



Forward Visions on the
European Research Area

ERA Fabric Map
Third Edition

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ERA Fabric Map – Third Edition: The ERA and its instruments in the global landscape. A look at the present and at the future.

1. Introduction

The concept of the European Research Area, first introduced in the Lisbon Council of March 2000, aimed at restructuring the landscape of research in Europe. Indeed, the EU system was largely scattered and divided, with the Framework Programmes supporting mainly small scale cross-border projects and national research policies being largely closed and isolated. Gaining efficiency by pooling resources and avoiding the duplication of efforts was one of the goals of the ERA since its offset and was complemented by another ambitious objective, that of realising the fifth "freedom of movement" within Europe. After the free movement of goods, people, capital and services, the ERA aimed at implementing the free movement and access to knowledge (both embodied in people and infrastructure or knowledge outputs).

The concept, as originally defined, promoted increased co-ordination and cooperation among national research policies and programmes, all aspects that require the construction and implementation of effective instruments. This third edition of the ERA Fabric Map reflects on this issue in two steps:

1. It analyses the current main policy programmes and instruments and their historical development thus delving into the mechanisms that shape the research and innovation scene in Europe.
2. To conclude it analyses the four scenarios developed by the VERA consortium from an instrumental perspective. It highlights the policy programmes and instruments that need to be in place to sustain them, and compares them to those currently in place in Europe -.

The third ERA Fabric Map is structured as follows: section 2 reviews the main research and innovation policy programmes at the EC level.. Specifically, it provides a description and historical overview of Horizon2020 and the Structural Funds (with particular attention to the European Regional Development Fund - ERDF), and the synergies between the two. Section 3 highlights how these instruments relate to the five ERA priorities identified by the ERA Communication (EC COM(2012) 392 final), discussed in the second edition of the Fabric Map. -. Section 4 introduces a prospective element to the report and describes the four scenarios developed by VERA, focussing in particular on whether and how stakeholders, instruments and the current ERA priorities are depicted -. Section 5 concludes.

2. Policy-instruments for the Europeanisation of research

In this section we describe the main research and innovation policy tools at the EC level; namely, Horizon 2020 and the Structural funds (in particular the European Regional Development Fund). It must be remarked that these policy tools are not developed with the aim of "implementing the ERA". The latter, as shown in the second ERA Fabric Map (Marinelli et al., 2013) is a complex political project, with a multi-layered governance that requires input from different actors and political negotiation. Rather, the ERA – in its formalisation in five priorities- constitutes the policy frameworks against which H2020 and the structural funds for R&I can be deployed.

2.1 Horizon 2020

H2020, the new EU programme funding research and innovation, is the financial instrument implementing the Innovation Union, a Europe 2020 flagship initiative aimed at securing Europe's global competitiveness. It will run from 2014 to 2020 with a budget of approximately €80 billion.

H2020 has important differences when compared to previous Framework Programmes (FPs) (EC, DG Research and Innovation, 2011, 2012a). First, it brings together the old FP, the CIP (Competitiveness and Innovation Programme) and the EIT (European Institute of Technology). Second, H2020 targets both research and innovation, providing instruments for all their different stages. Third, prominent attention is given to societal challenges. Finally, Horizon2020 has simplified access and rules for participation.

H2020 is organised around three priorities, under which different funding instruments are in place:

Box 1 Horizon 2020 and the European Research Area

Horizon 2020 should support the achievement and functioning of the European Research Area in which researchers, scientific knowledge and technology circulate freely, by strengthening cooperation both between the Union and the Member States, and among the Member States, in particular through the application of a coherent set of rules

Source EU regulation No1291/2013

1. **Excellent science:** with an approximate €24.4 billion budget , aims to boost to top-level research in Europe.
2. **Industrial leadership:** with an approximate €17 billion budget , this priority is committed to major investment in key technologies, greater access to capital and support for SMEs. It focuses on the more industrial aspects of research and innovation.
3. **Societal challenges:** with an approximate €29.7 billion budget of, it targets key collective concerns shared by all EU Member States, such as climate change, sustainable transport and mobility, renewable energy, food safety and security, ageing population.

In addition to the three large programme sections (Excellent Science, Industrial Leadership, and Societal Challenges), Horizon 2020 funds the EIT (2.7 billion) and includes funding for three cross-cutting areas: Spreading excellence and widening participation (€816 million), Science with and for society (€462,2 million), and Non-nuclear direct actions of the Joint Research Centre (€1.9 billion).

Table 1 below reports the key funding streams of H2020.

Table 1 H2020 Instruments

HORIZON 2020		
Priority	Name	Description
Excellent science: Reinforce and extend the excellence of the science base and consolidate the ERA to make the EU's research and innovation system more competitive on a	1. European Research Council (ERC)	The ERC is a bottom-up instrument that provides attractive long-term funding for excellent investigators and their teams to pursue ground-breaking, high-gain/high-risk research.
	2. Future and Emerging Technologies (FET)	The FET is an instrument to support collaborative research in order to extend Europe's capacity for advanced and paradigm-changing innovation. Its aim is to foster scientific collaboration across disciplines on

HORIZON 2020		
Priority	Name	Description
global scale. It consists of four specific objectives:		radically new, high-risk ideas. FET support the whole spectrum of science-driven innovation: from bottom-up, small-scale early explorations to large collaborative research initiatives built around a research agenda aiming to achieve ambitious and visionary goals.
	3. Marie Skłodowska-Curie actions	Marie Skłodowska-Curie actions tackles excellent and innovative research training as well as attractive career and knowledge-exchange opportunities through cross-border and cross-sector mobility of researchers to best prepare them to face current and future societal challenges.
	Research infrastructures	This instruments supports excellent European research infrastructures ensuring that they contribute to fostering innovation potential, attracting world-level researchers and training human capital, complementing the related Union policy and international cooperation
Industrial leadership, of which: This part targets the development of the technologies and innovations that will underpin businesses growth in the future, allowing European SMEs to develop into world-leading companies.	1. Leadership in enabling and industrial technologies	Leadership in enabling and industrial technologies" will support research, development and demonstration and, where appropriate, for standardisation and certification, on information and communications technology (ICT), nanotechnology, advanced materials, biotechnology, advanced manufacturing and processing and space. Particular importance is placed on the interactions and convergence across and between the different technologies and their relations to societal challenges, as well as on users' needs.
	2. Access to risk finance	Access to risk finance" shall aim to overcome deficits in the availability of debt and equity finance for R&D and innovation-driven companies and projects at all stages of development. Together with other the equity instruments it shall support the development of Union-level venture capital.
	3. Innovation in SMEs	"Innovation in SMEs" shall provide SME-tailored support to stimulate all forms of innovation in SMEs, targeting those with the potential to grow and internationalise across the single market and beyond.
Societal challenges, of which This Part responds directly to the policy priorities and societal challenges that are identified in the Europe 2020 strategy		All the activities from the research and innovation spectrum shall take a challenge-based approach. The instrument will also consider non-technological, organisational and systems innovation. There is a new focus on innovation-related activities, such as piloting, demonstration activities, test-beds, support for public procurement, design, end-user driven innovation, social innovation, knowledge transfer and market take-up of innovations and standardisation
Spreading excellence and widening participation	<p>The specific objective 'Spreading excellence and widening participation' is to fully exploit the potential of Europe's talent pool and to ensure that the benefits of an innovation-led economy are both maximised and widely distributed across the Union in accordance with the principle of excellence. These instruments are specifically targeted to low performing MS in terms of Research and Innovation. Specific actions include:</p> <ul style="list-style-type: none"> • Teaming action • Twinning action. • The ERA Chairs 	

HORIZON 2020		
Priority	Name	Description
		<ul style="list-style-type: none"> • The Policy Support Facility • Supporting access to international networks • Strengthening the administrative and operational capacity
Science with and for society		The aim of the specific objective 'Science with and for society' is to build effective cooperation between science and society, to recruit new talent for science and to pair scientific excellence with social awareness and responsibility.
Non-nuclear direct actions of the Joint Research Centre (JRC)		The JRC's activities shall be an integral part of Horizon 2020, in order to provide robust, evidence-based support for Union policies. This shall be driven by customer needs, complemented by forward-looking activities.
The European Institute of Innovation and Technology (EIT)		<p>The EIT shall play a major role by bringing together excellent research, innovation and higher education thus integrating the knowledge triangle. The EIT shall do so primarily through the KICs. In addition it shall ensure that experiences are shared between and beyond the KICs through targeted dissemination and knowledge sharing measures, thereby promoting a faster uptake of innovation models across the Union.</p> <p>KICs are integrated ventures, which bring together from industry, SMEs, higher education, research and technology institutes, in an open, accountable and transparent manner</p>
Supported partnerships		
Joint Programming Initiatives		JPI is a structured and strategic process whereby Member States agree, on a voluntary basis and in a partnership approach, on common visions and Strategic Research Agendas (SRA) to address major societal challenges. On a variable geometry basis, Member States commit to Joint Programming Initiatives (JPIs) where they implement together joint Strategic Research Agendas.
Article 185 initiatives		Article 185 of the Treaty on the Functioning of the European Union (TFEU) allows the EU to participate in research programmes undertaken jointly by several Member States, including participation in the structures created for the execution of national programmes.
European Technology Platforms		European Technology Platforms (ETPs) are industry-led stakeholder fora that develop short to long-term research and innovation agendas and roadmaps for action at EU and national level to be supported by both private and public funding.
ERA-NETs		The ERA-NET instrument under Horizon 2020 is designed to support public-public partnerships in their preparation, establishment of networking structures, design, implementation and coordination of joint activities as well as topping up of single joint calls and of actions of a transnational nature.

Horizon 2020 builds on the experience gathered during previous European research programmes. The first European Framework Programme for Research was launched in 1984. Some basic characteristics of European research funding have remained in place ever since. These are the *co-funding principle*, the *collaboration requirement* and the *allocation of funding to research performers across Europe*. The Lisbon strategy and the launch of the European Research Area brought about new instruments and initiatives directed towards a higher level of coordination among Member States and between Member States and the European Commission, such as the Open Method of Coordination, ERA-NETs, Technology Platforms, etc. (Barré et al., 2013) . More recently the policy perspective on research has shifted towards a greater focus on innovation and its potential to contribute to growth and employment.

Therefore, while some lines and instruments of Horizon 2020 have been introduced quite recently into European research programmes, others have long been in place. For instance, the focus on research infrastructures present in Horizon 2020 priority ‘excellent science’, has been present in all previous Framework Programmes and even before them.. Different instruments have been used in former Framework Programmes to develop and strengthen the European research infrastructures (e.g. Networks of Excellence (NoE), Coordination actions (CA), or IP’s (Integrated Projects)). Given the increasing complexity and cost of many research infrastructures, this focus continues to be present in current programmes; Horizon 2020 places high importance on developing new world-class infrastructures, integrating and opening research infrastructures, and developing e-Infrastructures. The European Strategy Forum on Research Infrastructures ESFRI (established in 2002, first Roadmap published in 2006) plays an important role in supporting policy-making on research infrastructures in Europe (EC, Decision C (2013)8631).¹

The Marie Skłodowska-Curie actions (EC, DG Research and Innovation, 2012b) – formerly Marie Curie Actions - have a fairly long tradition. They were instituted in the 4th Framework Programme for Research and Technological Development (1996) (FP4), in the FP5 and FP6 were part of the instruments for Improving Human Research Potential and the Socio-economic Knowledge Base, and were incorporated in the Peoples programme line in FP7 (European Commission, DG for Research and Innovation 2012). Similarly, Future and Emerging Technologies (FET) – despite being formally a new instrument – has various predecessors. FET’s forerunners are in programmes of support to ICT and digital research that can be traced back to the launch of the first Framework Programme.

In contrast, the European Research Council is a fairly new means to support basic science, scientific excellence and frontier research. It was officially launched in 2007, but the idea for implementing it dates from 2002.

The second priority – **Industrial Leadership** – is directly focused on the business sector and underlines the new orientation of Horizon 2020 towards integrating research and innovation. This dimension directly addresses the business sector and its agenda. Activities are directed towards key industrial technologies, growth support for European companies, and also foresee specific investment for SMEs (the new instrument “Innovation in SMEs” is specifically dedicated to highly innovative small companies). It integrates the FP7 SME Research and Innovation support and the Competitiveness and Innovation Programme (CIP), and additionally allows outsourcing of research as formerly supported by the “Research for the Benefit of SMEs” line in FP7. Contrary to former programmes, SMEs are key applicants (i.e. SMEs are the core partner of a consortium and single SME participant projects are also possible). Generally, investment embraces the different stages from research to market, thus includes instruments which have been newly created based on the experience from former research programmes (such as early stage investment, innovation capacity building, etc.). These measures are foreseen to be jointly implemented with the Programme for the Competitiveness of Enterprises and Small and Medium-sized Enterprises COSME (EU Reg No 1291/2013) Further, the participation of SMEs will be encouraged by lowering administrative burdens and the introduction of an entry point for SMEs.

¹For further information see: http://ec.europa.eu/research/infrastructures/index_en.cfm?pg=esfri, http://ec.europa.eu/research/infrastructures/index_en.cfm?pg=projects, http://cordis.europa.eu/programme/acronym/FP6-INFRASTRUCTURES_en.html

The priority on **Societal Challenges** constitutes a main pillar of the Horizon 2020 programme. It aims to provide answers to societal challenges with the ultimate objective of helping Europe progress towards the Europe 2020 goals of smart, sustainable and inclusive growth. These challenges were identified based on evaluations of preceding research and innovation programmes and external experts' views, consultations and documents. Rather than focusing on specific knowledge and technology fields, it calls for an integrated approach that aims at providing solutions to urgent demands of the present world, providing a new rationale for research and innovation promotion, and seeking changes on various governance levels of the research and innovation system (Daimer et al., 2011). Horizon 2020 defines seven societal challenges, each with its own, evolving work programmes: Health, demographic change and wellbeing; Food security, sustainable agriculture and forestry, marine, maritime and inland water research and the Bioeconomy; Secure, clean and efficient energy; Smart, green and integrated transport; Climate action, environment resource efficiency and raw materials; Europe in a changing world - Inclusive innovative and reflective societies; Secure societies - Protecting freedom and security of Europe and its citizens.

The European Institute of Innovation and Technology (EIT) was created during the former funding period (in 2008). It is now an integral part of Horizon 2020 and aims to develop strong 'Knowledge Triangles' addressing specific sectors or areas of concern (like, for instance, climate change).

The Joint Research Centre (JRC) is the Commission's in-house scientific service and the only Commission entity carrying out research. The JRC has a research tradition of more than 50 years. Its non-nuclear work is funded by Horizon 2020, with the objective *to provide customer-driven scientific and technical support to Union policies, while flexibly responding to new policy demands.*²

'Spreading Excellence and Widening Participation' refers to both new instruments – such as the "Teaming action" which targets new collaboration structures between advanced research institutions and other institutions, agencies or regions – and to established ones such as supporting access to international networks through COST ([European Cooperation in Science and Technology](#)) which exists since 1971 (Daimer et al., 2011).

The programme line "Science with and for Society" addresses the connection between science and society. An important approach integrated in this programme line refers to Responsible Research and Innovation (RRI), which focuses on societal values, needs and expectations of research and innovation. The programme evolves from the 'Science in Society' initiative in FP7 that aimed "... to stimulate a harmonious integration of scientific and technological endeavour and associated research policies in European society".³

In addition to the above-mentioned programme lines, Horizon 2020 supports partnering initiatives through various measures.

- Joint Technology Initiatives (JTI) had been a new FP7 instrument seeking to establish long-term public-private partnerships under Art. 187 TFEU, to implement Strategic Research Agendas for selected European Technology Platforms (ETPs). The latter, led by industrial stakeholders, develop research and innovation agendas to be implemented at European level. Their creation dates back to 2003. ETPs were established in several fields and complemented by Cross ETP Initiatives.

² The JRC's nuclear work is framed within the EURATOM Research and Training Programme which complements Horizon 2020. Its objective is to pursue research, manage knowledge and training activities with emphasis on nuclear safety and security, while contributing to the transition to a carbon free economy in a safe, efficient and secure way.

³ http://cordis.europa.eu/fp7/sis/about-sis_en.html.

- The Horizon 2020 ERA-Nets replace the former ERA-Net, ERA-Net Plus, Inco-Net and Inno-net schemes. Having been introduced in FP6, these schemes promote collaboration of research programme owners and managers. In Joint Programming Initiatives (JPIs), Member States jointly implement Strategic Research Agendas and thus pool their individual research efforts.⁴
- European Innovation Partnerships bring together different stakeholders (See EU Reg No 1290/2013 and 1291/2013).

2.2 Cohesion policy: structural funds for R&D

The objective of the European Structural Investment Funds (ESIF), which implement the Regional Policy, is to reduce the spatial economic and social and economic disparities that exist within the EU regions. Whilst EU regional policy relies on different funds addressing different fields of activity, we will only focus on ERDF as it is the one most directly addressing the research and innovation landscape in Europe.⁵

The overall objectives of the EU regional policy may not appear directly relevant to the ERA, however, in line with the Europe 2020 strategy, structural funds recognise the critical role of RDI as an engine for growth and thus promote strategic investment in these areas. Specifically, the European Regional Development Fund (ERDF), one of the ESIFs has, as its first objective, to strengthen research, technological development and innovation (see box 2 below). In this specific sense, structural funds can help shape the European Research Area.

The **European Regional Development Fund (ERDF)**⁶ became a budgetary instrument of regional policy in the mid-1970s. In its first specification, ERDF targeted “lagging behind” regions and industrial regions in decline with two basic interventions: investment in infrastructure and production. The Single European Act (1986) brought about regulations leading to a European Regional Policy with the aim to support a harmonious development in the European Union as a whole. This should be achieved through reducing disparities between regions within the Community, by means of the Structural Funds (at that time consisting of ESF and ERDF) and the European Agricultural Guidance and Guarantee Fund EAGGF on the one hand, and by the European Investment Bank and further instruments on the other hand. The objective of a balanced and harmonious development was targeted in the European Union Treaty of 1992. At that time, the Cohesion Fund was created as an instrument of the new Committee of the Regions. During the 1994-1999 period, ERDF’s investment concentrated on four objectives related to four types of regions, namely: Objective 1-Promoting the development of regions whose development is lagging behind; Objective 2-Converting (parts of) regions that are seriously affected by industrial decline; Objective 5b-Facilitating the development and structural adjustment of rural areas; and Objective 6-Development and structural adjustment of extremely sparsely populated regions.⁷

With the 2000-2006 programming period, new objectives were introduced, namely: objective 1 (Regions lagging behind in development terms); objective 2 (Economic and social conversion of regions); and objective 3 (Training systems and employment policies). The former two were addressed by ERDF and ESF (Objective 1 also by additional funds) and the latter by ESF. Additionally, regional policy support through ERDF could be granted for the Interreg III and Urban II initiatives. In the 2007-2013 programming period,

⁴JPIs are based on a Commission Communication in 2008 (EC Communication, 468/2008).

⁵ The ESIF include the European Social Fund (ESF), the European Regional Development Fund (ERDF), the European Agricultural and Development Fund (EARDF), the European Maritime and Fisheries Fund (EMFF) and the Cohesion Fund (CF).

⁶ The historical overview of ERDF in this paragraph relies on EU (2007).

⁷ Objectives 3, 4 and 5a were financed by other Structural Funds.

three new objectives were introduced (Convergence, Regional Competitiveness and Employment, European Territorial Cooperation) to be addressed with the ERDF. In the current programming period, ERDF's investments address all the 11 thematic objectives supporting the Europe 2020 strategy, namely (see EU Reg 303/2013):

- 1) Research and innovation,
- 2) Information and Communication technologies,
- 3) Competitiveness of Small & Medium-Sized Enterprises (SME),
- 4) Shift to a low-carbon economy,
- 5) Climate change adaptation and risk management,
- 6) Environmental protection and resource efficiency,
- 7) Sustainable transport and major network infrastructure,
- 8) Employment and support for labour mobility,
- 9) Social inclusion and poverty reduction,
- 10) Education, skills and lifelong learning,
- 11) Institutional capacity & effectiveness of public administration.

A key novelty of the 2014-2020 investment framework is that, in order to access the ERDF funds allocated to RTDI, the EC requires countries and regions to have in place a Smart Specialisation Strategy. The latter, among other things, needs to identify a limited set of research and innovation priorities, outline measures to stimulate private research, technology and development (RTD) investment and put in place an adequate monitoring and review system. It is based on the idea that nations and regions need to build competitive advantage by matching their own research and innovation strengths to their own business strengths.

Furthermore the EU makes provisions for minimum allocations on certain priority areas. For example, in more developed and transition regions, at least 80 % of ERDF resources at national level should be allocated to energy efficiency and renewables, innovation and SME support, whereas less developed regions, in light of their wider needs, will have more flexibility, yet will have to devote at least 50 % of ERDF resources to energy efficiency and renewables, innovation and SME support.

R&I, ICT, SME competitiveness and Low carbon economy (i.e. the first 4 thematic objectives) need to account for 80% of the whole structural funds for most advanced and transition regions and 50% for the less advanced regions. These strategies are annexed to the ERDF operational programmes and submitted as ex-ante conditionalities to access the funds.

Strengthening research, technological development and innovation

- a) Enhancing research and innovation (R&I) infrastructure and capacities to develop R&I** excellence and promoting centres of competence, in particular those of European interest
- b) Promoting investments in R&I**, developing links and synergies between enterprises, R&D centres and higher education, in particular product and service development, technology transfer, social innovation and public service application, demand simulation, networking, clusters and open innovation through smart specialisation
- c) supporting technological and applied research**, pilot lines, early product validation actions, advanced manufacturing capabilities and first production in Key Enabling Technologies and diffusion of general purpose technologies.

2.3 Synergies between European Structural and Investment Funds, Horizon 2020 and other research, innovation and competitiveness-related Union programmes

For the first time, in the 2014-2020 multiannual framework, it is possible to combine Structural Funds with other Union funds. The European Commission and the Member States have designed the rules for enabling synergies between the European Structural and Investment Funds⁸ (ESIF), Horizon 2020, and other EU programmes directly managed by the Commission in the areas of research, innovation and competitiveness⁹.

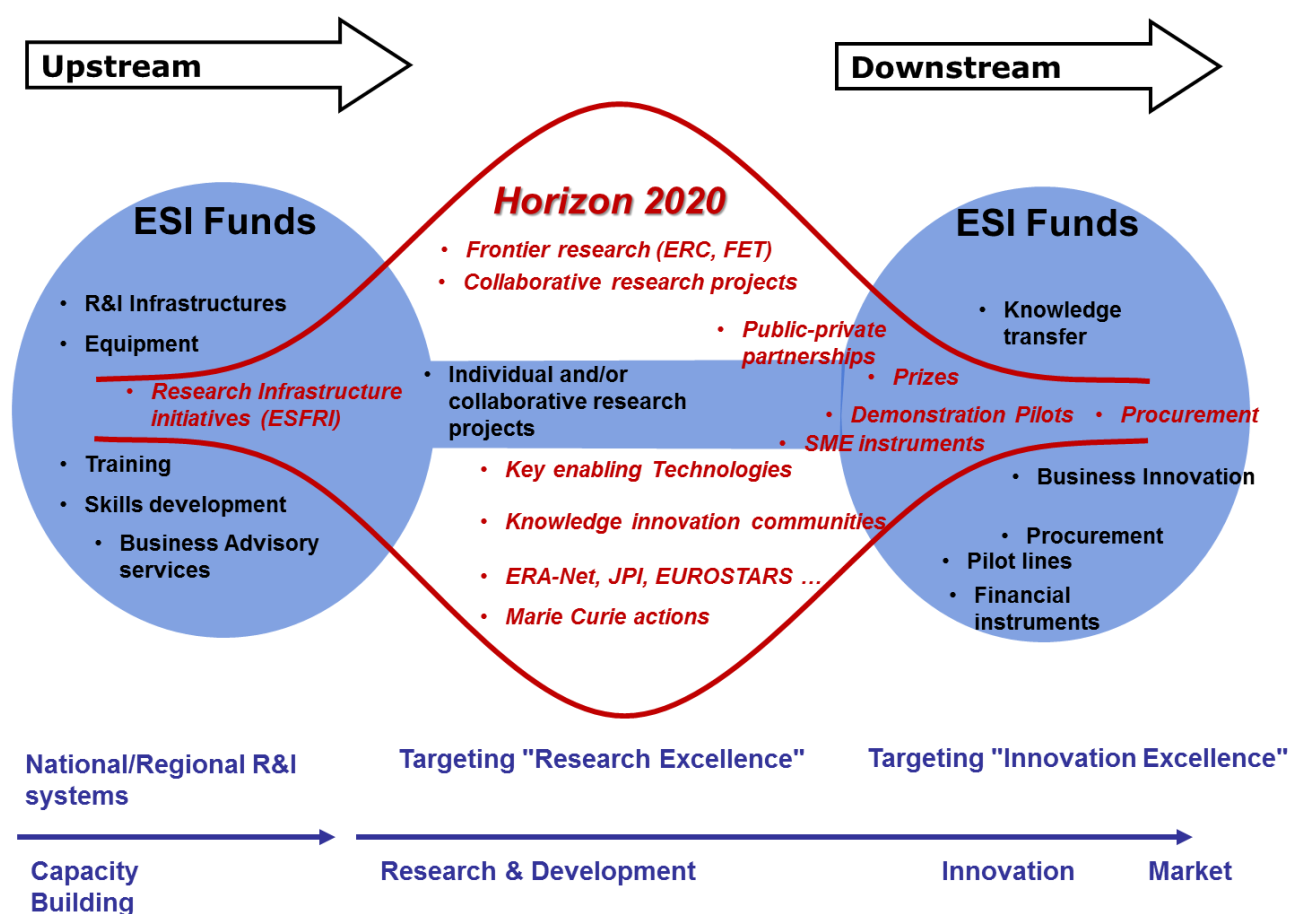
Specific rules govern the combination of these different funds, with the common aim to enhance capacity building for research and innovation (increasing the use of international peer reviews, and monitoring through performance indicators), improving information flows towards local players and take up of funds, as well as interaction with RDI stakeholders.

Cohesion policy, through the smart specialisation strategy, could act as a capacity building instrument, allowing for local learning mechanisms to emerge and fostering, through “upstream actions” a better capacity to participate in Horizon 2020. At the same time, “downstream actions” should enable the diffusion into the market of the results generated in Horizon 2020 and other programmes.

⁸ ESIF refers to: ERDF – European Regional Development Fund, Cohesion Fund, ESF - European Social Fund, EAFRD - European Agricultural Fund for Rural Development and EMFF – European Maritime and Fisheries Fund.

⁹ See EC Directorate-General for Regional and Urban Policy (2014).

Figure 1 Overview of synergies between Horizon 2020 and ESIF



Source: 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

On the Horizon 2020 side, synergies can be exploited by raising awareness, providing information, engaging in communication campaigns, and connecting National Contact Points (NCP) as much as possible to national and regional ESIF policy makers and managing authorities.

The basic principles for combined funding are:

- No substitution of national/regional or private co-funding to EU projects/programmes under direct Commission management by ESIF money (and vice versa).
- No double financing.

Synergies can be achieved through:

- Upstream coordinated efforts between programme using H2020 funding and ESIF
- Bringing together Horizon 2020 and ESIF money in the **same project** (this could be a single action or a group of coordinated actions/operations, but always provided that there is no double funding of the same expenditure item) (remarkably, this is only possible with H2020 and not any other European Programme);

- **Successive projects** that build on each other through

- Upstream sequential combination. The typical form of ESIF investments for this purpose is the capacity building in physical capital (construction or improvement of research infrastructures, purchasing equipment, including IT equipment and connections, data storage capacities, etc.), innovation infrastructures (LivingLabs, FabLabs, Design factories, etc.) and social capital (assistance for building networks, clusters and consortia).

Example: A Region provides ESIF money to a university hospital for state of the art IT content management systems and data storage space for patient data, and trains staff in handling this IT equipment. This equipment is needed to be able to exchange patient data and enable patients to handle data themselves in a secure way. The hospital may use this "up-grade" to become a partner in a Horizon 2020 project in Societal Challenges, e.g. "secure societies". While the equipment means a clear advantage, it does not guarantee that the hospital will become a partner in a Horizon 2020 project, or that a Horizon 2020 project will be successful.

Upstream sequential funding is a potential "stepping stone" for stronger involvement in R&I activities.

- Downstream sequential combination. Horizon 2020 or FP project results are used or further developed with subsequent ESIF investments. ESIF money can be used as support to individual firms or research bodies or public procurers. Activities contributing to the improvement of the innovation ecosystem that facilitates follow-up to successful RDII activities in order to bring them either higher up on the technology readiness level scale or closer to commercialisation could be supported by ESIF (technology transfer, adoption, proof of concept study, public procurements).

Example: a FP7 project developed a prototype for mobile health monitoring. While a pilot has been carried out successfully during the project phase, the commercial application on mobile terminal is not yet ready. The "app" development can be carried out by two SMEs of the consortium. The SME or public procurers can apply for ESIF support to develop/procure a commercial app based on the FP7 results (depending on the availability of funding and the specialisation strategies of the territories). Through **parallel projects** that complement each other ESIF and Horizon 2020 funding are running in parallel (Parallel use of funds in separate projects) and are mutually supportive.

Example: A project proposal on geo-monitoring based soil analysis receives a Horizon 2020 grant. A partner in the project in a rural region obtains EAFRD support to develop more drought/bacteria resistant crops analysing their reactions to specific soil compositions. While the two projects are legally separate, synergies are developed through the targeted, parallel use of funds.

ESIF programmes could also be designed and implemented¹⁰ to take up high quality project proposals from Horizon 2020 or other centrally managed programmes, for which there is not enough budget available in the respective programmes.

¹⁰ Notably in compliance with Art. 125(3) of CPR as regards the selection processes and criteria for operations.

3. The ERA policy-instruments and the ERA priorities

This section looks at the relationship between the aforementioned policy instruments and the five ERA priorities described in the EC Communication 2012 (and explored in the second Fabric Map), to highlight how the latter are reflected in the former and to point out the different nature of the priorities.

The 5 ERA Priorities

1. More effective national research systems
2. Optimal transnational co-operation and competition
3. An open labour market for researchers
4. Gender equality and gender mainstreaming in research
5. Optimal circulation, access to and transfer of scientific knowledge including via digital ERA

Horizon 2020 aligned with ERA priority 1

seeking “effective national research systems”. The actions under “Spreading excellence and widening participation” support the development of national research capabilities across all European countries and therefore can contribute to the achievement of Priority 1. The development of “research triangles” supported by the European Institute of Technology can also contribute to improve the efficiency of the research systems of the countries involved by improving the connectivity among the actor of their research systems, both within and outside the country. Finally, the actions under the first investment priority of structural funds (Enhancing research R&I infrastructure and capacities to develop R&I excellence and promoting centres of competence, in particular those of European interest) are also relevant to the ERA priority 1.

The ERA priority 2 aims at achieving synergies and reinforced interoperability between national research systems in terms of strategic agendas, research infrastructures and processes. The priority can also be realized through effective investment in and use of research infrastructures. Indeed, Horizon 2020 funding supports partnerships that promote the integration and coordination of R&D programmes such as ERA-NETs, JPIs, Technology platforms and Article 185 initiatives. Furthermore the EIT (European Institute of Technology), provided another example of how an activity can organize transnational co-operation and competition; the EIT works mainly through KICs (Knowledge and Innovation Communities), which bring together higher education, research and business across countries. As for the creation of R&I infrastructure, H2020 provides – through the “Research Infrastructure” action –, a further example of transnational co-operation can be achieved. As for structural funds, ERDF investment in “Enhancing R&I infrastructure and capacities” and “Promoting investments in R&I, developing links and synergies between enterprises, R&D centres and higher education” also support ERA priority 2.

Priority 3 refers to the possibilities to select and nurture researchers *across* the EU. As highlighted in the second edition of the ERA Fabric Map, the priority is addressed by various practices, including transparent, open and merit based recruitment of researchers (with career structures embedding the principles of the Charter and Code and the Human resource strategy for researchers), access of grants, international and intersectoral mobility, innovative doctoral training, and the promotion of tailored assistance to researchers through the EURAXESS website. Horizon 2020 alignment with this ERA priority occurs through its general provisions and the rules for participation. Indeed, the EU Regulation 1290/2013 states that Horizon 2020 shall contribute to the reinforcement of a single market for researchers and attractiveness of researchers' careers. Similarly the support to the Charter and Code for researchers is listed as one of the cross-cutting supported issues in H2020 (Reg EU 1291/2013) and the rules for participation themselves state that the grant agreement should reflect the principles expressed in the Charter and Code and characterising a free

labour market for researchers. The Marie Skłodowska-Curie action (MSCA) also helps realise this ERA priority. Indeed, its objective is to support, across border and disciplines, the career development and training of researchers. The MSCA, provides grants at all stages of researchers' careers, addressing explicitly industry-academia and international mobility and on support to training in skills related to innovation. The ERA-Chairs (under the Spreading excellence and widening participation instruments), are also directly related to this priority. The scheme provides support to attract and maintain top-level human resources. The Euraxess Portal, supports researchers in their international job-search and adaptation is a soft instrument, providing information, advice and guidance to navigate the job market.

The ERA priority 4 is about gender equality and gender mainstreaming in research. The ERA-Communication 2012 focusses on various aspects of gender promotion (for instance in scientific recruiting and managing committees), evaluation of gender practices as well as promotion of cultural change. As in priority 3, Horizon 2020 addresses the issue of gendered science mainly through its "general provisions". Article 16 of the regulation establishing Horizon2020 (EU Reg No 1291/2013) states that [...] *the programme shall ensure the effective promotion of gender equality and the gender dimension in research and innovation content. Particular attention shall be paid to ensuring gender balance, subject to the situation in the field of research and innovation concerned, in evaluation panels and in bodies such as advisory groups and expert groups. The gender dimension shall be adequately integrated in research and innovation content in strategies, programmes and projects and followed through at all stages of the research cycle.* In other words, all the instruments within the programme will embody this priority. Whilst there is no specific funding instrument within H2020, exclusively geared to gender, H2020 itself will be the subject of the 2014 gender-summit, a global event (sponsored by the EC, in conjunction with universities, firms and research councils within and outside the EU) looking at issue of gender in scientific activities. As for structural funds, with the fourth ERA priority, is also addressed through its the general provisions (EU Reg No 1303/2013), where it is stated that *"In the context of its effort to increase economic, territorial and social cohesion, the Union should, at all stages of implementation of the ESI Funds, aim at eliminating inequalities and at promoting equality between men and women and integrating the gender perspective, as well as at combating discrimination based on sex, racial or ethnic origin, religion or belief, disability, age or sexual orientation."*

The ERA priority 5 can be achieved through the (i) implementation of policies and measures on Open Access to and preservation of scientific information; (ii) fostering public-private knowledge transfer; (iii) harmonisation of policies for public e-infrastructures and associated digital research services; and (iv) the implementation of strategies for transnational access to digital research services. Open Access as a principle in Horizon 2020 now has its legal basis in the Framework Programme itself and in its Rules for Participation, translated into specific requirements in the Model Grant Agreement under the Horizon 2020 Work Programme. Furthermore, the FET action (Future and Emerging Technologies), under the H2020 Excellence in Science pillar, stresses the role of scientific collaborations across disciplines and innovation stages. As for the structural funds, actions under the priority "promoting investments in R&I and developing links and synergies between enterprises, R&D centres and higher education", provide economic incentives supporting this priority.¹¹

¹¹ Noted that there are also examples of projects funded by multiple sources, such as ESFRI (European Forum for Research Infrastructure, cofunded by H2020, Member States and ESIF), GEANT and EduGain.

Finally, although the five ERA priorities – contrary to the previous six dimensions (EC COM(2007) 161 final) – do not address explicitly the international, extra-European dimension of RDTI, international cooperation can be considered as a cross-cutting element of ERA. Horizon 2020 supports international cooperation in several ways, for instance through funding streams, where entities of third countries are required or at least considered as desirable, or through joint initiatives (such as joint calls or coordinated calls) involving entities of EU Member States and international partners, or through specific initiatives which require joint funding from EU, third countries and EU Member States. Additionally Scientific and Technological Cooperation Agreements and policy dialogues established at regional level and the coordination with instruments of EU's external policies (e.g. Instrument for Pre-Accession, Development Cooperation Instrument, the European Development Fund, Partnership Instrument) are important vehicles for implementing the EU International Strategy for Research and Innovation.¹²

Horizon 2020 generally is open to researchers from all over the world to “extend the frontiers of scientific knowledge, tackle challenges that affect us all, make industries more competitive”.¹³ International research is considered as advantageous in various ways i.e. better access to knowledge, improving research quality, learning through shared expertise. Non-EU countries are eligible to take part in Horizon 2020 projects, even as coordinators; in certain topics international partners are required or encouraged and coordinated calls are used for specific actions (e.g. EU-Japan R&D Cooperation in Net Futures, Partnering with Brazil on advanced biofuels). Nevertheless, not all countries are eligible for funding – this is limited to legal entities established in Member States, Associated Countries, European Interest Organisations and developing economies.¹⁴ The five priorities are reflected in H2020 differently. While priority 1, and particularly 2 are addressed directly through specific H2020 instruments, priorities 3, 4 and 5 are addressed mainly through the framework conditions and regulations underpinning many of these instruments. They are mainly targeted in the general provisions of the instruments and, rather than having funding streams directly aimed at them, are applied horizontally across different financial instruments.

To conclude we can observe a good alignment between the ERA priorities and the instruments deployed by H2020 (and the structural funds). Nevertheless, it is important to notice that there is no perfect match between H2020 and ERDF instruments, on the one hand, and the ERA priorities as currently defined on the other. H2020 and ERDF address a wider set of goals they address the 5 ERA priorities, while the ERA priorities are so general in nature that cannot be addressed by a single set of instruments. Instead, as described in the second edition of the ERA Fabric map, pursuing the ERA priorities requires a broad set of actors also including Member States and stakeholders. National level policies, for instance have a bearing on the extent to which and the ways in which the 5 ERA priorities will be addressed.¹⁵ Further, while the Fabric Map focuses mainly on EC-level instruments, it needs to be highlighted that intergovernmental cooperation represents an important pillar of the European Research Area. In particular, research alliances and intergovernmental and international organisations involved in research and innovation play an important role in setting research priorities, promoting excellence, fostering innovation and addressing societal challenges in Europe and beyond. Some research alliances are organised around specific challenges, while others have a more general nature or address a variety of problems. Appendix 1 shows an overview of currently active European and international research alliances by topic. Many

¹² See: http://ec.europa.eu/research/iscp/index.cfm?lg=en&pg=faq_4

¹³ See: http://ec.europa.eu/research/iscp/pdf/inco_h2020_for_international_audience.pdf#view=fit&pagemode=none

¹⁴ See: http://ec.europa.eu/research/iscp/pdf/inco_h2020_for_international_audience.pdf#view=fit&pagemode=none

¹⁵ An interesting recent development in this respect is that the German federal government has – as the first among the member states – published its ERA strategy (see <http://eravisions.eu/object/news/63>).

intergovernmental and international organisations also play an active role in funding and performing research, and related innovation and societal objectives.

4. ERA Scenarios – Priority and instruments

This section adds a prospective dimension to the ERA Fabric Map. In particular, we look at the four scenarios developed by the VERA project (Teufel et al., 2013) through the lenses of “ERA instruments”.

In particular, for each of the scenarios developed by the VERA project, we provide the snapshots (available also in the VERA website: www.eravisions.eu), some reflections on the instruments required and the stakeholders involved, the relationship with the ERA priorities and their comparison with other science and research systems around the globe. In so doing we are able to enrich our appreciation and understanding of the scenarios and develop more tools to reflect on the future of innovation and research in Europe.

4.1 Scenario 1. Private Knowledge – Global Markets

Box 3 Scenario Snapshot

In this scenario, today’s European Research Area gradually evolves into a Global Innovation Area, where research is mainly legitimized by its contribution to innovativeness, competitiveness and growth. As a result of limited public funds, growing inequalities between Member States and the jostling for political influence within Europe, private actors, mainly firms, dominate the financing of the research landscape and thus the setting of research priorities. The coordination and integration of worldwide research, technological development and innovation are primarily managed by global, vertical networks.

Relation to priorities, stakeholders, instruments and ERA as it is today:

ERA Priorities

In this scenario the little public funding, where available, is by definition allocated competitively. International cooperation does not occur much across Government organisations but through global, vertical networks and value chains. The (little) remaining share of public research is horizontally coordinated by closed circles of EU Member States, such as DACH or ORA (Open Research Area), regions and specialized research clusters. Private actors such as big corporations and lobby organizations have the power to set the agenda and align public RTDI activity with market interests. Grand challenges are taken into account only in so far as there is market potential. The scenario witnesses a rise of philanthropic organisations which, in developed countries, have a focus on societal needs. The scenario does not particularly explore the issue of labour market for researchers, it only highlights that there is free-mobility within the Union and the competition for R&D jobs is extremely high. Similarly, no mention is made of issues related to gendered science. As for open access, the scenario highlights that open infrastructure is available.

Stakeholders

Private stakeholders are at the core of research funding, the bulk of RTDI activity is carried out by specialized supplier firms; the organizational research landscape is split into private research providers,

joint ventures between big firms, and public-private consortia. The ERA, as described in the EC (2012) communication does not exist in this scenario: stakeholders are involved and invested in profit-maximising strategies detached from any public-driven political project.

Instruments

Given the little involvement of the public sector in research, the policy instruments are limited. The small share of public research is horizontally coordinated by closed circles of EU Member States, regions and specialized research clusters, and limited to single win-win domains for competitiveness. To compare this scenario with current EC-level programmes, we can imagine a strengthening of current instruments which foster joint action of some European Member States in research and innovation (such as joint programming, ERA-NETs, etc).. Participation of Member States is limited to those who can bring in funds, while the role of European bodies is restricted to monitoring progress with respect to regulations. Governments have managed to coordinate worldwide some friendly framework conditions for business (e.g. standards). The Horizon 2020 dimension of Industrial Leadership would have lost in importance, as public funding of research has been substantially reduced vis-à-vis private sources. As the market paradigm leads to a high fragmentation of research and innovation activities and support, cohesion aspects are not on the agenda anymore.

4.2 Scenario 2. Societal Challenges – Joint Action

Box 4 Scenario Snapshot

EU Member States have become increasingly open to collective action to tackle societal challenges such as climate change or health protection. The Joint Actions emerge as large programmes with large public investments in research and development complemented by NGO investment and activities and a greater role for regions.. The role of the European institutions becomes increasingly important and this leads to a substantial change in the governance system, with the European Parliament taking a central policy role.

Relation to priorities, stakeholders, instruments and ERA as it is today:

ERA Priorities

This scenario is close to a projection of the ERA as it is foreseen today by its promoters. Public and private RTDI actors collaborate jointly, as foreseen in Priority 2, to tackle societal challenges, in a common endeavour. The scenario is not explicit about the nature of the labour market for researchers in Europe; yet the focus on societal challenges suggests that gender issues will have been actively addressed in research policy. The labour market for researchers is prosperous and offers good opportunities to female and male researchers alike. No mention is made of Open Access (Priority 5) within the scenario.

Stakeholder

The scenario foresees a situation with a wide variety of stakeholders, including new privately-funded organizations set up to fund research and address societal challenges, and new, genuinely trans-European research organizations. Stakeholders operate in highly developed and specialised innovation hubs, in a governance structure that is largely led by the public sector, with super-national, national and sub-national bodies being involved in different aspects.

Instruments

The instruments are such as to support inter- and trans-disciplinary research topics. As this scenario projects an “ERA 2030” which is mostly a further development of the “ERA 2014”, a wide range of current instruments is still in place, though with modifications and alignments compared to the present situation. The ‘Societal Challenge’ dimension is of high importance, and challenges are complemented or re-oriented. This scenario is consistent with sub-national regions becoming strong actors on the research and innovation landscape. Although the applied perspective of H2020 has become, if anything, stronger, we can expect that the delivery and organisation of research activities will have changed, in part to fit with a more complex set of stakeholders and participants in the research and innovation landscape. The increased harmonisation of procedures or the strong linkages among different instruments – already visible in the current funding period – are further developed.

4.3 Scenario 3. Solutions Apart – Local is beautiful

Box 5 Scenario Snapshot

Today’s understanding of progress is transformed into a human-centred rationale, where happiness and quality of life are operationalized into new measures of progress. Research and innovation in Europe are transparent and open to individual or societal needs, in particular regarding new ways of living together, health or data privacy, with active citizen participation and close ties with local societal actors around micro/regional level activities addressing local problems.

Relation to priorities, stakeholders, instruments and ERA as it is today:

ERA Priorities

The scenario describes a Europe significantly different from the current one, in terms of values and societal priorities. In a scenario like this, any remaining concern about “effective national research systems” (Priority 1) would be interpreted as efficiency in the generation of capabilities to enhance quality of life, rather than a focus on “scientific excellence”. This is because the very rationale of RTDI activities moved to human well-being. In this scenario “transnational co-operation and competition” is no longer a priority; the scenario is based on increased participation of citizens and the increased territorial grounding for RTDI activities. Innovation is seen mainly as changes at local or regional level that promote wellbeing. When this requires scientific contributions, these will be of a transdisciplinary nature, but will often be conducted within the region. In this scenario the supply of researchers exceeds demand and the focus on local needs will tend to “close” the labour market for researchers. The issue of gender equality and mainstreaming in research (Pr 4) is not mentioned throughout the scenario. Implicitly, however, gender equality and mainstreaming are relevant to the extent they impact on the population well-being. Open access (Pr 5) is deeply embedded in this scenario, which relies on high participation, transparency and open knowledge flows.

Stakeholders

In this scenario citizens and civil society emerge as key stakeholders, which engage in RTDI activities. At the same time, international public agencies play a less relevant role –compared to the current situation. In turn this implies that new intermediary organizations emerge such as RTDI-intensive industry associations, hybrid public-private research councils, and societal representative boards, which advise and, in some

cases, distribute public funding around targeted themes. Philanthropists, crowd-funding and crowdsourcing actors also become more relevant as RTDI stakeholders.

Instruments

This scenario is based on the idea of deeper structural and systemic change, leading to the new rationale of human well-being and quality of life. Accordingly, a deep revision of European research and innovation policy has taken place leading to new instruments with differing foci, missions and rationales. On the thematic level, new lines of research have been opened until 2030, e.g. developing new measurement frameworks or focusing on new research lines and interdisciplinary fields (e.g. sports/ health/ nutrition). Basic criteria are their excellence with respect to quality of life, health and happiness. However, the main innovation compared to the 2014 situation is on processes: societal actors are much more engaged, leading to the introduction of new communication channels, discussion forums and the like. These are also introduced for government representatives, policy-makers and business representatives. High on the agenda are means for exchange, learning and coordinating activities. Further instruments that significantly gain in importance are “crowd instruments” like crowd funding or crowd sourcing. New research actors are citizens who have an important say in defining and performing research policy, as well as private businesses and specifically their social activities.

4.4 Scenario 4. Times of Crises – Experts at the Wheel

Box 6 Scenario Snapshot

Climate catastrophes unfold disruptive forces leading to societal transformation. A new sense of ‘deep sustainability’ on which all economic, political and societal activities are based requires targeted scientific adaptation solutions. European-level coordination is key in steering research, technological development and (social) innovation towards this goal. Experts in sustainability play key policy roles becoming heavily involved in policy definition and implementation.

Relation to priorities, stakeholders, instruments and ERA as it is today:

ERA Priorities

This scenario also departs from the ERA as we know it 2014. Sustainability becomes a guiding societal principle, shaping RTDI activities as well as broader social and economic dynamics. Support for research excellence is implicit in the binding “science-in-society” contract, whereby research has to deliver to citizens solutions to sustainability problems posing substantial scientific and technological challenges. Transnational cooperation is needed in this scenario given the global and complex nature of the problems faced. Furthermore research and knowledge-intensive value creation occur in globally interconnected hubs with Europe likely to hold a competitive advantage in some (environment-related) fields. This scenario explicitly mentions issues related to labour market for researchers and gender (priority 3 and 4) respectively, highlighting how the researchers’ base expands, integrating – among the other segments of society – also a large number of women. Open access (ERA priority 5) is supported as it facilitates circulation and application of knowledge.

Stakeholders

In this scenario the EU is a key stakeholder, as European level coordination and policies are crucial in shaping the research agenda and the research area as a whole. Citizens, as well as NGOs, foundations, banks or ethical investors, are also important stakeholders in this scenario.

Instruments

Scenario 4 is based on the assumption of deep structural and systemic change compared to the present situation, with sustainability aspects being at the core. This means that supporting instruments are strongly focusing on sustainability, and funds oriented towards resolving the Challenge of sustainable production and way of living. These new requirements lead to the introduction of alignments in coordinating and delivering policy as well as to major new actors approaching the research and innovation scene.

From the current focus on excellent science, societal challenges, and industrial leadership, this scenario concentrates on a specific societal challenge, albeit with multiple implications for a variety of sectors and policies. To address will require applied transdisciplinary research, and transition research. The latter does not have any predecessor in Horizon 2020 and is strongly related to coordination and intermediation, involving new actors and methods to integrate a diverse set of contributions.

5. Conclusions

The third and last edition of the ERA Fabric Map has taken a deeper look at the policy programmes and funding instruments shaping research and innovation. We have provided some historical notes on the key EC-level instruments governing research and innovation, and explored further the scenarios developed by the VERA consortium, reflecting on them under the spotlight of our discussion on instruments.

By adopting this approach, the third Fabric Map complements the previous editions of the document, which focussed more on the structure and governance of the ERA. The document has been organised in two parts.

In the first, we have taken an in depth look at research and innovation policy programmes at the EC level, reviewing H2020, the current framework programme for science and innovation, and the Structural Funds, covering in particular the ERDF in which the development of a Smart Specialisation Strategy is a pre-condition to access funds. Though pursuing overall different scientific aims (the former focussing on achieving global excellence and the latter a more equal territorial development) the two policy programmes share a common development paradigm, where science and innovation are seen as engines for smart and inclusive growth. The document has shown in detail the mechanisms that govern ERDF and H2020 and provided an historical perspective, highlighting the elements of novelty and continuity with previous framework programmes and programming periods for regional policy. In this Fabric Map we have also made explicit the links between the ERDF and H2020 and the five ERA priorities, highlighting how – whilst priorities 1 and 2 are the explicit target of some funding instruments-, priorities 3, 4, and 5 are mainly linked to the general provisions, rules for participation and transversal issues. Furthermore, in between the MS-level (not addressed in this FM) and the EC-level, lies a third critical (and not fully acknowledged) dimension for the implementation of the ERA, that of intergovernmental organisations.

The second part of the report has connected the fabric map to one of the core VERA outputs, namely the four scenarios. For each of them we have reported the snapshots (published in other VERA documents) and discussed the policy instruments and stakeholders underpinning their relationships to the five ERA priorities. Whilst the future cannot be predicted- understanding the present and reflecting on its potential outcomes and learning from other global experiences are critical to prepare the minds of all those involved in the ERA to be proactive actors of change. This exercise conducted within the Fabric Map, aims at providing some seeds for reflection. The exercise has highlighted that aspects related to transnational coordination (ERA priority 2) appear as relevant in all the scenarios, they do so in very different ways. Different political contexts will lead to different ways of understanding and implementing international research coordination. Similarly the significance and final objective of scientific research and technological development varies also from scenario to scenario; this suggests that the ERA Priority 1 (“more effective national research systems”) can be interpreted in different ways, as the nature of “effectiveness” depends on the objectives pursued. The implications of the scenarios for the other priorities can be clearer; this is probably because they rely less heavily on value-laden concepts: while the definition of “effective” and “optimal” will depend on the way final policy objectives are defined, notions like “open labour markets” and “gender equality” are more easily objectivised; what we see in the scenarios is that there are differences among them in the extent to which we can reasonably expect such objectives to be achieved. In other words, our understanding of the ERA, and of the ERA priorities, is time- and context-depending and should be understood and approached in its evolving nature.

Indeed, the evolutionary nature of the ERA, has been – implicitly – the *fil rouge* connecting the three Fabric Maps. The three documents, in fact, have monitored relevant changes in definitions, instruments and landscape in the short amount of time covered by the VERA project. Indeed, the VERA experience itself – with its wide stakeholder involvement, shows that the ERA, as a political project aimed at enhancing the benefits of research and innovation for Europe, is inherently a dynamic concept. The aim of harmonising the needs of different stakeholders, in a multi-level governance setting, to guide science and innovation processes (which by definition involve change, risk and uncertainty) at the EU level, cannot but be in constant evolution. As such, continuously *stretching the ERA*, through policy and analytical reflections, foresight and monitoring exercises –as (partly) attempted by the VERA consortium –, seems to be a vital part of the ERA, one that is critical to ensure its development and full deployment.

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Appendix 1

Research alliances and intergovernmental and international organisations involved in European research funding and performance by topic

Topic	European ¹⁶ and International Research Alliances	Intergovernmental and international organisations (European ¹⁷ and International)
General	Research Data Alliance - https://rd-alliance.org/ Social Science Research Council - www.ssrc.org Global Research Alliance - www.theglobalresearchalliance.org International Alliance of Research Universities (IARU) - www.iaruni.org	NordForsk - www.nordforsk.org Organization for Economic Co-Operation and Development (OECD) European Cooperation in the field of Scientific and Technical Research (COST) UNITED NATIONS ¹⁸
Climate change, environment, meteorology	European Climate Research Alliance (ECRA) - http://ecra-climate.eu Atlantic Ocean Research Alliance - http://ec.europa.eu/research/iscp/index.cfm?lg=en&pg=transatlantic-alliance	Global Biodiversity Information Facility (GBIF) Global Monitoring for Environment and Security (GMES) European Molecular Biology Laboratory (EMBL) European Molecular Biology Organization (EMBO) European Centre for Medium-Range Weather Forecasts (ECMWF) European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) European Incoherent Scatter - EISCAT
Energy (non-nuclear)	European Energy Research Alliance (EERA) - http://www.eera-set.eu/ Nordic Energy Research Council – www.nordicenergy.org	International Energy Agency (IEA)
Nuclear	EERA Joint Programme on Nuclear Materials - http://www.eera-set.eu/index.php?index=25	European Organization of Nuclear Research (CERN) The European Fusion Development Agreement (EFDA) ITER Organisation – www.iter.org International Atomic Energy Agency (IAEA) – www.iaea.org
Transport	European Transport Research Alliance (ETRA) - http://www.etralliance.eu/	
Health	Alliance for Biomedical Research in Europe (BioMed Alliance) - www.biomedeuropa.org Alliance for European Diabetes Research - www.euradia.org	World Health Organisation (WHO) ¹⁹
Space	Fraunhofer Space Alliance ²⁰	European Space Agency - ESA European Organisation for Astronomical Research in the Southern Hemisphere - ESO
Other		European Synchrotron Radiation Facility - ESRF European XFEL - European XFEL Free-Electron Laser Facility Institut Laue-Langevin - ILL World Bank - Development Economics (DEC) Pan-European network for market-oriented industrial R&D - EUREKA

Sources: IPTS and ERAWATCH (Intergovernmental Fiche)

¹⁶ Organisations comprising EU Member States, Associated Countries, and Switzerland.

¹⁷ Organisations comprising EU Member States, Associated Countries, and Switzerland.

¹⁸ The UN currently comprises around 20 research institutes. For a complete overview, see:

<http://unpan1.un.org/intradoc/groups/public/documents/un/unpan022689.pdf>

¹⁹ For an overview of research activities, see: <http://www.who.int/topics/research/en/>

²⁰ <http://www.fraunhofer.de/en/institutes-research-establishments/groups-alliances/alliance-space.html>