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Executive summary

The Annual Joint Programming Conference 2016 focused on "Impacts of Public-Public Partnerships - expectations and experiences". The objective was to raise awareness and collect evidence of outcomes and impacts of P2Ps at European and national level. The 2-day conference attracted more almost 400 policy makers and research funders in Europe, together with related stakeholders (GPC members, JPI representatives, ERA-NET coordinators and participants, representatives from Art.185, ETP, JTI, etc).

Following the positive experiences from past events the programme offered a mix of plenary sessions, including overview presentations which provided a common forum for all participants. The conference also included interactive workshops around key issues and challenges surrounding public-to-public (P2P) partnerships and identified evidence of impacts, success factors, and good practices.

P2Ps represent a shift in the devolving governance of research and innovation policy. There is something new that needs to be studied and understood within changing European and national R&I policy environments. Assessing their impact has become extremely important but it is not something straightforward. Taking the EC Framework Programme as an example, long term analysis of impacts demonstrates the importance of social and organisational impact and those are impacts that we can expect in P2Ps, i.e. way beyond the normal scientific, technical and industrial outputs. However, the documentation around P2Ps includes a vast variety of processes, rules and governance and our methods for understanding agenda setting are poorly developed. At the same time impacts from research may take 20 or even 50 years to become visible thus necessitating a long-term perspective in P2P impact assessment.

The main messages of the conference discussions can be summarised as follows.

Assessing P2P impacts

The interim evaluation of Horizon 2020 and the formulation of the forthcoming framework programme provides the policy background at the national and EU level for demonstrating impacts from P2Ps. Despite differences across the different types of P2Ps (JPIs, Art 185s, ERA-NETs, EJPs, ERA-NET Cofund, etc.) a common impact assessment framework as suggested by ERA LEARN 2020 covering both the network and project levels is feasible as well as desired. The conference discussions provided a wealth of suggestions and recommendations in order to further work in this direction.

Impacts should be examined at both the network and project levels as well as at national/European/ International levels, addressing both short-term and long-term perspectives as well as the needs of all relevant stakeholders (researchers, policy and business communities, civil society). Visible Impacts could be demonstrated on effective stakeholder involvement from the outset. A variety of communication means should be deployed to reach the diverse audiences in appropriate ways to increase visibility of impacts.

Challenges for impact assessment are acknowledged, notably as some impacts (as in the area of health) may occur with a long-term time lag after the launch of a P2P. The research sectors addressed also need to be accommodated in a P2P impact assessment framework. Exchanging experiences and spreading of good practices is important. While ERA-LEARN 2020 can and should facilitate this, P2Ps should resume their proper responsibility.

P2P expectations and achievements

Although overall P2Ps seem to share a common orientation, i.e. structuring the ERA and dealing with societal challenges by joining resources and aligning strategies, they present a variety of expectations.

P2Ps have managed to mobilise and connect substantive resources across Europe and the world. A great deal has been achieved especially in terms of enhancing transnational collaboration of research. The numerous P2P cases that were discussed over the two days of the conference provided clear evidence of impressive outcomes and a variety of impacts that go beyond 'rate of return' interests but were considered equally important. The audience acknowledged the value of the different impacts achieved that range from influencing the national and European or even international policies, to making national R&I systems more effective through coordination and alignment, as well as to producing new services and products thus increasing competitiveness of European industries. It is important to document the wealth of impact evidence to inform decision-making at both the European and national levels.

Future of P2Ps

P2Ps need a more strategic approach led by Member States (MS) in collaboration with the European Commission (EC); their role needs to be increased in formulating the forthcoming Framework Programme's topics. The future design of P2Ps should shift from being instrument-driven to a more challenge/objective-driven approach. A strategic continuation of successful P2Ps with strong commitments from MS might be one way forward. Simultaneously, the missions and overall aims of P2Ps need to be revisited in order to manage expectations.

The P2P landscape needs to be streamlined by establishing synergies among P2Ps in similar areas but also by deciding on the life cycle of P2Ps and possible entry-exit criteria. This would facilitate decision-making about the selection of the appropriate P2Ps to join and which new ones can/should be formed. A differentiated approach towards the MS-driven JPIs from the other P2Ps may be valid, although EC support for P2Ps is important in all cases.

A new (policy) narrative needs to be developed for P2Ps that is underpinned by evidence/impacts and that will bring science closer to society by pursuing missions related to solving societal challenges. The national Action Plans and ERA Road-maps reflect commitment of the MS and are encouraging in this regard, although the readiness level to get engaged in P2Ps is different across different countries.

The value of P2Ps is highly appreciated although a lot still needs to be done to fully exploit their potential for structuring the ERA. There is a need for action at the national level. Certain R&I national systems may not be ready for P2P engagement. This needs some degree of national coordination and strong commitment.

The conference provided a timely opportunity to the P2P community to inform the interim evaluation of Horizon 2020 and the future of P2P instruments. The conference proceedings will be part of this process. P2P impacts on our societies and economies are among the key elements to consider as these will inform what policies we need to define. The added value of national and European investments in P2Ps needs to be clearly demonstrated. The Joint Programming process seems to be at a crossroads: progress has been made but now we need to compare our achievements with our original goals of openness, excellence and impact.

Introduction

The Annual Joint Programming Conference 2016 focused on "Impacts of Public-Public Partnerships - expectations and experiences". The objective was to raise awareness and collect evidence of outcomes and impacts of P2Ps at European and national level. The sessions organised accommodated discussions on a possible P2P impact assessment framework suggested by ERA-LEARN 2020, which highlighted the diversity of impacts that are made possible through P2P participation. The opportunity was given to participants to exchange views and experiences from the relevant practice thus far and draw possible success factors and guiding principles for future ventures. The main points of the discussions, as documented in the presentations and this report, will be an important contribution also for the Horizon 2020 interim evaluation and prepare for the next Framework Programme. The 2-day conference attracted more almost 400 policy makers and research funders in Europe, as well as related stakeholders (GPC members, JPI representatives, ERA-NET coordinators and participants, representatives from Art.185, ETP, JTI, etc).

Following the positive experiences from past events the programme offered a mix of plenary sessions, including overview presentations which provided a common forum for all participants. The conference also included interactive workshops around key issues and challenges surrounding public-to-public (P2P) partnerships and identified evidence of impacts, success factors, and good practices.[1]

The opening plenary focused on European and national policy makers and their expectations towards P2Ps. Erik Arnold[2] spoke about policy and evaluation challenges of P2Ps. P2Ps represent a shift in devolving governance of research and innovation policy. This has advantages, but also presents dangers. "When you delegate responsibility for programming and project selection to a P2P or a public-private partnership you run the risk that the partnership will run the programme in its own short-term interest, rather than in the interest of society more widely. We have to understand, manage, police and monitor these kinds of principal agent relationships and that is quite difficult." as Arnold noted.

Taking the EC Framework Programme as an example, long term analysis of impacts shows the importance of social and organisational impact and those are impacts we can expect in P2Ps, i.e. way beyond the normal scientific, technical and industrial outputs. However, understanding impact and even more so long-term impact is extremely difficult although extremely important. The documentation around P2Ps includes a vast variety of processes, rules and governance. P2Ps are a common research effort in Europe that sets common agendas among member states. Better alignment leads to increased knowledge outputs, human capital development in areas of importance to Europe, generating competitive advantage and added value. Documenting and measuring all this in terms of impact is not straightforward. Elements like human capital are understudied, while our methods for understanding agenda setting are poorly developed.

Impacts from research may take 20 or even 50 years to become visible depending on the area and type of research. A long-term perspective in impact assessment is crucial. At the same time, P2Ps are also expected to have structural impacts. "They are there to restructure things to some degree and if we are going to evaluate those in a coherent way, then maybe we need to take a life cycle approach to it."

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[1] The agenda is attached as Annex to the present report and can also be downloaded with the presentations from https://www.era-learn.eu/events/annual-joint-programming-conference-2016
[2] Chairman of the Technopolis Group and adjunct professor in research policy at the Royal Institute of Technology (KTH), Stockholm.

Kurt Vandenberghe (DG RTD) recognised that the time is ripe and relevant to assess impacts from P2Ps. Within this frame certain issues may need to be revisited. P2P impacts go beyond rates of return on investment and beyond Key Performance Indicators that we have currently defined. We need to explore a wide range of impacts while asking ourselves what impacts we want to have. We may also need to manage our expectations as they may have been too ambitious. Yet we need to recognise that in the current difficult times of shrinking public budgets, P2Ps are a solution for efficient and effective research organisation and delivery but we do need to create narratives of P2Ps underpinned by impact evidence to create excitement and bring science closer to society.

Taking a national perspective the rest of the panellists echoed the importance of P2Ps in structuring the ERA. Elisabeth Vergès, from the Ministry for Higher Education and Research in France, stressed the importance of having a national strategic view on the use of P2Ps and highlighted the role of P2Ps in preparing future strategies. She concluded that national strategies need to be better linked to the EC Framework Programme. Taivo Raud, from the Ministry of Education and Research, Estonia, noted the challenges that a small economy is facing in participating in P2Ps. These include limited human resources in managing national participation in P2Ps as well as the proliferation of P2Ps that questions their sustainability and makes decisions difficult. However, the value of P2Ps in providing access to additional funding and knowledge is high. Evelina Santa-Kahle from the Federal Ministry of Education and Research, Germany, reminded the audience of the crucial role that P2Ps played over the years since 2008 in enhancing collaboration across different countries and their ministries/agencies. She highlighted the role that JPIs can play as hubs of sectoral policies and the need to create P2P narratives that embrace society-relevant concerns.

The discussion that followed highlighted the need for action at the national level. Certain R&I national systems may not be ready for P2P engagement. This needs some degree of national coordination. Some national organisations such as ANR in France structured their strategies around ten challenges. This facilitated their engagement in P2Ps. Countries such as Estonia set up coordination mechanisms across different ministries to support and facilitate decision-making. Countries such as Germany show significant commitment in structuring the ERA. There is a need to define clearer goals at the national level and communicate them better. At the same time we need to develop a helicopter view on the P2P landscape and define clear criteria and principles for new P2Ps which need to follow lifecycles with entry and exit criteria. To improve exploitation of the P2Ps dynamic the future also calls for improved cross-fertilisation with the EC Framework Programme.

The next sections present the main points of the presentations and discussions that were held in the remainder of the conference sessions. The structure of the report follows to a large extent the conference programme.

Assessing P2P impacts

Below follow the main points that were made during relevant plenary session on Achievements and two parallel sessions addressing impact assessment at the policy/network and at the project level.

While the need for documenting and measuring P2P impacts has been widely acknowledged, impact assessment is not an easy task and faces a number of challenges. The ERA-LEARN 2020 framework for impact assessment of P2Ps that was presented in the second plenary, tries to shed light on the P2P special features and what these mean for impact assessment. P2P instruments come in a variety of shapes and sizes but they are all networks. When evaluating a network we should take into account how decisions are made, who participates and its evolution over time. Impacts should be sought in terms of a chain, in that networks can impact on members, which can in turn impact on their local environmental or at a national or European level. Following a Logic Model approach, as some P2Ps have already done, an evaluation should start by examining what the original challenges and objectives were. These may belong to different types either operational, specific, intermediate or global and span different levels, i.e. from the P2P level, to the national level and then to the cross-national or even European/international policy context. Then, inputs and activities need to be identified, before moving on to outputs, outcomes and global impacts. This requires clear and shared understanding of key concepts and terms. It is also crucial to clearly articulate the assumptions that are inherent in our thinking on how outcomes and impacts will derive from the activities implemented. Apart from identifying impacts, an impact assessment exercise has the mandate to test these assumptions and explain diverse levels of impact achievements to provide useful feedback for improved design of future activities.

Also following a Logic Model approach, the experience under **Art 185 EMRP/EMPIR** emphasised that the importance of a sound system for collecting data for monitoring and evaluation purposes. The different methods applied and sources of data/information for retrieving different types of impacts complemented the presentation. The EMRP/EMPIR case also stressed that there are impact timescales that need to be taken into account and that usually there is an over-focus on achievement of operational objectives rather than the overall global objectives of a P2P. Thus it is usually outputs / outcomes that are measured and demonstrated rather than longer-term impacts. Another point is that the resources need to be ensured for the evaluation/assessment tasks and these are not insignificant and that the P2Ps need to achieve 'buy-in' to data collection processes.

Applying the ERA-LEARN 2020 framework for impact assessment, the next case, the JPI **JPND** presented a diversity of achieved impacts at the project level. In terms of outputs JPND funded 95 projects for a total of €124 m over the 11 calls that have been launched since 2011. These projects present scientific, health-related and training impacts. As an example, the BIOMARKAPD project with 52 partners from 21 countries standardised the sampling and measurement for the biomarkers across most centres in Europe, and identified two new biomarkers. It also produced 135 publications in peer reviewed journals and enabled laboratory training and certification. Further, the work will continue in a European "CSF Society" established by the members of BIOMARKAPD, thus indicating signs of *enduring connectivity* amongst experts and stakeholders in the field.

At the network level, JPND has become well-known and been asked to present results in global policy networks including G7 and international organisations like the World Health Organisation, hence influencing agendas and achieving conceptual impact in relation to policy. Over the years JPND had to show increasing

numbers of participating countries and research teams participating in the joint calls and actions groups, while it managed to create a real common pot to support internal management, thus showing evidence for a more sustainable network. JPND also pursues conceptual and cultural impact in terms of affecting national and international strategies and policies, by applying a wide communication and outreach activities, connecting to relevant associations and strengthening national alignment. JPND envisage bringing structural changes by becoming a major 'tool' for achieving the ERA in the field of neurodegenerative diseases, implementing a stronger global dimension and ensuring multi-annual commitments of partner countries. In this context the necessity was noted for a sustainable structure to increase efficiency, visibility, commitment and leverage effect.

The presentation on the external assessment of M.ERA-NET also applied an input-output-outcome-impact model and applied a user-perspective approach in identifying the types of impacts to examine:

- the network perspective (achievements/facts regarding objectives of the network);
- the research community perspective (comparative attractiveness of funding offer);
- The consortium member's objectives perspective (national benefits from cooperation
- The network management perspective (appropriateness, effectiveness and efficiency of network management)

Selected results of the assessment verified that the projects supported were of high Technology Readiness Levels (TRL) while the network members appreciated the opportunities to learn from each other in relation to innovation programming and noted that the **M.ERA-NET** projects produced earlier and better results than national projects. As another element, the specific case studied the leverage effect i.e. own funding vis-à-vis leveraged foreign project cost for each participating country. The presentation concluded with some lessons learnt. While the form and channels of addressing past funded projects are under discussion and make take different routes, impact assessment is difficult but invaluable and necessary at the same time.

Impacts at Policy and Network Level

At the parallel session on impacts at the policy/network level, there were two main discussion themes that were addressed during this panel format, parallel session and these were posed as questions to the panellists, who used their own experiences as the basis of their responses. The panellists had been provided with the document '*Guide on the conduct and use of impact assessment for P2P networks*', which is referred to as the 'draft framework' for impact assessment of P2Ps in the text below. The six panellists represented one JPI (Urban Europe), two ERA-NET Cofunds (Biodiversa & QuantERA), an Article 185 (EMPIR), the Austrian Federal Ministry for Transport, Innovation and Technology and the Swedish Research Council.

The two main questions were firstly, whether the draft framework for impact assessment of P2Ps, as presented, effectively captures the various impacts that participants have experienced from their P2P participation or that have surfaced in P2P evaluation exercises and secondly, whether the framework appropriately addresses/considers network elements that they think are important, such as network organisation, governance structures, network processes or other elements. Additionally the presenters and audience were asked to consider how the framework might be operationalised to be useful for their community. The overall aim of the workshop was to validate the suggested framework and to provide insights for specialising the framework to certain P2P specificities that may have not been adequately captured in the draft document.

In response to the first question the panellists and session audience were generally positive about the draft framework document commenting that it contained useful impact definitions, shed light on the diversity of impacts and identified a relevant set of network processes.

Whilst recognising that an ideal standard or model is not possible due to the heterogeneity of P2Ps, the summary of main requests centred around the need for practical guidelines including how to achieve impact and how to assess impact. Suggestions for this additional material included a step by step impact assessment; a section on the initial phase of building a network; a handbook of good practice - perhaps a toolkit approach and/or the inclusion of some case studies - essentially an easy to read manual for carrying out impact assessments.

In considering the second question posed, the panellists concluded that the framework provides a relevant set of network elements. Three of the presenters had adopted and successfully employed the process network level impacts model[3] for the evaluation of network impacts included in the draft ERA-LEARN 2020 suggested framework, using the identified categories to analyse their own P2P activity. These presenters positively endorsed the language in the process model (enduring connectivity, capacity building, attitudinal/cultural change, conceptual impact) and actively encouraged others to engage with it.

One presenter emphasised that added value is at the core of everything. The key question is does the chosen organisation/structure provide added value? Identifying impact is crucial and the impact on our societies and economies will help identify our intervention means. Connected to this was a comment in the discussion that the framework document omits to include a section that might support an argument for joining a P2P. This could easily be resolved with inclusion of a short summary of major and significant P2P benefits in a box.

The conclusions emerging from a summary of the session will result in a number of additional actions to amend the existing draft framework document. Suggestions for the inclusion of a 'further' impacts section, case studies, consistent terminology; a step by step guide to impact assessments and a focus upon the 'building the network' phase will be considered as additional material to enhance the impact assessment and monitoring framework. Essentially there is a good framework in place that can start to be used for impact identification by the P2Ps as evidenced by some of the presentations in the session. The effects on the networks are clear; what is less clear is the effects at project level and this is an important point.

There were a number of additional suggestions that included establishing a database compiling the results of evaluation exercises following the scheme and making evaluation exercises comparable; the provision of a complementary document in the form of an easy to read manual for carrying out impact assessments and further consideration of the issue of the interplay between the network and project levels. A manual for P2P impact assessment might group the P2Ps whilst acknowledging the differences between them. Indicators are essential for use early on in the life of a P2P for effective monitoring and evaluation but have to be specific for the type of P2P in its own subject environment. This is a much greater broadening out beyond the framework presented and is a request for a much more detailed and in depth toolkit for monitoring and impact assessment.

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[3] Meagher (2009)

Impacts at Project Level

This parallel session complemented the session on impacts at policy and network level in that it focussed on impacts at the level of the research & innovation projects funded by P2P Joint Calls. One of the aims of the ERA-LEARN 2020 project is to help the P2P networks and associated national funding organisations, gather better evidence on the impacts of the funded projects. The session was therefore designed to increase awareness of this increasingly important subject and give stakeholders the opportunity to contribute to the development of a practical common framework to collect, analyse and report appropriate data. It therefore had three main objectives:

1. Introduce the concept of a centralised process for systematic collection of project-level evidence of impact and the proposed common framework
2. Provide some examples of the current state-of-the-art amongst those that have experience of project-level impact assessment
3. Identify the main issues that will need to be addressed to enable a centralised data collection and reporting process to become a reality

The session commenced with an overview of the ERA-LEARN 2020 activities to explore the feasibility of centralised project-level impact assessment. This was followed by case study presentations from the four panellists. Two of these were from P2P networks that have implemented systematic processes for assessing the impact of funded projects (M-ERA.NET and A185 EMPIR). The other two were from national funding organisations (from Netherlands and Finland) that had recently carried out surveys of beneficiaries in their country.

After the presentations, the panellists and the audience were invited to respond to the following key questions for centralised impact assessment:

- What would be the benefits of the proposed common framework for the P2P networks?
- How could it work with (or for) their network?
- Could ERA-LEARN offer additional value added by providing data management functionality and/or benchmarking information?

The case study presentations were clearly helpful to those in the audience who would be responsible for the future assessment of the projects (particularly with respect to ERA-NET Cofund Actions). For example, one of the issues discussed was continuity of the networks, given that the lead time from Joint Call to impact could be at least five years. Both M-ERA.NET and the A185 EMPIR on Metrology had been able to address this network continuity issue through subsequent EU contracts but not every network has this possibility. This was considered to be a good example of how a centralised database could be helpful - especially to the national funding organisations.

Another issue mentioned was the difficulty in communicating with the beneficiaries several years after the end of a project when the impacts are more apparent. Related to this was an open question about imposing mandatory requirements on beneficiaries to provide data after the end of the projects. Project case studies also seem to be a good option for networks to capture good quality information on impacts and to gain a wider perspective than can be gained from individual beneficiaries.

The three key questions also allowed both the panellists and the audience to provide their opinion on the strengths & weaknesses of centralised impact assessment. All of the panellists agreed that a common framework could have a number of important benefits. Firstly, it would allow everyone to develop a common language and understanding of what project-level impacts can be expected from P2P joint calls. Secondly, it would provide a consistent means of gathering and (where appropriate) sharing data amongst the funding organisations and thus minimise the number of surveys that beneficiaries are asked to complete. This would, of course, need to be done in a way that takes data protection issues into account. Thirdly, it would minimise the P2P network resources compared with setting up individual assessment/analysis processes. It was acknowledged that monitoring and impact assessment of the funded projects can be a significant burden but is becoming increasingly important.

Clearly, those that are planning to implement project-level impact assessment activities in the future have most to gain from an effective common framework. However, the panel members also felt that there would be benefits for those like them that had already implemented their own frameworks. A consistent and comparable means of gathering data on projects was seen as adding value but, of course, would need to be introduced in a way that enabled comparison with historical data. One member of the audience posed the question about 'big data' and whether such methodologies could be useful a way of complementing direct methods of identifying societal impacts from P2P funded projects.

There was general agreement amongst the panel that ERA-LEARN could go beyond taking the lead in developing a common framework and play an additional value adding role by providing data management functionality and/or benchmarking information. Establishing and maintaining a data management system to monitor projects ex-post requires a significant and ongoing commitment and so a central system has many potential benefits. A show of hands indicated that around 50% of the audience believed that their network could benefit from using ERA-LEARN functionality to support their impact assessment activities. Most of the others were unsure about the practicalities of this potential option.

The session confirmed the logic for a common framework to help P2P networks with the challenge of impact assessment at the project level. It also confirmed the clear role for ERA-LEARN to develop a core set of harmonised questions that would be comparable across networks, whilst allowing individual networks to ask more specific questions and/or use other assessment methods in addition to surveys. It also highlighted the increasing interest in project-level impact assessment amongst P2P networks and funding organisations but also that it can be a quite challenging and labour-intensive process. Again, the enabling role of ERA-LEARN in terms of both a common framework and where appropriate, to provide data gathering/management functionality is obvious.

The next stage for the ERA-LEARN 2020 exploratory task is to finalise a set of common survey questions and carry out some data collections pilots with interested P2P networks. This could target a cross-network batch of recently completed projects and/or focus on a thematic area with a broad range of beneficiaries. The obvious thematic area would be the 'bio-economy,' as the PLATFORM2 project also has an interest in project-level impact assessment and recently completed a comprehensive online database of projects that have been funded by P2P networks in the bio-economy area.

It is planned that the pilot studies with the interested networks will be completed during the first half of 2017. This should validate the proposed common framework for project-level impact assessment. It will also provide the practical experience to develop a strategy for ERA-LEARN portal functionality that will improve the quality of data collection/management/reporting and reduce the transaction costs.

P2P expectations and achievements

On the second day of the conference there were five parallel, thematic workshops inviting presentations on the expectations of the P2Ps as well as achieved impacts. The aims of the thematic workshops were:

- to present practical examples of impact achieved by Public-Public Partnerships in the respective area/challenge,
- to facilitate the exchange of experience between P2P networks in the specific challenge,
- to help elaborate the framework for assessing impacts and identify opportunities to maximise impact and its visibility.

Demonstrating and measuring the impacts of P2Ps was acknowledged as an imperative necessity at the conference. Yet, a valid point is that in general, building up a P2P network from the initial stages of scanning interest from Member States through to launching joint transnational calls and funding research activities, may take several years (at least 7 to 8) before meaningful conclusions can be taken and conveyed to the public. This may also vary among areas. In the health area for instance, innovation in the form of new therapies may take between 10 and 15 years; thus the success of funded research projects usually represent small steps rather than big leaps.

Health

In the workshop addressing the area of health six cases of P2Ps were presented:

- ERA-NET E-RARE – Research Programmes on Rare Diseases, Daria JULKOWSKA, ANR
- ERA-NET NEURON - Neuroscience research, PD Marlies DORLÖCHTER, DLR
- JPND – JPI on Neurodegenerative Disease Research, Philippe AMOUYEL, JPND
- AMR – JPI The microbial challenge - An emerging threat to human health, Laura MARIN, JPIAMR
- Art.185: AAL – Active and Assisted Living Programme, Karina MARCUS, AAL
- Art.185: EDCTP - European & Developing Countries Clinical Trials Partnership, Michael MAKANGA

Expectations and achievements

The ultimate overall expected impact for all presented P2P projects was to contribute to the European Research Area in the field of health research with the ultimate goal to reduce the burden of diseases. In order to achieve this goal, more specific expectations included the development of a common vision (e.g. by producing a strategic research & innovation agenda), the alignment of national/regional research programmes (e.g. by preparing and implementing joint transnational calls, but also via other alignment-relevant measures), and the pooling of national/regional resources (i.e. research budgets, research infrastructures, and research communities).

The health-related P2Ps reported a variety of impacts. The development of strategic research (and innovation) agendas has affected the respective national health research agendas mainly via the P2P strategic discussions and the priority topics that were eventually defined for joint transnational calls.

In the case of JPI AMR for instance, 20 participating states have developed national plans for anti-microbial resistance whereas

there were only 2 at the beginning of the initiative. New AMR national research programmes were set up with earmarked funding as in the case of Norway, Sweden, the Netherlands, and Switzerland, while the development of the JPI AMR strategic research agenda influenced the national agendas of Sweden and Spain. JPIAMR has also achieved some policy-related impact at global level. JPIAMR was cited within the framework of the AMR global action plan of the World health Organisation to develop a global research agenda as well as in relevant statements of the G7. This has resulted in non-EU countries showing interest in becoming members of JPI AMR such as Japan, Argentina, and South Africa.

Health P2Ps reported a high level of alignment of their national programmes by contributing to joint transnational (annual) calls with national budgets. The joint calls in the health P2Ps usually include more than 20 funding organisations, while the call budget is between 10 - 15 Mio € and allows for funding between 10 - 15 research consortia of between 40 - 90 research teams. JPND, for instance, launched eleven joint translational calls since 2011 and supported 95 projects with a total funding of €124 M. Each JPND call enabled support of between 20 and 175 proposals and between 122 and 892 research teams. NEURON ERA-NET has supported since 2008 research grants of in total about 100 m € (incl. EC top-up in 2016 call) to around 100 multinational projects in various areas of research into brain function and its disorders involving around 400 research groups.

When implementing EC cofunded calls, health P2Ps usually present higher national commitments (combined with the EC top-up). This has allowed funding of considerably more consortia than usual (e.g. in the case of JPND: 36 Mio € for 21 consortia in the cofunded call versus about 10 Mio € for 10 consortia in non-cofunded calls). Another related impact was also that in some cases, the joint calls enabled to support certain topics of a narrower nature that would not have been supported alone in national calls.

All funding partners highlighted the benefit of learning about procedures in trans-national, research programme management. This was also highly appreciated by P2P partners outside the EU who also highlighted the positive experience for their researchers of gaining access to the EU research communities via P2Ps (much more than in bilateral cooperations). The health P2Ps contribute to the EU strategy for international cooperation in research and innovation by including a number of third-party funding partners (e.g. Canada, Australia, and Taiwan). EDCTP is a specific case including 14 African countries in addition to the European countries. E-Rare has involved international partners (CA, JP, USA) and facilitates tackling a global societal challenge (rare diseases) by connecting funding agencies and providing funding platform for IRDiRC partners. P2Ps have also taken measures to increase the success of underrepresented countries.
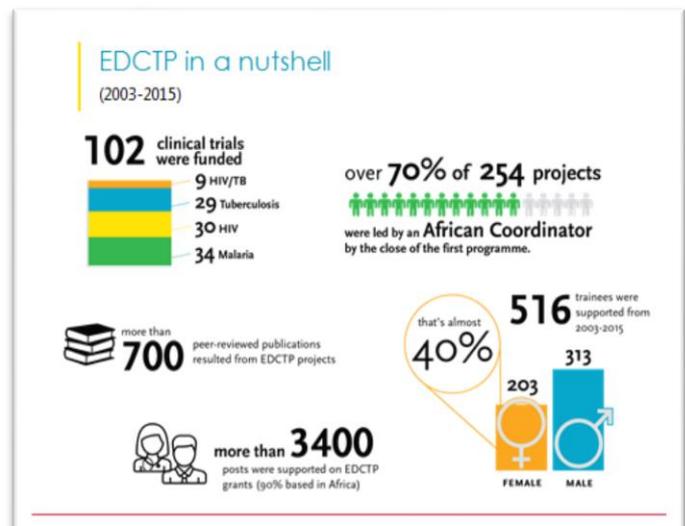
The first programme of EDCTP that ran from 2003 to 2015 launched 65 calls for proposals, received 789 applications and awarded 254 grants with a total budget of € 207.992 m. In addition € 169.695 m cofunding (cash and in-kind) was provided directly to the EDCTP projects, bringing the total project value to € 377.688 m. More than € 154 m (74.2%) of EDCTP grant funding was awarded to African participants and more than

70% of the 254 EDCTP projects were led by an African coordinator. More than 700 peer-reviewed publications have resulted from EDCTP projects, including findings that have influenced national and international policies and guidelines.

Health P2Ps have managed to achieve research excellence as well as research results relevant for users' needs and long-lasting collaboration. Research excellence was reflected in the high-impact publications (in some cases the impact factor of papers were more than 10). For many project consortia, researchers reported sustained collaborations even beyond the project lifecycle. In the case of E-Rare this was valid for almost 80% or the supported researchers.

In E-RARE, since 2007, the participation of funders in joint transnational calls has increased from 6 to 23 funding agencies. For 70% of the funders, E-Rare is the unique programme to finance Rare Disease (RD) research. E-Rare invested 78 M€ in 7 calls to finance 98 transnational consortia including 449 research teams. The publication output of the funded projects results in an outstanding publication record with average impact factor of 9.5. Hundreds of new genes were identified, new diagnostics protocols and guidelines established and three patents filed. E-Rare has also remarkable results on the internationalisation front by involving several international partners (CA, JP, USA).

Innovation has also been addressed to some extent. Art. 185. AAL in particular reported a strong participation of small and medium sized enterprises (>50%) and end-users (>20%) in their projects. In AAL the implemented products, solutions and service concepts should come to the market within two to three years of the end of the funding period.

Collection of impact evidence

General feedback on the development of a health P2P is usually achieved by online surveys (for P2P partners, and at project level for researchers), while some P2Ps have analysed the impact of each joint transnational call and documented the results in specific reports (as in the NEURON case).

The progress of funded research projects is usually monitored by central annual reports (in English, sometimes using key performance indicators). Most health P2Ps hold specific monitoring meetings, with researchers presenting their projects, their progress or their problems and envisaged solutions. Some P2Ps use specific questionnaires addressed to the funded researchers or the P2P partners for more specific information.

In addition, due to national legal constraints, many funding organisations require annual and final national reports, reflecting the progress and results of the national part of a consortium (in that country's language). This "double reporting" is usually criticised by Research Performing Organizations, and ways to improve this situation have been discussed (e.g. adjust national requirements, provision of an EU reporting template); however, Programme Managers do not see this as a critical issue.

Visibility of P2Ps and their impacts

Visibility of health P2Ps is usually addressed by dedicated communication and outreach strategies, including elements such as websites, newsletters, and presence in the social media. All P2Ps also engage in presenting their results at relevant scientific conferences.

An important means of enhancing the visibility of P2Ps is by strengthening the interaction and collaboration with national and European stakeholders (researchers, scientific societies, patients, and general public). In this regard, active engagement with the target audience (patients, researchers) was suggested, in the planning of funding programs and to report impacts not only in 'formal' reports but also in dedicated communication material demonstrating the benefits for society of addressing major societal challenges through research. This can take the form of success stories ("narratives") for the patients, their families, the general public, and health professionals (research, care). The engagement of the significant number of national funding organisations in P2Ps should also be more comprehensively communicated through media channels for example, in the EU Horizon Magazine. Such activities are anticipated to increase both the visibility of impacts and the take-up of results at the national and European policy levels.

Environment and Climate Change

The 'Environment and Climate Change' workshop started with the presentation of five P2Ps:

- ERA-NET Biodiversa - Consolidating the European Research Area on biodiversity and ecosystem services, Xavier Le Roux, INRA
- JPI Water - Water Challenges for a Changing World, Dominique Darmendrail, ANR
- JPI CLIMATE - Connecting Climate Knowledge for Europe, Patrick Monfray, ANR
- JPI Cultural Heritage, Cristina Sabbioni, CNR
- ECO-INNOVERA, Robbert Droop, Ministry of Infrastructure and the Environment, Netherlands

Expectations and achievements

BiodivERsA, now in its third phase (2015-2019) addresses the need to develop science-based approaches to better preserve and sustainably use biodiversity and to develop nature-based solutions while promoting European innovation & competitiveness. Applying the suggested ERA-LEARN 2020 impact assessment framework, BiodivERsA presented a series of impacts starting with *enduring connectivity* i.e. long-standing cooperation of the partners since 2005 and increased numbers of participating countries and partners from 13 and 20 at the outset to 19 and 32 in 2015. With almost regular annual calls since 2008 BiodivERsA has managed to spend a total of € 80 m in cash (€ 134 m in cash and in kind). Capacity building among the network partners receives high attention through staff exchanges and special activities for the successful integration of new partners and 'low performing countries'.

This network also presented *attitudinal and conceptual impacts* in relation to the way they approached the challenge addressed: unsustainable activities and land management leading to increased degradation of biodiversity and ecosystem services with a rising cost for European societies. From dealing with threats to bio-diversity, they turned to finding opportunities for biodiversity and nature-based solutions by escaping the linear model of basic – applied research and applying a multi-stakeholder approach that helped bridge the gap across the different views on biodiversity. This was facilitated by a foresight exercise that led to a

common vision on the common themes of interest and resulted to revisiting the challenge tackled by BiodivERsA.

The Water JPI expected impacts were: i) reaching effective, sustainable coordination of European water RDI through a multi-disciplinary approach (ecological, societal, economic, technological considerations), ii) involving water end-users for effective RDI results uptake, iii) harmonising National water RDI agendas in partner countries, and iv) supporting European leadership in science and technology. Ten key achievements have been reached to date within the Water JPI. The Water JPI membership has grown from 10 in 2013 to 22 in 2016 accounting for 88% of all European public RDI annual expenditure on water issues. In addition, there is high level of partner involvement in implementing joint transnational calls (from 11 in 2013 to 25 in 2016). Three calls have been launched in 2013, 2015 and 2016[4] while the call budget has been increasing from €9.25 million in 2013, to €25.5 million in 2016. The international cooperation dimension has also been address in Water JPI with Israel, Norway, the Republic of Moldova, Turkey, Egypt, South Africa, Tunisia, Canada and Taiwan participating in the JPI.

JPI Climate aims to connect research, performers and funders across Europe and also internationally to promote the creation of new knowledge in the natural and anthropogenic climate change domain that is fundamental and relevant for decision support. The work of JPI Climate's Working Group on Climate Services (CS) was crucial in building a European CS community and framing the research needs in CS. Members of JPI Climate were invited to take part in the Expert Group established by the European Commission (EC) to propose a European Research and Innovation Roadmap for Climate Services that is used for the definition of future actions promoted by the EC. To facilitate implementation of its programme the ERA-NET Cofund Action "European Research Area for Climate Services" (ERA4CS) was formed. ERA4CS involves a large network of 15 public Research Funding Organisations (RFOs) and 30 Research Performing Organisations (RPOs) from 18 European countries. In March 2016, the ERA4CS partners launched a large joint call with a total budget of €72 million supporting three-year research projects involving at least three countries.

The focus of the JPI Cultural Heritage (CH) is to build a common European Research Area on Cultural Heritage and the most important impact sought is to implement the comprehensive ERA on tangible, intangible and digital Cultural Heritage. Until now JPI CU bringing together Ministries and Agencies from 19 Countries (+ 8 Observers) has launched two calls (2013-2014) of a total budget of € 13 m under which 26 proposals were funded involving a variety of organisations. The number of submitted proposals however was much higher and increased from 89 to 352 proposals in the second call thus denoting an increasing interest in the areas addressed. JPI CH aspires to achieve impacts in various areas such as environmental impact on the preservation of the environment, as well as economic impact (on tourism industry, job creation, European competitiveness etc.) and social impact (preservation of the European identity, etc.).

The last presentation was on the ERA-NET ECO-INNOVERA. The overall objective of ECO-INNOVERA is to promote the development and implementation

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[4] The two last calls under the framework of two respective COFUND Actions under H2020.

of eco-innovation in Europe through different activities including pooling Europe's most relevant research and innovation programmes on eco-innovation and developing and operating a common, networking, and funding platform of relevant research activities. Twelve projects were funded until now with various national and European wide impacts including patented outputs. Apart from tangible impacts, ECO-INNOVERA also contributed to establishing a common understanding about systemic eco-innovation among the 25 partners/collaborators, which can lead to policy development for a paradigm change in the environment sector.

Collection of impact evidence

In the discussion that followed delegates noted that an interoperable projects' database in cooperation with EC would be beneficial for data and impact evidence collection. A framework of common indicators (quantitative & qualitative) addressing several areas such as societal impacts, stakeholder involvement, mobilisation of infrastructures, and capacity building would also be worthy of development. It would be necessary to consider a long-term perspective given that impacts take some time to occur.

Certain challenges were highlighted, especially in relation to fragmented areas, such as the case of JPI CH (tangible, intangible and digital Cultural Heritage) or novel areas bearing diverse interpretations and consequent lack of alignment of national strategies that call for a common understanding and change of mind-sets:

- eco-innovation and circular economy,
- biodiversity: a threat or opportunity of nature-based solutions
- integrated approach (multidisciplinary & systematic).

Partnerships take time to bear results and have visible impacts. This calls for long term support of their operation. Based on the BiodivERsA experience for basic research it may take 50 years, while in the case of applied research up to 30 years may be needed for long-term impacts to become visible. The impact assessment should be undertaken at different stages and it takes a long time to start to see identifiable trends. There is a need for a long term perspective, common understanding and framework for impact assessment of P2Ps allowing flexibility and providing a core set of common indicators, both qualitative and quantitative.

Visibility of P2Ps and their impacts

The P2P networks collect data and impact evidence through a variety of methods (project reporting, surveys, etc.) but they also see various opportunities to maximise impact achievement and visibility. In this the strong engagement and collaboration with other stakeholders plays a crucial role. According to Water JPI relevant actions should address all levels i.e.:

- the programme/network level: via better connection and complementarity with EC and other initiatives' programmes; exploratory or thematic workshops; mirror groups in Member States;
- the project level: follow-up project group (mid-term and final review); knowledge hubs development (targeted at stakeholders needs); training and capacity building activities;
- instrument level: better use of current instruments; connect to ESFRI (Infrastructures), COST (research networking);

- communication level: stakeholders Advisory Boards ambassadors of Water JPI activities; Water JPI conference / Showcasing; LinkedIn Water JPI researchers forum group (857 members);

Along similar lines, JPI Climate tries to maximise impacts by organising special events to engage the private sector, via activities on widening international cooperation activities on climate adaptation and mitigation, joint actions with other thematically relevant JPIs and the Strategic Mechanism under the new JPI Climate Strategic Research and Innovation Agenda (SRIA). Increasing visibility of the JPI beyond the JPI's outreach is also a goal for JPI Cultural Heritage (CH). JPI CH also plans to extend trans-national joint activities beyond calls addressing issues such as historical urban centres, landscape preservation (landslides and earthquake), socio-economic value, sharing infrastructures, advanced ICT for human sciences, migration and identity, and exploit 2018 as the European Year of Cultural Heritage (EYCH) for highlighting cultural heritage as a currently strategic element in the European policy scenario.

At the same time, other P2Ps including ECO-INNOVERA require actions to promote common understanding of new concepts (eco-innovation) to change the mind-sets of both policy-makers and European societies. In this regard, supporting a systemic eco-innovation platform to develop strategies and policies is important as a means of spreading awareness and understanding of the changing concept and opportunities.

Overall, opportunities to maximise impacts include:-

- identifying and spreading success stories through science flagships/awards, creating databases, project factsheets, and other promotional material,
- engaging stakeholders through dissemination means like policy briefs but also direct interaction with target audiences,
- links to other relevant P2Ps to multiply possible effects,
- promotion of initiatives within the partner countries,
- and reaching out to international parties beyond the EU.

Bio-economy

This workshop started with an introduction of the role of PLATFORM for mutual learning, networking, and joint communication of P2P networks in the Bioeconomy by Christine Bunthof and continued with short presentations on impacts expected and achieved from:

- JPI FACCE - Agriculture, Food Security and Climate Change - Heather McKhann, INRA
- Art.185 BONUS - Joint Baltic Sea Research Programme – Kaisa Kononen, BONUS
- ERA-NET WoodwisdomNet - Innovation in the Forest-Based Sector – Martin Greimel, Austrian Ministry of Agriculture
- ERA-NET ANIHWA - Animal Health and Welfare – Luke Dalton, Defra
- ERA-NETs on Biotechnologies - Christian Breuer, Jülich

PLATFORM is the network of 74 P2Ps active in the bio-economy area. It is a mutual learning, joint dissemination and strategic forum. It has developed a project database including more than 1000 supported projects, runs master classes and workshops, communicates through its website and newsletters, and prepares policy briefs. It facilitates building the community and giving a voice to bio-economy P2Ps.

Expectations between the bio-economy P2Ps vary from increased alignment, collaboration and building a common vision, to network inclusiveness, boosting competitiveness, co-creation or simplification in international programme management.

As an example, FACCE-JPI aims to serve three broad aims:
1. Improve the alignment of national and European research programmes (Short Term),
2. Increase high quality transnational research activities within food security, agriculture and climate change (Medium Term),
3. Improve the societal impact on the challenge of food security, agriculture and climate change (Long Term).

A concrete example of how FACCE is achieving this impact is through the MACSUR Knowledge Hub, which has successfully created a network of 300 researchers from 70 institutions originating from 18 countries that has generated significant new knowledge and fed into policy discussions. MACSUR has also performed capacity building and awareness raising around the issues examined. Visibility for these impacts is through the FACCE-JPI website and the use of different board members as ambassadors of the JPI and the work of the 10 JPIs together. In addition, currently FACCE is developing a National Communication Contact network, while also finalising a Communication and Valorisation strategy that aims to increase FACCE's impact on four main interrelated EU policies: bio-economy, food and nutrition security, climate, and the Common Agricultural Policy.

BONUS is an important case of P2P impacts on policy and regulation in the battle against overfishing and for the sustainability of the Baltic Sea fish populations. As an example, BONUS fisheries projects InSPIRE and GOHERR are actively supporting the process of providing scientific information, to define total allowable catch and maximum sustainable yield of fish population in the Baltic Sea by collecting data on 19 indicators. During their first years of implementation the two projects reported 12 contributions to the development and implementation of fisheries regulations, policies and management practices, 14 suggestions for designing, implementing and evaluating the efficacy of fisheries related policies and governance and 183 participations in stakeholder committees related to fisheries. Scientific contributions from BONUS projects helped provide advice to the European Commission on implementing the EU Common Fisheries Policy, the International Council for the Exploration of the Seas, as well as to the relevant Danish, Estonian, Polish and Swedish ministries.

Another example of influencing regulation is drawn from the forest sector. A project supported by WoodWisdom-Net (WW-N) 2, called FireInTimber, which ran from 2007-2010, led to the very first European wide guideline on the fire safe use of wood in buildings. The new models developed were used as input for the next revision of the European standard for structural fire design of timber structures (EN1995-1-2). In addition the project was acknowledged in terms of scientific excellence with the award of the Count Carl Bernadotte Forestry Prize (Sweden) to researcher Birgit Östman, the FireInTimber Coordinator.

Other projects that achieved certain impacts include TES Energy-Façade (2008-2009) and the WW-Net follow-up projects smartTES (2010 -2013) as well as E2ReBuild (2011-2014). The results of the WWN projects led to the creation of a special renovation system (by Paroc Group Oy) that is used in retrofit projects in several European countries. In addition, Arbonaut Oy Ltd was able to develop new products and

services and further improve its forest inventory service ArboLiDAR, a remote sensing technology for effective, efficient timberland management. These projects also received a number of excellence awards including the Schweighofer Preis 2011, and the European Innovation Award for the Forest Based Sector.

In the animal health and welfare sector the P2Ps aim to provide a forum leading to improved collaboration on research prioritisation and procurement, creating the necessary critical mass and focus to deliver the animal health and welfare research needs of our policy makers and the livestock industry. Expectations span from increasing the quality and capacity of research to strengthening industry's competitive ability. The two P2Ps that were cited, EMIDA and ANIHWA, launched five calls and funded 58 transnational projects with a total value of €75 Million. Thanks to the Orbi Net – an EMIDA-funded project – a solution based on reverse genetics technology was given to losing millions of ruminants due to the Bluetongue virus that has been invading Europe since 1998. The reverse genetics technology was successfully established in six of the partner organisations and disseminated beyond the consortium. The establishment of links between the consortium and major vaccine and diagnostics companies to take it to market was also another significant impact.

Last but not least, the ERACoBioTech was presented, an ERA-NET Cofund Action supported under H2020 that is joining three previous ERA-NETs in the area of biotechnologies, i.e. ERA SynBio, ERA IB and ERA Sys App. As an example of impact the SysMilk project was presented that was supported under the first call for proposals of the ERA Sys App. This project brought together leading academic and industrial partners, gave access to state of the art technologies in both academia and industry. The research carried out enabled the production of GMO-free personised kefir which led to an estimated 15% growth rate in Chr. Hansen company, a global market leader in dairy ingredients that took up the results.

Collection of impact evidence

Data and evidence on results and impacts are usually collected through regular project reporting to both the P2P call secretariat as well as the national funding organisations. Additional activities include special surveys such as the one carried out for the WWN supported projects in spring 2016 or the external evaluation of the WWN Research Programme that was published in May 29, 2012. The collection of data sometimes follows a wider monitoring and evaluation framework such as the one developed by FACCE-JPI.

Visibility of P2Ps and their impact

Visibility of P2Ps and their impacts is usually achieved through website and communication activities. FACCE-JPI also puts special emphasis in the validation of the results produced by the supported projects through special workshops to produce policy and/or practice briefs. FACCE-JPI has also created a network of national communication contacts and holds an international stakeholder conference bringing all relevant audiences together to present results.

Suggestions for external support to the P2Ps were made in relation to visibility, for example, a common JPI newsletter, website or a centralised call office for the various P2Ps, as along with targeted training/ workshops on impact, science/policy links, and validation, or events to strengthen collaboration among related P2Ps including, for instance, joint seminars, joint calls, joint project meetings and presentations of results, or joint activities with related COST Actions. Some of these activities could be facilitated within the ERA-LEARN 2020 project. The discussion that followed revealed certain challenges in relation to impact

assessment. Participants noted that the concept of impact is unclear. There is a need to define it and sort it into categories considering the different stakeholders' perspectives (funders, project beneficiaries, etc.). There is also the need for consideration of impact at the definition of the project, and inclusion of the end-users (national policymaker, industry) at that stage and it would be useful to share indicators used for e.g. excellence, capability building.

PLATFORM and ERA-LEARN 2020 related work is a good basis to draw upon and further develop. The two structures, PLATFORM and ERA-LEARN 2020, are also working closely to join up the projects' databases and start the piloting and implementation of the suggested ERA-LEARN 2020 framework for impact assessment of P2Ps.

Innovation and Technologies

The Innovation and Technologies session invited presentations of P2Ps covering various sectors:

- Art.185 EUROSTARS, Peter Lalvani, Eureka Secretariat
- Art.185 EMPIR- European Metrology Programme for Innovation and Research, Duncan Jarvis, Euramet
- ERA-NET M-ERA.NET - Materials research and innovation, Roland Brandenburg, FFG
- ERA-NET MANUNET – Advanced manufacturing technologies, Cristina Ugarte, Innobasque
- ERA-NET CoBiotech – Biotechnologies, Petra E. Schulte, PT Jülich
- ERA-NET WoodwisdomNet - Innovation in the Forest-Based Sector, Mika Kallio, Ministry of Agriculture and Forestry, Finland

Eurostars is the only European funding programme to be specifically dedicated to support R&D-performing SMEs in their innovative R&D projects. The major categories of expected impact relate to commercialisation (required within 2 years as part of Eurostars eligibility criteria), growth (turnover and employment), IPR (patents but also trademarks/copyright), international collaboration and increased R&D investment. Eurostars is operating through the EUREKA Network that has been carrying out systematic impact assessment of its market-driven programmes for many years previous to the launch of the Eurostars programme in 2008. The EUREKA Secretariat (ESE) usually carries out internal impact assessment at the project level, while programme-level impact assessment is usually commissioned externally.

A thorough econometrics-based impact assessment survey was carried out in 2014 by an independent expert group. It found a number of impacts on participating SMEs including:

- Average 3% to 3.5% higher growth rate in turnover
- Employment growth rate of R&D-performing SMEs nearly twice as high as that of observable equal non-funded firms
- Nearly 8,000 jobs created based on projects completed in 2012, or earlier
- Significantly increased innovative outputs, as measured by patent filings (42% higher according to one estimation)

EUROSTARS publishes success stories showcasing the different types of impacts achieved. Such a case is Mendeley. The well-known Mendeley service started from the MAKIN'IT project that produced free software to manage and share research papers, coupled with a social media-type website, connecting like-minded researchers. Eurostars helped to bring more

knowledge and funding into the company. Other investors included the former executive chairman of Last.fm, the founding engineers of Skype, and the former Head of Digital Strategy at Warner Music Group. Mendeley was eventually sold to Elsevier in 2013 for up to $100m.

Art. 185 EMPIR (the successor of Art. 185 EMRP) presented an interesting approach for calculating in economic terms the impact of their supported projects. The first objective set in the legislation for EMPIR is "At least € 400 m of European turnover from new or significantly improved products and services that can be attributed to the research activities of EMPIR and its predecessors". An example project that will contribute to this objective comes from the first Industry Call in EMRP where a supported project led to the creation of the "Dynamic Pressure" service allowing instrumentation manufacturers to validate their measuring systems. An instrumentation company used those services to validate the equipment it was selling. One of its customers use the instrumentation to develop more efficient engines which cost less to run, emit less pollution, others build better air-bag systems. Innovation increases, companies increase turnover, make profit and employ people. Eventually you can calculate the contribution to the objective. So far, from the 25 projects selected in 2009 and 2010 we have identified 109 M€ of European turnover from new or significantly improved products and services that can be attributed to the research activities. EMRP/EMPIR also contributed to 17 published and 103 draft standards.

Among others, the M-ERA.NET project which deals with material science and engineering, presents a successful case for establishing international cooperation beyond the EU. Back in 2012 there were only a few examples of networks with international partners from outside Europe and very little experience with respect to implementing joint calls and other joint activities with large scale budgets. M-ERA.NET had the mandate to explore options for international cooperation. The result of the respective activities were to ensure participation of Taiwan, Russia, South Korea, Brazil and South Africa in a number of M-ERA.NET calls and increase the number of submitted participations of international partners from 16 in 2012 to 48 in 2016. The total funding for projects with international partners reached the amount of 8.2 mio € (international partners: 2.9 mio €) out of a total funding of 70.0 mio € for all projects in 2012-2015.

As another example, the MANUNET active in the field of advanced manufacturing, has launched 10 calls for proposals from 2007 with an average of 19 million euros per call. In total, 963 proposals were received involving more than 2500 SMEs. With a support of the EC of 4.2 M€ the network has mobilized more than 211 M€ of which more than 121M€ are national/regional public funding. A survey sent to 1500 applicants and filled in by 464, revealed the following impact on beneficiaries:

The development of new products, process and methods:
- 75% of applicants had innovative results (especially in products, process and methods)
- 61% of respondents confirmed that the results had been commercialized
- 47% of the project results commercialized had reached the market in a period of 2 years
- 83% of project results led to in-house application or generated a follow-up project
The companies R&I activities:
- 65% of beneficiaries increased their R&I expenses
- 66% of beneficiaries increased their R&I personnel

- 46% of the cases allowed the non-permanent personnel recruited during the project to get a permanent position

The economic benefits:
- 41% of the respondents experimented an increase in turnover
- 73% of the cases resulted in business opportunities

The cooperation:
- 87% of the respondents continue cooperating in different ways

The Innovation and Technologies workshop also hosted two more P2Ps that were also presented in the workshop on bio-economy. The one was the WoodWisdom-NET and the FireInTimber project that contributed in the very first European wide guideline on the fire safe use of wood in buildings. The other was ERACoBioTech and the FAIRDOM project which provided support to make projects' data, operating procedures and models. Apart from enhancing knowledge of systems biology tools through interdisciplinary research, FAIDOM contributed to the development of the H2020 guidelines on FAIR data management.

Collection of impact evidence

Based on the EMPIR's experience, assessing achieved impact is perhaps the most difficult data to collect. Firstly a system to collect details of stakeholders associated with funded projects is required. Secondly, ask the consortium who is using their outputs, identify good stories. Thirdly, have the stories written up by a technical writer but in a form that can be appreciated by a wider audience and finally engage economists that analyse and report back on the commercial outcomes.

Impact assessments need to be connected to monitoring. According to MANU-NET the joint monitoring system should cover the follow-up of projects from financial to technical point of view paying special attention to the exploitation of the results. Having an updated monitoring system is crucial for statistical analysis, promotion and a better understanding of projects performance.

Various methods can be applied such as surveys but also other types of evidence (to avoid biases), including counter-factual analysis, econometrics, etc. Harmonisation and a greater compatibility of indicators between national and international innovation support programmes may also help to raise awareness of impact, along with new forms of communication and visualisation of results.

Visibility of P2Ps and their impacts

The visibility of P2Ps is an issue that is given high priority although there is still room for improvement. The impact of Eurostars projects is communicated via publicised success stories and the results of studies are integrated into communications campaigns and materials. M-ERA.NET promotes the projects' results through the network's website, posters, and international conferences, and also carries out more targeted dissemination activities of concrete results and future opportunities to local RTD communities through local events, and info days (e.g. Taiwan Nano Week 2012, 2013, 2014; FAPESP Seminar 2015, GP Korea 2016).

Active collaboration with all relevant stakeholders is essential to increase the up-take of the projects' results. Other relevant networks and P2Ps should also be included in the target groups to establish close collaboration with. According to MANU-NET experience, the promotion of success stories and the organisation of workshops with beneficiaries could help to maximise the achieved impact and its visibility. Success stories need to be communicated in an easy to understand format contextualised to the appropriate

audience. Scientists should be trained using Webinars and special templates for creating a targeted communication/dissemination plan for their projects

Special platforms should also be created to make success stories visible. ERA-LEARN 2020 could play an important role in this. Creating a common impact assessment framework with a common set of indicators, to the degree possible but also allowing flexibility, is important taking into consideration the work already undertaken in this direction by P2Ps.

In conclusion, based on the P2P presentations most but not all networks have some sort of impact assessment included in their routine activities. Professional communication support is very helpful to increase visibility of impacts. Stakeholders need to be involved to raise awareness and to maximise the practical relevance and effect of the strategic research agendas. Obvious impacts are the facilitation of easy access to funding for transnational research (evident by large number of submissions to calls) and the facilitation of access to new markets (evident by substantial international non-EU participation). Yet there are a series of other impacts that are also worthy of measurement and demonstration such as influence of national and European/international policies.

Energy

This workshop started with presenting four P2Ps related to energy areas of research:

- European Joint Programme: EUROFUSION EJP, Christopher Ibbott, EC DG RTD
- ERA-NET ACT - Accelerating CCS technology, Gerdi Breembroek, RVO
- Art 185: EMPIR - Energy impacts of Metrology research, Paula Knee, EURAMET
- Governance: SET Plan Joint Actions Working Group, Hans-Günther Schwarz, Austrian Ministry of Transport, Innovation and Technology

The fusion area is quite suitable for such an instrument as the European Joint Programme (EJP). Fusion is an integrated research effort with practically all Member States participating (high critical mass) and funded 100% through public support (limited competition). EUROfusion receives from the Euratom H2020 programme €424 million from 2014 to 2018. About the same amount comes from Member States, adding up to an overall budget of €850 million for five years. EUROfusion brings together 29 beneficiaries while it also links around 149 third parties. According to the reporting that took place in 2015 the research supported resulted in 225 articles, of which 219 in 'high impact' journals. The scientific success rate is 110 (87%) of the 2014-15 deliverables, with 16 still pending. In addition an international panel of seven experts was created to conduct a mid-term review and concluded that EUROfusion is 'fit for purpose', research on EU facilities is better co-ordinated, while the impact of the work on the 'physics' area is impressive. Remote handling techniques that are being used in EUROfusion's JET Tokamak, are being applied to high-energy physics, space science, nuclear decommissioning, and modern surgical methods.

The ERA-NET Cofund Action ACT is an initiative to facilitate research and innovation within CO2 capture and storage (CCS). Ten European partners are working together with a total of €28 M plus €12,8M form the EC. The first call that was launched in June 2016 received 38 pre-proposals. Of those 20 cases were invited to submit full proposals. The expected impacts include coordination of national and transnational R&D that will lead to an acceleration of CCS

technology ready for commercialisation. Furthermore, a platform for knowledge sharing is established that will be crucial for technology development beyond the early commercial phase. While it is too early for impacts to become visible in the case of ACT, additional European countries (e.g. France and Italy) have already expressed interest in joining the 2nd call and/or an ACT-2 action.

Art 185 EMPIR presentation focused on the impact of the research supported by EMPIR on the energy sector. Research focused on improved data quality for sustainable energy sources, low carbon technologies and modernising the electricity generation infrastructure. In relation to actual impact achieved two examples were presented:

- Supporting the development of smart grids: ensuring the right instrumentation to manage grids is available: large and small companies are using new PMU calibration capabilities to support instrumentation development; the research also contributed to the development of an ISO standard on PMU application;
- Improving efficiency of traditional power plants: research led to Improved calibrations for ultrasonic flowmeters which supported the innovative use of power plant flow meters for both flow and temperature; it is estimated that implementation would result in power plant efficiency improvements of 2-3%.

Based on the [Impact on Energy Report](#) about the outputs and impact of the finished EMRP joint research projects in energy, a survey of industrial companies that engaged with the Energy EMRP projects demonstrated that early impacts in the form of innovative products and services have generated sales of €9M to date.

The last presentation focused in the SET-Plan Joint Action Working Group (SET-Plan JAWG). This is a configuration of the EU Strategic Energy Technology (SET) Plan Steering Group allowing SET-PLAN countries to participate on a voluntary basis (variable geometry) with the purpose to initiate intergovernmental joint actions, which support the implementation of the SET-Plan. As the most obvious form of joint action is transnational funding in research and innovation, discussions in the SET-PLAN JAWG have led to a series of ERA-NET Cofund actions addressing some of the main themes of the SET-Plan while other forms of joint actions are currently under discussion. The new ten Actions of the NEW SET-Plan could again form an important frame for such joint actions.

Collection of impact evidence and visibility of impacts

The discussion that followed clarified the peculiarity of the sector of energy, i.e. that the projects supported by energy P2Ps need to be within the frame of the SET-Plan and are much closer to innovation, thus collaborative and competitive elements both play a part. Yet, the sector does share the need for a common vision, roadmaps, programme and project management structures and concepts.

It is important to think about 'the route to impact' from the beginning of a project if not the design of the research programme. Impact assessment and quality evaluation of funded projects through joint calls should also allow comparison to the degree possible with projects funded through H2020 or national programmes. The need also emerges for consistent evaluation of impact across instruments/P2Ps, so that projects can be compared on a like-with-like basis.

ERA-NET Cofund evaluation

In addition to the presentation of P2P impacts in the thematic workshops, the conference hosted a plenary discussion about the recently published [Expert Group Report on the Analysis of the first ERA-NET Cofund Action in H2020](). The analysis conducted[5] by the Expert Group shows that the ERA-NET Cofund actions are strongly perceived as a valuable instrument for contributing to the objectives of EU policies (ERA and Horizon 2020). The added value of ERA-NET Cofund lies primarily in strengthening transnational collaboration and building long-lasting relationships across countries. It also supports more ambitious calls and funds more projects through the EU top-up funding.

The analysis also highlighted that the financial aspects are still not clearly understood. While there is a need to ensure that the EC contribution can be fully spent by mobilising additional national funds for cofunded calls, at the same time there is a lack of understanding of how Cofund actions function and management costs should also be included. Complementarity and synergies with other ERA-NETs and partnering initiatives as well as the Framework Programme needs to be improved. Cofund actions are not adequately embedded in national policies or national strategies, which may reflect a lack of ambition to realise their potential by member states. The presentation concluded with the six main recommendations from the Expert Group that referred to:

- focusing more on the strategic potential for ERA-NET Cofund actions in the process of designing the H2020 WPs and at national level;
- changing the design of the instrument to better reflect the level of ambition in the collaboration and commitment of the participants;
- improving efficiency of implementation by stepping-up the learning curve with sharing knowledge, experience and good practices;
- facilitating efficient management of the Union and national contributions;
- better exploiting ERA-NET Cofund actions for the "widening" strategy; and
- improving valorisation of results of ERA-NET Cofund Actions and funded projects

These recommendations, however, are underpinned by an overall long-term recommendation: ERA-NET Cofund actions need to be framed by a comprehensive strategy in the challenge/thematic area addressed and synergies with other instruments and initiatives should be explored in order to achieve ERA objectives more efficiently. This recommendation should underline the future format of the ERA-NET instrument. It is suggested that this should be an adaptable scheme reflecting the different levels of maturity of networks, as well as the ambitions and commitments of Member States.

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[55] The analysis was based on review of ERA-NET proposals, strategy documents, and previous analysis, but also an online survey addressed to 450 recipients, achieving a 50 per cent response rate and over 75 interviews involving ERA-NET coordinators, national representatives, Commission staff, JPI Chairs and others.

The Future of P2Ps

Within a climate of overall appreciation of the progress of P2Ps the conference attendees stressed that the time is ripe to take stock of what exactly has been achieved and how the future of P2Ps should be revisited. The future of P2Ps needs a more strategic approach led by Member States in collaboration with the EC exploiting their high potential in influencing European R&I policies. Their role needs to be increased in formulating the forthcoming Framework Programmes topics. The future design of P2Ps should shift from being instrument-driven to a more challenge/objective-driven approach. A strategic continuation of successful P2Ps with strong commitments from Member States might be one way forward. At the same time, however, the missions and overall aims of P2Ps need to be revisited in order to manage expectations.

Experience has shown that prerequisites for successful Joint Programming include clear goals stemming from a joint vision manifested by a strategic research and innovation agenda, long-term commitment and substance, i.e. an adequate number of countries, participating stakeholders, and budget volume. Adding to these we need to move from "defending the interests of our own country to working for the greater good"[6].

The P2P landscape needs to be streamlined by establishing synergies among P2Ps in similar areas but also by deciding on the life cycle of P2Ps and possible entry-exit criteria. This would facilitate decision-making about selecting which P2Ps to join and which new ones can/should be formed. A differentiated approach towards the MS-driven JPIs from the other P2Ps may be valid, although EC support for P2Ps is important in all cases.

A new (policy) narrative needs to be developed for P2Ps that is underpinned by evidence/impacts and that will bring science closer to society by pursuing missions related to solving societal challenges. The national Action Plans and ERA Road-maps reflect commitment of the MS and are encouraging in this regard, although the readiness level to become engaged in P2Ps is different across different countries.

While the value of P2Ps is highly appreciated, no more new instruments are needed. Instead, we need to optimise the use of existing ones by exploiting their potential for achieving the ERA to the full. This also necessitates transnational alignment of national R&I programmes, long-term commitment and support (utilising also alternative sources like the European Structural and Innovation Funds).

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[6] Hans-Günther Schwarz, Austrian Ministry of Transport, Innovation and Technology.

Conclusions

Assessing P2Ps has become pertinent but is also demanding. ERA-LEARN 2020 offers a good starting basis though the suggested impact assessment framework but work on this topic clearly needs to be continued. This requires close collaboration with P2P partners in identifying their needs and provision of their data. Some good suggestions from the sessions were discussed on how to maximise impact – it is important to identify and spread good practices.

In the concluding session Jana Kolar[7] noted the importance of putting the issue of P2P impacts on the table and expressed satisfaction that P2Ps were able to demonstrate a variety of different impacts. This is important for both the European Commission to guide decisions and also for Member States to increase commitments.

In closing the conference, Fabienne Gautier[8] reminded the audience of the timely opportunity that the P2P community has to inform the interim evaluation of Horizon 2020 and the future of P2P instruments. The conference proceedings will be part of this process. P2P impacts on our societies and economies are among the key elements to consider as these will inform the policies we need to define. The added value of national and European investments in P2Ps needs to be clearly demonstrated. The Joint Programming process seems to be at a crossroads: progress has been made, but now we need to compare our achievements with our original goals of openness, excellence and impact.

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[7] Executive Director CERIC-ERIC.
[8] Head of Unit ERA Policy and Reform, DG Research & Innovation.

Annex: Conference agenda

Impacts of Public-Public Partnerships - expectations and experiences

22/23 November 2016

MCE Management Centre Europe, Rue de l´Aqueduc 118, 1050 Brussels

Day 1 – 22 November 2016

12h00 – 13h00   Registration of participants and welcome lunch

13h00 – 14h30   Opening Plenary – Policy Level expectations
                   (moderator: Jana Kolar, Executive Director CERIC-ERIC)

Public-Public Partnerships (P2Ps) address societal challenges in close collaboration between countries, driven by the shared believe in the added value in terms of societal impacts and scientific evidence on national and EU policy making. The opening plenary will focus on European and national policy makers and their expectations towards P2Ps.

Welcome and Introduction: *Roland Brandenburg, FFG, coordinator ERA-LEARN and Joerg Niehoff, European Commission, DG RTD, Head of Sector Joint Programming*

Keynote speech: Policy and evaluation challenges of P2Ps - Eric Arnold, Technopolis

Policy Panel

- *Kurt Vandenberghe, Director Policy Development and Coordination, DG RTD*
- *Elisabeth Vergès, Director for R&I strategy, Ministry for Higher Education and Research, France*
- *Lubica Pitlova, Director, Ministry of Education, Science, Research and Sport, Slovak Republic (requested)*
- *Taivo Raud, Head of Research Policy Department, Ministry of Education and Research, Estonia*
- *Evelina Santa-Kahle; Deputy Head of ERA Unit, Federal Ministry of Education and Research – BMBF, Germany*

14h30 – 15h00   Coffee break

15h00 – 16h00   Plenary session 2 - Achievements
                   (moderator: Jana Kolar)

The second plenary session will provide participants with an overall framework for impact assessment of P2Ps – from the national/European policy level to the network level, but also to the level of funded projects. Selected initiatives will showcase their impacts and how they are assessed.

ERA-LEARN 2020 Framework for impact assessment of P2Ps
Effie Amanatidou, University of Manchester

Assessing the Impact of the European Metrology Research Programmes
Paula Knee, Euramet

Joint Programme – Neurodegenerative Disease Research (JPND)
Philippe Amouyel, JPND Chair

Final Assessment of M-ERA.NET
Peter Hahn, VDI/VDE Innovation + Technik GmbH

Delegates move to Parallel Sessions

16h00 – 18h00   Parallel sessions

Session 1: Impacts at policy and network level

Moderator: Effie Amanatidou, University of Manchester

Session 2: Impacts at project level

Moderator: Angus Hunter, OPTIMAT

18h00 – 21h00   Dinner reception at MCE

Day 2 – 23 November 2016

8h30 – 9h00   Welcome coffee

9h00 – 9h45   Plenary session – Result of the ERA-NET Cofund evaluation
Niels Gøtke (Chairman) and Effie Amanatidou (rapporteur) of the expert group "ERA-NET Cofund evaluation"

09h45 – 11h30   Parallel sessions day 2: Impacts in the thematic context - expectations and achievements

Session 1: Health

Moderator: Cornelius Schmaltz, Head of Strategy Unit, Directorate Health, DG RTD

Session 2: Environment and Climate Change

Moderator: Marialuisa Tamborra, Acting Head of Strategy Unit, Directorate Climate Action and Resource Efficiency, DG RTD

Session 3: Bio-economy

Moderator: Barna Kovacs, Research Programme Officer, Directorate Bioeconomy, DG RTD

Session 4: Innovation and Technology

Moderator: Doris Schröker, Head of Strategy Unit,
Directorate Industrial Technologies, DG RTD

Session 5: Energy

Moderator: Gwennael Joliff-Botrel, Head of Strategy Unit, Directorate Energy, DG RTD

11h30 – 12h00	***Coffee break***
	Delegates move to Plenary Session
12h00 – 13h30	**Closing plenary**
	(Moderator: Jana Kolar)

Report on parallel sessions days 1 and 2
Moderators of parallel sessions

Conclusions
Fabienne Gautier, Head of Unit ERA Policy and Reform, DG Research & Innovation