MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

SCIENCE, TECHNOLOGY AND INNOVATION SYSTEM OF UKRAINE

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Deputy Minister
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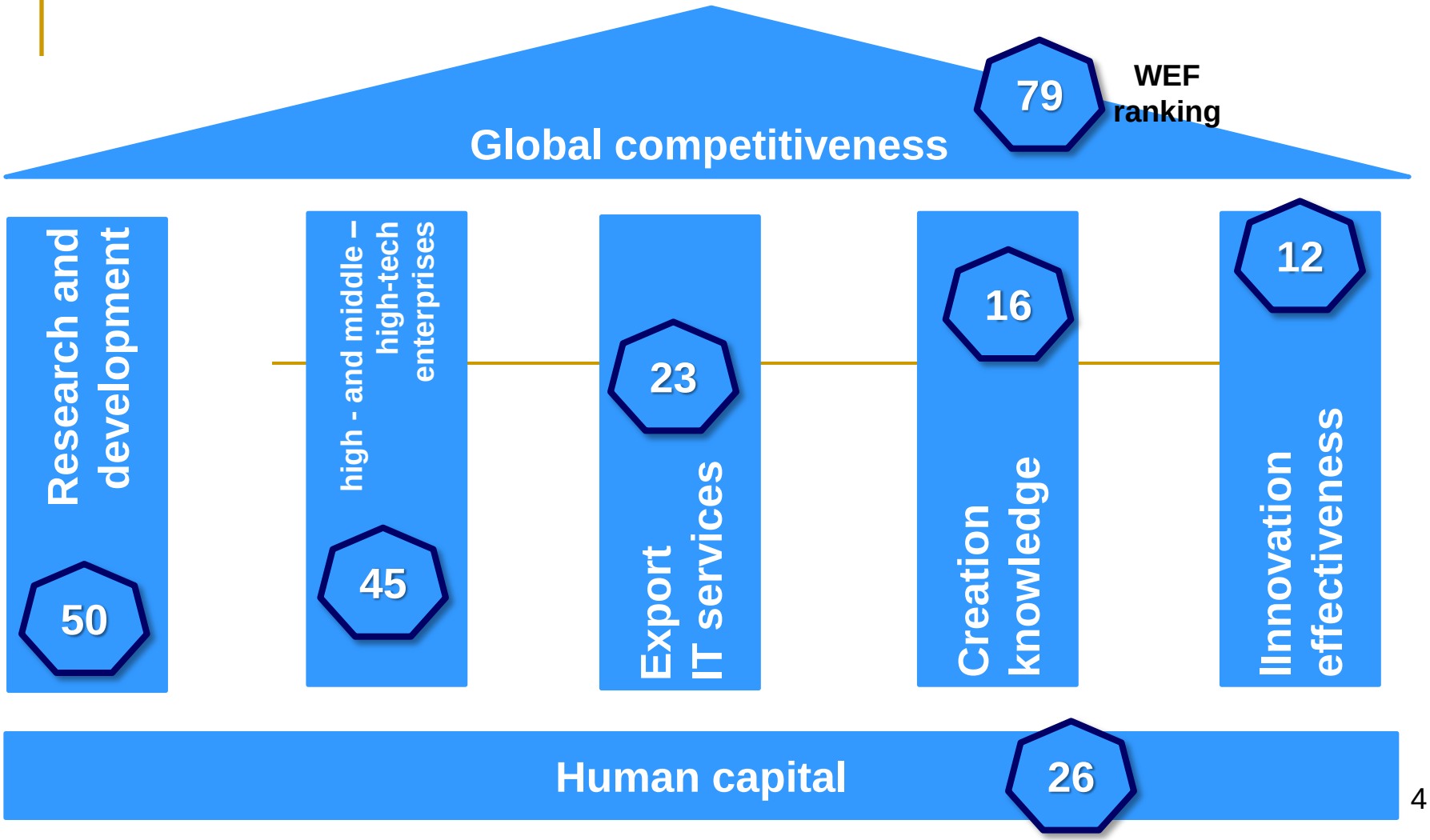
Content

1. Administration of the science and technology sector
2. Science, technology and innovation development of Ukraine
3. Review of R&D projects results
4. International cooperation in the science and technology sector
5. Challenges

Ukraine today

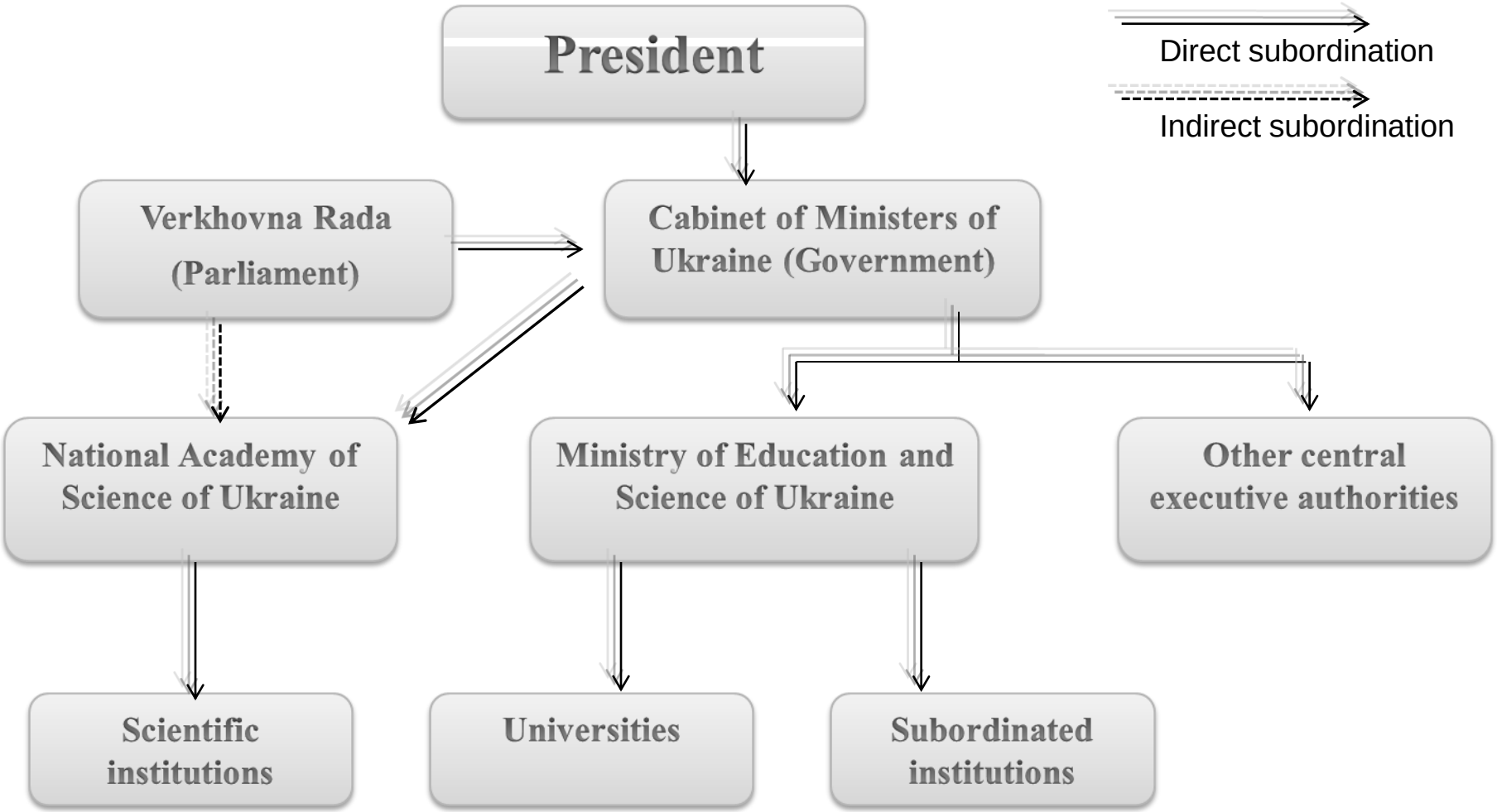
- 27 Ukrainian Universities and research institutions and 12 000 scientists have been forced to move from the occupied territories
- 7.8% of territory is occupied
- over 1.7 mln. persons were relocated from the occupied territories

Ukraine in the world rankings



I. Administration of the science and technology sector

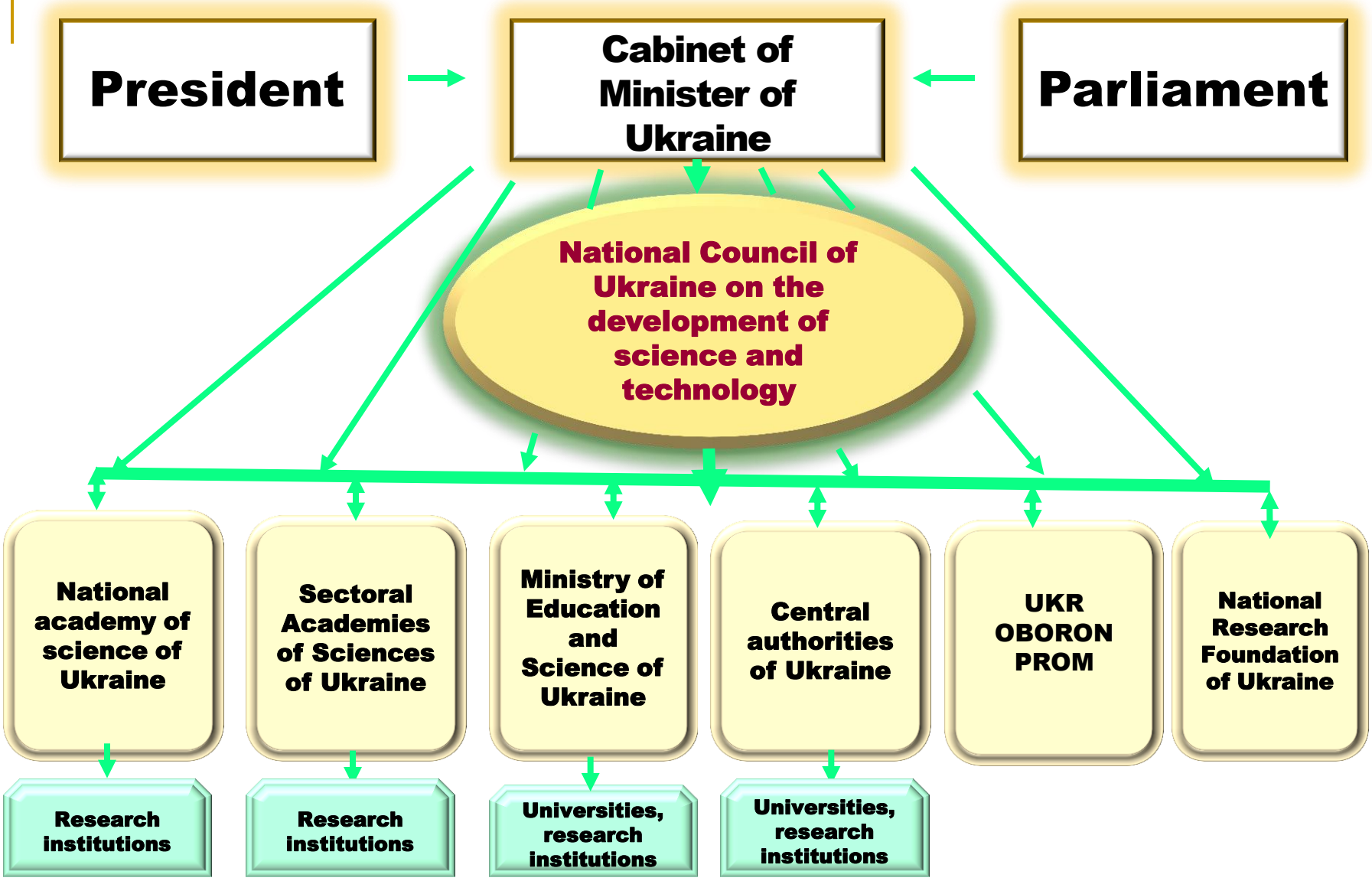
STATE GOVERNANCE OF THE SCIENCE AND TECHNOLOGY SECTOR (as it is)



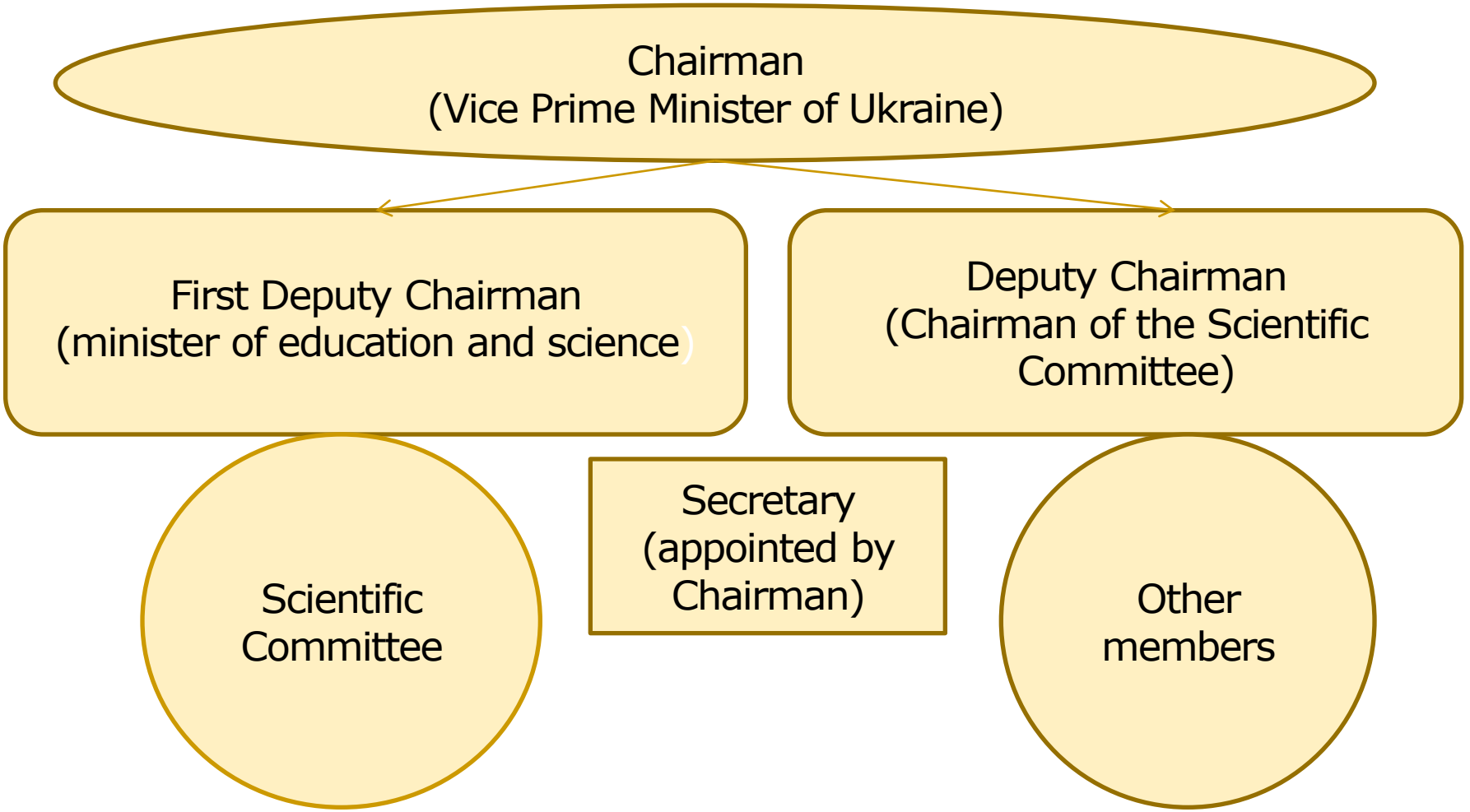
The new Law of Ukraine

"On scientific and scientific-technical activity" was adopted on 26 November 2016

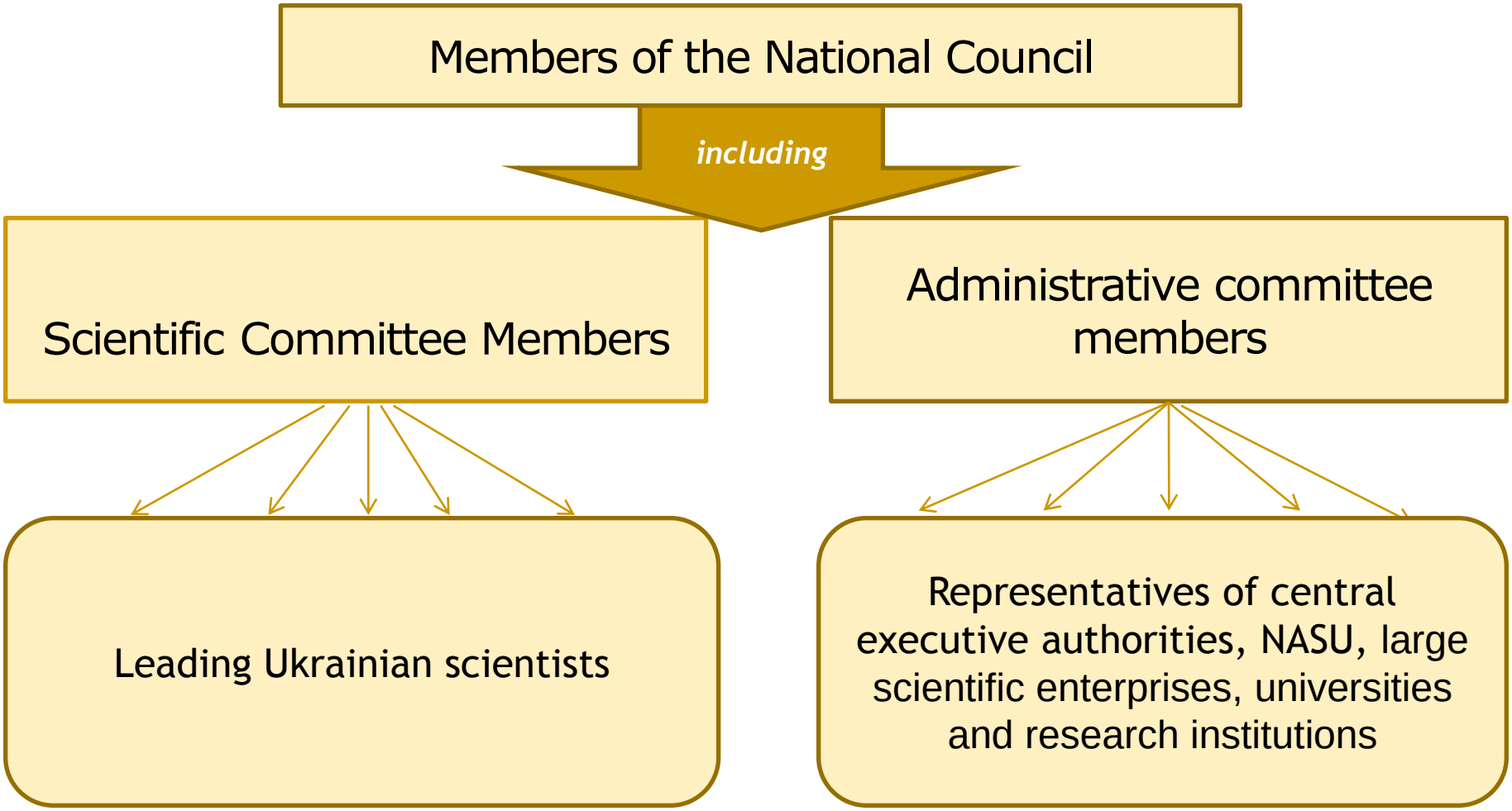
Institutional framework of R&I policy



Organizational structure of the National Council of Ukraine on Science and Technology Development



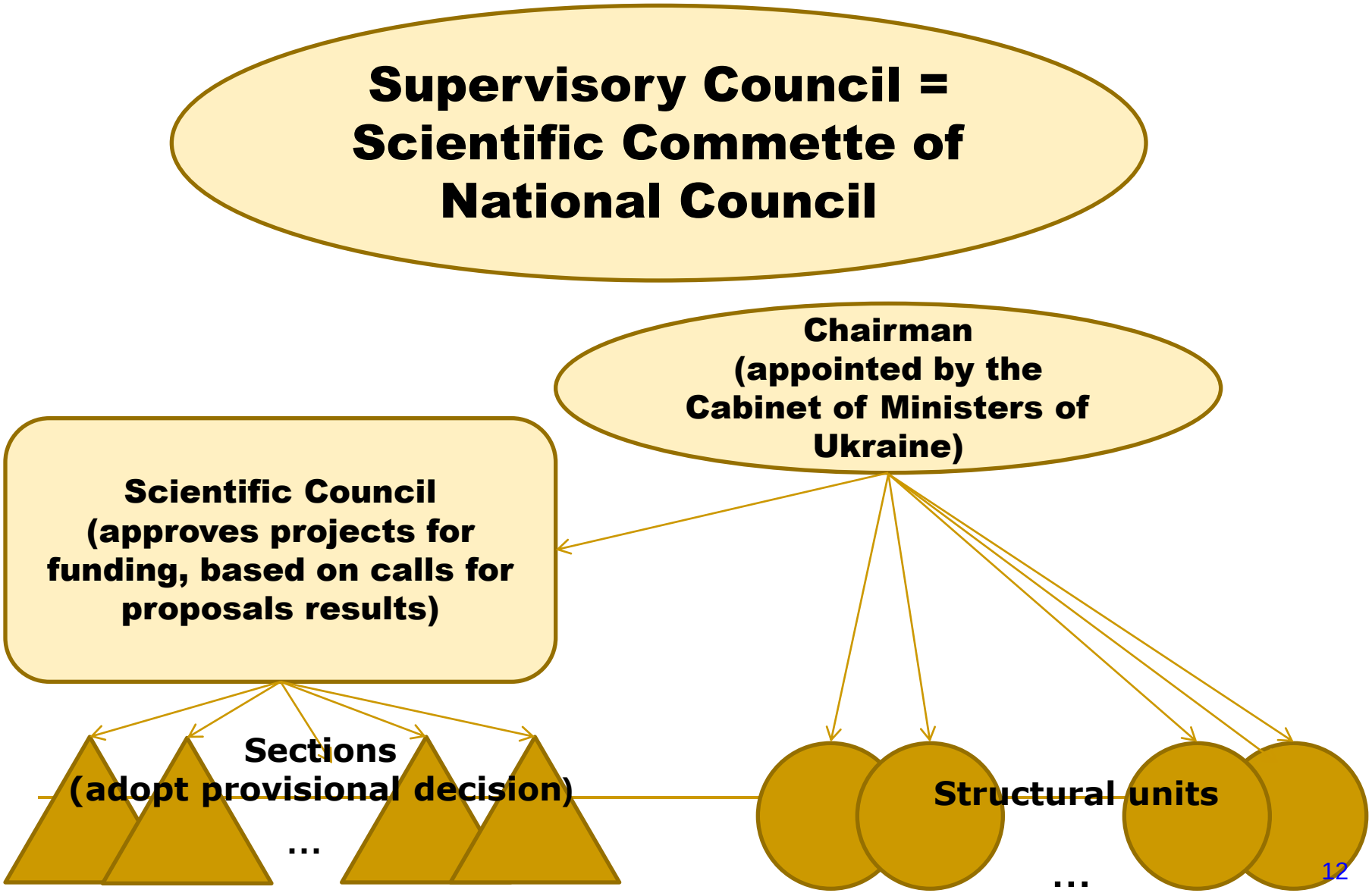
Members of the National Council of Ukraine on Science and Technology Development



Main functions of the National Council of Ukraine on Science and Technology Development

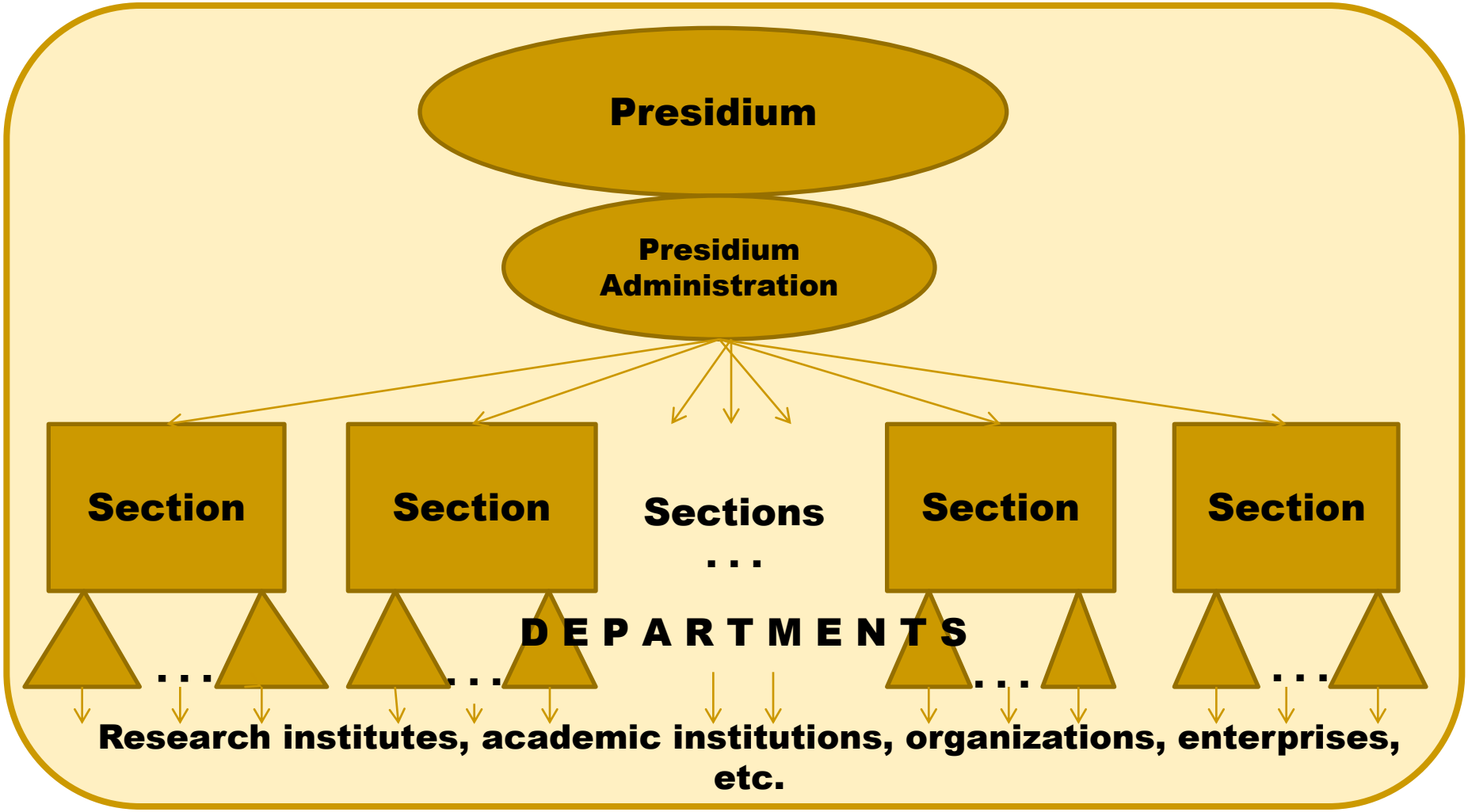
- preparing proposals for the policy frameworks development in the field of scientific and technological activities and submitting appropriate recommendations to the Cabinet of Ministers of Ukraine;
- preparing proposals for the integration of national science into the international science, taking into account national interests;
- evaluation of reports on use of funds for scientific and technical activities and obtained results submitted by the National Research Fund of Ukraine, National Academy of Sciences, central executive authorities, etc.

Organizational structure of the National Research Foundation



The National Academy of Sciences of Ukraine

Structure



Development of the law on amendments to the Law of Ukraine "On scientific and scientific-technical activity"

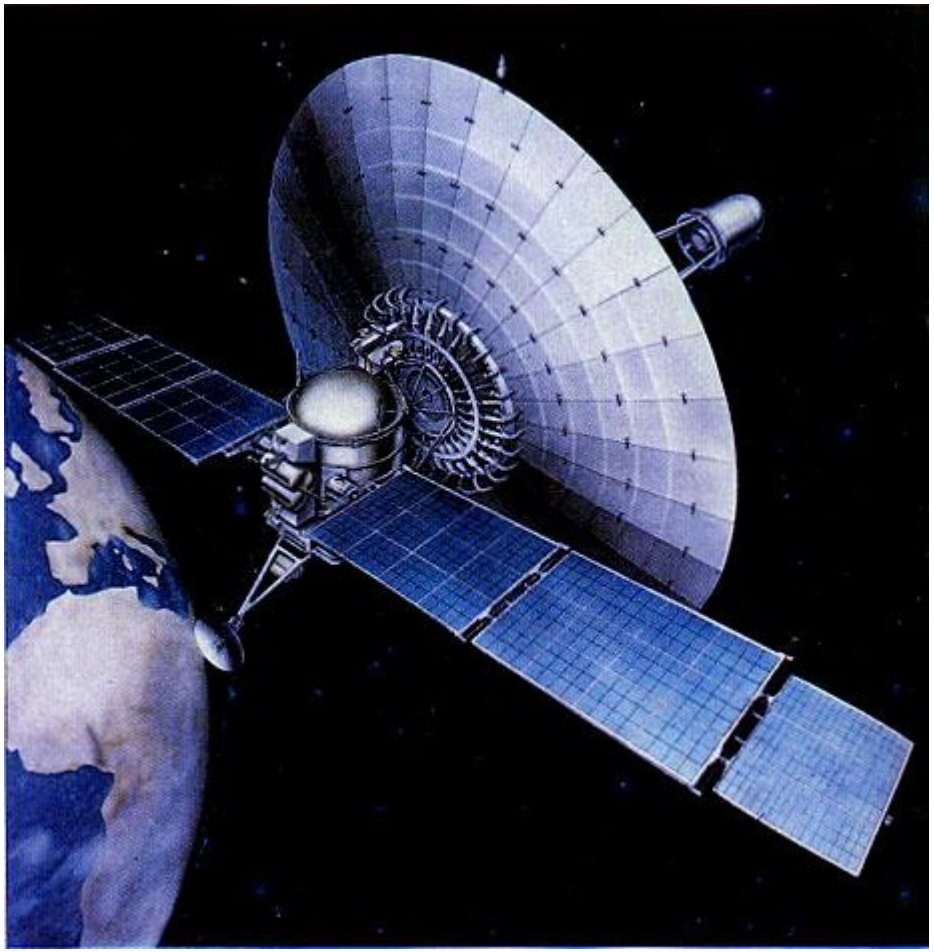
Assurances for higher education institutions and academic staff:

- Higher education institutions (universities, academies, institutes), which have passed state certification of their research activities, are covered by assurances for conducting researches, established by this Law for research institutions;

- Academic staff of such institutions are covered by assurances for research activities, established by this Law for researchers

II. Science, technology and innovation development of Ukraine

The most advanced fields of Ukrainian science



- nuclear science
- new materials
- IT- technologies
- physics and astronomy
- engeneering
- Biotechnology
- agricultural technologies
- aerospace technologies

R&D Priorities of Ukraine until 2020

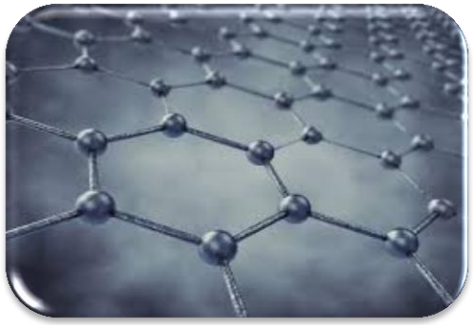
Fundamental research

Information and Communication Technologies

Energy and Energy Efficiency

Rational environmental management

Life sciences, new technologies on prevention and treatment of the most common diseases



New substances and materials

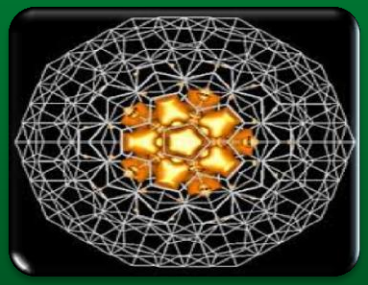
Strategic directions of innovation activity in Ukraine set for 2011-2021 (1)

Energy sector

- growing focus on energy transportation, use of energy-efficient and resource-saving technologies, and application of alternative energy resources

Transportation sector

- a hi-tech development of transport system, space rocket industry, aircraft engineering and shipbuilding, armament and military equipment



Materials science

- focus on materials production, machining and combination, establishment of nonmaterial's and nanotechnology industry

Strategic priorities of innovation activity in Ukraine set for 2011-2021 (2)

Agricultural sector

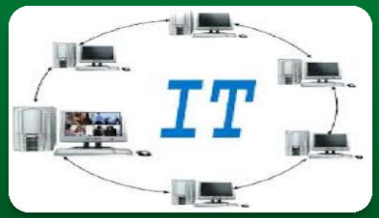
- technological renewal and agricultural development

Medical sector

- development of equipment for high quality medical care, treatment, pharmaceutics

Environmental sector

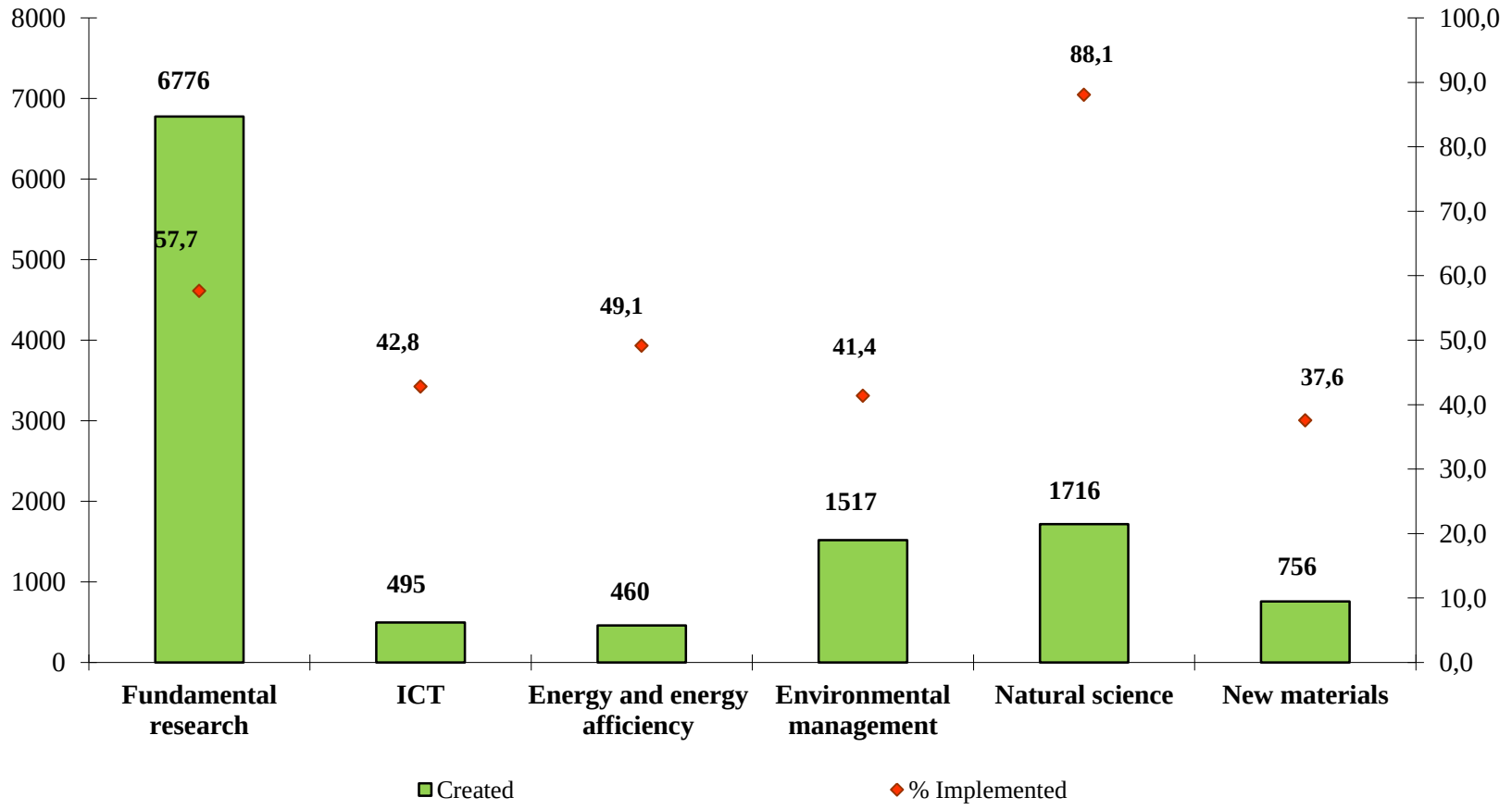
- wide application of technologies for cleaner production and environment protection



IT sector

- development of modern information, communication technologies, robotics

NUMBER OF DEVELOPED & IMPLEMENTED R&D PROJECTS BY SCIENTIFIC FIELDS



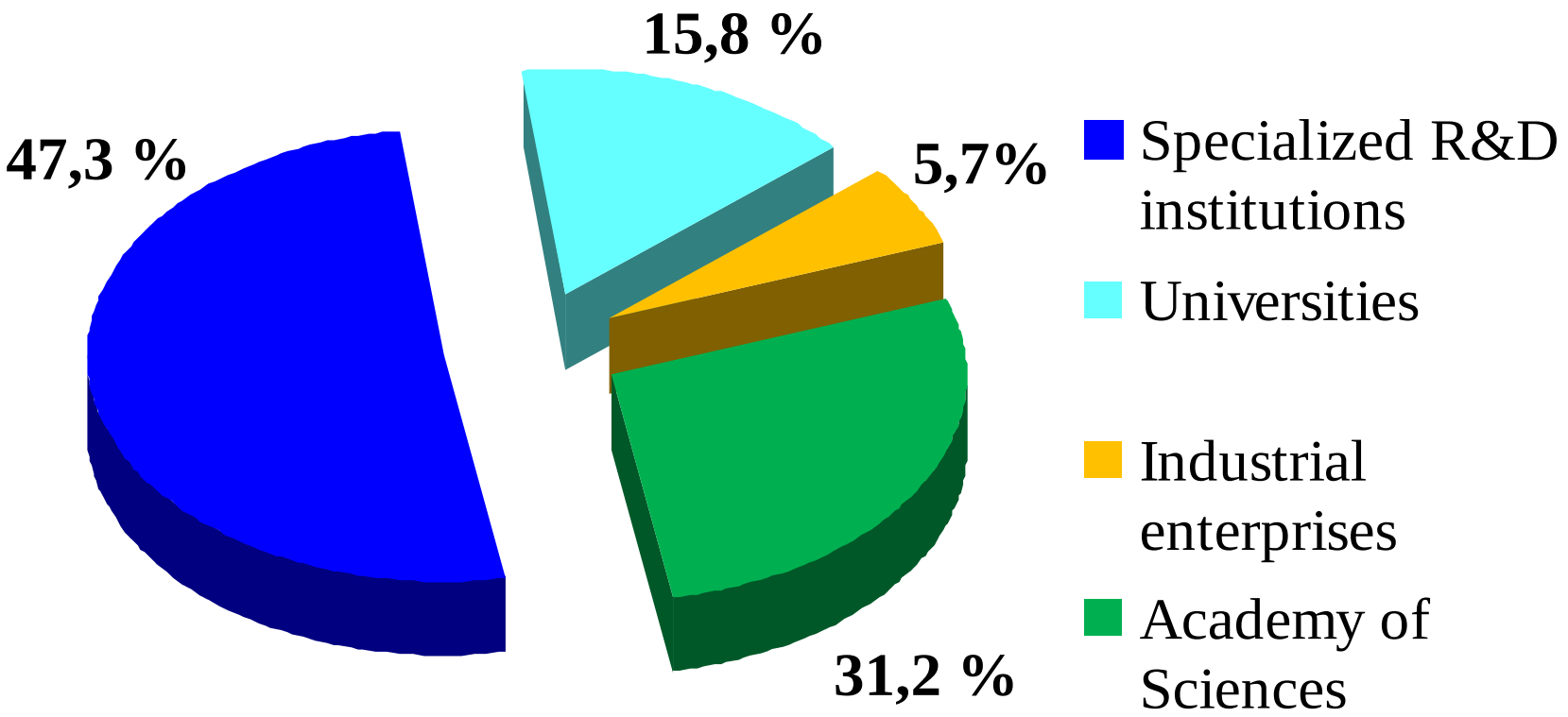
SPECTRUM OF ORGANIZATIONS INVOLVED IN THE SCIENCE AND TECHNOLOGY SECTOR (AS OF 2014)

The science sector in Ukraine is concentrated on four domains:

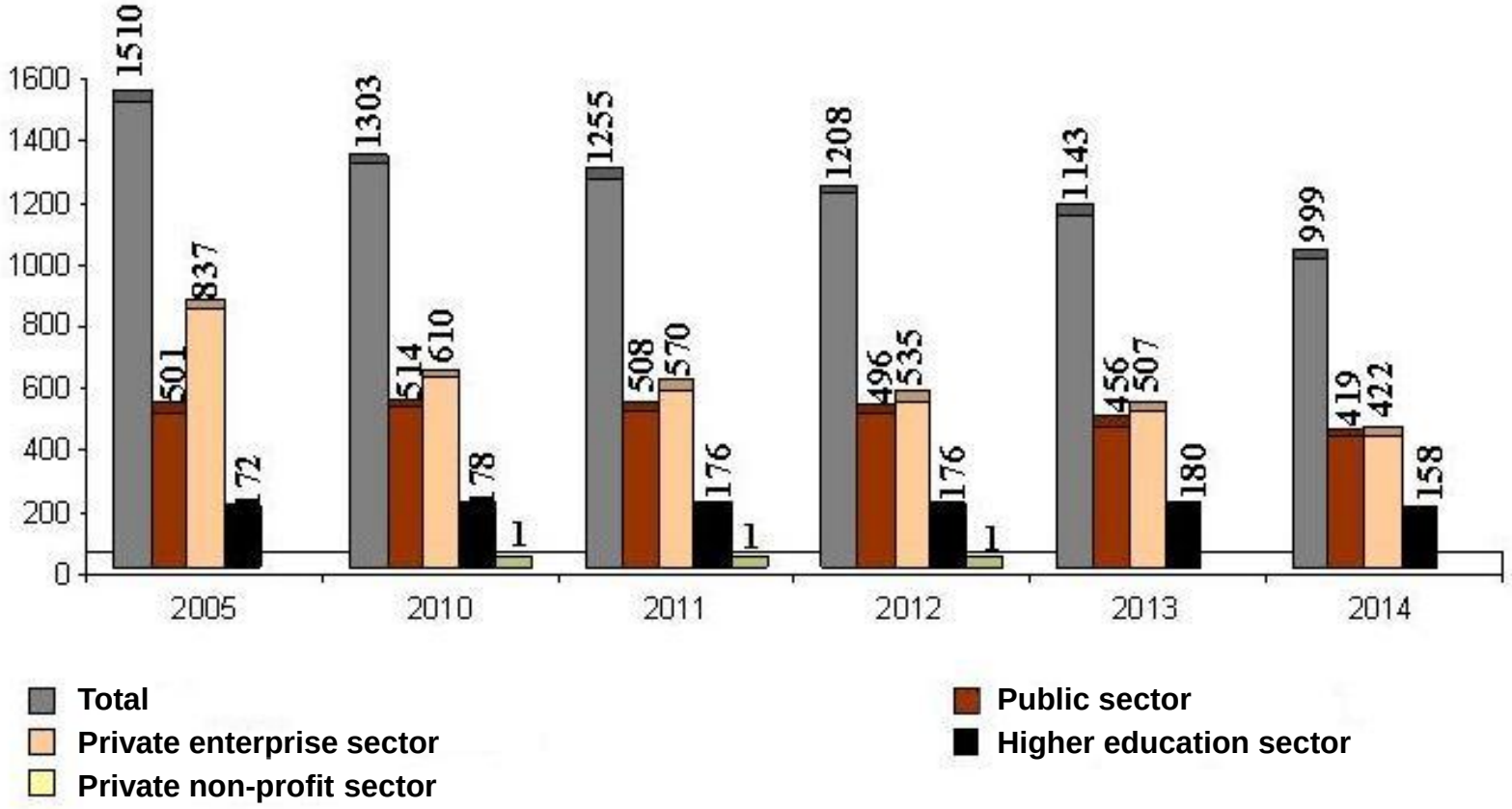
- **Academy of Sciences**
- **Universities**
- **State R&D**
- **Corporate R&D**

1143 organizations took part in performing research and development in 2014

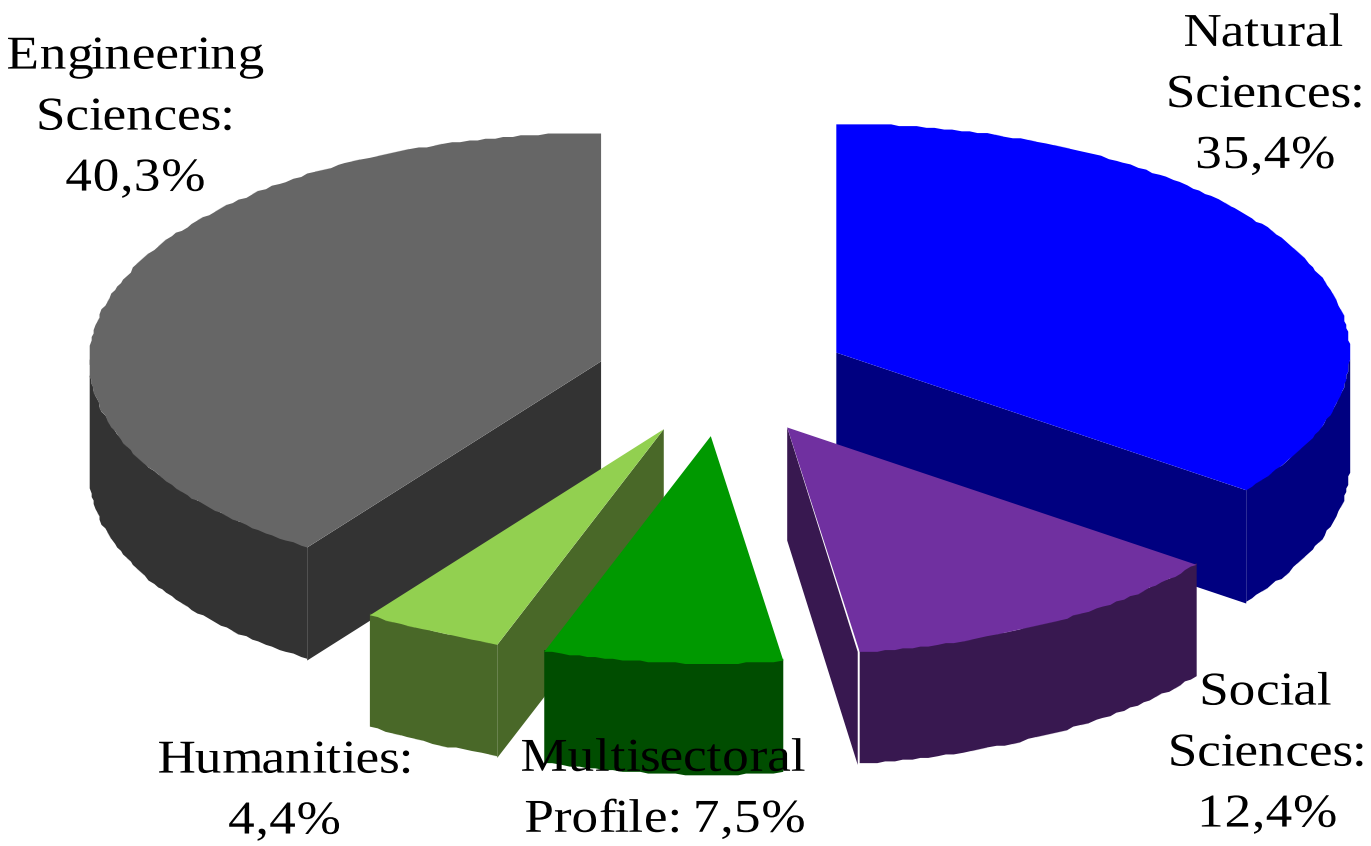
DISTRIBUTION OF ORGANIZATIONS IN ACCORDANCE WITH THE SECTOR OF SCIENCE (as of 2014)



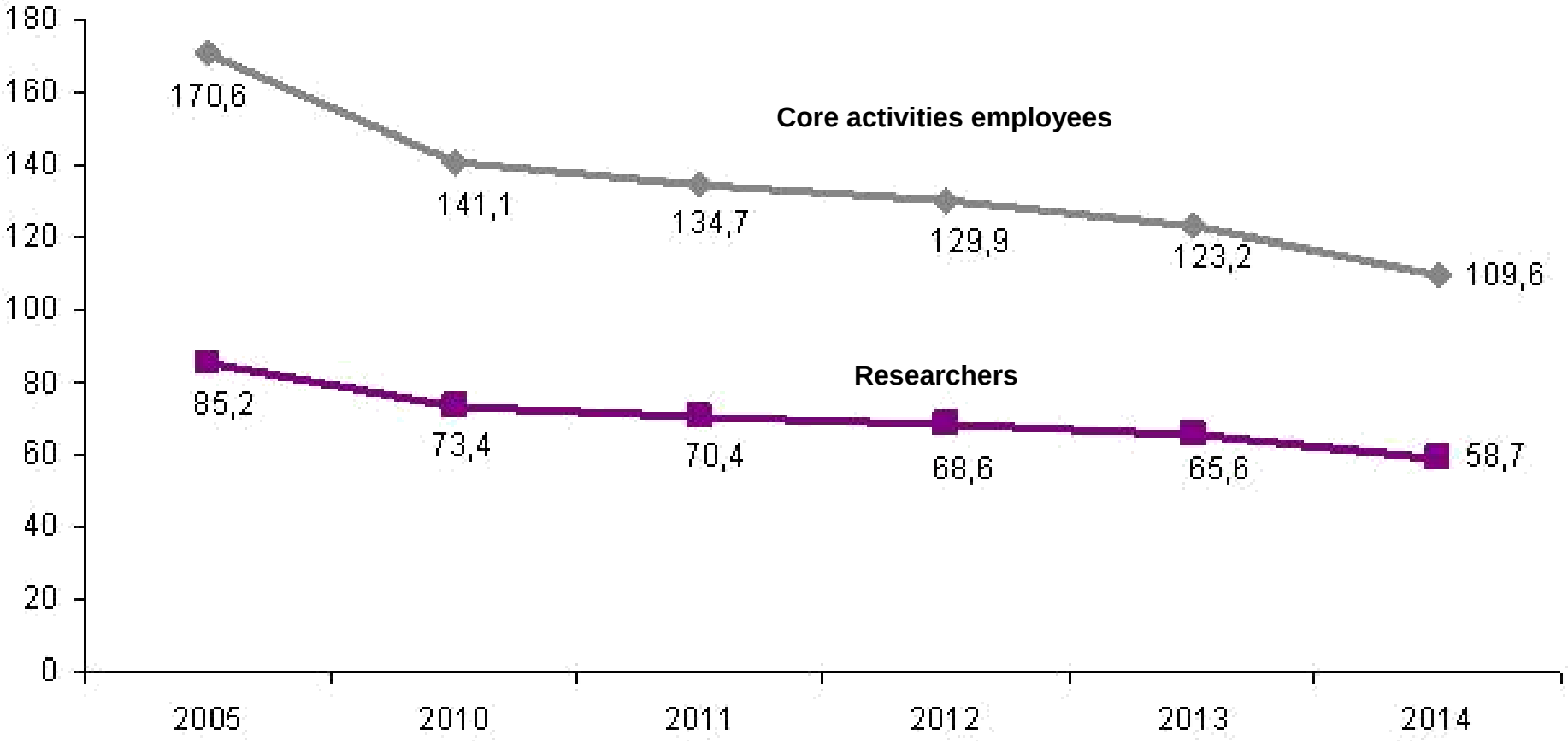
SPECTRUM OF ORGANIZATIONS INVOLVED IN THE SCIENCE AND TECHNOLOGY SECTOR FOR THE PERIOD 2005 - 2014



QUANTITY DISTRIBUTION OF ORGANIZATIONS INVOLVED IN THE SCIENCE AND TECHNOLOGY SECTOR (by branches of science,%)

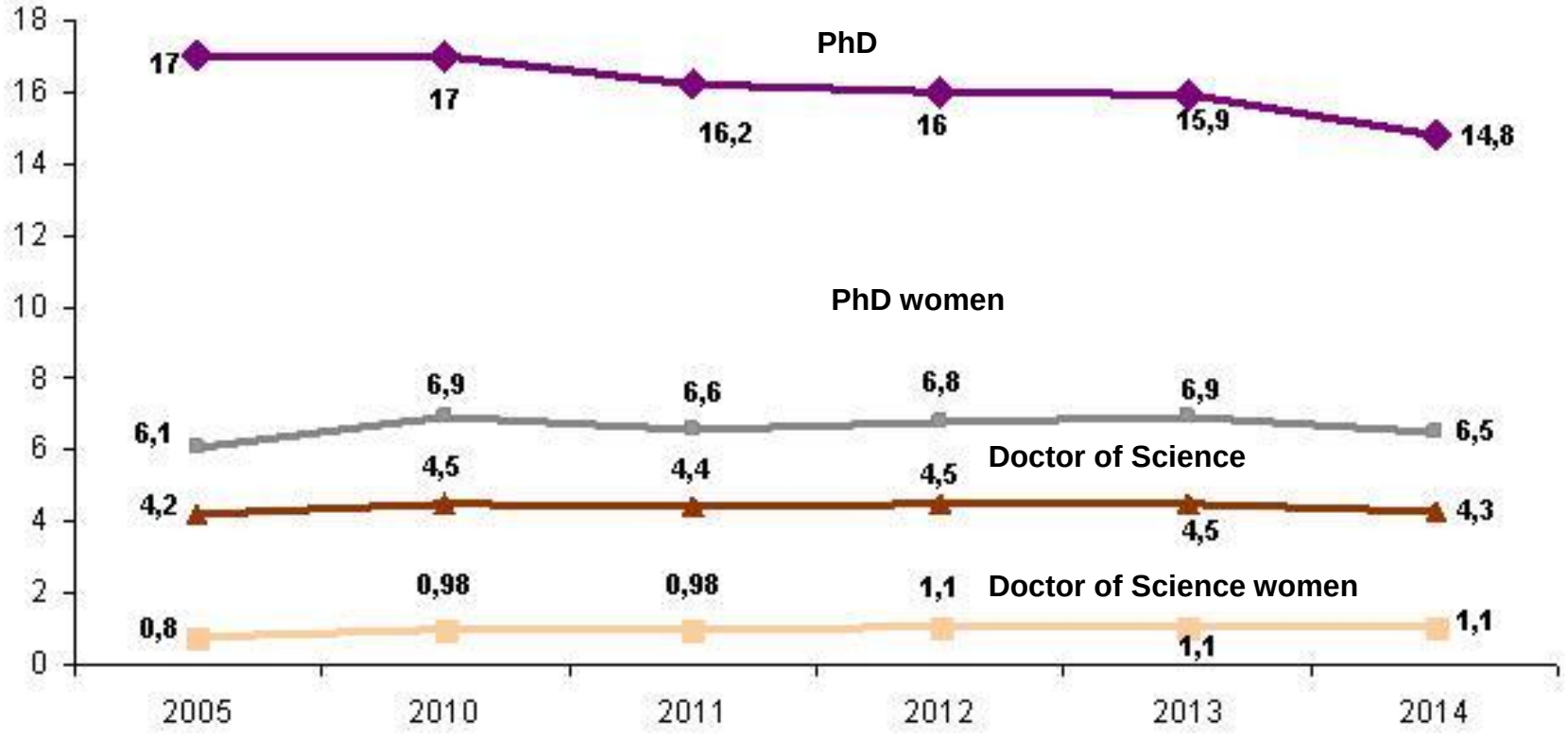


NUMBER OF EMPLOYEES INVOLVED IN THE RESEARCH AND DEVELOPMENT SECTOR FOR THE PERIOD 2005 – 2014

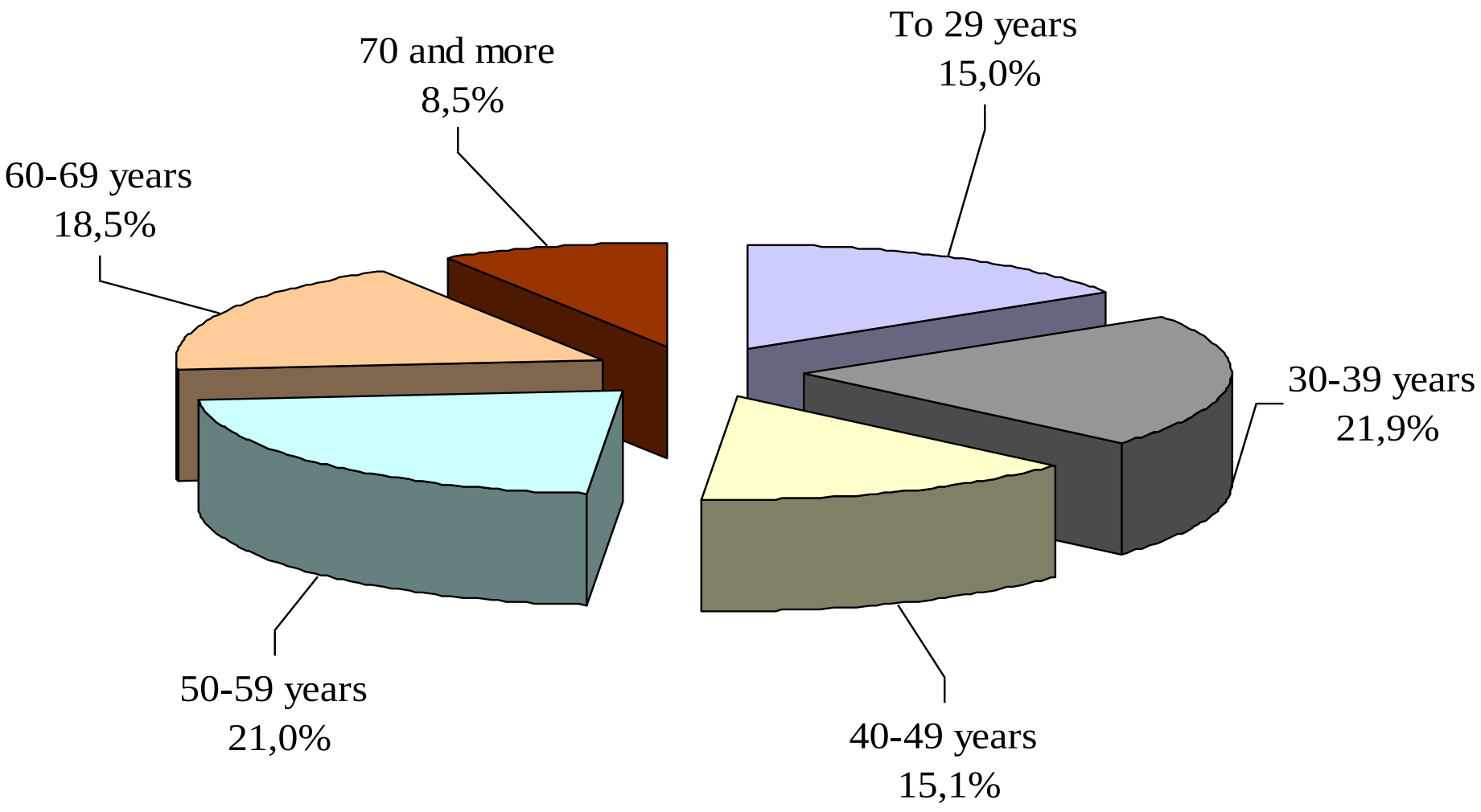


NUMBER OF EMPLOYEES WITH ACADEMIC DEGREE INVOLVED IN THE R&D

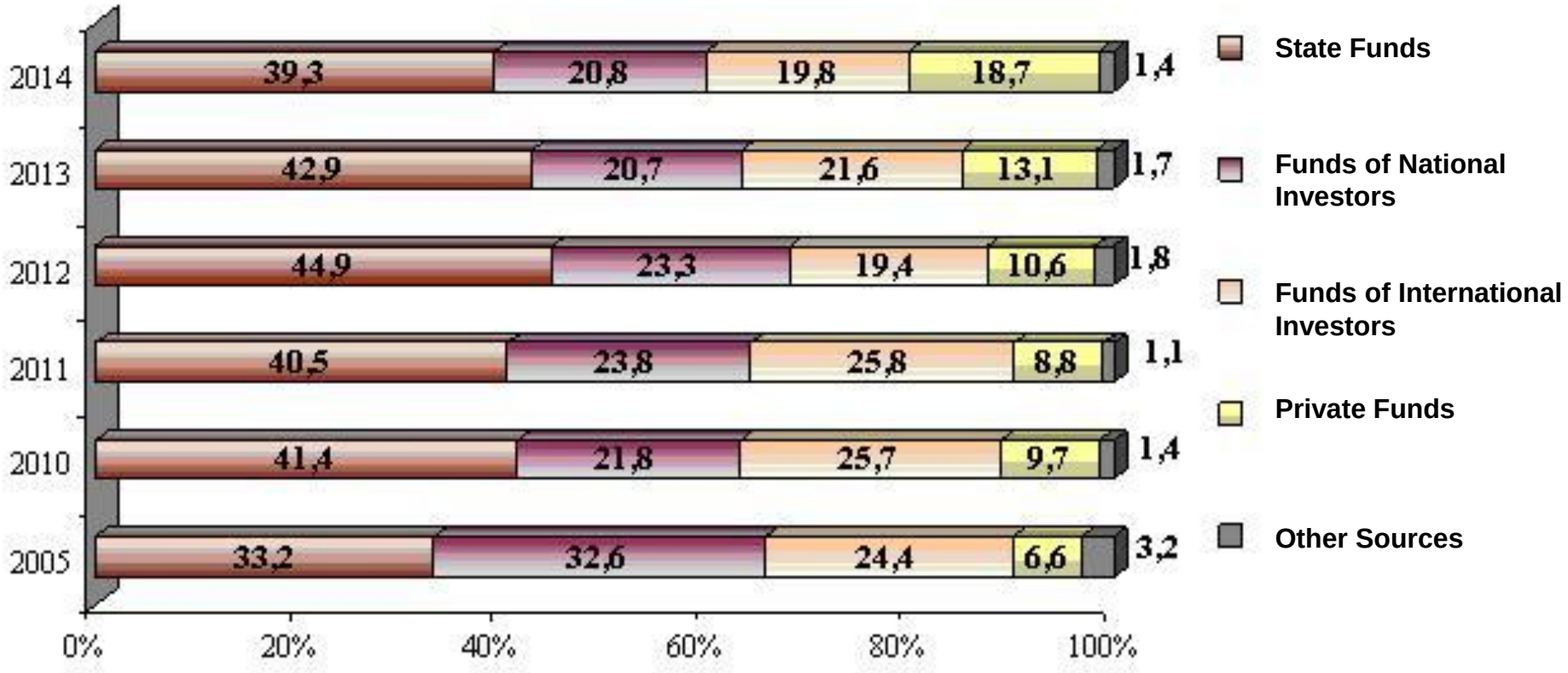
NUMBER OF EMPLOYEES WITH SCIENTIFIC DEGREE



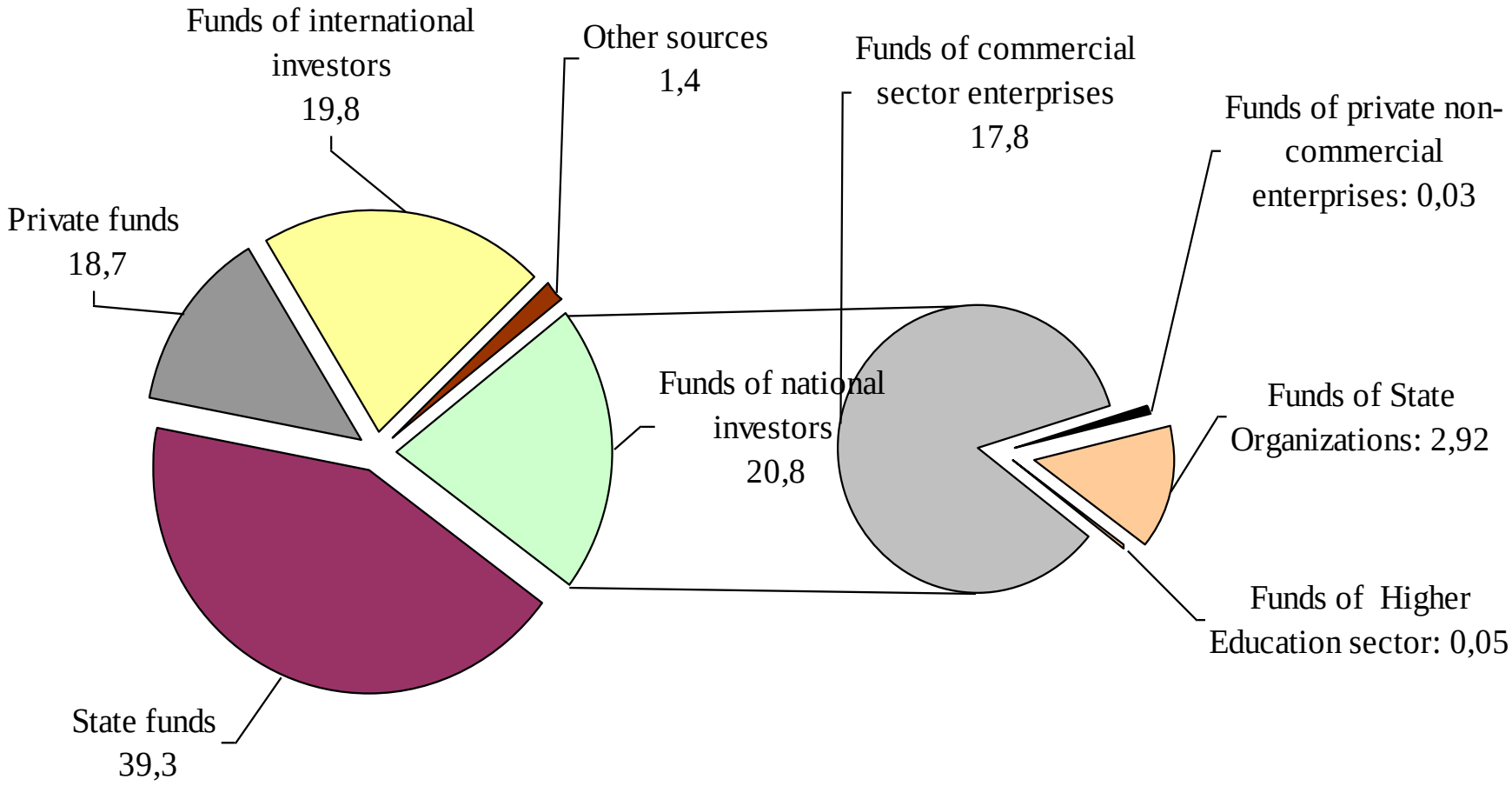
AGE DISTRIBUTION OF SCIENTISTS (as of 2014)



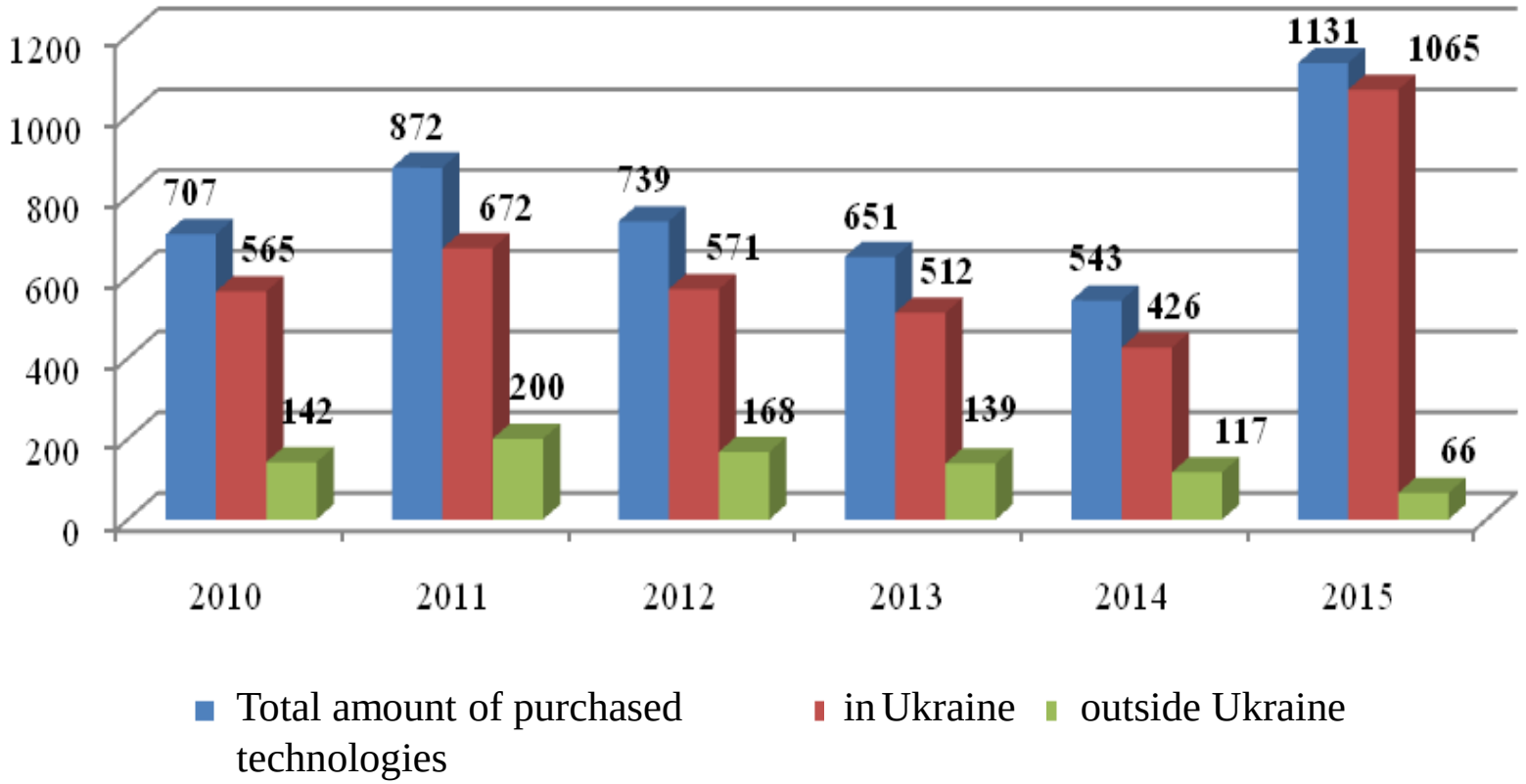
FUNDING OF THE SCIENCE AND TECHNOLOGY SECTOR FOR THE PERIOD 2005-2014



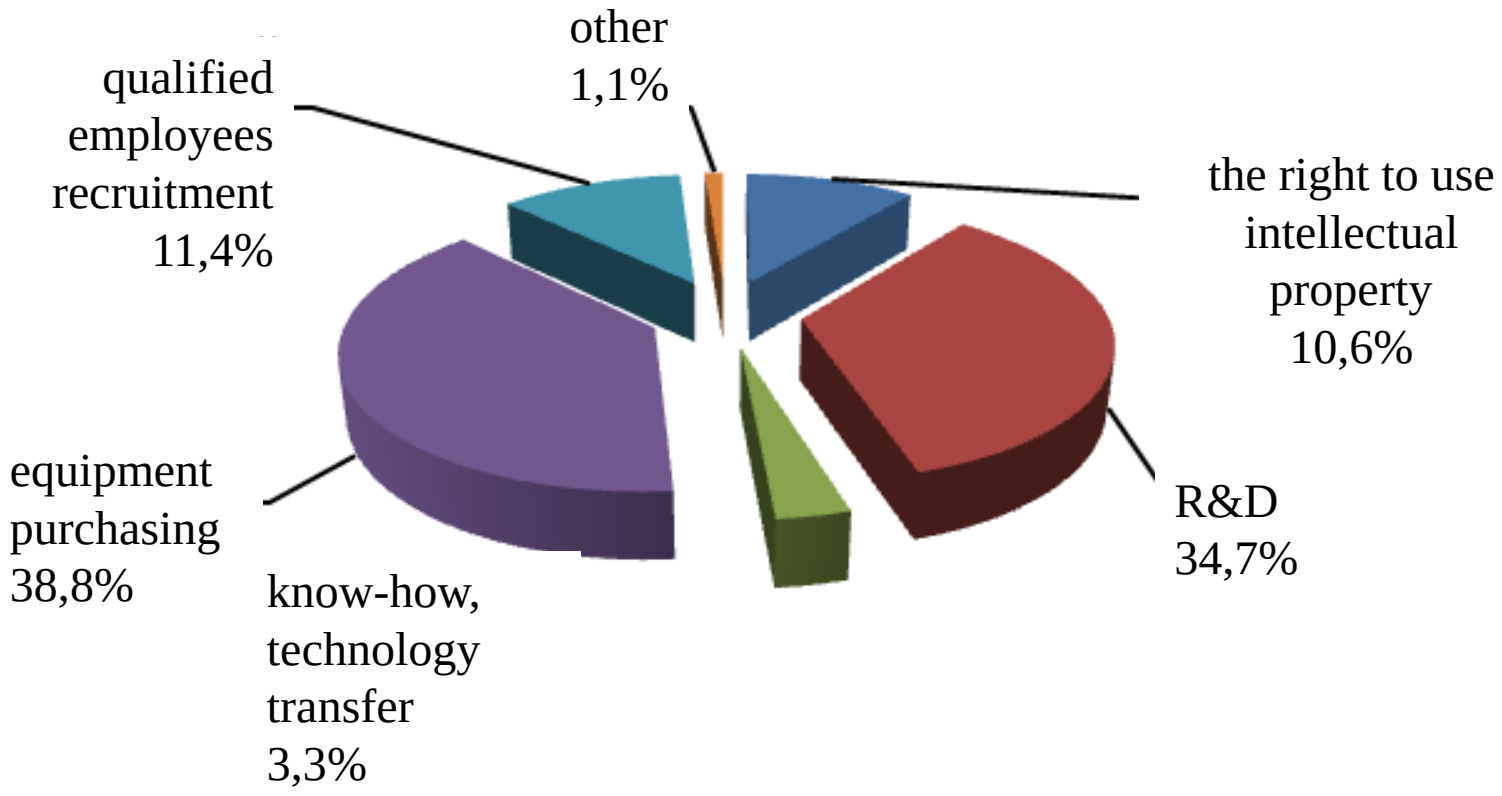
FUNDING DISTRIBUTION OF R&D BY SOURCE AND SECTORS (as of 2014)



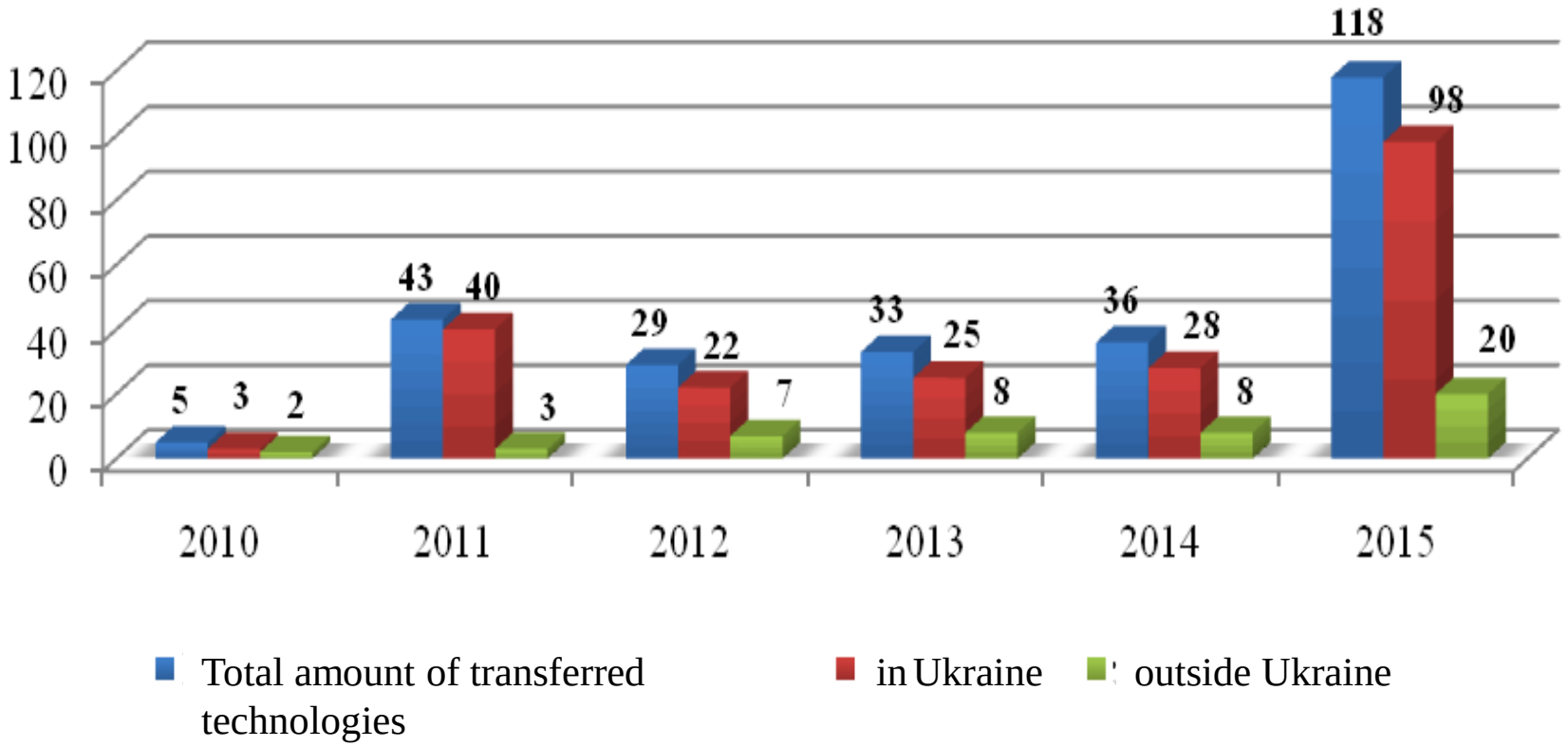
Dynamics of technologies, purchased by industrial enterprises, 2010-2015, items



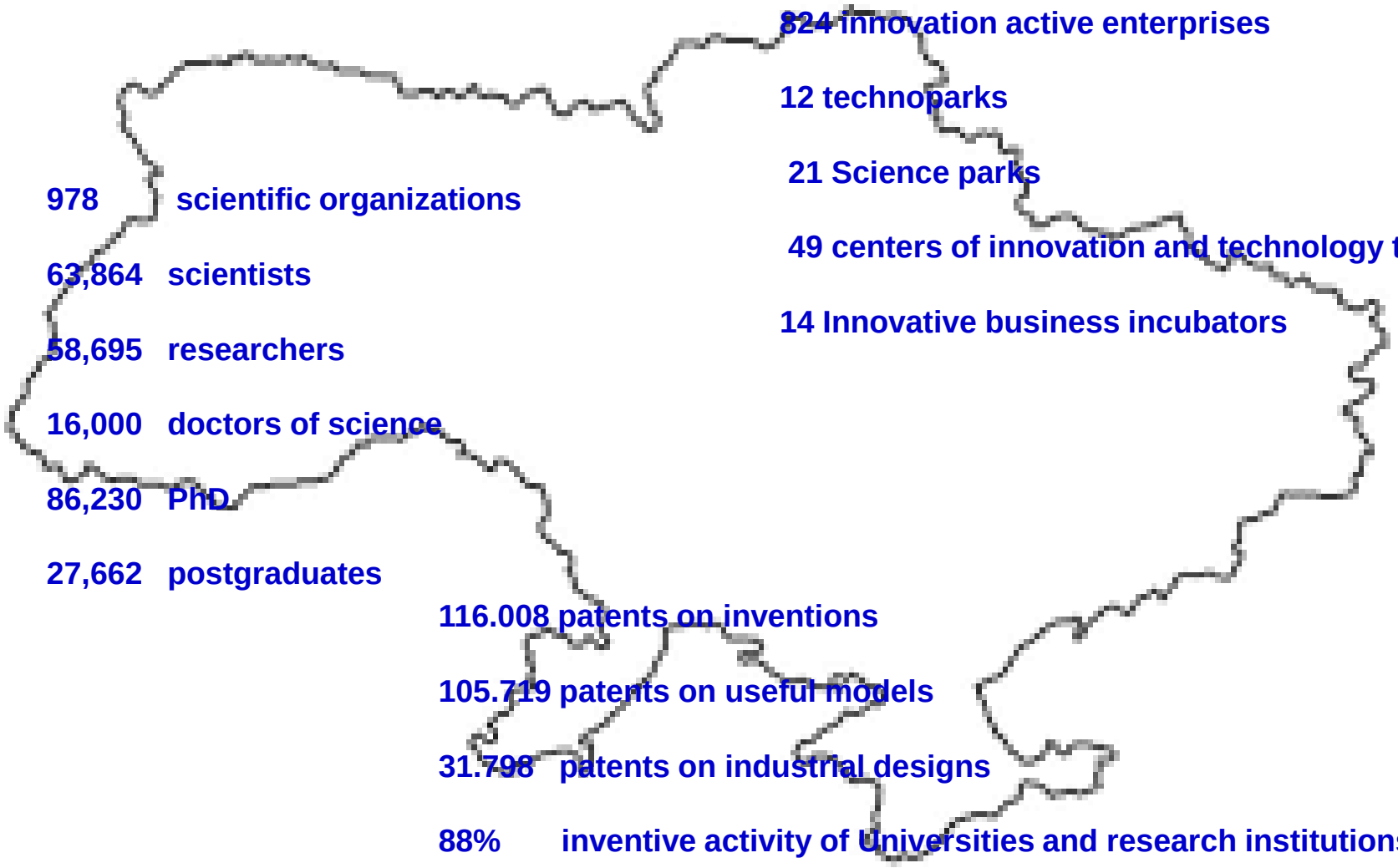
The structure of technologies, purchased by industrial enterprises, by forms, 2015, %



Dynamics of technologies, transferred by industrial enterprises, 2010-2015, items



National innovation system of Ukraine: key facts and figures



824 innovation active enterprises

12 technoparks

21 Science parks

49 centers of innovation and technology transfer

14 Innovative business incubators

978 scientific organizations

63,864 scientists

58,695 researchers

16,000 doctors of science

86,230 PhD

27,662 postgraduates

116.008 patents on inventions

105.719 patents on useful models

31.798 patents on industrial designs

88% inventive activity of Universities and research institutions

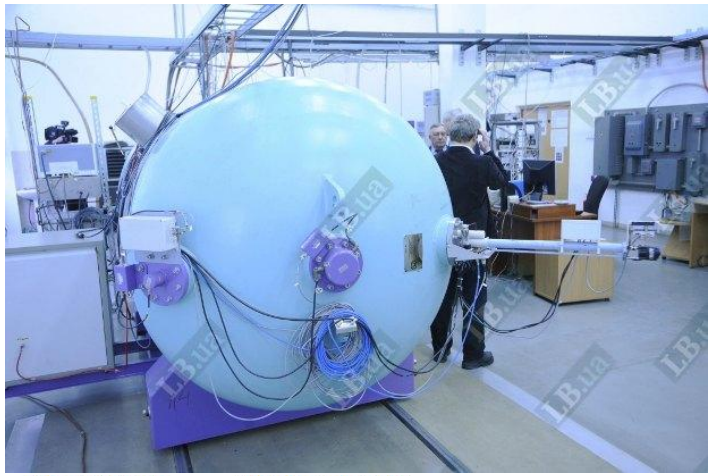
Projects of Technology Park "Y.O. Paton Institute of Electric Welding"

The technology of welding high-robust railroad rails.

The technology of welding soft living tissue.

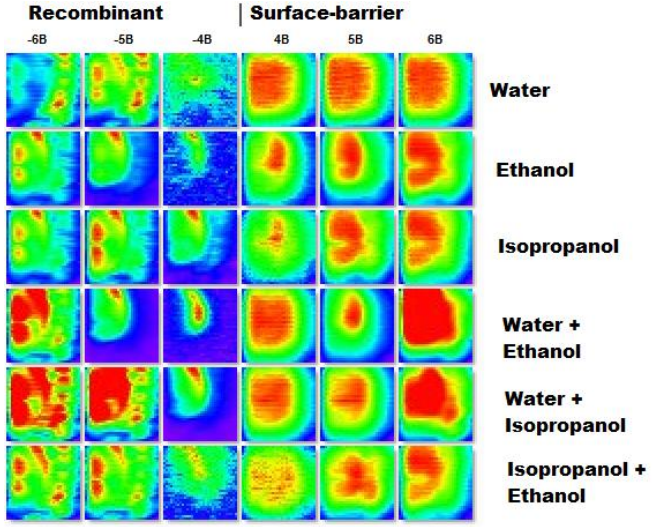
Stand-alone energy-saving system with using alternative energy sources.

Science Park
Taras Shevchenko University of Kyiv

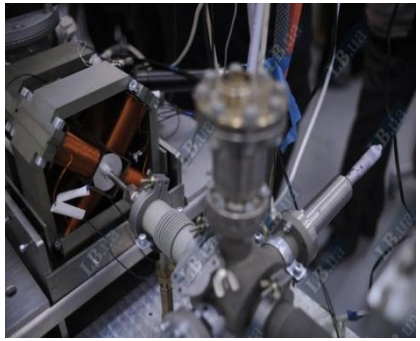


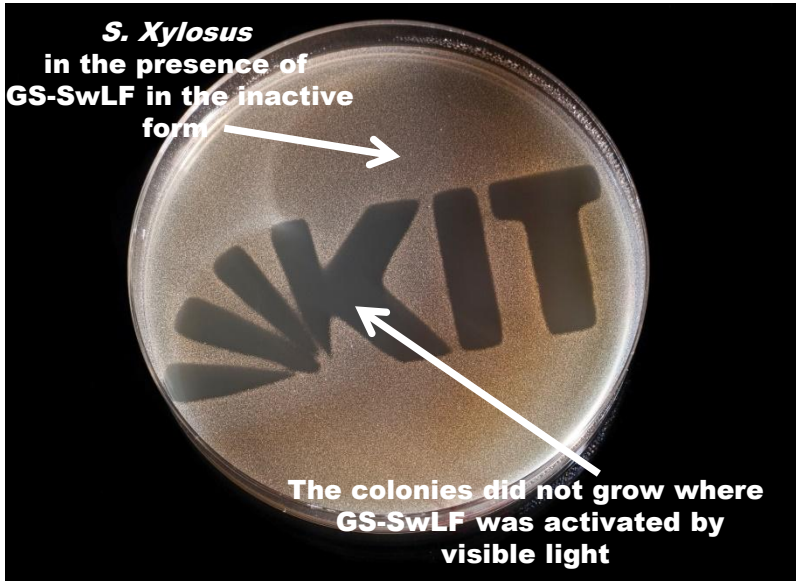
SCANNING NUCLEAR MICROPROBE

SILICON-BASED SEMICONDUCTING SENSOR (ELECTRONIC NOSE)



PHOTOCONTROL OF ANTIMICROBIAL ACTIVITY





Science park "Kyiv polytechnic"

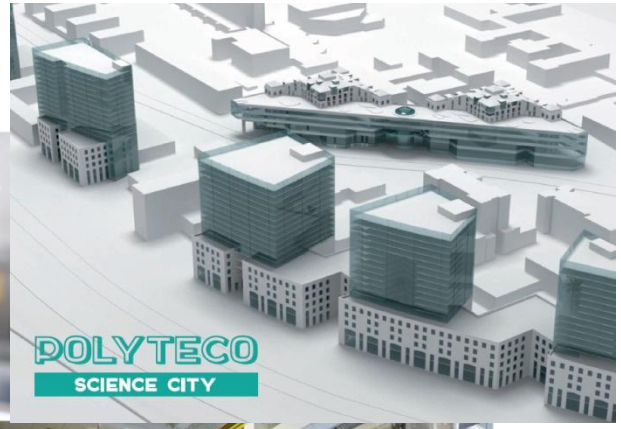
National Technical University of Ukraine "Kyiv Polytechnic Institute" Science Park "Kyivska Polytechnika"

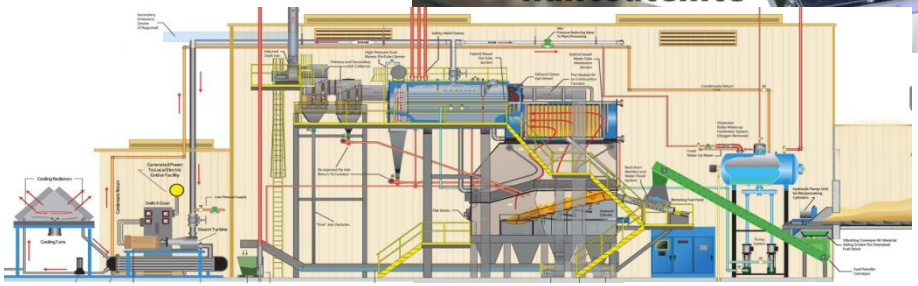
polyteco aero

Currently, the university implements 11 projects worth 10.2 mln. UAH.

Since 2012 the Science Park hosts the annual nationwide festival innovative projects «Sikorsky Challenge».

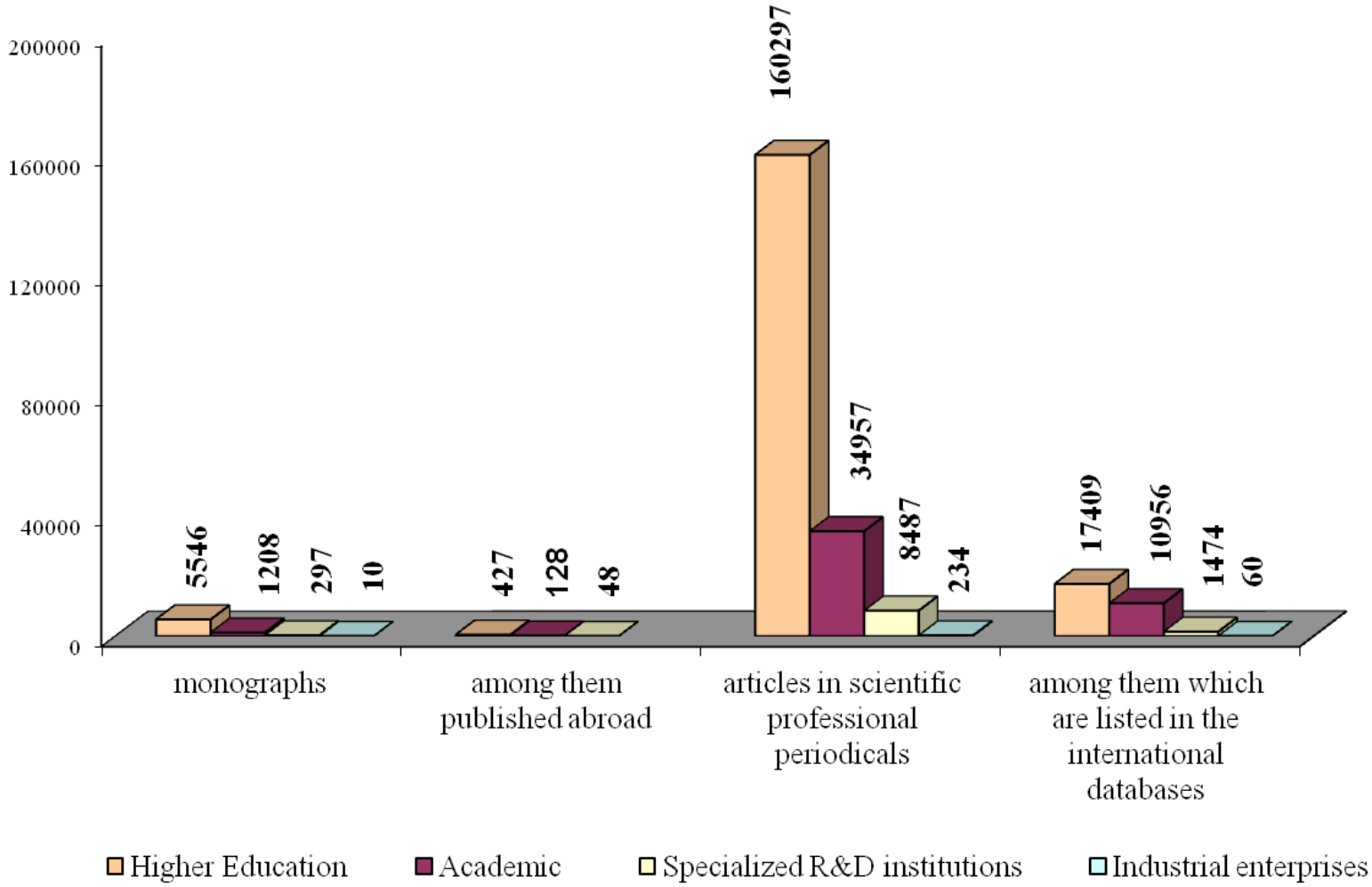
Winners of the Festival "Sikorsky Challenge -2015» signed agreements with venture capital, investment and charitable funds for investment of development worth over 573 million UAH.



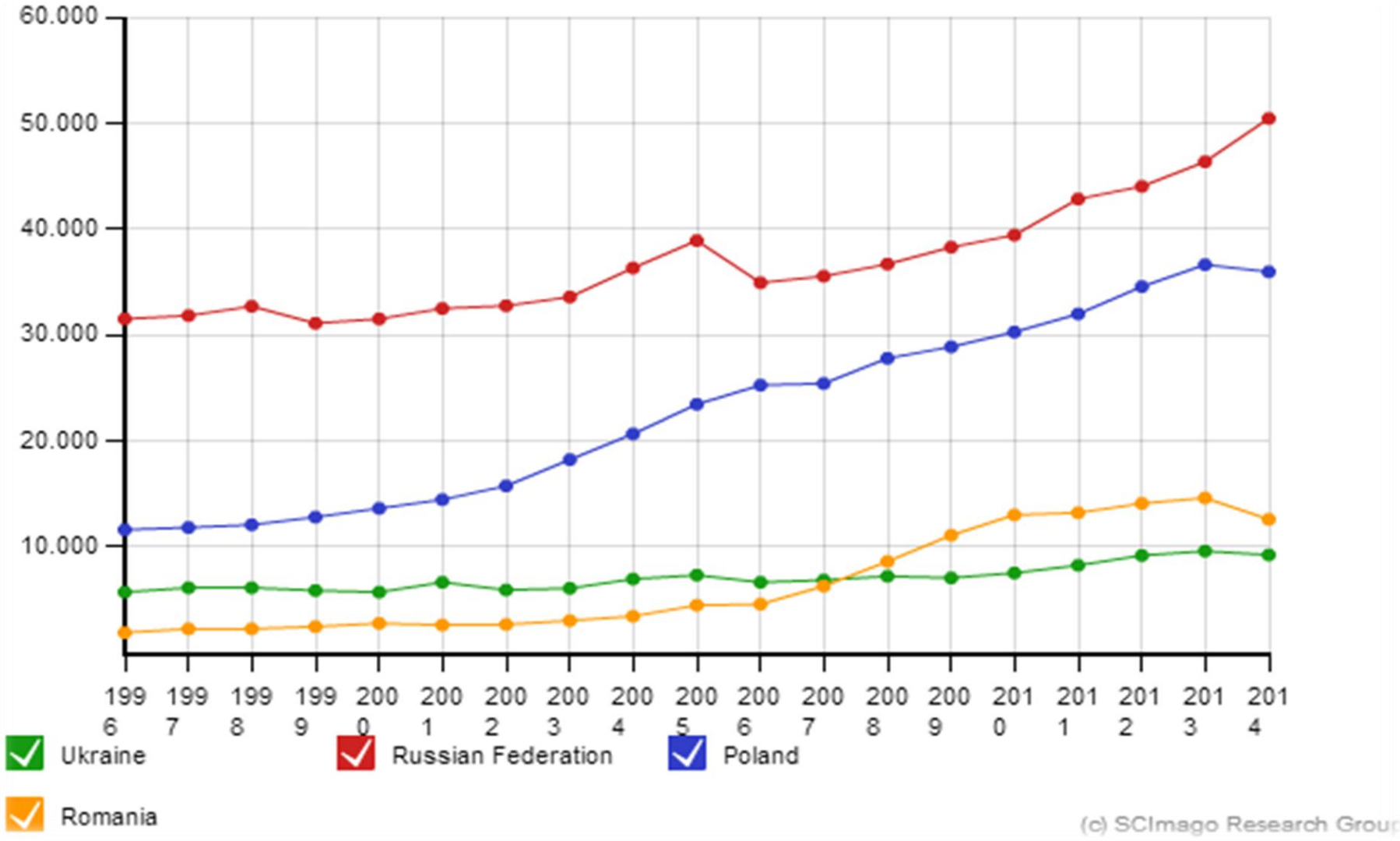


IV. Review of R&D projects results

DISTRIBUTION OF PUBLICATIONS BY SECTORS OF SCIENCE (UNITS)



Countries ranking due to publication activity (SCImago, 2014)



Ukrainian Science Overview according to Scopus data

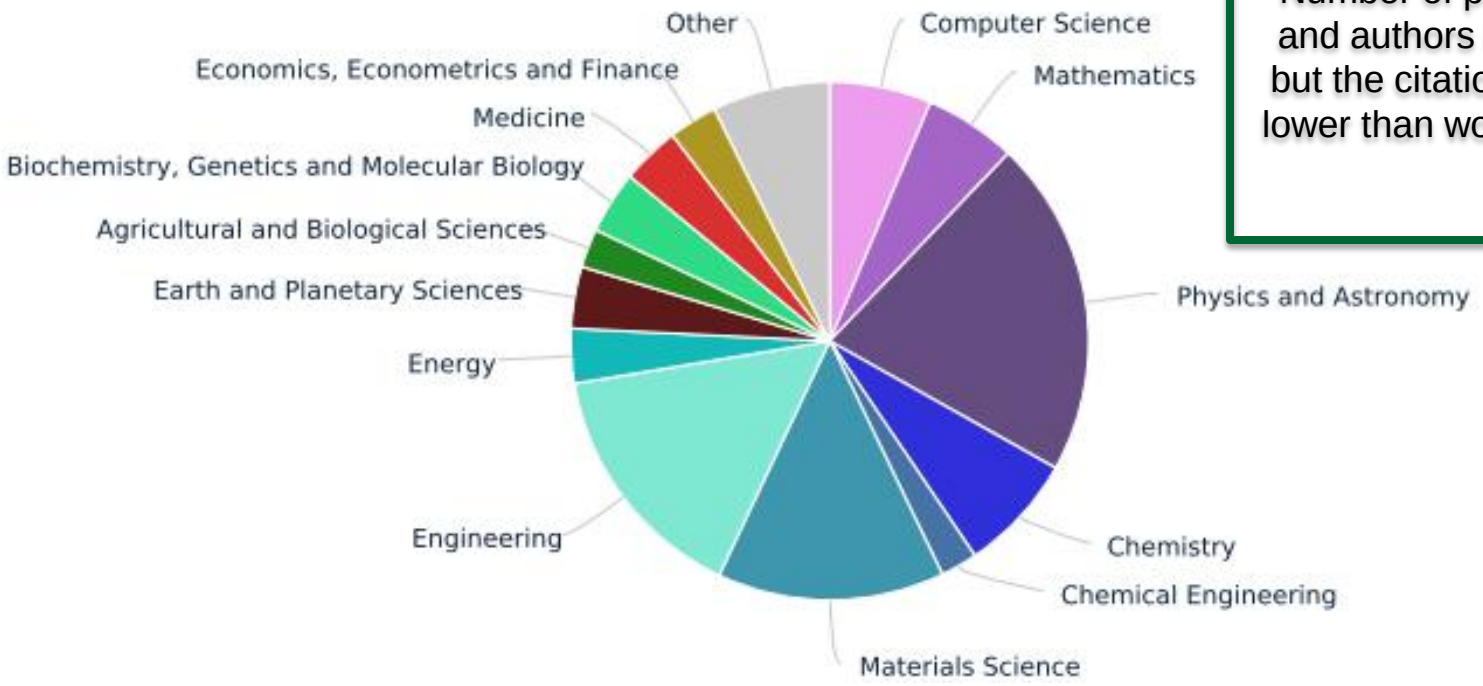
Ukraine

SciVal

Year range: 2012 to 2015

Publications	Citations	Authors	Field-Weighted Citation Impact	Citations per Publication
37,533 ▲	75,476	35,931 ▲	0.61	2.0

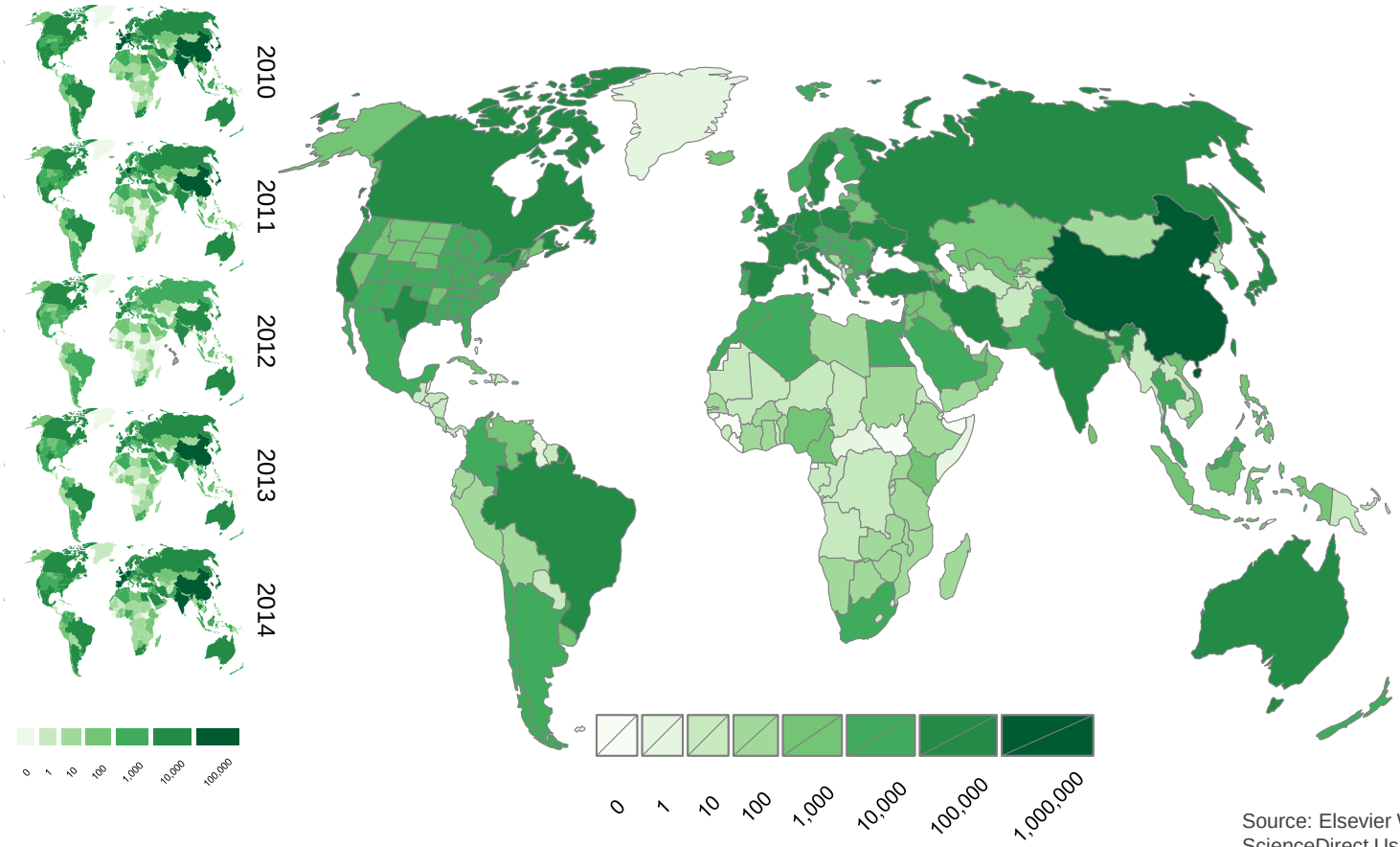
Publications by Subject Area



Number of publications and authors is growing, but the citation impact is lower than world average

ScienceDirect brings research from all over the world to Ukraine

Where in the world do the articles downloaded by Ukrainian researchers via ScienceDirect come from?



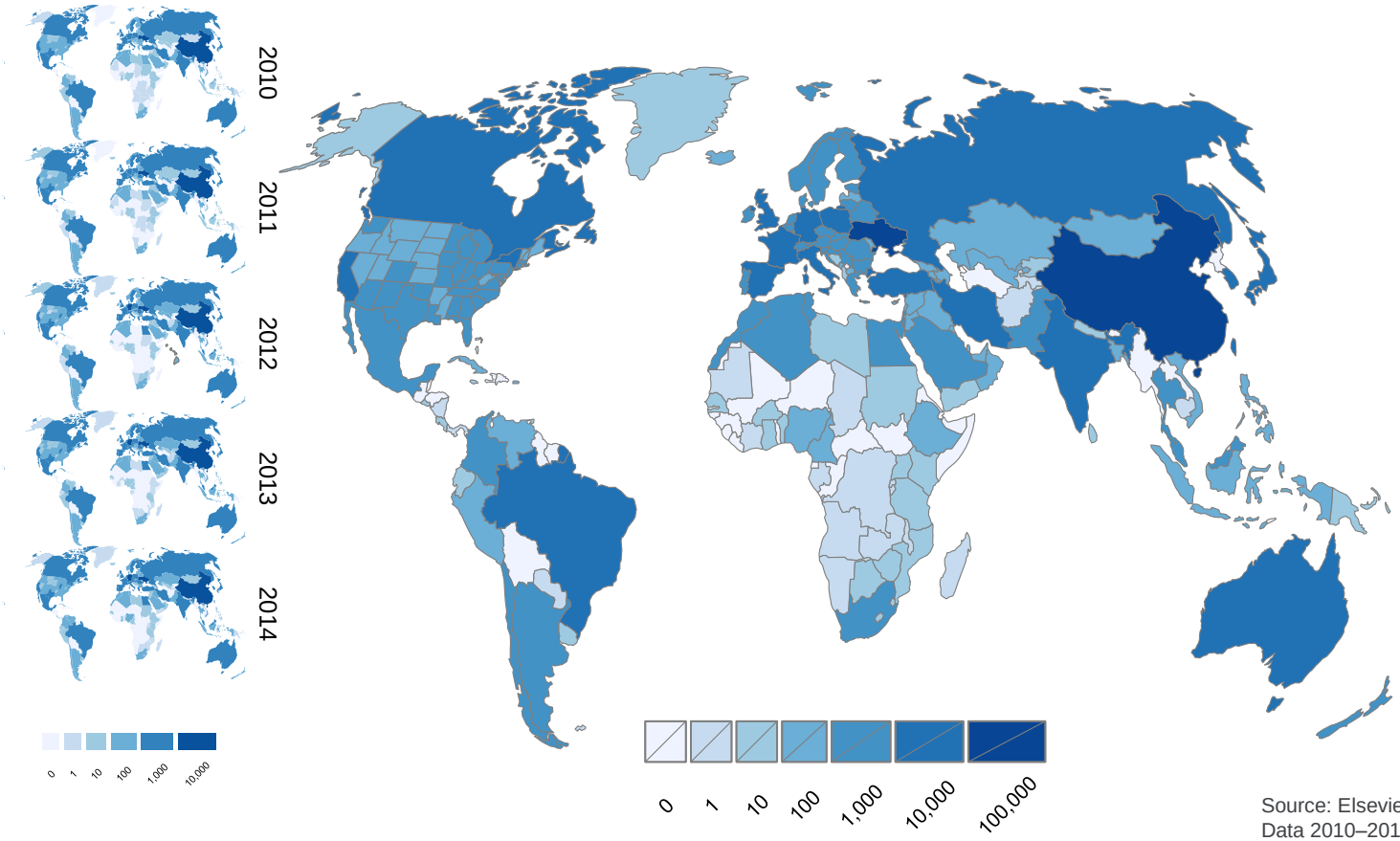
Top 20 Downloaded Countries	
United States	16.49 %
China	15.86 %
Japan	5.46 %
France	5.08 %
Germany	4.90 %
India	4.46 %
United Kingdom	4.36 %
Korea	3.57 %
Spain	3.30 %
Italy	3.29 %
Taiwan	2.61 %
Canada	2.57 %
Australia	2.03 %
Iran	1.79 %
Brazil	1.61 %
Poland	1.59 %
Russia	1.50 %
Turkey	1.42 %
Ukraine	1.36 %
Netherlands	1.28 %

Source: Elsevier Web Analytics Department, ScienceDirect Usage Data 2010–2014

In the last 5 years, researchers from Ukraine have downloaded on ScienceDirect 1,071,431 documents written in 211 countries.

ScienceDirect ensures research from Ukraine is used and recognised all over the world

Where articles authored by Ukraine affiliated researchers and published on ScienceDirect have been cited in the world?



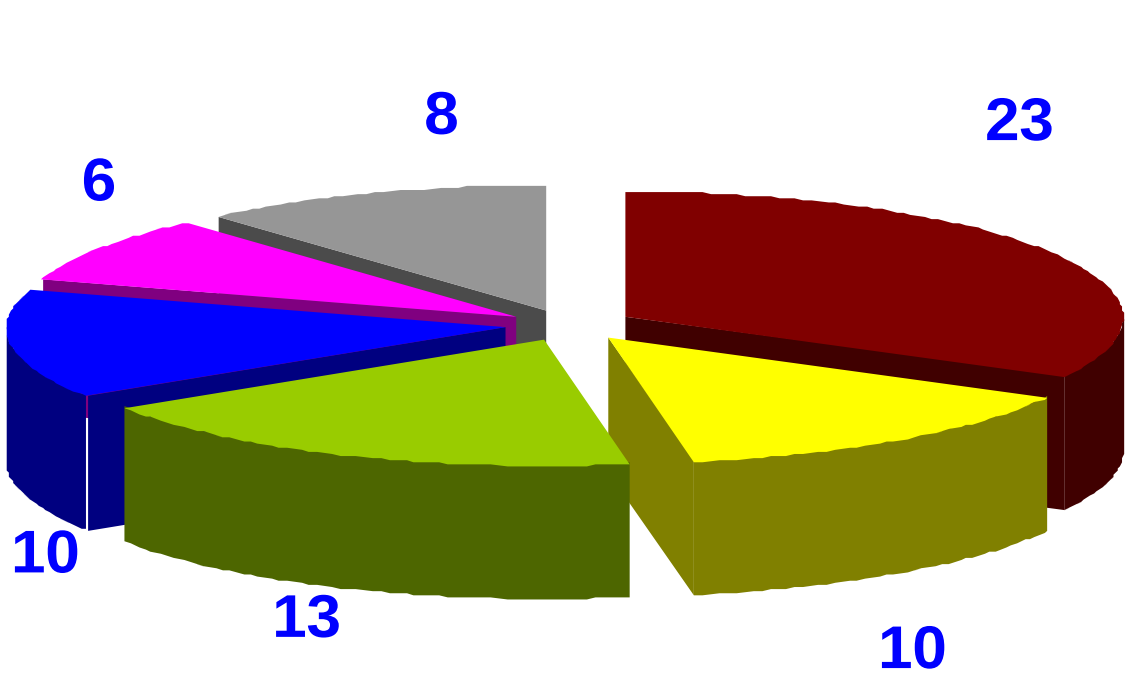
Top 20 Citing Countries	
China	13.60 %
Ukraine	12.78 %
United States	12.25 %
Germany	5.63 %
France	4.28 %
India	3.95 %
Italy	3.83 %
Russia	3.74 %
Poland	3.46 %
Japan	3.32 %
United Kingdom	3.31 %
Spain	2.79 %
Iran	1.84 %
Korea	1.81 %
Canada	1.70 %
Brazil	1.50 %
Turkey	1.40 %
Australia	1.25 %
Taiwan	1.07 %
Switzerland	1.01 %

Source: Elsevier Web Analytics Department, Scopus Data 2010–2014

In the last 5 years, articles from Ukraine affiliated authors and published on ScienceDirect, have been cited 97,651 times by authors from 169 countries.

IV. International cooperation in the science and technology sector

INTERNATIONAL AGREEMENTS IN THE SCIENCE AND TECHNOLOGY SECTOR BETWEEN UKRAINE AND OTHER COUNTRIES



- European Union countries
- CIS countries
- African and Middle East countries
- Asian and Pacif Region countries
- North and Southern American countries
- International Organizations

TOTAL: 70 AGREEMENTS

COOPERATION WITH INTERNATIONAL ORGANIZATIONS AND FUNDS

- Ukraine-EU
- Ukraine-NATO
- International European Innovation Scientific and Technical Program “EUREKA”
- U.S. Civilian Research and Development Foundation (CRDF)
- European Organization for Nuclear Research (CERN)
- Joint Institute for Nuclear Research (JINR)
- Organization of Black Sea Economical Cooperation (BSEC)
- Science and Technology Center in Ukraine (STCU)
- International Centre for Scientific and Technical Information (ICSTI)

UKRAINE IN HORIZON 2020

On 20 March 2015, Carlos Moedas, European Commissioner for Research, Science and Innovation and

Serhiy Kvit, Minister of Education and Science of Ukraine, signed the Horizon 2020 Association Agreement.

On 27 June 2016 Ukraine joined the Euratom Research and Training Programme

The agreement was signed in Brussels by Carlos Moedas, European Commissioner for Research, Science and Innovation, and Pavlo Klimkin, Minister of Foreign Affairs of Ukraine. The signing was in the presence of Petro Poroshenko, President of Ukraine.

Action Plan of Ukraine on participation in Horizon 2020

1. Establishment of a joint commission on the program implementation coordination with the participation of responsible central executive authorities, NASU, etc.
2. Establishment of a structural unit responsible for Horizon 2020 implementation
3. Functioning of Program Committees Delegates; selection of the delegates
4. NCP activities' support
8. Development of a Horizon 2020 National Portal (www.h2020.com.ua)
9. Raising awareness of society on Horizon 2020 programs and activities (Promotion, Information Campaign on the permanent basis)
10. Peer review of National science and innovation system
11. Adjustments of the national legal framework to European standards, improvement of R&D legislation (taxes, obligatory currency exchange, etc.)
12. Development of Science & Business partnerships
13. Involving Ukrainian scientific diaspora in Ukrainian R&D activities

Horizon 2020 First Calls Results 2014-2015-2016

459 submitted project proposals with **600** teams from Ukraine:

Higher Education Institutions– 214 teams (7.94%)

Private Institutions – 182 teams (9.89%)

Research Institutions – 149 teams (12.08%)

44 projects supported for funding with **60** teams from Ukraine and **7 601 574** Euro Budget allocated to Ukrainian participants

Success rate 9.59%

Challenges

1. Russian occupation of Crimea, Donetsk and Luhansk (>5 mln population)
2. 1,7 mln refugees
3. 27 universities and scientific institutions, over 12000 researchers and university teachers relocated from Donetsk and Luhansk to other regions (thousands of researchers and university teachers)
4. Budget crisis caused by war (decrease of GPD – 20%)
5. Inertness of main stakeholders (NAS, National branch academies)

Answers to challenges

- Implementation the Law of Ukraine "On scientific and scientific-technical activity“
- The new Law of Ukraine "On innovation activity“ is to be adopted
- Ukraine should use all instruments and possibilities of Horizon-2020

Priority topics of the Peer Review of Ukrainian research and innovation system

I. Optimization of available policy instruments to support the national research system

- Which research are most promising in Ukraine in terms of potential and trends of world science development?
- How effective is the established practice to support the national research system and new tools introduced by Law "On scientific and technical activity"?
- What are the recommendations for improving these tools (in particular, the evaluation system of scientific results and scientific institutions, system of institutional and project financing, research coordination system at national level? etc.)?
- What regulatory and institutional factors and practices hinder the researches mobility (cross- sectoral, internal and external mobility)?
- How scientists and researchers mobility should be improved?

Priority topics of the Peer Review of Ukrainian research and innovation system

II. Internationalization of research and integration of Ukraine into the European Research Area

- What factors hinder the complete integration of Ukraine into ERA and what can be advised for neutralizing these factors?
- What are the priorities/priority steps for integration into the ERA, taking into account existing structure of scientific system?
- What research areas in Ukraine (in term of available capacity and program structure) are of high priority in term of participation in “Horizon 2020” projects and which tools should be used to improve the Ukrainian participation in the program?
- What mechanism can be used to enhance the interest of Ukrainian SMEs to participate in the program?
- Which EU support programs (Commission’s Structural Reform Support Service) can be effectively used in Ukraine?

Priority topics of the Peer Review of Ukrainian research and innovation system

III. Role of science in Ukrainian innovations development

- Which sectors of Ukrainian economy are the highest priorities in terms of innovations implementation and which can mostly influence the further development of economy and society as a whole?
- What factors nowadays hinder the development of innovation system in Ukraine, efficient communication between the national research system and business?
- What are the recommendations for overcoming these factors, what support instrument should be established to ensure effective growth strategies?

Thank you for your attention!