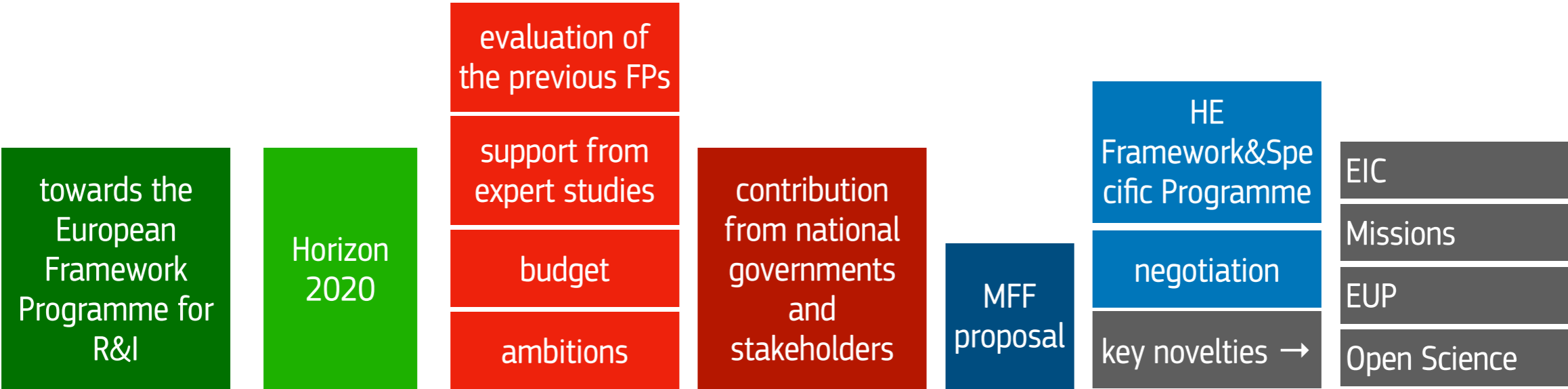


Shaping research for the years to come

the next EU Framework Programme
for R&I and other policies

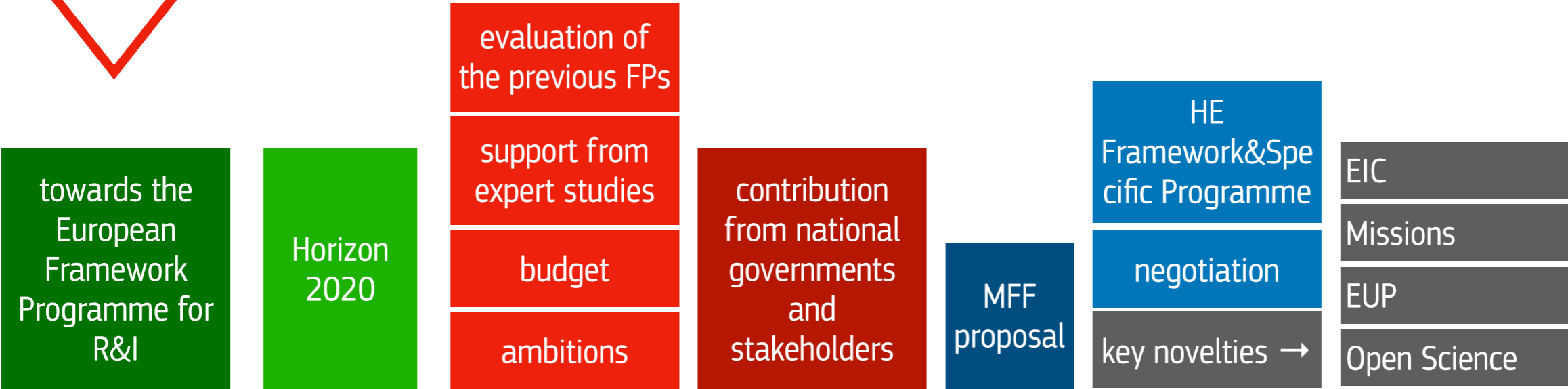
outline/timeline



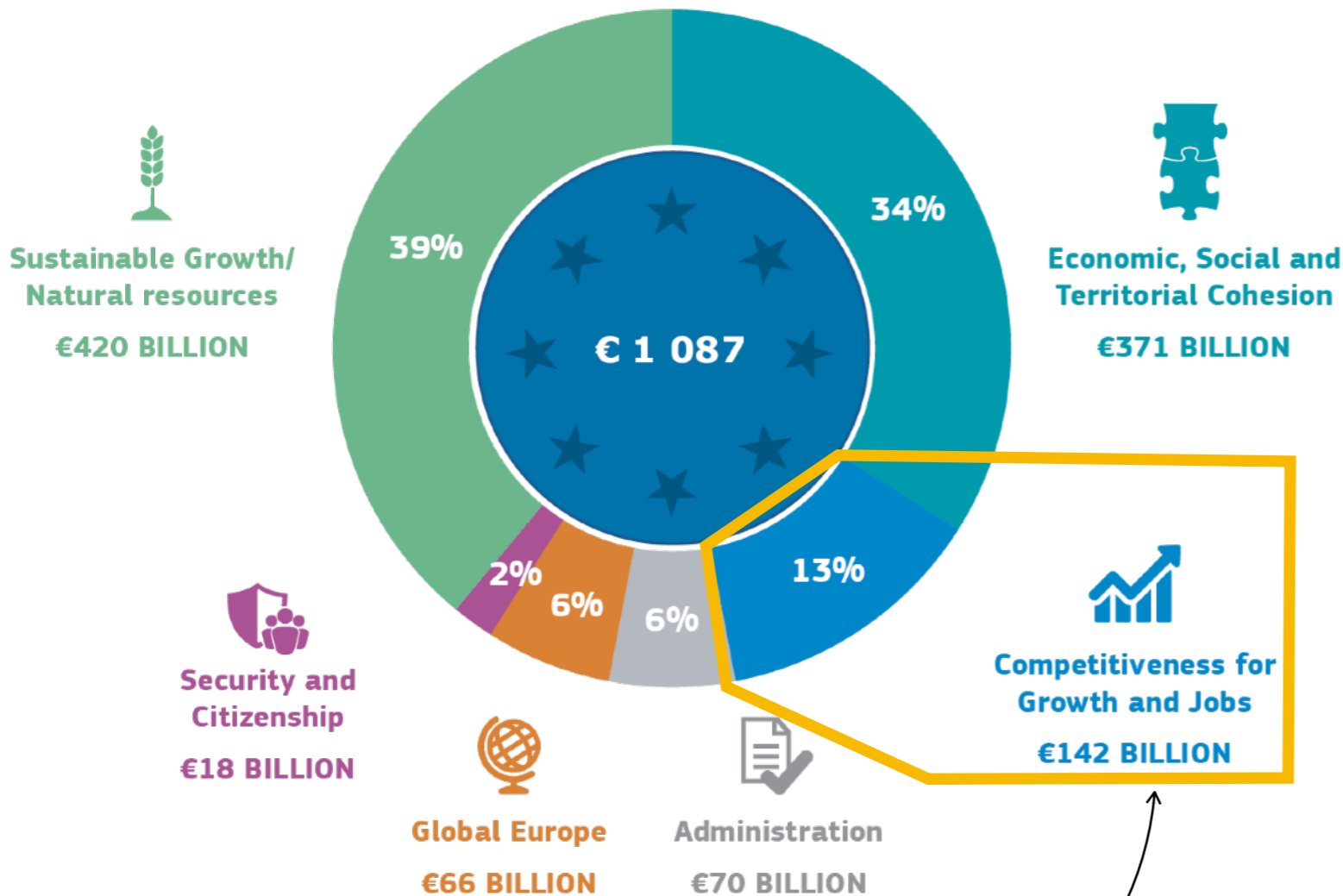
Keywords



outline/timeline



EU FP for R&I: today



FP is a **multi-annual funding programme** created by the European Union/European Commission to support and foster research in the European Research Area (ERA).

The **specific objectives** and actions vary between funding periods.

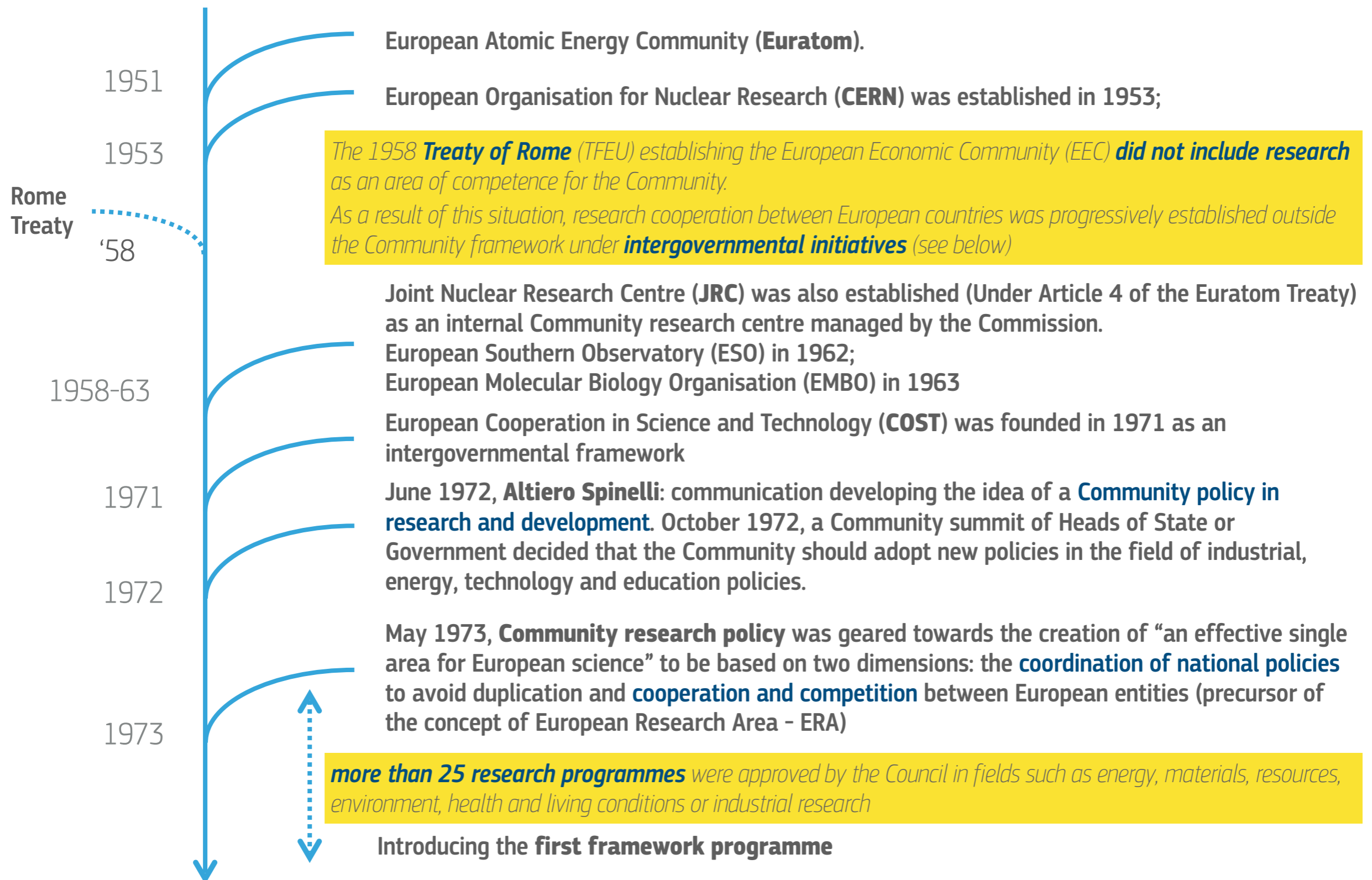
In Horizon 2020 the focus is in innovation, delivering economic growth faster and delivering solutions to end users. FP6 and FP7 focus was still in technological research.

it is part of the EU programmes under heading 1a of the 2014-2020 MFF (**research, education, infrastructure**)

The framework programme is **implemented by the European Commission**, the executive body of the European Union, either by various internal directorate general (DGs); mostly by the directorate general for research and innovation (DG RTD)

- Connecting Europe Facility (CEF)
- Competitiveness of Enterprises and SMEs (COSME)
- Copernicus, Galileo, ..
- Erasmus+
- Euratom
- Horizon 2020**
- ITER
-

towards the first European research program



the first framework programmes of EU R&I

1983

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 financial resources'** and proposed to establish a 'true Community strategy' for research. The framework programme (FP) would act as a **concertation mechanism** and should be revised regularly.

1984-87

The first framework programme (**FP1**) was adopted for the period 1984 to 1987.

*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.*

Eureka
Programme '85

It was 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.

1987-91

The structure of **FP2** was to resemble that of FP1 with thematic objectives and transversal actions. 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 **Single European Act** ('87) provided 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.*

1990-94

FP3: 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**. Three guiding principles: (i) the institutional basis offered by the treaties; (ii) application of the **subsidiarity principle**; (iii) more **cohesion** by reducing disparities between regions, although **excellence** should remain the key criterion.

the first framework programmes of EU R&I

The **Maastricht Treaty** modified the process for the adoption of the framework programme, which imply the **adoption of several decisions**:

- a decision from the Council and the Parliament regarding the **structure of the FP and its budget**;
- a Council decision on the **rules of participation and dissemination** of the results adopted under the cooperation procedure;
- a Council decision for **each of the specific programmes implementing the FP** adopted under the consultation procedure.

1994-98

FP4: enlarging the scope of the framework programme while topics remained similar those defined in the previous FPs; the novelty was the introduction of **targeted socio-economic research** and the adoption of **rules on participation and dissemination**.

1998-2002

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**: “the aim now is to make research more efficient and increasingly directed towards meeting basic social and economic needs”.

European research area (ERA) 2000

With a communication adopted in January 2000 the Commission successfully launched and developed the **concept of the European research area (ERA)** as 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'. 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'.

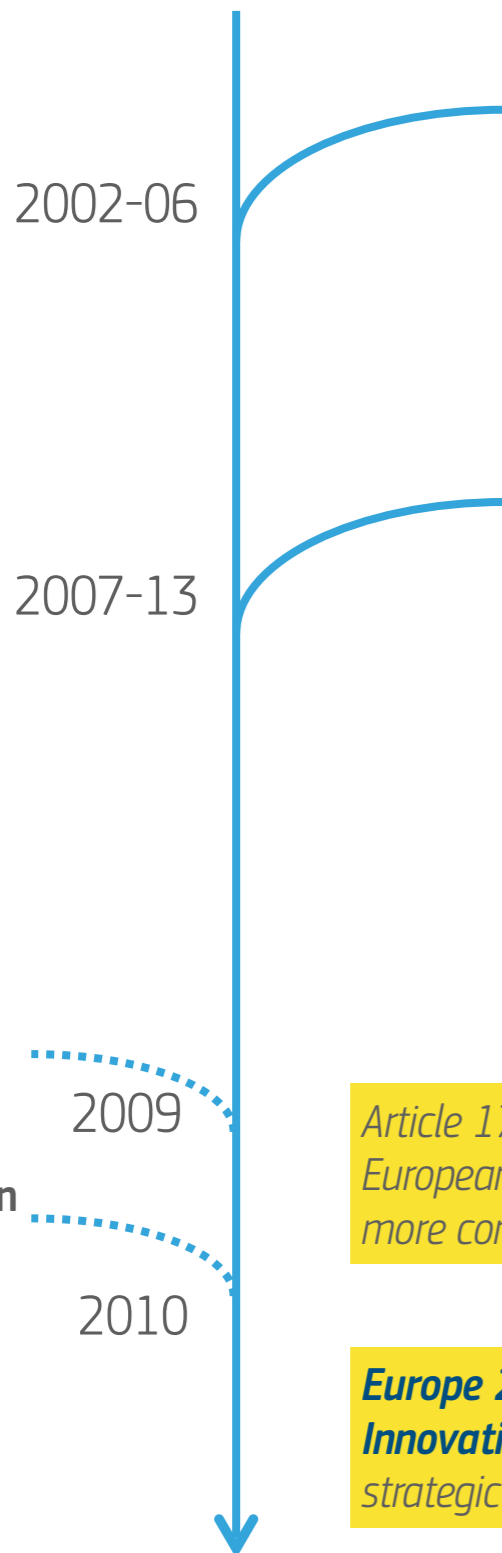
Until 2000, the FP was promoting better coordination of research activities at EU level by funding transnational research projects.

It could not support an EU research policy as **no such policy was clearly defined**.

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.

recent framework programmes of EU R&I

source: EPRS – European Parliamentary Research Service



FP6: A tool to implement the ERA. Research activities should 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'. 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.

FP7: designed to help reach the 3 % of GDP target with an increased budget, to strengthen excellence and exercise a 'catalytic' effect on national initiatives. The Commission proposed six major objectives for FP7:

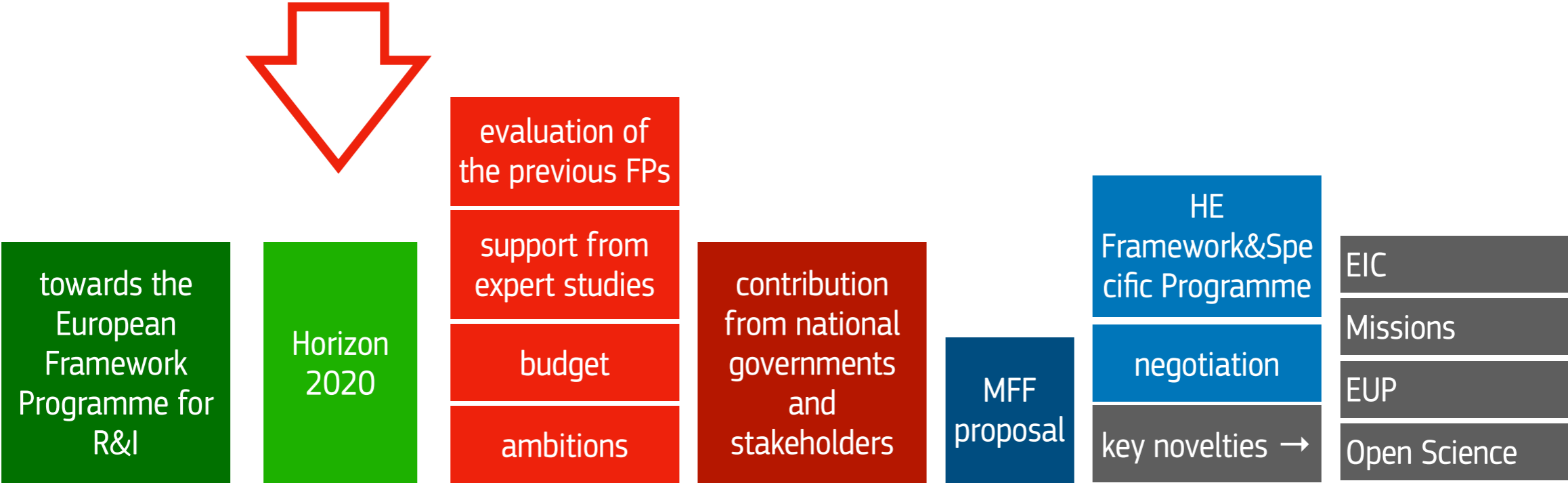
- creating European **centres of excellence** through collaboration;
- launching European **joint technology initiatives (JTIs)** as public-private partnerships;
- creating a **European Research Council (ERC)** promoting competition at EU level;
- making Europe more **attractive to the best researchers**;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

The length of the programme was **extended to seven years** to match the length of the multiannual financial framework (MFF).

Article 179(1) TFEU: '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...'

***Europe 2020** strategy for smart, sustainable and inclusive growth to develop an economy based on knowledge and innovation. **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'.*

outline/timeline



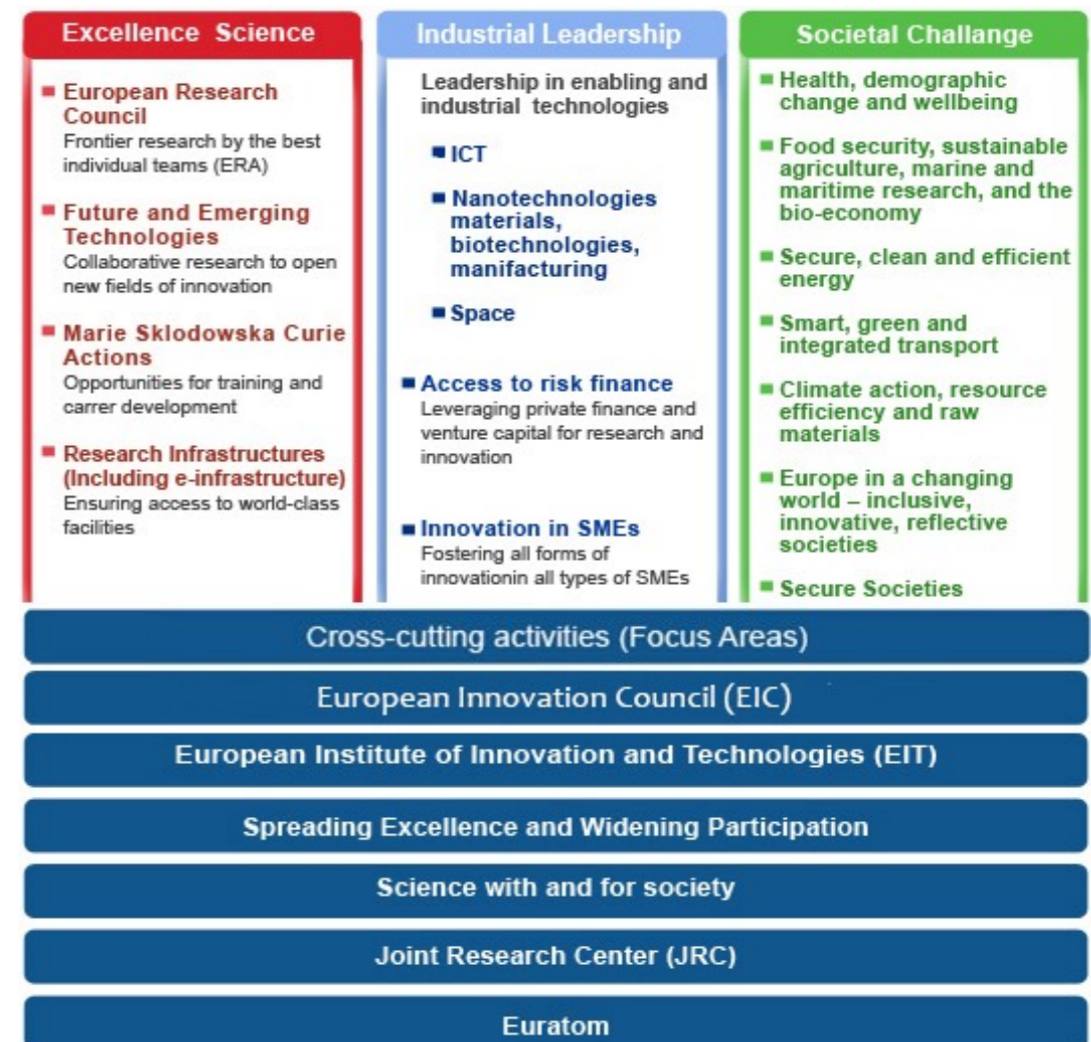
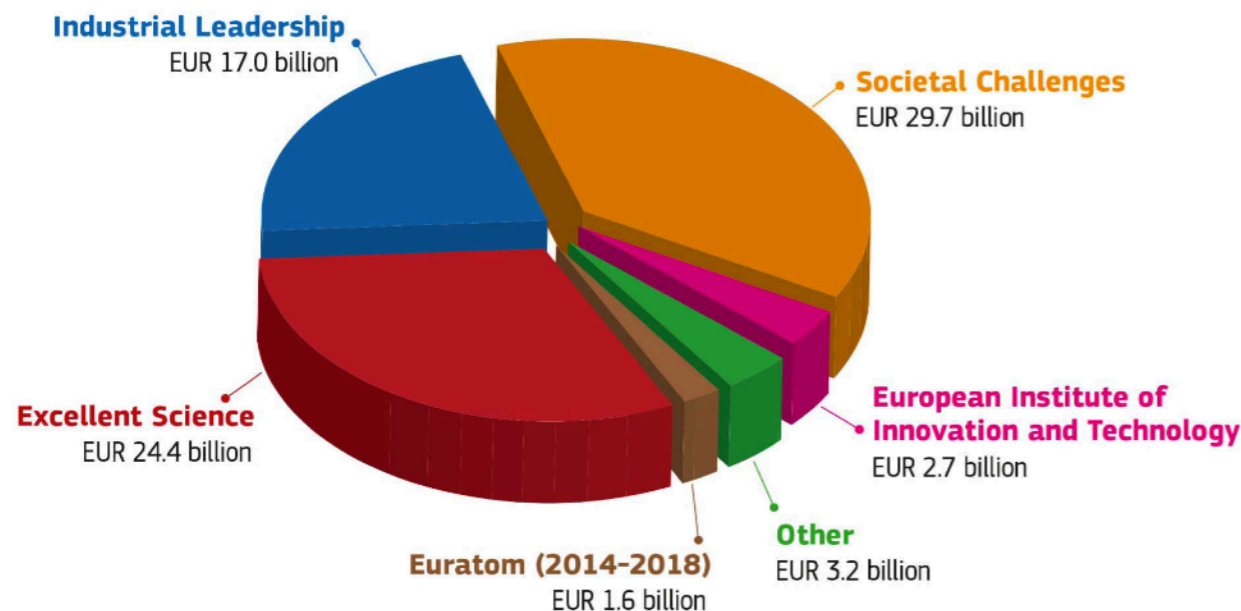
Horizon 2020

FP8 (2014-20) - Horizon 2020: the focus 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 **rules of participation** were made **simpler and common to all parts of the programme**.

The budget adopted in 2013 for Horizon 2020 was €77 billion, reduced to €74.8 billion by the adoption of the European Fund for Strategic Investments (2015).

HORIZON 2020 BUDGET (in current prices)



Evolution of the Framework Programme: directionality at work

1951

- call for R&I support to EU political priorities
- introduce the idea of a Community policy in research and development
- identify the two dimensions: the (1) coordination of national policies and (2) competition between European entities
- framework approach for a 'true Community strategy' for research
- select main thematic priorities and transversal objectives
- focus on EU level: e.g. research infrastructures, mobility
- open to non-EC countries
- subsidiarity principle, more cohesion and excellence as key criterion
- put the FP at the service of society
- European research area: the FP as the main tool to implement this policy
- more "structuring" effect on European research: R&I Partnership
- an economy based on knowledge and innovation: **innovation to be 'the overarching policy objective'**

2020

Evolution of the Framework Programme:

Warning#1 (from EUP): research and/or innovation

Warning: 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.**

Evolution of the Framework Programme:

Warning#2 (from EUP): checking for subsidiarity and EU added value

inventory of the proposed **EU added value (EAV)** aspects of the FPs:

- **preparation of the proposals:** FP has positive effects on the reduction of commercial and scientific risks, creating a stronger competition at EU level and leveraging private and public funds;
- **outputs of FP projects:** the pooling of resources and the building of a critical mass of capacities, international and inter- sectoral mobility of researchers and research policy coordination;
- **medium-term outcomes:** 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;
- **in the long-term impacts:** the economic impacts and the better capacity to tackle societal and pan-European challenges.

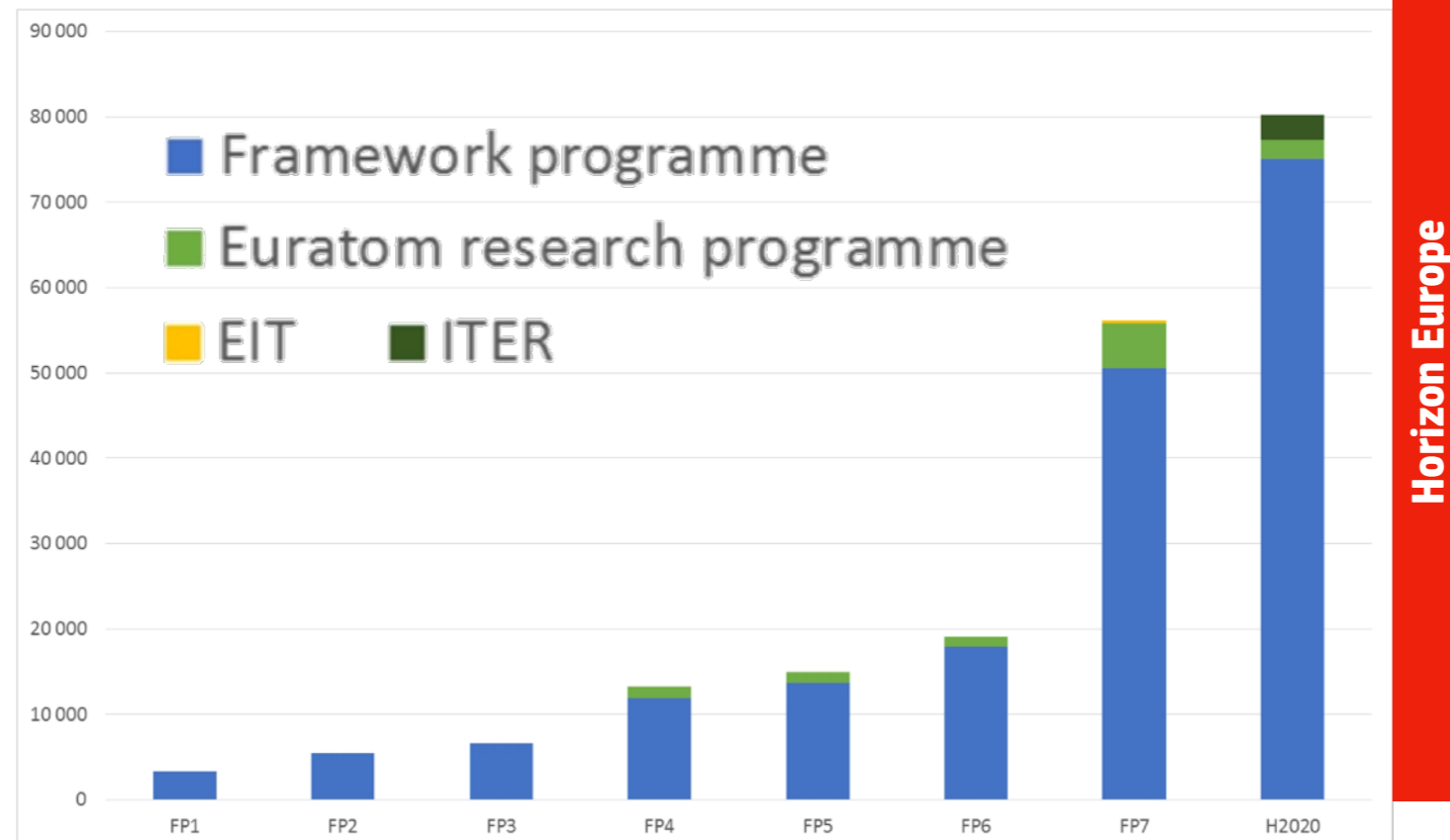


However, EAV **cannot be quantified for all of these aspects** and there are **no concrete evidence** of research teams participating in the FP becoming more productive.

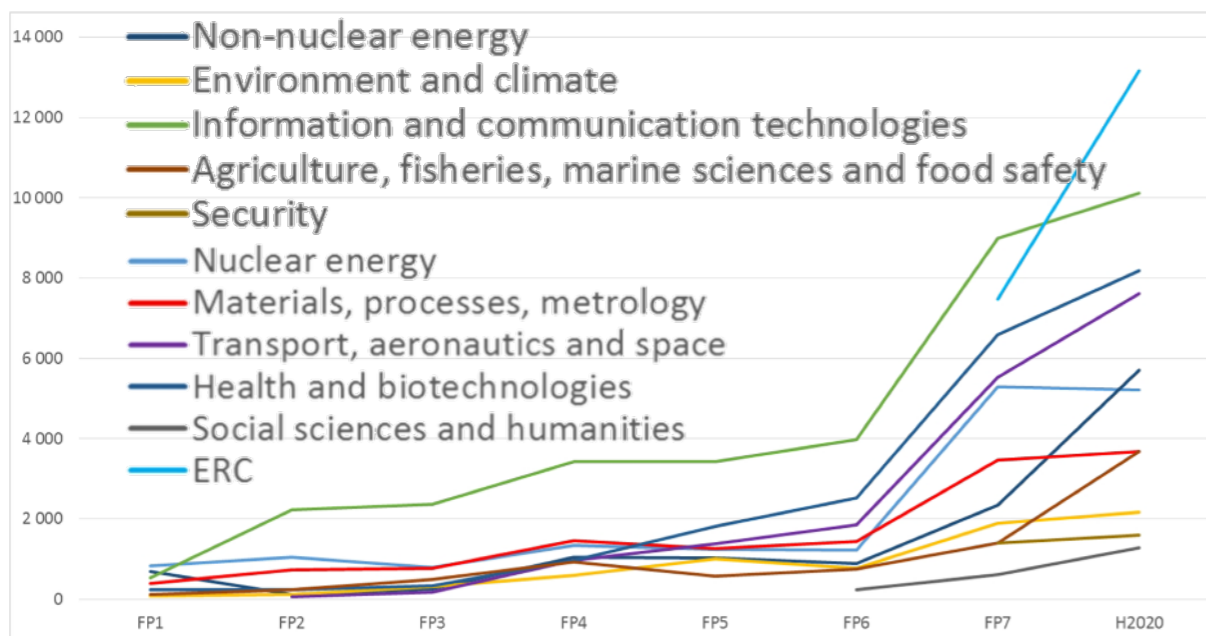


'most of the beneficial effects in terms of EAV stem from the fact that the Horizon 2020 **promotes cross-border, inter-sectoral, interdisciplinary cooperation**' as well as the **pooling of resources and building critical mass**.

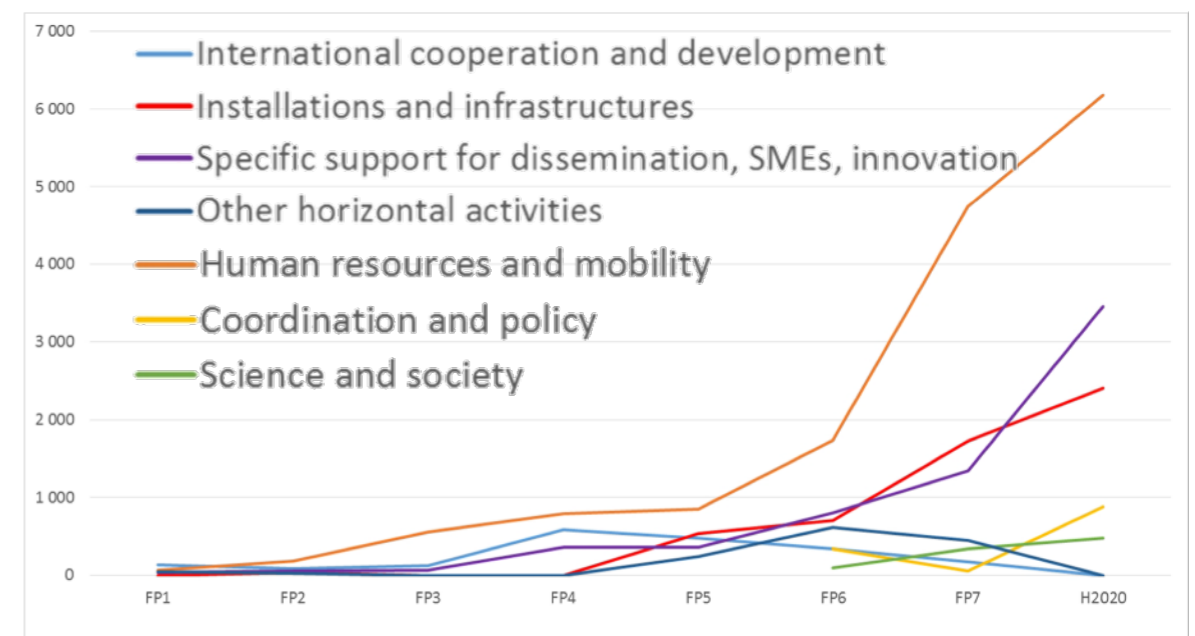
FP: rise of the Budget (in million ECU/€)



thematic activities

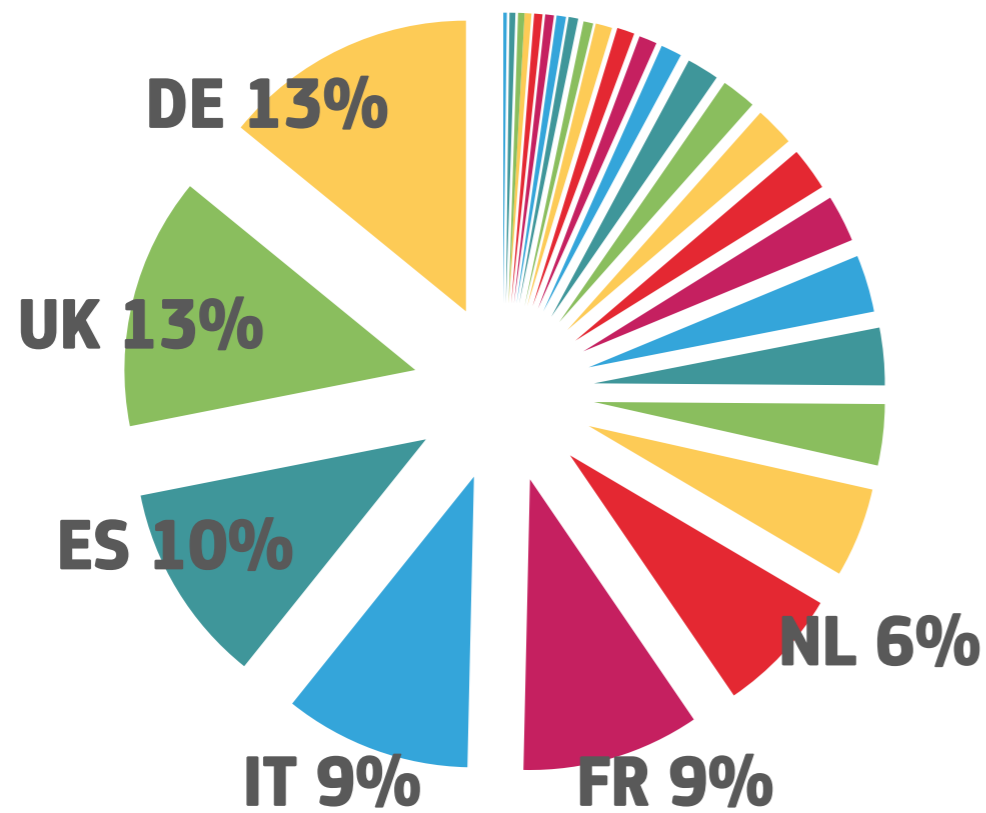


horizontal activities

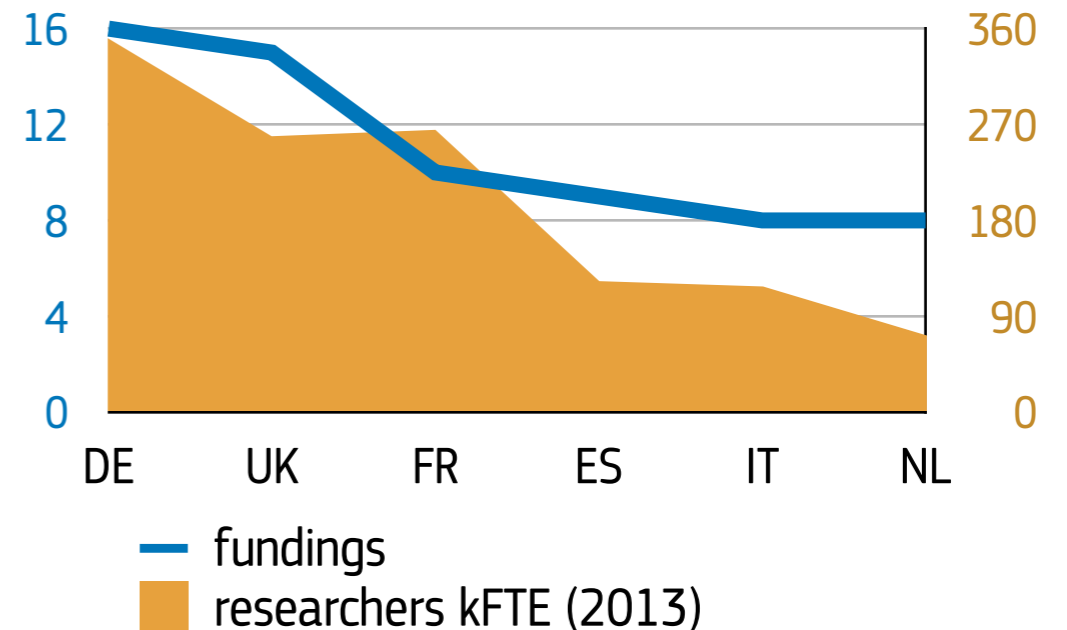
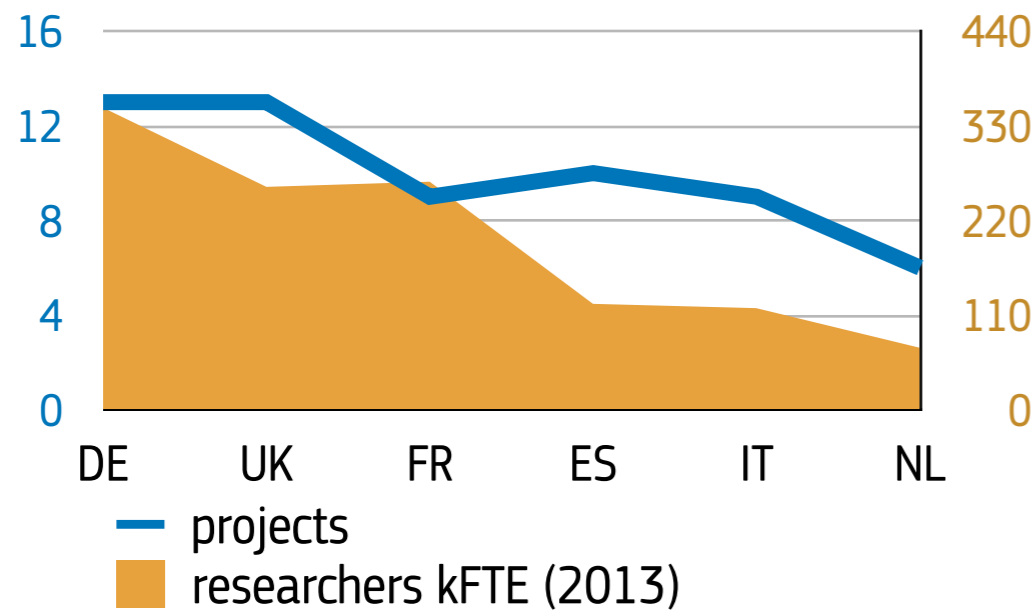
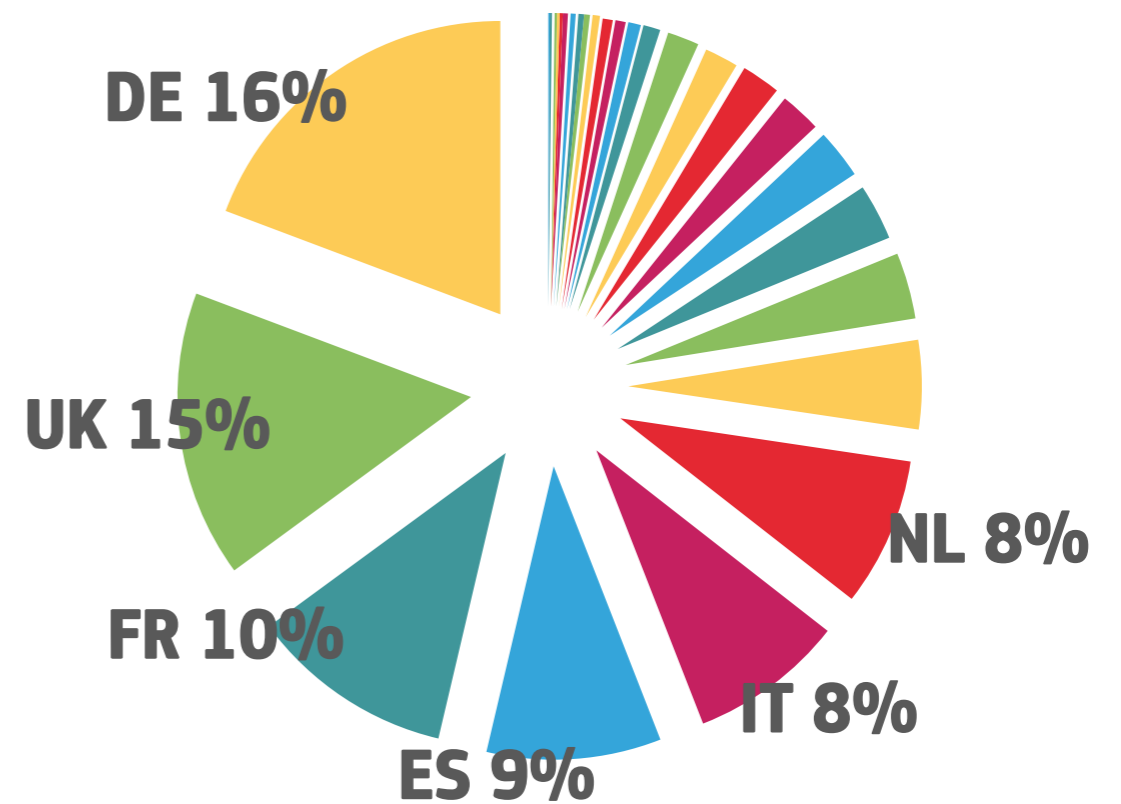


participation in Horizon 2020

share of **project** funded (EU28)



share of **fundings** (EU28)



participation in Horizon 2020

Average weighted total
yearly salary per countries
(2006 in €)

Country	Avg. weighted total yearly salary adjusted	Country	Avg. weighted total yearly salary adjusted
Austria	62.406	Latvia	10.488
Belgium	58.462	Lithuania	13.851
Bulgaria	3.556	Luxembourg	63.865
Croatia	16.671	Malta	28.078
Cyprus	45.039	Netherlands	59.103
Czech Republic	19.620	Norway	58.997
Denmark	61.355	Poland	11.659
Estonia	11.748	Portugal	29.001
Finland	44.635	Romania	6.286
France	50.879	Slovakia	9.178
Germany	56.132	Slovenia	27.756
Greece	25.685	Spain	34.908
Hungary	15.812	Sweden	56.053
Iceland	50.803	Switzerland	82.725
Ireland	60.727	Turkey	16.249
Israel	42.552	United Kingdom	56.048
Italy	36.201		

source: European Commission (2007),
Study on the Remuneration of
Researchers in the Public and Private
Commercial Sectors

participation in Horizon 2020

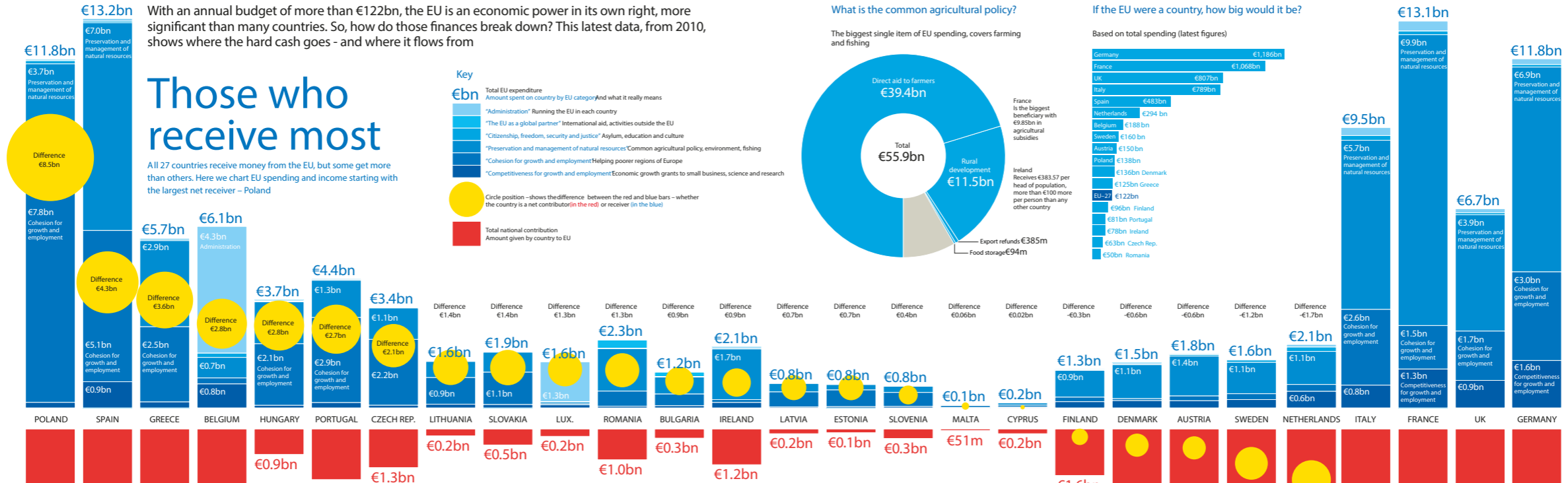
source: <https://www.theguardian.com>

Where does the European Union get its money from – and how does it spend it? theguardian

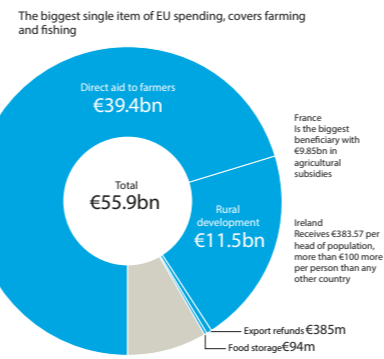
With an annual budget of more than €122bn, the EU is an economic power in its own right, more significant than many countries. So, how do those finances break down? This latest data, from 2010, shows where the hard cash goes - and where it flows from

Those who receive most

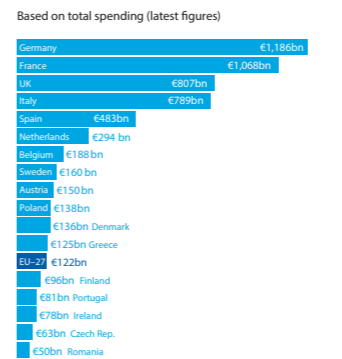
All 27 countries receive money from the EU, but some get more than others. Here we chart EU spending and income starting with the largest net receiver – Poland



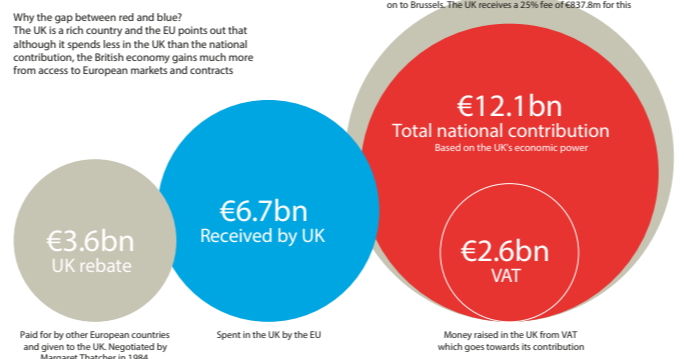
What is the common agricultural policy?



If the EU were a country, how big would it be?



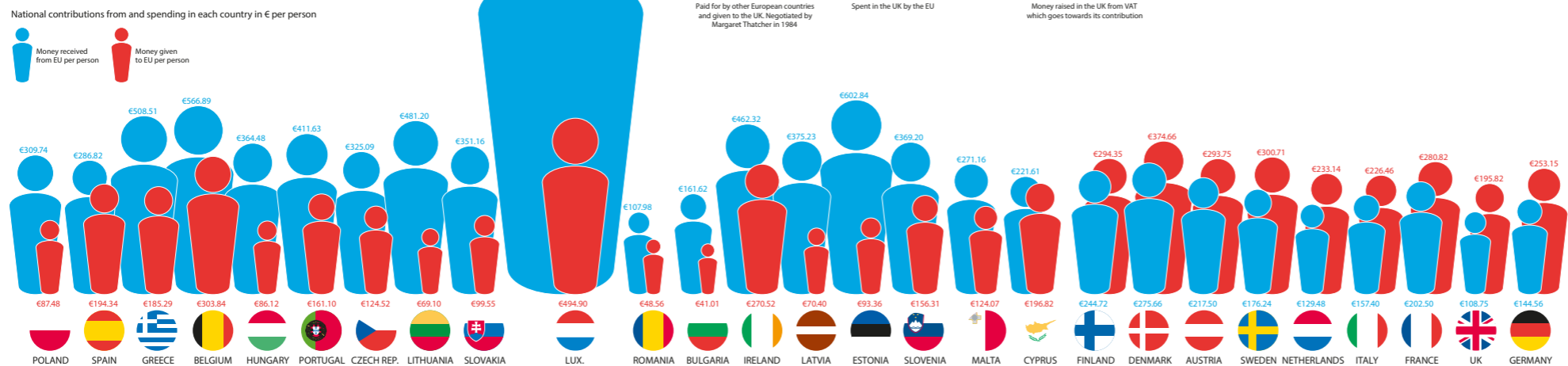
How the UK's EU money breaks down



Those who give most

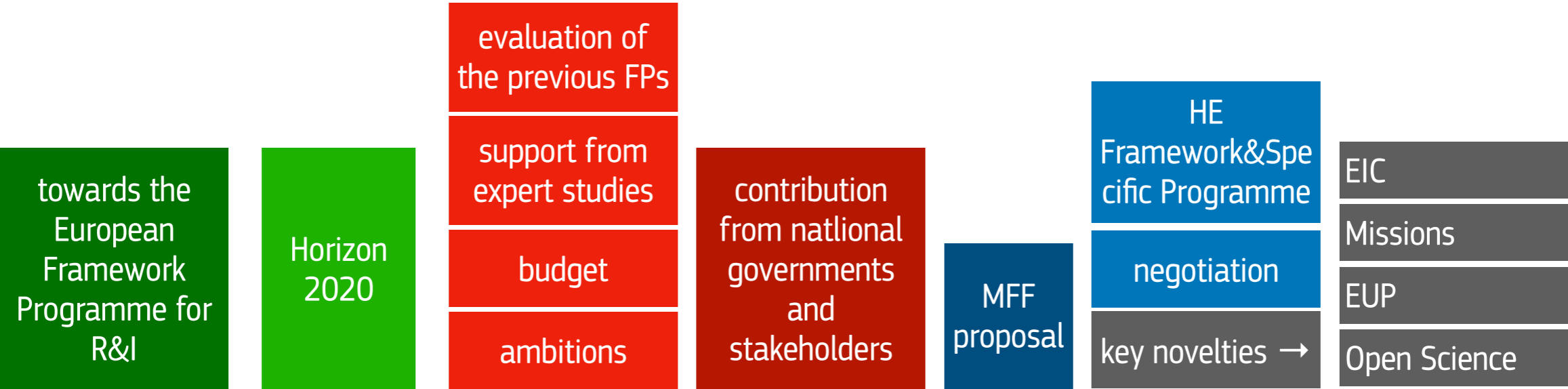
At the other end of the chart are the net-givers – the economic and industrial powerhouses of Europe, led by Germany

How much does each country give and receive per person?



SOURCE: EUROPEAN COMMISSION BUDGET OFFICE, EUROSTAT
GRAPHIC: PAUL SUTTON, MICHAEL ROBINSON. DATA: SIMON ROGERS

outline/timeline



Preparatory work to design FP9 proposal

- **evaluation of the previous FPs**
 - FP7 final assessment and middle-term evaluation of Horizon 2020
 - assessment of R&I Partnership instruments
- **expert studies to help structure the programme**
 - Economic rationale for public support for research and innovation
 - “LAB-FAB-APP: Investing in the European future we want’
 - ‘Beyond the Horizon: foresight in support of future EU research and innovation policy’
- **define its budget**
 - Multiannual Financial Framework (MFF)
- **select the priorities it should address**
 - co-creation (MS/AC) and consultation (citizens)

FP7 assessment

achievements

The experts underlined achievements including:

- FP7's encouragement of **scientific excellence** in Europe;
- promotion of ground-breaking research with the creation of the **European Research Council**;
- engagement with **both large corporations and small and medium-sized enterprises** (SME);
- and reinforcement of an **open innovation** framework.

five recommendations for the future programmes

- **Focus on critical challenges:** key strategic areas where the EU can play a leading role
- **Align research and innovation instruments and agendas in Europe:** aligning not only EU, national and regional programmes but also EU policies between the Commission directorates.
- **Integrate the key components of the FP more effectively:** the different sub-programmes and instruments under the FP created fragmentation and threatened the efficiency and coherence of the programme.
- **Bring science closer to Europeans:** future FPs should involve stakeholders, civil society and citizens in the preparation and implementation of the FP in a more substantial way.
- **Establish strategic programme monitoring and evaluation:** the monitoring and evaluation procedures need to be improved for better evidence-based decision-making in future programmes.

Horizon 2020: middle-term assessment

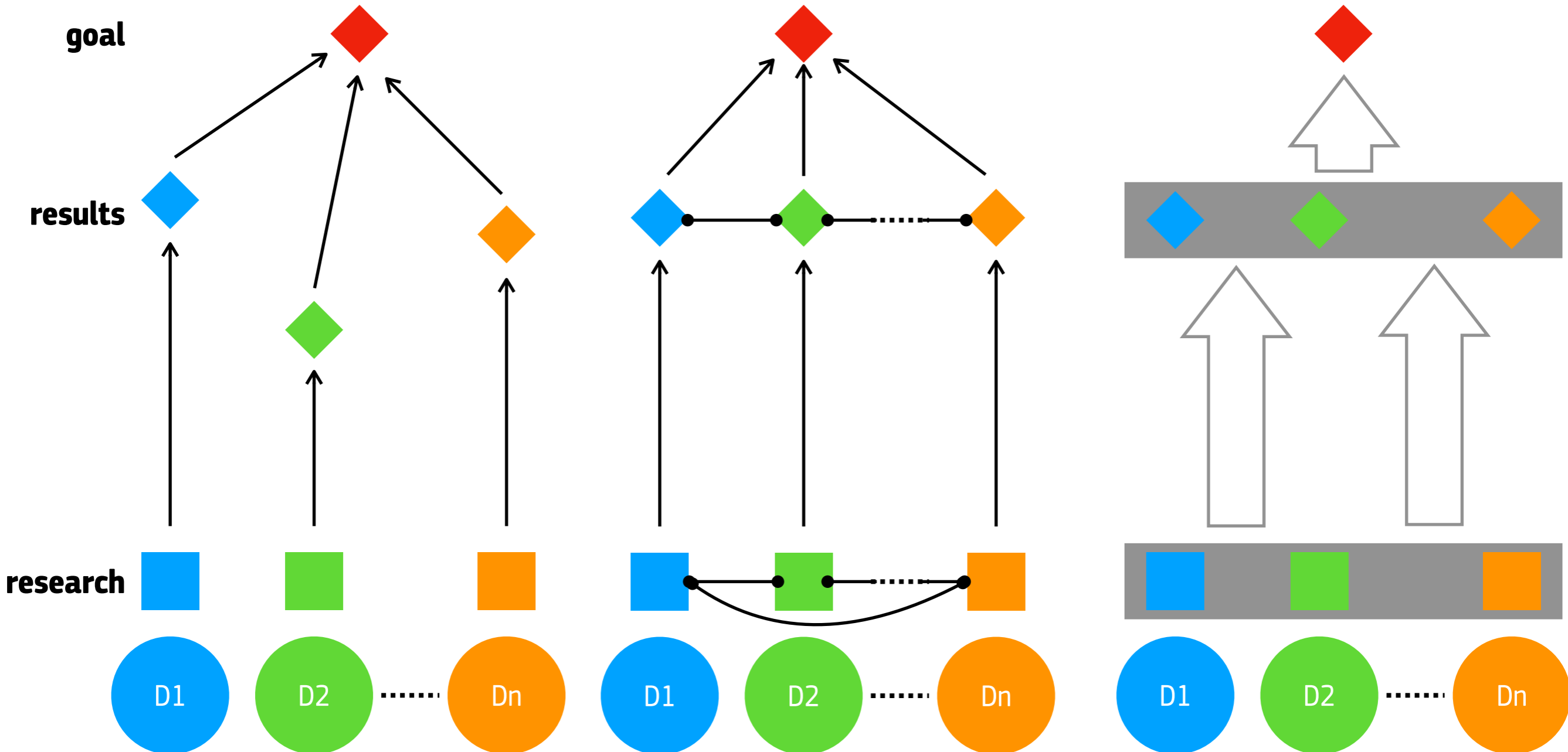
lessons learned from the evaluation (based on the Public Consultation)

- **Invest more ambitiously** in research and innovation programmes to address the current situation described as an underfunding of the programme.
- **Continue simplification** in the implementation of the programme.
- **Strengthen support to breakthrough, market-creating, innovation** with the creation of the [European Innovation Council](#) and more flexibility in the programme.
- **Create greater impact and more outreach** with increased citizen involvement for the co-design and co-creation of the programme and by introducing research and innovation missions.
- **Increase synergies with other EU programmes** and policies from the programme design stage by making co-funding schemes more flexible and improving the compatibility of rules between EU programmes.
- **Strengthen international cooperation** in order to reverse the negative trend observed with Horizon 2020.
- **Reinforce programme openness**, making all publications openly accessible and all data findable, accessible, interoperable and reusable.
- **Rationalise the EU funding landscape** by redefining instruments and funding schemes.

what should be addressed by the next FP

- **The balance between excellence and cohesion in EU support for research and innovation.** The [unbalanced distribution of FP funding across the EU raises concerns regarding the impact of the use of the excellence criterion](#) and calls for an evolution of the possibility for different EU funds to work better in synergy, to both maintain EU competitiveness and promote EU cohesion in research and innovation.
- **The multi-level governance of the FP, shared between the EU, Member States and regions.** To improve the coherence of the EU research and innovation ecosystem, the need to clarify the role of each level in supporting the research and innovation ecosystem and to align research and innovation priorities and programmes across all levels are underlined.
- **The issue of the EU added value of the FP and its instruments.** The [main EU added value of the FP comes from the transnational, trans-sectoral and/or multidisciplinary dimension](#) of collaborative instruments. This is expected to be taken into account in the process of streamlining the EU research and innovation funding landscape, and in order to strike a balance for funding between mono-beneficiary instruments and cooperation instruments.

multi-, inter-, trans-disciplinarity



European Council: the position of Member States

Opinion on the Interim Evaluation of Horizon 2020 (July 2017)

Conclusion on interim evaluation of Horizon 2020 and the preparation of FP9 (Dec. 2017)

- recognised the **issue of the low success rate** in Horizon 2020 (11.6% compared to 18.5% for FP7) and invite the Commission and the Member States to explore ways to **reduce oversubscription**
- the achievement of the **European research area (ERA)** **should be the top priority of the next FP**, and required **improved multi-level governance with the Member States** and the associated countries and better alignment of EU and national priorities and activities.
- The FP should deliver **continued dialogue with the European citizens** with a better focus on co-creation and co-construction of the programme with all stakeholders and society
- FP should incentivise the **involvement of new participants**, whatever their location, status and gender, providing they meet the excellence criterion
- future EU programmes must be designed from the very beginning with **synergies** (e.g. with the structural funds), **coherence**, **compatibility** and **complementarity** in mind
- streamlined set of instruments and initiatives **focused mainly on collaborative projects** supported with grants
- the FP must **reinforce international cooperation** and should feed into all EU sectoral policies.

EC study on economic impacts of R&I

Economic rationale for public support for research and innovation (DG RTD - Mar.2017)

- **economic impacts of public research and innovation funding are large and significant** and that research and innovation is a key driver of productivity and economic growth;
- **two thirds of the economic growth from 1995 to 2007 derives from research and innovation**, and research and innovation accounted for 15% of all productivity gains between 2000 and 2013;
- **research and innovation support the creation of better, higher-quality jobs**; impact of research and innovation on jobs creation cannot be quantified;
- the nature of innovation evolves, barriers to the creation and diffusion of research and innovation tend to be more pronounced, making the **role of public funding in research and innovation ever more important**;



'main issue in Horizon 2020 is the low success rate'

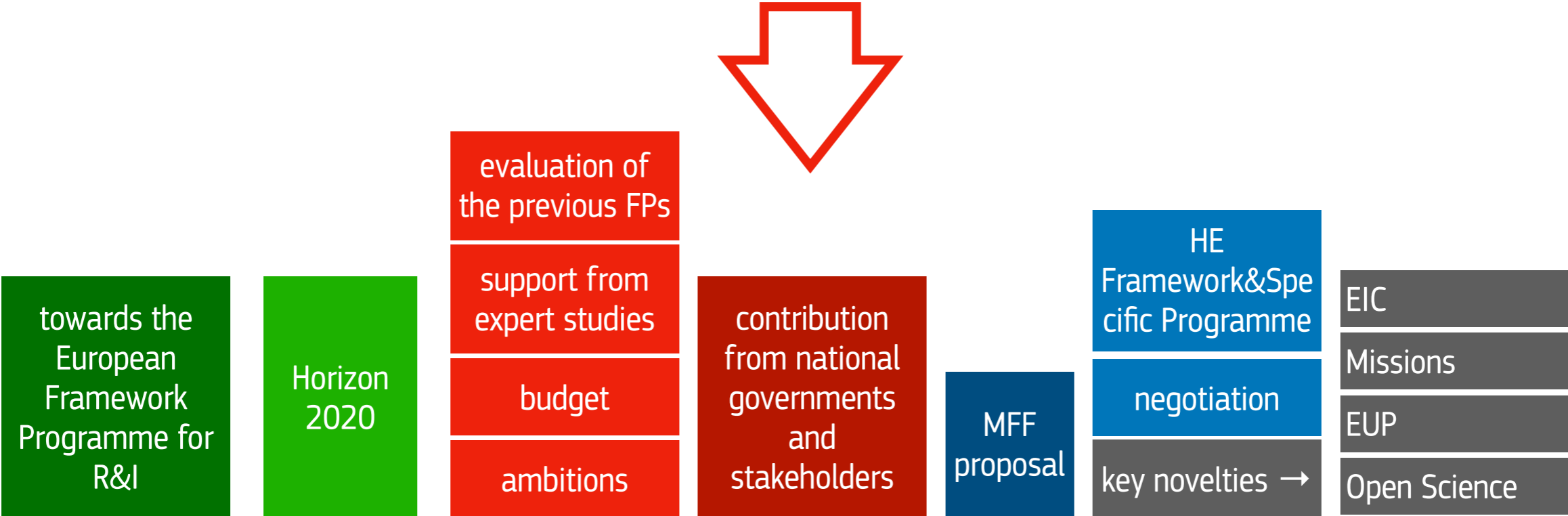
expert studies (1)

‘LAB-FAB-APP: Investing in the European future we want’ - Lamy Report

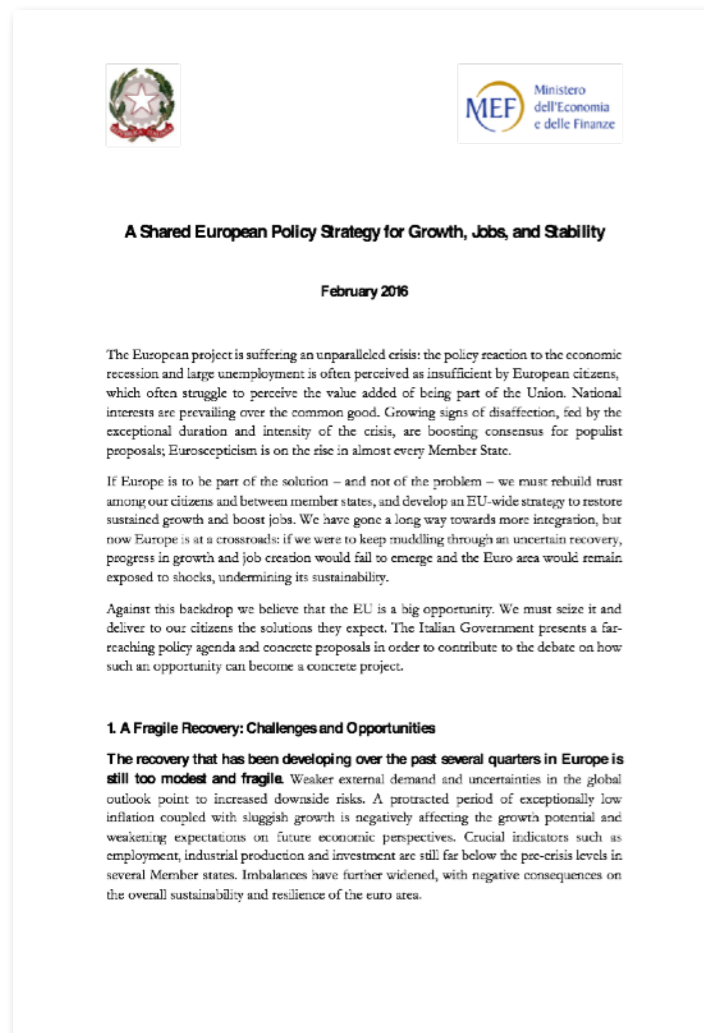
the group formulated 11 recommendations **to maximise the impact of FP9:**

1. Prioritise research and innovation in EU and national budgets, with a **doubling of the FP budget;**
2. Build a true EU innovation policy that **creates future markets**, with the creation of a **European Innovation Council;**
3. Educate for the future and **invest in people who will make the change;**
4. Design the EU research and innovation programme for **greater impact;**
5. Adopt a **mission-oriented, impact-focused approach** to address global challenges;
6. **Rationalise** the EU funding landscape and achieve **synergy with structural funds;**
7. Simplify further, creating the most attractive research and innovation programme in the world;
8. **Mobilise and involve citizens**, by stimulating co-design and co-creation;
9. Better **align EU and national research and innovation investment;**
10. Make **international research and innovation cooperation a trademark of EU** research and innovation;
11. Capture and **better communicate** impact.

outline/timeline



Contribution of MS: the case of Italy

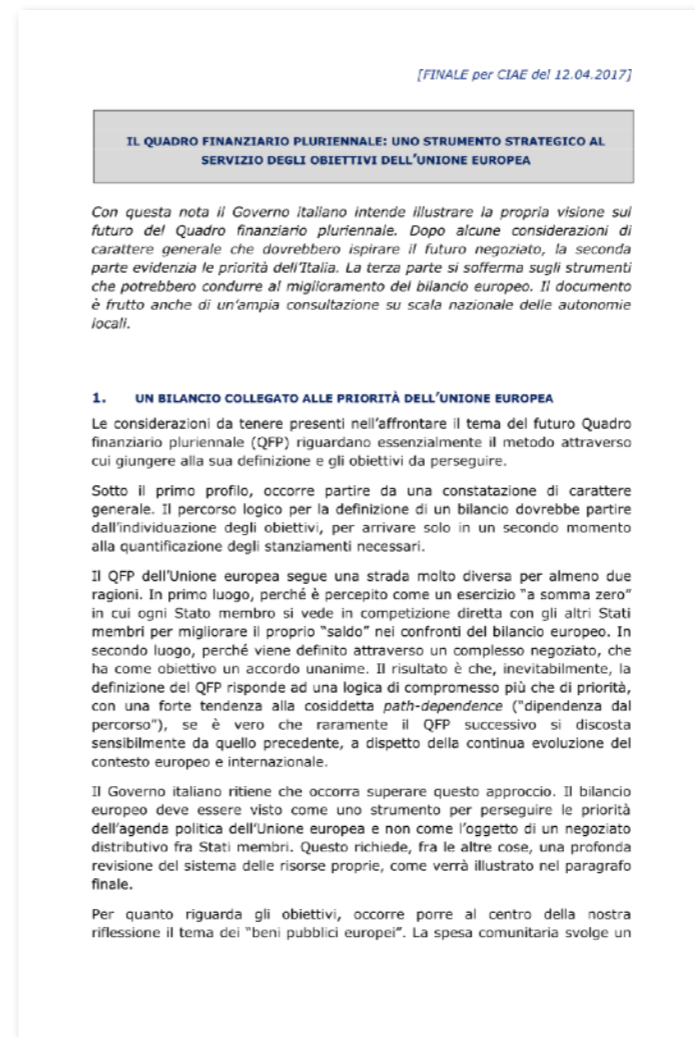


Febr.2016

The position is described in the document “A Shared European Policy Strategy for Growth, Jobs, and Stability”, empathised that the EU should adopt an integrated set of initiatives, to stimulate knowledge creation through investment in education and research, which are the main drivers of innovation.

http://www.governo.it/sites/governo.it/files/ASharedPolicyStrategy_20160222.pdf

GSSI – 17.6.20 – LC



Apr.2017

QFP: PRESENTAZIONE ED APPROVAZIONE DEL POSITION PAPER ITALIANO SUL FUTURO DEL QUADRO FINANZIARIO PLURIENNALE

<http://www.politicheeuropee.it/comunicazione/20247/comitato-interministeriale-per-gli-affari-europei-ciae-12-aprile-2017>

- A Union up to its new challenges
- Cohesion
- Human capital
- Sustainable growth
- Flexibility of EU budget
- Simplification of rules

national public consultation on FP9

- **Objective:** collect the opinion of those who actively work in the scientific research to develop, with the contribution of the national research system, **a common vision** and to **synthesise a shared position** aiming to provide a reference for presenting a coherent national position and contribution to the various tables for discussion.
- **Purpose:** the country should play an active role in defining the next Framework Program, making the most of the lessons learned so far from researchers in participating to the Horizon 2020 Program;
- **Method:** evaluate the degree of consensus on statements that underlie general strategic guidelines
- **Openness:** contribution from researchers of public and private system

national public consultation on FP9

structure of the questionnaire

- Horizon 2020 architecture;
- Topics in Work Programs
- Budget
- Focus Area, Joint Programming and Research Infrastructures
- Priority for FP9
- Major Societal Challenges
- The next FP and SMEs; Innovation
- Primary targets for the next FP
- Research funding policies and instruments
- Indirect objectives of the action of the next FP
- The Evaluation Process
- Future FP and National Research Program
- 41 questions (online compilation with user profiling)
- 39 closed-ended questions: indication of the degree of agreement, or of relevance, on statements or proposals relating to general strategic guidelines
- 2 open questions (e.g. current and emerging challenges in European society, to be introduced as a Major Societal Challenge in the next FP)

the consultation: results (excerpts from)

<https://consultazionefp9.miur.it/index.html>

19



IL PROSSIMO PQ E LE PMI

23 Indicare la rilevanza che dovrebbero assumere, nel prossimo PQ, questi possibili interventi al fine di migliorare la strategia di coinvolgimento delle PMI.

Sett.Priv.

23A rendicontazione costi semplificata.



23B maggiore sostegno a strumenti esistenti come gli "SME Instruments".



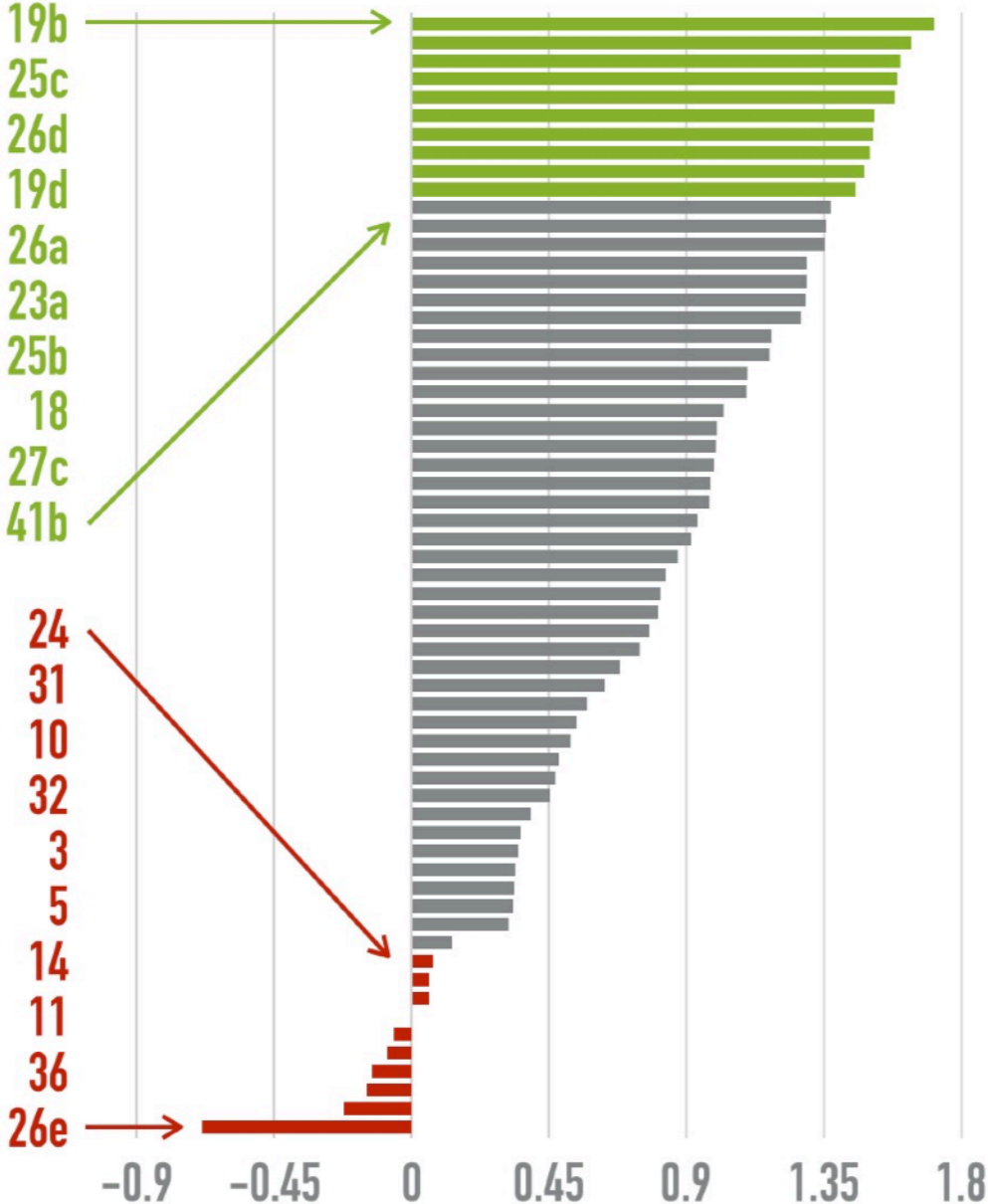
23C maggiore sostegno ai meccanismi finanziari come EFSI (European Fund for Strategic Investments).



24 L'azione del Programma Quadro Horizon 2020 è in grado di sostenere, con eguale efficacia, le iniziative più rilevanti ai livelli di TRL più alti e vicini al mercato fino a quelli più bassi dove si posizionano gli sviluppi tecnologici e le prove di fattibilità.



the consultation: results

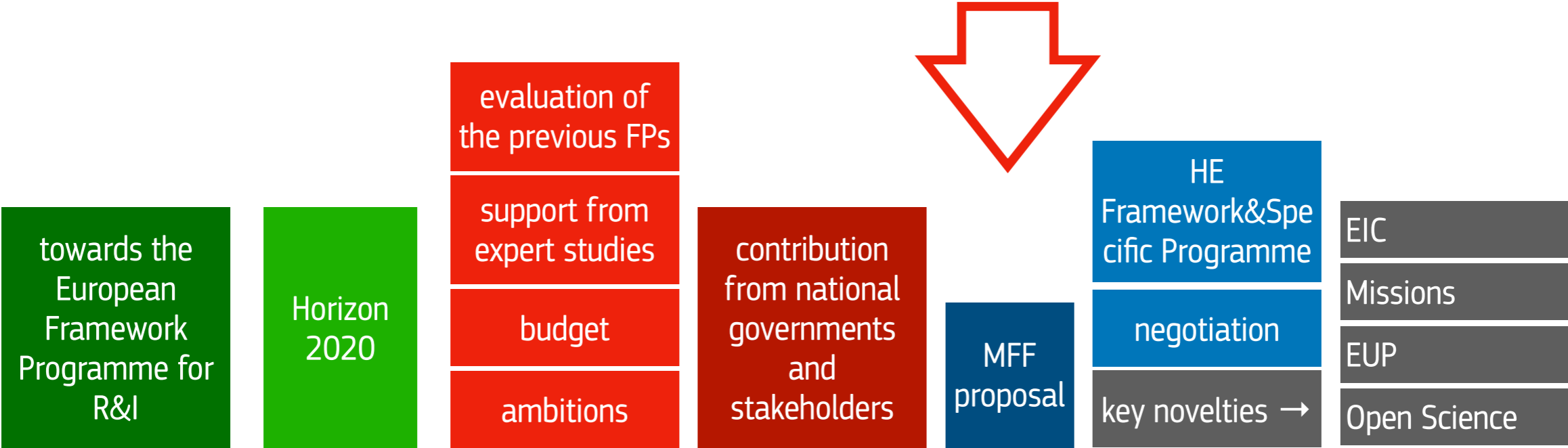


GRADO DI CONSENSO

- +2x (completamente d'accordo)
- +1x (abbastanza d'accordo)
- 1x (poco d'accordo)
- 2x (per niente d'accordo)

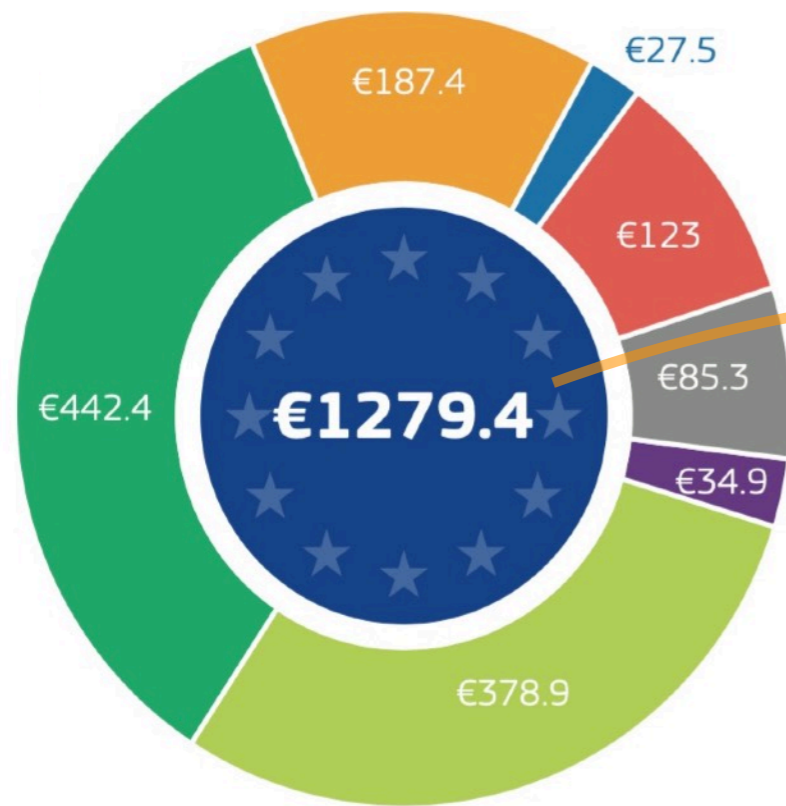
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outline/timeline

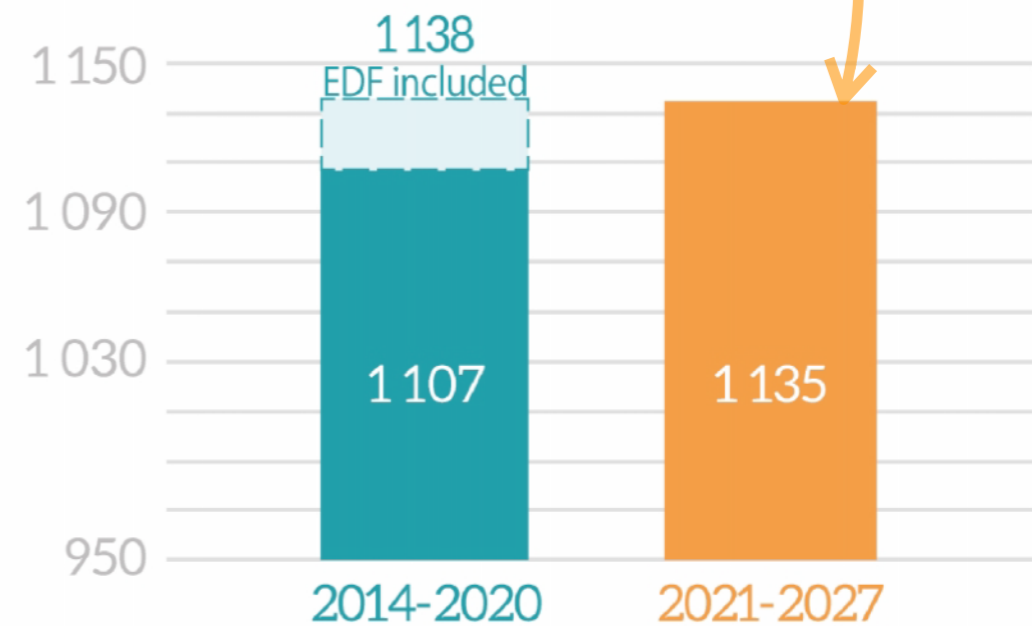
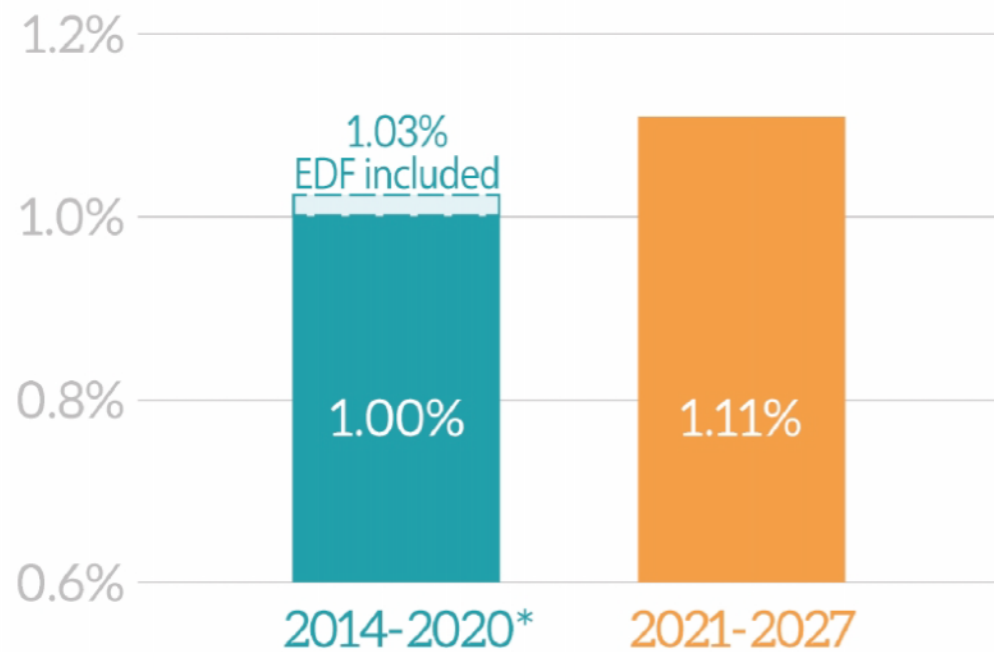


QFP - Multiannual Financial Framework (MFF)

Commission proposal



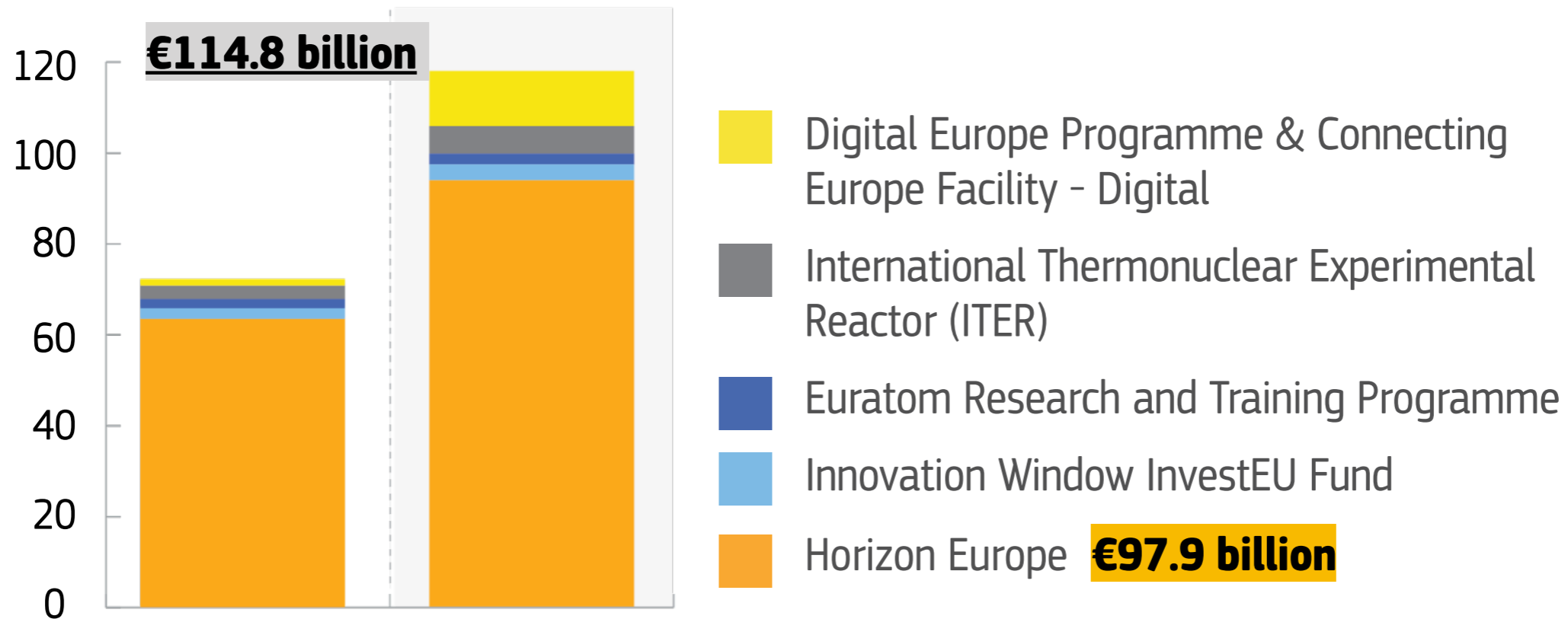
The European Development Fund (EDF) expenditure for the 2014-2020 period was not included in the EU budget for that period, but is included in the 2021-2027 MFF. Therefore, when inflation is stripped out, and the EDF is included, there is no real increase in the 2021-2027 MFF – from €1 138 billion for 2014-2020 to €1 135 billion for 2021-2027 (in 2018 prices).



percentage of Gross National Income (GNI)

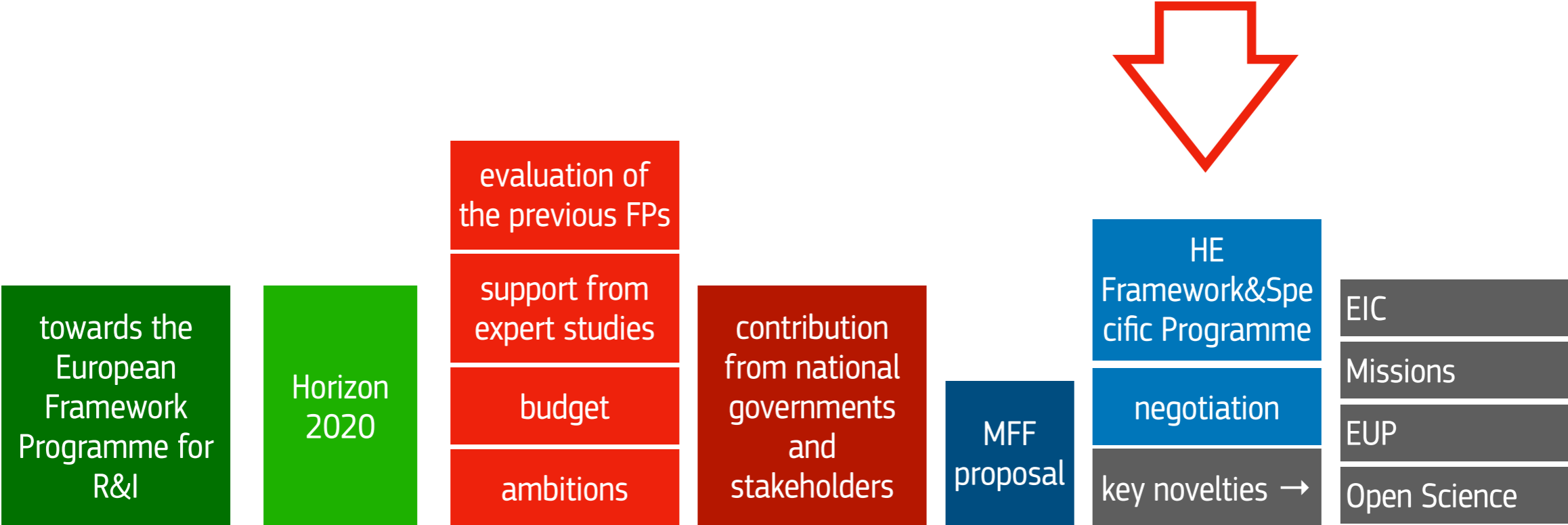
€ billion

RESEARCH AND INNOVATION



- with EU budget of €15.2 billion, **InvestEU** will mobilise more than €650 billion of additional investment across Europe;
- **EU Cohesion Policy**: focus on innovation and Smart Specialisation strategies. (ex. “Seal of Excellence”);
- **European Defence Fund**, (€13 billion): collaborative projects which address emerging and future defence and security threat;
- **ITER** (€6 billion) and **EURATOM**;
- **Digital Europe Programme** (€9.2 billion): high-performance computing and data, artificial intelligence, cybersecurity and advanced digital skills

outline/timeline



Horizon Europe proposal

Framework Programme

sets out the general and specific objective of Horizon Europe, the structure and the broad lines activities to be carried out



Article 7 Missions

1. Missions shall be programmed within the pillar 'Global Challenges and Industrial Competitiveness', but may also benefit from actions carried out within other parts of the Programme.
2. The missions shall be implemented in accordance with Article 5 of the Specific Programme. Evaluation shall be carried out in accordance with Article 26.
3. Missions shall:
 - (a) have a clear EU-added value and contribute to reaching Union priorities;
 - (b) be bold and inspirational, and hence have wide societal or economic relevance;
 - (c) indicate a clear direction and be targeted, measurable and time-bound;
 - (d) be centered on ambitious but realistic research and innovation activities;
 - (e) spark activity across disciplines, sectors and actors;
 - (f) be open to multiple, bottom-up solutions.

Specific programme

define the operational objectives and the activities which are specific to parts of Horizon Europe



Article 5 Missions

1. For each mission, a mission board may be established. It shall be composed of around 15 high level individuals including relevant end-users' representatives. The mission board shall advise upon the following:
 - (a) content of work programmes and their revision as needed for achieving the mission objectives, in co-design with stakeholders and the public where relevant;
 - (b) adjustment actions, or termination if appropriate, based on implementation assessments of the mission;
 - (c) selection of expert evaluators, briefing of expert evaluators and evaluation criteria and their weighting;
 - (d) framework conditions which help achieve the objectives of the mission;
 - (e) communication.
2. Specific provisions to enable an efficient and flexible portfolio approach may be set out in the work programme provided for in Article 11.

Horizon Europe – the Framework Programme proposal

General Provisions

Art.1

Art.12

Rules for Part. & Dissem.

Art.13

Art.44

Programme monitoring, communication, evaluation and control

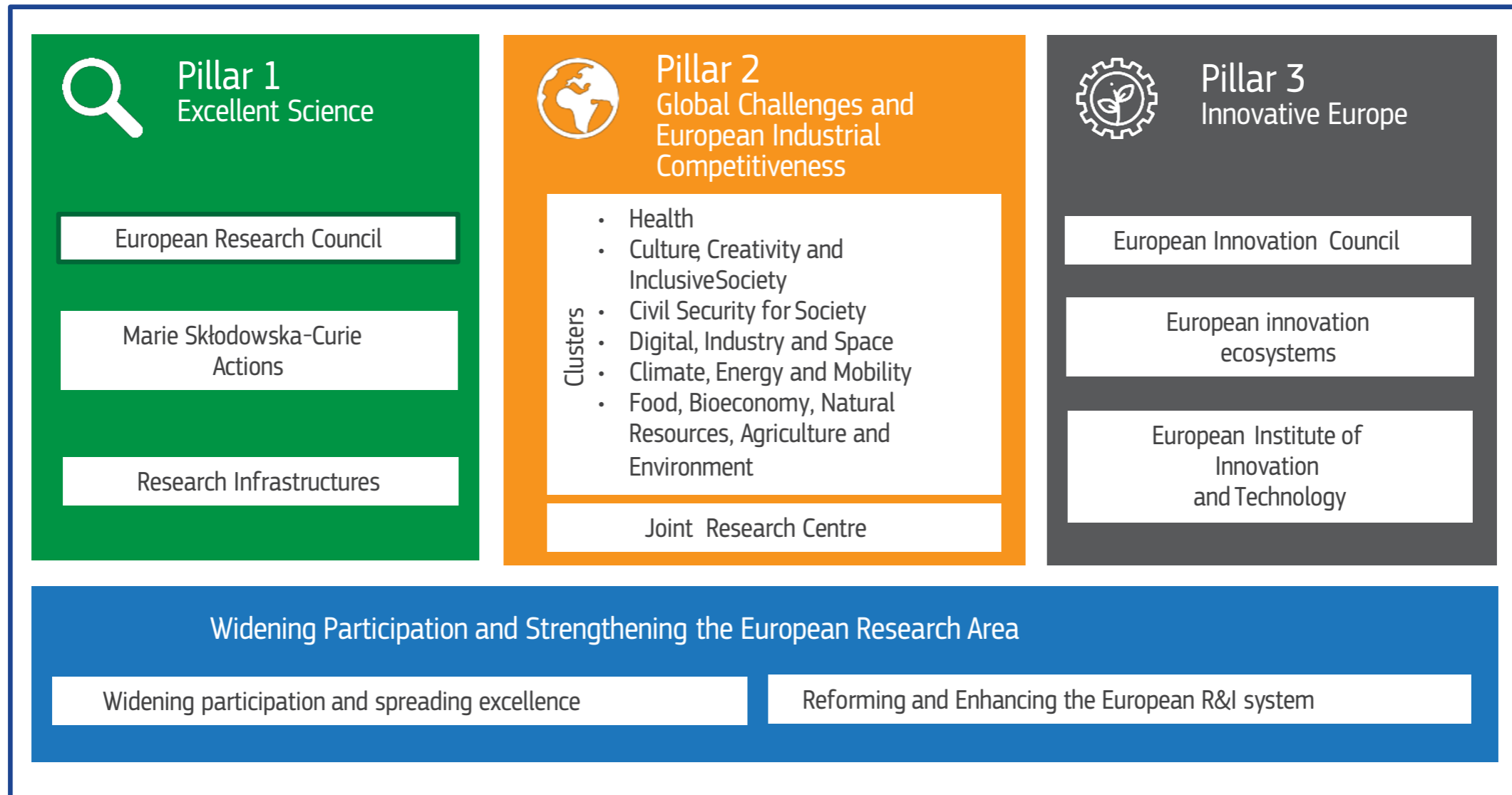
Art.45-50

Transitional & final provisions

Annexes

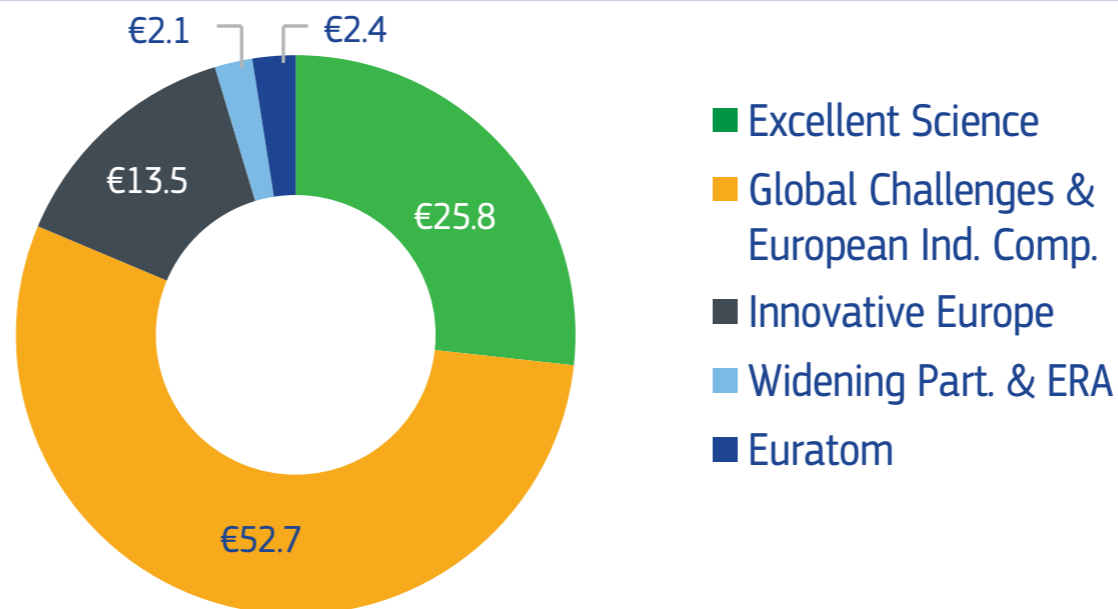
- Subject matter
- Definitions: missions, european partnerships, pre-commercial procurement, dissemination, funding body,....
- Programme objectives and structure
- Defence research and development
- Strategic planning and implementation and forms of EU funding
- Missions
- Budget
- Eligible actions and ethical principles
- Grants
- Entities eligible for participation and entities eligible for funding
- Calls for proposal, evaluation
- Model Grant Agreement
- Funding rates, Indirect costs, Eligible costs
- Monitoring and reporting
- Information, communication, publicity and dissemination and exploitation
- Programme evaluation
- Audits
- Broad lines of activities; European institute of innovation and technology; Partnerships; Synergies with other programmes; Key impact pathway indicators; ...

Horizon Europe proposal



Commission proposal for budget:
 €100 billion* (2021-2027)

[includes EUR 3.5 billion allocated under the InvestEU Fund]



Horizon Europe proposal

Pillar 1

EXCELLENT SCIENCE:

reinforcing and extending the excellence of the Union's science base

European Research Council

- Frontier research by the best researchers and their teams

**Commission proposal:
€ 16.6 billion**

Marie Skłodowska- Curie Actions

- Equipping researches with new knowledge and skills through mobility and training

**Commission proposal:
€ 6.8 billion**

Research Infrastructures

- Integrated and inter-connected world-class research infrastructures

**Commission proposal:
€ 2.4 billion**

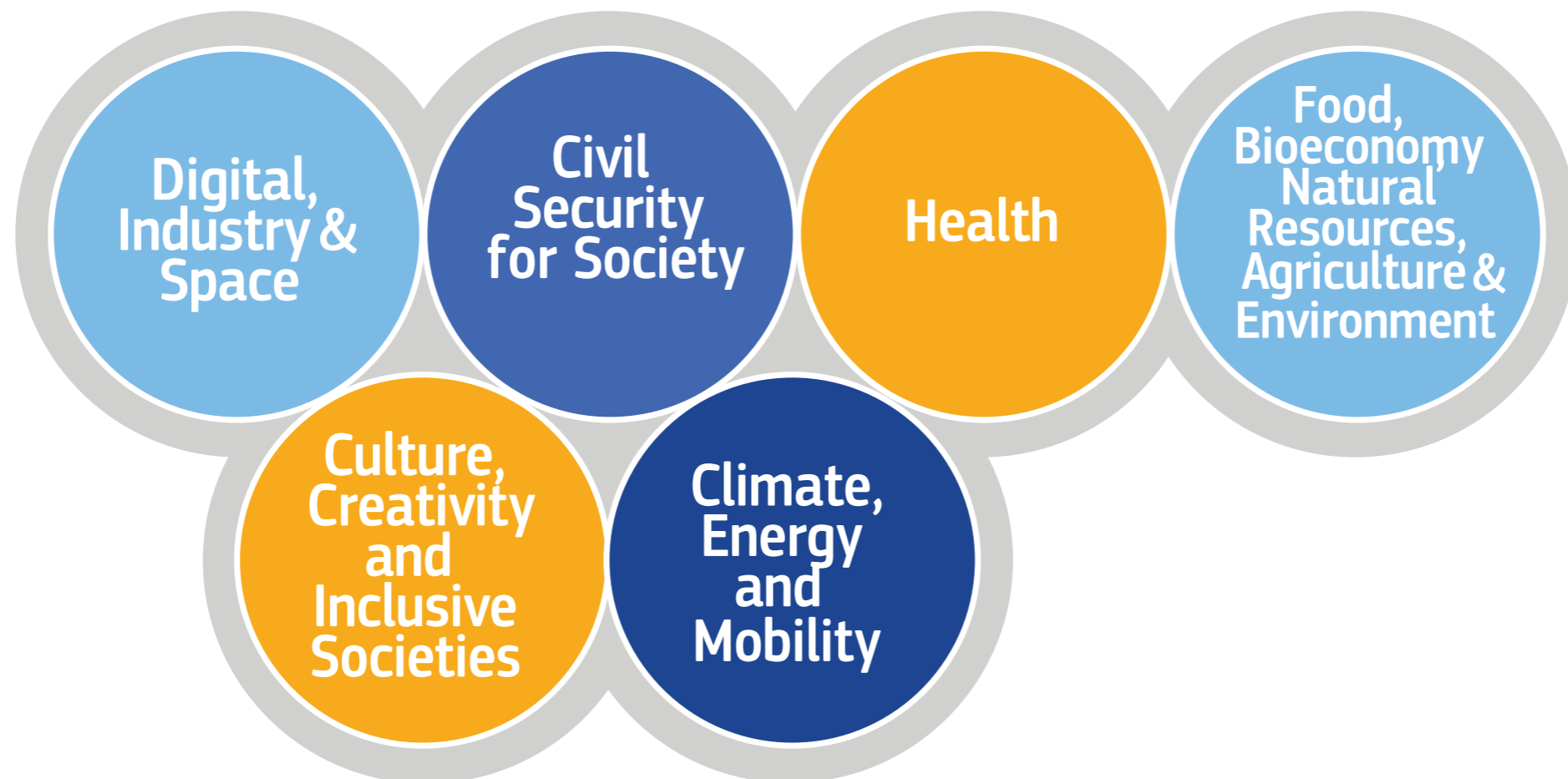
Horizon Europe proposal

Pillar 2 - Clusters

Global Challenges & European Industrial Competitiveness:

boosting key technologies and solutions underpinning EU policies & Sustainable Development Goals

Commission proposal for budget: € 52.7 billion



Horizon Europe proposal

Pillar 3

INNOVATIVE EUROPE:

stimulating market-creating breakthroughs and ecosystems conducive to innovation

European Innovation Council

- Support to innovations with breakthrough and market creating potential

Commission proposal: € 10.5 billion, incl. up to € 500 million for ecosystems

European innovation ecosystems

- Connecting with regional and national innovation actors

European Institute of Innovation and Technology (EIT)

- Bringing key actors (research, education and business) together around a common goal for nurturing innovation

Commission proposal: € 3 billion

Horizon Europe proposal

Widening Participation and Strengthening the European Research Area: optimising strengths & potential for a more innovative Europe

Widening Participation and Spreading Excellence, e.g .

- Teaming & twinning
- ERA Chairs
- COST
- Support to NCPs
- Brain circulation and excellence initiatives
- “Hop-on”

Common understanding: At least 3.3% of Horizon Europe budget

Reforming and enhancing the European R&I system

- Scientific evidence & foresight
- Open Science
- Policy Support Facility
- Attractive researcher careers
- Citizen science, Responsible Research & Innovation
- Gender equality

Horizon Europe proposal

Euratom research and training programme (2021-2025)

- **Objective**

Research and training activities to reduce nuclear safety and security risks, development of safe nuclear technologies and optimal radiation protection.

- **Key novelties**

- Increased focus on non-power applications of radiation (medical, industrial, space)
- Opening mobility opportunities for nuclear researchers through inclusion in Marie Skłodowska-Curie Actions
- Simplification: Specific objectives from currently 14 to 4, covering both direct actions (implemented by JRC) and indirect actions

- **Commission proposal for budget: € 2.4 billion (2021-2027)**

European Parliament

- **December 2018:** Parliament voted on the Industry, Research and Energy (ITRE) Committee reports on the Horizon Europe framework programme and the related specific programme;
- **April 2019:** after several Trilogue meetings, Parliament and Council reached a **partial agreement**, covering the specific programme's content. It does not address budgetary issues, pending negotiations on the EU's overall 2021-2027 long-term budget (MFF);



(Ordinary legislative procedure: first reading)

Amendment 1

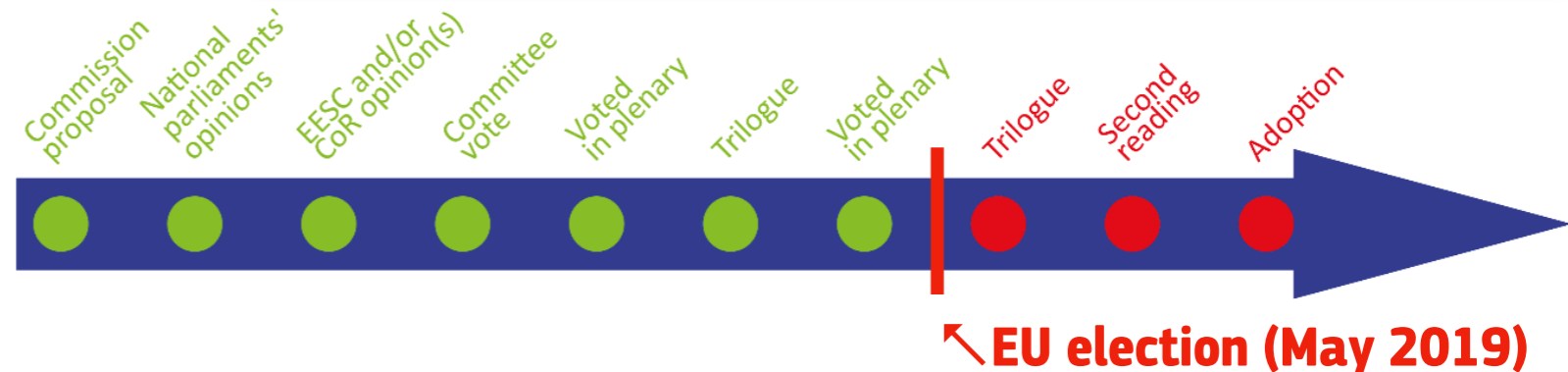
Proposal for a regulation
Recital 1

Text proposed by the Commission

(1) It is the Union's objective to strengthen its scientific and technological bases and encourage its competitiveness, including in its industry, while promoting all research and innovation activities to deliver on the Union's strategic priorities, which ultimately aim at promoting peace, the Union's values and the well-being of its peoples.

Amendment

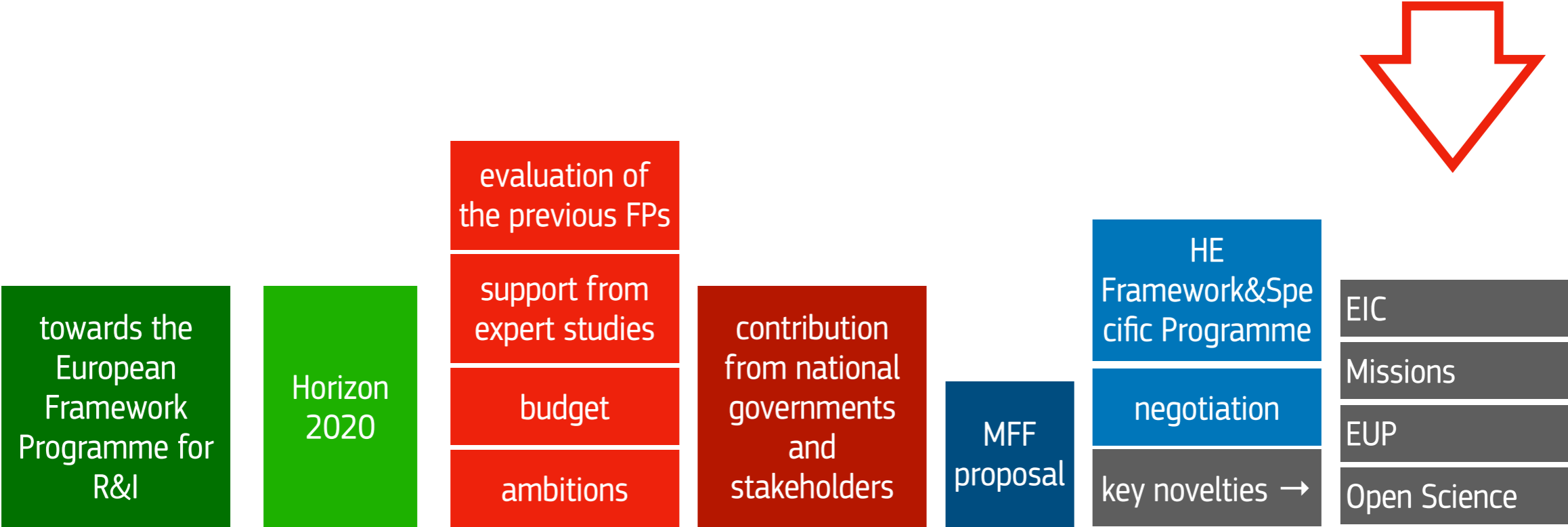
(1) It is the Union's objective to strengthen its scientific *excellence* and technological bases *in which researchers, scientific knowledge and technology circulate freely* and encourage its competitiveness, including in its industry, *to strengthen the European Research Area*, while promoting all research and innovation activities to deliver on the Union's strategic priorities *and commitments*, which ultimately aim at promoting peace, the Union's values and the well-being of its peoples;



Parliament amendments/requests:

- reducing the existing **remuneration gap** between researchers across the EU;
- increasing the budget dedicated to **spreading excellence and strengthening the ERA**;
- broader support for SMEs, including start-ups → at least 70 % of the EIC budget to be dedicated to SMEs;
- Parliament has demonstrated more ambition than the Commission proposal by **asking Council to increase the Horizon Europe budget to €120 billion** or €135.25 billion (current prices);

outline/timeline



Horizon Europe proposal

Lessons Learned

from Horizon 2020

Support breakthrough innovation



Create more impact through mission-orientation and citizens' involvement



Strengthen international cooperation



Reinforce openness



Rationalise the funding landscape



Encourage participation



Key Novelties

in Horizon Europe

European Innovation Council



R&I Missions



Extended association possibilities

Open science policy



New approach to Partnerships



Spreading Excellence

Horizon Europe proposal

European Innovation Council

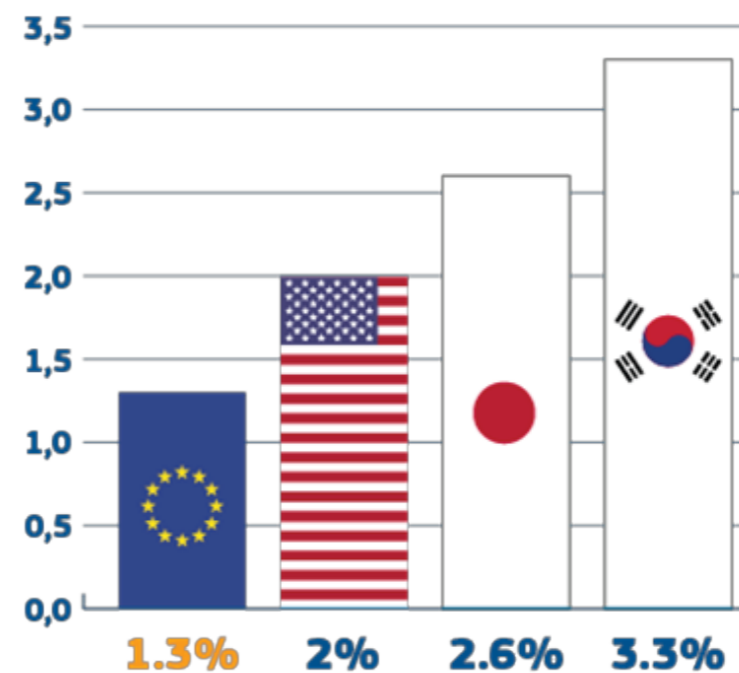
While benefiting from world-class research and strong industries...



...Europe can do better at transforming this into leadership in innovation and entrepreneurship

Our knowledge and skills are our main resources.

- ↑ 7% of the world's population
- ↑ 20% of global R&D
- ↑ 1/3 of all high-quality scientific publications
- ↓ 1.3% EU business R&D investment



Horizon Europe proposal

European Innovation Council

Support to innovations with breakthrough and disruptive nature and scale up potential that are too risky for private investors
(70% of the budget earmarked for SMEs)

European Innovation
Council – a one-stop-shop

Helping innovators create markets of the future, leverage private finance, scale up their companies, Innovation centric, risk taking & agile, pro-active management and follow up

Two complementary instruments bridging the gap from idea to investable project

Pathfinder: grants
(from early technology
to pre - commercial)

Accelerator:
grants only & blended finance
(from pre -commercial
to market & scale-up)

Horizon Europe proposal

R&I Missions



R&I Missions

Relating EU's research and innovation better to society and citizens' needs; with strong visibility and impact

A mission is a portfolio of actions across disciplines intended to achieve a **bold and inspirational and measurable goal** within a set timeframe, with **impact** for society and policy making as well as relevance for a significant part of the European population and wide range of European citizens.

Horizon Europe defines mission characteristics and elements of governance, and 5 missions areas.

Specific missions will be programmed within the Global Challenges and European Industrial Competitiveness pillar (drawing on inputs from other pillars)

Horizon Europe proposal

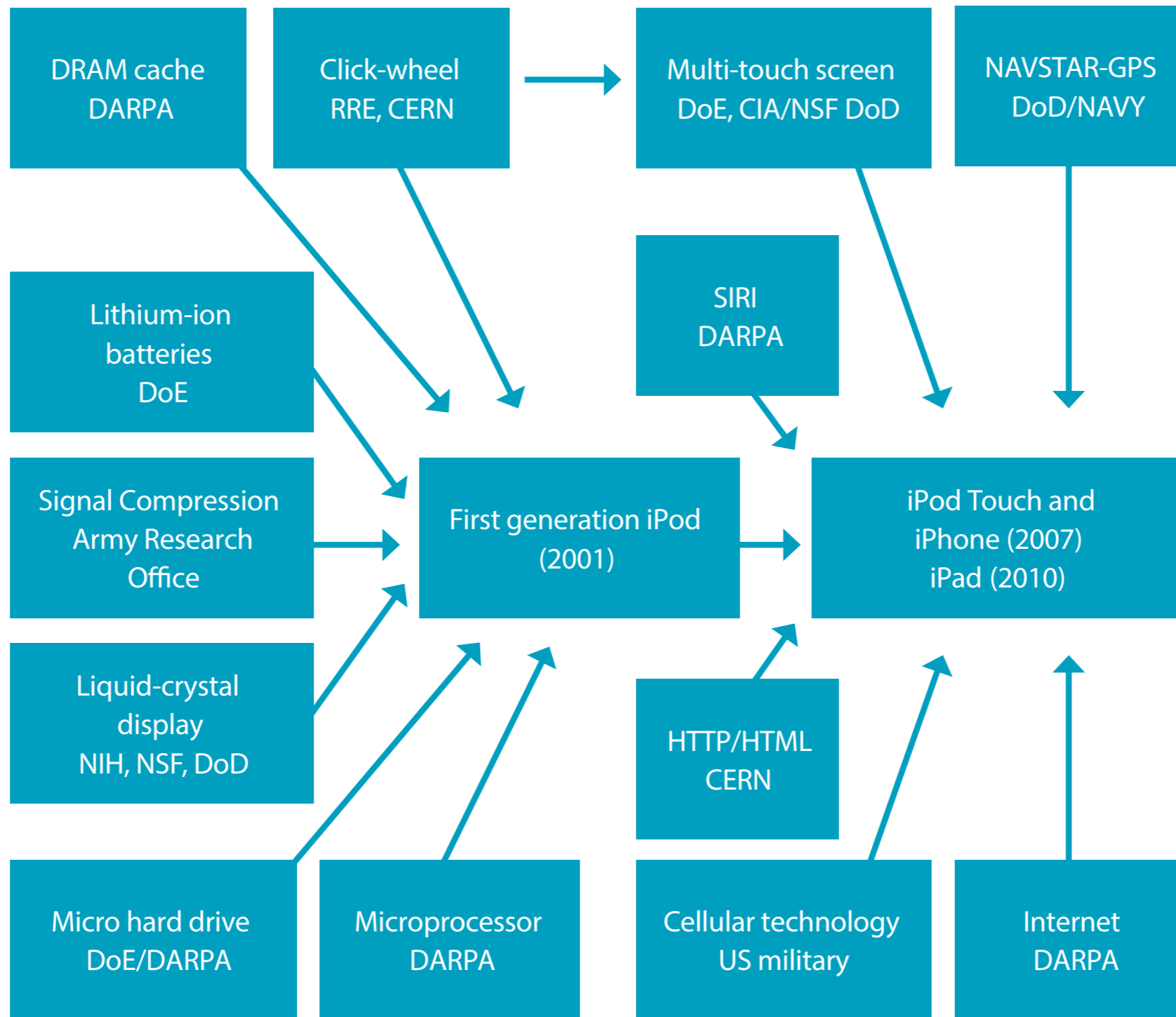
Mission-oriented research and innovation

- "The ambition to achieve a particular type of economic growth (smart, inclusive, sustainable) is a direct admission that economic growth has **not only a rate but also a direction**" (M. Mazzucato);
- rethink the role of public policy in the economy: government can achieve transformational change by **tilting the playing field in the direction of the desired goals** and by playing a catalytic role in creating and shaping markets;
- challenges are broadly defined areas WHILE **missions focus on specific problems**
- directionality and intentionality of these initiatives is what differentiates them from other types of initiatives, such as systemic or challenge-oriented policies
- A mission-oriented approach means developing, implementing and monitoring a **strategic innovation policy programme** (a package of measures and activities, not just R&I) that draws on the strengths of an R&I system to overcome a country's weaknesses and address its challenges;
- is to mix a top-down approach **to set the goal and provide a direction**, and a bottom-up approach allowing the **development of an open portfolio of activities** to complete the mission;

Mission-oriented policies can be defined as systemic public policies that draw on frontier knowledge to attain specific goals or **"big science deployed to meet big problems"**

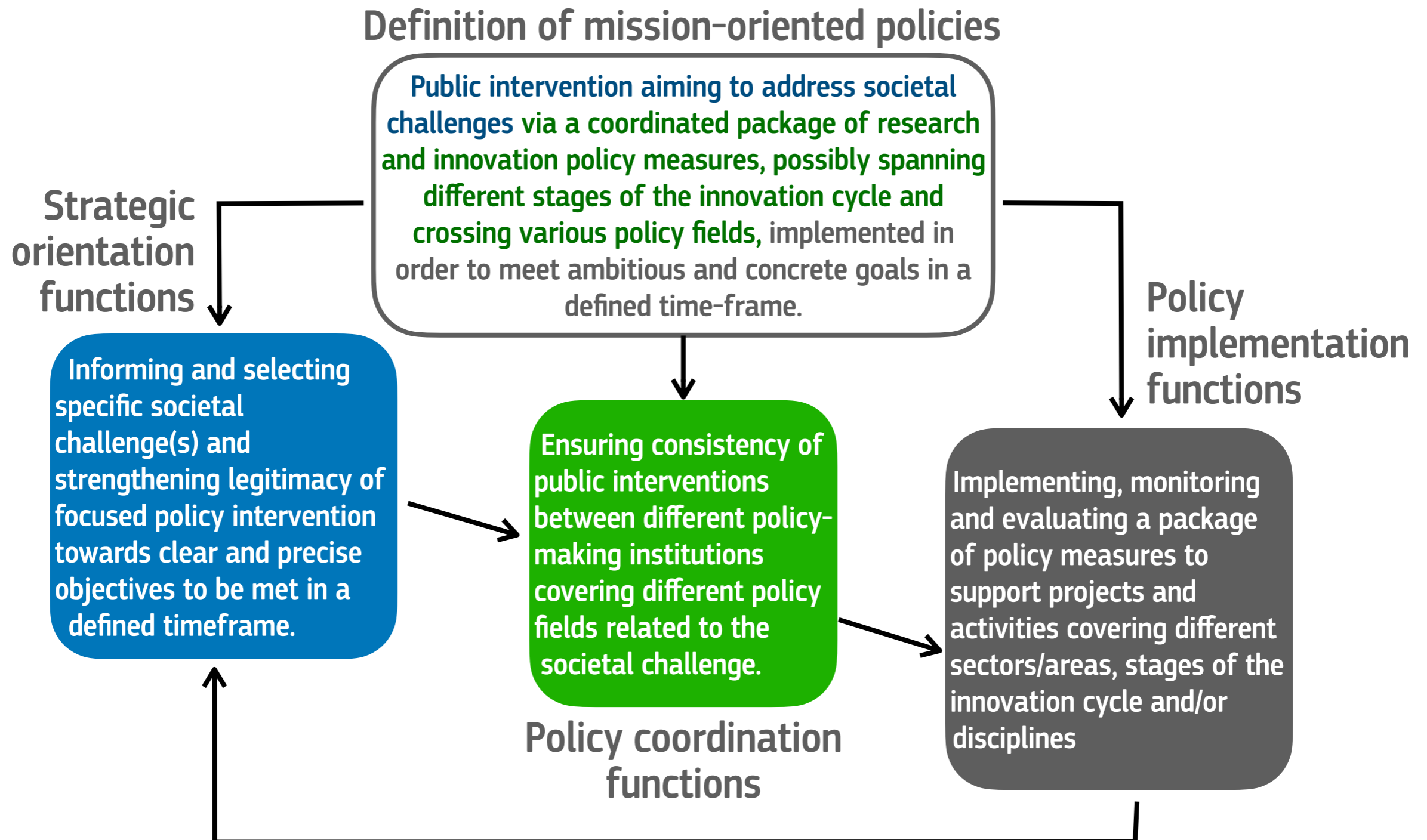
Horizon Europe proposal

Publicly funded technology in 'smart' phones



Horizon Europe proposal

Decomposition of the definition in elementary functions



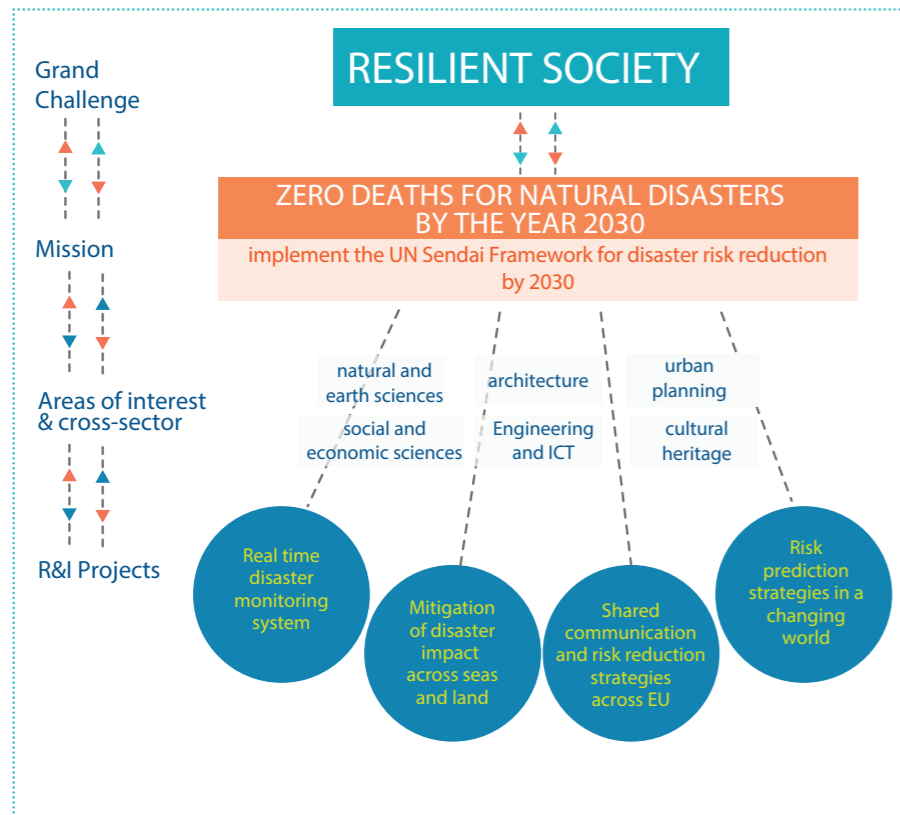
Mazzucato Report

five criteria for selecting missions

- **Bold, inspirational with wide societal relevance.** Public engagement is essential and each mission needs to be relevant to a large share of the EU population. They must provide exciting opportunities while being connected to the key challenges.
- A clear direction: **targeted, measurable and time-bound.** Missions have to be clearly framed with a specific, measurable target and a clear timeframe.
- **Ambitious but realistic.** Taking risks means that missions have to be ambitious, with objectives that are neither unrealistic nor too timid.
- **Cross-disciplinary, cross-sectoral and cross-actor innovation.** Framing of the mission should lead to new forms of partnerships for co-design and co-creation.
- **Multiple, bottom-up solutions.** Missions must allow for development of different paths to reach the objectives.



Horizon Europe proposal national consultation on topics for EU Missions



ZERO DEATHS FOR NATURAL DISASTERS BY THE YEAR 2030

1. BOLD, INSPIRATIONAL WITH WIDE SOCIETAL RELEVANCE

Natural and man-made disasters are grand challenges to be managed at European and national levels taking into account the huge political and social impacts of such crisis. Effects of climate changes, the complexity of the interdependencies of the energy, transportation networks as well as the occurrence of "black swans" as exceptional natural events and pandemics are on top of the decision makers to do list.

Reducing disaster risk is a cost-effective investment in preventing future losses; that means protect people, communities and countries, their livelihoods, health,

cultural heritage, socioeconomic assets and ecosystems, and thus strengthen their resilience.

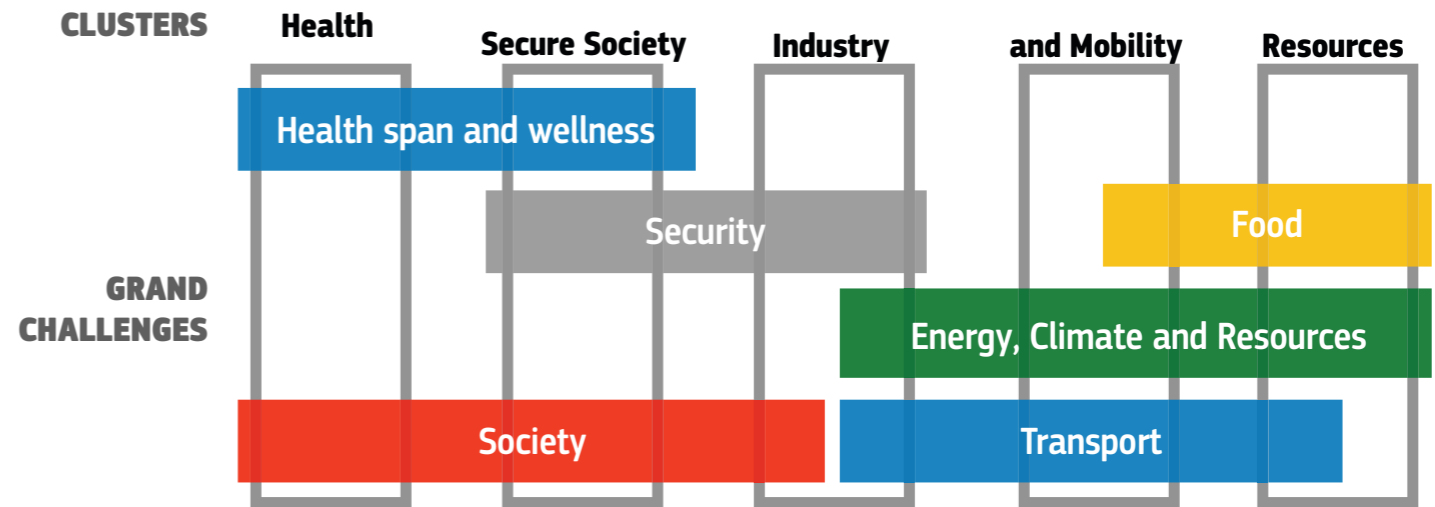
2. A CLEAR DIRECTION: TARGETED, MEASURABLE AND TIME-BOUND

Build a common EU platform for risk reduction by 2030. Reduce disaster impact by 25%, between 2020-2030 compared to 2010-2020, i.e. reduce (i) the number of affected people in terms of mortality, (ii) direct economic loss, (iii) damage to critical infrastructure and disruption of basic services (health and educational facilities).

3. AMBITIOUS BUT REALISTIC RESEARCH & INNOVATION ACTIONS

The mitigation of the impact (in terms of losses of human lives and economic value) of natural disasters requires a multidisciplinary and holistic approach. Research and

~150 proposals from public and private research system, other Ministries, citizens organisations,...



Grand Challenge	Mission	Page
HEALTHY LIFESPAN AND WELLNESS	HEALTHY AGEING FOR ALL BY THE YEAR 2030	5
	HEALTHY HEARTS FOR EUROPE: REDUCING BY 50% THE BURDEN OF HEARTH FAILURE UNTIL 2030	7
SOCIETY	A LESS UNEQUAL EUROPE	10
	MAKING CULTURAL HERITAGE ALIVE	12
	ZERO DEATHS FOR NATURAL DISASTERS BY THE YEAR 2030	14
FOOD	MORE FOOD, LESS WASTE	16
	ZERO PREMATURE DEATH IN EUROPE FOR POLLUTION	18
ENERGY, CLIMATE AND RESUORCES	REDUCING THE CARBON FOOTPRINT	20
	BIOFUELS AND BIOPLASTICS FROM ORGANIC WASTE AS AN ALTERNATIVE TO FOSSIL RESOURCES BY 2025	22
	100% RECOVERY FROM E-WASTE BY 2025	24
MOBILITY	FROM LITHIUM TO WHEEL: 100% EV-HEV SUPPORTED MOBILITY UNTIL 2025	26
	TOWARDS A ZERO-EMISSION AND ZERO-ACCIDENT TRANSPORT	28
SECURITY	GREEN AND BLUE EU BORDER SURVEILLANCE	30
	5G COMMUNICATIONS FOR A SAFER DIGITAL EUROPE IN 2030	32

source MIUR "Italian contribution to the quest for Missions topics" - 2018

Horizon Europe proposal

Adaptation to climate change, including societal transformation

Healthy oceans, seas, coastal and inland waters



Mission areas



Cancer

Climate-neutral and smart cities



Soil health and food

Horizon Europe proposal

R&I Partnerships in Horizon 2020

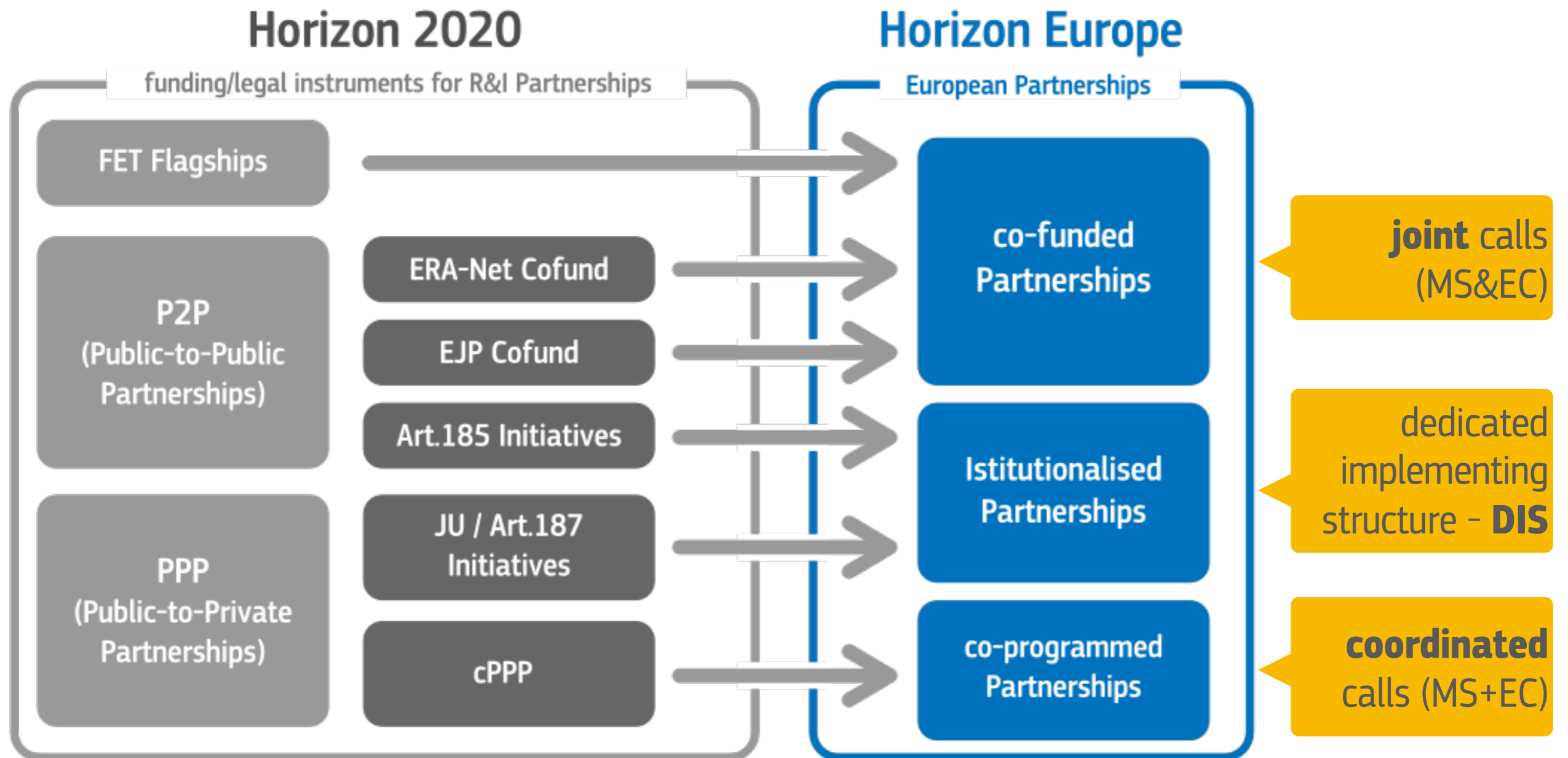
Partnerships were originally designed and have been further developed to overcome the fragmentation in the R&I landscape, to avoid duplication of efforts, to address economic crisis, competitiveness and innovation.

→ (co-funded) initiatives oriented towards **coordination**, **collaboration** and **alignment** of national strategies

Partnership approaches	Public-public partnerships (P2P)	Public-private partnerships (PPP)	EIT-KICs*	FET Flagships**
Implementation modes	ERA-NET-Cofund, EJP Cofund, Article 185, Joint Programming Initiative (JPI)	Contractual Arrangement (cPPP) Article 187	H20202 Grant agreements for different types of actions, Framework Partnership Agreements (FPA)	
Currently active R&I Partnerships (Horizon 2020)	a) ERA-NETs: ≈ 70 b) EJP Cofund: 5 c) Article 185: 6 d) JPIs: 10	a) JUs: 7 (+HPC) b) cPPPs: 10	KICs: 6	FET-Flagships: 2 (+Quantum)
Financial contribution from H2020 (estimated)	2.500 M€ (3,1% of H2020 budget)	13.450 M€ (JU 7.250 M€, 10% cPPP 6.200 M€, 7,5 of H2020 budget)	2.400 M€ (3,1% of H2020 budget)	1.000 M€ (1,3% of H2020 budget)
	~78% of total number	~70% of total budget allocated to R&I Partnerships (~20G€)		



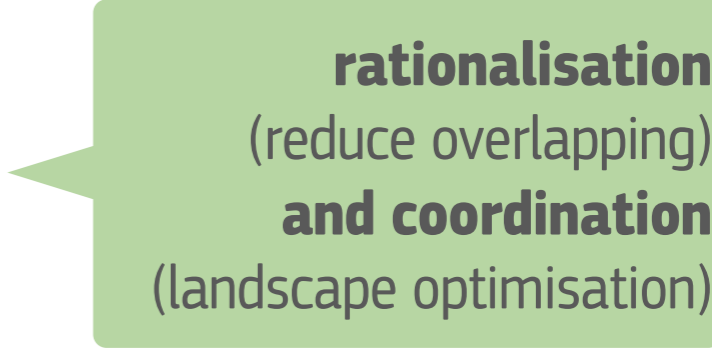
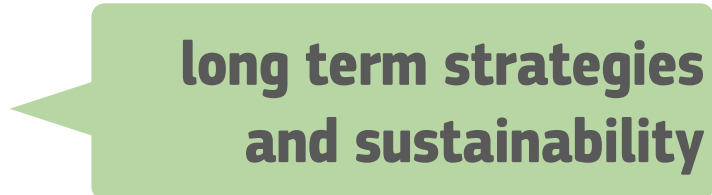
Horizon Europe proposal

European Partnerships: what's new



Horizon Europe proposal

European Partnerships: what's new

- one single funding instrument, in three 'flavours'  **simplification**
- no more 'public' or 'private'  **flexibility and openness**
- an overall monitoring and coordinating process (including all EU R&I Partnerships)  **rationalisation**
(reduce overlapping)
and coordination
(landscape optimisation)
- EPs are part of the Strategic Planning  **long term strategies and sustainability**

Horizon Europe and Open Science

EU Commissioner's 3-Open's book (2015)

"Open Innovation, Open Science and Open to the World"

"they do not represent a new policy initiative or funding programme as such, but a way to reinforce existing programmes, such as Horizon 2020, and reinvigorate existing policies such as the European Research Area", such us:



Open Innovation



- European Innovation Council and the creation of a Seal of Excellence to facilitate links between Horizon 2020 and other funding programmes;

Open Science



- European Science Cloud and greater openness to scientific data generated by Horizon 2020 projects;

Open to the World



- Association Agreements with Ukraine and Tunisia to Horizon 2020, as well as international agreements with China and South American countries

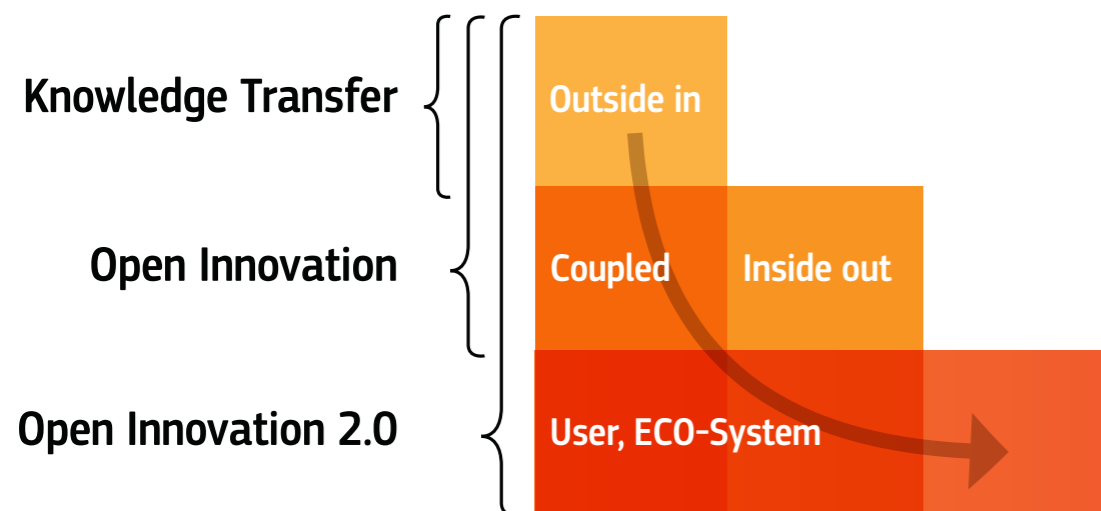
Horizon Europe and Open Science

Open Innovation

The European Union is a research powerhouse, still the **world's leading producer of scientific knowledge**, ahead of the United States.

However, Europe too rarely succeeds in **turning research into innovation**, in getting research results to market. Too often, new technologies that have been developed in Europe are commercialised elsewhere.

OI 2.0: Innovation can no longer be seen as the result of predefined and isolated innovation activities but rather as the outcome of a complex co-creation process involving knowledge flows across the entire economic and social environment



CLOSED INNOVATION PRINCIPLES	OPEN INNOVATION PRINCIPLES
The smart people in our field work for us.	Not all the smart people work for us. We need to work with smart people inside and outside our company.
To profit from R&D, we must discover it, develop it, and ship it ourselves.	External R&D can create significant value; internal R&D is needed to claim some portion of that value.
If we discover it ourselves, we will get it to market first.	We don't have to originate the research to profit from it.
The company that gets an innovation to market first will win.	Building a better business model is better than getting to market first.
If we create the most and the best ideas in the industry, we will win.	If we make the best use of internal and external ideas, we will win.
We should control our IP, so that our competitors don't profit from our ideas.	We should profit from others' use of our IP, and we should buy others' IP whenever it advances our own business model.

Horizon Europe and Open Science

Open to the World

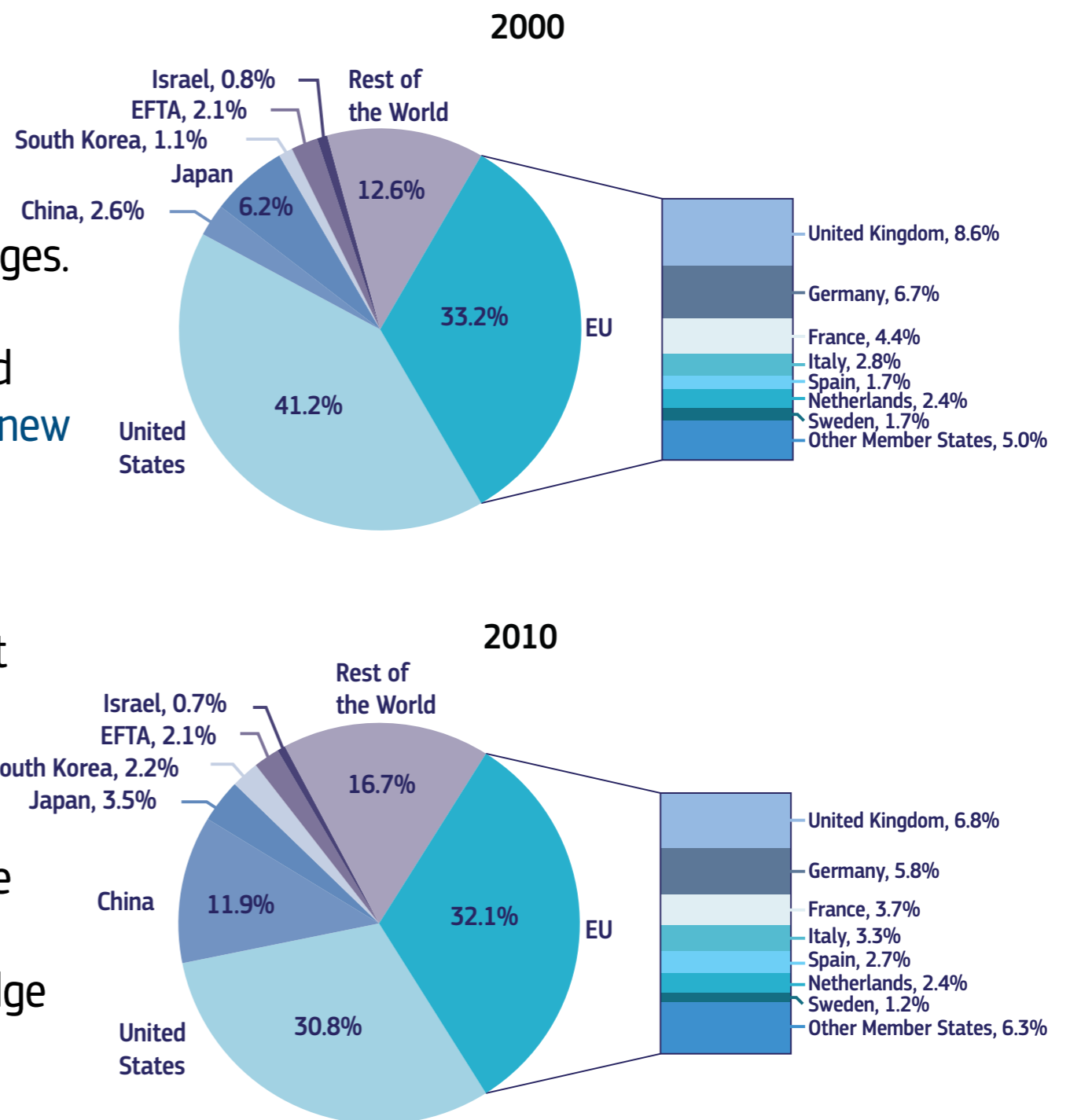
The increased interaction between science and technology actors at world level is partly due to the emergence of new international players with large research and innovation capacities, but also to a stronger political focus on addressing global challenges.

The world is becoming both more R&D-intensive and multipolar, and **the relative weight of the EU in this new global R&D landscape is falling.**

Openness to and engagement with the world is a strategic priority for Europe to produce the very best science and technology.

One focus has been on the concept of a Global Research Area where researchers and innovators are able to work together smoothly with colleagues worldwide and where researchers, scientific knowledge and technology circulate as freely as possible.

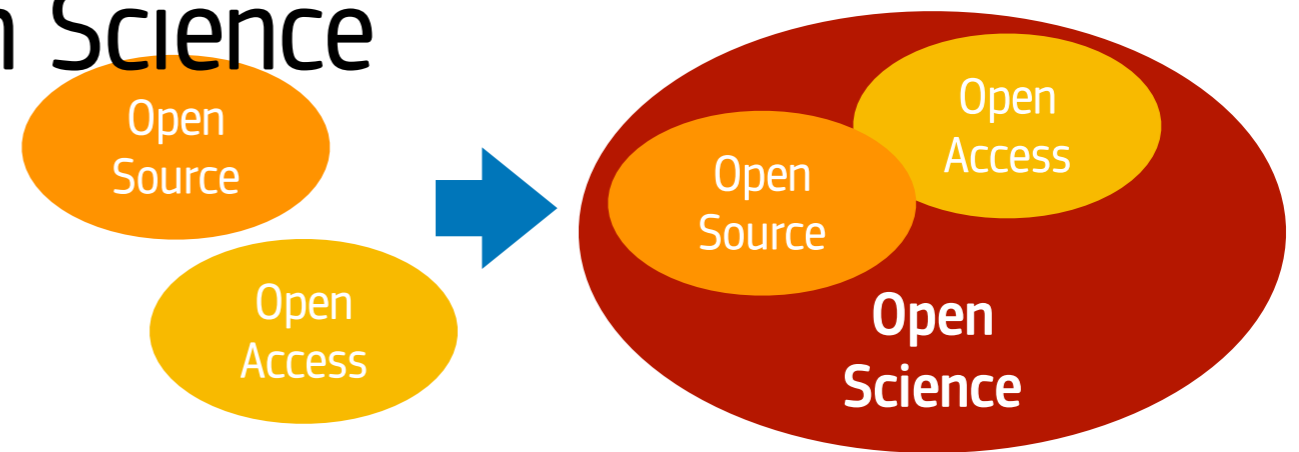
World share of highly cited scientific publications, 2000 and 2010



Horizon Europe and Open Science

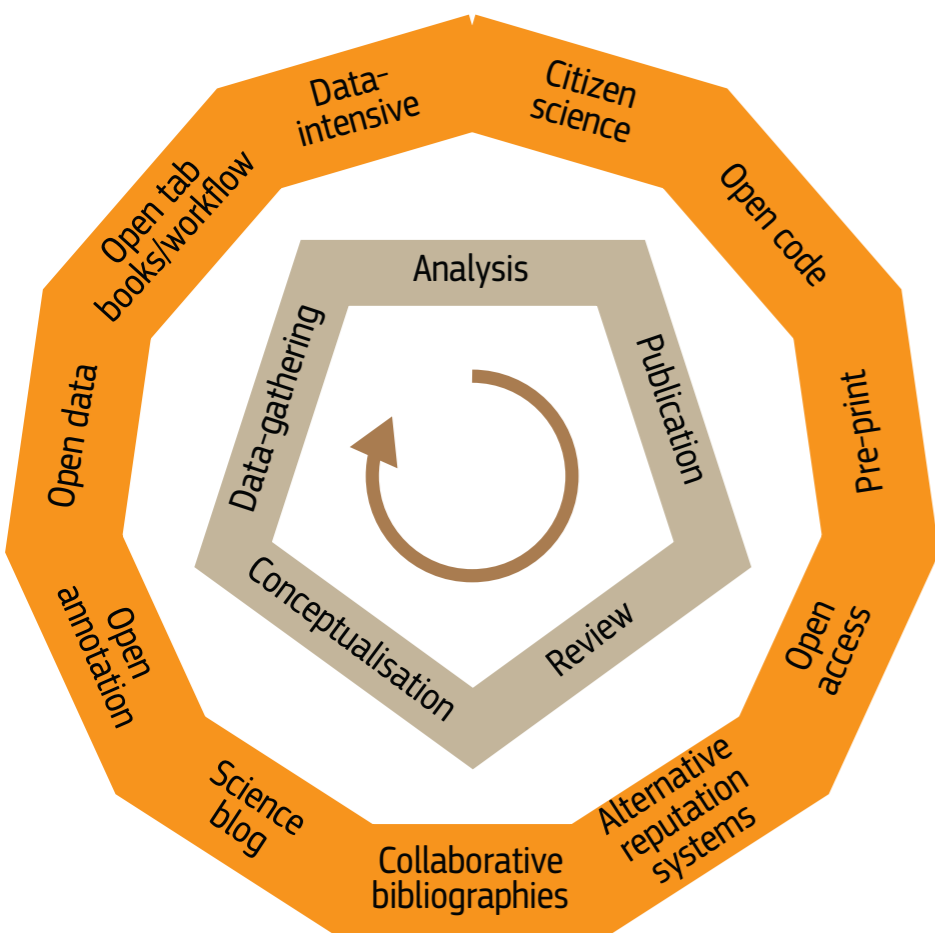
Open Science

it represents a new approach to the scientific process based on cooperative work and new ways of diffusing knowledge by using digital technologies and new collaborative tools.



(selection of) relevant milestones in the debate on Open Science

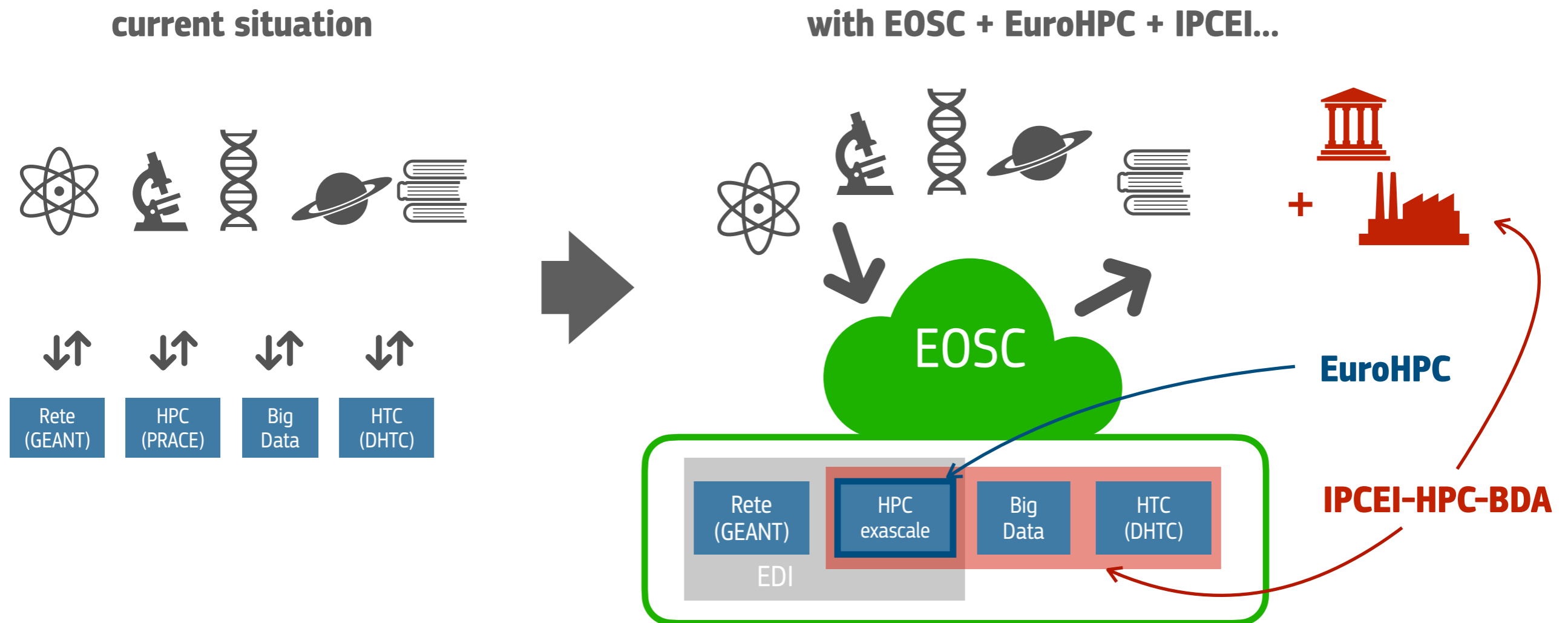
- The [San Francisco Declaration On Research Assessment](#) (2012): stop using of bibliometric parameters for evaluation of research(ers) and research proposals
- The Economist (2013): “How Science Goes Wrong”) focuses on unreliable research and states that many errors in science go uncorrected
- Promotion and grant committees should be reading through papers and judging research by its merit, says Nobel Prize winner Sydney Brenner (2014)
- New England Journal of Medicine (2014): academic environments often place more value on the discovery itself and less value on learning how to realise the potential benefit of its application. -> universities should foster implementation science;
- In July 2014 the European Commission starts an online “Public consultation ‘Science 2.0’: Science in Transition” about the changing science system;
- Gottfried Schatz-EMBO (2014): “the exponential growth of science has led to meaningless quantification, a crisis in peer review, reproducibility problems”.
- John Ioannidis (2014): “modify reward system for science to create reproducible and translatable research. With the current reward system “an estimated 85% of research resources are wasted”
- Inder Verma-PNAS Editor-in-Chief (2015): science should strive for impact, not impact factor. “When it comes to judging the quality and significance of a body of work, there is no substitute for qualitative assessment.”
- In PNAS (2015) two researchers show that “biomedical research outcomes over the last five decades, as estimated by both life expectancy and New Molecular Entities approved by the Food and Drug Administration, have remained relatively constant despite rising resource inputs and scientific knowledge.”



Horizon Europe and Open Science

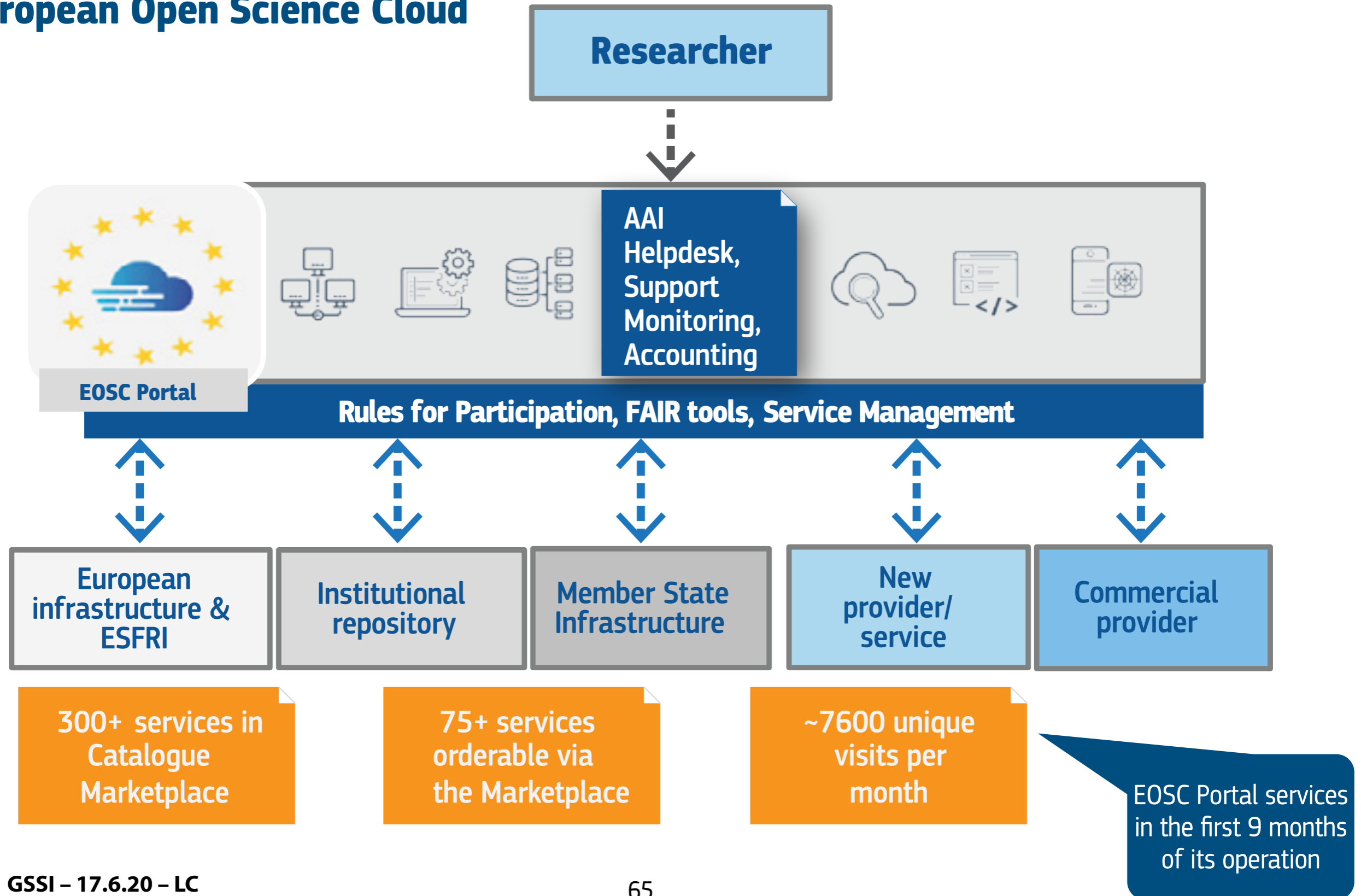
European Open Science Cloud

- a **trusted digital platform** for the scientific community
- provides seamless **access to data** and **interoperable services** that address the whole research data cycle, from discovery and mining to storage, management, analysis and re-use across borders and scientific disciplines



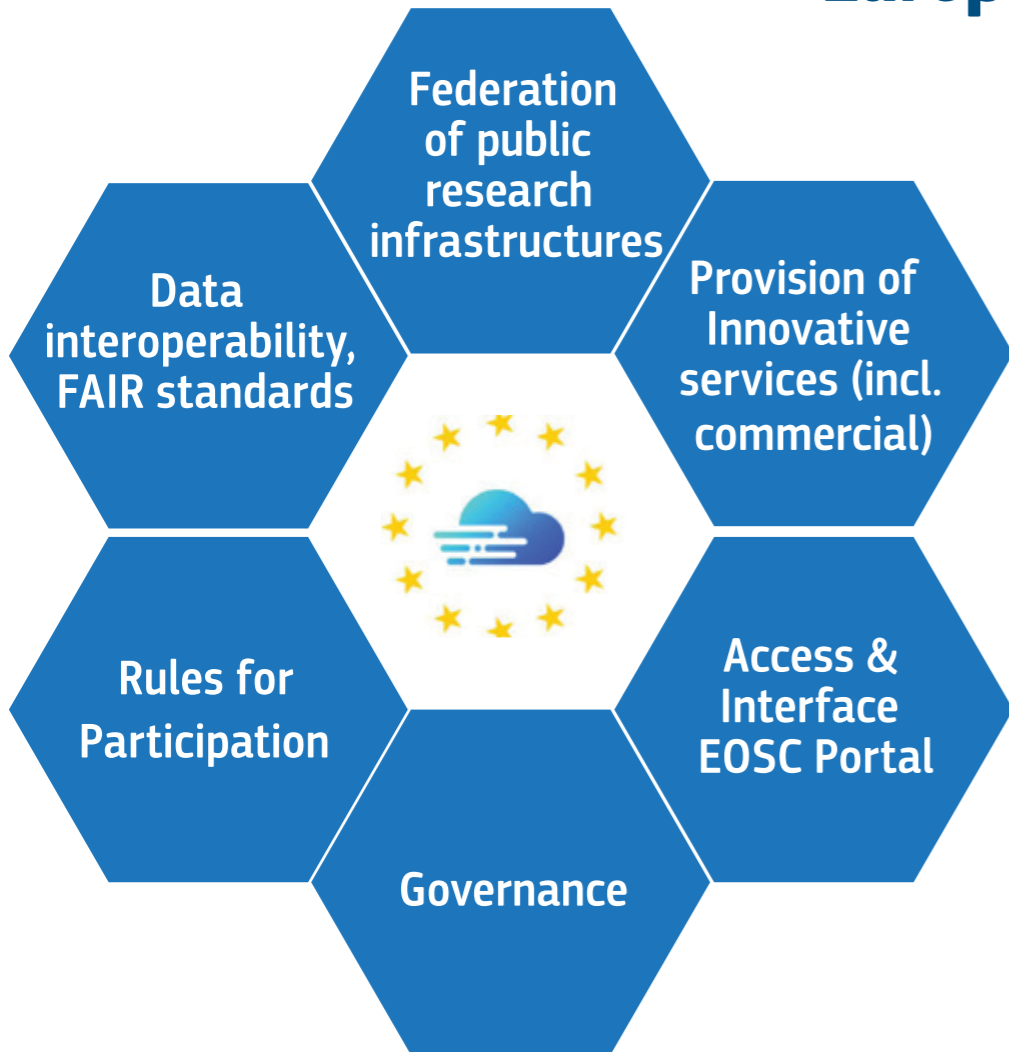
Horizon Europe and Open Science

European Open Science Cloud



Horizon Europe and Open Science

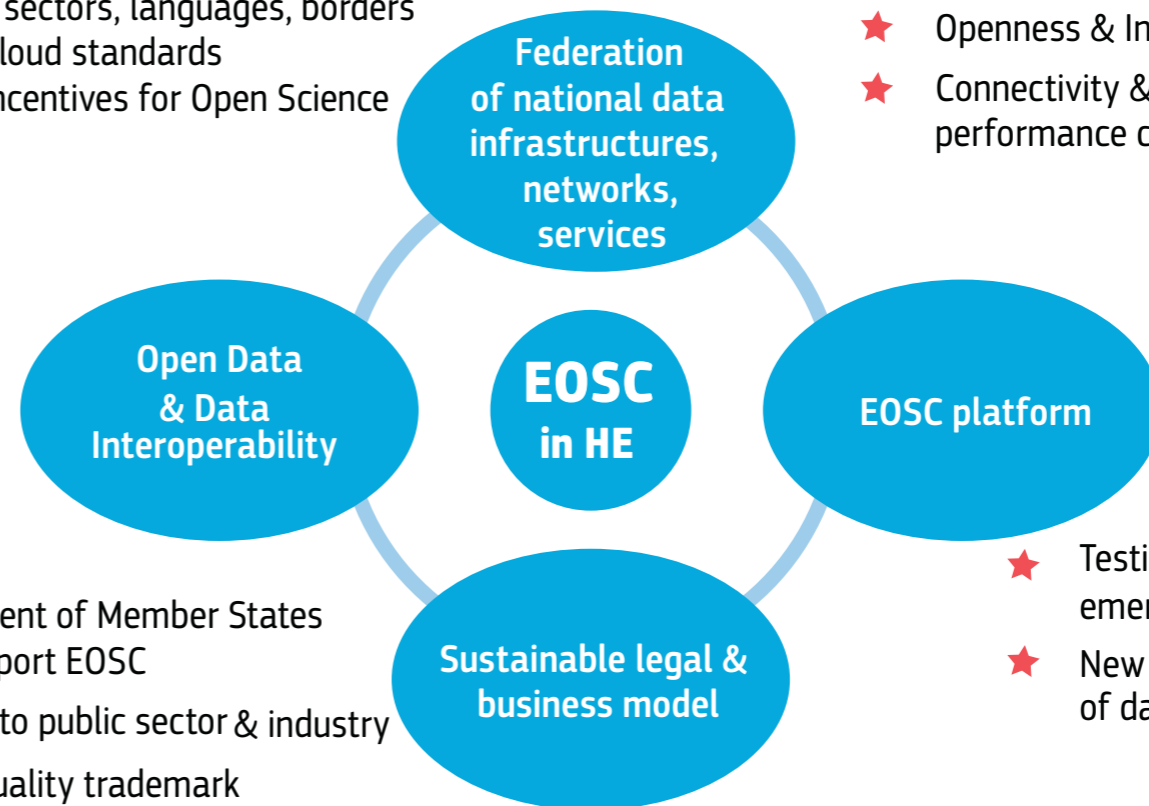
European Open Science Cloud



EOSC Implementation Roadmap describes a federation of national and European data infrastructures, services and computing resources. The Roadmap addresses technical, governance and participation issues, under six action lines.

- ★ Interoperability across sectors, languages, borders
- ★ Cloud standards
- ★ Incentives for Open Science

- ★ Openness & Inclusiveness
- ★ Connectivity & High performance computing



- ★ Commitment of Member States to support EOSC
- ★ Widening to public sector & industry
- ★ Trusted quality trademark

- ★ Testing ground for emerging technologies
- ★ New generation of data services

EOSC will be fully supported by the Horizon Europe (HE) programme in the post-2020 period.

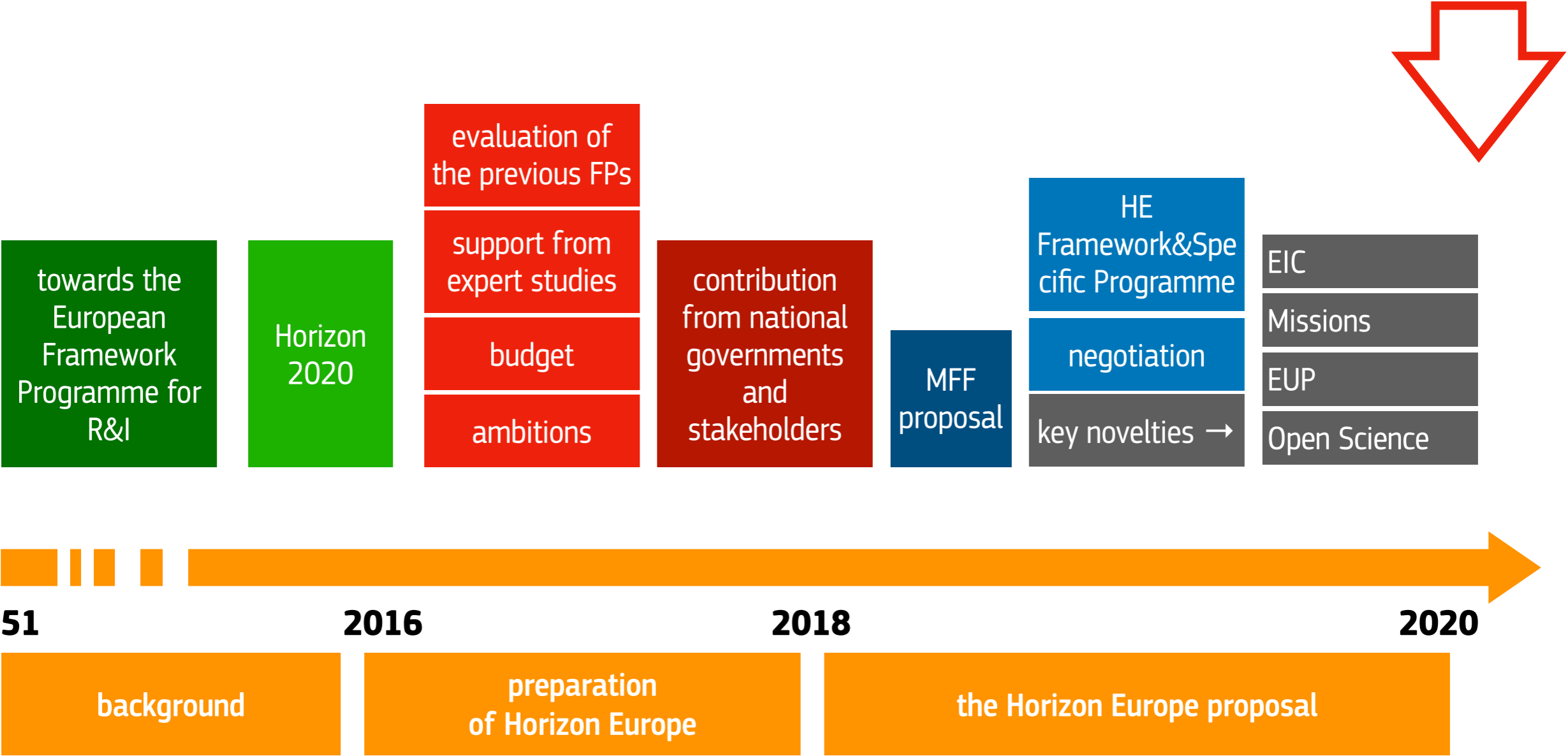
Horizon Europe and Open Science

Open Research Europe:

the European Commission Open Research Publishing Platform

- the **open access publishing platform** for scientific articles as a free service for Horizon 2020 beneficiaries (launch is planned for early 2021);
- the platform will be a **peer-reviewed publishing service** to support Horizon 2020 and Horizon Europe beneficiaries to publish their research in **open access free of charge** (i.e. without article fees), if they so wish, during their project or after it has ended;
- the platform will support beneficiaries to **meet the open access requirements** of Horizon 2020, and of its successor Horizon Europe to support open access publishing as the main mode for publication of research in the years to come;
- the platform will operate under the highest scientific and publishing standards and will have a **Scientific Advisory Board** to steer the publishing of research of the highest quality;
- it will manage the **entire publication process**, from submission to publication, comprising open peer-review, post-publication curation and preservation;
- original articles of various types in any discipline stemming from Horizon 2020/Europe-funded research will be eligible for publication on the platform, which will offer an open and transparent peer-review process;
- the platform will be accepting submissions for articles funded by Horizon 2020 as of autumn 2020. Its official **launch is planned for early 2021**.

outline/timeline



Horizon Europe proposal

Key elements of the Commission proposal

- + Three pillar structure addressing fundamental science, global challenges and innovation
- + A new cross-sectoral clusters approach
- + Missions as key novelty for more impact and visibility
- + EIC as one-stop shop for innovation to help small companies to innovate and scale up
- + Strategic planning as direction-setting for the work programmes
- + New approach to partnerships to rationalise the landscape
- + Impact pathways to track progress with the achievement of the Programme's objectives over time.
- + Rules for participation aiming at further simplification and a more robust Open Access regime.

'their' point of view about 'you'

Human Capital Formation: Investing in Research and Innovation Communities.

1. We recognise that researchers provide a crucial contribution to the socio-economic growth of our societies. We commit to supporting our research communities, in particular women, youth and other underrepresented groups, through training, motivating others to follow. Researchers can help promote the advancement of knowledge and diffusion of new technologies throughout our

4. Researchers can play an instrumental role in shortening the delay between inventions and their uptake. To achieve this we agreed on the need to ensure that researchers have access to training that goes beyond and across strictly disciplinary domains, including complementary and technical skills (such as, basic understanding of data curation, entrepreneurial mind-set, self-direction, creative thinking, problem solving and communication). Researchers also need

7. We believe that researchers should be encouraged and supported to carry out this dialogue with society on a permanent basis, taking care to involve them from the start of the technology development pipeline, informing them openly about risks and uncertainties and taking account of discussions with the public as research and policy develops.



G7 SCIENCE MINISTERS' COMMUNIQUÉ

Turin, 27 – 28 September

28th September 2017

Introduction

We, the Science Ministers of Canada, France, Germany, Italy, Japan, the United Kingdom, the United States of America, and the European Commissioner for Research, Science and Innovation, met in Venaria on September 28th, for the Ministerial meeting hosted by the Italian Presidency during the G7 Innovation Week. In this meeting, we discussed how our nations could lead efforts to realise the benefits and meet the new global challenges posed to the scientific community by the Next Production Revolution (NPR). The NPR brings unparalleled opportunities to advance not only the means of production of goods and services, but also the ways in which knowledge is generated and exploited.

Science will be at the heart of delivering the NPR. Against this background, we discussed a set of possible common actions and areas of cooperation, to create the conditions for

Grazie per l'attenzione