourg (2) and the United Kingdom (9). While Switzerland is the global leader, EU Member States are, however, better in the *retaining* talent pillar with Austria (3), Denmark (4), Finland (5), Sweden (6), the Netherlands (7) and Luxembourg (8) in the top 10. As regards the *grow* pillar the US ranks first and EU countries in the top 10 are the Netherlands (3), Finland (4), Denmark (6), Sweden (7), Belgium (8) and the UK (9).

In the pillar *vocational and technical skills*, Switzerland ranks first and the United States second. EU Member States ranking in the top 10 worldwide in this pillar are Germany (3), Finland (4), Netherlands (6) and Austria (9). As regards *global knowledge skills*, Singapore ranks first while the EU countries in the top 10 are the United Kingdom (5), Denmark (7) and Luxembourg (9).

INSEAD has also looked at the talent competitiveness of cities. While Washington (US) is ranked first worldwide, Copenhagen comes second and Vienna, Helsinki and Paris are other EU cities in the top 10. The top 20 includes in addition, Stockholm (11), London (14), Brussels (18) and Munich (20). The highest ranked EU13 city is Prague (25). With regard to the pillar *attract*, Luxembourg (2) and Dublin (6) rank high. Regarding the pillar *retain*, Kiel (3), Vienna (4), Prague (8) and Munich (10) rank high. In the pillar *Be global*, Paris (1) and London (2) rank best, with Brussels (6), Helsinki (8), Copenhagen (9) and Stockholm (10) also ranking high.

More info: <https://gtcistudy.com/wp-content/uploads/2019/01/GTCI-2019-Report.pdf>



GTCI 2019 Top 10

Rank	City
1	Washington D.C. (U.S.)
2	Copenhagen (Denmark)
3	Oslo (Norway)
4	Vienna (Austria)
5	Zurich (Switzerland)
6	Boston (U.S.)
7	Helsinki (Finland)
8	New York (U.S.)
9	Paris (France)
10	Seoul (S. Korea)

6. Miscellaneous results from national data sources

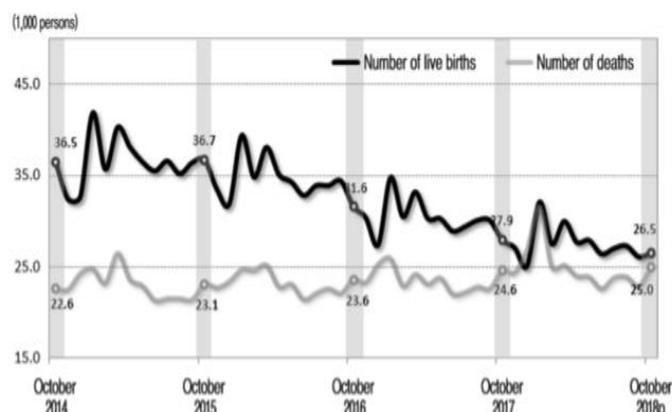
South Korea: fertility level at an all-time low

In 2017 the number of births in South Korea dropped to the lowest level ever recorded, with the fertility rate of 1.05 children per woman being the lowest among OECD countries. Data from Statistics Korea for the first 10 months imply that the rate fell further to a new record low in 2018. The crude birth rate in 2018 will probably be below 7 children/1000 people and the fertility rate below 1.0 child/woman. South Korea is hence likely to have the lowest birth and fertility rates worldwide in 2018. At such rates, a generation reproduces itself by less than 50%.

Japan has a higher fertility rate (1.4), but a different age structure has resulted in 2018 in the lowest number of births (0.92 million) ever recorded in the country, a post-war high number of deaths (1.37 million) and the highest natural decline in population (-0.45 million) recorded so far in Japan.

Another country reporting for 2018 an all-time fertility low is Finland (1.4 children/woman, < 50 000 births).

○ Live birth and death



More info: <http://kostat.go.kr/portal/eng/pressReleases/8/1/index.board>

Germany: number of unicorn companies increasing

The number of EU based unicorn companies has progressed well in recent months, increasing from 28 in November 2018 to 33 in January 2019. At the same time the number increased by 12 in the US, but stagnated in China. Nearly half of the EU unicorn companies are based in the UK, BREXIT will hence strongly affect EU figures.

With 4 companies joining in 2018 and the Berlin-based fintech company N26 in January 2019, Germany now has more than half (9 out of 17) of non-UK EU unicorns and

ranks fifth worldwide, after the US (151), China (83), the UK (16) and India (13). However, CBInsights attributes the company *Darktrace* to Germany, although it is based in London. Counting *Darktrace* as a UK company would increase the number of British unicorns to 17 and lower the German number to 8.

Three of the German unicorns are based in Berlin, the largest EU unicorn cluster outside London.

More info: <https://www.cbinsights.com/research-unicorn-companies>

China: Overtaking the EU in R&D intensity

The National Bureau of Statistics of China has recently updated its R&D data. The latest performance figures relate to 2017. The data on R&D intensity show that China has overtaken the EU with 2.13% of GDP spent on R&D, compared to 2.07% in the EU. In absolute terms spending on basic research increased most in China (in yuan +76% since 2013), while spending on applied research increased by 46% and spending on experimental development, by far the largest item, by 47% since 2013. While government spending on R&D increased by 40%, enterprise spending increased by 52%. Business R&D intensity in China now amounts to 1.6%, compared to only 1.4% in the EU. R&D personnel in China increased to over 4 million in 2017, with 80% of them employed in experimental development.

More info: <http://www.stats.gov.cn/tjsj/ndsj/2018/indexeh.htm>

Item	2013	2014	2015	2016	2017
Statistics on R&D Input					
Full-time Equivalent of R&D Personnel(10 000 man-years)	353.3	371.1	375.9	387.8	403.4
Basic Research	22.3	23.5	25.3	27.5	29.0
Applied Research	39.6	40.7	43.0	43.9	49.0
Experimental Development	291.4	306.8	307.5	316.4	325.4
Expenditure on R&D (100 million yuan)	11846.6	13015.6	14169.9	15676.7	17606.1
Basic Research	555.0	613.5	716.1	822.9	975.5
Applied Research	1269.1	1398.5	1528.6	1610.5	1849.2
Experimental Development	10022.5	11003.6	11925.1	13243.4	14781.4
Government Funds	2500.6	2636.1	3013.2	3140.8	3487.4
Self-raised Funds by Enterprises	8837.7	9816.5	10588.6	11923.5	13464.9
Ratio of Expenditure on R&D to GDP (%)	1.99	2.02	2.06	2.11	2.13

Calendar of data releases and indicator based publications

Update of: 30/1/2019 (grey= already published)

2019	Eurostat data updates	Commission indicator based reports	Data and indicator based reports of other organisations
January			Bloomberg Innovation Index INSEAD Global Talent Competitiveness Index
February	Community Innovation Survey (2016 data) Tertiary attainment (2018, prov.) High growth enterprises data (provisional, 2017)	Winter forecast (ECFIN)	OECD MSTI statistics (R&D expenditure)
March	R&D expenditure data update (revision of preliminary 2017 results)		European Patent Office , annual results OICA world motor vehicle production data OECD R&D Statistics
April	Education headline indicators (LFS, 2018 results)		Reuters Most Innov. Institutions Internet Minute (Excelacom/Allaccess)
May	High-tech trade (2018) Education enrolment, graduates Knowledge-int. activities (2018)	Spring Forecast (ECFIN) DESI index (CNECT)	Invest Europe European Private Equity Report IMD World Competitiveness Yearbook
June	Education spending Employment high-tech (2018) HRST education inflows (2017)	European Innovation Scoreboard (GROW/RTD) Regional Innovation Scoreboard (GROW/RTD)	Times Higher Ed. Reputations Ranking IRF Industrial robot sales
July			UNESCO UIS STI stats release WIPO/Cornell/INSEAD Global Innovation Index
August			Academic Ranking of World Universities (Shanghai)
September	Final high growth ent. data (2017) Economic data on high-tech (2018)	Europe 2020 publication (ESTAT)	OECD Education at a Glance
October	GBARD (2018 preliminary)	Education Monitor (EAC)	WEF Global Competitiveness Index World Bank Doing Business
November	R&D intensity (2018 preliminary, 2017 final) Knowledge-int. activities (2018) Employment high-tech (2018)	Autumn Forecast (ECFIN) Annual Growth Survey (ECFIN) Draft Joint Employment Report (EMPL)	Top500.org: Top 500 Supercomputer list OECD STI Outlook (2-yearly)
December	ICT household data (2019) ICT enterprise data (2019) HRST stocks (2018)	Industrial R&D Investment Scoreboard (JRC)	WIPO World Intellectual Property Indicators UNDP/MBRF Global Knowledge Index

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