



European Innovation Scoreboard 2023

Annex B Performance per indicator

Independent
Expert
Report

European Innovation Scoreboard 2023 - Annex B Performance per indicator

European Commission

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European Innovation Scoreboard 2023

Annex B Performance per indicator

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as part of the European Innovation Scoreboard project

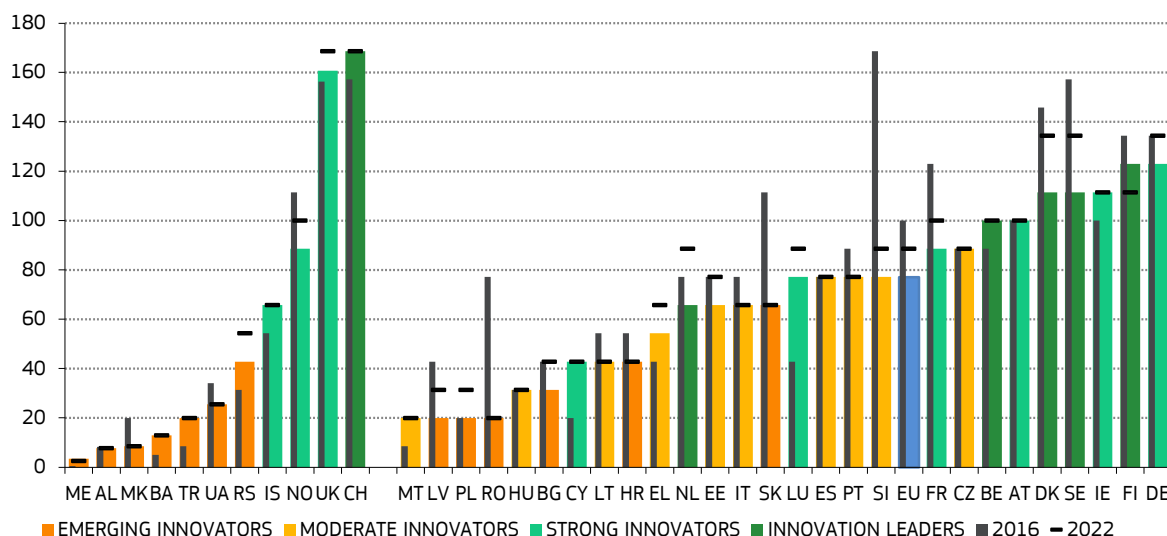
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Annex B – Performance per indicator

This annex shows performance results for each of the indicators used in the European Innovation Scoreboard 2023. For each indicator a graph is included which shows performance for 2016, 2022 and 2023 of Member States and neighbouring countries relative to the EU.

1.1.1 New doctorate graduates in science, technology, engineering, and mathematics (STEM) per 1,000 population aged 25-34



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016.

	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)			Performance change 2022-2023 (# of countries)					
	> EU	= EU	> 0	= 0	< 0	> EU	= EU	< EU	> EU	= EU	< EU
Member States	9	4	6	5	16	20	1	6	1	14	3
Non-EU countries	3	0	7	0	4	10	1	0	1	7	0

Innovation Leaders and Strong Innovators, on average, show higher performance on this indicator. The overall best performing country in 2023 is Switzerland, and the best performing Member State is Germany. The EU average declined from 100 in 2016 to 77.1 in 2023.

Of the **Member States**, in 2023 in total 9 perform above, 4 perform equal to, and 14 perform below the EU average.

Between 2016 and 2023, for 6 Member States performance improved, for 5 Member States it did not change and for 16 Member States it declined. Compared to the EU, for 20 Member States performance improved, for 1 Member State relative performance did not change, and for 6 Member States relative performance declined. Relative performance increased fastest for Luxembourg (+34.3%-points) and declined strongest for Slovenia (-94.5%-points).

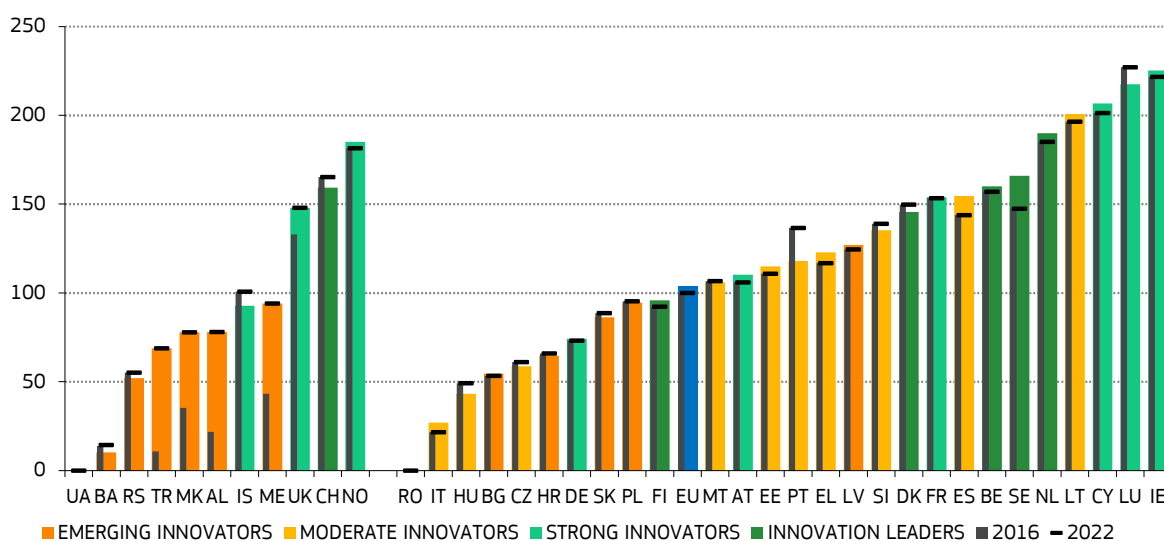
More recently, between 2022 and 2023, for only 1 Member State performance improved, for 14 Member States it did not change and for 12 Member States it declined. Compared to the EU, for 22 Member States performance improved, for 2 Member States relative performance did not change, and for 3 Member States performance declined. Relative performance increased fastest for Finland (+11.4%-points) and declined strongest for Denmark, the Netherlands and Sweden (-22.9%-points).

Of the **non-EU countries**, in 2023 3 perform above and 8 perform below the EU average.

Between 2016 and 2023, for all 7 countries performance improved and for 4 countries performance declined. Compared to the EU, for 10 countries performance improved and for only 1 country relative performance declined.

More recently between 2022 and 2023, for 1 country performance improved, for 7 countries relative performance did not change, and for 3 countries it declined. Compared to the EU, for all 11 countries performance improved.

1.1.2 Percentage population aged 25-34 having completed tertiary education



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016. No data for Ukraine.

	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)			Performance change 2022-2023 (# of countries)					
	> EU	< EU	> 0	= 0	< 0	> EU	= EU	< EU	> EU	= EU	< EU
Member States	17	10	6	0	4	9	0	18	16	1	10
Non-EU countries	3	7	6	0	4	5	0	5	1	5	4

Performance change for 2016-2023 is not available for EU Member States as data for the first 6 years have been imputed using the 2022 data value also for 2016. For several non-EU countries longer time series are available.

The overall best performing country in 2023 is Ireland, followed by Luxembourg and Cyprus. The EU average increased from 100 in 2016 to 103.6 in 2023.

Of the **Member States**, in 2023 in total 17 perform above and 10 perform below the EU average.

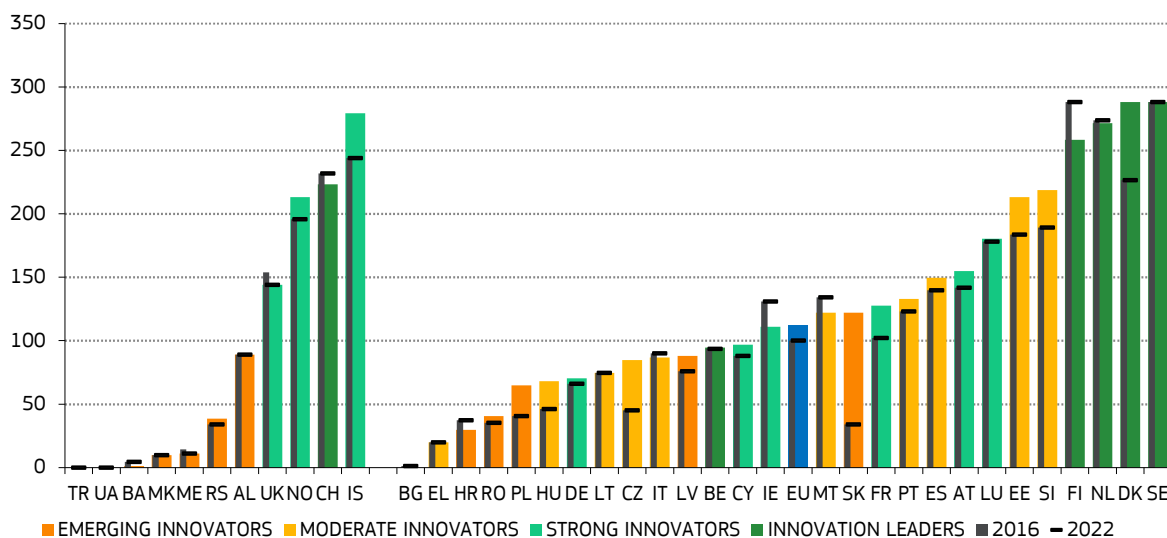
Between 2022 and 2023, for 16 Member States performance improved, for 1 Member State it did not change and for 10 Member States it declined. Compared to the EU, for 9 Member States performance improved, and for 18 Member States performance declined. Relative performance increased fastest for Sweden (+18.6%-points) and declined strongest for Portugal (-18.6%-points).

Of the **non-EU countries**, in 2023 3 perform above and 7 perform below the EU average.

Between 2016 and 2023, for 6 countries performance improved and for 4 countries performance declined. Compared to the EU, for 5 countries performance improved and for 5 countries relative performance declined.

More recently between 2022 and 2023, for 1 country performance improved, for 5 countries relative performance did not change, and for 4 countries it declined. Compared to the EU, for all 10 countries performance improved.

1.1.3 Percentage population aged 25-64 participating in lifelong learning



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016. No data for Ukraine and Türkiye.

	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)			Performance change 2022-2023 (# of countries)					
	> EU	< EU	> 0	= 0	< 0	> EU	= EU	< EU	> EU	= EU	< EU
Member States	13	14	-	-	-	-	-	-	17	3	7
Non-EU countries	4	5	3	2	4	2	0	7	3	4	2

Performance change for 2016-2023 is not available for EU Member States as data for the first 6 years have been imputed using the 2022 data value also for 2016. For several non-EU countries longer time series are available

Innovation Leaders and Strong Innovators, on average, show higher performance on this indicator. The overall best performing countries in 2023 are Sweden, Denmark, and Iceland, followed by the Netherlands and Finland. The EU average increased from 100 in 2016 to 112.1 in 2023.

Of the **Member States**, in 2023 in total 13 perform above and 14 perform below the EU average.

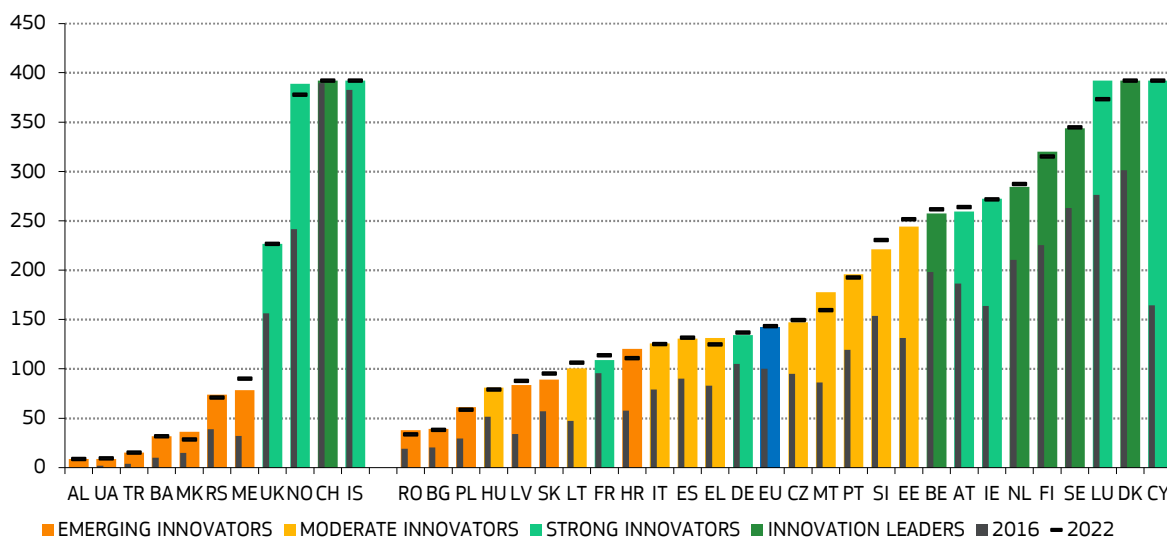
Between 2022 and 2023, for 17 Member States performance improved, for 3 Member States it did not change and for 7 Member States it declined. Compared to the EU, for 9 Member States performance improved, for 1 Member State relative performance did not change, and for 17 Member States performance declined. Relative performance increased fastest for Slovakia (+87.9%-points) and declined strongest for Finland (-29.7%-points).

Of the **non-EU countries**, in 2023 4 perform above and 5 perform below the EU average.

Between 2016 and 2023, for 3 countries performance improved, for 2 countries performance stayed the same and for 4 countries performance declined. Compared to the EU, for 2 countries performance improved and for 7 countries relative performance declined.

More recently between 2022 and 2023, for 3 countries performance improved, for 4 countries relative performance did not change, and for 2 countries it declined. Compared to the EU, for 2 countries performance improved and for 7 countries performance declined.

1.2.1 International scientific co-publications per million population



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016.

	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)			Performance change 2022-2023 (# of countries)		
	> EU	< EU	> 0	= 0	< 0	> EU	= EU	< EU
Member States	14	13	27	0	0	19	0	8
Non-EU countries	4	7	11	0	0	3	0	8

Innovation Leaders and Strong Innovators, on average, show higher performance on this indicator. The overall best performing countries in 2023 are, in descending order, Iceland, Switzerland, Cyprus, Denmark, Luxembourg, and Norway, all having more than 3.000 scientific co-publications per million population. The EU average increased from 100 in 2016 to 142.6 in 2023.

Of the **Member States**, in 2023 in total 14 perform above and 13 perform below the EU average.

Between 2016 and 2023, for all 27 Member States performance improved. Compared to the EU, for 19 Member States performance improved and for 8 Member States relative performance declined. Relative performance increased fastest for Luxembourg (+18.8%-points) and declined strongest for Slovenia (-9.4%-points).

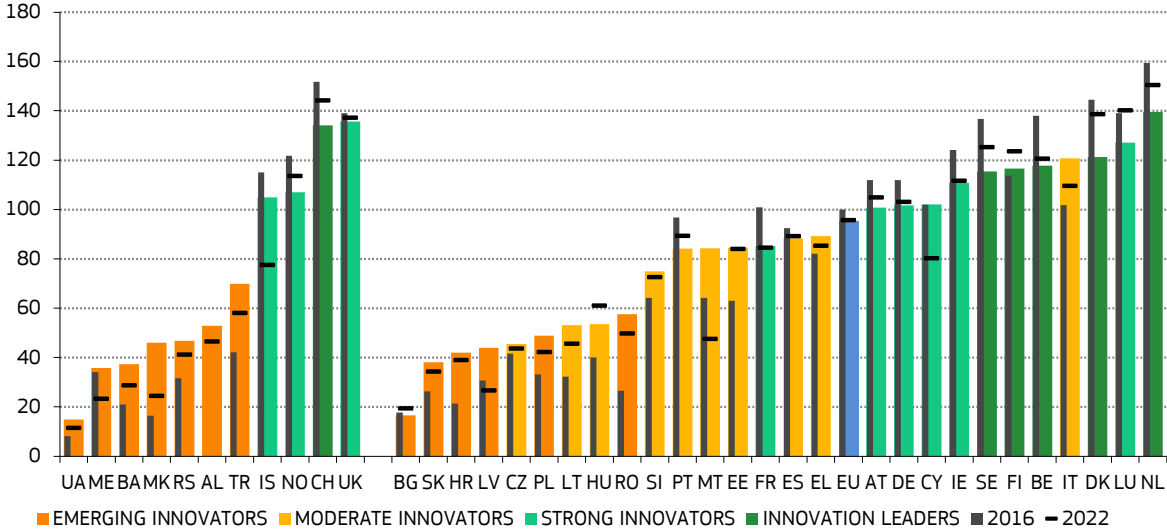
More recently between 2022 and 2023, for 12 Member States performance improved, for 2 Member States it did not change and for 13 Member States it declined. Compared to the EU, for 14 Member States performance improved and for 13 Member States performance declined. Relative performance increased fastest for Cyprus (+227.8%-points) and improved slowest for France (13.2%-points).

Of the **non-EU countries**, in 2023 4 perform above and 7 perform below the EU average.

Between 2016 and 2023, for all 11 countries performance improved. Compared to the EU, for 3 countries performance improved and for 8 countries relative performance declined.

More recently between 2022 and 2023, for 3 countries performance improved, for 6 countries relative performance did not change, and for 2 countries it declined. Compared to the EU, for 9 countries performance improved and for 2 countries relative performance declined.

1.2.2 Scientific publications among the top-10% most cited publications worldwide as percentage of total scientific publications of the country



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016.

	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)			Performance change 2022-2023 (# of countries)					
	> EU	< EU	> 0	= 0	< 0	> EU	= EU	< EU	> 0	= EU	< 0
Member States	11	16	15	0	12	17	0	10	14	0	13
Non-EU countries	4	7	7	0	4	8	0	3	8	0	3

The overall best performing countries in 2023 are the Netherlands, the United Kingdom, and Switzerland, all having a share of more than 13%. The EU average declined from 100 in 2016 to 95.5 in 2023.

Of the **Member States**, in 2023 in total 11 perform above and 16 perform below the EU average.

Between 2016 and 2023, for 15 Member States performance improved and for 12 Member States it declined. Compared to the EU, for 17 Member States performance improved and for 10 Member States relative performance declined. Relative performance increased fastest for Malta (+36.7%-points) and declined strongest for Denmark (-17.4%-points).

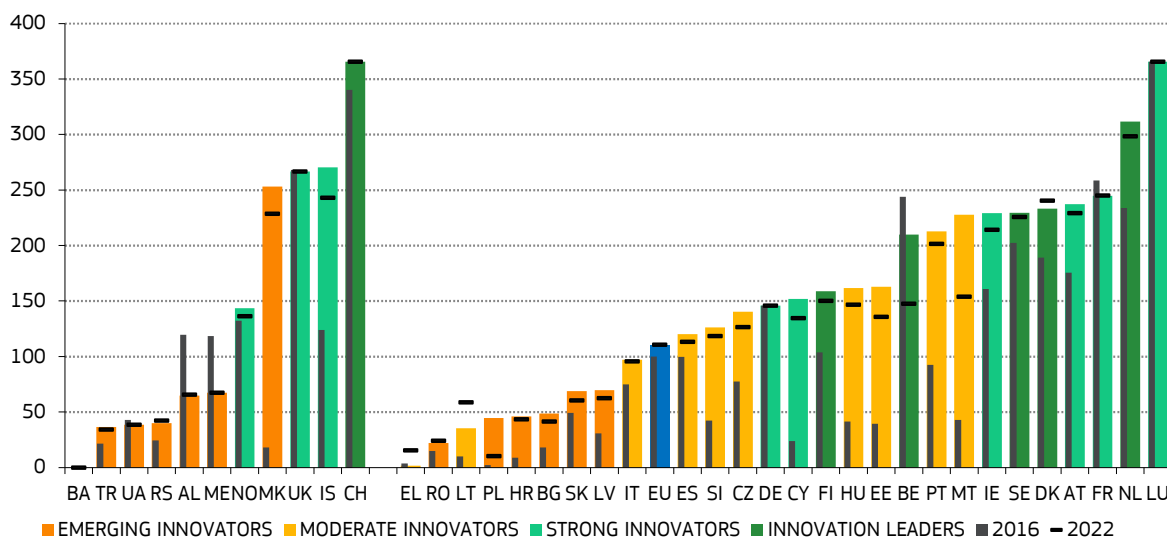
More recently between 2022 and 2023, for 14 Member States performance improved and for 13 Member States it declined. Compared to the EU, for 14 Member States performance improved and for 13 Member States performance declined. Relative performance increased fastest for Romania (+31.1%-points) and declined strongest for Denmark (-23.1%-points).

Of the **non-EU countries**, in 2023 4 perform above and 7 perform below the EU average.

Between 2016 and 2023, for 7 countries performance improved and for 4 countries performance declined. Compared to the EU, for 8 countries performance improved and for 3 countries relative performance declined.

More recently between 2022 and 2023, for 8 countries performance improved and for 3 countries it declined. Compared to the EU, for 8 countries performance improved and for 3 countries relative performance declined.

1.2.3 Foreign doctorate students as percentage of all doctorate students



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016. No data for Bosnia and Herzegovina.

	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)			Performance change 2022-2023 (# of countries)					
	> EU	< EU	> 0	= 0	< 0	> EU	= EU	< EU	> EU	= EU	< EU
Member States	18	9	22	2	3	21	0	6	20	2	5
Non-EU countries	5	5	6	0	4	6	0	4	4	4	2

Innovation Leaders and Strong Innovators, on average, show higher performance on this indicator. The overall best performing countries in 2023 are Luxembourg and Switzerland. The EU average increased from 100 in 2016 to 110.6 in 2023.

Of the **Member States**, in 2023 in total 18 perform above and 9 perform below the EU average.

Between 2016 and 2023, for 22 Member States performance improved, for 2 Member States it did not change and for 3 Member States it declined. Compared to the EU, for 21 Member State performance improved and for 6 Member States relative performance declined. Relative performance increased fastest for Malta (+73.9%-points) and declined strongest for Lithuania (-23.3%-points).

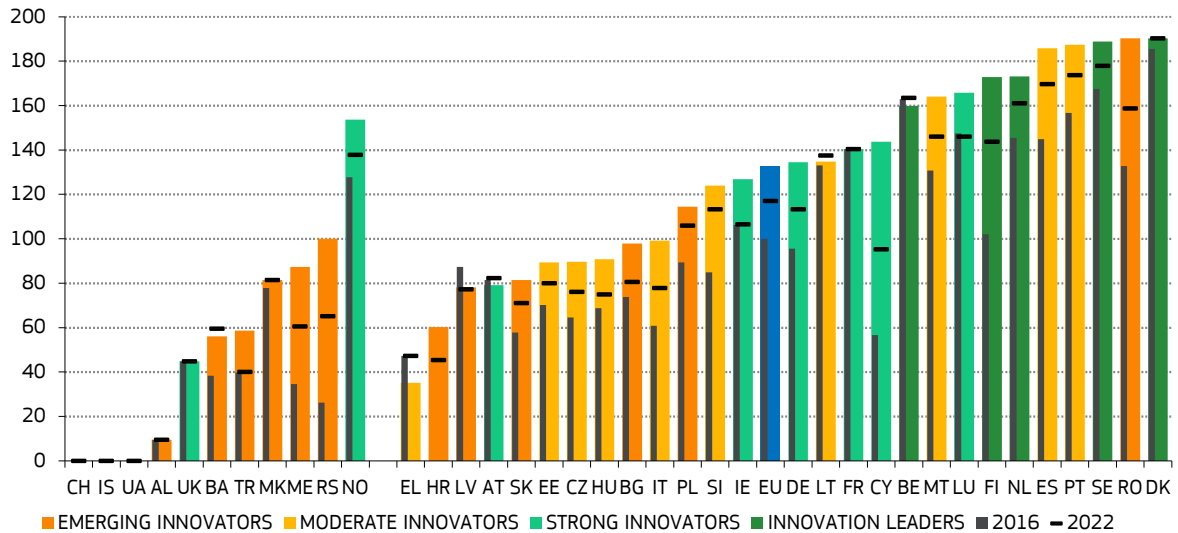
More recently between 2022 and 2023, for 20 Member States performance improved, for 2 Member States it did not change and for 5 Member States it declined. Compared to the EU, for 20 Member States performance improved, for 2 Member States relative performance did not change, and for 5 Member States performance declined. Relative performance increased fastest for Malta (+184.9%-points) and declined strongest for Belgium (-34.1%-points).

Of the **non-EU countries**, in 2023 5 perform above and 5 perform below the EU average.

Between 2016 and 2023, for 6 countries performance improved and for 4 countries performance declined. Compared to the EU, for 6 countries performance improved and for 4 countries relative performance declined.

More recently between 2022 and 2023, for 4 countries performance improved, for 4 countries relative performance did not change, and for 2 countries it declined. Compared to the EU, for 4 countries performance improved and for 4 countries relative performance did not change, and for 2 countries relative performance declined.

1.3.1 Broadband penetration



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016. No data for Iceland, Switzerland and Ukraine.

	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)				Performance change 2022-2023 (# of countries)				
	> EU	< EU	> 0	= 0	< 0	> EU	= EU	< EU	> 0	= EU	< EU
Member States	14	13	22	1	4	9	0	18	21	2	4
Non-EU countries	1	7	6	2	0	2	0	6	4	3	1

Countries from different performance groups show a high performance on this indicator. The overall best performing countries in 2023 are Denmark, Romania, , Sweden, Portugal, and Spain. The EU average increased from 100 in 2016 to 132.7 in 2023.

Of the **Member States**, in 2023 in total 14 perform above and 13 perform below the EU average.

Between 2016 and 2023, for 22 Member States performance improved, for 1 Member State it did not change and for 4 Member States it declined. Compared to the EU, for 9 Member States performance improved and for 18 Member States relative performance declined. Relative performance increased fastest for Cyprus (+48.4%-points) and declined strongest for Greece (-12.1%-points).

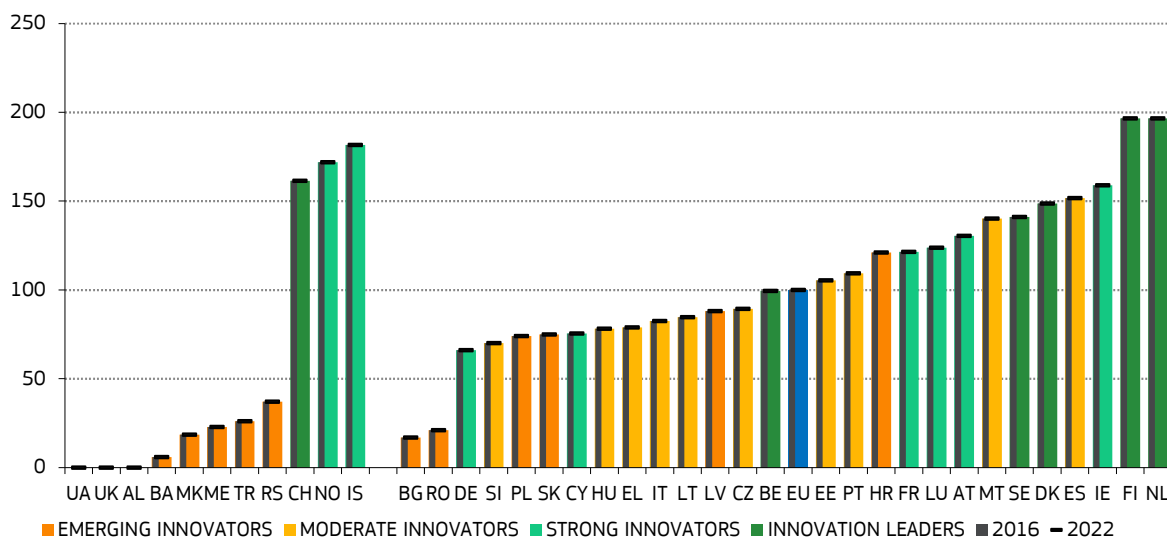
More recently between 2022 and 2023, for 21 Member States performance improved, for 2 Member States it did not change and for 4 Member States it declined. Compared to the EU, for 11 Member State performance improved and for 16 Member States performance declined. Relative performance increased fastest for Cyprus (+87%-points) and declined strongest for Greece (-12.1%-points).

Of the **non-EU countries**, in 2023 1 performs above and 7 perform below the EU average.

Between 2016 and 2023, for 6 countries performance improved and for 2 it did not change. Compared to the EU, for 2 countries performance improved and for 6 countries relative performance declined.

More recently between 2022 and 2023, for 4 countries performance improved, for 4 countries relative performance did not change, and for 2 countries it declined. Compared to the EU, for 4 countries performance improved and for 4 countries relative performance did not change, and for 2 countries relative performance declined.

1.3.2 Individuals who have above basic overall digital skills



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016. No data for Ukraine and United Kingdom.

	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)			Performance change 2022-2023 (# of countries)					
	> EU	< EU	> 0	= 0	< 0	> EU	= EU	< EU	> 0	= 0	< 0
Member States	13	14	-	-	-	-	-	-	-	-	-
Non-EU countries	3	6	-	-	-	-	-	-	-	-	-

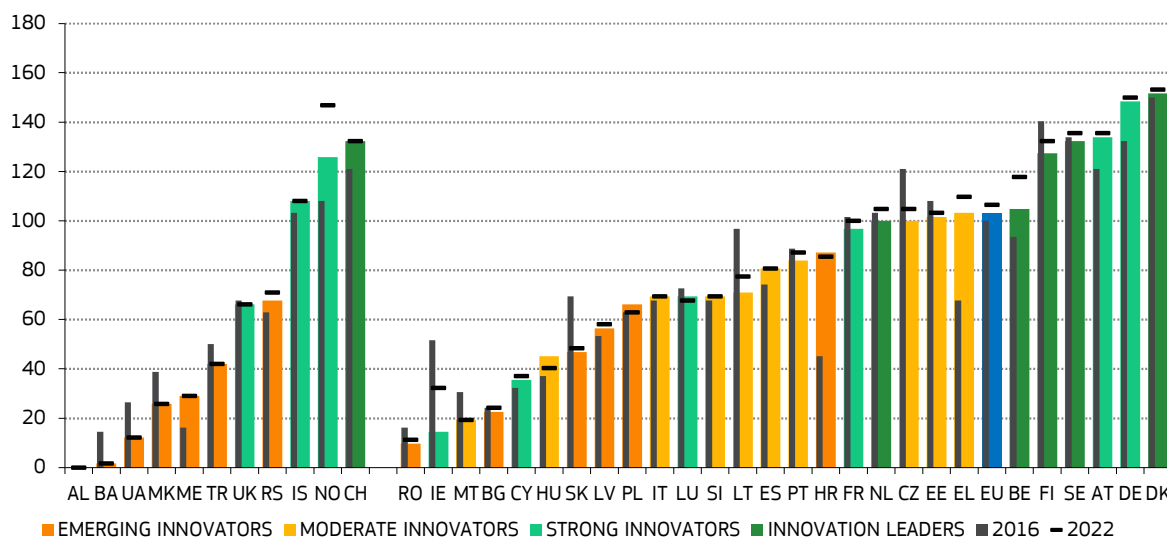
Performance change for 2016-2023 and 2022-2023 are not available for EU Member States as data for the first 7 years have been imputed using the 2023 data value also for 2016 and 2022.

The overall best performing countries for this indicator in 2023 are the Netherlands and Finland, followed by Iceland, Norway, and Switzerland.

Of the **Member States**, in 2023 in total 13 perform above and 14 perform below the EU average.

Of the **non-EU countries**, in 2023 3 perform above and 6 perform below the EU average.

2.1.1 R&D expenditure in the public sector as percentage of GDP



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016. No data for Albania but assumed to be equal to lowest performer.

	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)				Performance change 2022-2023 (# of countries)				
	> EU	= EU	> 0	= 0	< 0	> EU	= EU	< EU	> 0	= EU	< EU
Member States	6	1	13	0	14	7	0	20	4	4	7
	20								19		
Non-EU countries	3	0	5	1	5	5	0	9	0	9	1
	7								2		

Innovation Leaders and Strong Innovators, on average, show higher performance on this indicator. The overall best performing countries in 2023 are Denmark and Germany. The EU average increased slightly from 100 in 2016 to 103.2 in 2023.

Of the **Member States**, in 2023 in total 6 perform above, 1 performs equal to, and 20 perform below the EU average.

Between 2016 and 2023, for 13 Member States performance improved and for 14 Member States it declined. Compared to the EU, for 7 Member States performance improved and for 20 Member States relative performance declined. Relative performance increased fastest for Hungary (+4.8%-points) and declined strongest for Ireland (-17.7%-points).

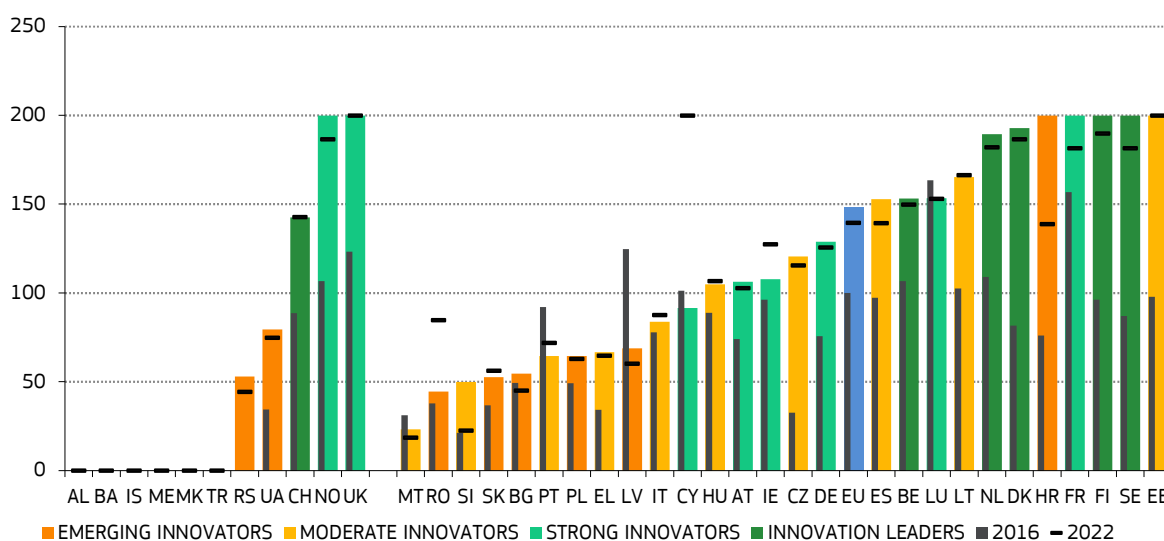
More recently between 2022 and 2023, for 4 Member States performance improved, for 4 Member States it did not change and for 19 Member States it declined. Compared to the EU, for 20 Member States performance improved and for 7 Member States performance declined. Relative performance increased fastest for Croatia (+41.9%-points) and declined strongest for Ireland (-37.1%-points).

Of the **non-EU countries**, in 2023 3 perform above and 7 perform below the EU average.

Between 2016 and 2023, for 5 countries performance improved, for 1 it did not change and for 5 countries performance declined. Compared to the EU, for 5 countries performance improved and for 6 countries relative performance declined.

More recently between 2022 and 2023, for none of the non-EU countries performance improved, for 9 countries relative performance did not change, and for 2 countries it declined. Compared to the EU, for 9 countries performance improved and for 1 country relative performance did not change, and for 1 country relative performance declined.

2.1.2 Venture capital expenditures as percentage of GDP



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016. No data for Albania, Bosnia and Herzegovina, Iceland, Montenegro and North Macedonia.

	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)				Performance change 2022-2023 (# of countries)			
Member States	> EU	11	> 0	22	> EU	10	> 0	18	> EU	8
	= EU	0	= 0	0	= EU	0	= 0	1	= EU	0
	< EU	16	< 0	5	< EU	17	< 0	8	< EU	19
Non-EU countries	> EU	2	> 0	5	> EU	4	> 0	3	> EU	1
	= EU	0	= 0	0	= EU	0	= 0	1	= EU	0
	< EU	3	< 0	0	< EU	1	< 0	1	< EU	4

Due to the skewness of the data, performance of seven countries in 2023 has been capped at an indicator value of 0.385 or almost 200% of the EU average (in 2016). These countries include, in descending order, Estonia, the United Kingdom, Sweden, Finland, France, Croatia, and Norway. The EU average increased from 100 in 2016 to 148.1 in 2023.

Of the **Member States**, in 2023 in total 11 perform above and 16 perform below the EU average.

Between 2016 and 2023, for 22 Member States performance improved and for 5 Member States it declined. Compared to the EU, for 10 Member States performance improved and for 17 Member States relative performance declined. Relative performance increased fastest for Croatia (+61.1%-points) and declined strongest for Cyprus (-108.4%-points).

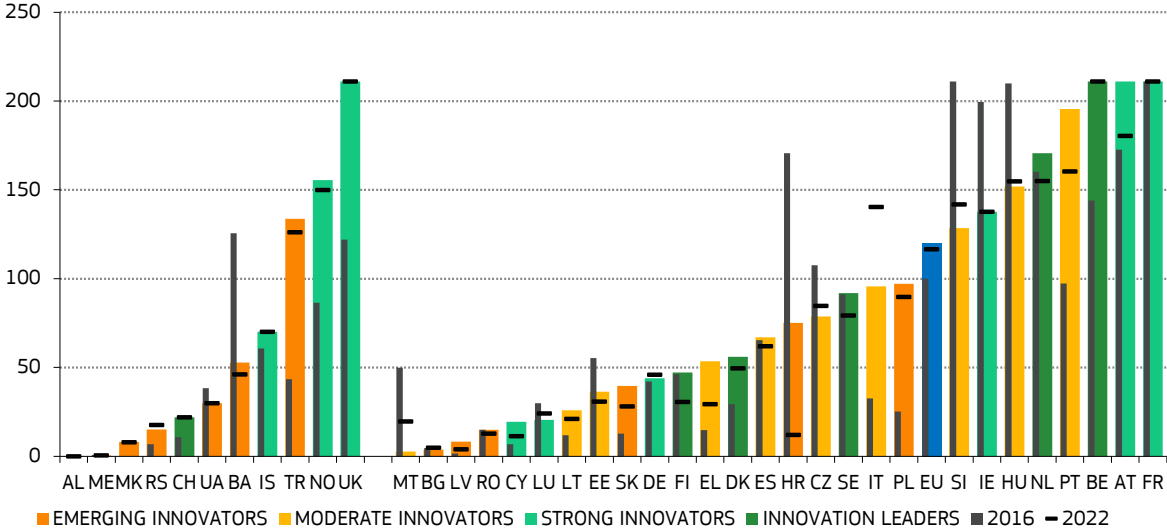
More recently between 2022 and 2023, for 18 Member States performance improved, for 1 Member State it did not change and for 8 Member States it declined. Compared to the EU, for 8 Member States performance improved and for 19 Member States performance declined. Relative performance increased fastest for Croatia (+123.9%-points) and declined strongest for Latvia (-55.7%-points).

Of the **non-EU countries**, in 2023 2 perform above and 3 perform below the EU average.

Between 2016 and 2023, for all 5 countries for which there is data performance improved. Compared to the EU, for 4 countries performance improved and for 1 country relative performance declined.

More recently between 2022 and 2023, for 3 countries performance improved, for 1 country relative performance did not change, and for 1 country it declined. Compared to the EU, for 1 country performance improved and for 4 countries relative performance declined.

2.1.3 Direct government funding and government tax support for business R&D as percentage of GDP



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016. No data for Albania.

	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)			Performance change 2022-2023 (# of countries)				
Member States	> EU	8	> 0	17	> EU	8	> 0	17	> EU	15
	= EU	0	= 0	1	= EU	0	= 0	2	= EU	0
	< EU	19	< 0	9	< EU	19	< 0	8	< EU	12
Non-EU countries	> EU	3	> 0	7	> EU	3	> 0	4	> EU	3
	= EU	0	= 0	0	= EU	0	= 0	5	= EU	0
	< EU	7	< 0	3	< EU	7	< 0	1	< EU	7

Due to the skewness of the data, performance of four countries in 2023 has been capped at an indicator value of 0.32 or 211% of the EU average (in 2016). These countries include, in descending order, the United Kingdom, France, Austria, and Belgium. The EU average increased from 100 in 2016 to 119.8 in 2023.

Of the **Member States**, in 2023 in total 8 perform above and 19 perform below the EU average.

Between 2016 and 2023, for 17 Member States performance improved, for 1 Member State it did not change and for 9 Member States it declined. Compared to the EU, for 8 Member States performance improved and for 19 Member States relative performance declined. Relative performance increased fastest for Croatia (+63.1%-points) and declined strongest for Italy (-44.6%-points).

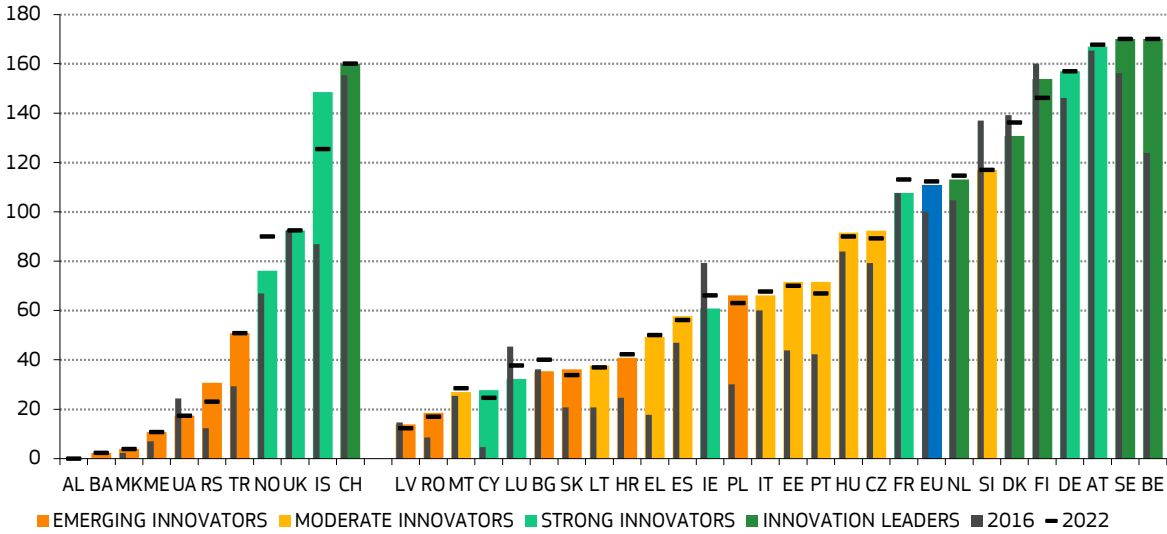
More recently between 2022 and 2023, for 17 Member States performance improved, for 2 Member States it did not change and for 8 Member States it declined. Compared to the EU, for 15 Member States performance improved and for 12 Member States performance declined. Relative performance increased fastest for Portugal (+98.3%-points) and declined strongest for Croatia (-95.4%-points).

Of the **non-EU countries**, in 203 3 perform above and 7 perform below the EU average.

Between 2016 and 2023, for 7 countries performance improved and for 3 countries performance declined. Compared to the EU, for 3 countries performance improved and for 7 countries relative performance declined.

More recently between 2022 and 2023, for 4 countries performance improved, for 5 countries relative performance did not change, and for 1 country it declined. Compared to the EU, for 3 countries performance improved and for 7 countries relative performance declined.

2.2.1 R&D expenditure in the business sector as percentage of GDP



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016. No data for Albania but assumed to be equal to lowest performer.

	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)			Performance change 2022-2023 (# of countries)		
	> EU	< EU	> 0	= 0	< 0	> EU	= EU	< EU
Member States	8	19	19	1	7	11	2	14
Non-EU countries	2	8	8	2	1	3	0	8

Innovation Leaders and Strong Innovators, on average, show higher performance on this indicator. The overall best performing countries in 2023 are Belgium, Sweden, and Austria. The EU average increased from 100 in 2016 to 119.8 in 2023.

Of the **Member States**, in 2023 in total 8 perform above and 19 perform below the EU average.

Between 2016 and 2023, for 19 Member States performance improved, for 1 Member State it did not change and for 7 Member States it declined. Compared to the EU, for 11 Member States performance improved, for 2 Member States relative performance did not change, and for 14 Member States relative performance declined. Relative performance increased fastest for Finland (+7.7%-points) and declined strongest for Ireland (-5.4%-points).

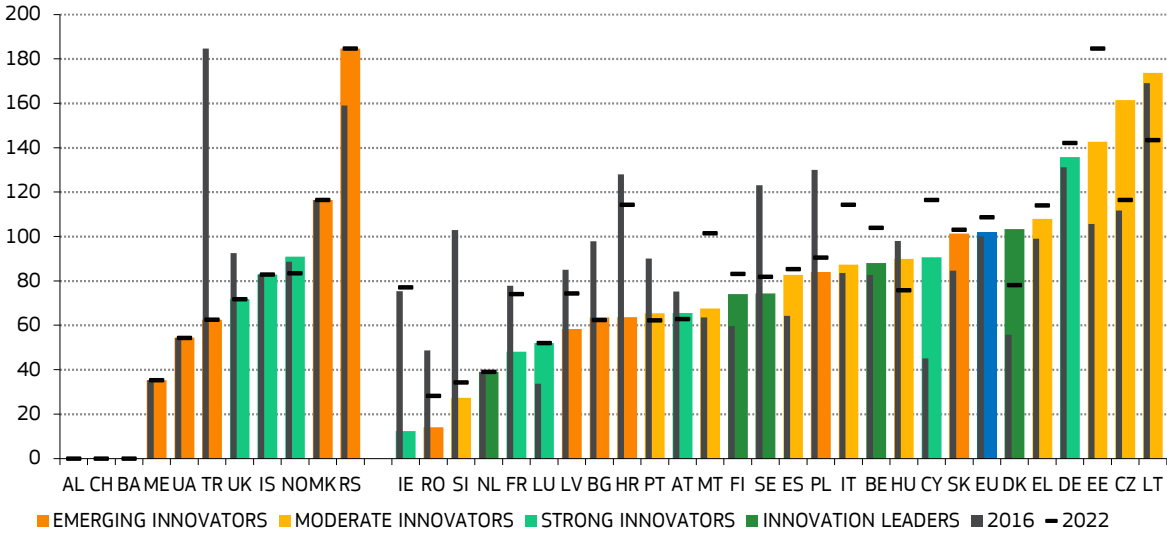
More recently between 2022 and 2023, for 12 Member States performance improved, for 4 Member States it did not change and for 11 Member State it declined. Compared to the EU, for 18 Member States performance improved, for 2 Member States relative performance did not change, and for 7 Member States performance declined. Relative performance increased fastest for Belgium (+46.2%-points) and declined strongest for Slovenia (-20%-points).

Of the **non-EU countries**, in 2023 2 perform above and 8 perform below the EU average.

Between 2016 and 2023, for 8 countries performance improved, for 2 it did not change and for 1 country performance declined. Compared to the EU, for 3 countries performance improved and for 8 countries relative performance declined.

More recently between 2022 and 2023, for 2 countries performance improved, for 8 countries relative performance did not change, and for 1 country it declined. Compared to the EU, for 10 countries performance improved and for 1 country relative performance declined.

2.2.2 Non-R&D innovation expenditure as percentage of total turnover



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016. No data for Albania and Switzerland.

	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)				Performance change 2022-2023 (# of countries)			
Member States	> EU	6	> 0	14	> EU	14	> 0	7	> EU	15
	= EU	0	= 0	1	= EU	0	= 0	2	= EU	0
	< EU	21	< 0	12	< EU	13	< 0	18	< EU	12
Non-EU countries	> EU	2	> 0	3	> EU	2	> 0	2	> EU	9
	= EU	0	= 0	4	= EU	0	= 0	7	= EU	0
	< EU	7	< 0	2	< EU	7	< 0	0	< EU	0

Countries from different performance groups show a high performance on this indicator. The overall best performing country in 2023 is Serbia, followed by Estonia and Czechia. The EU average increased from 100 in 2016 to 101.7 in 2023.

Of the **Member States**, in 2023 in total 6 perform above and 21 perform below the EU average.

Between 2016 and 2023, for 14 Member States performance improved, for 1 Member State it did not change and for 12 Member States it declined. Compared to the EU, for 14 Member States performance improved and for 13 Member States relative performance declined. Relative performance increased fastest for Czechia (+45%-points) and declined strongest for Ireland (-64.7%-points).

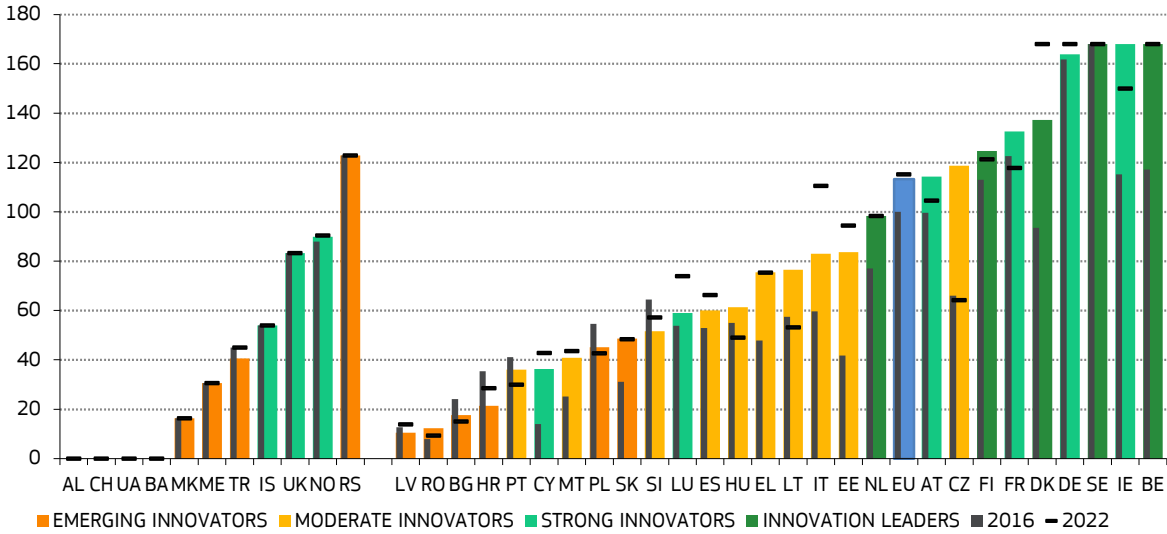
More recently between 2022 and 2023, for 7 Member States performance improved, for 2 Member States it did not change and for 18 Member States it declined. Compared to the EU, for 15 Member States performance improved and for 12 Member States performance declined. Relative performance increased fastest for Czechia (+49.8%-points) and declined strongest for Slovenia (-75.6%-points).

Of the **non-EU countries**, in 2023 2 perform above and 7 perform below the EU average.

Between 2016 and 2023, for 3 countries performance improved, for 4 it did not change and for 2 countries performance declined. Compared to the EU, for 2 countries performance improved and for 7 countries relative performance declined.

More recently between 2022 and 2023, for 2 countries performance improved and for 7 countries relative performance did not change. Compared to the EU, for all 9 countries for which there is data available performance improved.

2.2.3 Innovation expenditures per person employed



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016. No data for Albania, Switzerland and Ukraine.

		Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)			Performance change 2022-2023 (# of countries)			
Member States	> EU	9	> 0	20	> EU	13	> 0	13	> EU	16
	= EU	0	= 0	1	= EU	0	= 0	3	= EU	0
	< EU	18	< 0	6	< EU	14	< 0	11	< EU	11
Non-EU countries	> EU	1	> 0	1	> EU	0	> 0	0	> EU	7
	= EU	0	= 0	6	= EU	0	= 0	6	= EU	0
	< EU	7	< 0	1	< EU	8	< 0	2	< EU	1

Innovation Leaders and Strong Innovators, on average, show higher performance on this indicator. The best performing countries in 2023 are Belgium, Ireland, Sweden, and Germany. The EU average increased from 100 in 2016 to 113.3 in 2023.

Of the **Member States**, in 2023 in total 9 perform above and 18 perform below the EU average.

Between 2016 and 2023, for 20 Member States performance improved, for 1 Member State it did not change and for 6 Member States it declined. Compared to the EU, for 13 Member States performance improved and for 14 Member States relative performance declined. Relative performance increased fastest for Czechia (+54.5%-points) and declined strongest for Denmark (-30.7%-points).

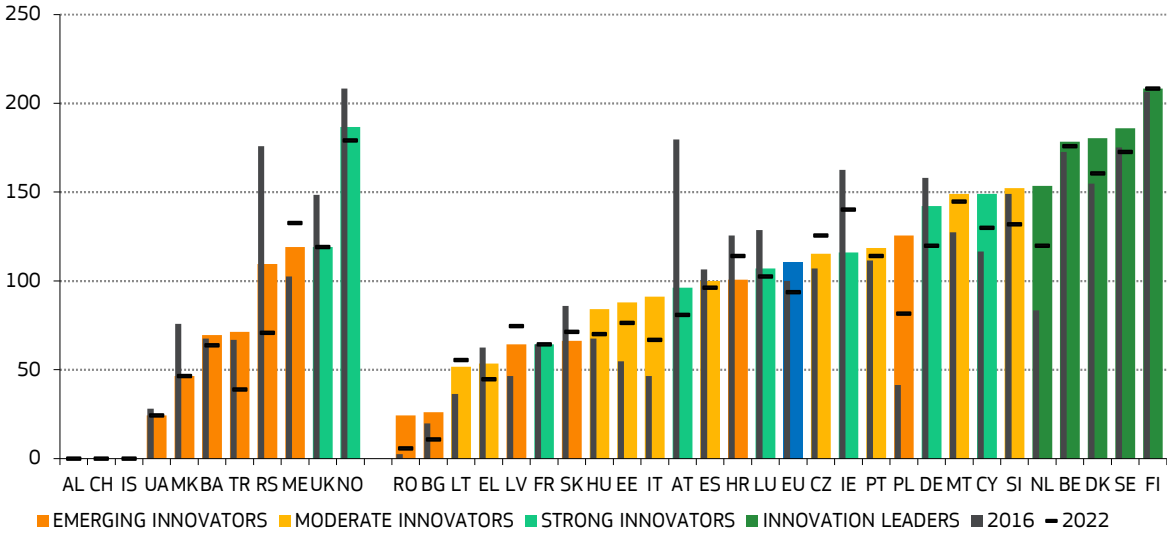
More recently between 2022 and 2023, for 13 Member States performance improved, for 3 Member States it did not change and for 11 Member State it declined. Compared to the EU, for 16 Member States performance improved and for 11 Member State performance declined. Relative performance increased fastest for Ireland (+52.8%-points) and declined strongest for Croatia (-14%-points).

Of the **non-EU countries**, in 2023 1 performs above and 7 perform below the EU average.

Between 2016 and 2023, for 1 country performance improved, for 6 it did not change and for 1 country performance declined. Compared to the EU, no country's performance improved and for 8 countries relative performance declined.

More recently between 2022 and 2023, for 6 countries relative performance did not change, and for 2 countries it declined. Compared to the EU, for 7 countries performance improved and for 1 country relative performance declined.

2.3.1 Enterprises providing training to develop or upgrade ICT skills of their personnel



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016. No data for Albania, Iceland and Switzerland.

		Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)			Performance change 2022-2023 (# of countries)			
Member States	> EU	13	> 0	18	> EU	11	> 0	19	> EU	8
	= EU	0	= 0	1	= EU	1	= 0	2	= EU	0
	< EU	14	< 0	8	< EU	15	< 0	6	< EU	19
Non-EU countries	> EU	3	> 0	3	> EU	1	> 0	4	> EU	2
	= EU	0	= 0	0	= EU	0	= 0	3	= EU	0
	< EU	5	< 0	5	< EU	7	< 0	1	< EU	6

Innovation Leaders and Strong Innovators, on average, show higher performance on this indicator. Finland is the best performing country, followed by Norway, Sweden, Denmark, and Belgium. The EU average increased from 100 in 2016 to 110.8 in 2023.

Of the **Member States**, in 2023 in total 13 perform above and 14 perform below the EU average.

Between 2016 and 2023, for 18 Member States performance improved, for 1 Member State it did not change and for 8 Member States it declined. Compared to the EU, for 11 Member States performance improved, for 1 Member State relative performance did not change, and for 15 Member States relative performance declined. Relative performance increased fastest for Poland (+43.9%-points) and declined strongest for Ireland (-24.2%-points).

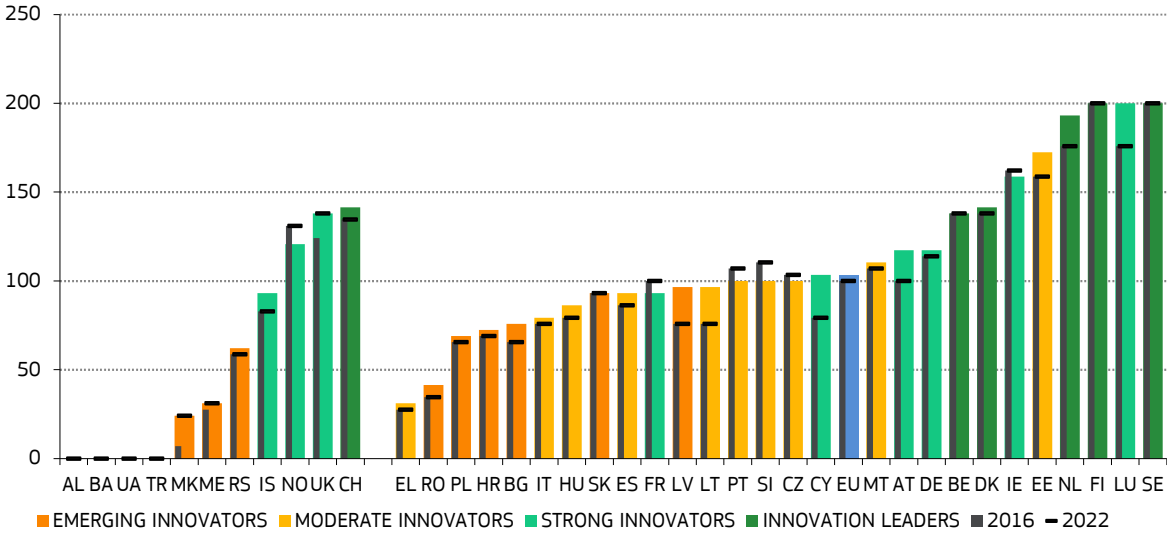
More recently between 2022 and 2023, for 19 Member States performance improved, for 2 Member States it did not change and for 6 Member States it declined. Compared to the EU, for 8 Member States performance improved and for 19 Member States performance declined. Relative performance increased fastest for Poland (+84.1%-points) and declined strongest for Austria (-83.4%-points).

Of the **non-EU countries**, in 2023 3 perform above and 5 perform below the EU average.

Between 2016 and 2023, for 3 countries performance improved and for 5 countries performance declined. Compared to the EU, for 1 country performance improved and for 7 countries relative performance declined.

More recently between 2022 and 2023, for 4 countries performance improved, for 3 countries relative performance did not change, and for 1 country it declined. Compared to the EU, for 2 countries performance improved and for 6 countries relative performance declined.

2.3.2 Employed ICT specialists as a percentage of total employment



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016. No data for Albania, Bosnia and Herzegovina and Ukraine.

	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)			Performance change 2022-2023 (# of countries)					
	> EU	= EU	> 0	= 0	< 0	> EU	= EU	< EU	> EU	= EU	< EU
Member States	11	1	11	1	15	18	4	5	17	1	9
Non-EU countries	3	0	6	1	5	3	4	1	3	0	5

Performance change for 2016-2023 is not available for EU Member States as data for the first 6 years have been imputed using the 2022 data value also for 2016. For several non-EU countries longer time series are available

Sweden, Luxembourg, and Finland are the best performing countries on this indicator. The EU average increased from 100 in 2016 to 103.4 in 2023.

Of the **Member States**, in 2023 in total 11 perform above, 1 performs equal to, and 15 perform below the EU average.

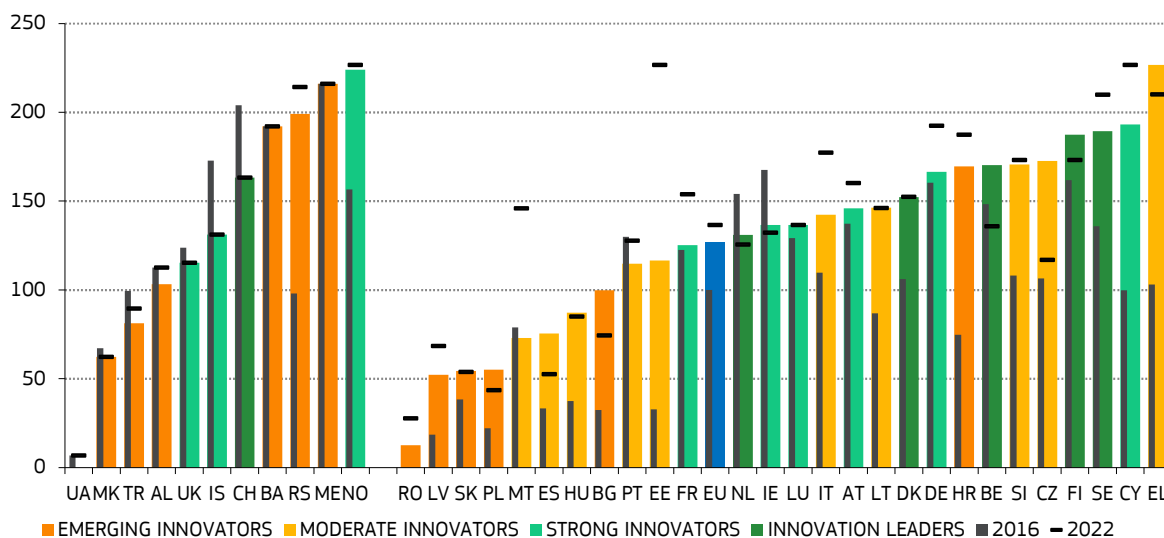
Between 2022 and 2023, for 18 Member States performance improved, for 4 Member States it did not change and for 5 Member States it declined. Compared to the EU, for 17 Member States performance improved, for 1 Member State relative performance did not change, and for 9 Member States performance declined. Relative performance increased fastest for Luxembourg (+24.1%-points) and declined strongest for Slovenia (-10.3%-points).

Of the **non-EU countries**, in 2023 3 perform above and 5 perform below the EU average.

Between 2016 and 2023, for 6 countries performance improved, for 1 it did not change and for 1 country performance declined. Compared to the EU, for 6 countries performance improved and for 2 countries relative performance declined.

More recently between 2022 and 2023, for 3 countries performance improved, for 4 countries relative performance did not change, and for 1 country it declined. Compared to the EU, for 3 countries performance improved and for 5 countries relative performance declined.

3.1.1 SMEs introducing product innovations as percentage of SMEs



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016.

	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)			Performance change 2022-2023 (# of countries)		
	> EU	< EU	> 0	= 0	< 0	> EU	= EU	< EU
Member States	16	11	23	0	4	15	0	12
Non-EU countries	6	5	2	2	7	2	0	5

The overall best performing countries are Greece, Norway, and Montenegro. The EU average increased from 100 in 2016 to 126.7 in 2023.

Of the **Member States**, in 2013 in total 16 perform above and 11 perform below the EU average.

Between 2016 and 2023, for 23 Member States performance improved, and for 4 Member States it declined. Compared to the EU, for 15 Member States performance improved, and for 12 Member States relative performance declined. Relative performance increased fastest for Greece (+123.7%-points) and declined strongest for Ireland (-30.9%-points).

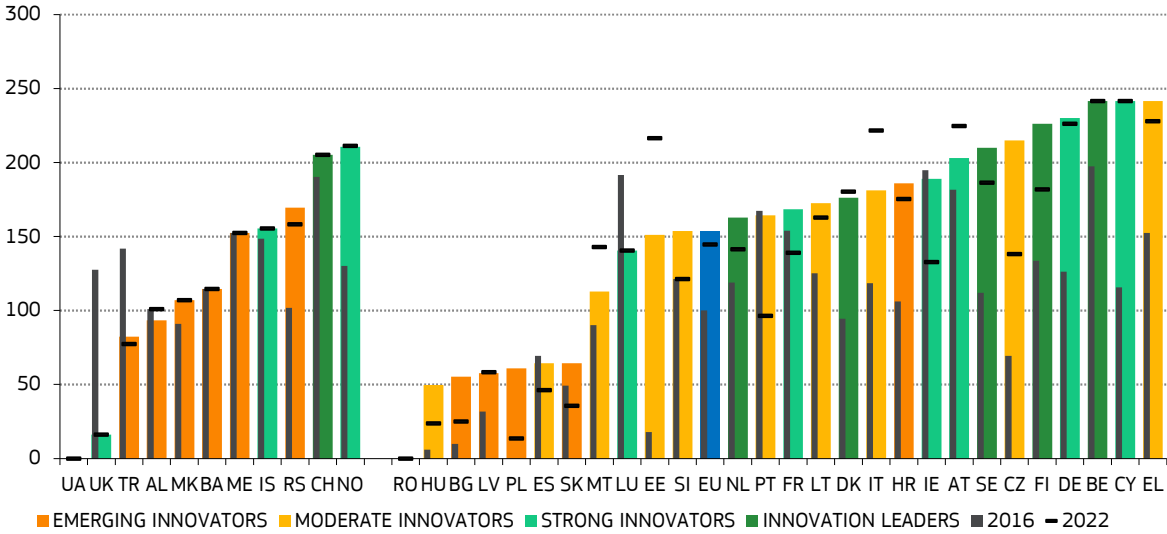
More recently between 2022 and 2023, for 12 Member States performance improved, for 1 Member State it did not change and for 14 Member States it declined. Compared to the EU, for 15 Member States performance improved, and for 12 Member States performance declined. Relative performance increased fastest for Czechia (+55.8%-points) and declined strongest for Estonia (-110.2%-points).

Of the **non-EU countries**, in 2023 6 perform above and 5 perform below the EU average.

Between 2016 and 2023, for all 2 countries performance improved, for 2 countries relative performance did not change, and for 7 countries performance declined. Compared to the EU, for 2 countries performance improved, and for 9 countries relative performance declined.

More recently between 2022 and 2023, for 6 countries relative performance did not change, and for 5 countries it declined. Compared to the EU, for 10 countries performance improved, and for 1 country it declined.

3.1.2 SMEs introducing business process innovations as percentage of SMEs



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016. No data for Ukraine.

	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)			Performance change 2022-2023 (# of countries)					
	> EU	< EU	> 0	= 0	< 0	> EU	= EU	< EU	> 0	= EU	< EU
Member States	16	11	22	1	4	11	0	16	17	4	6
Non-EU countries	4	6	5	2	3	2	0	8	2	6	2

The overall best performing countries are Greece, Cyprus, and Finland. The EU average increased from 100 in 2016 to 153.8 in 2023.

Of the **Member States**, in 2023 in total 16 perform above and 11 perform below the EU average.

Between 2016 and 2023, for 22 Member States performance improved, for 1 Member State it did not change and for 4 Member States it declined. Compared to the EU, for 11 Member State performance improved, and for 16 Member States relative performance declined. Relative performance increased fastest for Czechia (+145.7%-points) and declined strongest for Luxembourg (-51.1%-points).

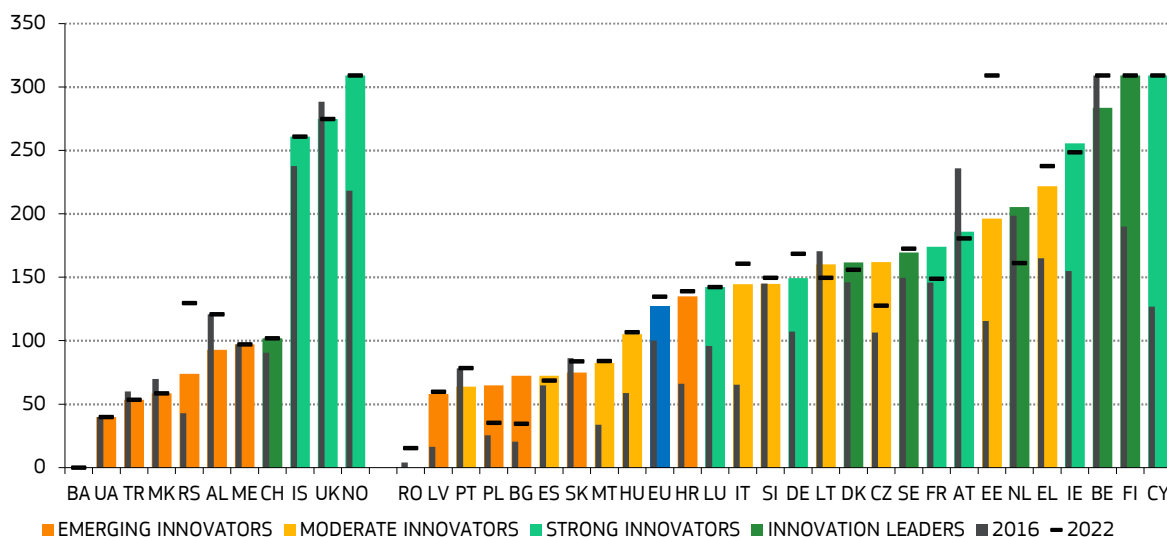
More recently between 2022 and 2023, for 17 Member States performance improved, for 4 Member States it did not change and for 6 Member States it declined. Compared to the EU, for 16 Member States performance improved, and for 11 Member State performance declined. Relative performance increased fastest for Czechia (+76.8%-points) and declined strongest for Estonia (-65.2%-points).

Of the **non-EU countries**, in 2023 4 perform above and 6 perform below the EU average.

Between 2016 and 2023, for all 5 countries performance improved, for 2 countries relative performance did not change, and for 3 countries performance declined. Compared to the EU, for 2 countries performance improved, and for 8 countries relative performance declined.

More recently between 2022 and 2023, for 2 country performance improved, for 6 countries relative performance did not change, and for 2 countries it declined. Compared to the EU, for 1 country performance improved, and for 9 countries it declined.

3.2.1 Innovative SMEs co-operating with others as percentage of all SMEs



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016. No data for Bosnia and Herzegovina.

	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)				Performance change 2022-2023 (# of countries)				
	> EU	< EU	> 0	= 0	< 0	> EU	= EU	< EU	> EU	= EU	< EU
Member States	18	9	20	0	7	16	0	11	10	3	14
Non-EU countries	3	7	4	0	4	2	0	8	0	8	2

The best performing countries in 2023 are Norway, Cyprus, and Finland. The EU average increased from 100 in 2016 to 126.8 in 2023.

Of the Member States, in 2023 in total 18 perform above and 9 perform below the EU average.

Between 2016 and 2023, for 20 Member States performance improved, and for 7 Member States it declined. Compared to the EU, for 16 Member States performance improved, and for 11 Member State relative performance declined. Relative performance increased fastest for Cyprus (+182.3%-points) and declined strongest for Austria (-50%-points).

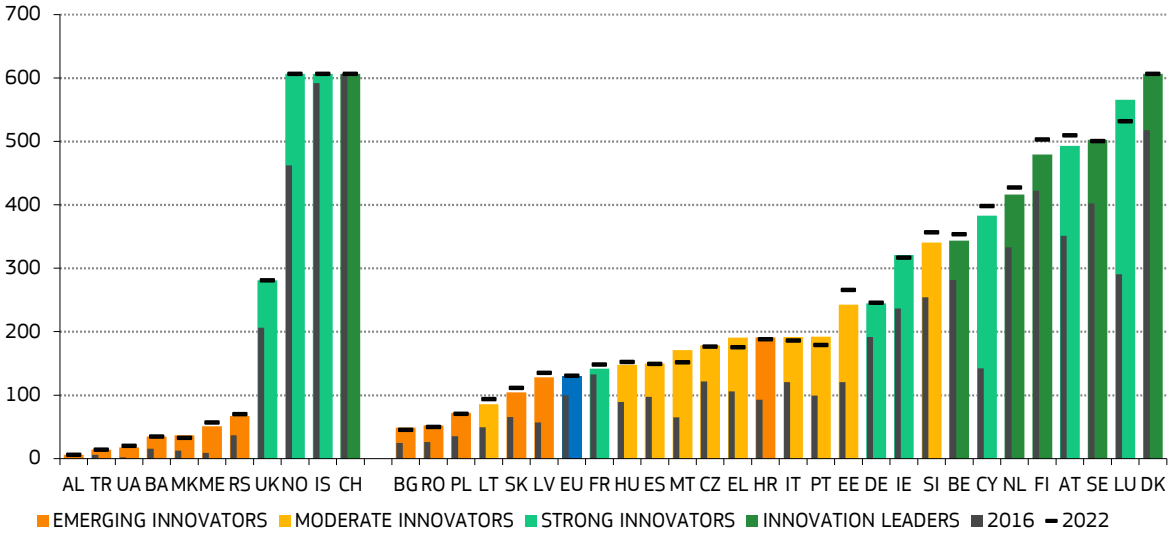
More recently between 2022 and 2023, for 10 Member States performance improved, for 3 Member States it did not change, and for 14 Member States it declined. Compared to the EU, for 19 Member States performance improved, and for 8 Member States performance declined. Relative performance increased fastest for Netherlands (+44%-points) and declined strongest for Estonia (-112.7%-points).

Of the non-EU countries, in 2023 3 perform above and 7 perform below the EU average.

Between 2016 and 2023, for all 4 countries performance improved, for 2 countries relative performance did not change, and for 4 countries performance declined. Compared to the EU, for 2 countries performance improved, and for 8 countries relative performance declined.

More recently between 2022 and 2023, for 8 countries relative performance did not change, and for 2 countries it declined. Compared to the EU, for 8 countries performance improved, and for 2 countries it declined.

3.2.2 Public-private scientific co-publications per million population



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016.

	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)			Performance change 2022-2023 (# of countries)				
Member States	> EU	21	> 0	27	> EU	24	> 0	13	> EU	14
	= EU	0	= 0	0	= EU	0	= 0	1	= EU	0
	< EU	6	< 0	0	< EU	3	< 0	13	< EU	13
Non-EU countries	> EU	4	> 0	10	> EU	4	> 0	1	> EU	8
	= EU	0	= 0	1	= EU	0	= 0	7	= EU	0
	< EU	7	< 0	0	< EU	7	< 0	3	< EU	3

Innovation Leaders and Strong Innovators, on average, show higher performance on this indicator. Due to the skewness of the data, performance of four countries in 2023 has been capped at an indicator value of 622.6 or 606.5% of the EU average (in 2016). These countries include, in descending order, Switzerland, Iceland, Denmark, and Norway. The EU average increased from 100 in 2016 to 129.6 in 2023.

Of the Member States, in 2023 in total 21 perform above and 6 perform below the EU average.

Between 2016 and 2023, for 27 Member States performance improved. Compared to the EU, for 24 Member States performance improved, and for 3 Member States relative performance declined. Relative performance increased fastest for Luxembourg (+274.9%-points) and declined strongest for France (9.1%-points).

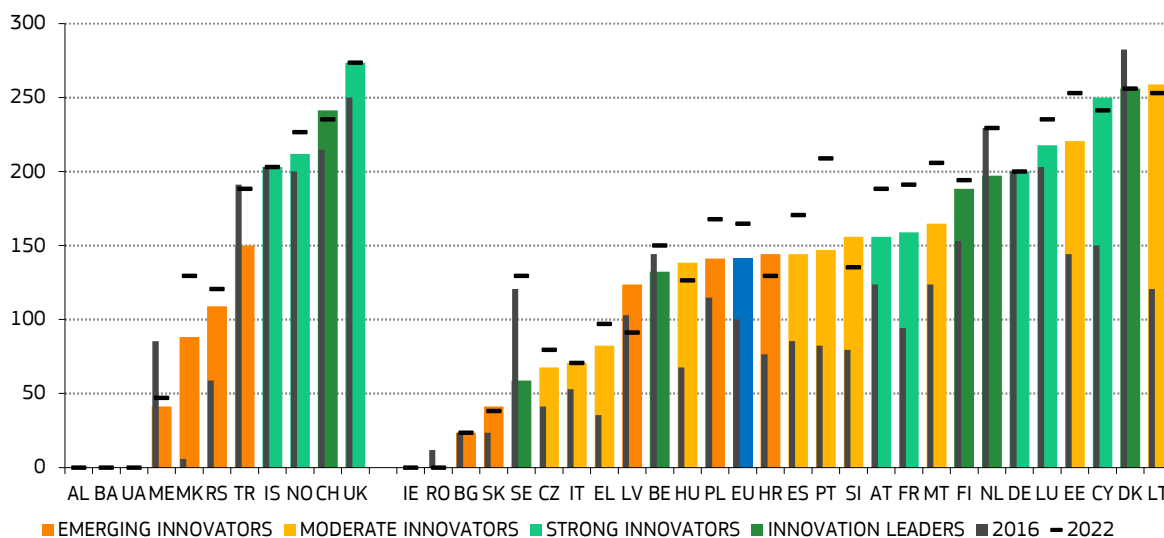
More recently between 2022 and 2023, for 13 Member States performance improved, for 1 Member State it did not change and for 13 Member States it declined. Compared to the EU, for 14 Member States performance improved, and for 13 Member States performance declined. Relative performance increased fastest for Luxembourg (+33.8%-points) and declined strongest for Finland (-23.7%-points).

Of the non-EU countries, in 2023 4 perform above and 7 perform below the EU average.

Between 2016 and 2023, for all 10 countries performance improved, for 1 country relative performance did not change. Compared to the EU, for 4 countries performance improved, and for 7 countries relative performance declined.

More recently between 2022 and 2023, for 1 country performance improved, for 7 countries relative performance did not change, and for 3 countries it declined. Compared to the EU, for 8 countries performance improved, and for 3 countries it declined.

3.2.3 Job-to-job mobility of Human Resources in Science and Technology (HRST)



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016. No data for Albania, Bosnia and Herzegovina and Ukraine.

	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)			Performance change 2022-2023 (# of countries)					
	> EU	= EU	> 0	= 0	< 0	> EU	= EU	< EU	> 0	= 0	< 0
Member States	15	1	19	2	5	10	1	15	7	5	14
Non-EU countries	5	0	5	1	2	2	0	6	1	2	5

The overall best performing country in 2023 is United Kingdom, followed by Lithuania, Denmark, and Cyprus. The EU average increased from 100 in 2016 to 141.2 in 2023.

Of the **Member States**, in 2023 in total 15 perform above, 1 performs equal to, and 10 perform below the EU average.

Between 2016 and 2023, for 19 Member States performance improved, for 2 Member States it did not change and for 5 Member States it declined. Compared to the EU, for 10 Member States performance improved, for 1 Member State relative performance did not change, and for 15 Member States relative performance declined. Relative performance increased fastest for Lithuania (+138.2%-points) and declined strongest for Sweden (-61.8%-points).

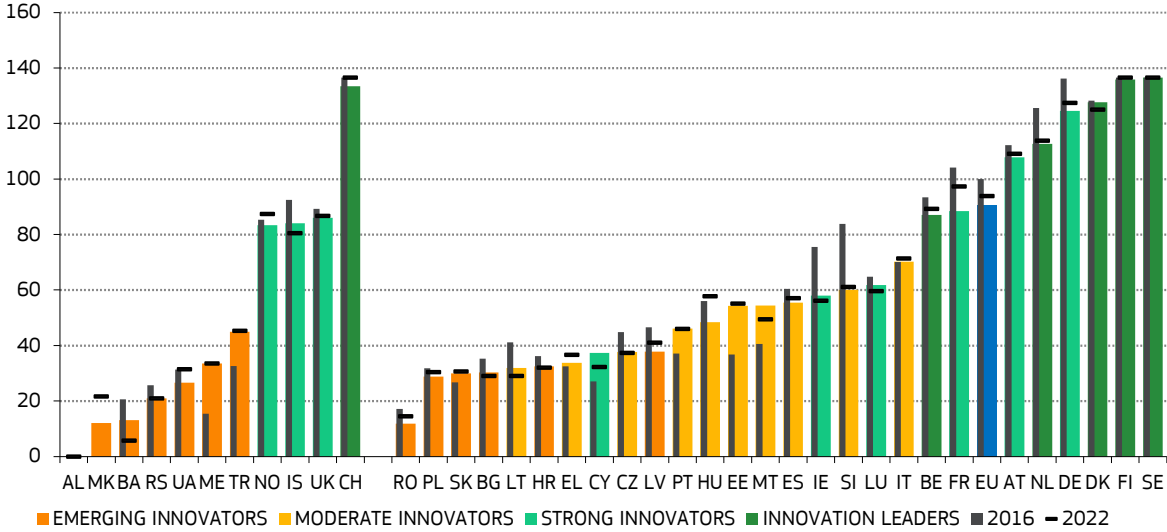
More recently between 2022 and 2023, for 7 Member State performance improved, for 5 Member States it did not change and for 14 Member States it declined. Compared to the EU, for 17 Member States performance improved, and for 9 Member States performance declined. Relative performance increased fastest for Latvia (+32.4%-points) and declined strongest for Sweden (-70.6%-points).

Of the **non-EU countries**, in 203 5 perform above and 3 perform below the EU average.

Between 2016 and 2023, for all 5 countries performance improved, for 1 country relative performance did not change, and for 2 countries performance declined. Compared to the EU, for 2 countries performance improved, and for 6 countries relative performance declined.

More recently between 2022 and 2023, for 1 country performance improved, for 2 countries relative performance did not change, and for 5 countries it declined. Compared to the EU, for 6 countries performance improved, and for 2 countries it declined.

3.3.1 PCT patent applications per billion GDP in PPS



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016.

	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)			Performance change 2022-2023 (# of countries)				
Member States	> EU	6	> 0	7	> EU	22	> 0	10	> EU	25
	= EU	0	= 0	1	= EU	0	= 0	1	= EU	0
	< EU	21	< 0	19	< EU	5	< 0	16	< EU	2
Non-EU countries	> EU	1	> 0	3	> EU	10	> 0	2	> EU	7
	= EU	0	= 0	0	= EU	0	= 0	2	= EU	0
	< EU	9	< 0	7	< EU	0	< 0	6	< EU	3

Innovation Leaders and Strong Innovators, on average, show higher performance on this indicator. The overall best performing countries in 2023 are Sweden, Finland, and Switzerland. The EU average declined from 100 in 2016 to 90.5 in 2023.

Of the **Member States**, in 2023 in total 6 perform above and 21 perform below the EU average.

Between 2016 and 2023, for 7 Member States performance improved, for 1 Member State it did not change and for 19 Member States it declined. Compared to the EU, for 22 Member States performance improved, and for 5 Member States relative performance declined. Relative performance increased fastest for Estonia (+17.5%-points) and declined strongest for Slovenia (-23.7%-points).

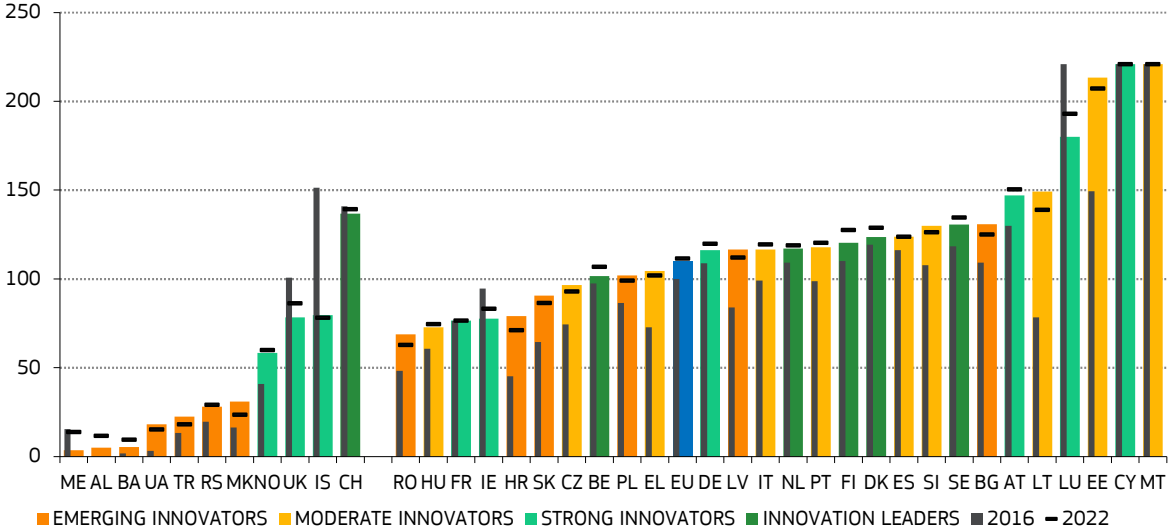
More recently between 2022 and 2023, for 10 Member States performance improved, for 1 Member State it did not change and for 16 Member States it declined. Compared to the EU, for 25 Member States performance improved, and for 2 Member States performance declined. Relative performance increased fastest for Cyprus (+5.1%-points) and declined strongest for Hungary (-9.3%-points).

Of the **non-EU countries**, in 2023 1 performs above and 9 perform below the EU average.

Between 2016 and 2023, for all 3 countries performance improved, and for 7 countries performance declined. Compared to the EU, for all 10 countries performance improved.

More recently between 2022 and 2023, for 2 country performance improved, for 2 countries relative performance did not change, and for 6 countries it declined. Compared to the EU, for 7 countries performance improved, and for 3 countries it declined.

3.3.2 Trademark applications per billion GDP in PPS



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016.

	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)			Performance change 2022-2023 (# of countries)		
	> EU	< EU	> 0	= 0	< 0	> EU	= EU	< EU
Member States	17	10	23	2	2	17	0	10
Non-EU countries	1	10	7	0	4	3	0	8

The best performing Member States are Malta, Cyprus, and Estonia. The best performing non-EU country in 2023 is Switzerland. The EU average increased from 100 in 2016 to 109.9 in 2023.

Of the **Member States**, in 2023 in total 17 perform above and 10 perform below the EU average.

Between 2016 and 2023, for 23 Member States performance improved, for 2 Member States it did not change and for 2 Member States it declined. Compared to the EU, for 17 Member States performance improved, and for 10 Member States relative performance declined. Relative performance increased fastest for Lithuania (+70.9%-points) and declined strongest for Luxembourg (-40.9%-points).

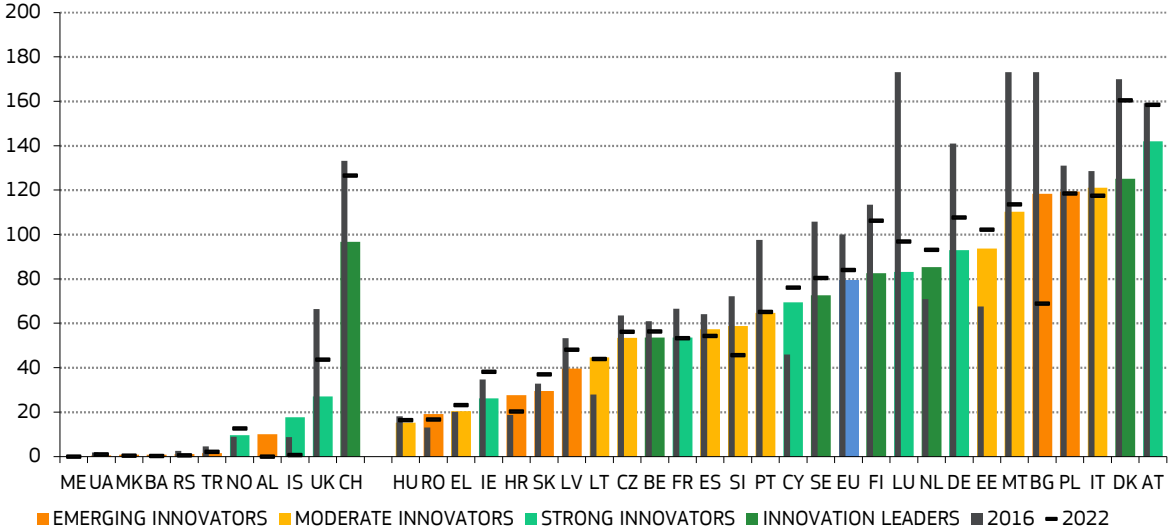
More recently between 2022 and 2023, for 13 Member States performance improved, for 2 Member States it did not change and for 12 Member States it declined. Compared to the EU, for 15 Member States performance improved, and for 12 Member States performance declined. Relative performance increased fastest for Lithuania (+10.3%-points) and declined strongest for Luxembourg (-13.1%-points).

Of the **non-EU countries**, in 2023 1 performs above and 10 perform below the EU average.

Between 2016 and 2023, for all 7 countries performance improved, and for 4 countries performance declined. Compared to the EU, for 3 countries performance improved, and for 8 countries relative performance declined.

More recently between 2022 and 2023, for 4 country performance improved, and for 7 countries it declined. Compared to the EU, for 6 countries performance improved, and for 5 countries it declined.

3.3.3 Design applications per billion GDP in PPS



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016.

	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)			Performance change 2022-2023 (# of countries)		
	> EU	< EU	> 0	= 0	< 0	> EU	= EU	< EU
Member States	11	16	7	0	20	19	0	8
Non-EU countries	1	10	5	1	5	9	0	2

The overall best performing country is Austria, followed by Denmark, Italy, Poland, and Bulgaria. The EU average declined from 100 in 2016 to 79.3 in 2023.

Of the **Member States**, in 2023 in total 11 perform above and 16 perform below the EU average.

Between 2016 and 2023, for 7 Member States performance improved, and for 20 Member States it declined. Compared to the EU, for 19 Member States performance improved, and for 8 Member States relative performance declined. Relative performance increased fastest for Estonia (+26%-points) and declined strongest for Luxembourg (-90%-points).

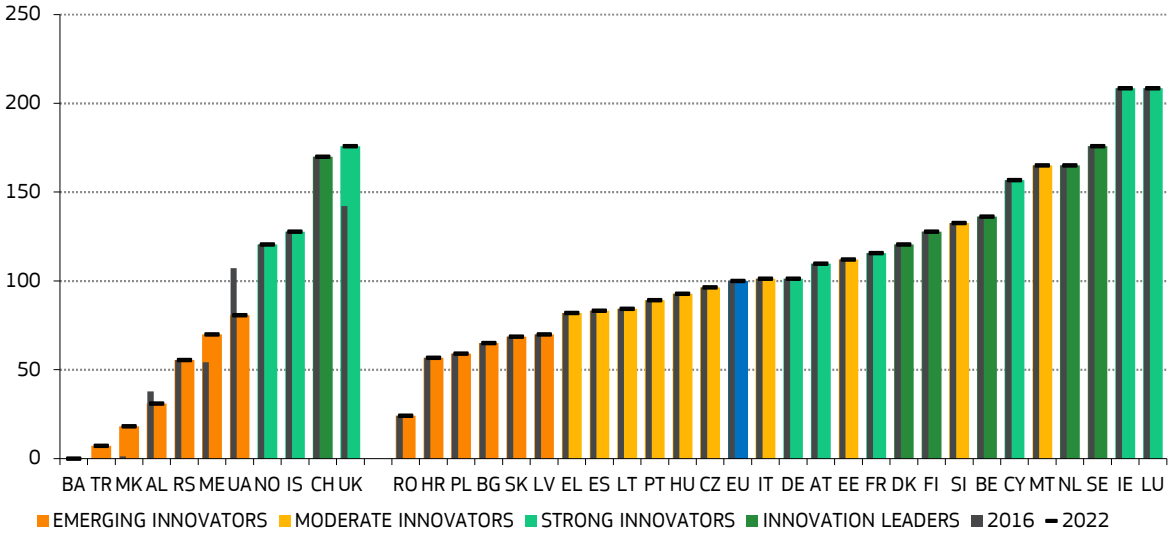
More recently between 2022 and 2023, for 9 Member State performance improved, and for 18 Member States it declined. Compared to the EU, for 15 Member States performance improved, and for 12 Member States performance declined. Relative performance increased fastest for Bulgaria (+49.5%-points) and declined strongest for Denmark (-35.3%-points).

Of the **non-EU countries**, in 2023 1 performs above and 10 perform below the EU average.

Between 2016 and 2023, for all 5 countries performance improved, for 1 country relative performance did not change, and for 5 countries performance declined. Compared to the EU, for 9 countries performance improved, and for 2 countries relative performance declined.

More recently between 2022 and 2023, for 5 country performance improved, for 1 country relative performance did not change, and for 5 countries it declined. Compared to the EU, for 9 countries performance improved, and for 2 countries it declined.

4.1.1 Employment in knowledge-intensive activities as percentage of total employment



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016. No data for Bosnia and Herzegovina.

	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)			Performance change 2022-2023 (# of countries)					
	> EU	< EU	> 0	= 0	< 0	> EU	= EU	< EU	> 0	= 0	< 0
Member States	15	12	0	0	0	-	-	-	-	-	-
Non-EU countries	4	6	4	4	2	4	4	2	0	10	0

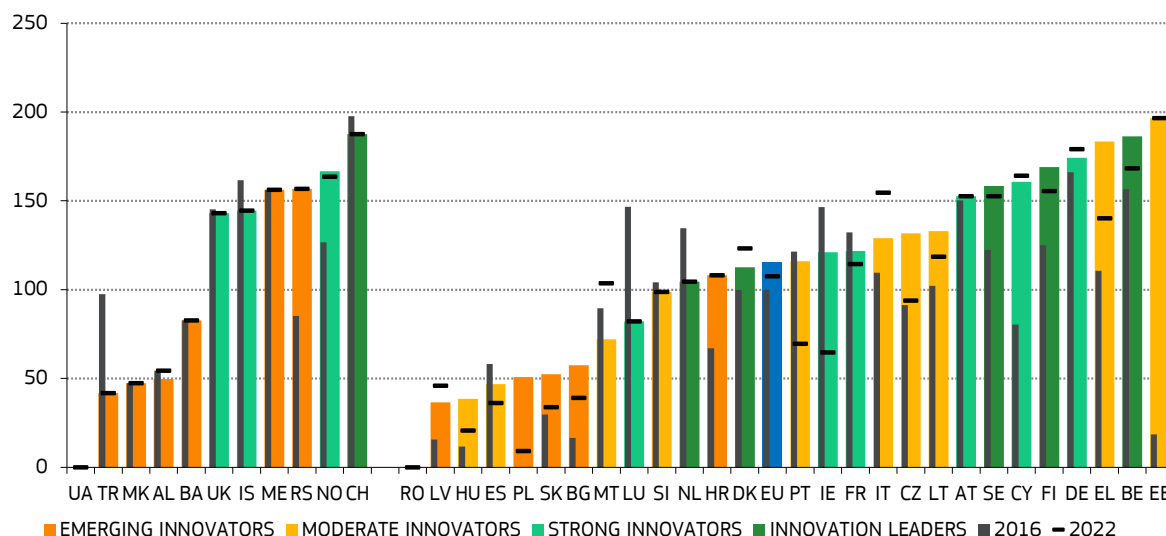
Performance change for 2016-2023 and 2022-2023 are not available for EU Member States as data for the first 7 years have been imputed using the 2023 data value also for 2016 and 2022. For several non-EU countries longer time series are available

The overall best performing countries are Luxembourg and Ireland The EU average declined from 100 in 2016 to 79.3 in 2023.

Of the **Member States**, in 2023 in total 15 perform above and 12 perform below the EU average.

Of the **non-EU countries**, in 2023 4 perform above and 6 perform below the EU average.

4.1.2 Employment in innovative enterprises as percentage of total employment for enterprises with 10 or more employees



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016. No data for Ukraine.

	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)			Performance change 2022-2023 (# of countries)								
	> EU	< EU	> 0	= 0	< 0	> EU	= EU	< EU	> EU	= EU	< EU			
Member States	14	13	18	1	8	15	0	12	14	7	6	12	0	15
Non-EU countries	6	4	2	3	5	2	0	8	1	8	1	0	0	10

The overall best performing countries are Estonia, Switzerland, Belgium, and Greece. The EU average increased from 100 in 2016 to 115.5 in 2023.

Of the **Member States**, in 2023 in total 14 perform above and 13 perform below the EU average.

Between 2016 and 2023, for 18 Member States performance improved, for 1 Member State it did not change and for 8 Member States it declined. Compared to the EU, for 15 Member States performance improved, and for 12 Member States relative performance declined. Relative performance increased fastest for Estonia (+177.9%-points) and declined strongest for Luxembourg (-64.5%-points).

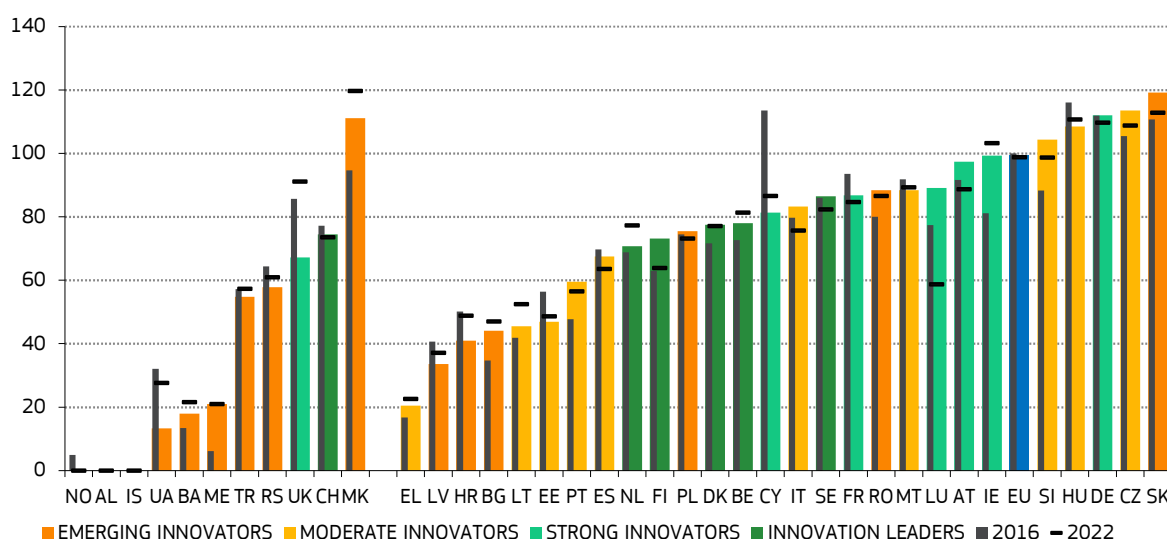
More recently between 2022 and 2023, for 14 Member States performance improved, for 7 Member States it did not change and for 6 Member States it declined. Compared to the EU, for 12 Member States performance improved, and for 15 Member States performance declined. Relative performance increased fastest for Ireland (+56.5%-points) and declined strongest for Malta (-31.5%-points).

Of the **non-EU countries**, in 2023 6 perform above and 4 perform below the EU average.

Between 2016 and 2023, for all 2 countries performance improved, for 3 countries relative performance did not change, and for 5 countries performance declined. Compared to the EU, for 2 countries performance improved, and for 8 countries relative performance declined.

More recently between 2022 and 2023, for 1 country performance improved, for 8 countries relative performance did not change, and for 1 country it declined. Compared to the EU, for all 10 countries performance declined.

4.2.1 Exports of medium and high technology products as a share of total product exports



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016.

	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)			Performance change 2022-2023 (# of countries)					
	> EU	< EU	> 0	= 0	< 0	> EU	= EU	< EU			
Member States	5	22	19	0	8	19	0	8	15	0	12
Non-EU countries	1	10	3	2	6	5	0	6	1	4	6

The overall best performing country is Slovakia, followed by Czechia, Germany, and North Macedonia. The EU average declined from 100 in 2016 to 99.3 in 2023.

Of the **Member States**, in 2023 in total 5 perform above and 22 perform below the EU average.

Between 2016 and 2023, for 19 Member States performance improved, and for 8 Member States it declined. Compared to the EU, for 19 Member States performance improved, and for 8 Member States relative performance declined. Relative performance increased fastest for Ireland (+18.1%-points) and declined strongest for Cyprus (-32.2%-points).

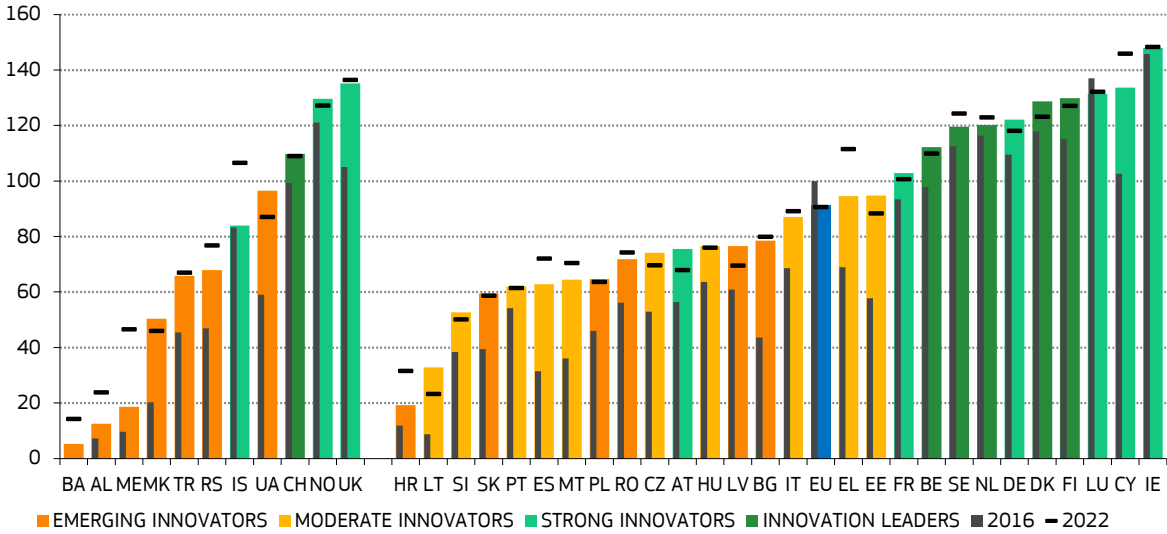
More recently between 2022 and 2023, for 15 Member State performance improved, and for 12 Member States it declined. Compared to the EU, for 14 Member States performance improved, and for 13 Member States performance declined. Relative performance increased fastest for Luxembourg (+30.4%-points) and declined strongest for Croatia (-7.8%-points).

Of the **non-EU countries**, in 2023 1 performs above and 10 perform below the EU average.

Between 2016 and 2023, for all 3 countries performance improved, for 2 countries relative performance did not change, and for 6 countries performance declined. Compared to the EU, for 5 countries performance improved, and for 6 countries relative performance declined.

More recently between 2022 and 2023, for 1 country performance improved, for 4 countries relative performance did not change, and for 6 countries it declined. Compared to the EU, for 1 country performance improved, and for 10 countries it declined.

4.2.2 Knowledge-intensive services exports as percentage of total services exports



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016.

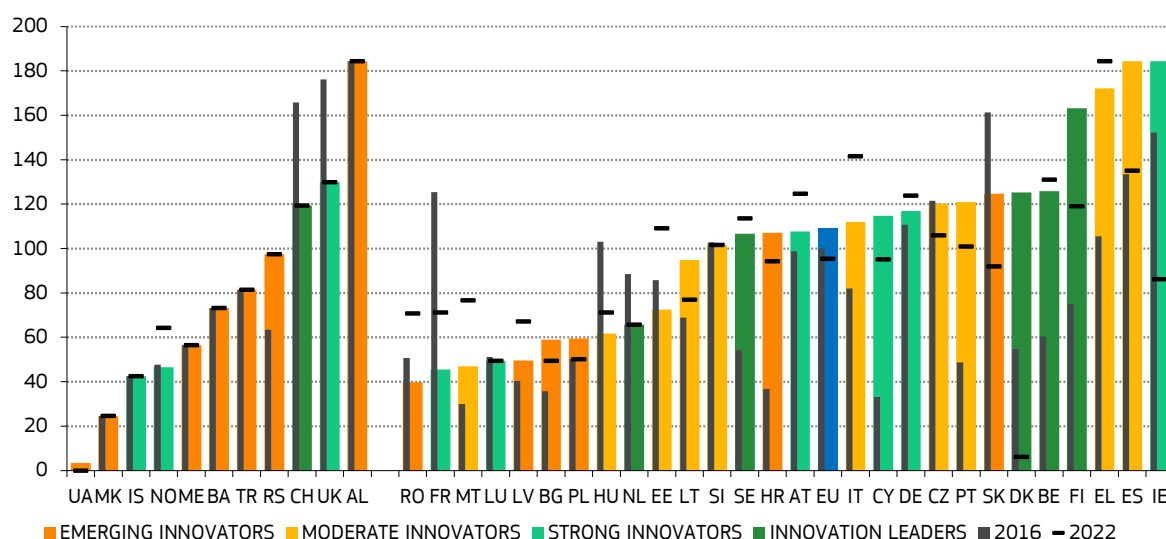
	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)			Performance change 2022-2023 (# of countries)		
	> EU	< EU	> 0	= 0	< 0	> EU	= EU	< EU
Member States	12	15	26	0	1	27	0	12
Non-EU countries	4	7	11	0	0	11	0	7

Innovation Leaders and Strong Innovators, on average, show higher performance on this indicator. The overall best performing is Ireland, followed by the United Kingdom, and Luxembourg. The EU average declined from 100 in 2016 to 91.4 in 2023.

Of the **Member States**, in 2023 in total 12 perform above and 15 perform below the EU average. Between 2016 and 2023, for 26 Member States performance improved, and for 1 Member State it declined. Compared to the EU, for 27 Member States performance improved¹. Relative performance increased fastest for Estonia (+37%-points) and declined strongest for the Luxembourg (-5.7%-points). More recently between 2022 and 2023, for 15 Member State performance improved, and for 12 Member States it declined. Compared to the EU, for 13 Member States performance improved, and for 14 Member States performance declined. Relative performance increased fastest for Lithuania (+9.6%-points) and declined strongest for Greece (-17%-points). Of the **non-EU countries**, in 2023 4 perform above and 7 perform below the EU average. Between 2016 and 2023, for all 11 countries performance improved. Compared to the EU, for 11 country performance improved. More recently between 2022 and 2023, for 4 country performance improved, and for 7 countries it declined. Compared to the EU, for 4 countries performance improved, and for 7 countries it declined.

¹ For the EU the indicator is defined differently. Where for individual countries the indicator includes all exports, to both EU Member States and other countries, for the EU the indicator only included exports to other countries outside the EU. Exports to non-EU countries might have evolved differently than individual EU Member States, which might explain why EU export performance has been below that of all Member States.

4.2.3 Sales of new-to-market and new-to-enterprise innovations as percentage of turnover



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016.

	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)				Performance change 2022-2023 (# of countries)				
	> EU	< EU	> 0	= 0	< 0	> EU	= EU	< EU	> EU	= EU	< EU
Member States	12	15	18	0	9	16	0	11	12	2	13
Non-EU countries	3	8	2	6	3	1	0	10	1	9	1

The best performing countries in 2023 are Albania, Ireland, and Spain. The EU average increased from 100 in 2016 to 108.9 in 2023.

Of the **Member States**, in 2023 in total 12 perform above and 15 perform below the EU average.

Between 2016 and 2023, for 18 Member States performance improved, and for 9 Member States it declined. Compared to the EU, for 16 Member States performance improved, and for 11 Member State relative performance declined. Relative performance increased fastest for Finland (+88.2%-points) and declined strongest for France (-79.9%-points).

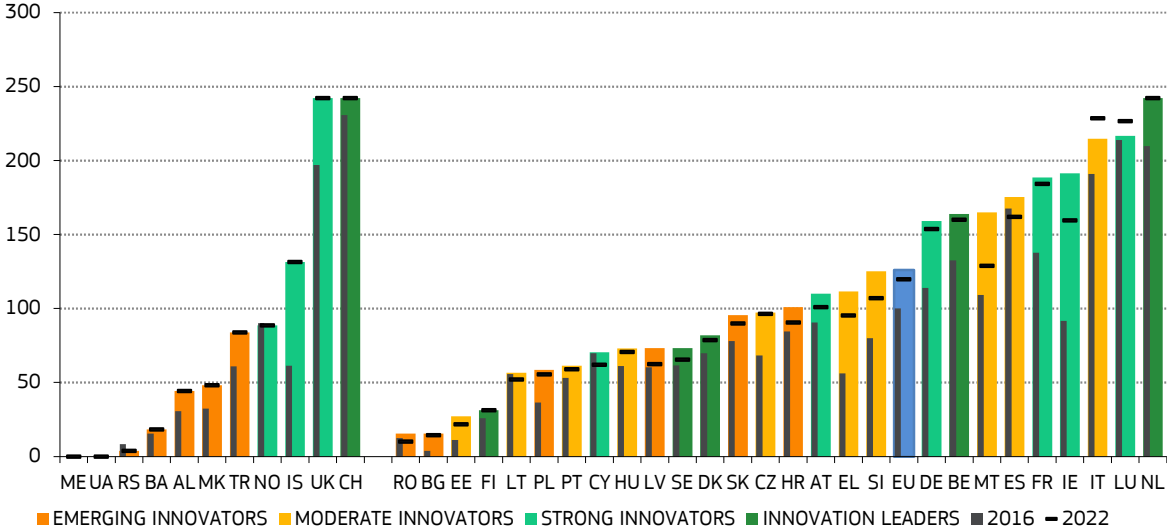
More recently between 2022 and 2023, for 12 Member States performance improved, for 2 Member States it did not change and for 13 Member States it declined. Compared to the EU, for 9 Member States performance improved, and for 18 Member States performance declined. Relative performance increased fastest for Denmark (+119%-points) and declined strongest for Estonia (-36.6%-points).

Of the **non-EU countries**, in 2023 3 perform above and 8 perform below the EU average.

Between 2016 and 2023, for all 2 countries performance improved, for 6 countries relative performance did not change, and for 3 countries performance declined. Compared to the EU, for 1 country performance improved, and for 10 countries relative performance declined.

More recently between 2022 and 2023, for 1 country performance improved, for 9 countries relative performance did not change, and for 1 country it declined. Compared to the EU, for all 11 countries performance declined.

4.3.1 Resource productivity



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016. No data for Montenegro and Ukraine.

	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)			Performance change 2022-2023 (# of countries)					
	> EU	< EU	> 0	= 0	< 0	> EU	= EU	< EU	> EU	= EU	< EU
Member States	9	18	27	0	0	9	0	18	24	1	17
Non-EU countries	3	6	7	0	2	2	0	7	0	9	0

The overall best performing countries in 2023 are the Netherlands, Switzerland, and the United Kingdom. The EU average increased from 100 in 2016 to 126.1 in 2023.

Of the **Member States**, in 2023 in total 9 perform above and 18 perform below the EU average.

Between 2016 and 2023, for 27 Member States performance improved. Compared to the EU, for 9 Member States performance improved, and for 18 Member States relative performance declined. Relative performance increased fastest for Ireland (+99.8%-points) and declined strongest for Cyprus (0.8%-points).

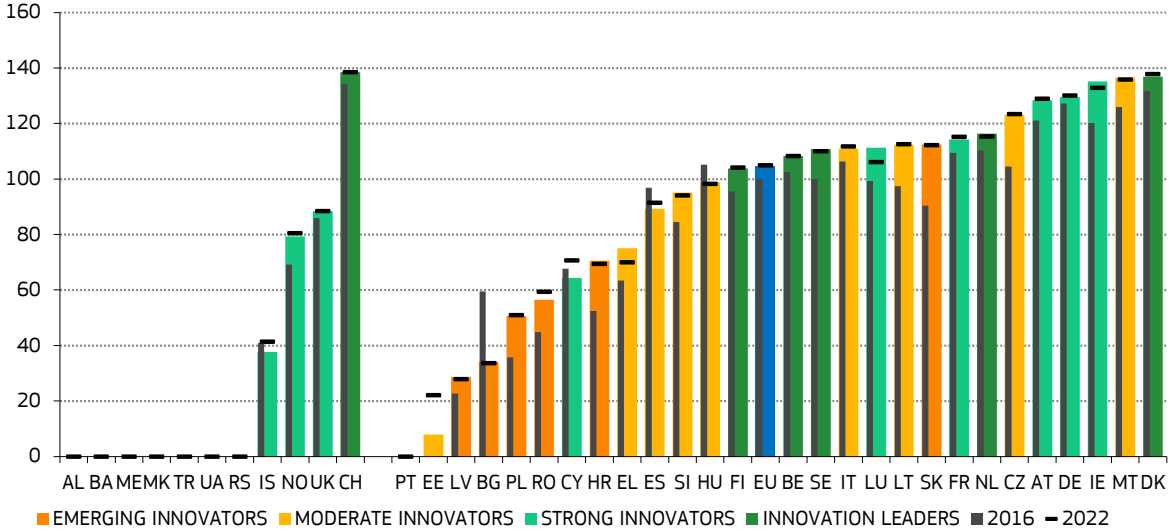
More recently between 2022 and 2023, for 24 Member States performance improved, for 1 Member State it did not change and for 2 Member States it declined. Compared to the EU, for 10 Member States performance improved, and for 17 Member States performance declined. Relative performance increased fastest for Malta (+36.1%-points) and declined strongest for Italy (-13.9%-points).

Of the **non-EU countries**, in 2023 3 perform above and 6 perform below the EU average.

Between 2016 and 2023, for all 7 countries performance improved, and for 2 countries performance declined. Compared to the EU, for 2 countries performance improved, and for 7 countries relative performance declined.

More recently between 2022 and 2023, for all 9 countries relative performance did not change. Compared to the EU, for all 9 countries performance declined.

4.3.2 Air emissions in fine particulates (PM2.5) in industry



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016. No data for Albania, Bosnia and Herzegovina, Montenegro, North Macedonia, Türkiye and Ukraine.

	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)				Performance change 2022-2023 (# of countries)				
	> EU	< EU	> 0	= 0	< 0	> EU	= EU	< EU	> EU	= EU	< EU
Member States	13	14	22	1	4	21	0	6	12	1	9
Non-EU countries	4	1	3	1	1	1	0	4	0	3	2

The overall best performing countries in 2023 are Switzerland, Denmark, and Malta. The EU average increased from 100 in 2016 to 104.4 in 2023.

Of the **Member States**, in 2023 in total 13 perform above and 14 perform below the EU average.

Between 2016 and 2023, for 22 Member States performance improved, for 1 Member State it did not change and for 4 Member States it declined. Compared to the EU, for 21 Member State performance improved, and for 6 Member States relative performance declined. Relative performance increased fastest for Slovakia (+21.9%-points) and declined strongest for Bulgaria (-25.4%-points).

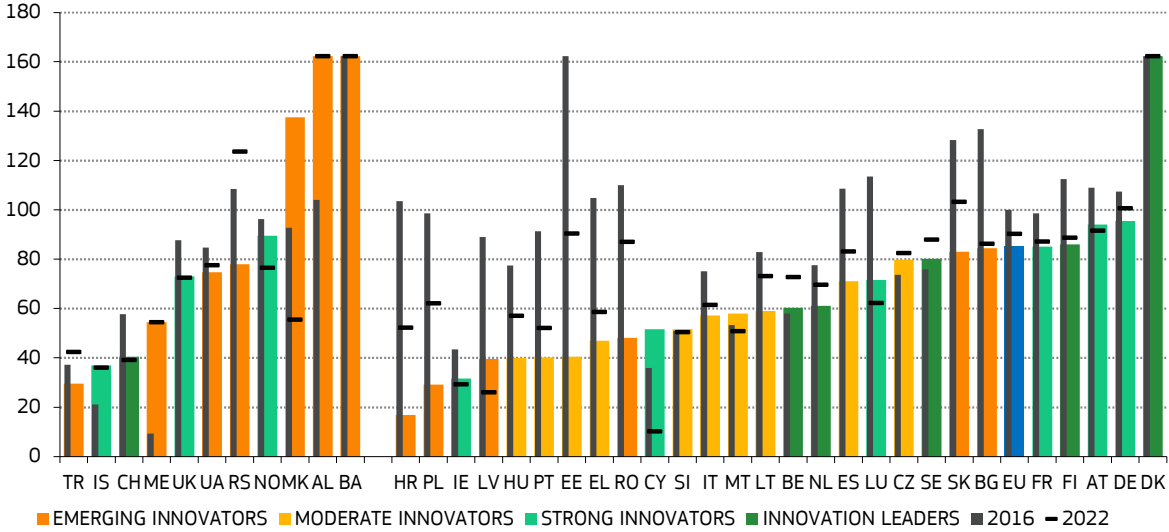
More recently between 2022 and 2023, for 12 Member States performance improved, for 1 Member State it did not change and for 14 Member States it declined. Compared to the EU, for 18 Member States performance improved, and for 9 Member States performance declined. Relative performance increased fastest for Luxembourg (+5.2%-points) and declined strongest for Estonia (-14.1%-points).

Of the **non-EU countries**, in 2023 4 perform above and 1 performs below the EU average.

Between 2016 and 2023, for all 3 countries performance improved, for 1 country relative performance did not change, and for 1 country performance declined. Compared to the EU, for 1 country performance improved, and for 4 countries relative performance declined.

More recently between 2022 and 2023, for 3 countries relative performance did not change, and for 2 countries it declined. Compared to the EU, for 3 countries performance improved, and for 2 countries it declined.

4.3.3 Development of environment-related technologies as percentage of all technologies



All performance scores are relative to that of the EU in 2016. Coloured columns show countries' performance in 2023, the horizontal hyphens show performance in 2022, and dark coloured columns show countries' performance in 2016.

	Performance relative to EU in 2023 (# of countries)		Performance change 2016-2023 (# of countries)			Performance change 2022-2023 (# of countries)		
	> EU	< EU	> 0	= 0	< 0	> EU	= EU	< EU
Member States	5	22	6	1	20	11	0	16
Non-EU countries	4	7	4	1	6	9	0	2

The best performing countries in 2023 are Bosnia and Herzegovina, Albania, and Denmark. The EU average declined from 100 in 2016 to 85 in 2023.

Of the **Member States**, in 2023 in total 5 perform above and 22 perform below the EU average.

Between 2016 and 2023, for 6 Member States performance improved, for 1 Member State it did not change and for 20 Member States it declined. Compared to the EU, for 11 Member State performance improved, and for 16 Member States relative performance declined. Relative performance increased fastest for Cyprus (+15.6%-points) and declined strongest for Estonia (-121.8%-points).

More recently between 2022 and 2023, for 7 Member States performance improved, for 1 Member State it did not change and for 19 Member States it declined. Compared to the EU, for 14 Member States performance improved, and for 13 Member States performance declined. Relative performance increased fastest for Cyprus (+41.3%-points) and declined strongest for Estonia (-50.1%-points).

Of the **non-EU countries**, in 2023 4 perform above and 7 perform below the EU average.

Between 2016 and 2023, for all 4 countries performance improved, for 1 country relative performance did not change, and for 6 countries performance declined. Compared to the EU, for 9 countries performance improved, and for 2 countries relative performance declined.

More recently between 2022 and 2023, for 5 country performance improved, for 3 countries relative performance did not change, and for 3 countries it declined. Compared to the EU, for 9 countries performance improved, and for 2 countries it declined.

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Within the context of the European Innovation Scoreboard (EIS), this report shows performance results for each of the indicators used in the EIS 2023. For each indicator a graph is included which shows relative to EU performance similarly as overall innovation performance and performance for each of the 12 innovation dimensions in the EIS report.

Studies and reports