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Parallel session 4: Experiences monitoring and evaluating S3 performance

Generalitat

de Catalunva



# Experiences monitoring and evaluating S3 performance

- Tatiana Fernández, Head of Economic Strategy, Generalitat de Catalunya, Spain
- Ieva Gurklyte, R&D&I coordinator of ICT Lab division, Lithuania
- Jennifer Maria Grisorio, Head of "Research and education system" area, ARTI-Puglia, Italy
- Alexandra Avdeenko, Evaluation Specialist, Finance, Competitiveness, and Innovation, World Bank
- Gabriela Macoveiu, North-East Regional Development Agency, Romania

Moderator : Daniela Kretz, S3 CoP Secretariat





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# S3 monitoring through open data in Catalonia

Tatiana Fernández

Head of Economic Strategy Generalitat de Catalunya



## Catalonia's S3

RIS3CAT 2030 promotes transformative, responsible research and innovation with impact on the quality of life of people and the territory

#### Enabling technologies

- Artificial intelligence
- Cybersecurity, connectivity and blockchain
- Microelectronics and nanoelectronics, photonics and quantum technologies
- Advanced and sustainable materials
- · Biotechnology
- Advanced digital manufacturing

New digital- and technology-based industry

#### RIS3CAT 2030 shared agendas

- A sustainable, fair, equitable and healthy food system
- An environmentally-friendly, emissions-neutral energy and resource system
- A sustainable mobility and logistics system
- A universal, sustainable, resilient social and health care system
- A reflective, proactive, inclusive and responsive education and knowledge-generation system
- · A sustainable, competitive industrial system
- A cultural system that integrates people, territory and history

Greener, more digital, more resilient and fairer socioeconomic model





# S3 are based on place-specific challenges (needs and opportunities) and contributing to a green and just transition (SDGs)

## How can we monitor smart specialisation?

- Counting of items is NOT enough, we need a contextualised perspective (indicators contextualised for purpose and place)
- Simplistic indicators have counterproductive effects (narrowing of activities), they are likely to reflect resource availability rather than relative effort

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## **RIS3CAT 2030 monitoring system**

It combines different sources of information and types of analysis to better understand how research and innovation in Catalonia are supporting:

- The articulation of sustainable value chains
- The emergence of new business models aimed at generating shared value
- The transformation of socio-technical systems (water, energy, mobility, health, food, etc.)
- The creation of digital- and technology-based industry
- The transition towards a greener, more digital, more resilient and fairer socio-economic model

These transformative processes are complex, as they involve interrelated changes in very different areas (such as the production systems, technologies, markets, regulations, user preferences, infrastructure, and cultural expectations).





## **RIS3CAT indicators**

Output and result indicators of R&I projects managed by Generalitat de Catalunya

Statistics, surveys, technology foresight reports, indicators and official data

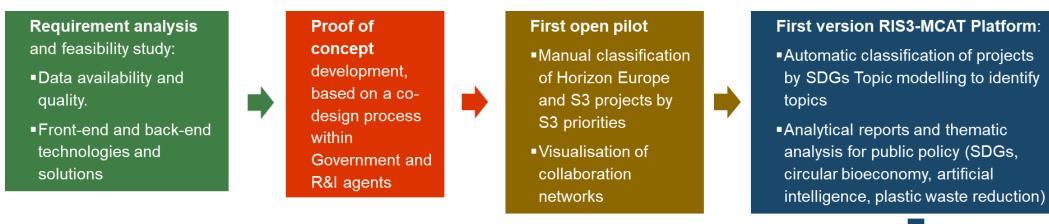
Open data from R&I projects managed by other administrations (EU, Central and local governments) Qualitative and semi-structured data from the S3 discovery process and from shared agendas (bottom-up)







# The process of creating an open data platform for monitoring S3 (starting in 2017)



#### Next steps:

 Integration of projects managed by the central Government and of additional projects managed by Generalitat de Catalunya (beyond ERDF)

#### Second version RIS3-MCAT Platform:

- Adaptation to the new policy framework: automatic reclassification of all projects in the new priorities (deep learning classifiers)
- Updating of the front-end technology
- Streamlining the design patterns
- Integration and visualisation of an emerging classification of topics (topic modelling, semantic similarity, deep learning)

#### **Development of new functionalities** as a result of a participatory review and requirement analysis with

- Catalan R&I stakeholders:
- International and interregional collaboration networks and others





#### rgencat Cofinançat per la Unió Europea **RIS3-MCAT Platform** Help in PDF SPARQL Queries EN ~ • Organisations network **Projects map** https://ris3mcat.gencat.cat/ $\nabla$ Areas of action 596 Food system Q Cultural system 480 Mobility and logistics system 637 $\Theta$ Energy and resource system 1.949 Education and knowledge generation 152 Q system Industrial system 605 ж Social and health care system 1.526 Unclassified 734 More than 5,000 unique users from 73 countries $\checkmark$ 3.184.670.262 € of investment 1.517 organisations 16.546 external partners 4.832 projects



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## Topics' map (through a topic modelling)

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Government of Catalonia

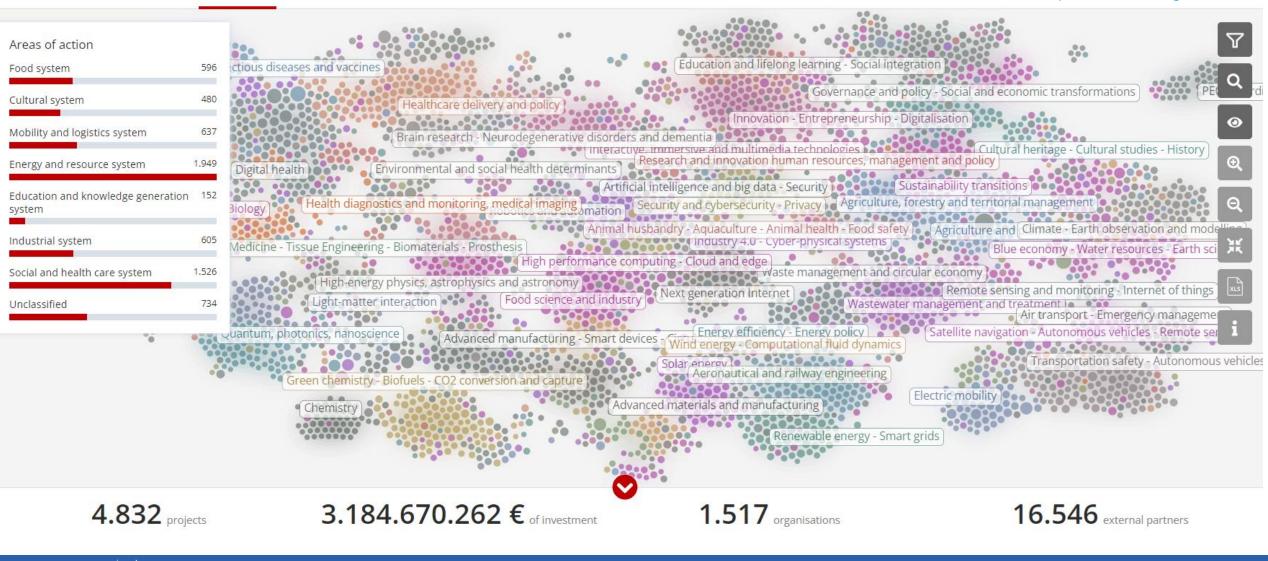
Organisations network

Projects map

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https://ris3mcat.gencat.cat/





## **Distribution of "mobility and logistics" projects**

https://ris3mcat.gencat.cat/





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## Distribution of "social and health care system" projects

https://ris3mcat.gencat.cat/



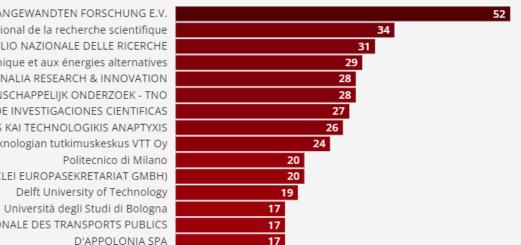
## **Exploring SDGs: sustainable cities and communities**

https://ris3mcat.gencat.cat/

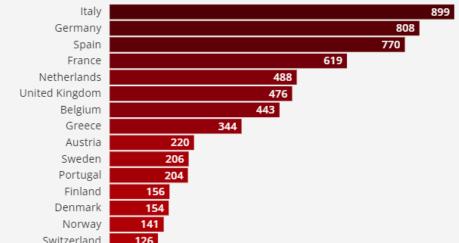


#### Ranking of countries of origin of partners by number of projects

#### Ranking of external partners by number of projects



 FRAUNHOFER GESELLSCHAFT ZUR FO...R ANGEWANDTEN FORSCHUNG E.V. Centre national de la recherche scientifique CONSIGLIO NAZIONALE DELLE RICERCHE Commissariat à l'énergie atomique et aux énergies alternatives FUNDACION TECNALIA RESEARCH & INNOVATION NEDERLANDSE ORGANISATIE VOOR TO...NSCHAPPELIJK ONDERZOEK - TNO AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS Teknologian tutkimuskeskus VTT Oy Politecnico di Milano ICLEI EUROPEAN SECRETARIAT GMBH (ICLEI EUROPASEKRETARIAT GMBH) Delft University of Technology Università degli Studi di Bologna UNION INTERNATIONALE DES TRANSPORTS PUBLICS

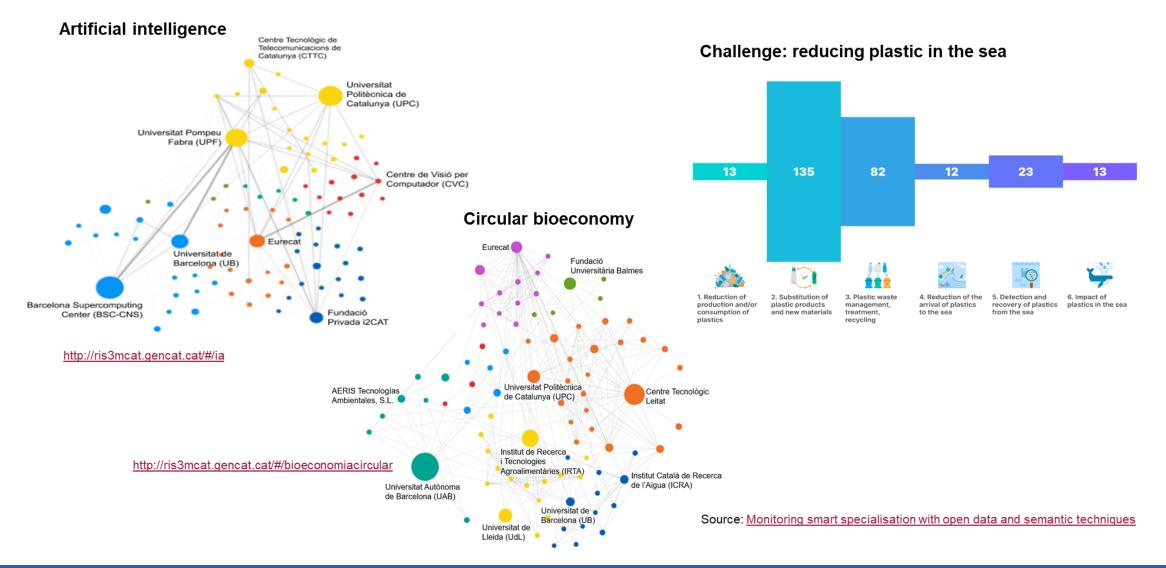


## **Exploring emergent topics of interest**

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## **Conceptualising areas of interest related to health**

Generalitat de Catalunya

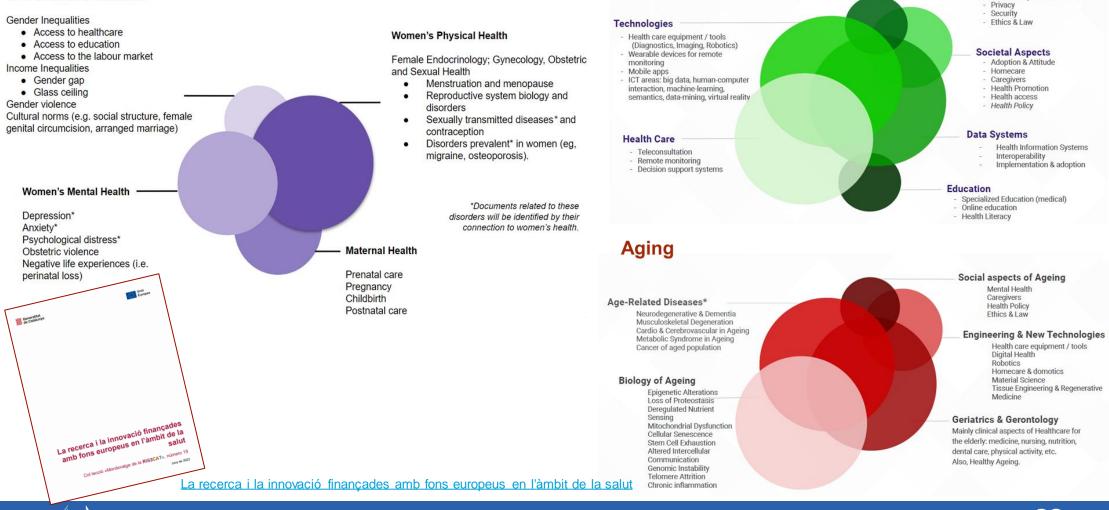
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#### Women health

#### Socio-Economic Determinants

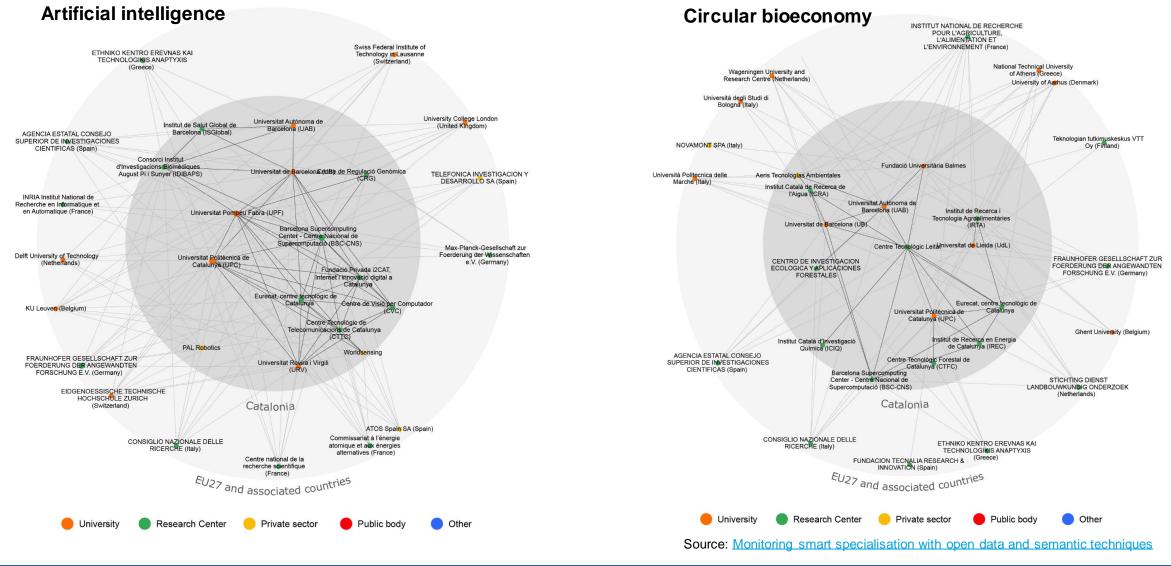


**Digital health** 



**Data Privacy & Concerns** 

### **Analysis of European collaboration networks**



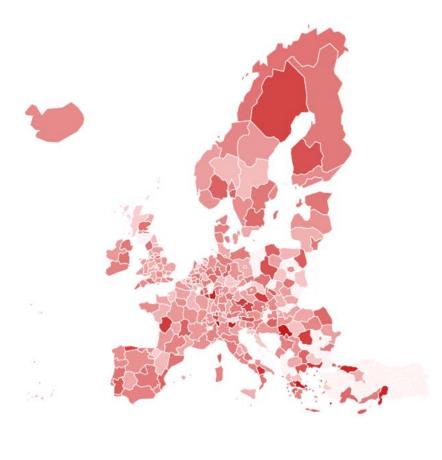




## Analysis of regional specialisation patterns

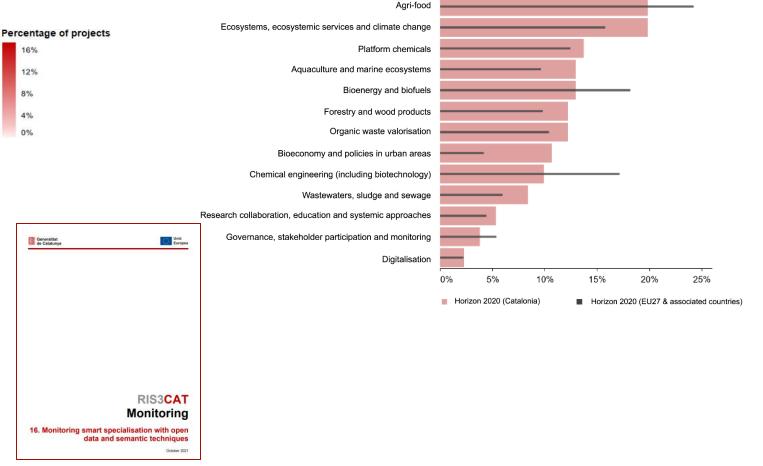
Map of the relative specialisation of European regions in artificial intelligence projects in Horizon 2020

Percentage of Horizon 2020 circular bioeconomy projects in Catalonia and the European Union, by thematic area



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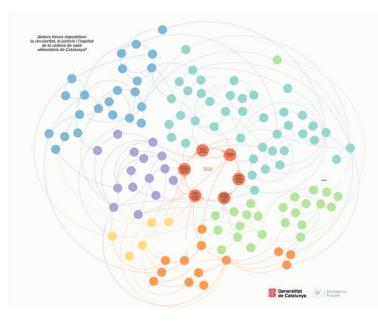
Monitoring smart specialisation with open data and semantic techniques



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#### Qualitative and semi-structured data from the S3 discovery process

Experimenting with system's mapping

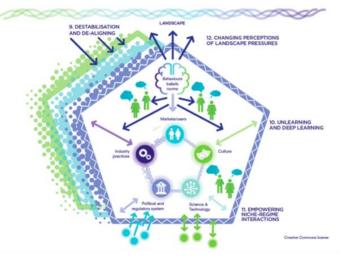


Exploring the possibilities of data lakes (through innovation public procurement)

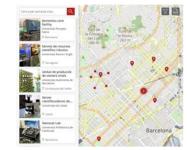


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Working with MEL frameworks and transformative outcomes (TIPC)

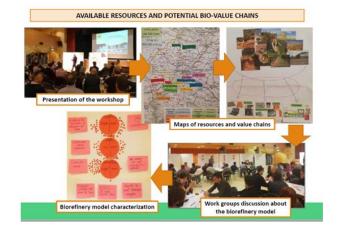


Exploring with R&I agents how to collect and visualize relevant data about transformative innovation, collaboration networks and technological capacities

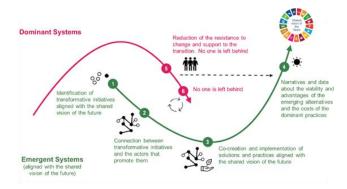


#### https://fonseuropeus.gencat.cat/ca/ris3cat/2030/

Engaging stakeholders in discovery processes and shared agendas



**Developing frameworks and** methodologies for collective transformative action









#### Thank you for your attention!



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Monitoring and evaluation of Lithuanian smart specialization - experiences and plans for the future



# Smart specialisation in Lithuania 2021-2027

## Challenges

Low SME capacity to apply innovations (esp. in regions)

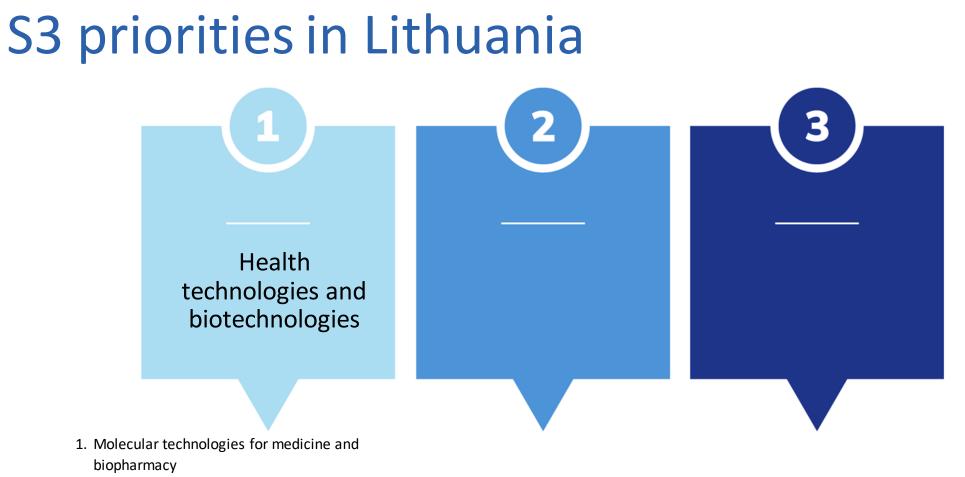
Small share of companies generating high added value and small share of R&D expenditures in GDP Low level of business and science internationalization level (participation in international projects, networks)

**Goal** – to develop an innovation-driven economy by strengthening the cooperation between business and science, and by concentrating resources into R&D resources of highest potential.









- 2. Advanced applied technologies for personal and public health
- 3. Advanced medical engineering for early diagnostics and treatment
- 4. Safe food and sustainable agriculture resources



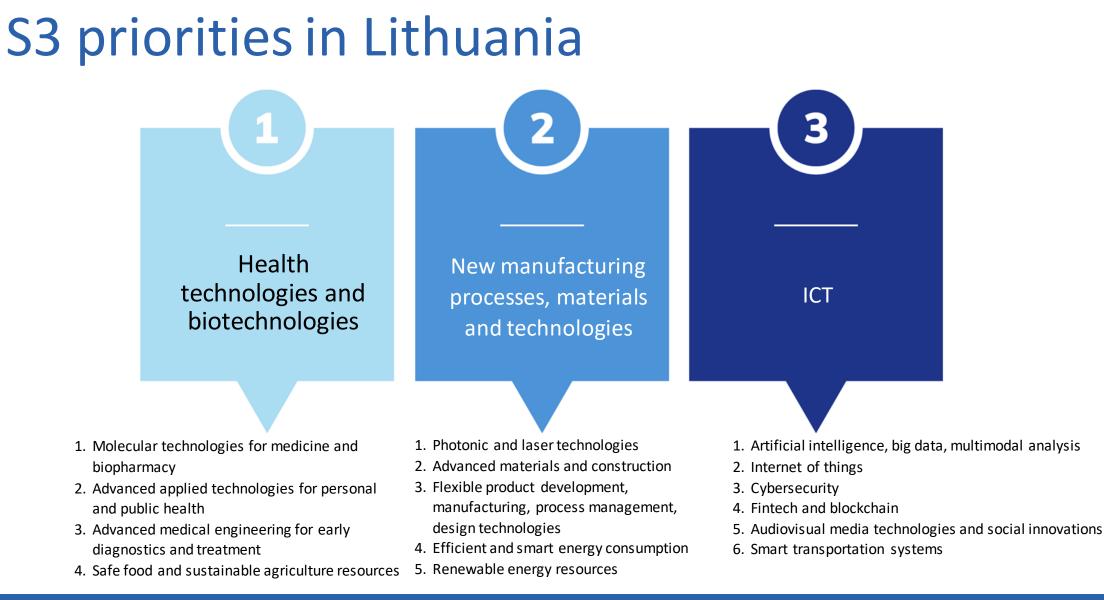


#### S3 priorities in Lithuania Health New manufacturing technologies and processes, materials biotechnologies and technologies 1. Photonic and laser technologies 1. Molecular technologies for medicine and 2. Advanced materials and construction biopharmacy 3. Flexible product development, 2. Advanced applied technologies for personal manufacturing, process management, and public health design technologies

- 3. Advanced medical engineering for early diagnostics and treatment
- 4. Safe food and sustainable agriculture resources 5
- Efficient and smart energy consumption
   Renewable energy resources









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# S3 monitoring framework

- Yearly monitoring of progress.
- Goal to monitor implementation progress according different S3 priorities.
- Evaluation conducted in **2025** in order to assess if priorities and sub-themes are still relevant.
- Goal to assess the potential, efficiency and results of the programme.

- Impact evaluation conducted in **2030**.
- Goal to assess the impact of the programme in economic terms and to understand what kind of externalities it has produced.

Monitoring

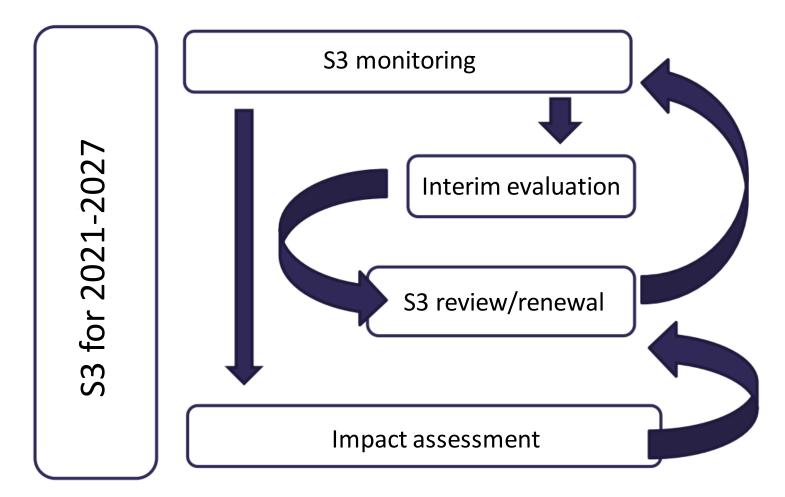
Interim evaluation Impact assessment

2021-2027





## S3 monitoring and evaluation process







# Indicators used

Input indicators	<ul> <li>To assess how the financial resources are distributed among the priorities, among the financial support measures, which part of demanded amount was assigned.</li> </ul>
Product indicators	<ul> <li>To assess what is the progress of implementation, what is the scope of companies supported.</li> </ul>
Result indicators	<ul> <li>To assess what are the benefits for the direct target beneficiaries, what kind of results do they produce.</li> </ul>
Impact indicators	• To understand what is the broader economic impact of the programme.





# Indicators (statistical data)

#### Entire economy

### According S3 priorities

R&D expenditure (% from GDP)

Share of turnover from new products (%)

Share of SMEs which adopted product or process innovations (%)

Employment in high added sectors (%)

Impact of high and medium value added products on trade balance of goods

Knowledge-intensive services exports (%)

GDP growth

Added value for an employee

Number of employees

Turnover

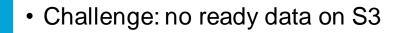
Turnover generated by one employee

Investment (Investment in equipment, investment in building, investment in patents and software, investment in land)

Exports of products and services



# Lessons learnt from 2014-2020 period



- LT Statistics Department was asked to provide additional data on specific companies which are part of Smart specialisation → more precise analysis of macroeconomic indicators
- S3 priorities and NACE codes were matched with the help of external experts and analysts of Ministry of Economy and Innovation
- Qualitative data needs to be more integrated in monitoring process for getting deeper insights

• Statistical data gives only broad overview  $\rightarrow$  need to collect and analyse company level data



2



# More indepth data of companies

- S3 interim evaluation and final impact assessment will be conducted by external experts
- Companies surveys and interviews for the interim evaluation and final impact assessment
- Interviews with key stakeholders





# S3 monitoring for ICT Lab

- NACE codes do not always accurately represent the activity of the company e.g. J6201 is associated with 4/6 ICT priority subtopics
   → risk of skewed data
- 2. Conflation: AI and big data are considered 1 subtopic in ICT priority
  → Difficult to tell what is doing better from S3 monitoring
- **3. R&D expenditure** (business and public) is important in S3, but R&D plays a smaller role in ICT than in other priorities

 $\rightarrow$  digital innovation is often R&D-light







#### Thank you for your attention!



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# The monitoring of the RIS3 in Puglia

Jennifer Grisorio

Head of research and education Unit ARTI-Puglia





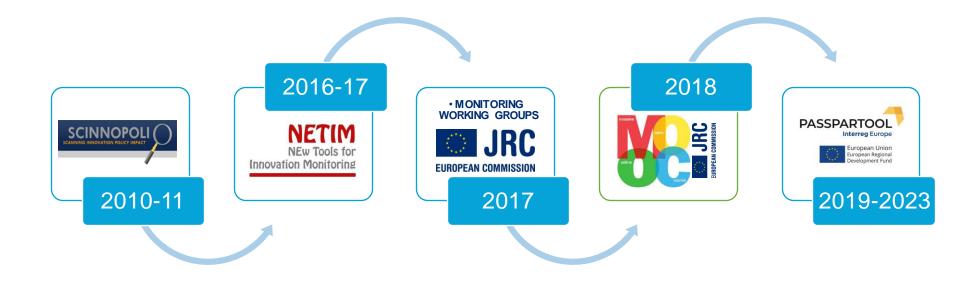


- Information needed at S3 priority areas (no Nace codes but «innovation value chains» in which innovation deploys also thanks to cross-fertilisation)
- Necessity to have timely data for monitoring the implementation of the strategy
- Available information useful also to revise the selected specialisation areas/priority areas
- RIS3 and ROP monitoring system are different but strongly connected





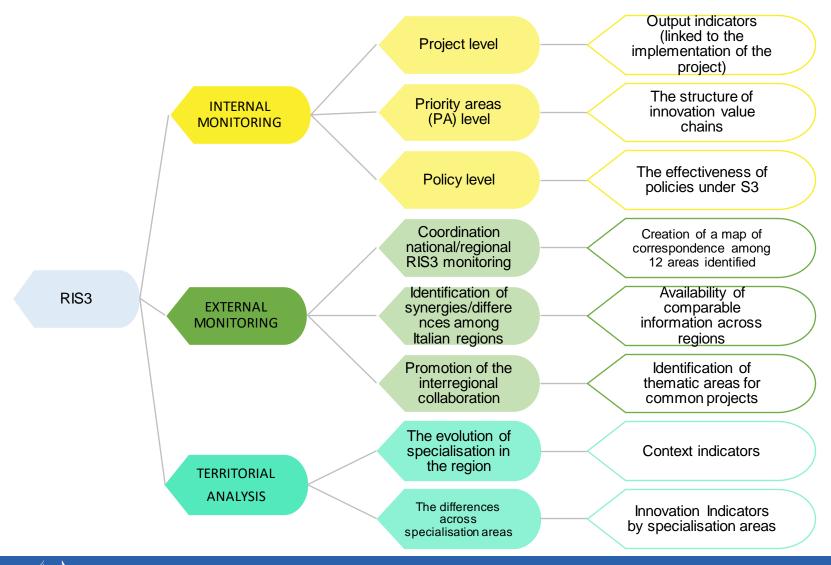
# Monitoring innovation policy: a continuous learning approach







# The RIS3 monitoring activities



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European Commission Different levels of analysis



### Puglia RIS3

#### The strategy

- RIS3 and Regionale Operative Programme are strongly connected
- NO "priority specific calls"

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- Identification of "innovation value chains": a combination of different industrial sectors, areas of scientific and technical competence and enabling technologies
- The RIS3 monitoring is not incorporated in the implementation activity

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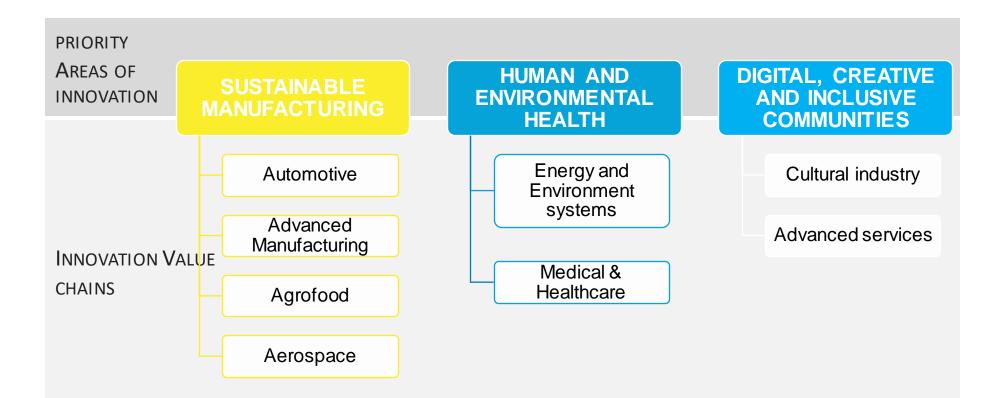
Government of Catalonia

#### The monitoring system

- A structured data collection system, mainly based on information related to the participants to the public calls
- Monitoring based on information mandatorily provided by the participants to public calls and beneficiaries, at project proposal submission time, at project conclusion and in a later follow-up phase
- Use of a set of indicators: input, output and results/outcome (disaggregated at specialisation/priority areas)
- Mainly a quantitative approach

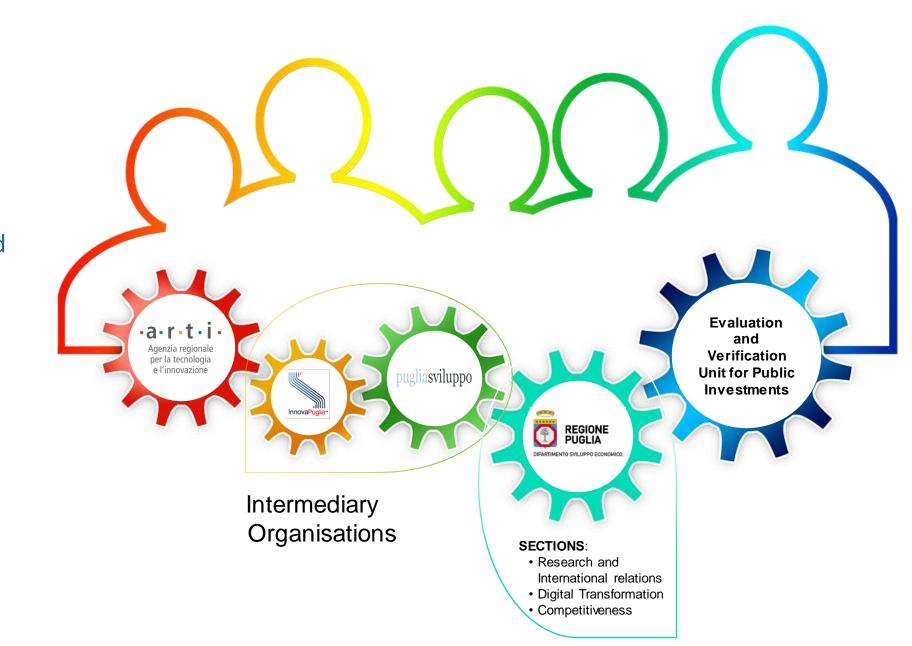


### Puglia RIS3







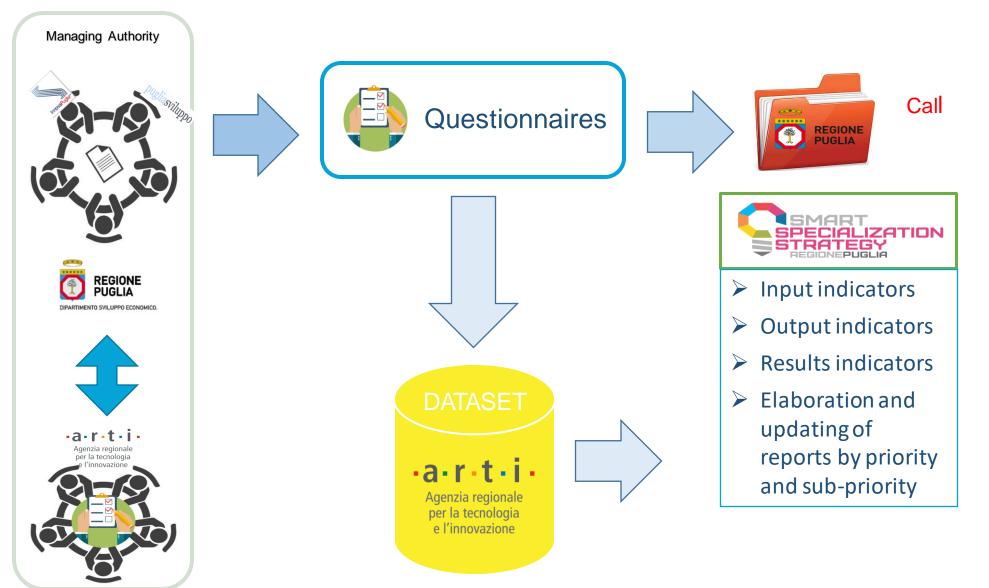


The monitoring and evaluation of RIS3: the actors





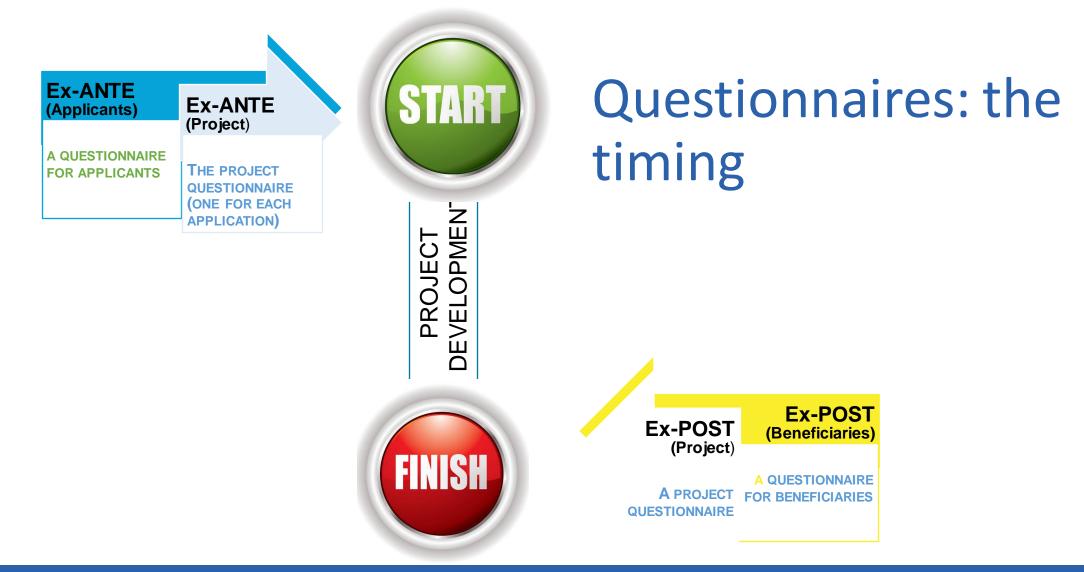
#### How the RIS3 monitoring system works





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**Ex-ANTE** (Project)

#### **PARTECIPANT**:

- Enterprise  $\rightarrow$  each enterprise
- Group of enterprises  $\rightarrow$  leader



**Ex-POST** (Project)

**BENEFICIARY**: Enterprise  $\rightarrow$  single enterprise Group of enterprise  $\rightarrow$  leader



(Applicants)

**PARTECIPANT**: Enterprise  $\rightarrow$  single enterprise Group of enterprises  $\rightarrow$  single enterprise



**Ex-POST** (Beneficiaries)

**BENEFICIARY**:

Enterprise  $\rightarrow$  single enterprise Group of enterprises  $\rightarrow$  single enterprise

PROJECT DEVELOPMENT





AK

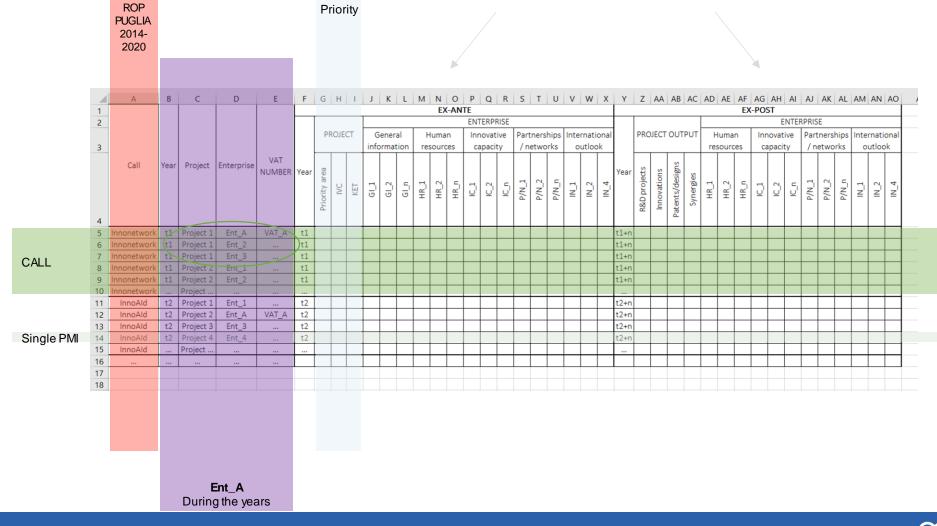


### Dataset: the structure

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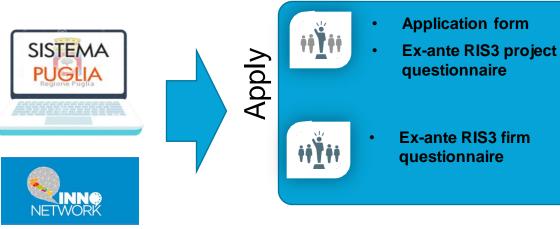
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43



### The process







#### **††Ť**†† Leader





- Final presentation of the project
- Accounting and balance request
- Ex-post RIS3 project questionnaire
- Declaration of the conclusion of the project and request for disbursement/disbursement of the contribution of each partner
- Ex-post RIS3 firm questionnaire

PROJECT DEVELOPMENT







### The process



#### FINAL PRESENTATION OF THE PROJECT

- Partner Description;
- Project goals and outcomes;
- Solutions identified in terms of methodology, technology, and organisation;
- Usability of results and patents;
- Market and industrial spin-offs;
- Application scenarios;
- Dissemination of results





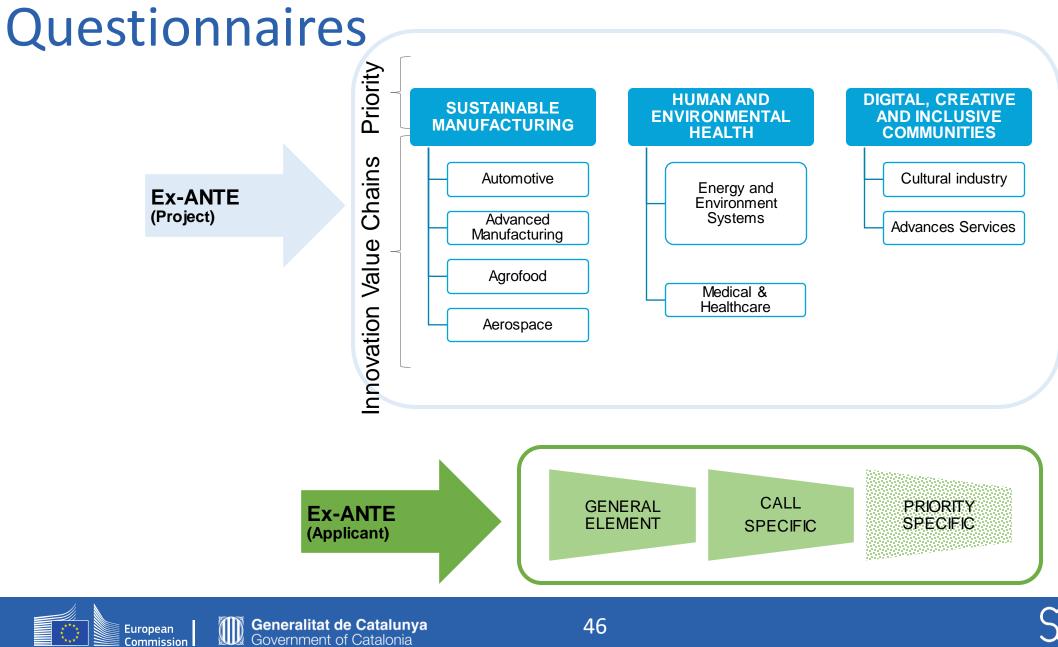


- Final presentation of the project
- Accounting and balance request
- Ex-post RIS3 project questionnaire
- Declaration of the conclusion of the project and request for disbursement / balance of the contribution of each partner
- Ex-post RIS3 firm questionnaire









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The participating enterprise is: a micro enterprise / a small enterprise / a medium enterprise / a large enterprise

The participating enterprise is: a start-up enterprise / a university spin-off / an innovative enterprise

The number of human resources employed within the enterprise by contract type

Indicate the number of human resources employed in R&D within the company







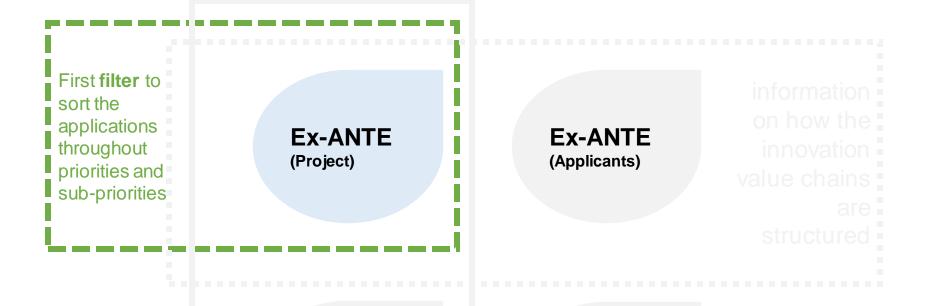


In the last three years, has the enterprise introduced product or service innovations (incremental innovations, radical innovations, marketing innovations, organisational innovations)?

In the last three years, has the company formalised collaborations with research and/or industrial partners?







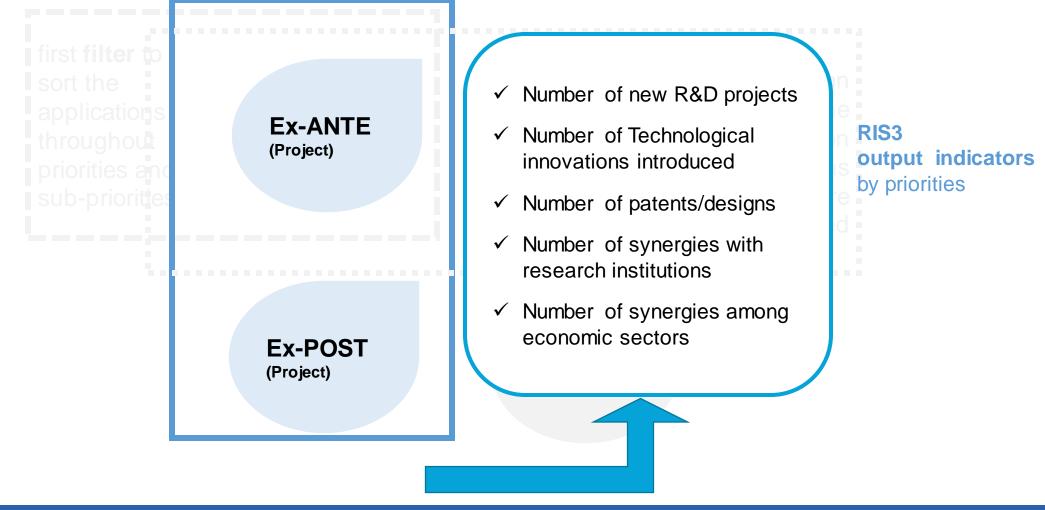
Ex-POST (Project)





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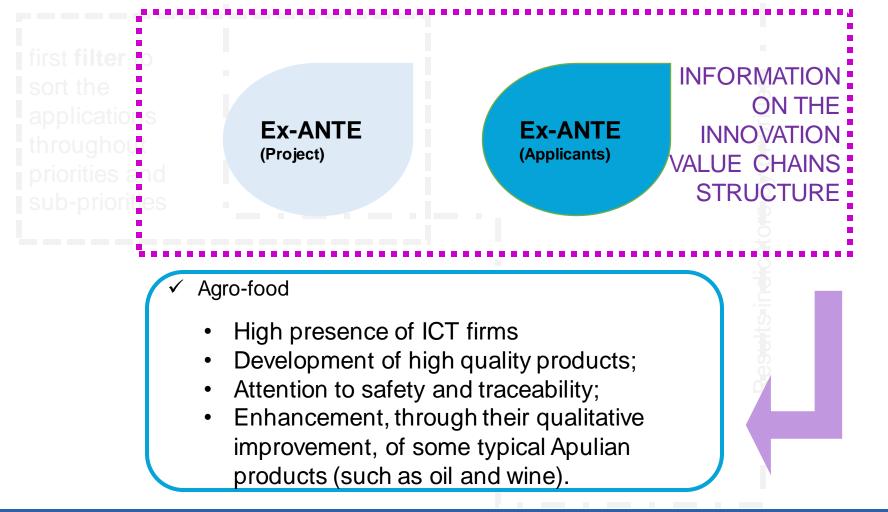
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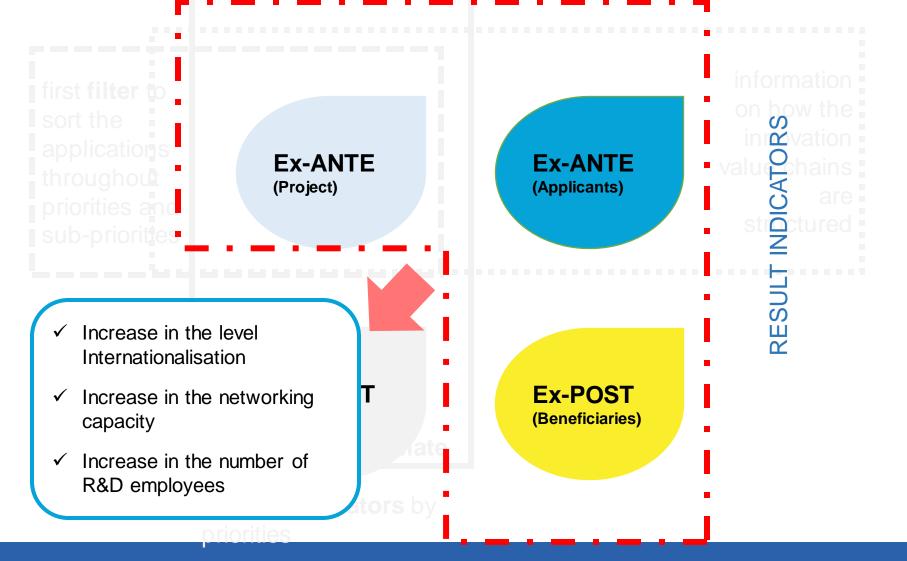














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#### Thank you for your attention!

#### m.grisorio@arti.puglia.it



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Monitoring and evaluation of RIS3 Nord-East Romania Case study- Impact assessment for the Investment program on Digitalization of SMEs







# Learning from Experimentation in Europe

### Alexandra Avdeenko (World Bank Group)







Do EU citizen and businesses get the most impact from every Euro spent on Cohesion Policies?

How do we know if a program is effective?

How do we know the investments had a positive return?

And what is IMPACT?







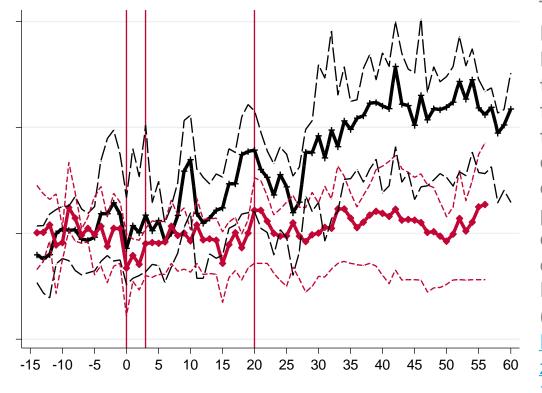


### To measure impact, we need to MOVE...

#### ...from here



...to here



#### Total Factor Produc tivity for the treatm ent and control plants; evidenc e from India (Bloom, McKen <u>zie et al</u> 2012)

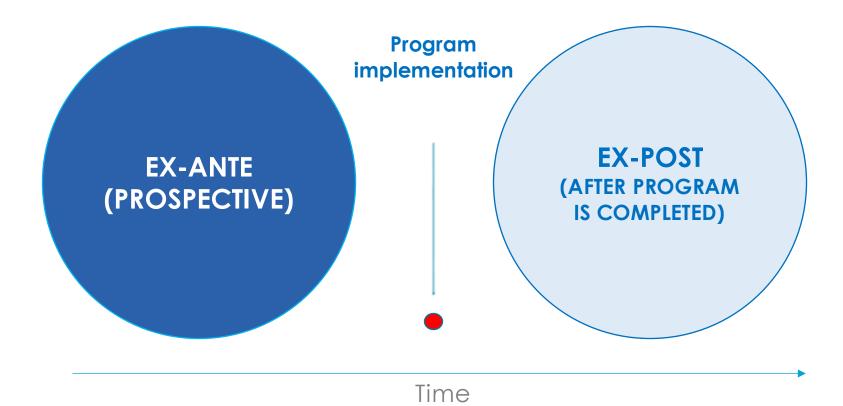
#### ...from counting

#### ...to evaluating impact!





### To increase impact through learning, we recommend starting the evaluations...







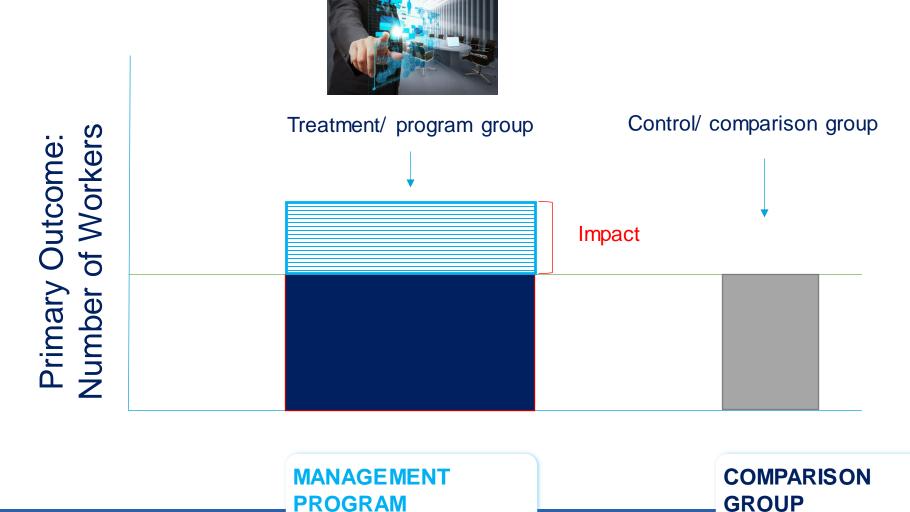
#### **ONE KEY MESSAGE**

Impact evaluations should ideally be carried out early in the program cycle (at the design stage), when most actions are not yet completed, **uncertainties** exist over what could work best, and **testing** of different approaches to target and deliver the program can provide answers and be still embedded.





### Does better management improve firm performance?



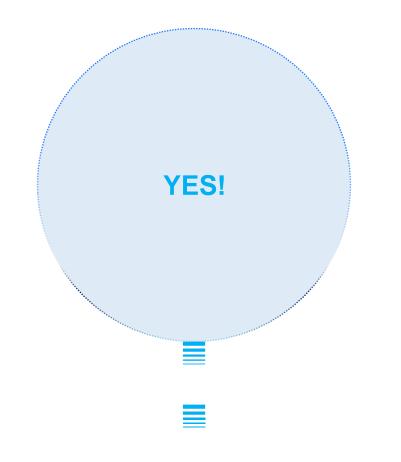


61



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### Does better management improve firm performance?



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## It causally increases the number of workers and other firm growth measures

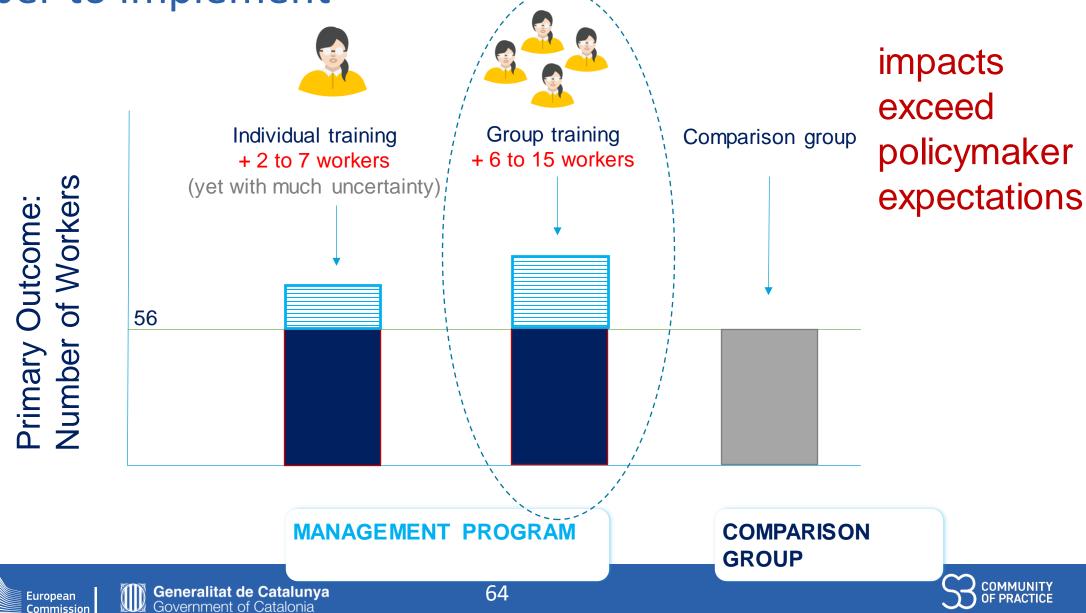
Colombian auto parts firms lacovone et al. (2022, <u>Link</u>)

But this is <u>NOT</u> the KEY QUESTION of a good impact evaluation since there is a lot of variation on how to design programs... !





The Groups-based intervention generate more impact and are cheaper to implement



### A good impact evaluation builds on a good relationship with the managing authorities

High demand for impact evaluations









#### Encourage Learning from Peers and top Researchers: Matchmaking workshop in Lisbon brought together 112 participants





When do you know you were successful? When you hear...

"I optimistically expect that by the end we will discover together how to invest EU money more efficiently."

General Director of a Regional Managing Authority







## The managing authorities are curious to learn example evaluation questions:







68



Given access to funds: How can firms be supported in identifying the best R&D investment opportunities? What is the impact of digitalization on firms' performance and perception of the markets? How to connect firms to scientists and support their collaboration? What is the impact of R&D grants on firms' performance?



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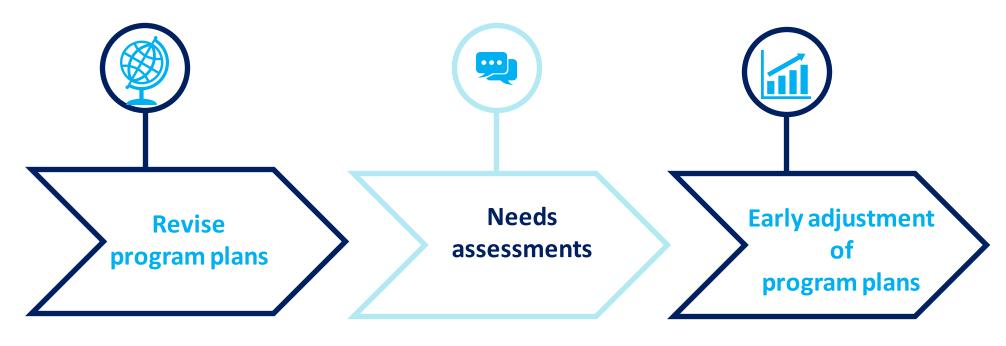
A good impact evaluation supports the development of a good program design and implementation

> Impact evaluations should ideally be carried out early in the program cycle when uncertainty exist over what could work best, FOR WHOM, UNDER WHICH CONDITIONS





In the evaluation process, the program benefits from an early, thorough review process



• Set up theories of change

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Consider good global
 practices

No theories or ideologies: Consider beneficiaries' actual needs

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70

Adjust the program activities and targeting





### An impact evaluation is as good as its ability to identify a credible comparison group

Embedding a sizeable and CREDIBLE COMPARISON group is key to be able to detect impacts





### Challenge with Cohesion Policies Beneficiaries are likely already well-performing

Hard to quantify the added value of a Euro spent on them Unclear that selecting the best generates the highest returns



(Well-performing) Firms self-select into applying for EU funds



Managing authorities select "good firms" (based on ranking)







In other words, how to amend the assignment mechanism to a program so that if two actors are equally eligible for the program, background characteristics (on average) would not matter?







Randomized Control Trial (RCT)





## Learning from a Prospective Evaluation in Romania Gabriela Macoveiu (North-East Regional Development Agency)





Digital transformation of SMEs oriented towards increasing digital intensity

- Conditions of the call:
  - RP North-East 2021-2027 (25,000,000Eur ERDF)
  - Programme contribution per project: min 15,000 max 100,000Eur
- Expected results:
  - Min 400 SMEs increased digital maturity (DESI)
- The task: Perform an ex-ante (RCT) impact assessment on this competitive call to learn about the impacts of the program and to identify how to improve the performance of the program





#### Implementation process -the challenges

#### • Limited experience of MA:

- the call for digitalization of SMEs is implemented for the first time in Romania at regional level
- RCT impact assessment implementation constraints
  - Timeline sept 2022-july 2024 for first round of evidence
  - Selection of a large comparison group (min 400 SMEs) respecting the conditions of Art 73(2) and 74 CPR
  - Collection of data from SMEs related to digital maturity and digital investment needs (set the baseline) without overloading the program potential applicants







### Implementation process - the solutions

- Development of a digital assessment on-line tool (124 questions) covering:
  - the company economic performances
  - the digital maturity level
  - the company needs for digitalization
  - the fulfilment of the program general eligibility conditions
- Introduce a digital feasibility study to relate the company specificity,

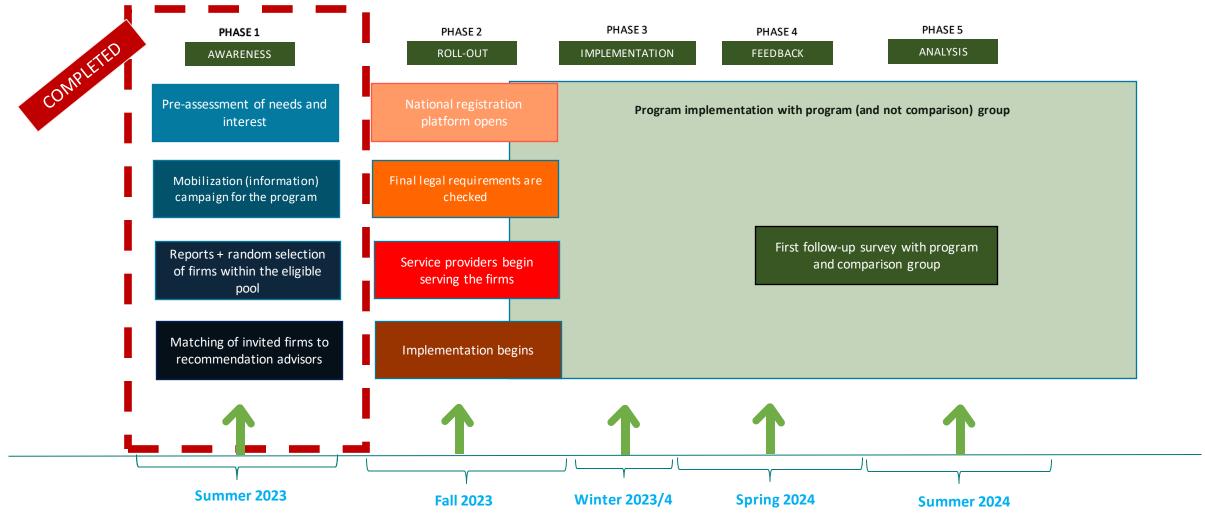
investment needs, and digital maturity level

Deploy a consistent awareness campaign





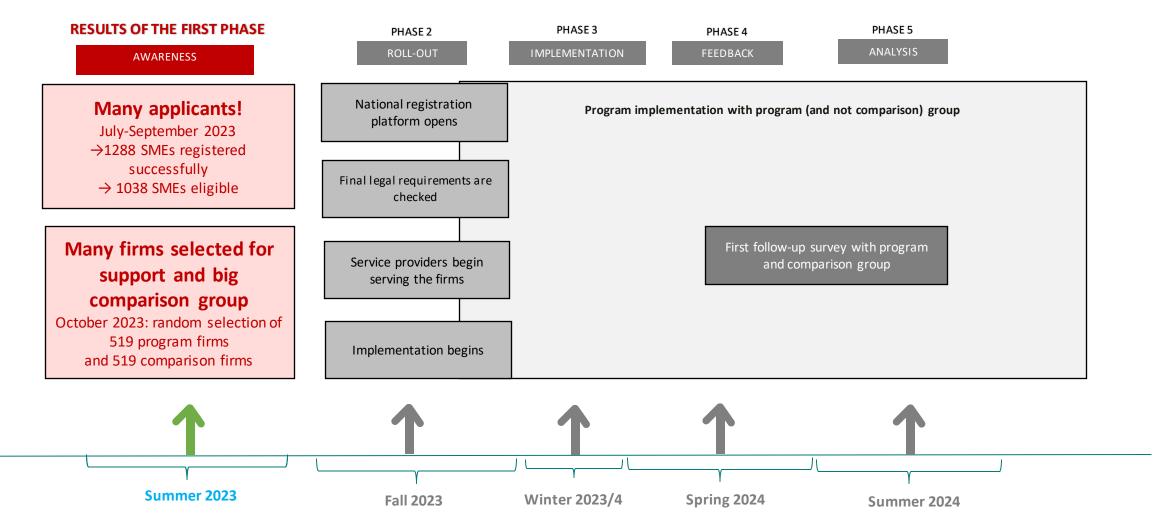
#### Embedding the Evaluation into Implementation...







### Mobilization reached many - new and eligible - firms ...







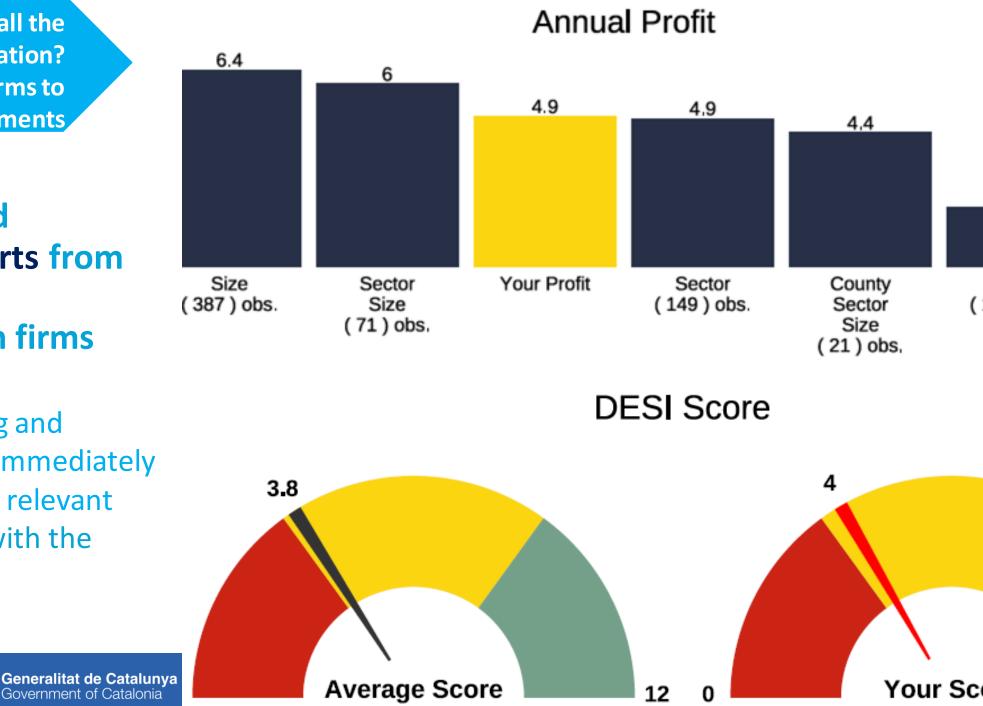
What to do with all the information? Give it back to the firms to make better investments

We share tailored Benchmark Reports from needs (baseline) assessments with firms

We make monitoring and administrative data immediately useful by generating relevant analytics sharing it with the applicants

European

Commission



# Lessons learned (I)

- The World Bank expertise and support was essential for our MA to perform this task → THANK YOU !!!
- Beside intervention logic of the program/the call, **preconditions** are very important:
  - ensure the service & technology providers, consultants are ready too
  - identify possible **bottlenecks** as early as possible
  - pay attention to the **feedback** coming from the potential beneficiaries
- Transparency
  - for every single step to be carried out in the **pilot program**
  - good communication with interested parties →WB support for the dialogue with Council of Competition and European Commission





#### **Full transparency:** Random selection in front of a Notary.



Given a large number of equally eligible applicants, the fairest, fastest, and most transparent way to select beneficiaries is random.

## Lessons learned (II)

- RTC Impact assessment
  - involves supplementary resources and work on behalf of MA
  - has long-term added values which worth to be considered
    - better prepared calls
    - better understanding of the beneficiary needs and closer interaction of beneficiaries with the providers and consultants
    - MA get earlier involvement in the process (before the open of the call)
    - companies propose investments with better understanding of their position (Market report, Digital needs analysis, DFS)
    - stronger alliances, ex. ADR-EDIH alliance → Catalogue with service providers, improvement of clients' selection system and diversification of their services







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Generalitat

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# Thank you !

