

Synthesis Report on the Partnership Landscape in view of the clusters in Horizon Europe

Description and Analysis

LAST UPDATE
05/06/2019

Information

Project no.	811171
Project acronym	ERA-LEARN
Project full title	Strengthening partnership programmes in Europe
Funding scheme	CSA
Start date of project	1. July 2018
Duration	48 months
Background	<p>The description and analysis of networks follow the recommendation of the ERAC ad hoc Working Group on Partnerships to provide an analysis on the status-quo of partnerships in prospective areas of Horizon Europe. This synthesis report is based on the partnership analyses that have been performed in relation to the clusters under Pillar II “Global Challenges and Industrial Competitiveness” of Horizon Europe (Commission proposal).</p>

Disclaimer

The Synthesis Report and the underlying Cluster Reports were elaborated by ERA-LEARN to support the coordination and cooperation among networks. They are work in progress and should be seen as a basis for starting discussions among the networks about the potential to adjust and streamline the partnership landscape in view of the challenges addressed by Horizon Europe. They are based on:

- a listing of networks provided by DG RTD, reviewed and partly modified by ERA-LEARN experts
- the ERA-LEARN database and
- desktop research and professional background knowledge of the ERA-LEARN authors of the individual Cluster Reports.

While due diligence was applied there are certain limitations that readers should bear in mind:

- The papers display and discuss existing partnerships, serving current framework priorities, and apply educated guesses about their relevance for the thematic clusters and (groups of) intervention areas sketched for Horizon Europe. They do not take into account the gradual thematic flexibility of networks or parts thereof, or the changes of research priorities that national ministries and funding initiatives may undertake. Nor do they consider the invaluable capacity of ministries to design and implement MS-based transnational funding initiatives across Europe across all innovation phases and aspects, and beyond their mere match with future thematic intervention areas of the clusters under Pillar II “Global Challenges and Industrial Competitiveness” of Horizon Europe (Commission proposal).
- The clustering of intervention areas to sub-clusters has been determined by the authors by means of expert assessment, for greater clarity of the connections displayed.
- The displayed connections are limited to formal connections and existing collaborations among partnerships.

Taking these limitations into account the parties involved in creating the databases and drafting the Cluster Reports would like to emphasize that references to networks and/or their relevance and/or their connections are not meant to be exhaustive nor judgemental but a preliminary input to the discussion on the rationalisation and reform towards future European Partnerships under Horizon Europe.

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1. Introduction

1.1. Scope and Methodology

This synthesis report provides an indicative overview of the relevance of the existing partnerships to the proposed clusters in the new Framework Programme Horizon Europe¹. It serves as an input to the discussion of bringing greater coherence and added value to the partnership landscape. The report presents how the existing partnerships are relevant to the new thematic clusters in Horizon Europe, who are the main type of actors and type of activities of the partnerships relevant to each cluster and how the existing partnerships interact with each other. The analysis is based on the outline of the Commission's proposal for Horizon Europe and the clusters proposed therein².

The following types of existing partnerships (see section 2 on their description) have been considered:

- Public-Public Partnerships: Art. 185 Initiatives (A185), European Joint Programme Cofund (EJP Cofund), ERA-NET Cofunds and Joint Programming Initiatives (JPIs),
- Public-Private Partnerships: Art. 187 Initiatives (A187), European Technology and Innovation Platforms (ETIP/ETP) and contractual Public-Private-Partnerships (cPPP),
- Other Partnerships: European Innovation Partnerships (EIP), Knowledge and Innovation Communities of the European Institute of Technology (EIT-KIC), European Research Infrastructure Consortia (ERIC), Future Emerging Technologies Flagships (FET Flagships).

The analysis concentrates on networks that exhibit close connection to the EU framework programme and/or receive some funding from this source. Hence, although EIP and ERIC do not constitute partnerships in a narrow sense, they have been considered in the mapping

¹ The analysis performed refers to the European Commission Proposal establishing Horizon Europe – the Framework Programme for Research and Innovation, laying down its rules for participation and dissemination, COM(2018) 435 final.

² The analysis does not refer to partnership areas for institutionalised European partnerships, which have been proposed recently by the European Commission (See: <https://data.consilium.europa.eu/doc/document/ST-5907-2019-INIT/en/pdf>). An indication of the relevance of the institutionalised partnership areas for the clusters of Horizon Europe is provided in Section 2.2 of this report.

analysis due to their close nexus to the clusters of Horizon Europe. At the same time, certain networks and initiatives not related to research and innovation that are implemented between the European Commission, Member States and other agencies (e.g. Copernicus³) have not been considered.

The report first provides a **summarising overview on the existing partnership landscape** by presenting those partnerships of different type and nature, which are deemed to be fully or partly relevant for each of the clusters suggested for Horizon Europe:

- We consider initiatives as fully relevant if the initiative and its research and innovation programme and/or activities deals with the thematic content of the specific intervention area to a large extent. For example, Electronics in Health is one of the top priorities of large PPP ECSEL. Hence ECSEL is therefore considered to be fully relevant for the cluster Health.
- A network can also be partly relevant to a specific area of intervention in case the focus of the network serves as the application area for the respective technologies or services to be developed in the intervention area. For instance, EIP on Active and Health Ageing is partly relevant to the intervention area of 'Digital Technologies' as digital technologies can be applied to improve healthy ageing of people. In a similar line, EIP on Smart Cities and Communities is partially relevant for the areas "Next Generation Internet" or "High-performance Computing and Big Data" as the respective technologies or services can find various application opportunities in the framework of smart cities.

The report then discusses the **main actors of the different types of partnerships** and reflects upon the **activities performed by the different types of partnerships** in the clusters. It then sets on to discuss the scope, level and type of interactions between and across the different partnerships and clusters.

In a concluding section, the synthesis report poses some key questions resulting from the analysis. They seek to initiate a discussion on the future orientation of partnerships in Europe, in view of contributing to the rationalisation and reform of the partnership landscape.

The analysis is based upon a mapping of interactions between Public-Public Partnerships (P2P) and Public-Private Partnerships, which resulted in the provision of five cluster reports of Horizon Europe. It is mainly based upon desk research activities. The relevance of partnerships is based upon the expert judgement of the ERA-LEARN team members and the European Commission. ERA-LEARN represents funding agencies taking part in a large number of partnerships and research organisations and consultancies actively involved in a number of networks. This cross-cutting analysis highlights the main findings that are relevant across the clusters. For each cluster report, feedback from external experts was used to revise the initial drafts.

³ <https://www.copernicus.eu/en/about-copernicus>

2. Overview on the partnership landscape

2.1. Type of partnerships in and related with Horizon 2020

Under the current framework programme Horizon 2020, European Union Member States, the European Commission and industry partners have joined efforts in different type of partnership programmes in research and innovation:

- **Public-Public Partnerships (P2Ps)** are agreements that allow EU Member States to draw up joint research programmes where the EU may also participate⁴. The aim of Public-Public Partnerships (Article 26 of the Horizon 2020 Regulation) is to pool national research efforts together in order to make better use of Europe's public research and development resources and to tackle common European challenges more effectively. The main pillars of Public-Public Partnerships in EU research are: 1) Member-State driven **Joint Programming Initiatives**, which are partly supported by Horizon 2020 through ERA-NET Cofund Actions, 2) **ERA-NET Cofund** instruments, which are mainly used to 'top-up' single joint calls and actions of a transnational nature, 3) **Article 185 initiatives** of the Treaty on the Functioning of the European Union, which allows the EU to participate in research programmes undertaken jointly by several EU Member States, and 4) **European Joint Programme Cofund** (EJP Cofund) which are designed to support coordinated national research and innovation programmes, aiming at attracting and pooling a critical mass of national resources on objectives and challenges of Horizon 2020 and achieving significant economies of scales by adding related Horizon 2020 resources to a joint effort.
- **Public-Private-Partnerships (PPPs)** are partnerships between the Commission and industry⁵. They intend to bring project results closer to the market and improve the link between research and societal growth. They are established in the form of **Article 187 Joint Undertakings** (JUs) under the Treaty on the Functioning of the European Union. In addition to these **contractual Public-Private Partnerships**

⁴ <https://ec.europa.eu/programmes/horizon2020/en/h2020-section/public-public-partnerships-0>

⁵ <https://www.era-learn.eu/p2p-in-a-nutshell/type-of-networks/public-private-partnerships-other-era-relevant-partnerships>

(cPPP)⁶ exist in H2020, which aim to support the European industry in areas of strategic importance.

- **FET Flagships** are ambitious large-scale, science-driven, research initiatives that aim to achieve a visionary goal, tackling scientific and technological challenges across scientific disciplines. The flagships foster coordinated efforts between the EU and its Member States' national and regional programmes, and beyond. They are highly ambitious and rely on the collaboration among a range of disciplines, communities and programmes, requiring sustained support of up to 10 years. They are financed by the EU Framework Programmes for Research and Innovation and by the EU Member States and hence they are another modality of a Public-Public Partnership, which forms an integral part of Horizon 2020.

Via Horizon 2020 the European Union invested 1016 Mio. Euro until September 2018 in the Partnership programmes mentioned above⁷. The distribution of funding across these partnerships is displayed in Figure 1.

Figure 1: EU investment for specific types of partnerships

Partnership approaches	Public-public partnerships (P2P)	Public-private partnerships (PPP)	EIT-KICs*	FET Flagships**
Implementation modes	ERA-NET-Cofund, EJP Cofund, Article 185, Joint Programming Initiative (JPI)	Contractual Arrangement (cPPP) Article 187	H2020 Grant agreements for different types of actions Framework Partnership Agreements (FPA)	
Currently active R&I Partnerships (Horizon 2020)	a) ERA-NETs: ~70 b) EJP Cofund: 5 c) Article 185: 6 d) JPIs***: 10	a) JUs: 7 (+HPC) b) cPPPs: 10	a) KICs: 6 (+ 2 until 2020)	a) FET-Flagships: 2 (+Quantum)
Financial contribution from H2020, estimated)	2.500 M€ (3,1% of H2020 budget)	13.450 M€ (17,5% of H2020 budget)	2.400 M€ (3,1% of H2020 budget)	1.000 M€ (1,3% of H2020 budget)

*EIT-KICs: Knowledge and Innovation Communities (KICs) of the European Institute for Innovation and Technology (EIT)
 **FET-Flagships: Flagships of the Future and Emerging Technologies programme (FET)
 *** JPIs: Joint Programming Initiatives are no EU level instruments but included here as they receive EU support via ERA-NETs and/or CSAs

Source: European Commission

In addition to the main types of partnerships mentioned above, a number of other partnerships exist, which are of certain relevance for the European research and innovation landscape and therefore considered in this report and the cluster specific discussion papers:

⁶ <https://ec.europa.eu/programmes/horizon2020/en/contractual-public-private-partnerships>

⁷ https://ec.europa.eu/research/evaluations/pdf/archive/h2020_monitoring_reports/h2020_monitoring_flash_092018.pdf; Analysis excludes Art. 185 Initiatives, as these are not included in CORDA.

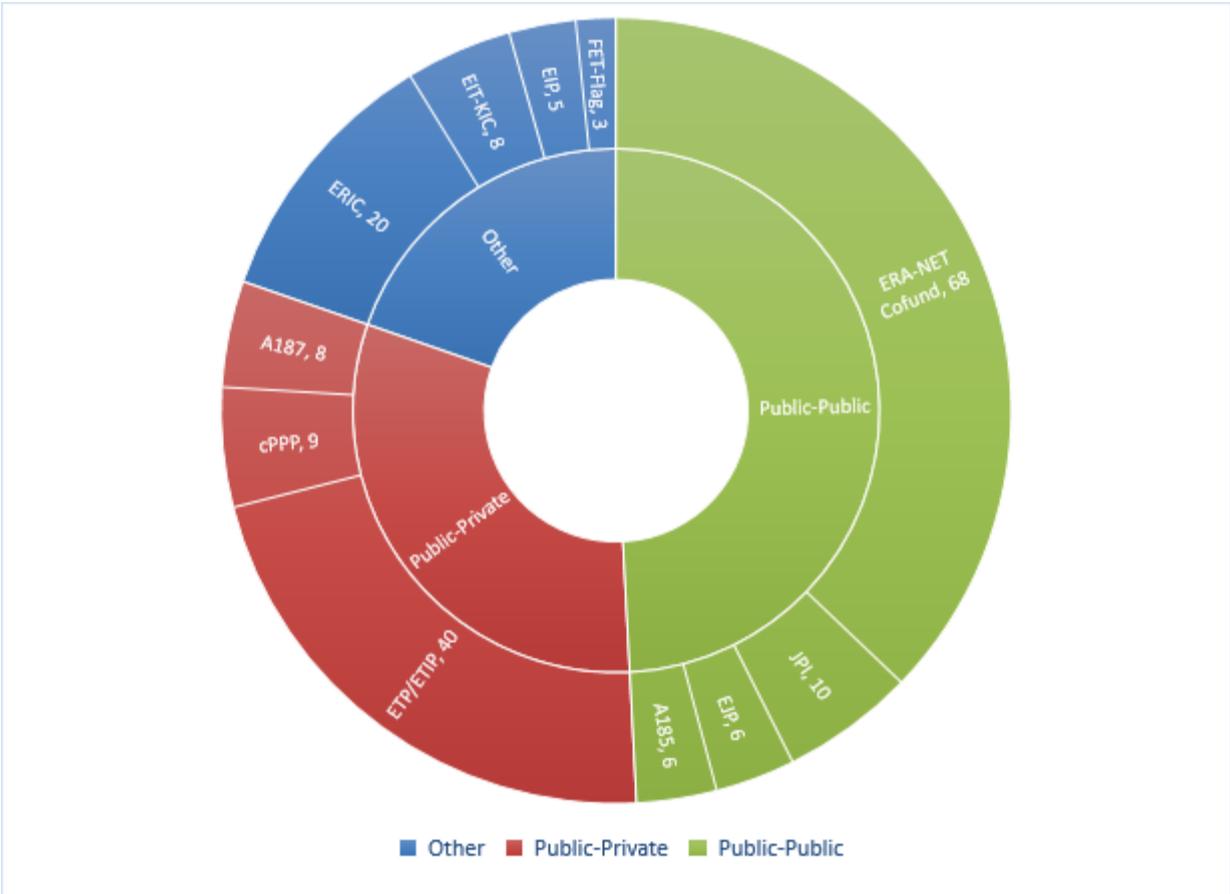
- **European Innovation Partnerships (EIP)**: are challenge-driven, focusing on societal benefits and a rapid modernisation of the associated sectors and markets. EIPs have been set up in order to: (i) step up research and development efforts; (ii) coordinate investments in demonstration and pilots; (iii) anticipate and fast-track any necessary regulation and standards; and (iv) mobilise “demand”, in particular through better coordinated public procurement, to ensure that any breakthroughs are quickly brought to market.
- The **Knowledge and Innovation Communities (KIC)** of the European Institute of Technology (EIT) are partnerships that bring together businesses, research centres and universities. They allow: 1) innovative products and services to be developed, 2) new companies to be started and 3) a new generation of entrepreneurs to be trained. The Innovation Communities carry out activities that cover the entire innovation chain: training and education programmes, reinforcing the journey from research to the market, innovation projects, as well as business incubators and accelerators.
- The **European Research Infrastructure Consortium (ERIC)** is a specific legal form that facilitates the establishment and operation of Research Infrastructures with European interest. The ERIC allows the establishment and operation of new or existing Research Infrastructures on a non-economic basis and the ERIC consortium becomes a legal entity from the date the Commission decision setting up the ERIC takes effect.
- Furthermore, **the European Technology and Innovation Platforms (ETP/ETIP)** are industry-led stakeholder fora recognised by the European Commission as key actors in driving innovation, knowledge transfer and European competitiveness. ETP/ETIP develop research and innovation agendas and roadmaps for action at EU and national level to be supported by both private and public funding. The ETIPs are specifically related to the SET-Plan in the field of energy.

The types of partnerships above formed the basis for the ERA-LEARN mapping of partnerships according to their relevance to the envisaged clusters of Horizon Europe. In this regard it is important to note that some ERA-NET Cofunds may be serving the needs of JPIs or FET Flagships in terms of implementing the joint calls and possibly other joint activities. In these cases the ERA-NET Cofunds can be regarded as integral parts of the wider initiatives (the respective JPIs or FET Flagships). However, they are considered as individual partnerships as they consist of separate H2020 contracts with their own scope, objectives, timeline and expected impacts.

In total, the analysis considers 183 active partnerships and networks (see Figure 2). Out of these, 49% of partnerships are Public-Public-Partnerships, 31% are Public-Private Partnerships and 20% are other partnerships. ERA-NET Cofunds exhibit the largest number of partnerships included in the analysis followed by ETIP/ETP, and ERICs. In financial terms, the eight Art. 187

Joint Undertakings and the cPPPs account by far for the largest share of EU funding provided to all partnership instruments (cf. Figure 1)⁸.

Figure 2: Number and type of currently active partnerships and networks



Source: ERA-LEARN

2.2. Clusters and institutionalised partnerships in Horizon Europe

The European Commission proposal for Horizon Europe, the successor programme of Horizon 2020, which will start on 1 January 2021 and end on 31 December 2027, will continue to support the entire research and innovation cycle. The second pillar of Horizon 2020, on Global Challenges and Industrial Competitiveness will take forward the societal challenges and industrial technologies in a more ‘top down’ approach addressing the Union and global policy and competitiveness challenges and opportunities. Global Challenges and Industrial Competitiveness are integrated into the following **five clusters**:

⁸ As no single data-source exists which allows comparing the funding for the different types of partnerships so far due to their different nature and different funding sources, it was decided not to display such a graph.

The **Health** cluster underlines the importance of the UN Sustainable Development Goals (SDG) calling for universal health coverage for all at all ages by 2030, leaving no one behind, and ending preventable deaths. The cluster description points out that health research and related innovation actions play a significant role in improving productivity and quality in health, health care systems and in the relevant industry. The cluster has a proposed budget of 7,700 million € in Horizon Europe.

The **Inclusive and Secure Society** cluster aims at incorporating social sciences and humanities research for a model of inclusive and sustainable growth and R&I activities responding to the need of European citizens to be protected from different types of threats. The cluster has a proposed budget of 2,800 million € in Horizon Europe.

The **Digital and Industry** cluster follows on from the Industrial Leadership Pillar of Horizon 2020 and specifically the objective targeting 'Leadership in Enabling and Industrial Technologies (LEIT)' that covers Key Enabling Technologies (KETs: nanotechnologies, advanced materials, advanced manufacturing and processing and biotechnology). In Horizon Europe a proposed budget of 15,000 million € is foreseen for this cluster.

The **Climate, Energy and Mobility** cluster is aimed at addressing, in a highly integrated and effective way, one of the most important global challenges for the sustainability and future of our environment and way of life. The cluster has a proposed budget of 15,000 million €.

The **Food and Natural Resources** cluster aims to develop the adequate knowledge base and promote the emergence of social and technical innovations needed to address the challenge of nourishing the planet's growing population while tackling climate change and natural resources depletion. The Food and Natural Resources cluster has a proposed budget of 10,000 million €.

These clusters, each having a number of intervention areas, are aimed to incentivise cross-disciplinary, cross-sectoral, cross-policy and international collaboration, thereby achieving higher impact and better seizing the innovation potential that is often greatest at the intersection of disciplines and sectors⁹.

In addition to these clusters **partnerships** should be a way to stimulate research and innovation activity across disciplines and enable active participation of stakeholders from public and private sectors, including citizens and end-users¹⁰. In November 2018, Ministers agreed on a framework for establishing missions and **a new approach to rationalise the partnerships landscape**.

Thereby, it was agreed that the involvement of the Union in European Partnerships may take any of the following forms: Co-programmed European Partnerships, Co-funded European

⁹ Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL establishing Horizon Europe – the Framework Programme for Research and Innovation, laying down its rules for participation and dissemination, COM/2018/435 final

¹⁰ <https://data.consilium.europa.eu/doc/document/ST-5907-2019-INIT/en/pdf>

Partnerships and Institutionalised European Partnerships. They should have a clear life-cycle approach, be time-limited and include conditions for phasing-out the Union funding. In particular regarding the **Institutionalised European Partnerships**¹¹, eight areas have been identified in the Presidency Discussion paper – Competitiveness Council of 19 February 2019¹². The table below provides an overview of the correspondence of the clusters with the designated areas for institutionalised partnerships in Horizon Europe.

Table 1: Relevance of draft suggested institutionalised partnership areas for clusters of Horizon Europe

<i>clusters</i>	<i>Health</i>	<i>Inclusive and Secure Societies</i>	<i>Digital and Industry</i>	<i>Climate, Energy, and Mobility</i>	<i>Food and Natural Resources</i>
<i>Institutionalised Partnership Areas</i>					
Area 1: Faster development and safer use of health innovations for European patients, and global health	X				
Area 2: Advancing key digital and enabling technologies and their use, including novel technologies such as Artificial Intelligence and quantum technologies	X	X	X	X	
Area 3: European leadership in Metrology including an integrated Metrology system	X	X	X	X	X
Area 4: Accelerate competitiveness, safety and environmental performance of EU air traffic, aviation and rail		X		X	
Area 5: Sustainable, inclusive and circular bio-based solutions					X
Area 6: Clean hydrogen and sustainable energy storage technologies with lower environmental footprint and less energy-intensive production			X	X	

¹¹ Please note, that the eight areas for institutionalised partnerships are not pre-defining the potential scope of other partnerships in Horizon Europe.

¹² <https://data.consilium.europa.eu/doc/document/ST-5907-2019-INIT/en/pdf>

<i>Clusters</i>	<i>Health</i>	<i>Inclusive and Secure Societies</i>	<i>Digital and Industry</i>	<i>Climate, Energy, and Mobility</i>	<i>Food and Natural Resources</i>
<i>Institutionalised Partnership Areas</i>					
Area 7: Clean, connected, cooperative, autonomous and automated solutions for future mobility demands of people and goods			X	X	
Area 8: Innovative and R&D intensive small and medium-sized enterprises					

Source: ERA-LEARN

The table shows that institutionalised partnership areas and clusters of Horizon Europe are highly interrelated. Some partnership areas (2,3,4,6) are relevant for more than one cluster in Horizon Europe and the research envisaged to be performed in the clusters of Horizon Europe would be relevant for more than one partnership areas as well (Health, Inclusive and Secure Societies, Digital and Industry, Climate).

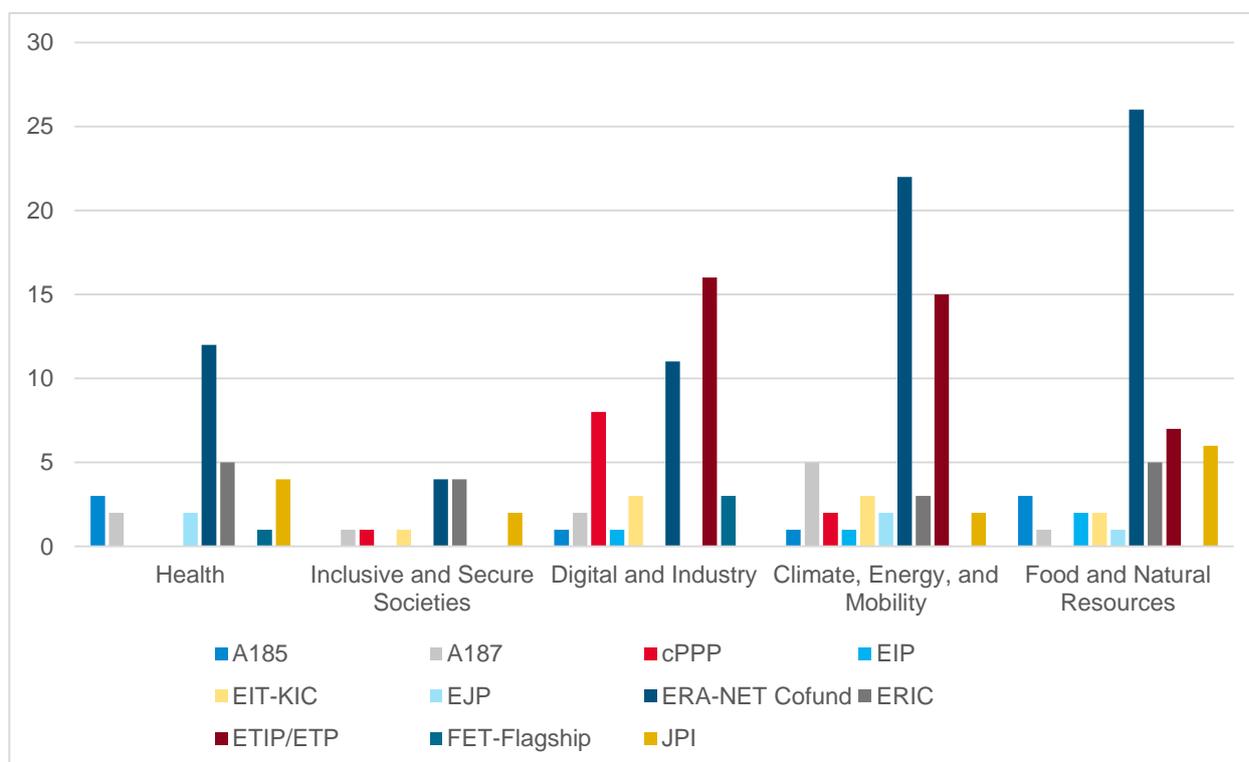
2.3. Mapping of R&I Partnerships related to the clusters of Horizon Europe

In this section, we provide a mapping of the existing partnerships against the clusters of Horizon Europe. We first provide an overview on the allocation of fully relevant partnerships per cluster. Then we review the relevance of partnerships for multiple clusters and intervention areas.

Allocation of partnerships in clusters

Figure 3 displays a mapping of the number and type of fully relevant partnerships per cluster of Horizon Europe.

Figure 3: Number and type of fully relevant partnerships per cluster

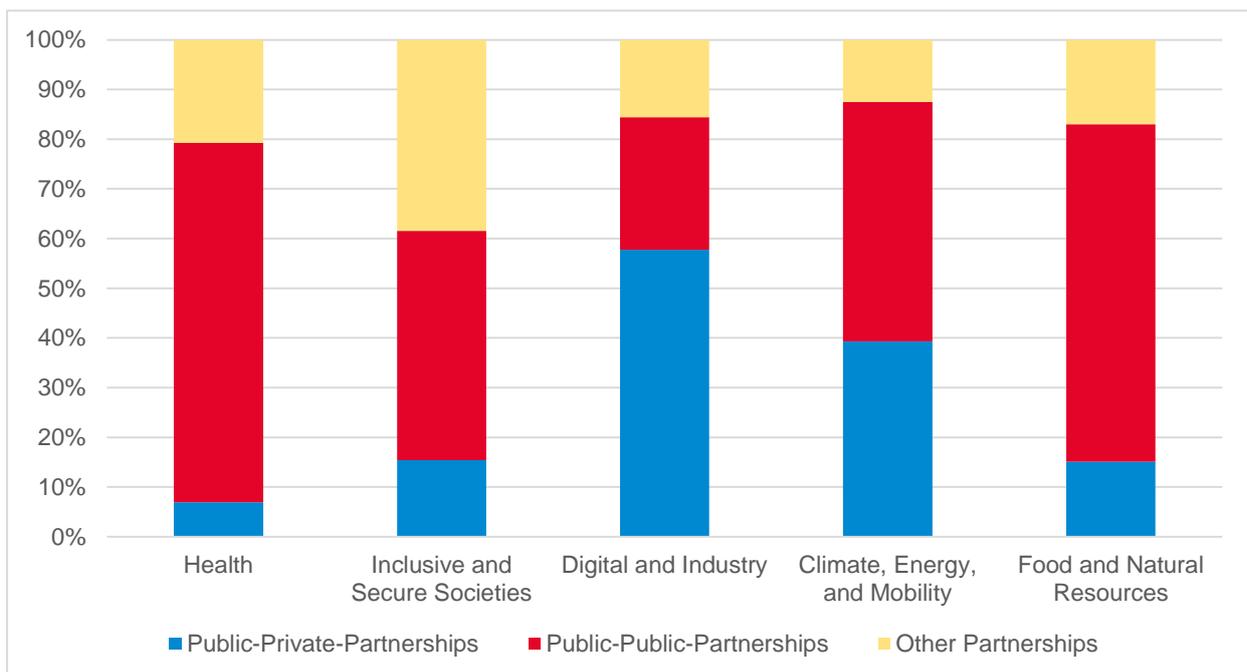


Source: ERA-LEARN

- The cluster **Climate, Energy and Mobility** and the **Food and Natural Resources** cluster exhibit the highest number of fully relevant partnerships (> 50). They also exhibit the highest diversity of types of partnerships represented. Except from FET-Flagships all types of partnerships are represented in the Climate, Energy and Mobility cluster. In the Food and Natural Resources cluster only FET-Flagships and contractual Public-Private Partnerships are absent from the portfolio. The Food and Natural Resources cluster is in particular dominated by the presence of a large number of ERA-NET Cofunds. Whereas this also holds true for the Climate, Energy and Mobility cluster, this cluster also exhibits a comparatively large number of ETP/ETIPs.

- The **Digital and Industry** cluster also exhibits a large variety of partnerships being present. Except from ERICs, JPIs and EJPs all types of partnerships are fully relevant for this cluster. The cluster has the highest number of ETP/ETIPs, cPPP and FET flagships in comparison with the other clusters. Overall, the number of P2P (11 ERA-NET Cofunds, 1 Art. 185 initiative) is relatively small compared to other clusters.
- As opposed to the **Digital and Industry** cluster, the **Health** cluster shows a higher representation of Public-Public Partnerships but is also populated with institutional Public-Private Partnerships. Four out of ten Joint Programming Initiatives, three Art. 185 initiatives and a number of ERA-NET Cofunds and ERICs are relevant for this cluster. The cluster also comprises two Art. 187 initiatives that are relevant for this cluster, but ETP/ETIPs and EIT-KICs are not represented therein.
- The cluster **Inclusive and Secure Societies**, which is in financial terms the smallest cluster of the Horizon Europe proposal, comprises the least number of fully relevant active partnerships. Only a number of ERICs, two JPIs and four ERA-NET Cofunds are fully relevant to this cluster.

Figure 4: Share of fully relevant partnerships by partnership category



Source: ERA-LEARN

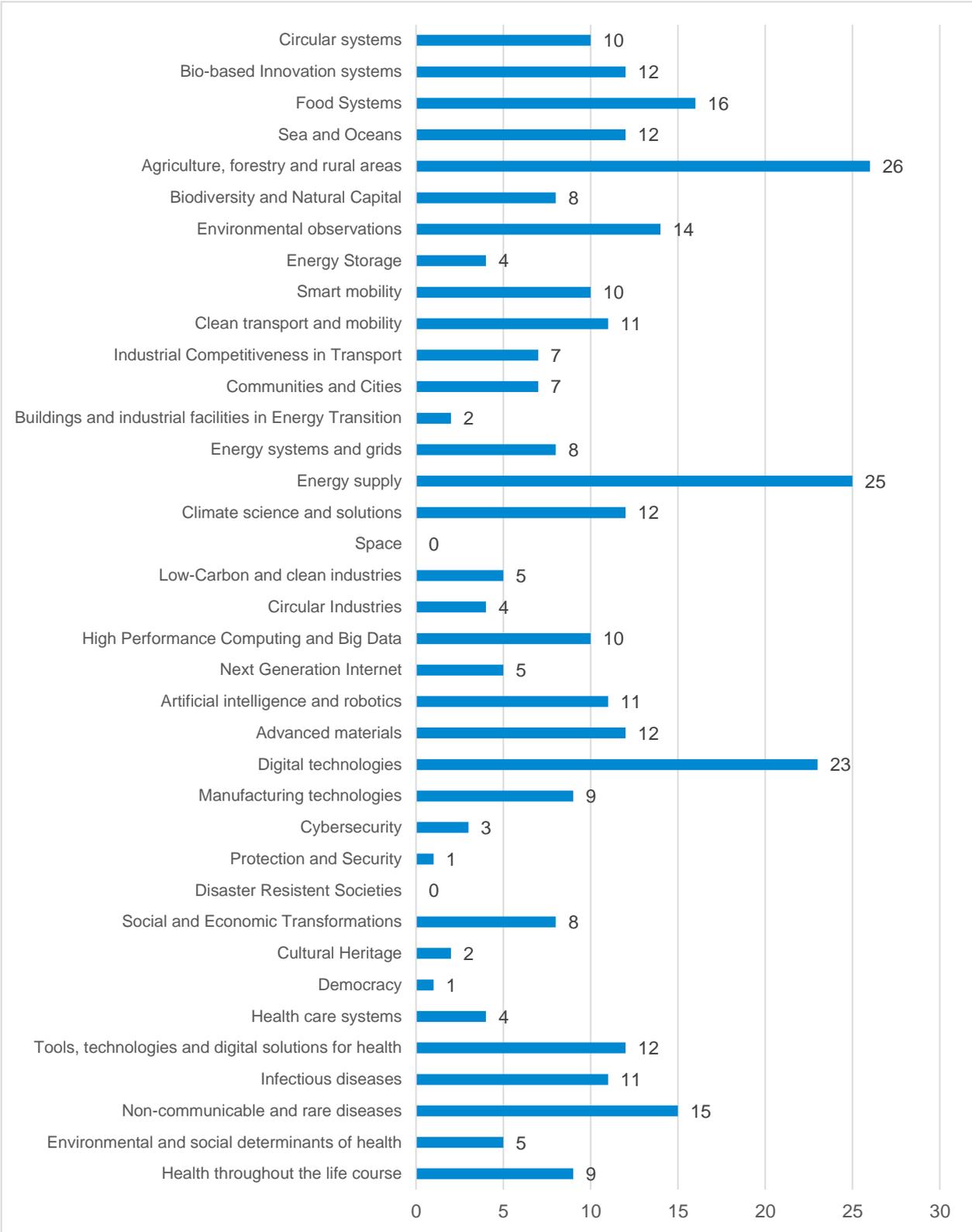
Figure 4 shows how the different clusters of Horizon Europe are populated with different types of partnerships in terms of numbers:

- Public-Public-Partnerships are mainly represented in the Health cluster, the Food and Natural Resources cluster and the Inclusive and the Secure Societies cluster.
- Public-Private-Partnerships are mainly represented in the Digital and Industry cluster and the Climate Energy and Mobility cluster.
- Other partnerships are represented in all five clusters, but specificities exist: some ERICs are to be found fully relevant to all clusters, except the Digital and Industry cluster. Some FET Flagships are fully relevant to the clusters Health and Digital and Industry and some EIT-KICs are fully relevant to the clusters Digital and Industry, Climate, Energy and Mobility and Food and Natural Resources.

Focussing on the intervention Areas of Horizon Europe (see Figure 6), it becomes evident that in many intervention areas of Horizon Europe a large number of partnerships exists which operate in the respective field of research and innovation:

- Out of the 37 intervention areas in Horizon Europe, only the intervention areas Space and Disaster Resistent Societies do not exhibit a fully relevant partnership.
- Except from the cluster Inclusive and Secure Societies, there are intervention areas in which more than 15 active partnerships are present.
- The intervention areas with the largest number of different active partnerships are: 1) Agriculture, forestry and rural areas (26 partnerships), 2) Energy supply (25), 3) Digital technologies (23), 4) Non-communicable and rare diseases (15) and 5) Food systems (15).

Figure 5: Number of fully relevant partnerships per intervention area of Horizon Europe



Source: ERA-LEARN

2.4. Key actors and activities performed in the different types of partnerships

The different types of partnerships are characterised by different types of key actors in the governance structures of the partnerships and activities performed. This section provides a short overview on the distinguishing factors of the different types of partnerships.

Public-Public Partnerships

In the **Public-Public Partnerships** the main partners are national ministries, national funding agencies and the European Union. The largest Public-Public Partnerships in terms of funding are the Art. 185 initiatives. Art. 185 initiatives are intended to address common challenges in specific research areas by creating economies of scale and synergies between national and EU research programmes and investments. The Meta-Evaluation of the Art. 185 initiatives¹³ states that at the beginning of FP7 the Article 185 initiatives had a clear position as the only large-scale joint programming instrument that was available to EU Member States. Since then, ERA-NET Cofunds have increasingly implemented multi-annual calls and other instruments and initiatives (EJP Cofunds, JPIs) have been introduced.

Public-Public Partnerships represent a wealth of knowledge concerning the capacity and state-of-the-art of R&I activities in the respective fields in the EU Member States. Through the existence of advisory boards and the strong presence of national research funding agencies, in particular the JPIs reach out to R&I communities, (partly) societal actors and also international policy makers. For example, in the cluster Inclusive and Secure Society, representation of international bodies is ensured in the advisory board of JPI Cultural Heritage by including e.g. UNESCO, the Council of Europe, the European Construction Technology Platform (ECTP) – Focus Area on Cultural Heritage.

JPIs often serve as the overall strategy research framework under which certain ERA-NET Cofunds operate and are mandated with the implementation of parts of the JPIs' SRAs and relevant supporting activities. Examples in this respect are:

- JPI Urban Europe, which serves as the strategic framework for the implementation of related ERA-NET Cofunds (ENSUF, SUGI and ENSCC).
- FACCE-JPI has launched a number of related ERA-NET Cofund actions including FACCE ERA-GAS, FACCE SURPLUS and FACCE SusCrop.

¹³ <https://publications.europa.eu/en/publication-detail/-/publication/3966c4a7-b47c-11e7-837e-01aa75ed71a1/language-en/format-PDF/source-66145783>

- JPI HDHL has launched ERA-HDHL and HDHL Intimic.
- JPI Climate has launched AXIS ERA-NET and ERA4C.
- JPI Oceans has a strategic engagement with the BONUS Article 185 initiative, with a joint working group at Board level, chaired jointly by a representative of the JPI Oceans Management Board and the chair of the BONUS Steering committee.

Public and private research performing organisations in ERA-NET Cofunds and JPIs are mainly involved in their role as research actors. In all networks, overall, some representation of the research community in advisory structures is given. In addition to that, other activities promoting research networking have taken place. For example, JPI Urban Europe has established the Urban Europe Research Alliance (UERA) that brings together around thirty European research organisations from thirteen different states, building a community of researchers, professors, and PhD students with the aim to advance scientific excellence in the field of urban research. The inclusion of relevant public stakeholders (e.g. owners of critical infrastructures, mobility providers, health-care providers etc.) and non-governmental organisations is sometimes possible within projects of the Public-Public Partnerships.

Public-Private Partnerships

The **Public-Private Partnerships** mainly set out to support the development of research and innovation activities with the aim to strengthen Europe's competitiveness and industrial leadership and to address specific societal challenges.

The largest Public-Private Partnerships in terms of funding, the **Joint Technology Initiatives (Art. 187)** are established on the basis of a Decision by the Council, following a proposal by the Commission to establish a Joint Undertaking (JU). The JUs are independent legal entities that manage research projects in an integrated manner with industry joining forces with other stakeholders. They have a dedicated budget and staff and provide a framework for the public and private players to work and take decisions together.

The **contractual Public-Private Partnerships** are based on roadmaps for research and innovation activities which are the result of an open consultation process and which have been positively evaluated by the European Commission with the help of independent experts. The cPPPs represent a large part of the European economy (manufacturing industry, telecommunications etc.) and aim at strengthening European supply chains and innovating key industrial sectors. The cPPPs are being implemented through open calls under Horizon 2020. In contrast to the Joint Technology Initiatives, the cPPPs do not organise their own calls.

Within all the Public-Private Partnerships, **research performing organisations** and in particular European industry is more strongly engaged (than in the Public-Public Partnerships) and has more influence on the actual design of the R&I agendas as well as the strategic orientation of the activities to be performed, due to their clear representation in decision making bodies and/or intensive consultation processes. This holds in particular true for the Art. 187 Joint Undertakings, where the definition of strategic research agendas are strongly defined by industry itself.

Other partnerships and networks

While P2Ps currently have a major focus on R&I activities, the scope of activities of the remaining types of partnerships are even broader in scope:

- The **EIT Knowledge and Innovation Communities** are partnerships focussing on innovation and entrepreneurship and they carry out activities at the interface between business, higher education and research. They provide training and education programmes, reinforcing the journey from research to the market, innovation projects, as well as business incubators and accelerators.
- The **European Innovation Partnerships (EIP)** are stakeholder platforms that bring together representatives from industry, public services, academia and NGOs. Their main mission is to provide high-level guidance to the European Commission, Members States and private actors on innovative approaches in their fields of operation.
- The **FET-Flagships** aim to bring emerging technologies from the realm of fundamental science to industrial and societal applications in the space of ten years, which requires investments that cannot be carried out alone by the Commission or any single Member State.
- The **ERICs** are European joint-venture (also allows the participation of countries from outside Europe), in which the research infrastructures participating are required to carry out research programmes and projects. They seek to provide effective access to the European research community in accordance with the rules established in the statutes and mainly contribute to the mobility of knowledge and/or researchers within the ERA.

Hence, the European partnership landscape in research and innovation is composed of a set of different types of partnerships, which all have their specific rationales, type of activities performed, and stakeholders engaged.

3. Connections between the partnerships

The five cluster reports on the partnership landscape in the clusters of Horizon Europe analyse the connections between the different partnerships active in the cluster. The analyses performed therein did not attempt to be comprehensive but rather provide an indication of the more obvious connections. The analysis distinguishes between:

- Existing collaborations, which comprise among others joint activities or some joint decision making through common memberships in boards. An example of an existing collaboration is the launch of a joint call between the cPPPs Robotics and Photonics.
- Formal connections, where one partnership is clearly linked to another. An example for a formal connection is that between JPI Urban Europe and its ERA-NET Cofunds that implement parts of the JPIs SRA.

In the following, we provide summaries of the main findings on the connections between the partnerships in the clusters of Horizon Europe and we provide an indicative analysis on the cross-cluster relevance of partnerships and networks.

3.1. Health

The Cluster **Health** is populated by a medium number of public-public and public private partnerships. The P2Ps in this cluster show a high number of formal connections: Most of the JPIs in the cluster 'Health' (JPND, JPIAMR, JPHDHL) have received support for their implementation by means of an ERA-NET Cofund. For example JPND implemented two ERA-NET Cofunds (JPco-fuND and JPco-fuND2) and launched joint transnational calls for proposals aimed at supporting ambitious, innovative, multi-national and multi-disciplinary collaborative research projects.

In addition to these connections, there also exist formal connections and collaborations between ERA-NET Cofunds and other partnerships, like the FET-Flagships active in the field. FLAG-ERA Cofund supported the implementation of two calls with the FET Flagships Human Brain Project and Graphene. Also a long-term collaboration within the ERA-NET Cofund E-Rare and the EJP on Rare Diseases has evolved. As some ERA-NET Cofunds and Joint Programming Initiatives tackle topics with potential overlap in activities (e.g. E-Rare and TRANSCAN, as some cancers are rare), explicit distinctions between their call themes and actions, to clearly target separate fields, have been incorporated.

However, formal and informal connections between the world of public-public and public private partnerships, have not been spotted in the thematic analysis. Although there are, for example some joint thematic areas tapped by the EIT-KIC Health, the cPPP on Robotics and the Joint Undertaking ECSEL, no formal or informal relationships are evident. For example, the 2017 Annual report of ECSEL does not highlight any co-operation with other Public-Private or Public-Public Networks. External institutional communication focuses on a) the European Commission (DG CNECT, DG Research and Innovation), b) the European Parliament, c) the European Council and d) the Committee of Regions. At national level, several ECSEL Mirror Groups have been set up. Concerning synergies, two workshops were co-organized by IMI JU and the ECSEL, bringing together the respective communities to discuss and identify areas of common interest for future collaboration.

Also for the Innovative Medicine Initiative IMI 2 and the Art. 185 initiative European & Developing Countries Clinical Trials Partnership (EDCTP 2) no formal linkages or joint activities could be identified, but there have been some joint workshops between IMI 2 and ECSEL Joint undertaking.

3.2. Inclusive and Secure Societies

The cluster Inclusive and Secure Societies is the cluster with the smallest number of partnerships initiatives. In the cluster network interactions between fully relevant P2Ps and partly relevant PPPs for the cluster do not exist. Within the P2Ps, which mainly focus on topics of inclusiveness, there are strong formal linkages and involvement of similar actors between the Joint Programming Initiatives and ERA-NET Cofunds. Network interactions exist along the main broad topics: urban policies, cultural heritage, demographic change, etc. Collaboration within these P2Ps comprise joint activities of SRIA planning, reaching out to stakeholder communities and operational programme management activities.

Furthermore, there are some informal connections between the European Innovation Partnerships Smart Cities and Communities with the JPI Urban Europe and respective ERA-NET Cofunds as well as the EIP Active and Healthy Ageing, the Art. 185 Active and Assisted Living and the JPI More Years better Lives. So far, no structured collaborations between ERICs and partnership Initiatives have become visible.

In the intervention areas dealing with secure societies, Public-Public Partnerships are by and large missing. Except from JPI Urban Europe and JPI Water, which also put some emphasis on aspects of resilience, there are no P2Ps active in this area. The Art. 185 initiatives PRIMA - The Partnership for Research and Innovation in the Mediterranean Area - will devise new R&I approaches to improve water availability and sustainable agriculture production in the region that is heavily distressed by climate change, urbanisation and population. In this regard, it has thematic similarities with JPI Water and also FACCE JPI. There are evident thematic

connections concerning disaster resilience in the actions of JPI Water, WsssTP and EIP water which also lead to joint actions among participating entities.

So far, no structured collaborations between ERICs and partnership Initiatives have become visible in the intervention areas dealing with 'secure societies' and no linkages between the cross-cutting JTI ECSEL and any of the other partnerships can be witnessed.

3.3. *Digital and Industry*

The Digital and Industry cluster is a cluster with a very high number of active partnerships. In the digital sub-cluster, a limited number of ERA-NET Cofunds seem to serve as means of implementation for overarching initiatives (e.g. QuantERA for FET Quantum, FLAG-ERA for the FET Flagships, or JPco-fuND and JPCofund2 for JPND). The other P2Ps involved are also connected with each other (AAL 2 with JPI MYBL) as well as other networks (JPI MYBL with EIP Active and Heath Aging).

The PPP world seems to be more inter-connected. ETPs providing strategic orientations are directly connected to suitable 'implementation' channels, i.e. the respective cPPPs. Several ETPs (AENEAS, ARTEMISIA, EPoSS) are linked to ECSEL. Certain cPPPs are also connected to each other (Big Data Value and 5G Infrastructure cPPPs). EIT-KIC Digital also has existing collaborations with cPPPs 5G, Big Data Value and Factories of the Future. Links between P2Ps and PPP are very few.

The industry sub-cluster is heavily populated with PPPs, ETPs, cPPPs and the fully relevant Art. 187 initiative ECSEL. On the other hand, there is a relatively small number of P2Ps with only four fully relevant ERA-NET Cofunds. In addition there are two EIT KICs (Manufacturing, Raw Materials) and one FET Flagship (Graphene) relevant in this cluster.

Within the cluster there are plenty of informal links in the sense of considering priorities of related networks. For instance, Photonics and Robotics cPPPs take into account the priorities and activities of the Factories of the Future cPPP. EPoSS coordinates strategies and priorities with other relevant ETPs and ETIPs. AAL2 coordinates their strategy building and activities with EIT-KIC Heath and wider umbrella initiatives such as EIP AHA.

However, our analysis shows that connections between the P2P and non-P2P world are limited even in areas that are represented in both communities. In this regard, recent reports such as the Mid-term Review of cPPPs¹⁴ include suggestions about links to be created/strengthened. For instance, ECSEL should be connected to both relevant PPPs (FoF and BDV) and EUREKA

¹⁴ Mid-term review of cPPPs <https://publications.europa.eu/en/publication-detail/-/publication/6de81abe-a71c-11e7-837e-01aa75ed71a1>.

clusters as well as wider 'umbrella' networks such as EIP AHA providing overarching strategies and relevant application areas.

3.4. *Climate, Energy, Mobility*

The cluster climate, energy and mobility is the cluster with the highest number of partnerships. Among these are 22 ERA-NET Cofunds and 15 ETP/ETIPs.

Climate is a popular thematic area for P2Ps and it is also an area that has synergy with a number of JPIs in addition to JPI Climate. This includes JPI Urban Europe, JPI Water and FACCE JPI, and even JPI Oceans. Likewise, there is synergy with the 'environment' calls of EMPIR and the priorities of other Article 185 initiatives such as PRIMA (and perhaps BONUS). Some of the PPPs are at least partly relevant as they represent decarbonisation pathways for industry. A number of the ERICs are also relevant to this thematic area.

Also in this cluster, the most obvious connections are between the JPIs and specific Cofunds that can be regarded as implementation tools for their strategic agendas. Less obvious is the level of connection between partnerships like JPI Climate and the Climate KIC.

Energy is a highly populated thematic area, in which the increasing top-down influence of the SET-Plan¹⁵ becomes clear. This is most apparent in the way that the energy-related ETPs have been consolidated into nine European Technology and Innovation Partnerships (ETIPs). Less obvious, is the wider influence on the priorities of the P2Ps in this area that are increasingly apparent in the calls for project proposals (e.g. expectations of alignment with specific priorities of the implementation plans of the SET-Plan).

There are some clear connections amongst some of the P2Ps. For example, there are multiple ERA-NET Cofunds in the area of solar power and the coordinating organisation is common between SOLAR-ERA.NET Cofund and Solar Cofund2. A new Cofund on concentrated solar power (CSP ERANET) is also due to commence in 2019 but the degree of synergy is less clear.

Some connections are also apparent with partnerships that have a broader agenda (including energy) such as the EIP on smart cities and communities and JPI Urban Europe. Clearly, there is also an EIT-KIC in this thematic area.

The Mobility area is heavily populated by Public-Private Partnerships whereas the number of P2Ps is more limited. Of course, there is some synergy with the scope of partnerships that have an interest in sustainable transport, especially in cities, such as JPI Urban Europe and the EIP for smart cities and communities. The presence of an EIT-KIC on urban mobility is also

¹⁵ The Strategic Energy Technology Plan (SET-Plan) is a high level EU framework to support the implementation of the Energy Union policy.

important. The connections between the long standing European Technology Platforms (ETPs) in this area can be traced back to the historical development of PPPs like CleanSky2, Green Vehicles (EGVI) and Shift2Rail. JPI Urban Europe is clearly a key player in this area. As well as directly spawning several Cofunds (ENSCC, ENSUF, EN-SUGI) it has also collaborated with another JPI (Climate) and a stand-alone ERA-NET (NORFACE) to implement the ERA-NET Cofund known as T2S (transformations to sustainability).

3.5. Food and Natural Resources

The Food and Natural Resources cluster has the second highest number of fully relevant partnerships. It is heavily populated by ERA-NET Cofunds, but there are also a number of ETP/ETIPs, JPIs and Art. 185 initiatives and at least two EIT-KICs fully relevant to this cluster area.

Also in this cluster, there are many formal connections and collaborative activities between ERA-NET Cofunds and JPIs. This can be explained by the fact that all JPIs in this cluster have facilitated the launch of ERA-NET Cofunds to implement their respective Strategic Research Agendas and Implementation Plans, and have therefore formal connections with these. Furthermore, many JPIs and ERA-NET Cofunds have included ETPs in their respective Stakeholder Boards.

There are however fewer connections between P2Ps and other partnerships/ networks such as KICs and EIPs. Looking ahead, there may be room to develop more of such connections in the future, to ensure greater complementarity between their work and facilitate the uptake of (publicly funded) research findings amongst (private) end-users. Likewise, the ERICs in this cluster do not seem to have formal connections with other partnerships/networks.

At the same time, sharing information concerning work programmes of partnerships in this cluster in order to avoid duplication and ensure complementarities is not uncommon (e.g. PRIMA Article 185 and the 3 JPIs active in its thematic remit).

Overall, P2Ps, and in particular JPIs, ERA-NET Cofunds and Article 185/187 initiatives in this cluster are **well-connected**. They have formal connections and/or collaborative activities. In contrast, there seems to be **more limited connections between the P2Ps and other initiatives (e.g., EIP, KICs, ERICs)**. However, the connections are often of an informal nature (e.g. participation in each other's meetings).

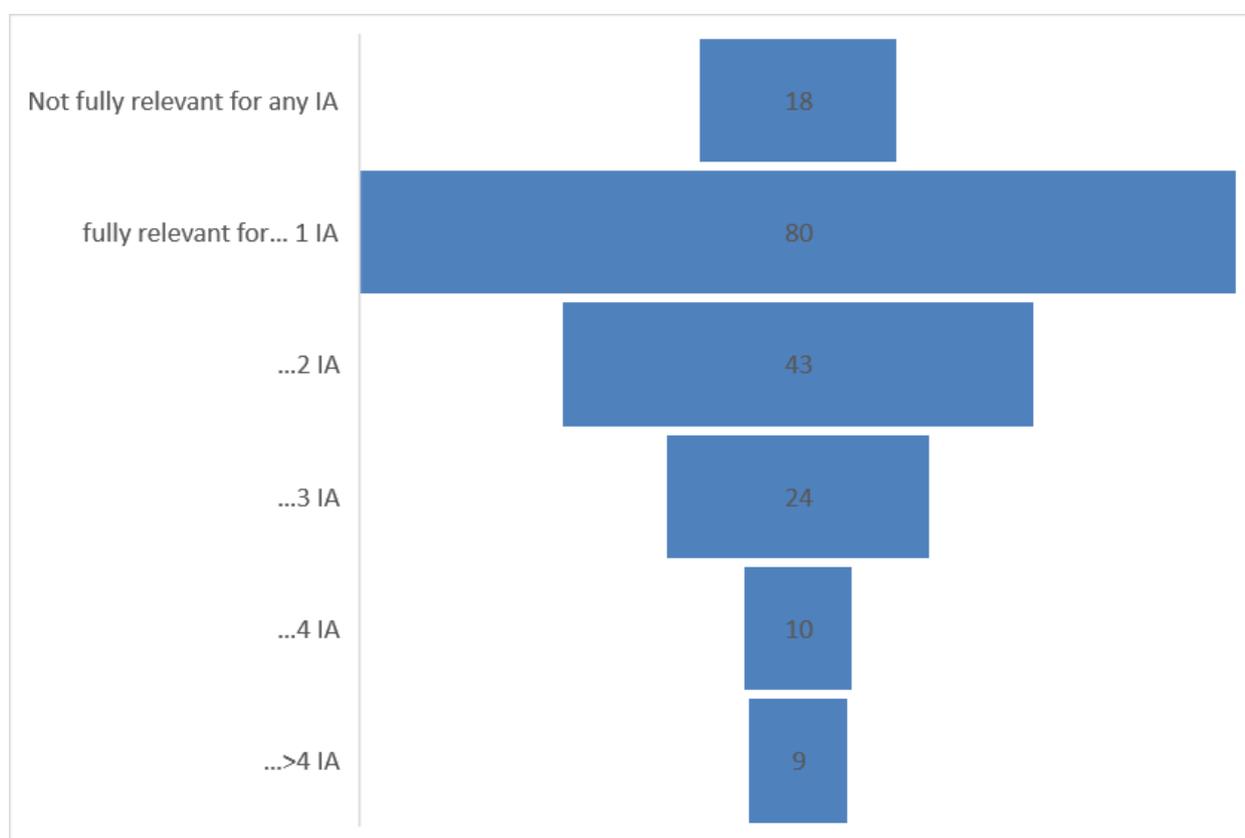
It remains open, why (typically) industry dominated Technology Platforms did link well with the P2Ps, while ERICs and e.g. the Food KIC were formally less well connected to the Agriculture and Food P2Ps.

3.6. Cross-cluster relevance of partnerships

Each thematic cluster report provides an overview on which partnerships are partly or fully relevant for each cluster. The vast majority (76%) of current partnerships is focussing on activities which are fully relevant for one specific cluster only. About 14% of partnerships are relevant for two clusters and one partnership is fully relevant for three clusters. 10% of all partnerships are not fully relevant for any of the cluster proposed for Horizon Europe.

When also considering the 37 intervention areas (IA) of the different clusters (5-9 per cluster), the number of partnerships that are relevant for more than one area increases significantly (See Figure 6).

Figure 6: Number of Partnerships that are “fully relevant” for x number of intervention areas (IA)



Source: ERA-LEARN

Among the partnerships which are deemed to be fully relevant for more than one cluster all different types of partnerships are represented.

- Among the Public-Private Partnerships, the Art. 187 initiative ECSEL is the most cross-cutting partnership. It supports research, development and innovation in electronics in key application areas covering for example smart solutions for mobility, healthcare, the environment, energy, digital society manufacturing and is therefore fully relevant for all clusters except Food and Agriculture. In addition to ECSEL the cPPP Energy-efficient Buildings is relevant for the clusters Digital and Manufacturing and Climate, Energy, Mobility and the cPPP Cybersecurity is relevant for the clusters Inclusive and Secure Societies and Digital and Manufacturing. Among the world of Public-Private-Partnerships also the ETP/ETIPs Alice and Photonics 21 are fully relevant for the clusters Digital and Manufacturing and Climate, Energy, Mobility. Furthermore, the ETP/ETIP Ocean is fully relevant for Climate, Energy, Mobility and Food and Agriculture.
- Among the Public-Public Partnerships, the large Art. 185 initiatives EDCTP 2, AAL 2, EMPIR and the EJP One Health have full relevance for at least two clusters. EDCTP2 focuses on R&I cooperation in clinical trials with developing countries with relevance for the areas Health and Food and Agriculture. AAL 2, focusing on Active and Assisted Living is relevant for Health and Digital and Manufacturing. Also the Art. 185 initiative EMPIR – focusing on the science of metrology, has dedicated application areas in Health, Digital and Manufacturing, and Climate, Energy and Mobility. Furthermore, the three Joint Programming Initiatives Healthy Diet - Healthy Life (HDHL), More Years Better Lives (MYBL) and Climate, as well as the EJP One Health are relevant for two clusters. HDHL and EJP One Health are relevant for Health and Food and Agriculture. JPI MYBL is relevant for Health and Inclusive and Secure Societies and JPI Climate is relevant for clusters Climate, Energy and Mobility and Food and Agriculture. Also a variety of ERA-NET Cofunds are fully relevant for two clusters. Cross-cluster relevance of networks is particular high for the Climate, Energy, and Mobility with Food and Agriculture (for example AXIS, BESTF3, EN-SUGI, and ERA-PLANET) and Health and Food and Agriculture (for example ERA-HDHL, HDHL Intimic).
- Among the remaining type of partnerships, the EIT-KIC Climate and Digital, the FET Flagship Human Brain Project, as well as some ERICs (e.g. EMSO and ICOS) are fully relevant for two clusters. Also here, cross cluster relevance is along the lines Climate, Energy, Mobility with Food and Agriculture, as well as Inclusive and Secure Society with Digital and Industry.

4. Conclusions and questions on the future of partnerships

This synthesis report and the cluster reports show that the European partnership landscape in research and innovation is composed of a set of different types of partnerships, which all have their specific rationales, type of activities performed and stakeholders engaged.

The partnership landscape that has emerged in the last decades reflects a) the strengths and needs of European industry, b) the societal challenges that Europe faces and which require a transformative approach to research and innovation policy going beyond field specific areas, and c) the outstanding will of EU Member States to jointly invest in transnational research and innovation endeavours.

The joint efforts of the European Commission, the Member States and the research and innovation actors have led to a situation in which all clusters and intervention areas of the new framework programme Horizon Europe can draw upon the collective knowledge and capacities developed in these specific partnerships.

Against this background, the analysis performed in the thematic cluster reports and in this synthesis report also highlights some key challenges that need to be overcome for the future development of partnerships:

Virtually every intervention area of Horizon Europe is populated by a large number of different types of partnerships, operating in similar fields of concern. While some coordination efforts to avoid duplication in calls exist, potential overarching questions are:

- How and by which means can synergies among the different types of partnerships be explored and established?
- How can coordination efforts between partnerships and administration efforts across research funding organisations be designed as efficiently as possible?
- How can fair and easy access of research and innovation communities be granted to this wealth of different types of partnerships?

Within the world of **Public-Public Partnerships**, a number of common means of interaction have emerged. The most prominent one is the joint programming activities of JPIs and various ERA-NET Cofunds. In every cluster except Digital & Industry, ERA-NET Cofunds have emerged as implementation structures of JPIs. A number of JPIs share the web presence with ERA-NET Cofunds and have developed joint mechanisms for promoting calls and setting up joint activities beyond calls (e.g. activation of stakeholders). Also, some ERA-NET Cofunds form distinct partnership networks. Examples in this regard are the multiple ERA-NET Cofunds in the area of

solar power, which also have the same coordinating agency. Although all these P2Ps constitute different legal entities, they share joint overarching missions.

Furthermore, informal collaborations exist between different types of Public-Public Partnerships that operate in similar fields. While some of these partnerships focus on goal-oriented activities (provision of results, joint actions etc.) the most common form of interaction across the clusters was to balance and synchronise the content of calls in order to avoid duplication of efforts.

Hence, for these types of partnerships potential key questions are:

- Is there a scope for merging of existing partnerships into bigger entities?
- Are there any means to design the joint activities of different partnerships more effectively?
- How can the potential administrative burden be minimised and longer-term funding agreements between national and EU players be achieved?

In the domain of **Public-Private Partnerships** some formal linkages and joint actions can be found. The most long-standing and intensive relation seems to be the connection between the ETP/ETIPs and the contractual PPPs. ETP/ETIPs provide orientation for the strategic research agendas of cPPP and Art. 187 initiatives. Several ETPs (AENEAS, ARTEMISIA, EPoSS) are the core members of the Art. 187 ECSEL. Certain cPPPs and Art. 187s are connected with each other (e.g. Big Data Value and 5G Infrastructure cPPPs) and some connections with certain EIT-KICs have been built up.

Our analysis shows that, with the exception from the Food and Natural Resources cluster, **connections between public-public and public-private and other partnerships** are limited even in areas that are represented in all communities (e.g. in clusters Health and Digital and Industry):

- The level of connectivity between Art. 187 initiatives and cPPPs with Public-Public Partnerships seems to be low. For example, the 2017 Annual report of ECSEL does not highlight any co-operation with other public-private or public-public networks. Also, recent reports such as the Mid-term Review of cPPPs¹⁶ suggest that links to other networks should be created/strengthened.
- The Knowledge and Innovation Communities of the EIT-KIC seem to be fairly disconnected from various relevant partnerships, although some JPIs, ERA-NET Cofunds and also ETPs operate in fields and sectors that are very similar to those of the KICs. In this regard, some cluster Reports suggest that there is a lack of time and resources to engage with other networks for ERA-NET Cofunds, whereas

¹⁶ Mid-term review of cPPPs <https://publications.europa.eu/en/publication-detail/-/publication/6de81abe-a71c-11e7-837e-01aa75ed71a1>.

there are limited incentives for collaboration in the EIT-KIC model, as they do not need to coordinate with others for implementing their activities.

The KICs have a specific relevance concerning innovation activities and start-ups and a number of Art.187 initiatives do have cross-cutting relevance for various clusters and intervention areas in Horizon Europe. This low level of collaboration seems to be a particular relevant issue.

Against this background potential questions to be discussed are:

- To what extent does the scope of activities performed by these partnerships require collaboration among the various types of partnerships?
- What could a (stronger) cooperation between different kinds of partnerships look like?
- What are critical factors for such a cooperation and consequences for e.g. governance, instruments, target groups?
- Where is the highest potential for synergies across partnerships?

Hence, for preparing the transition towards the new policy approach for partnerships, increasing coherence among partnerships and with the Framework Programme for research and innovation will be needed. This will require more openness to a broader range of actors including closer interaction between public and private actors.

Imprint

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