



FROM HORIZON 2020 TO HORIZON EUROPE

MONITORING FLASH

#1.1 COUNTRY PARTICIPATION

August 2018

This Monitoring Flash is based on monitoring data of Horizon 2020 – the European Framework Programme for Research and Innovation 2014-2020 - and its predecessor, the Seventh Framework Programme (FP7). Widening participation is monitored regularly as a cross-cutting issue across Horizon 2020. This analysis covers the applications and participations from entities located in the different participating countries for the first 4.5 years of Horizon 2020 implementation. However, most Horizon 2020 projects are implemented by consortia of partners from different countries, and they generate a European added value that goes beyond each country. This European added value is not captured by looking specifically at the country of origin of the applicants and participants.

HORIZON 2020 - 4.5 YEARS OF IMPLEMENTATION

Key overview data

€33.1b	19 292	11.9%	88 374	27 355
of EC contribution allocated to signed grants	grants signed, from 155 196 proposals	of proposals are successful	participations in signed grants	distinct participants from 148 countries



COUNTRY PARTICIPATION IN HORIZON 2020

Evolving heterogeneity

- Compared to the previous Framework Programme (FP7) the share of EU funding going to 'EU13'¹ countries has slowly increased (from 4.2% to 4.8% in Horizon 2020). This is proportionate to their share in the EU wide investments in research and development (R&D) (4.4%). The share of applications from EU13 entities has also slightly increased (from 9.6% in FP7 to 10% in Horizon 2020) but this remains relatively low compared to their share of the EU's scientists and engineers (17%). There are also indications that an increasing share of Horizon 2020 multi-beneficiary projects are involving at least one EU13 participant, reversing a downward trend observed under FP7.
- Different country groupings conceal noticeable performance differences among Member States and across Horizon 2020 programme parts. Some EU13 countries perform better than some EU15 countries in the 2018 European Innovation Scoreboard; and/or have a relatively high number of applications compared to their population of scientists and engineers. At the same time, some EU15 countries score poorly in the Scoreboard and/or have a relatively low participation in Horizon 2020. Data overall still shows that the more a country invests nationally in its R&D capacity, the more funding from the Programme it receives.

¹ EU13 Member States are meant as Bulgaria; Croatia; Cyprus; Czech Republic; Estonia; Hungary; Latvia; Lithuania; Malta; Poland; Romania; Slovakia; and Slovenia, whereas EU15 countries are the other 15 Member States of the European Union.

Introduction

This is the first in a series of Monitoring Flash reports prepared by the Directorate-General for Research and Innovation (DG RTD) to provide up-to-date evidence on the implementation of Horizon 2020 – the European Framework Programme for Research and Innovation. This evidence base should inform policy discussions on the Commission proposal for the successor programme, Horizon Europe (2021-2027). Data covers the first 4.5 years of implementation of Horizon 2020, and the full implementation of FP7.² Detailed data tables per country and programme parts are available in the Data Annexes³.

Applications and Success Rates

Evidence shows that stakeholders from all EU Member States are engaged more closely with Horizon 2020 compared to the previous Framework Programme (FP7), with the number of applications submitted having already surpassed the number submitted during the whole of FP7. Under Horizon 2020 to date, more than 530,000 applications within 155,000 projects' proposals have been submitted, from entities located in more than 200 countries. This represents almost double the number of applications to FP7 per year.

Slightly more than half (53%) of these applications involve entities located in five countries: United Kingdom, Italy, Germany, Spain and France. Overall, almost eight out of ten applications comes from entities in EU15 countries. These countries also constitute 83% of the population of scientists and engineers in Europe and represent 96% of EU28 investments in research and development (R&D).

Entities located in countries that are 'Innovation leaders' or 'Strong innovators' according to the grouping of the European Innovation Scoreboard 2018 tend to also apply more frequently than the other country groups. Some 59% of the applications from the EU28 countries come from the 12 countries ranked as 'Innovation leaders' or 'Strong innovators', while 41% from the 16 countries ranked as 'Moderate' or 'Modest' innovators.

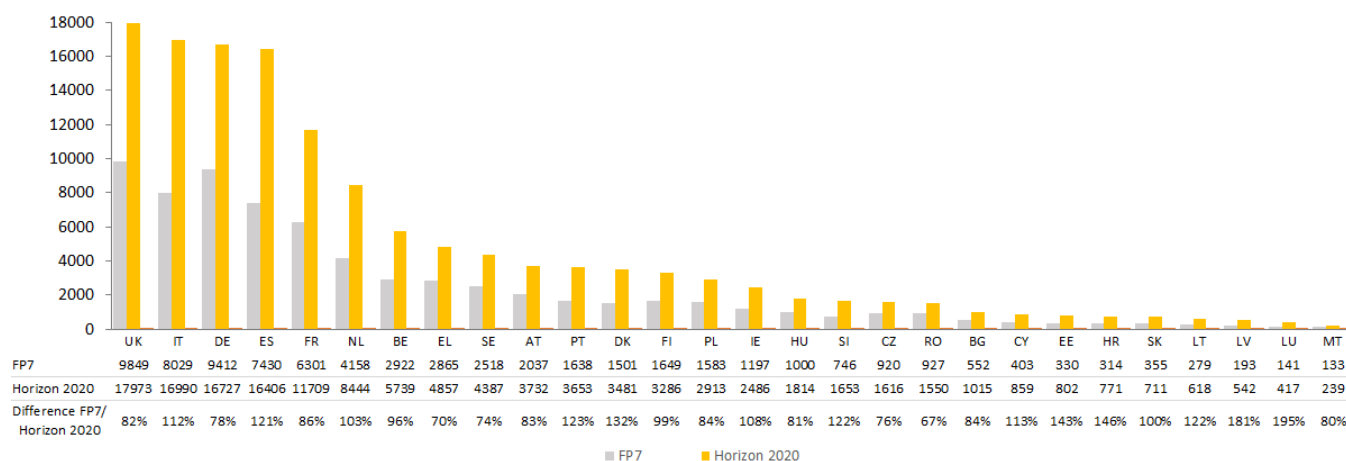
Representing 4% of EU28 national investments in R&D and 17% of European scientists and engineers⁴, the so-called EU13 countries account for 10% of applications, with a slight increase compared to FP7 (9.6%). Notably Cyprus, Slovenia, Malta and Estonia are among the top 5 European countries – together with Greece - when looking at the number of applications according to their population of scientists and engineers. On the other hand, the relatively high number of scientists and engineers in Poland are typically involved in very few proposals, three times less than the rest of Europe (8.5 applications on average against 27 for EU28). On average, each applicant to Horizon 2020 submits 6 different proposals, as compared to 11 over the whole duration of FP7. However applicants from EU13 countries tend to apply less frequently than the ones from EU15 countries (3.8 against 6.5 applications per distinct applicant).

² This Monitoring Flash includes all fully evaluated calls, including from the Work Programmes of the Public-Private Partnerships (Joint Undertakings), but excludes Public-Public Partnerships, the EIT's Knowledge and Innovation Communities (KICs) and direct actions of the Joint Research Centre. The data is stored in the Common Research Data Warehouse (CORDA), an internal database maintained by DG RTD.

³ For additional information and the latest implementation data, please check the Horizon 2020 Dashboard <https://webgate.ec.europa.eu/dashboard>

⁴ Scientists and engineers as defined by Eurostat (data table hrst_st_ncat)

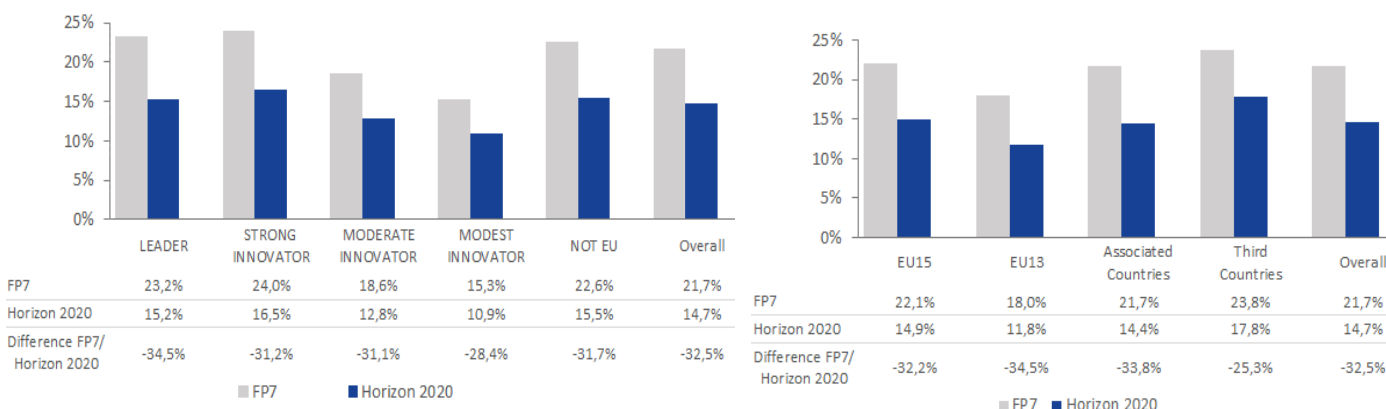
Figure 1 Number of applications to FP7 and Horizon 2020 per year per Member State



Source: European Commission, DG RTD, based on CORDA data, Cut-off date 1 July 2018

All country groups witnessed a strong drop in the success rates of applications between FP7 and Horizon 2020, from 21.7% to 14.7% for the programme as a whole. Countries with a high level of national expenditure for research and development compared to their population also show the highest success rates. Applications from entities in Belgium, France, Austria, the Netherlands, and Germany are the most successful, with close to 1 out of 6 applications being successful. Applications from entities in Bulgaria, Slovenia, Hungary, Croatia and Lithuania are the least successful. Success rates and other key data on applications are presented per country in the Data Annex, Table 1. The highest success rates can be found in the groups of 'Innovation leaders' and 'Strong innovators' with the notable exception of Finland and Slovenia, which display lower than average success rates.

Figure 2 Success rates of applications to Horizon 2020 and FP7 per country groups of applicants (EIS 2018, EU15/13)



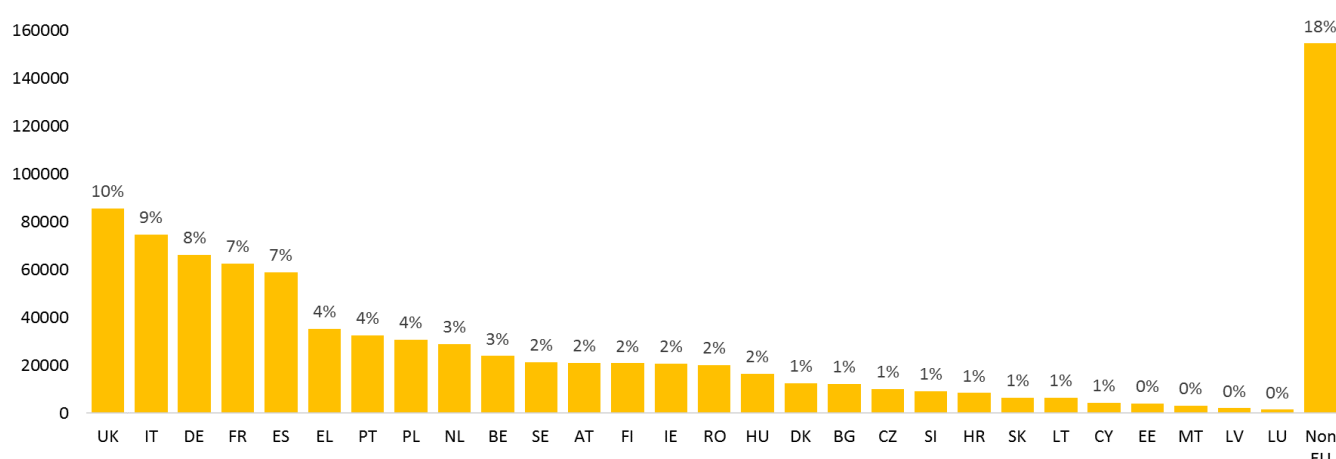
Source: European Commission, DG RTD, based on CORDA data, Cut-off date 1 July 2018

Horizon 2020 Evaluators

All Horizon 2020 proposals are evaluated by independent experts. More than 22,000 different independent experts from 114 countries evaluated the 155,000 proposals submitted to date. In total 850,000 evaluations were carried out – on average each proposal is evaluated by at least 5 different experts.

72% (15,764) of evaluators were from EU15 countries and they carried out 66% of all evaluations during the first four and a half years of Horizon 2020. 16% (3454) of evaluators were from EU13 and they carried out 16% of all evaluations. The share of EU13 evaluators was proportionally much higher than the share of EU13 applications (10% of all applications). The number and share of evaluations carried out by independent experts per country is presented in the Figure 3 below.

Figure 3 Number and share of evaluations of Horizon 2020 proposals per country of evaluator



Source: European Commission, DG RTD, based on CORDA data, Cut-off date 1 July 2018

Participation Patterns and EU Investment

The overall participation patterns and EU investment from the Framework Programmes are largely correlated with the size of the national research and innovation systems, which are characterised by different levels of national investments in research and development and varying populations of scientists and engineers.

Analysis per different types of country grouping beyond the factor of size does not show clear trends – both the EU15, EU13 grouping and the country grouping based on the latest European Innovation Scoreboard ranking from 2018 indicate significant differences when looking at individual countries within each group.

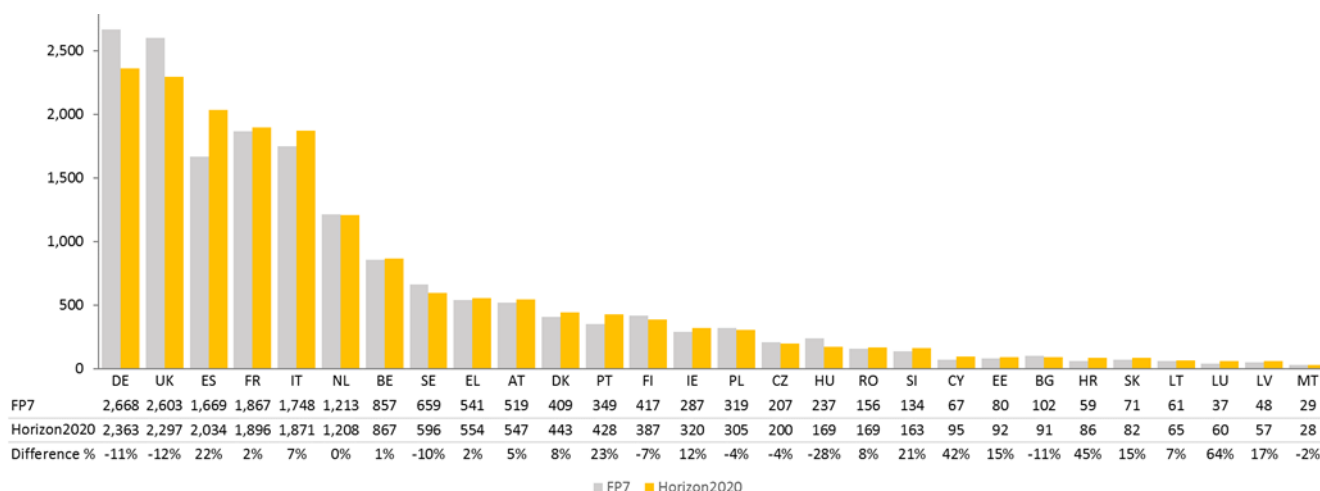
More than 27,000 distinct beneficiaries received grants from Horizon 2020 during its first four and a half years. On average each beneficiary participated in the programme more than three times, hence the total number of participations in the programme being 88,374. Comparatively, more than 30,000 distinct beneficiaries received grants from FP7, while on average each beneficiary participated in the FP7 programme more than four times throughout its seven year lifetime.

Figure 4 compares participations per year by EU Member State in Horizon 2020 and FP7. The overall number of participations per year from beneficiaries located in EU Member States in Horizon 2020 remains similar to FP7 (an increase of 0.4% or 60 participations per year). More than 50% of all participations in both FP7 and Horizon 2020 were from beneficiaries located in Germany, the United Kingdom, Spain, France and Italy. These are also the EU Member States with the biggest national research and innovation systems (i.e. they are home to more than 60% of all scientists and engineers in Europe and more than 70% of all R&D investment in EU). Analysis shows that there is a strong correlation between the share of participations in the EU Framework Programme and the size of the

national scientific and engineering workforce⁵; countries with a larger share of scientists and engineers have a larger share of participations.

Differences are observed when comparing the number of participations of entities from individual Member States between FP7 and Horizon 2020. Some Member States record a high increase in participations compared to FP7: Luxembourg (+64.1%), Cyprus (+ 45.7%) and Croatia (+45.4 %). Other Member States record a strong decrease in participations from FP7 to Horizon 2020: Hungary (-28.3%), the United Kingdom (-11.6%) and Germany (-11.2%).

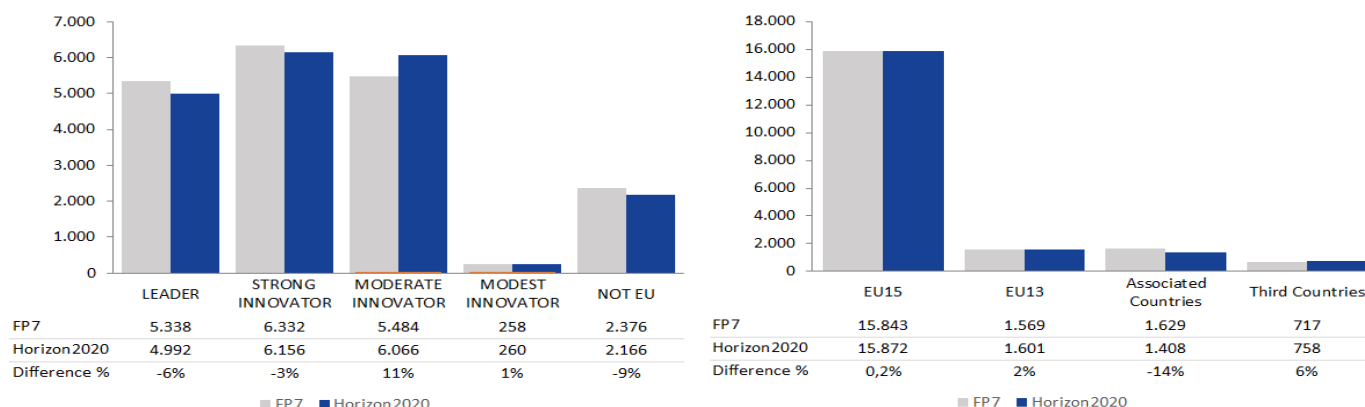
Figure 4 Number of participations to Horizon 2020 and FP7 per year per Member State of beneficiaries



Source: European Commission, DG RTD, based on CORDA data, Cut-off date 1 July 2018

Looking at different country groupings, the participations of non-EU countries in Horizon 2020 decreased by 9% when compared to FP7. Conversely, participations of both EU15 and EU13 countries slightly increased (0.2% for EU15 and 2% for EU13). However as seen in Figure 5, there are considerable differences within each group of countries. Based on the European Innovation Scoreboard ranking of 2018, participations from EU 'Innovation Leaders' and 'Strong Innovators' decreased from FP7 to Horizon 2020, whereas participations from 'Moderate' and 'Modest innovators' increased (see Figure 5 below).

Figure 5 Number of participations to Horizon 2020 and FP7 per year per country groups (EIS 2018, EU15/13)



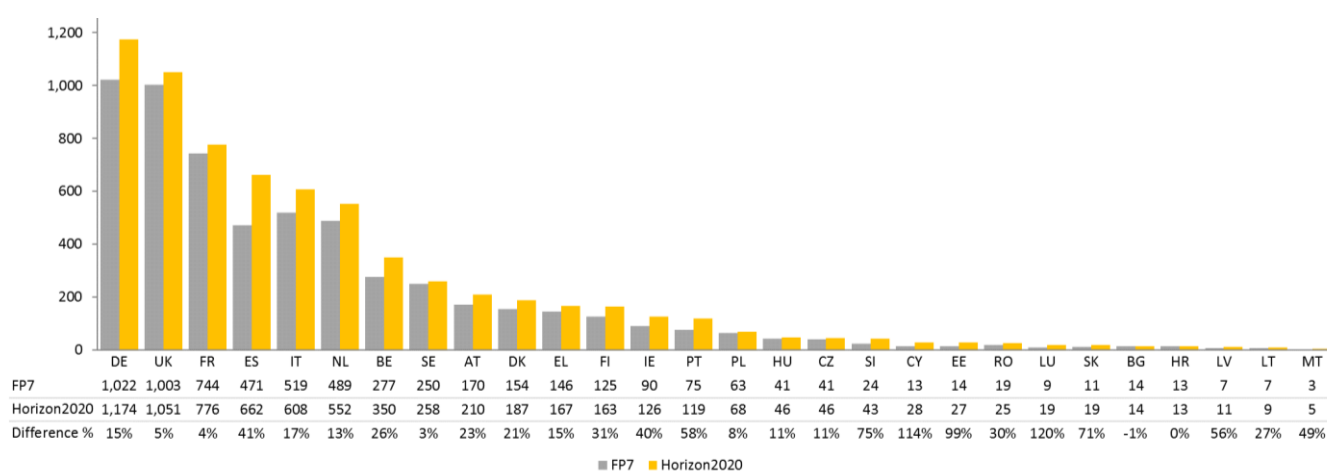
Source: European Commission, DG RTD, based on CORDA data, Cut-off date 1 July 2018

5 The Pearson correlation coefficient is larger than 0.8.

More than EUR 33.1 billion were invested through Horizon 2020 during its first four and a half years, or on average EUR 7.4 billion per year. This is a 13% increase from the FP7 average annual investment of EUR 6.5 billion.

Figure 6 compares the EU investment per year by countries of beneficiaries for EU Member States in Horizon 2020 and FP7. Given the overall increase in the budget of Horizon 2020, entities from all EU Member States except Bulgaria and Croatia were awarded a higher amount per year. In particular, entities located in Luxembourg, Cyprus, Estonia and Slovenia saw a doubling or near-doubling of their annual EU funding from Horizon 2020 compared to FP7

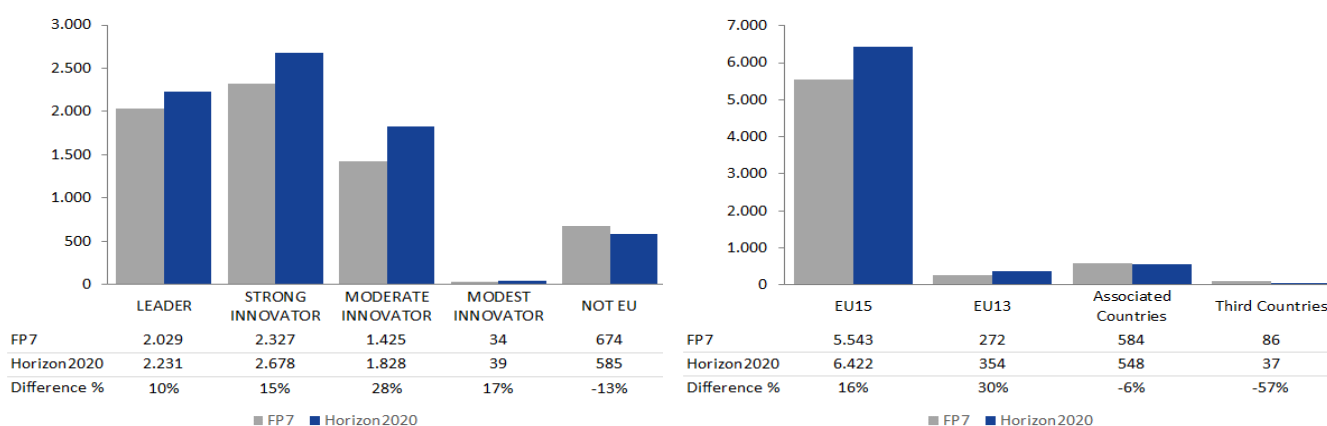
Figure 6 Annual EU investment through Horizon 2020 and FP7 (EUR million), by Member State of beneficiaries



Source: European Commission, DG RTD, based on CORDA data, Cut-off date 1 July 2018

Looking at different country groupings (Figure 7) entities located in EU13 countries recorded on average a 30% increase in EU funding from Horizon 2020 per year when compared to FP7. At the same time, EU funding to third country entities decreased by more than half. Based on the European Innovation Scoreboard ranking of 2018, the annual EU funding to entities from the group of countries ranked as 'Moderate innovators' increased the most.

Figure 7 Annual EU investment through Horizon 2020 and FP7 (EUR million), by country group of beneficiaries



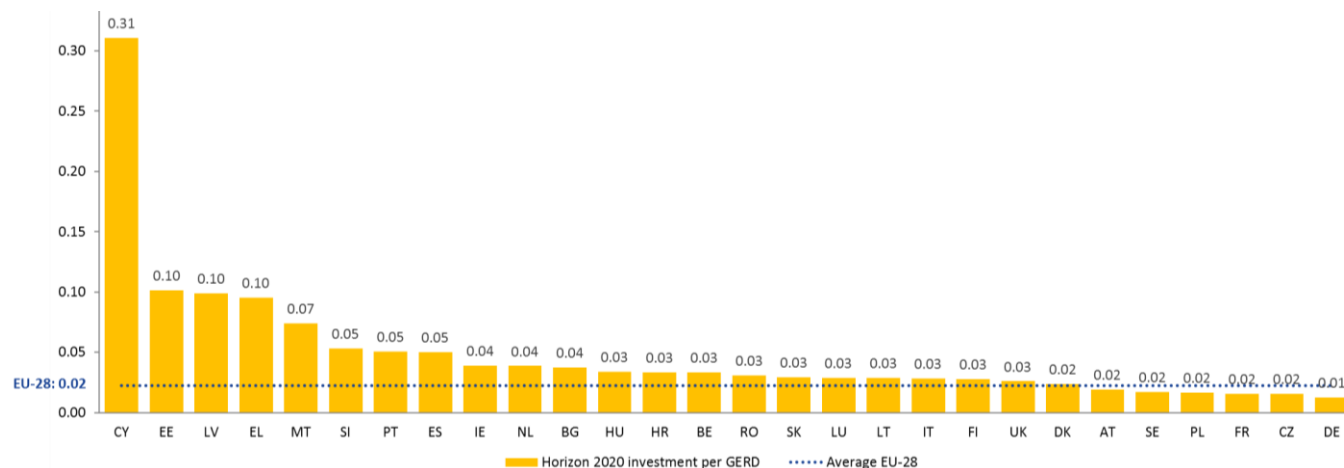
Source: European Commission, DG RTD, based on CORDA data, Cut-off date 1 July 2018

In terms of the overall distribution of Horizon 2020 funding to beneficiaries across the EU28 investment patterns closely follow the participation patterns observed above: more than 50% of both Horizon 2020 and FP7 funds went to entities located in Germany, the United Kingdom, Spain, France and Italy. Again, these are also the Member States with the biggest national research and innovation systems. As in the case of the number of participations,

the analysis shows a strong correlation⁶ between the share of funding from the EU Framework Programme and the size of the national research and development investments; beneficiaries from countries with higher national investment in research and development (GERD) obtain a larger share of EU funding (see also Figure 15).

To account for such differences in the sizes of the national research and innovation investments, Figure 8 compares the annual Horizon 2020 investment to the national expenditures in R&D (GERD). On average Horizon 2020 invests EUR 0.20 for each EUR of national R&D investment in EU Member States. Horizon 2020 funding awarded to beneficiaries from Cyprus is much higher in relative terms (EUR 0.30 of Horizon 2020 funding for each EUR of national R&D investment). Similarly, beneficiaries from Estonia, Latvia and Greece receive EUR 10 cents of investment from Horizon 2020 for each EUR invested nationally. Countries categorised as Innovation ‘Leaders’ in the European Innovation Scoreboard 2018 attract 30% of EU investments through Horizon 2020 when they represent 28% of the EU28 investments in R&D.

Figure 8 Annual EU investment through Horizon 2020 per EUR of national gross expenditures in R&D (GERD) by country of beneficiary



Source: European Commission, DG RTD, based on CORDA data, Cut-off date 1 July 2018

Other Indicators of Participation Patterns

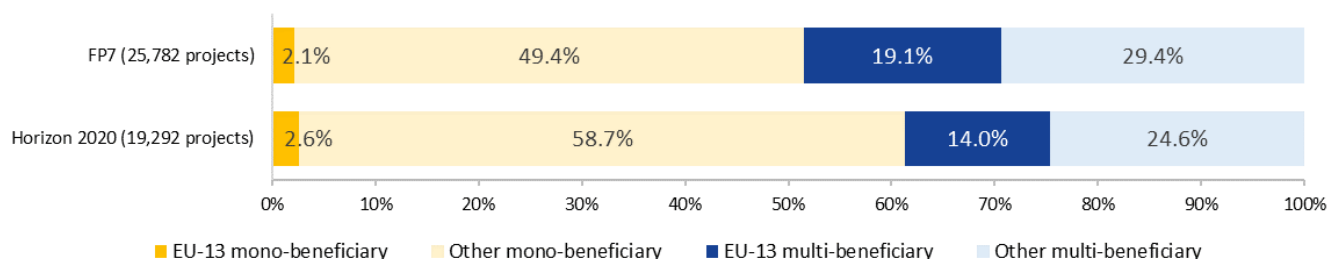
The number of projects with at least one participant from each country and country group, as well as other indicators relevant to monitor participation patterns and EU investment in the Framework Programme are included in the Data Annex (Table 2 and Table 6). These generally follow similar patterns described in the analysis above.

When focusing specifically on the EU13 country grouping and looking at the openness of networks, in FP7 21% of all projects had at least one EU13 participant whereas this represents 17% of projects in Horizon 2020. This decrease is largely explained by the increase in the number of mono-beneficiary projects in Horizon 2020 (61%) compared to FP7 (52%)⁷.

⁶ The Pearson correlation coefficient is larger than 0.8.

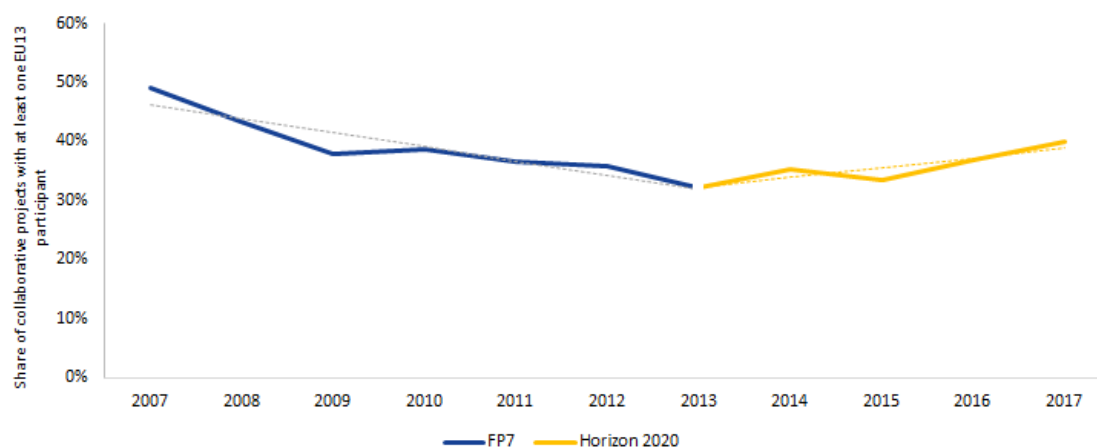
⁷ NB: The budget share of multi-beneficiary projects in Horizon 2020 is 72%.

Figure 9 Share of projects with at least one EU13 participant in Horizon 2020 and FP7 in total number of projects



To discount for the effect of the larger share of mono-beneficiary projects, EU13 participation is further analysed for multi-beneficiary projects only. On average, 40% of all multi-beneficiary projects in FP7 had at least one EU13 participant compared to 36% in Horizon 2020. Figure 10 depicts a decreasing annual trend as regards the share of multi-beneficiary projects with at least one EU13 participant under FP7: from 49% at the beginning of the programme (2007) to 32% at its end (2013). In Horizon 2020, the trend appears to reverse towards more open networks to EU13 participants: 40% of multi-beneficiary projects funded in 2017 had at least one EU13 participant.

Figure 10 Share of multi-beneficiary projects with at least one EU13 participant in Horizon 2020 and FP7 in total number of projects



Source: European Commission, DG RTD, based on CORDA data, cut-off data 1 July 2018

When looking at the different activities within Horizon 2020, the country participation patterns remain similar to those observed for the programme as a whole. However, three actions show some differences: the SME Instrument, the Coordination and Support Actions and the ERA-Net Cofund (see Data Annex, Table 3).

Scientific and Innovation Performance

The scientific and innovation performance of countries is influenced by a multitude of factors wider than participation in the Framework Programme. Looking at the level of participation in Horizon 2020 weighted by the number of scientists and engineers in the country, only those countries with a very low level of participation such as Bulgaria, Romania and Poland also underperform in terms of scientific and innovation outputs (as measured by typical indicators on peer-reviewed (co)publications, their citations and patents). The other countries display a more diverse picture as depicted in Figure 11.

Figure 11 Horizon 2020 participations per country of beneficiary compared to overall performance of EU countries in key scientific and innovation performance indicators

Country Code	Nr of participations in signed grants per thousands scientists and engineers in the country	Scientific publications among the top 10% most cited publications worldwide as % of total scientific publications of the country, 2015	International scientific co-publications per million population, 2017	Public-private co-publications per million population, 2017	PCT patent applications per billion GDP (in PPS), 2015	Employment in knowledge-intensive activities (% of total employment, 2017)	European Innovation Scoreboard Country Group 2018	EU15/ EU13 Grouping
CY	15,5	9,0	1283,3	21,1	0,8	17,0	MODERATE	EU13
LU	10,6	13,1	1715,0	25,4	1,8	22,0	LEADER	EU15
MT	9,8	10,7	597,4	0,0	1,3	18,4	MODERATE	EU13
EL	9,7	9,0	608,3	10,5	0,5	12,1	MODERATE	EU15
SI	9,6	8,6	1134,6	56,1	1,6	13,7	STRONG	EU13
AT	8,7	11,1	1375,8	82,3	4,7	15,0	STRONG	EU15
EE	8,5	8,2	1077,8	10,6	1,0	13,5	MODERATE	EU13
BE	8,0	12,6	1467,6	80,0	3,2	15,6	STRONG	EU15
IT	7,9	10,4	631,9	22,2	2,2	13,7	MODERATE	EU15
DK	7,0	13,4	2345,9	162,8	6,1	15,1	LEADER	EU15
ES	6,6	9,3	732,1	21,1	1,4	12,5	MODERATE	EU15
NL	6,6	14,6	1628,1	99,3	5,8	17,1	LEADER	EU15
FI	6,3	10,8	1658,8	85,4	7,4	16,2	LEADER	EU15
IE	6,2	12,6	1249,3	45,4	1,8	20,6	STRONG	EU15
PT	5,4	9,0	918,9	13,2	0,9	10,6	MODERATE	EU15
LV	4,9	6,2	315,4	1,0	0,8	12,1	MODERATE	EU13
FR	4,8	11,0	726,2	42,8	4,0	14,5	STRONG	EU15
SE	4,6	12,1	2018,8	130,6	9,1	18,5	LEADER	EU15
HR	4,3	4,6	492,3	17,3	0,6	11,6	MODERATE	EU13
SK	3,7	6,2	438,8	10,3	0,5	10,6	MODERATE	EU13
DE	3,3	11,3	812,2	62,4	6,1	14,8	STRONG	EU15
HU	3,1	6,9	456,3	29,6	1,3	11,6	MODERATE	EU13
UK	3,0	15,0	1222,3	65,1	3,1	18,5	LEADER	EU15
LT	2,9	4,3	450,5	3,9	0,8	9,7	MODERATE	EU13
CZ	2,7	6,6	754,8	21,0	0,9	12,9	MODERATE	EU13
BG	2,1	4,2	226,6	3,0	0,6	10,2	MODEST	EU13
RO	1,4	4,8	181,8	3,7	0,2	7,7	MODEST	EU13
PL	1,1	5,1	296,6	5,4	0,7	10,3	MODERATE	EU13
EU28	n.a	10,57	517,45	40,93	3,53	14,20		

Source: European Commission, DG RTD based on CORDA data, and data from the European Innovation Scoreboard 2018 (incl. Eurostat data)

Looking specifically at the quality and influence of the outputs produced with Horizon 2020 funding so far, the interim evaluation of Horizon 2020⁸ provided indications of the high quality and reputation of the research and innovation activities performed in the Framework Programmes.

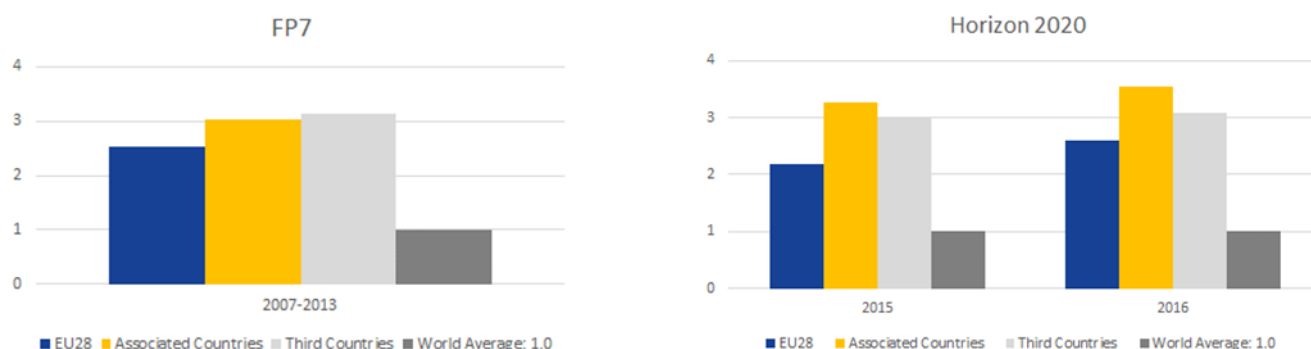
The preliminary assessment of the Field Weighted Citation Index (FWCI)⁹ of the 4043 Horizon 2020 peer-reviewed publications, carried out at the time of the interim evaluation in 2017, confirmed the trends observed in the period 2007-2013 for FP7: publications from FP7 and Horizon 2020 projects are cited at more than twice the world average (FWCI of 2.46). For 2015 and 2016, the EU28 countries' Horizon 2020-funded output was represented 3.74 times more in the world's top 1 % of cited research than the overall EU28 publication output.

⁸ European Commission, Interim evaluation of Horizon 2020, 2017, https://ec.europa.eu/research/evaluations/pdf/book_interim_evaluation_horizon_2020.pdf

⁹ Field-weighted Citation Impact normalises citation differences between research fields, with a world average set to 1.0.

Looking at the country groups of EU15 and EU13, Horizon 2020-funded publications were proportionally higher in the top 1% category by factors of 3.65 and 5.57, respectively. The EU13 group enjoyed the highest relative increase, between 2015 and 2016, over their own overall FWCI, with 1.84 and 2.29 ratio increases, respectively.

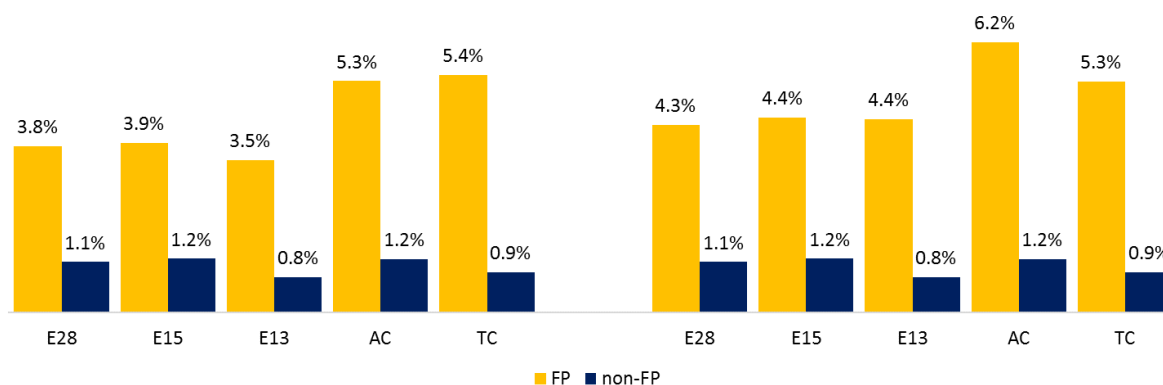
Figure 12 Field Weighted Citation Index for FP7 publications (left) and for Horizon 2020 (right)



Based on ECDG, Elsevier, Overall output of selected geographical group comparators and related FP7- and H2020-funded publication output, 2017

Overall, the share of EU13 publications in the world top 1% most cited increased from 3.5% in FP7 to 4.4% in Horizon 2020. FP publications are at least 3 times more likely to belong to the top 1% compared to non-FP publications.

Figure 13 Share of FP7 and Horizon 2020 publications in world top 1% (2007-2016)

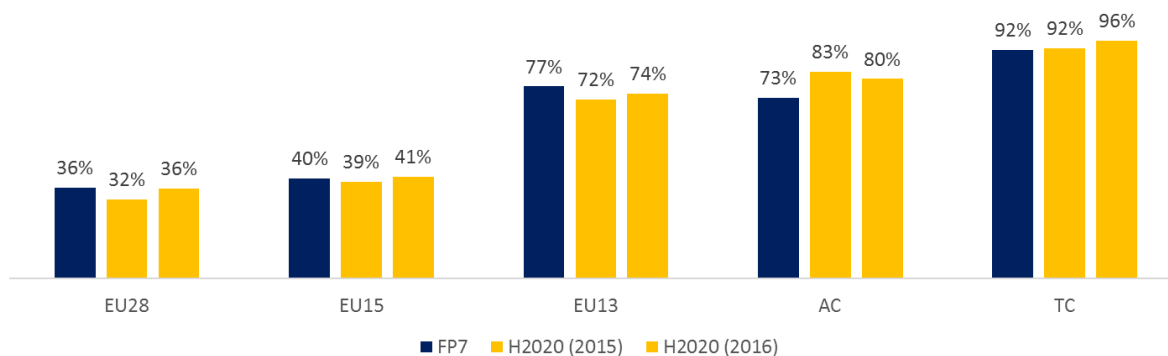


Source: Based on ECDG and Elsevier, Overall output of selected geographical group comparators and related FP7- and H2020-funded publication output, 2017

In terms of interdisciplinarity, the share of Horizon 2020 publications which are interdisciplinary is relatively high and increasing slightly compared to FP7. For the EU28, out of their total number of Horizon 2020 publications, 7.55% are interdisciplinary (compared to 7.45 % in the first three years of FP7). The EU15 share is 7.29% (compared to 7.53% in the first three years of FP7). For the EU13, the share is 10.19% (compared to 5.87% in the first three years of FP7). This means that the EU13 produces more interdisciplinary publications when compared to the EU15, and that the share of such publications among the EU13 countries in Horizon 2020 has doubled compared to what it was in FP7. So far, when looking only at interdisciplinary Horizon 2020-funded research, the FWCI indicates that these Horizon 2020 interdisciplinary publications are cited 78% more than the world average in this field (FWCI of 1.78). This is rising on a yearly basis.

In terms of international collaborations, 77% of publications from EU13 authors in FP7 were international. In Horizon 2020, the share decreased slightly to 72% in 2015 and 74% in 2016.

Figure 14 Share of international collaborations in FP7 and Horizon 2020 publications per country group (2007-2016)



** Disclaimer: international collaboration is defined as those publications in which at least one co-author comes from outside the geographical group. Source: Based on ECDG and Elsevier, Overall output of select geographical group comparators and related FP7- and H2020-funded publication output, 2017*

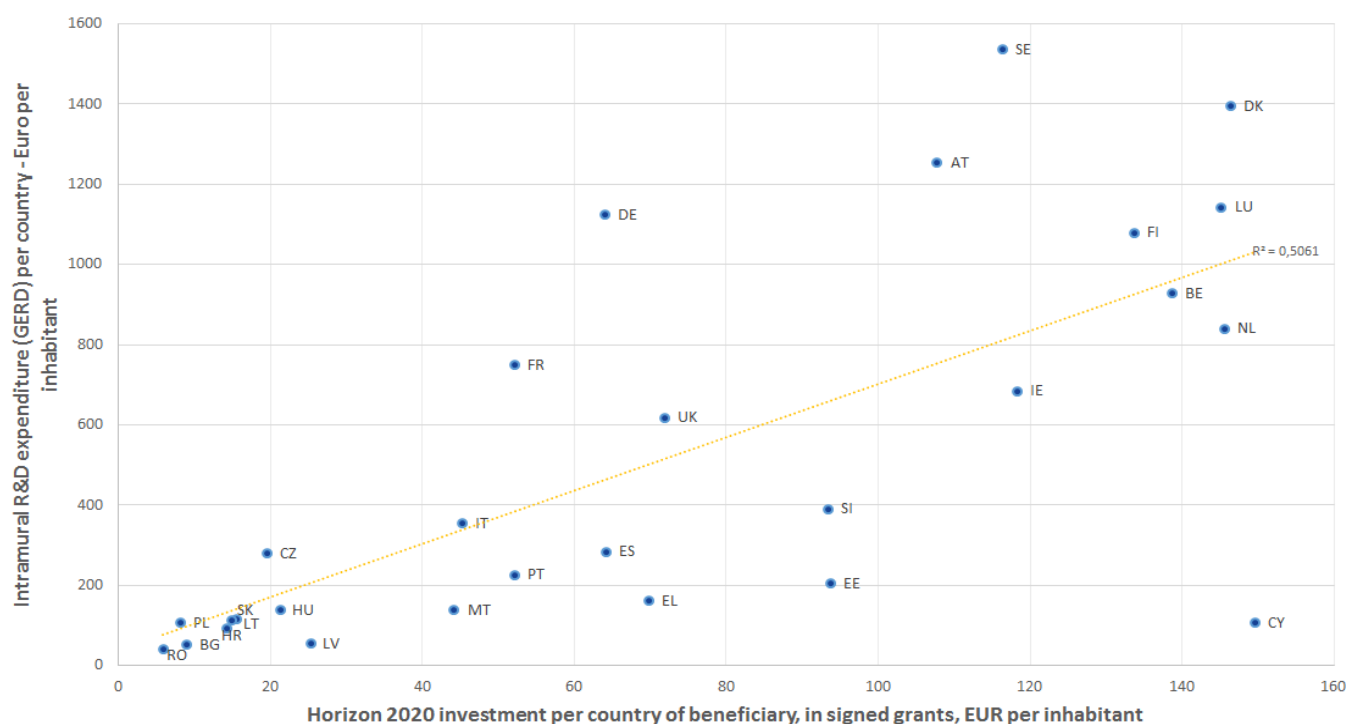
According to an external study based on counter-factual analysis, EU-funded research teams are around 40% more likely to be granted patents or produce patent applications than non-funded units. The data also shows that the patents produced under the Framework Programmes are of higher quality and likely commercial value than similar patents produced elsewhere¹⁰.

¹⁰ PPMI, Assessment of the Union Added Value and the Economic Impact of the EU Framework Programmes (FP7, Horizon 2020), 2017

Overall messages for Horizon Europe

Figure 15 compares the Horizon 2020 investment per country of beneficiary with the corresponding national investments in research and development: the more a country invests nationally in its R&D capacity, the more funding from the Framework Programme it receives¹¹.

Figure 15 Horizon 2020 investment per country of beneficiary, in signed grants, compared to the national investments in research and development (Intramural R&D expenditures - GERD) per country, in EUR per inhabitant



Source: European Commission, DG RTD, based on CORDA data, cut-off data 1 July 2018, and Eurostat data on GERD (2016)

A set of dedicated measures exist under Horizon 2020 to help spread excellence and widen participation such as Teaming, Twinning and ERA-Chairs (EUR 328 million invested so far, including 73% in Widening countries, see details in Data Annex, Table 8). Initiatives such as COST (promoting and networking pockets of excellence) and the Policy Support Facility¹² (providing on-demand advice to policy makers on national research and innovation systems) also provide support to low-performing countries. As stated in the interim evaluation of Horizon 2020¹³, the main expected outputs from these measures are related to the strengthened institutional, scientific and networking capacities of centres of excellence and knowledge and research institutions located in low-performing regions and Member States – on the basis of partnerships with internationally leading institutions and researchers – improved research and innovation policy frameworks, and support provided to strategic planning and implementation.

¹¹ The Pearson correlation coefficient is larger than 0.8.

¹² The Policy Support Facility (PSF) - launched under Horizon 2020 - works on a demand-driven basis and it offers, on a voluntary basis, high level expertise and tailor-made advice to national public authorities. Through its services, it has already been instrumental in provoking policy change in countries such as Poland, Bulgaria, Moldova or Ukraine and in bringing forward policy changes, driven by exchanges of good practice, in areas such as R&D tax incentives, open science, performance-based funding of public research organisations and the inter-operability of national research and innovation programmes.

¹³ European Commission, Interim evaluation of Horizon 2020, 2017 and Annex 2 Part Q for dedicated evaluation of Spreading Excellence and Widening Participation Programme part: <https://ec.europa.eu/research/evaluations/index.cfm?pg=h2020evaluation>

Overall, evidence shows the share of funding going to the EU13 countries has a slowly increasing trend under Horizon 2020 compared to FP7, which is proportionate to their share in the overall investments of all EU Member States in research and development. There are also indications that an increasing share of multi-beneficiary Horizon 2020 projects are involving at least one EU13 participant, reversing a trend observed under FP7, even as the share of EU13 applications remains low relative to the number of scientists and engineers in their population.

The evidence presented in this Flash raises the question whether an EU13 versus EU15 framing of issues around spreading excellence and widening participation to the Framework Programme remains valid and useful in the future. Different country groupings conceal noticeable performance differences among Member States and across Horizon 2020 programme parts. The differences in research and innovation performance among Member States – sometimes called divide – are determined by a multitude of factors beyond the influence of the Framework Programme, such as the national priorities, the level of private and public investments (incl. through public procurement), the availability and quality of infrastructures, human capital and skills, the access to finance, the support measures in place, etc. requiring tailored policy mixes in Member states in line with each country's specific challenges¹⁴.

Raising the level of participation in the Framework Programme of low research and innovation performing countries remains a complex issue which needs intervention at various levels. Widening participation in the EU Framework Programme is a shared responsibility to be addressed nationally and at EU level in a complementary and synergetic way whilst respecting the principles and role of each level and the measures used. The Framework Programme can stimulate reforms and leverage more and better investments across Europe if excellence is maintained as the programme's main driver and evaluation criterion. The search for excellence is what drives reforms, ensures value for money and delivery of measures that mutually benefit all parties involved and, ultimately, enables Europe to compete worldwide.

Towards Horizon Europe – based on the Commission proposal

The EU now needs to raise the bar in the quality and impact of its research and innovation system, requiring a revitalised European Research Area (ERA)¹⁵, better supported by the EU's research and innovation Framework Programme. Specifically, a well-integrated yet tailored set of EU measures¹⁶ is needed, combined with reforms and performance enhancements at national level (to which the Smart Specialisation Strategies supported under the European Regional Development Fund can contribute) and, in turn, institutional changes within research funding and performing organisations, including universities. By combining efforts at EU level, synergies can be exploited and the necessary scale can be found to make support to national policy reforms more efficient and impactful.

The activities supported under the proposed 'Strengthening the European Research Area' part of Horizon Europe addresses ERA policy priorities, while generally underpinning all parts of Horizon Europe. Activities may also be established to foster brain circulation across ERA through mobility of researchers and innovators.

Reducing disparities in research and innovation performance by sharing knowledge and expertise across the EU will help countries and regions that are lagging behind in terms of research and innovation performance, including the EU outermost regions, to attain a competitive position in the global value chains. Activities may also be established to foster brain circulation right across ERA and better exploitation of existing (and possibly jointly

14 For a more in-depth analysis see for instance European Commission, Science, Research and Innovation Performance of the EU 2018; Strengthening the Foundations for Europe's Future, 2018

15 The ERA Progress Report of 2018

16 Council Conclusions on the ERA Roadmap, 19 May 2015

managed EU programmes) research infrastructures in the targeted countries through mobility of researchers and innovators.

A set of targeted measures include:

- Teaming, to create new centres of excellence or upgrade existing ones in eligible countries, building on partnerships between leading scientific institutions and partner institutions;
- Twinning, to significantly strengthen a university or research organisation from an eligible country in a defined field, by linking it with internationally-leading research institutions from other Member States or Associated Countries.
- ERA Chairs, to support universities or research organisations attract and maintain high quality human resources under the direction of an outstanding researcher and research manager (the 'ERA Chair holder'), and to implement structural changes to achieve excellence on a sustainable basis.
- European Cooperation in Science and Technology (COST), involving ambitious conditions regarding the inclusion of eligible countries, and other measures to provide scientific networking, capacity building and career development support to researchers from these target countries. 80% of the total budget of COST will be devoted to actions fully aligned with the objectives of this intervention area.

The above mentioned funding lines will facilitate specific research elements customised to the particular needs of the actions.

Policy reforms at national level will be mutually reinforced through the development of EU-level policy initiatives, research, networking, partnering, coordination, data collection and monitoring and evaluation. Low research and innovation performing countries will be able to also benefit from this general action. This includes:

- Support to national research and innovation policy reform, including through a strengthened set of services of the Policy Support Facility (PSF) (i.e. peer reviews, specific support activities, mutual learning exercises and the knowledge centre) to Member States and Associated Countries, operating in synergy with the European Regional Development Fund, the Structural Reform Support Service (SRSS) and the Reform Delivery Tool;
- Providing researchers with attractive career environments, skills and competences needed in the modern knowledge economy¹⁷. Linking the ERA and the European Higher Education Area by supporting the modernisation of universities and other research and innovation organisations, through recognition and reward mechanisms to spur actions at national level, as well as incentives promoting the adoption of open science practices, entrepreneurship (and links to innovation ecosystems), trans-disciplinarity, citizen engagement, international and inter-sectoral mobility, gender equality plans and comprehensive approaches to institutional changes. In that context, also complementing the Erasmus programme support for the European Universities initiative, in particular its research dimension, as part of developing new joint and integrated long term and sustainable strategies on education, research and innovation based on trans-disciplinary and cross-sectoral approaches to make the knowledge triangle a reality, providing impetus to economic growth.

¹⁷ Including notably the European Charter for researchers, the code of conduct for the recruitment of researchers, EURAXESS and RESAVER Pension Fund.

DATA ANNEXES

Table 1 Applications to the Framework Programmes (FP7, Horizon 2020) and success rates, per country of applicants

Country code	Nr of Horizon 2020 applications in Eligible Proposals per country of applicant	Nr of Horizon 2020 applications per country of applicant/ year	Nr of FP7 eligible applications per country of applicant per year	% of total Horizon 2020 applications, per country	Nr of applications per Thousands Scientists and Engineers in the population	Success rate of Horizon 2020 applications, per country of applicants	Success rate of FP7 eligible applications, per country of applicants	Nr of Horizon 2020 applications per distinct applicant per country	Nr of FP7 eligible applications per distinct applicant per country	Intramural R&D expenditure (GERD) - Euro per inhabitant	Share of Scientists and Engineers in EU28 by country	European Innovation Scoreboard Country Group 2018	European Innovation Scoreboard Country Scores 2018	EU15/ EU13 Group
SE	15356	4387	2518	2,9%	26,4	15,6%	23,3%	6,0	13,1	1537	3,3%	LEADER	0,71	EU15
DK	12183	3481	1501	2,3%	42,6	14,9%	24,0%	6,6	12,6	1396	1,6%	LEADER	0,67	EU15
FI	11500	3286	1649	2,2%	41,8	13,5%	21,2%	5,5	13,0	1080	1,6%	LEADER	0,65	EU15
NL	29554	8444	4158	5,6%	35,7	16,5%	25,5%	6,5	12,3	841,1	4,7%	LEADER	0,65	EU15
UK	62905	17973	9849	11,8%	18,2	14,9%	22,6%	7,2	14,9	618,7	19,6%	LEADER	0,61	EU15
LU	1460	417	141	0,3%	57,3	15,7%	18,3%	5,4	8,7	1143,9	0,1%	LEADER	0,61	EU15
DE	58544	16727	9412	11,0%	17,9	16,3%	24,0%	6,3	12,3	1124,7	18,5%	STRONG	0,60	EU15
BE	20088	5739	2922	3,8%	41,2	17,6%	26,1%	6,6	12,3	929,9	2,8%	STRONG	0,59	EU15
IE	8701	2486	1197	1,6%	37,6	14,8%	21,6%	6,1	12,1	686,4	1,3%	STRONG	0,58	EU15
AT	13063	3732	2037	2,5%	46,2	16,9%	22,1%	6,2	12,2	1255	1,6%	STRONG	0,58	EU15
FR	40983	11709	6301	7,7%	22,9	17,2%	24,9%	6,2	12,4	750,4	10,2%	STRONG	0,55	EU15
SI	5787	1653	746	1,1%	76,0	10,6%	15,7%	4,5	9,3	392	0,4%	STRONG	0,47	EU13
CZ	5657	1616	920	1,1%	16,9	13,8%	20,5%	4,7	9,4	280,8	1,9%	MODERATE	0,42	EU13
PT	12787	3653	1638	2,4%	35,7	12,8%	18,3%	6,2	10,9	227	2,0%	MODERATE	0,41	EU15
MT	838	239	133	0,2%	65,5	13,4%	18,5%	4,4	8,8	140,1	0,1%	MODERATE	0,40	EU13
ES	57422	16406	7430	10,8%	41,2	13,9%	19,2%	6,3	11,0	285,5	7,9%	MODERATE	0,40	EU15
EE	2807	802	330	0,5%	57,9	13,0%	20,6%	4,3	10,0	205,4	0,3%	MODERATE	0,40	EU13
CY	3008	859	403	0,6%	109,0	12,0%	14,8%	6,3	11,5	107,7	0,2%	MODERATE	0,39	EU13
IT	59466	16990	8029	11,2%	55,6	12,2%	18,5%	5,3	11,9	356,2	6,1%	MODERATE	0,37	EU15
LT	2162	618	279	0,4%	21,3	11,8%	20,0%	3,7	8,1	113,4	0,6%	MODERATE	0,36	EU13
HU	6350	1814	1000	1,2%	25,5	10,7%	20,1%	3,6	9,6	139,5	1,4%	MODERATE	0,33	EU13
EL	17001	4857	2865	3,2%	66,0	13,0%	16,6%	7,7	16,7	162,7	1,5%	MODERATE	0,33	EU15
SK	2487	711	355	0,5%	24,6	12,7%	17,9%	3,3	7,1	118,1	0,6%	MODERATE	0,32	EU13
LV	1896	542	193	0,4%	36,6	12,0%	22,0%	3,6	7,0	56,1	0,3%	MODERATE	0,29	EU13
PL	10196	2913	1583	1,9%	8,5	12,2%	18,6%	3,8	10,5	108,3	6,8%	MODERATE	0,27	EU13
HR	2699	771	314	0,5%	30,4	11,7%	17,3%	3,5	6,7	93,6	0,5%	MODERATE	0,26	EU13
BG	3551	1015	552	0,7%	17,9	9,5%	16,4%	2,7	7,5	52,5	1,1%	MODEST	0,23	EU13
RO	5426	1550	927	1,0%	10,0	11,9%	14,6%	3,6	8,4	41,4	3,1%	MODEST	0,16	EU13

Country code	Nr of Horizon 2020 applications in Eligible Proposals per country of applicant	Nr of Horizon 2020 applications per country of applicant/ year	Nr of FP7 eligible applications per country of applicant per year	% of total Horizon 2020 applications, per country	Nr of applications per Thousands Scientists and Engineers in the population	Success rate of Horizon 2020 applications, per country of applicants	Success rate of FP7 eligible applications, per country of applicants	Nr of Horizon 2020 applications per distinct applicant per country	Nr of FP7 eligible applications per distinct applicant per country	Intramural R&D expenditure (GERD) - Euro per inhabitant	Share of Scientists and Engineers in EU28 by country	European Innovation Scoreboard Country Group 2018	European Innovation Scoreboard Country Scores 2018	EU15/ EU13 Group
EU13	52864	15104	7735	10,0%	17	11,8%	18,0%	3,8	9,0	n.a	17,2%	n.a	n.a	n.a
EU15	421013	120289	61648	79,3%	29	14,9%	22,1%	6,3	12,6	n.a	82,8%	n.a	n.a	n.a
EU28	473877	135393	69382	89,2%	27	14,6%	21,6%	5,9	12,0	n.a	100,0%	n.a	n.a	n.a
Associated Countries	39411	11260	6730	7,4%	n.a	14,4%	21,7%	4,7	10,4	n.a	n.a	n.a	n.a	n.a
Third Countries	17912	5118	4278	3,4%	n.a	17,8%	23,8%	3,1	6,3	n.a	n.a	n.a	n.a	n.a
Total	531200	151771	80440	100%	n.a	14,7%	21,7%	5,6	11,3	n.a	n.a	n.a	n.a	n.a

Source: European Commission, DG RTD, based on CORDA data, Cut-off date 1 July 2018, Eurostat data for GERD and HRST, European Innovation Scoreboard 2018

Table 2 Participations and EU investment through the Framework Programmes (FP7, Horizon 2020) per country of beneficiary

Country code	Nr of Horizon 2020 participations in signed grants per country of beneficiary	Nr of Horizon 2020 participations in signed grants per country of beneficiary per year	% of total Horizon 2020 participations	Nr of FP7 participations in signed grants per country of beneficiary per year	% of total FP7 participations	Nr of Horizon 2020 participations in signed grants Thousands Scientists and Engineers in the population	Number of Horizon 2020 projects with at least 1 participant from country	% of total Horizon 2020 signed grants with at least one participant from country	Horizon 2020 investment, signed grants (EUR million)	Horizon 2020 investment per year, signed grants (EUR million)	% of total Horizon 2020 investment	Horizon 2020 investment per EUR of GPD	FP7 investment per year, signed grants (EUR million)	% of total FP7 investment	European Innovation Scoreboard Country Group 2018	EU15/EU13 Grouping
AT	2460	547	2.8%	519	2.6%	8.7	1606	8.3%	944	210	2.9%	1.9%	170	2.6%	STRONG	EU15
BE	3901	867	4.4%	857	4.3%	8.0	2467	12.8%	1574	350	4.7%	3.3%	277	4.3%	STRONG	EU15
BG	410	91	0.5%	102	0.5%	2.1	300	1.6%	63	14	0.2%	3.7%	14	0.2%	MODEST	EU13
CY	428	95	0.5%	67	0.3%	15.5	326	1.7%	128	28	0.4%	31.1%	13	0.2%	MODERATE	EU13
CZ	898	200	1.0%	207	1.0%	2.7	678	3.5%	206	46	0.6%	1.5%	41	0.6%	MODERATE	EU13
DE	10635	2363	12.0%	2668	13.5%	3.3	5299	27.5%	5282	1174	15.9%	1.3%	1022	15.7%	STRONG	EU15
DK	1995	443	2.3%	409	2.1%	7.0	1457	7.6%	842	187	2.5%	2.3%	154	2.4%	LEADER	EU15
EE	413	92	0.5%	80	0.4%	8.5	327	1.7%	123	27	0.4%	10.1%	14	0.2%	MODERATE	EU13
EL	2491	554	2.8%	541	2.7%	9.7	1468	7.6%	751	167	2.3%	9.5%	146	2.2%	MODERATE	EU15
ES	9154	2034	10.4%	1669	8.4%	6.6	4654	24.1%	2981	662	9.0%	5.0%	471	7.3%	MODERATE	EU15
FI	1742	387	2.0%	417	2.1%	6.3	1157	6.0%	735	163	2.2%	2.8%	125	1.9%	LEADER	EU15
FR	8532	1896	9.7%	1867	9.4%	4.8	4211	21.8%	3493	776	10.5%	1.5%	744	11.5%	STRONG	EU15
HR	385	86	0.4%	59	0.3%	4.3	288	1.5%	59	13	0.2%	3.3%	13	0.2%	MODERATE	EU13
HU	762	169	0.9%	237	1.2%	3.1	591	3.1%	208	46	0.6%	3.4%	41	0.6%	MODERATE	EU13
IE	1441	320	1.6%	287	1.5%	6.2	1087	5.6%	565	126	1.7%	3.9%	90	1.4%	STRONG	EU15
IT	8419	1871	9.5%	1748	8.8%	7.9	4144	21.5%	2735	608	8.3%	2.8%	519	8.0%	MODERATE	EU15
LT	293	65	0.3%	61	0.3%	2.9	240	1.2%	42	9	0.1%	2.9%	7	0.1%	MODERATE	EU13
LU	270	60	0.3%	37	0.2%	10.6	233	1.2%	86	19	0.3%	2.9%	9	0.1%	LEADER	EU15
LV	255	57	0.3%	48	0.2%	4.9	213	1.1%	49	11	0.1%	9.9%	7	0.1%	MODERATE	EU13
MT	126	28	0.1%	29	0.1%	9.8	99	0.5%	20	5	0.1%	7.4%	3	0.0%	MODERATE	EU13
NL	5437	1208	6.2%	1213	6.1%	6.6	3202	16.6%	2485	552	7.5%	3.9%	489	7.5%	LEADER	EU15
PL	1374	305	1.6%	319	1.6%	1.1	981	5.1%	306	68	0.9%	1.7%	63	1.0%	MODERATE	EU13
PT	1928	428	2.2%	349	1.8%	5.4	1230	6.4%	537	119	1.6%	5.1%	75	1.2%	MODERATE	EU15
RO	759	169	0.9%	156	0.8%	1.4	516	2.7%	114	25	0.3%	3.1%	19	0.3%	MODEST	EU13
SE	2682	596	3.0%	659	3.3%	4.6	1782	9.2%	1162	258	3.5%	1.7%	250	3.9%	LEADER	EU15
SI	733	163	0.8%	134	0.7%	9.6	520	2.7%	193	43	0.6%	5.3%	24	0.4%	STRONG	EU13
SK	370	82	0.4%	71	0.4%	3.7	275	1.4%	84	19	0.3%	2.9%	11	0.2%	MODERATE	EU13
UK	10336	2297	11.7%	2603	13.2%	3.0	6376	33.0%	4729	1051	14.3%	2.6%	1003	15.4%	LEADER	EU15

Country code	Nr of Horizon 2020 participations in signed grants per country of beneficiary	Nr of Horizon 2020 participations in signed grants per country of beneficiary per year	% of total Horizon 2020 participations	Nr of FP7 participations in signed grants per country of beneficiary per year	% of total FP7 participations	Nr of Horizon 2020 participations in signed grants Thousands Scientists and Engineers in the population	Number of Horizon 2020 projects with at least 1 participant from country	% of total Horizon 2020 signed grants with at least one participant from country	Horizon 2020 investment, signed grants (EUR million)	Horizon 2020 investment per year, signed grants (EUR million)	% of total Horizon 2020 investment	Horizon 2020 investment per EUR of GERD	FP7 investment per year, signed grants (EUR million)	% of total FP7 investment	European Innovation Scoreboard Country Group 2018	EU15/EU13 Grouping
EU13	7206	1601	8.2%	1569	7.9%	n.a	17319	17%	1595	354	4.8%	2.9%	272	4.2%		
EU15	71423	15872	80.8%	15843	80%	n.a	3209	90%	28900	6422	87%	2%	5543	85%		
EU28	78629	17473	89.0%	17412	89%	n.a	n.a	n.a	30495	6777	92%	2%	5815	90%		
Associated Countries	6336	1408	7.2%	1629	8%	n.a	3816	20%	2467	37	1%	n.a	584	9%		
Third Countries	3409	758	3.9%	717	4%	n.a	1595	8%	167	548	7%	n.a	86	1%		
Total	88374	19639	100%	19758	100%	n.a	19292	n.a	33130	7362	100%	n.a	6486	100%		

Source: European Commission, DG RTD, based on CORDA data, Cut-off date 1 July 2018, Eurostat data for GERD and HRST, European Innovation Scoreboard 2018

Table 3 EU investment through Horizon 2020 by type of action (EUR million)

	European Research Council	Marie Skłodowska-Curie Actions	Research and Innovation Actions	Innovation Actions	Coordination and Support Actions	SME Instrument	COFUND-European Joint Programming	ERA-NET-Cofund	Pre-Commercial Procurement	Public Procurement of Innovation	TOTAL	European Innovation Scoreboard Country Group 2018	EU15/EU13 Grouping
DK	156	157	255	145	33	74	7	13	2	0	842	LEADER	EU15
FI	145	48	255	160	34	75	6	10	4	0	735	LEADER	EU15
LU	15	6	38	11	13	1	0	2	0	0	86	LEADER	EU15
NL	617	268	925	435	116	77	10	29	7	1	2485	LEADER	EU15
SE	239	115	452	196	41	82	8	26	5	0	1162	LEADER	EU15
UK	1408	692	1666	589	173	136	36	24	5	1	4729	LEADER	EU15
AT	203	78	348	199	66	30	3	17	0	0	945	STRONG	EU15
BE	235	138	535	336	276	14	12	15	14	0	1574	STRONG	EU15
DE	1154	391	1985	1016	220	104	336	66	1	9	5283	STRONG	EU15
FR	811	312	1388	634	157	103	38	36	6	9	3493	STRONG	EU15
IE	77	101	184	105	26	64	2	8	0	0	565	STRONG	EU15
SI	6	12	74	48	28	17	3	4	0	0	193	STRONG	EU13
CY	4	12	37	25	46	1	1	2	0	0	128	MODERATE	EU13
CZ	32	23	80	29	29	4	6	2	0	0	206	MODERATE	EU13
EE	4	7	23	31	32	22	2	2	1	0	123	MODERATE	EU13
EL	24	53	401	198	43	12	3	2	17	0	751	MODERATE	EU15
ES	387	316	1130	712	128	252	15	30	9	2	2981	MODERATE	EU15
HR	3	5	22	11	15	2	0	1	0	0	59	MODERATE	EU13
HU	47	12	64	20	35	26	3	2	1	0	208	MODERATE	EU13
IT	321	242	1162	646	149	131	44	24	7	10	2735	MODERATE	EU15
LT	3	5	13	8	9	5	1	1	0	0	42	MODERATE	EU13
LV	0	4	12	6	22	2	1	3	0	0	49	MODERATE	EU13
MT	2	1	5	4	6	2	0	0	0	0	20	MODERATE	EU13
PL	15	41	118	58	39	22	3	10	0	0	306	MODERATE	EU13
PT	84	56	177	117	66	21	5	6	5	0	536	MODERATE	EU15
SK	0	6	20	27	26	2	1	2	0	0	84	MODERATE	EU13
BG	0	5	16	13	25	2	2	1	0	0	63	MODEST	EU13
RO	5	8	43	29	18	0	2	8	0	0	114	MODEST	EU13
EU28	5996	3113	11427	5803	1870	1279	546	346	83	31	30495		
EU15	5876	2972	10901	5497	1540	1172	523	308	80	31	28900		
EU13	120	142	527	307	330	107	23	37	3	0	1595		
TOTAL	6924	3347	12225	6168	1979	1406	556	401	94	31	33130		

Source: European Commission, DG RTD, based on CORDA data, Cut-off date 1 July 2018, European Innovation Scoreboard 2018

Table 4 Number of participations in Horizon 2020 by programme part, per country of beneficiary

	FTI	ERC	FET	MSCA	RI	LEIT	LEIT-ICT	LEIT-NMBP	LEIT-SPACE	ARF	Innovation in SMEs	SC1	SC2	SC3	SC4	SC5	SC6	SC7	SEWP	SWAFS	Euratom	TOTAL
AT	9	140	67	375	66	0	356	156	38	0	48	114	124	259	310	150	81	72	24	59	12	2460
BE	17	170	69	570	104	1	395	277	99	11	60	282	350	353	477	274	121	122	17	50	82	3901
BG	12	1	10	46	28	1	21	12	5	2	23	16	33	77	21	20	14	28	14	16	10	410
CY	1	9	5	64	16	0	44	21	7	0	11	19	13	43	23	31	15	22	63	18	2	428
CZ	3	23	14	114	80	0	105	43	20	1	20	41	48	97	115	39	25	14	24	18	54	898
DE	62	781	342	1852	443	0	1550	784	241	3	212	673	514	854	1133	475	186	233	90	96	111	10635
DK	4	107	43	545	63	0	159	93	21	0	47	169	177	221	112	114	52	27	11	25	5	1995
EE	0	4	6	46	23	1	41	17	8	0	19	26	38	52	15	24	31	22	23	13	4	413
EL	15	28	63	304	137	0	463	169	54	1	50	137	161	214	186	154	114	167	8	52	14	2491
ES	58	314	221	1473	274	2	1320	780	227	3	280	530	672	921	823	601	155	282	24	97	97	9154
FI	4	93	39	239	100	0	299	107	21	2	30	105	127	149	100	140	48	56	14	25	44	1742
FR	36	679	309	1468	434	1	1089	491	282	4	145	515	619	507	920	382	121	205	36	54	234	8532
HR	2	3	4	27	20	0	16	3	2	0	22	31	40	74	44	37	16	8	15	11	10	385
HU	1	32	14	91	47	1	77	24	6	0	34	40	91	53	75	49	43	20	23	18	23	762
IE	11	58	14	344	66	0	206	96	13	1	30	85	140	103	73	72	38	57	8	22	4	1441
IT	54	299	243	1253	358	2	1049	696	246	4	215	492	639	785	880	530	200	290	43	74	67	8419
LT	1	1	2	36	12	1	24	12	7	0	16	6	22	42	38	12	22	4	9	12	14	293
LU	1	8	1	29	8	0	42	23	3	0	14	20	2	22	29	7	15	25	13	8	0	270
LV	0	0	3	20	14	0	20	14	5	2	7	20	34	53	12	7	12	9	12	5	6	255
MT	0	1	1	19	9	0	6	5	2	2	11	2	7	12	12	9	5	5	7	11	0	126
NL	55	436	117	1134	295	1	592	282	71	6	47	473	420	389	460	320	98	118	27	60	36	5437
PL	2	12	25	202	100	0	139	83	27	0	99	65	98	116	101	88	54	69	31	31	32	1374
PT	7	63	26	319	94	1	235	129	38	0	50	90	163	188	106	164	50	95	69	32	9	1928
RO	4	6	5	69	36	1	65	26	12	0	71	35	67	101	58	76	19	62	16	9	21	759
SE	11	161	76	491	130	0	282	158	33	0	56	203	170	230	319	179	56	44	20	18	43	2682
SI	11	7	13	69	34	0	80	50	10	0	31	48	53	95	63	65	22	19	29	17	17	733
SK	2	1	5	43	25	1	33	16	4	0	12	16	30	41	45	24	23	10	21	7	11	370
UK	92	999	323	3082	406	1	974	490	191	3	107	748	489	595	674	435	223	265	61	84	93	10336
EU13	39	100	107	846	444	6	671	326	115	7	376	365	574	856	622	481	301	292	287	186	204	7206
EU15	436	4336	1953	13478	2978	9	9011	4731	1578	38	1391	4636	4767	5790	6602	3997	1558	2058	465	756	851	71423
EU28	475	4436	2060	14324	3422	15	9682	5057	1693	45	1767	5001	5341	6646	7224	4478	1859	2350	752	942	1055	78629
Associated Countries	39	620	184	1177	328	2	682	369	98	2	193	386	484	524	380	359	158	187	30	90	44	6336
Third Countries	0	39	10	1852	128	0	179	64	52	0	5	226	292	47	62	236	145	14	2	36	19	3409
Total	514	5095	2254	17353	3878	17	10543	5490	1843	47	1965	5613	6117	7217	7666	5073	2162	2551	784	1068	1118	88374

Table 5 EU investment through Horizon 2020 by programme part, per country of beneficiary (EUR million)

	FTI	ERC	FET	MSCA	RI	LEIT	LEIT-ICT	LEIT-NMBP	LEIT-SPACE	ARF	Innovation in SMEs	SC1	SC2	SC3	SC4	SC5	SC6	SC7	SEWP	SWAFS	Euratom	TOTAL
AT	4.6	203.2	30.6	790	19.2	0.0	126.2	70.7	10.8	0.0	7.2	52.2	30.6	97.3	102.5	41.3	21.7	25.3	4.8	15.3	2.1	944
BE	4.9	234.8	29.4	137.8	28.7	0.2	207.1	104.2	26.1	2.9	9.3	102.9	87.1	130.6	131.3	78.1	32.7	40.7	139.8*	15.3	29.4	1574
BG	0.1	0.2	1.5	5.0	2.4	0.0	5.4	2.3	0.3	0.1	0.3	2.3	4.7	10.5	2.3	3.5	1.6	3.4	14.2	2.5	0.7	63
CY	0.0	3.8	3.2	12.9	2.7	0.0	12.7	5.8	1.2	0.0	0.5	5.5	3.3	8.2	9.6	5.8	3.9	5.2	39.5	3.0	0.1	128
CZ	0.9	32.1	4.6	23.1	12.7	0.0	22.1	10.1	2.4	0.0	0.9	8.0	9.0	17.5	20.4	7.0	4.3	2.6	14.9	3.0	9.9	205
DE	24.8	1154.1	185.0	391.1	191.7	0.0	681.9	360.2	86.2	0.8	25.9	335.9	198.3	432.4	494.6	192.6	59.0	81.3	22.2	25.2	339.3	5282
DK	1.6	156.2	22.8	157.4	20.5	0.0	64.3	43.9	4.2	0.0	9.5	78.8	61.4	98.1	52.7	37.2	14.7	8.9	2.0	6.5	1.1	842
EE	0.0	3.6	1.3	7.4	2.1	0.3	10.8	8.5	1.0	0.0	1.7	9.4	15.3	16.4	2.8	5.3	5.8	4.5	24.0	2.2	1.0	123
EL	5.2	23.7	29.8	54.3	40.1	0.0	165.9	66.1	10.3	0.1	4.0	50.3	40.5	56.3	55.1	44.2	23.8	69.8	1.1	8.4	2.0	751
ES	22.5	387.0	95.3	318.2	62.3	0.4	387.6	289.4	68.6	0.1	32.3	218.1	182.4	316.7	247.6	190.0	33.8	83.8	3.9	20.5	20.7	2981
FI	2.2	145.2	16.0	48.2	30.8	0.0	113.7	52.3	6.2	0.1	10.7	42.8	45.3	76.4	41.6	51.6	13.8	19.6	2.2	4.5	12.0	735
FR	13.8	812.1	124.2	312.7	155.4	0.2	439.4	187.5	97.8	0.3	23.4	236.4	173.0	254.5	354.1	113.3	28.5	77.2	4.1	10.1	75.4	3493
HR	0.7	2.6	1.6	4.9	2.3	0.0	2.9	0.8	0.2	0.0	1.6	7.2	5.7	9.0	4.6	5.0	2.2	0.4	5.4	1.4	0.4	59
HU	0.4	47.2	5.6	12.4	7.6	0.2	21.8	9.5	0.9	0.0	2.6	12.5	14.8	10.6	13.2	9.4	6.7	2.9	22.9	2.6	3.9	207
IE	8.5	76.6	6.8	101.4	16.6	0.0	78.9	46.7	5.2	0.0	6.7	52.4	63.9	39.1	15.1	16.9	8.9	14.2	1.5	5.5	0.4	565
IT	20.8	321.1	99.9	246.1	115.4	0.3	325.7	238.6	72.7	1.5	16.9	204.9	189.1	254.9	268.2	152.1	49.2	85.8	7.0	17.8	46.7	2735
LT	0.4	2.5	0.2	5.0	0.9	0.1	4.8	2.9	1.6	0.0	0.5	0.3	2.3	5.0	3.6	2.1	4.1	0.3	3.3	1.1	1.4	42
LU	0.3	15.2	0.2	5.7	1.5	0.0	11.2	8.2	0.8	0.0	3.3	7.1	0.5	3.5	9.0	1.5	3.5	8.6	4.4	1.1	0.0	86
LV	0.0	0.0	0.8	3.9	1.1	0.0	4.0	2.8	0.3	0.4	0.3	2.6	4.4	7.2	4.6	0.8	1.6	0.6	13.0	0.2	0.5	49
MT	0.0	1.6	0.6	1.9	0.3	0.0	0.7	0.7	0.2	0.8	0.1	0.4	1.1	1.1	2.7	1.6	0.8	2.8	2.0	0.8	0.0	20
NL	23.8	617.2	56.7	268.9	101.2	0.1	272.5	121.7	17.4	0.9	17.7	285.9	159.5	161.1	163.6	117.3	30.0	37.9	5.7	16.0	9.8	2485
PL	0.4	14.8	9.1	43.5	20.4	0.0	47.8	23.4	4.1	0.0	8.7	19.9	17.8	21.0	12.8	17.9	8.3	13.6	13.4	4.9	4.5	306
PT	2.4	84.2	9.4	57.1	13.4	0.1	58.6	42.6	13.3	0.0	4.7	21.9	35.1	55.3	24.0	42.2	8.3	23.5	32.9	4.1	3.5	536
RO	0.7	5.1	1.2	8.3	4.2	0.0	12.6	4.7	1.0	0.0	1.3	7.1	9.5	16.8	8.2	9.8	2.6	12.1	6.0	1.1	1.9	114
SE	5.3	239.4	57.2	114.7	45.2	0.0	109.3	67.0	10.1	0.0	7.6	110.3	58.2	103.0	107.6	70.3	14.8	18.1	6.9	3.7	12.3	1162
SI	4.9	6.4	3.2	12.5	4.1	0.0	18.6	21.9	2.7	0.0	0.5	10.3	11.8	27.5	19.7	16.8	3.3	4.5	18.2	2.2	3.5	193
SK	0.4	0.4	1.2	6.5	2.7	0.1	6.1	3.7	0.4	0.0	0.5	1.9	25.0	4.7	4.3	2.7	2.8	1.4	17.1	0.6	1.6	84
UK	40.6	1410.0	175.9	694.0	191.9	0.1	398.7	206.0	54.3	0.5	12.7	420.6	157.1	293.3	250.5	172.0	77.6	84.5	23.0	19.1	45.7	4729
EU13	9	120	34	147	63	1	170	97	16	1	19	88	125	155	109	88	48	54	194	25	29	1595
EU15	181	5880	939	2986	1034	1	3441	1905	484	7	192	2221	1482	2373	2318	1321	420	679	261	173	600	28900
EU28	190	6000	973	3134	1097	2	3611	2002	500	8	211	2308	1607	2528	2426	1408	468	734	455	198	630	30495
AC countries	0	9	920	125	236	75	0	204	121	17	0	0	106	146	164	93	95	30	56	19	12	2467
Third Countries	0	0	8	1	2	14	0	12	3	4	0	0	49	21	6	2	26	14	1	0	3	167
Total	191	6009	1902	3260	1335	92	3611	2218	624	30	211	2308	1762	2695	2596	1504	589	777	512	217	645	33130

*Includes payments from SEWP to the COST Association located in Belgium

Source: European Commission, DG RTD, based on CORDA data, Cut-off date 1 July 2018

Table 6 Number of participations and EU investment (EUR million) through Horizon 2020 for specific types of partnerships, per country of beneficiary per year

	Joint Undertakings*		Future and Emerging Technologies-Flagships**		ERA-NET-Cofund		COFUND-European Joint Programming		Contractual Public-Private Partnerships***		TOTAL per year		EU28	European Innovation Scoreboard Country Group 2018
	Participation	EU Investment	Participation	EU Investment	Participation	EU Investment	Participation	EU Investment	Participation	EU Investment	Total Participation	Total EU Investment		
AT	62	20	1	1	12	4	3	1	19	8	97	34	EU15	STRONG
BE	72	29	2	0	22	3	3	3	34	13	133	49	EU15	STRONG
BG	2	0	0	0	2	0	2	0	1	0	7	1	EU13	MODEST
CY	0	0	0	0	3	0	1	0	5	1	9	2	EU13	MODERATE
CZ	24	4	0	0	3	0	4	1	6	2	38	7	EU13	MODERATE
DE	196	92	6	4	25	15	5	75	127	57	359	243	EU15	STRONG
DK	26	7	1	0	7	3	3	2	8	4	44	15	EU15	LEADER
EE	2	3	0	0	5	0	1	0	2	0	10	4	EU13	MODERATE
EL	14	4	1	0	3	0	3	1	28	12	50	17	EU15	MODERATE
ES	139	41	3	1	24	7	8	3	108	35	282	87	EU15	MODERATE
FI	39	12	1	0	9	2	3	1	16	8	67	24	EU15	LEADER
FR	166	74	4	2	24	8	14	8	69	25	277	118	EU15	STRONG
HR	7	1	0	0	1	0	2	0	1	0	12	1	EU13	MODERATE
HU	10	1	1	0	3	0	2	1	4	1	20	3	EU13	MODERATE
IE	20	7	0	0	8	2	1	0	9	3	38	12	EU15	STRONG
IT	136	55	3	1	19	5	8	10	96	34	262	105	EU15	MODERATE
LT	7	0	0	0	3	0	1	0	2	0	14	1	EU13	MODERATE
LU	2	0	0	0	2	0	0	0	2	1	6	2	EU15	LEADER
LV	3	1	0	0	6	1	1	0	2	0	12	2	EU13	MODERATE
MT	1	0	0	0	0	0	0	0	0	0	2	0	EU13	MODERATE
NL	103	47	2	1	16	7	4	2	34	13	159	70	EU15	LEADER
PL	14	3	0	0	9	2	3	1	14	4	41	10	EU13	MODERATE
PT	18	3	1	0	8	1	2	1	14	5	44	11	EU15	MODERATE
RO	6	0	0	0	9	2	3	1	5	1	23	4	EU13	MODEST
SE	43	12	2	1	11	6	3	2	24	10	83	30	EU15	LEADER
SI	5	1	0	0	5	1	2	1	8	3	21	5	EU13	STRONG
SK	13	5	0	0	4	0	1	0	2	0	20	6	EU13	MODERATE
UK	90	45	4	2	8	5	3	8	71	33	177	92	EU15	LEADER
EU13	96	20	2	1	52	8	24	5	53	14	227	48		
EU15	1126	449	28	14	198	69	64	116	662	261	2078	908		
EU28	1221	469	31	15	250	77	88	121	715	274	2306	956		
Non EU	93	24	5	7	8	12	4	2	50	15	160	60		
TOTAL	1314	493	36	21	36	89	92	123	765	290	2244	1016		

Notes: *JU: Ecsel, BBI, FCH, JTI, SESAR, CS2 ; ** FET-Flagship 2014,2016,2017 & HBP ; ***cPPP: FoF, EeB, SPIRE, FET HPC. Includes Euratom, excludes Art. 185 and KICs as those actions are not included in CORDA. Source: European Commission, DG RTD, based on CORDA data, Cut-off date 1 July 2018, European Innovation Scoreboard 2018

Table 7 Share of Horizon 2020 projects with at least one participant from each country group per programme part (incl. mono-beneficiary projects)

	EU13	EU15	AC Countries	Third Countries
FTI	18%	95%	21%	0%
ERC	2%	85%	14%	1%
FET	24%	98%	36%	4%
MSCA	7%	92%	12%	15%
RI	62%	99%	61%	25%
LEIT-ICT	28%	90%	29%	5%
LEIT-NMBP	26%	92%	29%	5%
LEIT-SPACE	22%	94%	21%	9%
ARF	56%	78%	22%	0%
Innovation in SMEs	17%	75%	16%	0%
SC1	23%	91%	29%	14%
SC2	35%	90%	36%	13%
SC3	31%	93%	27%	3%
SC4	24%	91%	20%	4%
SC5	33%	91%	30%	15%
SC6	47%	94%	30%	14%
SC7	41%	91%	38%	3%
SEWP	77%	88%	13%	1%
SWAFS	73%	92%	48%	19%
Euratom	88%	98%	50%	24%
TOTAL	17%	90%	20%	8%

Source: European Commission, DG RTD, based on CORDA data, Cut-off date 1 July 2018

Table 8 EU investment (EUR million) in “Widening” and “Non-Widening” countries through specific actions under Horizon 2020 under the Programme part ‘Spreading Excellence and Widening Participation’

Budget Distribution	Widening	Non-Widening
ERA Chairs 2017	32	0
Twinning 2017	14	16
Teaming Phase 1 2017	7	5
Teaming Phase 2	111	29
Teaming Phase 1 2014	0	6
Twinning 2015	32	35
ERA Chairs 2014	34	0
TOTAL*	238	90
% budget distribution	73%	27%

Notes: The Member States currently eligible under Horizon 2020 for Widening support are: Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Luxembourg, Malta, Poland, Portugal, Romania, Slovakia and Slovenia. The Associated Countries eligible for Widening support are (subject to valid association agreements of third countries with Horizon 2020): Albania, Armenia, Bosnia and Herzegovina, Faroe Islands, Former Yugoslav Republic of Macedonia, Georgia, Moldova, Montenegro, Serbia, Tunisia, Turkey and Ukraine.

*Excludes payments from SEWP to the COST Association located in Belgium

Source: European Commission, DG RTD