

# Norway

ERA-LEARN:  
enabling systematic interaction with the P2P  
community

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## *ERA-LEARN Country Reports*

This is the sixth in a series of ERA-LEARN Country Reports on participation in European R&I partnerships (henceforth referred to simply as ‘Partnerships’) that are being produced during the course of ERA-LEARN. The first five reports covered Poland, Austria, Spain, Belgium and Finland, while this report focuses on Norway and the next in the series will cover Germany<sup>1</sup>.

The ERA-LEARN data used in this report mainly refer to partnerships that were launched and supported under Horizon 2020. The analyses are based on the data available in the ERA-LEARN database by a cut-off date of August 2020. A number of provisos need to be made when interpreting these analyses. In the first instance, it should be noted that the ERA-LEARN database on Partnerships at the cut-off point was around 75% complete, as not all required information (especially project-related and financial data) had been fully updated by the partnerships. It is also important to emphasise that the data collected in terms of pre-call budget committed or actual investments in selected projects do not take into account differences across countries in the eligibility of certain expenses. In some countries, for example, only additional costs of a research project are eligible, while personnel costs are not. Furthermore, in-kind contributions made by funding organisations when participating in P2Ps – which differ from country to country - are not usually considered as national investments in partnerships, although this will possibly change under Horizon Europe.

The country reports provide an analysis of participation and try to explain the ‘performance’ of a country in European R&I Partnerships within the context of their own national and regional research and innovation systems. Data and analyses stemming from a variety of sources are thus drawn upon. These include the RIO (Research Innovation Observatory) country reports; EU Semester national reports; ERA Progress Reports; the European Innovation Scoreboard and Regional Innovation Scoreboard; Regional Innovation Monitor Plus; H2020 Country Reviews; OECD country reviews; OECD, RIO and EUROSTAT statistics; special reports by the Policy Support facility; and MLE (Mutual Learning Exercise) special reports.

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<sup>1</sup> All the Country Reports are on the ERA-LEARN website <https://www.era-learn.eu/documents/documents-listing> (by inserting ‘country report’ in the search phrase).

The goal of the country reports is to provide an overall picture of a country's performance in terms of partnership participation, comparing this not only to EU14<sup>2</sup>, EU13 and EU27 averages but also to the performance of a group of comparator countries with similar research and innovation profiles. In the case of Norway, these are Finland, Denmark, Austria, Sweden and the Netherlands. The hope is that these reports are useful not only for organisations within the country of interest, which may only have a fragmented picture of the situation, but also for organisations in other countries that wish to learn the reasons underpinning the 'position' of a particular country and/or learn from the exemplary performance of other countries.

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## *The Structure of This Report*

The report commences with an overview of the Norwegian research and innovation system in an international context, as an aid to understanding the environment in which partnership participation takes place. The key R&I funders and performers in Norway are then identified and areas of R&I strength described prior to an analysis of Norway's research and innovation partnership participation patterns. An assessment of the strengths and weaknesses of Norway's involvement in partnerships is then presented and the report concludes with a review of topics of interest arising as a consequence of Norway's involvement in energy partnerships.

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## *Acknowledgements*

We owe special thanks to officials from Ministry of Education and Research (MER) and the Research Council of Norway (RCN), as well as to individual researchers that shared with us valuable insights, data and information about their experience of participating in European R&I Partnerships under H2020. Overall, people<sup>3</sup> from the following organisations were interviewed:

- Ministry of Education and Research and Research Council of Norway
- Norwegian Institute for Water Research, Norwegian Geotechnical Institute, University of Oslo, University of Bergen, and SINTEF

Special thanks are also due to the ERA-LEARN partner, Optimat, particularly Katrina Watson for supporting data elaboration, and Ken Guy, member of the ERA-LEARN Advisory Board, for commenting and editing earlier versions of the report and helping to improve it.

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<sup>2</sup> As of 1 February 2020 with the withdrawal of the UK from the EU.

<sup>3</sup> Respecting GDPR rules, the names of the interviewees are not disclosed.

# Key Highlights

Norway is actively engaged in public European R&I Partnerships, taking part in more calls than comparator countries and scoring higher than the EU14 average<sup>4</sup> for call participations (Table 1). Of the 81 partnerships launched under H2020 and 10 JPIs, Norway takes part in 71 initiatives, ranking 7<sup>th</sup> after Spain (82), France (81), Germany (79), Belgium (77), the Netherlands (76) and Italy (72) (Figure 1). Compared to the comparator group of countries, Norway is ranked second after the Netherlands in terms of number of partnerships. Despite its strong engagement in calls and partnerships, however, Norway has not generally taken a leading role in partnerships, coordinating only 2 ERA-NET Cofunds (ACT and BlueBio) and one JPI (JPI Oceans).

With 73 participations, Norway has about the same number of participations as Finland and Denmark. The Norwegian partner in most P2Ps is the Research Council of Norway (RCN), that acts as the funding agency of all relevant ministries.<sup>5</sup> In terms of support to projects, the RCN supported 434 projects in the co-funded calls of H2020 Partnerships (2014-2019). This is less than the Netherlands (893) and Sweden (585), but more than Denmark (346), Austria (400) and Finland (245) (Table 1).

*Table 1: Participation in H2020 public European R&I Partnerships including JPI data on participation, calls and projects that are not linked to ERA-NET Cofunds*

	<b>NO</b>	<b>FI</b>	<b>DK</b>	<b>A</b>	<b>SE</b>	<b>NL</b>	<b>EU13 aver.</b>	<b>EU14 aver.</b>	<b>EU27 aver.</b>
<i>Number of partnerships</i>	71	58	56	64	68	76	32	78	48
<i>Partnership participations</i>	73	70	68	80	90	105	36	95	65
<i>Partnership coordinations</i>	3	1	2	8	2	8	1	7	6
<i>Call participations</i>	163	102	96	126	130	161	75	140	109
<i>Supported projects</i>	434	245	346	400	585	893	92	511	309
<i>Researchers (FTEs) (‘000s – 2015-19)</i>	33.4	37.7	44.3	48.2	72.6	91.3			
<i>R&amp;D Intensity (% GDP-2018)</i>	2.06	2.75	3.03	3.17	3.32	2.16			

Source: ERA-LEARN database<sup>6</sup> (cut-off date August 2020); Eurostat.

(\*) Partnership coordinations: number of partnerships a specific country coordinates. Partnership participations: number of partnerships in which a specific country takes part as participant. Call participations: number of partnership calls in which a country takes part.

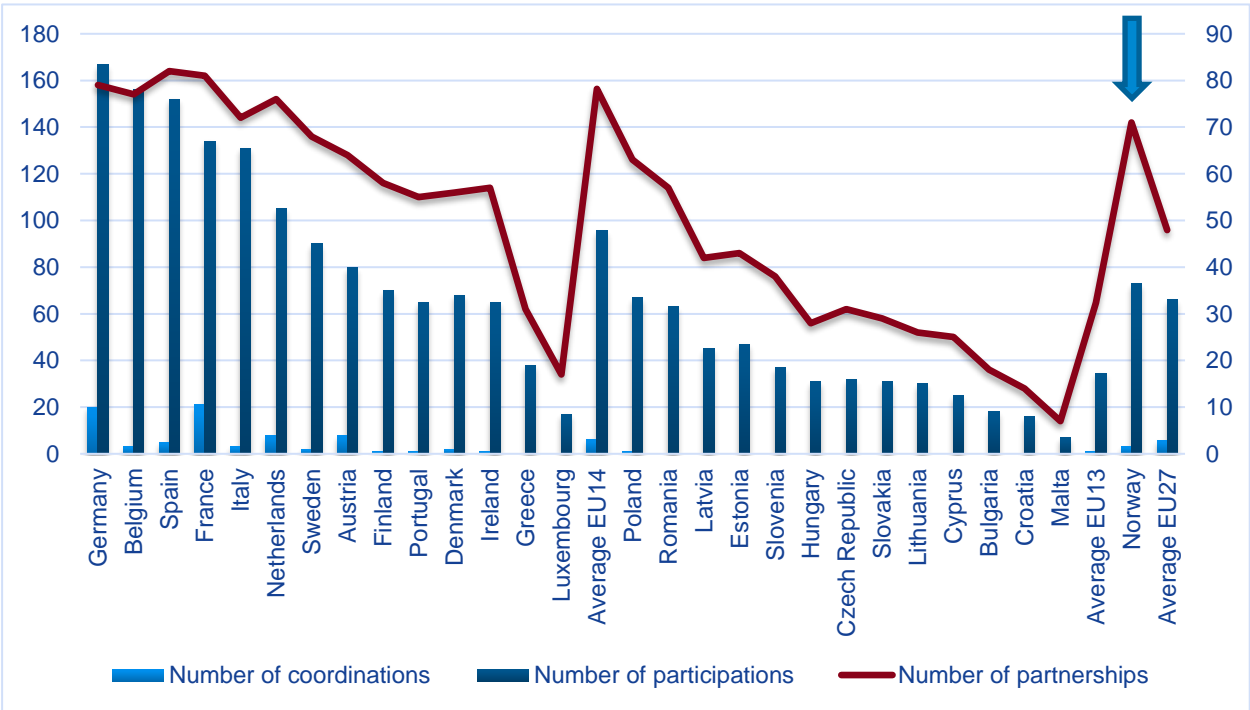
<sup>4</sup> EU15 excluding UK.

<sup>5</sup> For more details about the main funder of public European R&I partnerships in Norway please section 2.

<sup>6</sup> These figures are actually higher considering that around 25-30% of the financial data of the H2020 P2Ps have still to be updated by the P2P networks in the ERA-LEARN database.

Considering the research capacity (researchers in full-time equivalents - FTE) and the R&D intensity (GERD as share of GDP), it appears that rising researcher FTE and R&D intensity levels are associated with rising numbers of supported projects in four countries (FI, DK, A and SE). The outliers, however, are Norway and the Netherlands. In the Netherlands, which has a comparatively low R&D Intensity level, but a large number of researchers (more than three times the number in Norway), the number of supported projects is very high. In comparison, Norway - which similarly has a low R&D intensity - has a relatively high number of supported projects (surpassed only by Sweden and the Netherlands) despite possessing the lowest number of researchers. In an environment characterised by relatively low levels of researchers and R&D intensity, the high number of supported projects in Norway is an indication of the relative importance of partnership participation *per se* in a national context.

Figure 1: Participations and coordinations of Partnerships by country and number of Partnerships by country in H2020 (including JPIs)



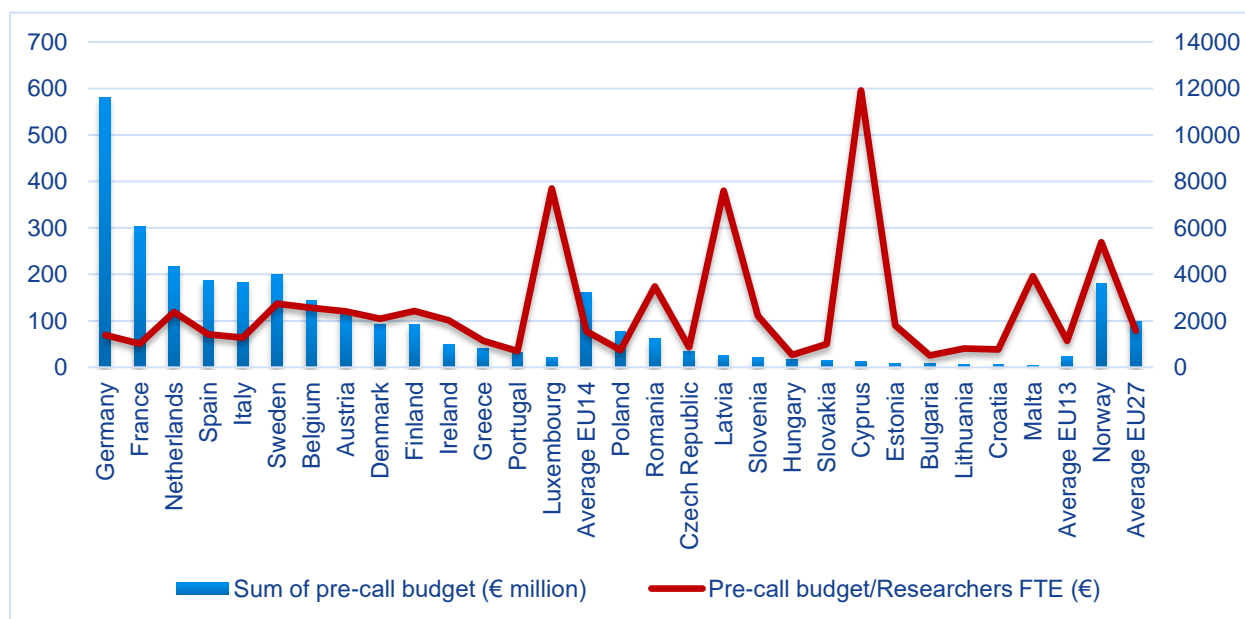
Source: ERA-LEARN database (cut-off date August 2020).

(\*) Partnership coordinations: number of partnerships a specific country coordinates. Partnership participations: number of partnerships a specific country takes part as participant. Total partnership participations: number of partnerships a specific country participates in with any role (i.e. coordinator, participant, observer, other).

Norway is 7th in rank in relation to the national contributions made available pre-call, outranked only by Germany, France, the Netherlands, Spain, Italy and Sweden. However, when these contributions are normalised by the number of researchers (FTE), Norway is one of the highest ranked countries in terms of amounts allocated per researcher and by far outstrips the benchmark countries, as well as the EU14 (€ 1,558) and EU27 averages (€ 1,582). In particular, pre-call allocations in Norway amount to € 5,389 per researcher while the benchmark countries range

from € 2,000 to € 2,500: Sweden (€ 2,738); Finland (€ 2,422); the Netherlands (€ 2,379); Denmark (€ 2,092); and Austria (€ 2,400) (Figure 2)<sup>7</sup>.

Figure 2: Pre-call national commitments, in total (€ million) and per researcher FTE (average 2015-2018) (in €)



Source: ERA-LEARN database (cut-off date August 2020)

(\*) Pre-call budget is the money committed by each country before the launch of a joint call.

(\*\*) Pre-call budget for each researcher is the total pre-call budget committed by a country divided by the number researchers in the country estimated in full-time equivalents (FTE). The average is for the years 2015-2018.

According to RCN data, the amount eventually invested in projects supported by public European partnerships during the period 2014-2019 amounted to € 101.5 million (including the EU funding for ERA-NETs and Art 185s). This varies from one type of partnership to another. Art 185 projects received € 41.3 million, around 80% of which was taken by Eurostars 2 projects (€ 32.2 million). Support to projects funded by the 44 ERA-NET Cofunds amounted to € 37.6 million, while those supported by the 10 JPIs accounted for the remaining € 22.6 million.

Based on the available ERA-LEARN data, the proportion of total project coordinations undertaken by Norwegian organisations is 6%, whereas this share rises to more than 10% for the leading countries: Germany (15%), Netherlands (12%), Spain (11%) and France (10%). However, Norway equals Sweden in terms of project coordinators and surpasses the other benchmark countries, with Denmark hosting 4% of project coordinators, Austria 3% and Finland 2%.

The Norwegian organisations that were interviewed appreciate the opportunities offered by partnerships for European as well as international collaboration. They also value simple application and evaluation procedures, light reporting systems and good communication with empathetic partnership secretariats and national funding agencies. They consider that

<sup>7</sup> These amounts are significantly lower than those appearing in previous country reports due to the fact that the figures on researchers FTE came from the OECD Main S&T Indicators in the previous reports. The OECD figures on researchers' FTE are much lower than the respective EUROSTAT figures. As the OECD database lacks data for certain EU countries, the EUROSTAT data in researchers' FTE will be used from now on.



partnerships are valuable instruments that can fill existing gaps and feel that they should be retained and further supported in the future.

Norway has proven expertise in a number of areas, including renewable energy, geology, petroleum technology, climate change, marine sciences, maritime R&D, clinical medicine and public administration. These areas are well represented in the participation of Norwegian organisations in H2020 as well as in European R&I Partnerships.

The new approach to partnerships in Horizon Europe is welcomed by Norwegian officials, especially in terms of streamlining administration and management efforts and rationalising the over-populated partnership landscape. Norway has also strongly supported the development towards more openness and transparency in all partnerships.

Norway performs well in terms of its active involvement in European R&I Partnerships, with the funds committed per researcher by far exceeding the levels committed by its peers. Moreover, Norwegian researchers highly appreciate the opportunity to participate in and benefit from European and international collaboration. Although some challenges going forward are envisaged, including those associated with navigating a relatively complicated landscape and coping with large variations in the way partnerships are run, the new approach to partnerships under Horizon Europe is nevertheless considered to be a step in the right direction.

# 1. Norwegian Research and Innovation in an International Context

Norway is one of the wealthiest nations among the OECD countries.<sup>8</sup> It has the fifth highest GDP per capita (2019) after Luxembourg, Singapore, Ireland and Switzerland. This is largely due to the successful country's development of resource-based sectors, namely, oil and gas, shipbuilding, fisheries and aquaculture. Currently, Norway is attempting to diversify its economy and reduce its high dependency on oil and gas, although higher oil prices and a tax relief package for the oil industry have improved and the outlook for oil investment and forecasts for the Norwegian economy are positive.<sup>9</sup>

In its attempts to diversify, the country can draw upon its healthy innovation performance. The European Innovation Scoreboard 2020<sup>10</sup> classes Norway as a 'strong innovator', with a marked improvement since 2011 in a range of innovation indicators. Norway is strong in terms of indicators such as 'innovators', 'linkages' and 'innovation-friendly environment' and performs well in terms of 'international scientific co-publications', 'public-private co-publications', and 'innovative SMEs collaborating with others'. Its lowest scores correspond to 'medium and high-tech product exports', 'design applications', and 'sales of new-to-market' and 'new-to-firm product innovations'.

The revised Long-Term Plan (LTP) for Research and Higher Education (2019-2028)<sup>11</sup> takes on board recommendations made by the latest OECD review<sup>12</sup> and encourages interaction and cooperation between public and private research actors. The three overall objectives of the LTP are: enhancing competitiveness and innovation capacity; tackling major societal challenges; and developing academic and research communities of outstanding quality. National priority areas specified in the revised LTP include 'seas and oceans'; 'climate, the environment and clean energy'; 'public sector renewal and better public services'; 'enabling and industrial technologies'; and 'societal security and social cohesion in a globalised world'. These closely resemble the societal challenges addressed by the EU in Horizon 2020, and may have facilitated Norway's participation in Horizon 2020 (including European R&I partnerships). They should also facilitate future participation initiatives launched under Horizon Europe.

Norway adopted the target of increasing total R&D expenditure to 3% of GDP as early as 2005, in line with the original EU Lisbon strategy. However, the current level of total R&D expenditure

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<sup>8</sup> <https://data.oecd.org/gdp/gross-domestic-product-gdp.htm>

<sup>9</sup> <https://insights.nordea.com/en/economics/norwegian-economic-outlook/>

<sup>10</sup> [https://ec.europa.eu/growth/industry/policy/innovation/scoreboards\\_en](https://ec.europa.eu/growth/industry/policy/innovation/scoreboards_en)

<sup>11</sup> <https://www.regjeringen.no/en/dokumenter/meld.-st.-4-20182019/id2614131/?ch=1>

<sup>12</sup> OECD Reviews of Innovation Policy NORWAY 2017, <https://www.oecd.org/norway/oecd-reviews-of-innovation-policy-norway-2017-9789264277960-en.htm>

still falls considerably short of this figure, even though the associated target of 1% of GDP for public R&D expenditure was achieved in 2016. There is now broad agreement that reaching the overall 3% target would require a substantial restructuring of Norway's industry, and the Long-Term Plan has correspondingly set 2030 as the date Norway is expected to achieve the 3% target (OECD Innovation Policy Review Norway, 2017).

Based on the OECD Main Science and Technology Indicators 2020<sup>13</sup> (2018 figures), Norway's R&D intensity is rather low, similar to that of the Netherlands. However, it ranks second after the Netherlands in relation to the number of European R&I partnerships in which the country is involved, although it has a smaller research community (FTE) than the other countries.

The share of GERD performed by the business sector in Norway is slightly above 50%, compared to around 65% for Denmark and Finland, 67% for the Netherlands and around 70% for Austria and Sweden. This is largely a function of the industrial structure of Norway, which is dominated by resource-based industries related to oil and gas. However, Norway has recorded the highest growth in business sector expenditure on R&D (BERD) since 2005, mainly as a consequence of increasing R&D in the service sector (OECD Innovation Policy Review Norway 2017).

On the other hand, the higher education sector performed 34% of GERD in Norway in 2018, i.e. the highest figure in the benchmark countries, though followed closely by Denmark (32%). It must be noted that the higher education sector in Norway is amongst those with the largest proportion of public funding, comparable only to Portugal. The scientific specialisations of academia and research are well in line with the focus of the large Norwegian industrial clusters, i.e. fisheries and aquaculture, the maritime sector, marine biology and environmental technologies (OECD Innovation Policy Review Norway 2017).

The Norwegian research institutes, comprising both public sector-oriented and industrial sector-oriented institutes, perform a relatively high share of R&D (22.6%) (STI for Norway, 2019). The research institute sector is quite strong in Norway and plays a key role in developing the international profile of Norwegian research and innovation (OECD Innovation Policy Review Norway 2017).

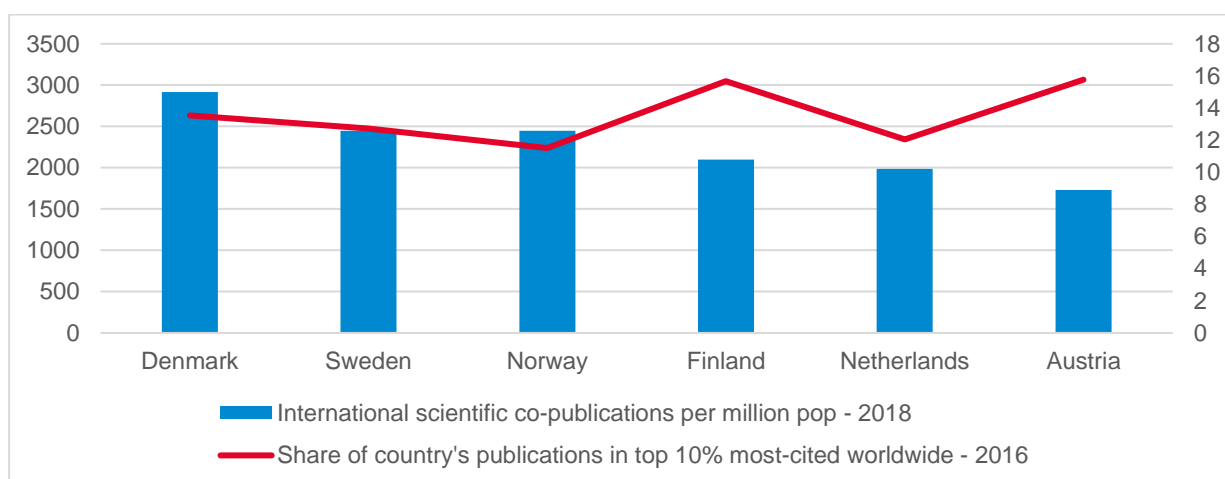
The 'attractiveness' of the Norwegian research system<sup>14</sup> is relatively high, ranking ninth among the countries compared in the European Innovation Scoreboard 2020. It is even higher in rank (fifth) in terms of 'international co-publications per million population' and seventh concerning 'most-cited publications as a share of total publications in a country'. Yet, it drops to fifteenth place in terms of 'foreign doctoral students'. Compared to the other benchmark countries, Norway is surpassed by Denmark and Sweden in terms of international scientific co-publications and is last in in terms of most cited publications (Figure 3).

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<sup>13</sup> [https://stats.oecd.org/Index.aspx?DataSetCode=MSTI\\_PUB](https://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB)

<sup>14</sup> Attractive research systems includes three indicators and measures the international competitiveness of the science base by focusing on International scientific co-publications, Most cited publications, and Foreign doctorate students ([EIS 2020 Methodology report.pdf](#))

Figure 3: Selected EIS 2020 indicators for 'Attractive research systems' for Norway and the comparator countries



Source: European Innovation Scoreboard 2020

Internationalisation of Norway's profile in research and innovation is an important strategic priority. This is reflected in numerous strategic documents and policy papers. Getting engaged in international research activities is seen to contribute to developing academic and research communities of outstanding quality and to strengthen innovation and national competitiveness. International collaboration is also seen as an important channel, along national efforts, for contributing to dealing with the Sustainable Development Goals in Norway's Long-term Plan for Research and Higher Education 2019-2028.

The Governments Strategy for research and innovation cooperation with the EU (Horizon 2020 and ERA), prescribes the cooperation with the EU, including the Joint Programming Initiatives (JPIs) and partnerships based on Article 185 and 187 of the Treaty. The Norwegian ERA Roadmap 2016-2020 prescribes increased commitment and involvement in JPIs as well as increased Norwegian participation in Horizon 2020 projects on societal challenges. The ERA Progress Report 2018 for Norway highlights the country's propensity to publish collaborative papers with researchers from other ERA countries and participation in all the JPIs and in a wide variety of ERA-NETs and Art. 185 initiatives.

Promoting international collaboration is key strand for the Research Council's Strategy for Sustainability 2017–2020. The Research Council of Norway (RCN), the country's major funding agency for research and innovation, is committed to supporting participation in H2020 through targeted schemes, facilitating collaboration with countries within and beyond Europe, encouraging businesses to get involved and exploiting investments in research infrastructure to expand international cooperation.

The RCN's Action plan for internationalisation 2021-2027<sup>15</sup> acknowledges that *"It is an important research and innovation policy goal for Norwegian research environments to increase cooperation and form closer ties with international partners"*. In line with national priorities, the new Action Plan has four main goals, namely to:

<sup>15</sup> [https://www.forskningsradet.no/siteassets/internasjonalt-innhold/nfr\\_handlingsplan\\_int\\_eng\\_utskrift.pdf](https://www.forskningsradet.no/siteassets/internasjonalt-innhold/nfr_handlingsplan_int_eng_utskrift.pdf)

- secure closer alignment between national and international instruments and to contribute to reaching Norwegian research and innovation policy goals,
- contribute to raising the quality of Norwegian research and innovation,
- better enable Norwegian research and innovation to solve national and global challenges facing society, and
- contribute to future value creation in industry and the public sector, environmentally friendly technology and greater sustainability.

Importance is given to increasing outgoing mobility and attracting foreign expertise while also contributing to the Sustainable Development Goals and increasing capacity in the Global South.

## 2. Who are the key R&I funders in Norway?

The Norwegian R&I system is rather unique. It is characterised by the so-called “sector principle”, meaning that each ministry is responsible for financing both applied R&D and more basic, long-term research related to their specific sectors of responsibility. In line with this, the major funding streams consist of R&D budgets from a number of ministries. Yet, there is only one major funding agency for research, the Research Council of Norway, that coordinates all priorities and funding of research from all the different ministries and invests in research and innovation. Fifteen ‘Portfolio Boards’ that cover all thematic areas are central to the work of the RCN in this respect.

On the one hand, the sector principle might be considered an advantage in terms of mobilising all the different ministries to fund research within their field of responsibility, while, on the other, strong coordination is needed to fund research that spreads across sectors. An important feature of the Norwegian system is extensive national coordination. At the policy level, the Ministry of Research and Education (MER) is responsible for the inter-ministerial coordination of national research policy and the government’s overall policy for research funding. At the implementing level, it is the role of RCN to manage the different funding sources. This flexibility is in general considered an advantage of the Norwegian system and makes decision-making easier. This is important for RCN, i.e. the major Norwegian player at the operational level in relation to participation in European R&I Partnerships.

Besides RCN, there are two main public funding agencies in research and innovation: Innovation Norway that offers programmes and services in innovation and development at the national / regional levels, with a particular focus on small and medium sized companies, and the Industrial Development Corporation of Norway (SIVA) that supports science parks, incubators and provides services mainly to start-ups (RIO Country Report Norway, 2015)<sup>16</sup>. However, while the role of Innovation Norway in relation to Norwegian participation in the Horizon programmes of the EU has increased, their role in European R&I Partnerships has so far been limited.

Partnerships are explicitly mentioned as one important means of intensifying internationalisation efforts in the RCN Action Plan for internationalisation 2021-2027. It is prescribed that the RCN will participate in joint calls where participation will constitute considerable added value for Norwegian research and/or industry; where funding is cost-effective; and where there are clear national research and innovation policy guidelines. Norwegian participation will be decided in a dialogue between the relevant ministries and RCN. The ‘sector principle’ allows decisions to be made for each specific sector separately, including funding.

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<sup>16</sup> <https://rio.jrc.ec.europa.eu/country-analysis/Norway/country-report>



## 2.1. Ministry of Education and Research

As a part of coordinating research policy across all ministries at the national level, the Ministry of Education and Research (MER) prepares the long-term plan for research and higher education.<sup>17</sup> It also coordinates the Norwegian participation that takes place in the EU Framework Programmes and the European Research Area (ERA) on the background of the Agreement on the European Economic Area (EEA), and establishes strategies for the participation.

The internationalisation of Norwegian research and innovation is high on the priorities of the national policy for R&I and the value of participating in partnerships has long been acknowledged. International collaboration is seen as a channel, among others, to pursue the objectives of the national R&I strategy.

Norway's example of a long-term research strategy explicitly citing international collaboration and covering both Horizon 2020 and the ERA was considered a good practice in the Mutual Learning Exercise on Alignment and Interoperability of National Research Programmes<sup>18</sup>. Norway's framework for participation in the joint programming process and especially the JPIs, involving both the sectoral ministries and the RCN was also highly appreciated.<sup>19</sup>

MER has the political responsibility of coordinating decisions on which partnerships Norway should join. Although all ministries fund both short-term and long-term research within their areas of responsibility, five ministries account for the bulk of R&D funding. Apart from MER, these include the Ministries of Trade, Industry and Fisheries, Health Care Services, Climate and Environment, Local Government and Modernisation and Defence (STI for Norway 2019).

*“We have several motivations to take part in Partnerships. We believe we can solve domestic challenges and problems by working together on the international arena... We also acknowledge that many of our challenges are global, expressed through the Sustainable Development Goals, and that we have to work together – internationally and globally – to solve them.” (MER Officials)*

Partnerships are considered suitable channels for addressing the challenges that Norway has prioritised as there is significant overlap between national priorities and those pursued by the partnerships themselves. Based on the Long-term Plan for Research and Higher Education 2019-2028, the priority areas for Norway are ‘seas and oceans’, ‘climate, the environment and clean

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<sup>17</sup> The current one is the Long-term Plan for Research and Higher Education 2019-2028,

<sup>18</sup> <https://rio.jrc.ec.europa.eu/policy-support-facility/mle-alignment-and-interoperability-national-research-programmes>

<sup>19</sup> According to guidelines on how to organise and manage JPIs and the SET-plan at the national level, each JPI has a national mirror/external advisory group involving a broad set of stakeholders. A common model has also been prepared under the responsibility of the MER to help ministries in managing and funding JPIs (MLE on Alignment and Interoperability Final Report).

energy', 'public sector renewal and better public services', 'enabling and industrial technologies' and 'societal security and social cohesion in a globalised world'.

As the Sustainable Development Goals (SDGs) are also very high on the Norwegian national agenda, partnerships are considered highly relevant as a tool for international collaboration on the SDGs. Engagement in partnerships also strengthens the knowledge-base of the Ministries' policies by benefiting from the scientific knowledge developed in their fields of responsibility.

The new approach followed by the EC for Partnerships in Horizon Europe is welcomed by Norway. It is important to use Partnerships coherently as means of realising the European Research Area and to ensure that they contribute to the green and digital transition, as reflected in current key policies such as the European Green Deal and strategies for Digitalisation. It is also important that Partnerships contribute to the new EU Missions.

The new strategic process of partnerships, which is currently developed, needs to be open and transparent so that national actors, including sectoral ministries can engage at the European level. This needs to be paired with a suitable organisation at the national level which may lead to some level of harmonisation across countries if the opportunities for mutual learning and exchange of good practices are exploited. Finding smart ways to monitor activities and assess impacts of partnerships is also key at both the European and national levels as is producing data that is easily accessible by all countries.

The new approach to partnerships under Horizon Europe envisages longer-term commitments by Member States. This constitutes a challenge in many countries, including Norway, where short-term policy cycles and annual investment plans are commonplace. Although long-term promises cannot be made, Norway maintains a high interest in partnerships and will continue to take part in them, also aspiring an increased role of the private sector, particularly the SMEs.

To Norway it is imperative, however, that new partnerships are organised in such a way that their participation is in line with the EEA Agreement and that they are allowed to play an active role in the governance of the partnerships, e.g. by participating as a full member in the governance structures established by the European Commission (management boards, steering committees, etc.).

In addition to the RCN, which has overall responsibility for advising the ministries and following up their decisions concerning partnerships, Innovation Norway is expected to increase its involvement as the innovation dimension of future Horizon Europe Partnerships becomes stronger.





## 2.2. The Research Council of Norway (RCN)

The Research Council of Norway (RCN) is the major funding agency covering all research disciplines and sectors and supporting all types of research, including research-based innovation, through a variety of schemes and initiatives (e.g. centres of excellence, research infrastructure, large thematic programmes and business-oriented and user-driven projects). In addition, RCN is an advisor to the Norwegian government on research policy and facilitates networking between the different actors in the Norwegian research and innovation system. As mentioned earlier, following the 'sector principle', RCN administers funds from the other ministries (through its fifteen 'Portfolio Boards'), though the two major ministries funding research and innovation are the Ministry of Research and Education and the Ministry of Trade, Industry and Fisheries (RIO Country report 2015).

RCN has a special unit for international collaboration, though the internationalisation dimension is embedded in all RCN national programmes.

*"The internationalisation of Norwegian research and innovation is high on the priorities of the national policy for R&I. In fact, international collaboration is seen as a channel, among others, to pursue the objectives of the national R&I strategy. Our participation is based on the national thematic priorities, so we address our national priorities together with the best researchers in Europe." (RCN officials)*

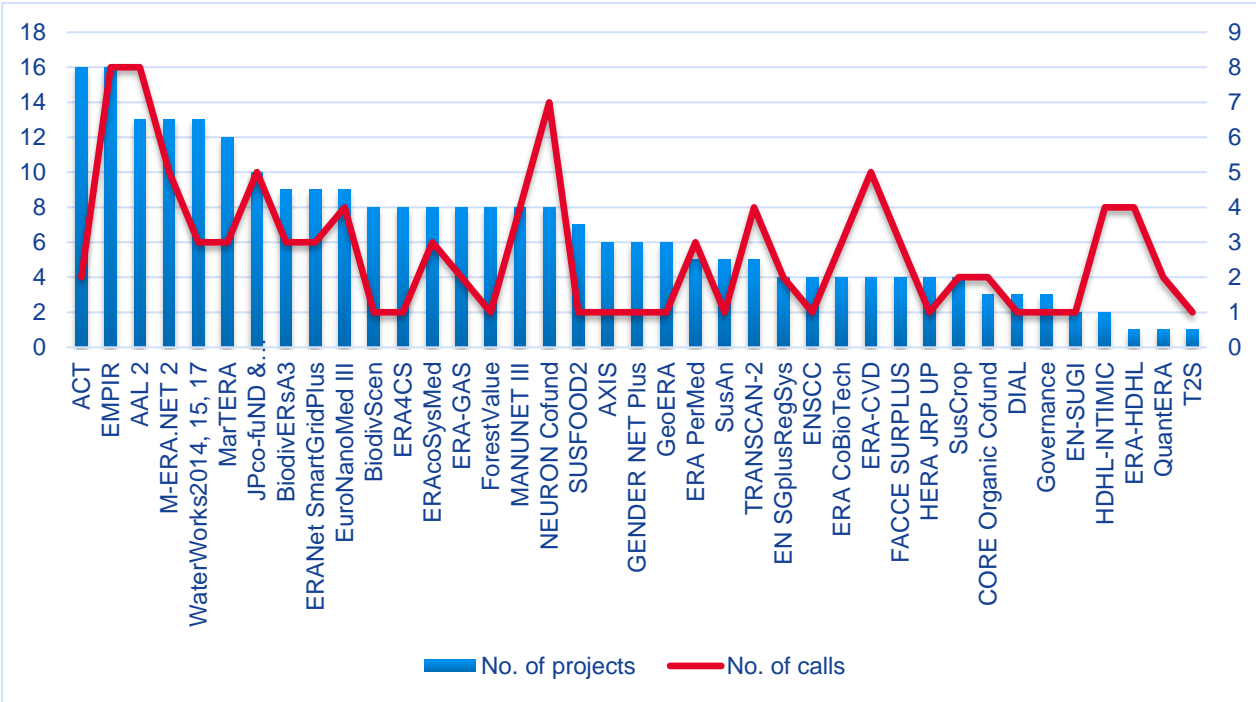
Participation in the partnerships is seen as an opportunity to internationalise the profile of Norwegian research as well as a way of building capacity with a view to participating in larger programmes such as H2020 and ensuring excellence by working with the best. The leverage effect is also appreciated.

*"If two researchers collaborate in a national project that is worth a million, then a million is the max they get. But if they collaborate with others from other countries in a trans-national project, they get a million from Norway, but they have access to a project that may be ten times larger in terms of budget. They also get the chance to work with the best in Europe and beyond and get to know different perspectives and stakeholders so the research they do is better and thus they make better use of that million." (RCN Officials)*

There has been an increase in international collaboration activities over the years. However, compared to the national RCN annual budget the funds invested in international activities under partnerships are around 3-4% of the total RCN budget (in 2019, 362 million NOK vs. 10 billion NOK). RCN has taken part in a large number of partnerships in FP6, FP7 and Horizon 2020. Based on this experience, RCN officials believe that a minimum Norwegian contribution to each partnership of around € 1.5 - 2 million per year is needed to increase the attractiveness of international activities in both research and policy circles; to justify the efforts involved in administering participation; and to increase the overall impact of the research funded.

RCN investments during 2014-2020 amounted to € 101.5 million (including the EU funding for ERA-NETs and Art 185s), The number of supported projects and calls in different initiatives is shown in Figure 4 (excluding the 109 projects supported by EUROSTARS 2 not to distort the visibility of the figure). Besides the six partnerships that have more than ten projects (ACT, EMPIR, AAL 2, M-ERA.NET 2, WATERWORKS and MarTERA), the project spread is quite broad and spans across more than 30 additional partnerships. The focus areas of the partnerships where Norway is involved include research in the areas of health, energy, the environment and climate change, food and bioeconomy, seas and oceans, but also social sciences and humanities. There is a clear match between these focus areas and Norway’s priorities in research.

Figure 4: Number of projects and calls supported by ERA-NET Cofunds and Art 185 initiatives with Norwegian participation during H2020 (2014-2020).

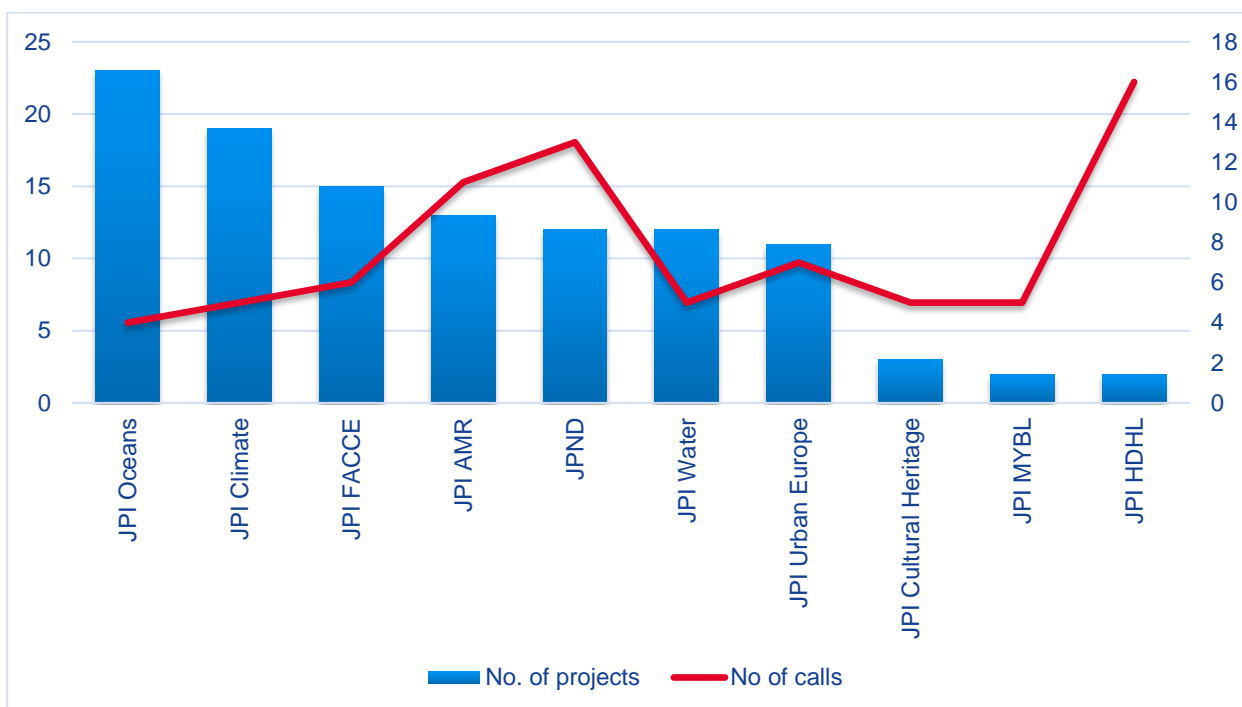


Source: ERA-LEARN database (cut-off date Aug 2020)  
 (\*) Excluding EUROSTARS 2 and EDCTP to allow visibility of the rest of the data

Besides the exceptional number of projects for EUROSTARS 2 (109 in 15 calls) and the similarly exceptional number of EDCTP2 calls (61 calls and 5 projects), projects per call are highest (8 projects per call) for ACT, BiodivScen, ERA4CS and ForestValue, followed by SUSFOOD 2 (with 7 projects per call) and AXIS, GeoERA and Gender Net Plus (with 6 projects per call).

When looking at the projects and calls of the JPIs (including those under ERA-NET Cofunds linked to JPIs) (see Figure 5), JPI Oceans has the highest number of projects as well as the highest number of projects per call, with an average of 5.75. This is followed by JPI Climate (3.8 projects per call), FACCE JPI (2.5 projects) and JPI Water (2.4 projects). The project per call ratio falls below the one for the JPIs Cultural Heritage, MYBL and HDHL, mainly because certain call topics were either not prioritised by Norway or because some proposals with Norwegian participation ended up not being supported, despite being highly marked, due to shortage of funds in partner countries.

Figure 5: Number of projects and calls launched by JPIs (including those under ERA-NET Cofunds that are linked to JPIs) with Norwegian participation during 2014-2020



Source: RCN

RCN officials believe that the partnership landscape has been quite heterogenous in nature, comprised of numerous small initiatives with limited budgets and others, especially the public-private partnerships, of much larger size and hence capable of attracting large investments from industry, the EC and Member States. The resultant complexity of this diverse landscape sometimes made it difficult to attract applicants and the cost of participation, viewed from a funding agency perspective, has been quite high.

However, the ministries as well as the research community value opportunities for international collaboration, including the EC Framework Programmes as well as European R&I partnerships. RCN will therefore increase its efforts to present a clearer picture of the crowded landscape to researchers. In addition, they will place greater emphasis on communication activities concerning the first wave of 14 new partnerships that Norway will participate in under Horizon Europe. They will also take steps to help researchers in the application and reporting stages so that the administrative burden on them is minimised. RCN is currently investing in efforts to streamline the management and monitoring of participation in partnerships with the help of a new IT system that exploits artificial intelligence.

*“We should take more advantage of digitisation in simplifying certain procedures such as applying, data reporting, etc. and harmonising them across the different countries. This would also make it easier for the scientists” (RCN officials)*

Norway welcomes the new emphasis on more strategic partnerships under Horizon Europe, and has indicated willingness to take part in all 14 partnerships being launched in the first phase of Horizon Europe. It also supports the ambition to simplify and streamline the partnerships in terms

of rules of participation, reporting, data collection and other administrative dimensions. There has been lack of decisiveness in terminating partnerships in the past and efforts to reduce administrative overload have not always been successful. More efficiency is needed. Hopefully, this will be achieved in Horizon Europe.

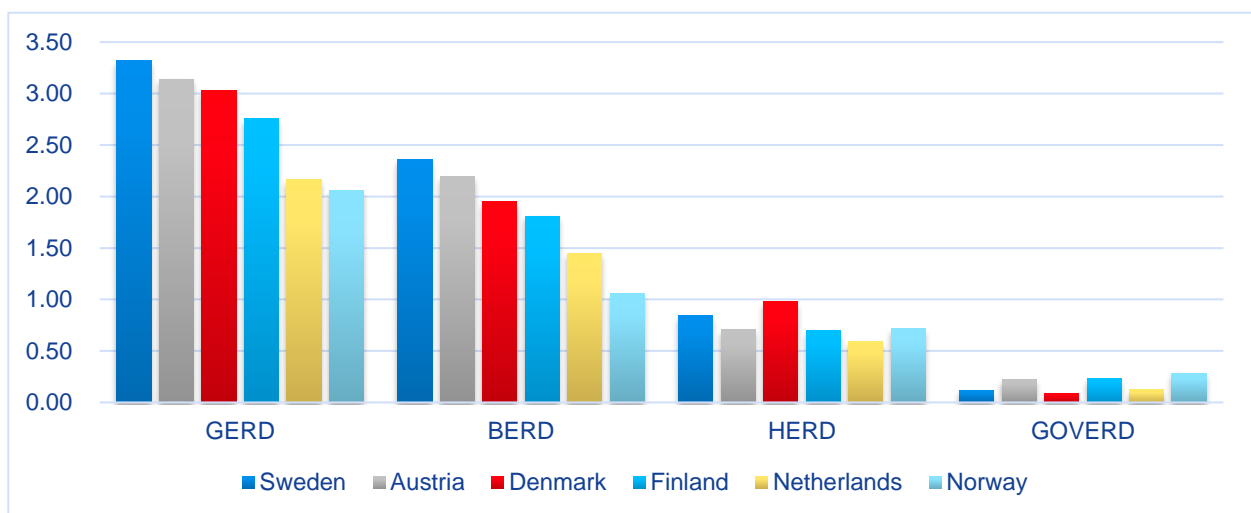
International collaboration is highly valued in Norway, a fact that is reflected in a number of key strategic documents. European R&I Partnerships are seen as a way of achieving national goals, internationalising the profile of the national research community and strengthening the competitiveness of indigenous industries. Although scope for improvement is recognised, Norway welcomes the new approach to partnerships under Horizon Europe and is committed to continued participation.

Reflecting the strategic importance of partnerships for Norway, RCN, the major Norwegian funding organisation, will take steps to assist and further support Norwegian researchers to minimise the administrative burden in the application and reporting stage, and is currently investing in efforts to streamline the management and monitoring of partnerships and their supported projects.

### 3. Who are the key R&I performers in Norway?

R&D intensity in Norway (2.06%) is comparable to the EU28 GERD average (2.03%), though lower than in any of the comparator countries. The same applies for business expenditure on R&D (BERD). Higher Education expenditure on R&D (HERD), however, is comparable across the comparator countries, while Government expenditure on R&D (GOVERD) is slightly higher than in any of the benchmark countries (Figure 6) and above the EU28 average (Annex – Main R&I indicators).

Figure 6: R&D expenditures in Norway and the comparator countries (as % GDP)



Source: OECD Main Science and Technology Indicators

As discussed earlier (Section 1), the share of GERD performed by the business sector in Norway is the lowest in the comparator group of countries and is below the EU average. This is mainly due to the structure of the Norwegian economy, with its high share of industries related to raw materials and its lower share of R&D-intensive sectors. However, business R&D spending adjusted to reflect the country's specific industrial structure compares favourably with that of other OECD countries<sup>20</sup>, and R&D spending in the services sector is high (OECD Review 2017). Norway is also one of the countries with high R&D growth in the business sector over the past few years and a number of large exporting companies have invested actively in R&D, particularly in ocean-based, energy, process, manufacturing and bio-based industries (Research in Norway. Facts and figures 2019)<sup>21</sup>.

The higher education sector performs a share of GERD (34%) that is greater than in the benchmark countries and well above the EU28 average (21.94%). Yet, the share of HERD financed by the business sector (2.27%) is the lowest in the comparator country group and well

<sup>20</sup> OECD, country note <https://www.oecd.org/norway/41559315.pdf>

<sup>21</sup> [https://www.forskningsradet.no/siteassets/internasjonalt-innhold/research\\_in\\_norway\\_2019.pdf](https://www.forskningsradet.no/siteassets/internasjonalt-innhold/research_in_norway_2019.pdf)

below the EU28 average (6.93%). This might reflect limited collaboration between academia and businesses.

The share of GERD funded by government is rather high (48%) – higher than in any of the benchmark countries and well above the EU28 average (28%) – whereas the share originating from sources of funds from the rest of the world is the lowest among the peer countries (8.23%) and below the EU28 average (9.89%). This possibly indicates that there is still room to grasp opportunities and establish international R&D links (Annex, Main R&I indicators).

Based on EUROSTAT and OECD data that are annexed to this report (Annex, Main R&I indicators), the international co-publications of Norway (per million population) are comparable to those of Sweden and are second only to those of Denmark. Yet, the impact of Norwegian publications is not as high as those of its peers, in particular, Austria and Sweden. Innovation output scores, as measured by PCT patent applications (EIS, 2020), are close to the EU28 average but much lower than the scores of the peer countries, reflecting again the dominance of resource-intensive rather than research-intensive industries.

In summary, Norway performs averagely in terms of expenditure on R&D as percentage of GDP, with the main R&I performer being the business sector, though this is in need of green and digital transformation in order to increase further its competitiveness and value creation based on new R&I activities and innovation outputs. Efforts to increase academia-business collaboration and the flow of R&D funds from abroad would be beneficial. While Norway is one of the leading performers in terms of international co-publications, the impact of Norwegian publications remains a concern.

Norway hosts a variety of institutions in the higher education sector, including 11 universities and 23 university colleges. Together with 37 research institutes and 51 health trusts/hospitals, these constitute key research actors in Norway and are the main beneficiaries of RCN programmes and activities, including European R&I Partnerships.<sup>22</sup>

According to the OECD, Norway possesses a strong research institute sector. In cooperation with industry, these institutes play a key role in the internationalisation of research and innovation in Norway. The research institutes undertake mainly applied research and the share of the R&D activities is higher than that in comparable structures in other countries such as Denmark and Sweden. The Norwegian research institutes are also important in terms of scientific outputs and impacts (publications and number of citations). Both the research institute sector and the whole landscape of higher education institutes have been restructured in recent years to limit fragmentation and facilitate the creation of critical mass in many of the scientific disciplines they address (OECD Innovation Policy Review Norway, 2017).

## Performance in H2020

Among the Associated Countries, Norway is the second largest player in H2020 after Switzerland, based on the data available in the H2020 dashboard. Overall, Norway accounts for 5.51% of total H2020 signed grants, which corresponds to 1.78 of total project participations, and receives 2.24% of net EC contributions. It ranks 13<sup>th</sup> in terms of number of participations and 12<sup>th</sup> in terms

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<sup>22</sup> <https://www.forskningsradet.no/en/apply-for-funding/who-can-apply-for-funding/research-organisations/approved-research-organisations/>

of EU budget share. Compared to its peers, Norway's performance is similarly to that of Finland (in terms of EU net contributions) but is last in the group in terms of project participations and signed grants. However, it has one of the highest success rates in terms of applications, alongside Denmark and after the Netherlands (Table 4).

Table 4: Key features of H2020 participation for Norway and the benchmark countries

	EU NET Contribution (€ b)	Signed grants	Project Participations	Success rate
Austria	1.64	2749	4305	16.47
Finland	1.32	1937	3012	13.40
Denmark	1.53	2543	3482	15.42
Netherlands	4.51	5367	9461	16.30
Sweden	1.97	2936	4461	14.81
Norway	1.31	1708	2710	15.42
<b>Total H2020</b>	<b>58.39</b>	<b>31003</b>	<b>152199</b>	<b>12.02</b>
<i>Norway's % in H2020</i>	<i>2.24%</i>	<i>5.51%</i>	<i>1.78%</i>	
<b>EU Member States</b>	<b>52.93</b>	<b>28492</b>	<b>134468</b>	<b>12.03</b>
<i>Norway's % in EU MS</i>	<i>2.47%</i>	<i>5.99%</i>	<i>2.02%</i>	

Source: Author's elaboration based on the H2020 data for provided on <https://ec.europa.eu/research/horizon2020/index.cfm?pg=country-profiles>

The top-ten organisations receiving the largest amounts in net EC contributions (€) include:

Organisation Name	net EC contributions (€)
1. UNIVERSITETET I OSLO	151,811,398.74
2. SINTEF AS	105,341,855.34
3. NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU	99,360,430.60
4. UNIVERSITETET I BERGEN	76,734,992.69
5. COALITION FOR EPIDEMIC PREPAREDNESS INNOVATION	36,000,000.00
6. NORGES FORSKNINGSRAD	30,835,385.53
7. BORREGAARD AS	26,019,613.63
8. STIFTELSEN SINTEF	25,904,975.42
9. UNIVERSITETET I TROMSOE - NORGES ARKTISKE UNIVERSITET	25,052,748.27
10. SINTEF ENERGI AS	21,118,812.06

Source: <https://ec.europa.eu/research/horizon2020/index.cfm?pg=country-profiles>

## How are they doing in partnerships' projects?

Based on the ERA-LEARN data, Norwegian organisations took part in 434 projects supported by European R&I Partnerships in H2020, with a cumulative budget of approximately € 101.5 million<sup>23</sup>. The number of projects with Norwegian organisations as partners is only behind the Netherlands and Sweden amongst the comparator group of countries, though Norwegian organisations only acted as project co-ordinators in a handful of instances.

The experience of Norwegian researchers participating in projects supported by European R&I Partnerships is quite positive based on random interviews that were carried out during the preparation of this report<sup>24</sup>. Partnerships are seen as filling a gap between national programmes, which do allow foreign partners but to a lesser extent, and other international programmes such as H2020. This can be interpreted in a number of ways. Partnerships may cover areas that are not adequately addressed in Norwegian programmes. They may also cover some research areas more comprehensively, with broader call topics that are not as narrowly defined as H2020 calls, providing researchers with more freedom to be creative:

*“The ACT call filled a gap in terms of the area of research addressed. There is the CCS programme in Norway but the funding has been decreasing and the block funding has been low so it is compulsory to find other funding opportunities. ACT also covered the area of CCS more comprehensively and in a more general way than H2020.” (project supported by ACT ERA-NET)*

Compared to H2020 projects, some researchers also feel that partnership projects are lighter in terms of bureaucracy and administrative burden, though it might not be as light as in Norwegian programmes generally. The opportunities offered by partnerships for collaboration within but also beyond the EU are much appreciated:

*“JPI Water enables good fundamental research at international level. In this regard it should be reinforced keeping the procedures as simple as possible without copying H2020. JPI Water encompasses research in broader areas than the relevant Nordic programmes and is also enabling collaboration beyond Europe; this is highly appreciated.” (project supported by WaterWorks 2015)*

*“JPND allows research collaboration within EU and beyond (between the North and the South, East and West - very integrating in Europe) and is not bureaucratic as H2020. The project participants have become so enthusiastic that we continued to collaborate after the official end of the project.” (project supported by JPco-fuND)*

Partnerships are also considered to be a stepping-stone to larger programmes and continued collaboration, with this occurring in several instances:

*“Another very positive outcome of the project is that we also got a new JPND grant for a more clinical setting with some of the previous partners. We also aim to apply for an*

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<sup>23</sup> Based on the data provided by the RCN for the preparation of this report.

<sup>24</sup> Five interviews were conducted with project participants randomly selected from the ERA-LEARN database.



*ERC Synergy grant when our last publication is accepted. The collaboration in this project was especially nice and fruitful.” (project supported by JPco-fuND)*

*“ERA-NET ACT provides a wide network that will live beyond the project time ...We have plans to continue our research. We are examining several technologies and services and we believe 2 of these technologies can be developed further into products/services to be applied in the field. This is what we’re working on and we’ll certainly continue our collaboration with other projects with higher TRLs.” (project supported by ACT ERA-NET)*

Yet, there is also value in smaller-scale partnerships:

*“We deliberately chose to apply for a small-scale project as a stepping-stone in our research. We wanted to bring in various components, built in other projects, and bring in other aspects, such as regulations and social aspects, together in the toolbox. This is not an end in itself; we will continue with this research and build on it later on. The toolbox will be used for future research” (project supported by ACT ERA-NET)*

*“As the JPI projects are rather small (3-4 partners) we had to make sure there is no redundancy in the competences of the partners – there was clear complementarity in the composition of the network, and this clearly facilitated the workflow and created a truly collaborative working environment.” (project supported by WaterWorks 2015)*

Researchers also commented on the different funding models of partnerships and other international programmes such as H2020. In particular, they saw a notable difference between centralised funding in H2020, with the coordinator responsible for distributing funds to the project partners, and the federal nature of funding in partnerships, with each project partner receiving funds from their own countries. This has two sides: coordinators do not have the burden of distributing funds, but at the same time they cannot use the funding as a control mechanism to make partners meet their obligations. Thus, the coordination of projects in partnerships is more reliant on the creation of a friendly and trustworthy collaboration environment than it is on formal control mechanisms.

The nature of projects discussed in interviews varied considerably. Some focused on more fundamental research that led to important publications (e.g. in Nature), while others focused on research at higher TRLs. Some led to impacts that were rather unexpected, although equally valued:

*“We also think IMPASSE led to broader impact in the sense that this topic started to be addressed in H2020. Part of this also stemmed from our contribution. They understood the value of this research and they pushed to have a bigger project, so we submitted a new proposal with 20 partners under H2020 which is now at the evaluation stage.” (project supported by WaterWorks 2015)*

Overall, the researchers that were interviewed appreciated:

- the short application proposals;
- the light reporting system applied by partnerships and by RCN;

- the good communication and guidance on the side of the partnerships as well as RCN;
- the two-stage evaluation process where this was applied.

At the same time, they criticised:

- long applications that took a lot of effort to complete and submit;
- lack of funds to cover the actual coordination costs of the projects;
- the obligation to follow the DESCA model for the consortium agreement, which is very difficult to implement when partners come from non-European countries;
- the short duration of projects (3 years); a 5-year duration was considered more appropriate, especially when the aim is to produce important, highly-ranked publications.

Researchers also noted the importance of securing more funds for partnership participation in the future (strategic investment), so that partnership projects could receive more funding and more projects could get funded, thus avoiding cases where excellent proposals are not supported due to budget limitations in one or more partner countries.

In conclusion, the key factors for success reported by interviewees can be summarised as follows:

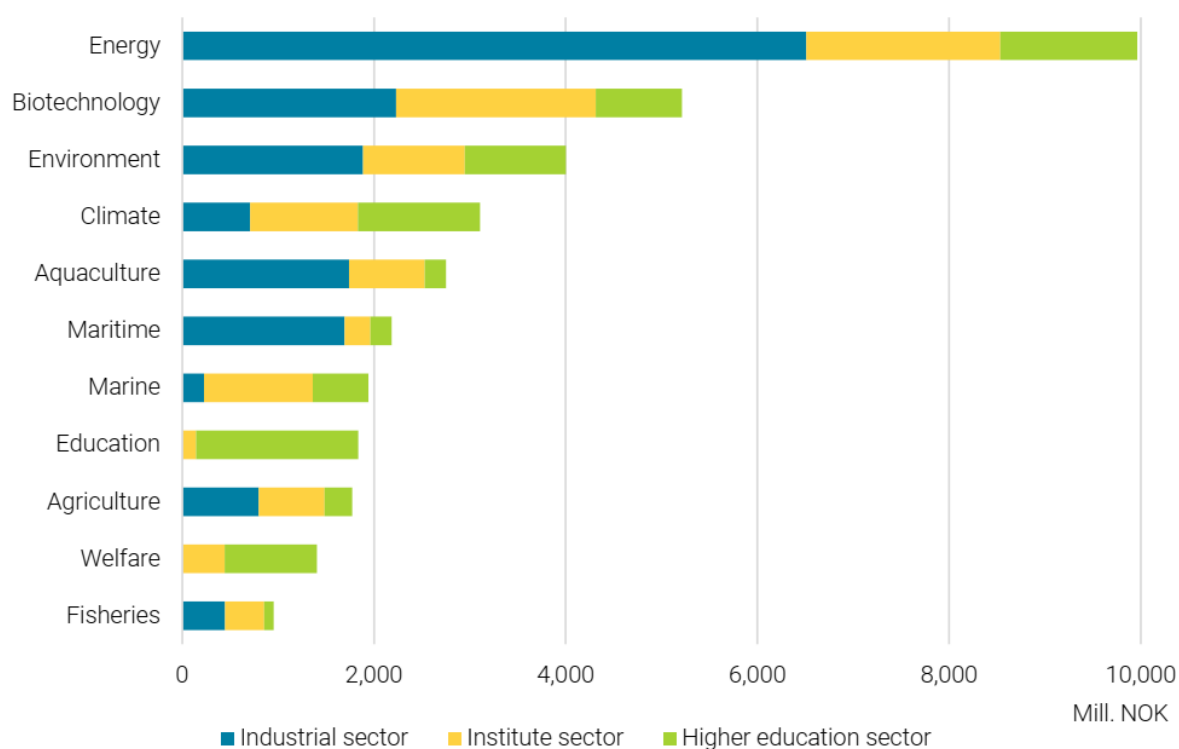
- Well thought out project proposals that automatically become coherent project plans;
- Good ideas regarding the scientific topic;
- strong expertise in the team;
- strong mutual interest in common project goals;
- Good procedures to ensure effective communication among partners;
- Light bureaucracy and administrative burden;
- Good organisation and tight follow-up from the project coordinator;
- Strategic selection of partners, making sure they get the funding from their countries;
- Good support from industry partners, where relevant;
- Good access and communication with, flexible and understanding partnership secretariats and funding agencies, especially in the cases where changes need to be made to the workplan due to exceptional circumstances, such as the COVID crises;
- Broadly defined call topics that foster creativity – which is especially important for fundamental research;
- Communication with stakeholders even at the proposal writing stage, to see how they can influence the research and how best to integrate them in the project.

The Norwegian researchers interviewed appreciated the gap-filling role of partnerships that allows coverage of research fields inadequately addressed by national programmes or narrowly defined in H2020. The opportunities offered for collaboration with other European countries, but also with countries outside Europe, are highly valued, although efforts are needed to facilitate the participation of non-Europeans. Smaller-scale partnership projects are important stepping-stones in longer-term research trajectories and can lead to collaboration in larger programmes. Key features of some successful partnerships may have broader application (e.g. two stage-evaluation procedures, short applications, light reporting systems)

## 4. In which R&I areas is Norway strong?

Norwegian researchers are strong in the following areas: renewable energy, geology, petroleum technology, climate change, marine sciences, maritime R&D, clinical medicine and public administration.<sup>25</sup> These areas are well reflected in the Government's Long-term Plan for Research and Higher Education, which defines ten thematic priority areas (energy, climate, environment, agriculture, fisheries, aquaculture, marine sciences, maritime R&D, welfare and education) as well as one technology area (biotechnology). Based on the latest STI Indicators for Norway report (2019), energy research accounted for 15 % of total Norwegian R&D activity in 2017; research within the agriculture domain accounted for 2.6 %; maritime R&D accounted for 3.3 % of total R&D expenditure; and biotechnology accounted for 7.8 per cent. (Figure 7)

Figure 7: R&D expenditures within the 10 thematic areas and biotechnology by performing sector (2017). Mill. NOK.



Source: Statistics Norway and NIFU, R&D statistics

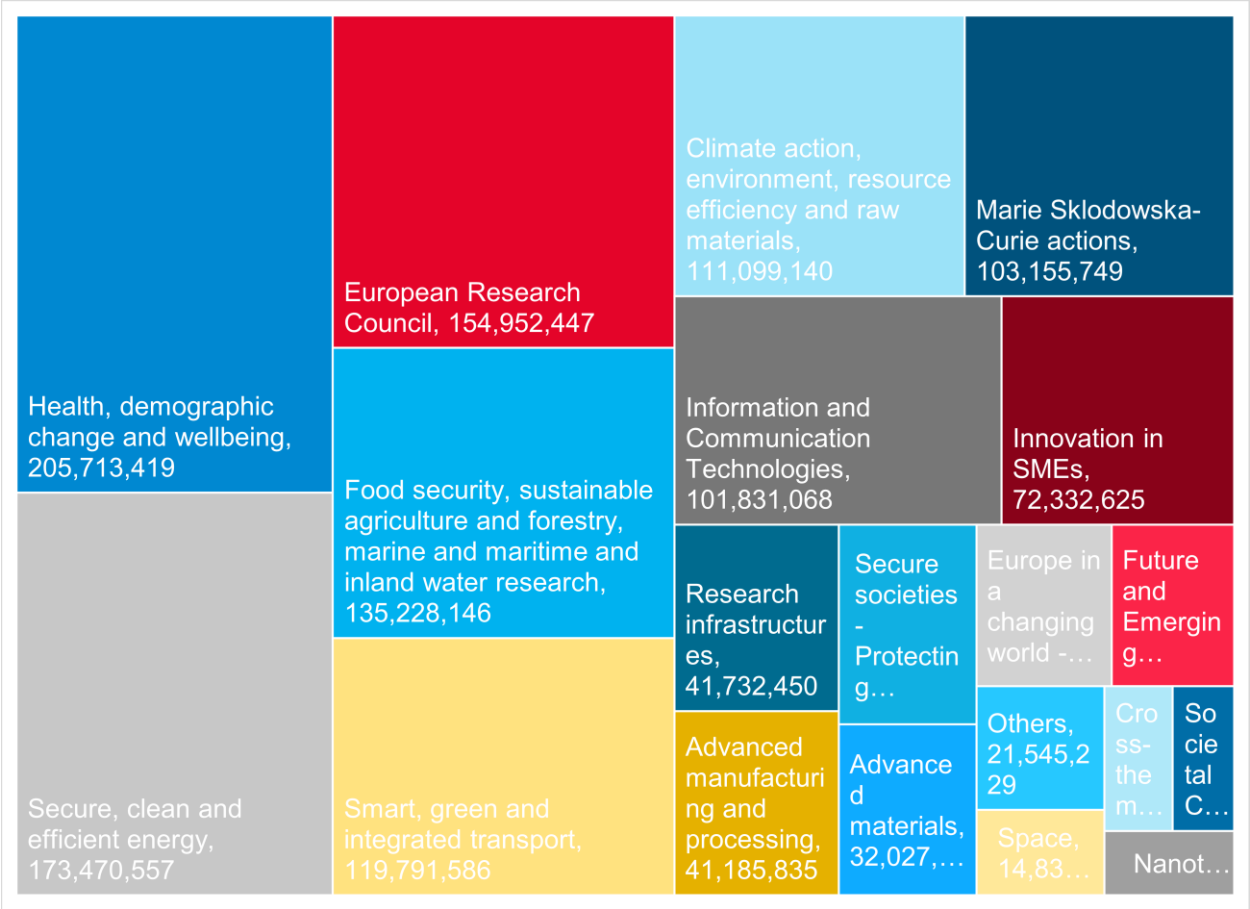
When publications are considered, 'medicine and health care' accounted for 27 % of the publications in 2018, with social medicine the largest field in this category. The largest field of study within natural sciences is geosciences, while 'pedagogy and education' dominates in the social sciences category, with 'computer technology and computer science' the largest field in the

<sup>25</sup> [https://www.forskningsradet.no/siteassets/internasjonalt-innhold/research\\_in\\_norway\\_2019.pdf](https://www.forskningsradet.no/siteassets/internasjonalt-innhold/research_in_norway_2019.pdf)

technology category. ‘Humanities’ is the smallest discipline (10% of total publications). Medicine and natural sciences largely account for the fact that the overall citation index is well above the world average (STI Indicators for Norway, 2019).

Norway’s participation in H2020 confirms the interest of the national research community in the areas of health, energy, food, agriculture and forestry, climate, environment and transport and ICT. These are the thematic areas where the net EU contribution in H2020 to Norwegian participants is largest – excluding ERC actions and Marie Skłodowska-Curie actions, which are non-thematic schemes (Figure 8).

Figure 8: Net EU Contribution (€) in H2020 for Norway per thematic area



Source: <https://webgate.ec.europa.eu/dashboard/sense/app/a976d168-2023-41d8-acec-e77640154726/sheet/d23bba31-e385-4cc0-975e-a67059972142/state/analysis>

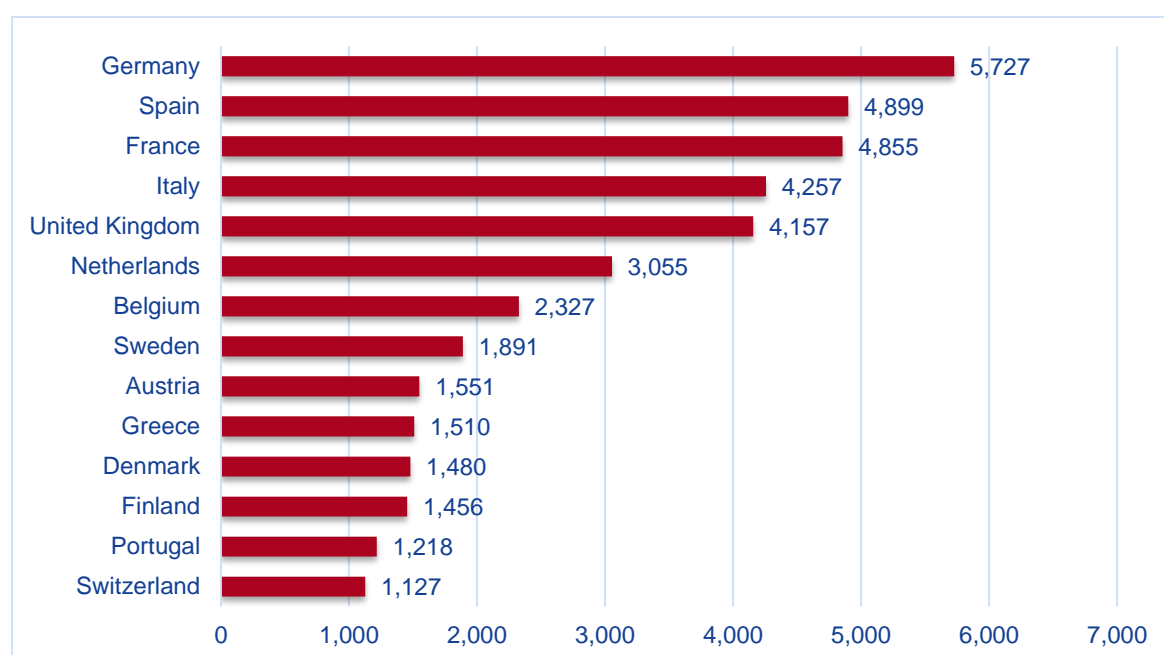
The participation of Norway in European R&I Partnerships (cf. section 2.2), as measured by the number of projects supported during 2014-2020, confirms a strong focus on areas that match those in H2020. These include the areas of health, energy, the environment and climate change, food, agriculture and forestry, bioeconomy, and maritime R&D, as well as social sciences and humanities. There is, thus, a clear match between national priorities and the successful participation of Norwegian researchers in both H2020 and Partnerships. This reflects an admirable spread of national competence across a variety of disciplines.

The interests of Norwegian researchers span an impressive variety of disciplines and research areas, with a specialisation profile that maps onto national research priorities. These areas are well represented in Norway's participation in both H2020 and in European R&I Partnerships.

## 5. With whom does Norway collaborate in R&I and why?

Based on H2020 data<sup>26</sup>, Norwegian organisations in H2020 projects collaborate mostly with counterparts from Germany, Spain, France, Italy, UK, the Netherlands, and Belgium (Figure 9). These countries are also among the most active countries in Horizon 2020. There is also strong collaboration with other Nordic countries (Sweden, Denmark and Finland), as well as with Austria and Switzerland and Southern European countries such as Greece and Portugal.

Figure 9: Top collaborations of Norway with other countries in H2020 projects (above 1000 links)



Source: <https://webgate.ec.europa.eu/dashboard/sense/app/a976d168-2023-41d8-acec-e77640154726/sheet/0c8af38b-b73c-4da2-ba41-73ea34ab7ac4/state/analysis/select/Country/Norway>

As noted during the interviews, researchers build networks through partnerships and then exploit them when developing future collaborations. ERA-NETs, in particular, have been important stepping-stones to the formulation of H2020 proposals. Historically there has been a strong tradition of collaboration among Nordic countries and research communities, but it is also clear that the Framework Programmes and Partnerships have broadened horizons. Interviewees suggested that partner selection is strongly based on potential contribution to the success of a proposal, which in turn is strongly influenced by knowledge accumulated via personal involvement in past collaborations.

<sup>26</sup> <https://webgate.ec.europa.eu/dashboard/sense/app/a976d168-2023-41d8-acec-e77640154726/sheet/0c8af38b-b73c-4da2-ba41-73ea34ab7ac4/state/analysis/select/Country/Norway>

The range of countries collaborating frequently with Norway in H2020 projects is comparable to the pattern for Partnerships. In particular, based on the ERA-LEARN data, Norwegian organisations collaborate most frequently with counterparts from Germany, France, the Netherlands, Spain, the United Kingdom, Italy and the other Nordic countries, but also with Romania (Figure 10).

Figure 10: Collaborations of Norwegian organisations in Partnership-supported projects in H2020 (above 10 links)



Source: ERA-LEARN database (cut-off date Aug 2020)

Going forward, collaboration is also likely to increase. The RCN Action Plan for internationalisation 2021-2027 defines certain priority countries for international collaboration also beyond the EU, including the USA, Canada, China, Brazil, India, Russia, South Africa, South Korea and Japan.

Norwegian organisations partner with counterparts from the most active countries in both H2020 and European R&I Partnerships. Although there is tradition of collaboration between the Nordic countries, Norway collaborates frequently with a much broader range of countries in both H2020 and Partnerships. The primary criterion governing partner selection is not spatial proximity, it is the relevance of expertise to future project success and the researchers' existing networks of counterparts.



## 6. What are Norway's S&W in relation to participation in European R&I Partnerships?

### Strengths

- Norway is actively engaged in public European R&I Partnerships, taking part in more calls than comparator countries and scoring higher than the EU14 average for call participations.
- Although Norway presents low levels of researchers and R&D intensity, the high number of supported projects in Norway is an indication of the relative importance of partnership participation *per se* in a national context.
- The internationalisation of Norway's profile in research and innovation is an important strategic priority. Partnerships are explicitly mentioned as one important means of intensifying internationalisation efforts in the RCN Action Plan for internationalisation 2021-2027
- The Norwegian strategic R&I priority areas closely resemble the societal challenges addressed by the EU in Horizon 2020. This facilitated Norway's participation in Horizon 2020 (including European R&I partnerships) and is also expected to facilitate future participation under Horizon Europe.
- Norway possesses a strong research institute sector that plays a key role in developing the international profile of Norwegian research and innovation.
- The new approach to partnerships in Horizon Europe is welcomed by Norwegian officials. Norway is committed to supporting the new types of partnerships.
- Both the research institute sector and the higher education institutes have been restructured in recent years to limit fragmentation and facilitate the creation of critical mass in many of the scientific disciplines they address. The interests of Norwegian researchers span an impressive variety of disciplines and research areas.

### Weaknesses

- The amounts of funds made available for international collaboration are low accounting for around 3-4% of the overall RCN budget. Securing more funds for partnership participation in the future is important.
- Norway performs well in terms of international co-publications and most-cited publications, though in terms of the latter it is out-performed by comparator countries (A, DK, FI, NL, SE).

## 7. A Topic of interest from Norway: energy R&I partnerships

Research in the energy domain is a high priority for Norway, as documented in the Government's Long-term Plan for Research and Higher Education. As indicated earlier, energy research accounted for 15 % of the total Norwegian R&D activity in 2017 and, based on the latest data (2019), Norwegian researchers are quite strong in renewable energy research. This is also reflected in the European R&I Partnerships in which Norway takes part. Among the 39 partnerships involving Norway, 7 are dedicated to energy research, with one of them, ACT, coordinated by RCN.



ACT, <http://www.act-ccs.eu/about-us>, was created in response to the EC call (in 2014) for low carbon energy technologies. This was of particular interest to Norway as relevant CCS (carbon capture and storage) technologies had already been developed in Norway. Thus, the call was an opportunity for Norway to transfer its knowledge to other countries, but also to benefit from international knowledge. The proposal submitted by RCN was approved and involved 9 countries (Germany, Greece, the Netherlands, Norway, Romania, Spain, Switzerland, Turkey and the UK). This gave Norway the opportunity to encourage the research community to collaborate trans-nationally. Such collaboration already existed, although it was not formalised and the relevant national programme did not really focus on trans-national collaboration.

Over the years, the collaboration has proved successful. In ACT 2, the consortium was extended with partners from the US, France and Greece and the total national contributions reached € 31 million without any EC funding. In ACT 3, the consortium was extended further to include Denmark, the Alberta region of Canada, Italy, India and the Nordic Energy Research platform, reaching € 36 million in national contributions. Interest from research communities has also been rising, starting with 30 pre-proposals submitted in the first call, and reaching 45 in the second and 91 in the third.

ACT has managed to identify certain good practices over the years. For instance, it has an 'inclusive' policy that ensures that each country has at least one proposal approved in each call if the proposal has been highly ranked by external experts. In addition, calls have been designed to achieve specific targets. As an example, in the first call proposals of different TRLs were targeted through two different call strands and were evaluated separately. This helped avoid proposals in specific TRLs being overtaken in the ranking list by proposals aimed at different TRLs. Another good practice concerns project reporting, which uses a traffic light system and is highly appreciated by project partners. This requires reporting on a quarterly basis to discover if a problem exists. If the red light is 'on', then the partner concerned is contacted to help find a solution. ACT also tries to maximise its impact by arranging annual knowledge sharing workshops

where all projects meet to create synergies, collaborate with each other and meet other stakeholders in the CCUS area.

Despite evolving some good practices that could be of use in other partnerships, there are still a number of challenges to overcome. First and foremost, managing such a partnership requires significant resources, not all of which are covered by the unit costs initially foreseen. Having to deal with a variety of national rules, policy-cycle timings and procedures across all the different countries is a great challenge for ACT partners charged with specified duties, not least project coordination. Second, there are contractual issues for non-EU and overseas partners. Europeans are used to the DESCA model, whereas this is not generally acceptable to US organisations. The EC should put greater effort into the development of a suitable Consortium Agreement model for non-European partners reflecting the strategic and political importance attached to international collaboration with such partners. Finally, there is great need for harmonisation of the different national rules and procedures for participation in R&I projects across countries, to the extent that this is politically expedient. It is therefore encouraging to see that some of these issues are being addressed in the new partnerships under Horizon Europe, where emphasis is being placed on simplification and centralised call and project management.

# Annex

Main indicators for P2Ps in H2020 (*)	Norway	Finland	Austria	Netherlands	Denmark	Sweden	EU14 average H2020	EU13 average H2020	EU27 AVERAGE
Total pre-called budget available for P2P calls (€ m)	180	91	116	217	93	199	161	23	97
Number of networks	71	58	64	76	56	68	78	33	48
Number of network coordinations	3	1	8	8	2	2	6	1	5
Number of funding organisations participating in P2Ps	14	16	21	29	16	18	24	9	17
Number of P2P calls with specific country participation	163	102	126	161	96	130	140	75	109
Number of full-proposals submitted to P2P calls (**)									
Number of eligible proposals submitted to P2P calls (**)									
Success rate (funded/full-proposals) (**)									
Number of projects funded in P2P calls	434	245	400	893	346	585	511	92	309
Total project participations	640	328	692	1310	531	846	787	122	467
Total costs of project participation (€)	315,604,018	113,930,109	203,773,712	583,001,179	258,157,512	344,324,976	264,042,377	22,254,971	147,626,219
Total requested EC funding (€)	151,385,079	51,626,024	100,042,748	238,620,918	103,032,477	166,126,672	128,223,937	13,044,632	72,767,235

(\*) Unless otherwise stated, the figures come from the ERA-LEARN database including JPI non-cofunded data but estimated to be missing around 25-30% of the project and financial data. This may range significantly across the different countries.

(\*\*) Based on the data provided by the country's funding agencies. (\*\*\*) Data to be collected by the networks in the future.

Sources: ERA-LEARN database (cut-off date Aug 2020), Estimated missing data 25-30%

Main R&I indicators	Nroway				Denmark	Netherlands	Austria	Sweden	Finland	EU 28 average
	2015	2016	2017	2018	2018	2018	2018	2018	2018	2018
GERD (as % of GDP)	1.94	2.04	2.10	2.06	3.03	2.16	3.14	3.31	2.76	2.03
Percentage of GERD funded by the business sector	44.23	43.20	42.83	42.03	58.52 (2017)	51.63 (2017)	53.85	60.76 (2017)	55.80	57.60 (2017)
Percentage of GERD funded by government	44.92	45.65	46.67	48.03	27.21 (2017)	31.38 (2017)	29.76	25.02 (2017)	28.27	29.72 (2017)
Percentage of GERD funded by rest of the world	9.20	9.46	8.84	8.23	8.92 (2017)	14.31 (2017)	10.06	10.08 (2017)	13.89	9.89 (2017)
Percentage of GERD performed by the business sector	53.89	53.27	52.61	51.52	64.27	67.05	69.87	70.95	65.66	66.28
Percentage of GERD performed by higher education	31.07	32.58	33.71	34.63	32.43	27.17	22.44	25.32	25.22	21.94
Percentage of GERD performed by government	15.04	14.15	13.68	13.85	3.00	5.78	7.14	3.62	8.31	10.90
GOVERD (% of GDP)	0.29	0.29	0.29	0.29	0.09	0.13	0.22	0.12	0.23	0.22
percentage of GOVERD financed by the business sector	7.38	7.95	7.51	7.05	3.86 (2017)	15.57 (2017)	8.86 (2017)	6.80 (2017)	7.76	7.76 (2017)
HERD (as % of GDP)	0.60	0.67	0.71	0.71	0.98	0.59	0.70	0.84	0.69	0.44
percentage of HERD financed by the business sector	3.13	3.10	2.27	2.27	8.34 (2017)	11.71 (2017)	5.12 (2017)	3.62 (2017)	2.93	6.93
BERD (% of GDP)	1.04	1.09	1.10	1.06	1.95	1.45	2.19	2.36	1.81	1.34
percentage of BERD funded by the business sector	78.22	77.09	78.00	78.17	89.01 (2017)	81.45 (2017)	85.52 (2017)	83.95 (2017)	82.87	83.75 (2017)
percentage of BERD funded by government	8.64	9.35	9.40	9.94	2.03 (2017)	2.12 (2017)	3.68 (2017)	4.7 (2017)	2.79	5.22 (2017)
percentage of BERD funded by rest of the world	13.08	13.52	12.60	11.87	8.21 (2017)	15.95 (2017)	20.68 (2017)	11.56 (2017)	14.32	10.54 (2017)
Total national public funding to transnationally coordinated R&D (€ million)	98.783	101.782	109.714	109.487	38.212	160.263	146.164	173.713	79.900	
National contributions to bilateral or multilateral public R&D programmes (€ million)	5.745	6.008	8.288	7.835	0.268	-	22.475	32.750	10.400	
National contributions to Europe-wide transnational public R&D programmes (including P2Ps)	60.205	63.506	68.211	67.632	12.330	102.463	90.119	100.017	50.200	
Total researchers (full-time equivalent)	30,632	31,913	33,632	34,337	46,396	95,475	50,484	75,151	37,891	2,098,323
International scientific co-publications per million pop - 2018				2446.59	2915.94	1984.27	1730.30	2449.04	2098.02	
Share of country's publications in top 10% most-cited worldwide - 2016				11.51	13.54	12.04	15.77	12.72	15.67	
PCT patent applications EIS 2020				3.60	6.17	5.52	4.71	9.57	7.73	3.53
ERC grantees by country per call year (2020)				7	12	42	11	22	7	

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