

Finland

ERA-LEARN:
enabling systematic interaction with the P2P
community

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The Finnish context in research and innovation

Finland was an exemplary country that transformed from a largely resource-based economy to a leading knowledge-based economy in the second half of the 20th century with strong emphasis in high-technology manufacturing and knowledge-based services. Yet, this proved to be a fragile position with the high dependence on a particular sector (ICT manufacturing) and the dominance of a particular company, Nokia. The global financial crisis in 2009 and disruptive technological advancements led to the decline of Nokia and a sharp drop in exports of ICT goods. This resulted in the loss of the leading position in terms of productivity and competitiveness. (OECD Peer Review Finland 2017)

While the industrial restructuring is still taking place, Finland also faced cuts in public R&D spending especially in applied research during 2016-17. However, public R&D budgets have increased again and a new target is set in the latest R&I Roadmap of Finland¹ for R&I expenditure to reach 4% of GDP by 2030 from the current 2.75% (2018). Education, R&D and innovation remain paramount for Finland's future economic and broader social development and encouraging the commercialisation of research output also features prominently on the policy agenda. (EIS Report Finland 2020)

Finland's real GDP is estimated to have increased by 1.6% in 2019, after a decrease in 2018 (1.7%) and an increasing trend between 2016 and 2018. (European Semester 2020 Country Report Finland) According to the European Innovation Scoreboard (EIS) 2020, Finland is in the 'innovation leaders' group with the strongest increase in 2018 in the areas of 'Innovation-friendly environment', 'Human resources' and 'Innovators' while its scores in 'Lifelong learning', 'Innovative SMEs collaborating with others', 'Public-private co-publications', and 'International scientific co-publications' are well above the EU average.

In this report, the performance of Finland is compared to that of Austria, Belgium, Sweden and Denmark. The selection of these countries is based on

- similar levels of researchers (no. of researchers per million population) (SE),
- similar levels of R&D intensity (GERD as a percentage of GDP) (BE, DK)
- diverse levels of involvement in public European R&I partnerships (AT, DK, SE).

¹

<https://minedu.fi/documents/1410845/22508665/The+National+Roadmap+for+Research%2C+Development+and+Innovation/e9566011-2acc-35b2-7b45-279387991430/The+National+Roadmap+for+Research%2C+Development+and+Innovation.pdf>

These countries form Finland's comparator group of countries.

Table 1: Finland's comparator group of countries in relation to performance in public European R&I Partnerships, GERD and FTE researchers

	GERD/GDP (2018)	Researchers (no. per million population, 2018)(*)	Partnerships
Finland	2.75	6861.10974	58
Austria	3.17	5733.07565	64
Belgium	2.76	5023.26301	77
Denmark	3.03	8065.88729	56
Sweden	3.32	7536.47495	68

(*) World Bank data, <https://data.worldbank.org/indicator/SP.POP.SCIE.RD.P6?end=2018&start=2018&view=bar> .

When compared to its peers, Finland's R&D intensity is similar to that of Belgium (2.76). However, Belgium presented a rise of 10% in R&D intensity in 2015-2018, whereas Finland's score slightly dropped from 2.86% in 2015. Finland's score is the second lowest above Belgium, but below Sweden (3.32%), Austria (3.17%) and Denmark (3.03%).

The largest R&D performer is the business sector accounting for around 65% of GERD. However, the business expenditures in R&D (BERD) has gone through a steep decline from 2.67% of GDP in 2009 to 1.8% in 2018. This is largely due to the decline in the ICT manufacturing sector and in particular the electronics industry and in companies with over 500 employees that accounted for the majority of business R&D. Encouragingly, R&D expenses have grown in companies with less than 500 employees in 2011–2018 and the service sector has started compensating since 2016 the loss of business R&D in the manufacturing sector. The Higher Education Sector (HEI) performs around 25% of GERD and the government sector around (8%). Public R&D funding has also been slightly declining over the years from 1.1% (of GDP) in 2010 to 0.83% in 2018. Yet, the new Finnish government has committed to increasing public R&D investment en route to achieving the new target set for GERD reaching 4 % of GDP until 2030. (European Semester Report Finland 2020).

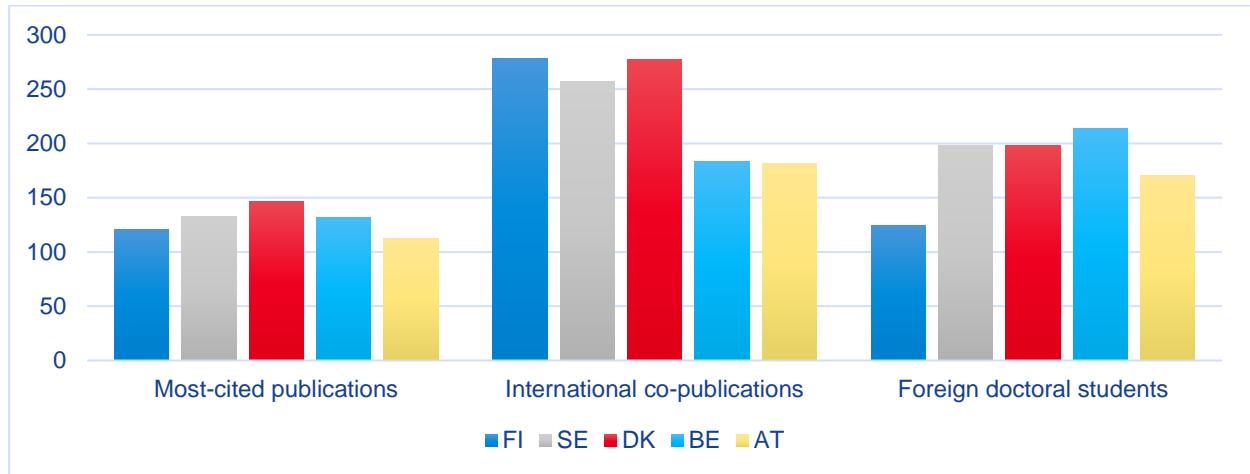
Finland needs to address the weakening of business-research cooperation due to the termination of public funding in the strategic centres for science, technology and innovation. Notwithstanding, the country continues to enjoy a wide range of innovation capabilities and proven ability for transition while education, R&D and innovation remain paramount. (OECD Innovation Policy Review Finland, 2017)

Finland presents a rather moderately 'attractive research system'. Based on the European Innovation Scoreboard (EIS) 2020², Finland only ranks 10th in the EU in terms of 'most-cited publications' (share of these in total publications of the country), while it is 8th for 'International co-publications per million population' and 14th regarding 'Foreign doctoral students as share of total doctoral students'. Compared to the benchmark countries, Finland tops the group in relation to 'international co-publications'. Indeed, the number of collaborative publications with other ERA countries (per 1000 researchers) has been increasing since 2009 (ERA Progress Report 2018).

² https://ec.europa.eu/growth/industry/policy/innovation/scoreboards_en

Yet, the country could do better with the most-cited publications while it also falls short in terms of foreign doctoral students.

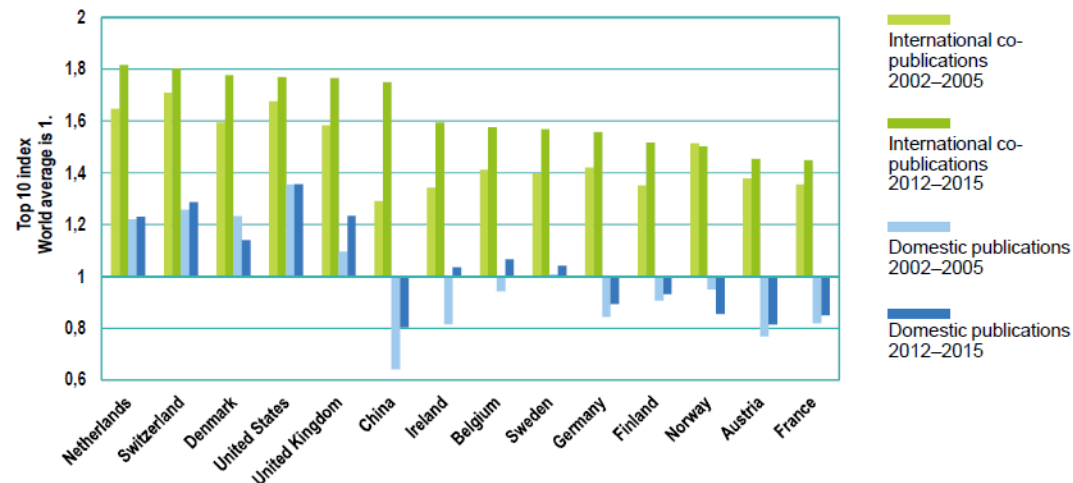
Figure 1: EIS 2020 indicators for 'Attractive research systems' for Finland and the comparator countries (country scores as share relative to EU average in 2019)



Source: European Innovation Scoreboard 2020

Nevertheless, the scientific impact of Finland’s international co-publications is not as strong as compared to the benchmark countries. As shown in the report of the Academy of Finland on the State of Scientific Research in Finland 2018 the top 10 index³ of the Finnish international co-publications is not as high as the benchmark countries, namely Denmark, Belgium and Sweden. (Figure 2)

Figure 2: Scientific impact of publications in Finland and in countries of comparison by type of publishing 2002–2005 and 2012–2015



³ The top 10 index describes a country's/organisation's relative share of the 10% most cited publications in the world. When the Top 10 index > 1 means that the share of a country's publications that belong to the most highly cited 10% of publications in their field is greater than in the world on average.

Source: https://www.aka.fi/globalassets/2-suomen-akatemia-toiminta/2-tietoaineistot/state_of_scientific_research_2018_slides.pdf p. 29.

Strengthening Finland's international attractiveness and the internationalisation of the national R&I has been acknowledged among the key challenges that Finland has to face (RIO Country Report 2017; OECD Innovation Policy Review Finland 2017). Increasing the flexibility of funding actors and the long-term commitment of the various R&D actors is explicitly mentioned among the measures of strengthening the ERA (Finland's ERA Roadmap 2015-2020).

The new vision of the Research and Innovation Council "*making Finland the most attractive and competent environment for experiment and innovation by 2030*" clearly sets internationality as a prerequisite for quality and effectiveness, addressing the attractiveness of Finland, the mobility of researchers and claiming international positions by Finnish R&I actors. (Finland's National Reform Programme, 2017). The latest National Roadmap for RDI⁴ highlights that "*Finnish actors must be well prepared to utilise European and other international RDI funding, both in Europe and more widely*" and the importance of improving RDI coordination both nationally and internationally. It also acknowledges the need to improve the national capacity for building networks and applying for funds, as well as for securing sufficient domestic matching funds. There is strict intention to increase the share of EU and international funding in total R&D funding and this is to be supported by a concrete action plan that will be prepared by the Ministry of Economic Affairs and the Economy for the period 2021–2027.

⁴ <https://minedu.fi/en/rdi-roadmap>

Introduction

This is the fifth ERA-LEARN Country Report on participation in public-to-public (P2P) partnerships in research and innovation - excluding industry-driven partnerships - in a series of country reports that will follow in the course of ERA-LEARN. The first four reports covered Poland, Austria, Spain and Belgium; this report focuses on Finland while the next in row will cover Germany⁵. The selection of these countries is based on a combination of variables: number of partnership participations, partnership coordination and national investments made to date, based on the data provided by the partnerships to the ERA-LEARN database.

The ERA-LEARN data that is used in the report (cut-off date August 2020) mainly refer to partnerships that were launched and are supported under Horizon 2020. This includes co-funded partnerships (ERA-NET Cofund Actions) as well as Art 185 and Joint Programming Initiatives. This data (especially the project-related and financial data) is around 75% complete, as not all required information has been fully updated by the partnerships. It is important to emphasise that the data collected in terms of pre-call budget committed or the actual investments in selected projects do not take into account the differences across countries in the eligibility of certain expenses; for example, in some countries only additional costs of a research project are eligible and not personnel costs. In addition, the in-kind contributions made by funding organisations when participating in P2Ps 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 publicly funded partnerships within the context of the overall situation in the national and regional research and innovation systems. In this regard, data and analysis available in other reports are considered such as the RIO (Research Innovation Observatory) country reports, EU Semester national reports, ERA Progress Reports, European Innovation Scoreboard and Regional Innovation Scoreboard, Regional Innovation Monitor Plus, H2020 Country Reviews, OECD country reviews, OECD, RIO and EUROSTAT statistics, and special reports by the Policy Support facility, MLE (mutual learning exercise) special reports, etc.

The goal of the country reports is to provide an overall picture of participation of a country in publicly funded partnerships, comparing this also to other countries of interest as well as the EU14⁶, EU13 and EU27 overall averages. This may be useful for individual organisations in the specific country as they might only have a fragmented picture of the situation or they might lack explanations for certain features that may be found in the wider R&I context of the country. The report may also be useful for organisations in other countries that wish to learn the reasons behind the 'position' of a particular country and/or learn from other countries' exemplary performances.

⁵ All the Country Reports are on the ERA-LEARN website <https://www.era-learn.eu/documents/documents-listing>

⁶ As of 1 February 2020 with the withdrawal of the UK from the EU.

Acknowledgements

We owe special thanks to the Finnish Funding Agencies, Ministries as well as individual researchers that shared with us valuable insights, data and information about their experience in participating in public-to-public Partnerships under H2020. In particular, people from the following organisations were interviewed:⁷

- Academy of Finland, Business Finland, Ministry of Economic Affairs and Employment, Ministry of Agriculture and Forestry, Ministry of Education and Culture,
- LUT University, University of Jyväskylä and University of Turku

Special thanks are also due to Optimat, ERA-LEARN partner, and particularly Katrina Watson for supporting the data elaboration and the whole ERA-LEARN consortium for commenting earlier versions of the report and helping to improve it.

⁷ Due to GDPR rules the names cannot be disclosed.

Key Highlights

Finland is rather moderately active in publicly funded R&I Partnerships under the Horizon 2020 programme. Currently, Finland holds the ninth position in terms of the number of partnerships the country is represented in (Figure 3). Compared to the comparator group of countries (Austria, Belgium, Denmark and Sweden) Finland only outnumbers Denmark in relation to the number of partnerships and is second to last regarding call participations. Furthermore, Finland seems reluctant to undertake a more leading role mainly due to shortage of resources for managing participation in partnerships and it coordinates only one H2020 partnership (ForestValue) and a self-sustained one (SAFERA).

Out of the 302 joint calls (including calls not cofunded by the EC) that have been launched under Horizon 2020 until now, Finland has participated in 102, one of the smallest number of calls in the comparator group of countries and has managed to support a relatively small number of projects, close to the EU27 average but less than half of the EU14 average (Table 2). Overall, Finland seems to follow the performance of Denmark, a country with similar scores in R&D intensity but with more researchers, but ends up with the lowest number of projects in comparison to its peers.

Table 2: Participation in H2020 publicly funded R&I Partnerships including JPI data on participation, calls and projects that are not linked to ERA-NET Cofunds

	<i>FI</i>	<i>A</i>	<i>BE</i>	<i>DK</i>	<i>SE</i>	<i>EU13 aver.</i>	<i>EU14 aver.</i>	<i>EU27 aver.</i>
<i>Number of partnerships</i>	58	64	77	56	68	32	78	48
<i>Partnership participations</i>	70	80	156	68	90	36	95	65
<i>Partnership coordinations</i>	1	8	3	2	2	1	7	6
<i>Call participations</i>	102	126	188	96	130	75	140	109
<i>Supported projects</i>	245	400	361	346	585	92	511	309

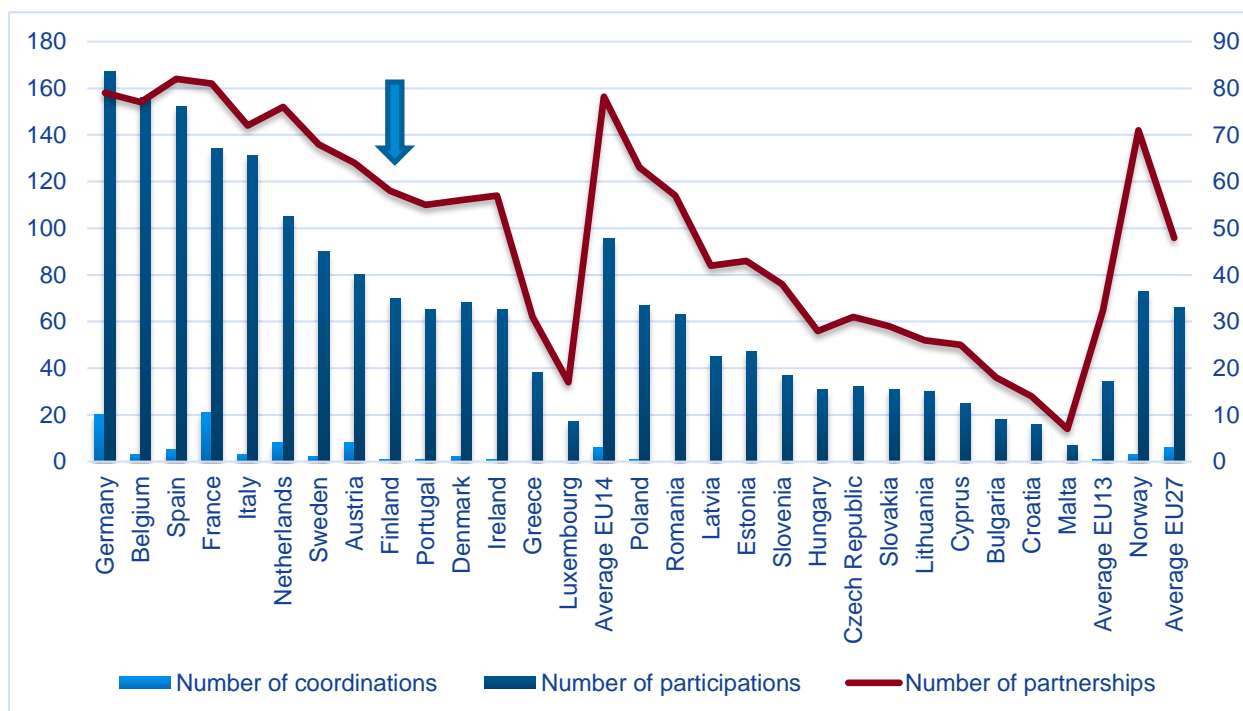
Source: ERA-LEARN database⁸ (cut-off date August 2020).

Finland also follows the list of the comparator countries, and is tenth in the total rank, in terms of the national investment made available for publicly funded R&I Partnerships (including JPIs) to fund research proposals (total pre-call budget). However, when the pre-call budget is normalised by the number of researchers (FTE) Finland ranks third after Sweden and Belgium and its score is much higher than the EU14 (€ 1558) or EU27 (€ 1582) averages, although the differences across the comparator countries are not that high: Sweden (€ 2737.54), Finland (€ 2422) Belgium (€ 2562.55), Denmark (€ 2091.52) and Austria (€ 2400) (Figure 4).⁹

⁸ 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.

⁹ 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

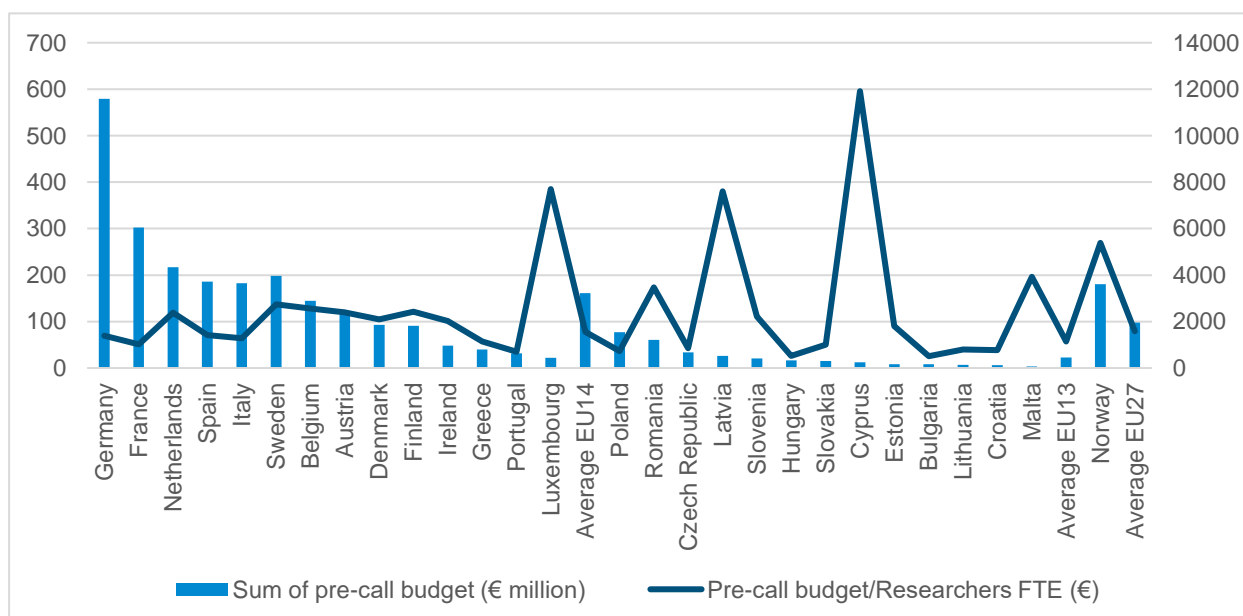
Figure 3: Participations and coordinations of Partnerships by country and number of Partnerships by country in H2020 (incl JPIs)



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

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

Figure 4: 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.

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.

(**) 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.

The funds made available pre-call eventually get spent on the granted projects although at different degrees across the agencies. For the period 2014-2020, the Academy of Finland spent over € 24.5 million in P2P partnership calls to support a total of 96 projects with Finnish participation. For the same period, the other major research funder, Business Finland, invested € 17.4 million that was distributed across 65 projects, and the Ministry of Agriculture and Forestry invested slightly over € 2.5 million to support 23 projects.

The shares of funds and the success rates of Finnish proposals vary widely from one partnership to another. Overall, however, the level of investment and successes of the Finnish proposals reflect the areas of specialisation of the national research community and the priority areas of Finland. These include climate change, carbon neutrality and biodiversity, health and welfare, key enabling technologies, information and communication technologies, food and agriculture.

Finnish researchers appreciate the low administrative burden in projects supported by the P2P partnerships and the multidisciplinary approach required. The smaller scale of the projects also seems to work as a stepping stone in applying in larger programmes but is also valued as such as it enables true collaboration and trust building. Finnish researchers do not usually take the leading role in projects supported by P2P partnerships. Based on the available ERA-LEARN data, of the total project coordinations only 2% is undertaken by Finnish organisations compared to 4% for Denmark or 6% for Sweden. Overall, most of the project coordinations belong to German (15%), Dutch (12%), Spanish (11%) and French (10%) organisations.

The Finnish Ministries and Funding Agencies that are involved in publicly funded H2020 partnerships mark their high value for the Finnish researchers and businesses in terms of the opportunities they offer for international collaboration as well as the benefits for policy officers in terms of policy learning and policy design. Yet, there are challenges that need to be overcome mainly in relation to the complicated landscape and the large variations in the way the partnerships are run. The efforts of the European Commission in streamlining the implementation processes and clearing up the landscape in Horizon Europe are much appreciated. The commitment of the Finnish government to increase the public R&D funds is also encouraging in view of increasing investment in international collaboration.

P2P R&I Partnerships are appreciated by Finnish Ministries, Funding Agencies as well as the local researchers. However, Finland exploits these initiatives to a rather moderate extent, albeit to different degrees across the partnerships. Strengthening Finland's international attractiveness is acknowledged as a challenge that Finland has to face and certain measures have been decided including the increase of public R&D funds. The efforts of the EC in streamlining the implementation processes and clearing up the landscape are also expected to help an increased Finnish engagement in the future.

1. Who are the key R&I funders in Finland?

The R&I system is quite centralised in Finland. National funds are mainly allocated through the Ministry of Education and Culture (MEC, 60%) and the Ministry of Economic Affairs and Employment (TEM, 27%), and their agencies Academy of Finland (AKA) and Tekes (the Finnish Funding Agency for Innovation) which was merged with FinPro (a provider of internationalisation advisory services) into Business Finland in 2018. (RIO Country Report Finland, 2017) In relation to international research partnerships, the Ministry of Agriculture also has an active role participating in several ERA-NETs, although it is rare for Ministries in Finland to directly fund research.

There is no specific national strategy for participating in transnational R&I programmes or partnerships. Each funding agency has relative autonomy to decide which partnerships to join. However, compliance with the national priorities needs to be secured as those are reflected in key strategic documents including the Health Sector Growth Strategy for Research and Innovation Activities¹⁰ and the Roadmap for 2016-2018¹¹, the International Water Strategy Finland, 2018¹² and Finland's biodiversity strategy 2012-2020¹³. The Finnish funding agencies need to justify how the specific collaboration fits with the national strategies or is related to national programmes. In addition, the potential benefits for the national research community (in the case of AKA) and the business community (in the case of Business Finland) need to be estimated. Coordination of the overall Finnish participation in transnational R&I partnerships has been done through the key funding agencies.

¹⁰

<https://tem.fi/documents/1410877/3437254/Health+Sector+Growth+Strategy+for+Research+and+Innovation+Activities+26052014>

¹¹ <https://julkaisut.valtioneuvosto.fi/handle/10024/75145>

¹² https://um.fi/publications/-/asset_publisher/TVOLgBmLyZvu/content/finnish-water-way-suomen-vesialan-kansainvalinen-strategia

¹³ <https://www.biodiversity.fi/actionplan/strategy>



Ministry of Education and Culture

1.1. Ministry of Education and Culture

The Ministry of Education and Culture is responsible for designing and implementing the national policy for education and science. The Ministry prepares the related statutes, national budget proposals and government decisions.¹⁴

The Ministry of Education and Culture has designed policies to build up the quality of Finnish

higher education and research and to achieve a globally acknowledged frontrunner position by 2025. As the relevant publication “Better Together for a Better World”¹⁵ notes, an active and constructive approach to development is needed not only in higher education institutions and research institutes, but also in many cross-administrative areas.¹⁶

Internationalisation of the national research and innovation scene is high on the agenda of the Ministry. The National Roadmap for Research, Development and Innovation (RDI)¹⁷, that has been jointly prepared by the Ministry of Education and Culture and the Ministry of Economic Affairs and Employment in consultation with the other ministries and RDI stakeholders, places special emphasis on the cooperation between companies and research organisations with the aim to exploit the outputs of research and innovation at Union, national and regional level. At the same time, it recognises that an increasingly greater share of international funding for research and innovation focuses on resolving broad societal challenges and Finnish actors must be well prepared to utilise such funding. In addition, the attractiveness of the Finnish RDI system needs to be increased. This relates to work- or education-based immigration and inter-sectoral mobility as well as attracting international research funding and investments in the Finnish research and innovation system.

Especially regarding international collaboration, the National Roadmap highlights that the share of EU and international funding in total R&D funding will be increased. This will be supported by an action plan for the period 2021–2027 to be prepared by the Ministry of Economic Affairs and the Economy in order to utilise the RDI funding sources of the EU (Horizon Europe, Digital Europe, the European Defence Fund, InvestEU, etc.). Furthermore, the ministries will continue to encourage RDI organisations to apply for funding to strengthen their capacity and utilise international RDI funding.

¹⁴ <https://research.fi/en/science-innovation-policy/research-innovation-system>

¹⁵ Better Together for a Better World, <https://toolbox.finland.fi/themes/education-and-know-how/better-together-for-a-better-world-2017/>

¹⁶ <https://minedu.fi/en/international-strategy-for-higher-education-and-research>

¹⁷ <https://minedu.fi/en/rdi-roadmap>



1.2. Academy of Finland (AKA)

AKA is the research funder with most participations in P2P partnerships, taking part in 32 networks during H2020. Participation in partnerships at AKA is either through the Academy Programmes¹⁸ or through the three main Research Councils¹⁹ addressing all research fields similarly to ERC.

AKA follows by large a bottom-up funding approach as only around 20-25 % of funding goes to thematically predefined areas. Attention is paid so that all areas are funded in a balanced way. When a request or interest to join a partnership appears the running Academy Programmes are checked in terms of relevance to the areas addressed by the candidate partnership. If the running programme(s) do not thematically match the areas of interest of the partnership, the possibility for joining and responsibility for funding lies with the Research Councils.

The common practice for AKA is to formulate budgets on an annual basis supporting all themes in a balanced way. Long-term planning and prioritisation of certain research areas is less practiced. This strategy may need to be adjusted with the new, more strategic approach of the partnerships in Horizon Europe that call for longer-term commitments. Thus, AKA faces the need to develop thematic Academy Programmes towards stronger international collaboration and to ensure continuation of available budgets. Improved coordination at the national level would also be beneficial in better preparing for the next phase of partnerships.

Currently, AKA takes part in 27 partnerships, 21 of which have issued calls during H2020 (2014-Aug 2020) as follows (Figure 5). It is interesting to note that the largest number of pre-proposals are submitted in the cases of BONUS, NORFACE and HERA ERA-NET followed by JPI Water. BONUS also presents the highest number of full-proposals followed by JPI MYBL and BiodivERsA, which also presents the best rate of full-/pre-proposals (39 full-proposals out of 40 pre-proposals) after BONUS (159 full-proposals out of 176 pre-proposals).

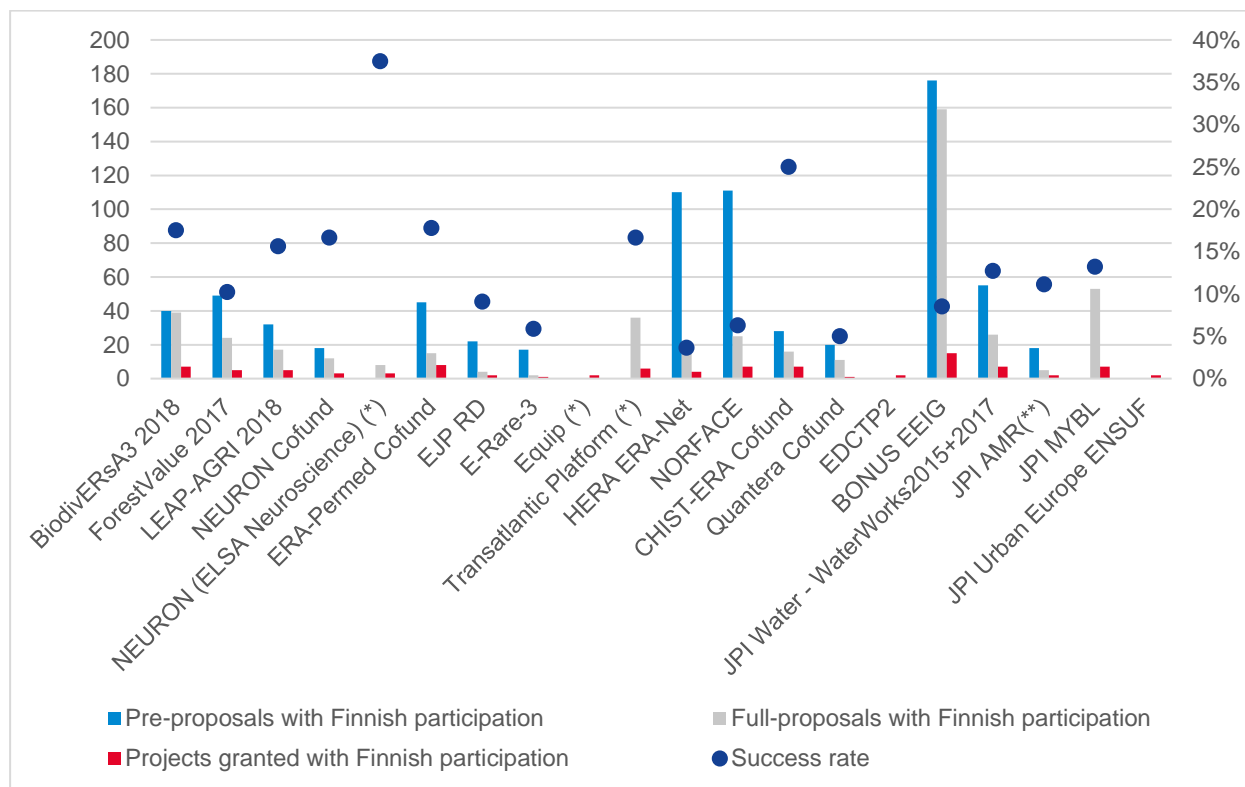
However, it is not the calls that attract the highest number of pre- or full-proposals that present the highest success rates. HERA ERA-NET and NORFACE for instance present rather low success rates (4% and 6% respectively). The success rates in most of the partnerships range between 10-20%, while the lowest ones are noted for the cases of Quantera (5%) and E-RARE 3 (6%). The highest success rate (38%) are noted for the ELSA Neuroscience calls in 2015 and 2017 (under NEURON) that were not cofunded and for the CHIST-ERA Cofund calls 2017 and 2018 (25%).

¹⁸ <https://www.aka.fi/en/research-and-science-policy/academy-programmes/>

¹⁹ BTY = Research Council for Biosciences, Health and Environment; KY = Research Council for Culture and Society; LT = Research Council for Natural Sciences and Technology

The initial AKA budget committed pre-call are usually around the actual budget spent. Since 2014 AKA spent over € 24.5 million in partnership calls to support a total of 96 projects with Finnish participation.

Figure 5: Number of proposals submitted and projects approved with Finnish participation and success rates (***) under Partnership calls during H2020 (2014-2020)



Source: Author's compilation based on data provided by AKA

(*) Not cofunded

(**) Excluding Cofund actions

(***) Success rates are estimated based on the number of granted projects divided by the number of pre-proposals or full-proposals as relevant.

AKA reformed its international policy in 2017 based also on a large-scale survey addressed to Finnish researchers in 2016 that revealed significant value for the ERA-NET scheme. According to the received responses, research groups appreciate this form of collaborative funding vis-à-vis national programmes and the EC Framework Programme (FP). This is largely due to the manageable size of consortia in projects supported by P2P partnerships that is optimal for effective collaboration and the easier project administration procedures compared with FP projects. Researchers also appreciate the two-step application process, the new modes of collaboration and the mobility that is enabled through the supported projects. The resulting joint materials and methods, ideas and infrastructures and the overall possibility for more bottom-up research is also of value. In fact, researchers consider that the partnerships are possibly the only EU-wide funding instrument for international collaborative basic scientific research.²⁰ (AKA Impact of Public Funding Organisations' Networks, 2017) In addition to funding opportunities, they are a

²⁰ https://www.aka.fi/globalassets/42julkaisut/impact_of_p2p_networks.pdf

significant instrument for the internationalisation of research, for searching new collaborators and for increasing the visibility of research.²¹ (AKA ERA-NET report, 2016)

An internal survey was also conducted by AKA in 2020²² and examined impacts from a funders' point of view. Partnerships were appreciated for their role in strengthening the ERA, for enabling joint, cross-sectoral funding with other national funders and collaboration with countries outside the EU. The relatively small budgets of the funding agencies bring significant leverage when joined together. Partnerships also offer tools for the internalisation of AKA's Academy Programmes and opportunities for training and learning with others by exchanging experiences and identifying best practises. In addition, the partnerships contribute to strengthening the cooperation and visibility of AKA and other funding organisations that are involved both nationally and internationally, and improve the visibility of Finland's science policy at the EU level.

“The partnerships have been an important addition to our researchers from a funders' point of view. If a funder provides this kind of opportunities for collaboration, networks and visibility are grown. The results, however, (e.g. cited publications) will be seen only in long run” (AKA official)

The 2020 survey also addressed the Research Services at 11 universities and 7 research organizations. The respondents consider the partnership calls an important addition to Framework Programme (FP) calls, with easier procedures to participate and enabling bottom-up research. They are particularly important for beginners, who are starting to build international networks and are considered to enable collaboration with countries outside Europe more than the EC Framework Programmes. Overall, Universities' research services think that the FP calls may seem too time consuming to researchers because of the bureaucracy and large consortia that need to be created and managed.

The major challenges that AKA face in relation to partnership participation relate to the different procedures and schedules of ERA-NET partners and how these can fit with AKA's annual planning process and project participation procedures. The great variety in timing and procedures of funding and participation across the partnership partners cause delays and complexity for both the funders and the applicants.

“Competition for funding among the AKA Research Councils is another hindrance especially considering that flexibility in funding is necessary due to the multi-disciplinary nature of the partnerships and the areas of research that they address.” (AKA officer)

The shortage in human resources and adequate funding for managing international participation is another challenge along with the lack of clarity of AKA's strategy in relation to selection of partnerships to join.

²¹ https://www.aka.fi/globalassets/42julkaisut/eranet_report_final_yhd4.pdf

²² In spring 2020, the Academy of Finland examined the Academy's participation in EU-based funding cooperation, or European partnership programmes. The report looks at Horizon 2020 and its ERA-NET programmes, Joint Programming Initiatives (JPI), the European Joint Programme (EJP) Cofund and Coordination and Support Actions (CSA) as well as at funding calls by independent international funder networks. (<https://www.aka.fi/en/about-us/whats-new/press-releases/20202/european-partnership-programmes-important-to-research-organisations-and-academy-of-finland/>)

Another challenge, as noted by the Universities' Research Services in the 2020 AKA's survey refers to the fact that the information available on which partnerships are being prepared is rather scarce. This hinders potential applicants from preparing themselves in time regarding which partnerships' calls to apply at. Research services feel that they do not have an early warning system about what partnerships are being prepared and there is no National Contact Points dedicated to partnerships. Thus, researches depend on the contacts they have developed in order to get involved in applications.

In the earlier AKA survey (2017) of researchers that participated in ERA-NETs, the low success rates were also marked as an issue along with the short funding periods (3 years), the small amount of funding and the low number of funded projects per call. They suggested the possibility to apply for continuation of projects for another 3 years based on positive evaluation of the progress made in the first period, and/or and granting some post-project funding for dissemination of results. The differences in the level of funding provided by each country and per project are also problematic as excellent proposals might not get funded because of shortage in funding by a partner country. Similar levels and timing of funding would ensure the smooth initiation and implementation of projects. Other improvement suggestions included increasing the number of networking events and joint dissemination activities already during the projects. ²³ (AKA Impact of Public Funding Organisations' Networks, 2017)

²³ https://www.aka.fi/globalassets/42julkaisut/impact_of_p2p_networks.pdf



Ministry of Economic Affairs
and Employment of Finland

1.3. Ministry of Economic Affairs and Employment

The Ministry of Economic Affairs and Employment (TEM) is responsible for preparing and implementing Finland's innovation policy. This is done also in collaboration with the Research and Innovation Council, chaired by the Prime Minister that coordinates the development of Finland's innovation system.²⁴ In addition to that, TEM, together with the Ministry of Education and Culture, have the main responsibility for the EU research and innovation policy in Finland.

Finland has been rather successful in selected industry-driven partnerships, which, however, are beyond the scope of this report as it focuses on publicly funded (P2P) partnerships in research and innovation. Collaboration between industry and academia is one of the policy priorities in Finland. Industry-driven partnerships offer fruitful ground for applied research collaboration, especially for large research organisations. In relation to P2P partnerships, the decrease in national R&I budget expenditures is directly linked to the moderate participation. However, P2P partnerships are considered useful as they provide a platform for multilateral collaboration, which is necessary to tackle societal challenges and offer the Finnish research community the benefits of European collaboration.

“We have seen benefits from taking part in partnerships in both the public and private sectors. The internationalisation of our research and innovation community and the opportunity to collaborate with other experts to tackle societal challenges that are of key importance to us is much appreciated.” (TEM Officials)

Finland places a lot of emphasis in facilitating collaboration between academia and industry and this can well be accommodated in the new European Partnerships under Horizon Europe. The engagement of industries is important to increase the demand-side of innovation and thus further improve the national economy and competitiveness.

The co-creation processes followed in the preparation of the new European Partnerships is well appreciated. Partnerships are a core element in the Horizon Europe and the general requirement for openness in the regulation is a positive step forward in relation to the past. Efforts are needed though to disseminate the new concept and elements of European Partnerships and make it also easy for different organisations to get involved.

Improved coordination is also required both at the national and EU level as the co-creation model to develop and launch the European Partnerships under Horizon Europe requires new ways to work. In this regard, the Strategic Coordination Process is very important to align guidance and exploit them to their full potential.

²⁴ <https://research.fi/en/science-innovation-policy/research-innovation-system>

1.4. Business Finland

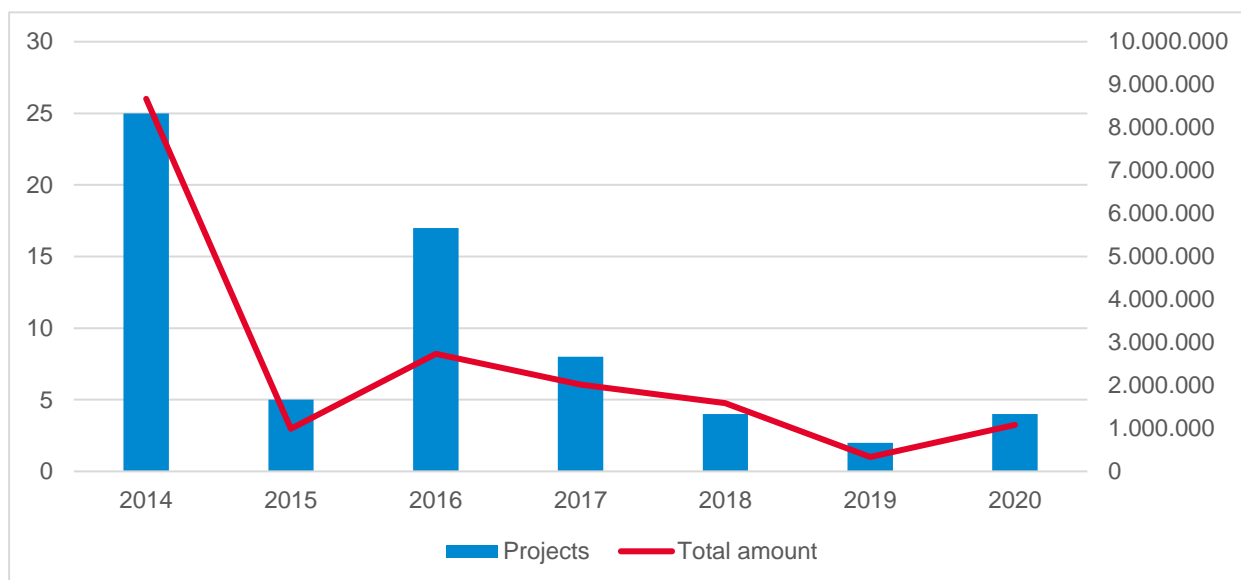


Business Finland is the Finnish government organization for innovation funding and trade, travel and investment promotion. Business Finland emerged after merging TEKES and FinPro in 2018. The organisation's aim is to “develop Finland as the most attractive and competitive innovation environment in which companies are able to grow, change, and succeed.” This is pursued with a two-fold strategy, i.e. by enabling companies to

grow internationally and by creating world-class business ecosystems and a competitive business environment for Finland.

AKA and Business Finland are the key funders in European Partnerships under Horizon Europe for Finnish participants.

Figure 6: TEKES and Business Finland budget spent on projects under co-funded Partnerships, i.e. ERA-NETs during H2020 (2014-2020)



Source: Author's compilation based on data provided by Business Finland

Business Finland recognises the potential and value in taking part in European Partnerships in certain areas of interest. In deciding on which partnerships to join the strategic national priorities need to be followed, some of which are well in line with the EU priorities (such as the Green Deal, Digitalisation, Health etc.). In addition, there is a strong industrial base in the mobility, transport and maritime sectors. There is no specific budget for partnerships in Business Finland; decisions are made on a case-by-case basis depending on the level of alignment of the partnership's focus area and the strategic priorities, the number of partners and the expected level of interest from the national research and business community and potential impact at national level.

Overall, most successful proposals are funded, and additional funding can be allocated when well justified, for example in established partnerships with proven added value for Finland. Planning

and reallocation of budget is harder to make in the case of new partnerships in new areas even though there may be some interest from the national stakeholders.

In the view point of individual organisations, especially from the private sector, the current landscape of European Partnerships seems rather complicated. It is difficult especially for smaller companies to understand where they could be involved. However, the steps taken by the EC in clearing the landscape and in revising the design of the partnerships under Horizon Europe is much appreciated.

“The local business community is interested to take part in partnerships but more efforts are needed to raise awareness about partnerships and what activities can be undertaken. There are many good experiences of business participation in the digital partnerships for instance, but an extra difficulty is when one takes part in projects under different partnerships and they have to bear the different practices and rules of participation.”
(Business Finland Officials)

In addition, it is very difficult for SMEs to get involved in areas where there is no strong industry presence in Finland, as they do not have the support of bigger players nationally.

“From the Finnish point of view, the public-private partnerships can really work well if and when some level of openness is ensured especially to accommodate smaller players.”
(Business Finland Officials)



Ministry of Agriculture
and Forestry of Finland

1.5. Ministry of Agriculture and Forestry (MMM)

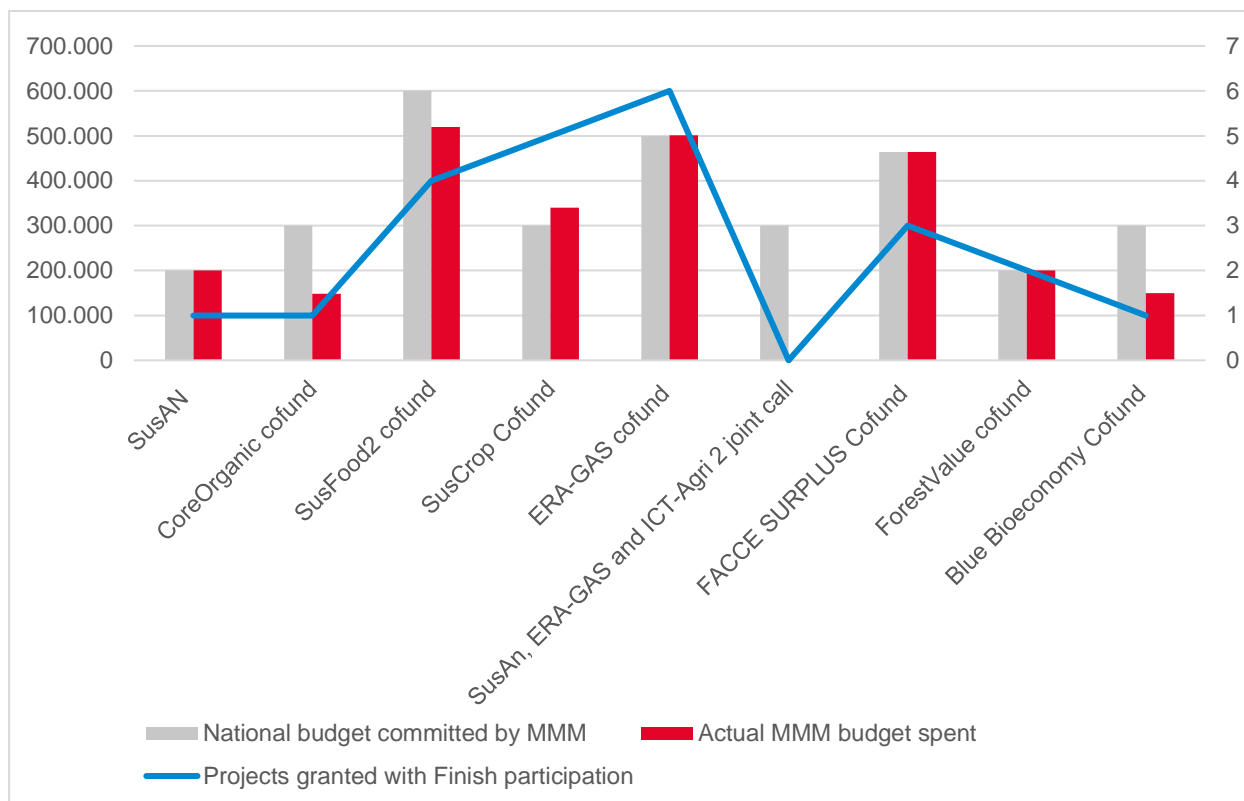
MMM supports the Finnish participation in ERA-NETs and JPIs since around 2005 and is actively promoting participation in partnerships to help the national research community become internationally known. The areas that MMM focuses on include agriculture, forestry, water management and climate research. They try to be part in as many relevant ERA-NETs as possible, although they may not take part in all calls. They choose which ERA-NETs to join based on the scope of MMM and the areas of high competence of Finnish researchers as well as the areas of interest to the national research community in terms of increasing their capacities. MMM is complementary to the other major funders; i.e. whereas AKA funds primarily basic research and Business Finland funds innovation activities, MMM supports more applied research. In addition, they apply a complementary approach in selecting the areas to fund, i.e. they fund areas through partnerships that they do not fund through the national programmes.

The funding agencies in Finland are independent in their decisions on which partnerships to join and the level of investment. MMM tries to involve them in calls that are of relevance to them, although it is difficult sometimes to find common ground to join forces also due to the different types of research and organisations supported by the agencies. Thus, there is a bit of fragmentation in this regard. The development of the National ERA Roadmap and the new approach of the partnerships in Horizon Europe is expected to facilitate more cooperation between MMM and the two major funders in Finland, i.e. Academy of Finland and Business Finland.

The resources available for participation in partnerships are limited; thus efforts are made to involve other colleagues from other ministry departments that are specialised in certain themes. Currently MMM actively takes part in 9 partnerships (ERA-NETs and JPIs) and is an observer in JPI HDHL. The Ministry does not have a large budget to support partnerships. Out of the annual budget of around €6 million, around €0.5-1 million is invested in ERA-NETs and JPIs. MMM pays particular attention to fund all successful proposals with Finnish participation, even though this would require to increase the funds made available.

During H2020, MMM participated in 12 calls of which 9 have been concluded (Figure 6). The highest number of projects granted with Finnish participation are noted under the ERA-GAS, SusCrop and SusFood2 calls. The initial budget committed pre-call is quite similar to the actual budget spent after the selection of proposals except in the case of CoreOrganic and Blue Bioeconomy where the calls did not attract as much interest as expected. Overall, MMM invested slightly over € 2.5 million to support 23 projects.

Figure 7: National budget committed by MMM and actual budget spent after the selection of proposals and number of projects granted with Finnish under Partnership calls during H2020 (2014-2020)



Source: Author's compilation based on data provided by MMM

MMM tries to keep the reporting obligations to the Ministry as limited as possible – in most cases only the obligations set centrally by the partnerships are followed. However, the final reporting is always needed. At the application stage MMM undertakes an eligibility check and only the successful proposals need to be submitted to MMM in the national language. The monitoring of the projects is assigned to steering groups that follow the projects and check the final reports in order for the project beneficiaries to receive the payments.

There are various benefits from participation in partnerships as experienced by MMM officials. The primary benefits are the opportunities offered to introduce the Finnish researchers to international consortia. There are also benefits for policy officers in terms of policy learning and policy design; MMM uses the SRIAs developed in the partnerships to inform national policy-making. Collaborating with foreign colleagues in other ministries and funding agencies has been a positive experience.

The negative impacts primarily refer to the multiplicity of partnerships and the limited available budget that is rather thinly distributed across them. The bureaucracy has been heavy in managing partnerships due to the different rules and criteria for funding across countries.

“Flexibility is very important to agree on more harmonised rules to lessen the burden and resources needed in funding agencies and ministries.” (MMM officers)

However, MMM is clear about the benefits of international collaboration and strongly supports the Finnish participation in P2P partnerships and other international programmes.

“The access to knowledge and infrastructure enabled through international collaboration outweighs the national commitments made. This is very important for a small country like Finland... Thus, the net benefit is positive, despite the hard work needed by the MMM officers.” (MMM officers)

The Finnish Ministries and Funding Agencies that are involved in P2P partnerships mark their high value for the Finnish researchers and businesses in terms of the opportunities they offer for international collaboration. The benefits for policy officers in terms of policy learning and policy design are also acknowledged. Yet, there are challenges that need to be overcome. These include the complicated landscape and the large variations in the way these are run as well as the limited national budget that is rather thinly distributed across them. The efforts of the European Commission in streamlining the implementation processes and clearing up the landscape are much appreciated. The commitment of the Finnish government to increase the public R&D funds is also encouraging in view of increasing investment in international collaboration.

2. Who are the key R&I performers in Finland?

While the gross R&D expenditure (GERD) in Finland remained rather stable since 2015 and clearly above the EU28 average, there has been a slight decrease in business R&D expenditures (BERD) as discussed earlier largely due to the decline of the ICT manufacturing sector and the consequent restructuring of the Finnish economy (Figure 7).

Yet, the Finnish BERD remains well above the EU28 average and is comparable to that of Belgium ahead of all the other comparator countries. The R&D expenditures from the Higher Education sector are also low but this is relatively the case for all the other comparator countries.

Finland presents a declining share of HERD funded by the business sector and rather low compared to its peer countries. This might show a declining trend in the collaboration between academia and businesses. However, the country presents a rather high share of BERD funded by the rest of the world, following that of Austria, indicating a relative openness of Finnish businesses to international R&D.

The share of GERD funded by government is similar to the EU28 average and significantly above that of Belgium, whereas the share coming from funds from the rest of the world is the highest among the peer countries and well above the EU28 average, possibly indicating a good position vis.a.vis international R&D links. The share of GERD performed by government institutes is between that of Austria and Belgium but much higher than Denmark and Sweden (Annex, Main R&I indicators).

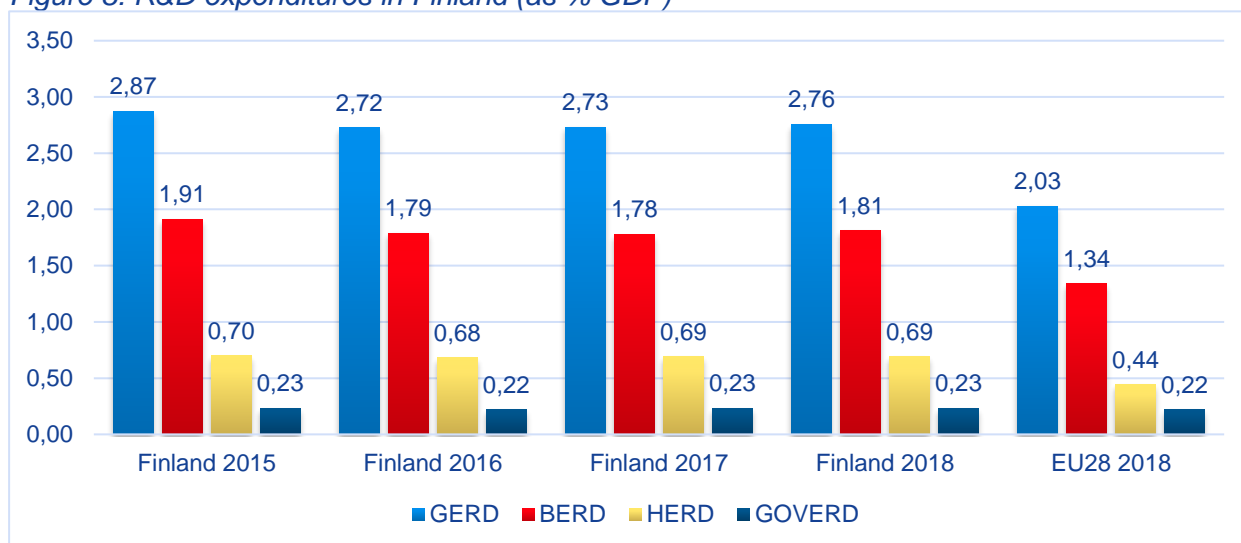
The private sector is the main funder of the Finnish GERD as well as the major performer at similar levels with the rest of the comparator countries. However, as discussed earlier, it faced a strong decline in R&D activities in the last decade especially in ICT-manufacturing even though this is still the leading sector in terms of R&D expenditure. Based on the RIO Country Report for Finland (2017) the decline was mostly due to the restructuring of Nokia whose share in BERD was estimated to reach 50% of BERD in 2009 and dropped to less than 20% in 2014. While part of this decline in BERD has been compensated by an increase of R&D expenditure in services and other manufacturing, BERD (as % of GDP) is still on a slightly declining mode. (RIO Country Report for Finland 2017)

In terms of scientific outputs (percentage of scientific publications among the top 10% most cited publications worldwide as share of total scientific publications of the country and international co-publications), Finland's performance is comparable to that of its peers and slightly above the EU28 average. Innovation outputs, as measured by PCT patent applications per billion GDP (in PPS), are better than Belgium and Austria as well as the EU28 average. (Annex, Main R&I indicators)

In conclusion, despite that Finland presents scores above the EU28 average in almost all the main R&I indicators, it needs to pay attention to the declining business R&D and academia-business collaboration. The Finnish R&I system seems to be relatively well connected in terms of

receiving R&D funds from abroad. Yet, it performs averagely in terms of top-cited publications and international co-publications, but has a relatively better performance in innovation outputs.

Figure 8: R&D expenditures in Finland (as % GDP)



Source: OECD Main Science and Technology Indicators

Finland hosts a total of 22 universities of applied sciences and 13 universities focusing on scientific research and education that operate within the Ministry of Education and Culture. In addition, there are 12 research institutes that operate under related ministries. The Technical Research Centre of Finland (VTT) that operates under the Ministry of Economic Affairs and Employment is a major Finnish research actor with a significant collaboration profile both nationally and internationally. Other public research institutes are more mission-oriented, with a variety of mandates ranging from research (both basic and applied) to monitoring, data collection and management, certification and inspection.²⁵ In total, the share of GERD performed by HEIs and governmental institutions reach 33%, i.e. slightly above the EU28 average (32%) and one of the highest in the comparative countries after that of Denmark (35%).

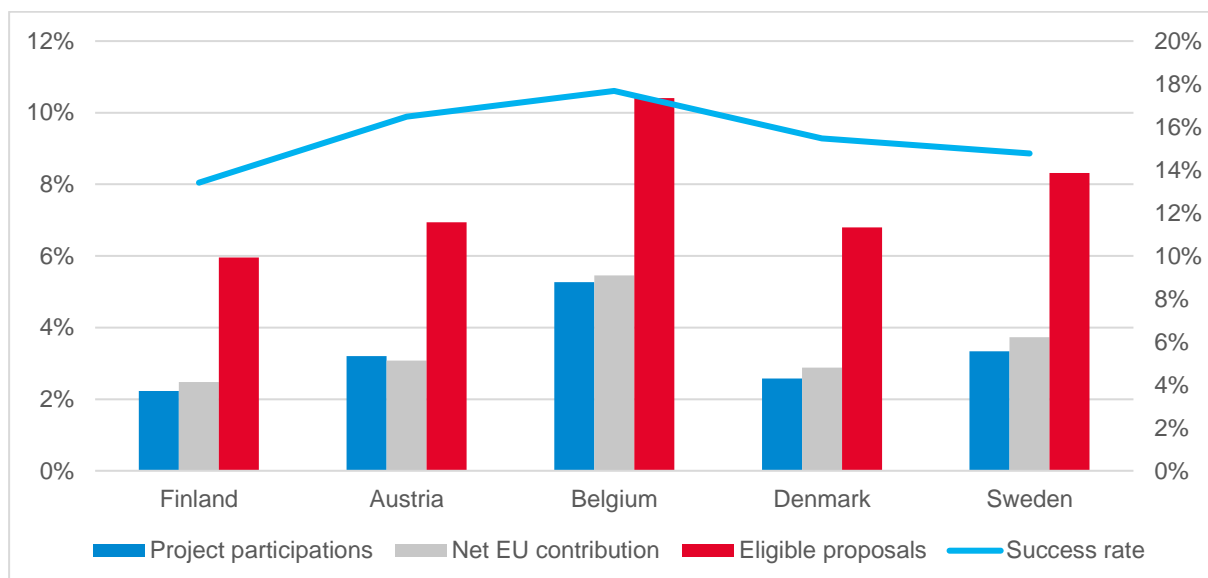
HEIs and central government institutes have gone through reforms in the past decade that resulted in an increased share of competitive funding for public research organisations and a new funding model for HEI that emphasizes scientific quality and provides incentives for cooperation and internationalisation (RIO Country Report Finland 2017).

Performance in H2020

Based on the H2020 dashboard, Finland accounts for 2.23% of the H2020 participations and receives 2.28% of the net EC contributions. It ranks 13th in terms of number of participations and 12th in terms of EU budget share. Compared to its peers Finland performs similarly to Denmark but lower than Austria and Sweden and is significantly behind Belgium (Figure 8).

²⁵ <https://research.fi/en/science-innovation-policy/research-innovation-system>

Figure 9: Key features of Finland's participation in H2020 (shares of EU average, Sept 2020)



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 (September 2020):

Organisation Name	net EC contributions (€)
1. Teknologian tutkimuskeskus VTT Oy	226.429.558
2. HELSINGIN YLIOPISTO	167.518.518
3. AALTO KORKEAKOULUSAATIO SR	114.972.688
4. TAMPEREEN KORKEAKOULUSAATIO SR	76.775.452
5. OULUN YLIOPISTO	48.214.403
6. ITA-SUOMEN YLIOPISTO	35.923.992
7. JYVASKYLAN YLIOPISTO	28.971.053
8. TURUN YLIOPISTO	26.837.761
9. LUONNONVARAKESKUS	25.975.284
10. ILMATIETEEN LAITOS	21.709.988

Source: <https://ec.europa.eu/research/horizon2020/index.cfm?pg=country-profiles> (September 2020)

How are they doing in P2P partnerships' projects?

Based on the ERA-LEARN data, Finnish organisations took part in 245 projects supported by P2P partnerships under H2020. The number of projects including Finnish organisations is rather low compared to its peers (Table 2). Yet, the views of the Finnish researchers are encouraging and in support of continuing and possibly strengthening the level of participation based on the survey that AKA undertook in 2017²⁶. These views were also confirmed in recent interviews that were taken for the preparation of this report. The relevant extracts are shown below in italics.

²⁶ https://www.aka.fi/globalassets/42julkaisut/impact_of_p2p_networks.pdf

Finnish researchers that participated in the projects funded by P2P partnership appreciate the opportunity they offer to collaborate within compact international consortia and under relatively low administrative and reporting workload.

“The call advertisement was straightforward as was the procedure for preparing the proposal. Proposals did not need to be long (around 20 pp.) This was much better compared with H2020 proposals that are around 80 pp...” (JPI MYBL project)

“The reporting is also manageable and attention is paid there is no double or triple reporting” (BiodivERsA projects)

Such collaboration contributes to the production of new scientific knowledge while combining basic, experimental, computational or clinical research is an important part of many joint projects. ERA-NET and JPI respondents also noted the benefits in relation to access to research equipment and other research infrastructures. Article 185 respondents (BONUS) viewed the specific scheme as a good tool for addressing major research questions and stressed the value of multinational and multidisciplinary research consortia that can provide expertise that cannot be achieved in national projects.

“In comparison to national programmes, JPI MYBL allows and promotes multi-disciplinarity; the call themes require that several scientific fields work together and this is a great thing!” (JPI MYBL project)

New research contacts are established while researchers make plans to continue collaboration beyond the funded projects. Partnerships promote international mobility and offer a good environment for training future researchers and they are possibly the only EU-wide funding instrument for international, collaborative, basic research.

“This type of trans-national projects are important both for building capacity to get involved in larger, follow-on projects but also as important means of achieving certain goals that need a small number of countries to do comparative analysis.” (BiodivERsA projects)

In addition, the interviewers highlighted the value of smaller consortia that enable trust building and actual collaboration in research.

“... a small consortium...proved to be beneficial as smaller consortiums are easier to manage and you get to know each other and actually work together...Often in large teams you end up working separately; there is no sense of community and there is little possibility to carry out joint research.” (JPI MYBL project)

“The fact that this is a small, manageable project enables us to really work together, create collective knowledge and acknowledge each other’s’ contribution.” (BiodivERsA projects)

The organisation of a kick-off meeting for all approved projects offering the ability to meet all the project beneficiaries followed by a second day devoted to engaging with stakeholders was appreciated in the case of BiodivERsA as was the strong emphasis on open science.

“Knowledge and responsibility sharing that is enabled in smaller projects is key. This builds trust and good communication. The organisation of work that enables such sharing and mutual acknowledgement is important as is openness of data. The emphasis given by AKA at the kick-off meeting that they really wanted to see this collaborative effort reflected in the outputs of the research (co-publications) was encouraging.” (BiodivERsA projects)

In relation to disadvantages, the surveyed Finnish researchers that were surveyed spotted the low number of funded projects, the short funding periods and the low levels of available funding. Those that were interviewed noted the importance of ensuring limited bureaucracy and continuity in the support by the central secretariat as well as making sure that available expertise to support running projects is exploited to the full.

“An area of improvement was in the appointment of a liaison person for each project from the members of the Scientific Advisory Board. This happened about one year after the start of the projects...Although this appointment was a positive step as such, the timing limited the ability to fully exploit the benefits of this action.” (JPI MYBL projects)

Finnish researchers appreciate the low administrative burden in projects supported by P2P partnerships under Horizon 2020 and the multidisciplinary approach required. The smaller scale of the projects also seems to work as a stepping stone in applying in larger programmes but is also valued as such as it enables true collaboration and trust building.

3. In which R&I areas is Finland strong?

The Finnish national priorities for research and innovation are reflected in key strategic documents including the Health Sector Growth Strategy for Research and Innovation Activities²⁷ and the Roadmap for 2016-2018²⁸, the International Water Strategy Finland, 2018²⁹, Finland's biodiversity strategy 2012-2020³⁰, the latest National Roadmap for RDI³¹ as well as the Smart Specialisation Strategy 2014-2020³². They include climate change, carbon neutrality and biodiversity, health and social work, key enabling technologies, information and communication technologies.

These areas are indeed the ones where Finnish researchers publish more. Based on the latest AKA report on the State of Scientific Research in Finland 2018³³ the volume of Finnish publications in ICT and electrical engineering, business studies and economics, ecology and environment, agriculture and forestry, social sciences and humanities, health, biomedicine and biosciences are above the world average. This is also confirmed by the scientific impact of these publications measured by the top 10 index. Indeed, the highest top 10 index for Finland is shown in the areas of business studies (1.35), humanities (1.31), ICT (1.23), engineering (1.20), agriculture and forestry (1.29) but also in mathematics and statistics (1.21).³⁴ Yet, in most of these areas Finland's scores are lower than most of the benchmark countries, in particular Denmark, Sweden and Belgium.

Finland's participation in H2020 overall confirms a significant interest in the above mentioned areas. In particular, the areas where Finland mostly benefits based on the net EU contribution in H2020 – besides the ERC actions and excluding Marie Skłodowska-Curie actions due to their bottom-up nature – are ICT, energy, health and demographics, climate action and environmental research and food and sustainable agriculture. (Figure 9).

²⁷

<https://tem.fi/documents/1410877/3437254/Health+Sector+Growth+Strategy+for+Research+and+Innovation+Activities+26052014>

²⁸ <https://julkaisut.valtioneuvosto.fi/handle/10024/75145>

²⁹ https://um.fi/publications/-/asset_publisher/TVOLqBmLyZvu/content/finnish-water-way-suomen-vesialan-kansainvalinen-strategia

³⁰ <https://www.biodiversity.fi/actionplan/strategy>

³¹ <https://minedu.fi/en/rdi-roadmap>

³² https://ec.europa.eu/regional_policy/en/information/publications/factsheets/2017/smart-specialisation-strengthening-innovation-in-finland

³³ https://www.aka.fi/globalassets/2-suomen-akatemia-toiminta/2-tietoaineistot/state_of_scientific_research_2018_slides.pdf p. 22, p.26.

³⁴ The top 10 index describes a country's/organisation's relative share of the 10% most cited publications in the world. When the Top 10 index > 1 means that the share of a country's publications that belong to the most highly cited 10% of publications in their field is greater than in the world on average.

Figure 10: Net EU Contribution in H2020 for Finland per thematic area

Net EU Contribution (EUR) by thematic priority



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

Based on the data collected and elaborated by AKA, the Finnish participation in ERA-NETs is mainly concentrated in the areas of health, environment, food, agriculture and fisheries and energy. In contrast, transport, space, services and security and defence have been much less common. Indeed, this is reflected also in the data presented in section 1.2 where the majority of proposals are attracted in the areas of environment, health, humanities and social sciences (BONUS, NORFACE, HERA ERA-NET, JPI Water, JPI MYBL and BiodivERsA).

The strong research competence in energy and food and agriculture are also confirmed by the data provided by MMM (section 1.5) where the highest number of projects were noted under the ERA-GAS, SusCrop and SusFood2 calls. The high success rate of the proposals submitted under CHIST-ERA Cofund also indicates a specialisation in the ICT research.

Finnish participation in Horizon 2020 as well as P2P partnerships can be seen to reflect the national priorities and specialization areas in research and innovation.

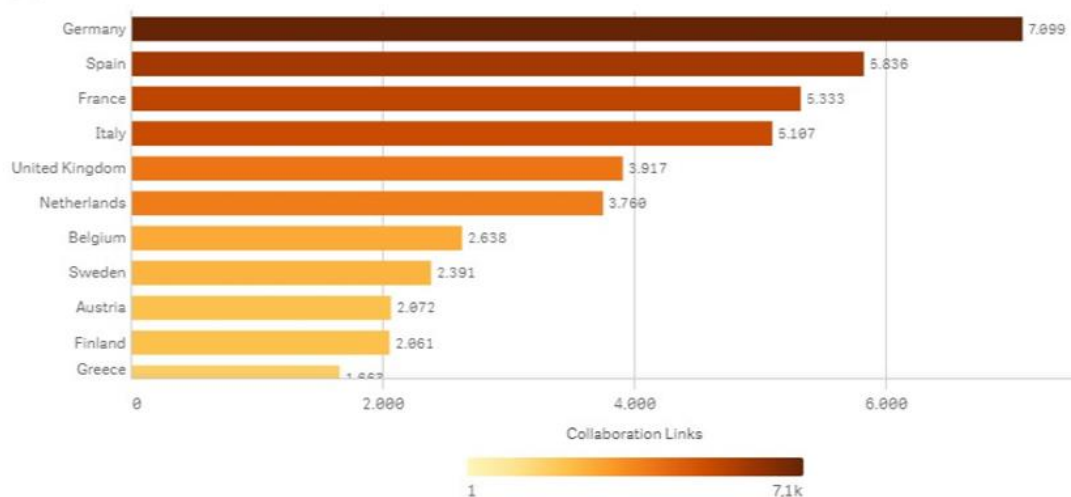
4. With whom does Finland collaborate in R&I and why?

Based on H2020 data³⁵ Finnish organisations in H2020 projects collaborate mostly with counterparts from Germany, Spain, France, Italy, UK, and the Netherlands (Figure 10). These countries are also among the most active countries in Horizon 2020. Of the Associated Countries, Finland enjoys strong links (above 1000) with Switzerland and Norway.

Figure 11: Top collaborations of Finland with other countries in H2020 projects (above 1500 links)

Top Collaborations

Collaboration links in the projects where Finland is involved



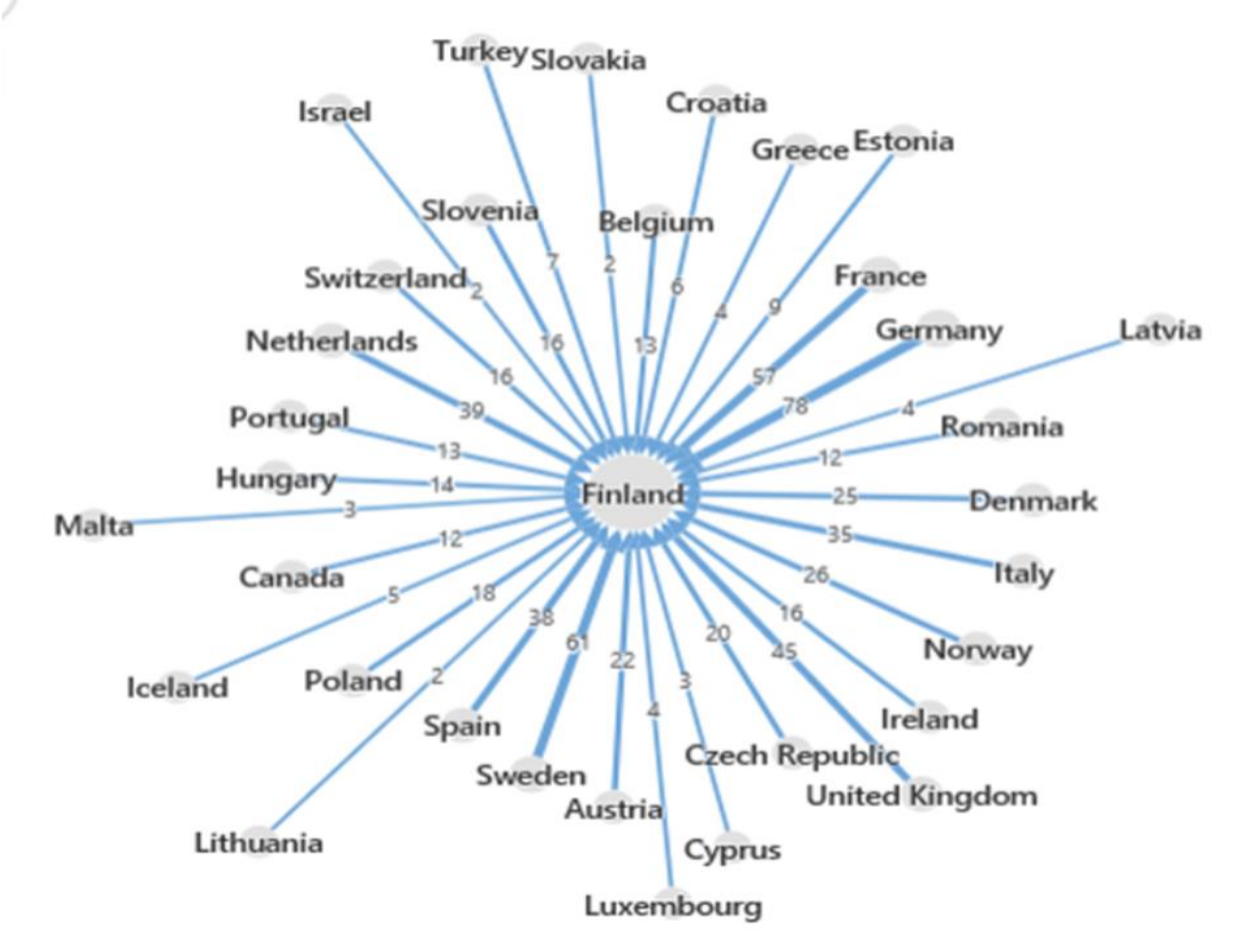
This is largely repeated in partnership-supported projects. Based on data elaborated by AKA Finland cooperates with more than 70 countries within ERA-NETs, the most common being Germany, France, the UK and the Netherlands. In JPIs, the major partner countries are Belgium, Denmark, France, Germany, Italy, the Netherlands, Norway, Spain, Sweden and the UK. In Article 169/185 initiatives, Sweden, Denmark and Germany top the list of collaboration countries.³⁶ This is confirmed by the ERA-LEARN data that shows Germany, Sweden, France, the Netherlands, Italy and the UK as the countries with more project collaborations (Figure 11).

³⁵ <https://webgate.ec.europa.eu/dashboard/sense/app/a976d168-2023-41d8-acec-e77640154726/sheet/e1b57f9a-669b-4962-bdb9-0151c523120f/state/analysis>

³⁶ https://www.aka.fi/globalassets/42julkaisut/eranet_report_final_yhd4.pdf

A more recent study carried out in 2020 showed that Finnish researchers have P2P partnership projects in at least 36 countries outside the EU, the most important partner countries being Norway, the United States and Canada.³⁷

Figure 12: Collaborations of Finnish organisations in Partnership-supported projects in H2020



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

Finnish organisations collaborate internationally with the most active countries in both H2020 and the P2P partnerships. They also have collaborative links with at least 36 countries outside the EU showing the value of partnerships as an effective tool to establish links beyond Europe. The selection of project partners is rather bottom-up for researchers as well as businesses reflecting where the needed excellence lies.

³⁷ <https://www.aka.fi/en/about-us/whats-new/press-releases/20202/european-partnership-programmes-important-to-research-organisations-and-academy-of-finland/>

5. What are Finland's overall S&W in R&I?

Strengths

- Finland among the EU innovation leaders; R&D expenditure among the highest in the EU
- Intention to increase public expenditure in R&D and education and keep the target of 4 % of GDP for 2030
- Still high private R&D intensity although in decline
- Acknowledgement of need to strengthen and promote Finland's attractiveness and internationalisation; Internationality an important part of the new vision and roadmap of the Research and Innovation Council; new guidelines for internationalisation of higher education and research
- Strong links between public research and businesses although weakening
- Relatively good performance in relation to innovation outputs (patents)
- High-quality education system and life-long learning; a wide range of innovation capabilities and proven ability for transition

Weaknesses / Challenges

- Decreasing business R&D and overconcentration of R&D expenses in big firms
- Public cuts in R&D and a resulting gap in funding technology development and innovation
- Weak internationalisation of Finnish science base
- In need of further developing strategic research, including through adequate steering and funding of public research institutions
- Combination of academic knowledge production and business-driven innovation still a challenge
- Difficulties in attracting foreign talents and promoting mobility of Finnish researchers abroad
- Average performance in top-cited publications and international co-publications

6. Topic of interest from Finland: Baltic Sea Research and SSH networks

Baltic sea research is quite important for Finland. BONUS has a long history of supporting multi-disciplinary research in the Baltic region and Finland has been a key actor since the beginning.



BONUS³⁸, the joint Baltic Sea research and development programme, has grown from a programme supported by the Nordic collaboration to an ERANET (in 2003), and then to an ERANET Plus and finally an Art 185 initiative. Finnish researchers have submitted 339 pre-proposals in BONUS calls since 2012 that ended up in 298 eligible full proposals. Being active for more than 15 years, BONUS has now made a full circle and is approaching its completion before it is scaled up to a joint Baltic and North Sea Research and Innovation Programme (BANOS) and eventually integrated in the new European partnership for climate neutral, sustainable and productive Blue Economy. BONUS has had several success stories. It has contributed significantly to policy and regulation in the battle against overfishing and to the sustainability of the Baltic Sea fish populations. Scientific contributions from BONUS projects helped provide advice to the European Commission, and the International Council for the Exploration of the Seas, as well as to the relevant Danish, Estonian, Polish and Swedish ministries. BONUS has encouraged and supported thematic collaboration and clustering among its projects from the early days. Several thematic workshops and outstanding joint publications have grown out of this line of activity. BONUS has also paid attention to critical review of the results of primary research and knowledge synthesis across the projects. This resulted in a call in 2017 that supported knowledge synthesis projects worth over EUR 3,5 million. Closer association between science and innovation has always been a key focus of BONUS. This translated to a dedicated innovation call in 2012 and encouraging enterprise participation in all other calls. Yet, the best formula is still to be found, although several success stories have been created. Strengthening the innovation dimension will keep being a major aim of the upcoming BANOS CSA.³⁹ The impact of BONUS as a multidisciplinary and cross-sectorial initiative is significant. It will form a valid basis for the New European Partnership for the Blue Economy.



NORFACE and HERA are the main partnerships dedicated to research in social science and the humanities (SSH). NORFACE⁴⁰ fills the intermediate gap between Finnish programmes and H2020. H2020 supports large consortia while NORFACE focuses on 3-4 countries and the national programmes have often a domestic scope or very limited

³⁸ <https://www.bonusportal.org/>

³⁹ https://www.bonusportal.org/files/7175/InBrief_Dec2020_WEB.pdf

⁴⁰ Standing for New Opportunities for Research Funding Agency Cooperation in Europe (NORFACE), is a partnership of national research funding agencies in Europe dedicated to leading and developing opportunities for scientists in the area of social and behavioural sciences. <https://www.norface.net/>

international collaboration opportunities. In this regard, it offers a way of enabling international collaboration without having to spend huge efforts needed to build and manage large consortia. Based on AKA data, NORFACE calls attracted more 111 pre-proposals since 2016 that led to 25 eligible proposals. The international collaboration enabled through NORFACE enhances the experience of Finnish researchers and help them form new networks. This is particularly important for early career researchers. Finland (University of Turku) is the scientific coordinator of the NORFACE DIAL programme⁴¹, where a very important task is undertaken, i.e. the joint and programme-wide dissemination of project results. This is done through the development of dissemination means such as working paper series, podcasts, thematic workshops, website, social media, newsletters etc. The aim is to enhance both the academic impact of the programme through high-quality publications as well as the impact on the wider context (e.g. through policy briefs). NORFACE puts particular emphasis in these aims. Although, evidence for impacts is still premature, progress is encouraging. The recently organised online discussion on gender inequalities and childhood disadvantages attracted strong interest from EC officials and a dialogue started on policy needs that may be addressed through the DIAL programme. These actions help build a particular impact pathway that can be traced back to document achievements.



HERA,⁴² Humanities in the European Research Area, is a network of 26 national funding agencies with the mission to fund humanities-led, collaborative, transnational research. The HERA network together with the European Commission has funded 55 transnational humanities-focused projects under a variety of themes. Since 2017, HERA calls attracted 110 pre-proposals with Finnish participation that led to 20 eligible full proposals. HERA has been supporting large-scale joint research programmes and associated activities such as matchmaking exercises for research applicants and knowledge exchange activities. Over the course of its calls, HERA together with the European Commission pooled €56 million to fund 49 transnational projects involving 231 scholars, 206 postdoctoral researchers and 88 PhD students as well as 173 partners from civil society and cultural institutions. Just in December 2020 HERA announced the launch of a new programme in collaboration with NORFACE called CHANSE (Collaboration of Humanities and Social Sciences in Europe). The first call of this joint programme will be dedicated to 'Transformations: Social and Cultural Dynamics in the Digital Age'. The objective of the call is to help understand how digital innovations give rise to social and cultural changes and are also influenced by society and culture. The programme, with a total budget of € 36 million including over € 26 million of national contributions, will be implemented by 27 research funding organisations from 24 countries.

It is important that the two partnerships (HERA and NORFACE) are now joining forces. This does not only increase the resources mobilised but also the potential impact on European policy making.

⁴¹ <https://dynamicsofinequality.org/about/>

⁴² <https://heranet.info/>

Annex

Main indicators for P2Ps in H2020 (*)	Finland	Austria	Belgium	Denmark	Sweden	EU14 average H2020	EU13 average H2020	EU27 AVERAGE
Total pre-called budget available for P2P calls (€ m)	91	116	145	93	199	161	23	97
Number of networks	58	64	77	56	68	78	33	48
Number of network coordinations	1	8	3	2	2	6	1	5
Number of funding organisations participating in P2Ps	16	21	26	16	18	24	9	17
Number of P2P calls with specific country participation	102	126	188	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	245	400	362	346	585	511	92	309
Total project participations	328	692	502	531	846	787	122	467
Total costs of project participation (€)	113,930,109	203,773,712	139,777,906	258,157,512	344,324,976	264,042,377	22,254,971	147,626,219
Total requested EC funding (€)	51,626,024	100,042,748	76,387,699	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.

(**) 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	Finland				Denmark	Belgium	Austria	Sweden	EU 28 average
	2015	2016	2017	2018	2018	2018	2018	2018	2018
GERD (as % of GDP)	2.87	2.72	2.73	2.76	3.03	2.76	3.14	3.31	2.03
Percentage of GERD funded by the business sector	54.76	56.99	58.01	55.80	58.52 (2017)	63.49 (2017)	53.85	60.76 (2017)	57.60 (2017)
Percentage of GERD funded by government	28.89	28.87	29.01	28.27	27.21 (2017)	19.96 (2017)	29.76	25.02 (2017)	29.72 (2017)
Percentage of GERD funded by rest of the world	14.52	12.12	10.77	13.89	8.92 (2017)	13.04 (2017)	10.06	10.08 (2017)	9.89 (2017)
Percentage of GERD performed by the business sector	66.67	65.84	65.25	65.66	64.27	69.78	69.87	70.95	66.28
Percentage of GERD performed by higher education	24.39	25.14	25.39	25.22	32.43	19.71	22.44	25.32	21.94
Percentage of GERD performed by government	8.17	8.16	8.54	8.31	3.00	9.89	7.14	3.62	10.90
GOVERD (% of GDP)	0.23	0.22	0.23	0.23	0.09	0.27	0.22	0.12	0.22
percentage of GOVERD financed by the business sector	8.67	9.12	7.36	7.76	3.86 (2017)	5.41(2017)	8.86 (2017)	6.80 (2017)	7.76 (2017)
HERD (as % of GDP)	0.70	0.68	0.69	0.69	0.98	0.53	0.70	0.84	0.44
percentage of HERD financed by the business sector	3.72	3.65	3.18	2.93	2.66 (2017)	11.71 (2017)	5.12 (2017)	3.62 (2017)	6.93
BERD (% of GDP)	1.91	1.79	1.78	1.81	1.95	1.87	2.19	2.36	1.34
percentage of BERD funded by the business sector	79.67	84.00	86.67	82.87	89.01 (2017)	86.34 (2017)	85.52 (2017)	83.95 (2017)	83.75 (2017)
percentage of BERD funded by government	3.64	3.57	3.11	2.79	2.03 (2017)	3.37 (2017)	3.68 (2017)	4.7 (2017)	5.22 (2017)
percentage of BERD funded by rest of the world	16.67	12.40	10.19	14.32	8.21 (2017)	10.24 (2017)	20.68 (2017)	11.56 (2017)	10.54 (2017)
Total national public funding to transnationally coordinated R&D (€ million)	71.590	78.020	78.200	79.900	38.212	284.150	146.164	173.713	
National contributions to bilateral or multilateral public R&D programmes (€ million)	10.100	9.950	10.130	10.400	0.268	13.574	22.475	32.750	
National contributions to Europe-wide transnational public R&D programmes (including P2Ps)	44.640	50.060	49.300	50.200	12.330	217.212	90.119	100.017	
Total researchers (full-time equivalent)	37,516	35,908	37,047	37,891	46,396	57,898	50,484	75,151	2,098,323
Percentage of scientific publications among the top 10% most cited publications worldwide as % of total scientific publications of the country	0.72	0.74	0.69	0.75	0.96	0.78	0.67	0.81	0.67
International co-publications per million population	0.71	0.74	0.76	0.76	1.00	0.67	0.63	0.90	0.38
PCT patent applications per billion GDP (in PPS)	1.00	1.00	0.90	0.94	0.75	0.42	0.57	1.00	0.43
ERC grantees by country per call year	5	6	7	10	14	16	10	18	

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