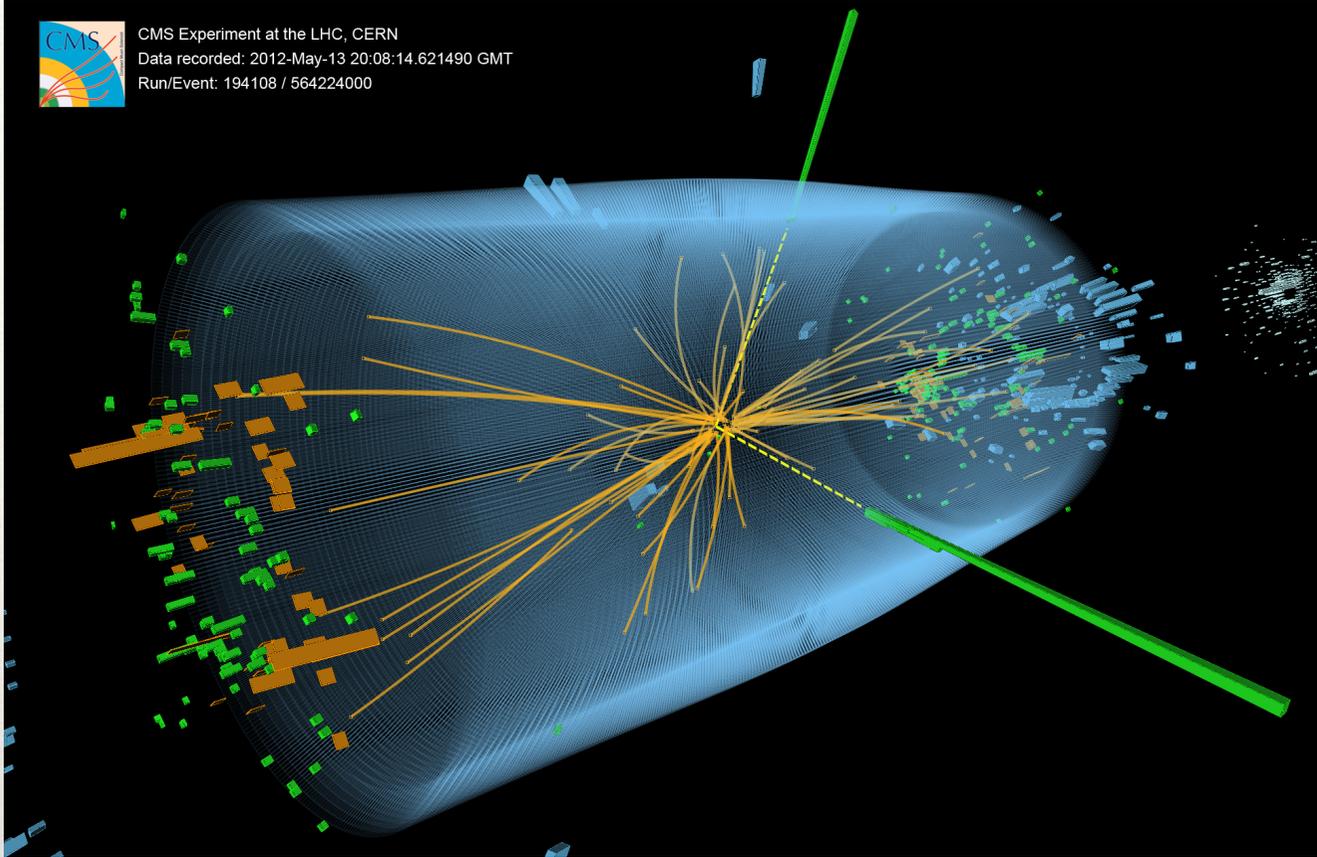




CMS Experiment at the LHC, CERN  
Data recorded: 2012-May-13 20:08:14.621490 GMT  
Run/Event: 194108 / 564224000



Istituto Nazionale di Fisica Nucleare



*XXXI Seminario di Fisica Nucleare e Subnucleare "F.Romano" 3th June 2019*

# European Funding in Fundamental Physics Research

Amedeo Staiano - Divisione  
Fondi Esterni - Istituto  
Nazionale di Fisica Nucleare

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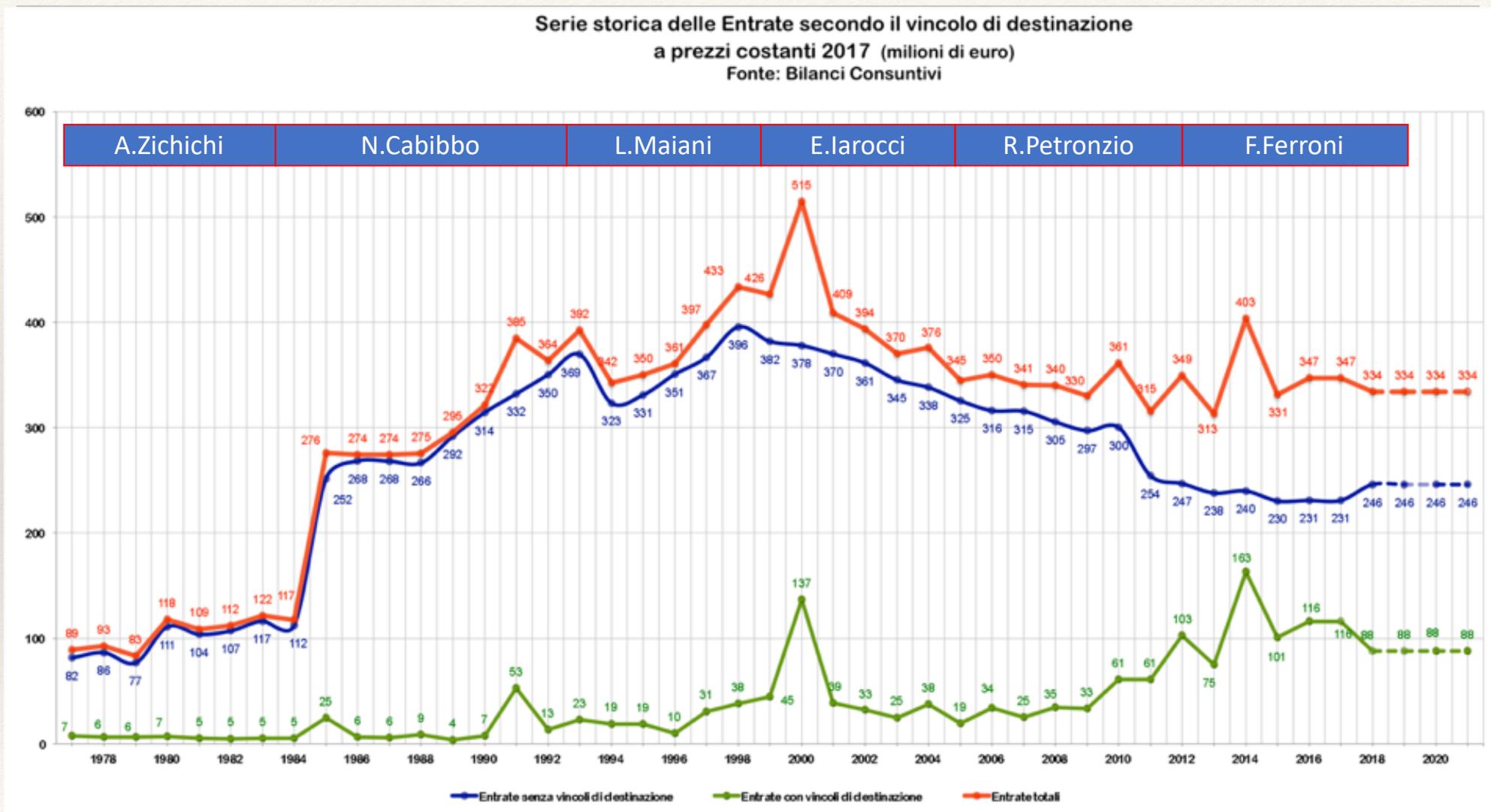
# Outline

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- Definition and relevance of External Funds
- European Commission policy and priorities
- Framework Programmes: Horizon2020, Horizon Europe
- Excellence Science Pillar, scores and examples
- Tips in the preparation of EU research project
- Conclusions

Credits: **Alessia D'Orazio**, Divisione Fondi  
Esterni INFN

# INFN External Funds: current plot



More than 1/3 of budget from external sources, and rising.

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# Definition of “external fund”

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Whatever is not **FOE** (Fondo Ordinario per il finanziamento degli Enti e istituzioni di ricerca) directly funded by MIUR.

It's a vast entity: **funds from international and national programs**, scientific collaborations with national and international institutes, technology transfer, contract to third parties, banking foundations or venture capitalist grants, patents and royalties, donations.

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# Why to look for external funds?

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## PROS

- International competitiveness
  - International visibility
  - Collaboration widening
  - Personal and Institution prestige
  - Career
- Fostering Scientific Management
- Money €€

**MUST**

## CONS

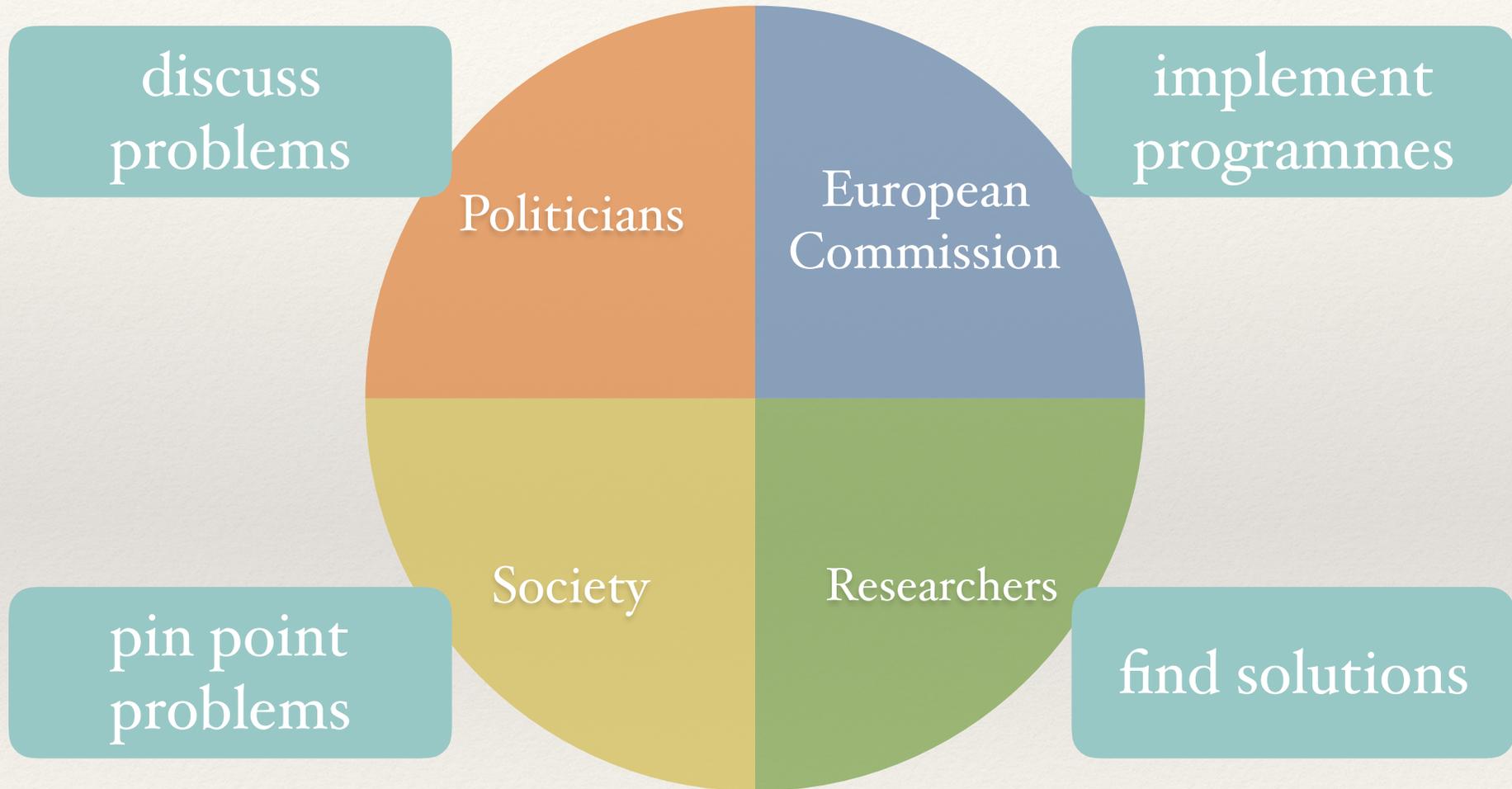
- International success might not be rewarded at national scale
- Potential drift of Institute Research mainstream
- Potential weakening of Fundamental Research

**MUST  
BE CAREFUL**

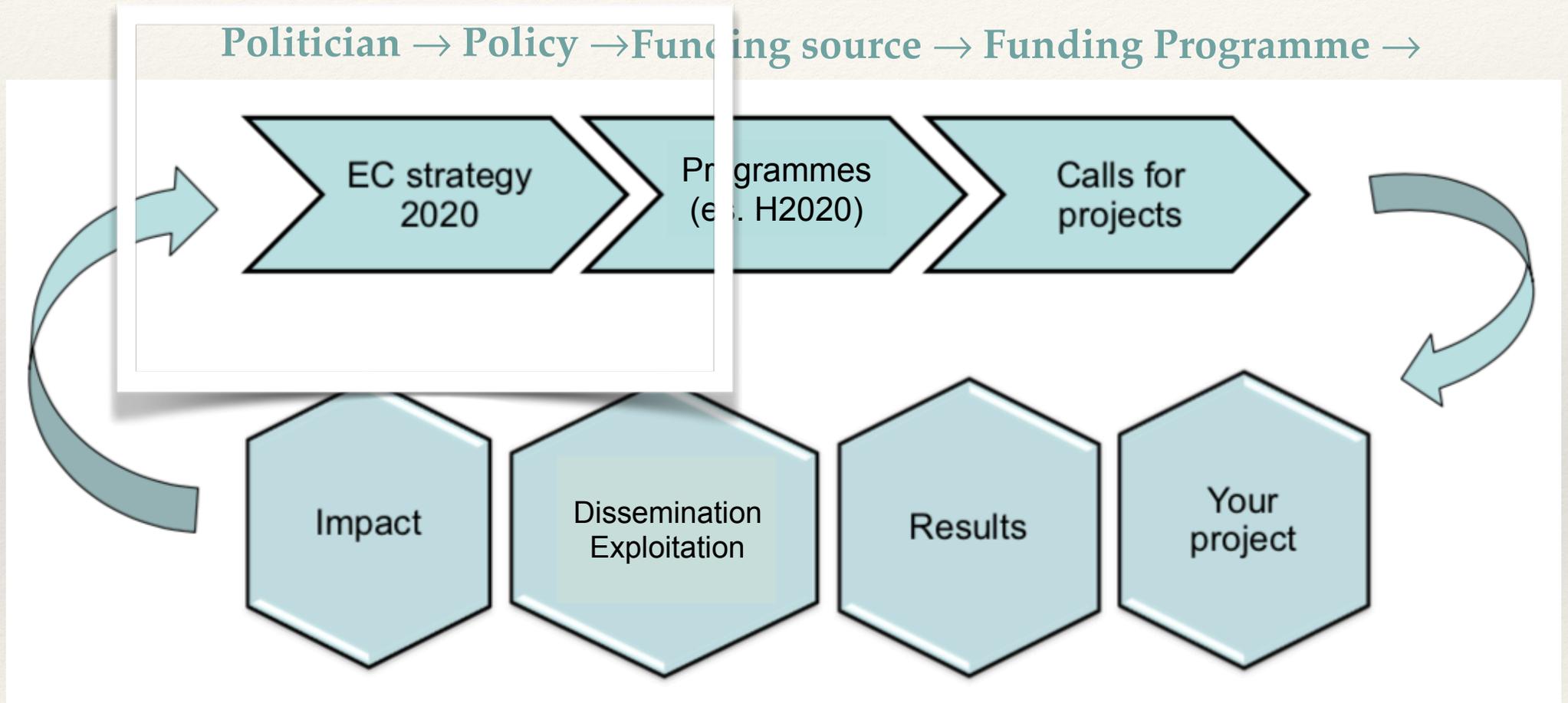
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# The Big Picture

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# The Big Picture



**Politician ← Impact ← Your project ←**

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# EC Strategy 2020

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## Overall political strategy

The EU's overall political strategy is developed jointly by its institutions: the **European Parliament, European Council, Council of the European Union, and European Commission.**

In particular, the European Council (gathering the leaders from the 28 EU countries) provides **orientations** and general political **priorities**.

**Every 5 years**, at the beginning of a new Commission term, **the President of the Commission sets out the priority areas** to be focused on during that term. These areas are derived from the Council's strategic agenda and from discussions with the **political groups** of the European Parliament.

## Priorities for 2014 – 2019

The Commission has indicated **10 priorities** for the period 2014-19

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# 10 Commission Priorities 2014-2019

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## 1. Jobs, growth and investment

Boosting investment and creating jobs

## 2. Digital single market

Bringing down barriers to unlock online opportunities

## 3. Energy union and climate

Making energy more secure, affordable and sustainable

## 4. Internal market

A deeper and fairer internal market

## 5. A deeper and fairer economic and financial union

Combining stability with fairness and accountability

## 6. A balanced and progressive industrial policy to harness globalisation

Open trade - with Europe's standard

## 7. Justice and fundamental rights

Stepping up cooperation on security and justice in the EU and preserving the rule of law

## 8. Migration

Towards a European agenda on migration

## 9. A stronger global actor

Strengthening the global role of Europe

## 10. Democratic change

Making the EU more transparent and democratically accountable

SET UP STRATEGIES TO ACCOMPLISH THESE TARGETS

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# EUROPE 2020 strategy

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EU agenda for **growth and jobs** for the current decade emphasises **smart, sustainable and inclusive growth** as a way to overcome the structural weaknesses in Europe's economy, improve its **competitiveness** and **productivity** and underpin a **sustainable social market economy**.

## TARGETS

### Climate change and energy

greenhouse gas emissions 20% lower than 1990 levels  
20% of energy coming from renewables  
20% increase in energy efficiency

### Education

rates of early school leavers below 10%  
at least 40% of people aged 30–34 having completed higher education

### Employment

75% of people aged 20–64 to be in work

### Research and development (R&D)

3% of the EU's GDP to be invested in R&D

### Poverty and social exclusion

at least 20 million fewer people in – or at risk of – poverty/social exclusion

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# The Europe 2020 targets

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- They give an overall view of where the EU should be on key parameters by 2020.
- They are translated into national targets so that each EU country can check its own progress towards each goal.
- There is no burden-sharing – they are common goals for all EU countries, to be met through a mix of national and EU action.
- They are interrelated and mutually reinforcing
  - educational improvements help employability and reduce poverty
  - R&D/innovation and more efficient energy use makes us more competitive and creates jobs
  - investing in cleaner technologies combats climate change while creating new business or job opportunities.

# Strategy monitoring

The EU statistics office, Eurostat, regularly publishes comprehensive progress reports for the targets.

In 2014-15, the Commission performed a mid-term review of Europe 2020. This included a public consultation that showed that the strategy is still seen as an appropriate framework to promote jobs and growth.

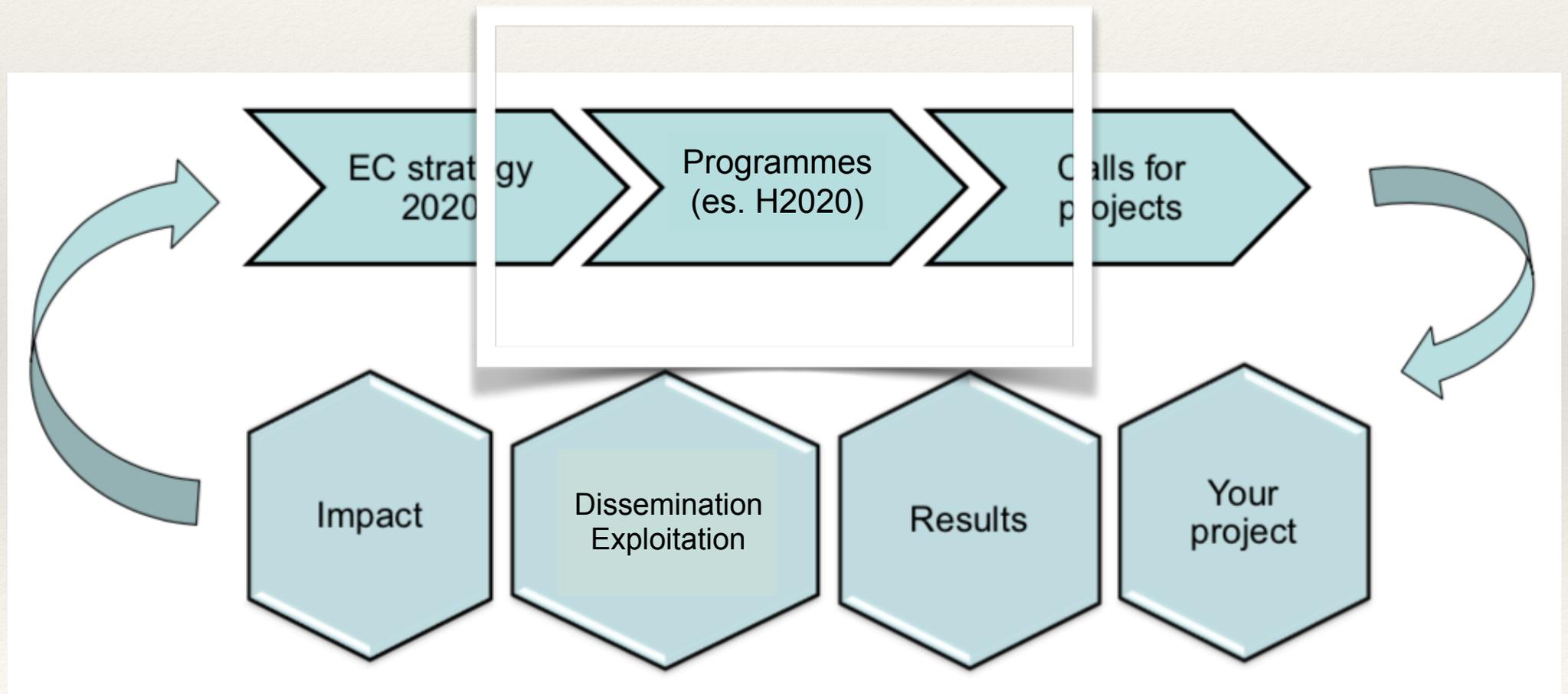
Following the review, the Commission decided to continue the strategy, monitoring and implementing it through a process known as the **European Semester**.

Last EUROSTAT report 2018, recommended, quite interesting!



# Strategy → Programmes

Targets are met by defining several specific “Funding Programmes”



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# Strategy implementation

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## **direct funding**

by EU Commission/Executive Agencies  
Supported by Europe2020 policy

- Direct management: Apply directly to Brussels
- Competitive bidding process
- transnational partnerships (with some exceptions)

## **indirect funding**

by National/Regional Authorities  
Supported by Cohesion policy  
(one of the tools to delivers the Europe 2020 strategy)

- National multiannual allocation (funds from EU)
- Shared management: Apply at national / regional level

but also

Financial Instruments (mix of EU and EIB/ local financing institutes)  
support different Programmes/ Juncker Plan Investment

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# European National Funds

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For the period 2014-2020

## **direct funding**

by EU Commission/Executive Agencies

200G€  
28 programmes

## **indirect funding**

Cofounded by National/Regional Authorities  
Supported by Cohesion policy

325G€ which sum 500G€ funded at national/  
regional level

Defined by Coesion Policy - Funds SIE 2014-2020

**2021-2027 330G€** with +6% per l'Italia. **Sardegna and Molise** declassified from Transition Regions to Underdeveloped Regions, **Marche e Umbria** declassified from Overdeveloped Regions to Transition Regions.

# Direct funding programmes I

Programme	Thematic Categories	Beneficiaries
Ambient Assisted Living Joint Programme (AAL JP)	Health Information and Communication Technologies	Private Sector Academic institutions and research centers
Baltic Sea Research and Development Programme (BONUS)	Environment	Private Sector Public Sector
Competitiveness of Enterprises and SMEs (COSME)	Trade and Commerce Economic growth and Competitiveness Information and Communication Technologies	Private Sector Public Sector
Connecting Europe Facility (CEF)	Transport Energy Telecommunications	Public Sector Non-Profit Organizations Academic institutions and research centers
Consumer Programme 2014-2020	Health Consumer Safety Education and Training Internal Market	Public Sector Non-Profit Organizations

# Direct funding programmes II

Programme	Thematic Categories	Beneficiaries
Creative Europe	Culture Media and Audiovisual Sector	Private Sector Public Sector Non-Profit Organizations Academic institutions and research centers
Customs 2020	Internal Market Law Enforcement Education and Training	Public Sector Central Government
Employment and Social Innovation Programme (EASI)	Social Affairs and Human Rights Labour Market Entrepreneurship	Private Sector Academic institutions and research centers Non-Profit Organizations
Erasmus+	Education and Training Youth Sport	Private Sector Public Sector Non-Profit Organizations Academic institutions and research centers

# Direct funding programmes III

Programme	Thematic Categories	Beneficiaries
Europe for Citizens	European Citizenship Democracy and Civic Participation	Public Sector Non-Profit Organisations Academic institutions and research centers
Fiscalis 2020	Internal Market Information and Communication Technologies Education and Training	Public Sector Central Government
Galileo and Egnos (European Geostationary Navigation Overlay Service) Programmes	Space Information and Communication Technologies	Central Government Private Sector Public Sector Academic institutions and research centers
Health for Growth	Health	Non-Profit Organizations Academic institutions and research centers

# Direct funding programmes IV

Programme	Thematic Categories	Beneficiaries
Hercule III	Education and Training Law enforcement Internal Market	Central Government Academic institutions and research centers Non-Profit Organizations
Horizon 2020	Energy Environment Health Industry Information and Communication Technologies Justice Security Social Affairs and Human Rights Space Telecommunications Transport Youth Economic growth and competitiveness	Private Sector Public Sector Bodies Non-Profit Organizations Academic institutions and research centers

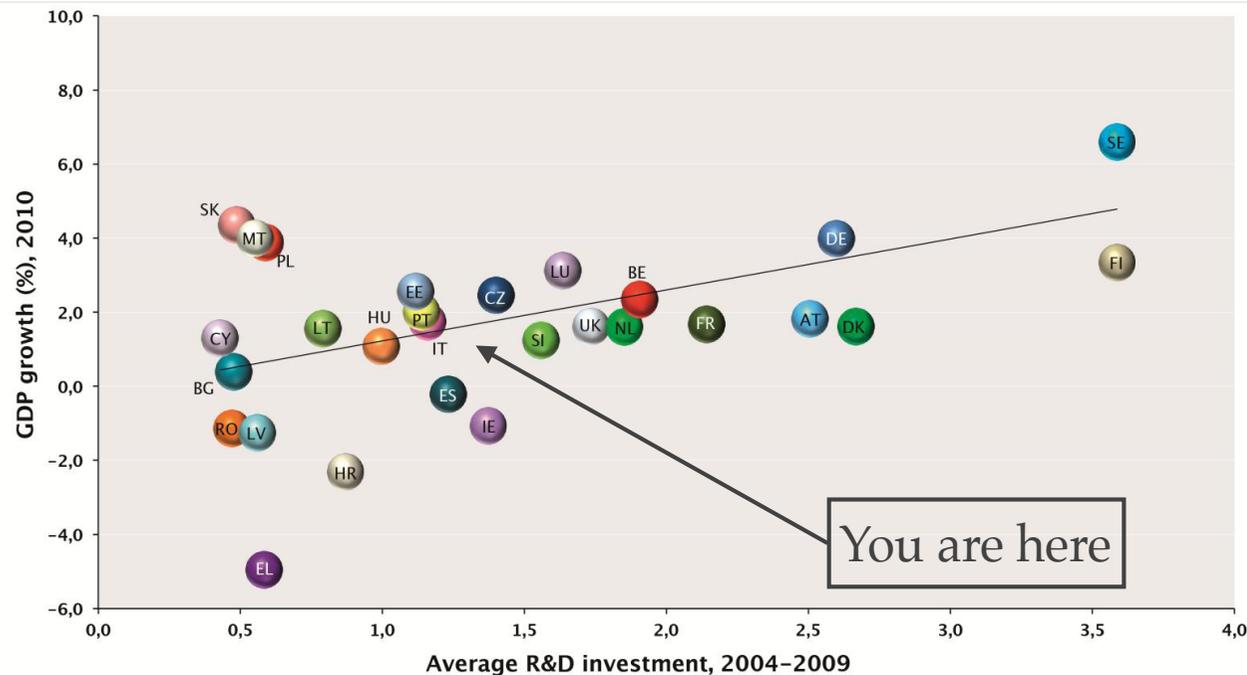
# Direct funding programmes V

Programme	Thematic Categories	Beneficiaries
Internal Security Fund – Component for Police Cooperation	Justice and Security, Law Enforcement, Education and Training	Central Government
LIFE Programme	Environment	Private Sector Public Sector Non-Profit Organizations Academic institutions and research centers
Pericles 2020	Law enforcement Education and Training Justice and Security Internal Market	Central Government, Public sector
Rights and Citizenship Programme 2014-2020	European Citizenship Social Affairs and Human Rights, Labour Market	Public Sector Central Government



# HORIZON 2020 (FP8)

Horizon 2020 is the **biggest** EU Research and Innovation programme **ever** with nearly €80 billion of funding available over **7 years (2014 to 2020)** – in addition to the private investment that this money will attract. It promises more **breakthroughs, discoveries** and **world-firsts** by taking great ideas from the lab to the market.



Source: DG Research and Innovation - Economic Analysis Unit  
Data: Eurostat

Notes. (1) Greece: average R&D intensity refers to 2004-2007.  
(2) Denmark, Portugal, Slovenia, Sweden: Break in series between 2004-2009.

EU implements the policy that **research** is an **investment** in our future and so put it at the heart of the EU's blueprint for **smart, sustainable** and **inclusive** growth and jobs.

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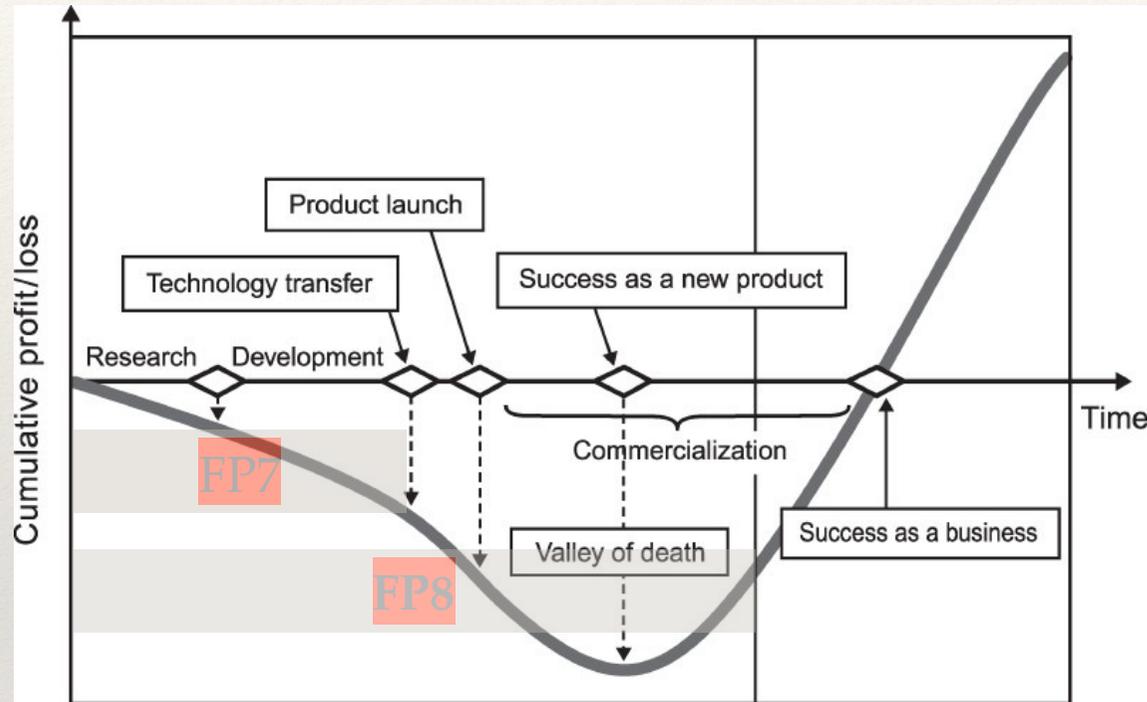
# HORIZON 2020

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What (was) new:

- A **single programme** bringing together three separate programmes / initiatives
- Coupling **research to innovation** – from research to retail, all forms of innovation
- Focus on **societal challenges** facing EU society, e.g. **health, clean energy and transport**
- **Simplified access**, for all companies, universities, institutes in all EU countries and beyond

# FP7 vs FP8

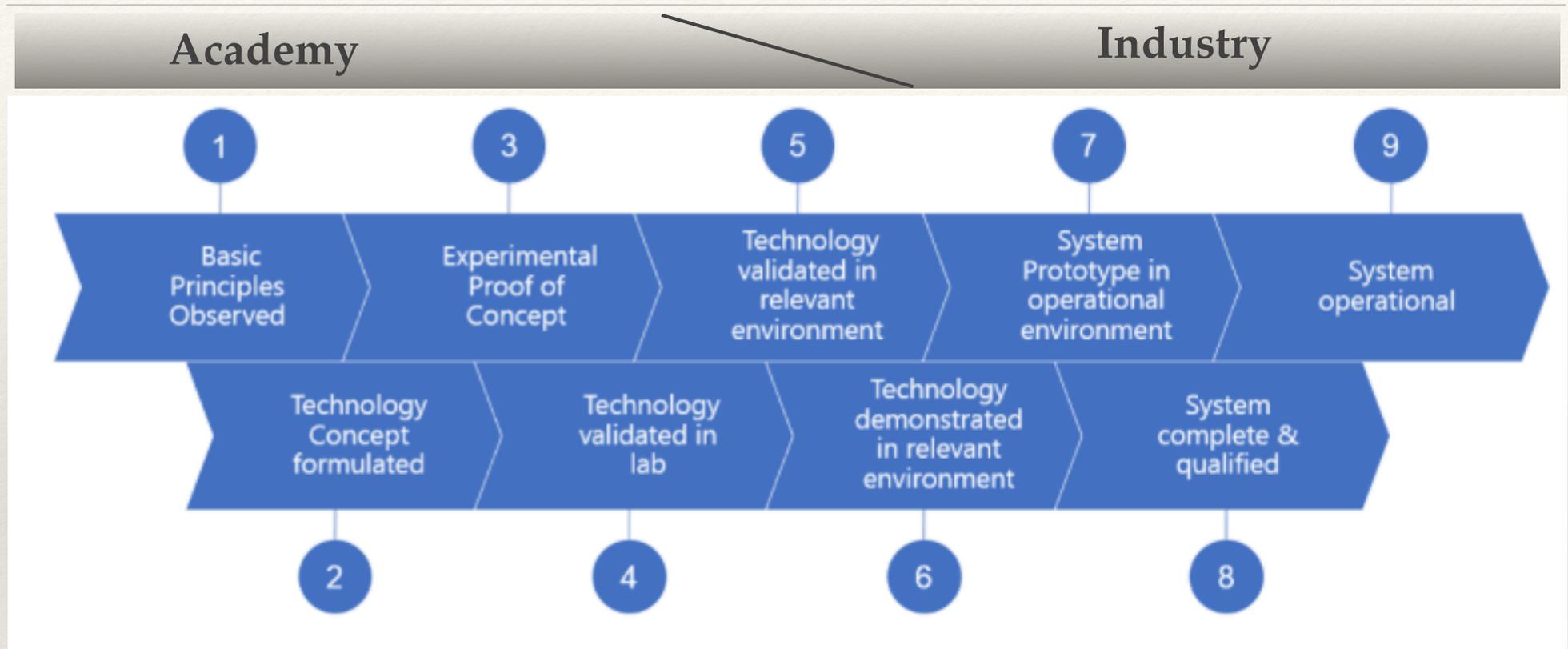


FP7	H2020
LINEAR THEMATIC CALLS	CHALLENGE BASED CALLS (MULTIDISCIPLINARIT
ACADEMIA CENTERED	BUSINESS CENTRED
FOCUS ON R&D	FOCUS ON ADDED VALUE OF INNOVATION
SUPPLY-DRIVEN	DEMAND-DRIVEN
LINEAR APPROACH	SYNERGISTIC APPROACH
KNOWLEDGE ORIENTED	IMPACT ORIENTED

Stressing **IMPACT** and **INNOVATION** concepts

In few words: FP7 was far simpler for Fundamental Research Organizations (like ours). But do not forget when submitting a proposal, that your project has to align its goals with the policy of the underlying call, not the other way around.

# Technology Readiness Level



TRL is a widely used acronym in external funds projects

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## H2020: focus on **impact, dissemination and exploitation**

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These are key points in writing H2020 projects and should be described well and in detail.

- **Impact:** Impact is **NOT the result** of the project but rather it's **value**
- **Dissemination:** sharing research results with **potential users** - peers in the research field, industry, other commercial players and policymakers).
- **Exploitation:** use of results for commercial purposes or in public policymaking.

# Horizon 2020

## Three priorities

- **WHY:** World class science is the foundation of tomorrow's technologies, jobs and wellbeing
- **WHAT:** Europe needs to develop, attract and retain research talent
- **HOW:** Researchers need access to the best infrastructures

**Excellent science**

- **WHY:** Concerns of citizens and society/EU policy objectives (climate, environment, energy, transport, etc) cannot be achieved without innovation

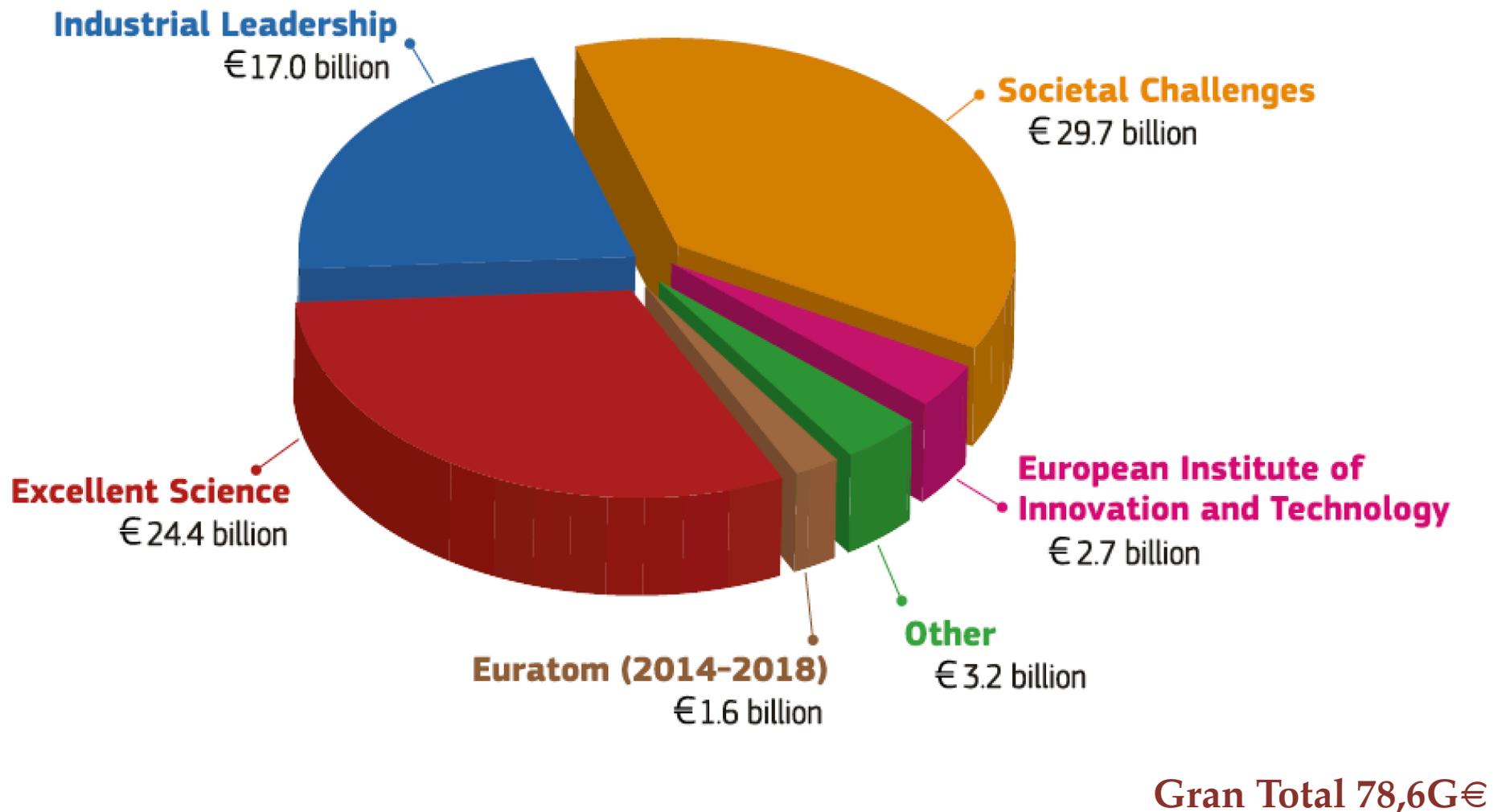
- **WHY:** Strategic investments in key technologies (e.g. advanced manufacturing, micro-electronics) underpin innovation across existing and emerging sectors
- **WHAT:** Europe needs to attract more private investment in research and innovation
- **HOW:** Europe needs more innovative small and medium-sized enterprises (SMEs) to create growth and jobs

**Industrial leadership**

**Societal challenges**

- **WHAT:** Breakthrough solutions from multi-disciplinary collaborations, including social sciences & humanities
- **HOW:** Promising solutions need to be tested, demonstrated and scaled up

# HORIZON 2020 budget



# H2020 split budget

M€ Excellent Science		M€ Industrial Leadership		M€ Societal Challenge	
13 095	<b>European Research Council (ERC)</b> Frontier research by the best individual teams	13 557	<b>Leadership in enabling and industrial technologies (LEITs)</b> (ICT, nanotechnologies, materials, biotechnology, manufacturing, space)	7 472	<b>Health, demographic change and wellbeing</b>
2 696	<b>Future and Emerging Technologies</b> Collaborative research to open new fields of innovation	2 842	<b>Access to risk finance</b> Leveraging private finance and venture capital for research and innovation	3 851	Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the Bioeconomy
6 162	<b>Marie Skłodowska-Curie actions (MSCA)</b> Opportunities for training and career development	616	<b>Innovation in SMEs</b> Fostering all forms of innovation in all types of SMEs	5 931	<b>Secure, clean and efficient energy *</b>
2 488	<b>Research infrastructures (including e-infrastructure)</b> Ensuring access to world-class facilities	+		6 339	<b>Smart, green and integrated transport</b>
		.....		3 081	Climate action, environment, resource efficiency and raw materials
				1 310	<b>Inclusive, innovative and reflective societies</b>
				1 695	<b>Secure societies</b>
				462	<i>Science with and for society</i>
				816	<i>Spreading excellence and widening participation</i>

\*Additional funding for nuclear safety and security from the **Euratom** Treaty activities (2014-2018)

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# Calls and Topics

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Most of the Horizon 2020 **calls** are divided into **topics**. On the *Funding & Tenders Portal*, where you can find useful information for your proposal:

- **Call page**
  - latest information and updates to the call
  - call summary that describes the common scientific field or societal challenge or innovation that the topics of this call are tackling
- **Topic page**
  - latest information and updates to the topic
  - detailed description of the topic scope, expected impact of projects and its type of action
  - topic conditions and documents, including its eligibility and evaluation criteria, pdf-templates of the forms that you will have in the electronic submission system
  - access to the submission system
  - support services that you can use when preparing your proposal for this topic

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# Types of Actions

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Horizon 2020 calls can have different types of **actions (funding schemes)**.

The type of action specifies:

- the scope of what is funded
- the reimbursement rate
- specific evaluation criteria to qualify for funding

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# Research and Innovation Actions (RIA)

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EU funding rate – **100%**

Activities aiming to establish **new knowledge** and/or to explore the feasibility of a **new or improved technology, product, process, service or solution**. For this purpose they may include **basic and applied research, technology development and integration**, testing and validation on a small-scale prototype in a laboratory or simulated environment.

Projects may contain closely connected but limited demonstration or pilot activities aiming to **show technical feasibility** in a near to operational environment.

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# Innovation Actions

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EU funding rate – **70%** (except non-profit, which are still funded 100%)

More related to **industrial activity**. Activities directly aiming at producing **plans** and arrangements or designs for **new**, altered or improved **products, processes or services**. For this purpose they may include prototyping, testing, demonstrating, piloting, large-scale product validation and market replication.

# Coordination and Support Actions

Accompanying measures such as **standardisation, dissemination, awareness-raising** and **communication, networking, coordination** or **support** services, policy dialogues and mutual learning exercises and studies.

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# European Research Council Grants

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To support frontier research.

EU funding rate – 100%

**Starting Grant** - support up-and-coming research leaders who are about to establish a proper research team and to start conducting independent research in Europe. The scheme targets promising researchers who have the proven potential of becoming independent research leaders. It will support the creation of excellent new research teams. For researchers of any nationality with **2-7 years of experience since completion of PhD** (or equivalent degree) and scientific track record showing great promise.

**Consolidator Grant** - support researchers at the stage at which they are consolidating their own independent research team or programme. The scheme will strengthen independent and excellent new individual research teams that have been recently created. For researchers of any nationality with **7-12 years of experience since completion of PhD** (or equivalent degree) and scientific track record showing great promise.

**Advanced Grant** – for exceptional established research leaders of any nationality and any age to pursue ground-breaking, high-risk projects that open new directions in their respective research fields or other domains. The ERC Advanced Grant funding targets researchers who have already established themselves as **independent research leaders in their own right**.

**Proof of Concept Grant** - open to **researchers who have already been awarded an ERC grant**. ERC grant holders can apply for this additional funding to establish the **innovation potential** of ideas arising from their ERC-funded frontier research projects.

**Synergy grant** - to enable a small **group of researchers** and their teams to bring together complementary skills, knowledge, and resources in new ways, in order to **jointly address a research problem**.

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# Marie Skłodowska-Curie Actions

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EU funding rate – **100%**

Marie Skłodowska-Curie **Individual Fellowships** (MSCA IF)

European Fellowships

Global Fellowships

Marie Skłodowska-Curie **Innovative Training Networks** (ITN)

Training Networks

European Industrial Doctorates

European Joint Doctorates

Marie Skłodowska-Curie **Research and Innovation Staff Exchange** (RISE)

Co-funding of regional, national and international programmes (COFUND)

Doctoral programmes

Fellowship programmes

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# Cofund Actions

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## **ERA-NET Cofund**

supports **public-public partnerships**, including joint programming initiatives **between Member States**, in their preparation, establishment of networking structures, implementation of **joint activities** as well as Union **topping-up** of a trans-national call for proposals. It is based on the merger of the former ERA-NET and ERA-NET Plus actions. It allows for programme collaboration in any part of the entire research-innovation cycle.

The main and compulsory activity of the ERA-NET Cofund is the implementation of the co-funded joint call for proposals to **fund trans-national research and innovation projects**.

The EU contribution is limited to **max. 33% of the total eligible costs** of the action.

## **European Joint Programme (EJP) Cofund**

supports **coordinated national research and innovation programmes**. It aims at attracting and pooling a **critical mass of national resources on objectives and challenges of Horizon 2020** and at achieving significant economies of scales by adding related Horizon 2020 resources to a joint effort. The EJP Cofund does not promote types of activities or forms of coordination, but relies on modalities and processes agreed by the coordinated national programmes and related actors.

The EU contribution is limited to **70% of the total eligible costs** of the action, unless otherwise specified in the call conditions.

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# Other actions

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## **Procurement Actions**

**Pre-Commercial Procurement:** enables the public sector as a technologically demanding buyer to encourage research and development of breakthrough solutions that can bring radical quality and efficiency improvements in areas of public interest, whilst opening market opportunities for industry and researchers.

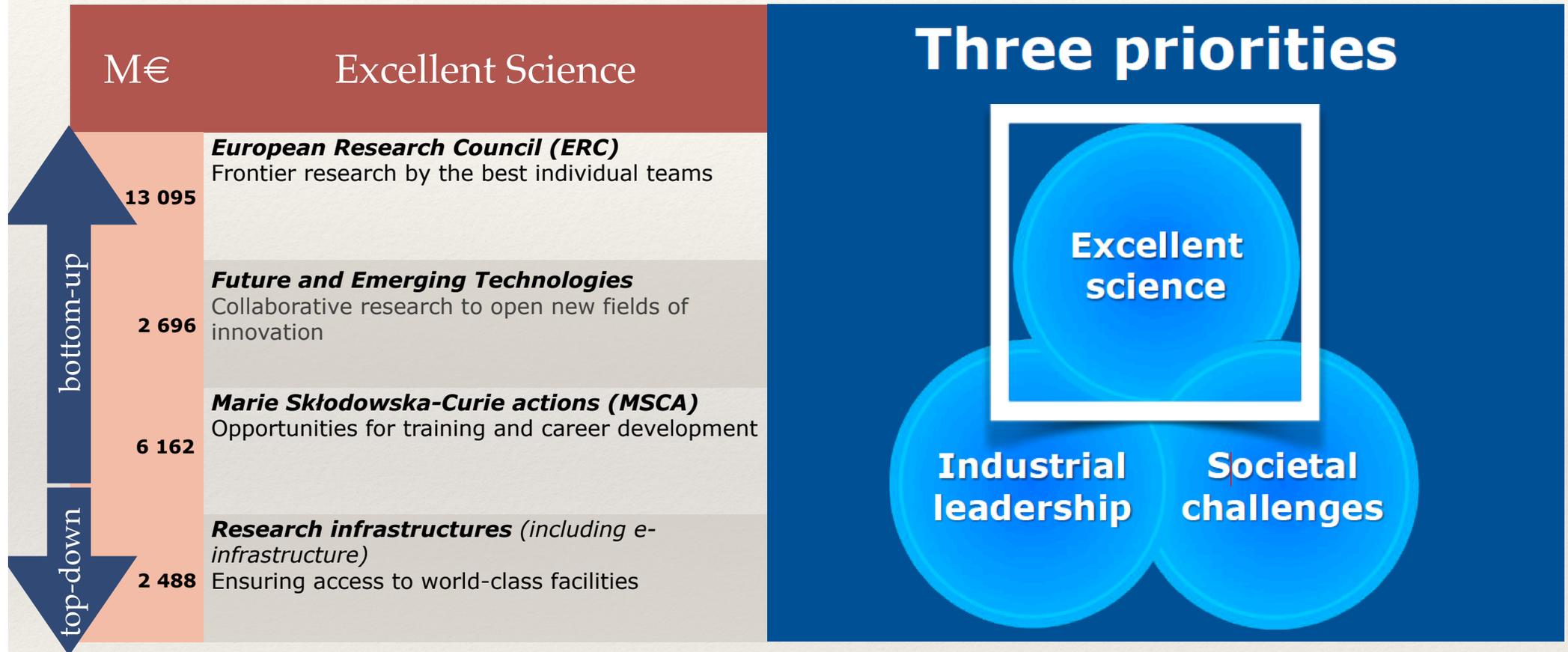
**Public Procurement of Innovative Solutions:** reinforces early deployment of innovative solutions that address challenges of public interest. The aim is to enable trans-national groups of procurers to share the risks of acting as early adopters of innovative solutions and to overcome the fragmentation of demand for innovative solutions in Europe. Each PPI action focuses on one concrete unmet need that is shared by the participating procurers and requires innovative solutions that are to a significant extent similar across countries and are therefore proposed to be procured jointly.

## **SME Instruments**

EU funding rate – lump-sum i.e. a specific amount of funding is given. Support to SME new ideas deployment divided in 3 TRL phases.

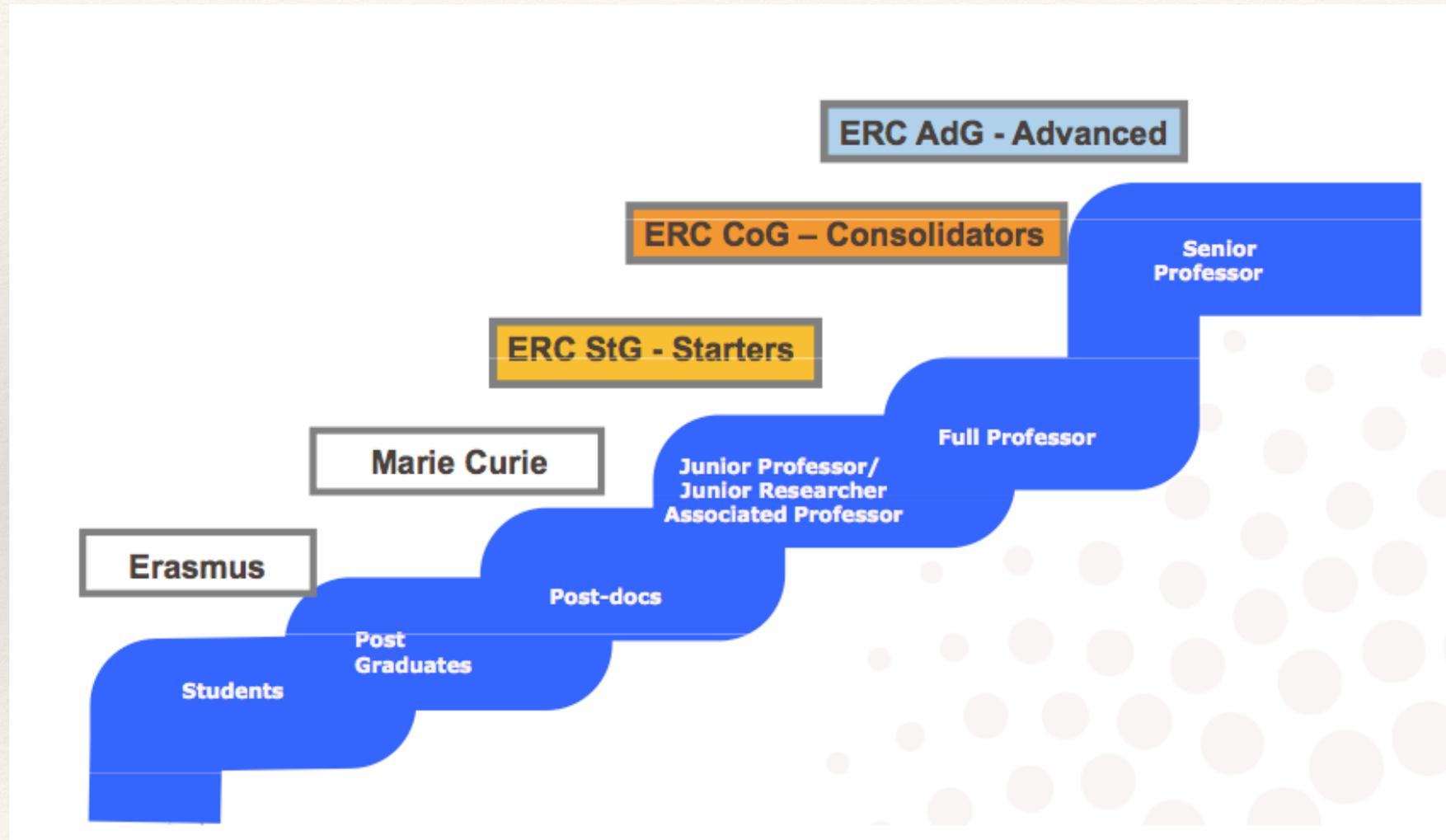
## **Inducement and Recognition Prizes**

# Excellent Science



The natural pillar for fundamental research, mostly bottom-up approach

# The natural progression



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# Marie Skłodowska Curie Action (MSCA)

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## MARIE SKŁODOWSKA-CURIE ACTIONS

### Research Fellowship Programme

Grants for all stages of researchers' **careers** and encourage **International, Intersectoral** and **Interdisciplinary mobility**.

Equip researchers with the necessary **skills** and **international experience** for a successful career, either in the public or the private sector, offering **attractive working conditions** and the opportunity to move between academic and other settings.

MSCA are open to **all domains of research and innovation**

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# MSCA overview

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5 possible programs:

1. Innovative Training Network (**ITN**)
2. Individual Fellowships (**IF**)
3. Research and Innovation Staff Exchange (**RISE**)
4. **COFUND**
5. **NIGHT**

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# MSCA: Innovative Training Network

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ITNs support competitively selected **joint research training** and/or **doctoral programmes**, implemented by European **partnerships of universities, research institutions, and non-academic organisations**.

The research training programmes provide **experience outside academia**, hence developing innovation and employability skills. ITNs include **industrial doctorates**, in which non-academic organisations have an equal role to universities in respect of the researcher's time and supervision, and **joint doctoral degrees delivered by several universities**.

Furthermore, non-European organisations can participate as additional partners in ITNs, enabling doctoral-level candidates to gain experience outside Europe during their training.

The consortium must be composed of at least three beneficiaries established in **three different EU Member States or Horizon 2020 Associated Countries**. All three legal entities must be independent of each other

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# MSCA: Individual Fellowships

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support for experienced researchers undertaking **mobility between countries**, optionally to the non-academic sector

Individual Fellowships support the **mobility** of researchers within and beyond Europe - as well as helping to attract the best foreign researchers to work in the EU. The grant usually covers **two years' salary, a mobility allowance, research costs and overheads for the host institution.**

Individual researchers submit proposals for funding **in liaison with their planned host organisation.** Proposals are judged on their

- **research quality**
- **researcher's future career prospects**
- **support offered by the host organisation.**

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# MSCA: Research and Innovation Staff Exchange

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RISE supports **short-term mobility of research and innovation staff at all career levels**, including also administrative and technical staff. It is open to **partnerships of universities, research institutions, and non-academic organisations both within and beyond Europe**. In **worldwide partnerships**, academia-to-academia exchanges are permitted.

The consortium must be created by **at least three legal entities**, independent of each other and established **in at least three different countries**. At least two of them must be beneficiaries established in an EU Member State or Horizon 2020 Associated Country. If all participating organisations are from the **same sector** (i.e. either only academic or only non-academic), there must be **at least one partner organisation from a third country**.

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# MSCA: COFUND

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**Co-funding** of regional, national and international programmes that finance fellowships involving mobility to or from another country

The MSCA offer additional funding to regional, national and international programmes for **research training and career development**. COFUND programmes encourage the movement of researchers across borders and provide good working conditions. The scheme can **support doctoral and fellowship programmes**.

Grant foreseen for a **single beneficiary**

# MSCA: NIGHT

The **European Research Night** is a Europe-wide public event to **stimulate interest in research careers**, especially among young people. The activities are focused on the general public and might take various forms such as hands-on experiments, science shows, debates, competitions or quizzes. The NIGHT takes place yearly, typically on the last Friday of the month of September.

# European Research Council (ERC)



**Frontier research, cross disciplinary proposals and pioneering ideas** in new and emerging fields which introduce **unconventional and innovative approaches** (high risk - high reward, **curiosity driven**). The ERC's mission is to encourage the **highest quality research** in Europe through competitive funding on the basis of scientific excellence. Total budget of **13 095 M€**.

- 1 researcher; 1 host institution; 1 project; 1 selection criterion: **50% project scientific excellence, 50% PI scientific excellence**
- No consortia, no networks, **no co-financing**
- Applications can be made in **any field of research**, including social sciences and humanities
- Independent researchers from **anywhere in the world**, of **any age and career stage** can apply
- Host institutions must provide **conditions** for the researcher to direct the research and manage its funding
- The grant is '**portable**' to another host institution, if the grantholder wishes so
- Research must be carried out **in one of the EU member states** or associated countries

# Types of ERC grants

	<b>STARTING GRANT</b>	<b>CONSOLIDATOR GRANT</b>	<b>ADVANCED GRANT</b>	<b>PROOF OF CONCEPT</b>
<i>eligibility criteria</i>	PI : <b>PhD <math>\geq 2</math> e <math>\leq 7</math></b> years prior to 1 Gen. 201X	PI : <b>PhD <math>&gt; 7</math> e <math>\leq 12</math></b> years prior to 1 Gen. 201X	no max. limits	<b>only for PI of ERC</b> going or ended less than 12 months
	at least <b>1 important publication</b> <u>without PhD</u>	at least <b>1 important publication</b> <u>without PhD supervisor</u>		
	appropriate track record and <b>independence</b>	demonstrate track record and <b>independence</b>	<b>significant research achievements</b> in the last 10 years	
	PI : <b><math>\geq 50\%</math> of time</b> on project and $\geq 50\%$ in EU	PI : <b><math>\geq 40\%</math> of time</b> on project and $\geq 50\%$ in EU	PI : <b><math>\geq 30\%</math> of time</b> on project and $\geq 50\%$ in EU	
<i>max grant</i>	<b>1.5M€</b> in 5 years (+ additional 0.5M€ for special cases)	<b>2M€</b> in 5 years (+ additional 0.75 M€ for special cases)	<b>2.5M€</b> in 5 years (+ additional 1 M€ for special cases)	150 k€ for 12 months (18 months possible)

# ERC Panel Structure

## Life Sciences – 9 Panels

- LS1 Molecular & Structural Biochemistry
- LS2 Genetics, Genomic Systems Biology
- LS3 Cellular and Developmental Biology
- LS4 Physiology, Pathophysiology, Endocrinology
- LS5 Neurosciences & Neuroscience
- LS6 Immunity & infectious diseases
- LS7 Diagnostic tools, therapeutic interventions
- LS8 Evolutionary, population genetics, biology
- LS9 Applied life science

## PE2 Fundamental Constituents of Matter

Particle, nuclear, plasma, atomic, molecular, gas, and optical physics

- PE2\_1 Fundamental interactions and fields
- PE2\_2 Particle physics
- PE2\_3 Nuclear physics
- PE2\_4 Nuclear astrophysics
- PE2\_5 Gas and plasma physics
- PE2\_6 Electromagnetism
- PE2\_7 Atomic, molecular physics
- PE2\_8 Ultra-cold atoms and molecules
- PE2\_9 Optics, non-linear optics and nano-optics
- PE2\_10 Quantum optics and quantum information
- PE2\_11 Lasers, ultra-short lasers and laser physics
- PE2\_12 Relativity
- PE2\_13 Thermodynamics
- PE2\_14 Non-linear physics
- PE2\_15 Metrology and measurement
- PE2\_16 Statistical physics (gases)

- SH5 Cultures & cultural production
- SH6 The study of the human past



European  
Commission

Horizon 2020  
European Union funding  
for Research & Innovation

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# ERC: how to build a competitive CV

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- Demonstrate **independence** from your PhD tutor (publication without your tutor, change activities, group or institution)
- Good publication record: includes paper in top journals and conferences and impact (check *impact factor*)
- **Mobility** —> avoid to stay in the same institution after your PhD. Consider a post-doc in another institution - you can always go back later!
- Experience towards **leading** a group (financial, supervision)
  - If possible, ask for some responsibilities, also financial ones (small responsibilities could be enough for young researchers). Enrich your CV with prizes, small grants, be proactive in this.

# Organization of an ERC proposal

## Administrative documentation

- Part A - online forms
- General information on research proposal
- Host Institution (HI) and applicant
- Budget
- Ethics
- Call specific questions

### Annexes - submitted as .pdf

- Host Institution support letter
- Copy of PhD (or equivalent degree) certificate (StG & CoG)
- If applicable document for extension of eligibility window (StG & CoG)
- If applicable explanatory information on ethical issues

## Documents sent to the panel members :

### Part B1 – submitted as .pdf

- a) Extended Synopsis 5p
- b) CV 2p
- c) Early achievements (StG & CoG) or 10-year track-record 2p

## Documents sent to the panel/reviewers:

### Part B2 – submitted as .pdf

- Full Scientific Proposal 15p
  - a) State-of-the-art and objectives
  - b) Methodology
  - c) Resources (incl project cost)

STEP 1/2 ONLY FOR STEP 2

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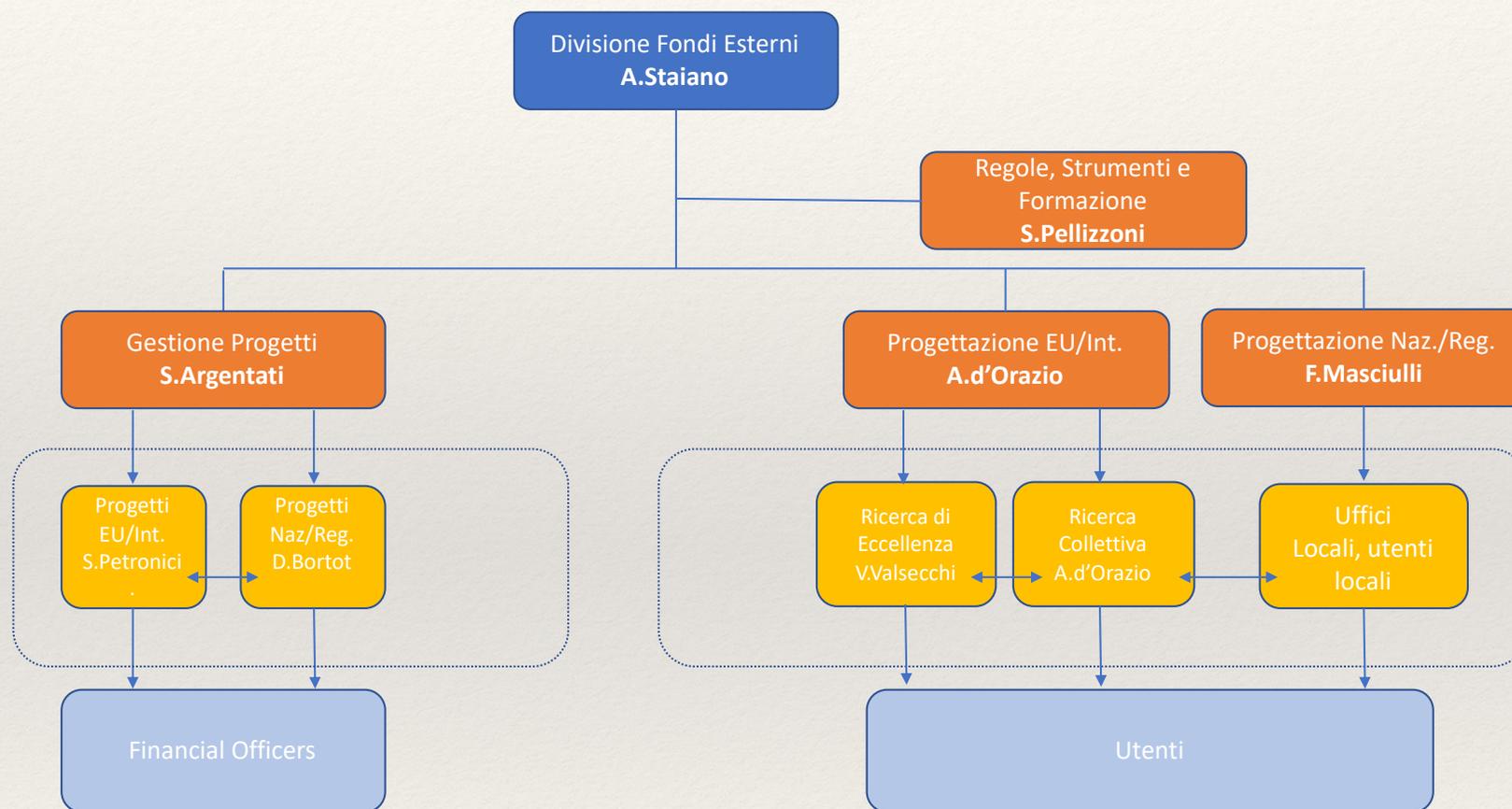
# ERC: how to fill B 1

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Few golden rules to write a successful project :

- Do not write for specialists but for a **generalist** reader
- Good and clear **English**
- The **topic** must be **relevant** and on the **cutting edge**
- Clearly identify current **gaps** in the topic
- Propose and underline the **novelties** in the proposal to **bridge the gap**
- Show a clear path to **gap filling**
- Show how **preliminary results** encourage and support the proposal
- Show how the **skills** required are matched by the **PI competence**
- Describe in detail the **impact** (scientific, social, economic)
- Research should be original, **NOT incremental**
- Pay attention to any **details** of the presentation, event esthetic
- In any circumstances: **always call the institute office which follows External Funds (Divisione Fondi Esterni in Infn)**

# INFN Divisione Fondi Esterni



- Divisione
- Servizio
- Ufficio

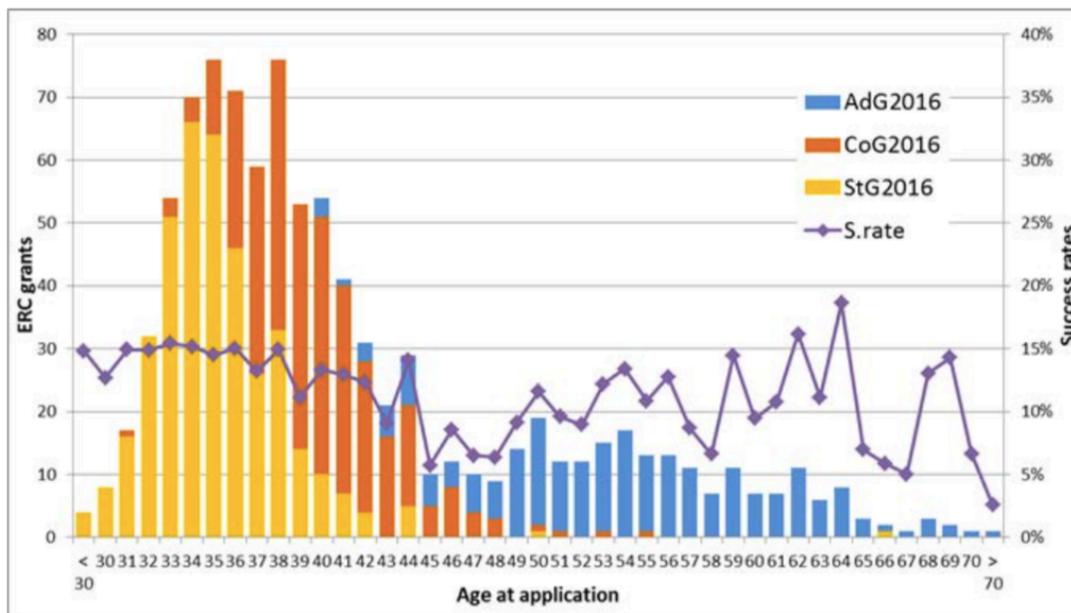
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# ERC: how to fill B2

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- It should not be a straight repetition of B1. **Never Cut&Paste;**
- Fill carefully the **budget breakdown;**
- Should be **autoconsistent**, reviewers at step 2 will not re-read B1;
- Should be enough **specific and detailed in the tasks description.**

# ERC: Statistics



Source: ERC

FUNDING SCHEME	ALL	CALL YEAR
Starting Grant (StG)	4218	✓ 2007 (305)
Consolidator Grant (CoG)	1822	✓ 2008 (284)
Advanced Grant (AdG)	2675	✓ 2009 (492)
Proof of Concept (PoC)	905	✓ 2010 (707)
Synergy Grants (SyG)	41	✓ 2011 (838)
		✓ 2012 (957)
		✓ 2013 (985)
		✓ 2014 (1068)
		✓ 2015 (1089)
		✓ 2016 (1095)
		✓ 2017 (1162)
		✓ 2018 (704)
FUNDING SCHEME	PE2	
Starting Grant (StG)	219	
Consolidator Grant (CoG)	102	
Advanced Grant (AdG)	150	
Proof of Concept (PoC)	0	
Synergy Grants (SyG)	0	

# Future and Emerging Technologies (FET)

The mission of FET : to turn Europe's excellent science base into a **competitive advantage**. **Impact:** renew the basis for future European competitiveness and growth, building a difference for society in the decades to come.

You are most probably here

FET Open

FET Proactive

FET Flagship

Bottom Up, smaller projects

Top Down Large Research Clusters

funds projects on new ideas for **radically new future technologies**, at an early stage when there are few researchers working on a project topic. This can involve a wide range of new technological possibilities, inspired by **cutting-edge science**, unconventional collaborations or new research and innovation **practices**.

nurtures **emerging themes**, seeking to establish a **critical mass** of European researchers in a number of **promising exploratory research topics**. This supports areas that are not yet ready for inclusion in industry research roadmaps, with the aim of building up and structuring new **interdisciplinary** research communities.

**1-billion, 10-years** initiatives where hundreds of excellent European researchers unite forces to focus on solving an ambitious scientific and technological challenge, like understanding the **Human Brain** or developing the new materials of the future, such as **Graphene**.

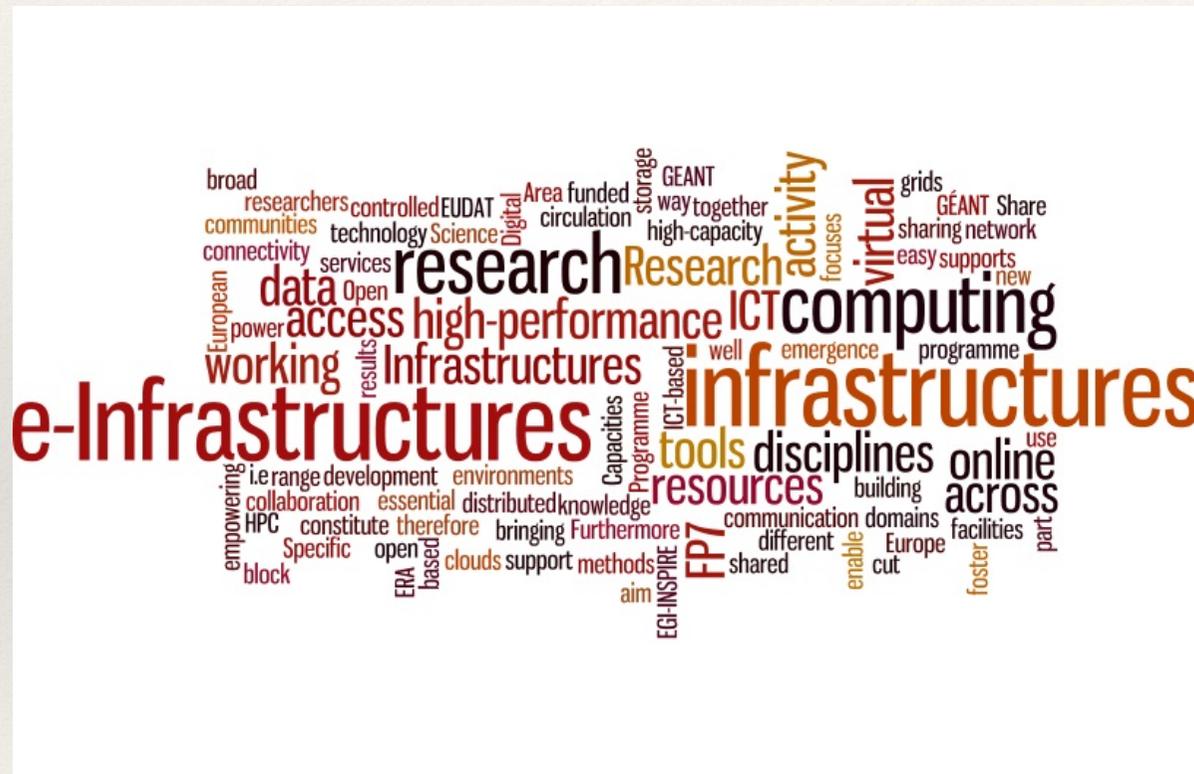
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# FET Open

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1. **Long-term vision:** a **new**, original or radical long-term vision of science- and technology-enabled possibilities going **far beyond the state of the art** and not currently foreseen by technology roadmaps.
2. **Breakthrough S&T target:** **scientifically** ambitious and **technologically** concrete breakthroughs plausibly attainable within the life-time of the project (to be argued in the proposal)
3. **Foundational:** the breakthroughs must be foundational in the sense that, if achieved, they can establish a basis for a **new line of technology** not currently anticipated.
4. **Novelty:** **new ideas** and concepts, rather than the application or incremental refinement of existing ones.
5. **High-risk:** the potential of a new technological direction depends on a **whole range of factors** that cannot be apprehended from a single disciplinary viewpoint.
6. **Interdisciplinary:** the proposed collaborations must **go beyond current mainstream collaboration configurations in joint S&T research**, and must aim to advance different scientific and technological disciplines **together and in synergy** towards a breakthrough.

# Research Infrastructures (RI)



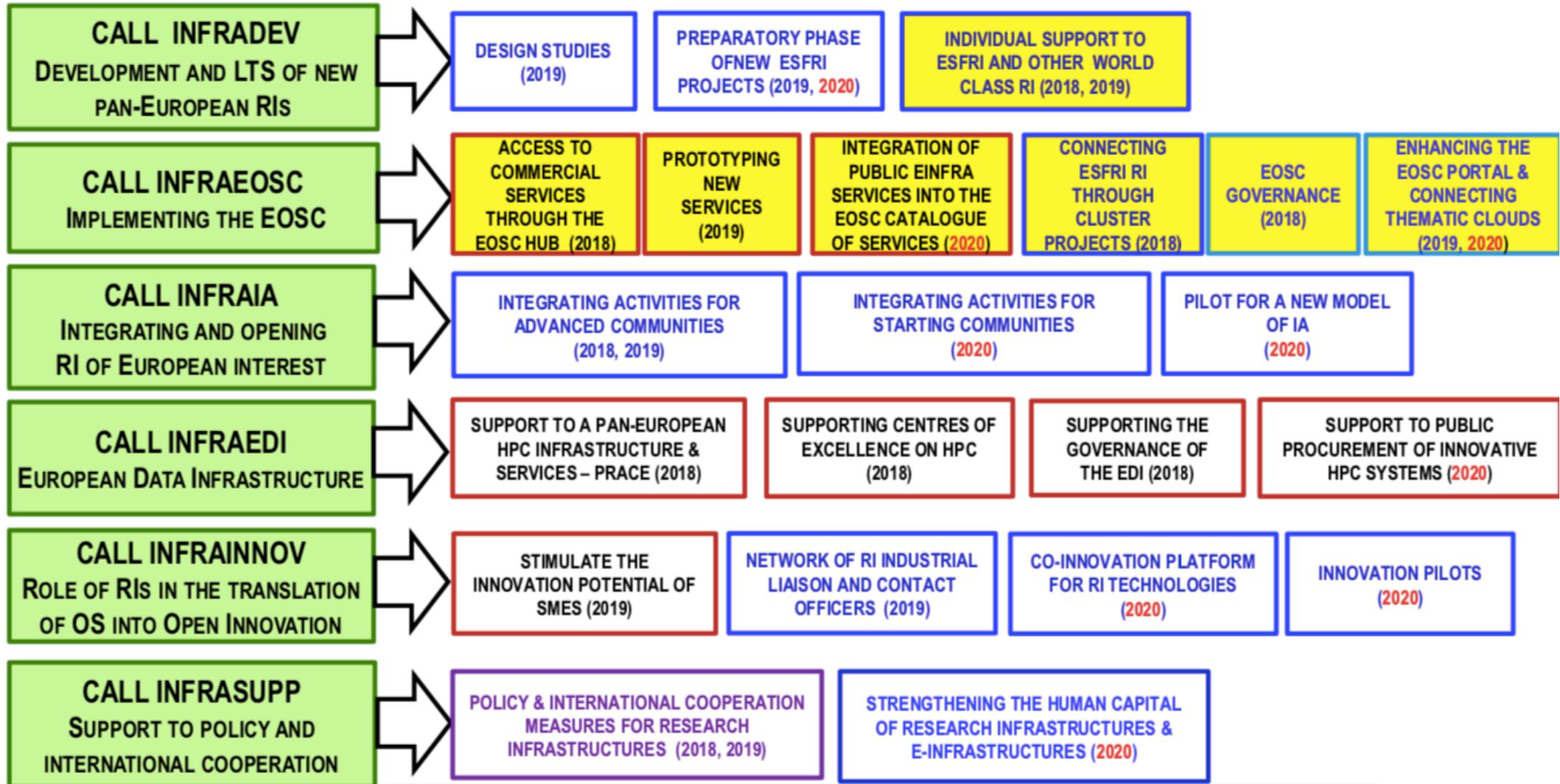
**Research Infrastructures** are **facilities** that provide **resources and services** for research communities to conduct research and foster innovation.

They can be used **beyond research** e.g. for education or public services and they may be **single-sited, distributed, or virtual**.

They include

- major scientific equipment or sets of instruments
- collections, archives or scientific data
- computing systems and communication networks
- any other research and innovation infrastructure of a unique nature which is open to external users

# RI Dictionary

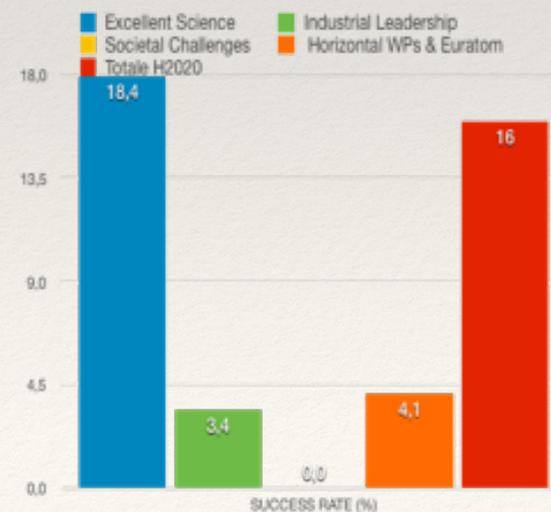
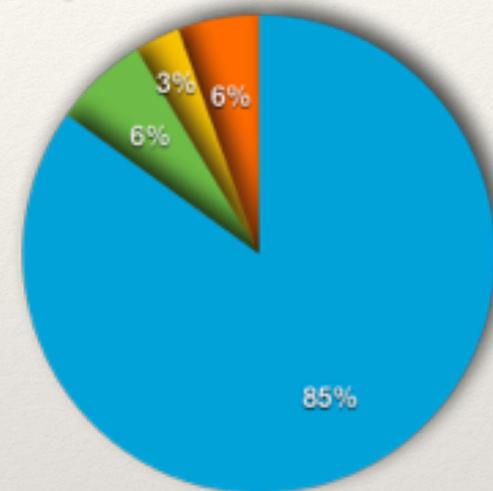


# INFN Score in H2020

Data 2014-2018, data source e-Corda

H2020	N. proposte sottomesse	N. proposte in valutazione	N. proposte finanziate	Finanziamento UE all'INFN (€)
Excellent Science	382	18	67	40.1M
Industrial Leadership	29	0	1	0.37M
Societal Challenge	14	0	0	0
Horizontal programme and EURATOM	25	1	1	0.24M
<b>Totale</b>	<b>450</b>	<b>19</b>	<b>69</b>	<b>40.8M</b>

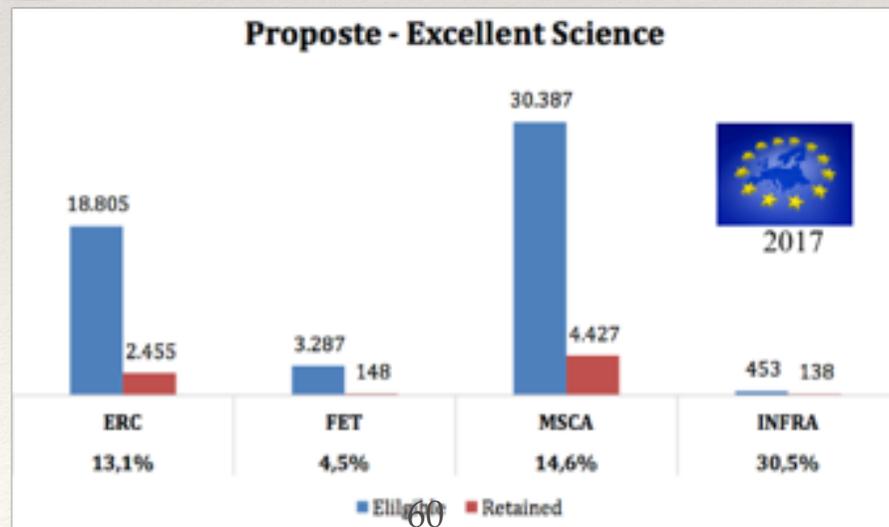
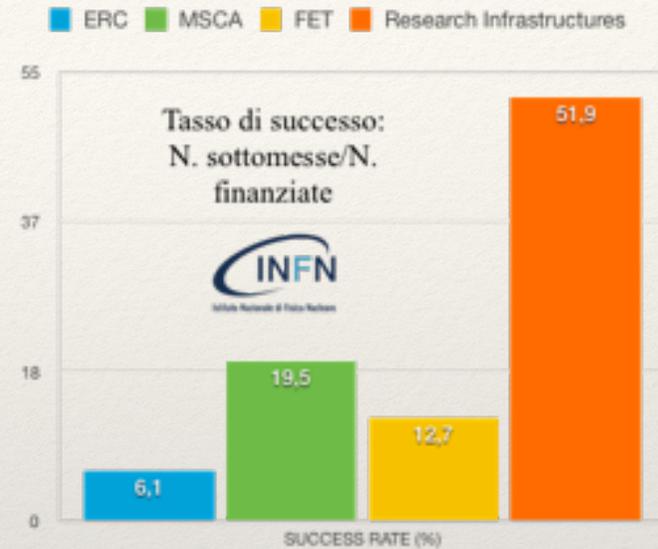
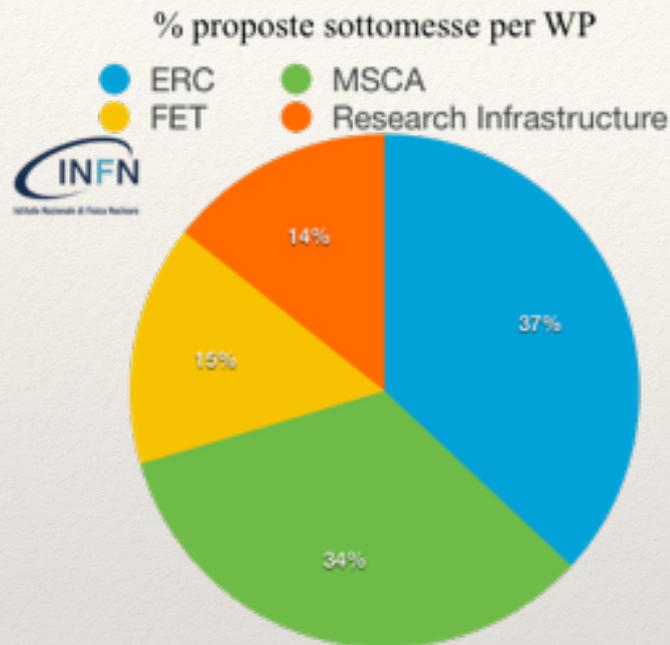
- Excellent Science
- Industrial Leadership
- Societal Challenges
- Horizontal WPs & Euratom



# INFN in Excellent Science

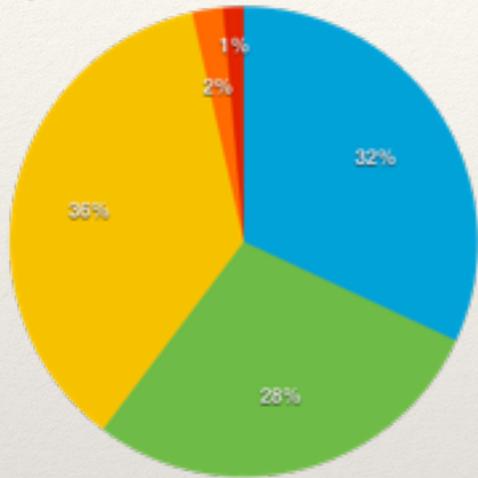
H2020	N. proposte sottomess e	N. proposte in valutazione (€)	N. proposte finanziate	Grant INFN (€)
ERC	141	9	8	11.6M
MSCA	128	5	24	11.3M
FET	58	3	7	3.4M
RI	55	1	28	13.8M
<b>Excellent Science</b>	<b>382</b>	<b>18</b>	<b>67</b>	<b>40.1M</b>

# INFN in Excellent Science (cont.)

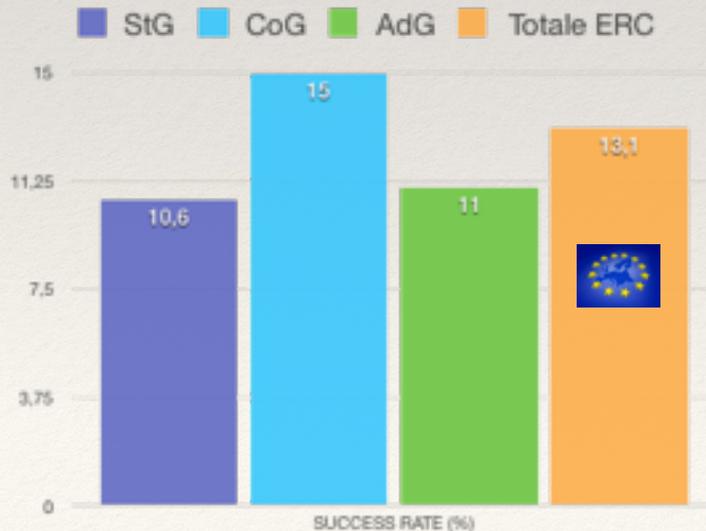


# INFN ERC Performance

● StG ● CoG ● AdG ● PoC  
● SyG



ERC	N. proposte finanziate
StG	3
CoG	4
AdG	1



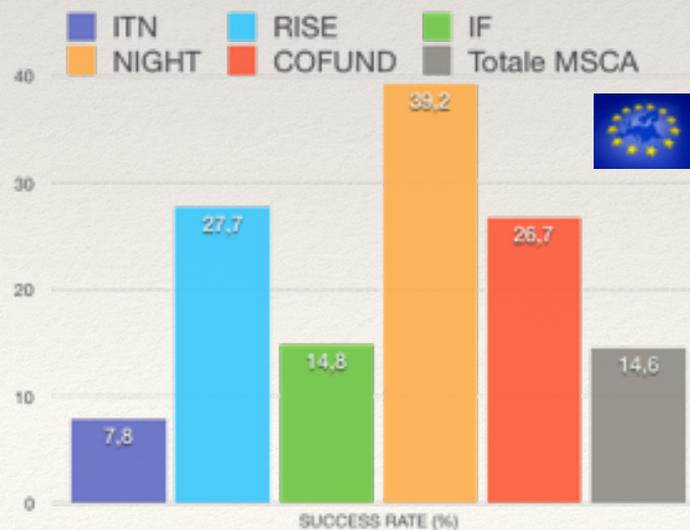
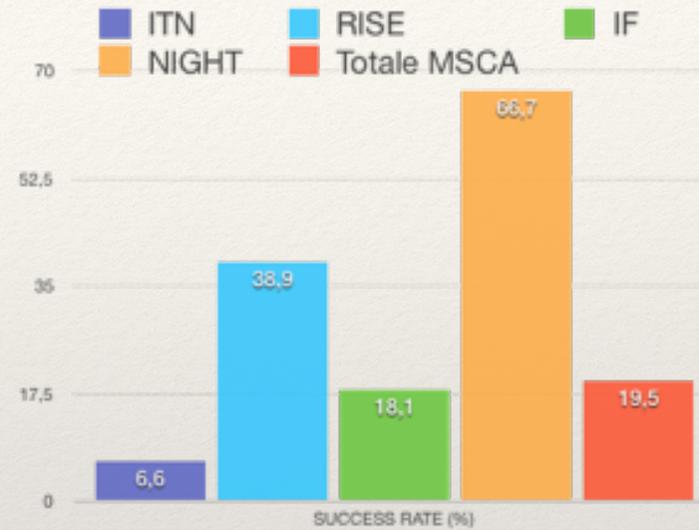
Dati 2017



# INFN MSCA Performance



% proposte sottomesse



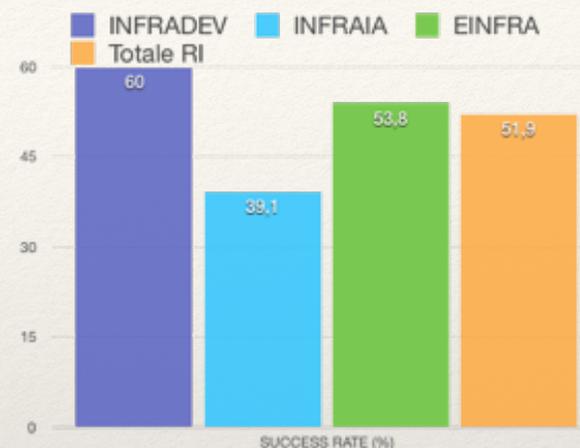
Dati 2017



# INFN RI Performance



% proposte sottmesse



INFRASUPP/INNOV INFRAINNOV: 1 solo progetto sottmesso e vinto per ciascuna call

Numerosità di partecipazione

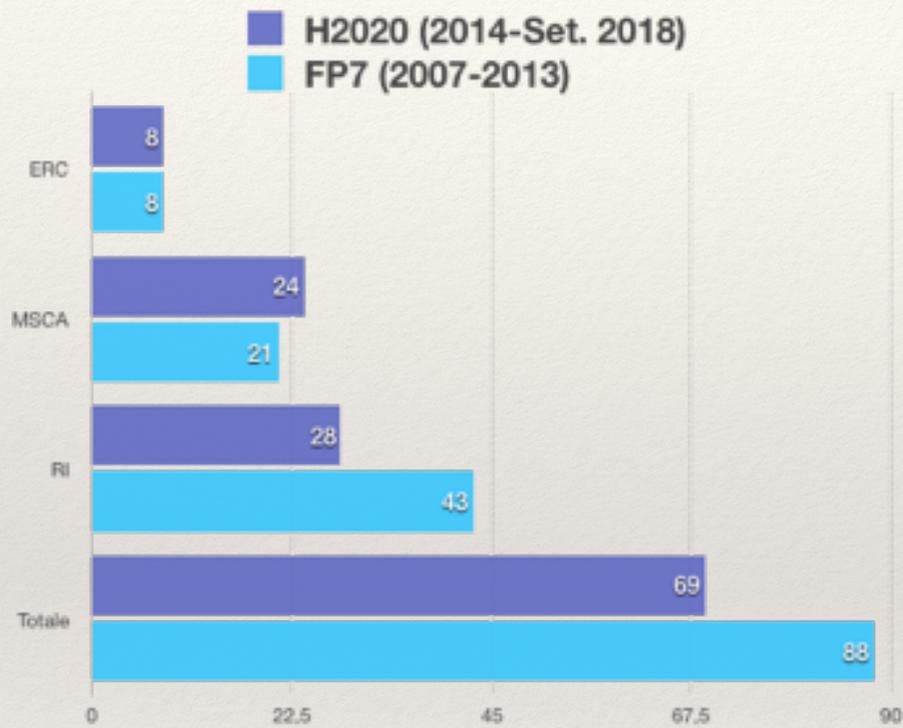
tasso di successo  
45.2%



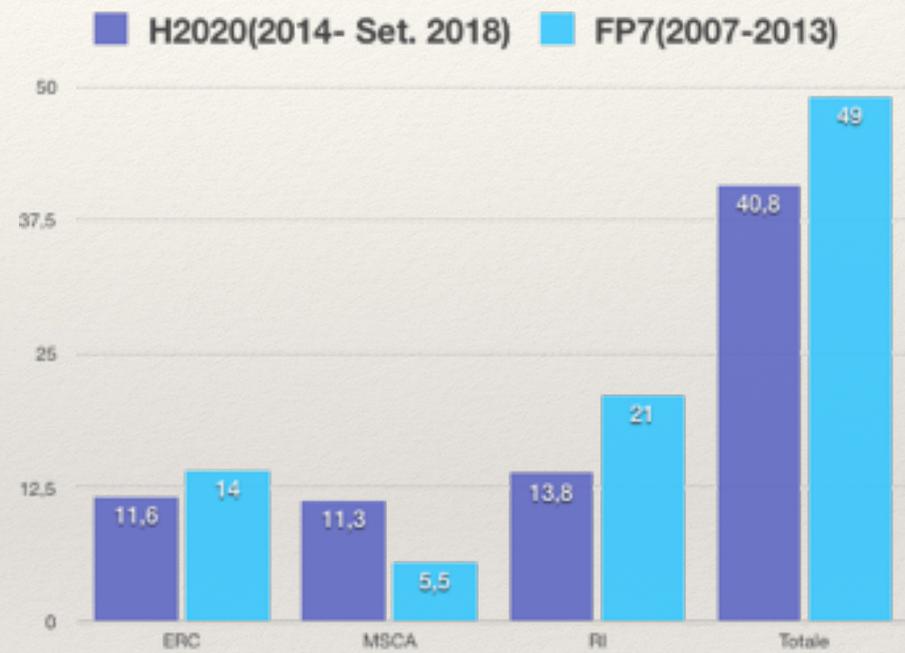
tasso di successo  
30.5%



# INFN FP7 vs FP8



N. Funded Projects



Funded Budget

# The next FP9 (2021-2027): Horizon Europe

What's new:



Support breakthrough innovation



Create more impact through mission-orientation and citizens' involvement



Reinforce openness



Rationalise the funding landscape



Reduce administrative burden



European Innovation Council

EU-wide R&I missions

Open science policy

New approach to Partnerships

Simpler rules

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# HE novelties

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- **The European Innovation Council:** one-stop shop to **bring the most promising ideas from lab to real world application** and support the most innovative start-ups and companies to scale up their ideas. It will provide direct support to innovators through two main funding instruments, one for early stages and the other for development and market deployment.
- **EU-wide R&I Missions:** ambitious, bold goals to tackle issues that affect our daily lives. Examples could range from the fight against **cancer**, to **clean transport** or **plastic-free oceans**. They will be co-designed with citizens, stakeholders, the European Parliament and Member States.
- **Open Science** will become the modus operandi of Horizon Europe. It will go beyond the open access policy of Horizon 2020 and require open access to publications, data, and to research data management plans.
- **A new generation of European Partnerships:** Horizon Europe will streamline the number of partnerships that the EU co-programmes or co-funds with partners like industry, civil society and funding foundations.
- **Simpler rules:** This will increase legal certainty and reduce administrative burden for beneficiaries and programme administrators.

# HE: pillars & budget

Bruxelles 17-4-2019  
Council of European Union

HORIZON EUROPE		
(marzo 2019)		
<b>Pillar 1</b>	<b>Pillar 2</b>	<b>Pillar 3</b>
<b>Excellent Science</b>	<b>Global Challenges and European Industrial Competitiveness</b>	<b>Innovative European Research Council</b>
European Research Council	<b>CLUSTERS</b> 1. Health 2. Culture and Inclusive Society 3. Civil Security for Society 4. Digital, Industry and Space 5. Climate Energy Bioeconomy, Food, Natural Resources and Environment Joint Research Council	European Research Council
Marie Skłodowska-Curie Actions		European Innovation Ecosystems
Research Infrastructures		European Institute of Innovation and Technology
<b>Widening Participation and Strengthening the European Research Area</b>		
Widening Participation and Sharing Excellence	Reforming and Enhancing the European R&I system	

100 G€ proposed by EC, 91.1G€ approved by CEU

# HE Missions and Partnerships

<b>Areas for Missions</b> (marzo 2019)
Area 1: Adaptation to Climate Change, including Societal Transformation Mission
Area 2: Cancer Mission
Area 3: Healthy Oceans and Natural Waters Mission
Area 4: Carbon-Neutral and Smart Cities Mission
Area 5: Soil Health for sustainable food

*“Missions are a key novelty of Horizon Europe. They aim to reconnect EU research with citizens by setting inspirational goals”*



<b>Areas for institutionalised European Partnerships</b> (marzo 2019)
Area 1: Faster development and safer use of health innovations for European patients, and global health Partnership
Area 2: Advancing key digital and enabling technologies and their use, including novel technologies such as Artificial Intelligence and quantum technologies Partnership
Area 3: European leadership in Metrology including an integrated Metrology system Partnership
Area 4: Accelerate competitiveness, safety and environmental performance of EU air traffic, aviation and rail Partnership
Area 5: Sustainable, inclusive and circular bio-based solutions
Area 6: Clean hydrogen and sustainable energy storage technologies with lower environmental footprint and less energy-intensive production Partnership
Area 7: Clean, connected, cooperative, autonomous and automated solutions for future mobility demands of people and goods Partnership
Area 8: Innovative and R&D intensive small and medium-sized enterprises



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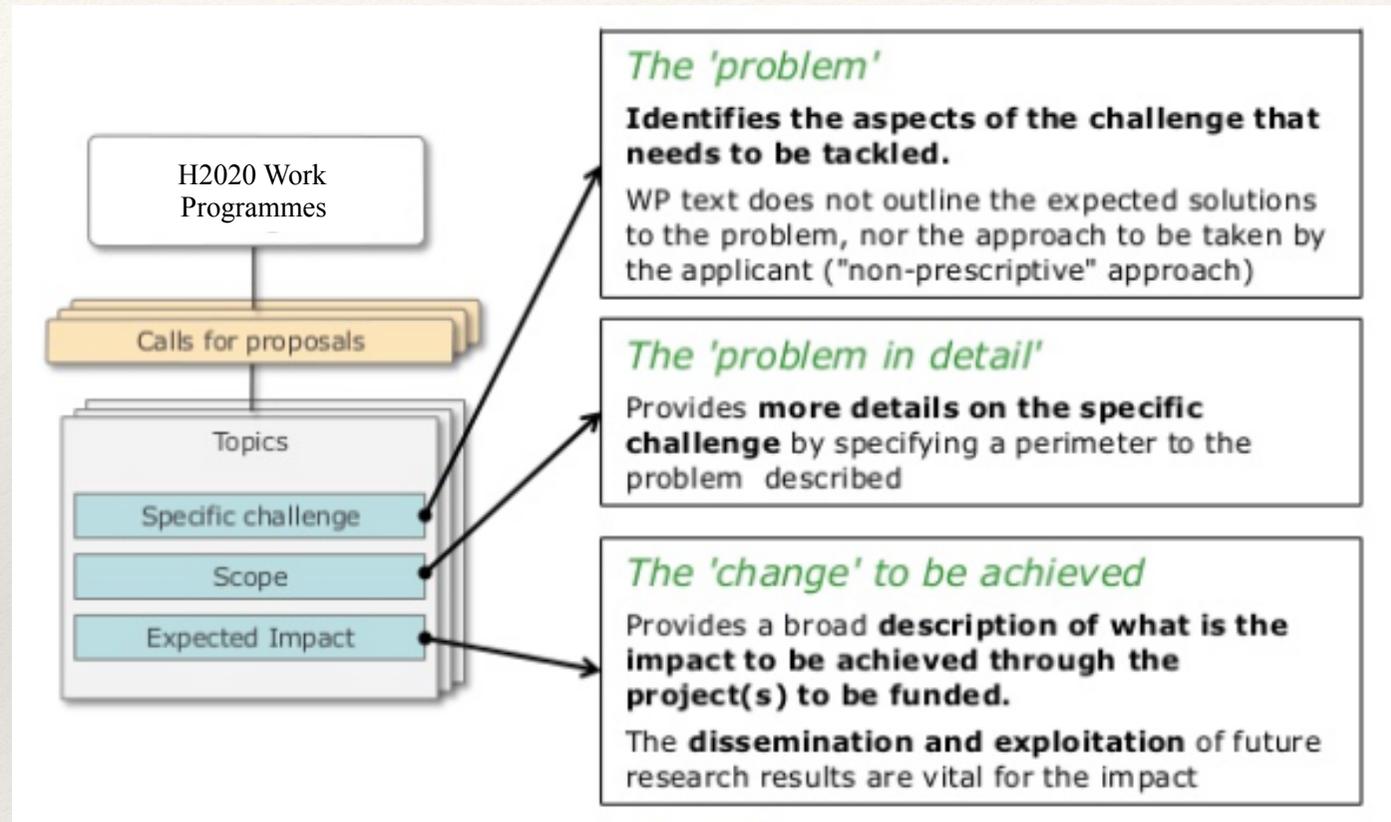
# Call informations and search

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- Contact your institute External Fund Service, for Infn **Divisione Fondi Esterni**, [dfе@lists.infn.it](mailto:dfе@lists.infn.it)
- **EU Participant portal**: [http://ec.europa.eu/research/participants/docs/h2020-funding-guide/index\\_en.htm](http://ec.europa.eu/research/participants/docs/h2020-funding-guide/index_en.htm), or other information pages of EU DG research, EU magazines
- **APRE, Agenzia per Promozione della Ricerca Europea**: <https://www.apre.it>
- A General research portal like **Research Professional**: <https://www.researchprofessional.com/sso/login?service=https://www.researchprofessional.com/0/>

# WP, Calls and Topics

- **Work programmes:** general objectives and impact, and budgets
- **Call for proposals:** eligibility, selection and award criteria, objectives/challenges and deadlines
- **Proposal templates and Guide for Applicant:** essential forms and guide to draw up and submit your proposal



! ERC has a different structure !

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# Project Plan Check List

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Before starting:

- Do you have a viable project?
- Does it fit with the call scope?
- Is there a level of innovation (i.e. going beyond the state of the art)?
- Are there uniqueness of the concept?
- Does it have a measurable impact?
- Do you have an achievable timeline?
- (for collaborative projects) Does your consortium fit the purpose of the project?
- Check the project template, it will help on all of the above

# Evaluation Criteria

Scheme of evaluation criteria mirrors structure of proposal outline; indicate how each criterion is approached, draw on same terminology to do so.

Evaluator give a **score of between 0 and 5 to each criterion** based on his/her comments

- Usually marks in step of 0.1
- No individual threshold
- Total score calculated weighting singles scores
- **Overall threshold** for entering the ranking list is 70/100

IF: Marie Skłodowska-Curie Individual Fellowships		
Excellence	Impact	Quality and efficiency of the implementation
Quality and credibility of the research/innovation project; level of novelty, appropriate consideration of inter/multidisciplinary and gender aspects	Enhancing the potential and future career prospects of the researcher	Coherence and effectiveness of the work plan
Quality and appropriateness of the training and of the two way transfer of knowledge between the researcher and the host	Quality of the proposed measures to exploit and disseminate the project results	Appropriateness of the allocation of tasks and resources
Quality of the supervision and of the integration in the team/institution	Quality of the proposed measures to communicate the project activities to different target audiences	Appropriateness of the management structure and procedures, including risk management
Capacity of the researcher to reach or re-enforce a position of professional maturity/independence		Appropriateness of the institutional environment (infrastructure)
50%	30%	20%
Weighting		
1	2	3
Priority in case of <i>ex aequo</i>		

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# General Tips (A.D'Orazio decalogue)

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- Read **carefully** the documentation, understand call rationale, evaluation criteria and build your proposal around them. **An EU project is not a mere research project! Keep this in mind when setting up the project.**
  - **For MSCA IF:** IF deal with the mobility of researchers and is supposed to have a **training effect** and an **impact on transfer of knowledge and career.**
- A proposal **should be a self-contained project**, not just a follow-up of a former project (not incremental)
- **Pay careful attention to each section.** Excellence of your **scientific proposal** is not enough to be granted! Impact and implementation count (proposals are often rejected for weaknesses in these sections).
- Structure your proposal to **address, in order, all points of each of the evaluation criteria.**

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# General Tips (cont.)

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- Be emphatic with evaluators: they like **minimum effort** (easy to read, follow and assess against the criteria) and **maximum accuracy** (easy to provide feedback).
- Use **clear and concise language**: Avoid open / empty statements. **Go to the point** and provide 'just enough' details needed to cover what is requested and needed for the reader to understand.
- **Cosmetics** is important: the display of your proposal should be very nice and clear. Use bold to highlight main points
- Write **facts** and external **references** supporting your statement instead of opinions.
- Remember to **explain specific terminology and define acronyms**.
- Templates can be repetitive: if possible **don't put double information** but try to **refer** to the section where you elaborate on the topic.

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# Generale Tips (cont.)

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**Abstract and title are very important.** Evaluators first read them.

**The abstract already decides if they are interested in reading more.**

An experienced evaluator can often make a good guess at a proposal's score based on the abstract alone.

With experience, there are all sorts of signs that show up in the abstract:

- Clear idea " easy to write abstract
- Muddled idea " hard to write abstract

**Write a crystal clear abstract.**

Choose a short and clear title.

Choose a short and handy acronym.

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# Fatal Errors

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- **Cut&Paste** from existing documents
- No respect for **instructions**.
- Lack of understanding of the **evaluation criteria**
- **Small relevance of the project for the call objectives** (e.g. a proposal with no planned training for the ER has small relevance for a MSCA IF)
- **Poor analysis and description** of the starting points (e.g. state of the art) and the objectives
- **Insufficient detail** given of planned activities and evidence to convince evaluators
- Poor **impact** analysis
- **Text** of different parts of your proposal is **not consistent**: evaluator get confused!

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# Conclusions

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- European funds are a jungle, learning where and how to proceed is a time consuming operation. Don't do it by yourself, ask for help
- Pay much attention to your career building. You are the best entitled person to think about it
- Do not run through fast and easy tracks and bypasses, focus on your goals and then look for the call that better suits your targets, do not try to adapt your project and your research to a specific call
- Proceed by steps, be ambitious but plan your path well
- You can have a beautiful and well written project and still don't get the grant. Competition is high, do not give up and try again. There is always room to improve, do it.

Thanks for your attention!