83rd International Scientific Conference of the University of Latvia 2025

HORIZON EUROPE CLUSTER 4: EMPOWERING EUROPE WITH NEXT-GENERATION RAW & INNOVATIVE MATERIALS

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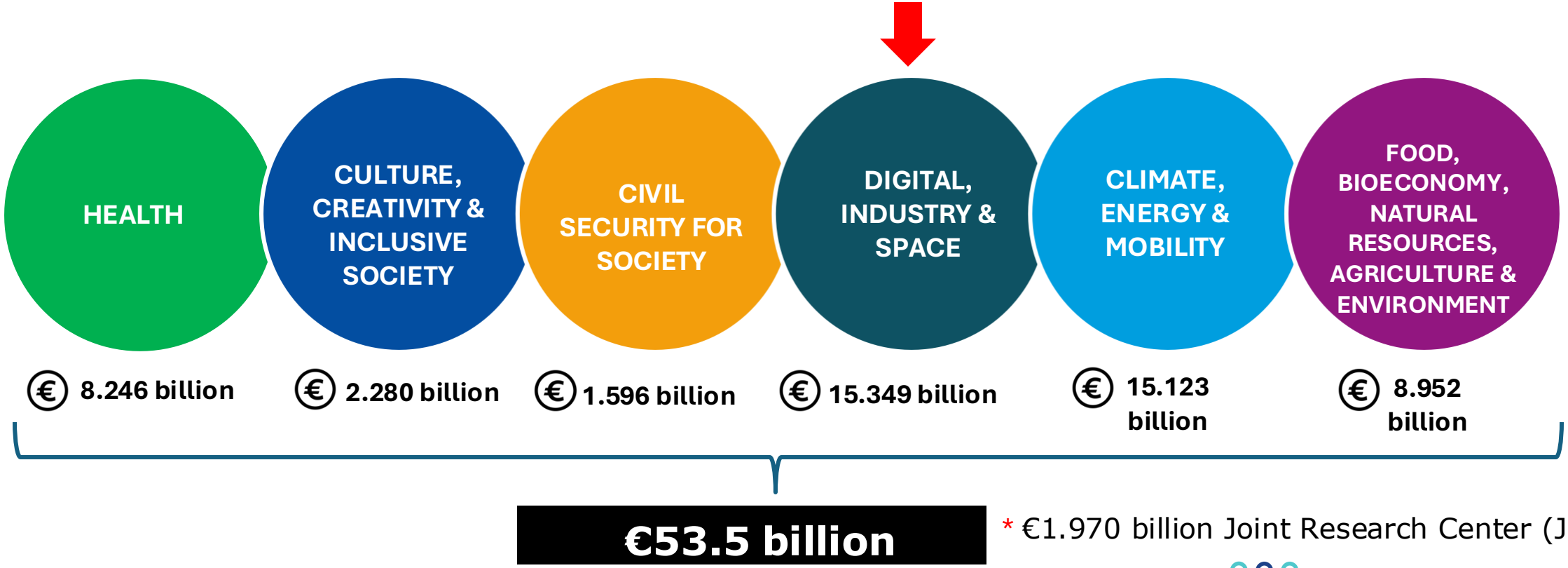
GLOBAL CHALLENGES & EUROPEAN INDUSTRIAL COMPETITIVENESS

II Pillar

Boosting key-technologies and solutions underpinning **EU Policies** & **sustainable development goals** (6 clusters and **Joint Research Centre**).



* €1.970 billion Joint Research Center (JRC)

PROGRAMME GUIDE

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https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/programme-guide_horizon_en.pdf

PROJECT TYPES

TYPE	ACTIVITIES	FINANCING RATE
RIA (RESEARCH AND INNOVATION ACTIONS)	ACTIVITIES TO **ESTABLISH NEW KNOWLEDGE** OR TO **EXPLORE THE FEASIBILITY OF A NEW OR IMPROVED TECHNOLOGY**, PRODUCT, PROCESS, SERVICE OR SOLUTION.	UP TO 100%
IA (INNOVATION ACTIONS)	ACTIVITIES TO **PRODUCE PLANS AND ARRANGEMENTS** OR **DESIGNS FOR NEW**, ALTERED OR IMPROVED **PRODUCTS**, **PROCESSES** OR **SERVICES**.	* UP TO 70%
CSA (COORDINATION AND SUPPORT ACTIONS)	**ACTIVITIES THAT CONTRIBUTE TO THE OBJECTIVES OF HORIZON EUROPE**. THIS EXCLUDES R&I ACTIVITIES, EXCEPT FOR 'WIDENING PARTICIPATION AND SPREADING EXCELLENCE'.	UP TO 100%

* the rate is 70 percent for profit-making legal entities and 100 percent for non-profit legal entities

TECHNOLOGY READINES LEVELS

TRL 1 – BASIC PRINCIPLES OBSERVED

TRL 2 – TECHNOLOGY CONCEPT FORMULATED

TRL 3 – EXPERIMENTAL PROOF OF CONCEPT

TRL 4 – TECHNOLOGY VALIDATED IN LAB

TRL 5 – TECHNOLOGY VALIDATED IN RELEVANT ENVIRONMENT

TRL 6 – TECHNOLOGY DEMONSTRATED IN RELEVANT ENVIRONMENT

TRL 7 – SYSTEM PROTOTYPE DEMONSTRATION IN OPERATIONAL ENVIRONMENT

TRL 8 – SYSTEM COMPLETE AND QUALIFIED

TRL 9 – ACTUAL SYSTEM PROVEN IN OPERATIONAL ENVIRONMENT

HORIZON EUROPE STATISTICS FOR LATVIA

1542 APPLICATIONS

2082 PARTICIPATIONS

309 PROJECTS

395 PARTICIPATIONS

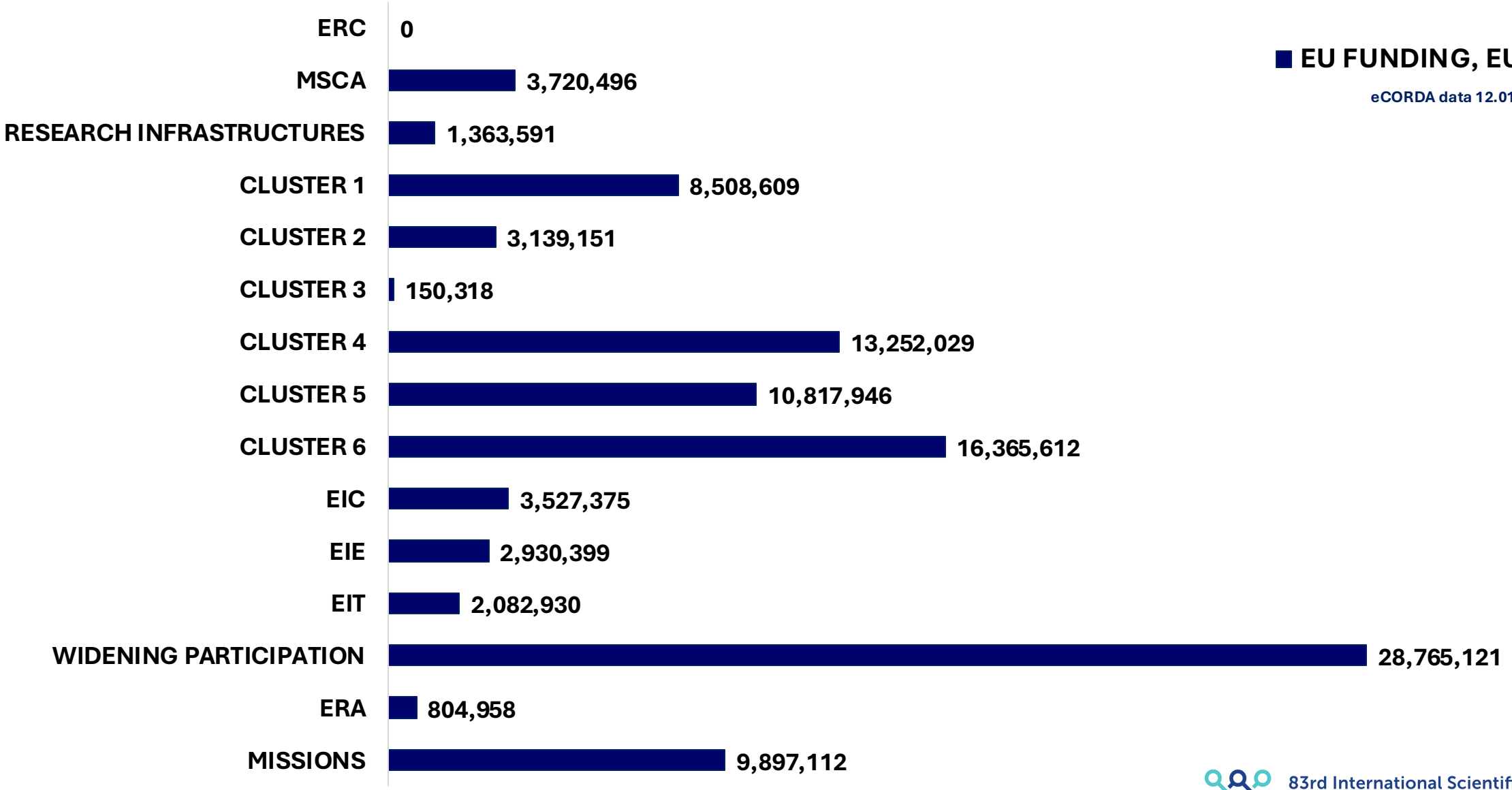
30 COORDINATORS

365 PARNTERS

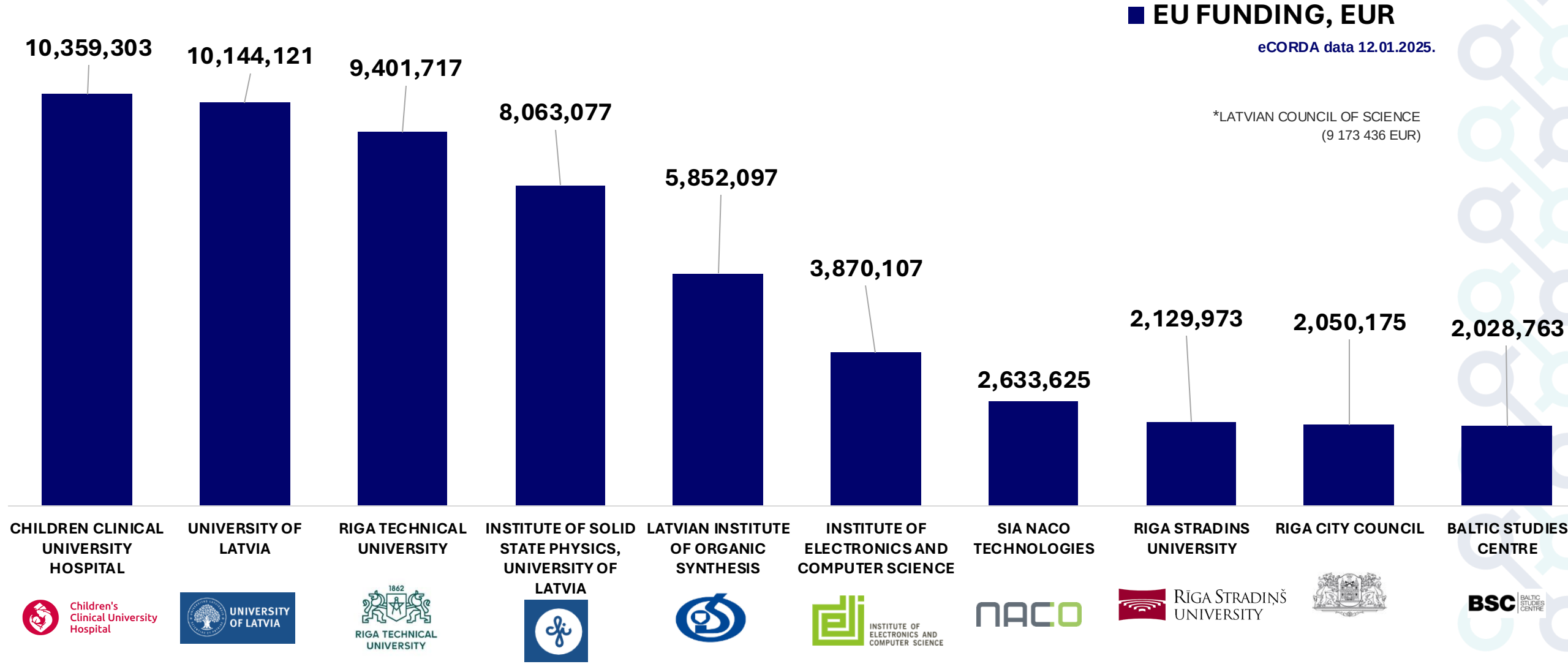
105,3 M€ EU FUNDING

eCORDA data 12.01.2025

HORIZON EUROPE STATISTICS FOR LATVIA



HORIZON EUROPE TOP 10 PARTICIPANTS



CLUSTER 4: ADVANCING DIGITAL, INDUSTRY AND SPACE

Cluster 4 Overview Cluster 4 Work programme

DIGITAL

- Digital and **emerging technologies for competitiveness** and **fit for the Green Deal**
- **leading data** and **computing technologies**

SPACE

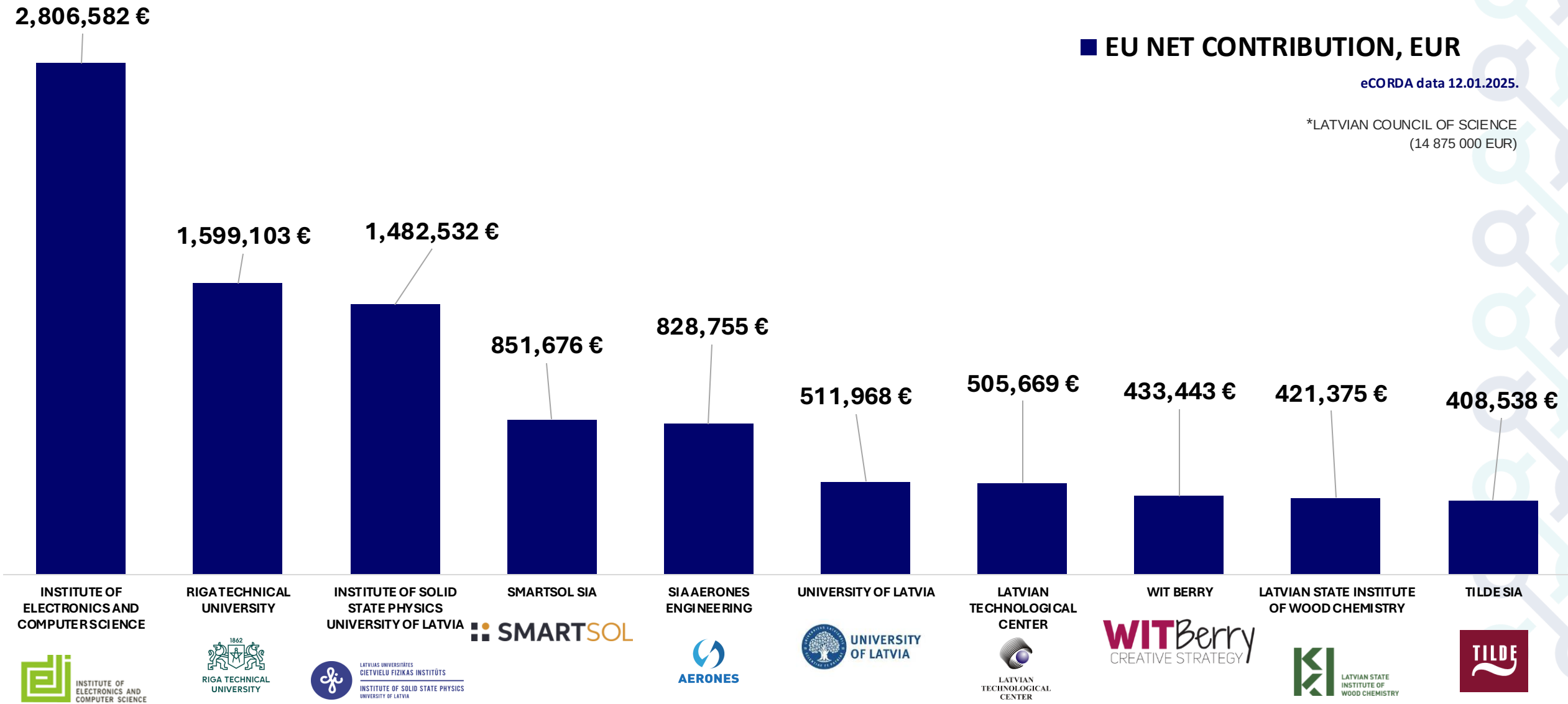
- **Autonomy in developing**, **deploying** and **using global space-based infrastructures**, services, applications and data

INDUSTRY

- Climate neutral, circular and **digitized production**
- **Autonomy** in **key strategic value chains for resilient industry**

Tech Leadership in Europe's Strategic Autonomy in Raw & Innovative Materials

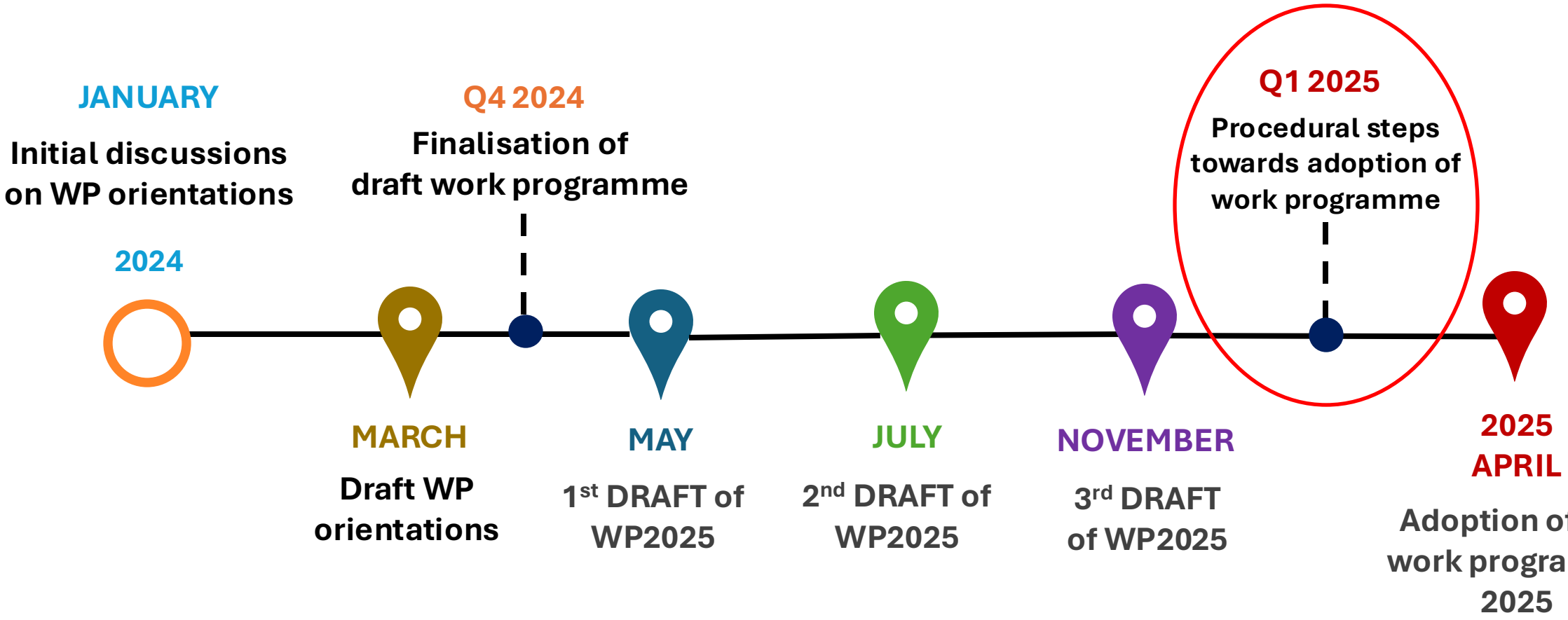
CLUSTER 4 TOP 10 PARTICIPANTS



eCORDA data 12.01.2025.

*LATVIAN COUNCIL OF SCIENCE
(14 875 000 EUR)

TOWRDS WORK PROGRAMME 2025



*The Work Programme 2025 is not published yet, therefore the information presented here is indicative only.

TOPIC AREAS

Global Leadership in Climate-Neutral, Circular, Digital Value Chains

- Manufacturing
- Construction
- Energy – Intensive Industries (Decarbonization and Energy Efficiency)
- Circularity and Zero Pollution
- Social Circular enterprises

Tech Leadership for Europe's Strategic Autonomy in Raw & Innovative Materials

- Raw materials
- Innovative Advanced Materials
- Safe and Sustainable by Design
- Textiles

Agile, Secure Data & AI Services in a Single Market

- Connected Collaborative Computing Networks (3C Networks)
- AI-GenAI, Data and Robotics

HORIZON EUROPE

WORK PROGRAMME 2025

Open Strategic Autonomy in Digital & Emerging Technologies

- Quantum and high-performance computing
- Photonics
- AI, GenAI/Data/Robotics
- Artificial Intelligence in Science

Open Strategic Autonomy in Global Space Infrastructure & Data

- Accessing Space
- Acting in Space
- Using Space on Earth (Telecommunications)
- Earth Observation
- Satellite navigation
- Monitoring Space
- Boosting Space

Human-Centric Innovation in Digital & Industiral Tech

- Virtual Worlds
- AI, Data, and Robotics
- Standardisation and Knowledge Valorisation
- International cooperation

**The Work Programme 2025 is not published yet, therefore the information presented here is indicative only.*

INDUSTRY (WP2025 *Draft*)

Destination 2: Achieving Technological Leadership for Europe's Open Strategic Autonomy in Raw Materials, Chemicals and Innovative Materials

Raw Materials

- **HORIZON-CL4-INDUSTRY-2025-01-MATERIALS-61:** Technologies for critical raw materials and strategic raw materials from end-of-life products **(IA)**
- **HORIZON-CL4-INDUSTRY-2025-01-62:** Strategic Partnerships for Raw Materials: Innovative Approaches for sustainable production of Critical Raw Materials **(IA)**
- **HORIZON-CL4-INDUSTRY-2025-01-63:** Innovative solutions for the sustainable production for Semiconductor raw materials **(IA)**
- **HORIZON-CL4-INDUSTRY-2025-01-64:** EU Co-funded Partnership on raw materials for the green and digital transition (Programme Co-fund action) (**PCA)**

Innovative Advanced Materials

- **HORIZON-CL4-INDUSTRY-2025-01-MATERIALS-42:** Innovative Advanced Materials (IAMs) for product monitoring, smart maintenance and repair strategies in the construction sector **(RIA)**
- **HORIZON-CL4-INDUSTRY-2025-01-MATERIALS-43:** Innovative Advanced Materials (IAMs) for robust, fast curing sealants and coatings for manufacturing and final assembly **(IA)**
- **HORIZON-CL4-INDUSTRY-2025-01-MATERIALS-44:** Innovative Advanced Materials Innovation Procurement **(CSA)**

The Work Programme 2025 is not published yet, therefore the information presented here is indicative only.

INDUSTRY (WP2025 *Draft*)

Destination 2: Achieving Technological Leadership for Europe's Open Strategic Autonomy in Raw Materials, Chemicals and Innovative Materials

Innovative Advanced Materials (cont.)

- **HORIZON-CL4-INDUSTRY-2025-01-MATERIALS-45:** Materials Commons for Europe **(IA)**
- **HORIZON-CL4-INDUSTRY-2025-03-MATERIALS-46:** Innovative Advanced Materials (IAMs) for photonics, enabling low-power and ultra-broadband performance for telecommunication **(RIA)**
- **HORIZON-CL4-INDUSTRY-2025-03-MATERIALS-47:** Innovative Advanced Materials (IAMs) for conformable, flexible or stretchable electronics **(RIA)**

Safe and Sustainable by Design

- **HORIZON-CL4-INDUSTRY-2025-01-MATERIALS-51:** Development of safe and sustainable by design alternatives to Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) **(IA)**
- **HORIZON-CL4-INDUSTRY-2025-01-MATERIALS-52:** Accelerate the uptake of life-cycle assessment (LCA) for Safe and Sustainable by Design (SSbD) chemicals and materials and resulting products **(RIA)**

Textiles

- **HORIZON-CL4-INDUSTRY-2025-01-MATERIALS-31:** Digitally enabled local-for-local textile and apparel production **(IA)**

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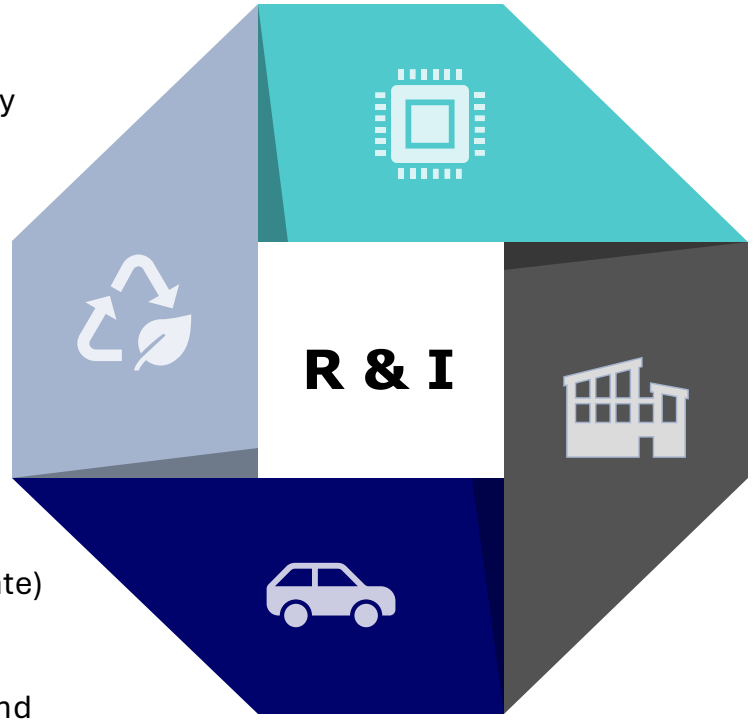
STATISTICS

Call	Topic		Type of action	Proposals	Projects Funded	Scores	Success ratio, %
HORIZON-CL4-2024-RESILIENCE-01-01	**01**	Exploration of critical raw materials in deep land deposits	**RIA**	19	4	13.0 to 14.5	21.1
	04	Technologies for processing and refining of critical raw materials	**IA**	17	3	14.0	17.7
	08	Rare Earth and magnets innovation hubs	**IA**	5	2	12.0 to 12.6	40.0
	10	Addressing due diligence requirements in raw materials supply chains	**CSA**	4	1	12.0	25.0
	11	Technologies for extraction and processing of critical raw materials	**IA**	11	2	12.0 to 13.0	18.2
	24	Development of safe and sustainable by design alternatives	**IA**	10	4	11.5 to 13.5	40.0
	41	Innovate to transform' support for SME's sustainability transition	**CSA**	39	2	14.0 to 14.5	5.1

EU ADVANCED MATERIALS R&I PRIORITIES

ENERGY

- Renewable and low carbon energy conversion and generation
- Energy storage systems
- Energy distribution and the transmission grid
- Renewable fuels



ELECTRONICS

- Sensors
- Novel computing and memory concepts
- Power electronics
- 5G/6G communication and beyond
- Optoelectronics
- Photonics
- Quantum components
- New chip production

MOBILITY

- Advanced batteries (e.g. solid-state)
- Fuel cells systems
- Advanced lighter materials
- Advanced composite materials and structures
- Coatings and paints
- Hybrid manufacturing proceses
- Safe and sustainable use components
- Resilient transport infrastructure
- Cost-efficient maintenance and repair

CONSTRUCTION

- Enhanced energy efficiency in buildings (composite foams, thermal insulation
- Robust and long-lasting building structures
- Grater wellbeing in buildings
- Materials for circularity improvement and environmental performance

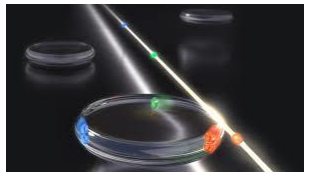
Advanced Materials for Industrial Leadership

AI FUELS THE GROWTH IN OPTICAL TECHNOLOGIES

3 KEY SEGMENTS

Optical communication

Optical sensing

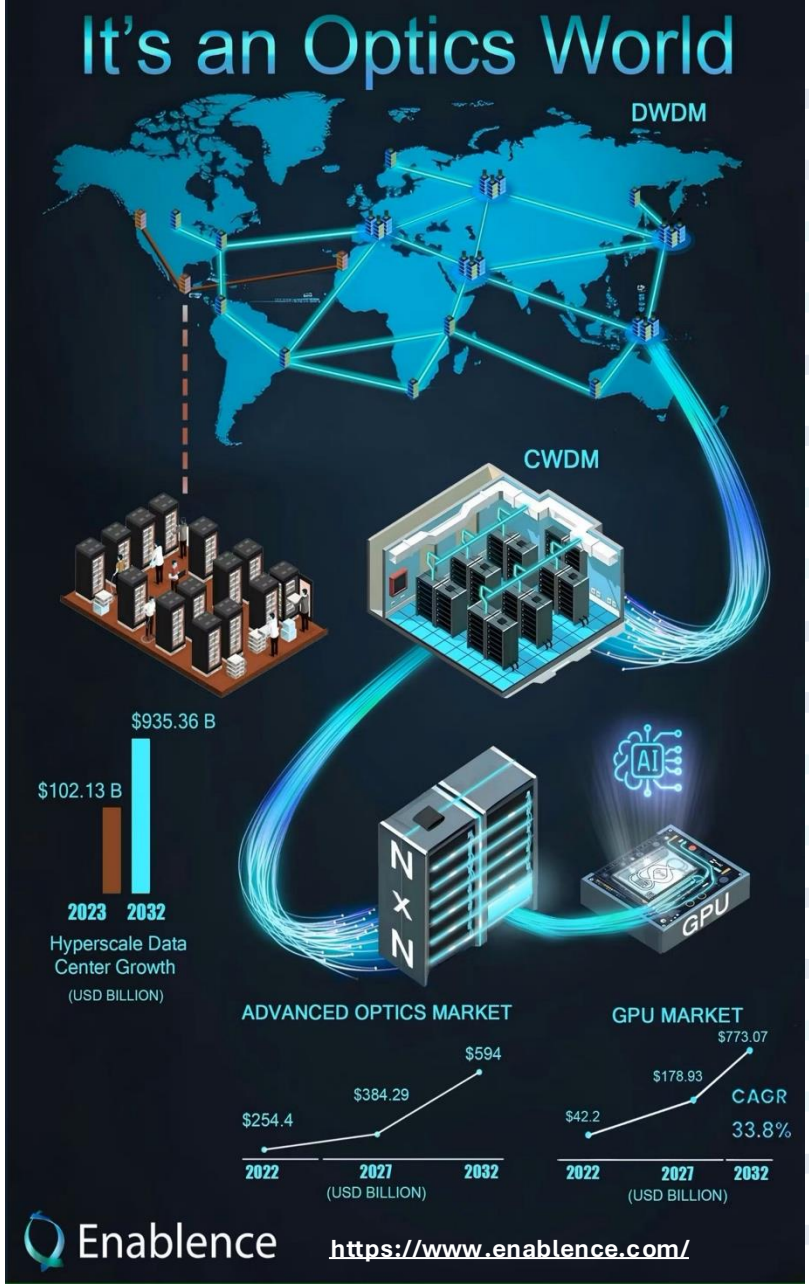


Optical computing

1. **Overall network capacity**
   - ✓ Demand for high-bandwidth, low-latency optical networks for big data
2. **High-bandwidth & low-latency connectivity**
   - ✓ Large GPU clusters
   - ✓ Co-packaged optics (CPOs) & NxN routers
3. **AI computing inside the chassis**
   - ✓ **Optics integration into AI hardware** (power consumption efficiency, heating reduction)
4. **Advanced vision systems**
   - ✓ **LiDARs** in robotics, automotive, aerospace, defense and medicine

AREAS FOR INNOVATION

[AI Needs Optical Chips (Laser Focus World Dec 2024)]



KEY-EVENTS AND CONFERENCES

[EMMC Brokerage Event 2025]

silicone EXPO Europe

[Silicone Expo Europe March 19-20]

[SICT 2025]

JEC WORLD 2025
The Leading International Composites Show
March 4-6 PARIS-NORD VILLEPINTE

[JEC World 2025]

Cables
11-13 March 2025 | Düsseldorf, Germany

[Cables Europe 2025]

[EuroTech 2025: Engineering the Clean Industrial Deal]

[European Advanced Materials Congress]

DIGITAL, INDUSTRY & SPACE

CLUSTER 4 CONTACTS

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Thank you!

83rd International Scientific Conference of the University of Latvia 2025