EU Framework Programmes

Horizon Europe

Maynooth University Research Week Oct 2019
Framework Programmes

European R&D Funding
Began in 1984

Has grown from €3.8 billion (1984-1987) to €77 billion (Horizon 2020)
Extended from basic research to include innovation and involve industry
Framework Programmes past, present and beyond (1984 – 2027)
## Horizon 2020 structure

<table>
<thead>
<tr>
<th><strong>Excellent Science</strong></th>
<th><strong>Industrial Leadership</strong></th>
<th><strong>Societal Challenges</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Frontier research funded by European Research Council</td>
<td>Leadership in enabling and industrial technologies</td>
<td>Health and wellbeing</td>
</tr>
<tr>
<td>Marie Skłodowska-Curie Actions</td>
<td>SME Innovation Instrument</td>
<td>Food security and sustainable use of biological resources</td>
</tr>
<tr>
<td>€6.162bn</td>
<td>€3bn</td>
<td>€3.851bn</td>
</tr>
<tr>
<td>Future and emerging technologies</td>
<td>Access to risk finance</td>
<td>Sustainable energy</td>
</tr>
<tr>
<td>€2.696bn</td>
<td>€2.842bn</td>
<td>€5.931bn</td>
</tr>
<tr>
<td>World-class infrastructure</td>
<td></td>
<td>Green, integrated mobility</td>
</tr>
<tr>
<td>€2.488bn</td>
<td></td>
<td>€6.339bn</td>
</tr>
</tbody>
</table>

**Total**

- **€24.4bn**
- **€17.0bn**
- **€29.7bn**

### Additional Funding

- Spreading excellence and widening participation: €816m
- Science with and for society: €462m
## Horizon 2020 – Progress to date

<table>
<thead>
<tr>
<th>National target of €1,250,000,000</th>
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<tbody>
<tr>
<td>As of today, €796,216,272 million received by Irish participants (1.88% of total funding)</td>
</tr>
<tr>
<td>1449 signed grants</td>
</tr>
<tr>
<td>15.21% success rate (11.98% EU average)</td>
</tr>
<tr>
<td>56.8% Higher Education</td>
</tr>
<tr>
<td>34.7% Companies</td>
</tr>
<tr>
<td>4.3% Public bodies</td>
</tr>
<tr>
<td>2.0% Research Organisations</td>
</tr>
<tr>
<td>Maynooth University - €13.02 million</td>
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Horizon Europe
Our vision

A sustainable, fair and prosperous future for people and planet based on European values.

- Tackling climate change (35 % budgetary target)
- Helping to achieve Sustainable Development Goals
- Boosting the Union's competitiveness and growth
While benefiting from world-class research and strong industries…

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

…Europe can do better at transforming this into leadership in innovation and entrepreneurship
Sibiu recommendations: Europe can shape its future through research and innovation

- Focusing research and innovation on the **ecological, social and economic transitions** and related societal challenges
- Leveraging Europe’s scientific strengths into **leadership in breakthrough and disruptive innovation**
- Setting **ambitious goals** for issues that affect us daily, such as skills development, the fight against cancer, harmful emissions, and the state of the oceans, including plastics
- Focusing on **cutting-edge research and innovation** projects spanning from research and innovation to deployment
Horizon Europe

The ambitious EU research and innovation framework programme (2021-2027)

- to strengthen the EU's scientific and technological bases and the European Research Area (ERA)
- to boost Europe's innovation capacity, competitiveness and jobs
- to deliver on citizens' priorities and sustain our socio-economic model and values

The Commission proposes a budget of €100 billion for Horizon Europe.
Added value through Horizon Europe:

- Trans-national collaboration, exchange and networks
- Critical mass to address global challenges
- Attracting the best talents
- Competitive funding promoting excellence
- Strengthened European R&I landscape
- Visibility for leading research and innovation
- Creating new market opportunities
- Transnational mobility
Progress of Negotiations

Jun 2018 – Commission published Proposal for Horizon Europe

Sept 2018 – Negotiations on proposal began

30 Nov 2018 – PGA on Regulation for Horizon Europe agreed

9th Jan 2019 – First Trialogue between Council, Commission and European Parliament

19 Feb 2019 – First Competitiveness Council under Romanian Presidency

18 March 2019 – PGA on Specific Programme for Horizon Europe agreed

20 March 19 – 6th and final trialogue discussions – common understanding reached

26 March 19 – Common understanding agreed by Council

17 April 19 – Amended Regulation passed by European Parliament

Q4 2019 – Discussions on financing split, breakdown, association of third countries & synergies begin

Q1 2020 – Agreement reached on remaining issues

Q2 2020 – First Work Programmes designed
Horizon Europe: Preliminary structure

**Pillar 1**
Excellent Science
- European Research Council
- Marie Skłodowska-Curie Actions
- Research Infrastructures

**Pillar 2**
Global Challenges and European Industrial Competitiveness
- Clusters:
  - Health
  - Culture, Creativity and Inclusive Society
  - Civil Security for Society
  - Digital, Industry and Space
  - Climate, Energy and Mobility
  - Food, Bioeconomy, Natural Resources, Agriculture and Environment
- Joint Research Centre

**Pillar 3**
Innovative Europe
- European Innovation Council
- European innovation ecosystems
- European Institute of Innovation and Technology

**Widening Participation and Strengthening the European Research Area**
- Widening participation and spreading excellence
- Reforming and Enhancing the European R&I system
Commission proposal for budget: €100 billion* (2021-2027)

€ billion
In current prices

- Excellent Science
- Global Challenges & European Ind. Comp.
- Innovative Europe
- Widening Part. & ERA
- Euratom

* This envelope includes EUR 3.5 billion allocated under the InvestEU Fund.
Horizon Europe – Central elements
Lessons Learned from Horizon 2020 Interim Evaluation

- 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
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)

Helping innovators create markets of the future, leverage private finance, scale up their companies, Innovation centric, risk taking & agile, proactive 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)
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)
Adaptation to climate change, including societal transformation

Mission areas

Healthy oceans, seas, coastal and inland waters

Cancer

Climate-neutral and smart cities

Soil health and food
New approach to European Partnerships

New generation of objective-driven and more ambitious partnerships in support of agreed EU policy objectives

Key features
- Simple architecture and toolbox
- Coherent life-cycle approach
- Strategic orientation

Co-programmed
Based on Memoranda of Understanding / contractual arrangements; implemented independently by the partners and by Horizon Europe

Co-funded
Based on a joint programme agreed and implemented by partners; commitment of partners for financial and in-kind contributions

Institutionalised
Based on long-term dimension and need for high integration; partnerships based on Articles 185 / 187 of TFEU and the EIT-Regulation supported by Horizon Europe
Areas for possible Institutionalised European partnerships (based on Article 185/7 TFEU)

Health innovations

Key digital and enabling technologies

Metrology

EU air traffic, aviation and rail

Sustainable bio-based solutions

Hydrogen and sustainable energy storage

Clean, connected mobility

Innovative SMEs
International Cooperation

Tackling together global societal challenges; access to the world's best talents, expertise and resources; enhanced supply and demand of innovative solutions

Extended openness to association

- Third countries with good capacity in science, technology and innovation
- Taking into account objective of driving economic growth in Europe through innovation

- General opening for international participation
- Intensified targeted actions (flagship initiatives, joint calls, etc.)

May 2019 | Version 25
Open Science

Better dissemination and exploitation of R&I results and support to active engagement of society

**Mandatory Open Access to publications:** beneficiaries shall ensure that they or the authors retain sufficient intellectual property rights to comply with open access requirements

**Open Access to research data ensured:** in line with the principle "as open as possible, as closed as necessary"; Mandatory Data Management Plan for FAIR (Findable, Accessible, Interoperable, Re-usable) and Open Research Data

- Support to researcher skills and reward systems for open science
- Use of European Open Science Cloud
Open science across the programme

Art. 10 - Open Science
The approach

- Open access to scientific publications to be ensured
- Open access to research data to be ensured in line with principle 'as open as possible, as closed as necessary'
- Responsible research data management to be ensured in line with FAIR principles
- Other open science practices to be promoted and encouraged
- Reciprocity in open science to be promoted and encouraged in all association and cooperation agreements with third countries

Art. 35 - Exploitation and Dissemination
The modalities

- Open access to scientific publications obligatory: sufficient IPR to be retained
- Open access to research data, 'as open as possible, as closed as necessary': exceptions
- Responsible research data management in line with FAIR principles; Data Management Plan mandatory; possible obligations (in specific WPs) to use the European Open Science Cloud for storing and providing access to data
- Possible additional incentives or obligations through work programmes for other open science practices
Widening participation/spreading excellence

15 Member States and 9 outermost regions eligible for coordinators
At least 3.3% budget

EXCELLENCE
Foster participation
Facilitate collaborative links
Contribute to reducing R&I divide

Recognition of participation
Hop-on

Teaming Twinning ERA-Chairs COST

Excellence initiatives
Brain circulation
Horizon Europe – In detail
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

**Marie Skłodowska-Curie Actions**
- Equipping researches with new knowledge and skills through mobility and training

**Research Infrastructures**
- Integrated and inter-connected world-class research infrastructures

Commission proposal: € 16.6 billion
Commission proposal: € 6.8 billion
Commission proposal: € 2.4 billion
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
### Clusters in 'Global Challenges and European Industrial Competitiveness'

<table>
<thead>
<tr>
<th>Clusters</th>
<th>Areas of intervention</th>
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</table>
| **Health**                                    | • Health throughout the life course  
• Non-communicable and rare diseases  
• Tools, technologies and digital solutions for health and care, including personalised medicine  
• Environmental and social health determinants  
• Infectious diseases, including poverty-related and neglected disease  
• Health care systems |
| **Culture, creativity and inclusive society** | • Democracy and Governance  
• Social and economic transformations  
• Culture, cultural heritage and creativity |
| **Civil security for society**                | • Disaster-resilient societies  
• Protection and Security  
• Cybersecurity |
| **Digital, Industry and space**               | • Manufacturing technologies  
• Advanced materials  
• Next generation internet  
• Circular industries  
• Space, including Earth Observation  
• Emerging enabling technologies  
• Key digital technologies, including quantum technologies  
• Artificial Intelligence and robotics  
• Advanced computing and Big Data  
• Low-carbon and clean industry  
• Emerging enabling technologies |
| **Climate, Energy and Mobility**              | • Climate science and solutions  
• Energy systems and grids  
• Communities and cities  
• Industrial competitiveness in transport  
• Smart mobility  
• Energy supply  
• Buildings and industrial facilities in energy transition  
• Clean, safe and accessible transport and mobility  
• Energy storage |
| **Food, bioeconomy, natural resources, agriculture and environment** | • Environmental observation  
• Agriculture, forestry and rural areas  
• Circular systems  
• Food systems  
• Biodiversity and natural resources  
• Seas, oceans and inland waters  
• Bio-based innovation systems in the EU Bioeconomy |
Partnerships - Partnership landscape in Ireland (10/18)

**Partnership Approaches**
- **Public-Public Partnerships (P2Ps)**
  - ERA-NETs
  - EJP Co-funds
  - Article 185, JPIs

**Implementation Mode**
- **Public-Private Partnerships (PPPs)**
  - cPPPs
  - Article 187

**Partnership Initiatives**
- **37 active ERA-NETs**
- **4 EJP Co-funds**
- **4 Article 185s**
- **8 JPIs**
- **9 cPPPs**
  - HPC, Big Data, ESCO, Photonics, FoF, e2b, Robotics, 5G, SPIRE
- **7 Article 187s**
  - IMI2; CS2; ECSEL; BBI; S2R; SESAR2020; Fuel cells; [EuroHPC]

**EIT-KICs**
- **Grant Agreements**
- **Framework Partnership Agreements**

**FET Flagships**
- **2 KICs**
  - Raw Materials
  - Health
- **1 Flagship**
  - Graphene

- **53**
- ~91
- **16**
- **18**
- **2**
- **6**
- **1**
- **3**
<table>
<thead>
<tr>
<th>Institutional</th>
<th>Co-funded</th>
<th>Co-programmed</th>
<th>EIT KICs</th>
<th>TBC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Health</td>
<td>Chemicals Risk Assessment</td>
<td>AI Data Robotics</td>
<td>Climate</td>
<td>Forestry</td>
</tr>
<tr>
<td>Health Innovation</td>
<td>ERA Health Research</td>
<td>Photonics</td>
<td>InnoEnergy</td>
<td>AMR</td>
</tr>
<tr>
<td>Key Digital Technologies</td>
<td>Health Systems Research</td>
<td>Clean Steel</td>
<td>Digital</td>
<td>Brain Health</td>
</tr>
<tr>
<td>Smart Networks Services</td>
<td>Personalised Medicine</td>
<td>Made in Europe</td>
<td>Health</td>
<td>Social Transformations and inequalities</td>
</tr>
<tr>
<td>Euro HPC</td>
<td>Rare Diseases</td>
<td>Circular Climate Neutral Industry</td>
<td>Food</td>
<td>Zero Emission Shipping</td>
</tr>
<tr>
<td>Metrology</td>
<td>Clean Energy Transition</td>
<td>Space</td>
<td>Man</td>
<td>Sustainable Smart and Inclusive Cities</td>
</tr>
<tr>
<td>Transforming Europe’s Rail System</td>
<td>Agro Ecology</td>
<td>Built Environment</td>
<td></td>
<td>Materials &amp; Production</td>
</tr>
<tr>
<td>Integrated ATM</td>
<td>Animal Health</td>
<td>2Zero</td>
<td></td>
<td>Geological Survey Europe</td>
</tr>
<tr>
<td>Clean Aviation</td>
<td>Environmental Observations</td>
<td>Batteries</td>
<td></td>
<td>Cultural Heritage</td>
</tr>
<tr>
<td>Clean Hydrogen</td>
<td>Biodiversity</td>
<td>European Open Science Cloud</td>
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<tr>
<td>Safe and Automated Road Transport</td>
<td>Blue Economy</td>
<td></td>
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<tr>
<td>Circular Bio Based Europe</td>
<td>Food Systems</td>
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<tr>
<td>Innovative SMEs</td>
<td>Water 4 All</td>
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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

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

Commission proposal: € 3 billion
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“

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

Common understanding: At least 3.3 % of Horizon Europe budget
Spreading Excellence and Widening Participation

- **Twinning**
  Institutional networking
- **ERA Chairs**
  Bringing outstanding academics to universities and institutions
- **Teaming**
  Creating new centres of excellence by coupling with leading institutions
Horizon Europe – How?
Simple and fit for purpose rules

- Further alignment to the Financial Regulation
- Increased use of **simplified forms of grants** where appropriate (building on the H2020 lump sum pilot experience)
- Broader acceptance of **usual cost accounting practices**
- Enhanced **cross-reliance on audits** benefiting beneficiaries taking part in several Union programmes

**while ensuring continuity and consistency for beneficiaries by maintaining**

- Attractive H2020 funding model, including up to 100% funding rate of direct costs
- Single set of rules principle
Commission proposal for synergies with other Union programmes

Horizon Europe

Other Union Programmes, including
- Common Agricultural Policy
- ERDF
- External Instrument
- Maritime & Fisheries Fund
- InvestEU
- LIFE
- Connecting Europe Facility
- ESF+
- Digital Europe
- Innovation Fund
- Internal Security Fund
- Erasmus
- Single Market Programme
- Space Programme

Enhanced synergies

Compatibility
Harmonisation of funding rules; flexible co-funding schemes; pooling resources at EU level

Coherence and complementarity
Alignment of strategic priorities in support of a common vision
Key impact pathways to track progress

1. Creating high-quality new knowledge
2. Strengthening human capital in R&I
3. Fostering diffusion of knowledge and Open Science

Scientific Impact

4. Addressing EU policy priorities & global challenges through R&I
5. Delivering benefits & impact via R&I missions
6. Strengthening the uptake of R&I in society

Societal Impact

7. Generating innovation-based growth
8. Creating more and better jobs
9. Leveraging investments in R&I

Economic Impact
Strategic Plan for implementing Horizon Europe

The Strategic Plan (*new implementing act by the Commission*) will prepare the content in the work programmes and calls for proposals for the first four years

- Strategic orientation for R&I support, expected impacts
- Partnerships and missions
- Areas for international cooperation
- Issues such as:
  - Balance between research and innovation
  - Social Sciences and Humanities
  - Key Enabling Technologies and strategic value chains
  - Gender
  - Ethics and integrity
  - Dissemination and exploitation
Strategic plan gives direction to the work programme

Main Features
Early involvement and extensive exchanges with Member States
Extensive exchanges with the European Parliament
Consultations with stakeholders and public at large
Implementation Strategy to shift the focus from administration to content

- Enhancing synergies with other EU programmes
- Simplifying the model grant agreements and guidance to be beneficiaries
- Funding and tenders portal – one-stop-shop for easy access to EU funding and project implementation

Early consultation with stakeholders/programme ready to start in 2021
Horizon Europe

Questions?