



Mutual Learning Exercise Widening Participation and Strengthening Synergies: Summary Report

Horizon 2020 Policy Support Facility



Mutual Learning Exercise - Widening Participation and Strengthening Synergies: Summary Report

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Mutual Learning Exercise

**Widening Participation
and Strengthening
Synergies:
Summary Report**

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EXECUTIVE SUMMARY

Policy initiatives designed to **widen participation** in the European Union's (EU's) Framework Programmes (FPs) and **realise synergies** between activities supported by European Structural Investment Funds (ESIF) and the Horizon 2020 Programme (H2020) were reviewed as part of a Mutual Learning Exercise (MLE). This Executive Summary details the most important policy lessons for national and regional policymakers and administrators that emerged from the MLE review. Examples of practices deployed by some Member and Associated States are contained within the body of the report and associated background documents.¹

Common Lessons Relevant to Both 'Widening' and 'Synergies'

Locate efforts to widen participation and realise synergies firmly within the context of coherent, long-term national and regional strategies to enhance R&I system performance and ensure that coherent packages of support instruments covering different stages of the research and innovation (R&I) spectrum and drawing upon multiple funding sources are the norm. Recognise too that improved governance structures are essential if overall system performance is to be strengthened and the benefits of 'Widening' and 'Synergies' reaped. In particular, implement governance structures that deliberately set out to improve communication and coordination between the Managing Authorities responsible for overseeing the implementation of ESIF-supported activities at national and regional levels and those bodies responsible for H2020-related activities.

'Widening' Lessons

Participation in Framework Programmes is strongly linked to national levels of investment in R&I and enhanced by a deep commitment to the reform and modernisation of national and regional innovation systems. Tackle the challenge of widening participation in H2020 via general actions designed to enhance the national skills base, strengthen science and business linkages and enhance participation in a variety of EU-level initiatives. Also launch FP-specific actions designed to support participants applying for and participating in FP projects.

Attracting Qualified Staff

Help create a mobility-friendly environment via policies that encourage public sector bodies such as universities to treat mobility as a positive step in career development. Implement inward mobility schemes to attract qualified researchers from abroad, both young and old, but include these in 'brain circulation' policy packages that complement inward mobility schemes with outward, returnee and virtual mobility schemes. Ensure sufficient financial and non-financial incentives, e.g. career opportunities for partners, are in place to encourage and reward mobility. Pay specific attention to private sector mobility,

¹ A List of reports produced during the course of the MLE can be found in Appendix 6.

which is often neglected but merits public support, especially in 'Widening' countries with relatively weak industrial sectors.

Encouraging Science-Business Cooperation

Recognise that science-business interactions underpin modern R&I systems and go beyond efforts to commercialise research by deploying 'packages' of instruments that support a wide variety of interactions. Make sure that these packages contain instruments that strengthen the 'science pillar' and orient it towards the needs of industry, e.g. via performance-based funding schemes that reward the 'Third Mission' of Higher Education Institutions (HEIs). Increase the capacity of the 'business pillar' to take advantage of science inputs, e.g. via the use of business advisory structures and services that can sensitise SMEs to the benefits of innovation. Facilitate science-business linkages, e.g. via the establishment of knowledge co-creation spaces and structures and continued support for classic linkage mechanisms such as collaborative R&D programmes. Increase the effectiveness of 'interface' organisations such as Technology Transfer Offices (TTOs) by encouraging them to join forces, broaden service delivery and improve levels of professionalisation. In addition, promote science-business co-operation via mechanisms such as industrial PhD schemes that facilitate inter-organisational mobility.

Improving Networking via Participation in EU-level Initiatives

Devote resources to the development of strategic intelligence systems that can inform decision-making about participation in EU-level initiatives such as Public-Public Partnerships (P2Ps), Public-Private Partnerships (PPPs) and other international networks. Use them to develop a strategic approach and prioritise those that can provide experience likely to enhance FP participation in future. Firmly embed efforts to increase the internationalisation of R&I activities within regional and national 'smart specialisation strategies' for R&I. Provide financial incentives to research performers to stimulate participation in EU-level initiatives and take advantage of the increased 'openness' of initiatives such as ERA-NETs, COST and EIT-KICs and other schemes that support cross-border and inter-regional R&I activities.

Rectifying Information, Communication and Skills Deficits

Develop coherent packages of support instruments specifically designed to enhance FP participation by rectifying weaknesses and capacity deficits in regional and national innovation systems that make it difficult for R&I performers to access relevant information about FPs, find relevant partners and prepare good proposals. Improve the provision of information and advisory services to potential and actual participants by adopting proactive, client-centred approaches; stepping-up the scale and scope of available information services; better targeting of R&I performers, especially SMEs; and upgrading levels of professionalism within National Contact Point (NCP) structures. Launch initiatives to bring national actors and activities to the attention of international audiences and support schemes that help research managers to design and manage FP projects. In addition, lower entry barriers by offering financial incentives to prepare proposals and participate in FP projects.

'Synergy' Lessons

Prioritise efforts to realise ESIF-H2020 synergies since there is now a legal mandate to maximise them. To facilitate these efforts, adopt a common conceptual framework that distinguishes between **dynamic synergies** (ESIF-H2020 synergies that can be expected to occur on a consistent, systemic, long-term basis within 'joined-up' governance environments); **strategic synergies** (ESIF-H2020 synergies that result from policy alignment and the creation of shared strategic frameworks); and two kinds of **operational synergies**: serial and parallel operational synergies. **Serial operational synergies** occur when a programme, project or other initiative supported, for example, by ESIF builds sequentially on one supported by H2020 (or vice versa), or leads to or facilitates another initiative that would not have happened otherwise. **Parallel operational synergies** occur when there are complementary interactions between ESIF and H2020 initiatives that are contemporaneous rather than sequential). It is also useful to distinguish between **intentional synergies** that are the outcome of deliberate attempts to create them and **incidental synergies** that are more fortuitous.

Dynamic Synergies

Understand that the term 'dynamic synergies' is not used to describe a new type of synergy: it describes instead a virtuous situation in which the occurrence of strategic and operational synergies is expected to occur on a continual rather than a one-off basis. Recognise, too, that dynamic ESIF-H2020 synergies are the result of changes in governance structures and cultures that lead to the creation of synergy-friendly environments via the erosion of communication barriers between different 'silos' within administrative structures. These changes always take time and demand high-levels of political commitment. To start the process, ensure that the long-term benefits of environments conducive to dynamic synergies are well understood by constituting platforms and processes that enable a structured dialogue to take place between all relevant stakeholders.

Strategic Synergies

Recognise and acknowledge that involvement in EU-level initiatives can facilitate the pursuit of ESIF-H2020 synergies and provide experience in strategy formulation at an international level that can benefit similar strategy development exercises at home. Treat the formulation of smart specialisation strategies, which are a prerequisite for ESIF funding, as an opportunity rather than an imposition. Tackle problems of mutual interest to different regions via macro-regional strategies that allow the synergistic alignment of policies and resources. Recognise too that involvement in strategy development and the pursuit of strategic ESIF-H2020 synergies can help foster the erosion of endogenous silos and the development of environments conducive to the eventual emergence of dynamic synergies.

Serial Operational Synergies

Prioritise the pursuit of intentional synergies that enhance 'Widening' prospects by using ESIF to launch schemes that support the preparation of H2020 proposals

or facilitate the entry of R&I performers into global networks. Use ESIF and national funds to support positively evaluated but unfunded H2020 proposals via Seal of Excellence (SoE) accreditation schemes that substitute H2020 evaluation procedures for indigenous procedures, thus cutting management and administration costs. Recognise that incidental serial synergies (synergies that occur serendipitously rather than as a consequence of deliberate policy initiatives) may still be important from a policy perspective because they provide examples of the benefits that result from the sequencing of ESIF and H2020 activities (e.g. when an ESIF supported activity puts R&I performers in a better position to win H2020 projects, or when the results of H2020 projects are further developed via ESIF-supported activities).

Parallel Operational Synergies

Take advantage of the many opportunities that currently exist for regional and national authorities to benefit from parallel ESIF-H2020 funding synergies attained through participation in EU-level initiatives such as ERA-NET COFUND schemes. Recognise that while the rules governing them are simple to understand in theory, applying them in practice can involve steep learning curves. Take advantage of documents and services provided by the Commission to traverse these curves, but work with the Commission to establish better ways of resolving ambiguities and vanquishing uncertainties in a speedy and effective manner. In addition, take the initiative by strengthening indigenous strategic intelligence capabilities and investing in staff training relevant to the implementation of synergies. To maximise the potential for synergies, also ensure that national and regional accounting and auditing practices are simplified and as closely aligned as possible with those of different EU authorities in order to reduce the administrative burden associated with rule compliance and multiple audits.

EU Policy Lessons

Although the MLE concentrated on lessons and policy imperatives relevant to national and regional authorities, some suggestions for EU policy emerged. In particular, the EU should:

- Continue to emphasise activities that support 'Widening' and 'Synergies' within Horizon Europe and the new Cohesion Policy Framework;
- Maintain a strong focus on 'Widening' and 'Synergy' policies that can assist the EU13 countries, but ensure that support is customised to the needs of individual countries and regions and also available in specific instances to EU15 countries likely to benefit from support;
- Ensure that the regulations governing the use of ESIF and H2020 funds are fully harmonised;
- Work closely with national and regional authorities to ensure that accounting and auditing practices at EU and regional and national levels are as closely aligned as possible;

- Revise State Aid regulations in line with a desire to ensure that funds from different EU sources can be combined easily at point of use;
- Provide greater support for the provision of information and advisory services that would make it easier for regional and national policymakers to promote and implement activities that involve the combination of funds from different sources.

1 INTRODUCTION

For many years, a central goal of the European Union (EU) has been to improve the research and innovation (R&I) capabilities of its Member States, a key step in improving social and economic well-being. This involves improving the performance of individual National and Regional Innovation Systems (NIS and RIS) as well as decreasing the wide gap that currently separates the least from the best performing systems.

In budgetary terms, the two largest support mechanisms at the EU's disposal for developing R&I capabilities are the Framework Programmes (FPs) and the European Structural Investment Funds (ESIF). In very broad terms, the former is a source of competitive funding that promotes 'Excellence' and the latter is a source of funding that supports 'Cohesion' by allowing lagging countries and regions to invest in and upgrade R&I capabilities. Operating in conjunction, these two mechanisms should theoretically improve NIS performance and narrow the R&I gap between countries.

Figure 1 shows that the EU13² countries are not too dissimilar from the EU15 countries in terms of capturing EU H2020 contributions when these are expressed as a proportion of Gross Expenditure on R&D (GERD),³ but GERD is so much lower in the EU13 countries that the actual levels of H2020 contributions are very small compared to those captured by the EU15 (see Figure 2). Weak national capabilities mean that the EU13 countries miss out on many of the opportunities that FPs provide to improve R&I performance. Increasingly, therefore, finding ways of **Widening Participation in FPs** has become a policy imperative.

If widening efforts lead to increased H2020 contributions in the EU13 countries, the need to ensure synergies between H2020-related activities and activities supported via the use of other funds will also grow. It will be particularly important to achieve **ESIF-H2020 synergies**, since it is vital that funds emanating from one EU source act synergistically with those from another.

This will be especially so in EU13 countries with low levels of GERD and Research Intensity⁴ (see Figure 3), since these are generally the countries with the highest dependence on ESIF. Figure 4 shows European Regional Development Funds (ERDF)⁵ for R&I over the period from 2014-2016, expressed as a proportion of GERD for the same period. It is clear that the low R&D intensity EU13 countries are much more dependent on ESIF than the high R&D intensity EU15 countries.

The task of widening participation is thus inextricably linked to efforts that attempt to capture the benefits of ESIF-H2020 synergies in EU13 countries.

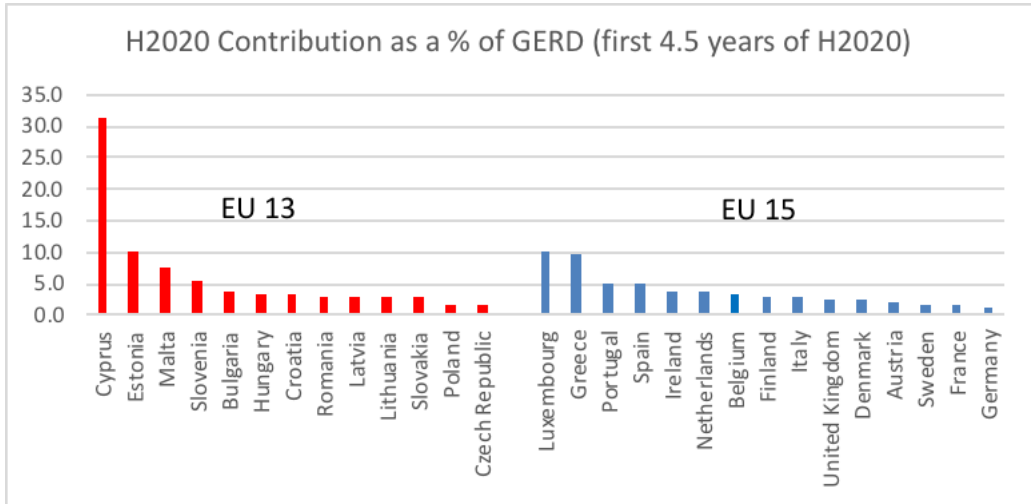
² The EU13 countries shown in Figures 1-4 are those joining the EU since 2014.

³ Some EU13 countries, e.g. Cyprus, Malta and Estonia even outperform most EU15 countries.

⁴ Research Intensity is GERD expressed as a proportion of Gross Domestic Product (GDP).

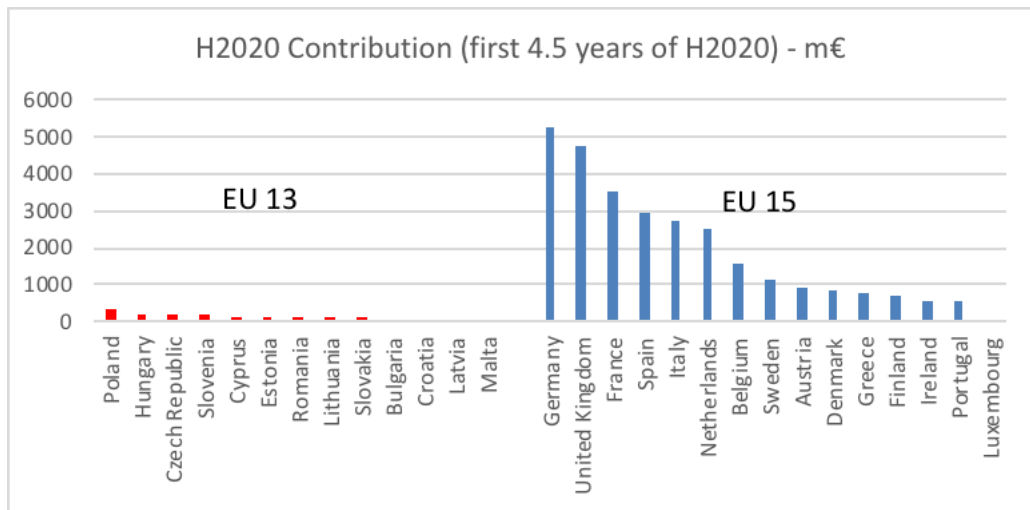
⁵ ERDF is a component of ESIF, some of which is used to support R&I activities.

Figure 1. H2020 Contribution as a Proportion of GERD (first 4.5 years of H2020)



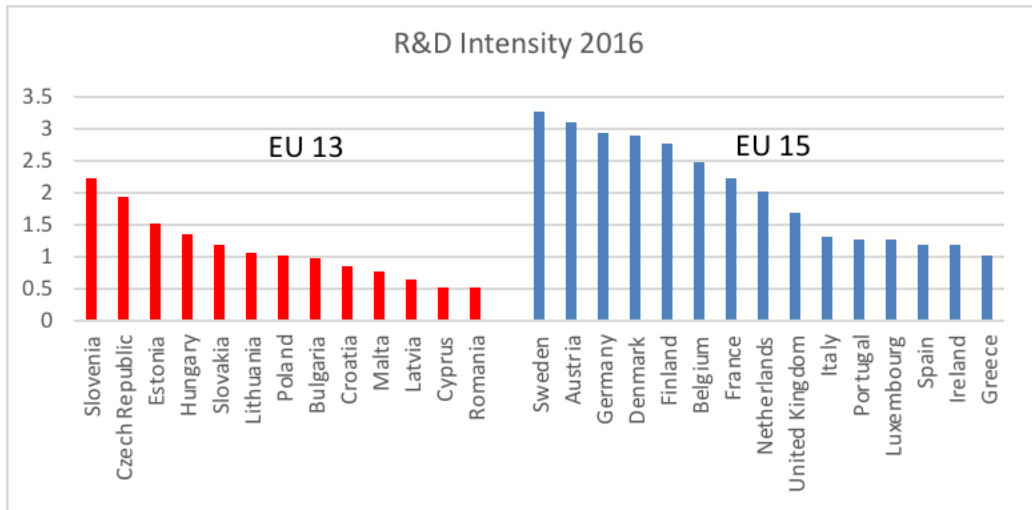
Source: European Commission (2018), From Horizon 2020 to Horizon Europe – Monitoring Flash #1.1 Country Participation, DG Research and Innovation
<https://ec.europa.eu/research/evaluations/index.cfm?pg=monitoring>

Figure 2 H2020 Contributions (first 4.5 years of H2020) - m€



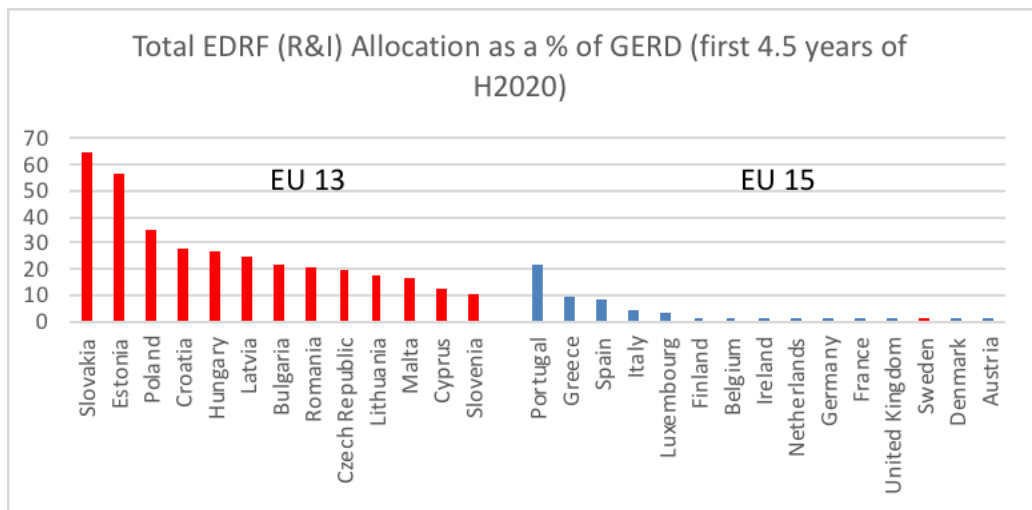
Source: European Commission (2018), From Horizon 2020 to Horizon Europe – Monitoring Flash #1.1 Country Participation, DG Research and Innovation
<https://ec.europa.eu/research/evaluations/index.cfm?pg=monitoring>

Figure 3. R&D Intensity (GERD as a % of GDP), 2016



Source: European Commission (2018), *Science, Research and Innovation Performance in the EU 2018*, DG Research and Innovation
https://ec.europa.eu/info/sites/info/files/srip-report-full_2018_en.pdf

Figure 4. Total EDRF (R&I) as a Proportion of GERD (first 4.5 years of H2020)⁶



Source: European Commission (2018), *From Horizon 2020 to Horizon Europe – Monitoring Flash #1.1 Country Participation*, DG Research and Innovation; and European Commission, *European Structural and Investment Funds Data*
<https://ec.europa.eu/research/evaluations/index.cfm?pg=monitoring>
<https://cohesiondata.ec.europa.eu/EU-Level/ESIF-2014-2020-FINANCES-PLANNED-DETAILS/e4v6-qrrq>

⁶ Total EDRF includes the Commission contribution and the national contribution. The EDRF allocation for 2014-16 was estimated on a *pro rata* basis from the allocation for 2014-2020.

This report summarises the results of work performed during the course of a Mutual Learning Exercise (MLE) on 'Widening Participation and Strengthening Synergies' (WPSS). This was conducted under the auspices of the Policy Support Facility (PSF) set up by DG Research and Innovation (DG RTD) under Horizon 2020 (H2020) to support countries in reforming their R&I systems. It was underpinned by the following two premises:

- Widening participation in the FPs can help countries to tap into their unexploited R&I potential and improve overall R&I performance;
- Ensuring and strengthening synergies between FP-related activities and those supported by the ESIF can improve the overall efficiency and effectiveness of public funding for R&I, enhance the performance of R&I activities and improve FP participation prospects.

Thirteen countries (Belgium, Bulgaria, Cyprus, Croatia, Germany, Hungary, Latvia, Poland, Portugal, Slovenia, Sweden, Spain and Turkey) expressed an interest in participating in the MLE, with Germany participating as an observer.

The schedule for the MLE called for eight workshops: an initial scoping workshop; a kick-off meeting; four 'mutual learning' workshops held in different countries to discuss background papers, examples of good practice and issues of concern; and two further meetings to discuss and approve the contents of this report, which summarises the main findings of five separate Topic Reports that were generated as a consequence of the workshops.⁷ A full list of all meetings and reports can be found in Appendix 6, and all documents, together with this summary report, can all be found on the PSF website:

<https://rio.jrc.ec.europa.eu/en/policy-support-facility/mle-national-practices-widening-participation-and-strengthening-synergies>

After this introductory **Section 1**, **Section 2** covers topics directly related to widening participation in FPs, while **Section 3** deals with the various ways in which synergy can be enhanced between EISF and FPs, in particular the current H2020 programme. A final **Section 4** offers some overall conclusions and main messages that should hopefully guide national, regional and EU policy makers as they attempt to widen participation and strengthen synergies.

⁷ **Topic Report 1:** Attracting Qualified R&D Staff in the Public and Private Sectors
Topic Report 2: Encouraging Science Business Cooperation
Topic Report 3: Improving Networking through Participation in EU-level Initiatives
Topic Report 4: Skills Development, Information, Communication and Training
Topic Report 5: Strengthening Synergies

N.B. All reports, including the Summary Report, took into account material received and policy documents in existence prior to a cut-off date of 26/06/18.

2 WIDENING PARTICIPATION IN H2020

2.1 Routes to Widen Participation

2.1.1 Context

The focal points for this MLE were established by participating countries during an initial scoping workshop. Widening participation in FPs was one of them. This has been a major concern of policymakers for many years. At an EU level, initiatives aimed at widening participation⁸ have been specifically targeted at 'Widening' countries.⁹ This MLE, however, was firmly focused on activities that national and regional policymakers in these countries could undertake themselves in their own countries within the current EU policy context.

Countries with more advanced innovation systems and higher research intensities tend to receive substantially higher absolute amounts of H2020 contributions (see Figures 2 and 3). All steps that countries can take to improve their regional and national innovation systems are thus likely to lead to higher FP participation. Key capacity building steps involve:

- **Attracting qualified R&D staff** from abroad to work in the public and private sectors, thereby enhancing institutional capabilities and putting potential participants in a better place to link with foreign actors and participate in successful H2020 proposals;
- **Encouraging science-business co-operation** in national contexts, thus familiarising potential participants in H2020 with the type of collaboration between public and private sector actors that is expected within most H2020 projects;
- **Improving networking through participation in EU-level initiatives**, thereby gaining experience of collaboration on an international basis.

Initiatives are also needed that specifically attempt to enhance the FP participation prospects of R&I performers by:

⁸ **Teaming**: Teaming projects aim at creating or updating existing centres of excellence via the coupling of their activities with leading centres of excellence in other countries.

Twinning: Twinning projects link emerging institutions with at least two internationally leading counterparts in Europe in specific fields of research, focusing in particular on short-term staff exchanges, expert visits, on-site or virtual training, workshops, conference attendance, dissemination and outreach activities.

ERA Chairs: ERA Chairs allow research institutions in 'Widening' countries to enrol outstanding academics with proven research excellence and management skills in the hope that these can attract high-quality research teams.

⁹ These 'Widening' countries are the EU13 countries (Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia) plus Portugal and Luxembourg.

- **Rectifying information, communication and skills deficits**, enabling R&I performers to become better informed about FP possibilities, more visible on an international stage and better equipped in terms of skill sets to formulate FP proposals and participate in FP projects.

MLE participants were particularly interested in these four capacity building routes to the widening of participation in H2020. Determined steps along them should ensure a strong R&D community that has adequate experience of science-business cooperation at national and international levels, good access to relevant information sources and contact points, and sufficient skills in project formulation and management to prepare for and participate in H2020 projects.

During the MLE, participating countries shared experiences along these individual routes and the main lessons learnt and associated suggestions for policymakers and administrators are documented in Sections 2.2-2.5.¹⁰ Overall, however, some lessons emerged concerning all routes to widening participation.

2.1.2 Policy Suggestions and Lessons Learnt

Locate efforts to widen participation firmly within the context of coherent, long-term national and regional strategies to enhance R&I system performance.

Historically, some of the most impressive and successful attempts to widen participation have occurred when countries have benefitted from high-level political commitment to the construction of national strategies that place R&I at the heart of economic development. In this context, the example of Ireland was much appreciated by MLE participants.

Make sure that there is adequate coverage of all four capacity-building routes covered in this MLE within policy packages that aim to strengthen R&I system performance.

All the routes discussed in the MLE tackle capacity deficits that are common in the 'Widening' countries. Progress along individual routes is necessary but insufficient. Good practice reviewed in this MLE linked different instruments in packages with the specific objective of increasing participation in FPs.

2.2 Attracting Qualified R&D Staff in the Public and Private Sectors

2.2.1 Context

An important way of increasing the prospect of successful entry into FPs is to increase the calibre of the R&I community in general, and one approach that has attracted a great deal of policy interest in the past, especially in the public sector,

¹⁰ The Accompanying Topic Reports 1-4 provide much more detail concerning good practice and lessons learnt than could be included in this Summary Report.

involves recruiting highly qualified staff from abroad via international mobility schemes.

Many EU regulations, directives and initiatives exist that have an impact on the international mobility of qualified R&D staff, and many national schemes are designed to promote the hiring of qualified R&D staff *per se*, but, in keeping with the spirit of this MLE, our focus lay on national schemes for qualified researchers, specifically international mobility schemes for researchers in the public and private sectors.

In essence, four types of **international mobility scheme for researchers in the public sector** can be distinguished:

- **Inward mobility schemes**, where the aim is to attract talent from abroad to work in public sector institutions such as Higher Education Institutions (HEIs) and Public Research Organisations (PROs);
- **Outward mobility schemes**, where the aim is to encourage indigenous R&I personnel to gain experience in other countries, with the expectation that they will either return to the country at some time in the future or otherwise link with the indigenous R&I community via 'virtual mobility' networking schemes;
- **Returnee mobility schemes**, which deliberately set out to encourage members of the international diaspora to return to the country;
- **Virtual mobility schemes**, which actively enjoin diasporas, other foreign researchers and indigenous researchers in joint activities, often involving short-term inward and outward visits.

All these schemes differ in terms of target groups, duration, financing mechanisms and the range of costs covered. For example, some aim to attract 'stars' i.e. highly-qualified, experienced researchers while others aim to attract young researchers that demonstrate potential. Similarly, some only cover short-term travel costs while others can cover individual salary costs, team salary costs, project funding, and funds for equipment and infrastructure development. The range of schemes in existence is illustrated in Appendix 1.

National schemes supporting mobility aimed specifically at the **private sector** are much less common than those aimed at the public sector. Schemes that do facilitate private sector mobility are generally either inward mobility schemes aimed at industry that are open to foreign researchers (e.g. the Torres Quevedo Programme in Spain, which helped private sector firms to recruit 74 non-Spanish PhDs during 2013-15, or schemes primarily concerned with public sector mobility that also facilitate private sector mobility (e.g. the Unity through Knowledge Fund in Croatia, which supports various types of mobility, including the recruitment of foreign researchers by industry).

2.2.2 Policy Suggestions and Lessons Learnt

Recognise that significant efforts are needed to overcome many of the deep-seated barriers that confront the successful implementation of mobility schemes. In many instances, these efforts will require political commitment to the erosion of institutional rigidities in the public research sector.

The mobility schemes discussed during the course of the MLE demonstrated that significant barriers have to be overcome when designing and choosing appropriate combinations of schemes to satisfy the needs of public and private sector actors. These include:

- Low levels of R&I competence in a country and correspondingly low remuneration rates for indigenous researchers that act as a deterrent, especially for 'star' researchers;
- Institutional rigidities that lead to a failure to valorise foreign experiences in the career paths of researchers;
- Similar rigidities that lead to a lack of transparency concerning researcher recruitment procedures;
- Lack of accreditation procedures to establish the equivalence of foreign qualifications;
- Lack of adequate information about existing schemes and the potential availability of research positions both at home and abroad;
- Limited opportunities for partners to gain employment and for family members to benefit from appropriate educational facilities;
- Language and cultural barriers.

Prioritise circular mobility packages that complement inward mobility schemes with other types of scheme.

Many countries have established 'packages' that include different types of mobility scheme, especially inward and linked returnee schemes, though the benefits of outward schemes aimed at gaining greater familiarity with international endeavours have been less appreciated in many 'Widening' countries. Outward bound researchers who do not envisage returning home, for example, can become important bridgeheads to research activities in their destination countries via 'virtual mobility' schemes that actively encourage links between indigenous researchers and diasporas (and other foreign researchers) in the form of project collaborations. Recommended practices for 'Widening' countries that were reviewed in this MLE and could be incorporated in mobility 'packages' include:

- Inward schemes that offer sufficient incentives in terms of salary levels, project funding and research infrastructures to attract 'star' researchers.

Examples include the Flemish Odysseus programme and the Polish International Research Agendas programme (IRAP);

- Relatively low-cost 'shuttle' schemes designed to attract 'star researchers, with a number of 'micro-stays' and intense on-line interactions replacing lengthy stays abroad. These are particularly appropriate when resources are insufficient to attract 'star' researchers to relocate for long periods of time;
- Outward mobility schemes involving a return phase, including short-term schemes aimed at gaining experience abroad. A good example is the NEWFELPRO scheme in Croatia;
- Initiatives that attract or connect with researchers from the diaspora in order to build bridges between the domestic research system and foreign systems. Examples include the Unity through Knowledge Fund in Croatia, the Irish Wild Geese Network and the Irish practice of including members of the diaspora on the Board of the Irish Science and Innovation Council.

Ensure sufficient financial and non-financial incentives are in place to encourage and reward mobility within mobility-friendly regulatory environments.

Low levels of R&I competence, poor research conditions and unattractive career prospects within a country are the biggest disincentives to both foreign researchers and returnees. This typically means that incentives to move location have to outweigh disincentives, which is difficult to achieve when national rules bar the payment of higher salaries to incoming foreign researchers used to more generous salary scales. Complementary incentives and regulatory reforms are often needed. These include:

- Grant schemes and scholarships that carry with them the prospect or promise of grant extensions, future employment and secure tenure tracks;
- Family-friendly assistance schemes that, for example, help the partners of researchers to find employment. The dual-career support offered by the Humboldt Foundation to visiting professors provides a good example;
- Accreditation schemes that ensure recognition of qualifications across borders and sectors;
- The incorporation of mobility as a positive criterion when assessing career prospects in HEIs and PROs;
- Promotion of English as the common language within education and/or research environments, as practised in Slovenia, Estonia and Flanders.

Pay greater attention to private sector mobility, either via new dedicated schemes or by adapting existing public sector schemes.

Companies in many 'Widening' countries are at a relative disadvantage compared to companies in stronger economies and would benefit from greater public

assistance aimed at inward mobility. There is scope for more schemes specifically dedicated to private sector mobility and greater efforts to ensure that firms are aware of existing schemes that can help them to recruit foreign researchers from abroad. Existing public sector schemes could also be modified to include private sector hosting organisations. The TECHNIOspring PLUS programme in Catalonia provides a good example of a programme that supports inward, outward and returnee mobility schemes involving companies located in Catalonia.

Expand the evidence base for mobility policy formulation.

Mobility schemes vary in nature and offer solutions for different types of problem: an appropriate mix is needed that meets national needs. Greater intelligence is needed on both problems and potential solutions, however, if effective strategies are to be developed and appropriate mobility schemes chosen. This will require:

- Better understanding of existing country-specific barriers to the implementation of successful mobility schemes;
- The use of 'smart' monitoring systems that would allow real-time and *ex post* analyses of the ways in which schemes are implemented;
- The more widespread evaluation of mobility programmes and the development of Key Performance Indicators (KPIs) that allow performance to be assessed and compared. The KPIs developed in Turkey to assess the success of its 'Attracting Qualified Human Resources programme' constitute an example.

2.3 Encouraging Science-Business Co-operation

2.3.1 Context

Participation in FPs almost invariably means that successful applicants will be involved in collaborative endeavours involving public sector science actors, such as HEIs and PROs, intermediaries such as Research and Technology Organisations (RTOs), and commercial enterprises, both large and small. Previous experience in national and regional contexts of science-business cooperation is thus a valuable asset and policy efforts designed to encourage this can benefit both public and private sector actors.

In reality, a tremendous amount of policy attention has been paid to science-business cooperation over the last fifty years, especially since it was recognised that interactions of this nature underpin the creation and maintenance of well-functioning innovation systems. One consequence of this is that a multitude of policy instruments have been developed to encourage and sustain science-business cooperation. Another is that the amount of material on good practices available for sharing during the course of this MLE was voluminous. So voluminous, in fact, that it was not possible to cover all relevant practices in any great detail. The coverage of science-business cooperation in this MLE, therefore, focused on:

- Brief descriptions of the different types of instrument that are used to promote and support science-business cooperation and **the lessons that practice to**

date can tell us about appropriate policy mixes, i.e. lessons concerning the relative appeal and efficacy combinations of instruments that can be applied to support science-business cooperation;

- **The lessons to be learnt concerning three instruments**, all of which were of particular interest to participants in the MLE: Technology Transfer Offices (TTOs) in HEIs; Industrial PhD schemes; and Collaborative R&D programmes.

The instruments available to support science-business cooperation can be classified in terms of their **targets** into:

- Instruments that target the public research sector in an attempt to strengthen capabilities and ready actors in this sector for collaboration with industry;
- Instruments that target the business sector, again readying them for collaboration with public sector science institutions and increasing their capacity to take advantage of science inputs;
- Instruments that target the interface between the two sectors, establishing appropriate linkage mechanisms.

Within each of these categories, three **types** of instrument are generally deployed:

- Instruments that allow institutions to finance their own activities or establish and reconfigure institutional structures. Instruments such as these can facilitate changes to existing HEI structures and the setting up or strengthening of institutions such as RTOs, TTOs, Business Advisory Services, Science and Technology Parks, Innovation Clusters etc.;
- Instruments that involve the funding of programmes or schemes that range through incentive schemes for spin-offs, industrial PhD schemes, mobility schemes, collaborative R&D programmes, innovation vouchers etc.;
- Instruments that involve the use of non-financial incentives to stimulate science-business cooperation. These incentives can be designed to reorient public research to the needs of industry, incentivise academics to work with industry, involve businesses in innovation strategy development etc.

Examples of all these instrument types exist in Europe and are summarised in Appendix 2.

2.3.2 Policy Suggestions and Lessons Learnt

Ensure that science-business co-operation policy packages address the public sector science base, the business community and the interface between them.

Experience tells us that effective policy mixes aimed at strengthening science-business co-operation cover a broad spectrum spanning all Technology Readiness Levels (TRLs) and instruments that range from short-term project support to

long-term funding for infrastructure development. In particular, policy mixes need to include a variety of instrument types aimed at all three targets i.e. the public science sector; the business sector; and the interface between them. This ensures that:

- HEIs, PROs and RTOs are adequately geared to the task of co-operating with industry and are fully capable of doing so. This is especially necessary when the public research sector is weakly oriented to the needs of industry and society at large;
- Companies have the necessary inclination and skills to interact with the public research sector. Measures addressing this issue are particularly appropriate when industry does not have a track record of working with the public sector or utilising its outputs;
- Adequate linkage mechanisms and incentives are in place to encourage and support interactions between the two communities.

Complement simple linkage mechanisms such as collaborative R&D programmes with instruments that support a wide variety of science-business interactions.

In terms of problems that merit policy responses, capacity deficits on the science and business sides in weaker innovation systems need to be addressed as a priority, but measures attempting to initiate science-business linkages are just as important. Relatively simple measures such as collaborative R&D schemes constitute very effective linkage mechanisms. They often need to be complemented, however, by instruments that support a wide variety of science-business interactions. These can include support for problem-solving via contract research, the establishment of knowledge co-creation spaces and facilities, and people-based activities such as public lectures by industrialists, participation of company personnel in educational and training schemes, and the involvement of industry representatives on the boards of HEIs and in regional R&I strategy development exercises. Interactions such as these between research and innovation actors in the public and private sectors underpin the development of modern knowledge economies. Policies that encourage them can help catalyse enduring partnerships.

When the 'science pillar' is weak, prioritise reforms that aim both to improve the excellence of the science base and to reward cooperation with industry.

Good examples can be found of schemes that provide support for the science base but also orient public sector research activities towards the needs of industry. In Estonia, for example, the baseline funding formula for R&D in the public sector has been changed to put more weight on work with industry and involvement in transnational research, while in Spain academic researchers are allowed to top-up their salaries (within limits) when they cooperate with industry in R&D projects.

On the 'business pillar' side, implement schemes that raise awareness of the benefits of science-based innovation and cooperation with public sector researchers, but also ensure that schemes are in place to lower the risks involved in the exploitation of research results.

Schemes supporting collaboration between science and business actors are now commonplace, but schemes aimed at initiating such interactions and schemes designed to help all partners fully reap the benefits of cooperation, are less frequent. Firstly, firms and academics with little experience of working with each other would benefit from policy instruments designed to broker introductions and familiarise them with the benefits of establishing partnerships. Secondly, concerning risk reduction at the exploitation end of the spectrum, good practices can be found in Ireland, where complementary instruments have been put in place to cover not only the first familiarisation phase but also 'the last mile' of the innovation chain from fundamental and applied research to market launch, a part of the innovation chain that is often neglected by policymakers. Schemes involving public support for pilot and demonstration plants, such as Interreg support for Biobase Europe, are also recommended.

Increase the overall effectiveness of 'interface' organisations such as TTOs by joining forces, broadening service delivery and improving levels of professionalisation.

TTOs can play an important role in science-business cooperation, especially when networking links with local private innovation and commercialisation actors are strong. Specific examples of good practice were covered during the MLE, e.g. the TTO of the University of Leuven in Belgium, but attention focused more generally on attempts to increase overall effectiveness by joining forces, broadening service delivery and improving levels of professionalisation. Although some individual institutions such as HEIs undoubtedly benefit from TTOs with a strong focus on technology transfer, very few HEIs are capable of deriving sufficient revenue from commercialisation activities to justify highly professional, adequately staffed TTOs dedicated solely to technology transfer. Increasingly, therefore, the solution is to join forces with other institutions and take advantage of a shared TTO resource that generates revenue by offering a broader range of services than valorisation assistance. Public support policies can assist in the generation and implementation of such structures and services. In Ireland, for example, if TTOs do not reach a critical size, they are obliged to cooperate with larger structures, while France has created 14 'Technology Transfer Accelerator Offices' (SATTs) that are shared by several HEIs/PROs, with the aim of reducing fragmentation through joint actions and the sharing of methods and good practices.

Support initiatives such as Industrial PhD schemes that act as effective ways of coupling the science and business worlds, especially when efforts are made to ensure that they satisfy academic and company needs.

Support schemes for PhD candidates to spend some of their time in industry and work closely with academic and industrial staff on projects of interest to all parties have a long history in some countries. They help increase the private sector

employability of researchers; upgrade firms' research and innovation capabilities; and improve university-industry relations. They are particularly successful when they reflect the needs of academia and industry; involve adequate and regular supervision by both academia and industry; and are administered in a light and flexible fashion. Good examples can be found in many countries and regions, notably Denmark, the UK and Flanders.

Retain support for collaborative R&D programmes, which continue to be an essential component of strategies to nurture science-business cooperation, especially when conceived within long-term strategies, clearly articulated and designed to satisfy the needs of all parties. They also pave the way for future participation in FPs.

Extensive evaluation evidence demonstrates that collaborative R&D programmes generally meet expectations in terms of outputs and the formation of strong science-business linkages. For universities, there is no trade-off between collaborative research and scientific quality and, for companies, collaboration increases innovative capacity and leads to productivity gains. Success factors include:

- Long-term and stable policy commitment to collaborative schemes;
- A sound rationale and clearly articulated goals;
- Flexible modes of implementation at the project level;
- Efforts to ensure all participants benefit from the collaboration;
- Minimal bureaucracy.

The Academy for Smart Specialisation in the Swedish region of Värmland constitutes a good example of how to integrate support for collaborative R&D within the context of a comprehensive regional innovation strategy.

2.4 Improving Networking via Participation in EU-level Initiatives

2.4.1 Context

Potential FP participants in 'Widening' countries generally lack experience not only in FPs but also in other international programmes and initiatives. Potential partners in other countries are thus frequently unaware of the calibre of R&I actors in 'Widening' countries. Governments entering into such initiatives, especially EU-level initiatives that involve co-funding by various governments and private sector concerns, can facilitate entry for indigenous actors into these international RD&I networks. In turn, this can enhance their visibility and FP participation prospects.

This MLE focused on three types of EU-level initiative:

- **Public-Public Partnerships (P2Ps)** in research and innovation are networks of public organisations (ministries, funding agencies, programme managers)

from interested EU countries and beyond that join forces to support research and innovation activities under an agreed vision or strategic agenda. P2Ps include networks supported by the European Commission such as ERA-NETs and Article 185 initiatives, as well as Member State-led initiatives such as Joint Programming Initiatives (JPIs).

- **Public-Private Partnerships (PPPs)** involve partnerships between public funding bodies and private sector funding sources that support research and innovation activities. PPPs supported by the European Commission in H2020 include Joint Undertakings (JUs) – also known as Joint Technology Initiatives (JTIs) – and Contractual Public-Private Partnerships (cPPPs).
- **Other Partnerships, Platforms and Networks** that are supported under H2020 include European Innovation Partnerships (EIPs); European Technology Platforms (ETPs); the Knowledge and Innovation Communities of the European Institute of Technology (EIT-KICs); Future and Emerging Technologies (FET) Flagships; and the European Cooperation in Science and Technology (COST) framework. Outside the context of H2020, various initiatives supported by European Structural and Investment Funds (ESIF) facilitate the networking of regional actors; and the Smart Specialisation Platform of the EU's Joint Research Centre helps countries with relatively weak innovation systems to participate more fully in innovation-oriented activities.

Fuller descriptions of these EU-level Partnerships Initiatives are provided in Appendix 3, which also includes details concerning partnerships currently supported in one way or another by H2020.

2.4.2 Policy Suggestions and Lessons Learnt

Embed efforts to increase the internationalisation of R&I activities within national R&I strategies geared to the development of knowledge-based economies.

It is not enough to implement short-term strategies to improve the internationalisation of R&I activities. This needs to be done within the context of long-term, overarching strategies for the improvement of national and regional innovation systems. Ireland has built on success in early FPs by incorporating efforts to increase internationalisation within the context of long-term national policy strategies that recognised the critical importance of R&I in modern economic development. As a consequence, Ireland has successfully improved its national innovation system and its participation in EU networks.

Be strategic and selective when choosing EU-level networks in which to participate.

Within the context of clearly articulated national R&I strategies, it is important for countries to develop specific strands aimed at the internationalisation or Europeanisation of research that include participation in a carefully selected set of EU-level initiatives. This is especially important given the range and complexity of the landscape of EU-level initiatives. EU13 countries with scarce resources cannot contemplate participation in all such initiatives. Choices have to be made

and strategies developed in a participatory, inclusive fashion that are informed by a comprehensive understanding of the choices on offer and the relative benefits they can bring. The national Estonian strategy for participation in research and innovation partnerships, for example, provides a framework in which choices can be made concerning participation in networks that target socioeconomic problems that cannot be tackled by Estonia alone.

Devote resources to the development of strategic intelligence systems that can inform decisions about participation in EU-level initiatives.

Governmental participation in relevant EU-level P2Ps, PPPs and other networks can improve prospects for the participation of indigenous research actors in H2020. Overall, the key to successful participation in EU-level initiatives is careful planning based on adequate intelligence concerning a landscape of EU-level initiatives that has grown increasingly complex over time. This has made it extremely difficult for R&I administrators and performers to develop a comprehensive understanding of the totality of opportunities that are available to potential participants in EU-level initiatives and the steps that need to be taken if appropriate opportunities are to be selected and grasped. This is a knowledge gap that needs to be filled.

Take advantage of the increased 'openness' of many EU-level initiatives.

Entry barriers to countries wishing to participate in EU-level initiatives that stem from resource and capacity constraints are generally higher for 'Widening' countries than for others. Amongst P2Ps, entry barriers are higher for JPIs and Article 185s than they are for ERA-NETs, and the barriers to PPPs are higher still for 'Widening' countries because the relative absence of strong industrial R&D actors within them exacerbates problems caused by scarce public funds for R&I. Some 'Widening' countries also perceive many EU-level partnerships to be 'closed clubs', though increasingly provisions are being made to facilitate the entry of 'Widening' countries:

- Over half of the ERA-NET COFUNDS include 'inclusiveness' features such as dedicated work programmes for newcomers or specific rules that allow new EU13 partners to be added;
- Some JUs specifically welcome non-members or have established systems where a share of the call budget is reserved for non-members, and examples exist of JUs willing to sign MoUs with countries interested in investing ESIF in relevant areas. This is the case for both the Clean Sky JU and the Bio-based Industries JU;
- COST has an 'inclusiveness' strategy and the EIT-KICs Regional Innovation Scheme has incorporated mechanisms to open participation to newcomers.

Take advantage of EU schemes that support specific transnational and cross-border R&I initiatives.

Existing EU 'Widening' initiatives such as 'Teaming' and 'Twinning' offer distinct opportunities for transnational and cross-border collaborations that can enhance

the visibility of 'Widening' countries on an international stage and provide valuable experience relevant to future participation in other EU-level initiatives, including FPs. For example:

- The Research Centre on Interactive Media Smart Systems and Emerging Technologies (RISE) was established in Cyprus with funding from the Teaming initiative, from ESIF, from the national government and from partners in other countries. It is part of a concerted effort to establish Nicosia as a regional innovation, technology and creativity hub;
- The Interreg programme can be used to establish infrastructures that support cross-border applied research involving public and private actors. A good example is the Interreg IV Flanders Netherlands initiative;
- The bottom-up Vanguard initiative encourages regions to work together to support R&I activities of mutual interest. This is an example of a scheme that is essentially industry-driven but relies on the political commitment of regional authorities in different countries to help mobilise relevant actors to take part in RD&I activities. Access is open, though lack of formal funding sources for pilot and demonstrator projects still constitutes a barrier for EU13 actors.

Provide financial incentives to stimulate participation in EU-level networks.

Just as many countries offer support to participants preparing FP proposals (which is dealt with in Section 2.5 below), some also offer financial incentives to organisations applying to other EU-level initiatives. These support partner search and proposal drafting activities. Grants are also available in some countries and regions for organisations such as SMEs to take part in EU-level initiative projects that were positively evaluated but did not receive funding. This is the case in Andalusia, for example, which also provides grants to support SMEs when submitting proposals to international calls.

2.5 Rectifying Information, Communication and Skills Deficits

2.5.1 Context

Potential participation in FPs is hindered in many 'Widening' countries (and elsewhere) by a number of capacity deficits that warrant the attention of policy makers. These include lack of information about FP opportunities and potential partners; lack of visibility on an international stage; lack of the skills necessary to prepare proposals and manage international projects; and lack of financial resources to underpin partner searches and proposal preparation.

This MLE focused on the actions undertaken by Member and Associated States to rectify deficits such as these. In particular, it focused on the following, all of which have the specific aim of improving FP participation prospects:

- The development of **national strategies** to maximise participation in FPs;

- The provision of **information, advice and guidance** to potential FP participants;
- Assistance **communicating and promoting indigenous capabilities** to the external world;
- **Skills development and training** for research managers;
- **Financial incentives** designed to lower entry barriers.

2.5.2 Policy Suggestions and Lessons Learnt

Evolve coherent national strategies aimed at increasing national participation in FPs that involve actions along multiple fronts and complementary interactions between all relevant bodies and initiatives.

Participation is easier for potential applicants if FP work programmes are in line with national capabilities. Many governments try to ensure this by attempting to influence the design and development of FP work streams and by developing national strategies that are either aligned with FP priorities or specifically include enhanced participation in FPs in national R&I goals and strategies, paying particular attention to the inclusion of mechanisms and incentives geared towards rectifying information, communication and skills deficits. During the MLE, national strategies to increase participation in FPs were described for Spain, Turkey, Norway and Denmark. Key elements include:

- The embedding of a national strategy for increased participation in FPs within an overall national strategy for R&I that aims to enhance national capabilities and recognises the importance of international cooperation in the development of a strong modern economy;
- The definition of a complementary set of policy instruments, i.e. a good policy mix, aimed specifically at increasing FP participation;
- A good targeting strategy that focuses on priority groups, raises awareness within them of the benefits of participation and provides them with appropriate support mechanisms;
- Good interaction between all relevant support institutions and coordinated action plans so that duplication is avoided and the prospect of synergy enhanced.

Improve the provision of information and advisory services to potential FP participants by stepping-up the scale and scope of available information services, better targeting of research performers and increased levels of professionalisation within NCP structures.

Organisations and institutions with little experience of FPs are often unaware of the potential benefits of participation and lack sufficient access to information about opportunities and advice about application procedures. To rectify this, networks of National Contact Points (NCPs) provide information and guidance

concerning FPs in all Member and Associate States, though in some instances their activities are complemented by other organisations or networks, e.g. university TTOs, Business Innovation Centres (BICs) and industrial associations. Reviews during the MLE of the services these networks and organisations provide in Spain, Austria, Sweden, Ireland, Turkey and elsewhere suggested that the following measures and actions could improve the delivery of timely and relevant information and advice to potential FP participants:

- The construction of an adequate national knowledge-base containing information relevant to partner searches, proposal opportunities and procedures, examples of good practice etc.;
- Public promotion campaigns alerting researchers and the public at large to the benefits of FP participation and notifying them of the existence of relevant sources of information;
- Efforts aimed at ensuring that there are synergies between NCP structures and services and institution-based services provided by TTOs, BICs etc.;
- The adoption by all relevant actors (NCPs, TTOs, BICs etc.) of more proactive approaches designed to broaden their reach, e.g. by targeting SMEs unfamiliar with the benefits of FP participation;
- Efforts aimed at broadening the scope of information and advisory offers to make them more relevant to the needs of target audiences, e.g. by providing information and advice on other EU-level initiatives as well as FPs; and by offering tailored advice to different target groups via client-centred approaches, as practised in Austria;
- Facilitating these changes via policy instruments that provide financial support for the introduction of expanded service delivery, improved staff levels and enhanced levels of professionalism within NCP structures.

Launch initiatives specifically designed to bring national actors and activities to the attention of international audiences.

Potential FP participants in 'Widening' countries are often not visible to prospective partners in other countries and lack sufficient experience to rectify this, which makes it difficult for them to be invited as partners in projects. This is particularly true for SMEs that are not part of global value chains. National schemes that can improve this situation this include:

- Portals that provide a window on national competences: information portals on the web can provide R&I-related information, including information about FP activities and opportunities, that is of value to indigenous academic and business interests. But they can also act as a window allowing national capabilities to be revealed to the world. ERA Portal Austria, for example, provides information on EU-related R&I policies and its implementation in Austria and Europe but it also acts as a promotion platform for EU-related activities conducted by Austrian participants;

- Active liaison offices in Brussels that promote indigenous capabilities: many countries have liaison offices in Brussels that provide help and assistance to potential and actual FP participants, but they also publicise national capabilities and promote indigenous partners when involved in discussions with the representatives of other countries such as those facilitated by the Informal Group of Liaison Offices (IGLO) in Brussels;
- Support for R&D actors and administrators to spend short stays in Brussels: some countries and regions, e.g. Spain and regions within it such as Murcia, provide support for short stays and courses held in Brussels aimed at improving participation prospects;
- International 'road shows' that highlight national competences: with the Irish Government and Enterprise Ireland working closely together, Ireland regularly holds events in Brussels that highlight and promote Irish R&I assets, while Turkey organises dedicated workshops in foreign countries to highlight indigenous capabilities and seek potential FP partners.

Implement specific schemes aimed at helping research managers to develop the skills necessary to design and manage FP projects.

Potential and existing FP participants with little prior experience of FPs are at a relative disadvantage when preparing proposals and implementing projects. They lack the skills and experience base to take full advantage of the opportunities that FPs present. Specific steps that can be taken to improve these skills include:

- Participation in international learning networks that offer support and guidance based on good practice at national and international levels: these networks include the COST BESTPRAC Targeted Network; the European Association of Research Managers and Administrators (EARMA); and the Informal Group of RTD Liaison Offices (IGLO). Training generally covers issues such as proposal preparation, financial management, contractual issues, Intellectual Property Rights (IPR) etc.;
- Participation in training programmes run for and by NCPs: the NCP Academy organises courses that better equip NCPs to offer advice and training to research managers, and many NCPs include formal training activities within the scope of their services;
- National training programmes and events for research managers: in Spain, there are specific courses leading to degrees that focus on the management and administration skills needed to participate in international R&D programmes. In Sweden, Vinnova organises events, workshops and exchanges between research managers that allow them to discuss and share good practices. In Turkey, researchers are encouraged to become FP evaluators and workshops are held to disseminate the lessons learnt from these experiences;
- The creation of specific structures dealing with international projects: the Euroingenio programme in Spain has financed the creation of offices for

international projects that help universities to train staff and increase levels of professionalisation amongst research managers.

Use direct and indirect financial incentives as a way of increasing participation in FPs, but take care to monitor and evaluate their effectiveness.

Potential participants not only face skills deficits, they often face resource constraints too. Schemes offering financial incentives to participate are frequently needed. These include:

- Schemes covering some of the costs of FP proposal preparation: these are based on the premise that many actors new to FP participation are not in a position to cover all the first-time costs that proposal preparation involves. Support includes grants to explore project feasibility and validation of project ideas; grants to seek advice from specialised consultants; and travel costs for transnational exchanges. Denmark, France, Ireland, Hungary Norway, Poland, Spain and Turkey all have schemes that were discussed during the MLE;
- Schemes allowing national and regional funds to incentivise the submission of FP proposals, FP participation and international cooperation *per se*: these offer direct financial incentives to organisations to submit FP proposals, engage in FP projects and take part in international cooperation. They generally take one of five forms:
 - Increased allocation of institutional funds to universities based on their overall levels of FP participation;
 - Specific top-up programmes that provide supplementary funding to successful FP participants in HEIs, PROs, RTOs and SMEs;
 - Schemes that provide support for positively evaluated but unfunded FP projects;
 - Direct monetary incentives for projects in regional and national programmes that meet international cooperation criteria;
 - Project selection criteria in national and regional programmes that favour international cooperation.
- Schemes supporting intermediary organisations charged with enhancing FP participation: these provide financial support to intermediary organisations and networks whose task it is to stimulate FP participation. In Spain, for example, the Programa de Bonos Tecnológicos (PBT) programme manages a network of agents (consultancy firms, universities, RTOs etc.) that is charged with finding new FP participants, especially SMEs. The incentive for the network members is a performance bonus based on the size of the FP grants awarded;
- Encouragement to individual institutions such as universities to implement internal reward schemes that incentivise FP participation: these include small

grants for proposal preparation, travel and, occasionally, accelerated progress along career paths.

Schemes offering financial incentives to participate are generally regarded as useful, but evaluation evidence concerning their effectiveness is not clear cut. In Norway, evaluation results for a proposal preparation subsidy were extremely positive, while an evaluation in Austria recommended discontinuation of a similar scheme on the grounds that there was little demonstrated additionality. Care should be taken, therefore, to ensure that incentive schemes are carefully monitored and evaluated.

3 STRENGTHENING ESIF-H2020 SYNERGIES

3.1 *Setting the Scene*

The topic of synergies between ESIF and FPs has become increasingly important, so much so that there has been a legal mandate since the start of the 2014-2020 programming period for synergies to be maximised.¹¹ The brief of this MLE, therefore, was twofold: to explore how Member States had approached this task; and to share good practices in order that mutual learning could occur.

ESIF and H2020 are the two most important EU instruments that have been used to support R&I during the 2014-2020 programming period (with budgetary appropriations for R&I of 43.7 billion € and 80 billion € respectively). ESIF addresses the issue of territorial cohesion, with investment allowing Less Favoured Regions (LFRs) to catch up, while H2020 promotes excellence in R&I. Both acknowledge R&I as a driver of jobs and growth.

They both have very different operational modalities, which affects the way synergies can be realised since the activities they support have to comply with the institutional and regulatory structures that govern the use of funds from each source. Appendix 4 provides a brief overview of the main differences.

At an EU regulatory level, there have been numerous changes in recent years that have opened the door for synergies between ESIF and H2020. In particular, the regulations for the 2014-20 EU programmes enlarged the scope for synergies by, *inter alia*, enshrining coordination between ESIF, other EU and national funding instruments in Partnership Agreements; allowing grants from different Commission funding instruments to be awarded to the same beneficiary or project as long as there is no double funding of the same cost items and EU funds are not used as a substitute for national funding; and allowing, in some cases, for the alignment of cost models between ESIF and H2020.

Steps have also been taken to stimulate the synergistic development of policies via initiatives geared towards the alignment of strategies both across different parts of the Commission and between different Commission authorities and national and regional authorities. Probably the most important of these has been the requirement for regions and Member States to develop regional smart specialisation strategies (RIS3s) as a prerequisite to the receipt of ESIF for R&I activities. Typically, multiple R&I stakeholders are involved in the strategy formulation process, and inclusion of those with H2020-related responsibilities can enhance the likelihood of ESIF-H2020 synergies.

For its part, H2020 is also now expected to implement its programmes in a synergies friendly fashion, including efforts encouraging NCPs in Member States to connect to national and regional ESIF policy makers and Managing Authorities (MAs). Specific programmes have also been launched that encourage the use of combined ESIF and H2020 contributions, e.g. the Marie Skłodowska-Curie

¹¹ Regulation (EU) No 1303/2013: Articles 65(11), 70(2), 96(3)d and Common Strategic Framework, Annex 1; Regulation (EU) No 1290/2013, Article 37

COFUND programme, which provides organisations with additional financial support for their own researcher training and career development programmes, and the Teaming and Twinning initiatives mentioned in Section 2.1.

It is in this context that the MLE set out to explore how Member State participants in the MLE were dealing with ESIF-H2020 synergies and what they could learn from each other. Our findings are contained in Sections 3.2-3.6 of this report.

3.2 A Conceptual Framework for ESIF-H2020 Synergies

3.2.1 Context

During the course of this MLE, it became increasingly obvious that people from dissimilar backgrounds viewed synergies between ESIF and H2020 in a variety of lights. In some instances, this was because people defined synergies in different ways. In others, it was because the levels at which they operated and conceptualised synergies differed (e.g. at project, programme, policy and regulatory levels), or because they had different ambition levels concerning the pursuit of synergies. As a consequence, although discussions during the MLE focused primarily on examples of synergies and how to attain them in other settings, a considerable amount of time was also spent contemplating the various ways in which synergies could be classified and defined.

3.2.2 Policy Suggestions and Lessons Learnt

Develop and share a common conceptual framework in which ESIF-H2020 synergies can be discussed and understood as a prelude to policy formulation and implementation.

Conceptual clarity is a priority if ways of implementing synergies are to be understood and absorbed. A major imperative for this MLE, therefore, became the evolution of a shared conceptual framework that would allow all interested parties to learn lessons of direct benefit to their own situations.

The framework presented in this section builds on some excellent texts that have been developed by the European Commission to describe the different types of synergies that can occur and guidelines that could lead to their attainment. Three in particular should be compulsory reading for all parties concerned with ESIF-H2020 synergies.¹² Table 1 draws upon these and adds our own elaborations to define some of the basic terms associated with the concept of synergy.

¹² European Parliament (2016), Research for REGI Committee – Maximisation of Synergies between European Structural and Investment Funds and Other EU Instruments to Attain Europe 2020 Goals [http://www.europarl.europa.eu/RegData/etudes/STUD/2016/585872/-IPOL_STU\(2016\)585872_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2016/585872/-IPOL_STU(2016)585872_EN.pdf)

European Commission – DG REGIO (2014), Enabling synergies between European Structural and Investment Funds, Horizon 2020 and other research, innovation and competitiveness-related Union programmes: *Guidance for policy-makers and implementing bodies* http://ec.europa.eu/regional_policy/sources/docgener/guides/synergy/synergies_en.pdf

In this report, we are primarily interested in intentional synergies, where policy interactions deliberately result in outputs and outcomes that are greater than would have occurred in the absence of the interaction. In real life, however, many attempts to achieve synergies via the act of coordinating different policies, programmes and projects result in outcomes that are coherent and/or complementary, but not synergistic. Many outcomes are also incidental rather than intentional. None of these types of outcome are excluded from this report when there are lessons to be learnt from them, but the main emphasis is on the occurrence of intentional, realised synergies.

Table 1 Terms Related to the Concept of Synergy

Synergy-related Terms	Definitions
Synergy	Synergy occurs when the sum of initiatives as a whole is greater than the sum of the parts ($1+1>2$)
Complementarity	Complementarity occurs when the sum of initiatives as a whole is the same as the sum of the parts ($1+1=2$)
Coherence	Coherence describes situations where the interaction of initiatives is always such that the sum of the initiatives as a whole is never less than the sum of the parts ($1+1\geq 2$)
Coordination	Coordination involves efforts to ensure that the sum of initiatives as a whole is never less than the sum of the parts ($1+1\geq 2$) and always greater than or equal to the sum of the parts ($1+1\geq 2$)
Intentional Synergy	Intentional synergies are those that occur when there is a deliberate attempt to achieve them
Incidental Synergy	Incidental synergies are those that occur serendipitously even in the absence of deliberate attempts to achieve them

The categorisation scheme we evolved for use in this report distinguishes between the different types of synergy shown in Table 2. It builds on typologies described in the documents referenced in the last footnote but adapts them in the light of other descriptions of ESIF-H2020 synergies in the literature and our own analyses based on discussions during the MLE and interviews with officials from the European Commission and Member States.

In subsequent parts of this report we use the taxonomy depicted in Table 2 to present examples of the different types of synergies that occur in practice in

European Commission – JRC (2014), Synergies between EU R&I Funding Programmes. Policy Suggestions from the Launching Event of the Stairway to Excellence Project http://s3platform.jrc.ec.europa.eu/documents/20182/114990/JRC92829_Synergies_EU_R%26I_Funding_Progs.pdf/2300a545-5902-46a9-b5e6-8cd286020fb9

different Member and Associated States. In each section, we also describe the range and nature of some of the problems encountered when trying to attain synergies.

Table 2. A Categorisation Scheme for ESIF-H2020 Synergies

Type of Synergy	Description
Dynamic Synergies	Dynamic synergies is the name given to ESIF-H2020 synergies (of various types) that arise when national and regional administrations responsible for dealing with ESIF- and H2020-related activities collectively configure governance arrangements and communication and coordination structures and processes to ensure that there are continual positive interactions between all parties over extended periods of time. Such changes can create a virtuous environment conducive to the continuous and repeated generation and evolution of synergies over long periods – hence the term dynamic synergies.
Strategic Synergies	Strategic synergies between ESIF and H2020 can occur when different ministries and agencies are involved in EU initiatives aimed at the alignment of policies, the co-creation of strategic frameworks and the exploration of existing strategic frameworks.
Operational Synergies	Operational synergies occur when ESIF and H2020 programmes, projects and other initiatives interact in such a way that their combined outcome is greater than the sum of their parts.
Serial Synergies	Serial synergies , also known as sequential or successive synergies, occur when one programme, project or other initiative builds on another, or leads to or facilitates another that would not have happened otherwise.
Upstream Synergies	The common convention is to say that upstream synergies occur when ESIF initiatives lead to H2020-related activities that would not have happened otherwise. In essence, H2020 activities are thus built on ESIF activities.
Downstream Synergies	Similarly, the common convention is to say that downstream synergies occur when H2020-related initiatives lead to ESIF activities that would not have happened otherwise. Here ESIF activities are built on H2020 activities.
Substitution Synergies	Substitution synergies , also known as alternative synergies, are a special case of downstream activities. They occur when positively evaluated but unfunded H2020 proposals are subsequently financed using funds from other sources, including ESIF.

Type of Synergy	Description
Parallel Synergies	Parallel synergies occur when there are positive, complementary interactions between initiatives that are contemporaneous rather than sequential.
Concurrent Funding Synergies	When initiatives funded by ESIF are complemented by contemporaneous H2020 funded activities, they are in a position to generate concurrent funding synergies (also known simply as parallel synergies).
Cumulative Funding Synergies	When initiatives are co-funded by ESIF and H2020, they are in a position to generate cumulative funding synergies (also known as simultaneous synergies).

3.3 Creating Dynamic Synergies

3.3.1 Context

It is in the interests of all governments if the governance structures they have in place allow the policies they conceive and implement to interact in a synergistic fashion – this is the desired endpoint of ‘joined-up government’. In some instances, however, different parts of governance structures often formulate policies and implement measures in an independent fashion with independent budgets, giving rise to the pejorative concept of autonomous ‘silos’ that rarely interact in a meaningful way.

In theory, a balance has to be struck between autonomy and flexibility of operation on the one hand and, on the other, the need to communicate and coordinate across different spheres of operation in order to ensure complementarity, cohesion and synergy – especially at the policy formulation stage. A balance is needed because communication and cohesion are not costless activities in terms of time and financial resources, and these costs can detract from efficient operation if they are too high.

In reality, institutional rigidities and ingrained modes of functioning lead to silo thinking and behaviour that act as major barriers to the achievement of synergies. If these barriers can be overcome, however, the scene is set for the attainment of positive interactions between all components of governance systems over extended periods of time and the establishment of an environment conducive to **dynamic synergies**, i.e. the continuous and repeated generation and evolution of synergies over long periods in a virtuous circle.

3.3.2 Good Practice

In terms of ESIF-H2020 synergies, one of the first opportunities to establish a path to dynamic synergies at national and regional levels occurs during the formal preparation of Partnership Agreements. Systematic attempts at coordination at this stage and subsequently during programming periods are needed to ensure the continued relevance of ESIF supported actions to national and regional priorities. During this MLE, however, it became apparent that only a few countries

could successfully demonstrate the constant pursuit of synergies through systematic coordination, though others appear to be making progress in this respect. MLE participants were particularly impressed by successes in Ireland and Germany.

Ireland. Over the last thirty years, Ireland has improved its national R&I performance tremendously from a very low base. In so doing, it has established cross governance communication and coordination structures that are conducive to dynamic synergies.

Funded via a mix of funds from a philanthropic source, EU Structural Funds and national funds, the Irish Programme of Research in Third Level Institutions (PRTLTI) was established in 1998. The aim was to help Irish institutions to produce world class research in areas such as science, technology, humanities and the social sciences through a combination of capital funding for infrastructure and recurrent funding for the development of human capital, including graduate programmes for the training of increased numbers of PhDs. Since it started there have been five cycles of awards with a strong emphasis on knowledge transfer and innovation likely to support key areas of economic development.

PRTLTI has been essential to the Irish success story. One of the most important factors underpinning this success was the search to integrate various features into a single funding scheme including an emphasis on research investments, the creation of a more competitive critical mass of research effort and strengthening linkages between teaching and research. Another was the clear elaboration of expected commercial and economic impacts at the point of funding and continuous monitoring throughout each stage of the research process.

Successful development strategies at home underpinned achievements in successive FPs. The evaluation of Irish involvement in FP7 explicitly recognised the strong synergies between national initiatives and FP7, acknowledging that “national programmes provide a valuable underpinning for subsequent success within the European RTD Framework Programme”.¹³

Such synergies have been a concern of the Inter-Departmental Committee (IDC) for Science and Technology for a long time. It has sought over the years to establish an open, communicative, co-ordinated culture across government departments and agencies. In the early 1990s there were significant disconnects between departments with functional responsibility for sectoral R&D (e.g. Health, Marine, Agriculture, Energy, Environment, Telecommunications) and those that funded other research in universities and industry (Education and Enterprise Ireland¹⁴ respectively). This led to the establishment of the IDC. Motivated and chaired by the Department of Jobs, Enterprise and Innovation (DJEI), the role of the IDC is to ensure that each government department is aware, informed and

¹³ <https://dbei.gov.ie/en/Publications/Publication-files/Ex-post-evaluation-of-Ireland%E2%80%99s-Participation-in-the-7th-EU-Framework-Programme.pdf>

¹⁴ The department responsible for industrial development has had different names over time. The Department of Jobs, Enterprise and Innovation (DJEI) is its current name.

consulted about the plans and investment decisions of all other departments with an RTDI budget. Critically, the Finance Department is also a member of the IDC. This is responsible for the allocation of all departmental RTDI budgets and has overall policy responsibility for Structural Funds and primary responsibility for the European Regional Development Fund (ERDF). Other functions of the IDC, apart from communication, consultation and co-ordination, include the development of a national position with regard to Ireland's position and priorities for EU Framework Programmes; the development of national STI Strategies (e.g. Innovation 2020 in 2015) and Priority Setting exercises (e.g. RIS3); and recommendations concerning Ireland's membership of international organisations.

In terms of synergies, there have been numerous examples of upstream and downstream synergies between ESIF and FPs over an extended period of time, with successful initiatives and projects supported by ESIF leading to downstream H2020 projects and ESIF used to support initiatives that build on H2020 results. Their existence owes much to the overall levels of understanding and coordination that exist across the Irish governance system for R&I.

Germany. In 2014, Germany launched an ambitious plan to establish a national-regional dialogue concerning synergies between ESIF and H2020. It was a pilot for a tailor-made, multi-level governance model across policies, programmes and projects spanning different research fields, economic sectors and societal challenges. Led by the Federal Ministry of Education and Research, the dialogue aims to involve all Federal and Regional Authorities responsible for Cohesion Policy and R&I. It provides a communication space for Managing Authorities; H2020 Programme Committees; NCPs; advisory services, including EEN; other key stakeholders; and potential applicants. It aspires to drive the 'entrepreneurial discovery' process associated with the development of RIS3s by better managing information flows; supporting the strategic use of EU funds; and customising applicant support services.

Results of the dialogue are fed back into national policy arenas to kick-start new activities and maximise the impact of existing activities. This structured and open dialogue fosters the commitment of key actors by concretely addressing societal challenges, the needs of key target groups such as higher education institutions, and the use of specific instruments such as public procurement for innovation.

Initial achievements are paving the way for the creation of dynamic synergies. They include the establishment of the 'Synergies Dialogue' secretariat, which manages a web portal¹⁰ on synergies between ESIF and Horizon 2020, organises thematic workshops and publishes regular overviews of Horizon 2020 calls related to smart specialisation and ESIF.

Significant strides towards the erosion of silos and the establishment of dynamic synergy environments have also been taken or are planned in other countries. During the MLE, examples from Austria, the Czech Republic, Estonia, the Slovak Republic, Slovenia, Spain, Sweden and Wales were discussed. Four examples are described briefly below:

- **Austria** has established a steering group on policy alignment that is jointly 'owned' by the Federal Ministry for Transport, Innovation and Technology (BMVIT), the Federal Ministry for Science, Research and Economy (BMWFW) and includes members drawn from the Austrian Research Promotion Agency (FFG) and a public consulting/research organisation (Joanneum Research Policies) to provide scientific advice and support to the coordination process;
- The national R&I strategy for **Estonia** specifically aims to reinforce, with the help of ESIF and national funds, the capacity of Estonian research institutions to participate in forms of cooperation based on excellence, including participation in H2020. In addition, the Estonian Operational Programme (OP) for Cohesion Policy during 2014-20 foresaw activities that would involve international cooperation and synergies with H2020;
- The **Spanish** 'Red de Políticas de I+D+I' is a thematic network for public policies in the areas of RTDI. The network is a tool to generate synergies between public RTDI policies at regional and national levels and between Cohesion Policy and Europe 2020, with a specific focus on FP7 initially and now H2020. It is responsible, *inter alia*, for helping to align the cost models of ESIF programmes, where feasible, with Horizon 2020, and for synchronising the funding decisions of ESIF and other directly-managed EU instruments. It also plans to create a working group to seek potential complementarities and synergies between instruments and promote a common environment between all the different actors involved in the network.
- In **Slovenia**, the concept of synergies between national, ESIF and FP funds is firmly embedded in the Slovenian research and innovation system. The National Research and Innovation Strategy of Slovenia for 2011-2020, for example, mandated the Government to prepare a document detailing the synergistic use of diverse sources for strengthening of research and development system. As a consequence, if a project selected at EU level allows for the use of complementary funding at the state level, the managing authority for ESIF is expected to treat this as a matter of priority.

3.3.3 Barriers

All the above examples suggest that 'silo' thinking and practice can be overcome, but many of the discussions in the MLE focused on the continued existence of a silo mentality in some quarters and why this still persists. There are various reasons why silos continue to thrive in many governance structures. These include:

- **Habit and inertia.** In many settings, institutional structures and processes have become deeply embedded over time. Good reasons for creating independent structures in the first instance may have eroded with the passage of time and changing circumstances, but once ossification sets in these patterns and structures are very difficult to change. This is especially so in governance systems that are resistant to the adoption of modern management systems;
- **Aversion to complexity and risk.** There are often deeply-seated aversions within bureaucratic structures to risk and complexity. Civil servants

accountable to the public are rarely rewarded for taking risks, and changes that involve high perceived levels of complexity are especially unwelcome. Moreover, when habit and inertia are deeply ingrained, all changes are perceived as risky and complex;

- **Relative importance.** If ESIF accounts for only a very small percentage of overall public expenditure on R&I, the virtues of synergy are frequently ignored. Conversely, and more worryingly for ESIF-H2020 synergies, if ESIF constitutes a very large percentage of expenditure on R&I and the H2020 drawdown is very low, the rewards accruing from synergies in the short-term are likely to be small and the long-term benefits unappreciated.

3.3.4 Policy Suggestions and Lesson Learnt

Appreciate that the term 'dynamic synergies' is not used to describe a new type of synergy: it describes instead a virtuous situation in which the occurrence of strategic and operational synergies is expected to occur on a continual rather than a one-off basis.

Recognise that dynamic synergies are the result of changes in governance structures and cultures that erode silos and lead to the creation of synergy-friendly environments. They are rarely the result of focused attempts to create synergies between specific activities or funding streams.

The examples presented earlier of countries that have created environments conducive to dynamic synergies demonstrate that it is possible to overcome obstacles of this nature, but the overriding need is for the political commitment to do so.

One of the first steps down this road is to ensure that the long-term benefits of environments conducive to dynamic synergies are well understood amongst all relevant stakeholders.

The constitution of platforms or processes enabling a structured dialogue on synergies to take place is highly recommended.

3.4 Strategic Frameworks and Synergies

3.4.1 Context

The opportunities that now exist for different ministries and agencies at national and regional levels to participate in the co-creation of strategic frameworks and the implementation of subsequent initiatives and projects that involve ESIF-H2020 synergies are extensive. Apart from self-initiated efforts to develop national and regional strategies that involve various ministries and agencies, multiple other opportunities for these bodies to interact in the synergistic development of policies of mutual interest exist, many of them initiated or supported in some way by the Commission. They range from the development of individual smart specialisation strategies as a precondition for the allocation of ESIF for R&I on the one hand to involvement in strategy development with an

international component within a variety of P2Ps and PPPs (see Appendix 3) on the other. During the MLE, our attention focused on:

- The **development of smart specialisation strategies** in individual regions and countries (RIS3);
- The voluntary development of **macro-regional strategies**;
- Involvement in various **partnership approaches** such as P2Ps and PPPs;
- The **EIT-KICs**.

3.4.2 Good Practice

Smart Specialisation Strategies. During the 2014-2020 programming period, as a prerequisite for ESIF to be allocated to R&I activities, all regions were asked to develop a RIS3 via a process of 'entrepreneurial discovery' involving all relevant actors from the public and private sectors. Moreover, during the process of strategy development, the expectation was that ways of realising ESIF-H2020 synergies would be considered. This is undoubtedly the most important development to date that has stimulated regions to think and act strategically.

To aid them, regions are able to take advantage of the RIS3 Platform established by the EU's Joint Research Centre (JRC).¹⁵ This provides guidance on strategy formulation, including advice on the attainment of ESIF-H2020 synergies. To date, 174 EU regions from 18 EU countries have registered on the Platform. Countries not signed up to the platform tend to be those with fairly advanced research and innovation systems, but even within some of these individual regions have registered on the platform. During the MLE, however, it was suggested that there was scope for regions to make more use of the platform, especially those with little experience of synergy-seeking strategies. In so doing, they could also take advantage of the Stairway to Excellence (S2E) project,¹⁶ launched by the European Parliament and executed by the JRC and DG REGIO, which provides assistance to EU13 countries concerning the attainment of ESIF-H2020 synergies.

Macro-regional Strategies. If EU countries located in the same geographical area voluntarily make a request to the EU Council, macro-regional strategies to tackle problems of mutual interest can now be drafted and initiated by the European Commission and supported by EU funds, including ESIF. They offer the promise of a coordinated approach to the solution of mutual problems in thematic areas such as innovation. The implementation of these intergovernmental strategies relies heavily on the commitment and goodwill of the participating countries. The process is as important as the result: it must be inclusive and bottom up to ensure ownership. Four macro-regional strategies have been developed to date covering the Baltic Sea Region, the Danube Region, the Adriatic and Ionian Region and the Alpine Region. One project of particular interest to the

¹⁵ <http://s3platform.jrc.ec.europa.eu>

¹⁶ <https://ec.europa.eu/jrc/en/research-topic/stairway-excellence-s2e>

MLE was the DanuBalt project, which is being implemented by stakeholders from two macro-regions via cross-strategy cooperation. It aims to tackle the health innovation and research divide in two macro-regions – the Danube and Baltic Sea regions – and is supported by both ESIF and H2020.

European Partnerships. Partnership approaches at an EU-level were described in Section 2.5 of this report, which covered P2Ps such as ERA-NETs and Article 185s and PPPs such as JUs and cPPPs. All these offer an opportunity for various ministries and agencies within a country to become involved in strategy development and the pursuit of synergies:

- Individual ERA-NETs typically involve many countries in strategy development and call implementation, but only single ministries or agencies from each country, so opportunities for the types of interactions between endogenous ministries that can lead to dynamic synergies are limited (unless countries have deliberately evolved a coherent strategy for involvement in ERA-NETs per se or for partnership approaches in general), but ESIF can be used to support ERA-NET COFUND actions that also benefit from H2020 contributions – subject to set rules governing co-funding – so operational ESI-H2020 synergies are certainly possible and have to be taken into account during the strategy development phase of the ERA-NET;
- In like manner, Article 185s, JPIs, JUs and European Joint Programme (EJP) COFUND initiatives all involve participation in strategy development and all potentially can involve both ESIF and H2020 funding streams as long as the rules governing *the* combination of funds are respected (these are discussed in Section 3.6).
- Examples of partnership approaches examined during the course of the MLE were the *Bio-based Industries JU*, which has led to the development of the *Bio-Base Europe Pilot Plant in Flanders*; the *CleanSky2 JU*, which aims to develop innovative technologies to cut aircraft emissions of CO₂ and other gases and reduce noise; and the BONUS Article 185 initiative that integrates research programmes of the Baltic Sea coast countries that are relevant to the sustainable development of the Baltic Sea region. All offer participants an important opportunity for strategic synergies via the coordination of research agendas and international networking and operational ESIF-H2020 synergies, if funding rules are respected.

EIT-KICS. The EIT constitutes another opportunity to create ESIF-H2020 synergies via the development of innovative strategies, though in this instance the strategies are developed by R&I actors that are members of KICs and not by national and regional policymakers. H2020 supports the KICs and these develop strategies to support regional developments. ESIF funding cannot be used to cover participation fees in the KICs but they can be used to finance downstream actions such as R&I projects that are in line with the strategies developed by the KICs.

3.4.3 Barriers

Barriers to the pursuit and realisation of synergies via the development and use of strategic frameworks – regional, national and international – are a mix of the types of barriers that impede the realisation of dynamic synergies (habit, inertia and aversion to risk and complexity) and those that hamper the realisation of operational synergies when ESIF and H2020 funds are combined, either sequentially or in parallel. These are discussed further in Sections 3.5.3 and 3.6.3.

There are ample signs, however, that opportunities to realise synergies via involvement in strategy formulation and implementation exercises are now being grasped. At one end of the spectrum, the top-down imperative that states that ESIF funds for R&I are contingent upon the development of a smart specialisation strategy has been an important driver of change. At the other end, strategic initiatives driven by the R&I communities involved in KICs provide a bottom-up stimulus to regional authorities to think strategically, while partnership approaches constitute an international peer pressure mechanism that obliges regional and national authorities to contemplate strategic approaches that can catalyse ESIF-H2020 synergies.

3.4.4 Policy Suggestions and Lessons Learnt

Recognise that involvement in EU-level partnerships can facilitate the pursuit of ESIF-H2020 synergies and provide experience in strategy formulation at an international level that can benefit similar strategy development exercises at home.

Treat smart specialisation strategies, which are a prerequisite for ESIF funding, as an opportunity rather than an imposition.

Tackle problems of mutual interest to different regions via macro-regional strategies that allow the synergistic alignment of policies and resources.

Recognise that involvement in strategy development and the pursuit of ESIF-H2020 strategic synergies can help foster the erosion of silos and the development of environments conducive to dynamic synergies.

3.5 Serial Synergies at an Operational level

3.5.1 Context

Serial ESIF-H2020 synergies occur at an operational level when either ESIF supported activities lead to or facilitate involvement in H2020 activities (conventionally called **upstream synergies**), or when H2020 projects lead to activities that are subsequently supported by ESIF (**downstream synergies**).

Many instances of both upstream and downstream activities have been reported and many descriptions of them are available as exemplars of the benefits that can accrue when they occur. Some were presented and discussed during the MLE

and many detailed accounts are available on-line.¹⁷ Many occurrences, however, can be termed **incidental** rather than **intentional**. In other words, they were not the result of deliberate attempts by policymakers to use one source to produce outputs specifically intended to lead to a particular activity funded by the other source.

When no direct intent is involved, the immediate lessons for policy formulation might seem slight, but this is not the case. **Incidental serial synergies** of this nature may not be a consequence of deliberate attempts to link specific activities via sequential funding, but they are exactly the kind of synergies expected in a dynamic synergy environment, where activities supported by one source frequently lead to further activities supported via the use of other sources. Here the element of deliberation lies in the creation of a conducive environment in which synergies are commonplace, and the barriers to incidental synergies are ultimately the same as those preventing the occurrence of dynamic synergies.

The downside of random, incidental synergies, however, is that their fortuitous occurrence can be used as an alibi for not pursuing intentional synergy-seeking strategies. This should be avoided at all costs.

3.5.2 Good Practice

There are examples of **intentional serial synergies** that constitute good practice. Financial incentives designed to lower the entry barriers to H2020 were described in Section 2.5.1 of this report, and ESIF can be and has been used for this purpose. In Romania, for example, the Competitiveness Operational Programme funds the creation of centres within research organisations that assist in the preparation of H2020 proposals and the management of ongoing projects. Estonia also has an interesting scheme supporting researchers during the preparation of ERC proposals. If researchers working in Estonian research institutes submit proposals to ERC that are positively evaluated at the first selection stage but do not receive funding after the second stage of the evaluation, ESIF can be used via the Mobilitas Plus programme to reimburse research costs related to a further ERC submission.

This scheme has echoes of Seal of Excellence (SoE) schemes that are growing in popularity. In essence, these are accreditation schemes that allow national and regional authorities to use H2020 evaluation procedures as a substitute for their own, enabling project support to be given to positively evaluated but unfunded H2020 proposals. ESIF can be used as a funding source and hence SoE schemes can be seen as examples of serial downstream synergy, since an activity related to H2020 has to precede the use of ESIF funding. Arguably, however, they merit the use of a separate term – substitution synergy or alternative synergy – since they allow ESIF funds to substitute for H2020 funds when these are not available.

¹⁷ See, for example, <http://s3platform.jrc.ec.europa.eu/synergies-examples>

3.5.3 Barriers

There are few overt barriers to the realisation of intentional serial synergies. The most obvious one relating to SoE schemes is the need to ensure the consistent application of State Aid rules,¹⁸ which does not present a problem unless the amounts involved rise above a certain threshold¹⁹ or lie outside the scope of the General Block Exemption Regulation (GBER) provisions for research and innovation.²⁰ When the threshold is exceeded, for example, the amounts that national and regional authorities can award to local companies are governed by aid intensity levels that frequently mean that applicants cannot receive all the funds articulated in their budget proposals and accepted by the H2020 reviewers. In turn, this can lead to applicants revising their plans in line with reduced budgets, which requires an additional evaluation procedure and negates the point and use of the SoE scheme.

3.5.4 Policy Suggestions and Lessons Learnt

Recognise that incidental serial synergies are important from a policy perspective because they provide examples of the benefits that can result from the sequencing of ESIF and H2020 activities, but only if they stimulate efforts to realise such synergies in a systematic fashion within the context of dynamic synergy environments.

Intentional serial synergies such as those that flow from ESIF-supported schemes that help researchers to prepare H2020 proposals are very important from a 'Widening' perspective and should be encouraged.

Realise substitution synergies by using SoE accreditation schemes to reduce the management and implementation costs of national and ESIF-supported programmes, especially when these schemes are used to support relatively small projects that allow firms to keep within the State Aid 'de minimis' limit of 200,000 €.

3.6 Parallel Synergies at the Operational Level

3.6.1 Context

Parallel synergies at an operational level occur when funds from two (or more) sources simultaneously support either the same activity (co-funding) or separate

¹⁸ State Aid is defined as an advantage in any form whatsoever conferred on a selective basis to undertakings by national public authorities. It is prohibited unless there are specific exemptions. The use of public funds to support R&I activities is allowed within certain prescribed limits.

¹⁹ A 'de minimis' provision allows cumulative business support from all public funding schemes up to a current ceiling of 200,000€ during any three-year period without the need for notification or screening.

²⁰ Research and innovation are subject to the provisions of a General Block Exemption Regulation (GBER) that precludes notification of aid that falls within the scope of the block exemption.

but concurrent activities, producing outcomes greater than those expected in the absence of parallel funding.

It is perfectly feasible for ESIF and H2020 to fund separate but concurrent activities that complement each other in a mutually supportive fashion and have the potential to interact synergistically. These are termed **concurrent funding synergies**. An example provided by the Commission²¹ describes a project on geo-monitoring-based soil analysis that is supported by H2020 on the one hand and a concurrent project, in which one of the H2020 participants is involved, that uses ESIF support to develop more drought/bacteria resistant crops by analysing their reactions to specific soil compositions. The two projects are legally separate, but concurrent synergies are developed through the targeted, parallel use of funds. Similarly, ESIF can be used to support the upgrading of research infrastructures in which recipients of H2020 funds are conducting projects.

Numerous examples of concurrent funding synergies exist. Many of them involve the vigorous pursuit of funds from multiple sources by extremely active R&I actors driven by their own agendas rather than by the agendas of policymakers. The main disincentive for them to seek funding from multiple sources – irrespective of whether this funding is received in a parallel or serial mode – is the administrative burden associated with dealing with different funding rules and auditing practices.

The final category of parallel synergy considered during the MLE was **cumulative funding synergy** – the type of synergy that can arise when ESIF and H2020 funding streams are combined in the same programme, project or other initiative. These are generally of great potential interest to many national and regional policymakers and R&I actors because of the leveraging involved – with the prospect of H2020 resources directly complementing national and ESIF-derived funding. Conversely, they are also the ones where barriers – real and perceived – most actively act to deter interest in some administrative settings.

3.6.2 Good Practice

There are now many opportunities for cumulative synergies to be pursued via co-funding schemes. They have been possible since new rules for participation were introduced for the 2014-2020 period and they are governed by rules that firstly do not allow double financing of the same cost items within the same initiative, and secondly do not allow H2020 funds to substitute for national, regional or private co-funding in ESIF initiatives, and vice versa. Good practice examples discussed in the MLE covered:

Partnership Approaches. We have already seen in Section 3.4.1 that many P2Ps and PPPs involve combinations of funds from different sources: national; regional; private sector; H2020 and ESIF:

²¹ http://ec.europa.eu/regional_policy/sources/docgener/guides/synergy/synergies_en.pdf

- In ERA-NET COFUND initiatives, national bodies collectively launch a call in an area of mutual interest using national funds and ESIF to finance the resulting projects. H2020 funds cover network support and can include a top-up contribution as long as this does not substitute for national/ESIF contributions. Similarly, ESIF contributions cannot be taken into account when calculating the contribution from H2020, which is limited to a maximum of 33 % of national contributions;
- ERA-NET COFUNDS can now also be used to support the implementation of other public-public partnerships, including Joint Programming Initiatives between Member States. ESIF can be freely used within JPIs too, though the rules related to double funding and substitution have to be respected when part of the JPI is implemented via ERA-NET COFUND or Article 185 mechanisms;
- Article 185s integrate national public research funding in particular thematic areas across all the countries involved. ESIF can be added to the budget but cannot be taken into account when calculating the level of the H2020 contribution;
- As long as double funding and substitution rules are respected, JUs can also use H2020 and ESIF funds in addition to private sector funds, either in a concurrent or cumulative fashion. When a cumulative model is used, H2020 and ESIF can be used to fund different Work Packages since these can be treated as separate cost items. Both the Bio-Based Industries JU and the CleanSky 2 JU discussed in the MLE were good practice examples of how cumulative synergies could be attained.

EIT. EIT is funded by H2020 and initiatives designated as KIC Added Value Activities (KAVAs) that are carried out by its KICs are funded 100% by EIT, i.e. ESIF and other funds cannot act as supplements. Other KIC Complementary Activities (KCAs), which account for at least 75% of the budget of a KIC, can combine funds from other sources, including H2020, ESIF and the private sector.

Marie Skłodowska-Curie COFUND scheme. This scheme co-finances doctoral and fellowship programmes for training, mobility and the career development of researchers. H2020 and ESIF contributions can be used concurrently or cumulatively as long as double funding is avoided.

Interreg. Interreg is financed by ESIF out of the ERDF. Although ESIF typically has been spent in the regions to which it is allocated, Interreg is a mechanism that can be used to support interregional cooperation. It can also be combined with H2020 funding via H2020 Coordination and Support Actions (CSAs). One interesting example considered by the MLE was the Screen CSA, which, *inter alia*, aims to develop an EU reference framework for establishing operational synergies between H2020 and ESIF related to the circular economy.

EIB/EFSD/InnovFin. The European Fund for Strategic Investments (EFSI) is overseen by the European Investment Bank (EIB) and EIB manages the InnovFin instrument of H2020 as part of its EFSI mandate. InnovFin provides financing instruments for innovation projects. These cover a wide range of loans,

guarantees and equity-type funding, all of which can be tailored to innovators' needs. Financing is either provided directly or via a financial intermediary, most usually a bank or a fund. EIB loans provided through the H2020 InnovFin scheme can in principle be mixed with ESIF contributions to projects, creating the potential for H2020-ESIF synergies, but to date there have been no instances of such blending. Potential barriers include the difficulty of synchronising input flows from different sources and variations in eligibility criteria from one source to another. In future, Member States wishing to circumvent the synchronicity problem could earmark ESIF funds for projects selected via use of the InnovFin instrument. Following the same philosophy as SoE schemes, ESIF funds could be released with minimal delay once projects are approved by InnovFin.

3.6.3 Barriers

The leverage aspects associated with the use of parallel ESIF-H2020 funding streams are attractive, especially in contexts where national resources are scarce. It is also arguable that the basic rules governing the parallel use of these funds – related to double funding, substitution and, where applicable, State Aid – are clear and relatively unambiguous²² and do not present 'real' barriers to the attainment of operational synergies. Furthermore, the guidance that has been prepared by the Commission²³ to enable synergies to be gained between ESIF, H2020 and other research, innovation and competitiveness-related Union programmes is laudable in terms of its scope and clarity, especially in terms of its coverage of parallel funding situations. Yet a dominant leitmotif throughout the course of the MLE was the frustration and confusion experienced by those parts of national and regional administrations interested in attaining synergies and the determined resistance of those parts that did not.

This confusion and frustration exists despite the clarity of rule sets and guidance documents. Clarity is one thing, but complexity is another. A large range of opportunities exist for parallel synergies to be attained, and although governed by the same overarching rules, each scheme has its own particularities and peculiarities that have to be understood fully prior to implementation, and each country or region has its own rules governing the way schemes can be implemented – which at best can complicate compliance and at worst deter participation in new schemes.

The learning curves associated with the introduction of initiatives governed by multiple rule sets are often steep and difficult to climb. They also change constantly from one programming period to another. The information contained in guidelines is a useful starting point, but there is scope for misinterpretation and more detailed information and advice on how to proceed is apparently either difficult to come by or of dubious quality and trustworthiness. On a number of

²² There is still scope for improvement and greater regulatory harmonisation, however. For example, the H2020 Rules for Participants make reference to "cost items" when discussing double funding, whereas the Financial Regulations applicable to the general budget of the Union mention "costs", which are not equivalent. This lack of clarity can trigger doubt and deter stakeholders from the pursuit of synergies.

²³ http://ec.europa.eu/regional_policy/sources/docgener/guides/synergy/synergies_en.pdf

occasions, the MLE heard that enquiries about the feasibility of different options had resulted in contrary opinions from different quarters within regional, national and EU administrations.

A large part of the problem is that there is no single repository of relevant and comprehensive information and advice that can cover all schemes and all possible options for configuring initiatives to attain synergies, and no way that single administrators can be expected to ascend all the learning curves needed to fully grasp all the available opportunities and possibilities. This is especially so in countries such as the EU13 countries that have less experience with participation in many of the EU-level schemes where parallel synergies are possible. The problem is exacerbated, also, by the existence of many administrators in other 'silos' – frequently ESIF Management Authorities – who are resistant to change, for all the reasons discussed in earlier sections, especially Section 3.3.2.

A further but related deterrent to the implementation of schemes involving multiple sources of funds is the accounting and auditing burden, both for the authorities involved in schemes and members of the R&I communities that are the beneficiaries of them. Accounting practices vary greatly across institutions and auditing and compliance checks can take place at multiple levels. For some parties, potential benefits accruing from the realisation of parallel synergies are not enough to outweigh the costs involved in their implementation.

3.6.4 Policy Suggestions and Lessons Learnt

Take advantage of the many opportunities that now exist for regional and national authorities to benefit from parallel ESIF-H2020 synergies attained through participation in EU-level initiatives.

Recognise, however, that while the rules governing them are simple to understand in theory, applying them in practice can involve steep learning curves that necessitate guided assistance and staff training to avoid misinterpretations.

Clearly articulated guidelines to the attainment of concurrent and cumulative synergies are necessary but insufficient on their own. They need to be complemented by substantial repositories of examples of good practice, easily accessible sources of authoritative advice, mechanisms to resolve ambiguities and misinterpretations, and training schemes oriented towards the capture of synergies.

Significant efforts are needed by regional and national authorities to ensure that their accounting and auditing procedures are closely aligned to those of the Commission in order to reduce the administrative burden associated with rule compliance and multiple audits.

4 OVERALL CONCLUSIONS

The purpose of these conclusions is to draw some of the most significant lessons learnt during the course of the MLE that are relevant to R&I policymaking and to suggest related courses of action that could be followed by national and regional policymakers and administrators. They focus first on high-level actions that are relevant to both 'Widening' and 'Synergies', then pick out some of the more important additional actions and lessons that are relevant to each topic individually. A short final section covers some points that deserve attention at EU-level.

4.1 *Widening and Synergies*

Most of the lessons relevant to both 'Widening' and 'Synergies' stem from a recognition that all efforts to capture the benefits of synergies and increase levels of participation in FPs are most likely to succeed when undertaken in the context of broad, coherent strategies to pursue economic development via the strengthening of R&I systems. Consequently, national and regional policymakers are invited to:

Treat 'Widening' and ESIF-H2020 'Synergies' as key considerations and policy priorities when designing new R&I strategies and governance structures.

Treating enhanced participation in FPs and the attainment of ESIF-H2020 synergies as key goals within governmental strategies to improve the performance of national innovation systems makes sense, even when the ratio of ESIF funding to H2020 drawdown is high and both 'Widening' and ESIF-H2020 'Synergies' appear on first inspection to be of marginal rather than central concern to policymakers. Efforts to improve FP participation are likely to lead to national and regional innovation systems that are in line with, and better connected to, leading-edge international developments. Efforts to realise ESIF-H2020 synergies necessarily involve consideration of the best ways to implement 'joined-up' governance structures facilitating cross-government involvement in the development of the comprehensive and coherent strategies that are needed to improve R&I systems. Prioritising both 'Widening' and 'Synergies' is thus likely to lead to better overall system performance. Two important prerequisites, however, are firstly that countries have to recognise the importance of R&I in the development of a modern economy and ensure long-term political commitment to the attainment of fully-functioning R&I systems; and, secondly, they need to recognise that improved governance structures and strategy formulation processes are essential if overall system performance is to be improved.

Prioritise the eradication of silo mentalities and unwarranted resistance to change.

The biggest barriers to the attainment of 'Widening' and ESIF-H2020 'Synergy' benefits are the continued existence of silo mentalities within governance structures and embedded resistance to change in many administrative settings – often based on habit, fear and inadequate levels of relevant knowledge about the benefits of new structures and processes and poor information flows between

different arms of government. New structures and strategy formulation processes have to be based on adequate intelligence gathering, analysis and communication procedures. But even more importantly, there has to be a deep political commitment to capacity building, modern public sector management and the eradication of all barriers that impede progress to the attainment of 'Widening' and ESIF-H2020 'Synergy' benefits.

Ensure that coherent packages of support instruments covering different stages of the R&I spectrum and drawing upon multiple funding sources are the norm.

In terms of the instruments needed to realise the benefits of both 'Widening' and ESIF-H2020 'Synergies', the overwhelming need is for coherent 'packages' of differentiated instruments that cover support at all relevant stages of the R&I spectrum. These packages should be based on sound analyses of national capabilities and aim to build on strengths and rectify weaknesses. Critically, they should also be conceived and implemented in a coordinated fashion by all relevant administrative branches and be able to draw upon multiple funding sources, as appropriate, and dependent, naturally, on availability.

Use accreditation instruments to ensure the coherence of policy packages and to enhance 'Widening' and 'Synergy' prospects.

Accreditation instruments such as Seal of Excellence (SoE) schemes have been used as a way of attaining substitution synergies between H2020 application procedures and ESIF supported schemes, but recognition of attainments in individual initiatives (e.g. R&D programmes) has also been used in some countries as an 'entry ticket' to other schemes (e.g. seed capital schemes) – thus helping to link different support instruments together within the context of coherent packages. In this way, for example, formal recognition of attainments in H2020 projects could pave the way for further national or ESIF funding, and recognition of achievements in ESIF-supported schemes could enhance the visibility of R&I actors and make them more visible on an international stage – thus enhancing their FP participation prospects. Accreditation instruments, therefore, could enhance both 'Widening' and ESIF-H2020 'Synergy' prospects.

4.2 ESIF-H2020 Synergies

Pursue operational synergies in the short-term, but prioritise a long-term focus on strategic and dynamic synergies.

Many opportunities are opening up for regions and countries to realise operational synergies between ESIF and H2020-related activities, but in the long-run these opportunities have no multiplication effects and are only magnified if strategies are in place to align and combine policies in a complementary and synergistic fashion and an environment is created in which dynamic synergies are the norm.

Implement governance structures and processes that deliberately set out to improve communication and coordination between the Managing Authorities responsible for negotiating and overseeing the implementation of ESIF-supported activities at national and regional

levels and those bodies responsible for national policymaking and H2020-related activities.

Many good practice examples of deliberate attempts to break down barriers and create dialogues between MAs and other national and regional R&I authorities exist. The Germans, for example, have established a 'Synergies Dialogue' Secretariat to ensure that a regional-national dialogue between all relevant stakeholders informs the formulation and implementation of appropriate R&I activities, while Spain established the 'Red de Políticas de I+D+I' thematic network to generate synergies between ESIF and H2020-related activities at regional and national levels.

Consider expanding the remit of NCPs to include a specific focus on ESIF-H2020 synergies.

NCPs provide information to the R&I community on FP opportunities and offer a variety of other support services. Via improved communication links with ESIF Managing Authorities at regional and national levels, they would be in a prime position to offer similar services concerning ESIF-H2020 synergies if adequately resourced. Alternatively, there is scope for charging other types of organisation with this role, e.g. regional centres of excellence such as universities.

Take greater advantage of existing EU-supported activities that offer opportunities for strategic and operational synergies.

ESIF-supported RIS3s and many of the P2Ps, PPPs and other partnership, platform and network configurations that are supported in one way or another by the EU offer opportunities for strategy development that include consideration of ESIF-H2020 synergies. Many also offer an opportunity for the serial and parallel use of funds from different sources, including ESIF and H2020, that can lead to operational synergies. Specific examples include ERA-NET COFUNDs, Joint Undertakings, MCSA-COFUND, EIT-KICs, and the development of macro-regional strategies. SoE schemes also offer a direct way of realising synergies between H2020 evaluation procedures and national and regional R&I initiatives, including those supported by ESIF.

Work with the Commission to establish better mechanisms for resolving ambiguities concerning the attainment of operational ESIF-H2020 synergies.

The rules governing the serial and parallel use of ESIF and H2020 funding are clearly specified at both a general level and at the level of specific initiatives that allow for co-funding. Implementation guidelines prepared by the European Commission are also generally clear and helpful. The devil lies in the detail, however, and there is still ample scope for misinterpretation. Better mechanisms are needed to facilitate a dialogue between Member States and the Commission to resolve ambiguities in a speedy and effective manner. There is also scope for national and regional authorities to take the initiative by strengthening strategic intelligence capabilities and investing in staff training relevant to the implementation of synergies.

Amend auditing practices to ensure rather than prevent the attainment of synergies.

It is fitting and correct that the use of public money should be subject to rigorous auditing. One of the biggest barriers to the attainment of ESIF-H2020 synergies, however, arises because different accounting and auditing practices are used to satisfy different authorities at EU, national and regional levels. Problems occur when these are neither aligned nor well synchronised. If ESIF-H2020 synergies are to be realised, greater efforts by national and regional authorities, working in conjunction with the Commission, are needed to ensure the greater alignment and synchronisation of auditing practices.

4.3 Widening

Tackle the challenge of widening participation in H2020 via general actions designed to enhance the national skills base and linkages between science and business concerns at home and abroad, and by specific actions designed to support participation in FPs.

High participation in FPs is strongly correlated with R&I system performance and comprehensive policy mixes aimed at strengthening overall performance are a necessity if FP participation is to increase. In particular, within these mixes, efforts are needed to strengthen the overall skills base within a country via brain circulation policies; to improve interactions between indigenous science and business communities; to increase the visibility of indigenous R&I actors on a world stage, especially by facilitating their entry into other EU-level networks that would ready them for subsequent participation in future FPs; and to enhance the prospects of R&I actors by providing FP-specific information, advice, guidance and training to potential participants.

Prioritise brain circulation strategies over simple attempts to improve inward mobility.

Inward mobility schemes that attempt to attract or repatriate 'stars' from other countries offer an appealing short-term fix to high-level skills shortages and should be an integral component of policy mixes in countries suffering such shortages. They should be complemented, however, by policies that encourage outgoing mobility as a way of gaining experience in other, more advanced settings, and by attractive return schemes. Short-duration shuttle schemes and virtual mobility schemes that encourage cooperative work with diaspora (and other foreign researchers) are also recommended.

Strengthen science-business links via policy instruments that do more than focus on collaborative R&D and the commercialisation of research.

Effective links between the science and business communities are the key to thriving R&I systems, and policies have been in place for many years in most countries that support collaborative R&D. Over time, these have been complemented in many instances by innovation-oriented measures that help move the fruits of science-business collaboration nearer the market, with the eventual aim of commercialisation. But science-business interactions take many

forms other than the co-creation of knowledge and its commercialisation, and these other activities also merit support if strong links between the two communities are to be engendered. These include involvement in strategy development exercises, membership of advisory boards, participation in standard setting fora, joint education and training initiatives etc.

Develop a strategic approach to participation in EU-level initiatives such as P2Ps, PPPs and other networks and prioritise those that can provide experience likely to enhance FP participation in the future.

There now exist many opportunities for countries and individual regions to engage in EU-level Partnership Approaches that can familiarise both R&I administrations and R&I performers with international partners and R&I agendas. Scarce resources often dictate that choices have to be made amongst these. Prioritising those that can enhance the FP participation prospects of R&I performers is advisable when this is a specific national objective.

Construct a coherent package of policy instruments conceived within an overarching strategy to support R&I actors in their attempts to become involved in FPs by rectifying information, communication and skills deficits.

There are many ways in which potential FP participants can be helped. They can be provided with better information about FP opportunities; proposal preparation can be assisted; training schemes can improve research management and administration skills; and the qualities of indigenous R&I actors can be extolled in international fora to increase their visibility. Good practice in this MLE involved policy packages covering all or most of these elements and implemented within strategic frameworks that specifically included increased participation in FPs as an objective.

4.4 EU-level Policy Improvements

Although the focus of this MLE was on practices that have been and could be undertaken within the current policy context by national and regional authorities, it became apparent in some instances that practices could be improved in future if attention was paid at an EU-level to the resolution of particular problems via actions. In particular, there is scope to:

Continue to emphasise activities that support 'Widening' and 'Synergies' within Horizon Europe and the new Cohesion Policy Framework.

Maintain a strong focus on 'Widening' and 'Synergy' policies that can assist the EU13 countries, but ensure that support is customised to the needs of individual countries and regions and also available in specific instances to EU15 countries likely to benefit from support.

Ensure that the regulations governing the use of ESIF and H2020 funds are fully harmonised as possible.

Work closely with national and regional authorities to ensure that accounting and auditing practices at EU and regional and national levels are as closely aligned as possible.

Revise State Aid regulations in line with a desire to ensure that funds from different EU sources can be combined easily at point of use, e.g. by amending State Aid regulations to exempt single firm SoE projects from State Aid assessment and by allowing funds from both national and ESIF sources to top-up H2020 project funding for firms without recourse to further State Aid assessment.

Provide greater support for the provision of information and advisory services that would make it easier for regional and national policymakers to promote and implement activities that involve the combination of funds from different sources.

APPENDIX 1. PUBLIC SECTOR INTERNATIONAL MOBILITY SCHEMES

Country	Scheme	Description
Austria	The Erwin Schrödinger Programme	Outward scheme supporting short stays abroad
Austria	The Lise-Meitner Programme	Inward and returnee scheme supporting long-term stays
Austria	The OSTINA network	Virtual mobility network aimed at the Austrian diaspora in North America
Belgium (Flanders)	The Odysseus Programme	Inward and returnee components with generous, long-term incentives
Croatia	The NEWFELPRO Programme	Inward, Outward and Returnee components aimed at young and experienced researchers
Estonia	Kristjan Jaak and Dora Plus Scholarships	Inward and outward support for short-term visits
Finland	The FiDiPro Programme	Inward scheme for experienced researchers
France	Agreen Skills and Agreen Skills+	Inward and outward support for young and experienced researchers
Germany	Alexander von Humboldt Awards	Inward and outward support, with substantial incentives for inward mobility
Germany	The DADD Programme	Returnee component with family-friendly assistance
Germany/Austria/Switzerland	The D-A-CH Programme	Joint funding programme with grant portability that facilitates mobility
Germany/China	The Sino-German Centre for Research Promotion Cooperation groups	Virtual mobility support for collaborative working between German and Chinese scientists
Hungary	The Momentum Programme	Returnee programme for experienced researchers
Hungary	Academy of Science Awards	Inward short-term mobility support for experienced researchers
Ireland	The Wild Geese Network of Irish Researchers	Virtual mobility scheme engaging the Irish diaspora in knowledge-based development of the Irish economy
Luxembourg	The PEARL Programme	Inward scheme for foreign stars
Luxembourg	The ATTRACT Programme	Inward scheme for young researchers
Poland	The Foundation for Polish Sciences 'Homing' Grant	Inward and Returnee components aimed at young researchers
Poland	The National Science Centre's 'Polonez' Grant	Inward scheme aimed at experienced researchers

Country	Scheme	Description
Poland	The International Research Agendas Programme	H2020 'Teaming initiative that has an inward mobility component
Poland/Norway	The Polish-Norwegian research Programme	Virtual mobility support for collaborative working between Polish and Norwegian scientists
Slovak Republic	National Scholarship programme	Inward and outward short-term mobility support
Slovenia	Fellowship to Visit ERC Grantee Scheme	One of first six countries to adopt this ERC instrument
Spain	The Ramón y Cajal Programme	Inward and returnee components aimed at experienced researchers
Sweden	Individual grants for Future Research Leaders	Support for young researchers with an inward component
The Czech Republic	J. E. Purkyně Fellowships	Inward and returnee components with long-term incentives
The Netherlands	The Rubicon Programme	Outward scheme supporting short stays abroad
The Netherlands	The 'Money follows researcher' Scheme	Scheme with grant portability that facilitates mobility
Turkey	TÜBA Academy Prizes	Inward scheme for young researchers that also supports short-term visits abroad
UK	Visiting Fellowship Schemes	Inward short-term mobility support

APPENDIX 2. LANDSCAPE OF INSTRUMENTS ENCOURAGING SCIENCE-BUSINESS COOPERATION

Structures	Funding Programmes	Non-Financial Incentives
INSTRUMENTS TARGETING THE PUBLIC RESEARCH SECTOR		
Research and Technology Organisations	Adaptation of funding programmes for HEIs and PROs to take into account work with industry	Incentives for reorienting public research towards the needs of industry
Technology Transfer Offices	Incentive schemes for start-ups Proof-of-concept schemes for HEIs/PROs	Incentives for rewarding work with industry in academic career paths and salaries Engagement strategies of HEIs/PROs (third mission, university patenting, student placements and entrepreneurship, sabbaticals in industry, etc.)
INSTRUMENTS TARGETING THE BUSINESS SECTOR		
Business advisory services, innovation centres acting as bridges to HEIs/PROs, and as matchmakers	Innovation/knowledge/R&D voucher schemes for SMEs Support schemes for hiring researchers in companies, placement schemes	Business and innovation advisory services
Innovation Clusters		
INSTRUMENTS TARGETING THE INTERFACE BETWEEN THE TWO SECTORS		
PPP complex programmes (centres or networks) and joint research units (covered in another MLE)	Funding programmes for collaborative research projects (generic, thematic)	Mechanisms and protocols for joint use of research infrastructure
Open innovation structures such as Living Labs, Fab Labs etc.	Industrial PhD schemes Sectoral mobility schemes for researchers	Involvement of businesses and HEIs/PROs in national/regional innovation strategies and platforms Engagement of industry in HEIs/PROs
Science and technology parks and incubators		

APPENDIX 3. EUROPEAN PARTNERSHIPS IN H2020

Partnership Approaches	Public-Public Partnerships (P2P)	Public-Private Partnerships (PPP)	EIT-KICs*	FET Flagships**
Implementation Modes	ERA-NET-COFUND, EJP COFUND, Article 185, Joint Programming Initiative (JPI)	Contractual Arrangement (cPPP) Article 18770	H2020 Grant agreements for different types of actions, Framework Partnership Agreements (FPA)	
Currently Active R&I Partnerships (Horizon 2020)	a) ERA-NETs: ≈ 70 b) EJP COFUND: 5 c) Article 185: 6 d) JPIs: 10	a) JUs: 7 (+HPC) b) cPPPs: 10	a) JUs: 7 (+HPC)	a) FET-Flagships: 2 (+Quantum)
Financial Contribution from H2020 (estimated)	2,500 M€ (3.1% of H2020 budget)	13,450 M€ (JU 7,250, 10% cPPP 6,200, 7.5% of H2020 budget)	2,400 M€ (3.1% of H2020 budget)	1,000 M€ (1.3% of H2020 budget)

*EIT-KICs: Knowledge and Innovation Communities (KICs) of the European Institute for Innovation and Technology (EIT)

**FET-Flagships: Flagships of the Future and Emerging Technologies programme (FET)

Source: DG RTD

Public-Public Partnerships (P2Ps) in research and innovation are networks of public organisations (ministries, funding agencies, programme managers) from interested EU countries and beyond that join forces to support research and innovation activities under an agreed vision or strategic agenda. In this way, these partnerships align national strategies and help to overcome fragmentation of research. P2Ps include networks supported by the European Commission such as ERA-NETs and Article 185 initiatives as well as Member State-led initiatives such as Joint Programming Initiatives (JPIs).

Public-Private Partnerships (PPPs) involve partnerships between public funding bodies and private sector funding sources that support research and innovation activities. PPPs supported by the European Commission in H2020 include Joint Undertakings (JUs) – also known as Joint Technology Initiatives (JTIs) – and Contractual Public-Private Partnerships (cPPPs). JUs are based on Article 172 of the European treaty and allow the European Commission, Member/Associated States and industry-led associations to organise their own research agendas and award H2020 funding for projects on a competitive basis. cPPPs involve dedicated arrangements between the Commission and private sector associations that allow the development of seven-year roadmaps in specific sectors and provide project funding in line with H2020 work programmes.

Other Partnerships, Platforms and Networks that are supported under H2020 include European Innovation Partnerships (EIPs), which help to align agendas in key societal challenge areas; European Technology Platforms (ETPs), which are industry-led platforms supported by the European Commission that develop research and innovation agendas and roadmaps at EU and national level and encourage industry participation in H2020; the Knowledge and Innovation Communities of the European Institute of Technology (EIT-KICs), which involve partnerships not between funding agencies but between businesses, research centres and universities across the EU; Future and Emerging Technologies (FET) Flagships, which foster coordinated efforts between EU, national and regional programmes in a limited number of key technology areas; and the European Cooperation in Science and Technology (COST) framework supported by H2020 that provides networking opportunities for researchers across Europe. Outside of the H2020 umbrella, there is EUREKA – a publicly funded, intergovernmental network involving over 40 countries that supports bottom-up projects; and initiatives supported by European Structural and Investment Funds (ESIF) that facilitate the international networking of regional innovation actors and the formation of thematic partnerships and macro-regional strategies.

APPENDIX 4. CHARACTERISING FEATURES OF ESIF AND H2020

Characterising Features	ESIF	H2020
Mission	To strengthen economic, social and territorial cohesion and reduce regional disparities, including those pertaining to research and innovation	To support excellence in research and innovation and place it at the heart of the Europe 2020 strategy for smart, sustainable and inclusive growth
EU Budget Appropriations for Research and Innovation 2014-2020 (approximate)	43.7 billion €	80.0 billion €
Distribution Mechanisms	Major role played by Managing Authorities at national and regional levels (in partnership with the ESIF Commission Services and cooperation with national institutions)	Major role played by the H2020 Commission Services
Implementation Authorities	Managing Authorities and appointed intermediaries	H2020 Commission Services
Support Activities	Provided by Managing Authorities and intermediaries	Provided by National and Regional Authorities and intermediaries via National Contact Point networks and other ERA support mechanisms
Final recipients	Research and innovation actors, either as direct beneficiaries or following competitive calls	Research and innovation actors, primarily following competitive calls
Accounting Rules	ESIF plus national and sometimes regional rules	H2020 rules primarily, but occasionally plus national rules

In brief, ESIF provides funds to national and regional governments and these are administered by Managing Authorities (MAs) at either a national or regional level (in partnership with the Commission and in cooperation with national ministries and agencies) and distributed to R&I actors, typically for infrastructure developments but also via competitive calls overseen by the MAs or indigenous intermediaries. In contrast, the majority of H2020 funds are allocated directly to R&I actors via competitive calls overseen by the Commission. National and

regional authorities are thus not directly involved, but they do play an important role as providers of advice (e.g. via NCPs) and support to indigenous R&I actors wishing to take part in H2020 (e.g. via the provision of grants to assist proposal preparation). In terms of accountability, ESIF recipients are subject to ESIF implementation rules, regulations and auditing practices as well as national (and sometimes regional) ones. In contrast, H2020 recipients are typically subject only to H2020 rules, regulations and auditing practices.

APPENDIX 5. MLE PARTICIPANTS

Independent Experts

Name	Role
Gonzalo Leon	Chair
Ken Guy	Rapporteur
Helena Acheson	Expert on Ireland
Claire Nauwelaers	Expert on Widening Participation
Lena Tsipouri	Expert on Strengthening Synergies

Representatives of Participating Countries

Country	Representatives
Belgium	Peter Spyns
Bulgaria	Neli Georgieva
Cyprus	Maria Poeti
Croatia	Zorana Barišić Ivana Markanović Ira Bušelić Miljenka Kuhar Vanja Pavlovic Mirjana Vuk
Germany (Observer)	Olaf Ripken Matthias Woiwode von Gilardi
Hungary	Szonja Csuzdi Ágota Dávid Eszter Lakos
Latvia	Janis Ancans
Poland	Kaspars Karolis Mateusz Gaczynski Anna Głąbska Agata Janaszczyk
Portugal	Ricardo Migueis
Slovenia	Tina Ušaj Urban Krajcar
Sweden	Magnus Härviden
Spain	Javier Garcia
Turkey	Hakan Karatas Selda Ulutas Cagri Yildirim

Representatives of the European Commission

Name	Unit
<i>Lead DGs</i>	
Román Arjona Gracia	Head of Unit A4, 'Analysis and Monitoring of National Research Programmes', DG Research & Innovation
Marta Truco-Calbet	Unit A4, 'Analysis and Monitoring of National Research Programmes', DG Research & Innovation
Magda De Carli	Head of Unit B5, 'Spreading Excellence and Widening Participation', DG Research & Innovation
Dionysia Lagiou	Unit B5, 'Spreading Excellence and Widening Participation', DG Research & Innovation
<i>Other DGs</i>	
Agnieszka Krasicka	Unit E1, 'Administrative Capacity Building', DG Regional and Urban Policy
Denisa Perrin	Unit E1, 'Administrative Capacity Building', DG Regional and Urban Policy
Karel Haegeman	Unit B3, 'Territorial Development', Joint Research Centre (Seville)
Nicholas Harrap	Unit B3, 'Territorial Development', Joint Research Centre (Seville)
Julie Sainz	Unit C2, 'Marie Skłodowska-Curie Actions', DG Education, Youth, Sport and Culture

PSF Contractors

Name	Organisation
<i>Overall Coordination</i>	
Viola Peter	Technopolis Group (Belgium)
<i>Quality Control</i>	
Jari Romanainen	Technopolis Group (Estonia)

APPENDIX 6. MLE MEETINGS AND REPORTS

MLE Meetings

Name	Venue and Date
Scoping Meeting	Brussels, 30 May 2017
Kick-off Meeting	Brussels, 27 October, 2017
Country Meeting	Madrid, 10-11 January 2018
Country Meeting	Zagreb, 6-7 February 2018
Country Meeting	Dublin, 22-23 March 2018
Country Meeting	Brussels, 14-15 May 2018
Draft Report Meeting	Brussels, 12 June 2018
Final Report Meeting	Brussels, 11 September 2018

MLE Reports

Number	Topic
Topic Report 1:	Attracting Qualified R&D Staff in the Public and Private Sectors
Topic Report 2:	Encouraging Science Business Cooperation
Topic Report 3:	Improving Networking through Participation in EU-level Initiatives
Topic Report 4:	Skills Development, Information, Communication and Training
Topic Report 5:	Strengthening Synergies

APPENDIX 7. LIST OF ABBREVIATIONS

Abbreviation	Full Name
BIC	Business Innovation Centre
BMVIT	Federal Ministry for Transport, Innovation and Technology (Austria)
BMFWF	Federal Ministry for Science, Research and Economy (Austria)
COST	European Cooperation in Science and Technology
CPPP	Contractual Public-Private Partnership
CSA	Coordination and Support Action
DG	Directorate-General
DG REGIO	Directorate-General for Regional and Urban Policy
DG RTD	Directorate-General for Research and Innovation
DJEI	Department for Jobs, Enterprise and Innovation (Ireland)
EAFRD	European Agricultural Fund for Rural Development
EARMA	European Association of Research Managers and Administrators
EC	European Commission
EEN	Enterprise Europe Network
EFSI	European Fund for Strategic Investments
EIB	European Investment Bank
EIP	European Innovation Partnership
EIT	European Institute of Technology
EJP COFUND	European Joint Programme COFUND
ERA	European Research Area
ERDF	European Regional Development Fund
ERRIN	European Regions Research and Innovation Network
ESIF	European Structural and Investment Funds
ETP	European Technology Platform
EU	European Union
FET	Future and Emerging Technologies
FFG	Austrian Research Promotion Agency
FP	Framework Programme
FTE	Full-Time Equivalent
GERD	Gross Expenditure on R&D
H2020	Horizon 2020 (FP 8)
HEI	Higher Education Institution
IDC	Inter Departmental Committee
IGLO	Informal Group of RTD Liaison Offices
IPR	Intellectual Property Rights
JPI	Joint Programming Initiative
JRC	Joint Research Centre
JTI	Joint Technology Initiative
JU	Joint Undertaking
KIC	Knowledge and Innovation Community
MA	Managing Authority
MLE	Mutual Learning Exercise
MoU	Memorandum of Understanding
MRS	Macro-regional Strategy
NCP	National Contact Point
NIS	National Innovation System
OP	Operational Programme

Abbreviation	Full Name
P2P	Public-Public Partnership
PBT	Programa de Bonos Tecnológicos (Spain)
PPP	Public-Private Partnership
PRO	Public Research Organisation
PRTLTI	Programme of Research in Third Level Institutions (Ireland)
PSF	Policy Support Facility
R&D	Research and Development
R&I	Research and Innovation
RD&I	Research, Development and Innovation
RIS	Regional Innovation System
RIS3	Regional Innovation Smart Specialisation Strategy
RISE	Research Centre in Interactive Media, Smart Systems and Emerging Technologies
RTDI	Research, Technological Development and Innovation
RTO	Research and Technology Organisation
S2E	Stairway to Excellence
SME	Small or Medium Size Enterprise
SoE	Seal of Excellence
TRL	Technology Readiness Level
TTO	Technology Transfer Office
WPSS	Widening Participation and Strengthening Synergies

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This is the final report of the Mutual Learning Exercise (MLE) on 'Widening Participation and Strengthening Synergies' that was carried out during 2017-18 by 12 Member States (including one Observer) and one associate country.

Widening participation in European Union (EU) Framework Programmes (FPs) can help countries to tap into their unexploited R&I potential and improve overall R&I performance. Similarly, ensuring and strengthening synergies between FP-related activities and those supported by European Structural Investment Funds (ESIF) can improve the overall efficiency and effectiveness of public funding for R&I, enhance the performance of R&I activities and improve FP participation prospects. This MLE reviewed national and regional policies and initiatives designed to widen participation and strengthen synergies, with a view to extracting lessons of relevance to future activities.

The Mutual Learning Exercise is one of three instruments available under the Policy Support facility (PSF), which was set up by the European Commission as part of the Horizon 2020 programme. The aim of the PSF is to give EU Member States (and countries associated with the Horizon 2020 programme) practical support to design, implement and evaluate reforms that enhance the quality of their research and innovation (R&I) investments, policies and systems.

