

Evaluation of investments in Research and Technological Development (RTD) infrastructures and activities supported by the European Regional Development Fund (ERDF) in the period 2007-2013

EVALUATION NETWORK MEETING

14 December 2021





Outline

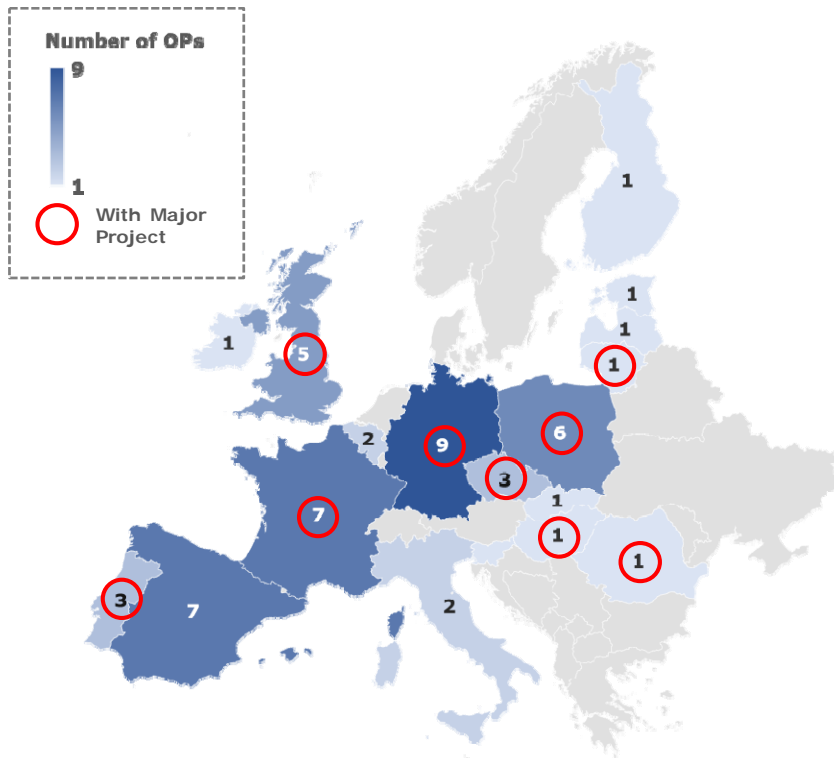
- 1 Scope and methodology
- 2 Projects and beneficiaries
- 3 Rationale and role of ERDF support for RTD in the broad policy mix
- 4 Key achievements and missed opportunities
- 5 Role of contextual factors in the causal pathway
- 6 Conclusions: what we have learned, both content and strategic-wise

Scope, methodology and team

Scope of the study

Representative sample of 53 OPs

- covering 18 Member States
- including 24 Major Projects



Types of policy measures: ERDF expenditure codes 01 and 02

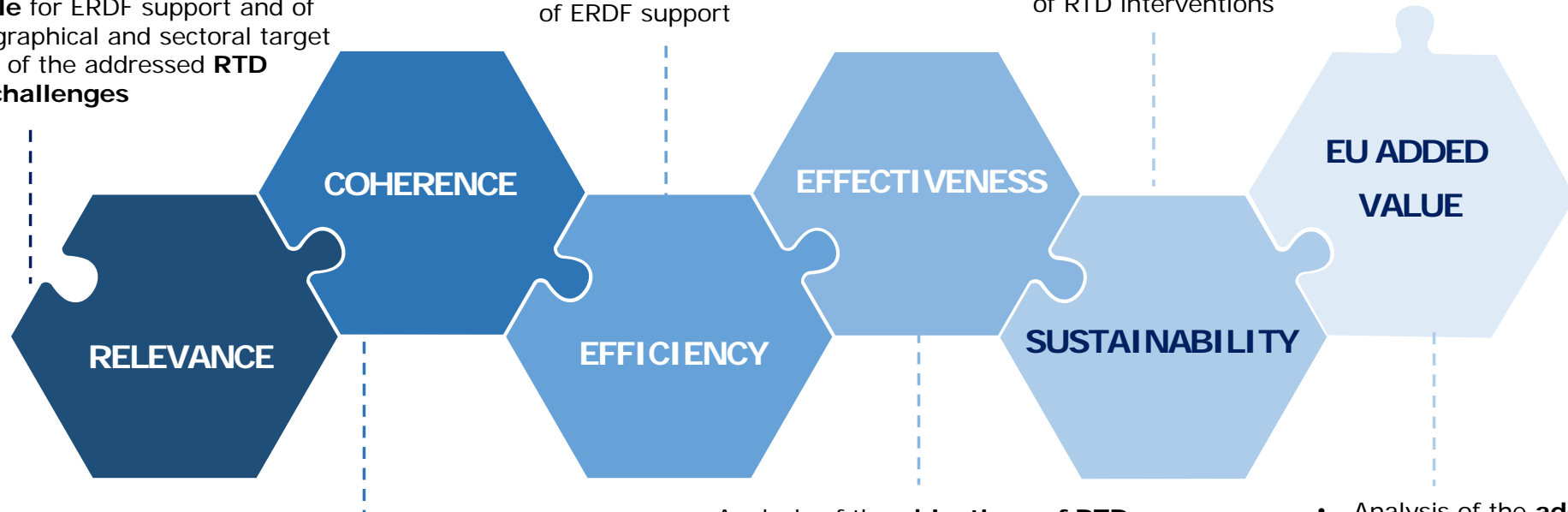
Codes of expenditure	Expenditure in 53 OPs	Share of the total expenditure
01 – Support to RTD activities in research centres	5 € billion	83%
02 – Support to RTD infrastructures and centres of competence in a specific technology	9.7 € billion	87%
01 + 02	14.7 € billion	85%

Objectives of the study

- Mapping of the **types interventions** supported
- Analysis of the underlying **rationale** for ERDF support and of the geographical and sectoral target
- Analysis of the addressed **RTD policy challenges**

- Analysis of the level of **geographical and sectoral concentration** of ERDF support

- Analysis of the **long-term sustainability** of RTD interventions

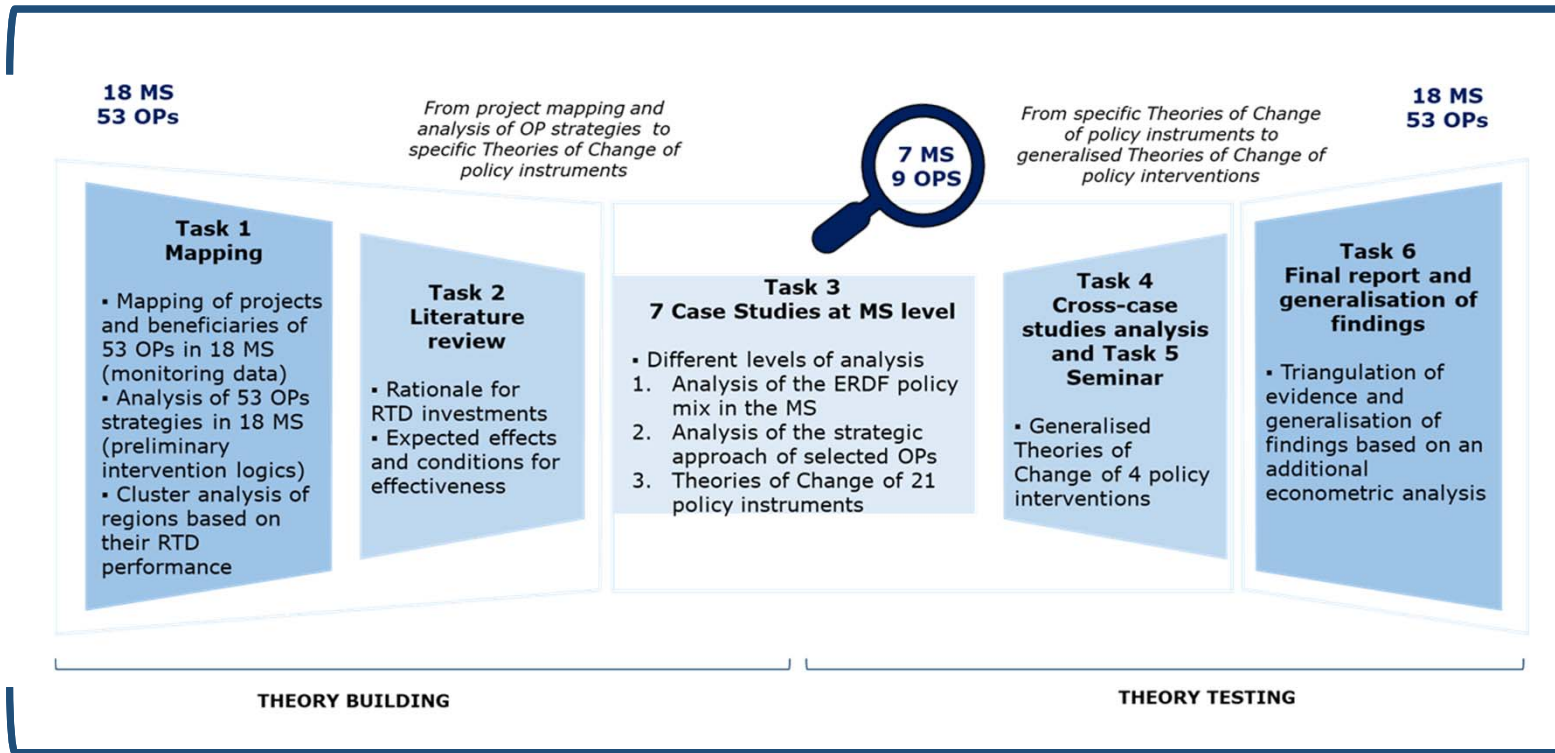


- Analysis of the influence of **State aid rules**
- Analysis of the links with the **Research Framework Programmes** (FP7, H2020)
- Analysis of the role of the ERDF in the **national policy mix for RTD**

- Analysis of the **objectives of RTD** infrastructures and activities
- Assessment of the **level of effectiveness** of different interventions
- Identification of the **main impacts** of each interventions and the **underlying mechanisms**

- Analysis of the **added value** of ERDF interventions compared to national ones
- Analysis of **EU-wide effects**

Methodological framework: a combination of tools and methods



Theory-Based Impact Evaluation following the Contribution Analysis approach

Main characteristics

- 1 The study goes beyond assessing **what** happened; it also provides answers about **why** and **how** the observed effects have occurred
- 2 Central to this approach are **'Theories of Change' (ToC)**: An intervention works as part of a broader 'causal package', a set of:
 1. supporting factors
 2. preconditions
 3. possible risks or threats
- 3 **Different levels of analysis:**
 - Country level
 - OP level
 - Instrument level
 - Project and beneficiaries level

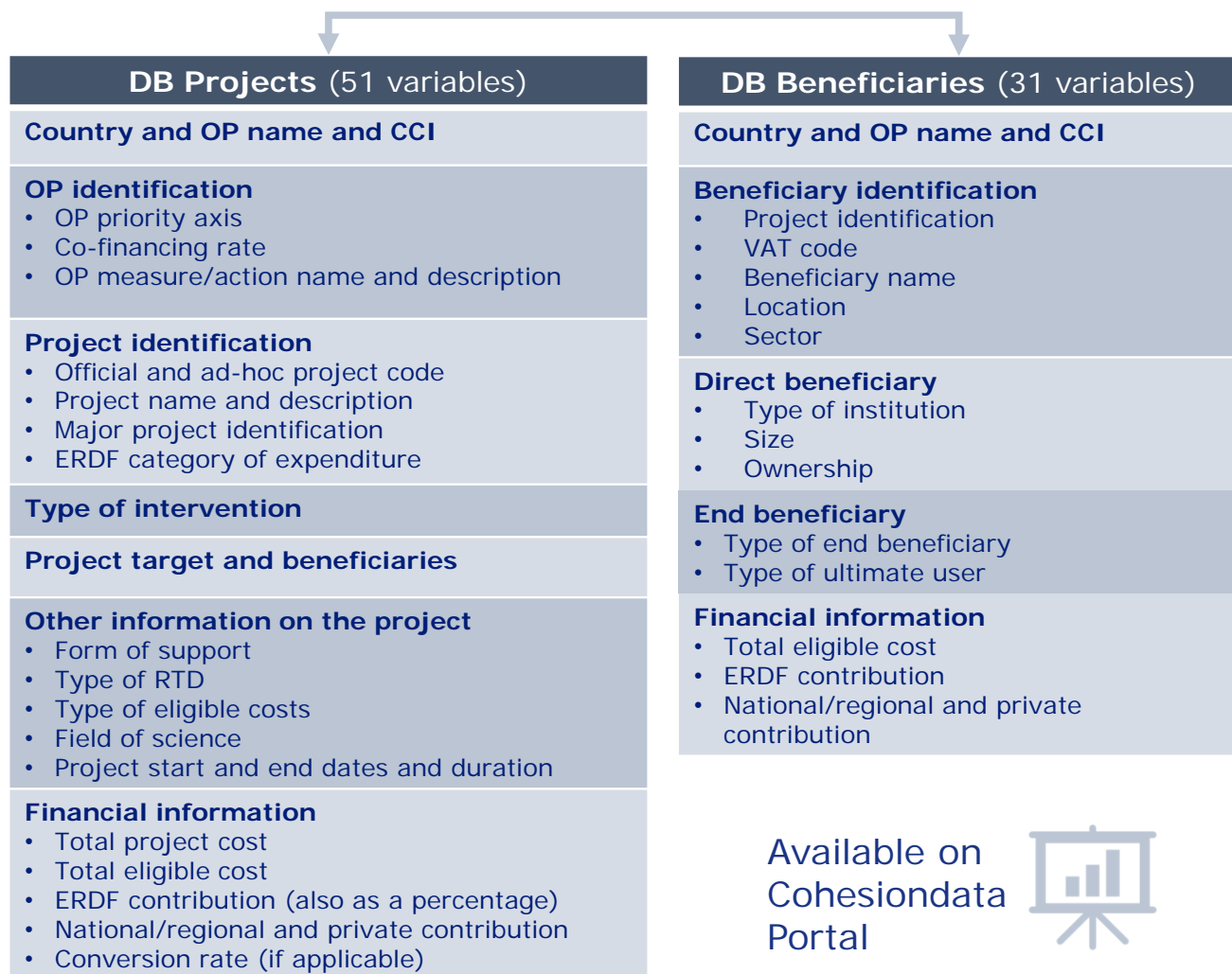


Different levels of analysis:

- Country level
- OP level
- Instrument level
- Project and beneficiaries level

Funded projects and beneficiaries: key findings

The database of RTD projects and beneficiaries



A rich and unique dataset at very granular level:

- 9,793 RTD projects in 46 OPs, implemented in 17 EU Member States, including 24 Major Projects
- 213 project on average funded by each OP (min 9, max 1,606)
- 11,431 beneficiaries in total (2,563 different bodies)

Main limitations:

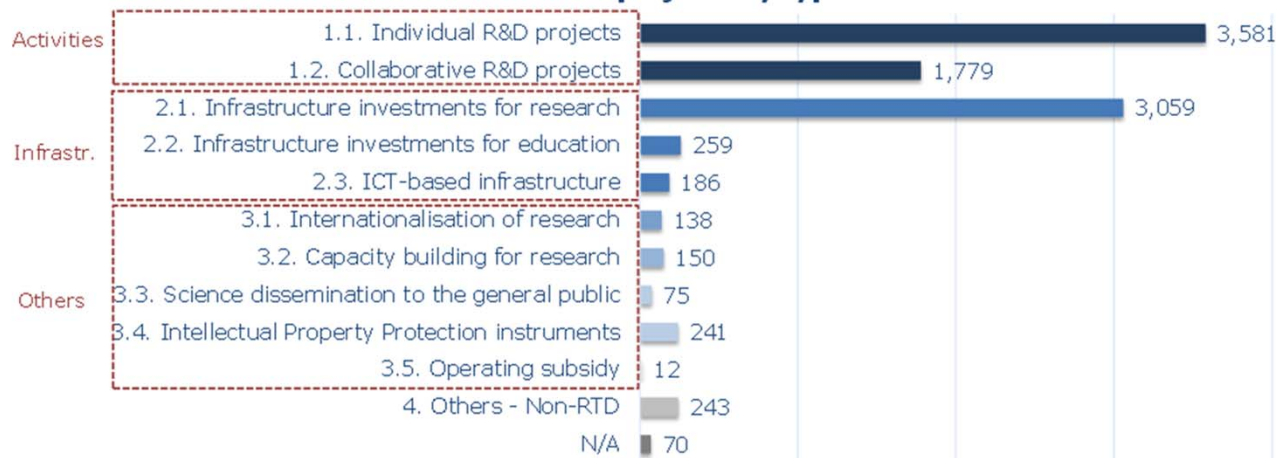
- Data for the 7 Spanish OPs (additional 10-14,000 projects) could not be integrated into the single database, because of uncertainty on the expenditure data
- The list of beneficiaries for collaborative projects are incomplete for 29 OPs

Available on
Cohesiondata
Portal

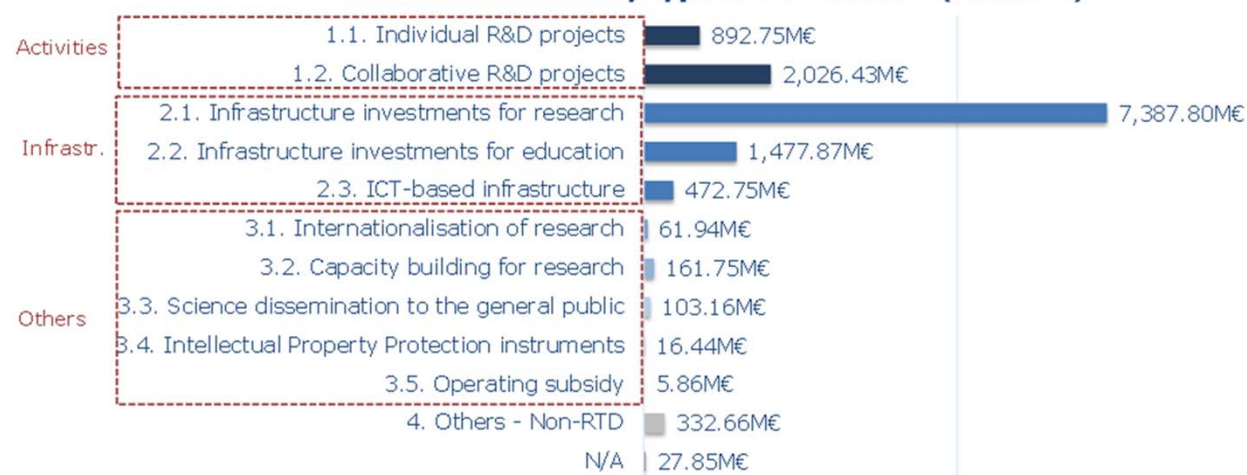


Types of RTD projects funded

Number of projects by type of intervention



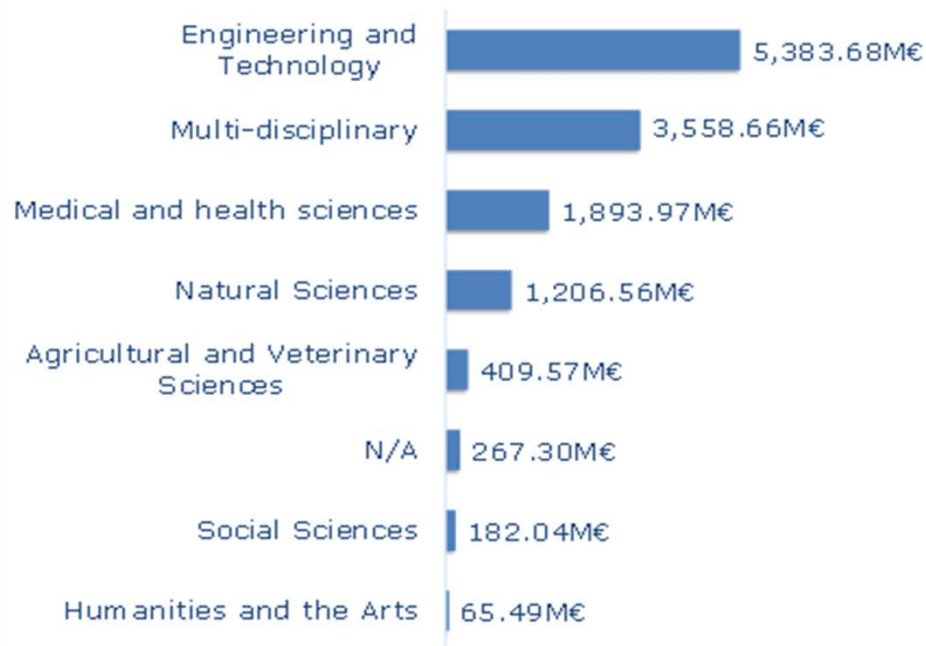
ERDF contribution by type of intervention (Million €)



- The selected 53 OPs supported more than **20,000 projects**, almost half of which were in Spain and a total of 9,973 in the remaining 17 MS (and 46 OPs).
- Projects can be classified into **10 types of RTD interventions**.
- Most of the ERDF expenditure (57%) was concentrated in **infrastructure investment for research**.
- Average **duration** of projects: 3 years.
- The ERDF contribution to RTD projects is typically provided in the form of **non-repayable aid**.

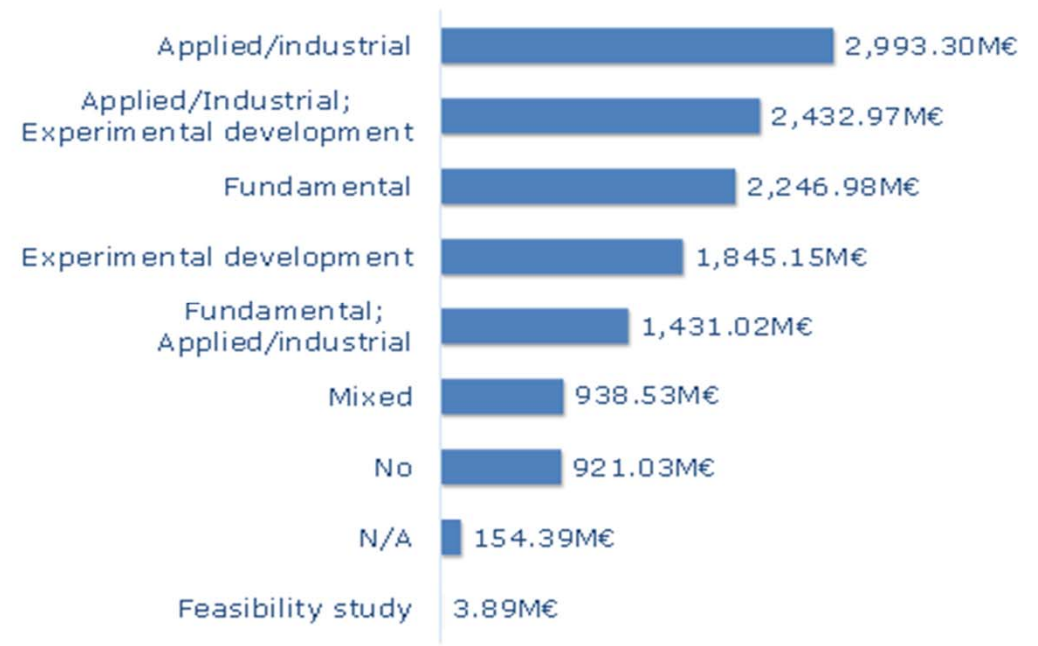
Type of research conducted

ERDF contribution by field of science



- A large share of projects and expenditure referred to research conducted in the field of **Engineering and Technology, Natural Sciences** and **Medical and Health sciences**.
- Infrastructure investments in HEIs and RTOs tend to be more **multi-disciplinary** than RTD activities.

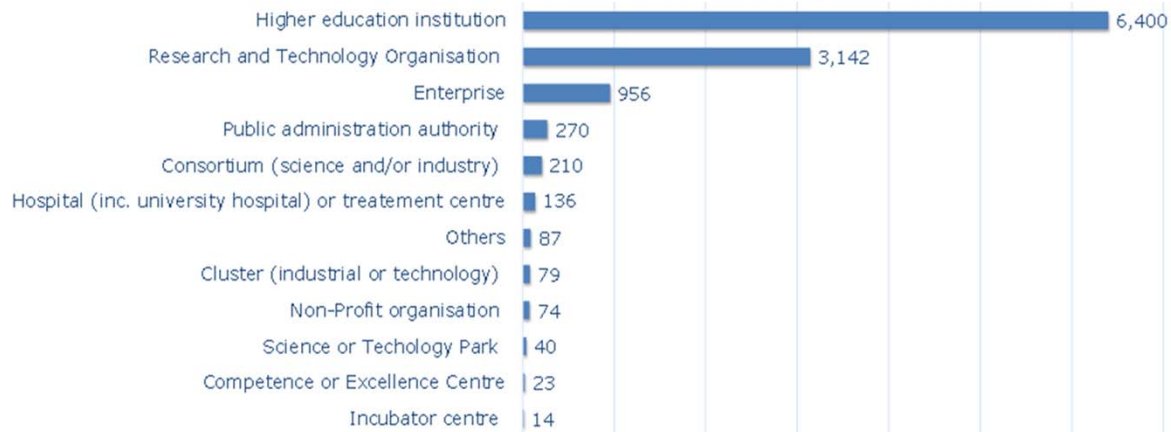
ERDF contribution by type of RTD



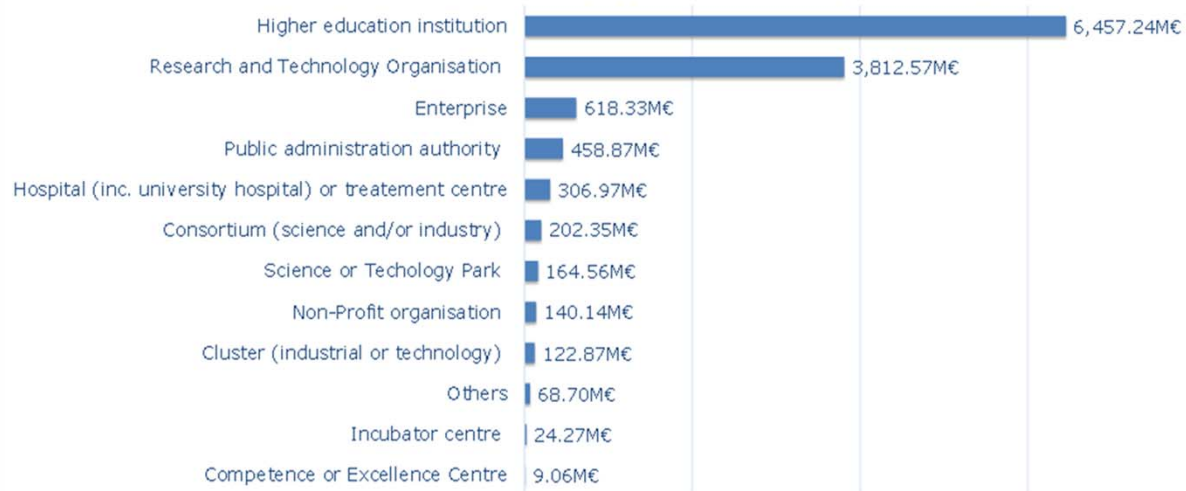
- The vast majority of projects and expenditure pertains to **applied research**, generally with a possible industrial application.
- **RTD activities** are relatively more focused on applied RTD and experimental development than infrastructure investments.

Type of direct beneficiaries

Number of beneficiaries by type

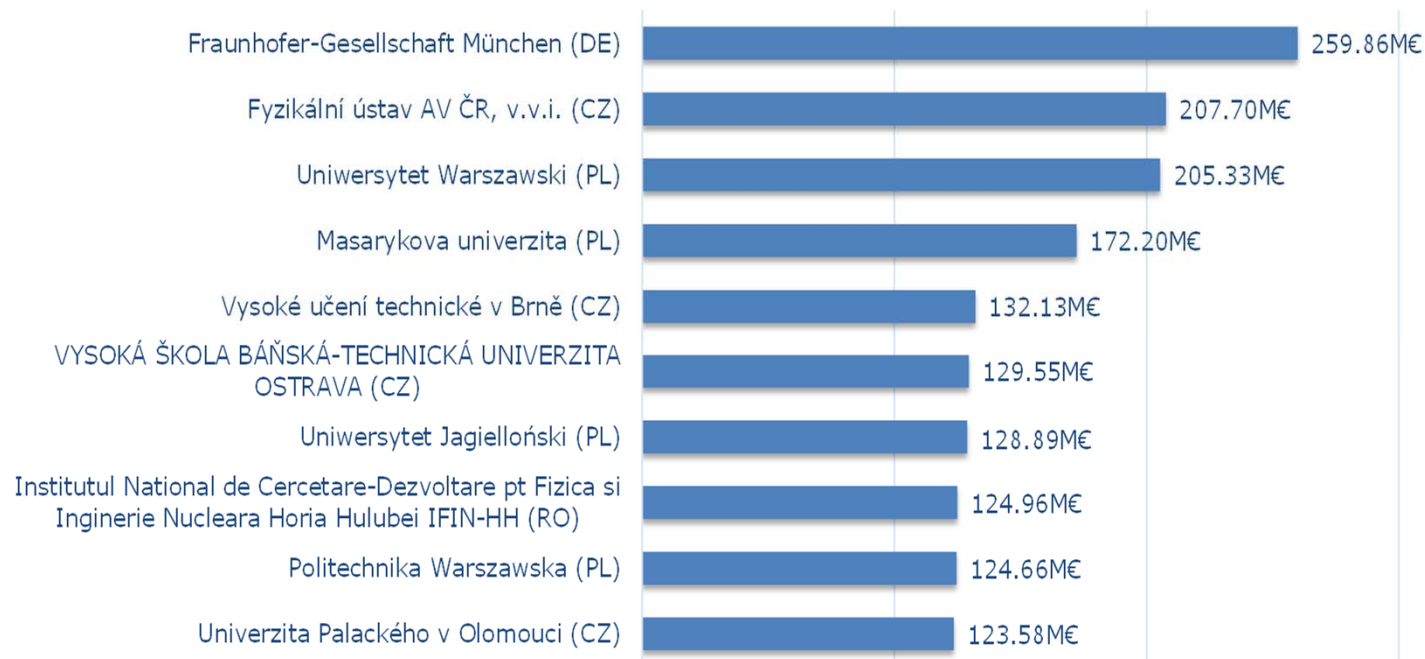


ERDF contribution by type of beneficiary (Million €)



- **HEIs and RTOs** account for more than 88% of the sample of lead beneficiaries and receive nearly 83% of the total ERDF contribution.
- Nearly 77% of beneficiaries are **public-owned organisations**.
- **Enterprises** are 4.5% of the total direct beneficiaries; 70% of them are SMEs; they are more often collaborating with HEIs and RTOs.
- An average of **3.7** beneficiaries in the collaborative projects.
- An average of **4-5** projects for each body/institution.

The top-10 institutions

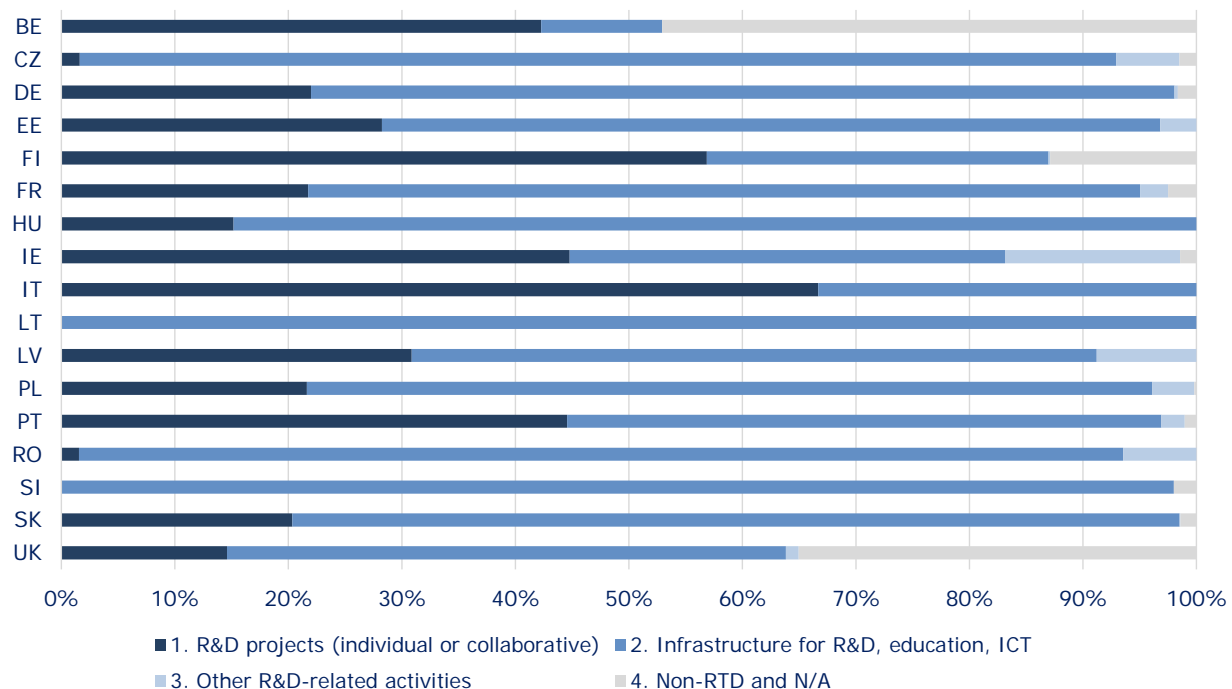


- A total of **about 4,000 different institutions** (including enterprises) can be identified among the almost 24,000 lead beneficiaries
- Excluding Spain, the total falls to about **2,000 different institutions**, out of which:
 - **More than 13% of the ERDF** support for RTD provided to lead beneficiaries was concentrated **on ten institutions**, and more than 20% on twenty institutions
 - The Fraunhofer-Gesellschaft Institute in München (Germany) received more than 2% of the total ERDF



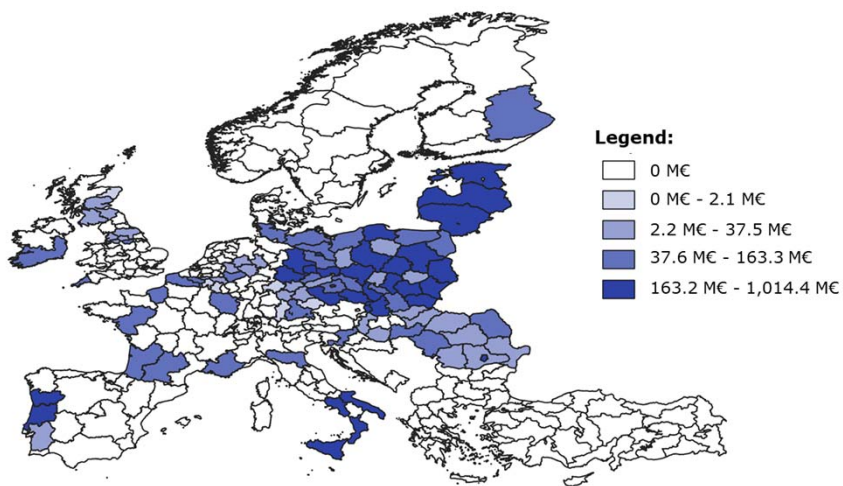
Rationale and role of ERDF support for RTD in the broad policy mix

Policy mix of ERDF support



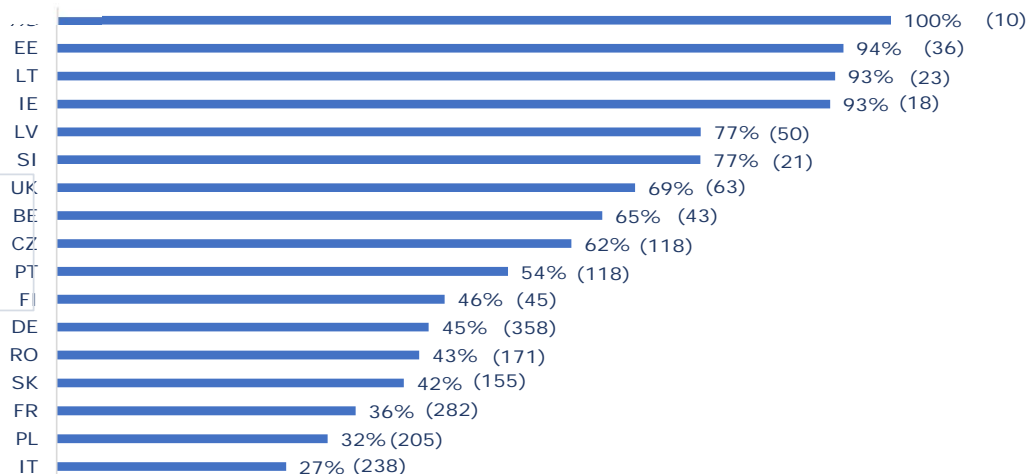
- The key strategic objectives pursued by the selected OPs were to **fill the infrastructure gap** and to improve the **systematic interaction among regional actors** by strengthening the relationships between research suppliers and users.
- There are strong differences across OPs in the way that they translated their strategic approaches into policy mixes:
 - **Similar territorial contexts saw the adoption of different combinations of instruments.**

The concentration of ERDF support for RTD

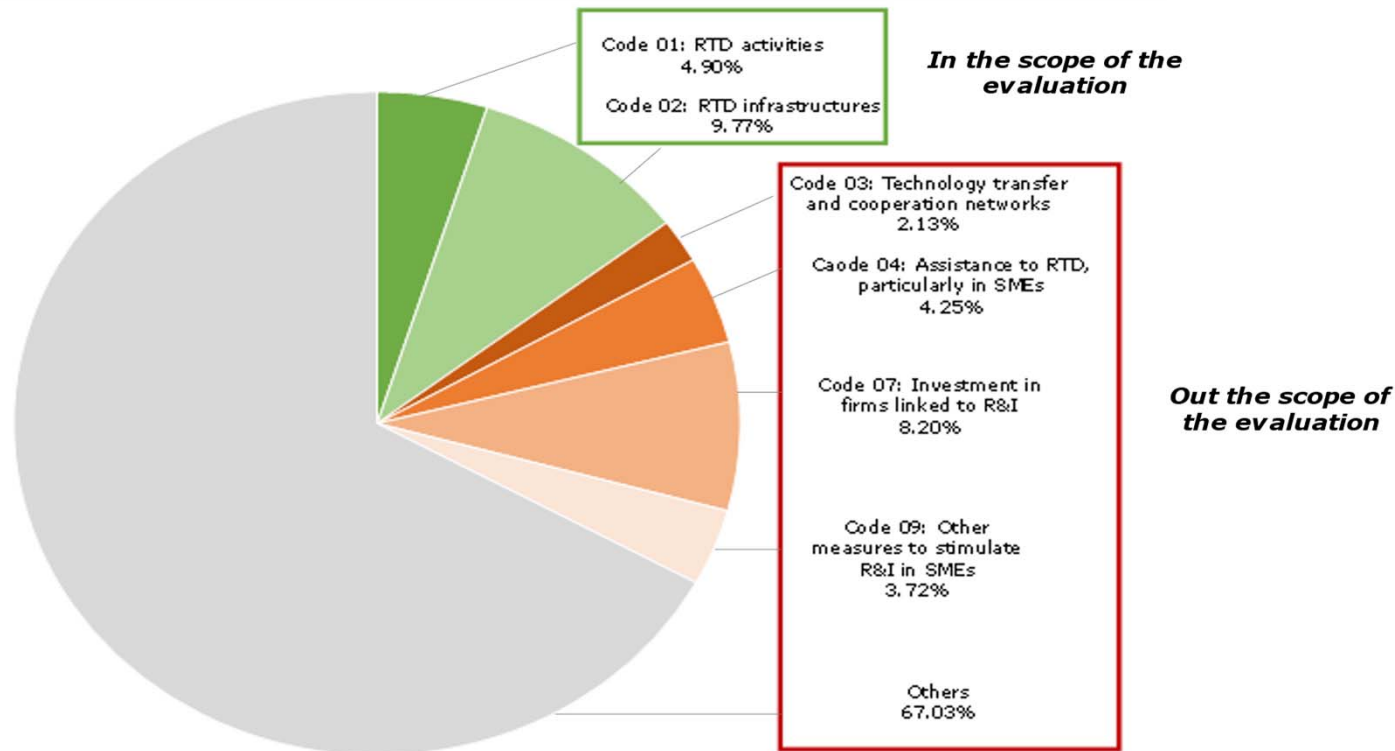


- **Infrastructure investments** were typically the result of a top-down approach guided by national road-mapping exercises.
- **Research projects** followed a more bottom-up approach, responding to the needs of regional scientific communities.
- The majority of RTD interventions were geared at supporting **excellence objectives**:
 - ERDF was mainly addressed to the strengthening of existing territorial excellence: its concentration reflected existing, regional scientific research-base and economic potential.
 - In many cases, 'target priority' sectors and technologies were identified on the basis of existing policy strategies and documents, either at national or regional levels.

- There was also a **high level of concentration within individual beneficiary organisations** applied to leading institutions in their field



ERDF support to RTD and other ERDF measures



- There was a **significant degree of coordination** across interventions carried out **within the ERDF framework**:
 - Across different ERDF OPs (national and / or regional)
 - Across different axes, measures and instruments implemented in the framework of the individual OPs.

ERDF support to RTD and regional/national strategies

Country covered by the study	Total ERDF contribution over total R&D expenditure (2007-2013)	Total ERDF contribution over public R&D expenditure (2007-2013)
Belgium	0.30%	0.80%
Czech Republic	8.10%	18.60%
Germany	0.40%	1.30%
Estonia	11.80%	25.50%
Finland	0.20%	0.50%
France	0.20%	0.60%
Hungary	1.10%	3.00%
Ireland	0.50%	1.70%
Italy ²⁵	0.80%	1.90%
Lithuania	10.00%	13.60%
Latvia	14.80%	20.90%
Poland	10.90%	16.40%
Portugal	2.60%	6.00%
Romania	6.30%	9.90%
Slovenia	1.50%	5.10%
Slovakia	19.40%	33.50%
United Kingdom	0.30%	0.80%

- ERDF support played a crucial role in the field of RTD **where it represented a significant share** of the total national R&D spending, or where there was a **high regional concentration** of this spending (e.g., in convergence regions).
- Despite a **significant level of strategic coherence between ERDF RTD support and existing local support instruments**, the ERDF support was **not generally explicitly linked** to other national or regional policies or programmes **from an operational standpoint**.

ERDF support and FP7/H2020

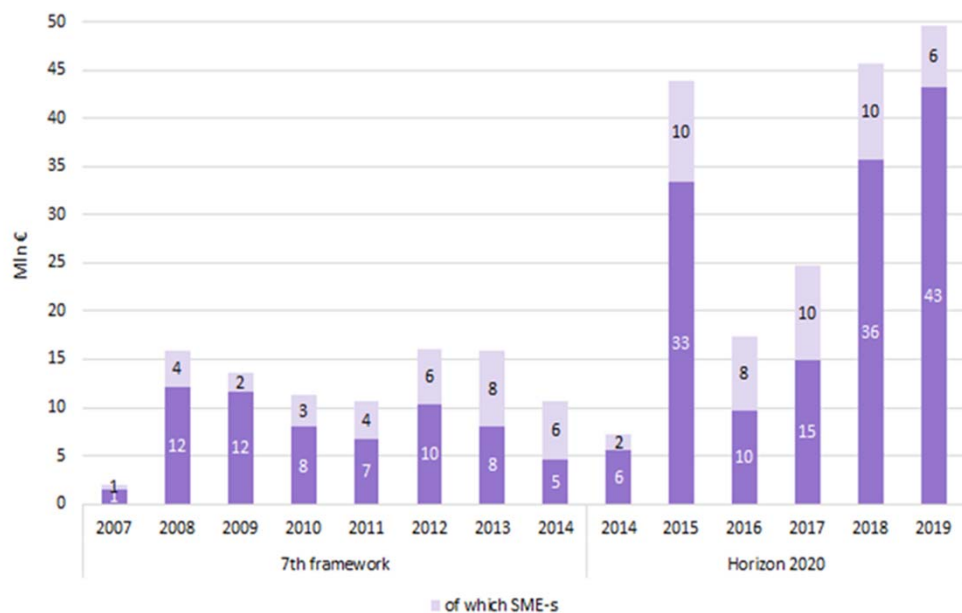
Participation rate in FP7 and H2020 projects amongst ERDF beneficiaries

	PARTICIPATION RATE (%)	
	FP7	H2020
Estonia	27.6	27.6
Italy	22.3	15.7
Germany	22.0	21.3
Poland	62.9	62.5
Czech Republic	33.3	39.8
Portugal	46.8	48.4
Romania	25.9	26.5

- Despite ambitions to build on the relative added value and to implement projects in continuity between ERDF and FP funds, **no specific arrangements were designed to facilitate and promote active synergy.**

ERDF support and FP7/H2020

Estonian participation in European Framework Programmes (EURm)



Source: Estonian Research Council on the basis of eCorda: <https://www.etag.ee/tegevused/uuringud-ja-statistika/statistika/raamprogrammide-statistika/> (retrieved on 20 November 2020)

Note: light purple represents participation of SMEs

Portuguese participation in European Framework Programmes (EUR m and %)



Source: ANI - National Innovation Agency

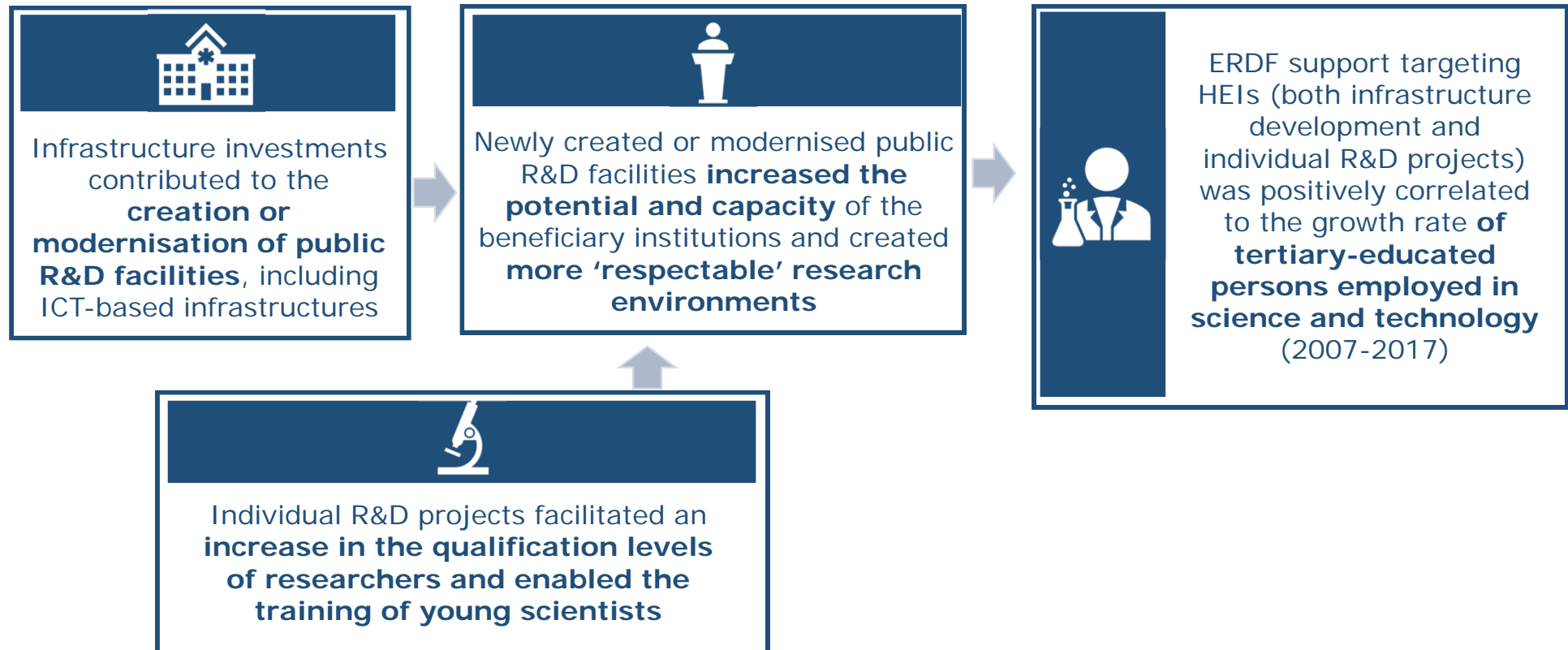
Key achievements and missed opportunities

Achievements regarding R&D capacities: students and tertiary attainments



- Results were more positive in those regions with **more advanced industrial fabric** and with higher business R&D expenditure.
- Demand-side effects related to the absorption capacity of local labour markets are crucial for the final success of such measures: problems of **labour market mismatches** were reported in Poland and may have applied to other countries as well.

Achievements regarding R&D capacities: R&D personnel and researchers



- **Such a relationship was valid on average**, i.e., without any statistically significant differences between the EU13 and EU15 or between Convergence and Competitiveness regions.
- The main channel of effects, however, lay through infrastructure development.

Achievements regarding scientific output



Infrastructure investments improved research facilities and R&D management capacities and brought a **profound shift in quality in provided services**



Individual projects allowed researchers both to **enhance existing expertise** and **develop new areas of inquiry**



Evidence points to a positive and statistically significant relationship between ERDF support targeting HEIs (both infrastructure development and individual R&D projects) and the **growth rate in the number of scientific publications**

- A **'catching-up' process of scientific production** was particularly visible in the EU13 (145% growth in the volume of publications between 2007 and 2017).
- No relationship was found, by contrast, regarding **the quality of scientific production**, which may take longer to catch up.

Achievements regarding technological development and innovation



POSSIBLE EXPLANATIONS

- Research activities are inherently risky and may lead to no or poor results
- Even when results are produced, they may remain unfeasibly distant from an industrial application
- There is a time-lag issue: it may take some time for research activities to generate a technological output
- Some implementation issues were reported for collaborative R&D, although the latter created a generally high degree of interest from the beneficiaries of all the calls.
- **ERDF support alone may not have been enough**

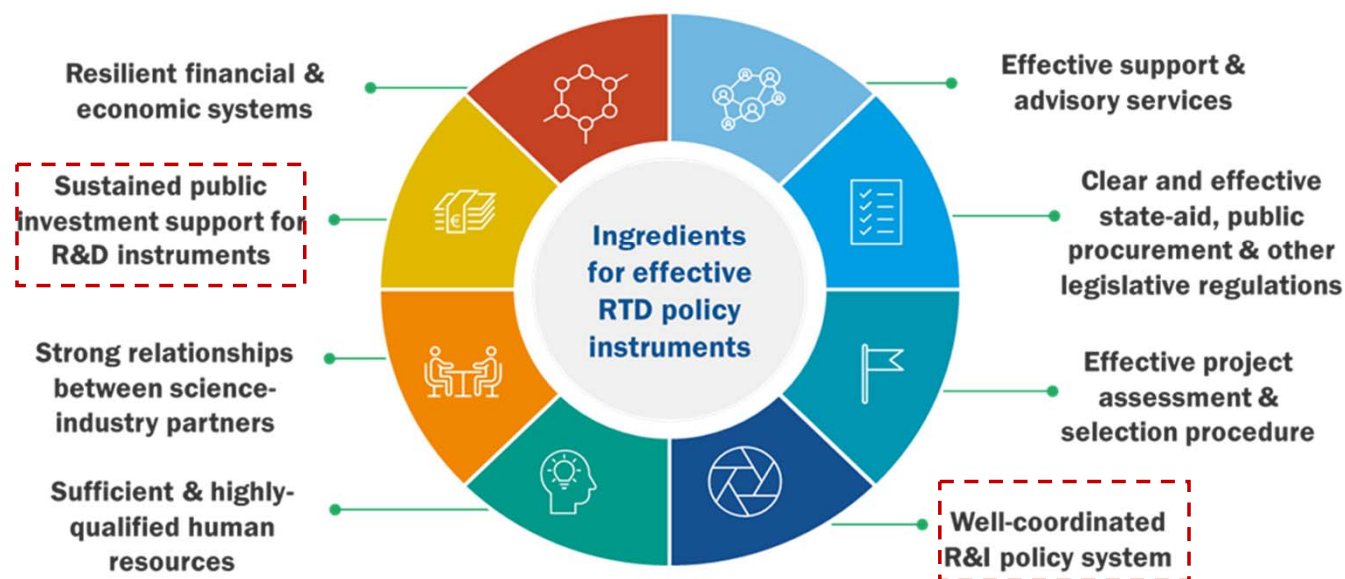
The role of contextual factors

RTD cookbook



Broader and long-term commitment to RTD investments

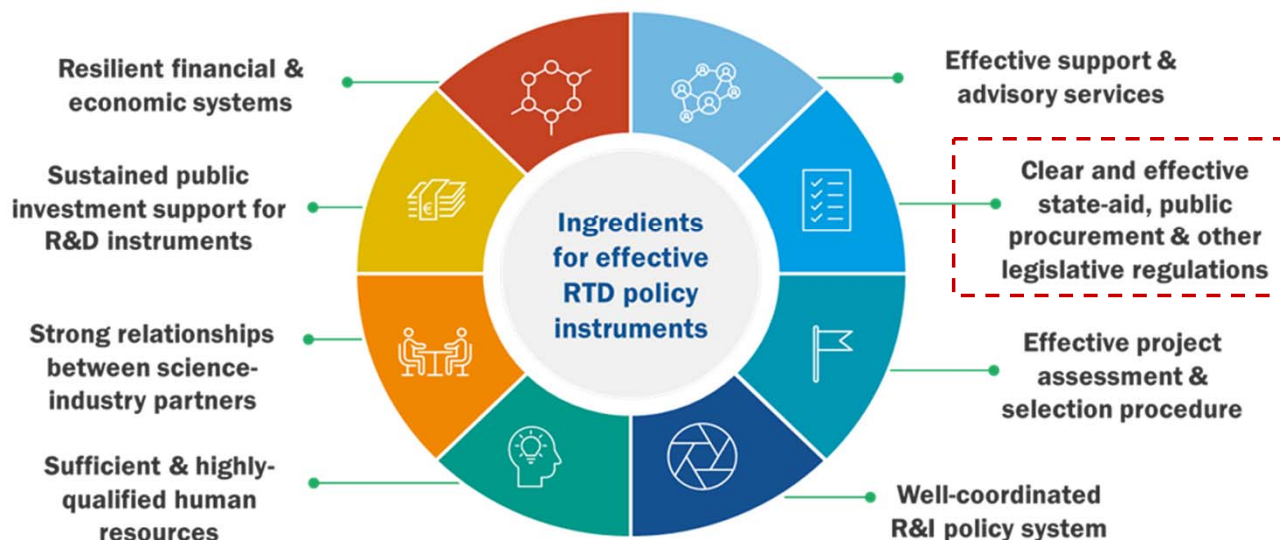
Most important ingredients for effective ERDF supported RTD policies



- **Continued public investment in research institutions is key**, as it allows for follow-up projects to take place that strengthen existing capacities and allow for the development of new ones
- The **long-term alignment of ERDF with national and regional RTD strategies** became, as it remains, a crucial element of success.

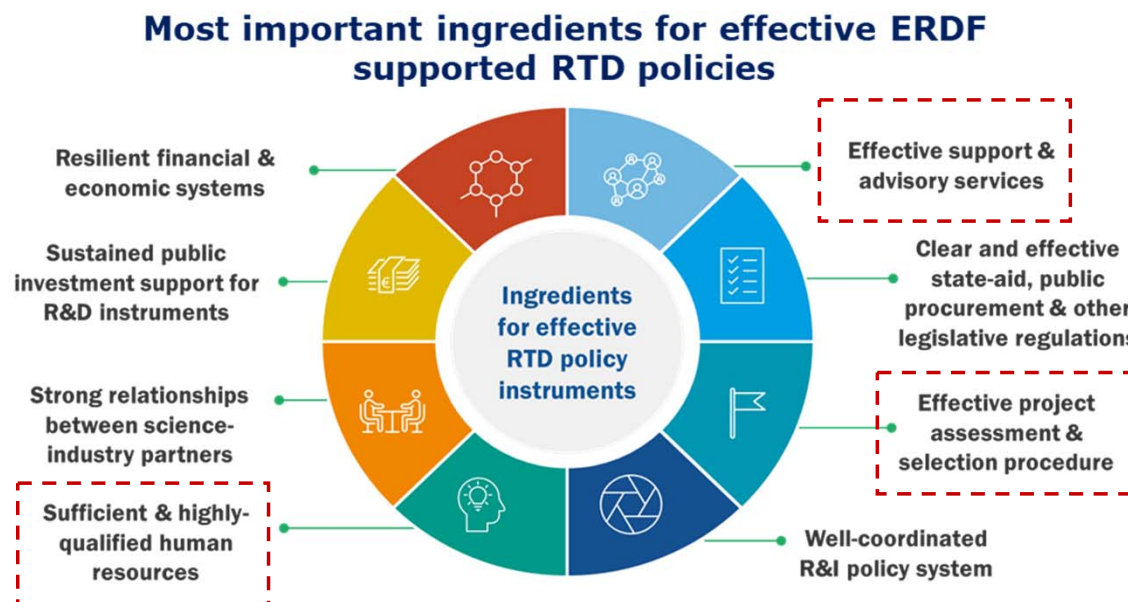
Stability and clarity of the legal framework

Most important ingredients for effective ERDF supported RTD policies



- **Clarity about the 'rules of the game'** to be followed in the common RTD space by science and industry partners, regulating their respective roles and responsibilities and providing the most appropriate incentives for successful partnerships, proved to be key.
- **State-aid issues** were reported as the most problematic factor in many countries, as they hampered the more intensive and effective involvement of businesses in the funded projects and follow-up activities

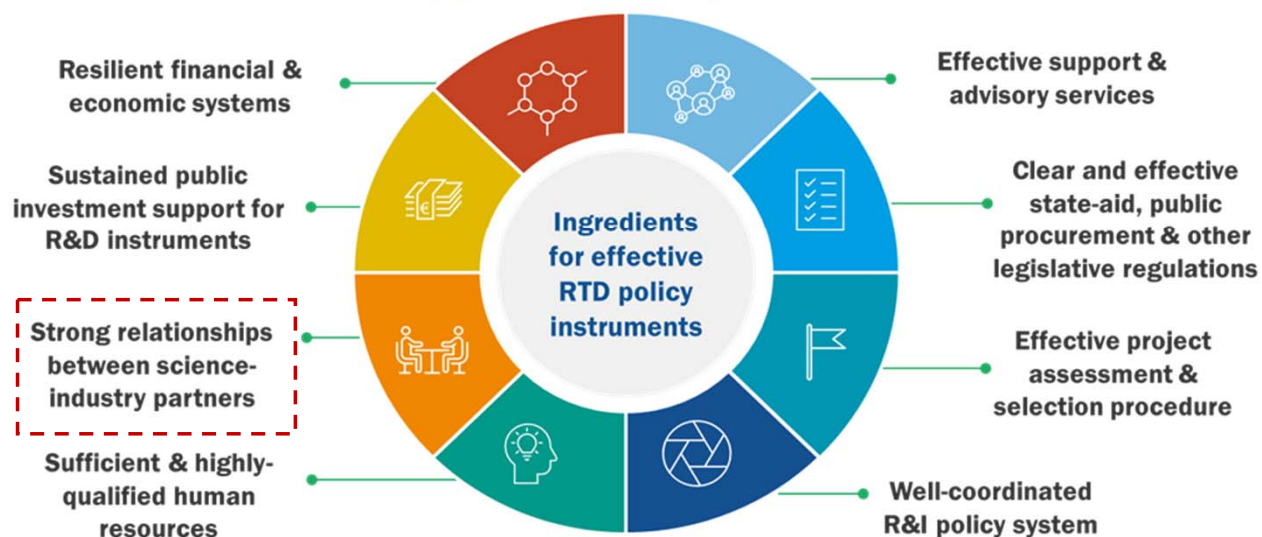
Ensuring appropriate human resources and capacities



- **Administrative and managerial capacities** of both programme managers and beneficiaries are crucial for effective public spending.
- Key elements are the **capacity to ensure the high scientific quality** of selected projects, as well as their **timely selection** and funding

Relationship between scientific and industry partners

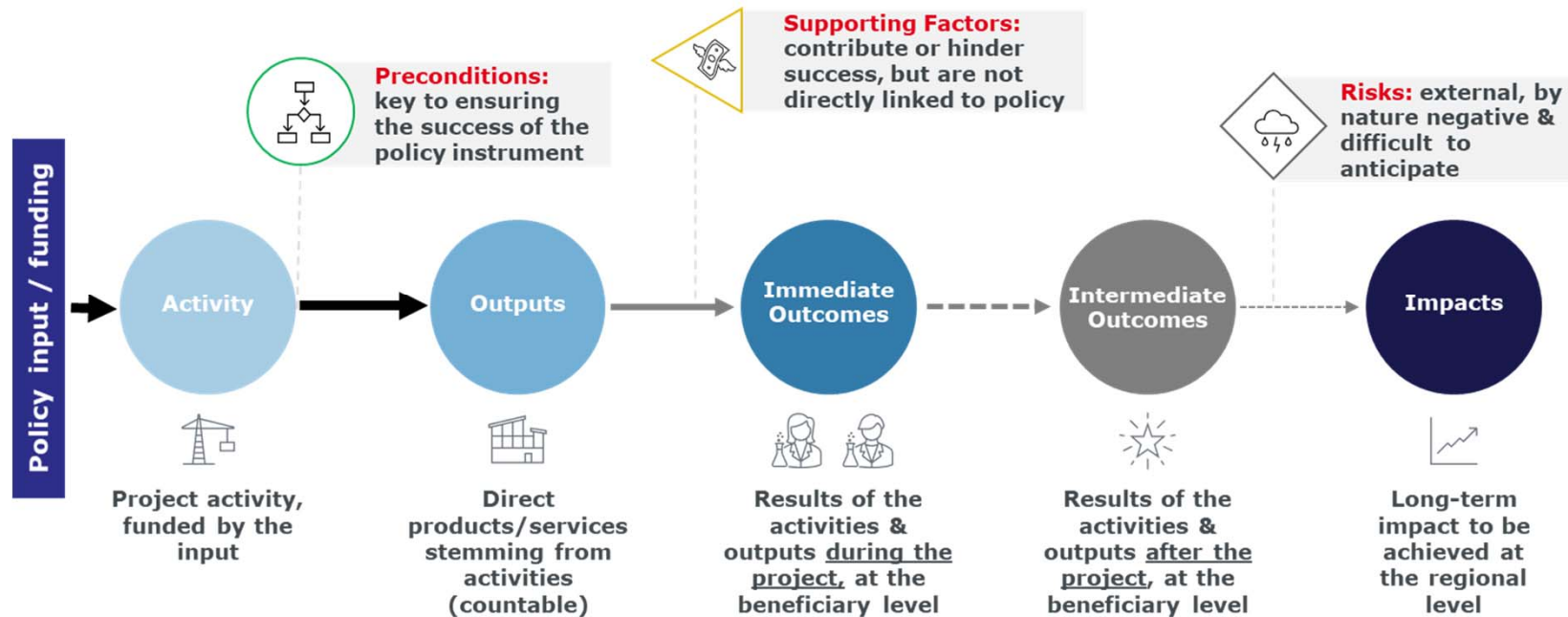
Most important ingredients for effective ERDF supported RTD policies



- **Promoting and maintaining mutual trust, awareness of respective needs and the capacity positively to exchange ideas and know-how** becomes a key enabling contextual feature.
- To ensure that new products, processes, and technologies find long-term commercial applications, an **effective science-business collaboration system** needs to exist and be maintained over time.

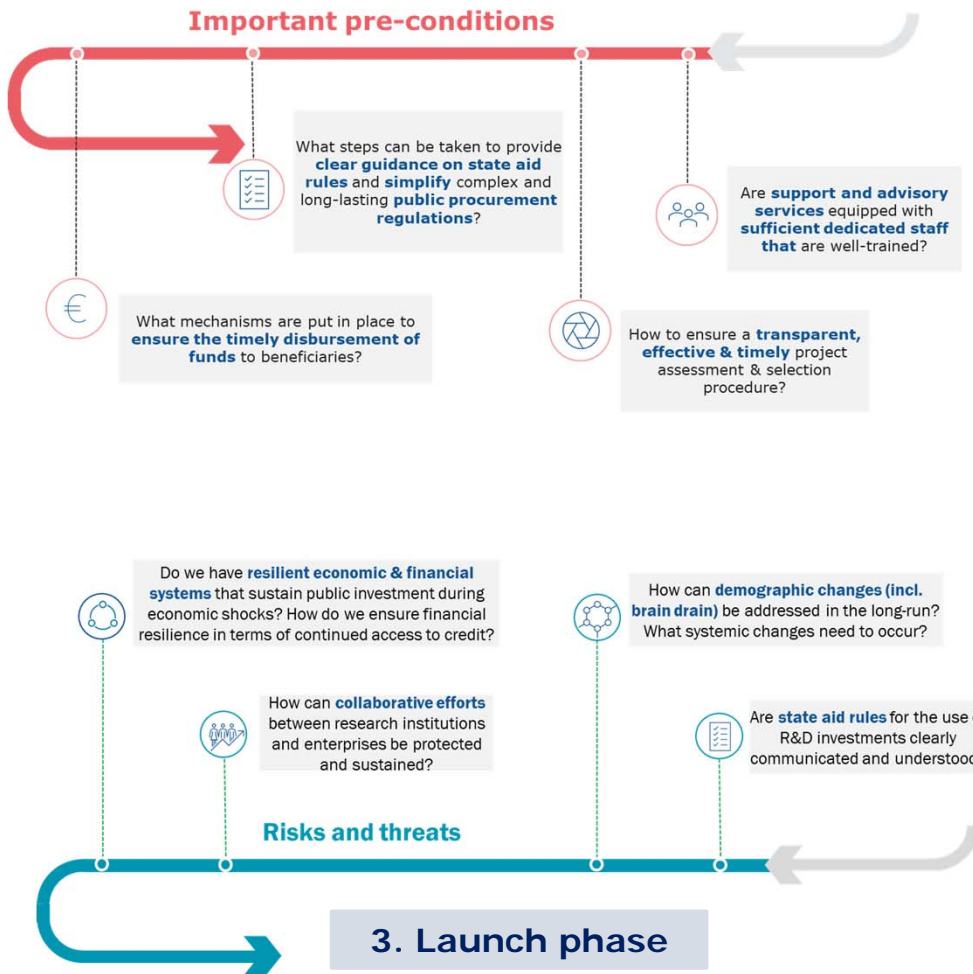
What must be considered on the path from initial activities to desired impacts?

- The degree of effectiveness of a policy intervention depends on the setting in which it occurs: pre-conditions, supporting factors, risks as well as other contextual factors play a significant role in determining the effectiveness of a policy intervention.

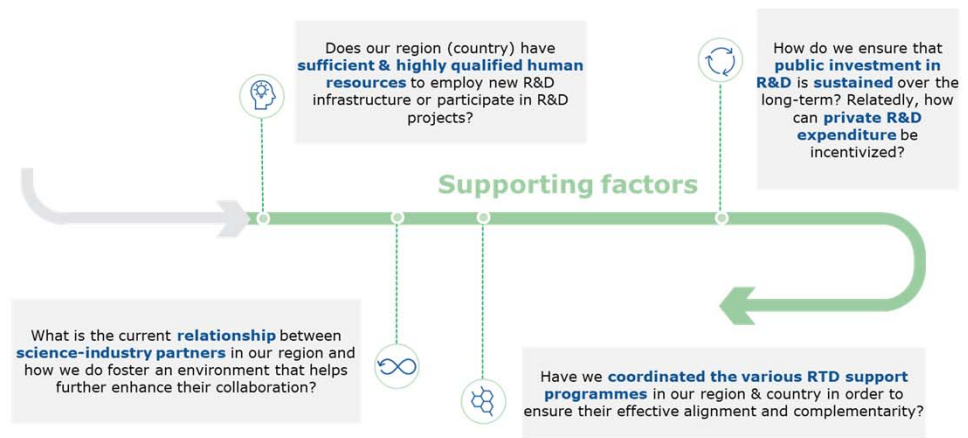


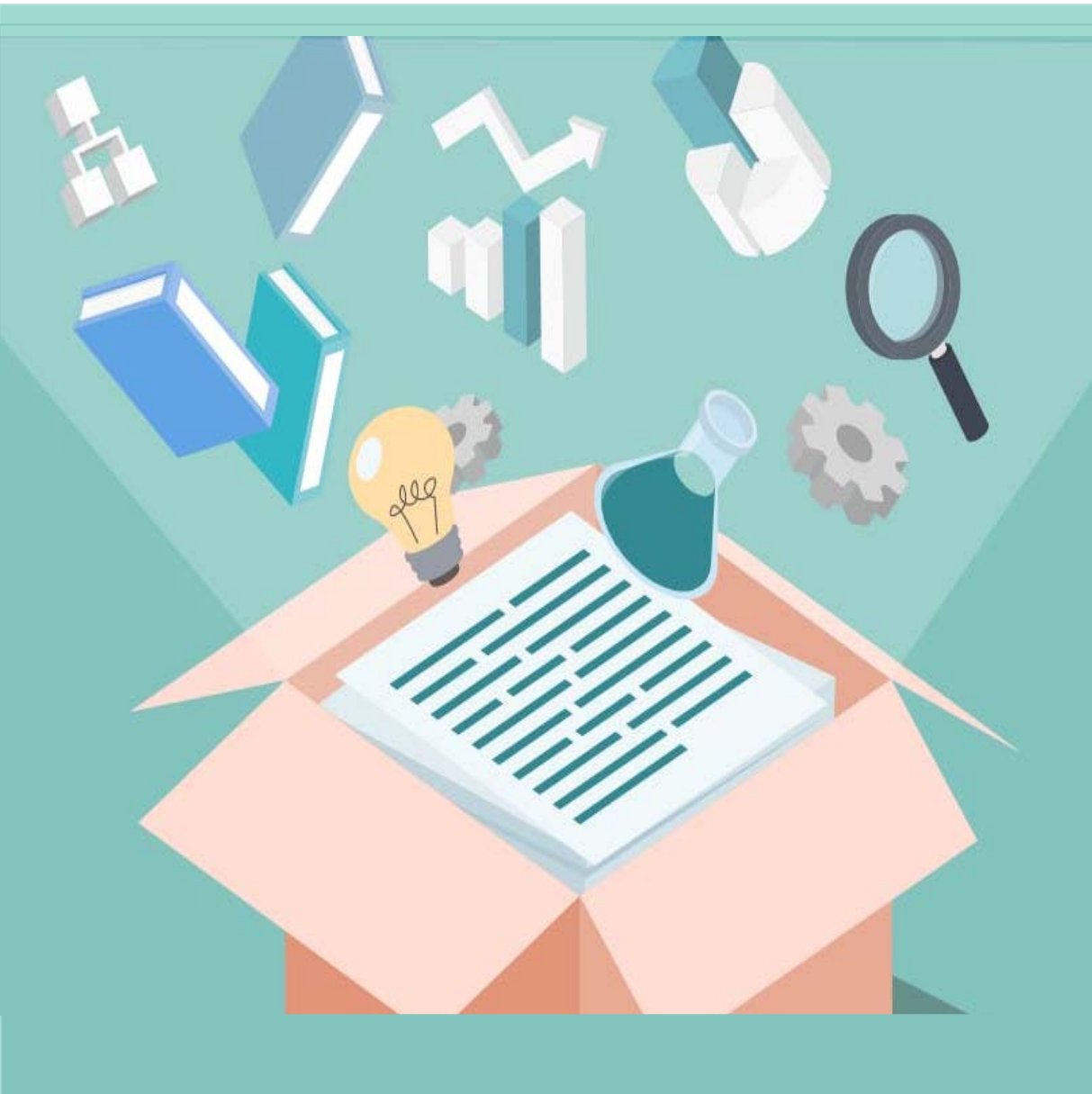
The design of future ERDF investments for RTD: an innovation journey

1. Preparatory phase



2. Ideation phase





Conclusions

Overall assessment of ERDF support for RTD

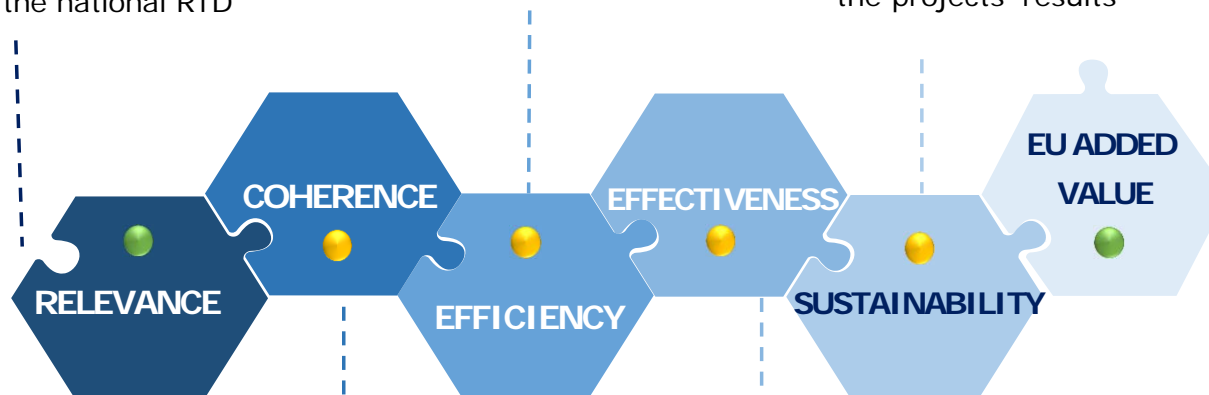
- In most of the case studies, the ERDF support for RTD actually **addressed the most pressing needs** of expansion and modernisation of the national RTD systems

- The role of ERDF **differed** significantly among regions and countries in terms of **financial weight** and strategic coherence

- **Long-term financial sustainability of RTD infrastructures** was **challenging** in some cases
- Collaborative R&D projects were not fully successful in ensuring the sustainability of the projects' results

Legend:

Green is high,
yellow is moderate,
orange is limited



- The main EU added value was a **scale effect** produced by the access of a considerable quantity of financial resources
- EU-wide effects were not among the direct, intended effects of funded instruments

- (Internal) **coherence with other forms of ERDF support** was generally **high**
- The ERDF policy mix for RTD was also **generally coherent with regional and national RTD strategies**, but not in operational terms
- **Good synergies** were reported **with the ESF**
- **ERDF and EU FPs** were seen as serving related but **essentially different purposes**
- **State-aid rules** proved to be a **challenging** factor in project implementation

- ERDF investments contributed to the **observed improvement of R&D capacities** in the target regions and to the **increase in the number of R&D personnel** and researchers at the regional level as well as the growth rate in the number of scientific publications
- **More limited** was the capacity of funded projects to generate economic benefits from the **commercial valorisation of R&D results**

Lessons learned for future evaluations



- 1 Focus on few and clear EQs with shared judgment criteria
- 2 Be ready to accept that some questions cannot be answered and some answers may lead to more questions
- 3 Consider the complexity and dynamic of the ToC
- 4 Find a reasonable way to triangulate evidence: from statistical significance to context-relevant considerations

Thank you!

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