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Milestone 4.2- Assessment of Current Approaches to Alignment:

Case Study No.3- The ERA-NET Plus Infravation

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ABSTRACT

This case study examines the key features, outputs and overall strengths and weaknesses of a specific modality that supports greater alignment of research activities, namely the ERA-NET Plus Infravation (2014-2018), which is a transnational joint call for research proposals in the field of road infrastructure that relies on a "**real common pot**" **funding mechanism**. This ERA-NET Plus (European Research Area Network – Plus) has adopted a **delegated funding, coordination and management model**. While focussing on the specific experience of Infravation, the case study also provides lessons for other public-to-public research partnerships wishing to develop a similar approach to finance a joint call via a real common pot**,** and promote greater alignment of research programming more generally. The case study does however not aim to provide an in-depth assessment of Infravation nor of the real common pot approach.

The study highlights Infravation's many benefits. The application of a real common pot approach has facilitated greater **financial alignment** across participating countries and allowed to fund the maximum number of research projects irrespective of the applicants' nationalities and regardless of the objective of fair return on investment at national level. This innovative funding mechanism has also promoted stronger alignment at the operational level through (i) the appointment of a central funding and management body; (ii) the set-up of standardised and centralised programme-related procedures; (iii) the creation of new common selection criteria and general conditions specific to this ERA-NET Plus in line with FP7 requirements (especially funding and legal rules and eligibility criteria); and (iv) the joint dissemination of project outcomes. Furthermore, the scoping study that preceded the launch of the call as well as the preceding Transnational Road Research Programme carried out amongst National Road Authorities allowed to identify and define common research priorities amongst prospective participating countries. Infravation has also fostered synergies with other related EU and international research programmes and networks, and promoted alignment beyond the EU by involving a third country. Lastly, selected Infravation joint research projects support market-ready research to promote innovations.

Yet, the ERA-NET Plus Infravation has also been confronted with: (i) legal issues with call application procedures, due to EU legislation and the adoption of a real common pot, as this funding mechanism can go against certain national or regional funding rules; (ii) variations in the financial support received by selected applicants originating from countries outside the Eurozone; and (iii) a costly evaluation of pre-proposals (or so-called "light proposals") due to the desire of applicants and of the Infravation team to provide excellent pre-proposals in order to demonstrate the effectiveness and quality of this pilot initiative.

The case study builds on the ERA-LEARN 2020 Task 4.1 ("Definition and Typology of Alignment"), and relies on a review of existing literature and targeted interviews with the Programme Coordinator of Infravation. The case is part of a series of nine short case studies that form the basis of the ERA-LEARN 2020 Task 4.2 "Assessment of Current Approaches to Alignment". The nine case studies that have been selected for this Task each rely on a different instrument (Member-State instrument or EC instrument, e.g. ERA-NET), cooperation mode (e.g. networking amongst researchers, programme integration, institutional cooperation, etc.) and approach (strategic, operational and/or financial) that promote alignment, and that are often put in place at different stages of the research programming cycle (planning, strategy, implementation, etc.).

ACKNOWLEDGEMENTS

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1. Introduction

This case study examines the key features, outputs and overall strengths and weaknesses of a specific alignment modality, namely the ERA-NET Plus on Road Infrastructure Innovation entitled "Infravation", which relies on **a real common pot** funding mechanism. The study assesses in what context such an approach is best used for promoting greater alignment of national research programmes and activities. While focussing on the specific experience of Infravation, it also provides **lessons for other JPIs and public-to-public research networks** wishing to develop a similar instrument to facilitate research cooperation and innovations amongst European researchers, and alignment more generally.

According to the Typology of Alignment (ERA-LEARN 2020 Task 4.1), the ERA-NET Plus tool is used for the organisation of a joint transnational call for research proposals in a field of common interest. It hence enables to generate **new transnational research in areas where there are research gaps**. This instrument mainly relies on alignment of national research programmes at the financial level as it particularly focuses on the funding stage of the research programming cycle and aims to advance transnational project cooperation. The different ERA-NET tools used under previous and current Framework Programmes (FP6, FP7 and H2020) are presented below in Annex 3.

Furthermore, the funding principle of a real common pot allows countries to **pool their national contributions into a common and centrally administered budget** via transnational flows of money. This mechanism provides funding for successful research proposals according to the total available budget (including the EC's contribution) and **irrespective of the applicants' nationalities**, hence independently of their countries' contributions.

2. Key features of the ERA-NET Plus Infravation

2.1 Overview

The ERA-NET Plus Infravation (2014-2018) consists of a transnational joint call launched in March 2014, which aims to facilitate the **implementation of new international joint research projects in the field of road infrastructure** (e.g. pavements, bridges and tunnels).[1] It was initiated by two members of the Forum of European National Highway Research Laboratories (FEHRL): Rijkswaterstaat, which is an agency of the Dutch Ministry of Infrastructure and the Environment, and the Danish Road Directorate. The focus of the Infravation call is to support near-market ready research and hence lead to the demonstration phase of innovative products, technologies and services for road transport. The ERA-NET Plus brings together **11 National Road Authorities**[2], including from some non-European countries such as Israel (FP7 Associated country) and the USA, and benefits from a **financial support from the European Commission** (see Section 2.4).

The Infravation call addresses participating countries' common needs for joint research and innovation on *'Advanced Systems, Materials and Techniques for Road Infrastructure'*[3]. Participating National Road Authorities seek to overcome barriers to implementation of identified potential innovations in this particular field. More broadly, this ERA-NET Plus aims to support the EU Transport White Paper (2011) by helping **develop "*a competitive and resource efficient transport system*"**. It also supports the Horizon 2020 objective of "*Smart, green and integrated Transport*"[4], which promotes the **increase of (i) cost- and resource-efficiency, (ii) environmental performance, (iii) capacity of the transport system and (iv) transport safety**. Infravation has been designed to complement existing European research programme. Infravation encourages road innovations in the private sector while taking account of the needs of national public road authorities. It has the longer-term objective of developing a joint research programme gathering and linking all modes of transport.

[1] Infravation Guide for applicants (March 2014)

[2] Denmark, France, Germany, Iceland, Israel, Italy, Netherlands, Norway, Spain, Sweden and USA.

[3] SST.2013.1-3. ERA-NET Plus *'Advanced systems, materials and techniques for next generation infrastructure':* https://ec.europa.eu/research/participants/portal4/desktop/en/opportunities/fp7/calls/fp7-sst-2013-rtd-1.html

[4] https://ec.europa.eu/programmes/horizon2020/en/h2020-section/smart-green-and-integrated-transport

2.2 Mission and activities

Infravation seeks to facilitate the development of "cost-effective advanced systems, materials and techniques in road infrastructure construction and maintenance, including repair, retrofitting and revamping"[5]. The outcomes of Infravation's selected joint research projects aim to benefit economic players in the field of transport and all current and future road users, by promoting innovations at local and international levels.

Infravation focuses on four main activities:

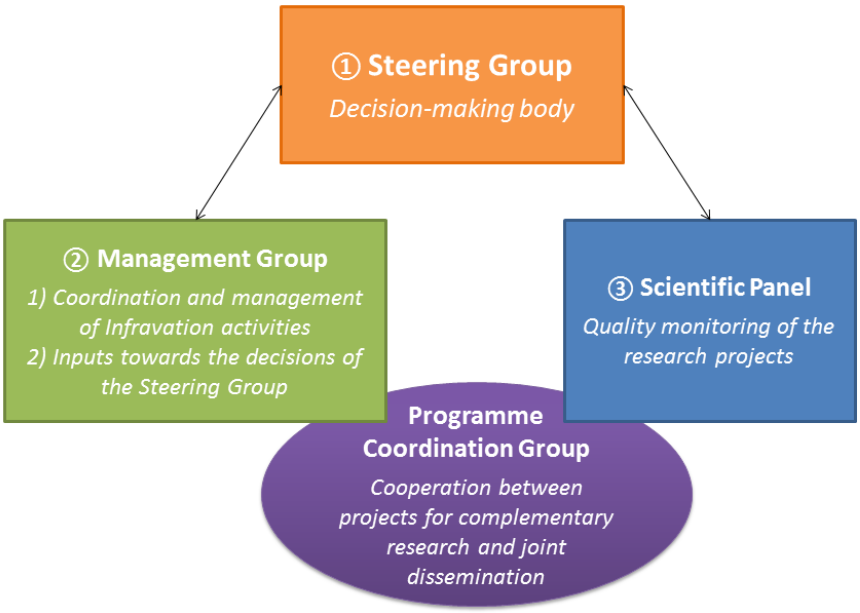
1) Preparation and launch of the 2014 Call for joint research proposals;
2) Evaluation of proposals and selection of joint research projects;
3) Funding and monitoring of selected research projects;
4) Communication, dissemination and application of project outcomes.

So far, it has successfully carried out the evaluation of proposals and the selection and launch of nine joint research projects. The first call for light proposals[6] led to the submission of 103 proposals with a total request for funding of 122.4 M€. During the second phase of the call, 23 research consortia then submitted full proposals. Considering the available budget, nine projects were ultimately selected for funding, with a maximum duration of 30 months each and an average budget of 1.1 M€.

2.3 Governance structure

Infravation is structured around three main bodies (see Fig. 1): 1) the Steering Group, which brings together all funding partners and is the highest decision-making body; 2) the Management Group, which is responsible for the day-to-day coordination and management of Infravation activities and advises the Steering group; and 3) the Scientific Panel, which is composed of independent experts who jointly provide technical advice regarding the projects. In addition, the Programme Coordination Group scientifically monitors the projects in order to foster cooperation and complementarity amongst them and promote joint dissemination of results. It is composed of the Work Package leaders responsible for the project selection and monitoring, the project coordinators and the Chair of the Scientific Panel.

Figure 1. Governance scheme of Infravation



Source: Infravation Description of Work

[5] Infravation Scoping Document (February 2014)

[6] Referred to as "pre-proposals" in several other ERA-NETs Plus.

2.4 Approximate resources and time needed for implementation

The uniqueness of Infravation's funding model relies in the implementation of a **real common pot** with central negotiation, funding and monitoring by **one single contracting and funding body**. This approach has rarely been used by other ERA-NETs Plus so far. Infravation's real common pot consists of national and EC in-cash contributions, of respectively 6.9 M€ and 2.675 M€, amounting to a total budget of **9.575 M€ which directly funds the activities of nine Infravation joint research projects**.[7] **All other types of costs are covered by the partners themselves, with at least 1.5 to 2 M€ of national in-kind funding** (i.e. for programme management procedures, travelling, accommodation, organisation of events, etc.). It is noteworthy that the EC top-up mechanism does not apply to the US contribution (i.e. 1 M€): the EC funding corresponds to 33% of European *in-cash* national contributions (excluding the US contribution).

The budget needed for the implementation of Infravation (Fig. 2) highlights: (i) the adoption of a real common pot for research project activities (in green) and (ii) the required in-kind funding for coordination and management activities of Infravation as a whole (in blue).

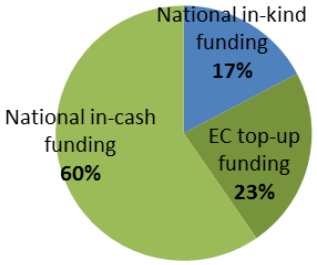


Figure 2. Composition of Infravation's budget

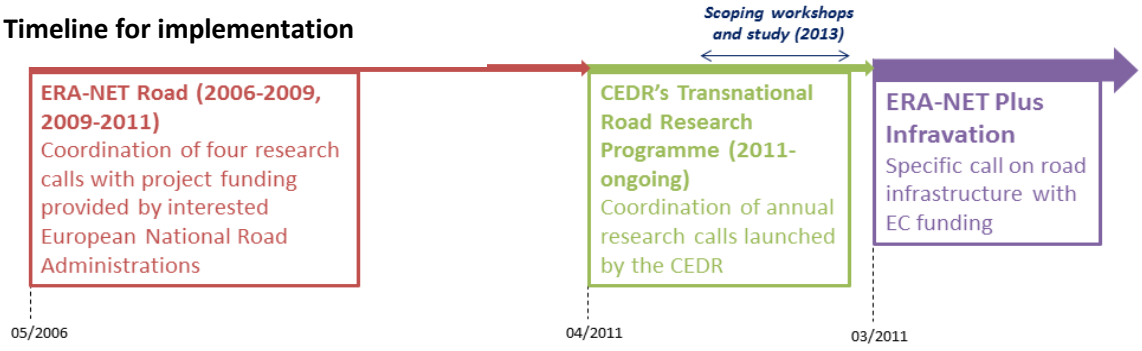
Source: Interview

The timeline below (Fig. 3) indicates that a first research network on roads (ERA-NET Road) was set up by the Conference of European Directors of Roads (CEDR) and co-founded by the EC. Afterwards, approximately **three years were necessary to prepare the Infravation 2014 Call**:

- First, CEDR launched a transnational research programme, through which National Road Authorities gathered annually to define common research priorities and indicate the extent of financial contributions the could provide towards a real common pot supporting the launch of a joint call. The first two years of this programme served as a "trial" for Infravation.

- Second, a scoping study was carried out by experts in close collaboration with potential Infravation partners and stakeholders and the EC in order to jointly set more specific research priorities to be addressed in the Infravation Call. The scoping phase was facilitated by the organisation of workshops in participating countries and scanning tours (especially in the United States). The Infravation Scoping Document is the output of this scoping process.

Figure 3. Timeline for implementation



Source: Infravation Description of Work

[7] Presentation Peter Wilbers Brokerage Event March 2014

3. Principal outputs to date

Infravation is a relatively recent ERA-NET Plus and all funded projects are still on-going. The expected key outcomes of Infravation research projects are listed in Annex 1 and demonstrate the potential for knowledge creation and innovation in the field of road infrastructure. So far, Infravation has organized several events: Road Infrastructure-Innovation Expo (June 2013), Call Information and Brokerage Event (March 2014), Kick-Off Meeting (November 2015). It has also participated in major scientific events in the field of transport and innovation.[8]

4. Overall strengths of this tool, including key achievements

The ERA-NET Plus Infravation offers many benefits, especially as it has adopted a real common pot mechanism which facilitates an integrated and centralised approach to its implementation and management.

4.1 Financial alignment through an innovative central funding mechanism

The **real common pot** approach has enabled participating countries to **pool their resources in order to collectively tap into new innovations at a lower cost** than if they had had to do so individually at the national level. The use of a real common pot approach is particularly suited in the case of Infravation as it involves national road authorities as funding providers. Such agencies have a longer-term budget allocation compared to traditional research funding organisations (i.e. two to four years) and can better anticipate cash flows in the future. The real common pot approach offers many benefits:

(i) It enables **full spending of the funding pot**: unlike a virtual common pot, there is no need to negotiate committed budgets at national level to fill in a potential resource gap associated with the lack of national funding of a research organisation, hence endangering the feasibility of a selected research project. With a real funding pot, a maximum number of joint projects are funded based on the total available programme budget and does not depend on the availability of national sub-budgets. Hence, the real common pot approach allows for the maximum use of national resources.

(ii) Infravation's funding mechanism provides a **clear picture of the budgetary situation**: in the case of a budget raise, it is easy to know how much is available to fund additional projects (and if necessary, how much more should be negotiated to complete the budget). In case of a budget cut, it is also clear which projects will be impacted. Indeed, the real common pot approach allows to follow the ranked list of potential projects, as it is **independent from specific national commitments**. In the case of Infravation, the centralised negotiation for additional funding enabled to finance two additional projects, hence nine projects in total instead of only seven.

(iii) **Infravation has allowed to go beyond the desire for a fair return on investment ("juste retour") at the national level**: compared to the virtual common pot approach, the return on investment per country is not visible and cannot be easily calculated. In fact, Infravation partners have agreed on a common goal, which is to aim for a **return on investment on total project resources**, and not on committed national budgets. This reflects their long-term shared interest, which is to collectively implement future procurement activities through joint infrastructure projects. Thus, Infravation projects serve as feasibility and demonstration tests for future common road infrastructures.

The implementation of Infravation's real common pot was made possible thanks to advanced collaboration and **time invested in discussing common benefits of adopting such an approach**. Indeed, discussions regarding this funding mechanism were initiated by ERA-NET Road (FP6 and FP7 ERA-NET) approximately four years before the official launch of Infravation. Persuading funding providers of going beyond a fair return on investment was particularly challenging. Hence, the leadership of a funding organisation that is strongly convinced of the benefits of such an approach is required in order to achieve such a change of mindset.

In practice, CEDR's Transnational Road Research Programme paved the way for Infravation as it served as a two-year trial for the organisation of transnational calls which relied on a real common pot and a "delegation

[8] Transportation Research Board Annual Meeting 2014-2015-2016, Transport Research Arena 2014-2016, FEHRL Infrastructure Research Meeting 2015, European Road Transport Research Advisory Council plenary meetings 2015-2016.

coordination"[9] approach (see Section 4.2). Infravation has followed this successful example and is one of the first ERA-NETs Plus to have implemented a real common pot with funding rules specific to the ERA-NET Plus. It hence consists in a pilot experiment**.** Infravation partners have collectively designed and agreed on *new common* funding rules which do not deal with national rules and suit the **profile of funding providers** (i.e. national road authorities, and not research funding organisations). In particular, established funding rules refer to procurements to invest in infrastructure, and not to subsidies for research which are governed at national level.

4.2 Centralised procedures and the "delegation of responsibility"

The existence of a real common pot also brings many benefits at the operational level. Indeed, the **delegation of responsibilities to a single entity** is a requirement when applying a real common pot. As Rijkswaterstaat was a driving force of the project, it was willing to cover most of the coordination and management costs through a significant in-kind contribution in order to demonstrate the effectiveness and benefits of such an approach. In particular, it was appointed as contracting and funding body. However, not all countries were initially favourable to this suggestion as this triggered money transfers across borders. A rigorous monitoring of the spent budget has been set up in order to regularly report to all partners and gain their trust on the use of the available funding. This has revealed itself to be very beneficial to the operation of the programme. Thanks to centralised and time-saving procedures carried out by Rijkswaterstaat, transaction costs related to programme management have been minimised at national levels. In particular, this "delegated" model has led to the establishment of only one funding contract per project instead of different national contracts for each country represented in a given project consortium. This has provided **greater simplicity and transparency** for project coordinators and applicants as the funding procedures are standardized and centralised for all participating countries. Also, Infravation has put in place an online tool which has facilitated not only the proposal submission, but also the evaluation and monitoring of funded projects.

The joint preparation of the call included the collective drafting of the Guide for Applicants, which was simplified thanks to the collective agreement on and adoption of new common general eligibility and funding criteria (see Section 4.1) which fully satisfied FP7 requirements. This allowed to address the problem of inter-operability, unlike in many cases where national rules also govern eligibility criteria for the funding of transnational research.[10] Regarding scientific expectations, clear guidance was also provided to applicants thanks to the advice of the Scientific Panel and the scoping efforts preceding the preparation of the call. The **effective dissemination of the call** was ensured by (i) a large advertisement amongst relevant European and international networks, stakeholders and research organisations, and (ii) the brokerage event organised during the launch of the call.

Infravation's central selection process consisted of a two-step procedure with **common evaluation criteria and guidelines**. Hence, **countries waved off their national requirements for eligibility checks and evaluation of projects**. The first step of the evaluation of light project proposals was jointly led by national experts chosen by the Infravation Steering group members. The second step consisted in the assessment of full proposals of the projects which had been selected in the first phase. This evaluation was jointly carried out through peer-review by an independent panel of international experts, ensuring that no conflict of interests could interfere with the common evaluation of projects.[11] After an initial remote evaluation, international experts all gathered at a Joint Consensus Meeting facilitated by the Infravation Management Group in order to jointly establish a single ranking list of projects. This list was then validated by the Infravation Steering Group and the EC.

Regarding the monitoring of Infravation projects, a common set of procedures towards the central funding body has been put in place. There are no double reporting requirements at national level, hence substantially reducing the administrative effort of project coordinators and participants. The monitoring of the quality of projects is also

[9] Investments in JOint and Open REsearch Programmes and analysis of their economic impact (JOREP) – Final Report (2013)

[10] Insufficient inter-operability between various national rules and procedures for funding and executing research has been identified in the Typology Report (ERA-LEARN 2020 Task 4.1) as a key challenge to alignment.

[11] The peer-review is a mandatory for ERA-NETs Plus and ERA-NETs Cofund.

continuously supervised by the Infravation Programme Coordination Group, which allows for synergies between projects and facilitates the coordination of the Infravation programme as a whole.

4.3 Facilitated joint knowledge transfer and dissemination of results

All project results will be accessible to Infravation funding partners for their own use. This collective agreement on **open access to Infravation results** will contribute to the overall strategic aim of reducing fragmented and duplicated research efforts at national level, and effectively implement transnational innovations. This is also consistent with the EC's strategic priority on "Open Science".[12]Moreover, Infravation has given priority to broad communication with stakeholders and the wider scientific community for effective dissemination and application of results (e.g. participation in standardization efforts, information and advice to policy-makers, establishment of new partnerships with road managers and especially with Small and Medium-sized Enterprises for the exploitation of innovations developed and demonstrated in Infravation projects[13]). This is achieved in particular through major external conferences, national workshops jointly carried out, newsletters, the maintenance of a website and the publishing of articles (e.g. in FIRM).

4.4 Strong linkages with other research networks and programmes

Infravation has established a strong link with the EC in order to ensure the complementarity and avoid duplication with other FP7 and H2020 research projects. This is also fostered through significant interactions with Infravation stakeholders and other projects and associated programmes (e.g. CEDR, U.S. programme Every Day Counts). Infravation builds on and complements several related research networks, programmes and projects in order to foster synergies and build on their already existing transnational cooperation, especially as there is an overlap of partners with many related initiatives. For example, several countries involved in the Forever Open Road (FOR) Programme launched by FEHRL are also participating in Infravation.

Infravation also takes into account lessons learnt by the ERA-NET Road and by CEDR's Transnational Road Research Programme, in terms of alignment at strategic, financial and operational levels. Indeed, these networks are experienced in the implementation of transnational cooperation activities. Over time, they have elaborated best practices especially (i) for jointly defining common research priorities, (ii) applying a real common pot approach for the funding of research projects (see Section 4.1) and (iii) jointly disseminating outcomes. In addition, the ERA-NET Transport brings in its experience in implementing transnational calls on EC grant scheme as it is the founding father of many ERA-NETs Plus such as Electromobility+ and Infravation.

4.5 Promotion of alignment of research beyond the EU

The Infravation call is noteworthy as it involves the **participation of non-EU partners** such as Israel (FP7 Associated Country) and USA, hence contributing to the coordination of national research programmes beyond the EU. As a result, seven of the nine projects include U.S. participants, and three of them are coordinated by a U.S. entity.[14] More generally, the Infravation Consortium decided to also open the call to all EU27 and FP7 associated countries, increasing as such the international visibility of the programme.[15] As explained in Section 2.4, a scoping study had been carried out, which had led to the **joint identification of 7 transnational challenges** (see Annex 1) and the need for *transnational* collaboration to address them in an effective way.

4.6 Support of near-market ready research to promote innovation

Infravation promotes **scientific excellence** as its real common pot approach allows the best expertise to be used, regardless of nationality and potentially associated budget constraints. Moreover, the Infravation call seeks to **support transnational near-market ready research** in the field of infrastructure for road transport. This includes (i) laboratory testing of integrated systems (close to the potential system that would be marketed) in simulated

[12] https://ec.europa.eu/programmes/horizon2020/en/h2020-section/open-science-open-access

[13] Infravation innovations could for instance be further developed via the EUREKA Eurostars programme which is dedicated to support R&D performing SMEs in developing marketable products, processes and services.

[14] FHWA R&T Now, November/December 2015

[15] Infravation Description of Work

environment, (ii) verification of prototype systems through a demonstration in an operational environment and (iii) removal of engineering or manufacturing risks for market uptake. Infravation hence facilitates the implementation of infrastructure related innovations resulting from associated research projects for road construction and maintenance. The call encourages innovations from the private sector as firms may have difficulties in allocating their resources to R&D projects while they are aware of the existence of a potential market for their newly developed technology or process.[16]

5. Overall limitations with this tool, including difficulties encountered during implementation

As the Infravation programme has recently been launched, the main difficulties concern the first stage of its implementation, which pertains to the application procedures and the funding and selection of projects.

5.1 Legal issues with EC application procedures and the real common pot approach

Grant Agreements established with selected project consortia and related general conditions are based on EU law in order to guarantee eligibility for EC top-up funding. However, this can lead to legal difficulties when these general conditions do not suit national rules of other participating countries. In the case of the US, some applicants were hindered in their application procedure. Eventually, only one project was really problematic as it could not be coordinated by a US coordinator. A coordinator from another country had to be chosen.

This type of difficulty can be avoided thanks to clearer communication from the Infravation research project coordinators to their consortium partners from the very beginning of the application procedure (especially with participants from non-EU/non-Associated countries). Indeed, the initial negotiations are focused on the content of the proposals. The legal issues were addressed later, which increased the risk of encountering major hurdles at the very end of the negotiation and consortium building process.

Furthermore, some countries or institutions required the demonstration of fair return on investment at national/regional level, which goes against the principle of a real common pot. In most instances, the creation of new funding requirements specific to the ERA-NET Plus Infravation enabled to address this problem (see Section 4.1). However, one applicant from a Spanish region could not participate in the end because this funding mechanism was explicitly not allowed by regional rules and this issue could not be worked around. In addition, the EC top-up mechanism, which is based on the virtual common pot approach, seemed not entirely suited to the real common pot approach.

5.2 Variation in the financial support for non-Eurozone project partners

The depreciation of the Euro vs. the US Dollar de facto meant that some US project partners suffered from significant budget cuts. Indeed, the US applicants' initial request for funding was in Euro yet the funding received in Euros and then converted into Dollars was lower than the initial estimation.

5.3 Costly evaluation of light proposals

The evaluation of light proposals cost similar efforts as for full proposals due to demanding requirements, which included relevance and quality of the proposal and of the Consortium as a whole, technical capacity, competence and financial and legal eligibility of applicants[17] (See Section 2.2 for call process). However, it should be reminded that Infravation is a pilot programme, which means that applicants and Infravation partners were keen to have excellent light proposals in order to increase the chance of obtaining a top-up EC funding. The Infravation team and applicants also had to convince national funding providers of the quality of the programme and associated programmes in order to benefit from their financial support. This initial negotiation procedure can only occur during the first phase of the call (i.e. at the light proposal stage), which means that the light proposals were indeed more detailed than typical light proposals. Now that Infravation has proven the effectiveness of its selection process, it has gained trust from national funding providers and the EC. Hence, the up-scaling of such a programme would probably be less challenging in terms of requirements for light proposals.

[16] FIRM Issue 1 November 2012

[17] Infravation Description of Work

6. Conclusions: Suitability and key factors of success

The central common pot approach for the funding of transnational research activities allows to pool national financial contributions and to optimally use the latter towards the implementation of a common transnational research programme. It can also be applied for larger budget volumes. It is in fact the only funding mechanism which enables full spending of the available national financial contributions hence allowing to fund the maximum number of joint research projects, **regardless of commitments at national level.** In addition, it allows to **lower transaction costs** thanks to centralised programme and project management. The **profile of the funding providers** greatly influences the feasibility of adopting a real common pot approach. In addition, the **pre-existing cooperation** between involved partners is vital to the success of this approach in order for them to realise the benefits of going beyond the notion of "juste retour".

Key factors of success:

1) At strategic level:

- **Clearly define the scope of the call** by building on networking activities and jointly identify **common research priorities.** This scoping process enables partners to identify specific needs for transnational cooperation and provide clear guidelines to applicants regarding scientific expectations.
- **Build on already existing research and innovation projects, programmes and networks**: beyond the scope of the call, this allows to identify relevant stakeholders to be involved in the programme and to effectively foster meta-level cooperation and strategic alignment across various related initiatives, hence contributing to strengthening the European Research Area.

2) At financial level:

- **Establish the conditions for the acceptance of a real common pot approach** (e.g. trust building, past cooperation, common understanding of the benefits of such an approach, etc.).
- **Build on past experience in the use of a real common pot:** best practices developed regarding this approach support the joint definition of a centralised funding mechanism.
- **Appoint a single contracting and funding body and define common funding rules which suit the profile of national funding providers:** this is essential for the application of a centralised funding distribution. In particular, this allows to overcome inter-operability issues between national rules and provides greater simplicity and transparency for applicants and funding providers at national level.
- **Anticipate and clearly communicate about legal issues and general conditions** at the very beginning of the application procedure, especially regarding the adoption of a real common pot approach: this enables to avoid major hurdles for applicants, who need to comply both with national/regional and ERA-NET Plus/common pot rules.
- **Secure funding (in-cash or in-kind) for all management and networking costs**: these activities are essential for an effective centralised running of the programme.

3) At operational level:

- **Implement a structured and centralised governance and management model** for efficient strategic decision-making and project management (centralised preparation of the call, proposal evaluation and project monitoring).
- **Facilitate an integrated coordination of projects** funded by the ERA-NET Plus in order to enhance synergies among projects of the research programme and with other related programmes or initiatives, and enhance the coherence ad visibility of the transnational research programme as a whole.
- **Effectively disseminate project outcomes** and, particularly if the programme is focused on market-ready research, **timely anticipate the innovative solutions** resulting from the research and innovation projects by preparing organisations and structures that can implement and upscale them afterwards.

REFERENCES

Literature

European Commission (2013). *WORK PROGRAMME 2013 - COOPERATION - Theme 7: Transport (including Aeronautics)*. Available at: https://ec.europa.eu/research/participants/portal4/desktop/en/opportunities/fp7/calls/fp7-sst-2013-rtd-1.html

European Commission (2013). *HORIZON 2020 WORK PROGRAMME 2014 – 2015. 11. Smart, green and integrated transport*. Available at: http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/main/h2020-wp1415-transport_en.pdf

European Commission (2016). *Periodic Report Summary 1 - INFRAVATION (ERA-NET Plus on Infrastructure Innovation)*. Available at: http://cordis.europa.eu/project/rcn/111269_en.html

Federal Highway Administration. *FHWA R&T Now*. Issue of November/December 2015. Available at: http://www.fhwa.dot.gov/publications/rtnow/15nov_dec_rtnow.pdf

FEHRL (2012). *FEHRL Infrastructure Research Magazine (FIRM)*. Issue of November 2012. Available at: http://www.fehrl.org/index.php?m=32&id_directory=7859

FEHRL (2013). *FEHRL Infrastructure Research Magazine (FIRM)*. Issue of June 2013. Available at: http://www.fehrl.org/index.php?m=32&id_directory=7859

FEHRL (2013). *FEHRL Infrastructure Research Magazine (FIRM)*. Issue of November 2013. Available at: http://www.fehrl.org/index.php?m=32&id_directory=7859

FEHRL (2014). *FEHRL Infrastructure Research Magazine (FIRM)*. Issue of December 2014. Available at: http://www.fehrl.org/index.php?m=32&id_directory=7859

FEHRL (2015). *FEHRL Infrastructure Research Magazine (FIRM)*. Issue of July 2015. Available at: http://www.fehrl.org/index.php?m=32&id_directory=7859

FEHRL (2016). *FEHRL Infrastructure Research Magazine (FIRM)*. Issue of January 2016. Available at: http://www.fehrl.org/index.php?m=32&id_directory=7859

Infravation (2014). *Infravation scope - Defining the scope of the Infravation ERA-NET Plus*. Available at: http://www.infravation.net/about

Infravation (2014). *ERA-NET Plus on Infrastructure Innovation – Annex I – Description of Work*.

Infravation (2014). *Transnational call for proposals on ´Advanced systems, materials and techniques for next generation road infrastructure´ - Guide for Applicants* (March 2014). Available at: http://www.infravation.net/about

Infravation (2014). *Update on ERA-NET Plus Infravation 2014 Call process*. Available at: http://www.fehrl.org/index.php?m=32&id_directory=7533

Infravation (2016). *Factsheet – Nine Infravation Innovation Projects*. Available at: http://www.infravation.net/calldocuments

Niehoff, J. (2014). *The ERA-NET scheme from FP6 to Horizon 2020*. Available at: https://www.era-learn.eu/publications/ec-publications/the-era-net-scheme-from-fp6-to-horizon-2020

Reale, E., Lepori, B., Nedeva, M., Thomas, D., Primera, E., Chassagneux, E. and Laredo, P. (2013). *Investments in JOint and Open REsearch Programmes and analysis of their economic impact – Final Report*, European Commission, Directorate General for Research and Innovation. Available at: https://ec.europa.eu/research/innovation-union/pdf/jorep_final_report.pdf

Presentations

Benedetti, A. (2015). Presentation of the project SHAPE at the Infravation Kick-off Event (November 2015). Available at: http://www.fehrl.org/index.php?m=32&id_directory=7886

Bertola, F. (2015). Presentation of the project SEACON at the Infravation Kick-off Event (November 2015). Available at: http://www.fehrl.org/index.php?m=32&id_directory=7886

Bird, W. (2014). Presentation *"EC Views on the Issue of Road Infrastructure Innovation"* at the Information and Brokerage Event (March 2014). Available at: http://www.fehrl.org/index.php?m=32&id_directory=7613

Birkner, C. (2015). Presentation *"ERA-NET Plus Infravation Guidelines for a successful dissemination plan"* at the Infravation Kick-off Event (November 2015). Available at: http://www.fehrl.org/index.php?m=32&id_directory=7886

Breslin, L. (2015). Presentation *"Road Infrastructure Research & Innovation - from Infravation to tomorrow"* at the Infravation Kick-off Event (November 2015). Available at: http://www.fehrl.org/index.php?m=32&id_directory=7884

Emmanuel, C. (2015). Presentation of the project BioRePavation at the Infravation Kick-off Event (November 2015). Available at: http://www.fehrl.org/index.php?m=32&id_directory=7886

Goger, T. (2015). Presentation *"ERA-NET Plus Infravation - Communication, dissemination and outreach of project results"* at the Infravation Kick-off Event (November 2015). Available at: http://www.fehrl.org/index.php?m=32&id_directory=7884

Haghani, R. (2015). Presentation of the project SUREBRIDGE at the Infravation kick-off event (November 2015). Available at: http://www.fehrl.org/index.php?m=32&id_directory=7886

Indacoechea, I. (2015). Presentation of the project HEALROAD at the Infravation kick-off event (November 2015). Available at: http://www.fehrl.org/index.php?m=32&id_directory=7886

Infravation (2013). Presentation *"Road Infrastructure Innovation Expo"*. Available at: http://www.fehrl.org/index.php?m=32&id_directory=7402

Jonsson, J. (2014). Presentation *"Thematic Scope of the Infravation 2014 Call"* at the Information and Brokerage Event (March 2014). Available at: http://www.fehrl.org/index.php?m=32&id_directory=7613

Kuehn, D. and Petros, K. (2015). Presentation *"Implementation"* at the Infravation Kick-off Event (November 2015). Available at: http://www.fehrl.org/index.php?m=32&id_directory=7884

Martinez-Garcia, M. (2014). Presentation *"A National Funding Provider's View on the Infravation Initiative"* at the Information and Brokerage Event (March 2014). Available at: http://www.fehrl.org/index.php?m=32&id_directory=7613

Neithalath, N. (2015). Presentation of the project ECLIPS at the Infravation Kick-off Event (November 2015). Available at: http://www.fehrl.org/index.php?m=32&id_directory=7886

Pascual, P. (2015). Presentation of the project AlterPave at the Infravation Kick-off Event (November 2015). Available at: http://www.fehrl.org/index.php?m=32&id_directory=7886

Prévost, T. (2015). Presentation *"Expectations from the funders"* at the Infravation Kick-off Event (November 2015). Available at: http://www.fehrl.org/index.php?m=32&id_directory=7884

Rijkswaterstaat (2016). *Infravation – lessons learnt* (April 2016).

Sacks, R. (2015). Presentation of the project SeeBridge at the Infravation kick-off event (November 2015). Available at: http://www.fehrl.org/index.php?m=32&id_directory=7886

Segarra, M. (2015). Presentation *"The Industry Perspective*" at the Infravation Kick-off Event (November 2015). Available at: http://www.fehrl.org/index.php?m=32&id_directory=7884

Stephan, M. and Doerr, D. (2014). Presentation *"Proposal Preparation and Submission"* at the Information and Brokerage Event (March 2014). Available at: http://www.fehrl.org/index.php?m=32&id_directory=7613

Wilbers, P. (2014). Presentation "*Welcome and Introduction"* at the Information and Brokerage Event (March 2014). Available at: http://www.fehrl.org/index.php?m=32&id_directory=7613

Wilbers, P. (2015). Presentation *"Infravation programme"* at the Infravation Kick-off Event (November 2015). Available at: http://www.fehrl.org/index.php?m=32&id_directory=7884

De Wilde, H. (2015). Presentation at the Infravation Kick-off Event (November 2015). Available at: http://www.fehrl.org/index.php?m=32&id_directory=7884

De Winne, P. (2015). Presentation at the Infravation kick-off event (November 2015). Available at: http://www.fehrl.org/index.php?m=32&id_directory=7884

Zalbide, M. and Murcia-Delso, J. (2015). Presentation of the project FASSTbridge at the Infravation kick-off event (November 2015). Available at: http://www.fehrl.org/index.php?m=32&id_directory=7886

Consulted websites

AlterPave: http://www.giteco.unican.es/proyectos/ALTERPAVE/index.html

CEDR: http://www.cedr.fr/home/

FASSTbridge: http://fasstbridge.eu/

FEHRL: http://www.fehrl.org/

HEALROAD: http://healroad.eu/

Infravation: http://www.infravation.net/

SEACON: http://seacon.um-sml.com/

SeeBridge: http://seebridge.net.technion.ac.il/

SUREbridge: http://surebridge.eu/

TRA: http://www.traconference.eu/

Interview

Peter Wilbers: ERA-NET Plus Infravation Coordinator (Rijkswaterstaat)

ANNEX 1. ADDITIONAL INFORMATION CONCERNING THE INFRAVATION CALL

Infravation has adopted a work plan which reflects the core objective of implementing a joint transnational call in compliance with EC´s rules for ERA-NET Plus actions. The core activities are:

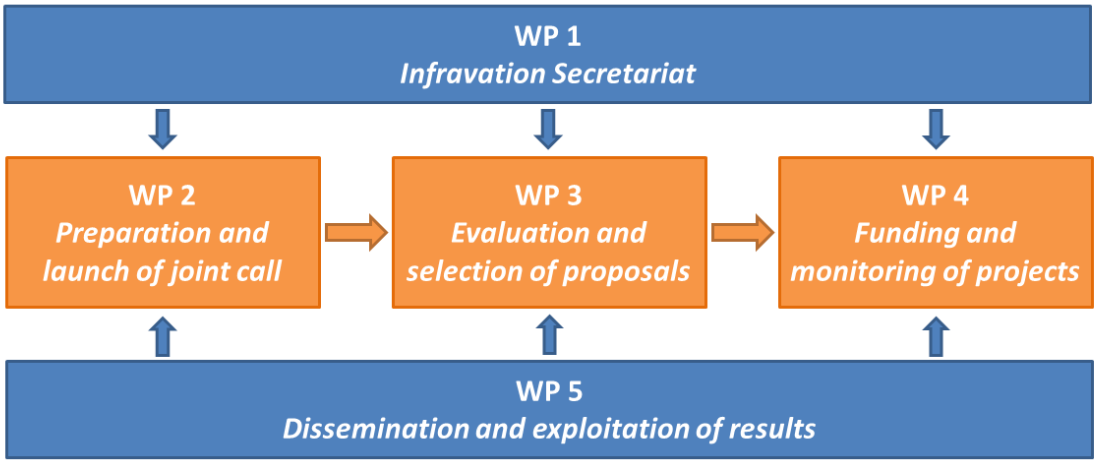
- Launch of the joint call including announcement (WP 2)
- Joint evaluation and selection of projects to be funded (WP 3)
- Joint monitoring of transnational projects (WP 4)

These are supported by two cross-cutting activities related to the joint call implementation:

- Dissemination and exploitation of results (WP 5)
- Infravation Secretariat (WP1)

Work Package 6 (Project Management) deals with management activities of the ERA-NET Plus call and the contractual and financial obligations related to the EC Grant Agreement.[18]

Figure 1. Scheme of Infravation's work plan



Source: Infravation Description of Work

The submitted proposals were required to address at least one of the seven challenges identified thanks to the scoping study (see Table 1). Regarding the project selection (WP 3), the second evaluation stage was under the responsibility of an independent panel of international experts on road infrastructure innovation. A joint consensus meeting took place end of March 2014 in order for them to jointly evaluate and rank proposals. It was followed by the Infravation Steering Group meeting for the final approval of selected joint research projects.

Table 1. Infravation Challenges addressed by research projects (in red)

Challenges	Projects								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
A. Advanced predictive infrastructure performance processes									
B. Enhanced durability and life-time extension									
C. Rapid and non-destructive methods for routine quality and performance checks of materials and construction									
D. Keeping freight routes open through zero-intrusive maintenance									
E. Ensuring infrastructure performance under all weather conditions									
F. Resource and energy efficiency in road construction and maintenance									
G. Virgin material reduction by substitution or recycling									

Source: Presentations of Infravation projects at the Kick-Off Meeting (November 2015)

[18] Infravation Description of Work

The expected key outcomes of Infravation research projects are listed below (Table 1) and demonstrate the potential for knowledge creation and innovation in the field of road infrastructure.

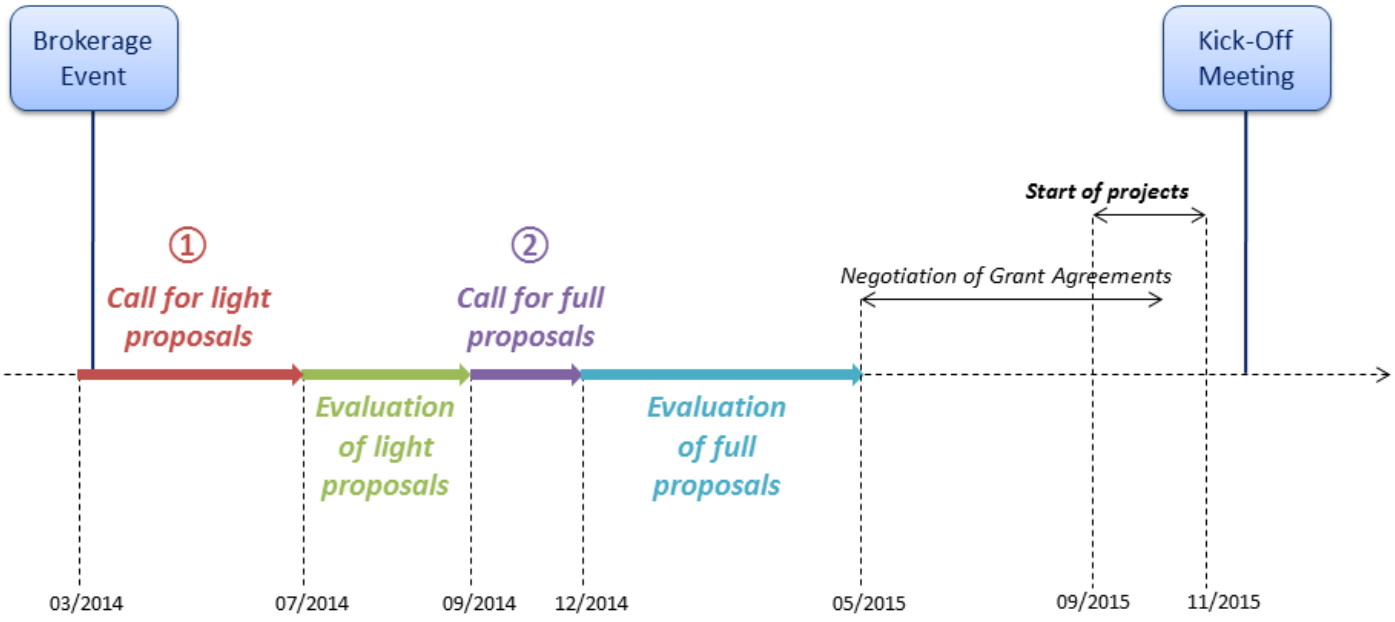
Table 2. Expected outcomes of Infravation projects

Project name	Main outcomes
(1) ALTERPAVE	Demonstration of the technical and economic feasibility of increasing the use of recycled materials, by-products and alternative materials for road pavements
(2) BIOREPAVATION	Demonstration of innovative recycling techniques of pavements by using alternative road binders made of bio-materials
(3) ECLIPS	Development of durability-enhancing components of concrete in road infrastructure by diminishing its sensitivity to varying temperature conditions
(4) FASSTBRIDGE	Development of a methodology to assess and prevent steel bridge fatigue and of a preventive strengthening system to extend life-time of steel-bridges
(5) HEALROAD	Development of a cost-effective self-healing technique to increase road durability
(6) SEACON	Demonstration of a sustainable technique for concrete production with seawater and salt-contaminated aggregates
(7) SEEBRIDGE	Development of a bridge information model which provides most of the information needed for decision-making concerning the repair, retrofit or rebuild of a bridge
(8) SHAPE	Development of a long-term monitoring device of bridges through non-destructive testing
(9) SUREBRIDGE	Improvement and demonstration of a refurbishing technique for bridge maintenance

Source: Infravation website; project websites

The timeline below (Fig.2) indicates that about a year and a half were required after the official publication of the Infravation 2014 Call in order to launch the research projects selected through the two-step evaluation procedure.

Figure 2. Timeline for launch of the Infravation call and associated projects



Source: Presentation "Proposal Preparation and Submission" for the Brokerage Event (March 2014), FIRM Issue of June 2015

ANNEX 2. OTHER EUROPEAN RESEARCH INITIATIVES AND NETWORKS RELATED TO INFRAVATION[19]

Infravation is well-embedded in the landscape of road research and the Consortium builds on the knowledge and lessons learnt from previous and on-going trans-national cooperation initiatives in the field.

CEDR's Transnational Road Research Programme and ERA-NET ROAD

The Transnational Road Research Programme is the research mechanism developed by the Conference of European Directors of Roads (CEDR) from the previous FP6 and FP7 ERA-NET ROAD (ENR) projects. CEDR experts representing the National Road Authorities meet annually through their Technical Group on Research to decide research priorities for the coming year. These are delegated to the Transnational Programme Meeting (TPM). Based on these priorities, nominated experts develop a Description of Research Need. Using the method developed under the ENR project, road authorities commit budget to a real common pot for the launch and subsequent funding of a call. A single road authority volunteers to lead this call, which is then run according to their national procurement rules. CEDR has launched one such call following the previous four calls run during the ENR projects. The TPM is responsible for ensuring the coordination of dissemination results from the different projects undertaken. Infravation has direct access to the TPM to ensure that all appropriate synergies are exploited.

ERA-NET TRANSPORT and ERA-NET Plus Electromobility+

ERA-NET TRANSPORT (ENT) is a cooperation network of owners and managers of national research funding programmes, which started in 2004 under the FP6 ERA-NET scheme. Besides the implementation of small- and medium-sized transnational calls, ENT aims to complement and step up the level of cooperation among the participating national transport research programmes by means of an ERA-NET Plus call. ENT has supported the preparation of the "Electromobility+" transnational funding initiative, set up as a joint call of national and regional programmes representing 13 European countries under the FP7 ERA-NET Plus scheme. The Electromobility+ call has been successfully launched in December 2010 and is one of the biggest ERA-NET Plus initiatives from FP7. Infravation cooperates with both ENT and ERA-NET Plus Electromobility+, in order to build on their experiences in the preparation, implementation and monitoring of large-scale transnational calls, particularly related to the ERA-NET Plus scheme. Infravation considers the lessons learnt from the previous ERA-NET calls and, moreover, is going ahead with the level of cooperation as compared to Electromobility+ by applying a real common pot model for funding. In doing so, there is the possibility for mutual learning between Infravation, Electromobility+ and ENT. The close exchange of information and experience is ensured by the overlap in partners. In particular, the coordinators of ENT and Electromobility+ are also involved in Infravation and build the natural links to best practice knowledge.

FEHRL's Forever Open Road (FOR) programme

In 2010, FEHRL initiated the Forever Open Road (FOR) programme as the core of its Strategic European Road Research Programme V (SERRP V). The FOR programme works towards a next generation of advanced and affordable roads that can be adopted both for maintaining the existing network and building new roads. This will enable future road operators to adopt emerging innovations, whilst overcoming the increasing constraints on capacity, sustainability, reliability and integration. The overall aim is to facilitate the future mobility needs of 21st century society. The SERRP document itself was derived from an extensive and detailed evaluation of the objectives of the Transport White Paper 'Roadmap to a Single European Transport Area - Towards a competitive and resource efficient transport system' and the associated documents and working papers. This specifically addressed all the relevant issues for infrastructure. In delivering the FOR programme, cooperation is linked to a number of 'sister' National Programmes with shared aims and goals. Infravation builds on the existing knowledge and means of cooperation developed between these related programmes as the respective countries are also involved in Infravation (Germany, Norway, Netherlands, USA and France).

[19] Infravation Description of Work

ANNEX 3. EVOLUTION OF THE ERA-NET TOOL UNDER FP6, FP7 AND H2020

Under FP6

The EU 6th Framework Programme (FP6) launched a research funding scheme called ERA-NET (European Research Area Networks) in order to support transnational coordination, networking and collaboration of national research agendas and programmes in different thematic areas of research. The ERA-NET scheme aims at giving a framework for capacity building through knowledge sharing and identification of good practices within a specific research community (e.g. via joint trainings and workshops) as well as strategic alignment through the joint elaboration of research agendas (e.g. via meetings with national representatives) and operational alignment, especially through the design of joint calls.

Under FP7

However, the FP6 ERA-NET scheme was only focused on supporting coordination and networking activities and did not allow for direct EC co-funding of joint research activities. Therefore, an additional module was created under the 7th Framework Programme (FP7): this new tool, the ERA-NET Plus, was implemented in parallel of the first ERA-NET scheme and allowed the European Commission to co-fund joint transnational calls for research projects on specific subjects. This allowed for a significant increase of the average budget per transnational call launched under an ERA-NET (from 8 M€ with an ERA-NET to 19 M€ with an ERA-NET Plus).

Under Horizon 2020

For more overall consistency and simplification, both tools (ERA-NET and ERA-NET Plus) were merged under Horizon 2020 into one single funding scheme called ERA-NET Cofund: this latter mainly consists in the co-funding of a joint transnational call by the EC on a specific large-scale research topic of high value at the European level and can also support networking activities around the joint call.

Source: The ERA-NET scheme from FP6 to Horizon 2020 (J. Niehoff, 2014)