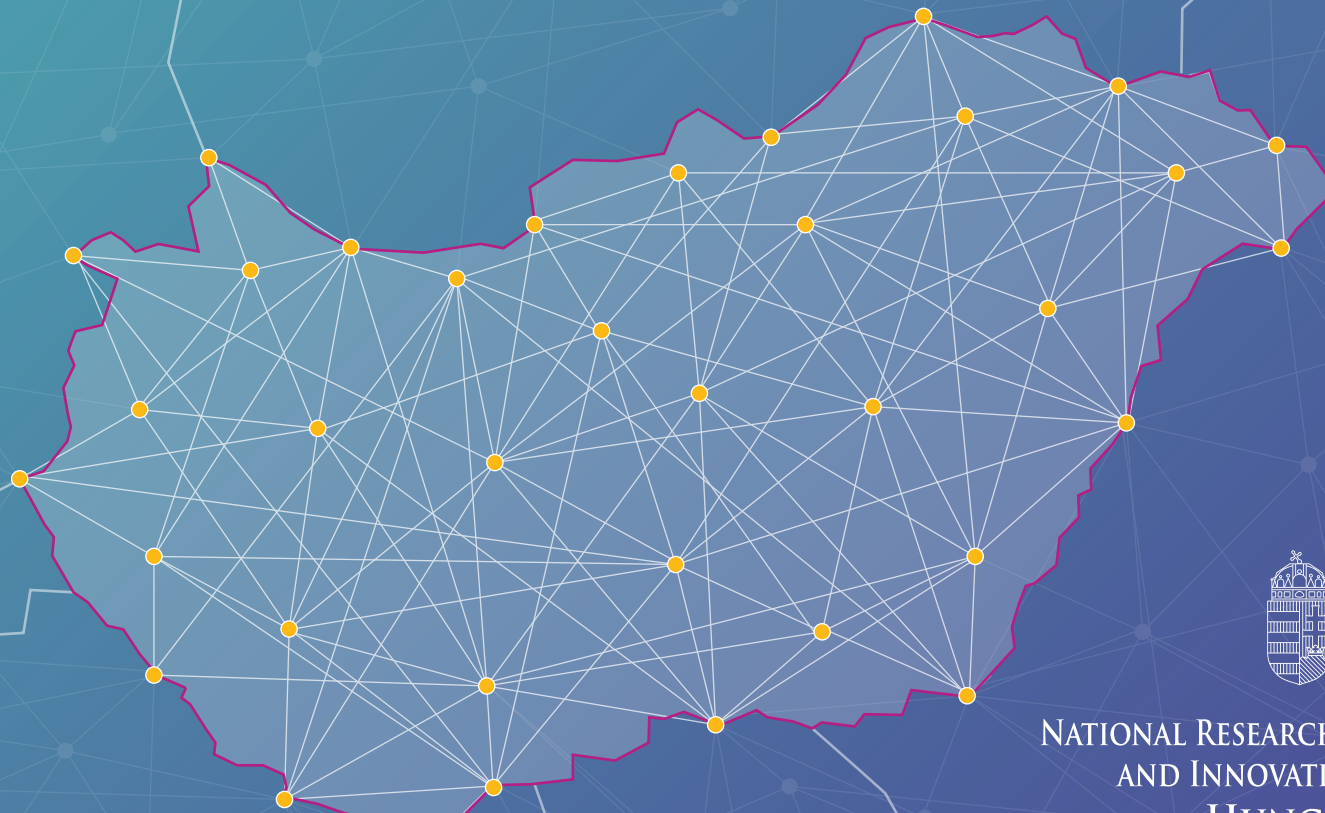


RESEARCH, DEVELOPMENT AND INNOVATION IN HUNGARY



NATIONAL RESEARCH, DEVELOPMENT
AND INNOVATION OFFICE
HUNGARY

FIVE CHARACTERISTICS OF R&D



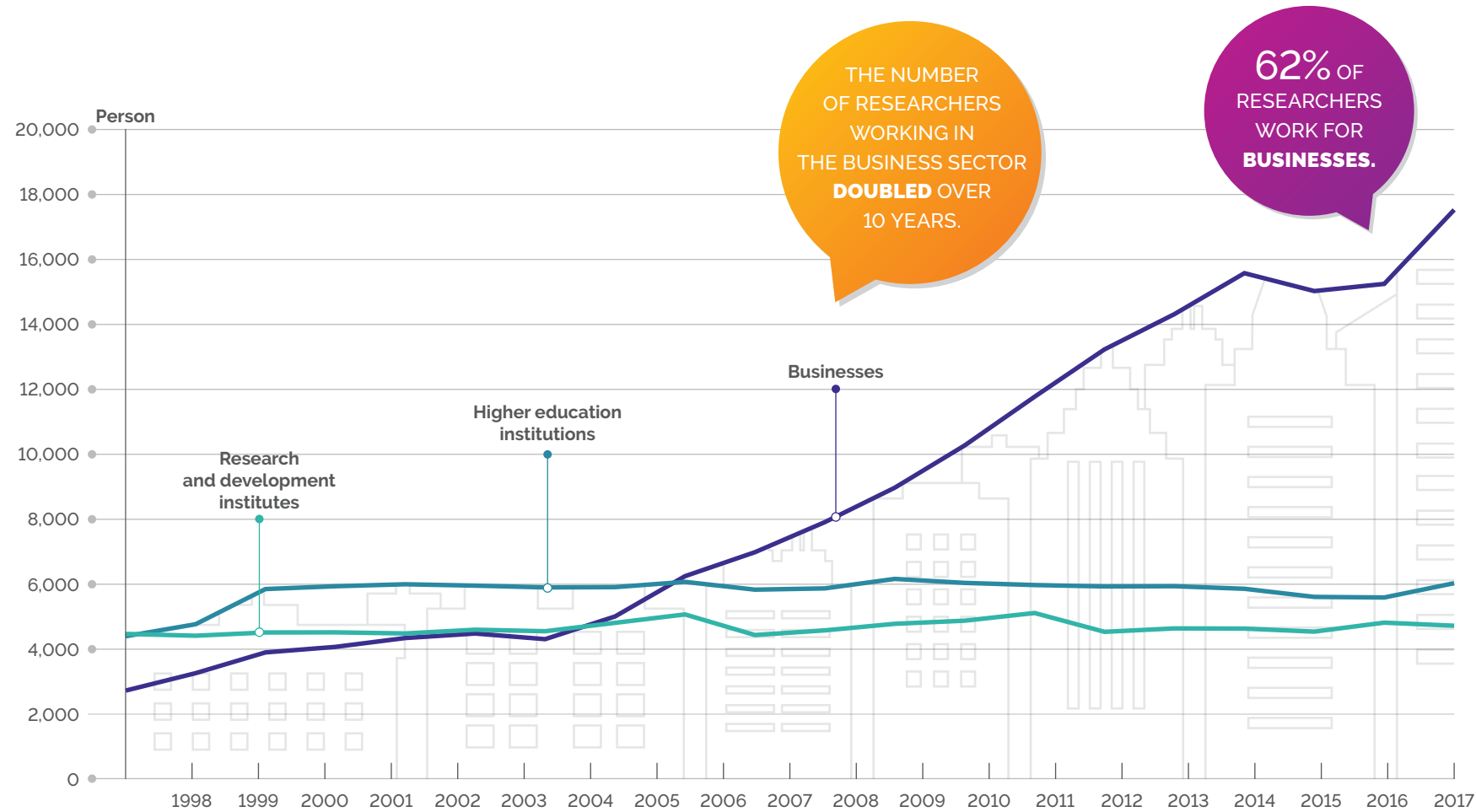
NATIONAL RESEARCH, DEVELOPMENT AND INNOVATION OFFICE
HUNGARY

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Year of publication: 2019

SECTORS OF RESEARCH AND DEVELOPMENT

Researchers* by sectors 1998–2017



THE NUMBER OF RESEARCHERS WORKING IN THE BUSINESS SECTOR **DOUBLED** OVER 10 YEARS.

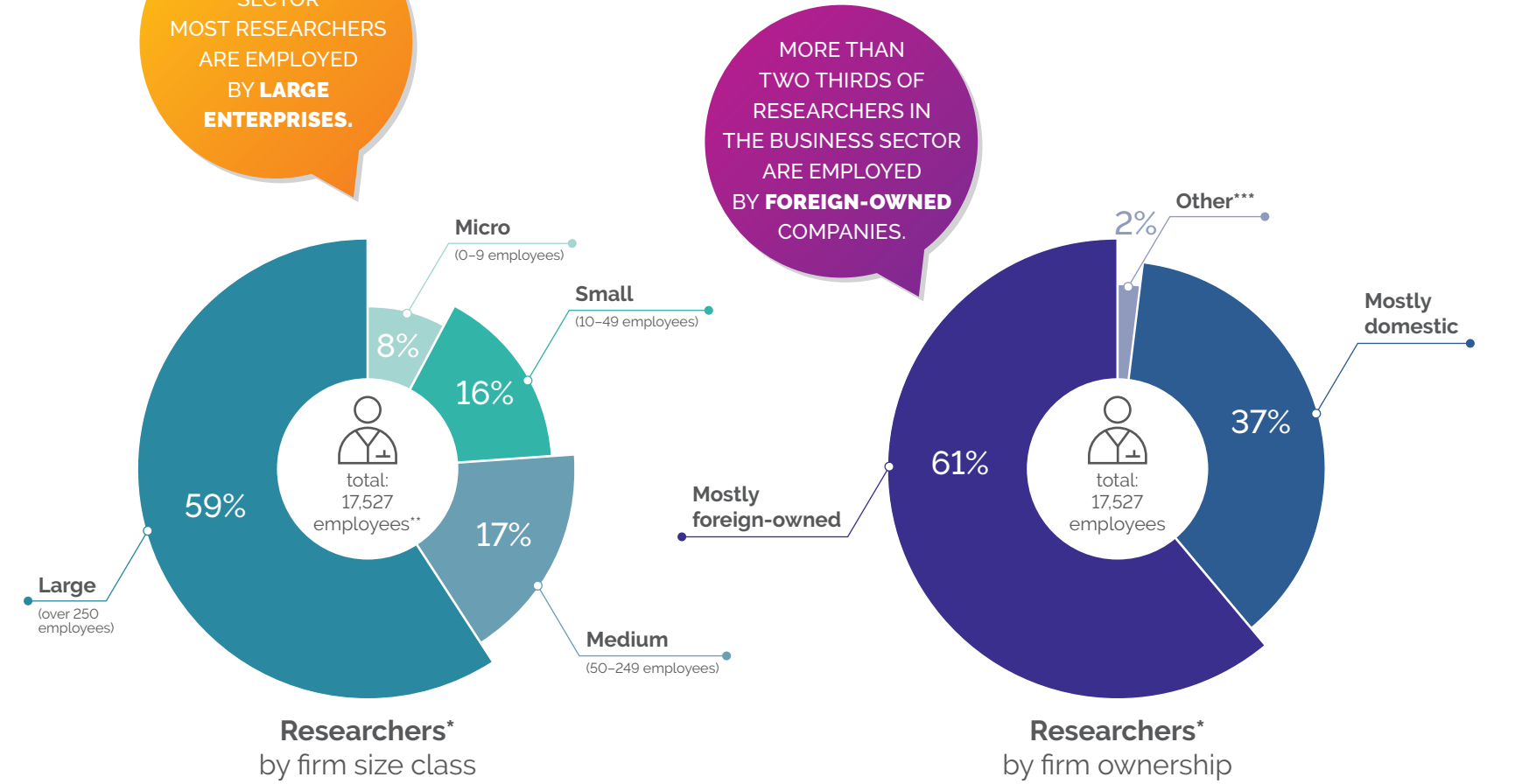
62% OF RESEARCHERS WORK FOR **BUSINESSES.**

* Full-time equivalent (FTE)

Source: Hungarian Central Statistical Office (HCSO)

R&D ACTIVITY IN THE BUSINESS SECTOR

2017



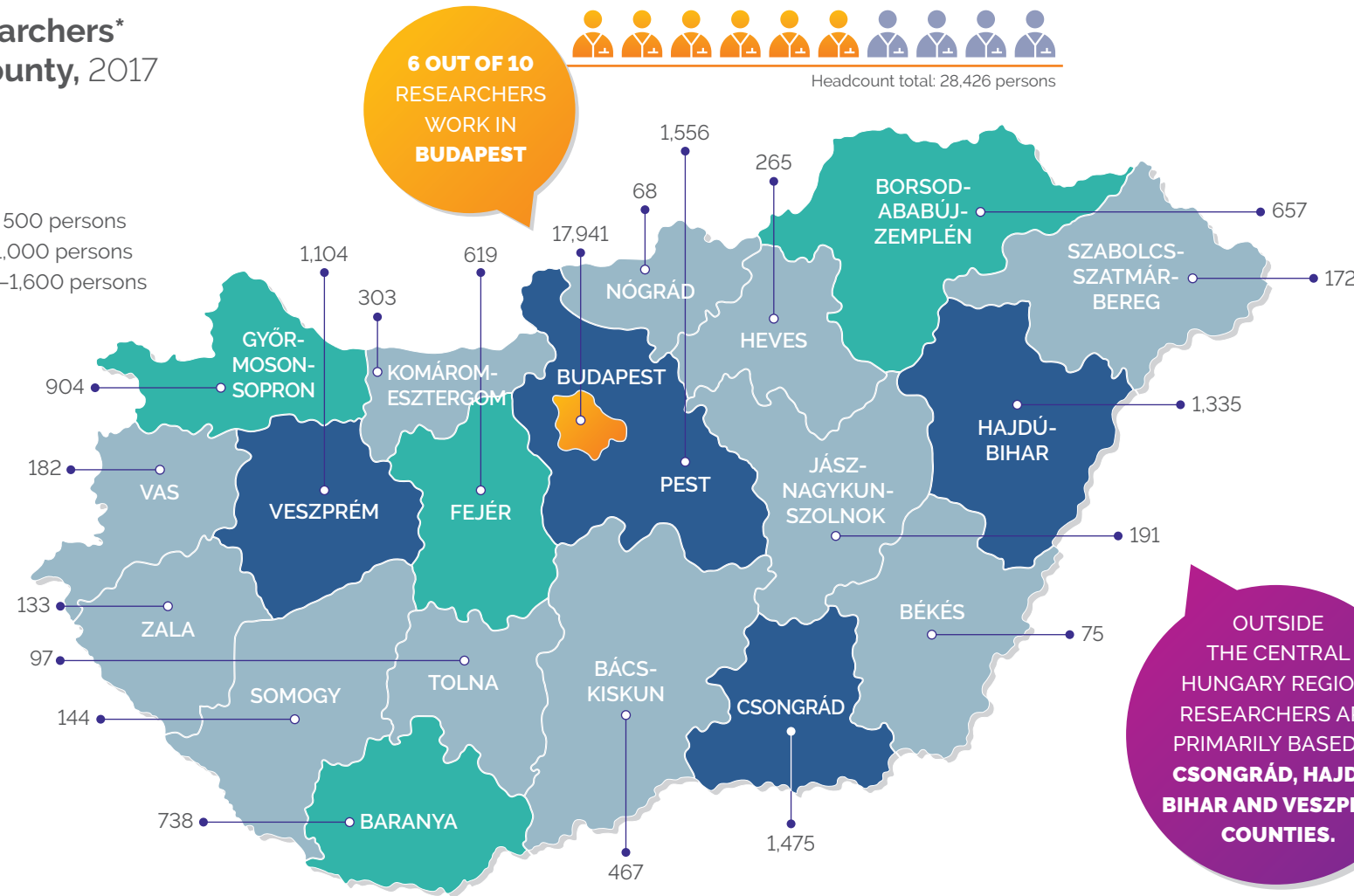
* Full-time equivalent (FTE) ** Unknown: 17 persons *** Mostly state-owned, local government owned, n.a.

Source: HCSO

REGIONAL DIFFERENCES IN R&D

Researchers*
by county, 2017

up to 500 persons
501-1,000 persons
1,001-1,600 persons



6 OUT OF 10 RESEARCHERS WORK IN BUDAPEST

Headcount total: 28,426 persons

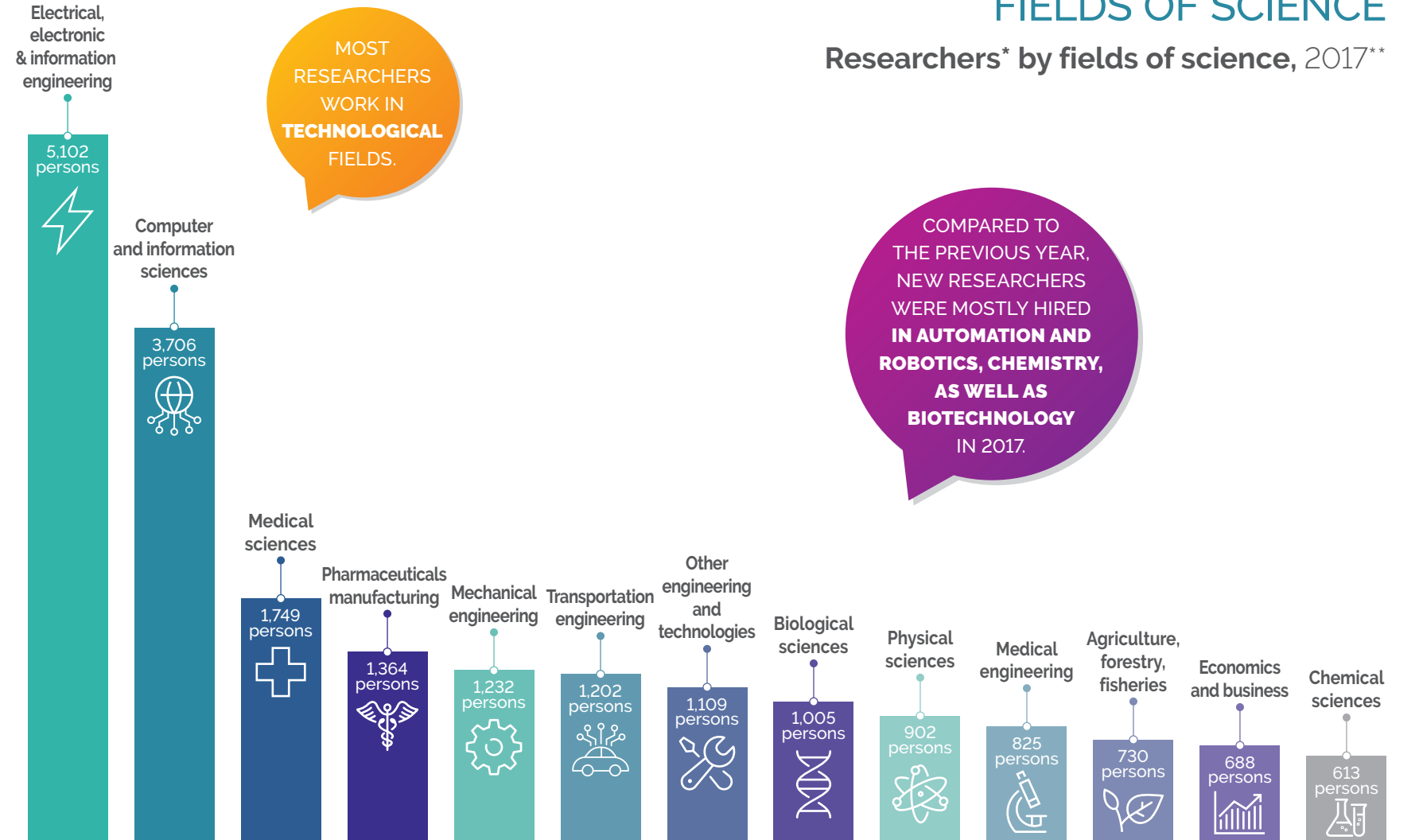
OUTSIDE THE CENTRAL HUNGARY REGION, RESEARCHERS ARE PRIMARILY BASED IN **CSONGRÁD, HAJDÚ-BIHAR AND VESZPRÉM COUNTIES.**

* Full-time equivalent (FTE)

Source: HCSO

FIELDS OF SCIENCE

Researchers* by fields of science, 2017**



MOST RESEARCHERS WORK IN **TECHNOLOGICAL FIELDS.**

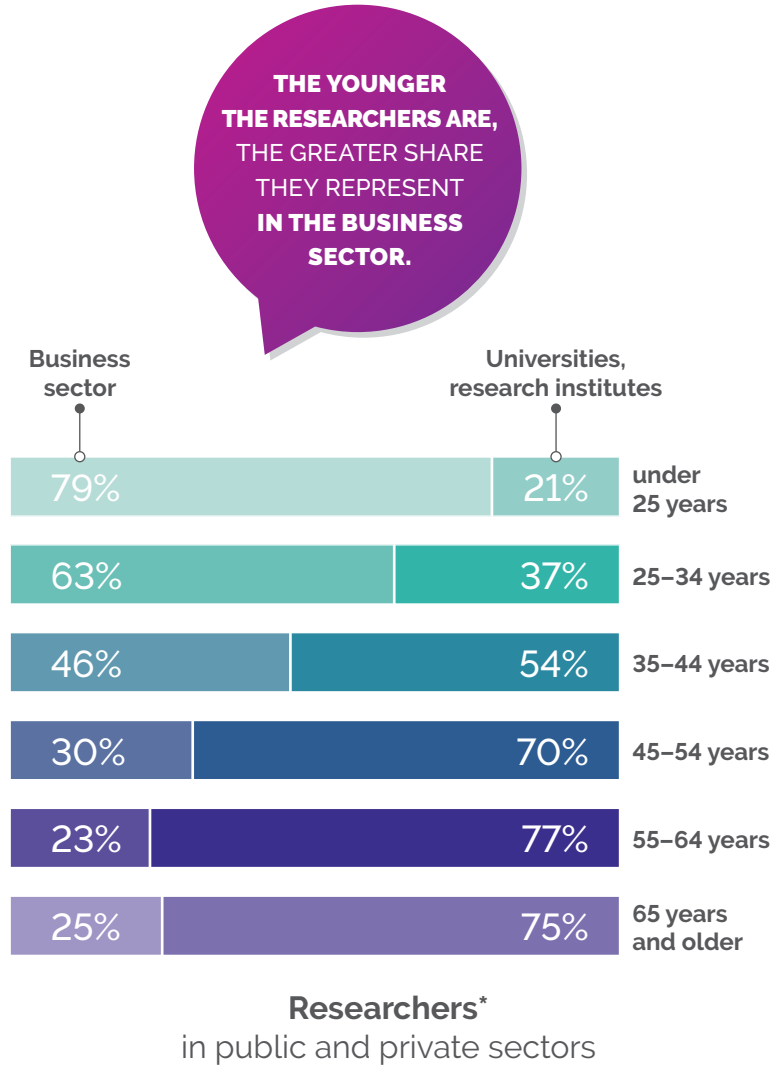
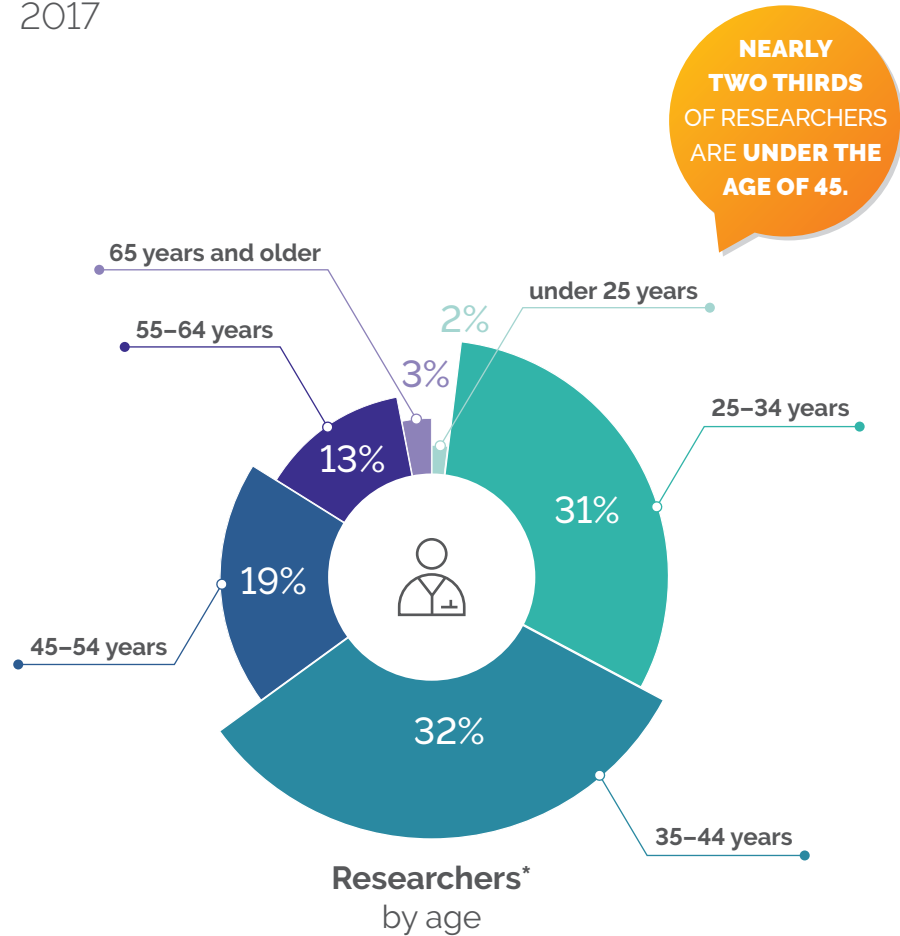
COMPARED TO THE PREVIOUS YEAR, NEW RESEARCHERS WERE MOSTLY HIRED IN **AUTOMATION AND ROBOTICS, CHEMISTRY, AS WELL AS BIOTECHNOLOGY** IN 2017.

* Full-time equivalent (FTE) ** Fields of science with at least 500 researchers

Source: HCSO

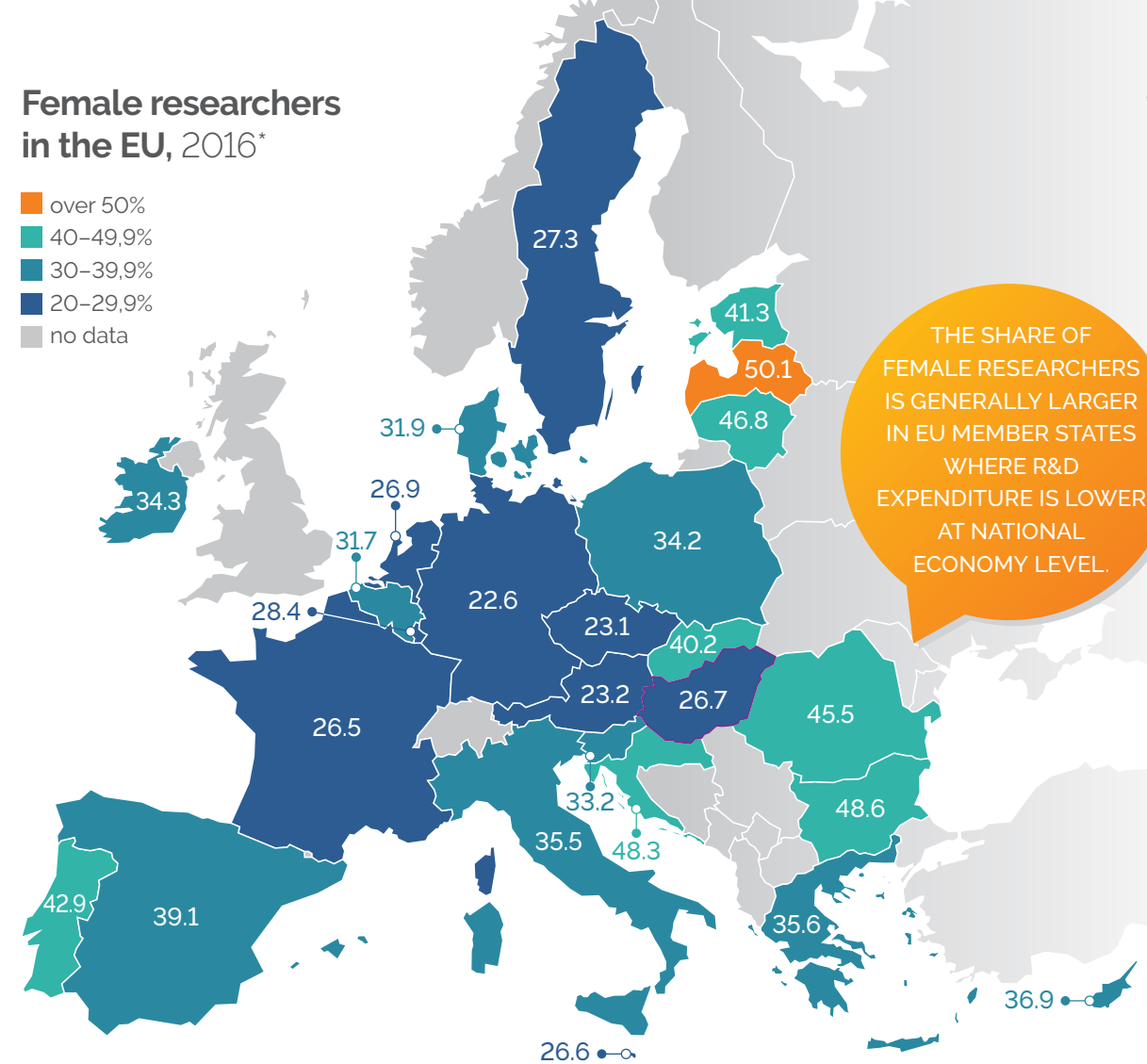
YOUNG RESEARCHERS

2017



Female researchers in the EU, 2016*

over 50%
40-49,9%
30-39,9%
20-29,9%
no data



WOMEN IN SCIENCE

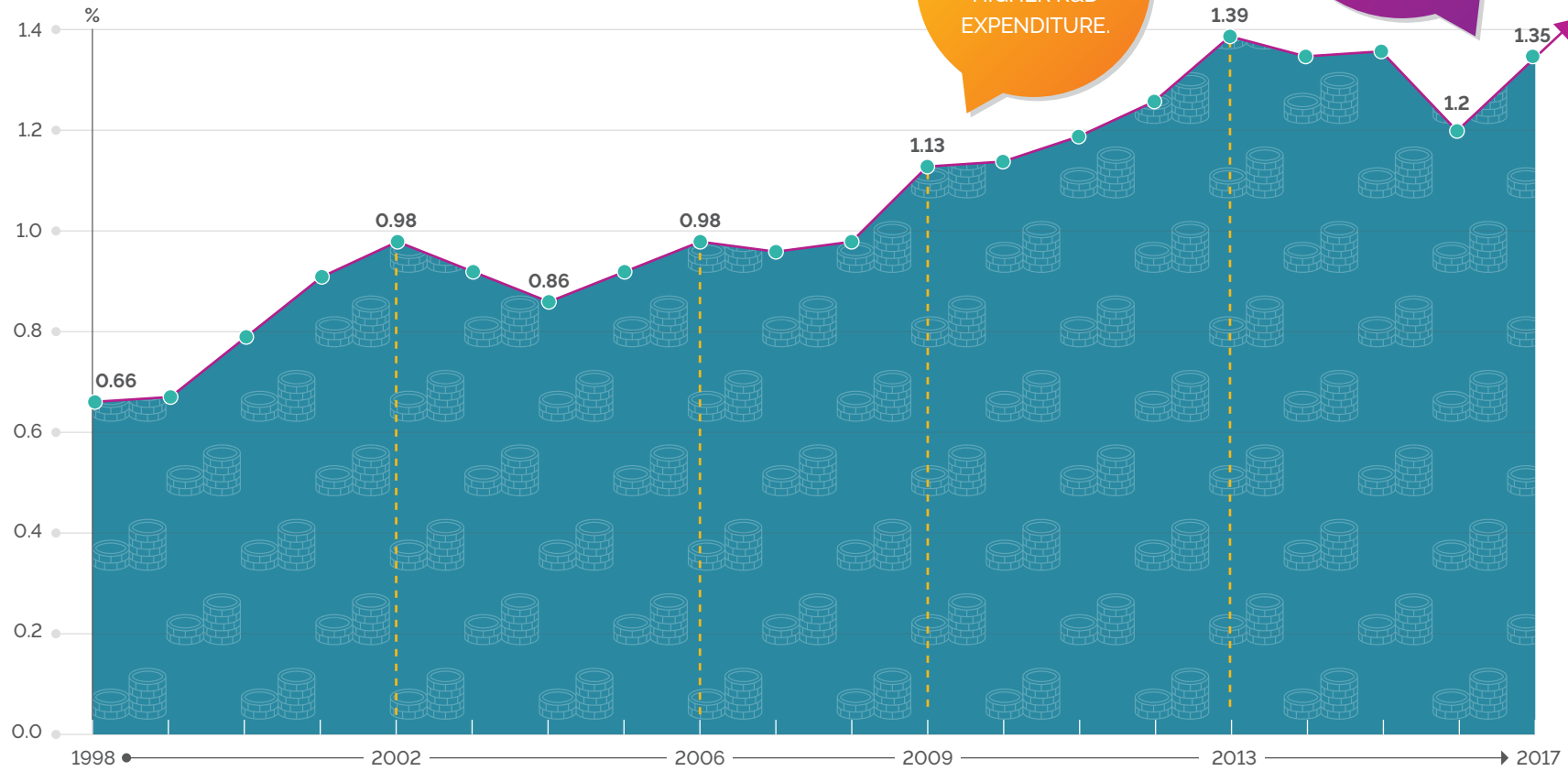
Women and men in academic hierarchy in Hungary 2015**

THE HIGHER THE POSITION IS, THE LESS LIKELY IT IS TO BE FILLED BY A WOMAN.



R&D EXPENDITURE (GERD) IN HUNGARY

R&D expenditure (% of GDP), 1998–2017

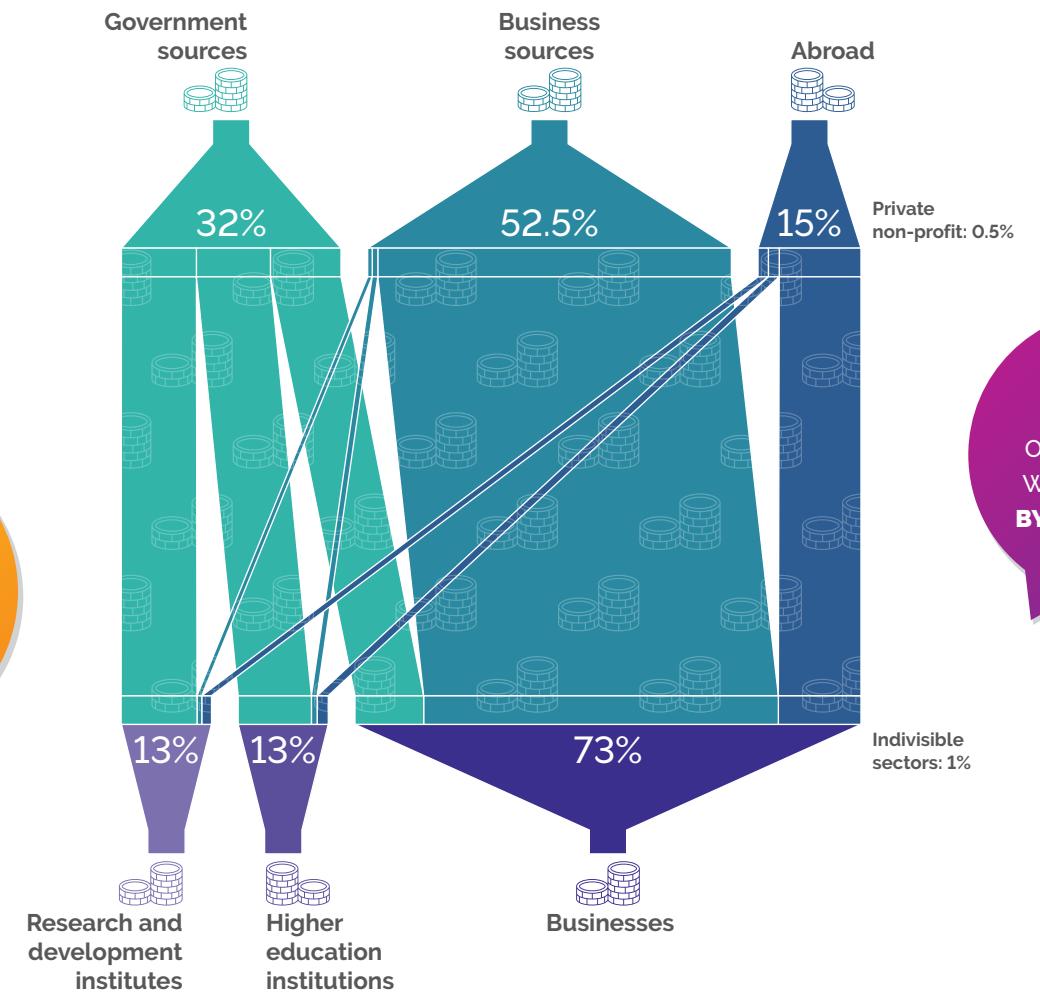


STEADY GROWTH REQUIRES HIGHER R&D EXPENDITURE.

R&D EXPENDITURE (% OF GDP) SHOWS AN **INCREASING** PATH DURING THE LAST TWO DECADES.

GERD BY SECTORS OF PERFORMANCE AND SOURCE OF FUNDS

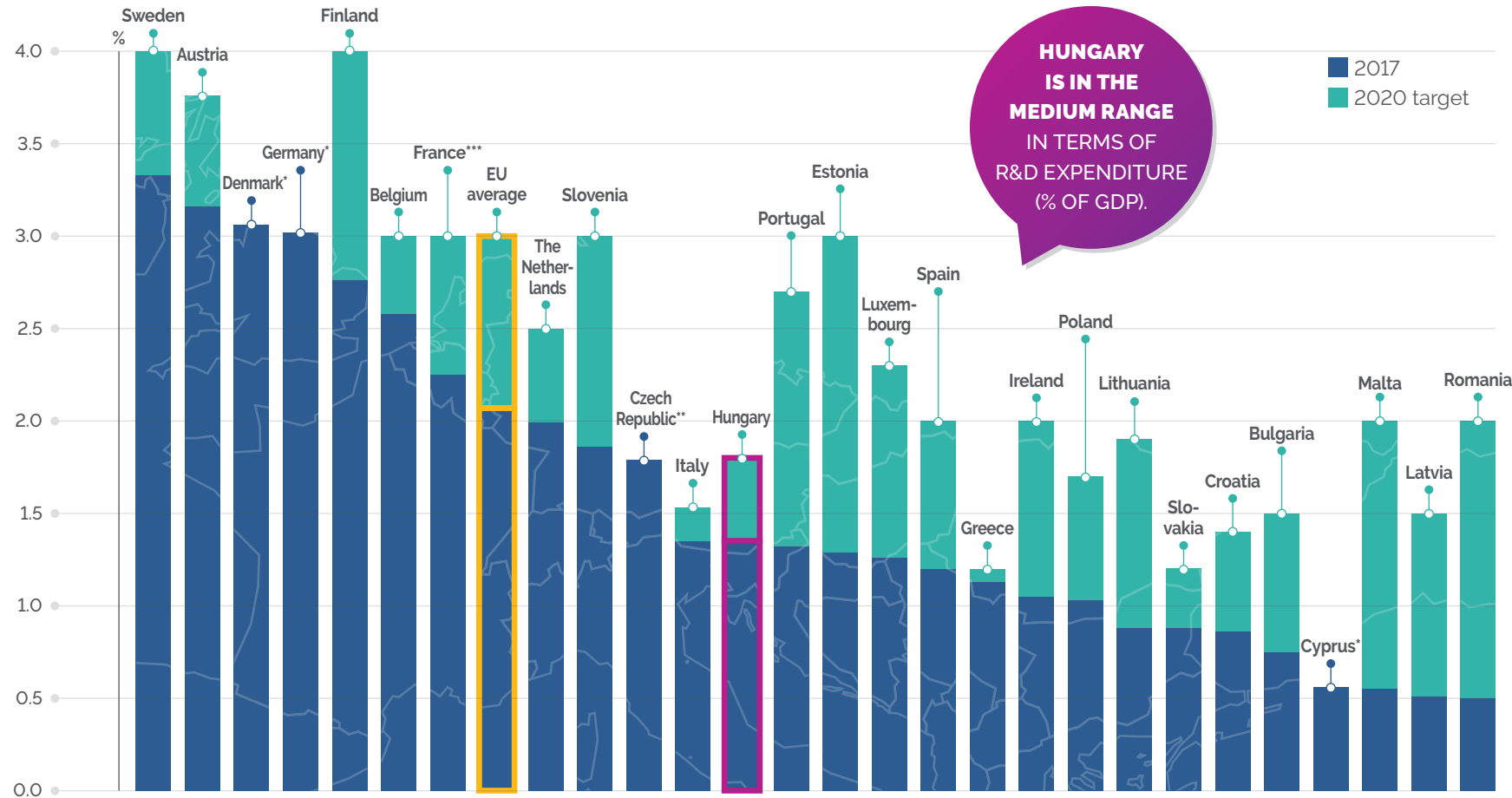
LINKS BETWEEN BUSINESSES AND HIGHER EDUCATION INSTITUTES, RESEARCH INSTITUTES ARE WEAK.



IN 2017, **52.5%** OF R&D FUNDS WAS PROVIDED **BY BUSINESSES.**

R&D EXPENDITURE IN EU MEMBER STATES

R&D expenditure (% of GDP) – 2017 facts and 2020 targets



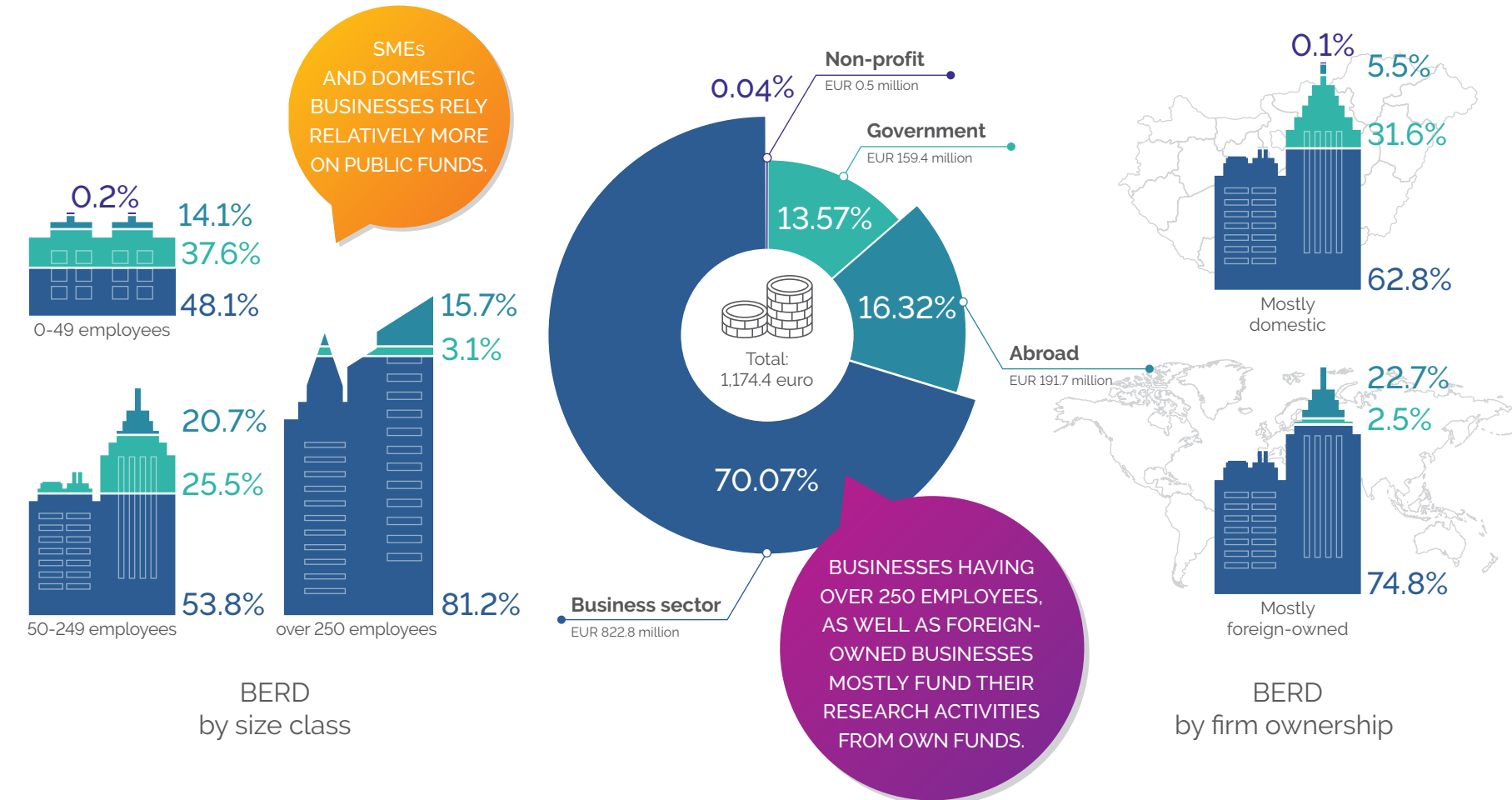
HUNGARY IS IN THE MEDIUM RANGE IN TERMS OF R&D EXPENDITURE (% OF GDP).

12 * Target achieved. ** Commitment relating to state funds only. *** 2016 data

Source: Eurostat, European Semester

BUSINESS R&D EXPENDITURE (BERD) BY SOURCE OF FUNDS

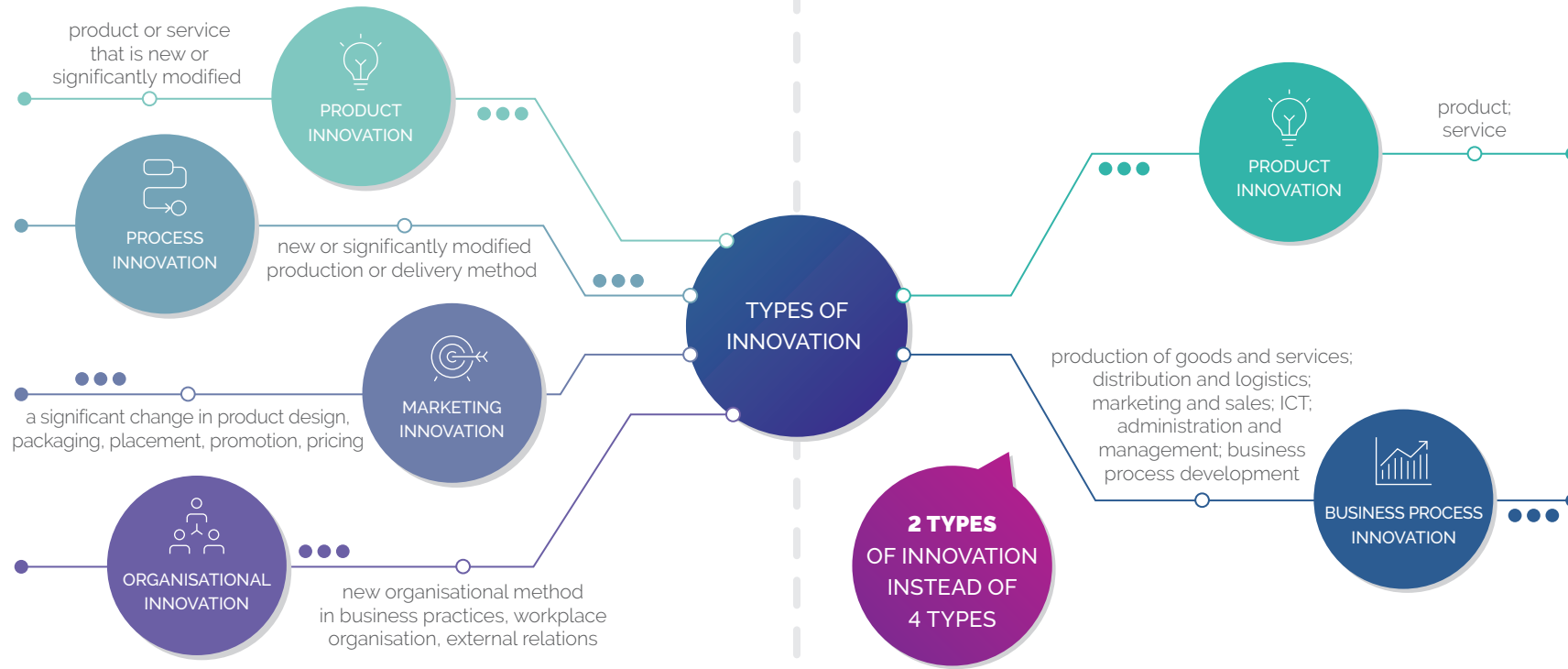
2017



Source: HCSO

WHAT IS INNOVATION?

Traditionally, we have distinguished between **four types of innovation**.

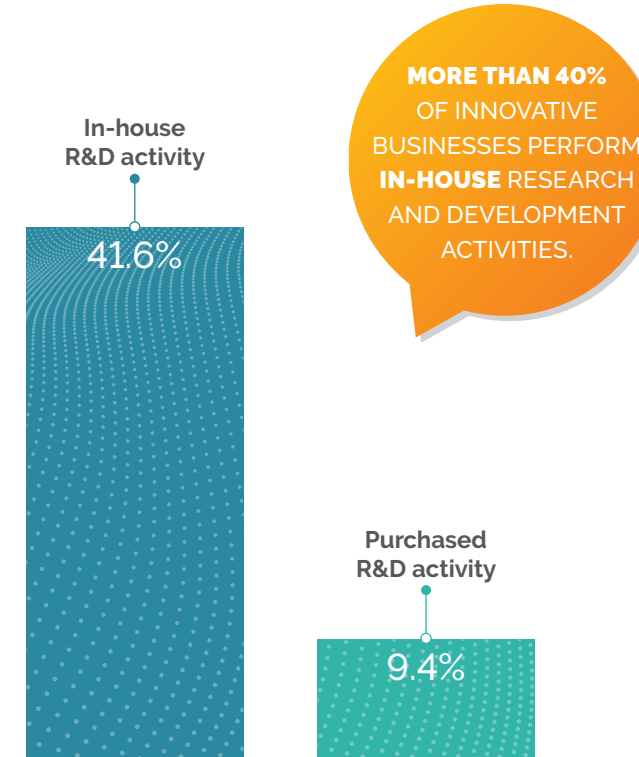


In 2018, the definition of innovation was clarified at international level.*

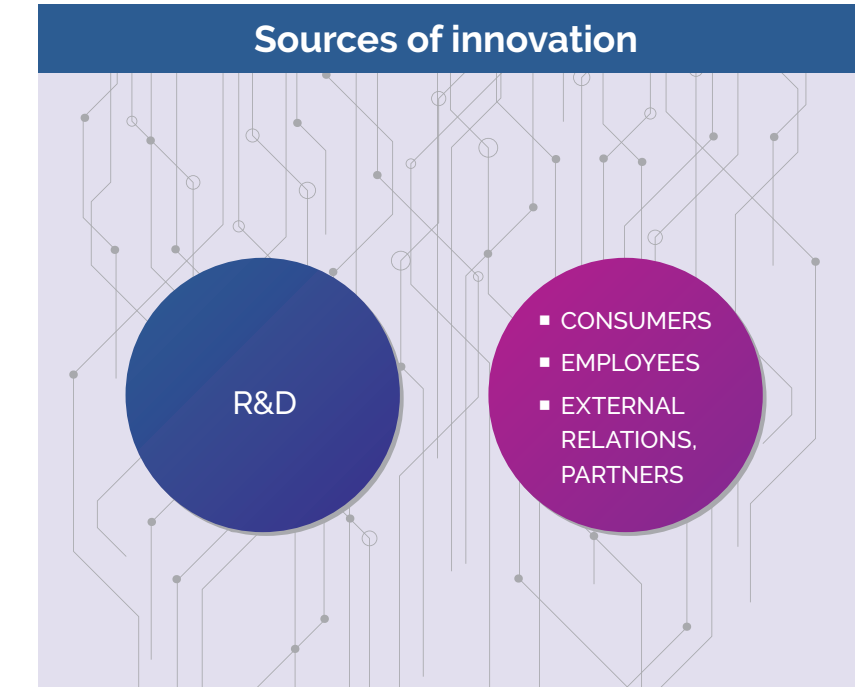
R&D AND INNOVATION

Research and development (R&D) and innovation are based on each other in many respects and are complementary to each other. Still, they are different in concept.

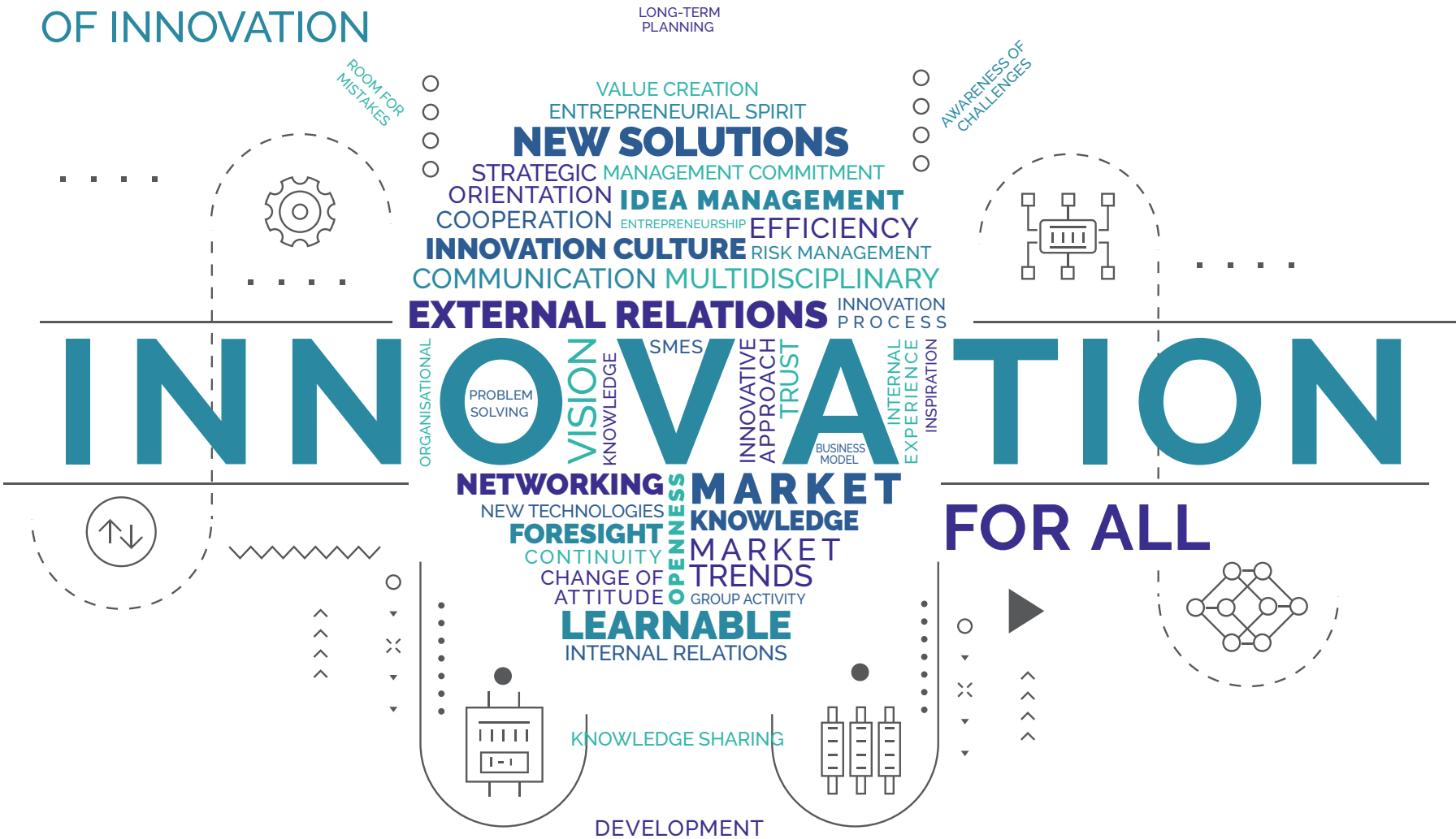
R&D activities at innovative businesses*, 2017



Sources of innovation



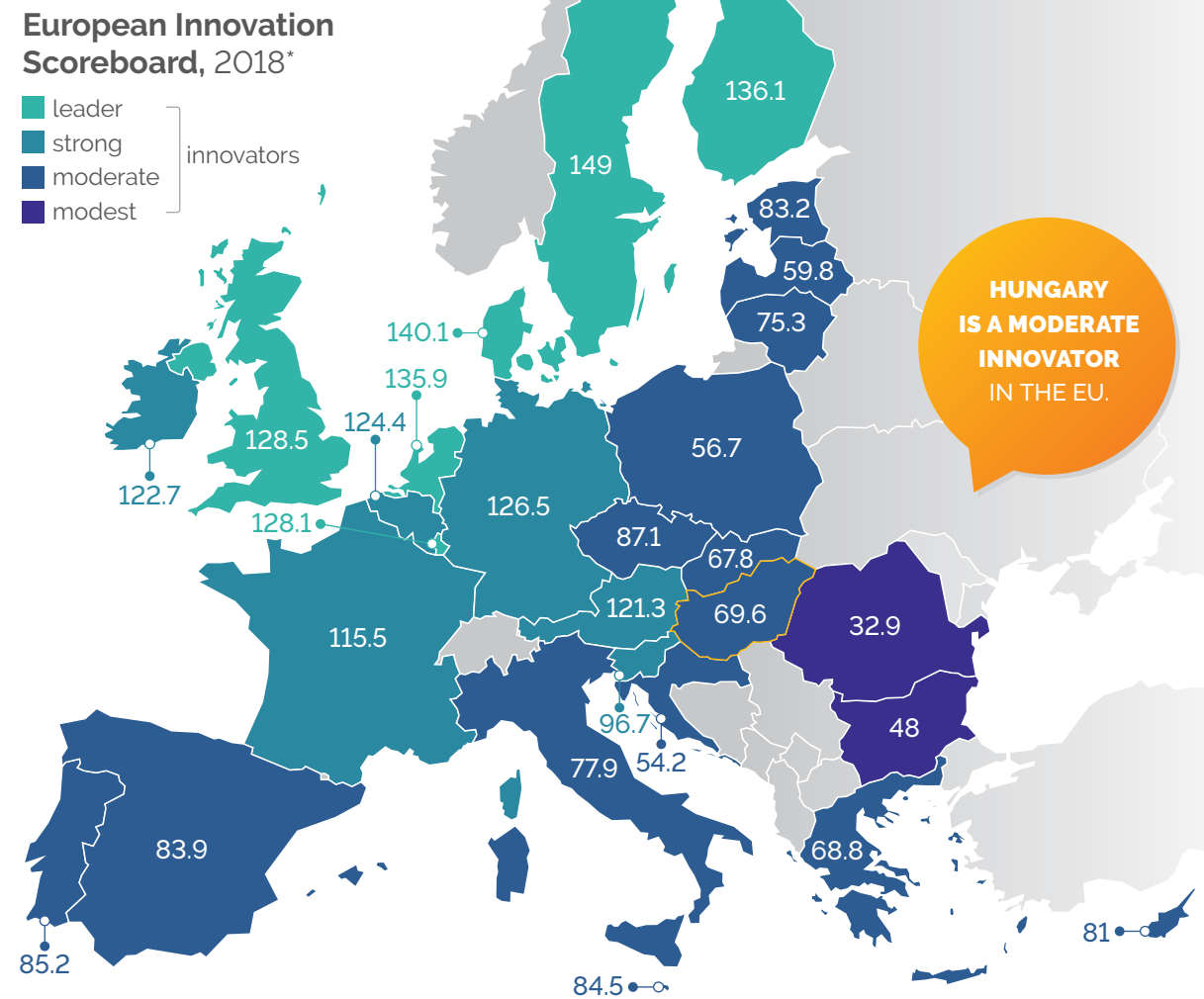
SUCCESS FACTORS OF INNOVATION



HUNGARY'S INNOVATION PERFORMANCE IN THE EU

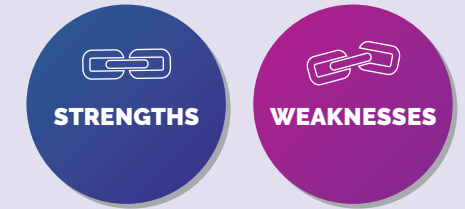
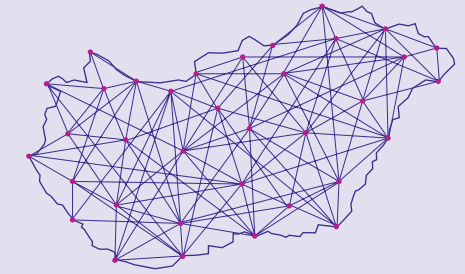
European Innovation Scoreboard, 2018*

- leader
- strong
- moderate
- modest



* Complex indicator relative to EU in 2010

Source: European Innovation Scoreboard, 2018



- | | |
|---|--|
| <ul style="list-style-type: none"> • Broadband penetration • International scientific co-publications • R&D expenditure in the business sector • Venture capital expenditures • Enterprises providing ICT training | <ul style="list-style-type: none"> • SMEs innovating in-house • Sales of new-to-market/firm innovations • Innovative SMEs collaborating with others • Lifelong learning • Private co-funding of public R&D expenditures |
|---|--|

INNOVATIVE BUSINESSES BY SIZE CLASS

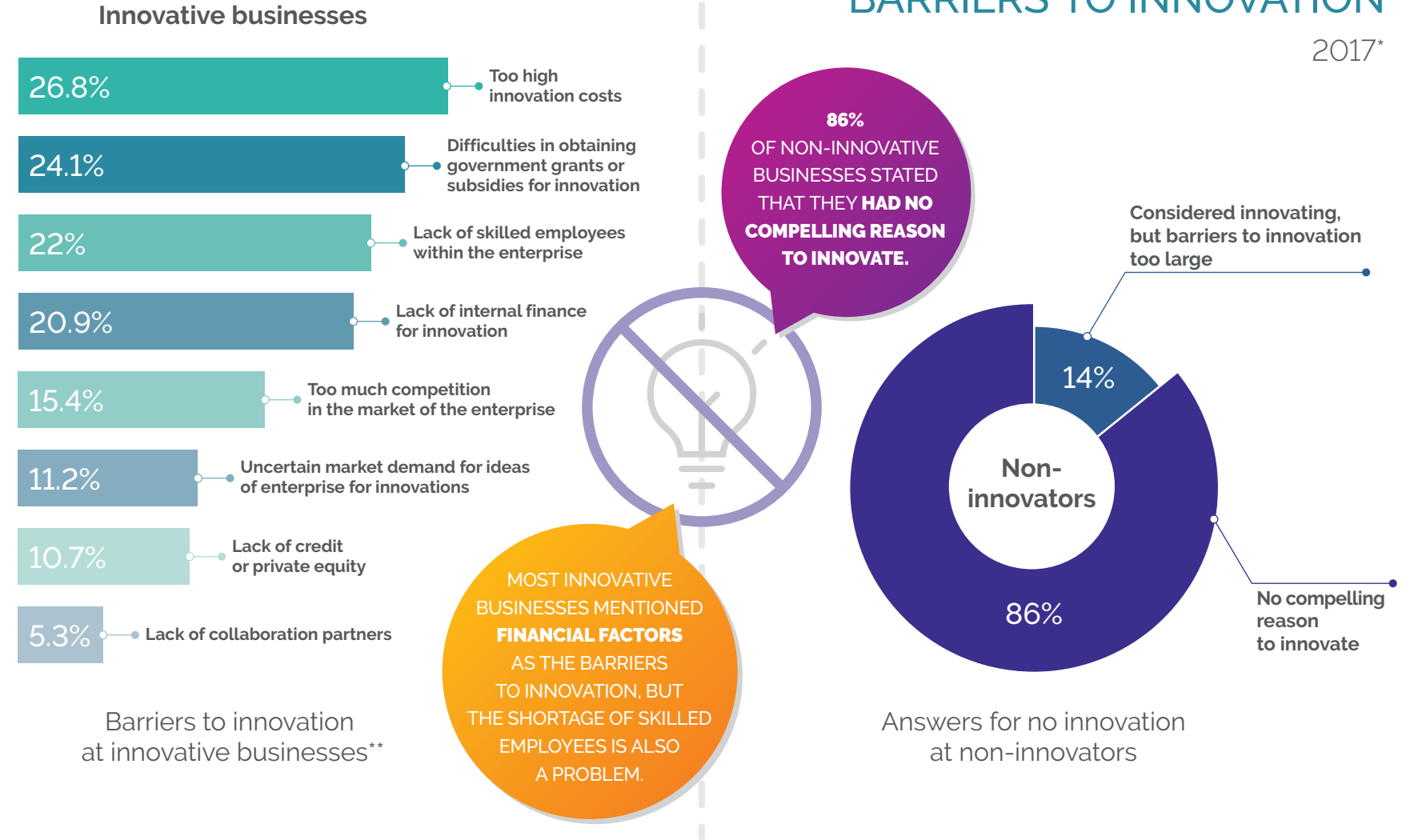
The share of innovative businesses in Hungary*



* Businesses having at least 10 employees.

BARRIERS TO INNOVATION

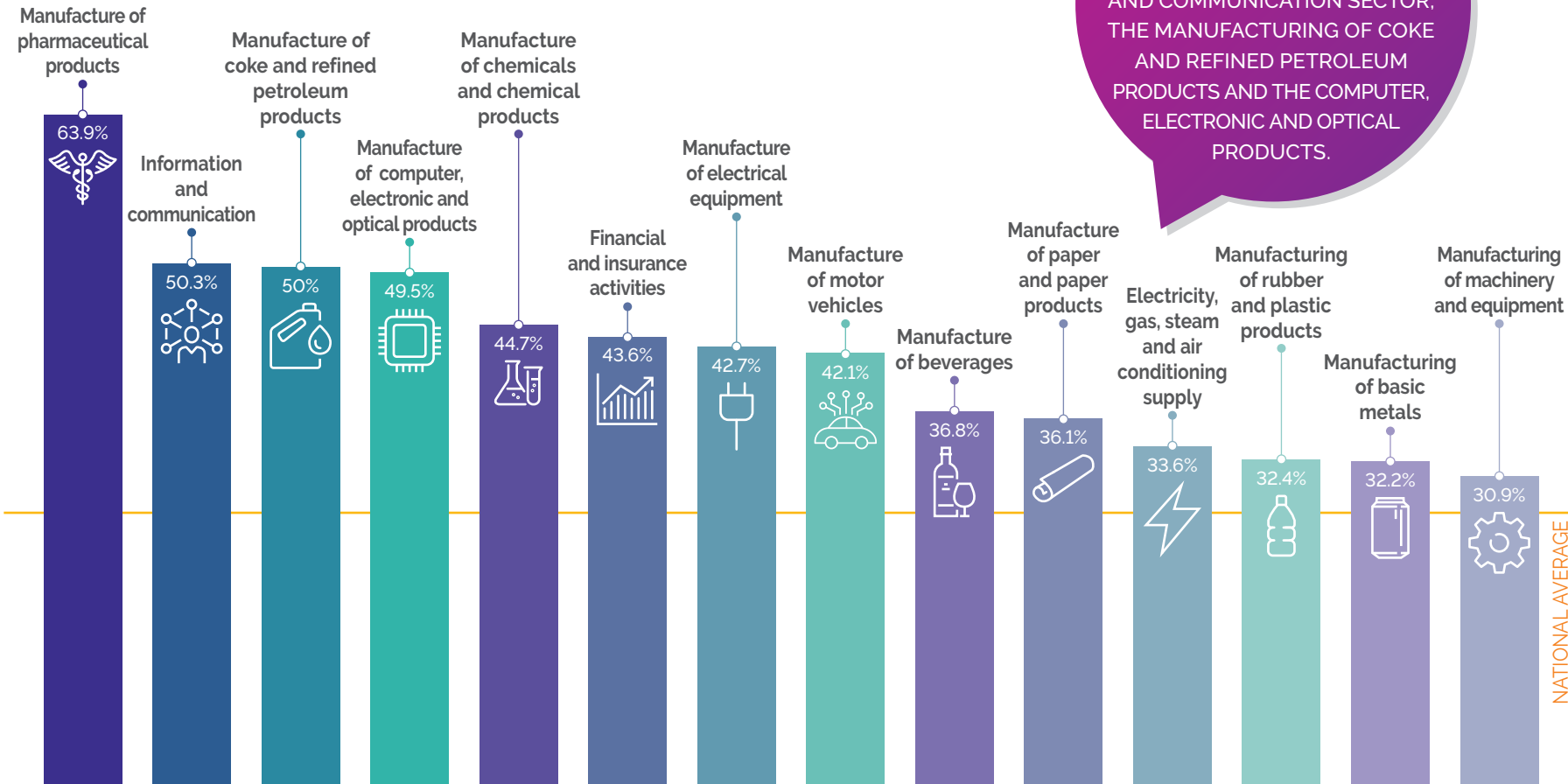
2017*



* Based on the results of the innovation questionnaire prepared by the HCSO. ** More than one answer could be given in the questionnaire.

THE MOST INNOVATIVE SECTORS

The share of innovative businesses* by classification of economic activities**, 2017



IN HUNGARY, THE PHARMACEUTICAL INDUSTRY IS THE MOST INNOVATIVE SECTOR, FOLLOWED BY THE INFORMATION AND COMMUNICATION SECTOR, THE MANUFACTURING OF COKE AND REFINED PETROLEUM PRODUCTS AND THE COMPUTER, ELECTRONIC AND OPTICAL PRODUCTS.

BEING MORE FLEXIBLE AND FASTER TO REACT TO EXTERNAL CHALLENGES.

IT HAS EXTENSIVE PARTNERSHIPS DUE TO ITS INITIATIVES.

THE MARKET INDICATES CHANGES IN CONSUMER NEEDS.



ATTRACTS THE BEST WORKFORCE.

CHARACTERISTICS OF AN INNOVATIVE BUSINESS

Innovation is much more than the introduction of a new product or technology. It permeates the entire organisation.

RDI REDUCES PRODUCTION COSTS.

NEW PROCESSES CAN BE INTEGRATED MORE EASILY.

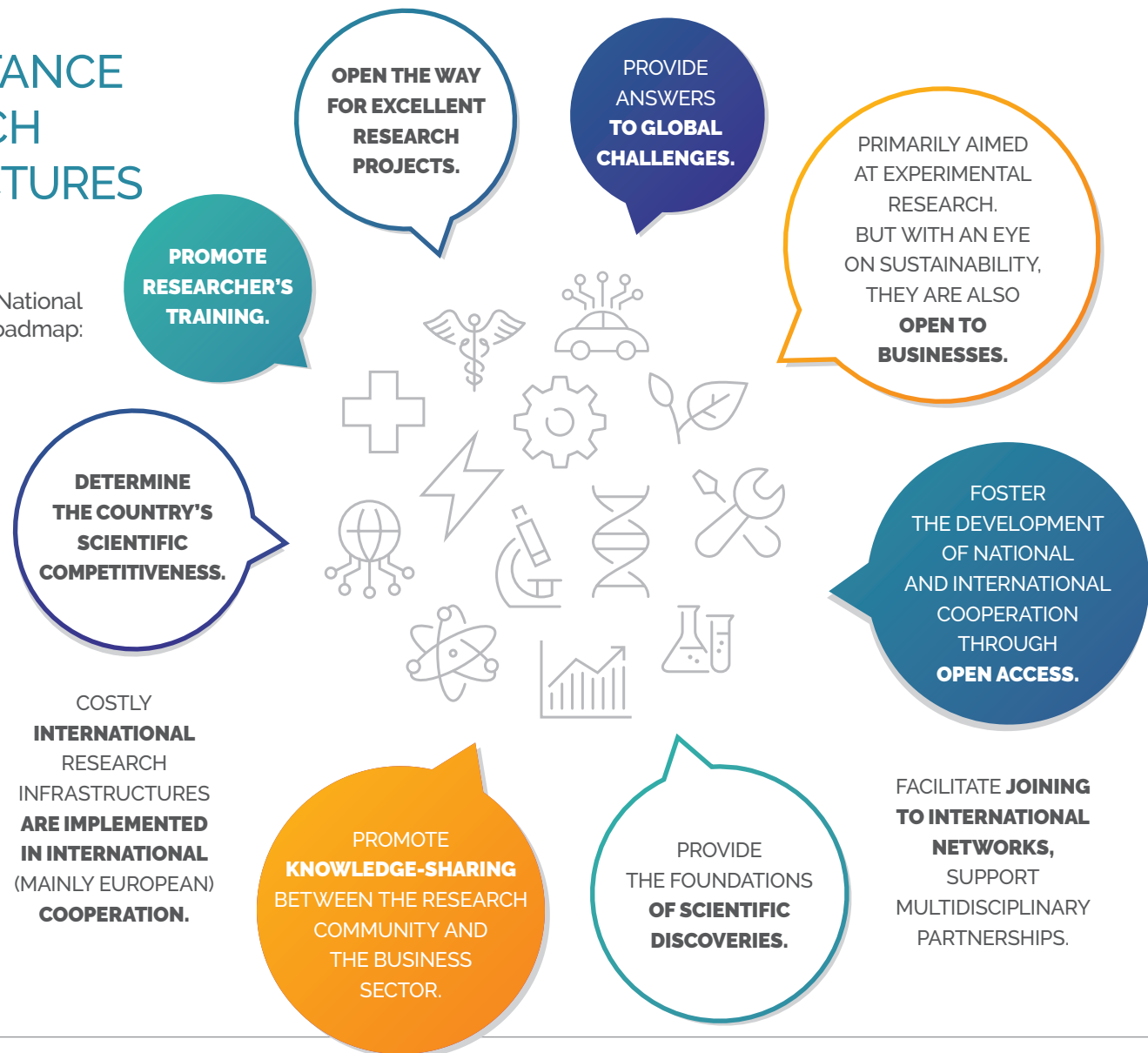
NEW ORGANISATIONAL AND INSTITUTIONAL SOLUTIONS CAN SAVE COSTS AND TIME.

KNOWS AND ADAPTS NEW TECHNOLOGIES.

* Classification of economic activities – NACE Rev. 2. ** Economic activities where the share of innovative businesses is at least 30%.

THE IMPORTANCE OF RESEARCH INFRASTRUCTURES IN RDI

Hungary has prepared its National Research Infrastructure Roadmap: <https://www.esfri.eu/latest-esfri-news/hungary-publishes-its-national-research-infrastructure-roadmap>



HUNGARY'S MEMBERSHIPS IN INTERNATIONAL RESEARCH INFRASTRUCTURES

Physical Sciences and Engineering	
CERIC-ERIC	Central European Research Infrastructure Consortium
CERN	The European Organization for Nuclear Research
CERN HL-LHC (ALICE, CMS)	High-Luminosity Large Hadron Collider (CERN)
ELI-ERIC	Extreme Light Infrastructure
ESA	European Space Agency
ESRF UPGRADES	European Synchrotron Radiation Facility (ESRF), Phase II: Extremely Brilliant Source
ESS-ERIC	European Spallation Source
European XFEL	European X-Ray Free-Electron Laser Facility
ITER/EUROfusion	International Thermonuclear Experimental Reactor
E-infrastructure	
GÉANT	Pan-European data network for the research and education community
PRACE	Partnership for Advanced Computing in Europe

Health and Food	
ECRIN-ERIC	European Clinical Research Infrastructure
ELIXIR	A distributed infrastructure for life-science information
EMBL	European Molecular Biology Laboratory
ERINHA	European Research Infrastructure on Highly Pathogenic Agents
EuBI ERIC	European Research Infrastructure for Imaging Technologies in Biological and Medical Sciences
ICGEB	International Centre for Genetic Engineering and Biotechnology
Social & Cultural Innovation	
CESSDA-ERIC	Consortium of European Social Science Data Archives
CLARIN-ERIC	Common Language Resources and Technology
ESS-ERIC	European Social Survey
SHARE-ERIC	Survey of Health, Ageing and Retirement in Europe

ELI-ALPS: HUNGARY'S LARGEST-SCALE RESEARCH INFRASTRUCTURE DEVELOPMENT



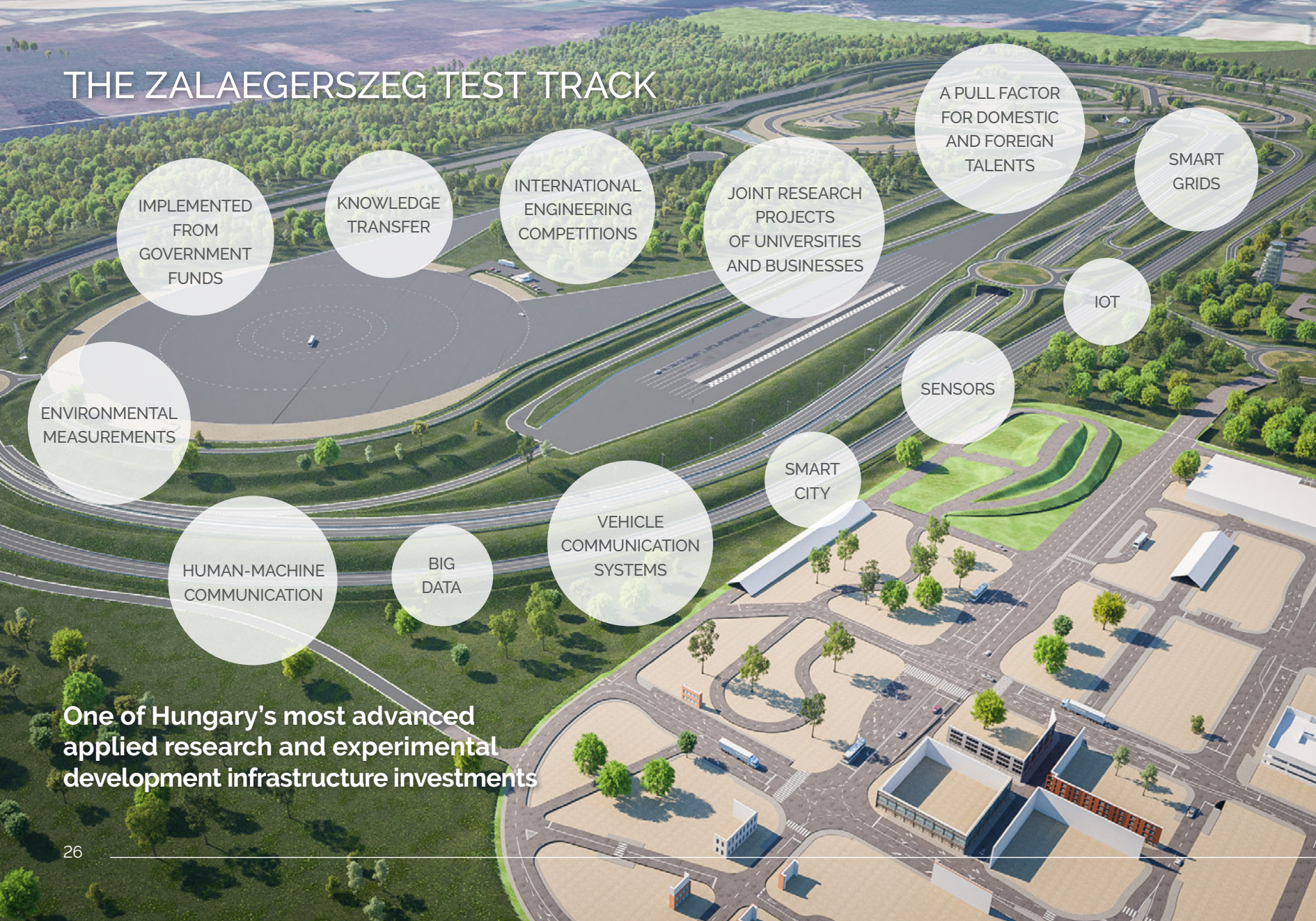
It was established in European cooperation and with the participation of the international scientific community.

It enables the **examination of light-matter interactions** at unprecedentedly high intensities.

It can lay the groundwork for new technological developments such as relativistic microwave electronics and compact (desktop size) laser particle accelerators.



THE ZALAEGRSZEG TEST TRACK



One of Hungary's most advanced applied research and experimental development infrastructure investments



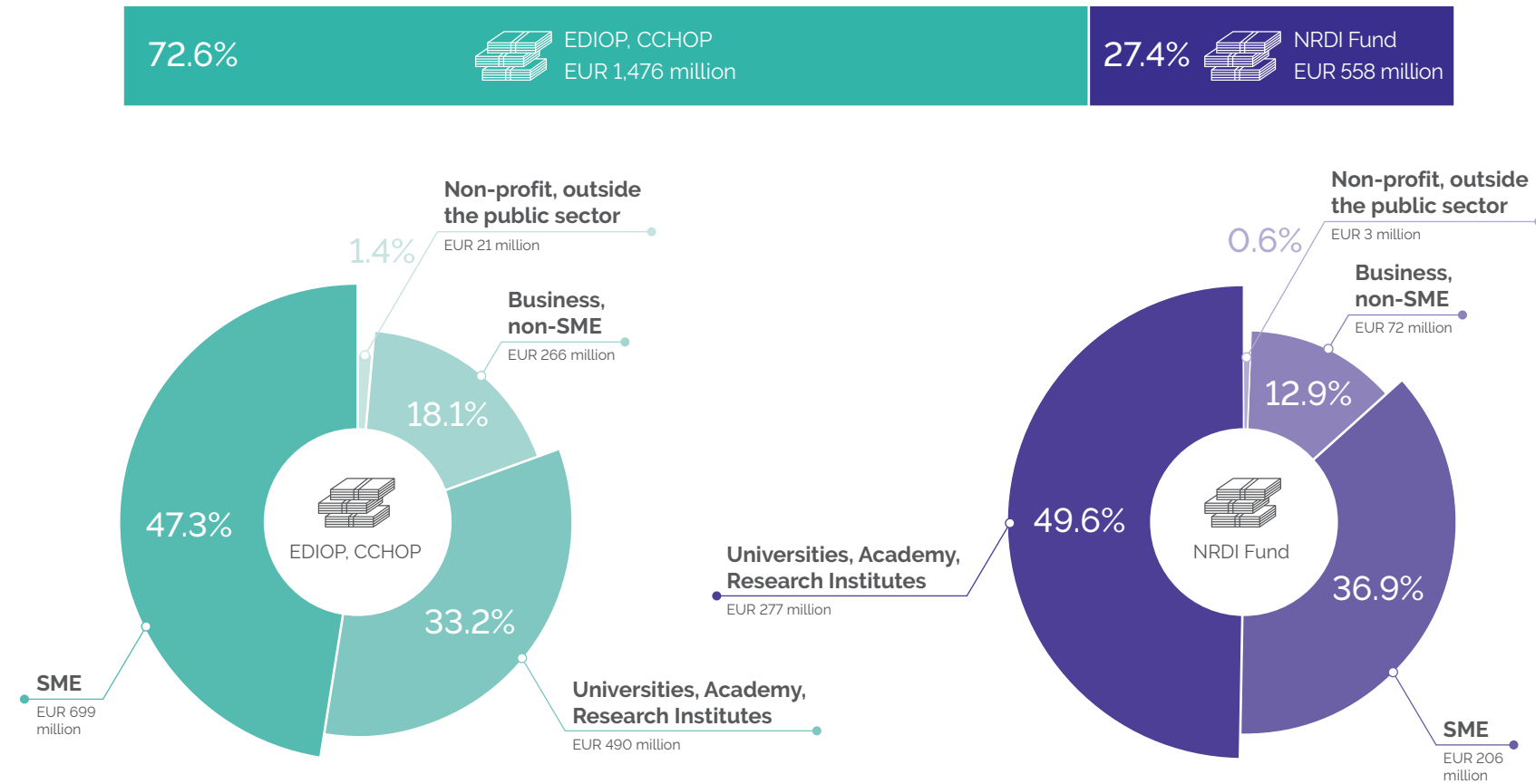
ZalaZone provides a complex and internationally competitive test environment for traditional, electric and self-driving vehicles.



FUNDED PROJECTS UNDER RDI CALLS

2015–2018*

Total awarded funding: EUR 2,034 million

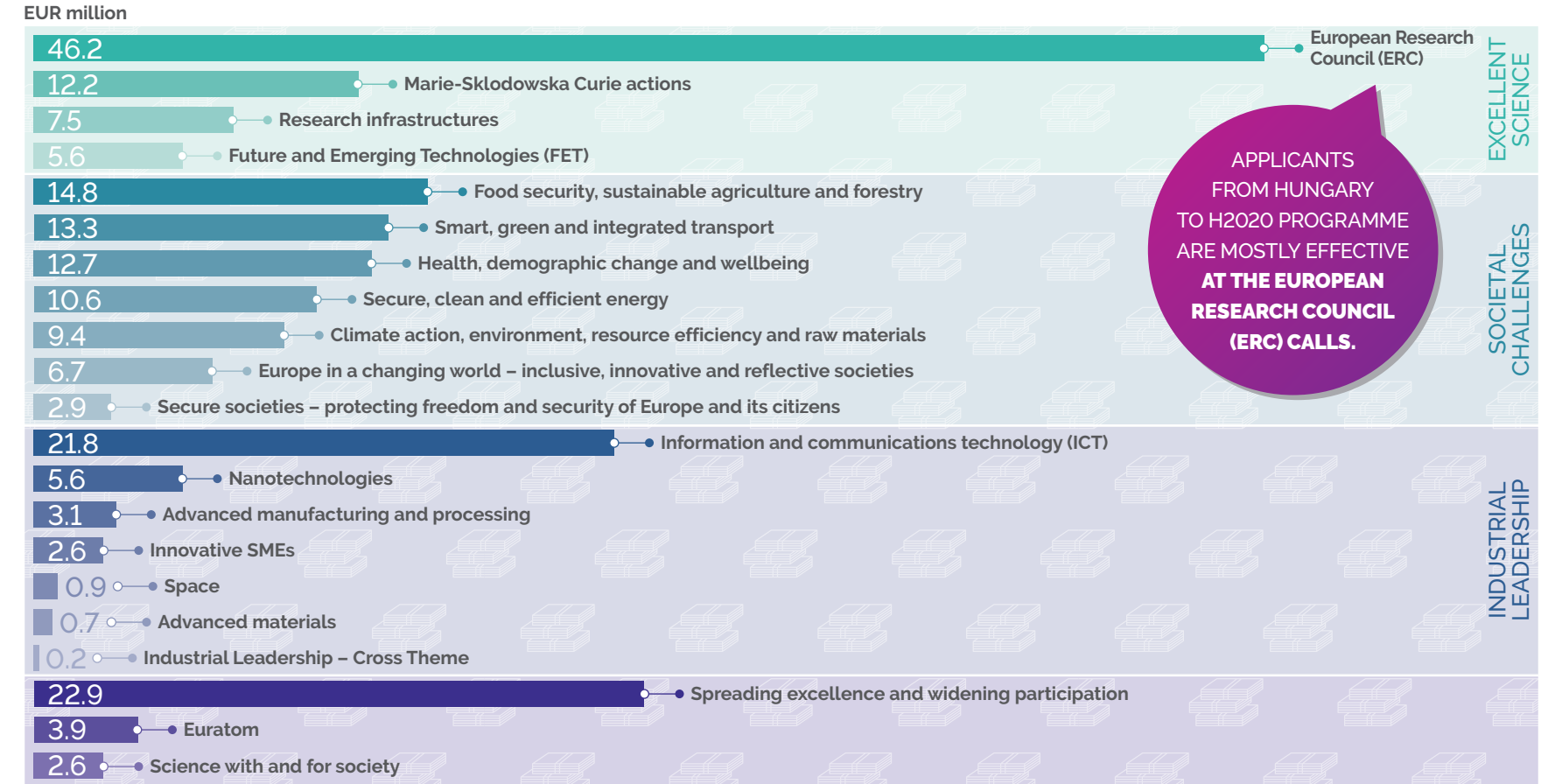


* In the case of the Economic Development and Innovation Operational Programme (EDIOP) and the Competitive Central Hungary Operational Programme (CCHOP), data relate to the research, technological development and innovation priorities.

Source: NRDIFund Office, based on the funding decisions made until 24 September, 2018.

HUNGARIAN PARTICIPATION IN THE CALLS OF THE EU'S HORIZON 2020 FRAMEWORK PROGRAMME FOR RESEARCH AND INNOVATION

EU contribution to H2020 projects with Hungarian participation by thematic field

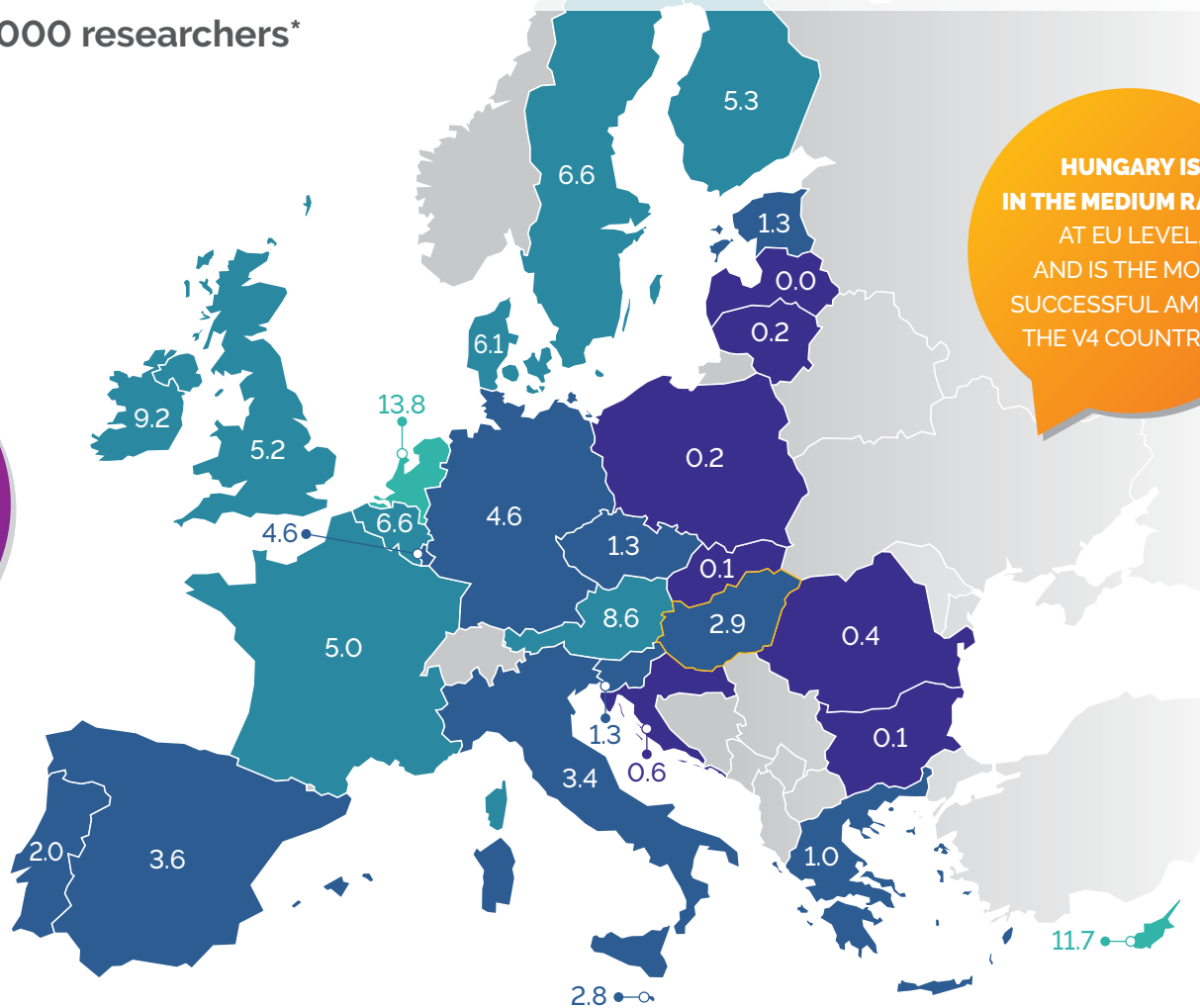


Source: NRDIFund Office, based on CORDIS data, 2015–2018

STRONG BASIC RESEARCH – SUCCESSFUL PARTICIPATION IN ERC CALLS

ERC projects by 1,000 researchers*

- over 10 projects
- 5–9.9 projects
- 1–4.9 projects
- 0–0.9 projects



HUNGARIAN ERC GRANTEES CAN HOLD THEIR GROUND EVEN DESPITE THE FIERCEST INTERNATIONAL RESEARCH COMPETITION.

HUNGARY IS IN THE MEDIUM RANGE AT EU LEVEL, AND IS THE MOST SUCCESSFUL AMONG THE V4 COUNTRIES.

* The calculated number (FTE) of researchers working in higher education institutions and research institutes.

Source: NRDl Office, based on CORDIS data, 2015–2018

For further useful information visit [the website of the National Research, Development and Innovation Office:](http://www.nkfi.gov.hu)

www.nkfi.gov.hu





www.nkfh.gov.hu