



PERSPECTIVES FROM HUNGARY SCIENCE POLICY AND FUNDING

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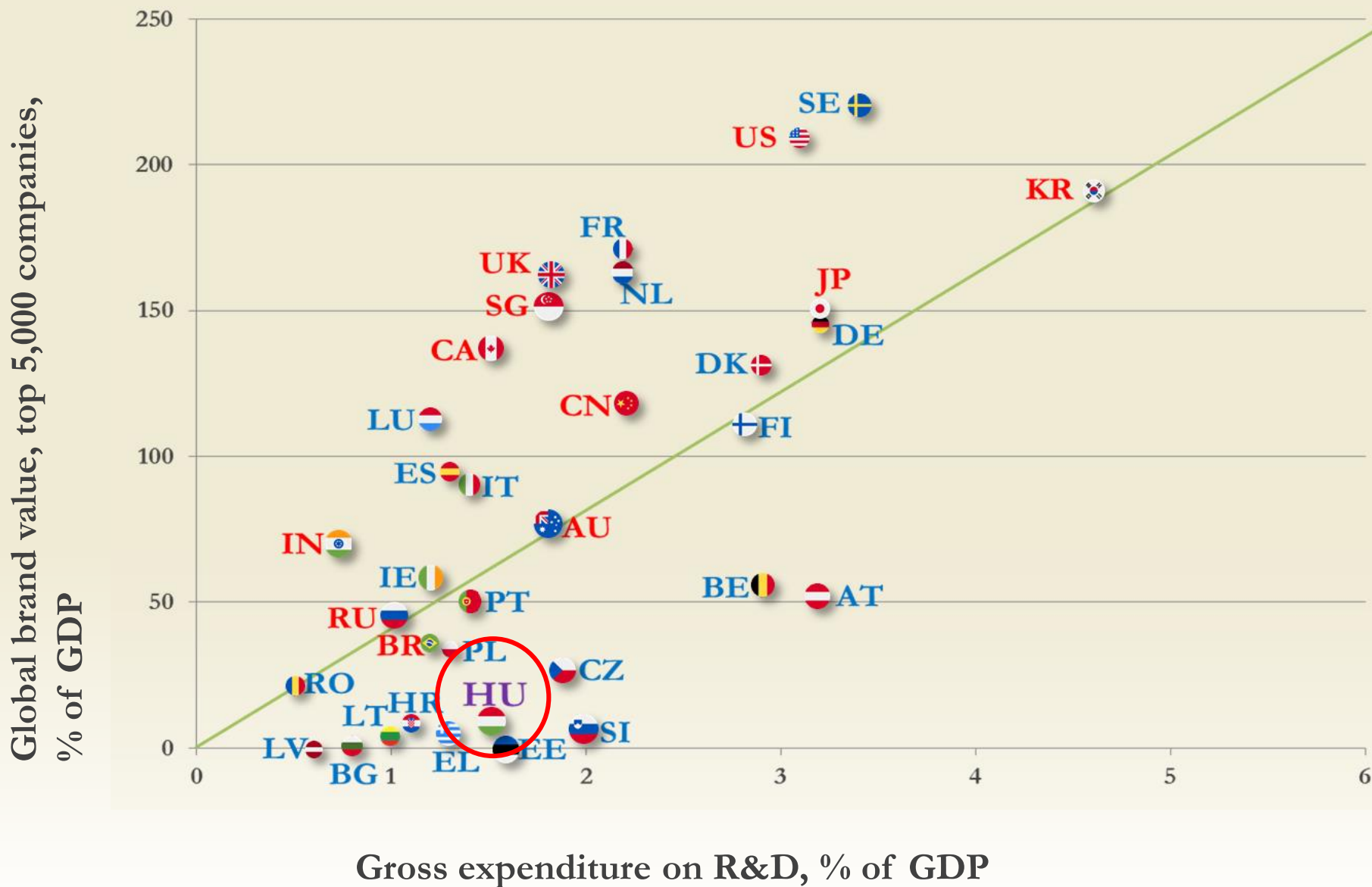


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RDI IN HUNGARY

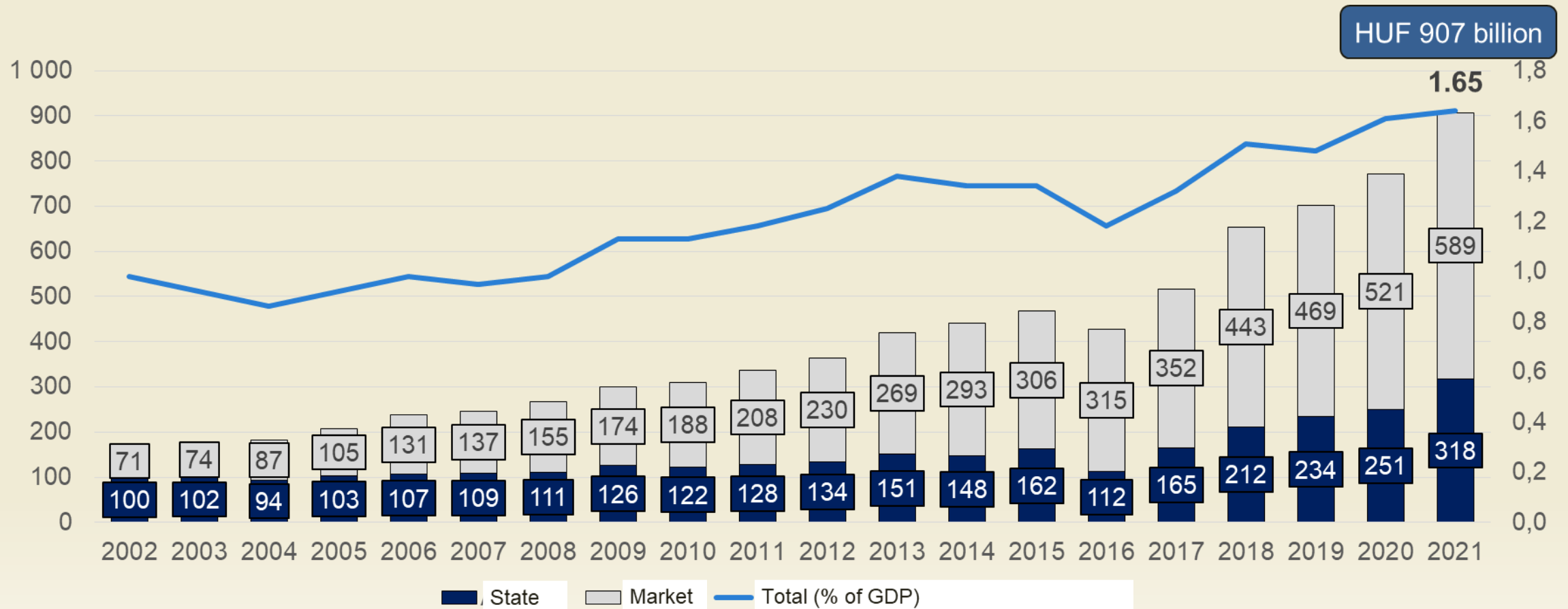
CURRENT STATE OF PLAY

THE EUROPEAN PARADOX



The main competitors of Europe are strong in innovation and have a good position in global competition, while most European countries perform better in R&D.

DEVELOPMENT OF DOMESTIC R&D EXPENDITURES (IN BILLION HUF AND IN PROPORTION TO GDP)

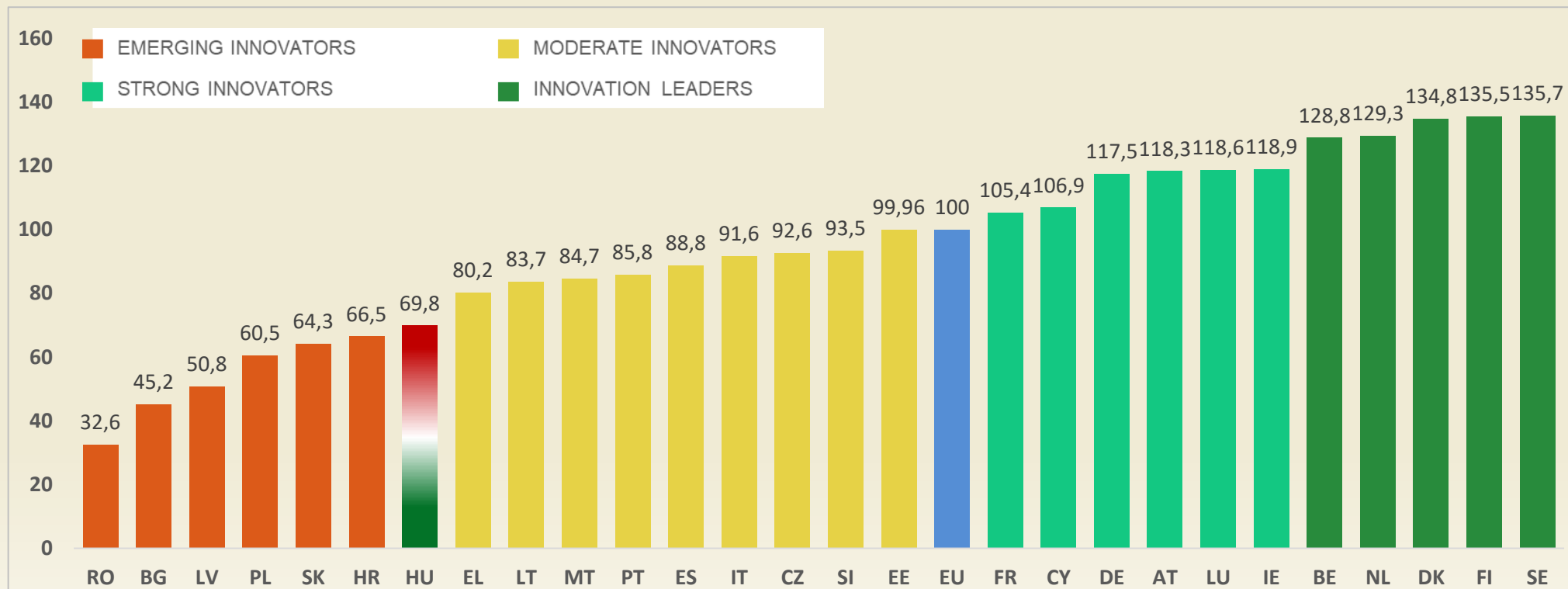


EIS: HUNGARY RANKS 21ST IN THE EU IN THE FIELD OF INNOVATION, 1ST AMONG EMERGING INNOVATORS



Innovation ranking of European countries based on EIS2022

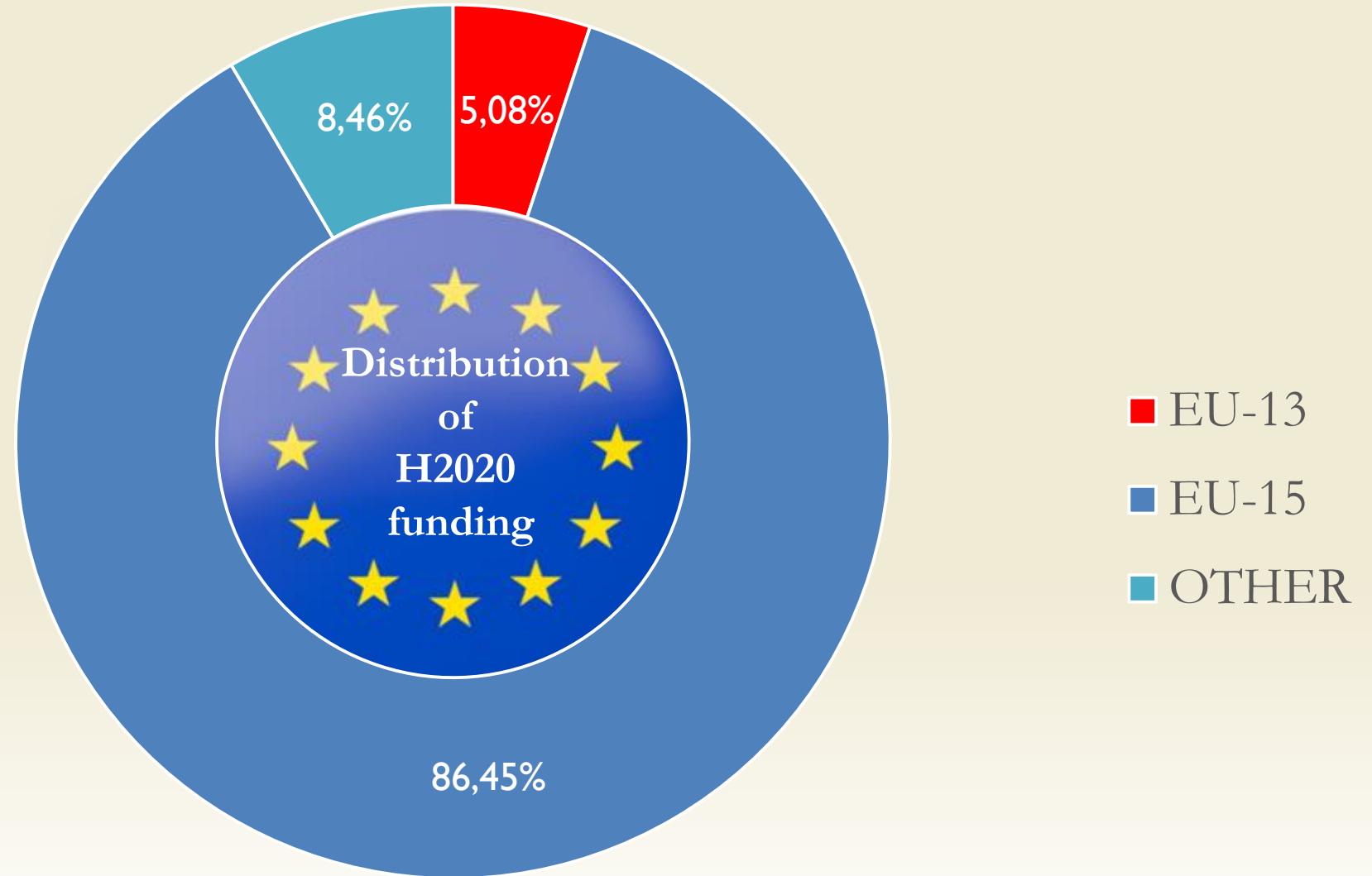
As a percentage of the 2022 EU average

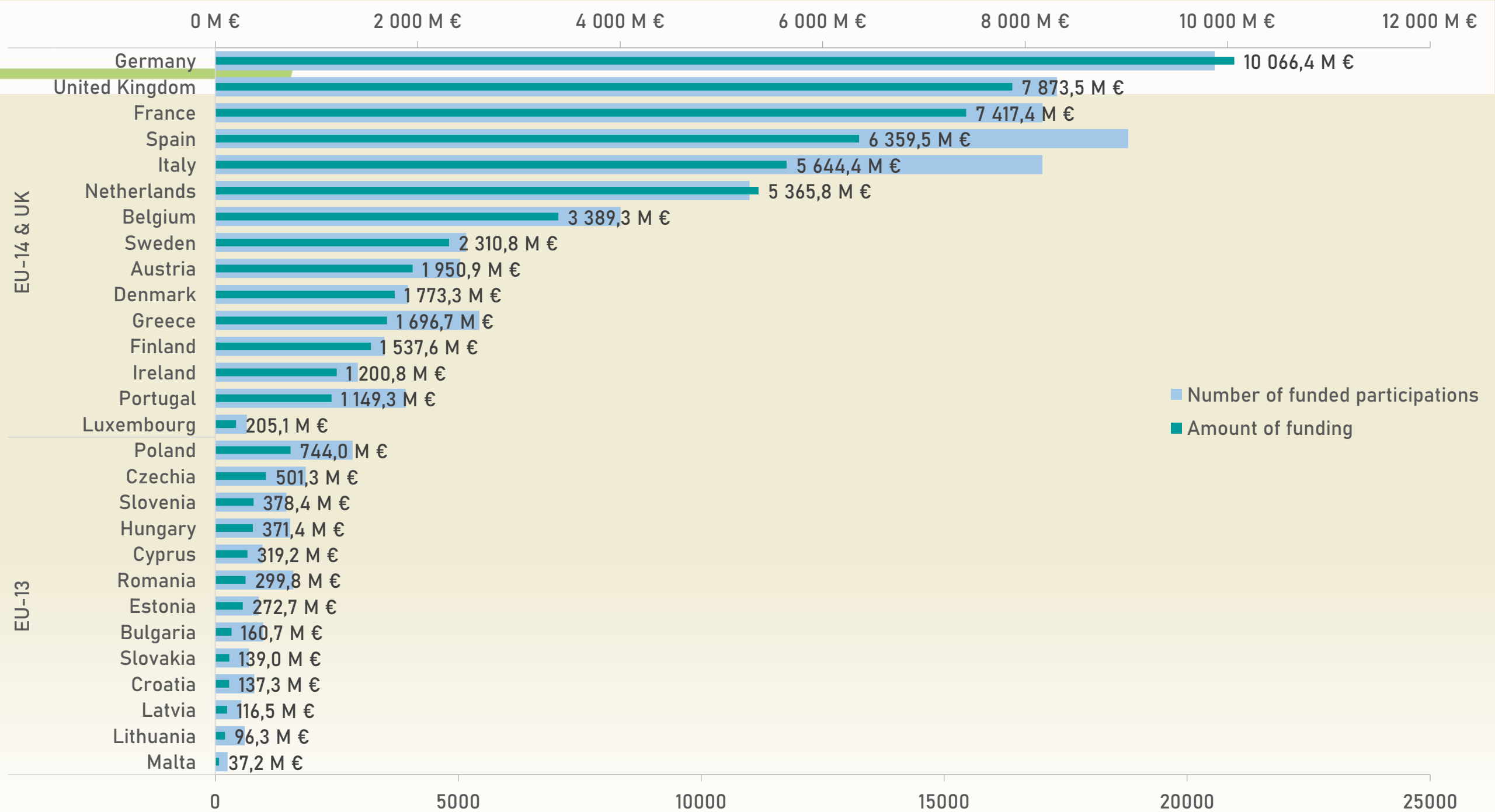


On the European Innovation Scoreboard for 2022, Hungary is at the 21st place, leading the group of „emerging innovators“. Hungary's innovation performance is 69.8% of the EU average in 2022.

PERFORMANCE GAP IN HORIZON 2020

Performance gap
between EU15
and EU13
countries in
Horizon 2020







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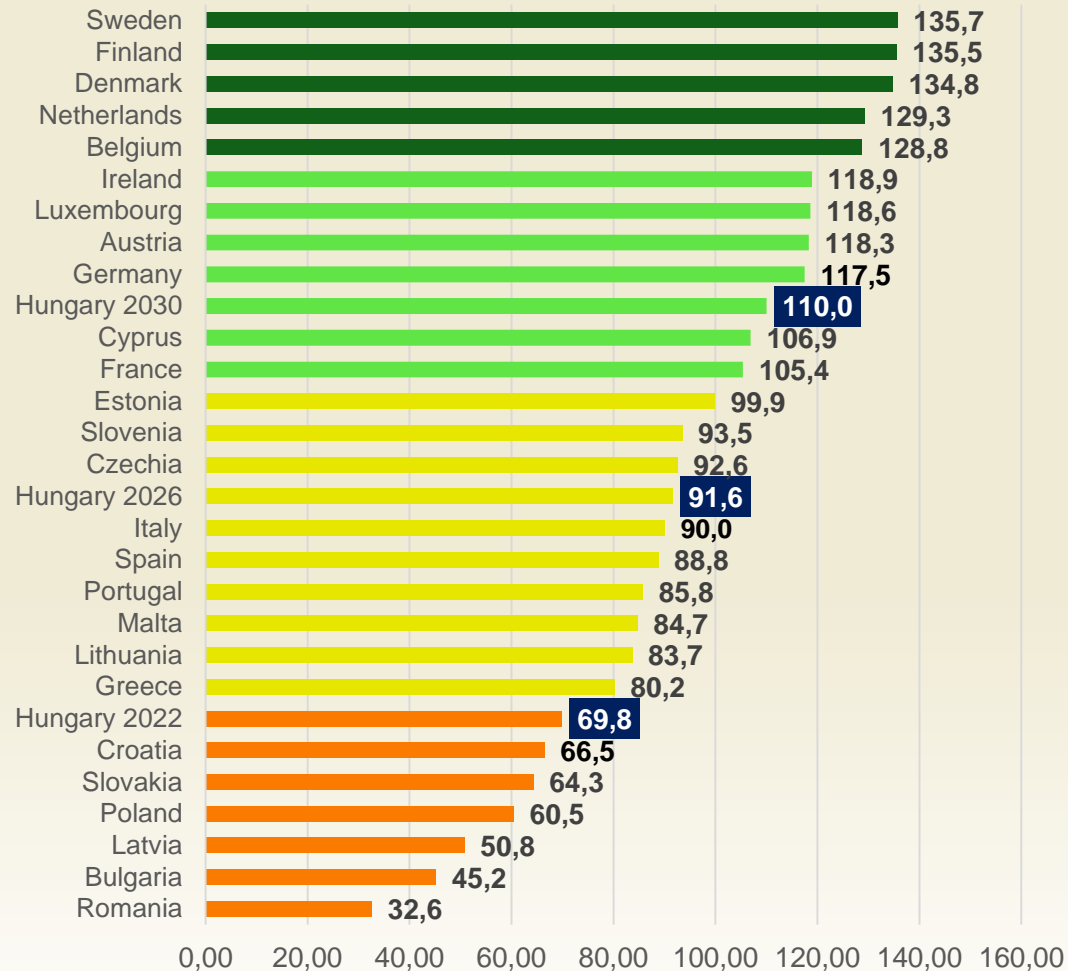
RDI PROGRAMME FRAMEWORK IN HUNGARY

CHALLENGES & ANSWERS

VISION: HUNGARY AMONG EUROPE'S TOP 10 INNOVATORS BY 2030

Aggregate innovation index, 2022

European Innovation Scoreboard, as a percentage of the 2022 EU average



What is needed?

Strategic target indicators until 2030

- 1 Knowledge production: R&D**
 employment per million people in research and development places will be among the highest in the EU (reaching 9,000)
- 2 Knowledge flow:** Tripling the number of RDI collaborations between companies and research institutes/universities
- 3 Knowledge usage:**
 - A. One in three Hungarian SMEs innovate
 - B. Unicorns are created

Source: European Innovation Scoreboard, 2022

SMART SPECIALIZATION STRATEGY 2021-2027 AND SECTORAL STRATEGIES



National Digitalization Strategy

- Digital skills development of SMEs
- Development of integration of digital technologies in the whole economy
- Development of the ICT sector as a priority

National RDI Strategy

1. Knowledge production
2. Knowledge transfer
3. Knowledge exploitation

National SME Strategy

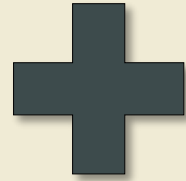
1. Strengthening the value-creating capacity of companies of high growth potential
2. Provide a predictable framework for the entire SME sector

Special Ministerial Order: NRDI Office is responsible for planning and implementation of S3

S3 PRIORITIES



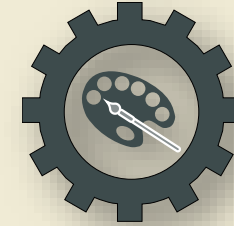
**Agriculture,
food industry**



Health



Digital economy



Creative industry



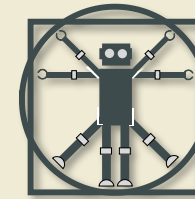
**Resource-efficient
economy**



Energy, climate



Services



Cutting-edge technologies



**Public sector and
university innovation**



Training, education

SYSTEM OF RDI PROGRAMMES OF NRDIO



International and domestic research
and technological infrastructures

Researchers



New National Excellence Programme

Basic research („OTKA”)

Forefront Research Excellence Programme

National Conference of Student Research

Cooperative Doctoral Programme

Businesses



Calls for business enterprises (NRDI Fund and operational programmes)

Horizon Europe

International calls

HEIs and Research institutions



Science Parks

National Laboratories

Competence Centres









University Innovation Ecosystem

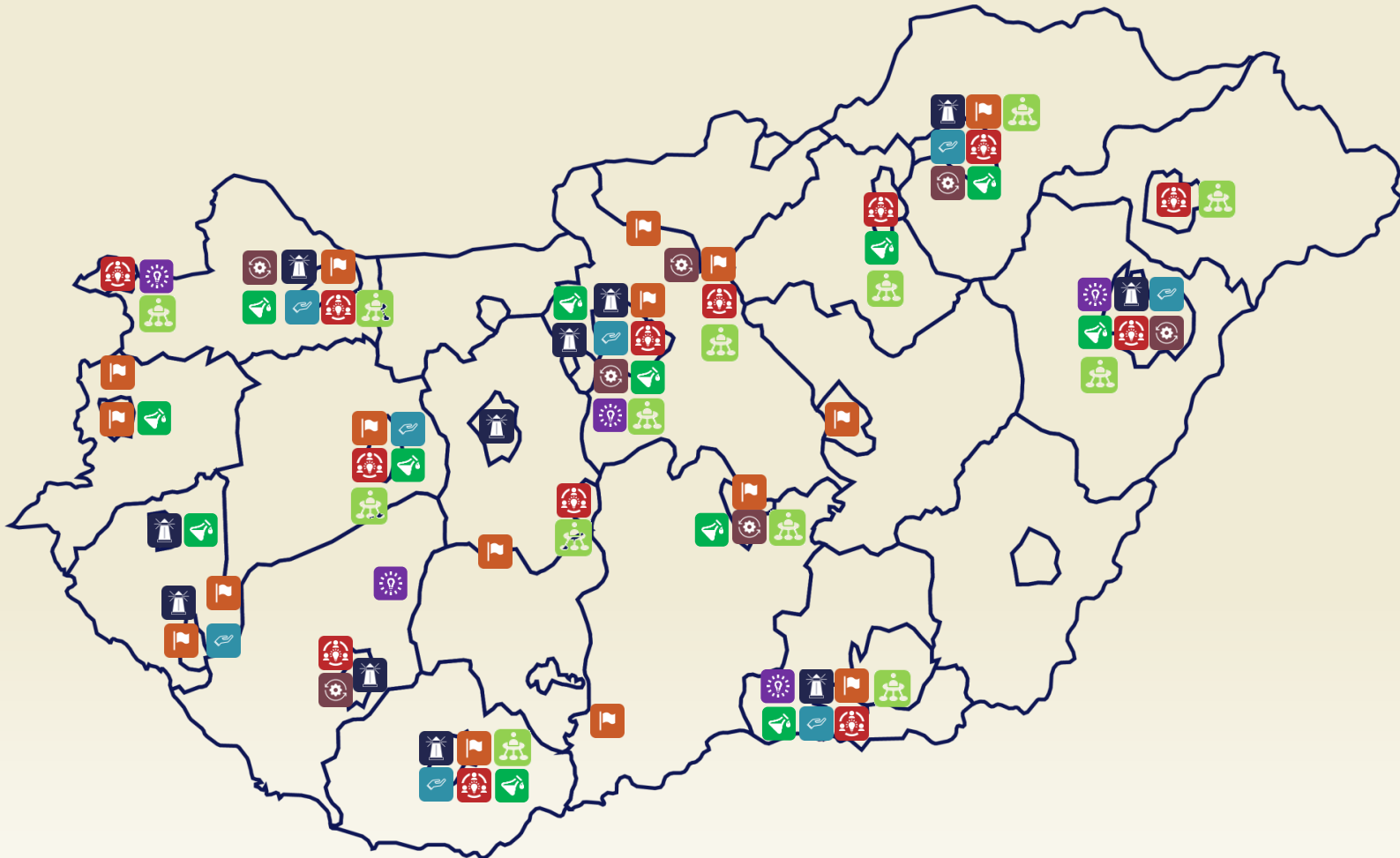
Thematic Excellence Programme

International Excellence

WE ORGANIZE THE INNOVATION ECOSYSTEM AROUND OUR UNIVERSITIES



-  University Innovation Ecosystem
-  National Laboratory
-  Higher Education Industry Cooperation Center (FIEK)
-  Competence Center (new FIEK)
-  Territorial Innovation Platform
-  Science Park
-
-  Bay Zoltán Nonprofit Kft.
-  Eötvös Loránd Research Network



• 2023 – Ministry of Culture and Innovation



NATIONAL LABORATORIES



NATIONAL RESEARCH, DEVELOPMENT
AND INNOVATION OFFICE
HUNGARY

BUDAPEST


National Laboratory of
Tumor Biology

HCEMM NL

National Laboratory of
Agricultural Technology

Molecular
Fingerprinting NL


Autonomous systems
NL

Artificial Intelligence
NL

Quantum Information
NL


Secure Technologies
NL

*National Laboratory for
Nanoplasmonic Laser
Fusion*

National Laboratory for
Info-communication
and Information
Technology


Social Innovation NL

National Laboratory for
Digital Heritage

VESZPRÉM


Multidisciplinary Laboratory for Climate Change

SZEGED


National Laboratory
for Laser-based
Transmutation


ELI NL


National Laboratory for
Biotechnology

PÉCS


National Laboratory
for Virology

National Laboratory
of Human
Reproduction



Secure society and
environment



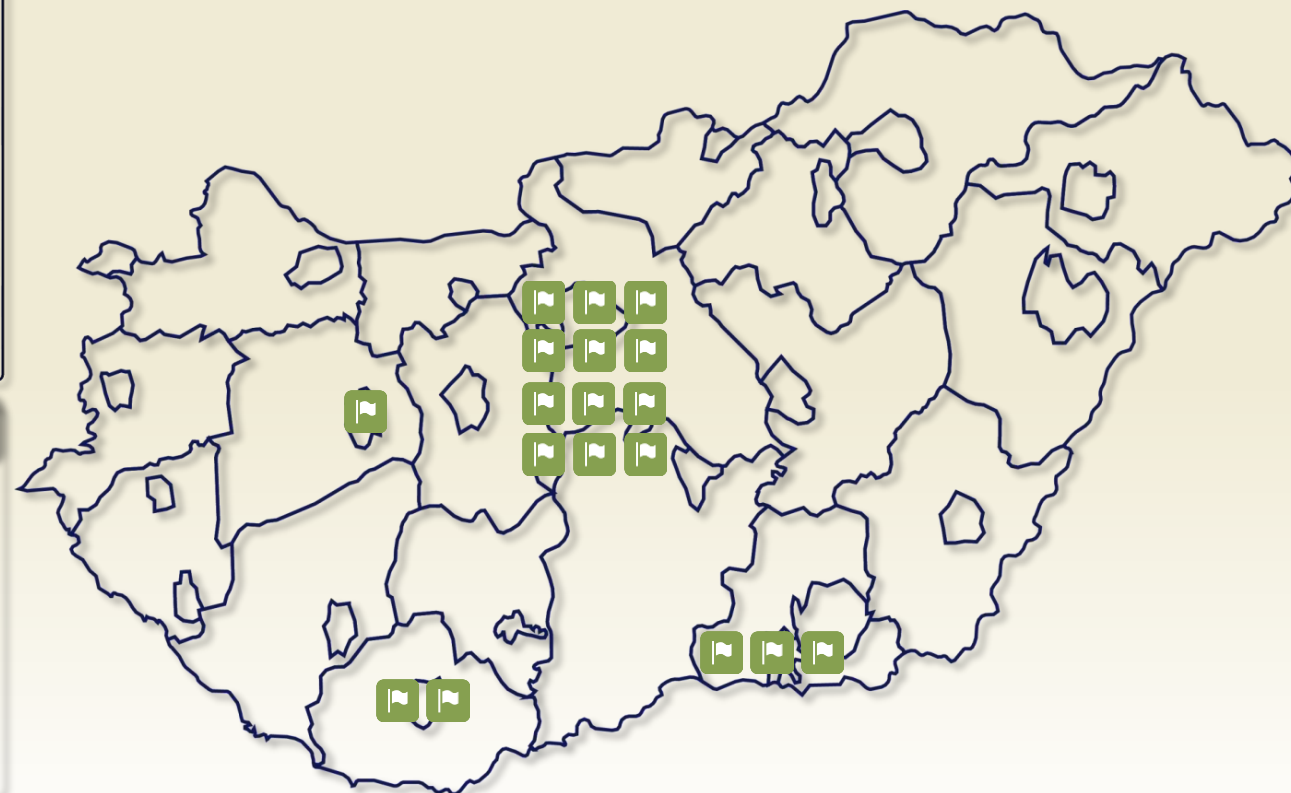
Industry and
digitization



Culture and family



Health





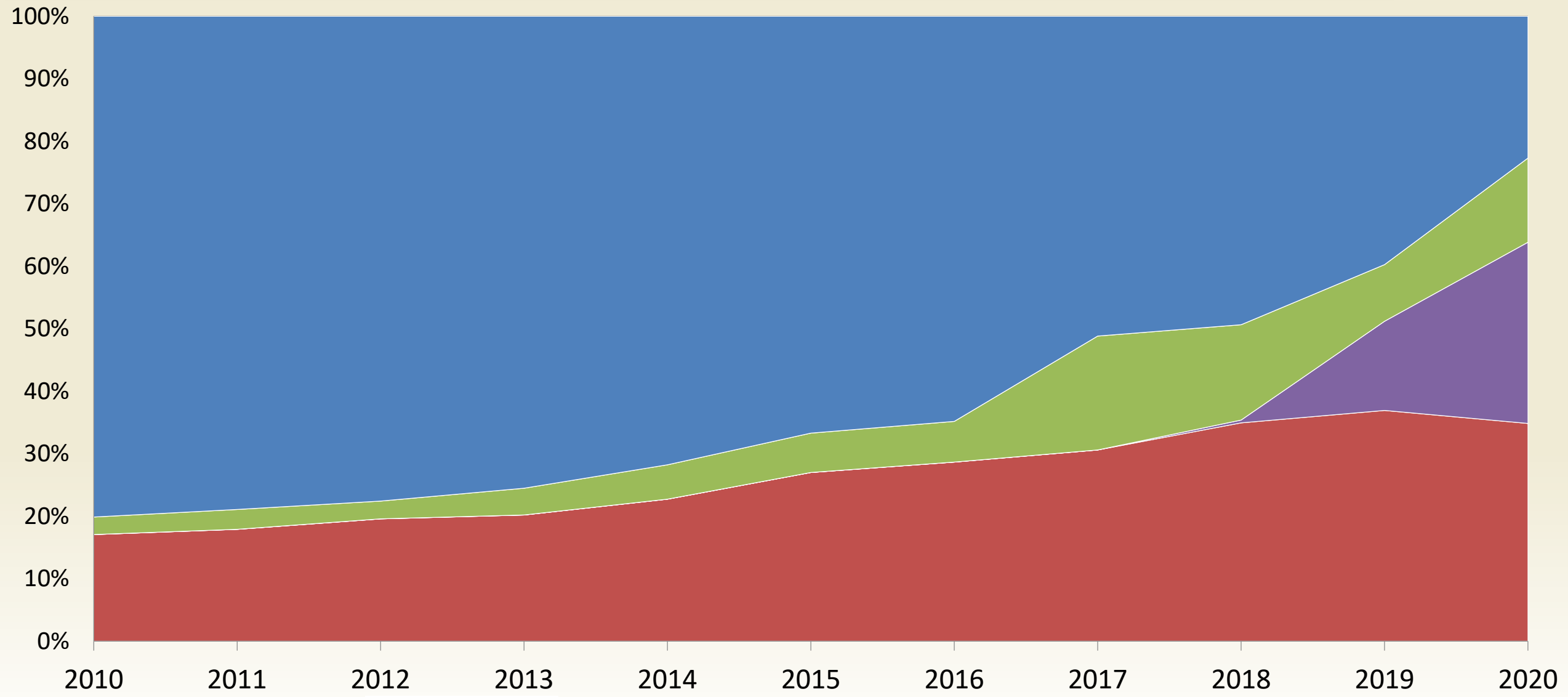
3 OPEN SCIENCE IN NATIONAL CONTEXT

NRDIO GOALS, ACTIVITIES & PRACTICES

DISTRIBUTION OF HUNGARIAN SCIENTIFIC OUTPUT 2010-2020



NATIONAL RESEARCH, DEVELOPMENT
AND INNOVATION OFFICE
HUNGARY



OA (HYBRID AND GOLD) Electronic Information Service OA - GREEN CLOSED

- Establishment of a National Open Science Advisory Board
- Formulation of a national resolution ("Open Science White Paper")
- Join the EOSC Association
- Enforcement of Open Science principles in research and innovation applications

The statement has been published with the aim of expressing a **common position** on Open Science, based on **professional consensus**, summarizes the **principles and the fields of activity** of Open Science that best **serve the interests and development of Hungarian science**.

The statement reflects on the key pillars of the Open Science ecosystem

- open access to research outputs;
- FAIR and CARE research data management;
- research integrity;
- next generation metrics in research assessment;
- new types of rewards and initiatives;
- international cooperation networks;
- Citizen Science;
- education and skills.

Funding organizations

Association of Hungarian PhD and DLA Candidates (DOSZ)

College of University Library Directors (EKK)

Eötvös Loránd Research Network (ELKH)

Ministry for Innovation and Technology (ITM)

Governmental Agency for IT Development (KIFÜ)

Hungarian Accreditation Committee (MAB)

Hungarian Rectors' Conference (MRK)

Library and Information Centre of the Hungarian Academy of Sciences (MTA KIK)

Hungarian Doctoral Council (ODT)

National Scientific Student Council (OTDT)

NRDI Office has incorporated several measures in relation to Open Science into the RDI funding system:

Science Patronage Programme

- **Budget:** 1 billion HUF from the NRDI Fund
- **Aim:** promoting the internationalisation of the Hungarian scientific research community and supporting the **development of open science practices in Hungary.**
- **Dedicated budget for Open Access publication**
- up to 10% of the direct project costs at the Postdoctoral and Young researchers' excellence programme Call for thematic research projects (OTKA).

Hungary takes part in the EOSC (European Open Science Cloud) activities (representation in the EOSC Steering Board, participation in the EOSC Association, providing data on national OS practices)

Further plans:

- The NRDI Office, as the main RDI funding organisation, will join the EOSC Association
- Collecting and reporting about national data and investments, policies, digital research outputs, open science skills and infrastructure capacities related to EOSC
- Further mainstreaming open science (OS) across national research funding programmes
- Increasing the connection of national/regional research infrastructures to the EOSC platform
- Contributing intensifying EOSC outreach and communication including through national EOSC events

- **Hungary's RDI strategy for 2021-2030** stresses the **importance of increasing the public awareness of the value of science and innovation** and highlighted that it is necessary to promote the **accessibility of scientific results and innovation methods** not only for universities, research institutes and businesses, but also **for society in general.**

DEDICATED CITIZEN SCIENCE SUPPORT MEASURE UNDER THE SCIENCE PATRONAGE PROGRAMME

The programme provides funding for

- **participation** in international scientific and innovation events and **conferences held abroad**
- **organizing** international scientific and innovation events and **conferences in Hungary** (with special regard to events related to international research infrastructure memberships)
- social promotion of the results of science and innovation, and **support of Citizen Science**
- **supporting the publication of scientific books** in paper-based and at the same time **open-access** electronic format.

648 applications

270 awarded grants

Hungary is committed to actively take part in ERA Action 14 Bring science closer to citizens under the ERA Policy Agenda and priority is given to the following activities:

Plastic Pirates Initiative

- **Hungary has joined the Plastic Pirates** citizen science initiative and participates in the “Europeanisation of the Plastic Pirates Citizen Science Campaign” action coordinated by DLR-PT and will contribute to further development of the initiative by fine tuning the citizen science approach and methodology and by organizing local sampling campaign and communication activities.

Mutual Learning Exercise

- **Hungary participates** in the Mutual Learning Exercise “Citizen Science Initiatives – Policy and Practice” launched under the PSF in 2022.
- Hungary is committed to get engaged in the **continuation of the MLE** on Citizen Science and **prepare the ground for a policy coordination mechanism** on public engagement practices and a network of exchange among responsible national organizations



FURTHER PLANS BASED ON INSTITUTIONAL LEVEL INITIATIVES

Although several citizen science activities are implemented at institutional level at Hungarian universities or research organizations but no dedicated platform or network has been established to monitor or link these initiatives.

- developing a monitoring system for the ongoing CS projects,
- a national Citizen Science network/hub will be established to create a common platform for those organizations which have already been implementing citizen science actions or express their commitment to promote public engagement in RDI



TOP RESEARCH INFRASTRUCTURES IN HUNGARY 2021



2 LARGE SCALE KEY RIS

40 EXCELLENT RI

10 EXCELLENT NEW RI CLUSTERS

5 EMERGING RIS

NATIONAL RESEARCH, DEVELOPMENT AND INNOVATION OFFICE HUNGARY

TOP RESEARCH INFRASTRUCTURES in Hungary 2021

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2 LARGE SCALE RI

ELI-ALPS EXTREME LIGHT INFRASTRUCTURE AT TOSECOND LIGHT PULSE SOURCE

DESCRIPTION OF THE RESEARCH INFRASTRUCTURE

The Extreme Light Infrastructure ELI is the first infrastructure in the world capable of the investigation of the interaction between light and matter at the highest intensities in the so-called ultra-relativistic regime. ELI is the first center large-scale high-power laser source facility fully realized with the highest cooperation and world-class scientific community, Hungary, the Czech Republic and a large group of partners, with coordinated management and research strategy, with the research program through the construction of the three laser facilities with the respective mission in the atomic, ionospheric and photonic applications. ELI-ALPS is dedicated with other research partners to establish ELI-ALPS in April 2021. Located in Győr, east of Hungary, ELI-ALPS is the advanced laser of the Extreme Light Infrastructure. A National center for the shortest, most intense laser pulses at the highest repetition rates. The combination of ground-breaking light sources and subsequent technology transfer opens a wide range of opportunities for fundamental, applied and proprietary research. ELI-ALPS offers more than just the use of a novel class of data of the laser system. The unique combination of the outstanding laser pulses with the pioneering secondary research techniques will open up new opportunities for experimental research.

ACTIVITIES AND SERVICES

ELI-ALPS, the Hungarian pillar of the Extreme Light Infrastructure, is dedicated to support fundamental and applied research in physical, biological, chemical, medical and materials science at extreme short time scales. The ground-breaking laser system together with the subsequent outstanding secondary research opens the highest possible peak power of the highest possible repetition rate in a special range from the THz through visible and near infrared to THz. The facility besides the regular scientific staff will provide accessible research laboratory for the international scientific community user groups from all around the world. The equipment of the Extreme Light Infrastructure - Attosecond Light Pulse Source ELI-ALPS research facility, as well as its operation and the related application significantly supports the opportunity to generate attosecond light pulses. The two objectives of the facility include the generation of single-pulse light pulses in a broad spectral range, their application for the investigation of the dynamics of ultrafast processes in the femto- and attosecond time regimes, as well as the application of attosecond energy laser fields for research in plasma physics (e.g. laboratory astrophysics), for laser induced particle acceleration for the high-field of the femto-petawatt range, for the investigation of light-matter interaction at extreme intensities. The generation of ultrafast electron pulses enables the development of the attosecond electron microscope and that of related technologies and techniques to measure time intervals to be established using digital signal processing.

PERSONS IN CHARGE
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RESEARCH FIELDS AND APPLICATIONS
ELI-ALPS has a wide range of opportunities for basic and applied research and will be used also for generating high-intensity attosecond, femto- and petawatt laser pulses.
The main research fields and applications are ELI-ALPS:
→ The development and an application of attosecond light sources
→ High-power femto-petawatt and high-intensity laser applications
→ Energy research from ultra-cold to ultra-hot phenomena
→ High-power plasma physics

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THANK YOU FOR YOUR ATTENTION!