

**EELISA**  
**European University**



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101035811

**EELISA**

**InnoCORE**

TORCH FORUM  
EUROPEAN UNIVERSITIES ALLIANCES  
R&I Strategy Mapping and Design

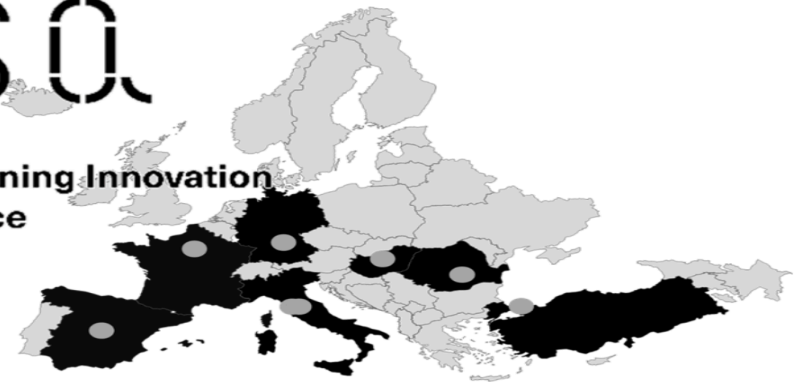
Highlights and Lessons Learned  
from EELISA InnoCORE



# The European Engineering Learning Innovation and Science Alliance (EELISA)



European Engineering Learning Innovation & Science Alliance



## WHO WE ARE?

**180,000**

Students

**16,000**

Faculty Members

**11,000**

Staff members

### 9 PIONEERS

- Universidad Politécnica de Madrid
- Budapest University of Technology and Economics
- École des Ponts ParisTech
- Friedrich-Alexander - Universität Erlangen - Nürnberg
- Istanbul Technical University
- Scuola Normale Superiore di Pisa
- Sant'Anna School of Advanced Studies
- University Politehnica of Bucharest
- Paris Sciences et Lettres

### 2 AFFILIATED ENTITIES

- Chimie ParisTech
- Mines ParisTech

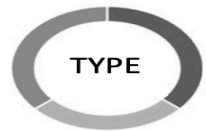


### 1 ASSOCIATE PARTNER

- European Network for Accreditation of Engineering Education



- < 5,000 students
- 5,000 - 25,000 students
- > 25,000 students



- Technical Universities
- Comprehensive Universities
- Graduate Engineering Schools



- < 1 year
- 1 - 100 years
- 100 - 200 years
- > 200 years

*The European Engineer*  
 - lead to a single European cross-border accreditation  
 - Foster a new generation of engineers who will be able to align smart technology with sustainable needs in order to tackle contemporary global challenge  
 - ready to work within interdisciplinary, multilingual, diverse and pan-European environments



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# EELISA InnoCORE



**EELISA InnoCORE is conceived as an integral part of the Alliance (a tool):**

- supporting,
- strengthening and
- delving deeper into the cooperation set up by the EELISA.
- Building on the ecosystem of EELISA Communities.

**EELISA InnoCORE focuses on the R&I dimension of the Alliance in a three-step plan:**

- **make researchers and innovators know each other, create spaces for dialogue with citizens and with non-academic actors and set up a portfolio of shared scientific infrastructures; and a new networking platform that will give them access to the common research strategies**
- **foster and support the development of joint R&I actions and the creation of new structures** (research groups, clusters, joint labs, start-ups, scientific parks) and
- **Optimize the outreach of R & I actions, maximizing their impact and promoting the knowledge exchange.**



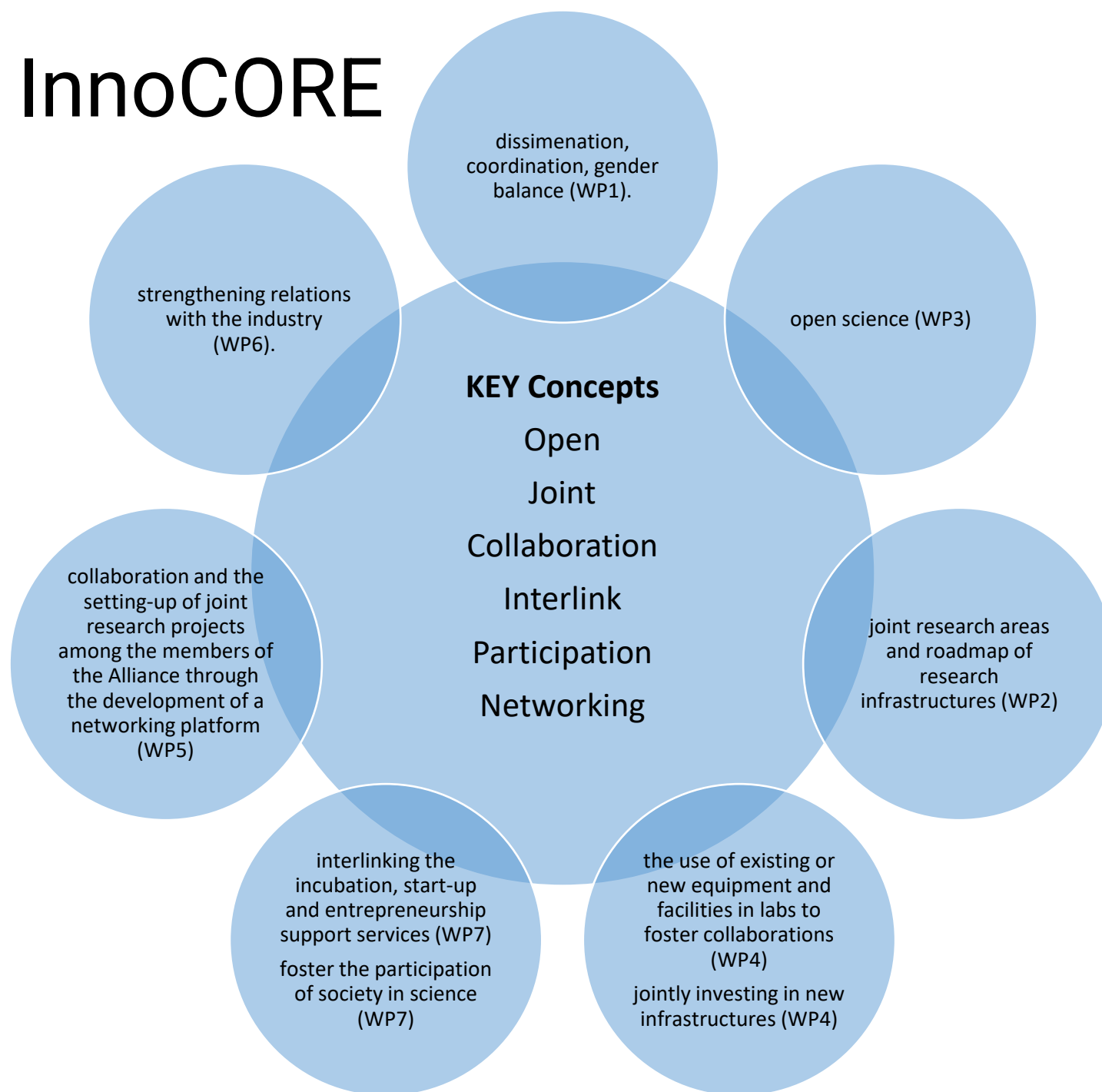


# EELISA InnoCORE

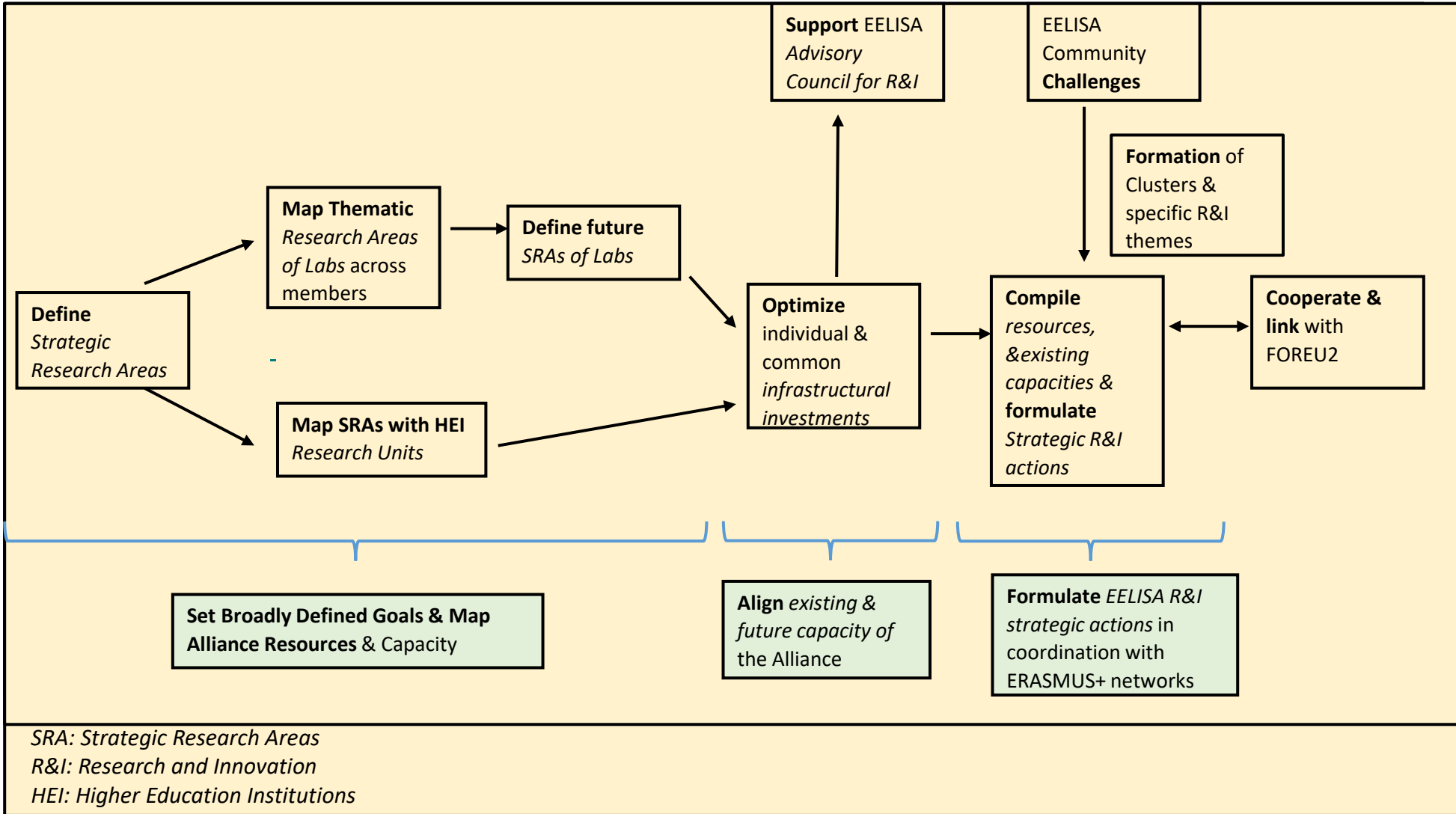
- Science with and for Society (SwafS) in Horizon 2020- Call Programme: H2020-IBA-SwafS-Support-2-2020 [H2020-EU.5](#)
- will be running for three years - From: 1 June 2021 to: 31 May 2024 (DURATION: 36 months )
- structured around seven (7) work packages (WPs), each focusing on one of the key elements of the project.

WP		
WP1	Communication, Dissemination, Coordination, Gender Balance	UPM
WP2	EELISA Research and Innovation Strategy	ITU
WP3	EELISA Strategic Framework for Open Science Practices	UPB
WP4	EELISA Multi Labs (Sharing Facilities and Equipment)	PSL
WP5	Set up initiatives for joint research projects (Enable Joint Research)	SNS
WP6	Reinforcing cooperation in R&I with other sectors, especially academia-business cooperation	BME
WP7	Create the «embedding» for EELISA-wide R&I structures (Optimize outreach(	FAU

# EELISA InnoCORE



# Flowchart of the Applied Methodology



**Ultimate Aim:**  
Develop EELISA R&I strategy

**Objectives:**  
Define concrete and collaborative action steps

Encouraging the leveraging of key tangible and intangible resources of EELISA in the formulation of its strategies

Identification of tangible and intangible resources and their potential configurations

- Governance Tools of the EELISA innoCORE WP2, aligned with the EELISA innoCORE framework:*
- Strategic, operational and Work package contact list
  - Information sharing by Miro and MS Teams
  - Meetings
  - Quarterly reporting
  - Quality Check Procedure



# EELISA Innocore WP2: R&I Strategy for European Universities

- EELISA InnoCORE's RI Strategy is based on
  - The collective nature of the EELISA alliance
  - acting with a shared vision,
  - a collaborative strategy development process
  - comprehensive strategic understanding,
  - Attention to identifying intra- and inter-organizational resources as the potential impact of the EELISA InnoCORE
  - Emphasizing the complementarities
  - Detecting and unleashing synergies/complementarities among alliance members.
  - Combining strategic research lines and dimensions of the R&D strategy,

InnoCORE is about creating new collaborations.

The engagement of researchers is fundamental.

Presenting InnoCORE as an opportunity and getting them on board is considered one of the **critical success factors**.

## *Approach:*

- by top-down and bottom-up approaches
- Horizontal approach
  - EELISA Communities to reinforce the educational dimension, oriented to face societal challenges raising scientific and technological needs addressed by researchers and innovators.
- Vertical Approach
  - Temporary or permanent R & I structures, where some researchers and innovators come together to develop joint actions meeting scientific and technological needs of EELISA Communities.



# EELISA Innocore WP2: R&I Strategy for European Universities

- WP 2.1 : Mapping of Strategic Research Areas of all EELISA Partners
  - An initial analysis of tangible and intangible alliance resources and their internal distribution among alliance members
  - broad pilot areas and strategic research areas defined
  - Deliverable D2.1 “EELISA innoCORE strategy: mapping of common research areas”
- WP 2.2 and WP 2.3: analysing, cataloguing, and matching existing resources of the alliance members both among and across the network.
  - WP2.2 (Task) Symposia on R&I strategy: Collaboratively formulation of the Prioritization of research areas
  - Classification of existing research infrastructures/units
- WP 2.4: Map existing research infrastructures and facilities : Align existing infrastructures to optimize individual member investments and identify potential areas of joint investments.
  - The construction of capabilities to align and coordinate alliance-level research capacities
  - Creation of structural linkages to the EELISA Advisory Council for R&I .
  - Linked to EELISA Multi Labs (Sharing Facilities and Equipment) (EELISA WP5)
- WP 2.5: Strengthen the organizational capital of the alliance by linking EELISA community challenges
  - Research clusters as specific topics of joint research opportunities.
- WP 2.6 : embed the novel value-added activities to the existing alliance practices and extend the social capital of the alliance by coordinating its activities across the FOREU2 network.



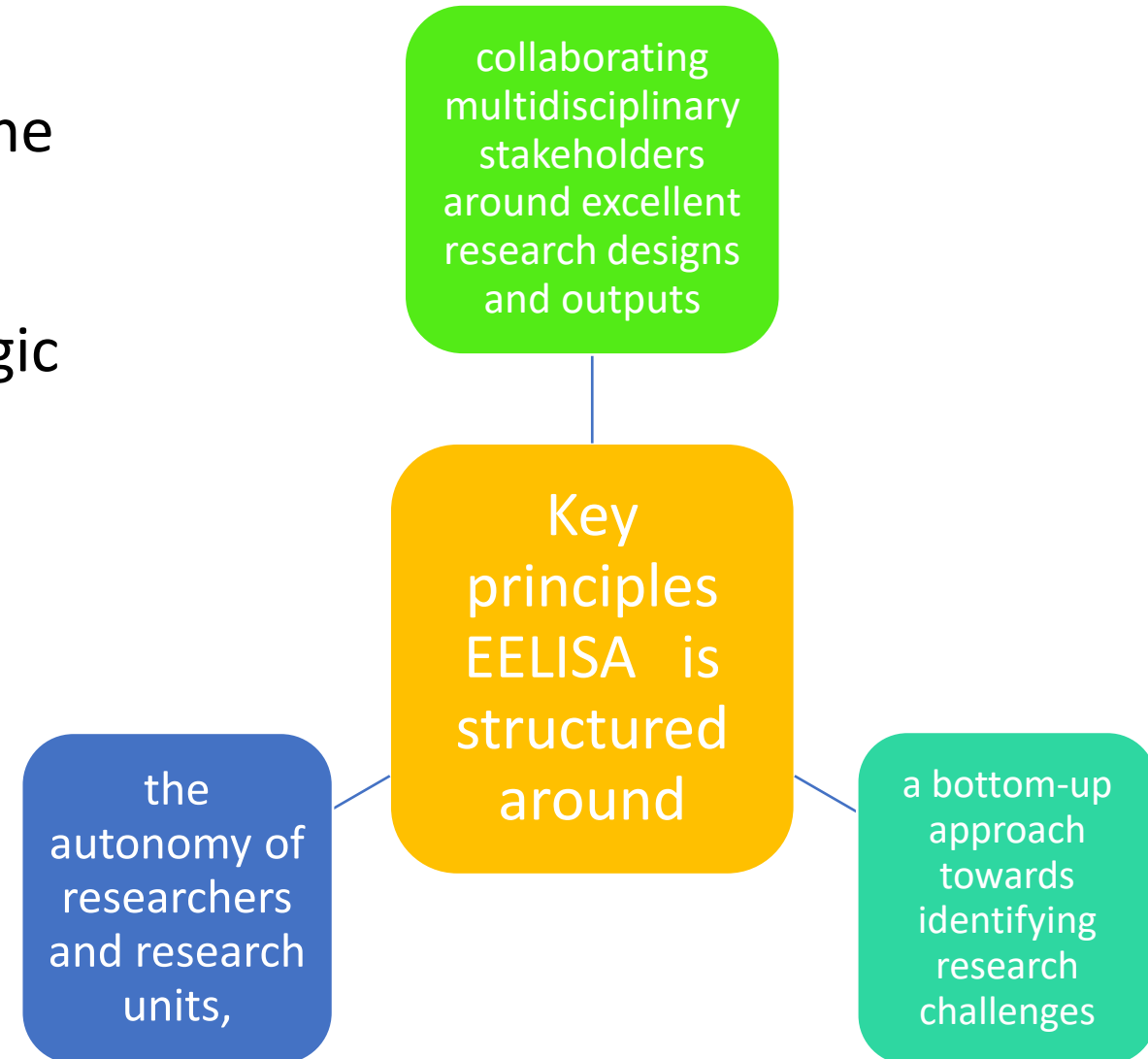


# EELISA Innocore WP2.1: Mapping of Strategic Research Areas of all EELISA Partners

- Identify the strategic research areas for the alliance
- Map the existing research capacities of each HEI in accordance with these strategic research areas.
- Mapping of existing research units across EELISA Innocore member institutions is designed following these principles.

## Strategic research areas :

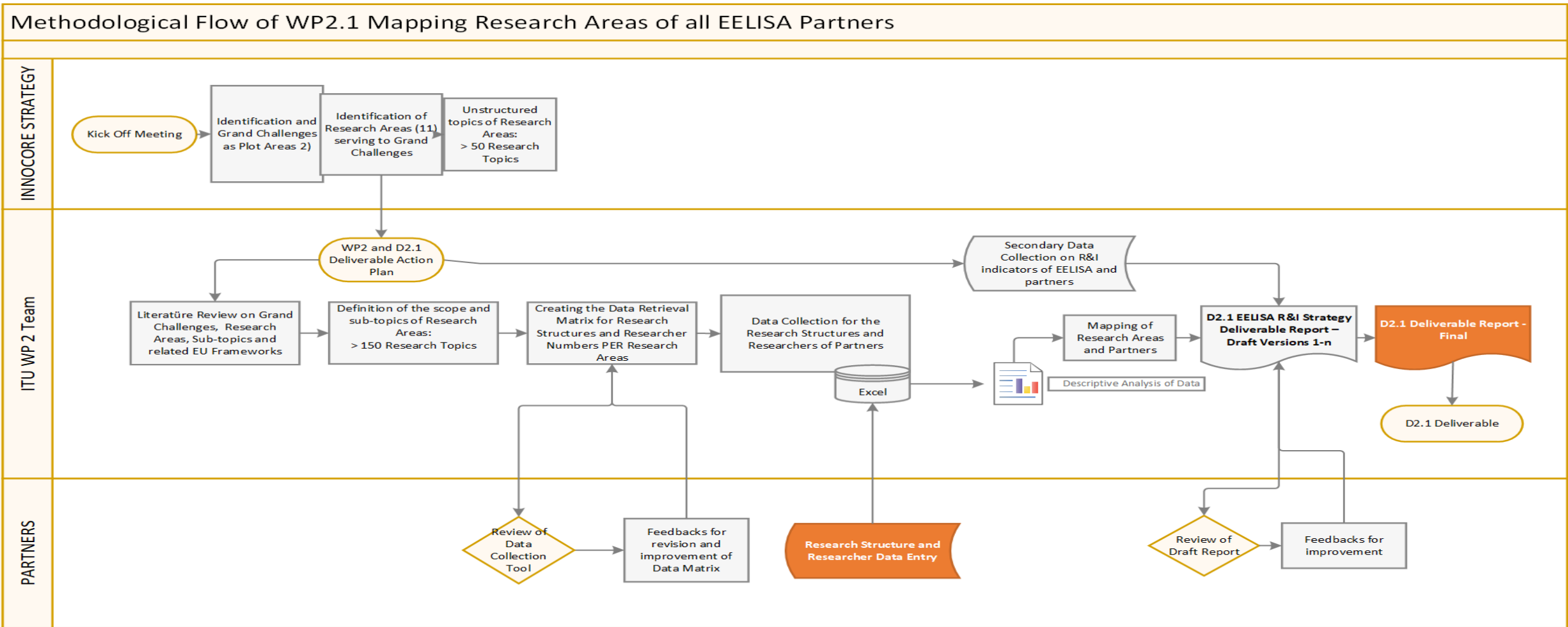
broad categories of research areas that are ***prioritized for the potential development of the joint strategic research efforts.***





# Mapping of Common Research Areas

## D2.1 “EELISA InnoCORE strategy: mapping of common research areas”





# Pilot Areas of Research on Two Pilot Areas (Grand Challenges) and Strategic Research Areas

## Two pilot areas of research on grand challenges – In EELISA Grant Agreement

Pilot Areas, which concentrate the focus of EELISA Innocore R&I efforts, are defined as:

**I - «SMART, GREEN & RESILIENT CITIES»**

**II - «SUSTAINABLE & SMART INDUSTRIES»**

## Strategic research areas identified during the kick-off meeting

1. Artificial intelligence
2. Health
3. Digital
4. Culture, creativity and inclusive society
5. Climate, energy and mobility
6. Connectivity
7. Food, bioeconomy, natural resources, agriculture and environment
8. Social sciences and humanities
9. Advanced material science and engineering
10. Smart industry and space technologies
11. Natural sciences



# Pilot Areas of Research on Two Pilot Areas (Grand Challenges) and Strategic Research Areas

Nr	Strategic Research Areas	EELISA InnoCore Pilot Areas	
		1 Sustainable and Smart Industries	2 Smart, Green and Resilient Cities
1	AI for smart industry	x	
	AI for smart city :		x
2	Connectivity	x	x
3	Social sciences and humanities	x	x
4	Digitalization	x	
5	Health		x
6	Smart industry and space technologies	x	
7	Advanced material science and engineering	x	x
8	Culture, creativity and inclusive society		x
9	Food, bioeconomy, natural resources, agriculture and environment		x
10	Climate, energy and mobility	x	x
11	Natural Sciences		



# Strategic Research Areas and Sub-topics

## Sub-topics of Research Areas

Artificial intelligence	Connectivity	Social sciences and humanities	Digitalization	Health
AI for smart industry :	New cellular technologies 5G and beyond	Social and technological innovation	Process automation	Health AI
• Visual recognition	Disaster resilience technologies	Governance	Quantum computing and technologies	Biotechnologies
• Robotics	Off-grid communication technologies	Economic and social transformations	Cloud, edge and fog computing technologies	Brain modelling, genetics
• Big data informatics	Next generation telecommunication technologies	Open science and inclusiveness	Digital humaties	Infectious and rare diseases
• Related Topics	Related Topics	Culture and cultural history/heritage	Cyborgs	Related Topics
AI for smart city :		Related Topics	Related Topics	
• Autonomous transportation				
• Big data and city informatics				
• IOT enabled sustainability and security solutions				
• Related Topics				
Smart industry and space technologies	Advanced material science and engineering	Culture, creativity and inclusive society	Food, bioeconomy, natural resources, agriculture	Climate, energy and mobility
Robotics	Biomaterials	Legal	Food technologies	Sustainable and clean energy production and sto
Autonomous manufacturing	Nano-materials and nano-technologies	Ethical and philosophical aspects of techn	Bio-economy	Climate and meteorology science
Smart materials	Advanced materials and engineering	Social innovation and inclusion	Bio-systems and sustainability	Transportation and mobility
Circular economy and manufacturing models	Circular and degradable materials and sustainable manu	Archeology and cultural heritage	Circular and sustainable agriculture	Disaster modelling and prevention technologies
Earth and space observation	Multidisciplinary engineering	Politics of science and technology	Precision agriculture and irrigation	Related Topics
Space security	Related Topics	Related Topics	Related Topics	
Related Topics				
x				
Natural Sciences				
Physics				
Particles and feilds				
Organic and bio chemistry				
Mathematical modelling				
Space and observatory sciences				
Related Topics				



# Data Collection Methods and Tools - Challenges

- Data declared by partners on Research Structures and researchers in these structures
  - Descriptive and focus analysis of partners
  - EELISA Partners' varying organizational structures and unit hierarchies.
  - *The Research Structure definition* : primary measures of Research Structures of EELISA Partners.
  - *Research infrastructures*: The laboratories as facilities and equipment inventory to be included as a capacity measure in further steps
- The term “Research Structures” includes
    - **centers,**
    - **hubs,**
    - **units,**
    - **Groups,**
    - **labs,**
    - **institutes,**
- with a research focus, having research outcomes representing a R&I capacity.**



# Initial Indicators Used in WP2.1 Mapping of Strategic Research Areas of all EELISA Partners

- Per Partner Indicators
  - Total Nr. of Researchers
  - Total Nr. of Research Structures
  - Nr. of Research Structures by Research Areas
  - Nr. of Researchers by Research Area
- EELISA All Partners Indicators:
  - Total Nr. of Researchers
  - Total Nr. of Research Structures
  - Total Nr. of Research Structures by Research Areas
  - Total Nr. of Researchers by Research Area
  - Researcher numbers per Pilot Area
  - Research Structures Per Pilot Area



# Data Collection Methods and Tools – Further Steps

- Since the deliverables indicate living documents, the mapping of strategic partners and R&I strategies should be iterative and evolve with the unfolding activities of the project.
- Actions to be taken for including some additional components of R&I strategy, and mapping of research areas in further steps:
  - Sub-topics of each broad subject area will be completed at a later step.
  - Research groups/laboratories can be tagged with keywords at a later step.

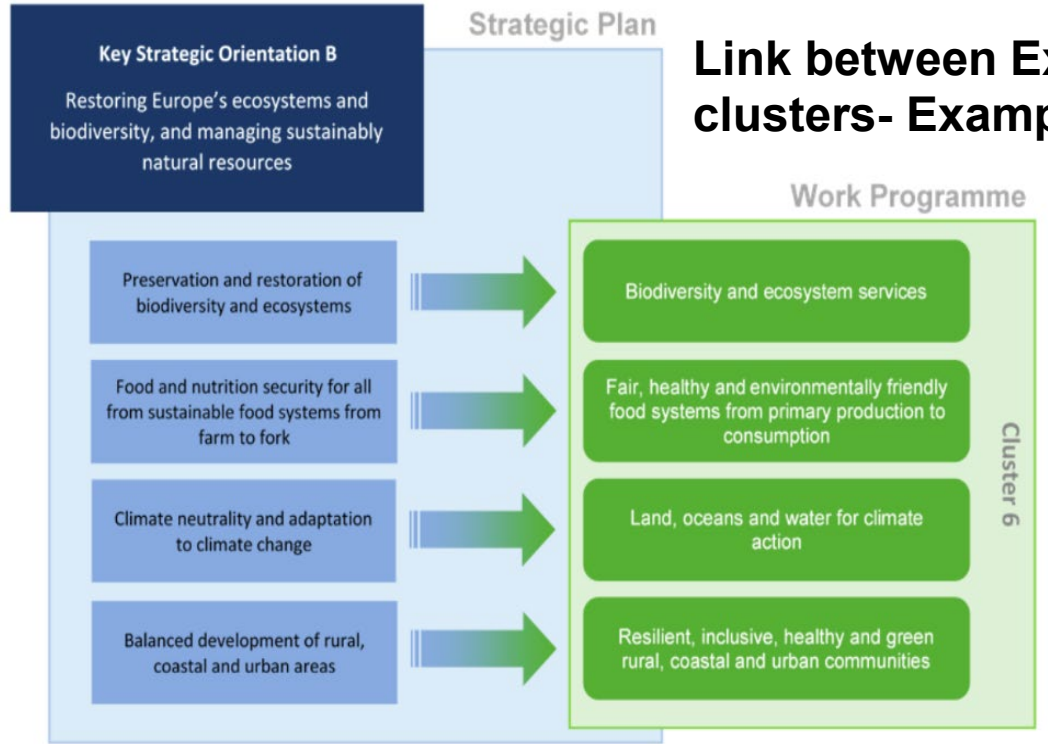




# Policy Analysis with literature review and secondary data / content analysis

- Building linkages with strategy and policies of EC, and Horizon Europe Clusters, Intervention Areas and Research Areas,
- Linkages with SDGs.

# Linkages of EELISA InnoCore Strategic Research Areas with EU Horizon Clusters

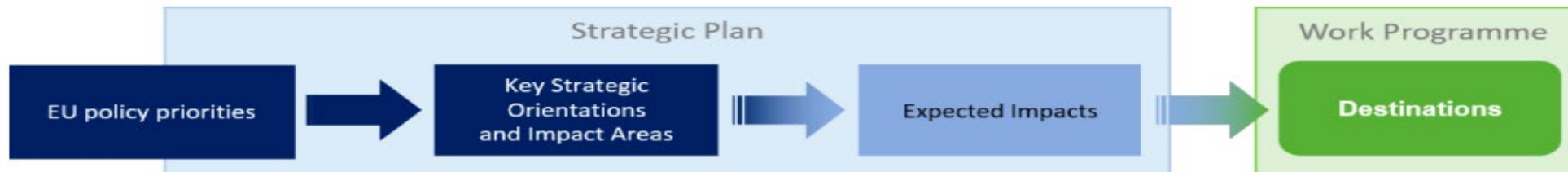


**Link between Expected impacts, destinations and clusters- Example of Cluster 6**

- 11 strategic research areas are explored according to the intervention areas of 6 clusters of the EU Horizon 2030 programme.

**Link between destinations, expected impacts and EU policy priorities**

*From EU priorities to work programme destinations*





# Linkages of EELISA InnoCore Strategic Research Areas and two pilot areas with EU Horizon Clusters

Nr	Strategic Research Areas	Horizon Programme Clusters						EELISA InnoCore Pilot Areas	
		CLUSTER 1 (Health)	CLUSTER 2 (Culture, Creativity and Inclusive Society)	CLUSTER 3 (Civil security for society)	CLUSTER 4 (Digital, Industry and Space)	CLUSTER 5 (Climate, Energy and Mobility)	CLUSTER 6 (Food, Bioeconomy, Natural Resources, Agriculture and Environment)	1 Sustainable and Smart Industries	2 Smart, Green and Resilient Cities
1	AI for smart industry				1	1		x	
	AI for smart city :					1			x
2	Connectivity			2	1			x	x
3	Social sciences and humanities		1	1				x	x
4	Digitalization		2		1	2		x	
5	Health	1					2		x
6	Smart industry and space technologies				1			x	
7	Advanced material science and engineering				1			x	x
8	Culture, creativity and inclusive society		1						x
9	Food, bioeconomy, natural resources, agriculture and environment						1		x
10	Climate, energy and mobility				2	1	2	x	x
11	Natural Sciences				1		1		
Scale: 1 - Multiple Topics Overlap, 2- Only one Topic Overlap									

- 11 strategic research areas are aligned with the EU Horizon Clusters
- Empowering research and innovation in these strategic research areas within EELISA InnoCORE R&I strategy will serve the mission of EELISA InnoCORE on contributing to a sustainable, digital and inclusive Europe.



# Linkages of EELISA InnoCore Strategic Research Areas with SDGs

Nr	Strategic Research Areas	Related UN SDGS						
1	AI for smart industry					9) Industry, Innovation and Infrastructure,		
	AI for smart city :	(11) Sustainable Cities and Communities,						
2	Connectivity	(11) Sustainable Cities and Communities,				9) Industry, Innovation and Infrastructure,		
3	Social sciences and humanities	(11) Sustainable Cities and Communities,	(5) Gender Equality	(4) Quality Education	8) Decent Work and Economic Growth,	(10) Reduced Inequality,	(13) Climate Action,	, (16) Peace, Justice, and Strong Institutions,
4	Digitalization					9) Industry, Innovation and Infrastructure,		
5	Health	(11) Sustainable Cities and Communities,	(3) Good Health and Well-being					
6	Smart industry and space technologies			(12) Responsible Consumption and Production		9) Industry, Innovation and Infrastructure,	(13) Climate Action,	
7	Advanced material science and engineering	(11) Sustainable Cities and Communities,		(12) Responsible Consumption and Production		9) Industry, Innovation and Infrastructure,		
8	Culture, creativity and inclusive society	(11) Sustainable Cities and Communities,	(5) Gender Equality	(4) Quality Education		(10) Reduced Inequality,		, (16) Peace, Justice, and Strong Institutions,
9	Food, bioeconomy, natural resources, agriculture and environment	(11) Sustainable Cities and Communities,	(6) Clean Water and Sanitation	(12) Responsible Consumption and Production	(2) Zero Hunger	(13) Climate Action,	(14) Life Below Water, (15) Life On Land,	
10	Climate, energy and mobility	(11) Sustainable Cities and Communities,	(7) Affordable and Clean Energy,	(13) Climate Action,		9) Industry, Innovation and Infrastructure,		
11	Natural Sciences					9) Industry, Innovation and Infrastructure,	(14) Life Below Water, (15) Life On Land,	

11 strategic research areas are related to various SDGs.



# Data Collection Methods and Tools – Secondary Data :

## Secondary data retrieval and analysis of Research Outputs of Partners

Secondary data on the R&I indicators of EELISA in total, as **an initial capacity analysis**

**Sources: (EU, EC, Horizon, Cordis, Scival, Scopus, Derwent etc.)**

Partners declare their research outputs by 11 SRAs using the EELISA researcher databases.

Research Outputs per strategic research areas:

Challenge due to various classifications of Scopus or keywords and tags which do not fully align with 11 SRAs.

Differing levels of publication and patent outputs of partners should be considered in Clusters and communities to enable the extension and sharing of current research capacities and effective task distribution among partners.



# Final remarks and Future directions on EELISA Innocore WP2.1: Mapping of Strategic Research Areas of all EELISA Partners

- Community building towards R&I
- Existing plan is dynamic and iterative. It is closely linked with strategic planning and timing of the outputs in other work packages.
- The process requires **extensive collaboration** and joint efforts
- Strategic research areas are strongly linked with the pilot research areas of EELISA, but they are also associated strongly with the EU R&I framework and sustainable development goals.
- Primary content covered by the deliverable focused on mapping thematic research areas with the descriptive analysis of research capacity (number of research structures and researchers) of EELISA members.
- Even so, the analyses have shed light on the distribution of research capacity across research areas and the degree of discrepancy between alliance members by research area.



# Future directions on EELISA Innocore WP2.1: Mapping of Strategic Research Areas of all EELISA Partners

- Analysis, and enhancement of Labs and facilities as infrastructures
  - to be integrated to the presented analysis of RSs and researcher capacity for an overall evaluation covering all dimensions of R&I capacity.
- Platform and Database creation on researchers, communities and clusters
- Research Output and Efficiency Analysis: The research outputs of EELISA Innocore partners per capacity measures
  - The deliverable results will be used in the symposium (WP2.2) among partners to initiate **concrete collaborative actions** for **creating complementarities across each alliance member**
- EEELISA InnoCORE strategy will leverage the academic corporate collaboration and high impact competency of partners for **creating industry linkages** towards the mission and performance improvement in strategic research areas with **industry collaboration**.
- Additional efforts for providing a higher level of economic impact. R&I strategy also contribute to expanding funding sources.

<https://eelisa.eu/>

<https://eelisa.eu/eelisa-innocore/>



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