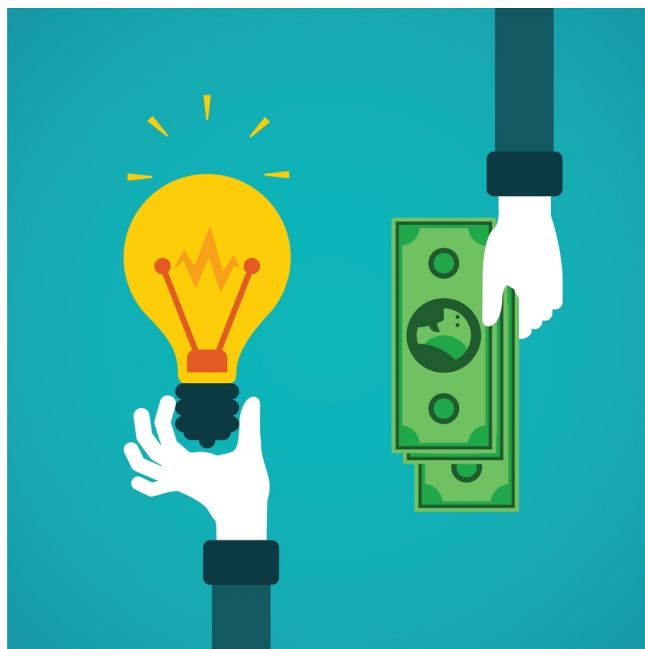

Horizon 2020 budget and implementation

A guide to the structure of the
programme



IN-DEPTH ANALYSIS

This publication aims to provide a detailed description of the budget for the Horizon 2020 programme. It presents the different structures that play a role in the management and implementation of EU funds provided through the programme for the period 2014-20 based on data available in July 2015 following the most recent modification of the Horizon 2020 budget. It complements the EPRS briefing 'Overview of EU Funds for research and innovation', published in September 2015.

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EXECUTIVE SUMMARY

Horizon 2020, the current framework programme for research and innovation, is the EU programme with the largest budget for supporting research and innovation activities for the 2014-2020 period. A 'programme of programmes', Horizon 2020 presents two types of complexity. The first is due to the implementation mechanisms it inherited from previous framework programmes. The second is linked to its structure – designed to promote a new approach to research and innovation funding and to enlarge the scope of the framework programme.

Implementation of the Horizon 2020 budget is the responsibility of nine different directorates-general (DGs) of the European Commission. The budget is implemented by 22 different bodies, some of which channel resources from other funding bodies (other EU, national, regional, and/or private funds) and so act as a secondary source of funds. This complex structure of direct and indirect funding is the heritage of the multiplicity of instruments, partnerships and agencies created over past decades. The cascade of funding from the managing DGs to the beneficiaries of the EU funds therefore follows various routes that are not always easy for the final beneficiaries who perform the research and innovation activities (researchers, research institutes, private companies) to identify and track.

The new architecture of Horizon 2020 with its three pillars – 'Excellent Science', 'Industrial Leadership', and 'Societal Challenges' – and two specific objectives – 'Spreading Excellence and Widening Participation' and 'Science with and for Society' is intertwined with this intricate system of funding, adding an extra level of complexity. For example, the funding for a given societal challenge usually falls under the budget responsibility of two DGs and can be implemented in part by executive agencies and in part by public-public or public-private partnerships. Linear situations, where one DG is in charge of one part of the programme under the management of one implementing body, have become the exception.

As Horizon 2020 tries to support a full research and innovation ecosystem, the number of potential beneficiaries (including individual researchers, public research institutions, national research funding organisations, large private companies and small and medium-sized enterprises) has increased. The opportunities for funding and the relevant sources of funds cannot easily be identified by each type of potential participant. Moreover, the enlargement of the scope of the programme, coupled with the proliferation of funding routes and the multiplication of potential beneficiaries, leads to increased fragmentation of the funding and greater competition for a limited budget. The low success rates in the first calls for proposals under Horizon 2020 illustrate this situation.

Reducing complexity in order to make Horizon 2020 more comprehensible to all potential participants, and providing adequate funding appropriations to support the programme's wide range of objectives, are two issues to be considered in the mid-term review of Horizon 2020 and the preparation of a future framework programme.

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List of main acronyms used

AAL2:	Active assisted living programme
BBI:	Bio-based industries
CIP:	Competitiveness and Innovation Framework Programme
cPPP:	Contractual public-private partnership
CS2:	Clean Sky
EASME:	Executive Agency for Small and Medium-sized Enterprises
ECSEL:	Electronic components and systems for European leadership
EDCTP2:	European and developing countries clinical trials partnership
EIB:	European Investment Bank
EIP:	European Innovation Partnership
EIT:	European Institute of Innovation and Technology
EMPIR:	European Metrology Programme for Innovation and Research
ERC:	European Research Council
ERCEA:	European Research Council Executive Agency
ETP:	European technology platform
FCH2:	Fuel cells and hydrogen
FET:	Future and emerging technologies
FP:	Framework programme
FPA:	Framework partnership agreement
FTI:	Fast track to innovation
ICT:	Information and communication technologies
IMI2:	Innovative medicines initiative
INEA:	Innovation & Networks Executive Agency
JPI:	Joint programming initiative
JRC:	Joint Research Centre
JTI:	Joint technology initiative
KIC:	Knowledge and innovation community
LEIT:	Leadership in enabling and industrial technologies
MSCA:	Marie Skłodowska Curie Action
PPP:	Public-private partnership
P2P:	Public-public partnership
REA:	Research Executive Agency
SESAR:	Single European Sky Air Traffic Management Research
SC:	Societal challenge
SME:	Small and medium-sized enterprise
S2R:	Shift to Rail

1. Horizon 2020 budget

1.1. The previous framework programmes

The first framework programme (FP) was established in 1983 for a four-year period. During the subsequent 30 years, successive FPs provided financial support for the implementation of European research and innovation policies. As this policy area became increasingly important in the EU context, new funding instruments were added within the FP, its structure evolved and its budget was increased (Table 1).

Table 1 – Framework programmes for research and innovation 1984-2020

Framework programme	Period	Budget (billion €)	Legislative procedure
FP1	1984-1987	3.3	Consultation procedure
FP2	1987-1991	5.4	Consultation procedure
FP3	1990-1994	6.6	Consultation procedure
FP4	1994-1998	13.2	Co-decision procedure
FP5	1998-2002	14.9	Co-decision procedure
FP6	2002-2006	19.3	Co-decision procedure
FP7	2007-2013	50.5	Co-decision procedure
Horizon 2020 (FP8)	2014-2020	74.8	Ordinary Legislative Procedure

Source: EPRS, based on European Commission [data](#).

1.2. A renewed structure for Horizon 2020

The idea behind FP1 was to concentrate all funding for research in one European programme. However other EU programmes funding research continue to exist.¹ When preparing FP8 in February 2011, the Commission proposed the creation of a Common Strategic Framework,² in a renewed attempt to integrate the funding for research and innovation activities under the same framework; the aim was to reduce the complexity of the EU programmes and simplify participation.

Some parts of the Competitiveness and Innovation Framework Programme (CIP) that ran from 2007 to 2013 were integrated³ into Horizon 2020, as was the European Institute of Innovation and Technology (EIT). The inclusion of these programmes in Horizon 2020 means that they no longer operate under their own specific rules, but have to follow the rules of participation⁴ and implementation of the FP. This modification aims to simplify administrative processes for participants.

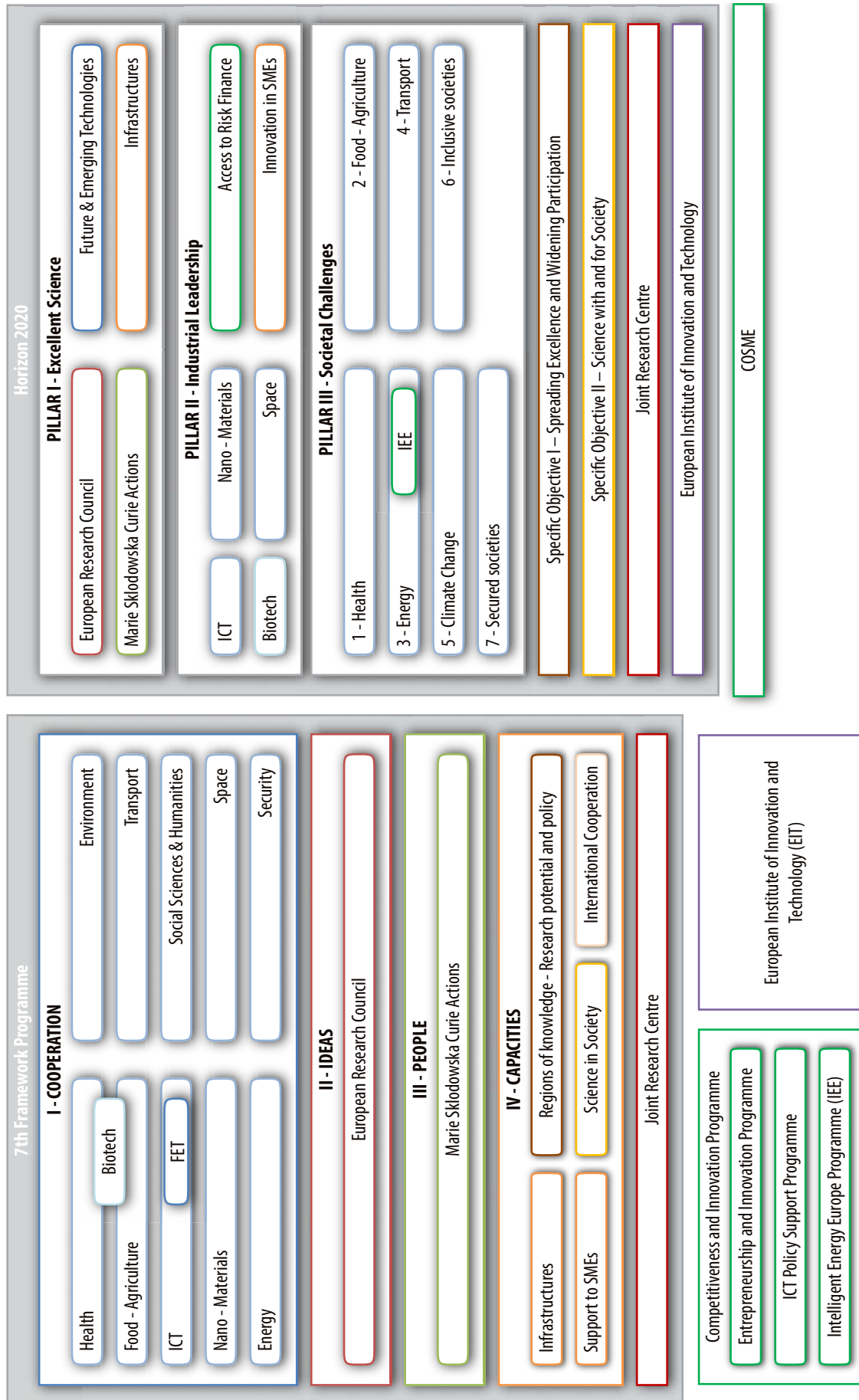
¹ The other programmes are the nuclear energy research programmes; the Research Fund for Coal and Steel; the space programmes Galileo and Copernicus; and the European Structural and Investment Funds. For more information and an historical perspective of EU funds for research, see '[Overview of the EU fund for research and innovation](#)', EPRS, September 2015.

² See the Commission Green [Paper](#) 'Towards a Common Strategic Framework for EU Research and Innovation funding', European Commission, COM (2011) 48, 9 February 2011.

³ The remaining parts of the CIP constitute the Competitiveness of SMEs programme ([COSME](#)).

⁴ The [rules of participation](#) specify all the aspects of the organisation of the calls for proposals under Horizon 2020, including for example, the definition of the legal entities that can apply for funding, the different types of actions funded, and the evaluation procedure for the proposals.

Figure 1 – The structure of FP7 and Horizon 2020 with some associated programmes



Source: EPRS, based on FP7 [Decision](#) and the Horizon 2020 [Regulation](#)

Moreover, Horizon 2020 was given a new architecture with three main pillars. Figure 1 shows how the different parts of FP7 were shuffled into the new structure of Horizon 2020 (section 4). The programme is meant to be aligned with the Europe 2020 strategy priorities published in 2010,⁵ especially in regards to tackling societal challenges and strengthening the impact of research and innovation activities on job creation and growth.

The eighth framework programme was specifically named Horizon 2020 in order to reflect these developments and to demonstrate to all potential participants that there was a discontinuity with the previous framework programmes.

1.3. Adoption and modification of the budget

The initial proposal⁶ of the Commission in November 2011 set the budget for Horizon 2020 at €87.7 billion. The final decision in December 2013, after consideration under the ordinary legislative procedure, reduced that budget to €77 billion. In June 2015, the adoption⁷ of the European Fund for Strategic Investments (EFSI) further lowered the amount to €74.8 billion. Between 4 and 5% of the programme's budget will be used for its administrative management,⁸ leaving an operational budget for the programme of slightly under €70 billion.⁹

1.4. European Parliament positions on the Horizon 2020 budget

In its September 2011¹⁰ position on the Commission proposal for the Common Strategic Framework, the European Parliament called for the budget for Horizon 2020 to be double the FP7 budget, i.e. €100 billion. However as the budget of Horizon 2020 is defined within the Multiannual Financial Framework adopted by Council, the EP was only immediately concerned with the relative repartition of the budget between the different parts of the programme, not the overall budget.

A report¹¹ adopted by the Committee on Industry, Research and Energy in December 2012 proposed a modification of the structure of Horizon 2020. Two new specific objectives, 'Spreading Excellence and Widening Participation' (section 4.6) and 'Science with and for Society' (section 4.7), were introduced, together with their respective budgets. The report also proposed the introduction of a seventh societal challenge on 'Secured societies'. Moreover, the EP insisted on support for small- and

⁵ For more information on the Europe 2020 Strategy, see the Commission [website](#).

⁶ Proposal for a Regulation of the European Parliament and the Council establishing Horizon 2020 – The Framework Programme for Research and Innovation (2014-2020), [COM\(2011\)809](#), 30 November 2011.

⁷ Regulation (EU) [2015/1017](#) of the European Parliament and the Council on the European Fund for Strategic Investments, 25 June 2015, OJ L 169, 1 July 2015, p. 1–38.

⁸ This is the average rate for the budget concerning indirect actions. The [regulation](#) sets 5% of the budget as a limit for administrative costs. However, in the case of the JRC, most of Horizon 2020 budget covers operational costs for infrastructures and personnel (section 3.1.2).

⁹ All the Horizon 2020 budget figures presented in this IDA are based on July 2015 Commission data on the Horizon 2020 operational budget for the full period 2014-20.

¹⁰ EP resolution on the Green Paper: From challenges to opportunities: towards a common strategic framework for EU research and innovation funding ([P7_TA\(2011\)0401](#)), 27 September 2011.

¹¹ [Report](#) on the proposal for a regulation of the European Parliament and of the Council laying down the rules for the participation and dissemination in Horizon 2020, Rapporteur: Christian Ehler, Committee on Industry, Research and Energy, A7-0428/2012, 19 December 2012.

medium-sized enterprises (SMEs) by guaranteeing funds for the SME Instrument (section 4.4) and introducing the Fast Track to Innovation pilot initiative (section 4.5).

During the negotiation of the budget of the EFSI, the report adopted¹² by the EP Committees proposed to ring-fence the Horizon 2020 budget. Although Council did not agree, the EP succeeded in reducing the maximum Horizon 2020 contribution to EFSI from €2.7 to €2.2 billion. Additionally, the EP maintained funding levels for the European Research Council (section 4.1.1), the Marie Skłodowska Curie Actions (section 4.1.3) and the specific objective 'Spreading Excellence and Widening Participation', while all the other Horizon 2020 sub-programmes would see a reduction proportional to their original budgets.

1.5. Stakeholders' positions on the Horizon 2020 budget

The main stakeholders have often voiced their support for an increased EU budget for research and innovation. In 2012, during the preparation of Horizon 2020, the European Association of Research and Technology Organisations (EARTO) supported the European Parliament proposition of a €100 billion budget for Horizon 2020, arguing that the proposed Commission budget presented no increase at all from PF7.¹³ In 2012 Science Europe, an association representing national research funding and performing organisations, called the €80 billion proposal by the Commission 'a carefully calculated budget' that is 'the minimum acceptable budget if the programme is to reach its goals'.¹⁴ In 2012, the League of European Research Universities (LERU) was concerned by the planned drop in funding between the last year of FP7 and the first years of Horizon 2020.¹⁵ In January 2013, EuroScience, a grassroots association of European researchers, asked the European Parliament, the Council and the Commission to increase the Horizon 2020 budget from €80 to €85 billion.¹⁶

In 2015, before the adoption of the EFSI, five members of the European Research Area stakeholder platform argued jointly in favour of safeguarding the Horizon 2020 budget. Science Europe, LERU, EARTO, the European Universities Association (EUA) and the Conference of European Schools for Advanced Engineering Education and Research (CESAER) jointly expressed 'their great concern on the EFSI regulation since it entails a Horizon 2020 budget cut while offering little reassurance that the projects to be funded under the new EFSI will effectively aim to support R&I activities'.¹⁷ In September 2015, as a consequence of the cuts in Horizon 2020 funding, the EUA called on the 'European Parliament to defend research in the upcoming EU budget' for 2016.¹⁸

¹² [Report](#) on the proposal for a regulation of the European Parliament and of the Council on the European Fund for Strategic Investments and amending Regulations (EU) No 1291/2013 and (EU) No 1316/2013, Rapporteurs: José Manuel Fernandes and Udo Bullmann, Committees on Budgets and on Economic and Monetary Affairs, A8-0139/2015, 23 April 2015.

¹³ [Comments](#) on the European Commission's Horizon 2020 Proposals, EARTO, 21 February 2012.

¹⁴ Science Europe [Position Statement](#) on the Budget for Horizon 2020, November 2012.

¹⁵ LERU's [feedback](#) on the proposals of the European Commission for Horizon 2020, 2012.

¹⁶ EuroScience [Open letter](#) on Horizon 2020, 21 January 2013.

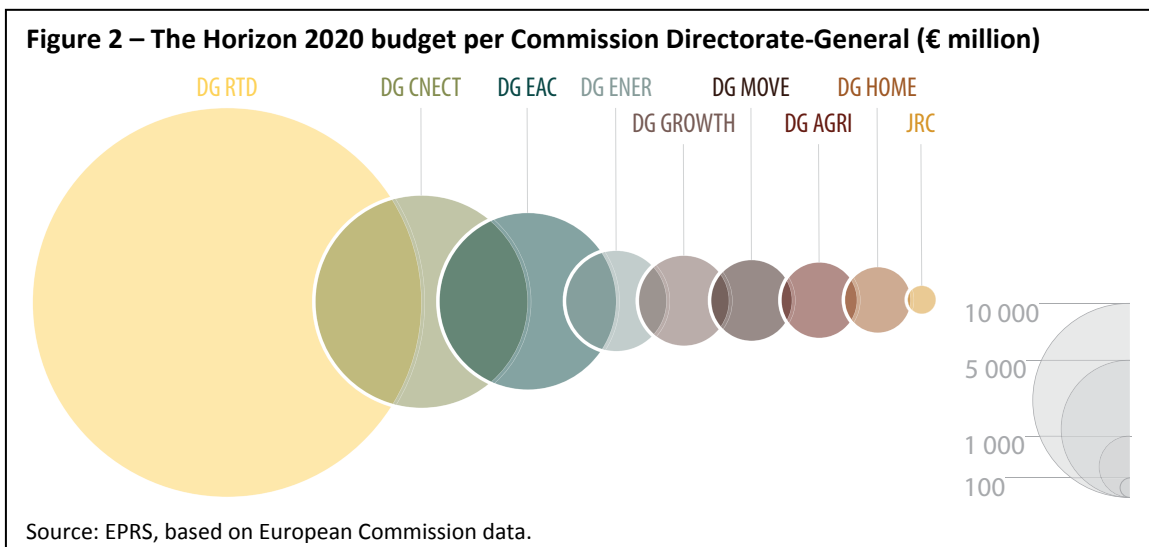
¹⁷ ERA Stakeholders [Joint Statement](#) on the EFSI 23 January 2015.

¹⁸ EUA [calls](#) on European Parliament to defend research in upcoming EU budget, 8 September 2015.

2. Funding budget by Commission Directorates-General

The overall budget of Horizon 2020 is managed by nine different Directorates-General (DGs) within the European Commission (Figure 2):

- DG Research and Innovation (DG RTD)
- DG Communications Networks, Content and Technology (DG CNECT)
- DG Education and Culture (DG EAC)
- DG Energy (DG ENER)
- DG Internal Markets, Industry, Entrepreneurship and SMEs (DG GROWTH)
- DG Mobility and Transport (DG MOVE)
- DG Migration and Home Affairs (DG HOME)
- DG Agriculture and Rural Development (DG AGRI)
- the Joint Research Centre (JRC).



The Joint Research Centre is the European Commission's internal science service, and employs scientists to carry out research in order to provide independent scientific advice and support for EU policy. The JRC carries out direct actions (in-house research activities), whereas the other DGs fund indirect actions (research and innovation activities for which the Union provides financial support and which are undertaken by participants).

The DG providing the budget for a specific section of the programme has the policy lead in defining the corresponding work programme. This DG is commonly referred to as the 'Parent DG' or 'Lead DG'. The work programme specifies the topics of the calls for proposals and indicates the type of action used for their implementation (see box). It also stipulates the selection and award criteria on which the proposals will be evaluated and the maximum rate of funding of the total eligible costs. The DG responsible produces a first draft of the work programme that is circulated to the other DGs through the inter-service consultation procedure. Programme committees¹⁹ and various stakeholders (section 6) are also consulted in the definition of the work programme. Once the work programme has been adopted, the implementation of the

¹⁹ National experts sit on the Horizon 2020 [programme committees](#). Their advice to the Commission during the preparation of the work programme ensures that there is coherence between the topics selected for the calls for proposals at the EU level and those selected at the national level.

programme can be delegated by a DG to an implementing body. The budget is then transferred to the implementing body. The implementing body reports back to the 'Parent DG', which is in charge of overseeing the implementation of the programme.

The different types of indirect actions under Horizon 2020

Funding is provided to participants through different types of actions:²⁰

- Research and Innovation Actions (RIA) fund collaborative research projects aiming to develop new knowledge or new technologies.
- Innovation Actions (IA) support activities for close-to-the-market products or services.
- Coordination and Support Actions (CSA) fund coordination and networking of research and innovation projects, programmes and policies (no research funding per se).
- Pre-Commercial Procurements enable the public sector, as a technologically demanding buyer, to encourage research, development and validation of breakthrough solutions in areas of public interest.
- Public Procurement of Innovative Solutions enable trans-national procurers to share the risks of acting as early adopters of innovative goods or services which are not yet available on a large-scale commercial basis.
- Prizes.

Other actions are specific to parts of the programme, such as the European Research Council (ERC) grants or the Marie Skłodowska Curie Actions (sections 4-5).

3. Implementing bodies

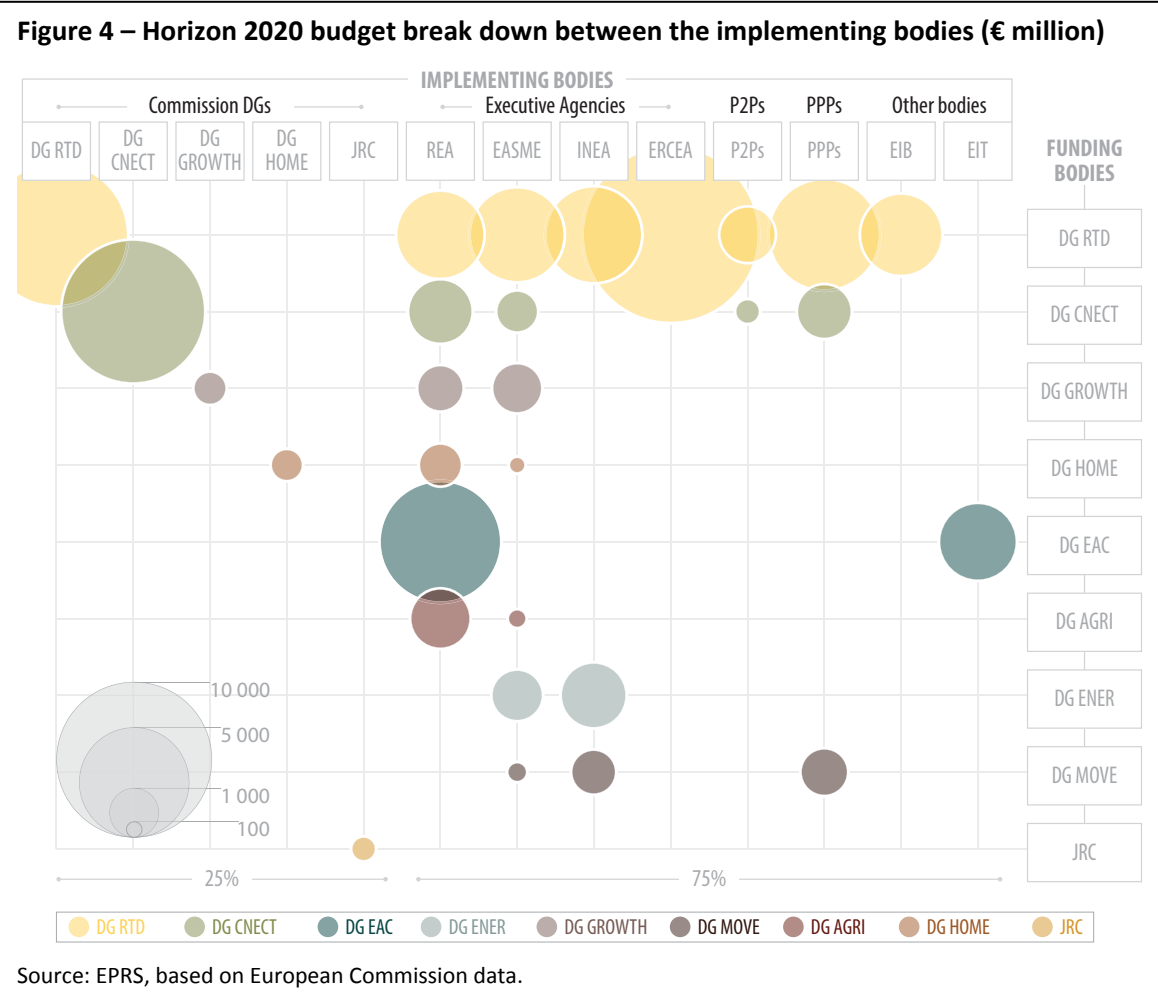
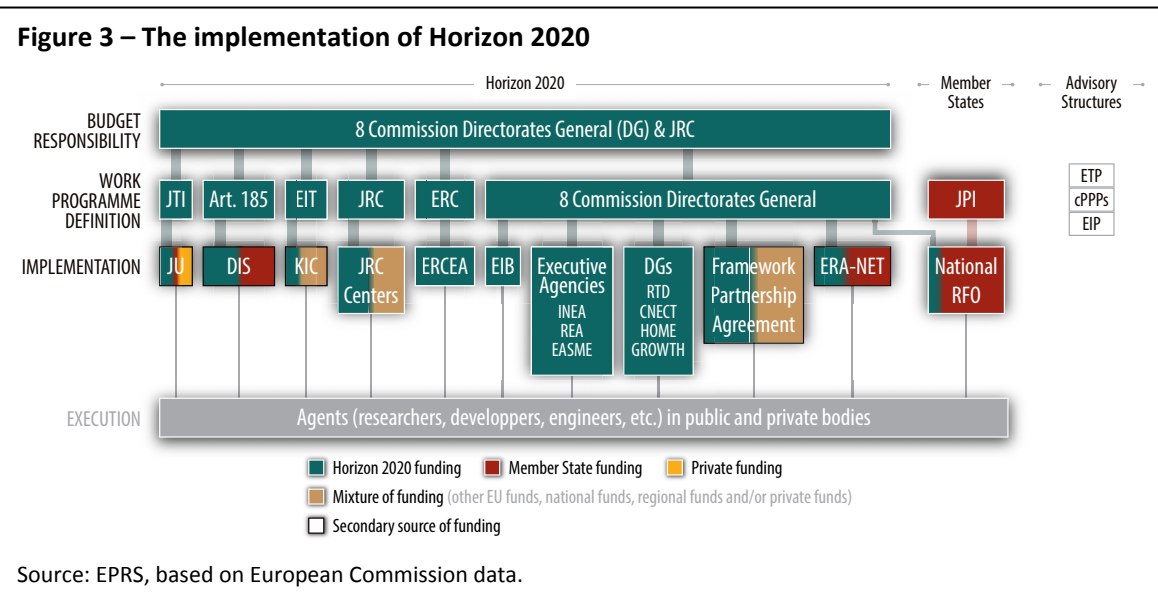
Following a decision of the Commission in 2011,²¹ the implementation of Horizon 2020 is mostly executed outside the Directorates-General (Figure 3). Overall, 22 different bodies implement different parts of the Horizon 2020 budget:

- five Commission DGs
- four executive agencies
- four public-public partnerships (P2Ps)
- seven public-private partnerships (PPPs)
- the European Institute of Innovation and Technology (EIT)
- the European Investment Bank (EIB).

Current estimates indicate that 75% of the Horizon 2020 operational budget will be implemented by entities other than the Commission DGs (Figure 4). This exceeds the target set in 2011 by the Commission that two thirds of the Horizon 2020 budget be implemented by bodies outside the DGs.

²⁰ From [NCP Wallonie](#) and [Swisscore](#).

²¹ A Budget for Europe 2020 – Part II: Policy fiches, European Commission, [COM\(2011\)500](#), 26 June 2011.



3.1. Commission Directorates-General

3.1.1. The DGs implementing indirect actions

About 25% of the budget of Horizon 2020 will be implemented directly by four DGs: DG RTD, DG CNECT, DG HOME and DG GROWTH (Figure 5). A DG usually keeps the implementation of the work programme for topics with specific policy implications. For example, funding for infrastructure implies a constant dialogue with the Member States and the Council (section 4.1.4). 'Security research' funding can be particularly

sensitive, and part of this is managed internally by DG HOME. The Framework Partnership Agreements for Future and Emerging Technologies (FET) Flagships also require direct management by DG CNECT (section 4.1.2).

3.1.2. The Joint Research Centre

The Joint Research Centre (JRC) was established in 1957 by the Euratom Treaty to carry out direct research activities in the field of nuclear research. The objective of the JRC was to provide independent scientific advice and support for the Community in this field. Its scope was extended to encompass other areas of research so that now the JRC provides an in-house research service for the Commission with more than 2 000 researchers from various fields. The JRC comes under the responsibility of the Commissioner for Education, Culture, Youth and Sport.²²

The JRC produces a multi-annual work programme and conducts direct actions through its seven research institutes, specialised in different areas of research:

- the Institute for Environment and Sustainability (IES)
- the Institute for Energy and Transport (IET)
- the Institute for Health and Consumer Protection (IHCP)
- the Institute for the Protection and Security of the Citizen (IPSC)
- the Institute for Prospective Technological Studies (IPTS)
- the Institute for Transuranium Elements (ITU)
- the Institute for Reference Materials and Measurements (IRMM).

Figure 5 – The Horizon 2020 budget implemented directly by the Commission DGs (in million euros)

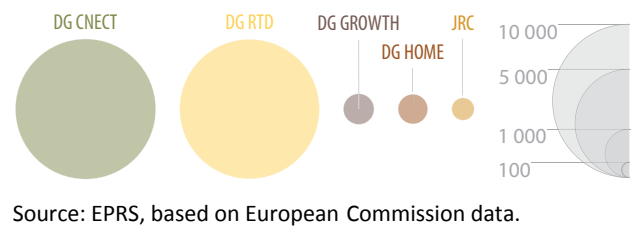
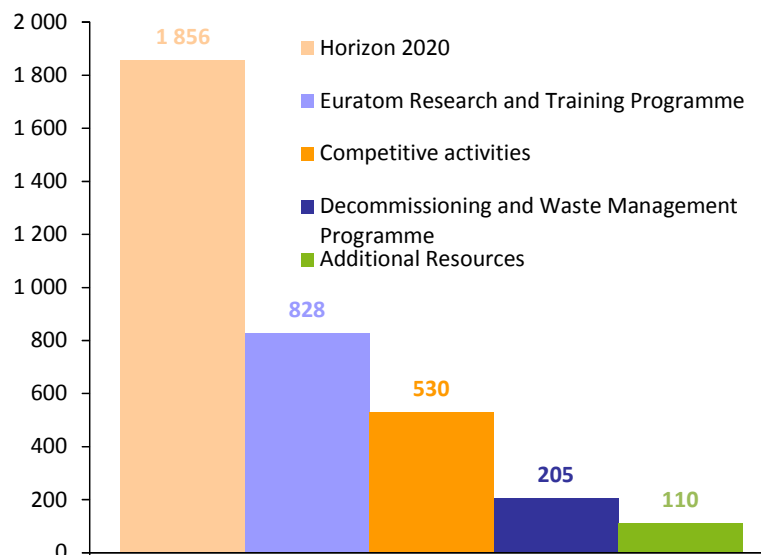


Figure 6 – The JRC budget 2014-20 (€ million)



Data source: JRC.

²² Until 2014, the JRC came under the responsibility of the Commissioner for Research and Innovation. The change was announced in November 2014 in the [mission letter](#) of the President of the Commission to the Commissioner for Education, Culture, Youth and Sport.

The Horizon 2020 budget dedicated to the JRC is €1 855.6 million (about 53% of the JRC budget – Figure 6). However, this budget covers mainly JRC staff and infrastructure expenditure. From this budget, it is estimated that around €210 million will be dedicated to operational research activities (Figure 5). The JRC is expected to receive about €820 million from the Euratom Research and Training programme²³ (23% of the JRC budget). Outside these two programmes, about 15% of the budget of the JRC comes from competitive activities; Commission DGs can ask the JRC to perform research activities, providing extra funding; the JRC can participate in indirect actions in collaboration with other research institutions in the EU; services can be provided by the JRC to third parties – private or public – through contracts.

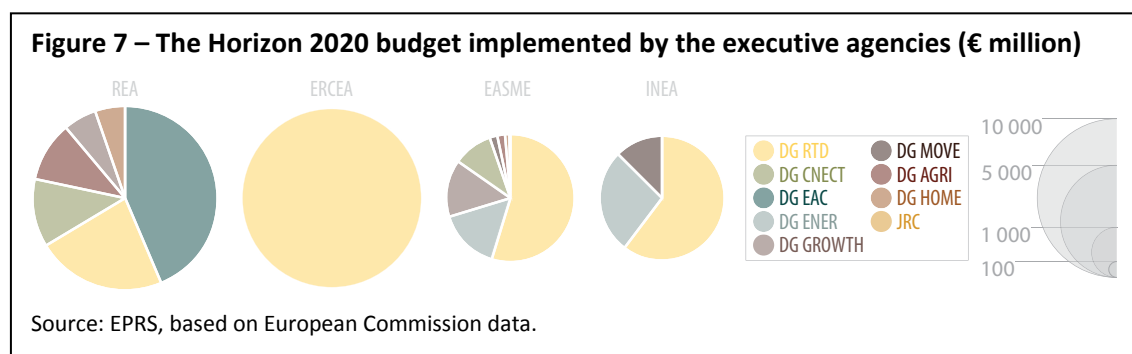
About 6% of the budget is provided by the Decommissioning and Waste Management Programme for JRC nuclear installations and the management of the associated waste. The remaining 3% is provided by the contribution of the associated countries²⁴ to Horizon 2020 and Euratom. This budget is mainly used for investments and for the JRC Enlargement and Integration Action plan, which supports the transposition of the EU legal framework to the national legislation of associated countries and facilitates scientific and technical exchanges with the EU.

3.2. Executive agencies

Four executive agencies participate in the implementation of Horizon 2020:

- the Research Executive Agency (REA);
- the Executive Agency for Small and Medium-sized Enterprises (EASME);
- the Innovation & Networks Executive Agency (INEA);
- the European Research Council Executive Agency (ERCEA).

The REA was set up in 2008 to implement FP7. The agency now manages implementation of about 20% of the Horizon 2020 budget. This includes the FET Open calls, the Marie Skłodowska Curie Actions supporting mobility, a share of the calls for proposals for space research and a share of the budget of three of the societal challenges (namely 'Food', 'Inclusive society' and 'Secured societies'). It also implements the specific objectives 'Spreading Excellence and Widening Participation' and 'Science with and for Society'. As the REA is the main executive agency implementing Horizon 2020, its mandate has been extended to include management support services for the whole programme: evaluation support, participant validation, management of the support for expert evaluators and the Horizon 2020 Helpdesk.



²³ The Euratom Research and Training Programme is a five year programme for 2014-18. The value presented here is a projection for 2014-20.

²⁴ [Associated countries](#) are non-EU countries participating in Horizon 2020 under the same conditions as Member States. This status implies that they provide a financial contribution proportional to their GDP that is added to the budget of the FP.

EASME was set up at the end of 2013 (with strong support from the European Parliament) as the successor to the Executive Agency for Competitiveness and Innovation. It focuses its activities on support for SMEs, environment, energy and maritime affairs. Under Horizon 2020, EASME manages the implementation of Innovation in SMEs, the SME Instrument, the Fast track to Innovation pilot, and a share of the calls for proposals under two societal challenges ('Energy' and 'Environment'). Outside Horizon 2020, EASME manages the implementation of the COSME programme.

INEA was set up at the end of 2013 as the successor to the Trans-European Transport Network Executive Agency. For Horizon 2020, INEA is in charge of the implementation of part of the budget of two societal challenges ('Energy' and 'Transport'). Outside Horizon 2020, INEA manages the implementation of the Connecting Europe Facility.

The ERCEA is an executive agency created in 2007 to implement the European Research Council (ERC) work programme, which has a special position within Horizon 2020 as a quasi-independent programme (section 4.1.1).

3.3. Public-Public Partnerships

According to Article 185 of the Treaty on the Functioning of the European Union (TFEU), the European Union can participate financially in research programmes developed jointly by the Member States (usually up to 50%). Financial provisions for these public-public partnerships (P2P) can be made by the EU through the Framework Programme. Regulations establishing these P2Ps are adopted by the European Parliament and the Council following the ordinary legislative procedure.

3.3.1. Establishing an Article 185 P2P

To establish an Article 185 P2P, Member States first put forward a proposal in which the topic and the objectives of the P2P are clearly identified. At this stage, each Member State mentions an approximate budget that represents its individual planned commitments to the P2P. The Commission studies this proposal and performs an ex-ante impact assessment. Different aspects of the proposal are analysed:

- What is the European added-value of the proposal?
- Is the proposal relevant to EU objectives? Is it relevant to the Framework Programme objectives?
- Are there already national research programmes in place in the Member States?
- Is the proposal mature enough? Is there a critical mass of research activities in Europe in the identified field?
- Is an Article 185 P2P the appropriate tool? What should the EU contribution be?

If the result of the ex-ante impact assessment is positive, the Commission finalises a proposal that then has to follow the ordinary legislative procedure. During the two years that this procedure requires, the Member States have to formalise their financial engagement. A Dedicated Implementation Structure (DIS), in charge of the evaluation process of the research proposals and the conclusion of the grant agreements with the recipients, has to be selected. The funds for approved proposals are provided by the national bodies and complemented with EU funding provided through the DIS.

3.3.2. Article 185 in Horizon 2020

Article 26 of the Regulation establishing Horizon 2020 stresses the need to consider a high level of commitment from the participating countries to integration at scientific, management and financial levels for Article 185 P2Ps. The rules for participation in the FP now apply to Article 185 of Horizon 2020.

Four Article 185 P2Ps implement EU funds under Horizon 2020:

- The Active Assisting Living programme (AAL2) aims to create better quality of life for older adults by fostering the emergence of innovative products, services and systems for healthy ageing; based on Information and Communication Technology.
- The European Metrology Programme for Innovation and Research (EMPIR) coordinates research projects to develop fundamental measurement science in the fields of health, energy, environment and industry.
- The European and Developing Countries Clinical Trials Partnership (EDCTP2) seeks to accelerate the development of new or improved drugs, vaccines, microbicides and diagnostics against HIV/AIDS, tuberculosis and malaria as well as other poverty-related and neglected infectious diseases in sub-Saharan Africa.
- The Eurostars Programme stimulates SMEs carrying out research to lead international, collaborative research and innovation projects.

The Baltic Sea research and development programme (BONUS) is an Article 185 P2P funded under FP7 until 2017. It aims to facilitate the implementation of ecosystem-based management of environmental issues in the Baltic Sea. A new proposal must be prepared to pursue this Article 185 P2P under Horizon 2020 after 2017.

The Partnership for Research and Innovation in the Mediterranean Area (PRIMA)²⁵ targets stronger cooperation between EU countries and Mediterranean countries in research and innovation. PRIMA is currently at the Member State proposal stage. In its December 2014 Conclusions, the Council invited the Commission to 'assess as soon as possible whether participation of the Union in the PRIMA Joint Programme on the basis of Article 185 TFEU is justified'.²⁶ If this evaluation is positive, PRIMA could be established in coming years as a new Article 185 under Horizon 2020.

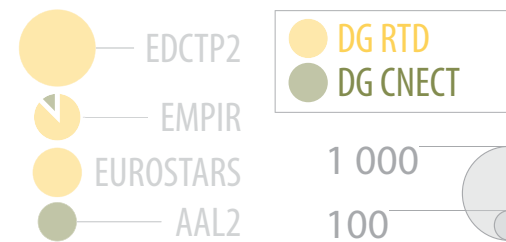
3.4. Public-Private Partnerships

The public-private partnerships funded under the Framework Programme are known as Joint Technology Initiatives (JTI). The Council adopts provisions for the establishment of JTIs after consulting the European Parliament.

3.4.1. Establishing a Joint Technology Initiative

Joint Technology Initiatives were introduced by the regulation for Framework Programme Seven (FP7). JTIs usually originate in European Technology Platforms (ETPs), i.e. industry-led stakeholder forums that develop common strategic agendas in specific fields (section 6.2). The scope of the research objective and the scale of the resources involved for some topics justified setting up long term public-private partnerships in the form of JTIs.²⁷ Joint Technology Initiatives combine private sector

Figure 8 – Horizon 2020 budget implemented by Article 185 P2Ps (€ million)



Source: EPRS, based on European Commission data.

²⁵ For more information on PRIMA, see the EraNetMed [website](#).

²⁶ Council [Conclusions](#) on PRIMA, 5 December 2014.

²⁷ Decision [1982/2006/EC](#) of the European Parliament and of the Council of 18 December 2006 concerning the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007-2013), OJ L 412, 30 December 2006, p. 1–43.

investments with European (and sometimes national) public funding. The private sector members are bound to provide an in-kind financial contribution to the JTI that at least matches the financial commitment of the public partners.

Whereas JTIs are a special funding scheme created under FP7, the legal entity used to implement JTIs is defined under Article 187 TFEU and is known as a Joint Undertaking (JU). Joint Undertakings can also be established to implement other funding schemes. For example, the Single European Sky Air Traffic Management Research (SESAR) was adopted in 2007 as a JU before the concept of JTI was implemented in FP7.

Table 2 – List of the JTIs and JU funded under Horizon 2020 (budgets in million euros)

JTI	Establishment	EU Budget	Industry contribution	Member States
IMI2	2008	1638	1725	-
FCH2	2008	665	700	-
CleanSky2	2008	1755	2250	-
ECSEL*	2014	1185	2400	1200
BBI	2014	975	1800	-
S2R	2014	450	470	-
JU	Establishment	EU Budget	Industry contribution	Eurocontrol
SESAR	2007	585	500	500

* ECSEL results from the merging of ENIAC and ARTEMIS, two JTIs established in 2008. Source: EPRS, based on European Commission data.

Following proposals from the Commission in 2008, five JUs were established by the Council for the implementation of JTIs. As a full member of the JU, the European Commission sits on its governing board, with the private members of the JTI represented individually or through associations. The JU implements the strategic innovation and research agenda adopted by the JTI members through annual or multi-annual work programmes. The JU launches the corresponding calls for proposals for funding research and innovation activities. These calls are usually open to all potential private or public applicants, members of the JTI or not. However, it is possible for some calls to be open only to the members of the JTI.

3.4.2. The Joint Technology Initiatives in Horizon 2020

Horizon 2020 provides funding for seven Joint Undertakings: six JTIs and the SESAR JU.²⁸ Five JTIs were established under FP7 in 2008. Three of these were renewed under Horizon 2020; the other two were merged to constitute a single JTI. Two new JTIs were established in 2014 (Table 2 – Figure 9).²⁹

- The JTI on Innovative Medicines Initiative (IMI2) aims to meet public health needs, improve patient access to innovative medicines, and pave the way for more personalised treatments.
- The Fuel Cells and Hydrogen (FCH2) JTI seeks to accelerate the commercial deployment of hydrogen-based solutions across Europe in the fields of transport (cars, buses and refuelling infrastructure) and energy (hydrogen production and

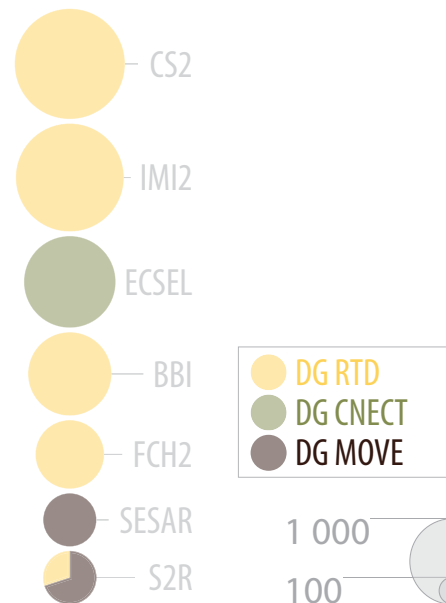
²⁸ Although not a JTI, the funding for SESAR is provided through Horizon 2020.

²⁹ European Commission [Memo](#) – Public-private partnerships under Horizon 2020: launch of activities and first calls, 9 July 2014.

distribution, energy storage and stationary power generation).

- The Clean Sky 2 (CS2) JTI works to improve the global aviation industry, providing safe, seamless and sustainable air mobility to meet citizens' needs. It will develop and test new technologies intended to increase aircraft fuel efficiency, thus reducing aircraft CO₂ and noise emissions.
- The Electronic Components and Systems for European Leadership (ECSEL) JTI focuses on maintaining Europe's capacity in the design and manufacturing of electronic components and systems.³⁰
- The Bio-Based Industries (BBI) JTI aims to develop new bio-refining technologies to sustainably transform renewable natural resources (waste, agriculture residues) into bio-based products, materials and fuels.

Figure 9 –Horizon 2020 budget implemented by Joint Undertaking PPPs (€ million)



Source: EPRS, based on European Commission data.

- The Shift2Rail (S2R) JTI sets out to improve the quality and efficiency of rail services in Europe (reliability and punctuality of rail services, railway capacity, costs of infrastructure) by accelerating the uptake of innovative solutions.
- The Single European Sky Air Traffic Management Research (SESAR) JU seeks to develop the new technology needed to deliver Europe's Single Sky, a project to reform Europe's airspace that is expected to double capacity and halve air traffic management costs.

3.5. European Institute of Innovation and Technology

The European Institute of Innovation and Technology (EIT) was created to improve the connections and interactions between higher education, research and innovation in Europe.³¹ The EIT was established in 2008 by a regulation of the Council and the European Parliament, based on Article 157 of the Treaty of the European Community regarding industry.³² It became operational in 2010 and is overseen by DG Education and Culture. Until 2013, the EIT was a separate entity from the Framework Programme (Figure 1). In 2013, it was included in Horizon 2020 and its regulation was amended so that Horizon 2020 rules would also apply.³³

³⁰ The Member States contribute to the funding of ECSEL and are members of the JU governing board.

³¹ Council [Conclusions](#), 15 and 16 June 2006.

³² Now Article 173 TFEU.

³³ Regulation (EU) [1292/2013](#) of the European Parliament and of the Council of 11 December 2013 amending Regulation (EC) No 294/2008 establishing the European Institute of Innovation and Technology, OJ L 347, 20 December 2013, p. 174–184.

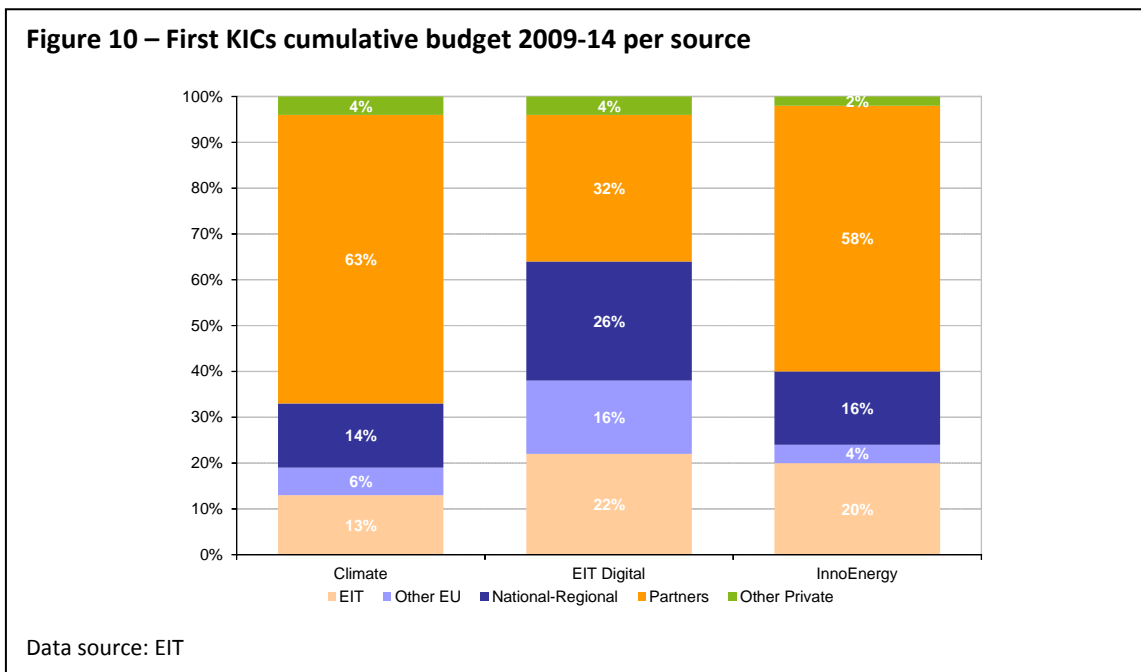
3.5.1. Knowledge and Innovation Communities

Knowledge and Innovation Communities (KICs) are autonomous partnerships of higher education institutions, research organisations, companies and other stakeholders, involved in the innovation process in the form of a strategic network on a defined topic. The EIT defines a Strategic Innovation Agenda (SIA) where it selects the topics for which Knowledge and Innovation Communities (KIC) are to be established. The EIT opens a call for proposals and selects, for each topic, the best partnership to form the KIC. It then oversees the activities of the different KICs. The KICs are in charge of implementing the necessary actions to reach the objectives set out in the European Institute of Innovation and Technology SIA. They carry out different kinds of actions, covering from setting up university curricula and training of students, to providing funding for research and/or innovation programmes.

In December 2009, the first three KICs were selected in the fields of energy, ICT and climate. Two additional KICs were selected in 2014, on the topics of 'Healthy Living – Active Ageing', and 'Raw Materials'. A call for proposals for two new KICs is planned in 2016 in the fields of 'Food for the Future' and 'Added-value manufacturing'. Finally a call for a seventh KIC is expected in 2018 dealing with the theme of 'Urban Mobility'.

3.5.2. Funding Knowledge and Innovation Communities

EU funds from the European Institute of Innovation and Technology are provided to the KICs based on a long-term Framework Partnership Agreement (section 5.2) between the EIT and the KIC Legal Entity. The EIT funding is provided annually to each KIC through a specific grant agreement that includes basic support funding (similar for all KICs), and competitive funding based on the results of the KIC performance assessment and future objectives.



European Institute of Innovation and Technology funds cannot represent more than 25% of the budget of a KIC. The rest of the KIC budget comes from in-kind or financial contributions from the partners within the KICs, from national and regional grants, or from other EU funds like Horizon 2020 competitive grants, or the European Structural and Investment Funds (Figure 10). The EIT verifies that different EU funds complement each other, following the rules of the different EU programmes.

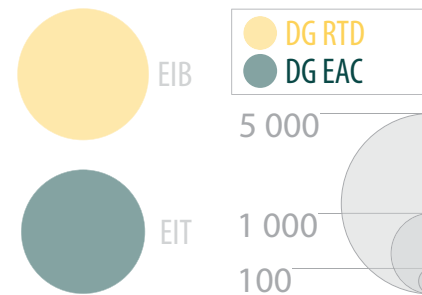
Internal agreements between the KIC Legal Entity and the KIC partners are then used to distribute the funding to the partners. The EIT funds can only be used to support added value activities contributing to the integration of research, innovation and higher education. Other activities, referred to as the KIC complementary activities, have to be funded by the partners through other sources.

In the long term, it is expected that each KIC will become financially autonomous, that is to say, it will rely only on non-EIT funding. The EIT can therefore be seen as an incubator of public-private partnerships, supporting their establishment and the initial years of their activity.

3.6. European Investment Bank

The European Investment Bank (EIB), with the European Investment Fund (EIF), implements the InnovFin programme (section 4.2.2), which supports private research and innovation investments.³⁴

Figure 11 – Horizon 2020 budget implemented by the EIT and EIB (€ million)



Source: EPRS, based on European Commission data.

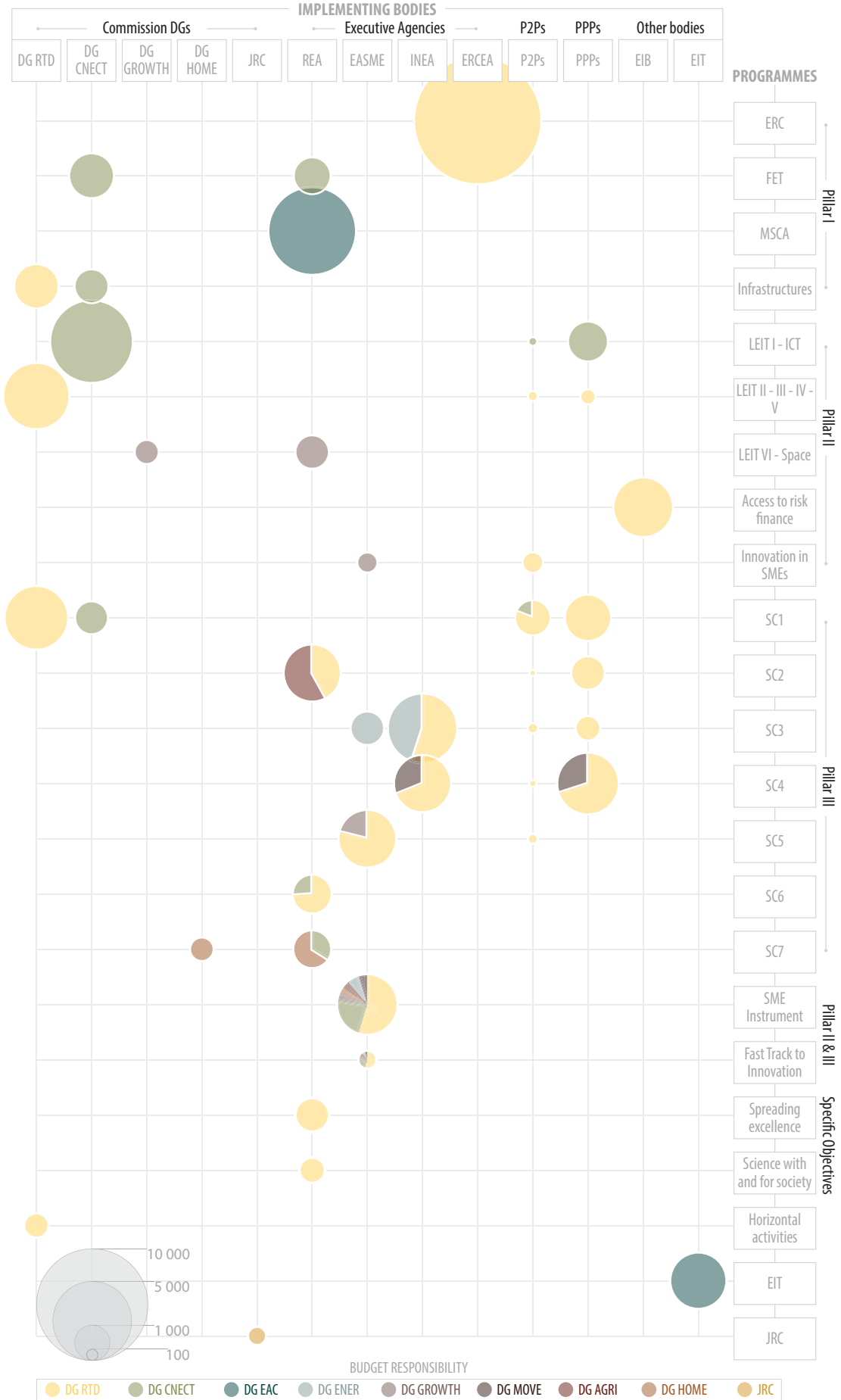
4. Structure of the programme

Horizon 2020 is organised around three main pillars (section 4.1-4.3) and two specific objectives (sections 4.6 and 4.7). Two instruments, the SME Instrument and the Fast Track to Innovation, which are funded transversally from Pillar II and III, are presented separately in sections 4.4 and 4.5.

Figure 12 presents an overview of the Horizon 2020 budget. For each part of the programme, it is possible to identify the bodies in charge of the implementation; the size and colour of each bubble corresponds to the size of the budget and the DG responsible.

³⁴ More information on [InnovFin](#) and the different financial [tools](#) are available on the EIB website.

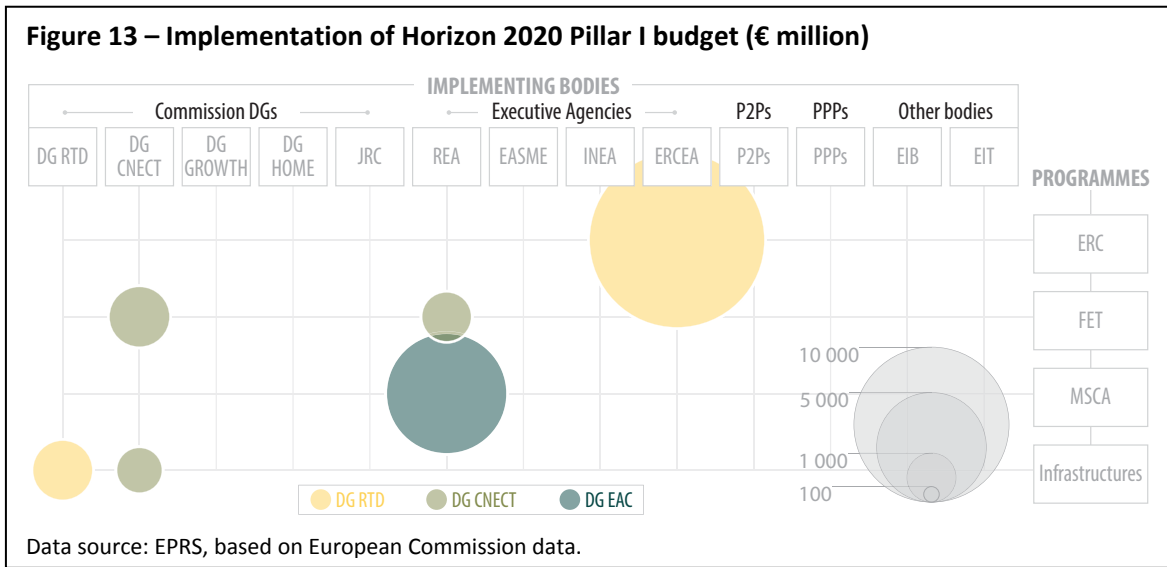
Figure 12 – Horizon 2020 operational budget and implementation for 2014-20 (€ million)



Source: EPRS, based on European Commission data.

4.1. Pillar I – Excellent Science

The purpose of the first pillar of the Horizon 2020 programme is to exploit EU potential in fundamental research and to consolidate the European Research Area (ERA), in order to make the Union's research and innovation system more competitive on a global scale. It gathers different programmes from FP7 (Figure 1) under one umbrella. The common objective of these programmes is to support the research system in the long term through investment in the production of new knowledge and the development of human resources and infrastructures. These programmes are focused on what is commonly referred to as exploratory, blue-sky or fundamental research activities.



4.1.1. European Research Council

The concept of a European-wide research council to fund individual researchers first arose in 2002 when an expert group was established by the Danish presidency. In 2005, acting on the recommendation of the expert group, the Commission proposed the creation of the European Research Council (ERC), aiming to attract and retain leading scientists in Europe by supporting high-risk and high-impact research. The ERC was formally established in 2007.

The ERC is a unique programme within the Framework Programme because:

- the ERC funds research projects under the leadership of individual researchers, whereas most of the other FP grants fund collaborative projects between researchers from different institutions;
- ERC grants are open to all researchers worldwide, regardless of their nationality;
- ERC grants are portable, meaning that they are attached to an individual researcher who can freely establish him or herself at any host institution in Europe;³⁵
- there are no identified topics in the calls for proposals, meaning that researchers propose their own topics in all areas of science and humanities when they apply;³⁶
- the scientific council of the ERC (22 researchers nominated by the Commission) defines the ERC work programme which is then approved by DG RTD;
- the work programme is implemented by a dedicated and autonomous executive agency, the ERC Executive Agency (ERCEA).

³⁵ An ERC grantee must spend at least half of his working time in an EU or associated country institution.

³⁶ This is the bottom-up approach. The definition of topics is referred to as the top-down approach.

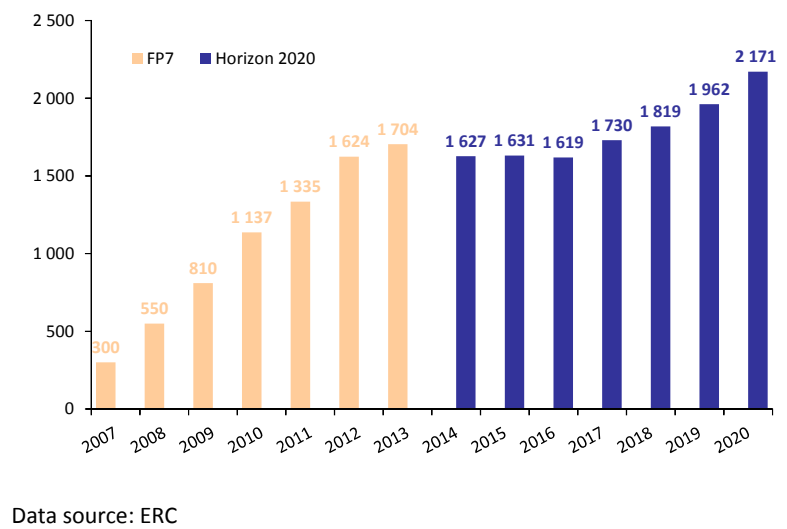
The ERC provides three types of individual grants for research projects of up to five years duration:

- Starting Grants of up to €2 million for researchers with two to seven years of experience after their PhD;
- Consolidator Grants of up to €2.75 million for researchers with seven to 12 years of experience after their PhD;
- Advanced Grants of up to €3.5 million for researchers with a track record of significant research achievements in the last ten years.

The ERC grantees can also benefit from a 18 month ERC Proof of Concept grant of €150 000 to explore the innovation potential of their research or to support commercialisation of the results of their ERC-funded research. In 2014, the ERC provided 355 Starting Grants, 302 Consolidator Grants, 93 Advanced Grants and 116 Proof of Concept grants.

The proposals are evaluated by 25 panels of researchers grouped into three research areas: Physical Sciences and Engineering; Life Sciences; and Social Sciences and Humanities. The Scientific Council defines how the budget is divided between the three main areas. As there are no selected topics for the applicants, the ERC work programme only defines the type of grants available and the budget associated with each call for proposals.

Figure 14 – ERC annual budget for 2007-20 (€ million)



With €13.1 billion, the ERC budget represents 17% of the whole Horizon 2020 budget and 54% of the budget of Pillar I. The overall budget increase of 75% from the €7.5 billion under FP7 is significant. However, the ERC budget increased dramatically 2007-13, as all the components of the programme were progressively established. Taking the years 2012-13 as the reference point, the average budget increase for the ERC under Horizon 2020 is only 8% (Figure 14).

4.1.2. Future and Emerging Technologies

The Future and Emerging Technologies (FET) programme was established under Framework Programme Four (FP4) by DG CNECT as part of the Cooperation – ICT programme. Under Horizon 2020, it was integrated into Pillar I and its scope extended beyond ICT topics to all technologies (Figure 1). The FET programme aims to fund high risk, foundational research projects that are multidisciplinary and collaborative, and that have a technological component. The programme is implemented through three types of actions:

- FET Open provides funding for research projects on new ideas for radically new future technologies in a bottom-up approach. The FET Open scheme receives 40% of the FET budget and is managed by REA.

- FET Proactive supports emerging themes in a top-down approach, seeking to establish a critical mass of European researchers in selected research topics. FET Proactive provides the funding for the High Performance Computing (HPC) contractual public-private partnership (section 6.3); this leaves only a small budget for the other selected topics.
- FET Flagships are long-term interdisciplinary research projects that involve a large number of researchers tackling complex scientific issues. The two FET flagship projects selected in 2013 seek respectively to understand the Human Brain; and to develop new materials for the future, such as graphene. FET Flagships are funded through framework partnership agreements (section 5.2).

4.1.3. Marie Skłodowska Curie Actions

The purpose of the Marie Skłodowska Curie Actions (MSCA) is to support the mobility and training of European researchers. Under Horizon 2020, MSCA fellowships are organised into four categories.

- Individual Fellowships (IF), open to individual researchers in agreement with a host institution, promote researcher's geographical³⁷ or trans-sectoral mobility.³⁸
- The Research and Innovation Staff Exchange (RISE) assists organisations wishing to encourage their research staff's geographical and/or trans-sectoral mobility.
- Innovative Training Networks (ITN) fellowships are available to consortia of organisations to fund joint training networks for researchers or doctoral training schemes under private-public or public-public partnerships;
- The COFUND programme, open to individual private or public funding organisations, provides complementary funding for national or local training and mobility schemes.

The MSCA also fund and coordinate European Researchers' Nights, providing funds for research institutions to organise events to promote careers in research. The MSCA budget is managed by DG EAC and is implemented by REA (Figure 13).

4.1.4. Infrastructure

The term infrastructure here covers a wide range of facilities, resources and services from physical research infrastructures to archives, bio-banks, data centres or communication network.³⁹ The funding provided under Horizon 2020 for research infrastructures (RI) supports three objectives.

About two thirds of the infrastructure budget is dedicated to the first objective, which aims to develop the European RIs. Member States define the priorities for new pan-European infrastructures through the European Strategy Forum for Research Infrastructures (ESFRI). Horizon 2020 then provides funds for the preparation of new infrastructures including, for example, technical aspects and the selection of a suitable site for the construction. However, construction of the RIs is the responsibility of the Member States.⁴⁰ Moreover Horizon 2020 provides incentives to allow EU researchers' access to national Research Infrastructures. The programme also promotes networking

³⁷ Mobility between two EU or associated countries, or incoming and outgoing mobility between an EU or associated country and any other country.

³⁸ From a public institution to a private company or the other way round.

³⁹ See Article 2 (6) of the Horizon 2020 [regulation](#).

⁴⁰ Whilst Horizon 2020 funds cannot be used to finance the construction of research infrastructures, the European Structural and Innovation Funds may be used for that purpose.

between national RI within a particular field to harmonise the framework for access or for data management, thus facilitating administrative procedures for researchers.

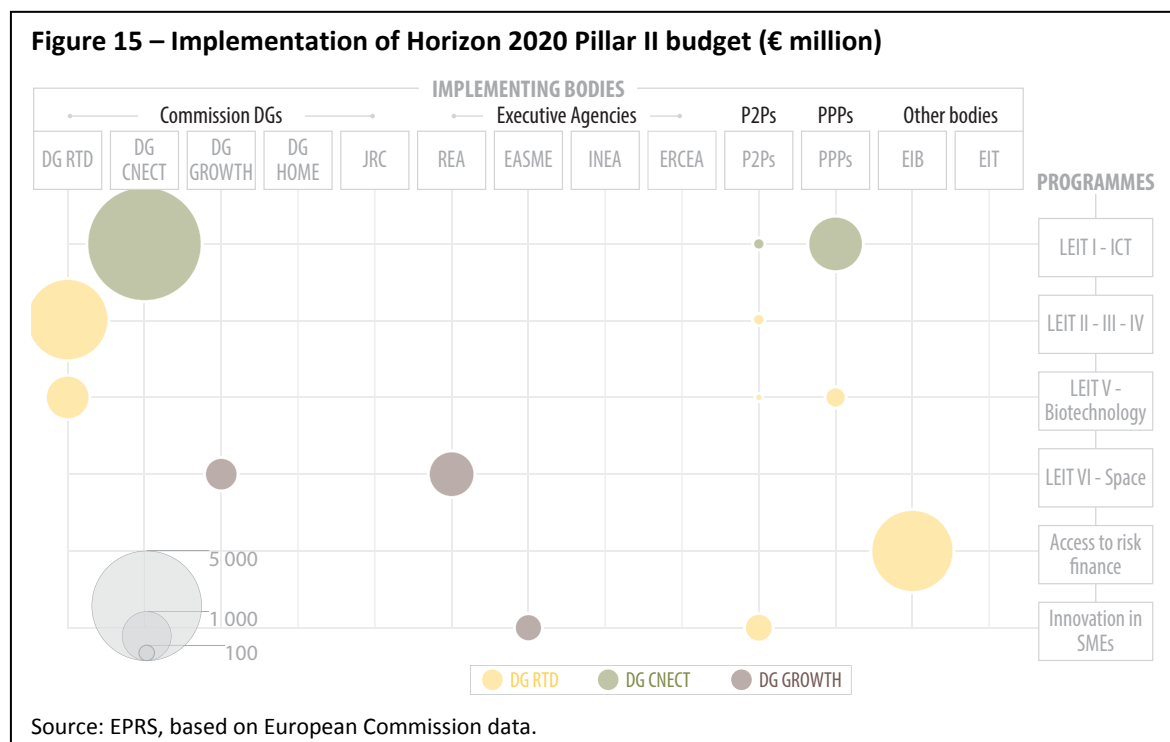
The second objective is to encourage the Research Infrastructures' contribution to innovation. RIs rely on a network of companies to supply instruments and provide services for infrastructure maintenance. These companies may be vulnerable if they depend only on one RI or if they cannot maintain the level of expertise needed to keep RIs up-to-date. Support for these suppliers is essential to guarantee the future of the RIs themselves. Horizon 2020 supports the suppliers by helping them analyse the long-term development of an RI, based on a strategic agenda defined by the public and private partners involved.

Finally, funds are provided through Horizon 2020 for the internationalisation of European Research Infrastructures and the development of a European policy for RI. This includes partnerships with third countries.

The budget for the infrastructures is managed directly by DG RTD and DG CNECT, given that coordination with the Member States is required. (DG RTD provides the ESFRI secretariat). DG CNECT is in charge of the development of e-infrastructures – the infrastructures related to computing, connectivity, and data storage.

4.2. Pillar II – Industrial Leadership

Pillar II of Horizon 2020 should speed up the development of technologies and innovations that will underpin tomorrow's businesses and help innovative European SMEs to grow into world-leading companies. The Pillar focuses on three specific objectives, namely, to develop Key Enabling Technologies and space research; to provide financing tools for research and development activities, especially in the private sector; and to support the development of innovative SMEs.



4.2.1. Leadership in Enabling and Industrial Technologies

This first objective, Leadership in Enabling and Industrial Technologies (LEIT), supports the development of Key Enabling Technologies (KET), defined by the Commission as

technologies 'providing the basis for innovation in a range of products across all industrial sectors'.⁴¹ The different parts of this section of the programme are:

- LEIT I – Information and Communication Technologies (ICT)
- LEIT II – Nanoscience and Nanotechnologies
- LEIT III – Advanced Materials
- LEIT IV – Advanced Manufacturing and Processing
- LEIT V – Biotechnologies.

These Key Enabling Technologies have the potential to transform activities in many different fields, from health to energy and transport. Connections with the private sector are strong, because the KETs and their synergies can provide a competitive advantage for European industry. The Electronic Components and Systems for European Leadership (ECSEL) and Bio-Based Industries (BBI) JTI are financed under this part of the programme. Defining the LEIT work programme includes consultation with the private stakeholders through the European Technology Platforms (section 6.2) and contractual Public-Private Partnerships (section 6.3).

Space research managed by DG GROWTH is part of this section and is labelled 'LEIT VI'. Funding under this topic supports actions for the implementation, exploitation and development of the two EU space programmes: the European Global Navigation Satellite System (EGNSS – Galileo) and the Earth Observation programme (Copernicus). These projects are implemented in partnership with the European Space Agency. Another objective is to strengthen the competitiveness of the European space sector supporting, for example, critical space technologies.⁴² Funding is also provided to improve the protection of space infrastructure through the establishment of a Space Surveillance and Tracking system.

4.2.2. Access to risk finance

The second objective, dealing with access to risk finance, is implemented by the European Investment Bank (EIB) through the InnovFin programme. This programme offers financial tools (including direct corporate lending, venture capital, loan guarantees) and one advisory tool, benefitting both SMEs and larger companies.

Horizon 2020 funding, provided to the EIB through DG RTD, serves as a guarantee for InnovFin implementation. The EIB invests eight times the value of this initial funding, and then guarantees, through InnovFin, up to 50% of the loans or venture capital funds provided by the local financial institutions to the SMEs or larger firms. This means that a minimum financial leverage effect of 16 is expected on the original funding. However, experience with similar instruments under the Competitiveness and Innovation Framework Programme (CIP) resulted in a larger leverage effect.⁴³ Hence, of the €2.67 billion in Horizon 2020 funding managed by the EIB through InnovFin, at least €48 billion (and potentially up to €65 billion) of investment in private research and innovation is expected.

4.2.3. Innovation in SMEs

The Innovation in SMEs programme seeks to increase innovation levels in SMEs. This part of the programme is made up of two components: the first is the financial support

⁴¹ KET definition from DG Growth [website](#).

⁴² See the joint [report](#) by the Commission, ESA and the European Defence Agency.

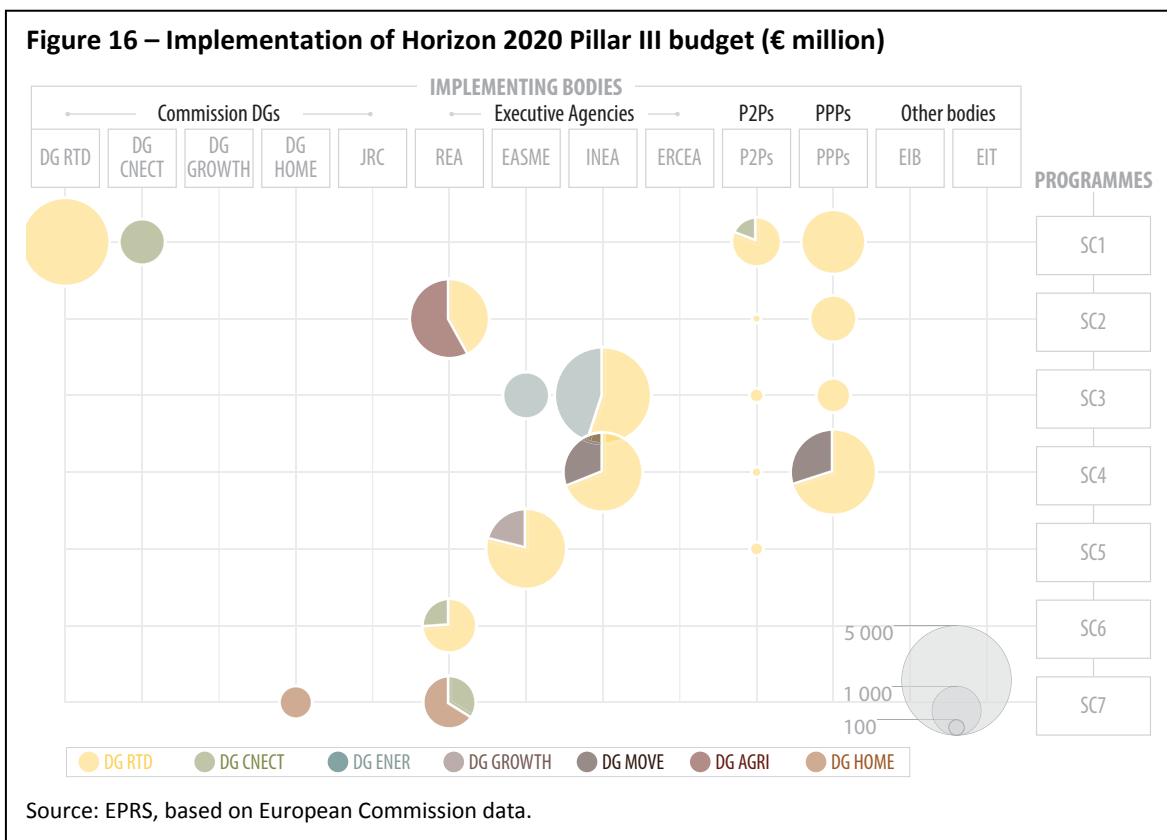
⁴³ See the [report](#) of the Commission on financial instruments for the period 2007-13.

provided through DG RTD to the Eurostars P2P that fund transnational collaborative projects by research-intensive SMEs (section 3.4).

The second component, InnoSup, is funded through DG GROWTH and is implemented by EASME. The InnoSup programme groups various actions in development and provision of better innovation support services to SMEs. These actions are designed to provide opportunities to Member States and regions to enhance their services through collaboration, peer-learning and the uptake of new approaches. They also help to establish common services at EU level. In addition, several actions focus on the identification, further development and dissemination of skills and expertise among SMEs. The 2014-15 work programme includes support for a European Intellectual Property Rights Helpdesk, as well as a networking action between national and regional innovation agencies. Outside InnoSup, this part of the programme also funds smaller actions, such as support for the 'Innovation in SMEs' Advisory Group.

4.3. Pillar III – Societal Challenges

The third pillar of Horizon 2020 is organised around seven societal challenges (SC). Whilst the topics are similar to those defined under 'Cooperation' in FP7 (Figure 1), the approach to preparing calls for proposal is different. Each topic focuses on policy priorities and includes funding for basic research, applied research, knowledge transfer and innovation so as to cover the full cycle of research and innovation. The goal is to bring together a critical mass of resources and knowledge across different fields, technologies, scientific disciplines and research infrastructures in order to address each of these specific challenges.



4.3.1. Health, demographic change and well-being

The first societal challenge targets improvements to the lifelong health and well-being of all citizens, to facilitate the successful adaptation of European societies to demographic change. With an operational budget of €6.8 billion, it is the most

significant of the seven challenges. About 23% of the funding goes to the IMI2 JTI and 13% to the EDCTP2, AAL2 and EMPIR public-public partnerships. The rest of the funding is managed directly by DG RTD (45%) and DG CNECT (11%).⁴⁴ DG CNECT focuses its funding on ICT tools related to health research and ICT solutions and innovation. It is the only challenge for which the DGs do not delegate implementation to the executive agencies (Figure 16).

4.3.2. Food security

The second societal challenge covers food security; sustainable agriculture and forestry; marine, maritime and inland water research; and the bio-economy. The focus is the development and implementation of new technologies which will accelerate the transition to a sustainable European bio-economy. DG RTD is responsible for 57% of the budget for this challenge, with 40% of this contribution going to fund the BBI JTI, (and fractionally, the EMPIR P2P). The rest of the budget is overseen by DG AGRI. The entire implementation, except for the JTIs and P2Ps, is managed by the Research Executive Agency.

4.3.3. Secure, clean and efficient energy

This specific challenge, related to energy, supports the transition to a reliable, affordable, publicly accepted, sustainable and competitive energy system with reduced fossil fuel dependency. The budget for this challenge is distributed equally between DG RTD and DG ENER. DG RTD funds part of the FCH2 JTI through this challenge. DG ENER provides funding for the continuity of the Intelligent Energy Europe programme, which was part of the CIP for 2007-13 (Figure 1). The remainder of both DGs' budget for this challenge is implemented jointly by INEA.

4.3.4. Smart, green and integrated transport

This challenge focuses on achieving a European transport system that is resource-efficient, climate- and environmentally-friendly, safe and seamless for the benefit of all citizens, the economy and society. 70% of the funding is overseen by DG RTD which uses it to fund CleanSky2, part of the FCH2 and part of the Shift2Rail JTIs. DG MOVE is responsible for 30% of the funding and funds the other part of the Shift2Rail JTI and the SESAR JU. The rest of the funding is used by the Innovation and Networks Executive Agency.

4.3.5. Climate action, environment, resource efficiency and raw materials

The fifth challenge focuses on achieving a resource- and water-efficient economy and a society that is resilient in the face of climate change. It also seeks the protection and sustainable management of natural resources and ecosystems, including a sustainable supply and use of raw materials. DG RTD is in charge of 79% of the budget for this challenge, with DG GROWTH managing the remainder. Except for a small contribution to the EMPIR P2P, the entire budget is implemented by EASME.

4.3.6. Inclusive societies

The challenge 'Europe in a changing world – Inclusive, innovative and reflective societies' seeks to foster a greater understanding of Europe and to support European societies as they evolve and adapt to unprecedented transformations on a global scale. It covers economic and cultural interdependencies, ageing and demographic change, integration, inequalities, and innovation culture. The budget is fully implemented by REA, with DG RTD responsible for 74% of the funds and DG CNECT in charge of the rest.

⁴⁴ For each challenge, part of the funding is attributed to the SME instrument (7%) and the Fast Track to Innovation instrument (<1%) and is implemented by EASME (sections 4.4 and 4.5).

4.3.7. Secure societies

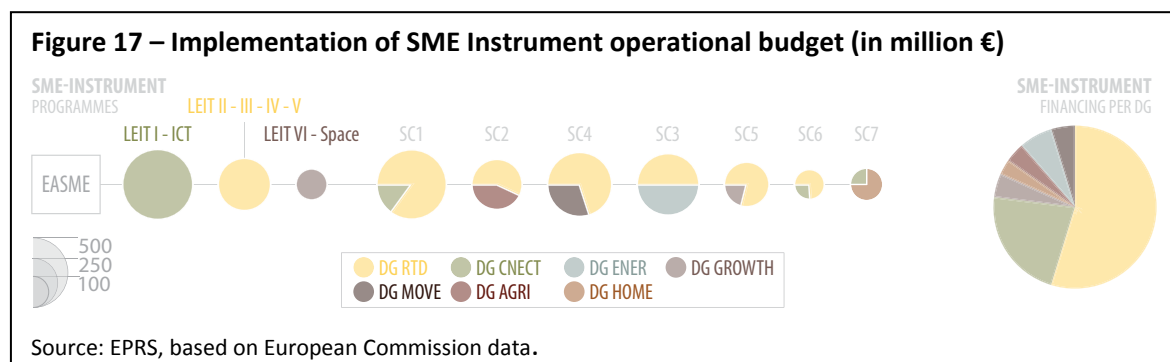
The last of the societal challenges aims to foster secure European societies, while strengthening a European culture of freedom and justice. The budget is mainly overseen by DG HOME (75%), which directly implements the calls for proposals related to security research. DG CNECT has responsibility for the remaining 25% of the budget. Apart from the portion implemented by DG HOME, the budget for this challenge is implemented by REA.

4.4. SME Instrument

The SME Instrument is a specific tool created under Horizon 2020 to support innovation projects by individual SMEs. These projects develop 'close-to-market' activities, i.e. activities directly related to new or improved products, services or processes such as prototyping, testing, piloting or large-scale product validation. This tool mainly funds the two initial phases of these activities:

- Phase I – Six month grants of €50 000 for exploring and assessing the technical feasibility and commercial potential of a breakthrough innovation;
- Phase II – One or two year grants of €0.5-2 million for innovation development and demonstration purposes covering, for example, prototyping, miniaturisation, scaling-up, testing or validation for market replication.

A Phase III, covering access to innovation support services to facilitate the commercial exploitation of the innovation, is proposed with the support of the Enterprise Europe Network and potential financial support from InnovFin (section 4.2.2). Free-of-charge business coaching is provided as an optional service in Phases I and II to support and enhance the firm's innovation capacity and help align the project to strategic business needs.

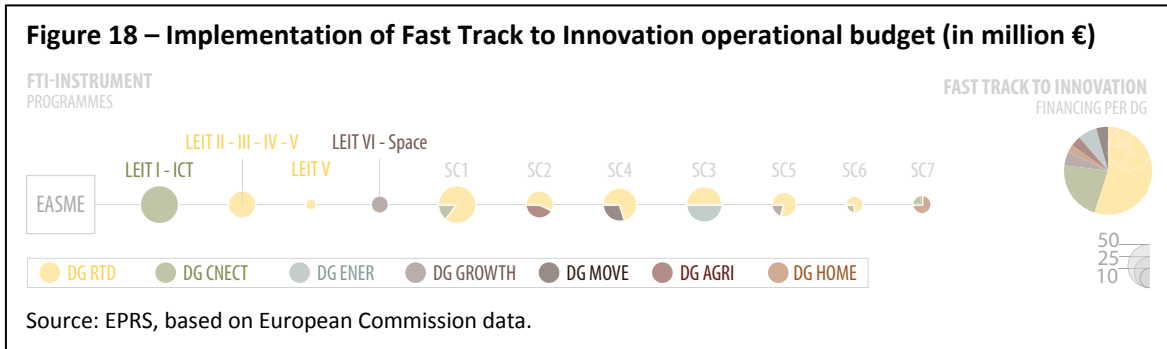


The budget for the SME instrument is levied from the budgets of the Pillar II LEIT and Pillar III Societal Challenges programmes: at least seven per cent of the budget from these two programmes has to be dedicated to the SME instrument.⁴⁵ This means that the budget for the SME instrument is a patchwork made up of 17 different budget lines, managed by seven different DGs (Figure 17). Each DG is responsible for defining, in the work programme, the topics corresponding to its budget. On the one hand, this ensures that, for each topic, a budget is available, and the different proposals for the SME instrument are evaluated separately. On the other hand, the SME Instrument budget for each topic is small, potentially resulting in a low success rate. The SME Instrument is implemented by EASME.

⁴⁵ The projection for Horizon 2020 is made under the assumption that each of the different programmes will contribute equally to the SME Instrument, meaning that seven per cent of each budget line under consideration will be dedicated to this tool.

4.5. Fast Track to Innovation Pilot

The Fast Track to Innovation (FTI) is a pilot instrument launched under Horizon 2020 to provide funding for proposals for close-to-market activities in any area of technology or application. Unlike the SME Instrument, the FTI has no predefined thematic topics. Also, the FTI instrument funds consortia of three to five partners, and is not restricted to SMEs.



This pilot is organised through two calls for proposals in the 2015-16 period, providing between €1 and €3 million for the projects selected. The €200 million budget for this pilot tool – implemented by EASME – is provided by a direct levy of less than one per cent on the budgets of the Pillar II LEIT and the Pillar III Societal Challenges programmes (Figure 18).

4.6. Specific Objective I – Spreading Excellence, Widening Participation

The first specific objective in Horizon 2020, 'Spreading Excellence and Widening Participation', provides various tools to fully exploit the potential of Europe's talent pool and to help reduce the innovation divide between different EU regions. The measures developed under this objective are:

- Associating ('teaming') leading research institutions with their counterparts in less-performing innovation regions, to create new centres of excellence in these regions;
- Linking ('twinning') research institutions to strengthen a research field in an emerging institution;
- Establishing ERA Chairs in emerging institutions to increase their potential for research by attracting leading academics;
- Improving the design, implementation, and evaluation of national and regional research and innovation policies, through expert advice from a Policy Support Facility;
- Supporting leading researchers' participation in international networks;
- Strengthening National Contact Points networks, to provide better support for potential participants in Horizon 2020 programmes.

The operational budget for this specific objective is €785 million, managed by REA under the supervision of DG RTD (Figure 12).

4.7. Specific Objective II – Science with and for Society

'Science with and for Society', the second specific objective under Horizon 2020, covers building effective cooperation between science and society, recruiting new talent for science, and pairing scientific excellence with social awareness and responsibility. In the 2014-15 work programme, the calls for proposals under this objective addressed the following issues:

- making science education and careers attractive to young people;
- promoting gender equality in research and innovation;
- integrating society in science and innovation;
- developing governance for the advancement of responsible research and innovation.

The operational budget for this specific objective is €424 million, managed by REA under the supervision of DG RTD (Figure 12).

4.8. Horizontal activities

Actions of a horizontal nature, which support the implementation of Horizon 2020, are planned in each part of the programme. These include activities in support of communication and dissemination, as well as making use of results to support innovation and competitiveness. This may also entail cross-cutting activities involving several Horizon 2020 priorities. The budget for each of these horizontal activities is relocated under a single budget line, directly managed by DG RTD. The operational budget for horizontal activities is about €400 million (Figure 12).

5. Other instruments under Horizon 2020

5.1. European Research Area Networks – (ERA-NETs)

At the national level, research funding organisations (RFO) in the EU operate following different procedures. The ERA-NET scheme was introduced under FP6 in 2002 to address this fragmentation. This funding instrument provided funding support for the different RFOs to share best practices and organise joint calls for proposals on identified topics with common criteria for evaluation. The research projects selected under ERA-NET were funded by the participating RFOs, each following its own evaluation procedures. Under FP6, 52 ERA-NET projects were supported.

Under FP7, the ERA-NET scheme was renewed and an additional scheme, ERA-NET+, was created as a second step. Unlike ERA-NET, this new scheme provided European financial support to top up the funds provided by the participating RFOs to the beneficiaries of one ERA-NET+ call. Proposals received by each RFO participating in ERA-NET+ call were evaluated jointly at the international level through a single common procedure. Under FP7, 71 ERA-NET and 23 ERA-NET+ projects were supported.

Under Horizon 2020, both schemes were merged under a single ERA-NET Co-fund scheme. The ERA-NET Co-fund includes money to support coordination activities between the RFOs for five years, as well as EU funds for one call organised by RFOs participating in the ERA-NET. The RFOs can organise additional calls, relying exclusively on funds they provide. It is expected that about 10 ERA-NET Co-fund actions will be launched each year under Horizon 2020.⁴⁶

⁴⁶ The programme committees select the topics on which ERA-NET Co-fund will be established when discussing the biannual work programme for Horizon 2020.

5.2. Framework Partnership Agreements

The Framework Partnership Agreement (FPA) is a tool defined by the financial rules of the EU budget⁴⁷ and is used as a long-term cooperation mechanism between the Commission and the beneficiaries of grants. FPAs are concluded for a maximum of four years, but an extension is possible when justified by the nature of the agreement. The FPA describes the partnership's general framework with a defined action plan and has to be implemented through Specific Grant Agreements (SGA). The SGA are used to transfer the funds to the beneficiaries on an annual or multi-annual basis.

The FET Flagships under Pillar I and the Teaming scheme under the objective 'Spreading Excellence and Widening Participation' are both implemented using FPAs. European Institution of Innovation & Technology funding is also provided to the Knowledge & Innovation Communities through the establishment of a FPA.

5.2.1. Cooperation in Science and Technology programme (COST)

The Cooperation in Science and Technology programme (COST) is an intergovernmental programme created in 1971 by 19 countries and the European Commission. In 2004, the secretariat, previously managed by the Commission, was outsourced to the European Science Foundation, which implemented the programme through the COST office for FP6 and FP7. For Horizon 2020, the COST Association was created and signed an FPA with the Commission for seven years with a budget of €300 million. This budget is provided through the Pillar III Societal Challenge on Inclusive Societies and under the objective 'Spreading Excellence and Widening Participation'.

The programme is implemented through COST Actions that organise transnational networking activities between researchers working in a given field of research. Once approved, the COST Actions receive funding of €130 000 per year for four years. The fact that the funding is now provided to the COST Association through one year SGAs has created an additional administrative burden for the management of these four year grants.

5.2.2. GÉANT

GÉANT is the pan-European research and education network which links Europe's National Research and Education Networks. GÉANT is recognised as the European 'communications commons', supporting computationally demanding and data-intensive collaborative research and education. For Horizon 2020, the consortium developing the network is financed under Pillar I – Infrastructures through a seven year Framework Partnership Agreement, implemented by Specific Grant Agreements that each year provides about €25 million in funding.

6. Other structures related to Horizon 2020

6.1. Joint Programming Initiatives

With the idea of fostering joint programming activities, the Commission proposed to the Member States the development of a framework for pooling national resources for

⁴⁷ Article 178 of the Commission delegated regulation (EU) [1268/2012](#) of 29 October 2012 on the rules of application of Regulation (EU, Euratom) No 966/2012 of the European Parliament and of the Council on the financial rules applicable to the general budget of the Union, OJ L 362, 31 December 2012, p.1–111.

research on selected topics in 2008. The Member States agreed to launch this process and created the Joint Programming Initiatives (JPI).

The first step in the creation of a JPI is the selection of an area of common interest that addresses a common European challenge; these challenges are identified by the High Level Group on Joint Programming (GPC – *Groupe de Programmation Conjointe*), with representatives from the Member States and the Commission. Once an area is identified, interested Member States can join the newly established JPI. The participants begin by defining a shared vision of the area through a Strategic Research Agenda (SRA) and Specific, Measurable, Achievable, Relevant and Time-Bound (SMART) objectives for the JPI. The implementation instruments are also defined by the participating Member States.

The JPI initiatives are funded and implemented by the Member States, and the Commission provides support for their management through Horizon 2020 Coordinated and Support Actions (similar to ERA-NET under FP7). However, no additional funding from Horizon 2020 is provided to fund the research projects themselves, contrary to the case of the ERA-NET Co-fund.

Also unlike ERA-NET, the JPIs develop a long term strategy for joint programming on key common European challenges. The SRA developed by each JPI can be used by different actors to promote a better alignment of research policies at European, national and regional level.

6.2. European Technology Platforms

European Technology Platforms (ETPs) are industry-led stakeholder forums recognised by the European Commission as key actors in driving innovation, knowledge transfer and European competitiveness. Their establishment has been promoted since 2004 and they usually take the form of an association.

Similarly to JPIs, ETPs develop Strategic Research Agendas that can be used by various private and public stakeholders at European, national and regional level to define and align their research policies. Once these SRAs are adopted, they are used by the ETP to advise policy makers in the preparation of the European, national and regional research and innovation programmes. The ETPs encourage their members to participate in these programmes and oversee the achievements of the SRA objectives.

Currently, 41 ETPs are active,⁴⁸ covering a wide range of topics. They are consulted by the Commission for the preparation and implementation of the Horizon 2020 work programmes. Joint Technology Initiatives (section 3.4), contractual Public-Private Partnerships (section 6.3) and European Innovation Partnerships (section 6.4) usually arise from earlier ETPs.

6.3. Contractual Public-Private Partnerships

In the context of the 2008 European Economic Recovery Plan, the Commission set out to increase the level of private sector investment in research and innovation. However, existing tools like the Joint Technology Initiatives did not provide the necessary flexibility, and their establishment required an 18 month legislative process. At this point, the concept of contractual public-private partnerships (cPPP) emerged as a potential tool to address this issue.

⁴⁸ See the full of ETPs list on the [European Technology Platforms page](#) of the European Commission's Innovation Union website.

A cPPP results from the signature of a memorandum of understanding in the form of a contractual arrangement between the Commission and an association representing the interests of the private sector. Under this arrangement, the Commission commits to a long term public investment in research and innovation in a given field, to provide a clear incentive for the private sector to invest. The partnership agreement ring-fences a part of the Horizon 2020 budget for the cPPP research topic. The association signing the contractual agreement is consulted during preparation of the work programme, which, however, remains under the full control of the Commission DGs.⁴⁹ The corresponding calls for proposals are implemented like any other calls in the programme and are open to all public and private participants.

The first cPPPs were selected from the existing ETPs on topics representing major EU industries in terms of employment: Factories of the Future, Energy Efficient Buildings and Green Vehicles. The cPPPs can be considered advanced ETPs with a secured budget for their thematic area under Horizon 2020.

The private investments expected are in kind and financial contributions linked to private sector participation in the corresponding calls for proposals under Horizon 2020. This participation also triggers additional investment by the private sector on the same topic, through projects developed in parallel or after their participation in Horizon 2020. The Commission expects that the private partners of a cPPP will contribute three to ten times the ring-fenced budget defined under Horizon 2020.

The first cPPPs established under FP7 resulted in a 50% participation rate for the private sector in the corresponding calls, with the participation of SMEs reaching 25-30%. The planned ring-fenced budgets for the nine existing cPPPs under Horizon 2020 are:

- Factories of the Future (€1.15 billion from LEIT I-IV);
- Energy-efficient Buildings (€600 million, mainly from LEIT II-IV);
- European Green Vehicles Initiative (€750 million, mainly from Societal Challenge 4);
- Sustainable Process Industry (€900 million, mainly from LEIT II-IV);
- 5G networks for the Future Internet (€700 million from LEIT I);
- High Performance Computing (€700 million from FET Proactive);
- Robotics (€700 million from LEIT I);
- Photonics (€700 million from LEIT I);
- Data (€500 million from LEIT I).⁵⁰

6.4. European Innovation Partnerships

European Innovation Partnerships (EIP) were established in 2010 to reduce fragmentation of effort between European, national and regional public and private stakeholders (including policy makers, research and innovation actors) in tackling societal challenges. EIPs are stakeholder forums created to streamline, simplify and better coordinate existing instruments on societal challenges. An EIP can also propose new actions to complement existing ones when needed. Their main tasks are (in parallel) to:

- step up research and development efforts;
- coordinate investment in demonstrations and pilots;

⁴⁹ The Commission determines the correct balance between the expectations of the private sector and its own strategic objectives in the definition of the work programme.

⁵⁰ The first eight cPPPs were announced in December 2013. The Data cPPP became operational in 2015.

- anticipate and fast-track any necessary regulation and standards; and
- mobilise 'demand', in particular through better coordinated public procurement to ensure that any breakthroughs are brought swiftly to market.

Five European Innovation Partnerships were established to provide a new European strategy for innovation on challenges requiring government intervention: Active and Healthy Ageing; Agricultural Sustainability and Productivity; Smart Cities and Communities; Water; and Raw Materials.

The EIPs develop a Strategic Implementation Plan (SIP) presenting the vision of the EIP, its objectives, and proposed implementing measures. Through the SIP, the EIPs act as advisory bodies in the development of the policies and programmes, including the Horizon 2020 work programme. In 2014, an expert group reported that, whilst setting high ambitions for EIPs was understandable, current EIPs have suffered somewhat from inconsistent execution.⁵¹

7. Outlook

For Horizon 2020, an effort was made to apply a common set of rules for participation in, and implementation of, all the different programmes. Moreover, the participant portal offers a new tool for Horizon 2020 direct funding. These initiatives address some aspects of the above-mentioned complexity. However, questions regarding the programme's transparency with respect to primary and secondary sources of funding still need to be addressed. Moreover the adequacy of the overall budget in the light of the scope of the overall programme raises fundamental questions about the proper funding level for each objective and satisfactory access to funding for all potential beneficiaries. The low success rates for the first calls for proposals under Horizon 2020 highlight this critical situation.⁵²

The mid-term review of the Horizon 2020 programme is scheduled to commence in 2016 and be completed by 31 December 2017. The review will give all stakeholders and policy makers an opportunity to reflect on these issues and propose solutions to Horizon 2020's limitations when preparing the next framework programme.

⁵¹ Outriders for European Competitiveness, European Innovation Partnerships (EIPs) as a Tool for Systemic Change, European Commission [report](#), 2014.

⁵² The [overall](#) success rate in Horizon 2020 is down to 12%, whereas the average success rate was 19-20% under FP7. The success rate of some programmes can be as low as 1.5% (FET Open).

8. Main references

Regulation (EU) [1291/2013](#) of the European Parliament and the Council of 11 December 2013 establishing Horizon 2020 – the Framework Programme for Research and Innovation (2014-2020) and repealing Decision No 1982/2006/EC, OJ L 347, 20 December 2013, p. 104–173.

Regulation (EU) [1290/2013](#) of the European Parliament and of the Council of 11 December 2013 laying down the rules for participation and dissemination in Horizon 2020 – the Framework Programme for Research and Innovation (2014-2020), and repealing Regulation (EC) No 1906/2006, OJ L 347, 20 December 2013, p. 81–103.

Council Decision (EU) [2013/743](#) of 3 December 2013 establishing the specific programme implementing Horizon 2020 – the Framework Programme for Research and Innovation (2014-2020) and repealing Decisions 2006/971/EC, 2006/972/EC, 2006/973/EC, 2006/974/EC and 2006/975/EC, OJ L 347, 20 December 2013, p. 965–1041.

Regulation (EU) [1292/2013](#) of the European Parliament and of the Council of 11 December 2013 amending Regulation (EC) No 294/2008 establishing the European Institute of Innovation and Technology, OJ L 347, 20 December 2013, p. 174–184.

Council [Regulations](#) (EU) 557/2014, 558/2014, 559/2014, 560/2014 and 561/2014 of 6 May 2014, OJ L 169, 7 June 2014, p. 54–178 and Council Regulations (EU) [642/2014](#) and [721/2014](#) of 16 June 2014, OJ L 177, 17 June 2014 establishing the Joint Undertakings funded under Horizon 2020.

[Decisions](#) (EU) 553/2014, 554/2014, 555/2014 and 556/2014 of the European Parliament and of the Council of 15 May 2014 establishing the Article 185 P2Ps funded under Horizon 2020, OJ L 169, 7 June 2014, p. 1–53.

Horizon 2020 2014-15 Work Programme on Horizon 2020 [Participants Portal](#).

Horizon 2020, the current framework programme for research and innovation, inherited features from its predecessors, whilst simultaneously proposing a new architecture to support all activities in the research and innovation system – from blue-sky research to close-to-market applications. Including all these dimensions introduced several levels of complexity to the programme's implementation.

Following the distribution of the budget – from the nine Commission Directorates-General which oversee Horizon 2020, to the 22 bodies which manage its implementation, along three main pillars and two specific objectives – this document provides a guide to the programme exploring the multiple levels of complexity.

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