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# EU framework programmes for research and innovation

## Evolution and key data from FP1 to Horizon 2020 in view of FP9

IN-DEPTH ANALYSIS

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This paper aims to provide an overview of the evolution of the EU framework programme for research and innovation. The paper focuses on the evolution of the legal basis to adopt the programme, its structure and its budget. It then highlights key issues that will have to be addressed in the coming years in the discussion leading to the adoption of the ninth framework programme.

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## EXECUTIVE SUMMARY

The involvement of the European Union in research activities (outside the coal and nuclear fields) began in the 1970s with the adoption by the Council of the first Community research programmes. These were adopted one by one as the need for research in a specific area at European level emerged. At the beginning of the 1980s, the European Commission proposed the framework programme (FP) for research as a strategic tool to manage the adoption of research programmes in a more coherent way.

Although no Treaty articles provided a clear legal basis for the adoption of these programmes, the first framework programme (FP1) was adopted in 1983. The Single European Act (1986) introduced research as a Community competence in the Treaty establishing the European Economic Community and provided a firm legal basis for the adoption of the following FPs. FP2 and FP3 were adopted in 1987 and 1990 respectively with increased budgets. The Treaty of Maastricht, which entered into force in 1993, modified the legal basis for the adoption of FPs, transforming them into financial tools for EU research activities. It also broadened the range of topics for which research programmes could be conducted by the EU. With FP4 and FP5 adopted in 1994 and 1998 the scope of the FP was enlarged and the focus on pre-competitive research was abandoned for an approach that would see the FP addressing societal challenges and supporting a wider range of activities in the innovation process. The development of the European Research Area concept in 2000 marked a clear shift in the evolution of the FP. FP6 and FP7, adopted in 2002 and 2006 respectively, were designed to implement this EU research policy, which aimed to address the fragmentation of the European research landscape. The adoption of the Europe 2020 strategy and the Innovation Union flagship initiative in 2010 influenced the structure of FP8, which was adopted in 2013 and named Horizon 2020.

As the FP evolved, the instruments used for its implementation diversified. The initial grants for transnational cooperative research projects were complemented, inter alia, by the development of public-public and public-private partnerships, the establishment of new structures such as the European Research Council (ERC) and the European Institute for Innovation and Technology (EIT), specific instruments for SME support, and individual mobility grants. With Horizon 2020 the FP became a programme of programmes covering all aspects of the innovation process and implementing various EU policies. Complexity in the management and implementation of the FP brought about a new level of fragmentation at EU level regarding the funding of innovation-related activities.

While discussions on the structure and priorities of FP9 are expected to begin in autumn 2017, an examination of the evolution of the FP highlights several issues that will have to be addressed: the lack of clarity regarding the EU innovation policy that the FP is expected to implement; the balance between the various aspects of the innovation process supported by the FP, research being just one of these; evaluation of the EU added value of the FP and its components, justifying support for each of these aspects; assessment of the existing instruments and their efficiency at EU level to rationalise the EU funding landscape and limit fragmentation; the balance between collaborative action and single beneficiary measures, the share of which has increased sharply in recent FPs; the balance between a focus on excellence that results in the concentration of innovation capacity and efforts to reduce the innovation gap with countries and regions requesting more cohesion measures; and the balance between top-down and bottom-up approaches when defining the programme's priorities.

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**List of main acronyms used**

| | |
|---|---|
| **EAV** | European added value |
| **EIT** | European Institute for Innovation and Technology |
| **ERA** | European research area |
| **ERC** | European Research Council |
| **FP** | Framework programme |
| **ICT** | Information and communication technologies |
| **JRC** | Joint Research Centre |
| **JTI** | Joint technology initiatives |
| **MFF** | Multiannual financial framework |
| **MSCA** | Marie Sklodovska Curie Actions |

# 1. Introduction

In the autumn of 2017, the European Commission is expected to adopt the first communication regarding the structure of the ninth framework programme for research and innovation. This communication will launch the debate among the European institutions, the Member States and the actors in the innovation ecosystem on the priorities for EU action in research and innovation after 2020. This publication presents a historical perspective of the evolution of the framework programme, the objective being to place the key aspects on which the debate on FP9 is expected to focus within a broader context.

# 2. History of the framework programme

## 2.1. The first Community research programmes

*2.1.1. Community research in the first treaties*

Economic and political objectives linked to the control of energy sources – coal and nuclear energy – were at the root of the establishment of the European Coal and Steel Community (ECSC) in 1951 and the European Atomic Energy Community (Euratom) in 1958. The treaties establishing these communities included the development of the first research and technology programmes at Community level.[1] Article 55 of the ECSC Treaty tasked the High Authority with encouraging technical and economic research with funds provided by the treaty.[2] Under Article 4 of the Euratom Treaty the Commission is to carry out a Community research and training programme in nuclear research.[3] The Joint Nuclear Research Centre (JRC) was also established under the Euratom Treaty as an

[1] For more information on the development of research in the European treaties, see V. Reillon, Research in the European Treaties, EPRS, March 2016.

[2] Treaty establishing the European Coal and Steel Community, April 1951. The research programme for coal and steel and its budget are covered by this paper.

[3] Consolidated version of the Treaty establishing the European Atomic Energy Community, OJ C 327, pp. 1-107, 26 October 2012.

internal Community research centre managed by the Commission. During that period Community research was limited to those specific energy fields, as the 1958 Treaty of Rome establishing the European Economic Community (EEC) did not include research as an area of competence for the Community.[4]

*2.1.2. From intergovernmental to Community initiatives*

As a result of this situation, research cooperation between European countries was progressively established outside the Community framework under intergovernmental initiatives: the European Organisation for Nuclear Research (CERN) was established in 1953; the European Southern Observatory (ESO) in 1962; and the European Molecular Biology Organisation (EMBO) in 1963.

In the 1960s the widening technological gap between Europe and the United States of America fuelled discussion on increased European cooperation in research. Tensions arose between the proponents of Community research policies and those favouring an intergovernmental approach.

European Cooperation in Science and Technology (COST) was founded in 1971 as an intergovernmental framework. COST launched concerted actions where various states opted *à la carte* to collaborate and exchange information on selected research fields (information science, telecommunications, metallurgy, materials, and environment). The intergovernmental setting offered the possibility for non-Community countries to take part.

In June 1972, Altiero Spinelli, a strong promoter of the Community approach, presented a communication developing the idea of a Community policy in research and development.[5] In October 1972, a Community summit of Heads of State or Government decided that the Community should adopt new policies in the field of industrial, energy, technology and education policies. As the EEC Treaty did not provide a legal basis for conducting and funding research programmes, it was agreed that a broad application of Article 235 of the EEC Treaty would be used.[6] In parallel the JRC was reformed, resulting in the centre losing its focus on nuclear energy and becoming a part of the wider Community research policy.

Various types of Community research action were defined. The JRC, as the internal research institution of the Commission, would conduct what would be known as **direct actions** whereas Community research programmes undertaken outside the JRC by public or private research institutions would be known as **indirect actions**.[7] The Community would also take part in **concerted actions** such as those undertaken by COST, in which it would support coordination activities only, not research projects.

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[4] Research is mentioned only in Title II regarding agriculture policy. Article 41 provides for 'effective co-ordination of efforts in the spheres of vocational training, of research and of the dissemination of agricultural knowledge'.

[5] Objectives and instruments of a common policy for scientific research and technological development, Commission of the European Communities, COM(72) 700, 14 June 1972.

[6] Article 235 stated that 'if action by the Community should prove necessary to attain, in the course of the operation of the common market, one of the objectives of the Community, and this Treaty as not provided the necessary powers, the Council shall, acting unanimously on a proposal from the Commission and after consulting the European Parliament, take the appropriate measures'.

[7] From FP1 to FP7 the Council adopted separate specific programmes for JRC activities.

*2.1.3. Establishing the first Community research programmes*

Formulated by the new Commissioner for research, Ralf Dahrendorf, in May 1973, Community research policy was geared towards the creation of 'an effective single area for European science' to be based on two dimensions: the coordination of national policies to avoid duplication and cooperation and competition between European entities (universities, research centres, researchers).[8]

In May 1973 the first non-nuclear direct actions were adopted by the Council in the field of standards, environment and earth observation.[9] They were complemented by the first indirect Community research programme adopted in June 1973.[10] These programmes all referred to Article 235 of the EEC Treaty as their legal basis.

The January 1974 Council resolution on an outline programme of the European Communities in the field of science and technology mentioned that Community civil research programmes would aim to support the sectoral policies of the Community.[11] They should be integrated and contribute to the development of a common policy on science and technology. In order to select research programmes relevant to the Community, the Commission established a first set of criteria based on the choices already made for the first programmes launched. Community research programmes should demonstrate greater efficiency and rationalisation of efforts; be transnational; cover areas requiring large markets; and address common needs.

Over the following 10 years, more than 25 research programmes were approved by the Council in fields such as energy, materials, resources, environment, health and living conditions or industrial research (Figure 1). The Council also adopted consecutive programmes for the dissemination of information related to the Community research programmes.[12] Meanwhile, additional intergovernmental structures supporting research were also established in Europe outside the Community framework: the European Science Foundation (ESF) in 1974; the European Space Agency (ESA) in 1975 and the European Molecular Biology Laboratory (EMBL) in 1977.

## 2.2. Introducing the framework programme

*2.2.1. A strategic tool for Community research*

Étienne Davignon took office in January 1981 as Commissioner for Industrial Affairs, Energy, Research and Science. The Community research programmes were then low-budget programmes adopted individually by unanimity in the Council in an incoherent way. The commissioner decided that more should be done to streamline the situation.

A Commission communication adopted in October 1981 recognised that Europe was 'falling behind its main competitors' and urgently needed 'to make the best use of its

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[8] Working programme in the field of research, science and education, Commission of the European Communities, SEC(73) 2000, 23 May 1973.

[9] Official Journal of the European Communities, L 153, 9 June 1973.

[10] Official Journal of the European Communities, L 189, 11 July 1973.

[11] Council Resolution of 14 January 1974 on an initial outline programme of the European Communities in the field of science and technology, OJ C 7, 29 January 1974, p. 6.

[12] Provisions regarding the intellectual property of the knowledge and inventions funded by the Community research programme were adopted in September 1974. A three-year programme for the dissemination of scientific and technical information from the Community research programmes was established in 1975 and renewed in 1978 and 1981.

financial resources'.[13] The Commission was proposing to establish a 'true Community strategy' for research with the aim of contributing to the implementation of other sectoral policies.

This strategy would take the form of an '**overall framework programme embracing all Community research**', aimed at:

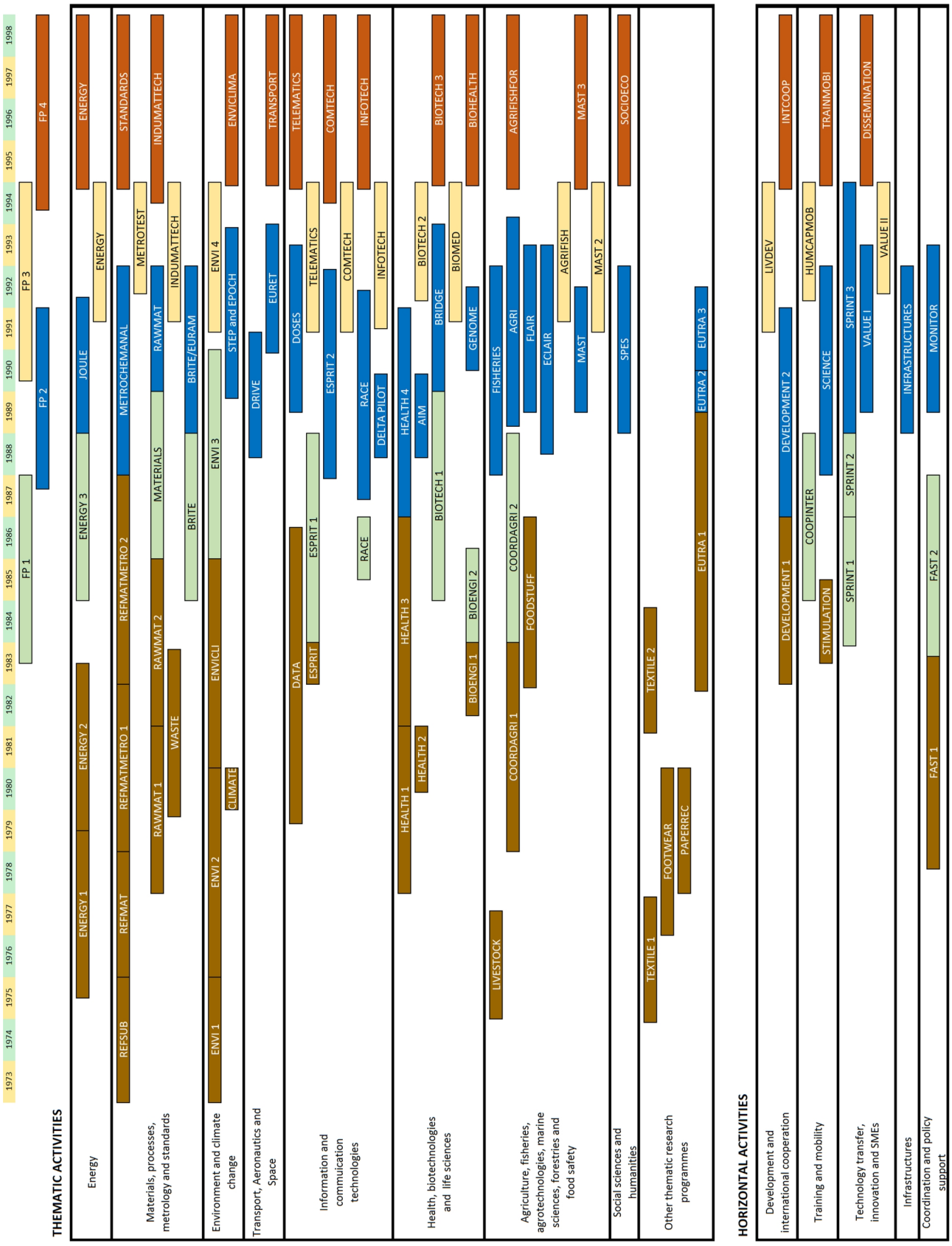
- bringing together national policies and avoiding duplication and dissipation of efforts;
- defining the common priorities; and
- defining the criteria for selecting joint actions and initiatives.

The framework programme (FP) would act as a concertation mechanism and should be revised regularly. It would define thematic priority areas that needed support and implement horizontal actions to stimulate the efficacy of Community research. The Commission would also establish an evaluation process for the FP and a policy for the dissemination of the results obtained. It also planned on strengthening its capacity to define the scientific needs of the Community.[14]

[13] Scientific and technical research and the European Community: proposals for the 1980s, Commission of the European Communities, COM(81) 574, 12 October 1981.

[14] In June 1983 the Council adopted an action plan regarding the evaluation of Community research programmes. It was renewed in 1986. A first programme on 'forecasting and assessment in the field of science and technology' (FAST) had been adopted in July 1978 and was renewed as FAST II in October 1983.

**Figure 1 – The various specific programmes in research adopted by the Council of the European Union between 1973 and 1998 (pre-FP period to FP4)**




Data source: EPRS based on EUR-Lex. The colours indicate under which framework programme the different specific programmes were adopted. However, some of the specific programmes adopted before FP1 (in brown) such as the programme of research and development in the field of science and technology for development (Development 1) were covered by the overall budget of FP1. The programmes under the thematic activities supported research projects on a given topic. Those under horizontal activities supported various aspects of the research and innovation ecosystems usually with no restrictions regarding the thematic area.

*2.2.2. Adopting the first framework programme*

In 1982, the Commission adopted two successive documents presenting the objectives and structure of the first framework programme (FP1).[15] **The FP was to become not only a programming tool but also a financial one**. It was to help address the economic crisis and support the competitive capacity of the Member States. The FP was also to play a role in modernising public research organisation structures, limit duplication of research activities in the Community and limit intra-Community competition. Its implementation would involve making 'a real choice between national, international and Community action' and considering which actions brought added value to national activities.

FP1 was to be structured around seven objectives: six thematic priorities (agriculture, industrial competitiveness, raw materials, energy, development aid and living conditions) and a transversal objective regarding the Community research potential. This last part, a novelty introduced by the FP, focussed on support for bottom-up proposals for exploratory research projects, mobility of researchers, and networking and twinning of research centres in Europe.[16] The Commission adopted its proposal for FP1 in May 1983.[17] The European Parliament welcomed the FP as a complement to the actions of the Member States in order to coordinate research policy in the Community.[18]

FP1 was adopted by the Council in July 1983 for the period 1984 to 1987.[19] The programme covered both Community research activities undertaken under the Treaty of Rome and the research programme under the Euratom Treaty. The resolution established the FP, its objectives and the processes and criteria for adopting the specific programmes implementing FP1. The budget in the proposal – ECU 3 750 million[20] – was merely indicative: it corresponded to the sum of the budgets of the specific programmes planned for the period.[21]

The selection criteria for the specific programmes formed an essential part of the decision.[22] They were formulated as guidelines to decide which activities could be supported by the Community and played a key role in the streamlining process that the FP was to put in place. Community action could be justified when: the scale of the research was beyond a single Member State's resources or capacities; the benefits of the results would outweigh the cost of coordination; the research was on a large scale that would be beneficial throughout the Community; and the activities developed could

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15 The first working paper was adopted in June 1982 and the second in December 1982.

16 The content of this new horizontal action was discussed in two Commission communications in June and August 1982. The pilot programme 'Stimulation' was adopted in June 1983 for a year and was followed by a specific programme for cooperation and interchange, adopted in March 1985 for four years.

17 Proposal for a Council Decision on the framework programme for Community scientific and technical activities 1984 to 1987, OJ C 169, pp. 11-13, 29 June 1983.

18 Resolution closing the procedure for consultation of the European Parliament on the proposal from the Commission of the European Communities to the Council for a European scientific and technical strategy: framework programme 1984 to 1987, OJ C 184, pp. 151-154, 11 July 1983.

19 Council resolution of 25 July 1983 on framework programmes for Community research, development and demonstration activities and a first framework programme 1984 to 1987, OJ C 208, pp. 1-4, 4 August 1983.

20 The European currency unit (ECU) was the former currency unit of the European Communities

21 Hence the FP1 budget and structure included some specific programmes already adopted before the adoption of the resolution (see Figure 1).

22 These criteria are known as the 'Riesenhuber criteria' after the then German research minister.

support the establishment of the single market and help create a unified European research area (ERA). All the activities were to contribute to the definition and implementation of Community policies, as expected under Article 235.

Despite the adoption of the FP resolution, the corresponding specific programmes were still adopted one by one throughout the duration of the programme (see Figure 1). Some Member States maintained their doubts about having more Community action in research rather than intergovernmental action. It would take a modification of the treaty, two more iterations of the FP and the positive outcomes of key programmes such as ESPRIT to achieve a better rationalisation of the Community support for research.[23]

## 2.3. Streamlining Community research programmes

*2.3.1. Research becomes a Community competence*

In the 1980s, the main objective of the Community was the establishment of the single market and its four associated freedoms of movement for goods, services, capital and people. In order to achieve this objective, the Single European Act (SEA) amending the three existing treaties was signed in 1986.[24] The SEA introduced competencies for the Community in research with the objective to support the economic and industrial development of the Community and its overall competitiveness.

**Table 1 – Evolution of the legislative procedures for the articles in the Treaties that set out provisions for the adoption of the framework programme**

| Legislation | Single European Act EEC Treaty | | Maastricht Treaty TEC | | Amsterdam Treaty TEC | | Lisbon Treaty TFEU | |
|---|---|---|---|---|---|---|---|---|
| | Article | Procedure | Article | Procedure | Article | Procedure | Article | Procedure |
| **Framework programme** | **130i** | Consultation *unanimity* | **130i.1** | Co-decision *unanimity* | **166.1** | Co-decision *QMV* | **182.1** | OLP |
| **Specific programmes** | **130k** | Cooperation *QMV* | **130i.3** | Consultation *QMV* | **166.3** | Consultation *QMV* | **182.3** | Consultation |
| **Rules of participation** | **–** | – | **130j** | Cooperation *QMV* | **167** | Co-decision *QMV* | **183** | OLP |
| **Public-public partnerships** | **130m** | Cooperation *QMV* | **130l** | Cooperation *QMV* | **169** | Co-decision *QMV* | **185** | OLP |
| **Joint undertakings** | **130o** | Consultation *unanimity* | **130n** | Consultation *unanimity* | **171** | Consultation *QMV* | **187** | Consultation |

Data source: EPRS based on EUR-Lex – Text in italics indicates the requirement for adoption by the Council. QMV – Qualified majority voting; OLP – Ordinary legislative procedure.

The procedure used to adopt FP1 and its specific programmes was introduced in the EEC Treaty, giving a firmer legal basis to the FP. The FP was to be adopted under the consultation procedure with unanimity in the Council, whereas the specific programmes would be adopted in cooperation with the Parliament and under a qualified majority of the Council (no longer unanimity as before). Additional articles provided for the Community to participate in programmes undertaken by several Member States (public-public partnership) or to set up joint undertakings for the execution of research programmes (Table 1).[25]

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[23] ESPRIT was the first research programme adopted in the field of information technology. Its special feature was close involvement of partners from the private sector.

[24] The Single European Act entered into force on 1 July 1987.

[25] The Commission mentioned the possibility of using these new possibilities offered by Articles 130m and 130o to implement parts of FP2, FP3, FP4 and FP5 (especially to encourage cooperation between Member States). However, they would not be used before the adoption of FP6 in 2002 (Article 169

The creation of the single market would imply the development of common standards and norms. The cohesion policy aspect, supported by the structural funds, would also contribute to the improvement of research capacities in less developed regions. Finally, implementation of the free movement of people required removal of the legal and social barriers impeding the mobility of researchers. In this context, the FP would progressively become a financial and programming tool to help establish the ERA.

**The Eureka programme**

While the SEA was being discussed and adopted, a new intergovernmental initiative supporting networking activities between public and private partners in technological development was launched. Proposed by France, and supported by Germany and the European institutions, Eureka was established by the Paris Declaration of July 1985. It was meant to complement Community programmes allowing for cooperation beyond the Community with a bottom-up approach, different from the top-down approach of the FP. The creation of Eureka illustrated the continued tension between the Community and intergovernmental approaches in the 1980s.

### *2.3.2. The second framework programme*

The preparation of FP2 began in September 1985 with the Commission communication presenting the priorities for the 1987 to 1991 period under the banner of a **European technology community**.[26] The Commission clarified the objectives of the FP, introducing the concept of subsidiarity that would later crystallise in European policies: 'the Community does not wish to usurp national authorities in the management and implementation of these activities but ... the coordinated planning of these programmes is necessary'. The Commission expected to work towards the identification of common objectives for FP2 and ensure consistency between national activities.

The structure of FP2 was to resemble that of FP1 with thematic objectives and transversal actions. There would be a special focus on access and support to research infrastructure, research worker mobility, support for actors in the innovation process, including small and medium-sized enterprises (SMEs) and the involvement of non-Community European countries in the programme. The Commission expected an increase in the Community budget for research and hoped that the modifications proposed by the SEA would simplify and speed up Community decision-making procedures.

The guidelines for FP2 were clarified in a communication in March 1986 in which the Commission suggested a budget of ECU 10 billion for FP2.[27] The Commission noted that 'the creation of a Science and Technology Community, which has been regarded as difficult, if not an impossible task to date, can now be guaranteed'. The additional criterion of **establishing greater cohesion in the Community regarding research** was added to the list of FP1 criteria for the selection of specific programmes.[28] This idea of increased

public-public partnerships, now Article 185) and FP7 in 2007 (Joint Technology Initiatives under Article 171, now Article 187).

[26] Towards a European technology community, Commission of the European Communities, COM(85) 350, 30 September 1985.

[27] Guidelines for a new Community Framework programme of technological research and development 1987-1991, Commission of the European Communities, COM(86) 129, 17 March 1986.

[28] The introduction of this criterion marked the beginning of the tension between the idea of an FP based on scientific excellence without geographical considerations and that of an FP that should support scientific capacity throughout the Union.

synergies between the FP and the structural funds was supported by the European Parliament in its June 1986 resolution.[29]

The resolution establishing FP2 was adopted in September 1987 by the Council under the procedures established by the SEA.[30] The priorities were slightly modified when compared to the initial proposal, with seven selected topics: quality of life (health and environment), information and communication technologies (ICT) and services (including transport), modernisation of industrial sectors, biological resources, energy,[31] science and technology for development, and marine resources. An eighth priority gathered the horizontal actions for human resources, infrastructure, forecast, and dissemination of results. The approved budget was ECU 5.4 billion, a 30 % decrease from the proposed budget.[32] About 30 specific programmes were adopted to implement FP2, still in a successive and unsynchronised way throughout the duration of FP2 (Figure 1).

*2.3.3. The third framework programme*

In 1989, while the specific programmes of FP2 were still being adopted, the process of preparing FP3 began based on the idea of **maintaining a rolling mechanism** where successive FPs would overlap. In June 1989 the Commission adopted a discussion document aiming to provide a framework for Community research actions in the 1990s.[33] This document followed the first evaluation of science and technology in Europe published in November 1988.[34] This evaluation had pointed out nine key challenges for Community research policy including: balancing support between basic and applied research; links between universities and industries; incentives for stronger private sector investment; coordination of national policies and cohesion action for less developed regions; and cooperation with third countries.

The Commission insisted on the role played by the FP to **support competitiveness and improve the quality of life** of the citizens. It also noted the increasing importance of new technologies such as ICT, biotechnologies and new materials. It stressed the need for better coordination and integration of skills and expertise, for more interaction between basic and applied research and between the producers and users of the technologies. The Commission intended to develop FP3 around three guiding principles: the institutional basis offered by the treaties; a method of action based on application of the subsidiarity principle; and a political commitment for more cohesion by reducing disparities between regions, although excellence should remain the key criterion. Community action should continue to be limited to pre-competitive activities. Finally, greater selectivity should be applied to topics to limit the number of specific programmes.

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[29] Resolution on the communication from the Commission of the European Communities to the Council on The Science and Technology Community: Guidelines for a new Community Framework Programme of technological research and development: 1987-1991, OJ C 176, pp. 19-21, 14 July 1986.

[30] Council Decision of 28 September 1987 concerning the framework programme for Community activities in the field of research and technological development (1987 to 1991), OJ L 302, pp. 1-23, 24 October 1987.

[31] Including nuclear energy, as FP2 also covered the research programme under the Euratom Treaty.

[32] The Commission had adopted its proposal for FP2 in August 1986 with a budget of ECU 7.7 billion. The Parliament had adopted its opinion on the proposal in December 1986.

[33] A framework for Community RTD actions in the 90's, Commission of the European Communities, SEC(89) 675, 13 June 1989.

[34] First report on the state of science and technology in Europe, Commission of the European Communities, COM(88) 647, 29 November 1988.

The Commission proposal for FP3 included only five thematic areas and a transversal priority on human capital and mobility, with a budget of ECU 7.7 billion.[35] The decision establishing FP3 was adopted by the Council in April 1990 for the 1990 to 1994 period with a budget of ECU 5.7 billion.[36] The adoption of the programme and its budget led to a confrontation between the Council and the Parliament, as the latter had requested a budget of ECU 8.23 billion. In the following years, the budget adopted for FP3 would be considered too low. Delays in the adoption of FP4 led the Commission in July 1992 to propose an additional budget of ECU 1.6 billion for FP3 to avoid a drop in Community support in 1993-1994.[37] The Council approved an increase of ECU 900 million for FP3 in March 1993, leading to an overall budget for FP3 of ECU 6.6 billion, a 14 % decrease from the initial Commission proposal.[38] FP3 was implemented by 15 specific programmes adopted between June 1991 and April 1992. For the first time, all these specific programmes were to end at the same time in December 1994, marking a first step in synchronising the FP and its specific programmes (Figure 1).

While completion of the single market was still a major aspect in the development of the FP, others were also added, such as introducing a European dimension to research training, boosting economic and social cohesion, and including aspects regarding environmental protection and quality of life. FP3 introduced the idea of multidisciplinarity and the concept of addressing technological challenges. It also marked clear tensions between the Member States in the Council on one side and the Commission and Parliament on the other, especially regarding the budget. These tensions originated partially from two different views on the part of the Member States: either the FP was seen as a source separate from national research budgets (additionality position) or as an extension of these budgets (attribution position). All these developments would impact the modification of the research title in the treaties and the definition of future framework programmes.

## 2.4. The outcomes of the Maastricht Treaty

*2.4.1. A new approach to research policy*

The treaty of Maastricht, which entered into force on 1 November 1993, modified the legal basis for the framework programme in the Treaty establishing the European Community (TEC) slightly, but these modifications had major consequences. The updated Article 130f broadened the scope of Community activities in research beyond simply strengthening the competitiveness of European industry to all research activities supporting any goal pursued by the Union. This made **research policy a fully horizontal policy** and allow it to cover basic research[39] as well as research in the fields of health,

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[35] Proposal for a Council Decision concerning the framework programme of Community activities in the field of research and technological development (1990 to 1994), Commission of the European Communities, COM(89) 397, 4 August 1989.

[36] Council Decision of 23 April 1990 concerning the framework Programme of Community activities in the field of research and technological development (1990 to 1994), OJ L 117, pp. 28-43, 8 May 1990.

[37] Proposal for a Council decision concerning supplementary financing of the third framework programme of Community activities in the field of research and technological development (1990 to 1994), Commission of the European Communities, COM(92) 309, 15 July 1992.

[38] Council Decision of 15 March 1993 adapting Decision 90/221/Euratom, EEC concerning the Framework Programme of Community activities in the field of research and technological development (1990 to 1994), OJ L 69, pp. 43–44, 20 March 1993.

[39] The Commission noted in a document of April 1992 that 'with the exception of 'curiosity-oriented' research, no fundamental research sector can, a priori, be excluded from Community intervention.

environment or social sciences for example. The **subsidiarity principle** – formally introduced in the treaty – was translated in research by setting Community and national research policies on an equal footing, requiring them to be 'mutually consistent'. The FP was now a fully-fledged financial tool as its adopted budget became the 'maximum overall amount' to be dedicated to research activities over the period considered.

Regarding these developments, the Commission reaffirmed the **supremacy of the scientific excellence criterion**, although also mentioning the need for more cohesion.[40] It criticised the inertia in the process to define a new FP, referring to the lack of selectivity, the tendency to disperse rather than concentrate, and the lengthiness of the legislative procedure. The Commission stated that 'Community research strategy must be replanned' by combining continuity and innovation. It noted that the coordination of national policies had become a task in which the Commission should play a greater role.

The Commission considered that Community research policy had to be 'put at the service of a whole range of wider problems, centred on Europe and on society'. This aspect would be essential in introducing common challenges to the FP in the following decades. The Commission reflected on the possibility of establishing a special 'kiosk' for SMEs and confirmed the principle of rolling programmes.

*2.4.2. A new structure for the framework programme*

The Maastricht Treaty modified the process for the adoption of the framework programme, which would, from now on, imply the adoption of several decisions:

- a decision from the Council and the Parliament regarding the structure of the FP and its budget for the period considered adopted under the co-decision procedure with unanimity in Council (see Table 1);[41]
- a Council decision on the rules of participation and dissemination of the results adopted under the cooperation procedure; and
- a Council decision for each of the specific programmes implementing the FP adopted under the consultation procedure.[42]

These new procedures, different from those set up in the Euratom Treaty for the adoption of the nuclear research programme, implied that this programme could no longer be included in the FP and would be established under separate decisions.[43] The Commission also decided that the structure of the FP should abide strictly by the list of four activity types set out in the Treaty (Article 130g):

- transnational/cooperative research, technological development and demonstration programmes on selective topics;
- cooperation with third countries and international organisations;
- dissemination and optimisation of the results of activities in Community research;
- stimulation of the training and mobility of researchers in the Community.[44]

This strict interpretation of the Treaty would guide the definition of FP4 and FP5.

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[40] The documents for the preparation of FP4 mention the need to strengthen synergies between research policy and structural policy, and between the FP and the structural funds.

[41] Research was the only field for which the unanimity of the Council was still required.

[42] This marked a reduction of the influence of the European Parliament from the previous situation where the cooperation procedure was used for the adoption of the specific programmes.

[43] The adoption of the nuclear energy research programmes after FP3 is not covered in this paper.

[44] This mobility scheme is now known as the Marie Sklodovska Curie actions (MSCA).

*2.4.3. FP4: enlarging the scope of the framework programme*

The Commission presented its first discussion document for the preparation of FP4 in September 1992 with a planned budget of ECU 14.7 billion for the 1994 to 1998 period.[45] In April 1993, a second working document was adopted with a planned budget of ECU 13.1 billion.[46] The Commission aimed to impose greater selectivity on the topics chosen, further integration of national, Community and European activities and increase the flexibility of Community activities.[47] The Commission's formal proposal for the decision on FP4 was adopted in June 1993 with a budget of ECU 11.625 billion.[48]

Whereas the Commission had proposed seven themes for FP4, the decision[49] adopted by the Council and the European Parliament in April 1994 included 13 topics under the first activity of the FP, showing the **difficulty in applying the principle of selectivity**.[50] Hence the topics remained similar those defined in the previous FPs: ICT, industrial technologies, environment, life sciences, agriculture and fisheries, life sciences, non-nuclear energy and transport. The novelty was the introduction of targeted socio-economic research. The adopted budget of ECU 11 billion was raised to ECU 11.7 billion in March 1996 and slightly increased again in December 1997 (by ECU 115 million).[51] The final budget for FP4 was then slightly superior to the formal proposal from the Commission, and 10 % under the initially planned budget.

The establishment of FP4 also required the adoption of rules on participation and dissemination; these became effective in November 1994.[52] The adoption of the 17 specific programmes[53] implementing FP4 took place between July and December 1994 marking the achievement of **full synchronisation between the FP and the specific programmes** (see Figure 1 above).

*2.4.4. FP5: a shift towards the needs of the Community and its citizens*

The preparation of FP5 was guided by the idea of **extending the scope of Community research policy** and its main instrument, the FP, to put it **at the service of society**. In July 1996 the Commission noted that Community research had so far been based largely on technical achievement and that 'the aim now is to make research more efficient and

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45 Working document of the Commission concerning the fourth framework programme of Community activities in the field of research and technological development (1994-1998), Commission of the European Communities, COM(92) 406, 9 October 1992.

46 Second Commission working document concerning RTD policy in the Community and the fourth framework programme (1994-98) of Community RTD activities, Commission of the European Communities, COM(93) 158, 22 April 1993.

47 The second working document mentions clearly that one objective of the FP should be closer integration to create the 'European research area'.

48 Proposal for a Council Decision concerning the fourth framework programme of the European Economic Community activities in the field of research, technological development and demonstration (1994 to 1998), Commission of the European Communities, COM(93) 276, 16 June 1993.

49 Decision No 1110/94/EC of the European Parliament and of the Council of 26 April 1994 concerning the fourth framework programme of the European Community activities in the field of research and technological development and demonstration, OJ L 126, pp. 55-87, 18 May 1994.

50 The adoption of the FP4 decision gave rise to the first trilogue between Council, Parliament and Commission.

51 See the first and second decisions amending the budget of FP4.

52 Council Decision of 21 November 1994 concerning the rules for the participation of undertakings, research centres and universities in research, technological development and demonstration activities of the European Community, OJ L 306, pp. 8-11, 30 November 1994.

53 One for each of the 13 topics under the first activity and one for each of the three other activities.

increasingly directed towards meeting basic social and economic needs'.[54] The Commission's aim was to satisfy the expectations of European Union (EU) citizens and have a positive impact on employment and competitiveness. It reaffirmed the principle of excellence and the need to improve cooperation and 'create a real European scientific area and single market'. The Commission stressed again the need to be more selective, to wind up activities, to ensure a greater concentration of resources and to simplify the decision-making procedure by reducing the number of programmes.[55]

In November 1996 and February 1997 the Commission adopted two working papers in which it discussed the objectives and structure of FP5.[56] The Commission proposal for FP5 was adopted in April 1997 founded on the guiding principles of concentration and flexibility.[57] The Commission proposed three thematic programmes under the first activity, shaped no longer as topics but as challenges: unlocking the resources of the living world and the ecosystem; creating a user-friendly information society; and promoting competitive and sustainable growth. The three other activities were also renamed as: confirming the international role of European research; innovation and participation of SMEs; and improving human potential. The budget was proposed simply as a percentage breakdown for each of these six actions. It was updated in August 1997 with a proposed budget for FP5 of ECU 14.833 billion.[58] The preparation of the specific programmes for FP5 was conducted in parallel.[59]

The decision establishing FP5 was adopted in December 1998 together with the rules on participation and dissemination.[60] The three original themes under the first activity were reorganised as four: quality of life and management of living resources; user-friendly information society; competitive and sustainable growth; and energy, environment and sustainable development (see Figure 2). The budget adopted for FP5 was ECU 13.7 billion, 7 % under the initial proposal of the Commission. The seven specific programmes plus the one for the JRC were adopted all together in January 1999.[61] FP5 was the **last framework programme adopted under the unanimity rule in the Council**. The Treaty of Amsterdam, which entered into force on 1 May 1999, modified the procedure for adopting the FP, requiring only a qualified majority of the Council.

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[54] Inventing tomorrow: Europe's research at the service of its people, Commission of the European Communities, COM(96) 332, 10 July 1996.

[55] The Commission also suggested adjusting the work programmes implementing the specific programmes regularly – potentially annually – and increasing flexibility by including in the FP non-allocated budgets in order to be able to respond to needs not originally foreseen.

[56] Towards the 5th framework programme: additional material for the policy debate, COM(96) 595, 20 November 1996 and Towards the 5th framework programme: scientific and technological objectives, COM(97) 47, 12 February 1997.

[57] Proposal for a European Parliament and Council Decision concerning the 5th Framework Programme of the European Community for research, technological development and demonstration activities (1998-2002), Commission of the European Communities, COM(97) 142, 30 April 1997.

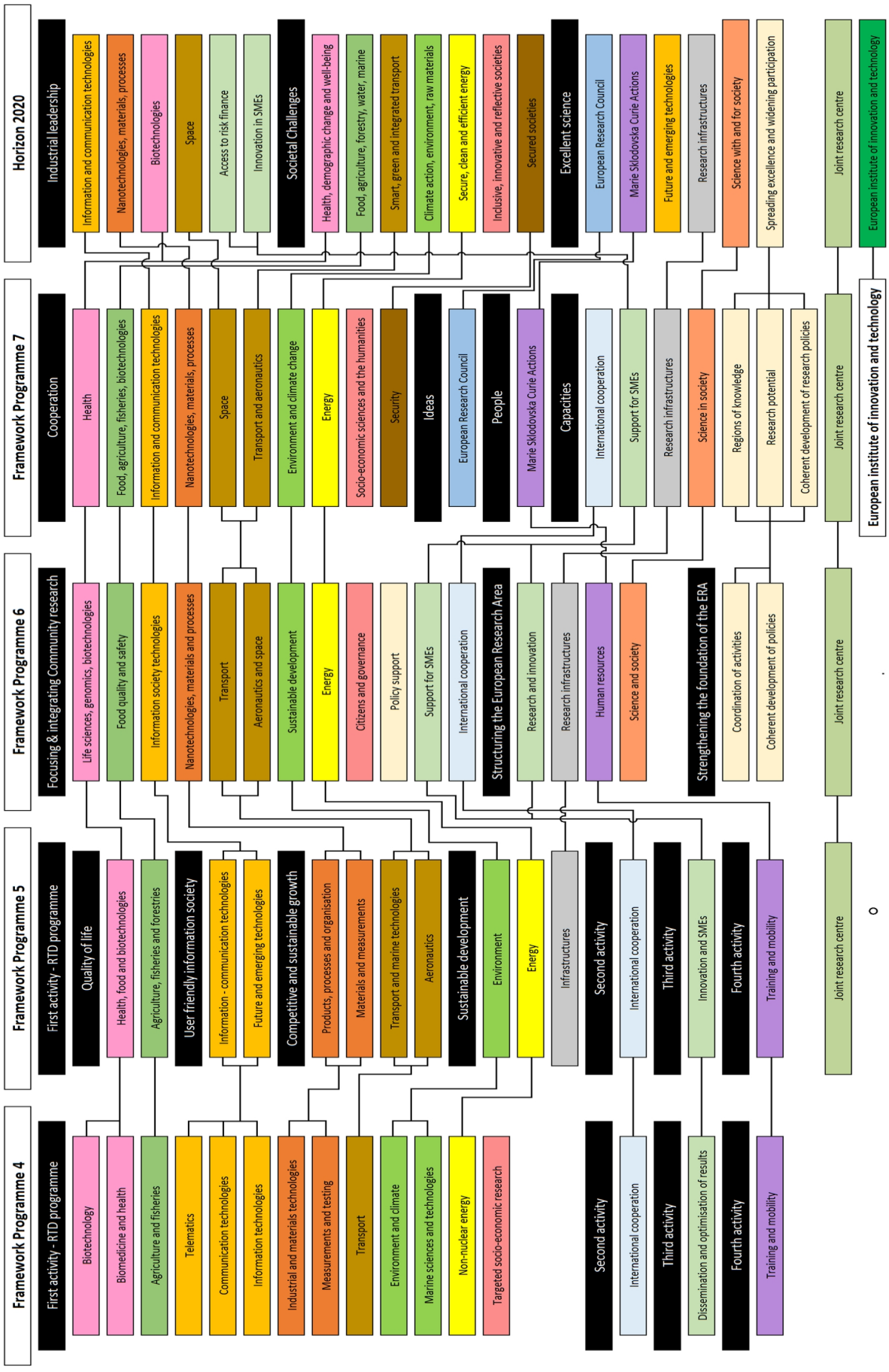
[58] This update followed the adoption in July 2000 of the 'Agenda 2000' and its corresponding budget for the period 2000-2006.

[59] Commission working paper on the specific programmes: starting points for discussion, Commission of the European Communities, COM(97) 553, 5 November 1997.

[60] OJ L 26, pp. 1-33 and pp. 46-55, 1 February 1999.

[61] OJ L 64, pp. 1-141, 12 March 1999.

**Figure 2 – Evolution of the structure of the framework programme from FP4 to Horizon 2020**




Data source: EPRS based on EUR-Lex.

## 2.5. Implementing the European research area

*2.5.1. The European research area concept*

In September 1999, while the implementation of FP5 was underway, Philippe Busquin became Commissioner for Research. Taking stock of the work of his predecessors, he successfully launched and developed the **concept of the European research area** (ERA), starting with a communication adopted in January 2000.[62] The ERA was to be part of the Lisbon strategy, adopted by the European Council in March 2000 and aiming to make the European Union 'the most competitive and dynamic knowledge-based economy in the world'.[63]

After decades maturing, the ERA's objective was to address the 'fragmentation, isolation and compartmentalisation of national research systems' and 'the lack of coordination in the manner in which national and European research policies are implemented'. This concept formed a strong base for a research policy at European level. In this context the **FP was to become the main tool to implement this policy**.[64]

*2.5.2. FP6: A tool to implement the ERA*

In October 2000, the Commission adopted a communication regarding the broad direction for the next framework programme, FP6.[65] In the context of the ERA, there was 'a need to reassess the shape and content of EU research activities' so that they could 'exert a more "structuring" effect on European research'. This meant for the Commission the **development of new instruments** and the 'full application of the principle, enshrined in the treaty, of complementarity between EU research activities and Member States' research activities'. The new FP should be geared towards the overall coherence of European scientific cooperation and take into account both regional and international dimensions. It should be focussed on a limited number of priorities, apply the concept of European added value and favour the criterion of excellence. This meant that the FP had to be 'revamped' in terms both of its design and how it was implemented.[66]

New instruments proposed included funding for the networking of national programmes,[67] the establishment of networks of excellence and provisions for large-scale targeted research projects. The FP should also be geared more towards support for the innovation process and, specifically, support for SMEs. The budget for the activities in the areas of research infrastructure and human resources, especially mobility, should be increased. Finally there should be a greater focus on interactions between science, society and citizens.

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62 Towards a European research area, Commission of the European Communities, COM(2000) 6, 18 January 2000.

63 Presidency conclusions, Lisbon European Council, 23 and 24 March 2000.

64 More information about the history, development and implementation of the concept of ERA can be found in The European Research Area, EPRS, V. Reillon, March 2016.

65 Making a reality of the European research area: Guidelines for EU research activities (2002-2006), Commission of the European Communities, COM(2000) 612, 4 October 2010.

66 As to implementation, DG Research would progressively focus more on the development of the policy while implementation tasks regarding the FP would be externalised to dedicated agencies or other Community structures.

67 Public-public partnerships such as Article 169 (now Article 185) partnerships and the ERANETs.

The Commission adopted its proposal for FP6 in March 2001.[68] The objective was to step up the role of the FP in supporting the development of scientific and technical excellence in Europe, to increase its impact on the innovation process and to reinforce its contribution to integrating European research. The Council and European Parliament adopted the decision on FP6 in June 2002, with the structure proposed by the Commission.[69]

The previous four-activity structure was replaced entirely by a new one with three programmes.[70] Under the first programme 'Focusing and integrating Community research', seven thematic topics were defined covering the same areas as in the previous FP with the addition of space and a topic on 'citizens and governance in a knowledge-based society'. Support for policy development, for SMEs and for international cooperation was also included in this programme. The second programme 'Structuring the ERA' covered support for innovation, human resources, research infrastructure and the topic 'Science and society'. Finally the last programme 'Strengthening the foundation of the ERA' gathered together actions to coordinate activities and promote the coherent development of research and innovation policies in Europe (see Figure 2).

FP6 had a budget of €16.3 billion for the 2002 to 2006 period, an amount corresponding to the initial proposal from the Commission, although funds were reallocated between the various programmes. This was on account of the fact that the multi-annual financial framework had been adopted in 1999 for the 2000 to 2006 period, meaning that the amount available for FP6 had already been agreed upon. Following the enlargement of the EU, the budget for FP6 was raised to €17.9 billion in April 2004.[71]

*2.5.3. The seventh framework programme*

FP6 triggered the **diversification and multiplication of instruments** to implement the FP. Coordination with national programmes was implemented by creating public-public partnerships, such as the ERA networks (ERANETs) and the Article 169 partnerships. Various public-private partnerships were also launched, including the European technology platforms (ETP).[72]

In March 2002, the European Council had set the objective of achieving a research effort of 3 % of EU gross domestic product (GDP) by 2010.[73] In 2003, the Commission prepared an action plan in order to reach this target, in which the FP and its instruments played a

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[68] Proposal for a decision of the European Parliament and of the Council concerning the multiannual framework programme 2002-2006, Commission of the European Communities, COM(2001) 53, 1 March 2001.

[69] Decision No 1513/2002/EC of the European Parliament and of the Council of 27 June 2002 concerning the sixth framework programme of the European Community for research, technological development and demonstration activities, contributing to the creation of the European research area and to innovation (2002 to 2006), OJ L 232, pp.1-33, 29 August 2002.

[70] Nevertheless, only two specific programmes (plus the one for the JRC) were adopted in September 2002 to implement FP6, as the first and third programmes were included in the same specific programmes. The rules of participation for FP6 were adopted in December 2002.

[71] Decision No 786/2004/EC of the European Parliament and of the Council of 21 April 2004 with a view to adapting the reference amounts to take account of the enlargement of the European Union, OJ L 138, pp. 7-11, 30 April 2004.

[72] The European technology platforms were the first form of EU public-private partnerships in research.

[73] Presidency Conclusions, Barcelona European Council, SN 100/1/02 REV 1, 15-16 March 2002. In 2002, the OECD estimated research intensity in the EU15 at 1.81 %.

major role.[74] A year later, in June 2004, the Commission adopted a communication regarding the guidelines for the preparation of FP7.[75] The new FP would be designed to help reach the 3 % target with an increased budget. It was to support the establishment of a 'critical mass' of resources, strengthen excellence and exercise a 'catalytic' effect on national initiatives.

The Commission proposed six major objectives for FP7:

- creating European centres of excellence through collaboration;
- launching European joint technology initiatives (JTIs) as public-private partnerships;[76]
- creating a European Research Council (ERC) promoting competition at EU level;
- making Europe more attractive to the best researchers;
- developing the research infrastructures of European interest; and
- improving the coordination of national research programmes.

The **enlargement of the Union was seen as a challenge** to make sure that all the new Member States could 'take the road to excellence'. Complementarity between the FP and the structural funds appeared necessary to reach that goal. Once again the Commission pointed out the need to identify topics of major European interest and the need to support the Union's political objectives. The issue of security was to be added as a new topic. The Commission also noted that the **low success rate** under FP6 – 20 % of proposals received funded overall, with 50 % of the proposals evaluated as excellent financed – was a growing issue. In terms of implementation, it stressed the need to pursue and extend the use of the executive agencies, increase the transparency of the evaluations, reduce delays and minimise the costs of preparing projects.

The Commission adopted its proposal for FP7 in April 2005, a few months after the Barroso Commission took office, with the objective of 'building an ERA of knowledge for growth'.[77] In the context of the relaunch of the Lisbon strategy, FP7 was prepared not to be 'just another framework programme'. The **extension of the scope of the FP towards exploratory research and innovation activities** and the multiplication of funding schemes and instruments that had begun under FP6 pointed to the need to simplify and rationalise the implementation of the FP.

The Council and the Parliament adopted the package of decisions regarding FP7 in December 2006.[78] FP7 marked the end of the overlap between two consecutive FPs, as FP6 finished in December 2006 and FP7 started in January 2007. The length of the programme was extended to seven years to match the length of the multiannual financial framework (MFF). The budget of €50 billion adopted presented a strong increase compared with FP6 but a 30 % reduction from the initial Commission proposal of €73 billion.

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[74] Investing in research: an action plan for Europe, Commission of the European Communities, COM(2003) 226, 4 June 2003.

[75] Science and technology, the key to Europe's future - Guidelines for future European Union policy to support research, Commission of the European Communities, COM(2004) 353, 16 June 2004.

[76] The JTIs were implemented by establishing joint undertakings under Article 171, now Article 187 TFEU.

[77] Building the ERA of knowledge for growth, Commission of the European Communities, COM(2005) 118, 6 April 2005.

[78] For the decisions on the FP, the specific programmes and the rules of participation and dissemination, see OJ L 412, OJ L 400 and OJ L 391, 30 December 2006.

The structure of the programme was renewed and organised around four objectives:

- cooperation: support for transnational research projects in 10 thematic areas, with security as a new area and space as an area on its own;
- ideas: supporting bottom-up research projects with individual grants via the establishment of the European Research Council (ERC);
- people: strengthening human capital in research and support mobility; and
- capacities: supporting key aspects of European research and innovation capacities (infrastructures, regional clusters, SMEs, international cooperation).

Support for research and innovation activities was also provided under other EU programmes adopted at the same time as FP7 such as the structural funds and the Competitiveness and Innovation Programme. Moreover, the president of the Commission had in 2005 proposed setting up a new EU institution supporting research and innovation: the European Institute of Innovation and Technology (EIT).[79] This new entity was financed outside FP7 under its own budget.

## 2.6. Supporting innovation

*2.6.1. Research policy in the Lisbon Treaty*

The Treaty of Lisbon, which was signed in December 2007, entered into force on 1 December 2009. It renamed the treaty establishing the European Community as the Treaty on the Functioning of the European Union (TFEU).[80] It clarified the competences of the EU and recognised research as a shared competence, yet set limitations for the Union. The objectives of EU research policy were broadened: the original focus on 'Community industry', introduced in 1986, shifted to implementation of the ERA concept.

Article 179(1) TFEU made this last point a legal requirement stating that 'the Union shall have the objective of strengthening its scientific and technological bases by achieving a European research area in which researchers, scientific knowledge and technology circulate freely, and encouraging it to become more competitive, including in its industry, while promoting all the research activities deemed necessary by virtue of other Chapters of the Treaties'. However the articles regarding the adoption of the FP remained unchanged (Table 1).[81]

*2.6.2. The innovation union policy*

In March 2010, the newly appointed Barroso II Commission, with Máire Geoghegan-Quinn as Commissioner for Research, Innovation and Science, presented the Europe 2020 strategy for smart, sustainable and inclusive growth.[82] The 'smart' aspect of the strategy was grounded on developing an economy based on knowledge and innovation. The **'innovation union' was introduced** as one of the seven flagship initiatives of the strategy aiming 'to improve framework conditions and access to finance for research and innovation so as to ensure that innovative ideas can be turned into

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[79] For more information on the EIT, see V. Reillon, The European Institute of Innovation and Technology, EPRS, European Parliament, September 2016.

[80] Consolidated version of the Treaty on the Functioning of the European Union, OJ C 326, pp. 47–390, 26 October 2012.

[81] The co-decision procedure was renamed the 'ordinary legislative procedure'.

[82] Europe 2020 A strategy for smart, sustainable and inclusive growth, European Commission, COM(2010) 2020, 3 March 2020.

products and services that create growth and jobs'. The target of 3 % of GDP invested in research and innovation, expected to be achieved in 2010, was reset for 2020.[83]

The 'innovation union' flagship initiative was presented by the Commission in October 2010.[84] This communication marked a clear shift by considering **innovation to be 'the overarching policy objective'** and that the EU and the Member States had 'to adopt a much more strategic approach to innovation'. The innovation union initiative was designed to address six priority areas:

- strengthening the knowledge base and reducing fragmentation;
- getting good ideas to the market;
- maximising social and territorial cohesion;
- creating European innovation partnerships;[85]
- leveraging EU policies externally; and
- making it happen.

The first priority aimed to deliver the ERA and to streamline EU research and innovation funding instruments. Hence the innovation union flagship policy provided a new framework that would influence the structure of the successor to FP7.

*2.6.3. Horizon 2020*

The alignment of the FP with the MFF implied that the discussion about the various EU programmes and their budgets needed to take place before the Commission proposals for each programme. In February 2011 the Commission adopted a communication on the different programmes supporting research and innovation activities.[86] The Commission noted that research and innovation were 'key drivers' for building the EU's future, enhancing the welfare of EU citizens and securing EU competitiveness, and that Europe needed to make a 'step change in its research and innovation performance'.

The Commission proposed to **merge existing programmes under a common strategic framework** simplifying and streamlining existing instruments and rules to make 'EU funding more attractive and easy to access for participants'. The ambition of the programme was to cover and support all the activities in the 'innovation chain in a seamless manner'.[87] The Commission noted the underinvestment in research and innovation in Europe and the costly duplication and fragmentation of the support for these activities, and that national and regional governments were still largely working according to separate strategies.

The interim evaluation of FP7 had concluded that the key features of the FP were support for cross-border collaborative research and the building and sustaining of European networks.[88] New instruments such as the ERC and the financial instruments were

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[83] The OECD estimated research intensity in the EU-28 to be 1.84 % in 2010.

[84] Europe 2020 Flagship Initiative Innovation Union, European Commission, COM(2010) 546, 6 October 2010.

[85] For more information, see V. Reillon, European Innovation Partnerships, EPRS, European Parliament, May 2017.

[86] From challenges to opportunities: towards a common strategic framework for EU research and innovation funding, European Commission, COM(2011) 48, 9 February 2011.

[87] For more information on innovation policy, see V. Reillon, Understanding innovation, EPRS, European Parliament, February 2016, V. Reillon, EU Innovation Policy – Part I, EPRS, European Parliament, May 2016 and V. Reillon, EU Innovation Policy – Part II, EPRS, European Parliament, May 2016.

[88] Interim evaluation of the seventh framework programme – report of the expert group, European Commission, 12 November 2010.

considered a success. The evaluation also mentioned that the focus for the next FP should be on excellence, competitiveness and addressing societal challenges. The programme should speed up progress towards a genuinely unified ERA and remain open to the world. The complementarity between the FP and the cohesion fund was also to be improved.

The Commission adopted its proposal for the eighth framework programme, named Horizon 2020, in November 2011.[89] Whereas the European Parliament had requested a budget of €100 billion in its resolution on the common strategic framework, the Commission proposed a budget of €87.7 billion.[90] Horizon 2020 would be structured around three pillars corresponding to the three priorities identified in February 2011: excellent science; industrial leadership; and societal challenges. The EIT would be integrated into the FP as would some parts of the Competitiveness and Innovation Programme.

After two years of negotiations, the Council and the European Parliament adopted the regulations establishing Horizon 2020 in December 2013.[91] The budget adopted for Horizon 2020 was €77 billion. One of the six initial challenges of the proposal was split in two resulting in seven identified societal challenges: health, food security, energy, transport, climate and environment, inclusive societies and secured societies. Two specific objectives were added to the three pillars on 'spreading excellence and widening participation' and on 'science with and for society'.

The rules of participation were made simpler and common to all parts of the programme.[92] However, Horizon 2020 remained **a complex programme** managed by nine different directorates-general of the Commission and implemented by 22 different bodies.[93] In June 2015 the Horizon 2020 budget was reduced to €74.8 billion by the adoption of the European Fund for Strategic Investments.

The interim evaluation presented by the Commission in May 2017 confirmed that Horizon 2020 was relevant and that its efficiency had increased compared with FP7. However, the programme suffered from **oversubscription with a very low success rate** of 11.6 % (18.5 % for FP7) and a large share of excellent proposals remaining unfunded.[94]

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89 Proposal for a regulation of the European Parliament and of the Council establishing Horizon 2020 – The Framework Programme for Research and Innovation (2014-2020), European Commission, COM(2011) 809, 30 November 2011.

90 Resolution on the green paper: From challenges to opportunities: towards a common strategic framework for EU research and innovation funding, European Parliament, P7_TA(2011)0401, 27 September 2011.

91 The regulation establishing the FP, the decision to establish a single specific programme for the FP, and the regulation on the rules of participation and dissemination were all adopted in December 2013. The amended regulation for the EIT and the EIT strategic innovation agenda were also adopted in December 2013. The regulations establishing the joint undertakings for the JTIs were adopted in May and June 2014. The decisions establishing the Article 185 partnerships were adopted in May 2014. The fact that only one specific programme was adopted for the implementation of Horizon 2020 shows that the specific programme has lost its importance.

92 The European Parliament had adopted a resolution concerning the simplification of the implementation of the framework programme in November 2010 following a communication from the Commission.

93 For more information on Horizon 2020, see V. Reillon, Horizon 2020 budget and implementation, EPRS, European Parliament, November 2015.

94 To date, more than €62 billion in additional funding would have been required to fund all 'excellent' proposals.

The **focus on excellent science had led to a concentration of funding,** making progress on spreading excellence and broadening participation slow. Despite the structure being more coherent structure than for FP7, the evaluation mentioned that the large number of instruments had made the **EU research funding landscape 'difficult to navigate'**. Finally, the interactions between the FP and other EU funds – mainly the structural funds – remained complex and unsatisfactory.

## 2.7. Main aspects in the evolution of the framework programme

As the number of research programmes undertaken by the Community in the 1970s was increasing, the purpose of the first framework programme was to provide coherent guidelines and a long-term view for the selection of the programmes to be supported by the Community. One of the most important aspects of FP1 was the definition of the selection criteria for these specific programmes. In that sense, the FP was a **flexible shell** within which the specific programmes remained the most important components to be debated and agreed upon at Council level. FP1 also introduced horizontal activities providing EU support for the research system beyond support for thematic activities.

Following the adoption of the Single European Act and the provisions of a stronger legal basis for the FP in the Treaties, FP2 and FP3 progressively achieved the **synchronisation of the FP with its specific programmes**. The result was to invert the strategic importance of the FP and the specific programmes: the FP was becoming not only a coordination and planning tool but also a financial instrument whose structure and budget would constrain the content and budget of the specific programmes.

These first three framework programmes were focussed on supporting pre-competitive research activities. They also targeted the implementation of the single market. The number of instruments used was limited mainly to shared cost contracts for transnational cooperative research projects. After the adoption of the Maastricht Treaty, the scope of the framework programme began to widen. Support for exploratory research activities was discussed as was increased support for a larger number of innovation-related activities. The horizontal activities – especially regarding human resources, mobility and research infrastructures – were also diversifying.

FP5 provided a new direction for the framework programme by introducing the idea of research activities serving society and the citizen. The FP was getting away from its original focus on technological development towards the objective of helping to address the social challenges to be faced at European level.

The introduction of the European research area policy would lead to a strong shift in the framework programme objectives and structure. Until 2000, the FP was promoting better coordination of research activities at EU level by funding transnational research projects. It could not support an EU research policy as no such policy was clearly defined. The ERA policy provided a strong vision and framework for research in the Union. The FP became the **financial tool supporting the implementation of this vision**.

This new role made it necessary to redefine the structure and objectives of the FP and to diversify the type of instrument. The multiplication of these instruments such as the various public-public and public-private partnerships, began creating increased complexity in the programme. Under FP7, this continued with the creation of new structures such as the ERC, the JTIs and the EIT. Under these two FPs, the changes implied a redefinition of the management of the programme leading to the creation of executive agencies and other institutional bodies to manage the calls and the funds.

With these new instruments, the initial focus of the FP on pre-competitive research activities had widened to include almost all the activities and actors participating in the innovation process. A redefinition of the scope of various EU programmes led to the acknowledgement with Horizon 2020 that the FP had become the 'framework programme for research and innovation'.[95] This transformation had consequences in terms of the structure of the programme, implementation, links with other EU funds, priority setting, focus on specific beneficiaries and rationalisation of instruments.

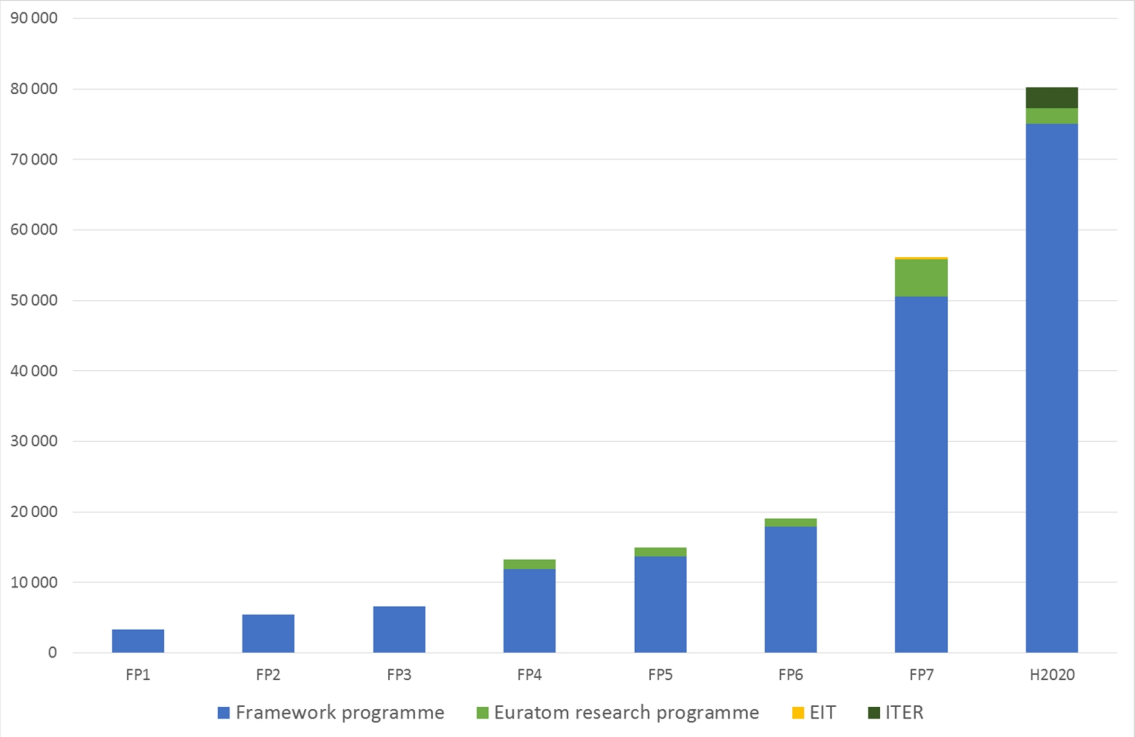
# 3. Key data on the evolution of the framework programme

## 3.1. The evolution of the budget of the FP

*3.1.1. The overall budget*

Figure 3 shows the evolution of the budget of the framework programme for research from FP1 to Horizon 2020 in current prices. The changes in the FP make it necessary to take into account the budget of different programmes to allow comparison.

**Figure 3 – Evolution of the budget of the EU framework programme for research (in million ECU/€)**




Data source: EPRS based on EUR-Lex.

FPs 1 to 3 merged the budgets of the framework programme for research and of the Euratom research programme.[96] Following the evolution of the legislative process for the adoption of the FP after the Maastricht Treaty, these two programmes could no longer be merged. For this reason Figure 3 includes the additional budget of the Euratom

[95] No longer the 'framework programme for research, technological development and demonstration activities' as were all FPs from FP4 to FP7.

[96] The Euratom research programme can be adopted for a period of five years maximum. The budget for the Euratom research programme used for the period of seven years covered by Horizon 2020 is an extrapolation of the five years budget adopted in 2013 over seven years. The additional Euratom research programme is expected to be adopted in 2018 for the 2019 to 2020 period.

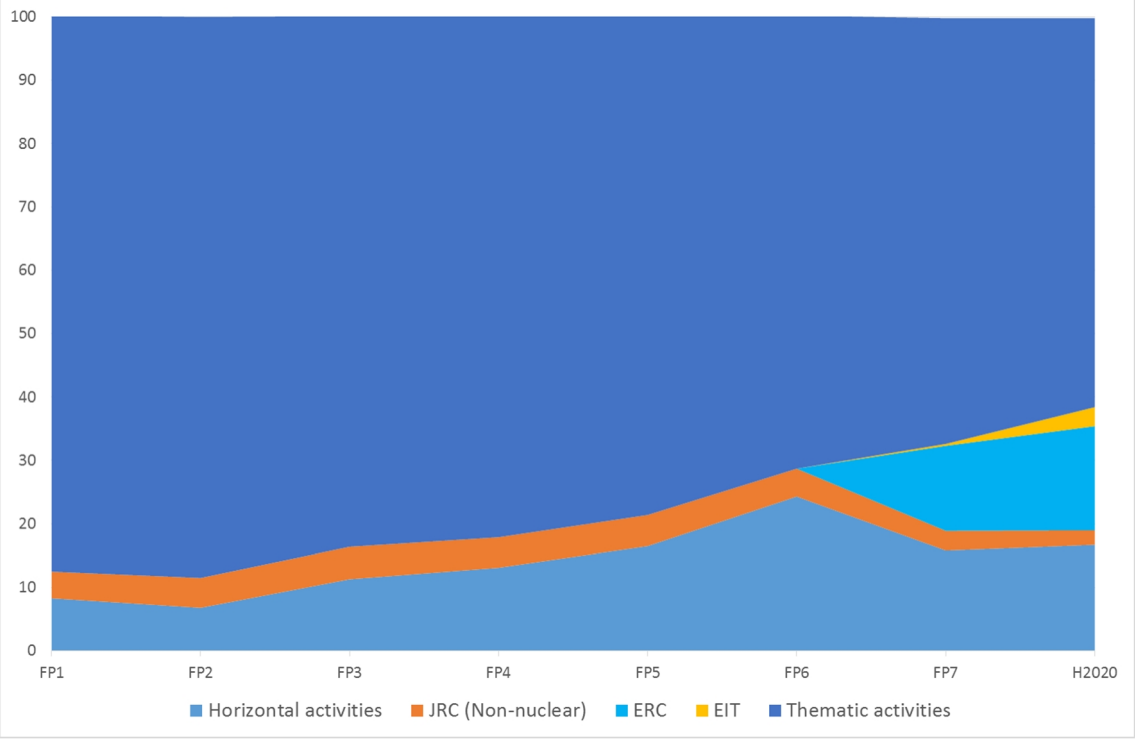
research programme after FP3. When created, the EIT was funded outside the scope of FP7 but its budget and rules are now included in Horizon 2020. The EIT budget for 2006-2013 is added in Figure 3. Finally, the EU funding provided for the International Thermonuclear Experimental Reactor (ITER) was included in the funding of the Euratom research programme for 2006-2013 but was adopted as a separate EU programme for the 2013 to 2020 period.[97]

The budgets in Figure 3 correspond to the budget adopted in current prices at the time of adoption of the programmes. They do not offer a direct comparison of the budget of one programme with the others. However, they illustrate the **increasing importance of the EU support for research and innovation activities**. The share of the EU budget for research was below 2 % in 1981, before the adoption of FP1. It is currently around 7.5 %.[98]

*3.1.2. Thematic and horizontal activities*

Under FP1, two kind of activities were defined. On the one hand, funding was provided for thematic activities on selected topics. On the other, a programme was designed to support horizontal activities with the aim of strengthening the European research system (research careers and mobility, research infrastructure, international cooperation, etc.). The funding of the JRC, the internal research centre of the Commission, represented a third component. Despite the changes in the structure of the FP, the separation between these different types of activities remained.

**Figure 4 – Evolution of support provided by the framework programme for different types of activities (in % of the total budget)**




Data source: EPRS based on EUR-Lex.

97 If not stated otherwise, the following figures are based on the cumulated budget of these different programmes.

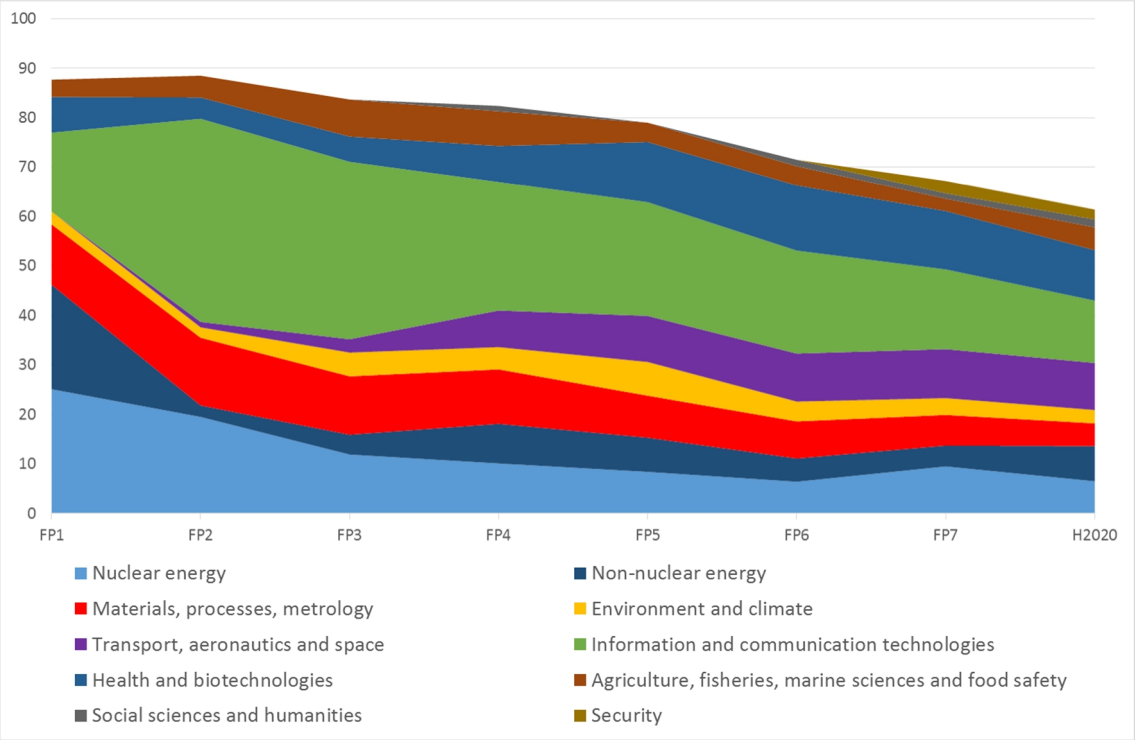
98 This figure takes into account only the programmes mentioned here (Horizon 2020, EURATOM research programme and ITER). About €40 billion of the European Structural and Investment Funds are also expected to be dedicated to research and innovation activities. See V. Reillon, Overview of EU funds for research and innovation, EPRS, European Parliament, September 2015.

Figure 4 shows the evolution of the relative importance of each type of activities from one FP to the next. The fraction of funding for the non-nuclear JRC activities remained relatively constant. While the share of funding for horizontal activities doubled between FP1 and FP6, the share of funding for thematic activities decreased. The establishment of new instruments – the ERC and EIT – that go beyond the thematic/horizontal separation modified this dynamic as the share for horizontal activities decreased.

## 3.2. The evolution of the budget of thematic activities

As shown by Figure 4, the share of funding for thematic activities under the FP has progressively decreased from almost 90 % in FP1 to slightly over 60 % in Horizon 2020.

**Figure 5 – Evolution of the support provided by the framework programme for the various thematic activities (% of the total budget)**



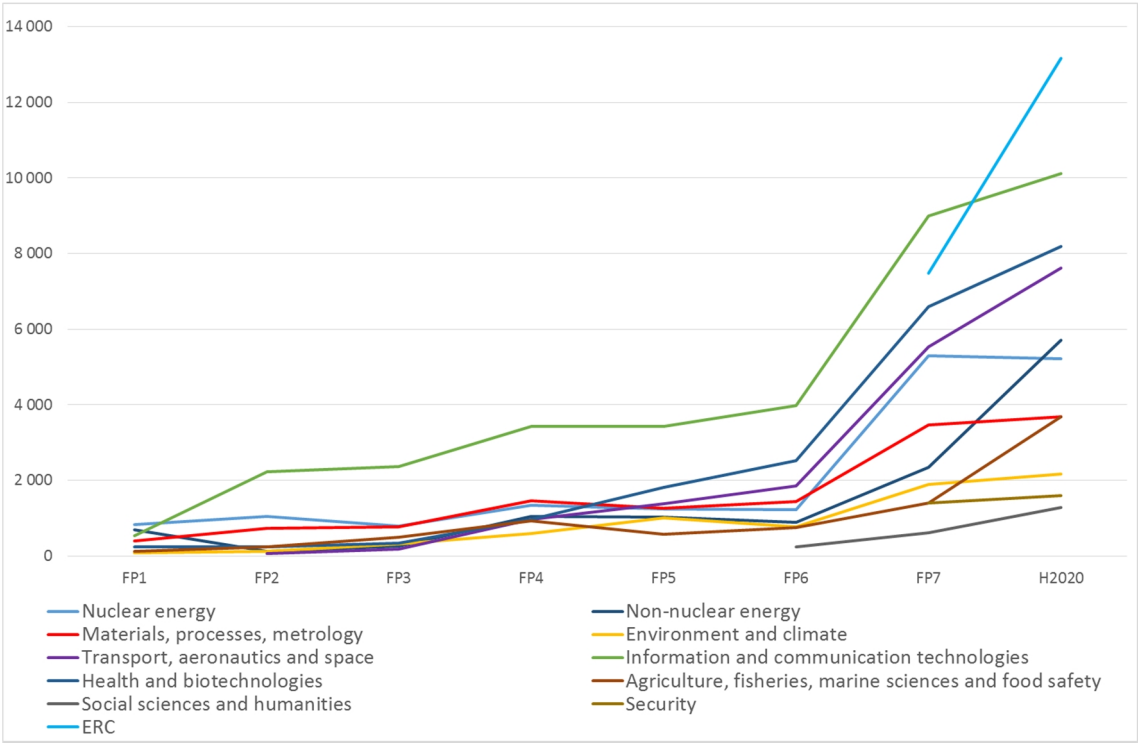

Data source: EPRS based on EUR-Lex.

Whereas the Commission has constantly called for a better focus regarding the thematic areas – and sometimes a decrease in the number of topics – it appears that **the same areas have been funded throughout the history of the framework programme**: energy, health and biotechnology, ICT, environment and climate, materials and processes, transport and space and agricultures and fisheries (see Figure 5). Specific areas on social sciences and humanities were added in FP6 and the topic of security was introduced in FP7.

Despite the reduction in the share of FP funding for thematic activities, the constant increase in the FP budget meant that **the budget for each topic usually increased from one FP to the next** (see Figure 6). In cumulative terms, the field of ICT has been that with the highest overall budget followed by energy (nuclear and non-nuclear), health and transport and space (see Annex 1, Figure 1).

Figures 5 and 6 also show how the budget of the ERC compares with the budget of the main thematic areas. Under Horizon 2020, the budget of the ERC is higher than the budget of any thematic area. Its cumulative budget for FP7 and Horizon 2020 reaches a level similar to the overall funding allocated to the topic of health since FP1.

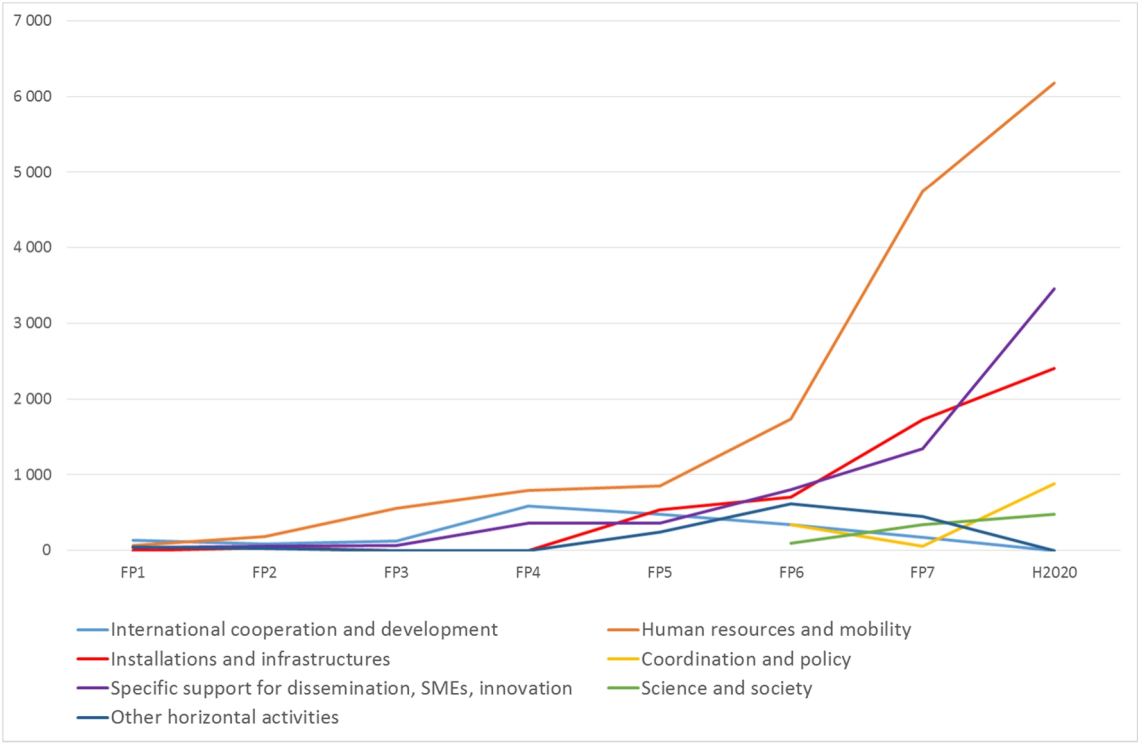
**Figure 6 – Evolution of the support provided by the framework programme for the various thematic activities and the ERC (in million ECU/€)**




Data source: EPRS based on EUR-Lex.

## 3.3. Evolution of the budget for horizontal activities

**Figure 7 – Evolution of the support provided by the framework programme for the various horizontal activities (in million ECU/€)**

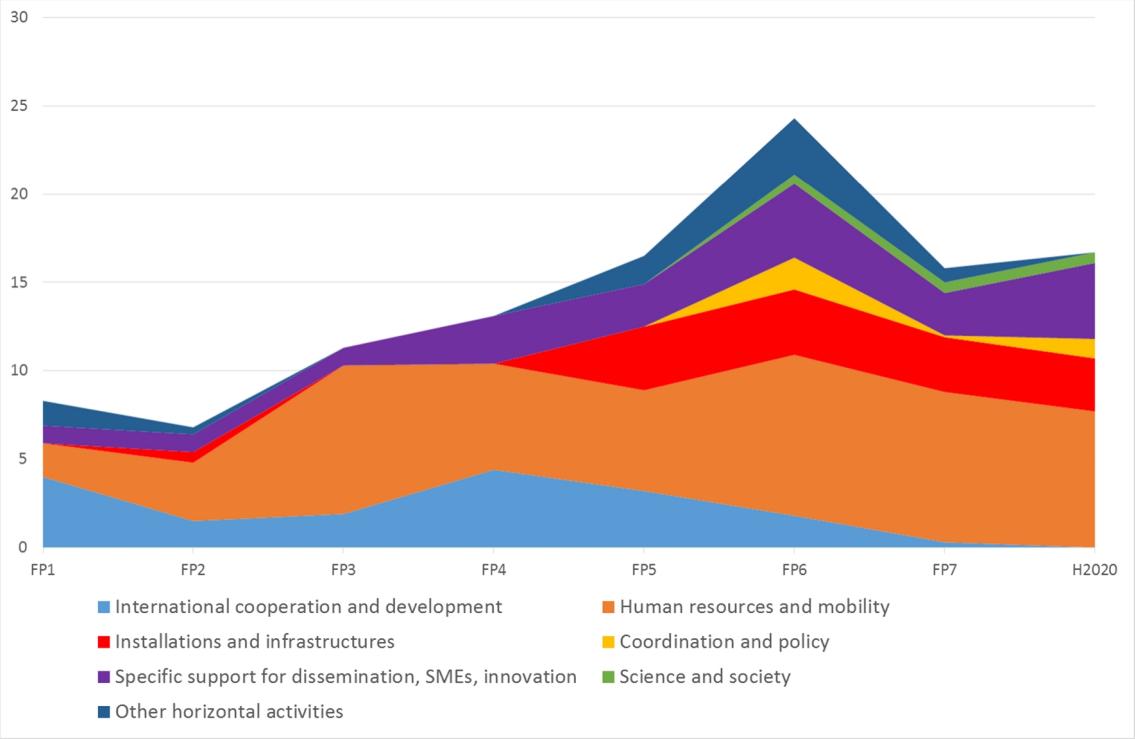



Data source: EPRS based on EUR-Lex.

Horizontal activities include non-thematic activities aimed at supporting the research capacity of the Union. Under FP1 the main horizontal activities were support for international cooperation, and human resources and mobility. As the FP evolved,

international cooperation moved from being a dedicated activity to being embedded in the thematic activities, with some calls targeting cooperation with specific countries. The data presented in Figures 7 and 8 reflect this trend.

**Figure 8 – Evolution of the support provided by the framework programme for the different horizontal activities (% of the total budget)**




Data source: EPRS based on EUR-Lex.

The same figures show that the budget for human resources and mobility – namely the Marie Sklodovska Curie actions (MSCA) – has increased constantly since FP1 even if its share of the FP budget has decreased since FP6 (1.9 % of FP1, 9.1 % of FP6 and 7.7 % of Horizon 2020). The cumulative budget of horizontal activities (Annex 1, Figure 2) show the predominance of human resources and mobility activities over the years. The support for research infrastructure took off from FP5 onwards, as did support for the various measures for SMEs and activities related to innovation beyond research.

## 3.4. New instruments and beneficiaries

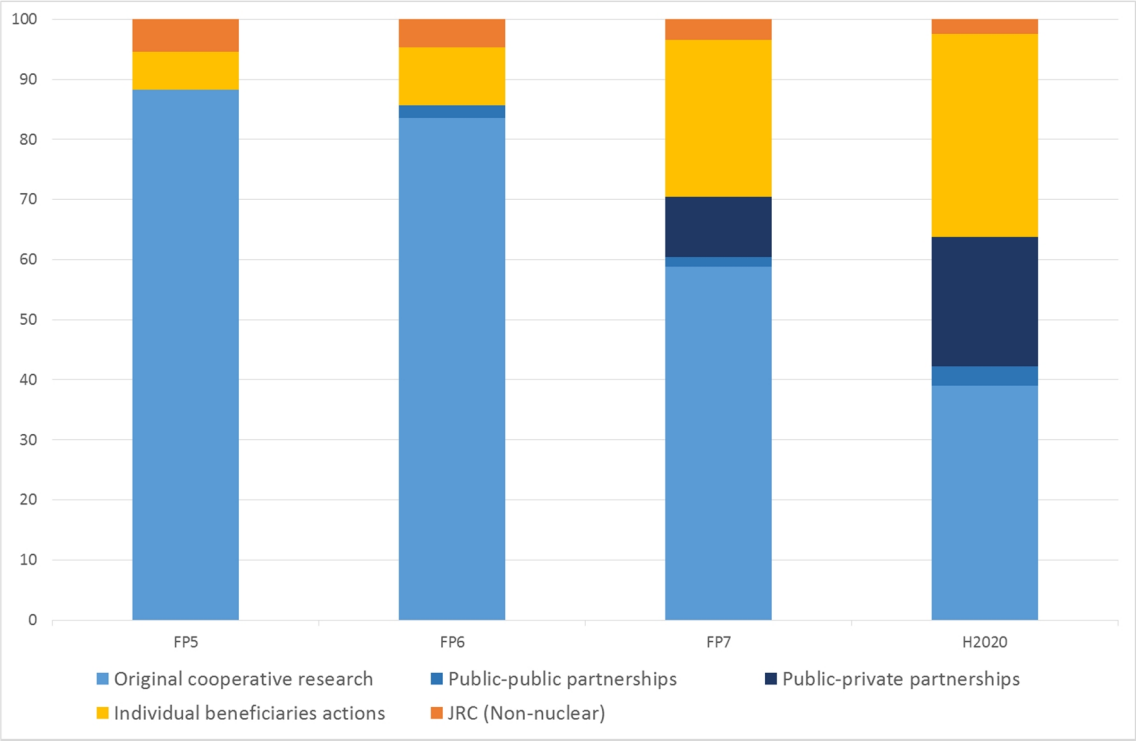
From FP1 to FP5, the instruments used to implement the FP remained limited. With FP6, FP7 and Horizon 2020, new instruments and structures were progressively introduced:

- public-public partnerships (P2P): ERANETs and Article 185 partnerships;[99]
- public-private partnerships (PPP): joint technology initiatives, the European Institute for Innovation and Technology, and contractual PPPs;[100]
- the European Research Council (ERC);
- the SME instrument and the Fast Track to Innovation instrument;
- risk finance instruments.

[99] For more information see V. Reillon, Public-public partnerships in research, EPRS, European Parliament, October 2016.

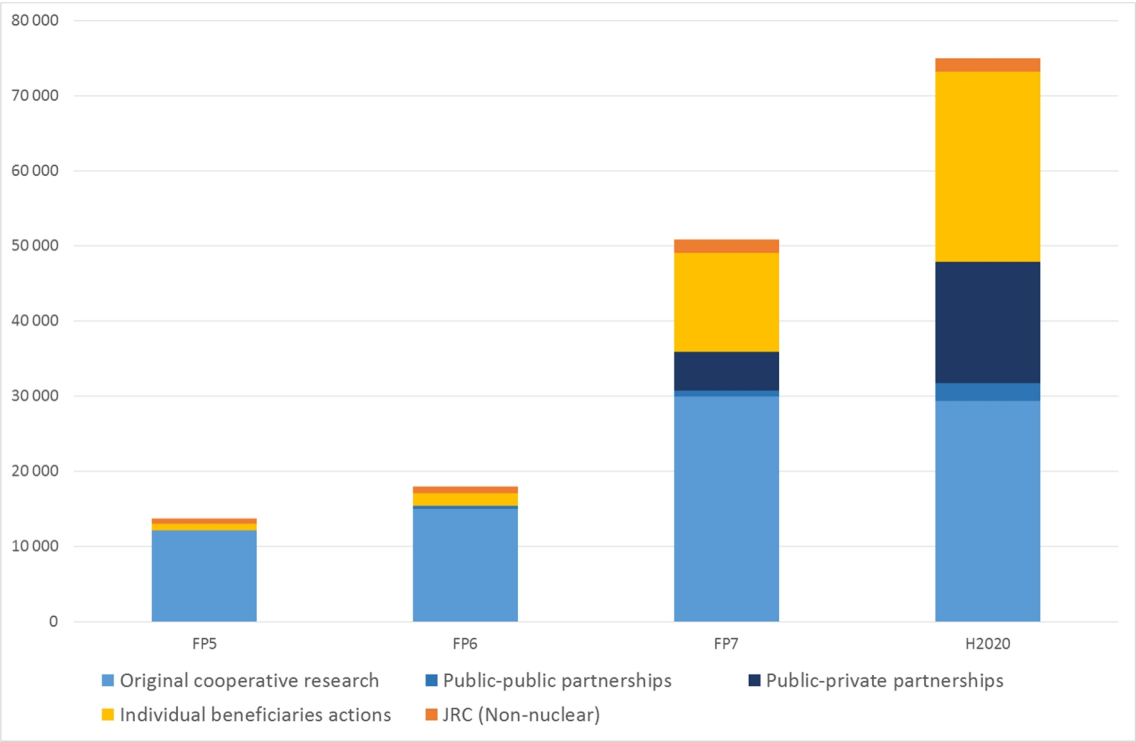
[100] For more information see V. Reillon, Public-private partnerships in research, EPRS, European Parliament, May 2017.

**Figure 9 – Evolution of the support provided by the framework programme for various types of beneficiary (% of total budget, nuclear energy not considered)**




Data source: EPRS based on EUR-Lex.

**Figure 10 – Evolution of the support provided by the framework programme for various types of beneficiary (million €, nuclear energy not considered)**




Data source: EPRS based on EUR-Lex.

The creation of these different instruments meant that the share of funding attributed to original cooperative research projects, whose topics are defined in the work programme by the Commission, decreased (see Figure 9). The P2Ps and PPPs also fund mainly collaborative research projects but follow a different process, requiring intermediate structures and, usually, a different procedure for the attribution of funding.

Despite the increase in the FP budget, the total funding for original cooperative research activities decreased between FP7 and Horizon 2020 (see Figure 10).

With the creation of the ERC and the various instruments in support of innovation, the **share of funding attributed to individual beneficiaries**, initially mainly limited to the human resources and mobility actions (MSCA), **tripled between FP6 and Horizon 2020**. About one third of the budget of Horizon 2020 is dedicated to instruments funding mainly individual beneficiaries.[101]

# 4. Outlook

## 4.1. A framework programme for innovation

Since FP1, the scope of the framework programme, initially focussed on pre-competitive research, has widened to encompass all the activities of the innovation process. However, the term 'FP for research and innovation' can be misleading. Research is an activity per se – the production of knowledge – conducted by specific professionals – the researchers. Innovation is a process encompassing many different activities conducted by various actors that exchange knowledge, funds and skills. With this view of innovation, research is one activity in the innovation process. With this definition of innovation as a process, the **FP has become the framework programme for innovation**.

Adopting this definition of innovation as a process would ease the discussions about the structure and objectives of the FP. It would open the way to define clearly what activities within the innovation process should be supported by the FP (research being one of them), to design the instruments that would support these activities more effectively at EU level, and to define the share of the funding to be devoted to each activity.

## 4.2. Implementation of EU policy

By 2002, the FP had become the financial tool used to implement EU policy on research and innovation: the ERA policy (FP6 and FP7) and the Innovation Union flagship initiative (Horizon 2020). The FP was also meant to support the policy objective of achieving the allocation of 3 % of GDP to innovation in the EU. In that regard, the FP is expected to be the catalyst to increase public and private spending for innovation-related activities.

However, the implementation of the ERA policy has been progressively delegated to the Member States[102] – with monitoring by the Commission – and the innovation union policy has been abandoned with the last state of the innovation union report published in December 2015.[103] Moreover, it appears that the objective 3 % will not be reached by 2020 as the data from the OECD show a stagnation below 2 % over the last years.[104]

There is currently **no clear EU policy for innovation** that would provide a framework for the definition of the next FP. The '3 'O's policy' (open innovation, open science and open

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[101] In Figures 9 and 10 the budget considered for individual beneficiary actions includes the full budget for the MSCA, the ERC, the SME instrument and the instrument for risk finance, although a limited part of the budget for these instruments can be used for collaborative actions. The budget considered for the ERANETs under Horizon 2020 corresponds to a projection of final funding based on the data currently available.

[102] The European Research Area: time for implementation and monitoring progress, European Commission, COM(2017) 35, 26 January 2017.

[103] State of the Innovation Union 2015, European Commission, December 2015.

[104] See the data on the website of the OECD.

to the world) focusses on some aspects of ERA and the innovation union but does not encompass all aspects of innovation in Europe.[105]

## 4.3. EU added value and subsidiarity

The question of the added value of the EU programme for research has been at the centre of discussions since the beginning of the FP. The FP was supposed to complement the Member States' and their regions' research programmes. It was necessary to define which activities would be better implemented and performed at EU level in order to strengthen the European innovation ecosystem. The definition of the Riesenhuber criteria in FP1 to select the specific programmes was one answer. The subsidiarity principle provided another conceptual framework that implied an objective of coherence of research policies at EU and Member State level and the coordination of Member States' policies and programmes.

Various studies have been conducted to define what EU added value (EAV) means in the research field.[106] These studies concluded that it is difficult to find 'an operational definition of EAV which facilitates its measurement' and that EAV is a 'multi-faceted concept difficult to operationalise'.

One recent study made a comprehensive inventory of the EAV aspects of the FPs.[107] The authors listed various types of EAV, identified:

- in the preparation of the proposals with the FP having positive effects on the reduction of commercial and scientific risks, creating a stronger competition at EU level and leveraging private and public funds;
- in the factors that influence the outputs of FP projects, including the pooling of resources and the building of a critical mass of capacities, international and inter-sectoral mobility of researchers and research policy coordination;
- in the medium-term outcomes with an improved level of research excellence and capacities, the economies of scale and scope, the better coordination of national research policies and the wider availability and dissemination of knowledge; and
- in the long-term impacts, including the economic impacts and the better capacity to tackle societal and pan-European challenges.

However, EAV cannot be quantified for all of these aspects. Also, the study showed that some aspects had limited or no EAV, such as the economies of scale and scope, and the production of open-access publications. They found no concrete evidence of research teams participating in the FP becoming more productive. They concluded that 'most of the beneficial effects in terms of EAV stem from the fact that the Horizon 2020 promotes cross-border, inter-sectoral, interdisciplinary cooperation'. The pooling of resources and building critical mass also stood out as one of the strongest areas for EAV.

With the evolution of the FP, the EAV principle justified investment in large scale projects and infrastructures, in support for research tackling common societal challenges that spread beyond geographical boarders and in efforts to develop competition at EU level

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[105] Open innovation, open science, open to the world – A vision for Europe, European Commission, 17 May 2016.

[106] See for example Identifying the constituent elements of the European Added Value of the EU RTD programmes: conceptual analysis based on practical experience, Yellow Window, November 2000 and M. Stampfer, European Added Value of Community Research Activities, WWTF, October 2008.

[107] Assessment of the Union added value and the economic impact of the EU framework programmes, European Commission, 2017.

(such as the action taken by the ERC). However, the **constantly blurred lines regarding competencies on innovation-related activities** between the EU, its Member States and their regions make it necessary to reassess the priorities and instruments developed at EU level continuously, in order to make sure that they are coherent and complementary with the programmes developed at a smaller geographical scale and that they bring measurable European added value.

## 4.4. Instruments and beneficiaries

Collaborative transnational research projects have been the main instrument for the implementation of the FP. The evolution of the FP since FP6 has led to the creation of a large range of instruments and structures. One consequence of this diversification has been the increase in the share of the funding devoted to single beneficiary actions and instruments. Another consequence has been the multiplication of the types of beneficiary, including individual researchers and companies, public and private research organisations, and public-private consortia, but also ministries, agencies and other users of the FP. This situation has also resulted in a more diversified landscape of funding possibilities that includes various types of grants and loans.

Whereas one of the aims of the FP was to help address the fragmentation of the EU's research landscape, the multiplication of instruments at EU level linked to the widening of the scope of the programme **has created a new type of fragmentation in EU research funding**. The FP can be seen today as a programme of programmes whose implementation – from the definition of the work programmes to the distribution of funds by Commission directorates-general, executive agencies or other EU bodies (JTIs, Article 185 partnerships) – has increased continuously in complexity.

The mid-term evaluation of Horizon 2020 provides an opportunity to analyse the current situation in order to simplify the EU innovation funding landscape and reassess the efficiency and efficacy of each instrument, including the evaluation of their EAV.

## 4.5. Excellence versus cohesion

The main criterion for selecting projects in the FP has always been the criterion of excellence. The FP has never included a geographical *juste retour* mechanism in the funding process. With FP2, the criterion of greater cohesion regarding research in Europe was added. The idea behind this cohesion criterion was to make sure that all regions in Europe could benefit from funding in order to develop their research capacity. However, **these two aspects conflict with each other** as the application of the excellence criterion tends to lead to a concentration of research and innovation capacities in some areas or regions. This problem has only increased as the European Union has grown larger.

The FP must accommodate two diverging objectives. On the one hand it must help to keep Europe at the forefront of scientific research, which demands use of the excellence criterion. On the other hand it must provide tools to support all countries and regions in developing a competitive innovation ecosystem. This situation led to the creation of instruments under Horizon 2020 whose objectives are to 'spread excellence' and 'widen participation', with a limited budget (less than 2 % of the Horizon 2020 budget).

The development of the innovation capacity of regions is also supported by the European structural and investment funds (ESIF). However, these funds, managed at regional level, follow different rules as regards how the funds can be used. Despite some efforts, the possibility of combining funding from the FP and the ESIF to support innovation-related projects remains limited. Reducing the innovation gap between Member States and

between regions within the EU remains one issue that the FP and other EU funds need to address in a more effective manner in the future.

## 4.6. Priority setting

At the origin of the FP, the topics for the specific programmes and the corresponding calls for proposals were selected and defined by the Council and the Commission. This is defined as a **top-down approach**. Despite Commission calls for more selectivity in the topics chosen, data shows that the same topics have been funded since FP1, with some additions along the way.

With the introduction of new instruments the situation evolved with more and more instruments based on a **bottom-up approach**, meaning that no topics are predefined within the scope of a given instrument. The definition of the topics lies with the applicants. This is the case for most of the single beneficiary activities (MSCA, ERC, SME instrument, etc.).

The establishment of intermediary structures such as the PPPs and the P2Ps also modified the priority-setting approach by involving the potential applicants more closely in the definition of the priorities and calls.

## 4.7. The context for FP9

The various aspects discussed above will frame discussions on FP9 and are to be the main points debated.[108] FP9 will continue to support all the activities of the innovation process. It will not implement a precisely defined policy as the current EU research and innovation policies are blurred: it will support some activities linked with the establishment of the ERA; it will promote open science and open innovation approaches; it is expected to provide a new approach to international cooperation; and requests have been made for its budget to be greatly increased compared with Horizon 2020.[109] However, the negotiations on the UK's withdrawal from the EU are holding up the adoption of the Commission proposal for the next MFF, delaying the discussion concerning the various EU programmes and casting uncertainty over their future budgets.

Discussions will take place about all the different instruments in the FP and their efficiency, following the evaluation currently being conducted regarding Horizon 2020 implementation. The EU added value of the various activities and instruments will have to be debated. A potential reorganisation of the instruments could be envisaged with the objective of addressing the current fragmentation of EU funding instruments. The issue of the complementarity and interoperability of the FP with other EU funds such as ESIF is already being discussed by some stakeholders and should be further explored.[110]

For all the above aspects, a balance will have to be struck between:

- the activities of the innovation process supported by the FP and the share of the budget dedicated to each of them;

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[108] All these aspects were mentioned in the issue papers prepared by the Commission for the high level group on maximising the impact of EU research and innovation programmes in February 2017.

[109] The European Parliament requested a budget of €120 billion for FP9 in its resolution regarding the implementation of Horizon 2020.

[110] Ambitious funding for excellent research in Europe post-2020, European University Association, May 2017 and Beyond the Horizon: LERU's views on the 9th Framework Programme for Research and Innovation, League of European Research Universities, June 2017.

- cooperative and single beneficiary activities;
- activities directly funded with grants and those supported with loans;
- the instruments in support of excellence and those in support of cohesion;
- the top-down and bottom-up approaches for priority setting.

The Commission has announced that FP9 will be developed around the concepts of excellence, openness and impact. The first discussion paper regarding the structure of FP9 is expected to be adopted by the Commission in autumn 2017. This will launch preparations for the adoption of the programme that are expected to be completed by December 2020.

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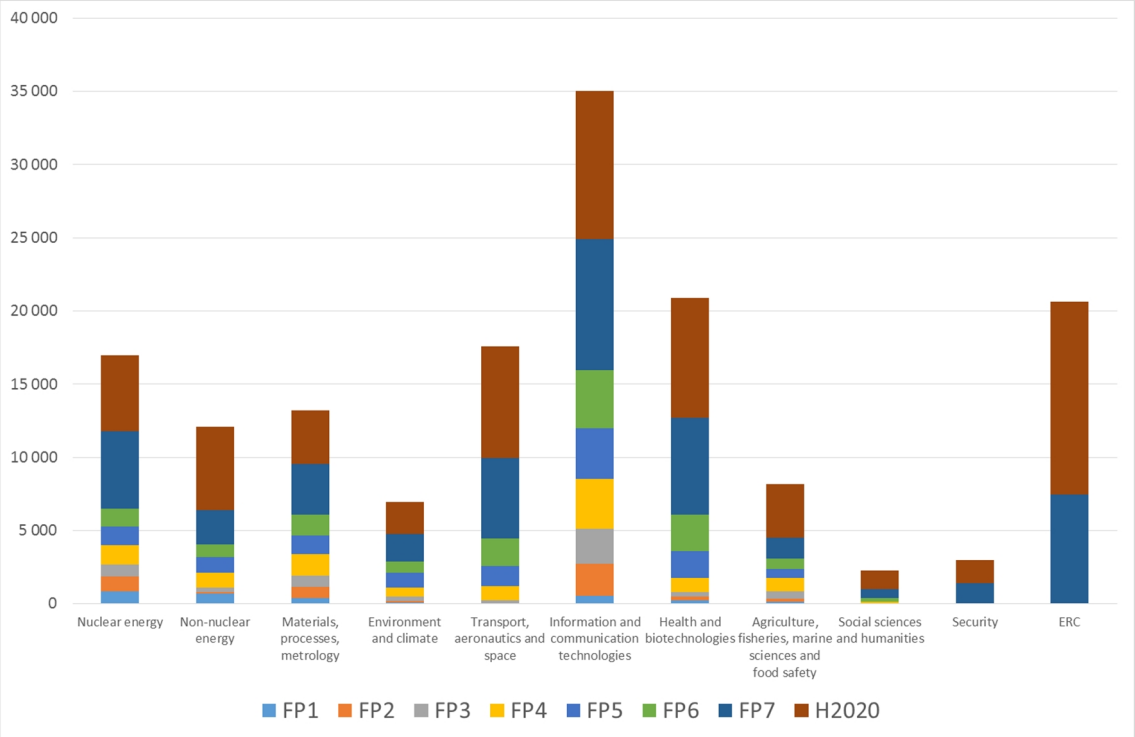
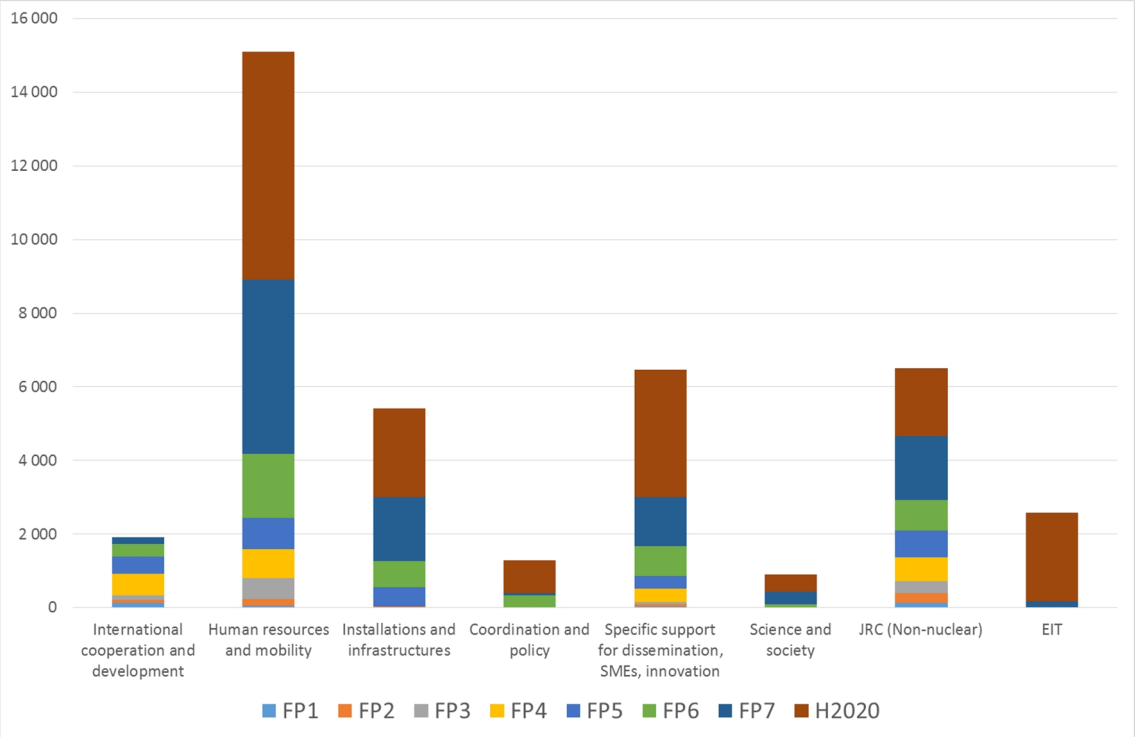
# Annex 1 – Cumulative budget for thematic and horizontal activities for the various framework programmes

**Figure 1 – Cumulative budget for thematic activities and the ERC for the various framework programmes (million ECU/€)**




Data source: EPRS based on EUR-Lex.

**Figure 2 – Cumulative budget for horizontal activities, the JRC and the EIT for the various framework programmes (in million ECU/€)**




Data source: EPRS based on EUR-Lex.

The framework programme for research was originally set up in the 1980s to streamline the adoption of Community research programmes. With the subsequent iterations of the process and Treaty modifications, the framework programme became a financial and strategic tool to support and implement EU research and innovation policies.

As the scope of the framework programme widened and with the multiplication of the type of instruments used to implement it, the framework programme progressively supported all activities of the innovation process, research being just one of them.

As the discussions on the structure and content of FP9 are expected to begin in autumn 2017, this paper reflects on the evolution of the framework programme since its origin and points out key issues that will be debated in the coming years among the European institutions, the Member States and stakeholders regarding the structure of the framework programme, its objectives and its implementation.

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