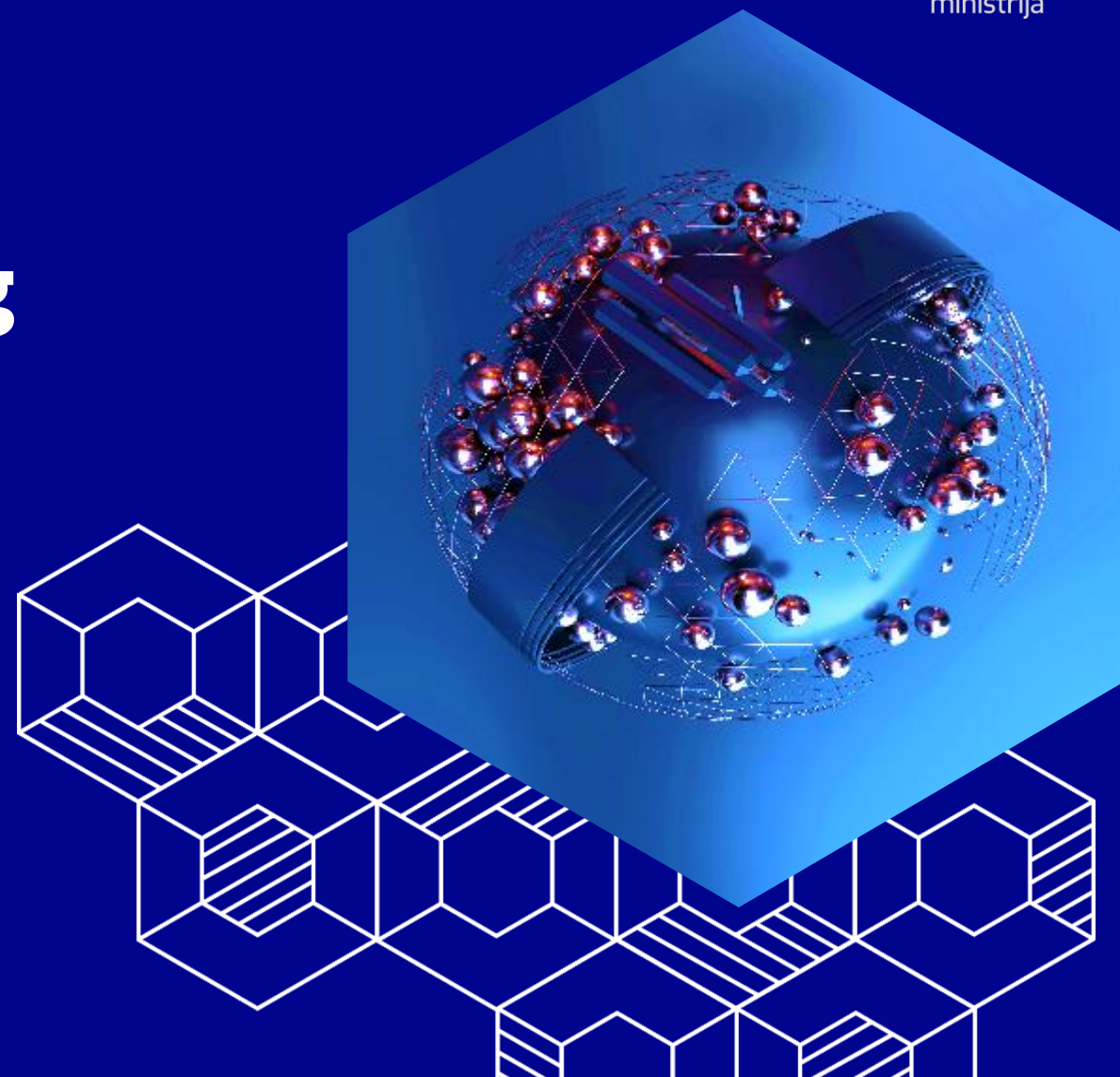


# CERN Baltic group meeting

**04/05/2023**

**Dmitrijs Stepanovs**

Deputy State Secretary  
Ministry of Education and Science  
of the Republic of Latvia  
Member of the CERN Council



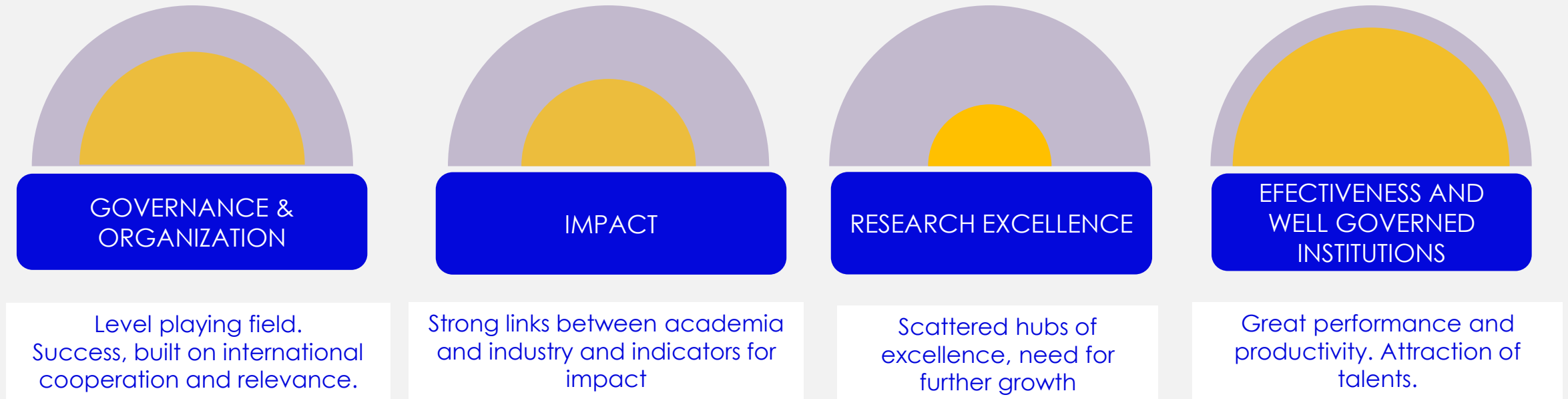


**Latvia is reliable and honest partner of CERN**

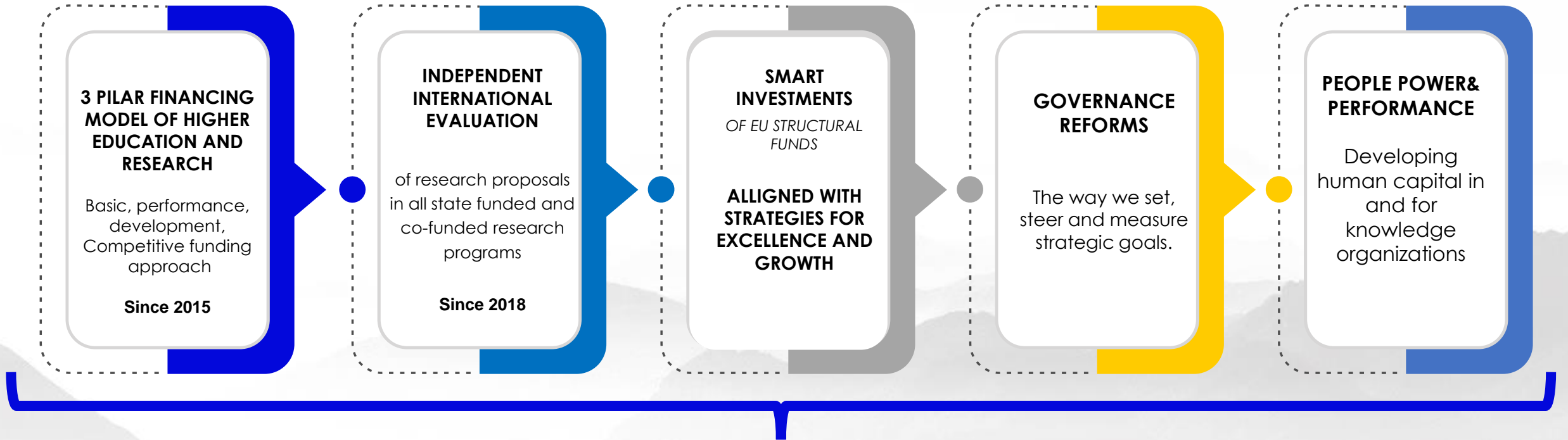
*#LatvijaCERN*

# Goals and vision.

Higher education and research is made by people and for the people.  
Together we enable high quality, high impact and innovative research for the world of tomorrow.



# What have we changed



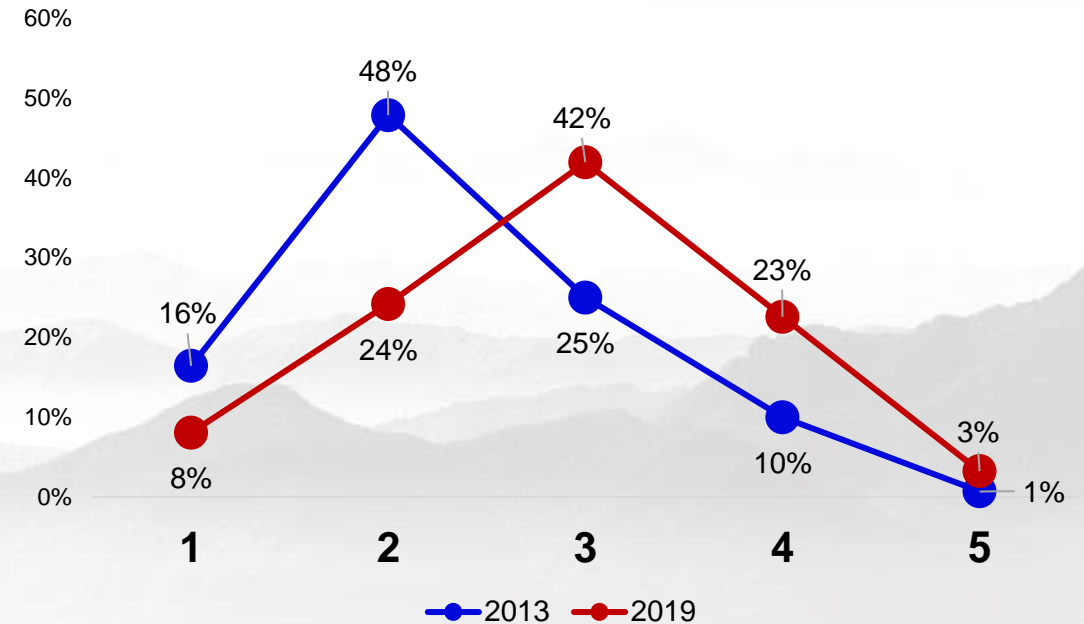
**Future objectives defined in Research,  
Development and Innovation Guidelines for  
2021-2027**

# International evaluation of research institutions



**Done once every 6 years.**  
2013 evaluation allowed to  
consolidate public sector  
research  
2019 evaluation allowed to  
emphasize excellence

Distribution of Latvian research evaluation scores  
between 2013 and 2019 in international research  
assessment



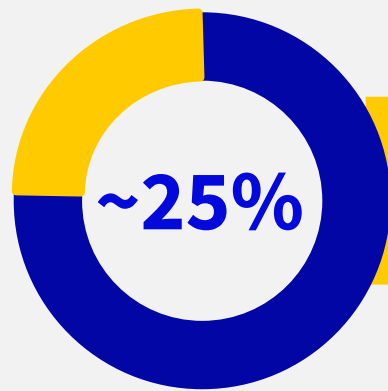
From 2013 – 2019 Latvian  
research landscape had major  
improvements. **Average results  
improved in all research areas.**

## Funding



**232 M EUR**

In 2021, 0.70% of GDP were invested in R&D



of companies are  
active in innovations

## Research environment



**64** research  
institutions

22 state funded research institutions

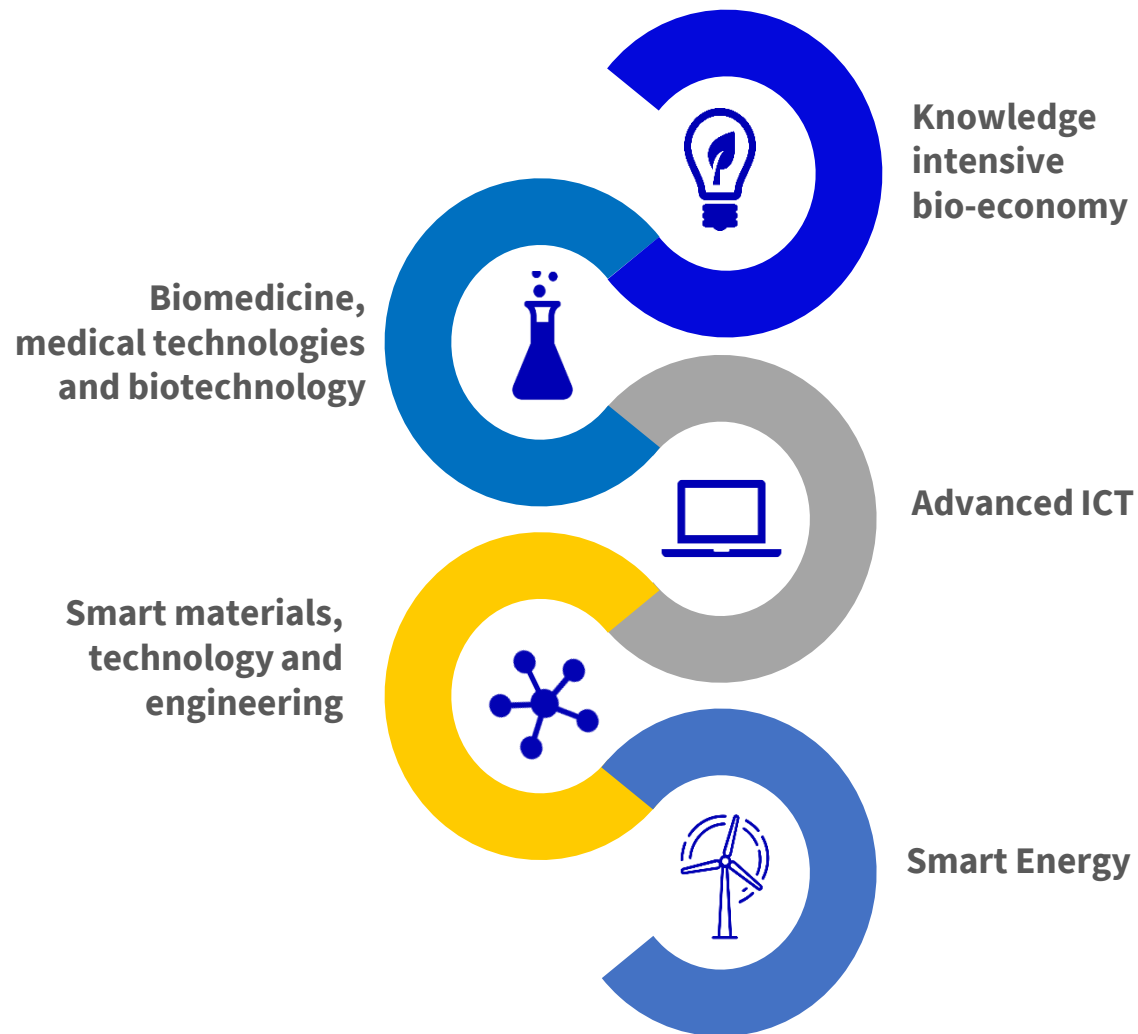


**14 200** research  
personnel

(7050 in FTE), ~20 % work  
in the industry (2021)

# Key Facts About Research in Latvia

## SMART SPECIALISATION AREAS



## RESEARCH UNIVERSITIES

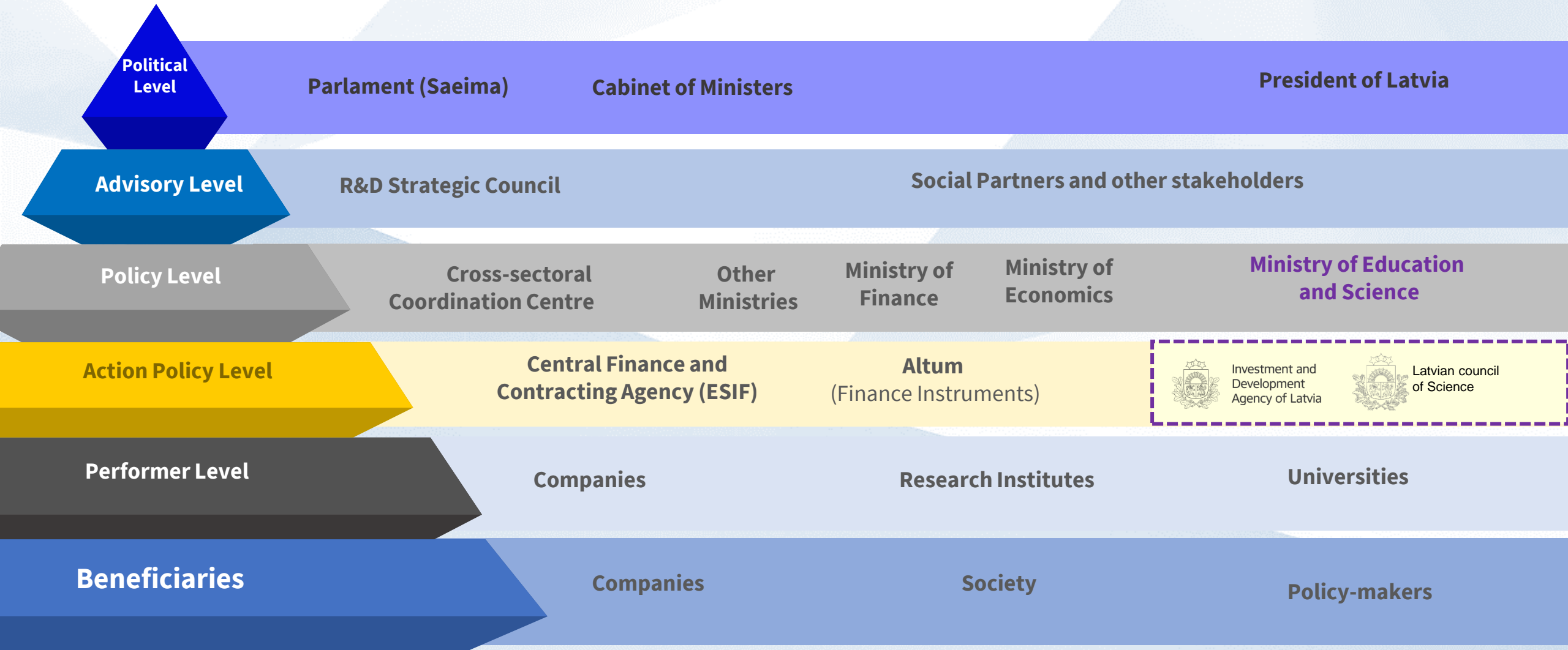


**UNIVERSITY  
OF LATVIA**



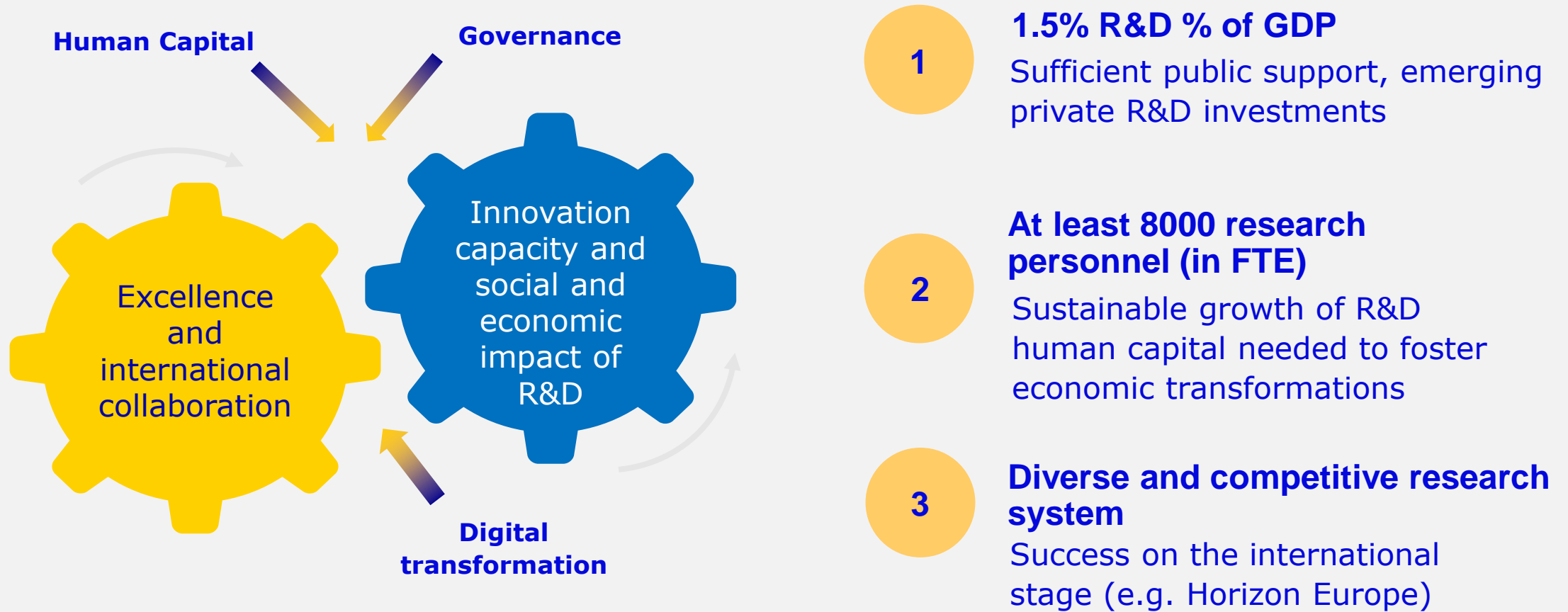
Latvia University  
of Life Sciences  
and Technologies

# Research Governance in Latvia





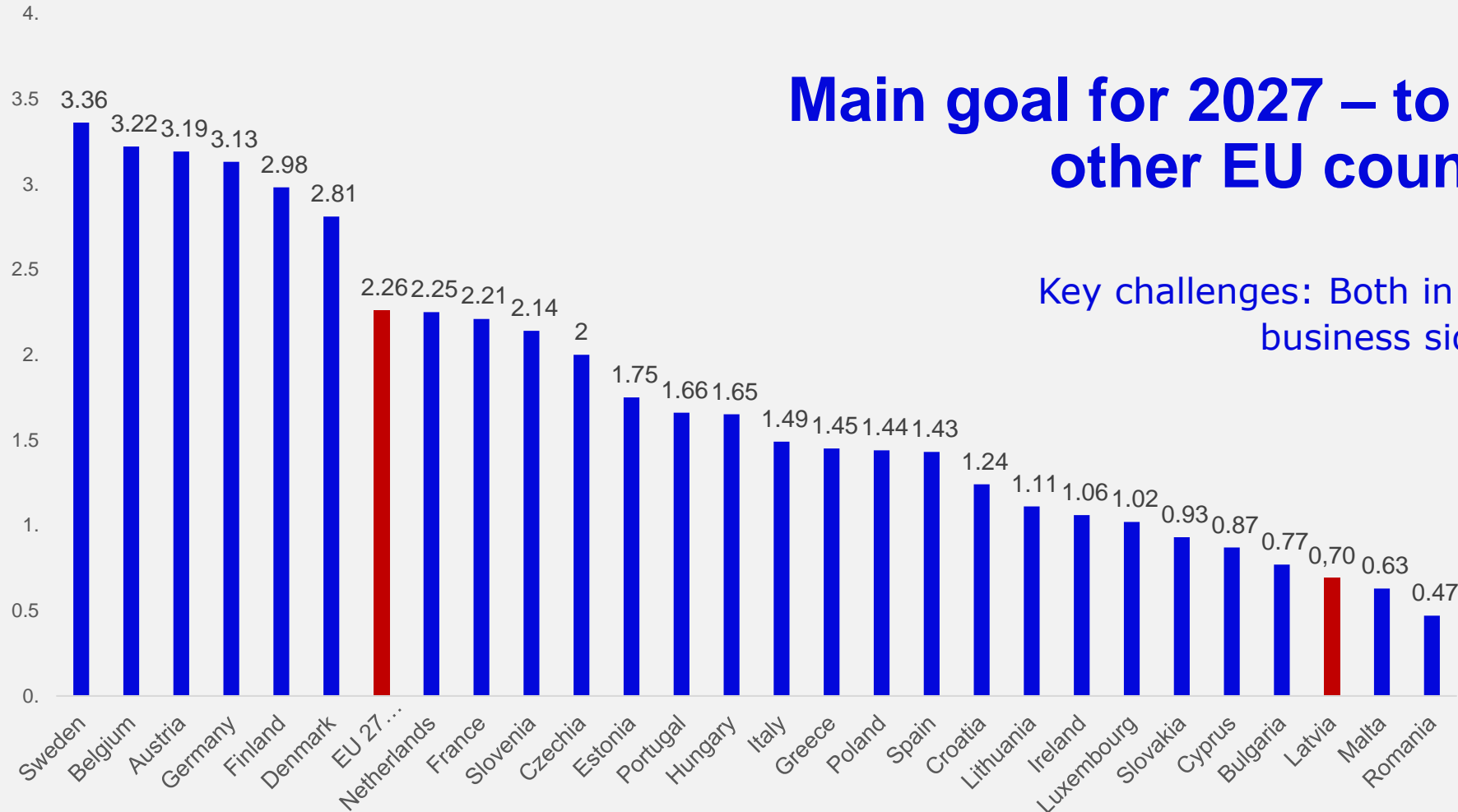
# Main Policy Priorities in R&D for 2021-2027



➤ Supporting the **mobility of researchers** has a direct impact on increasing of international collaboration & scientific excellence

# R&D expenditure in Latvia

R&D expenditure (% of GDP) in 2021

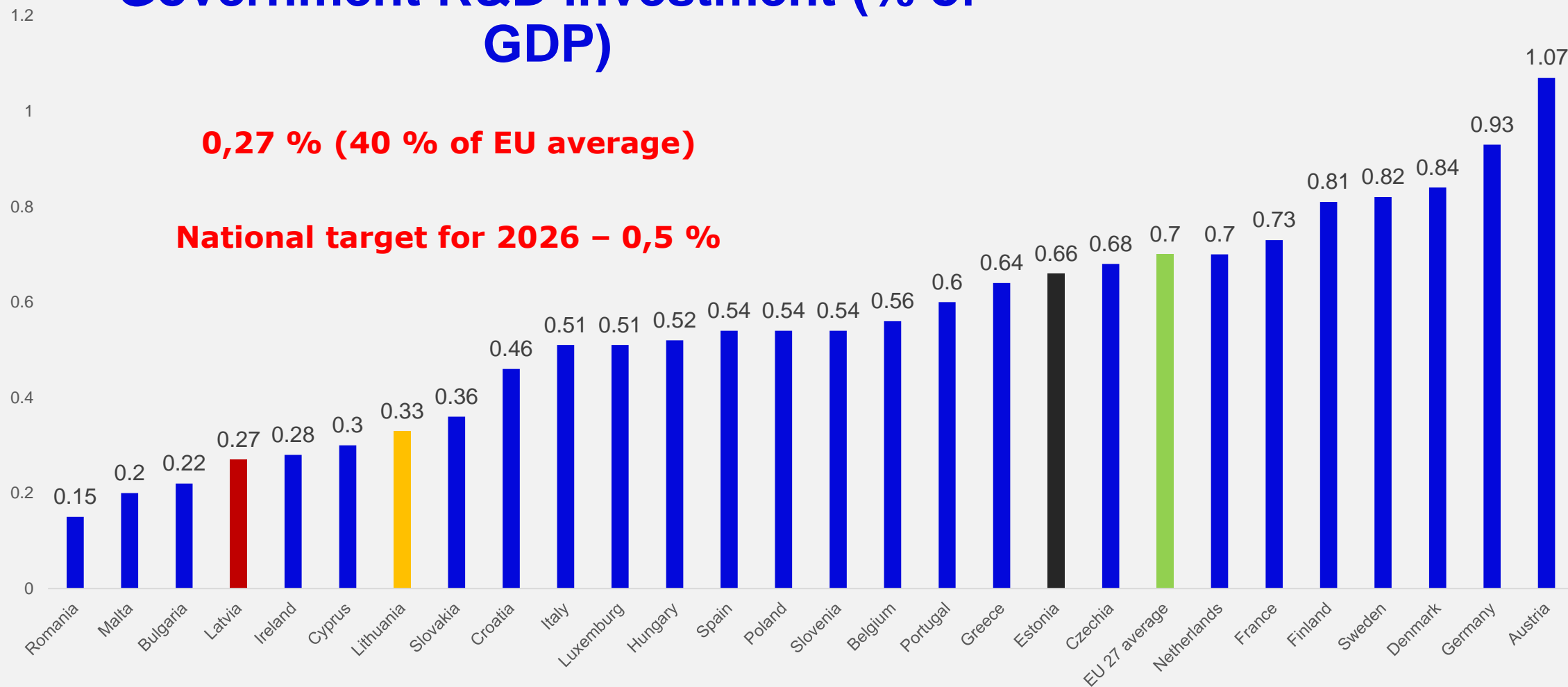


**Main goal for 2027 – to catch up with other EU countries**

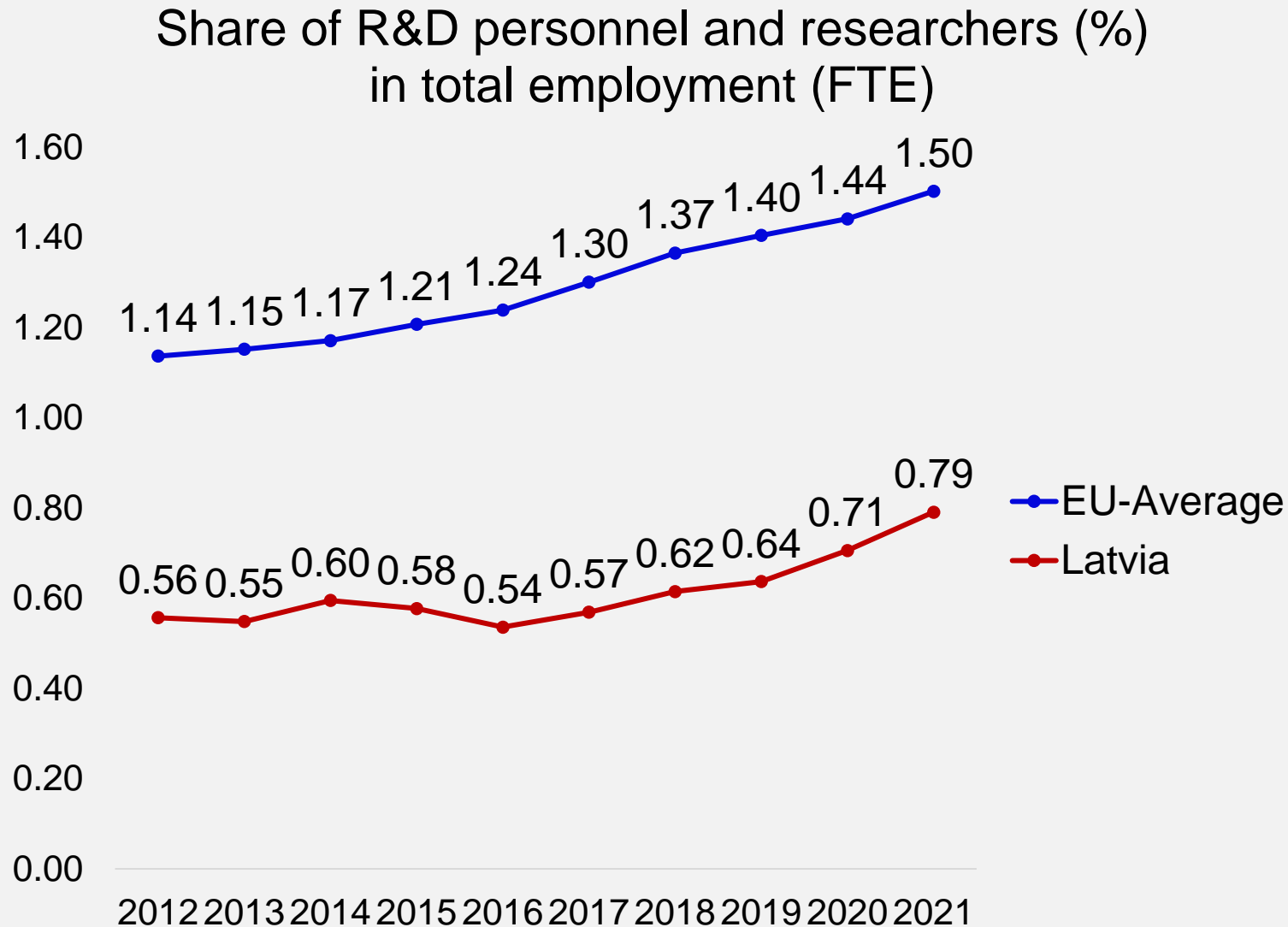
Key challenges: Both in the public and business side

# Government R&D expenditure in Latvia

## Government R&D investment (% of GDP)



# Human Capital in research – role in total employment



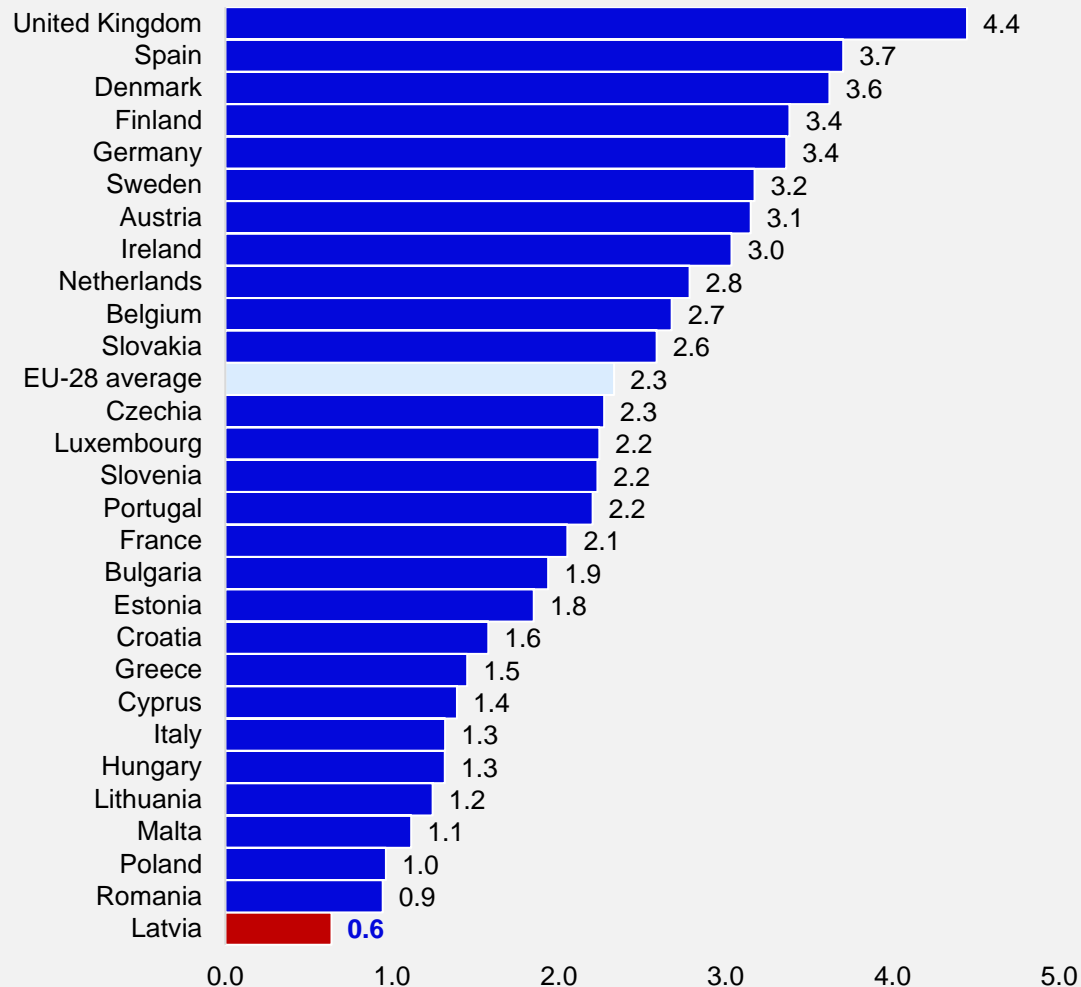
**0,79 % of labor force is  
working in research – 53  
% of EU average.**

Recent progress due to  
increased workload for  
researchers

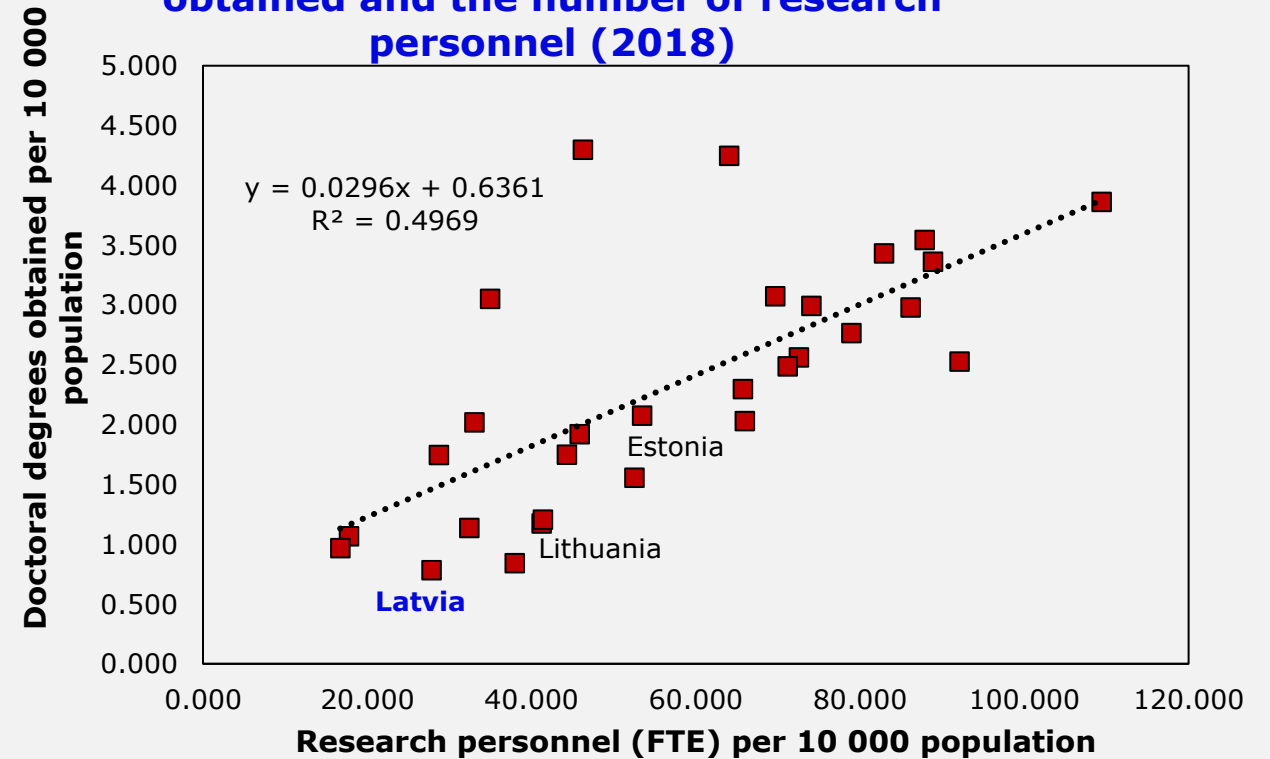
**Major challenge: human  
capital renewal (PhD  
students)**

# PhD renewal for research – key priority

Doctoral degrees obtained per 10 000 population (2018)



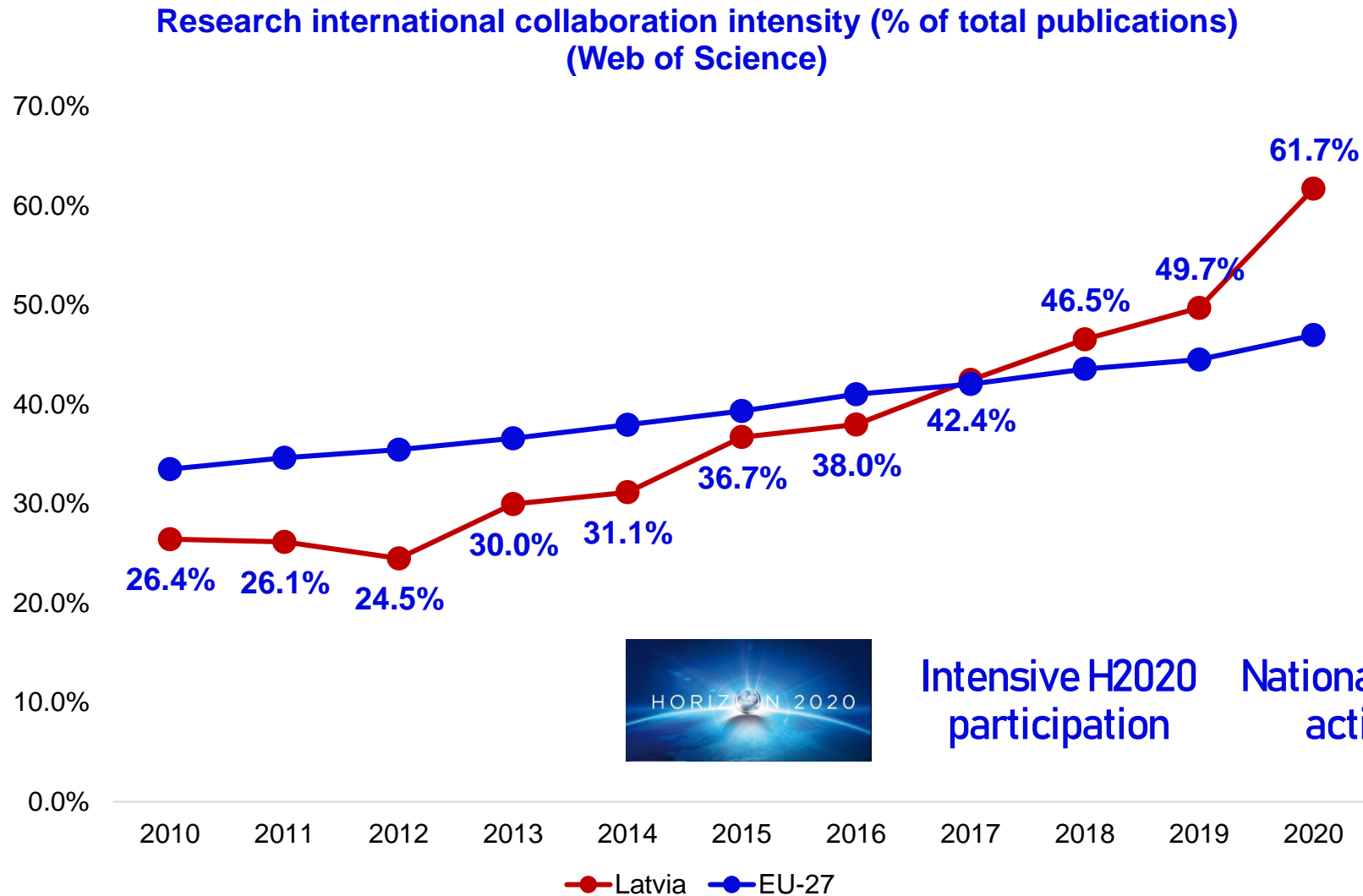
Correlation between doctoral degrees obtained and the number of research personnel (2018)



Currently - high drop-out rate in doctoral studies and an insufficient number of doctoral degree holders to ensure the renewal of scientists

*New PhD model approved in 2021, currently legislative base for it is being finished*

# International collaboration – progress in recent years

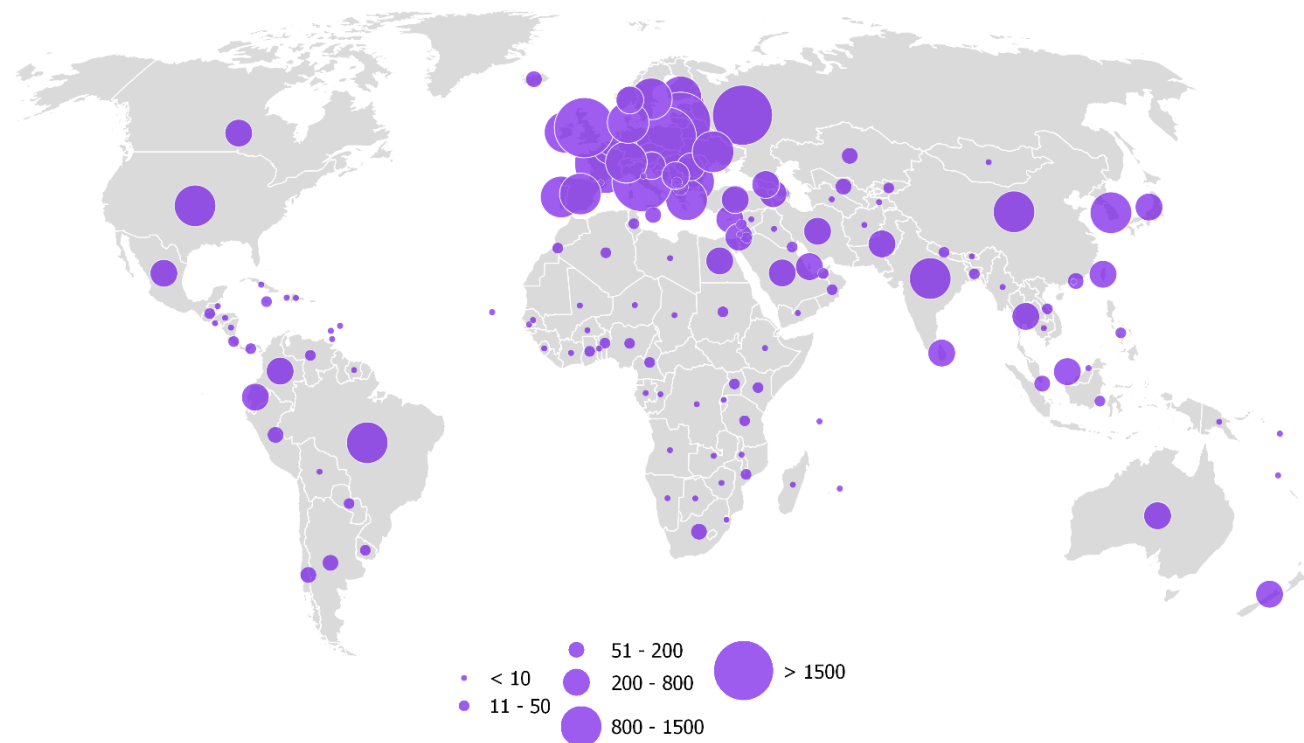


In Last 3 years – Increased participation in international consortiums, projects and other activities

Intensive H2020 participation

National support activities

# Changing research collaboration patterns



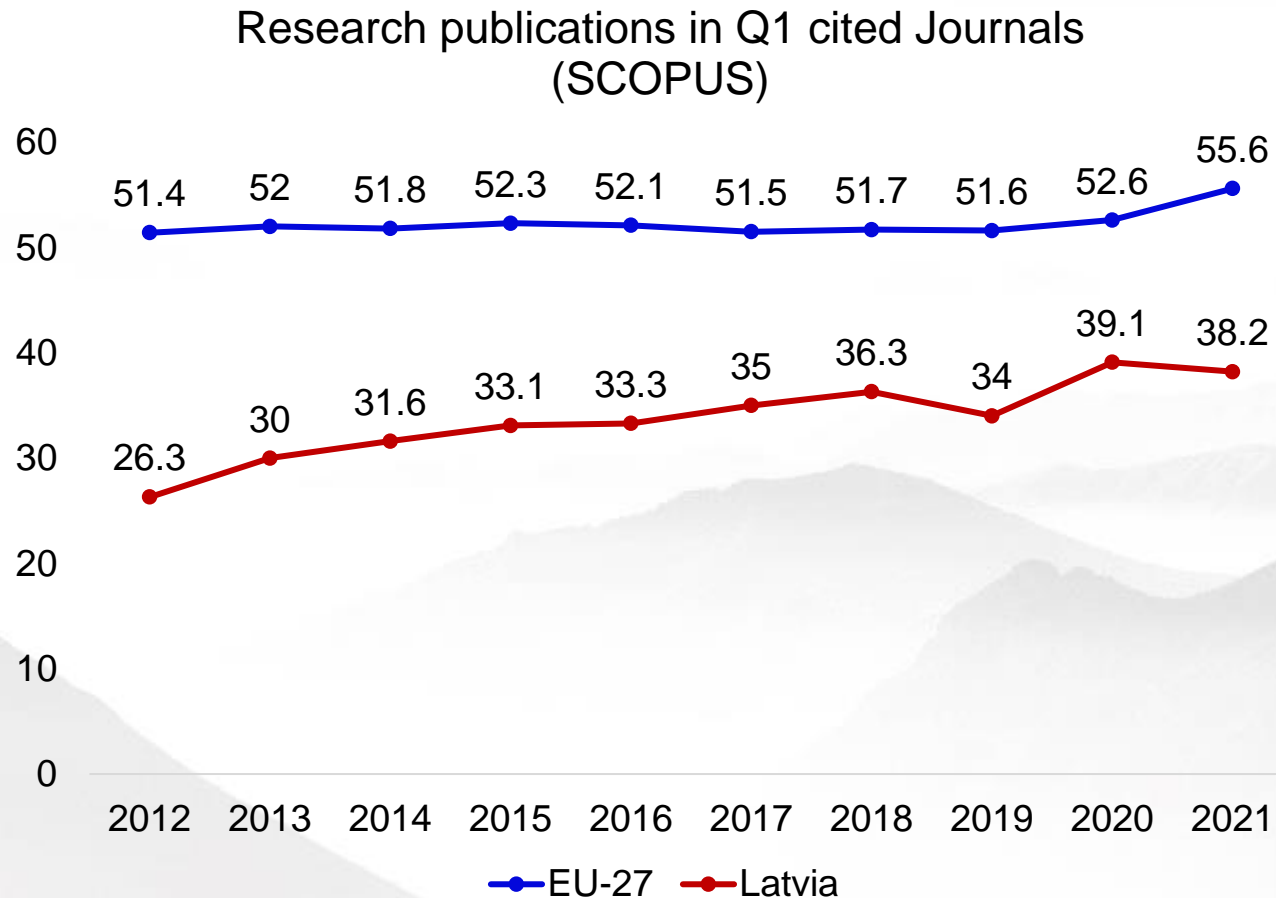
**Overall research output growth corresponds to a larger global collaboration network.**

**H2020 accelerated collaboration pattern shift towards Western Europe**

**Role of Latvian Diaspora researchers (more than 600) in international collaboration**

**Latvian research copublications (2014-2020) in SCOPUS**

# Research Excellence



**In the last 10 years –  
average quality of research  
has steadily been improving.**

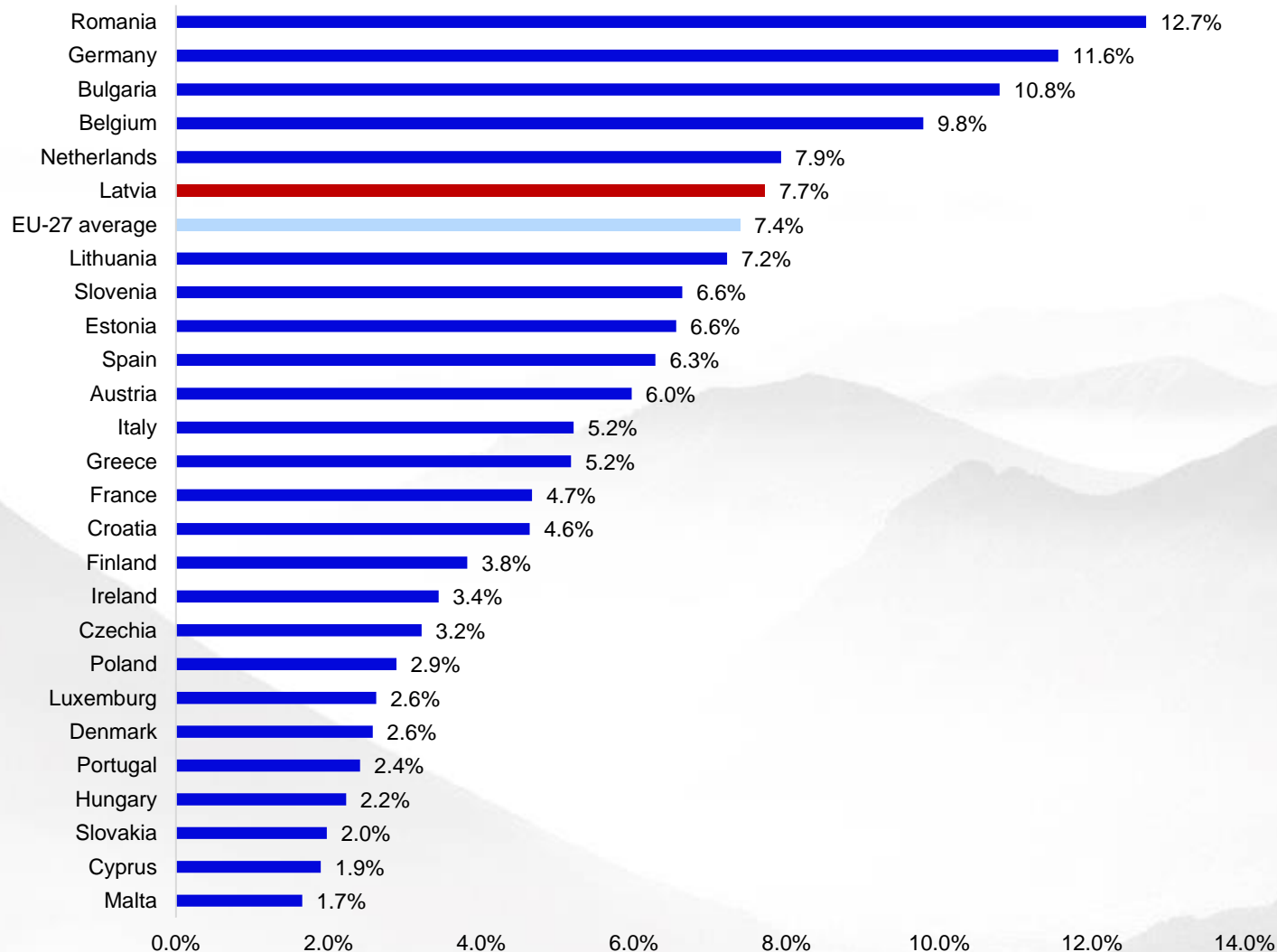
**Quality improvement  
coincided with improvements  
in quantity.**

**Steady cohesion for research Excellence**



# R&D collaboration with the business sector

% of public sector R&D that is contracted from businesses in 2020



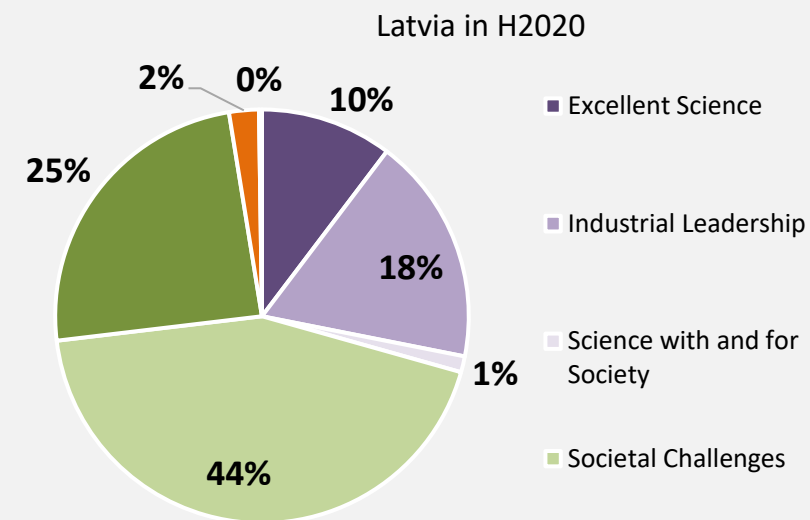
**Public sector R&D linkages with the business sector are relatively strong.**

**Challenge is to increase private in-house investments in research (especially in largest state owned enterprises)**

# Horizon framework role in Latvian R&D



	5IP (1999- 2002)	6IP (2002- 2006)	7IP (2007- 2013)	Horizon 2020 (2014- 2020)	Horizon Europe*
Total project proposals	667	1027	1127	2790	456
Total project participation proposals	776	1206	1424	3480	614
Supported projects	178	217	240	436	109
Participations in supported projects	204	258	337	5343	129
Coordinated projects	2	11	30	49	
Success rate	26.7 %	21.1 %	21.3 %	14.2 %	23,9%
Total EC funding (million EUR)	14.6	21.6	49.04	116.8	31.44



**Horizon Europe continues the trend of good results for Latvian institutions.**

**Current pace of results is faster than most EU countries**

# Horizon 2020 main organisations in Latvia

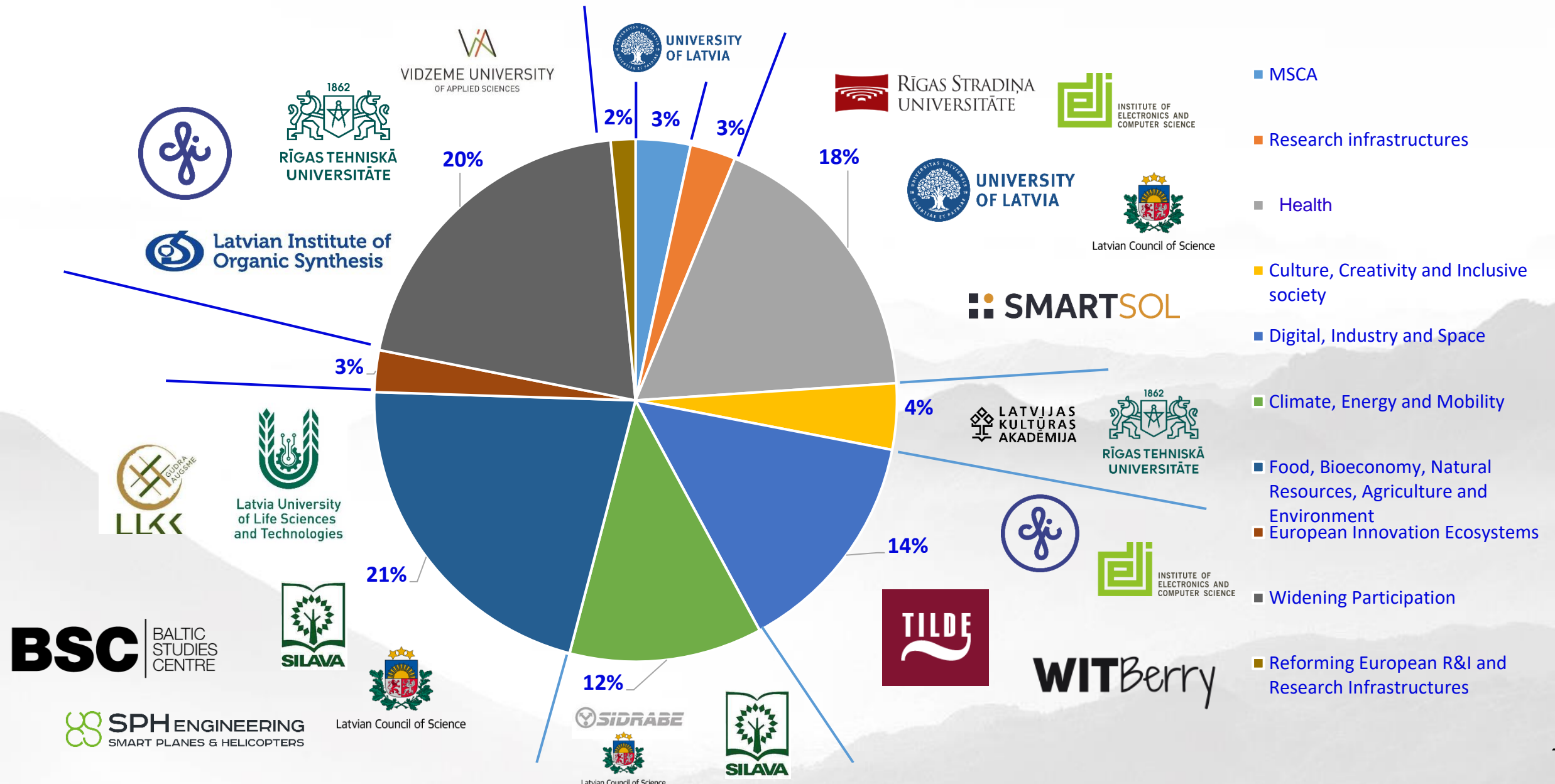


Valsts izglītības attīstības aģentūra



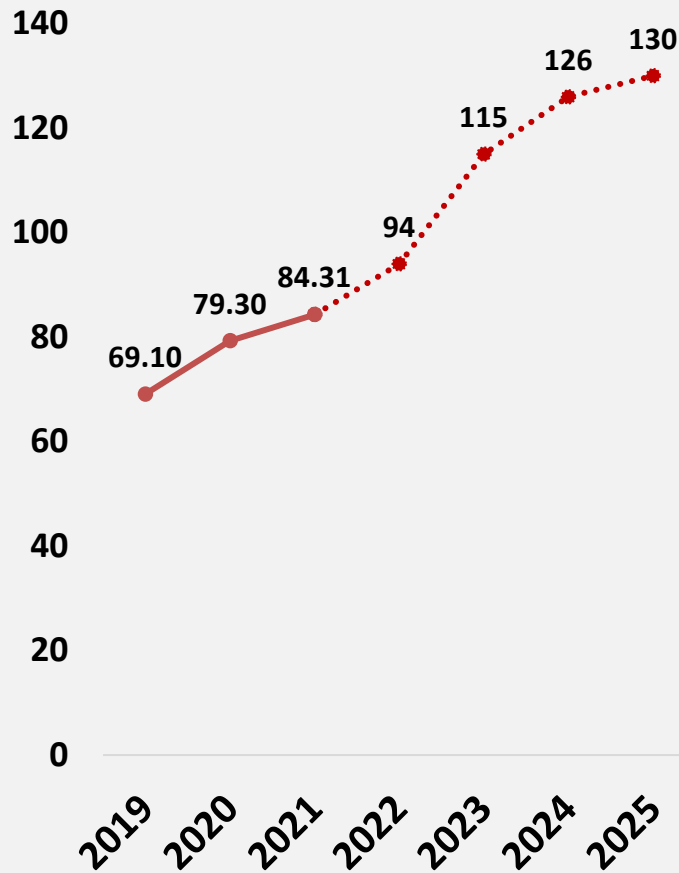
Organization	H2020 funding (million euros)
RTU	14,7
LU CFI	13,9
LU	10,2
LATVIJAS FINIERIS A/S	7,8
OSI	6,1
VIAA	5,9
RSU	3,6
TILDE SIA	3,2
NODIBINAJUMS BALTIC STUDIES CENTRE	2,9
EDI	2,2

# Horizon Europe – **positive start for Latvian institutions**



# R&D national programmes

Government funding for research and extra funding from 2023



Basic research funding (35 MEUR)

Institutional funding for research

Since 2022 – fully based on research outcomes within institutions

**+7,6 MEUR 2023  
+13,2 MEUR 2024  
+15,2 MEUR 2025**

Fundamental and applied research grants (14 MEUR)

Bottom-up funding for excellencet research groups

Currently – very high competition (only 13 % of all above-treshold grants funded)

**+1,5 MEUR 2023  
+ 3,0 MEUR 2024  
+4,5 MEUR 2025**

State research programmes (7,3 MEUR)

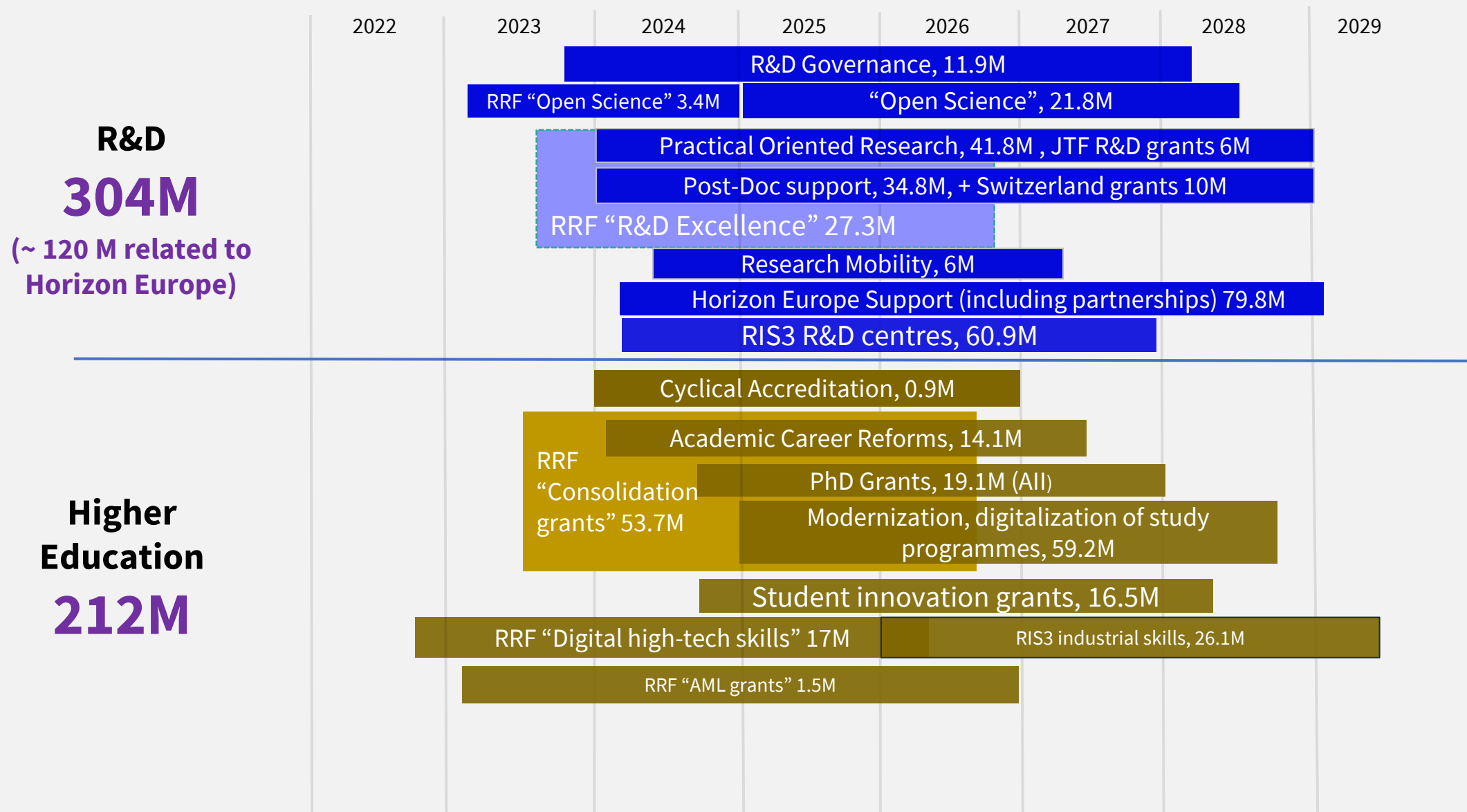
Direct R&D funding for national priorities

Open call for projects within defined priorities.

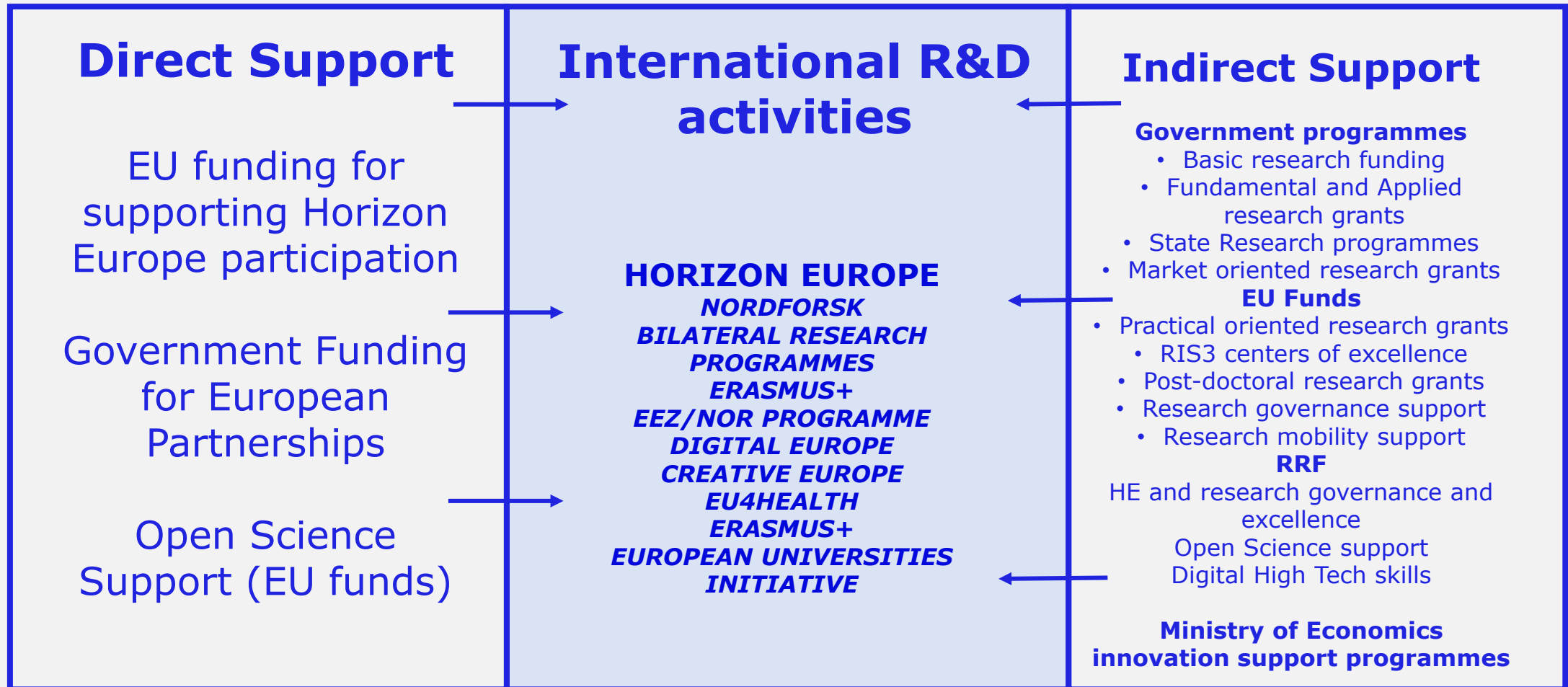
Linkages with economic and societal priorities

**+8,8 MEUR 2023,  
2024, 2025**

# SF and RRF investment in Latvian R&D and Higher Education



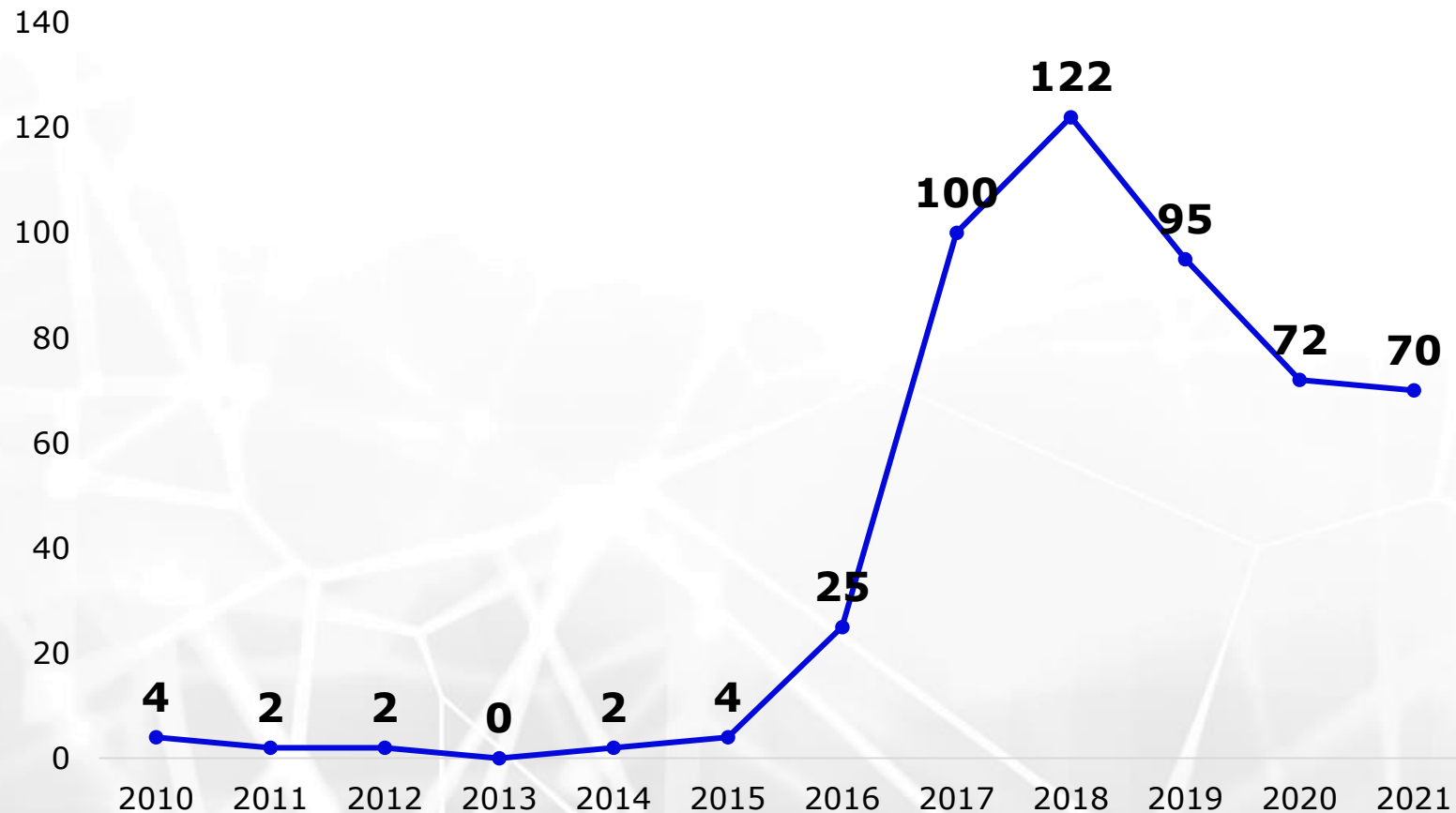
# National R&D programmes and their links with international programmes





# CERN role on Latvian research landscape

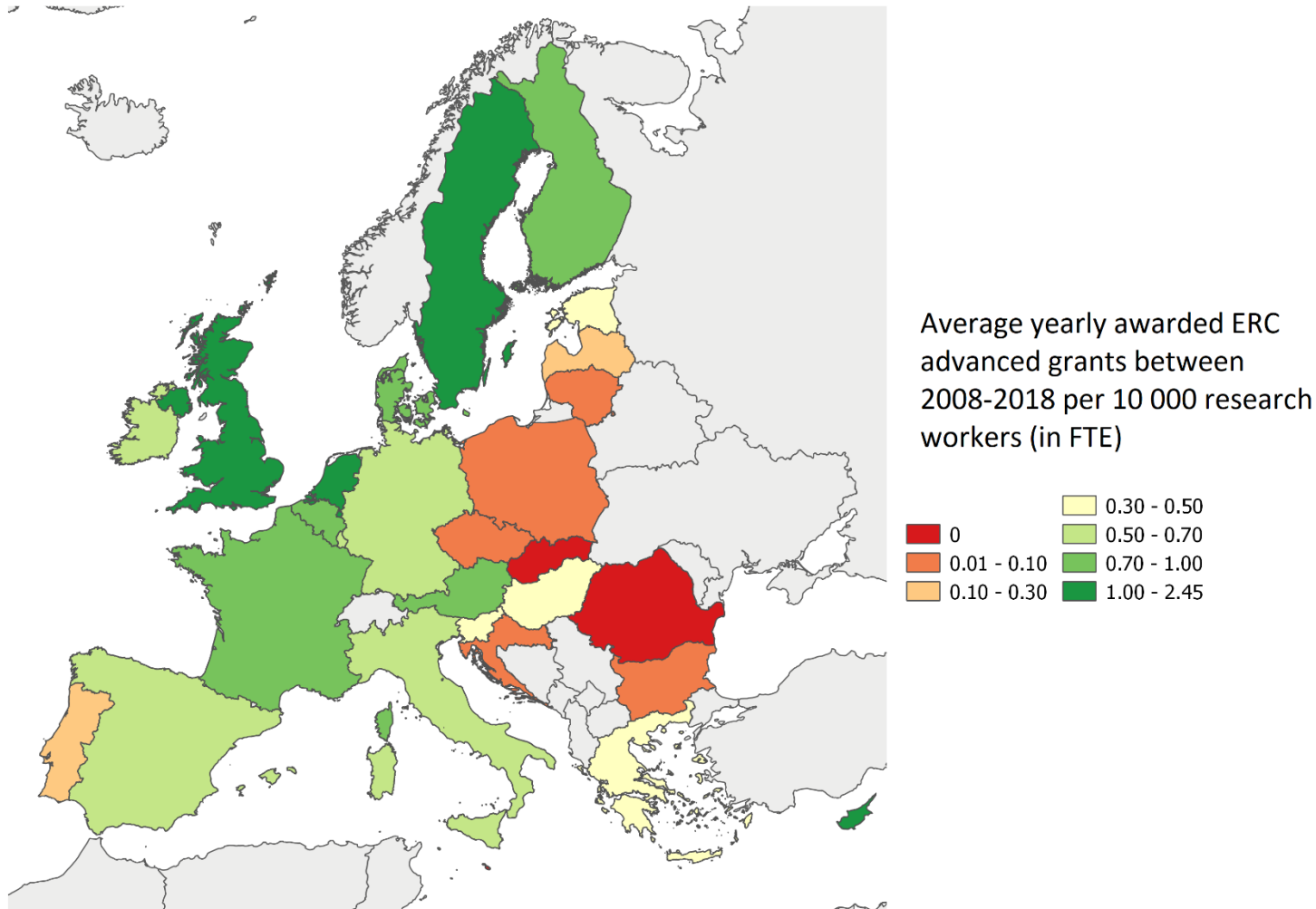
Research publications (Web of Science) for Latvian institutions in particle physics (2010 - 2021)



CERN has a direct impact in creating research capacity in particle physics where Latvia currently are involved in ~0,6 % of all global particle physics research since 2017.



# Research excellence – challenge for Latvia together with EU-13



- Latvia has excellence islands, but still lags behind in excellence-based R&D activities (e.g. in H2020 ERC grants).
- Target – research excellence in all 5 RIS3 priority areas
- Research excellence is one of our main policy priorities and our R&D investment programs will foster the necessary capacity development.
- This gap can be reduced by a significant policy shift towards increasing our R&D excellence.

# National Research Programme on high-energy physics and accelerator technology

Strengthening the development of the Latvian scientific community in the field of high-energy physics and accelerator technology in cooperation with the European Organization for Nuclear Research

## I Programme call (2020-2022)



**2 years**  
**900 000 EUR**



Project leader:



Project partners:



INSTITUTE OF SOLID STATE PHYSICS  
UNIVERSITY OF LATVIA



Develop world-class knowledge



Develop human capital & technologies



Create products & services



Involve scientific & academic staff, students, PhD applicants & young scientists

## II Programme call (2022-2026)



**5 years**  
**1 500 000 EUR**



Project leader:



INSTITUTE OF SOLID STATE PHYSICS  
UNIVERSITY OF LATVIA



Ensure the programme's continuity



Foster research capacity

# Achieved results of the 2020-2022 Programme call

## Participation in CERN scientific experiments

- ☑ High-energy particle physics
- ☑ Accelerator projects
- ☑ Crystal Clear Collaboration

## Delivery of high-level scientific papers

- ☑ Internationally reviewed  
in high quality level papers  
5 publications

## Development of Master's and doctoral study programmes

- ☑ "Particle Physics and  
Accelerator Technologies"  
- Riga Technical University,  
in collaboration with the  
University of Latvia  
4 masters theses  
5 PhD students directly funded

## Aim of the 2022-2026 Programme call

Select one multi-institutional project based on the scientific review process, including consortia cooperation criterion in the thematic focus of the programme

Strengthen the programme's 2020-2022 achievements further focusing on strong capacity building and **opening up for emerging technologies**

Ensure long term continuity & strategic planning

# National research program development 2022-2026 and beyond

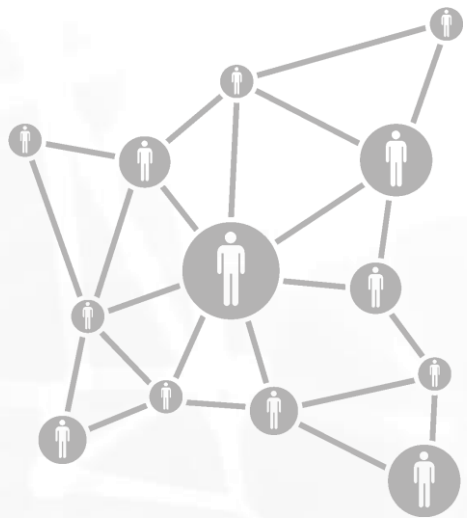
Originally program  
focuses on CMS, top  
quark experiments,  
MTD detector  
development

Program shall  
gradually increase  
value chain and scope  
– nuclear medicine,  
other nuclear  
tehnologies

2027 – new full-scale  
programm, indiciative  
funding 1,2M / year



# Main benefits for Latvia from full membership in CERN



**Increased integration global research community in CERN activities, talent circulation**

**Impact on strategic decision making process in CERN council**

**Economic benefits for industry partners from Latvia**

**All Baltic countries have similar future goals in CERN**

**CERN plays an increased role for R&D development in Latvia**

**Increased human capital involvement in CERN (researchers and technicians)**

# National roadmap of Latvia towards the full CERN membership

Cabinet of Ministers approval  
06.12.2022

Indicative budget until 2027,  
reaching 4,5M / year from national  
budget

Focused towards Latvia becoming  
Member State in the pre-stage to  
Membership until 2025

Envisages Latvia's aim to become full  
Member State of CERN from 2027

Indicates main actions to achieve readiness for  
pre-stage to Membership and future CERN  
membership

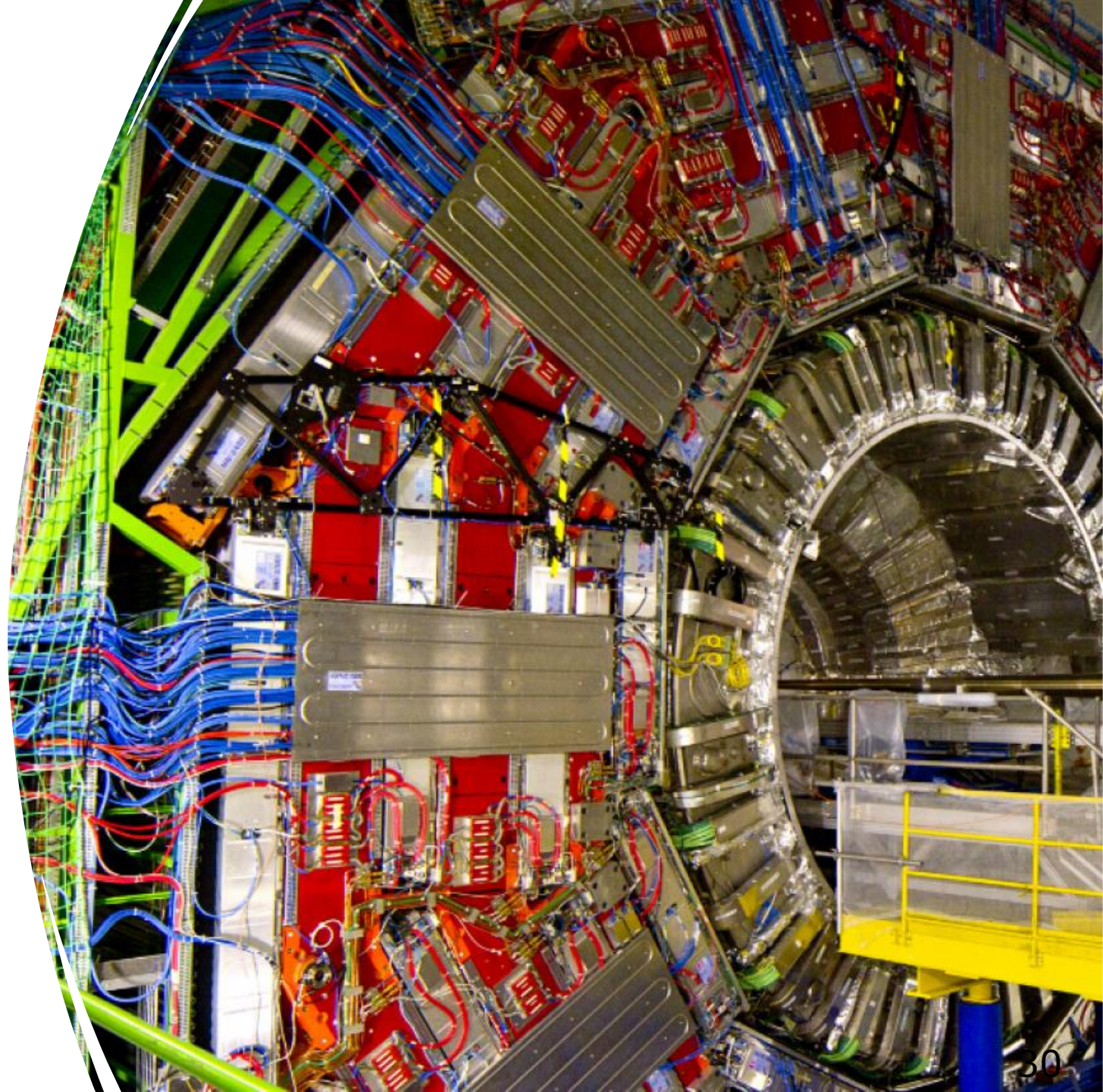




# Governance of the National roadmap of Latvia towards the full CERN membership

---

- **Strong governance of the roadmap**
  - Highest political support
  - Efficient CERN Baltic group role, exploiting priority regional synergies
  - National contact point, including professional industrial liaison officer (ILO) service
  - Latvia's representative to CERN facilitates collaboration and new opportunity establishment, inclusion into relevant projects
  - ILO – optimal and efficient industry involvement, networking and matchmaking



# CERN and nuclear technologies for industry

**Objective for benefits from participation in CERN**

Academic : industry 60:40

**Industry is critically interested in well prepared human capital**



Collaboration with industry facilitates investment into activities from structural funds (RIS3)



Industry has huge interest, 8 companies developing their CERN portfolios



Mature and new industries, start-ups, spillovers e.g. in nuclear medicine developing new ecosystems



# CERN and human capital development

**1**

**CERN is the priority collaborator in strengthening the master and PhD programs**

**2**

**Talent promotion via dynamic interplay of national programmes with CERN opportunities**

**3**

**Retaining human capital requires predictable and well funded career path for nuclear scientists, engineers, and optimal cooperation with industry via nuclear technology value chain**

**4**

**CERN has high attraction for the younger students, physics teachers – visits and national events / exhibitions**





# Time plan



**2023 1st half**

Minister's visit to CERN ✓

Application for Associate Member State in the pre-stage to Membership

**2023 2nd half**

CERN visit to Latvia, to access compliance with pre-stage

CERN invitation to Latvia

**2024 1st half**

Cabinet of Ministers decision about application

CERN decision

**2024 2nd half**

- Signature of pre-stage Agreement
- Saeima ratifies law on Agreement
- Latvia becomes Member State in the pre-stage to Membership of CERN

**2027 -**

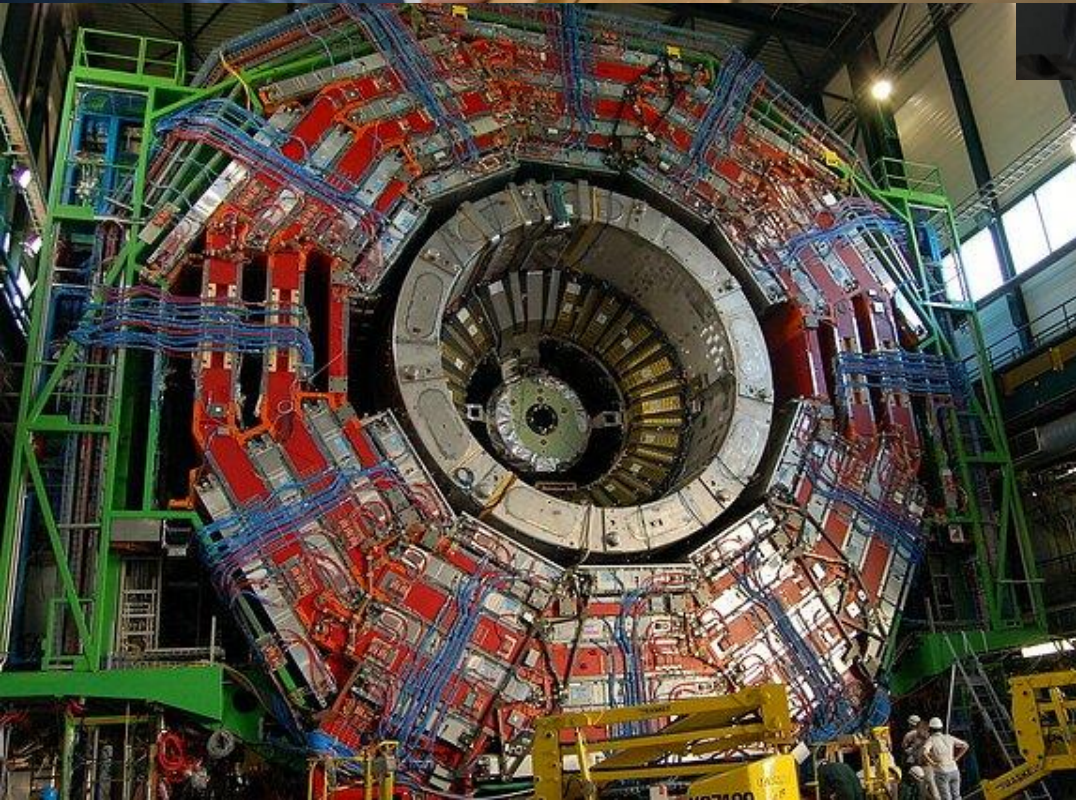
Latvia becomes Member State of CERN

# Roadmap evolving

- Visit of the Minister of Education and Science at CERN on April 28th, 2023











# Thank You!



Latvia National Contact Point of CERN

# **LATVIA – CERN STATE-OF-PLAY**

12th CERN Baltic Group General Meeting, Kaunas, 4-5 May 2023



# Latvia - CERN strategy

Government approved – consensus based - stakeholders and ministries

Overarching goals:

- 1. Meaningful and coordinated** participation of Latvia at CERN in the **Associate Member** state status
- 2. To become Full Member** state within **2-3 years**



## **Benefit from the opportunities at CERN**

- in the best possible way and  
at all levels**





# Scientific/research portfolio

Based on the bottom-up initiatives / balance & diversity / strategic approach

## **CERN based experiments and collaborations**

- **CMS** as a **HEP flagship** project (RTU+LU)
- **MEDICIS** (RTU+LU)
- AEGIS (LU)
- ISOLDE/LIEBE (LU)
- Crystal Clear Collaboration (LU)

## **Development of new projects and technologies at CERN**

- Accelerator & Technology Sector /ATS-DO
- Engineering and Technology Departments
- FCC

## **EU funded projects CERN coordinated/associated**

### **Riga Technical University (RTU)**

- I.FAST
- HITRIplus
- HERTIS
- NIMMS

### **University of Latvia (UL)**

- PRISMAP
- QuantHEP

+ Muon Collider Collaboration



# Latvia @ CERN

Personal based long term @CERN: USER, COAS, PJAS, DOCT, FELL, STAF  
- snapshot at 01/05/2023

## **CMS-Latvia HEP group** *Users (rec. COLA) 100% at CERN*

1. Senior researcher PhD in HEP – CMS Team leader
2. Senior researcher PhD in HEP – Top physics analysis group
3. PhD student – Top physics
4. PhD student – Higgs physics analysis group

## **Latvia Accelerator Technology group** *PJAS and COAS 100% at CERN*

5. Senior researcher – COAS / ATS-DO
6. Senior researcher – PJAS / ATS-DO
7. PhD Student AT – DOCT / ATS-DO; I.FAST+CMS
8. PhD Student AT – DOCT /ATS-DO; MME/HITRI+
9. PhD Student AT – DOCT / ATS-DO; I.FAST
10. PhD Student AT – DOCT / ATS-DO; NIMMS

+ numerous short (2-3 months) term stays @CERN  
paid from the Latvian budget

# Latvia @ CERN

Personal based long term @CERN: USER, COAS, PJAS, DOCT, FELL, STAF  
- snapshot at 01/05/2023

## **The Antiproton Decelerator** *100% at CERN*

11. PhD Student (UL) – atomic physics – AEGIS experiment

## **MEDICIS**

12. PhD Student (UL) – Physical Chemistry – MEDICIS experiment

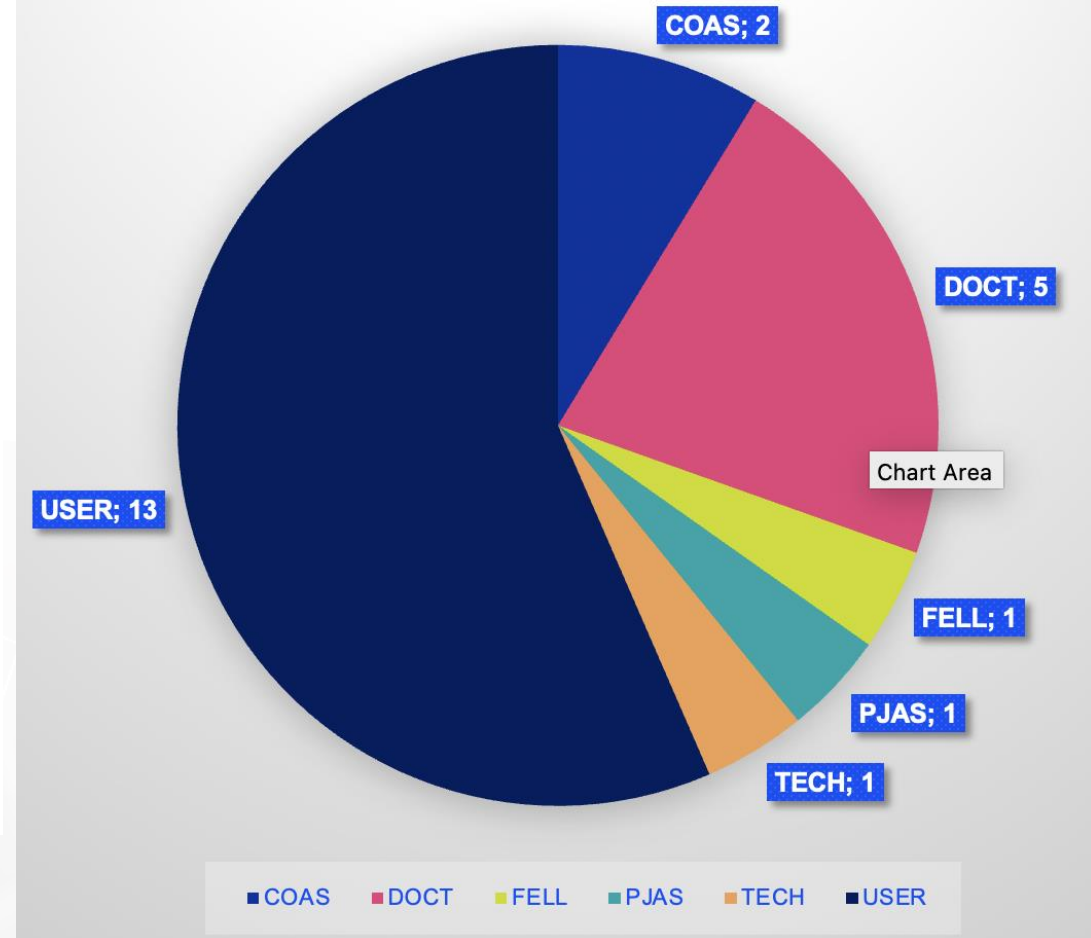
## **Not directly linked with Latvian scientific community**

13. CERN Fellow - EP-DT-EO / CERN cryogenics group

14. CERN Staff – HR / CERN

+ numerous short (2-3 months) term stays @CERN paid from the Latvian budget

**Overview of Members of Personnel: 23**



At 01.09.2022



**To continue capacity and competency building in HEP and AT**

**To maintain strong CERN related scientific institute with multidisciplinary research team and presence at CERN**



# CERN research in Latvia

Other institutes carrying out CERN related research and projects

## University of Latvia

1. Institute of Chemical Physics – Prof. Elina Pajuste group - **CMS** and **MEDICIS**
2. Faculty of Physics, Mathematics and Optometry - Prof. Mārcis Auziņš group – **AEgIS**
3. Faculty of Medicine – Prof. Maija Radziņa group – **MEDICIS/PRISMAP**
4. Institute of the Solid State Physics – Dr. Anatoli Popov group- **Crystal Clear Collaboration**
5. Institute of Physics – Dr. Kalvis Kravalis group – **ISOLDE / LIEBE**
6. Quantum Computing group of Prof. Andris Ambainis - **QuantHEP**

## Riga Technical University

1. Department of artificial intelligence and systems engineering - Prof. Agris Nikitenko group – **I.FAST** + Mechatronics, **Robotics** and Operations section **at CERN**
2. Institute of technical Physics – Prof. Arturs Medvids group – **I.FAST**
3. Institute of Industrial Electronics and Electrical Engineering – Prof. Pēteris Apse-Apsītis group - **ARIES**
4. Students of Institute of Mechanics and Mechanical Engineering - **I.FAST** and **HITRIplus**
5. High Performance Computing (HPC) Centre – **Tier2** project at **CMS**



# Outreach activities in Latvia

Integral part of the Latvia – CERN strategy / boosting interest in STEM

## **Latvian National Library**

- permanent CERN exposition and classroom for children and general public – CERN as a centre of excellence for technology and innovation

## **Latvian Physics Teachers Association**

- Participation in events, lectures of Latvian scientists @CERN and CERN staff / selection of teachers for the CERN visits

## **School of the Young Physicists of Latvia**

- Virtual and in-person lectures + events

## **Job shadowing at CERN**

- Every year 4-5 school children come to CERN to shadow Latvian scientists and engineers with preparatory and post-events in Latvia  
**+ many other** events and activities



# Latvia - CERN Stakeholders Group

Encompassing all relevant stakeholders - platform for engagement and exchange

<https://indico.cern.ch/category/11669/>

- 11 **regular meetings** since Nov 2019
- Organised by CERN **National Contact point**
- All **relevant** research institutions, business entities and associations, related ministries and agencies, CERN Council Delegates and ILO
- **Informing** the stakeholders about the relevant CERN-based and CERN-related activities
- Directly supporting the stakeholders' **engagement** with CERN
- Managing the information **exchange** and **collaboration** vis-à-vis CERN and the stakeholders





# Thank You!