

NATIONAL ACADEMY OF SCIENCES OF UKRAINE: STATISTICAL AND SCIENTOMETRIC ANALYSIS OF EFFECTIVENESS OF SCIENTIFIC POTENTIAL



NATIONAL ACADEMY OF SCIENCES OF UKRAINE

State Institution “G.M. Dobrov Institute for Scientific and Technological Potential
and Science History Studies”

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OF UKRAINE: STATISTICAL
AND SCIENTOMETRIC ANALYSIS
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The guide contains basic statistical data on scientific and technical potential and
performance of the National Academy of Sciences of Ukraine. Materials of guide give an idea of
the place and the role of the National Academy of Sciences of Ukraine in the scientific
institutions of the state, including in the context of the sector and in the global context. Statistical
data mainly cover the period from 2010 to 2014. In preparing the guide benefited the State
Statistics Service of Ukraine, the annual reports of the National Academy of Sciences of Ukraine
and international scientometric databases and scientific publications. The publication is intended
for representatives of public authorities, researchers, university students, journalists and the
general public.

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Abbreviation

NAS of Ukraine	National Academy of Sciences of Ukraine
MES	Ministry of Education and Science of Ukraine
IAAS	International Association of Academies of Sciences
CIS	Commonwealth of Independent States
OECD	Organization for Economic Cooperation and Development - an international organization that brings together 34 of the most economically developed countries in the world - most States of the European Union, the USA, Australia, Switzerland, Norway, South Korea, and Japan.
G-20	Twenty Group is a group of finance ministers and central bank governors of 20 countries: 19 of the largest economies in the world and the European Union. Members of the "twenty" are Argentina, Australia, Brazil, Great Britain, India, Indonesia, Italy, China, Korea, Mexico, Germany, South Africa, Russia, Saudi Arabia, US, Turkey, France, Japan, and the European Union.
IAP	InterAcademy Panel on International Issues
TWAS	Academy of Sciences for science development in developing countries (The World Academy of Sciences for the advancement of science in developing countries)

Legend

A dash (–)	– data not available and not included in total
The dots (...)	– data not applicable
Zero (0; 0,0)	– negligible value
The symbol (×)	– filling in character building category table does not make sense
"Including", "them"	– meaning that all of terms are not total

FOREWORD

The scientific edition "National Academy of Sciences of Ukraine: Statistical and Scientometric Analysis of Efficiency of Scientific Potential", is a realization of an idea launched two years ago to publish a reference book on a regular basis. The second edition, in the same way as the first¹, contains main data on the status and research activity and scientific output of the National Academy of Sciences of Ukraine, including the monitoring of the NAS of Ukraine. As in the first issue, the reference book is complemented with data from the last three years and additional indexes.

The content and structure of this publication is retained. The purpose of the authors is to show background and statistical materials should objectively reflect both the status and the role of the NAS of Ukraine in the science and technology system of the country and in a global context.

Structurally, the guide consists of *nine* sections.

The *first* section contains key information on the status, governing bodies, science and technology capacities and main directions as well as information on the scientific output of the Academy (cooperation with educational institutions, coordination of the research, innovation activity and implementation of scientific developments, publishing and expert activities as well as international cooperation). Texts of the articles of the Law of Ukraine "On Scientific and Technical Activities" adopted last fall year (valid from January 2016) are given. The Law regulates the legal regime of the academic sector of Science and Technology of Ukraine.

The *second* section provides a brief overview of information and data on types, prevalence and significance of the academic

¹ National Academy of Sciences of Ukraine, Scientometric and Statistical Analysis of Scientific Potential Efficiency: / B.A. Malitsky, O.O. Grachev, V.A. Kornilov, V.P. Rybachuk, V.I. Etokov, V.I. Horevin, N.G. Videnina, L.R. Golovashchenko; Editor-in-Chief. Corresponding Member of NAS of Ukraine V.L. Bogdanov; NAS of Ukraine, G.M. Dobrov Center for Scientific.-Tech. Potential and Science History Studies - K: Phoenix, 2014. – 142 p.

form of S&T organization existing in 114 countries of the world. Trends of an academy's formation of sciences, the first of which appeared in the seventeenth century, as well as international cooperation of contemporary academies and their associations, is characterized.

The *third* section contains information reflecting the status of the NAS of Ukraine in the national S&T system: R&D capacity data of national sectoral academies of sciences of Ukraine and key ministries comparisons (e.g. Ministry of Education and Science, Ministry of Healthcare care, Ministry of Agrarian Policy and Food, Ministry of Energy and Coal Industry).

In the *fourth* section, statistical data and a brief comment on the personal membership (full members, or academicians, corresponding and foreign members) of the NAS of Ukraine and its achievements are discussed. Some reports, initiated in the previous edition of the guide, raised interest from the readers.

The *fifth* section is devoted to the statistical data on output of research activity and achievements reflecting scientific efficiency of NAS research institutions: publication and patent activities, participation in state scientific and technological programs, etc.

The *sixth* section includes statistical indicators on international cooperation of scientific organizations of the NAS of Ukraine, sectoral national academies of sciences and some ministries, concerning foreign trips, participation in international conferences, performance of research on international grants, etc.

The *seventh* section - "NAS of Ukraine in domestic and global information space", logically linked to the previous one, presents the scientometric estimations of representation of the Academy's institutions and periodicals of Ukraine in the international databases of scientific publications, and also in the world rankings of scientific centers. The nomenclature of

journals of the NAS of Ukraine, reprinted in foreign languages abroad or published in English in Ukraine, is discussed.

This issue of the publication is supplemented with a special (*eighth*) section, presenting comparative data on scientific and technological efficiency in Ukraine and other countries, especially the EU. The data given in this section largely shows the significance of the S&T sphere in social relations within the country and their role, assigned to them by governing bodies (government, parliament, president) in achieving sustainable development, solving pressing issues and meeting the spiritual, social and economic needs of society.

The *ninth* section deals with information on the capacity and output indicators of research activity of departments, research institutions and the design and manufacturing enterprises of the NAS of Ukraine using data from departmental Statistics.

Finally, the basic methodological explanations used in statistical catalogues of the State Statistics Service of Ukraine «Scientific and Innovation activities in Ukraine» are set out. Methodological explanations to sections II, IV, V and VIII are also given in the notes, footnotes to tables, and figures. Additional indicators in Section IX are filled in accordance with the methodology of departmental statistics of the NAS of Ukraine.

The data book is based on statistical information from state and departmental statistics, materials from some publications and web search systems and databases.

The main statistical data covers the last five-year period - from 2010 to 2014. In some cases, information from an earlier period is shown, including data for 2015 where possible.

The information is presented in 156 Tables and 65 Figures grouped by indicator types in the 67 blocks (listed in the publication content)

This guide is the second publication of this type, prepared in the G.M. Dobrov Institute for Scientific and Technological Potential and Science History Studies of the NAS of Ukraine.

The authors wish to express their gratitude to all colleagues for providing feedback, comments and advice to the first edition and hope for further constructive cooperation in preparation future issues of the guide.

The data book is addressed to government officials, research community, university students, journalists and a wider audience. The authors consider they have reached their objective if the book promotes impartial reasoning when discussing problems and elaboration of proposals and decisions on development of domestic S&T in general and the National Academy of Sciences of Ukraine in particular.

I. NATIONAL ACADEMY OF SCIENCES OF UKRAINE

The National Academy of Sciences was founded in November 1918 due to the efforts of V.I. Vernadsky, an outstanding scientist, and many other well-known Ukrainian scientists and government officials.

From the early days of its existence, in very difficult socio-economic and political situation of that time, the Academy directed efforts to address the complex socio-economic and cultural problems of development of the Ukrainian people, forming the national intellectual capacities. The intellect and the work of academic scientists are embodied in many economic, social and cultural achievements of the Ukrainian people. The activity of the Academy of Sciences, especially under the presidency of academician B.Ye. Paton, is based through combining purposeful basic research with practical developments, which enabled to enhance the researchers' input in the innovation-driven development of Ukraine, create new knowledge-based industries, expansion the output of products with high added value and increase of their market competitiveness. As early as in 70s of the past century, industrial utilization of the Academy R&D brought annually about USD 1.0 billion of economic effect.

Welding technologies developed by Ye.O. Paton and coworkers (Electric Welding Institute), that had ensured during the war the most mass-scale output of the famous tank T-34, the building of dozens of entirely welded bridges and thousands of industrial constructions, advanced welding technologies for metal welding in space and welding of living human tissue, R&D support for elaborating powerful missiles, super heavy aircrafts, production of monocrystals and super hard materials, modern medicaments, fundamental results in the research of micro- and macro world, and many

other scientific achievements of the NAS of Ukraine are widely known in Ukraine and beyond. High technologies developed in the NAS of Ukraine pushed up modernization of many economic sectors, ensured manufacturing of unique domestic products and significant economic effects from their practical utilization. Thus, the transition in the 70' s of last century of the oil and gas system of the USSR to the large diameter pipes, manufactured with the significant contribution from Academy's researchers, and elaborating the unique automated equipment for their welding in the pipeline promoted rapid economic growth. The economic effect from exploitation of only the Ukrainian section of the pipeline is several folds higher than the budgetary investment in academic science.

Even now, in difficult economic conditions, with deficit of funds, worn out research-experimental base, appearance of serious problems with preservation of academic schools and continuity of researchers' generations, and other economic and social problems, the Academy continues to be the flagship of the national R&D and an important factor for the international image of Ukraine.

The NAS of Ukraine is the leader by many R&D indicators. Most part of Ukrainian scientific editions included in international databases of scientific citations is published by the NAS of Ukraine. Twenty journals of the NAS of Ukraine are translated into English by foreign publishers; another 11 are published in English in Ukraine.

The results of world level are getting every year in scientific institutes of the Academy. The scientists of NAS of Ukraine over the past decade carried out the basic research in the theory of strength structural materials, which are working in conditions of radiation exposure. Based on these results, and scientific and technological achievements of specialists from other disciplines - mathematicians, physicists, chemists, experts in materials science and power engineering -

managed to extend the term of exploitation of four blocks of nuclear power plants on 10-20 years. According to the evaluation of the State Enterprise "Energoatom", the economic impact of innovation for one such block only is about USD 1.5 billion a year.

Significant technological and economic contribution to the development of railway transport is made by researchers from Ye.O. Paton Electric Welding Institute. They developed the technology and launched manufacturing of special equipment for butt-welding of high strength steel rails at the electric welding equipment factory (Kakhovka city). More than five thousand km of “velvet” railway have been laid by this technology, enabling to increase the speed of trains up to 160 km/h. Products of Ye.O. Paton Electric Welding Institute are currently used in 11 countries, including China and the United States. Export of this welding equipment is amounted to almost USD 230 million.

The Academy's researchers have been working intensively to solve the problems technological equipping of world-class of the Ukrainian health care system. Thus, the innovative technology elaborated in the Institute for Registration of Information for diagnosis and treatment of strabismus in children by use of the so-called micro plasma compensators has not in general any analogues in the world. There is an agreement with the interested organizations of China on joint manufacturing of micro plasma glasses. According to estimates of medical doctors, only in Ukraine this will help to restore the sight of more than 200,000 children. Experts of the International Research and Training Center for Information Technologies and Systems of the NAS of Ukraine and MES of Ukraine have developed equipment to restore motor functions disturbed due to serious diseases, based on the original technology of electronic image of motion and programming of the respective sequence of electric stimulation pulses. This equipment

compared with foreign counterparts has wider range of functions and, moreover, much cheaper.

These and many other achievements of academic scientists, which they continue to receive even in the current situation of the reduced funding and forced to work part-time with meager salaries that are several times lower than in other sectors, being under the increasing psychological pressures from government officials and politicians seeking to destroy Academy, being guided not by common sense or true patriotism, but by narrow personal interests that are far from the national interests, demonstrate that the principles underlying activities of the NAS of Ukraine are effective and productive. The academic community gives them a fitting rebuff by own real contribution to the development of the country. The data presented in the guide to a large extent reflect the real place of the NAS of Ukraine in social relations in the country and the role assigned to it by the political power in achieving high goals and solving immediate problems and needs of the people. They show not only the vital importance of R&D for the successful development of the country, but also the understanding of this truth by the political power offices. The footing on R&D system, its comprehensive support and development is an imperative for effective growth in all the spheres of social life.

The NAS of Ukraine among the first in the world began to turn into an original and effective national innovation system. Its experience of direct utilization of basic research in innovation processes on the highest scientific level assists the modernization of many national R&D systems. Since the middle of the last century, the number of national academies of science worldwide increased 1.5 times. Now they operate in 114 countries.

Although each academy is a peculiar one, nearly all of them, if even established in countries with insignificant R&D

capacities, are focused on development of the basic research. Dissemination of the Academy form of R&D organization has a solid ground. It is recognized that depending on the chosen economic model science & technology factor provides for not less than 2/3 of GDP. More recent studies of economic effects of this factor suggest that basic research is crucial for the progress of a country. Countries that were rapidly developing earlier (Japan, Republic of Korea, China, etc.) give evidence that "borrowing" of knowledge at an early phase of growth would be inevitably followed by the phase of maturity and utilization of the results of domestic basic research.

Peculiar forms of the academic organization of R&D have risen in the United States, which is considered as a country with exclusively the university science. In fact, the universities perform directly less than half of basic research. Moreover, a tendency to autonomization of R&D units of research universities has been on in the last four decades.

Ukraine still has the preconditions for further development of domestic basic research. The destruction of what was created by generations of domestic researchers would be not only a mistake, but and a big threat to the national security. Because much of what that was destroyed in Ukraine (factories, roads, buildings) by money can recover relatively quickly. At the same time the revival of science requires decades.

Naturally, as the pivot of the national R&D system, the NAS of Ukraine needs to adapt to the current social environment. The tendency for modernization considering the needs of time has been always a tradition of the NAS of Ukraine. Today the leadership of the Academy and the scientific community are working together on the implementation of the provisions laid down in the new "Concept of the National Academy of Sciences of Ukraine in 2014 - 2023 years". Persistent work is conducted with a view

bringing the regulatory acts governing the activities of NAS of Ukraine in compliance with the new Law of Ukraine "On Scientific and Scientific-Technical Activities". Most importantly, Academy's personnel is seeking to overcome as effectively as possible the difficulties in the country by their research and innovative methods that brought Ukraine international prestige and promoted its socio-economic development in the past, and that are capable to help the country recover from the crisis and join the group of developed countries of Europe and the world.

I.1. Background information²

The National Academy of Sciences of Ukraine was founded on November 27, 1918, in Kyiv. V. I. Vernadsky, a prominent scientist of the world, was its first President. The Academy presidents were recognized scientists and organizers of science: academicians Mykola Prokopovych Vasylenko (president in 1921–1922), Orest Ivanovych Levytsky (in 1922), Volodimir Ipolytovych Lipsky (1922–1928), Danylo Kyrylovych Zabolotny (1928–1929), Olexandr Olexandrovych Bohomolets (1930–1946), Olexandr Volodymyrovych Palladin (1946–1962). Since 1962, the NAS of Ukraine has been headed by Borys Yevhenovych Paton, a renowned scientist in the field of metallurgy, welding and metal technology, an organizer of science, a political and public figure, an academician of the NAS of Ukraine (1958), a full member of the Academy of Sciences of the USSR (1962), the Russian Academy of Sciences (1992) and a number of other foreign academies, President of the International Association of Academies

² As of January 1, 2016.

Source: Materials of Information of the National Academy of Sciences of Ukraine. –
URL: http://www.nas.gov.ua/UA/About/Documents/2015_dovidka.pdf.

of Sciences (1993), twice Hero of Socialist Labor (1969, 1978), the first Hero of Ukraine (1998).

Status. The National Academy of Sciences of Ukraine (the NAS of Ukraine, the Academy) according to current legislation is a higher self-governing research organization of the country, based on state ownership. Its self-government implies the self-determination in setting of R&D themes and forms for their performance, building up the structure, solving the issues of research, organization, management and personnel, international scientific relations, election and collegiality of its management bodies. The NAS of Ukraine brings together full members, corresponding members, foreign members, and all the researchers of its institutions. It organizes and carries out the basic and applied research on the most important problems of natural, technical, social sciences and humanities.

Governing bodies. The supreme governing body of the NAS of Ukraine is the General Meeting (GM), consisting of full members (academicians) and corresponding members. In the GM sessions (except for matters related to the election of full members, corresponding members and foreign members of the NAS of Ukraine), researchers delegated by labor groups of the Academy's scientific institutions participate with the right of decisive vote. Foreign members, heads of the Academy's research institutions and representatives of the scientific community also participate in the GM sessions - in an advisory capacity.

The Presidium of the NAS of Ukraine, elected by GM for 5 years term, takes on administrative functions of the NAS of Ukraine in the period between GM sessions. The Presidium of the NAS of Ukraine, elected in April 2015, consists of 32 persons, including President, five Vice-Presidents, Chief Scientific Secretary, 14 Academicians-Secretaries of Scientific Departments, and 11 members. Four acting

Presidium members and 16 Presidium advisors also participate in the Presidium meetings in advisory capacity.

Structure. The NAS of Ukraine has 3 sections (physical, technical and mathematical sciences; chemical and biological sciences; social sciences and humanities), which combine 14 Scientific Departments of: Mathematics; Informatics; Mechanics; Physics and Astronomy; Geosciences; Physical and Technical Problems of Materials Science; Physical and Technical Problems of Power Engineering; Nuclear Physics and Power Engineering; Chemistry; Biochemistry, Physiology and Molecular Biology; General Biology; Economics; History, Philosophy and Law; Literature, Language and Art Criticism.

Also, the NAS of Ukraine has 5 regional research centers of dual subordination with the Ministry of Education and Science of Ukraine: Donetsk (Kramatorsk, Donetsk region), Western (Lviv), Southern (Odessa), North-Eastern (Kharkiv) and Prydniprovsky (Dnipro).

The main link of the structure of the NAS of Ukraine is a research institute or a research organization equated to research institute. The NAS of Ukraine incorporates national institutions such as V.I. Vernadsky National Library of Ukraine, National Science Center “Kharkiv Institute of Physics and Technology”, National Historical and Archaeological Reserve “Olbiya”, M.M. Hryshko National Botanical Garden, National Arboretum “Sofiivka”, National Museum of Natural History, V. Stefanyk Lviv National Academic Library, National Center “Small Academy of Sciences of Ukraine” at the NAS of Ukraine and MES of Ukraine.

The Academy's structure also includes the organizations of research and industrial base (research enterprise, design and technological organizations, data centers). Nowadays the

total number of research academic institutions is 168, and research organizations of industrial base - 46.

Cooperation with education institutions. In 2015, the NAS of Ukraine signed nearly 200 agreements with universities on cooperation, externship and internship of students, etc. There were nearly 200 joint research projects. The network of joint research and education organizations (more than 250 complexes, centers, laboratories, branches of the departments etc.) enables for extensive use of the NAS capacities for training of professionals of high qualification required by the domestic higher education system and the NAS of Ukraine. Nearly 1,300 Academy's researchers (one of the ten academicians or corresponding members of the NAS of Ukraine) read courses and series of lectures on topical areas of science. In 2015, about 280 researches and lecturers from the MES of Ukraine defended theses for PhD or Doctor of Sciences in the specialized academic councils of research institutions of the NAS of Ukraine. More than 1,200 students performed graduate works under the supervision of leading researchers of the NAS of Ukraine. About 100 monographs written in creative collaboration with educators were published.

Coordination of research. Interagency Council for the Coordination of Basic Research, the Council of Presidents of the Academies of Sciences of Ukraine, and Expert Council on topics on fundamental evaluation of research at the National Academy of Sciences of Ukraine carry out a significant contribution to the realization of this important area of activity of the Academy. The work of these bodies contributes to the development and implementation of a coherent science policy, preparation and submission to authorities of proposals for improving the regulatory and legal framework for the functioning of scientific sphere,

logistical and financial support for research, to improve staffing.

Research and coordination work on selected topical research areas and problems is done by public scientific associations of the NAS of Ukraine. Now the NAS of Ukraine operates 75 scientific councils, 19 committees, 15 commissions and 24 scientific societies. Their effort is focused on coordination of advanced research, preparation of recommendations and analytical reports for public authorities, organization of scientific readings, conferences, seminars and symposia.

Implementation of R&D and innovation activity. In 2015, research institutions of the NAS of Ukraine introduced in various sectors of Ukrainian economy over 1150 of the latest developments, including advanced technology, such as, information, machinery, equipment, materials, data bases and knowledge bases, plant varieties, guidelines and methodologies, standards. Institutions of the NAS of Ukraine signed 20 license agreements in Ukraine and abroad, obtained 576 patents for inventions and utility models. They implemented 40 innovation projects, selected on competitive basis at the beginning of the year.

In 2015, institutions of the NAS of Ukraine realized nearly 160 contracts with corporations, companies, enterprises and centers from more than 20 developed countries on line of foreign economic activities. Sales of R&D products, science & technology services, and technology transfer amounted to over UAH 92.9 million.

R&D of the NAS of Ukraine were presented at 8 large exhibitions, including the International Agrarian Exhibition “Grain Technology 2015”, the Ukrainian Forum of Innovative Technologies “Innotech Ukraine”, the International Healthcare Exhibition “MEDICAEXPO – 2015”, IX Ukrainian Science Festival, the International

Specialized Exhibitions: “HI-TECH EXPO. High Tech”, “PHARMA TechExpo” and “LABComplex”, the International Exhibition “SECURITY 2015”.

Scientific and expert activities. A main objective of the NAS of Ukraine, as the highest scientific organization of the country, is to prepare scientific assessments and forecasts of socio-political, socio-economic and cultural development of the country, its economic situation and develop relevant proposals and recommendations on these issues, participation in shaping public policy development in the R&D field.

In 2015, institutions of the NAS of Ukraine commissioned by various power authorities issued more than 2000 expert conclusions (comments, remarks, recommendations, etc.) to regulatory acts and policy documents, and analytical reports (scientific estimates, predictions, suggestions and recommendations) on various aspects of social development. A considerable amount of expert work was done by Academy’s experts included in expert and advisory boards and commissions created at government bodies for preliminary review and expert conclusions on various aspects of their work.

The NAS of Ukraine makes regular thematic assessment of the basic research performed by domestic research institutions, financed from the public budget of Ukraine. In 2015, 1,752 research projects of eight key budget spending units were reviewed, with an expert conclusion on the feasibility of budgetary funding of each project.

Publishing. There are two publishers in the structure of the NAS of Ukraine, Research and Production Enterprise Publishing "Naukova Dumka" of the NAS of Ukraine and the Publishing House (PH) "Academperiodicals" of the NAS of Ukraine, accounting for about 7% of the Academy output of books. In 2015, “Naukova Dumka” published 20 titles of scientific monographs prepared in the NAS of Ukraine, with

a total amount of more than 400 accounting and publishing pages. 262 issues of Academy journals with the circulation of over 46.8 thousand and more than 3.0 thousand accounting and publishing pages were published in “Academperiodicals”, including 195 issues of 33 journals printed according the Journals Support Program of the NAS of Ukraine. Also, “Academperiodicals” published 7 scientific monographs with more than 152.0 accounting and publishing pages.

In 2015, institutions of the NAS of Ukraine published 404 scientific monographs, 154 titles of scientific papers collections, 105 educational publications and 245 reference and scientific and popular books. The total number of articles in periodicals is 21,250, of which over 16,600 (approximately 78%) is published in professional domestic and foreign journals. 81 scientific books and over 5,500 articles in periodicals were published abroad.

In 2015, researchers’ papers were printed in 85 scientific journals of the NAS of Ukraine, in scientific papers collections, other periodicals and book series publications. 20 scientific journals of the NAS of Ukraine were translated into English and published by foreign publishers. Another 11 journals are printed in English in Ukraine by own funds of Academy research institutions.

International scientific cooperation is carried out within 120 current agreements concluded by the NAS of Ukraine with Academies, government agencies, research organizations, education institutions, firms and industrial companies from about 50 countries, including Europe, America, Asia and Africa. In general, more than 130 Academy institutions are involved in various forms of international cooperation.

The NAS of Ukraine represents the Ukraine in nearly 40 international organizations: the International Association of

Academies of Sciences (IAAS), the International Union of Academies (IUA), the European Federation of Academies of Sciences and Humanities (ALLEA), the International Committee on Space Research (COSPAR), etc. It actively participates in international scientific associations and centers: the International Institute for Applied Systems Analysis (IIASA), the European Research Association of Geophysical Research (EISCAT), the European Organization for Nuclear Research (CERN), the Joint Institute for Nuclear Research (JINR), the UNESCO-MAB Strategic Group to develop a strategy of this program for the next decade, etc.

Researchers of the NAS of Ukraine are active participants of the international research programs of the European Commission, UNESCO, DFG, CRDF, STCU, IAEA and NATO. More than 400 projects for research, coordination and support to scientific exchange are realized by grants of the above organizations, obtained annually on competitive basis. Relations with the EU countries and the European Commission institutions have been expanding, particularly through participation in the EU Research and Innovation Program “Horizon – 2020”. New formats for interplay in EURATOM Program have been elaborated. In framework of cooperation with the European Commission Joint Research Centre, the NAS of Ukraine assigned as the chief organization for R&D accompaniment of implementing the EU Strategy for the Danube Region in Ukraine territory and conducts respective work through its complex scientific programs and projects of the EU.

As part of the NAS programs for researchers exchange, over 150 bilateral projects are performed annually with Austrian Academy of Sciences, Bulgarian Academy of Sciences, Polish Academy of Sciences, Academy of Sciences of the Czech Republic, Slovak Academy of Sciences, National Centre for Scientific Research (CNRS) of France, Serbian Academy of Sciences and Arts, Hungarian Academy

of Sciences, Romanian Academy, Montenegro Academy of Sciences and Arts and the Turkish International Cooperation and Development Agency. The exchange of scientists is carried out upon quotas of the relevant agreements.

The joint scientific projects competitions are held together with international and foreign organizations on a competitive basis annually in recent years. Examples of such interactions are cooperation with the Ukrainian Science and Technology Centre on line of the program “Targeted Research and Development Initiatives”, the National Centre for Scientific Research (CNRS) of France and the National Academy of Sciences of Belarus. Over 100 bilateral research projects were carried out in 2015 on the basis of parity funding.

Scientific and technical cooperation with institutions and organizations of the People's Republic of China is actively developing. It has a tendency to expand further in terms of the commercialization of scientific and technical developments and technologies created by the Academy scientists. Today, one-fifth of all the institutions of the NAS of Ukraine cooperate with more than 75 Chinese partners within bilateral framework agreements of the Academy and direct inter-institutional contacts.

Staffing. The total employment in the NAS of Ukraine as of 01.01.2016 was 37,447, including 18,346 researchers, of which 2,530 doctors of sciences and 7,603 candidates of sciences. The average age of researchers was 51.3; the average age of doctors of sciences is 63.8, candidates of science – 50.0.

Personal composition. As of 01.01.2016, the NAS of Ukraine consists of 197 full members (academicians), 379 corresponding members and 104 foreign members.

I.2. Legal status of National Academy of Sciences of Ukraine and national sectoral academies of Ukraine

(Extract from the Law of Ukraine

“On Science and Technology Activities”³)

Article 17. The National Academy of Sciences of Ukraine

1. The National Academy of Sciences of Ukraine is the highest academic self-governing organization of Ukraine. The National Academy of Sciences of Ukraine based on state ownership is a state organization established as a non-profit state budgetary institution.

Staff of the National Academy of Sciences of Ukraine include full members (academicians), whose number cannot exceed 200 persons, corresponding members, whose number cannot exceed 400 persons, foreign members and employees of academic institutions (organizations, enterprises) which are in its jurisdiction.

2. The National Academy of Sciences of Ukraine organizes and carries out basic and applied research on major problems of natural sciences, technical, social and humanitarian sciences.

At the National Academy of Sciences of Ukraine are acting:

1) The Interagency Council on Coordination of Fundamental and Applied Research in Ukraine, formed by the National Academy of Sciences of Ukraine jointly with the central executive body, that provides forming and implements state policy in the field of scientific and scientific and technological activities, and of the national sectoral academies of sciences for promoting the development of the

³ *Source:* the Law of Ukraine "On scientific and scientific and technical activity"// Proceedings of Verkhovna Rada of Ukraine. – 2016. – No 2. – P.25 (As of 26.11.2015).

basic research and effective use of the results of applied research and scientific and technical developments on priority directions of development of science and technology. The provision on the Council on Coordination of Fundamental and Applied Research in Ukraine and its composition are approved by the Cabinet of Ministers of Ukraine on the basis of proposals from the National Academy of Sciences of Ukraine and central executive body that provides forming and implements state policy in the sphere of scientific and scientific and technical activities, agreed by the National Council for Science and Technologies;

2) The Council of presidents of the academies of sciences of Ukraine, which is a permanent collegial body that brings together the presidents of the National Academy of Sciences of Ukraine and national sectoral academies of Ukraine for the purpose of coordination of R&D performed in these academies.

The National Academy of Sciences of Ukraine as the highest scientific self-governing organization of Ukraine carries out an independent scientific assessment of drafts of strategic, predicted and program documents (doctrines, concepts, strategies, etc.) and also by proxy the President of Ukraine, Verkhovna Rada of Ukraine, the Cabinet of Ministers of Ukraine and/or on their own initiative develops the proposals on the principles of the state scientific and scientific and technical policy, forecasts, analytical materials, suggestions, recommendations for socio-political, socio-economic, scientific-technical, innovative and humanitarian development of the state, carries out scientific expertise of draft laws, state decisions and programs.

3. The National Academy of Sciences of Ukraine incorporates the Presidium, the administrative office of the Presidium, sections and departments, which coordinate

operation of research institutes, other research institutions, organizations and enterprises (observatories, botanical gardens, dendroparks, nature reserves, libraries, museums, etc.), social and support facilities incorporated in the National Academy of Sciences of Ukraine.

4. The National Academy of Sciences of Ukraine is endowed with the right to control its activities, possesses, uses and disposes of property under state ownership and belongs to its on the rights of economic supervision according to the legislation and the Statute of the National Academy of Sciences of Ukraine.

State property is transferred to the National Academy of Sciences of Ukraine in perpetuity for free use without changing its ownership and used in accordance with the legislation and the Statute of the National Academy of Sciences of Ukraine.

Land plots are given to the National Academy of Sciences of Ukraine for permanent use in accordance with land legislation.

5. Establishment, merger, acquisition, division, transformation or liquidation of public research institutions (organizations) administered by the National Academy of Sciences of Ukraine is regulated by the articles of the Law of Ukraine “On Peculiarities of the Legal Regime of the National Academy of Sciences of Ukraine, sectoral academies of sciences and the Status of their Property”.

Research institutions of the National Academy of Sciences of Ukraine are subject to mandatory state certification in the manner prescribed by this Law.

The National Academy of Sciences of Ukraine and the central body of executive power responsible for setting and implementation of science and science & technology policy, other central executive power authorities may establish research institutions of dual subordination, and research

institutions of the National Academy of Sciences of Ukraine can establish joint research units with universities.

The National Academy of Sciences of Ukraine (and selected research institutions incorporated in it) has the right to establish higher education institutions for training at different skill levels, including master and PhD.

6. Funds for providing of the National Academy of Sciences of Ukraine are determined annually by the State Budget of Ukraine as a separate line. Funding of the National Academy of Sciences of Ukraine may be from other sources not prohibited by the legislation of Ukraine.

The National Academy of Sciences of Ukraine is the main manager of budget funds.

The National Academy of Sciences of Ukraine carries out its activities in accordance with the laws of Ukraine and the Statute of the National Academy of Sciences of Ukraine, which is approved by the general meeting of the National Academy of Sciences of Ukraine and registered by the Ministry of Justice of Ukraine, in accord with the presence of positive conclusion of central body of executive power which provides to form and implements state policy in the sphere of scientific and scientific and technical activities.

7. The State management of scientific and scientific and technological activities of the National Academy of Sciences of Ukraine is carried out in accordance with the legislation without violating its self-government and freedom of scientific creativity.

Self-government of the National Academy of Sciences of Ukraine consists of:

1) self-determining the thematic of basic and applied research, scientific and technical (experimental) developments, forms of organization and conducting the basic and applied research, scientific and technical

(experimental) developments, shaping own structure, solving scientific and organizational, economic, personnel issues, performing international scientific relations to the extent not inconsistent with this Law;

2) The electiveness and collegiality of bodies of governance, the implementation by the general meeting of the National Academy of Sciences of Ukraine the functions of the highest body of governance.

The National Academy of Sciences of Ukraine by the decision of Cabinet of Ministers of Ukraine may represent Ukraine in international organizations (academic associations, professional unions, societies) as a national member, and comply with the relevant membership obligations, including financial ones, within the expenditures of the State Budget of Ukraine for providing the activity of the National Academy of Sciences of Ukraine.

The mechanism realizing the principle of self-government of the National Academy of Sciences of Ukraine is determined by the Statute of the National Academy of Sciences of Ukraine to the extent not inconsistent with this Law and legislation.

The National Academy of Sciences of Ukraine submits to the Cabinet of Ministers of Ukraine together with the conclusion of the National Council of Ukraine on the development of science and technology the annual report on the results of its scientific and technical activities, the effectiveness using the state property belonging to it on the base of the right of economic management and use of budget funds.

8. The supreme body of self-government of the National Academy of Sciences of Ukraine is the general meeting, composed of full members (academicians) and corresponding members of the National Academy of Sciences of Ukraine. Scientists delegated by labor groups

scientific institutions of the National Academy of Sciences of Ukraine participate in the sessions of general meetings (other than matters relating to the election of full members, corresponding members and foreign members of the National Academy of Sciences of Ukraine) with the right of decisive vote the in an amount that consisting of not less half the number of full members (academicians) and corresponding members of the National Academy of Sciences of Ukraine, participating in the session. The foreign members of the National Academy of Sciences of Ukraine, heads of scientific institutions of the National Academy of Sciences of Ukraine and representatives of the scientific community may participate at the sessions of general meeting with an advisory vote.

The exclusive competence of the general meeting of the National Academy of Sciences of Ukraine includes:

- 1) Approval of the Statute of the National Academy of Sciences of Ukraine;

- 2) Election of the President of the National Academy of Sciences of Ukraine, the first vice president, vice-presidents and chief scientific secretary of the National Academy of Sciences of Ukraine, other members of the Presidium of the National Academy of Sciences of Ukraine;

- 3) Election of full members (academicians), corresponding members and foreign members of the National Academy of Sciences of Ukraine;

- 4) Approval of academician-secretaries of departments of the National Academy of Sciences of Ukraine;

- 5) Withdrawal of the status of a full member (academician), corresponding member and foreign member of the National Academy of Sciences of Ukraine on the

grounds, in cases and order established by the Statute of the National Academy of Sciences of Ukraine.

9. The President of the National Academy of Sciences of Ukraine organizes the Academy work, heads the Presidium of the National Academy of Sciences of Ukraine, carries out the management of the property complex, and represents the National Academy of Sciences of Ukraine in bodies of state power, public institutions, organs of local authorities, public and other organizations.

10. The overall scientific and organizational management of the daily operations of the National Academy of Sciences of Ukraine carries out the Presidium of the National Academy of Sciences of Ukraine consisting of the president, first vice-president, vice-presidents, chief scientific secretary, academicians-secretaries of departments, members of the Presidium, elected for five years and may not hold their posts for more than two terms.

The Presidium of the National Academy of Sciences of Ukraine has constantly acting administrative office that provides preparation and implementation of the decisions of the general meeting, the Presidium and president of the National Academy of Sciences of Ukraine, provides scientific and organizational expert-analytical, legal, information and logistical support of activity of the Presidium of the National Academy of Sciences of Ukraine.

The administrative office of the National Academy of Sciences of Ukraine is headed by chief scientific secretary of the National Academy of Sciences of Ukraine.

11. The President, first vice president, vice presidents, chief scientific secretary, members of the Presidium of the National Academy of Sciences of Ukraine shall be elected by the general meeting of the National Academy of Sciences of Ukraine by secret ballot by majority vote of the total number

of members of the general meeting and performing their duties till to the election of a new the Presidium of the National Academy of Sciences of Ukraine.

If none of the candidates for the President of the National Academy of Sciences of Ukraine not received majority during the voting, the second round shall be organized, with the two candidates having largest numbers of votes in the first round. The candidate shall be deemed elected in the second round, which has more votes than the other candidate.

The right to nominate a candidate for President of the National Academy of Sciences of Ukraine belongs to the Presidium, scientific institutions, full members (academicians) and corresponding members of the National Academy of Sciences of Ukraine. On the president post can claim the person who is a full member (academician) of the National Academy of Sciences of Ukraine.

The procedure for the election by the general meeting of the president, the first vice president, vice-presidents, chief scientific secretary and members of Presidium of the National Academy of Sciences of Ukraine is determined by the Statute of the National Academy of Sciences of Ukraine.

12. The academician-secretaries of departments shall be elected by the general meeting of the respective department of the National Academy of Sciences of Ukraine, in the session of which attended by all full members (academicians) and corresponding members of the National Academy of Sciences of Ukraine, engaged in the department, and by the delegated representatives (candidates of sciences, Ph.D., doctors of sciences) of research teams from the department establishments, in numbers equal to half of the personal membership of full members and corresponding members participating in the session of the department's general meeting.

The right to nominate candidates for the position of academician-secretary of the department belongs to the research institutions, full members (academicians) and corresponding members of National Academy of Sciences of Ukraine, engaged in the respective department.

A person who is a full member (academician) or a corresponding member of National Academy of Sciences of Ukraine is entitled to apply for the position of the first vice-president, the chief scientific secretary or the academician-secretary of the department.

A person who is a full member (academician) or a corresponding member of National Academy of Sciences of Ukraine or one with the scientific degree of doctor of sciences and with the main job place in a research institution of the National Academy of Sciences of Ukraine is entitled to apply for the position of Presidium member.

13. Corresponding members of the National Academy of Sciences of Ukraine (to replace the persons dropping out in the respective period) shall be elected once in three years by secret ballot of all full members (academicians) and corresponding members of the National Academy of Sciences of Ukraine. Full members (academicians) of the National Academy of Sciences of Ukraine (to replace the persons dropping out in the respective period) shall be elected once in three years by open voting of all full members (academicians) of the National Academy of Sciences of Ukraine.

The nomenclature of vacancies for the election of corresponding members and full members (academicians) of the National Academy of Sciences of Ukraine shall be specified by the Presidium of the National Academy of Sciences of Ukraine in view of the proposals from scientific departments, made by analysis of trends in global and domestic science, the existing human resource capacity to fill

the vacancies, the need for representation of all the sectors of the domestic science in the National Academy of Sciences of Ukraine.

The procedure for the election of full members (academicians), corresponding members and foreign members of the National Academy of Sciences of Ukraine is determined in the Statute of the National Academy of Sciences of Ukraine.

Persons for the election of corresponding members of the National Academy of Sciences of Ukraine shall be nominated by the full members and corresponding members, scientific (scientific, science & technology) councils of research institutions, certified in accordance with this Law, and higher education institutions (universities and academies) among doctors of sciences who have research achievements recognized by the domestic and international scientific community, who have found solution to a scientific problem of significant theoretical or practical importance, who are active in research and public fields.

Persons for the election of full members (academicians) of the National Academy of Sciences of Ukraine shall be nominated by the full members, scientific (scientific, science & technology) councils of research institutions, certified in accordance with this Law, and higher education institutions (universities and academies) among the corresponding members of National Academy of Sciences of Ukraine, who are founders of academic schools recognized by the domestic and international scientific community, who have suggested approach to solutions of scientific problems with great theoretical and practical significance, who are active in research and public fields.

14. The procedure works and other competencies of the general meeting of the National Academy of Sciences of Ukraine, Presidium of the National Academy of Sciences of

Ukraine are determined in the Statute of the National Academy of Sciences of Ukraine.

Article 18. The National sectoral academies of sciences

1. National sectoral academies of sciences are the National Academy of Agrarian Sciences of Ukraine, the National Academy of Medical Sciences of Ukraine, the National Academy of Pedagogical Sciences of Ukraine, the National Academy of Law Sciences of Ukraine, the National Academy of Arts of Ukraine which are the self-government research organizations based on state ownership, established as non-profit state budgetary institutions.

2. The organizational structure of the national sectoral academies of sciences, their material and financial support and guarantees of activity are carried out under the provisions established for the National Academy of Sciences of Ukraine, considering the activity specificity and norms of the Law of Ukraine “On Peculiarities of the Legal Regime of the National Academy of Sciences of Ukraine, national sectoral academies of sciences and the status of their property” and also the statutes of respective national sectoral academies of sciences.

3. National sectoral academies of sciences, as self-government scientific organizations of Ukraine, coordinate, organize and conduct research in relevant fields of science and technology, interact with the respective power bodies to implement the tasks defined by the state priorities in these fields.

4. Activities of national sectoral academies are coordinated by the Cabinet of Ministers of Ukraine to the extent not affecting their self-government.

National sectoral academies of sciences are the main managers of budgetary funds.

National sectoral academies of sciences of Ukraine operate in accordance with the legislation of Ukraine and their statutes that are approved by the general meeting of the national sectoral academies of sciences and registered in the Ministry of Justice of Ukraine, given the conclusions of the central body of executive power, which provides to form and implements the state policy in the sphere of scientific and scientific and technical activities, and the central executive body which provides to form and implements the state policy in respective sphere.

5. National sectoral academies of sciences submit to the Cabinet of Ministers of Ukraine the annual report on the results of science and science & technology activities and use of funds allocated to them from the state budget, together with the conclusion of the National Council of Ukraine on the Development of Science and Technology.

6. Use of state property transferred to the national sectoral academies of sciences is subject to the Law of Ukraine “On Peculiarities of the Legal Regime of the National Academy of Sciences of Ukraine, National Sectoral Academies of Sciences and the Status of Their Property”.

Land plots are given to national sectoral academies of sciences in permanent use in accordance with land legislation.

7. Establishment, reorganization and liquidation of state research institutions (organizations) managed by the national sectoral academies of sciences is subject to the procedure specified by the Cabinet of Ministers of Ukraine.

Research institutions of the national sectoral academies of sciences are subjects to the mandatory state certification in the manner prescribed by this Law.

The national sectoral academies of sciences and the central body of executive power which provides to form and implements the state policy in the sphere of scientific and scientific and technical activities, other central bodies of executive power can establish research institutions of dual subordination, and research institutions of national sectoral academies can establish, together with universities, academies and institutions, joint research units.

II. NATIONAL ACADEMY OF SCIENCES OF UKRAINE IN THE GLOBAL SCIENCE

The Academy form of R&D is widespread in the world and represents a balance between universities and other educational institutions, research institutions not involved in the process of learning, and the community of eminent scientists and experts who form the institute of Academy members.

In 1993, a group on international problems, InterAcademy Panel on International Issues (IAP), was founded, which took on the functions unite of national, regional and global academies. National Academies of Sciences are represented in the IAP by the principle: one country – one Academy of Sciences. The basic organization for IAP was the Academy of Sciences of the Third World, operating in the framework of a UNESCO program. Its current name, the Academy of Sciences for the Development of Science in the Developing World (World Academy of Sciences for the Advancement of Science in Developing Countries), has existed since 2012. According to the statute, IAP acts as an independent international forum uniting Academies of Sciences from various countries, to promote their cooperation and mutual support, discuss scientific aspects of global problems, etc.

According to the data available on the websites of IAP and its regional partners, National Academies of Sciences or their analogues exist in 114 countries, including in 29 in Eastern Europe, 19 in Western Europe, 2 in North America, 16 in Central and South America, 24 in Asia, 2 in Australia and Oceania, 22 in Africa. This total includes the Academies of Sciences with own website and those ones which have data are available on various web resources.

Depending on the availability of a part of science academies of the scientific community and research institutes, the countries that have Academies of various groups were divided into four types.

There are sixty-eight countries classified as group I. They have Academies of Sciences, which consist only of the scientific community, elected from among leading scientists. Of these, 5 countries are in Eastern Europe, 9 in Western Europe, 15 in the New World, 17 in Asia and Australia, and 22 countries in Africa where an Academy can be found.

Thirty-eight countries having Academies of Sciences, that incorporate scientific community and research institutions, are classified as group II. These include 24 Eastern European countries, 5 countries of Western Europe, 7 in Asia and Oceania, and two in Latin American countries.

Two countries having Academies of Sciences incorporating only research organizations are classified as group III.

Six developed countries that have Academies of Sciences of the three abovementioned types; are classified as group IV.

Countries by type of National Academy of Sciences

Type of national academies of sciences and the names of countries	Number of countries
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Group I. Countries with academies incorporating only scientific community

68

5 Eastern European countries:

Estonia, Georgia, Kazakhstan, Latvia, Lithuania

9 Western Europe countries:

Belgium, Denmark, Finland, Ireland, Iceland, Norway, Turkey, Switzerland, Vatican

15 countries in North and South America:

Argentina, Brazil, Canada, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Mexico, Nicaragua, Panama, Peru, Uruguay, Venezuela

Type of national academies of sciences and the names of countries	Number of countries
<i>17 countries in Asia and Oceania:</i> Afghanistan, Australia, Bangladesh, India, Indonesia, Iran, Israel, Japan, Lebanon, Malaysia, Pakistan, Palestine, Singapore, South Korea, Sri Lanka, Thailand, the Philippines	
<i>22 African countries:</i> Benin, Botswana, Burkina Faso, Cameroon, Democratic Republic of the Congo, Egypt, Ethiopia, Ghana, Kenya, Madagascar Mauritius, Morocco, Mozambique, Nigeria, Senegal, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia, Zimbabwe	
Group II. Countries with academies incorporating scientific community + research institutes	38
<i>24 Eastern European countries:</i> Albania, Armenia, Azerbaijan, Belarus, Bulgaria, Bosnia and Herzegovina, Croatia, Czech Republic, Hungary, Kosovo, Kyrgyzstan, Macedonia, Moldova, Montenegro, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan	
<i>5 Western European countries:</i> Austria, Greece, Netherlands, Portugal, Sweden	
<i>7 countries in Asia and Oceania:</i> Cambodia, China, North Korea, Mongolia, Nepal, New Zealand, Taiwan	
<i>2 Central and South America:</i> Bolivia, Cuba	
Group III. Countries with academies incorporating only research institutes	2
Vietnam, Jordan	
Group IV. Countries with academies of various types	6
France, Germany, Italy, Spain, United Kingdom, USA	
Total	114

Note: Countries of the Caucasus and Central Asia that were part of the Soviet Union and Turkey are referred as European ones due to the existing practice of their inclusion into European structures.

The rise of Academies of Sciences is an indicator of social development in the country, evidence of objective need and willingness of society to address issues of economic, social and cultural development through the use of scientific knowledge. The establishing of Academies of Sciences has taken place at a

certain maturity of public relations. This process began in Western Europe in 16–17 centuries, in North America – in the second half of the nineteenth century. In most countries of Eastern Europe it happened after the World War I, in the former colonies and semi colonies of Africa, Asia and Latin America – in the second half of the 20 century. The oldest one of the existing Academies of Sciences (National Academy dei Lincei) was founded in Rome in 1603. During 2007–2015 only in nine countries the Academies of Sciences were founded, including five in Africa, three in Central and South America, one in Asia. Academies of Sciences are constantly in search for improvements in their organization and relations with public through focusing their actions on public needs and global challenges. To enlarge the participation of scientific community in their ranks, National Academies of Sciences are trying to increase the representation of young people and women among their members. It is reported that the share of young members (under 40) in the Academy of Sciences of Cuba must not be lower than 10% of the total membership, with preferences given to women in case of equal numbers of nominees in the elections. The Academies of Sciences in Denmark, Mexico and Thailand are involved in the programs of the L’Oreal-UNESCO for women in science, sponsored by these countries. The Academy of the Republic of South Africa (Academy of Science of South Africa), a country that 25 years ago suffered from racial and other forms of discrimination, in 2014 the share of blacks and women members accounted for 27 and 25%, respectively. Due to purposeful policy of National Academies of Sciences, the share of women elected in this century, was twice higher than in previous years. In Western Europe, the average share of women members of National Academies of Sciences in 2014–2015 was 10%, in Eastern Europe – 5%, in North America – 15%, Central and South America – 11.3%, in Asia – 5%, in Africa – 12.6%. “The Young Academy” founded in Germany in 2000 with the promotion of the National Academy of Sciences Leopoldina and

the Berlin-Brandenburg Academy of Sciences and Humanities, gave impulse to establishment of analogous institutions in 29 countries, including 10 “Young Academies” established in Africa, 9 in Asia, 8 in Western Europe, one in North America and one in Eastern Europe. Similar organizations of young scientists were established in another nine countries, including 5 in Eastern Europe, 2 in South America, one in of Africa and one in Asia. “Young Academies” or their analogues help overcome a conservatism of the existing academies and open up opportunities for active young researchers to work directly with international and foreign scientific organizations.

National Academy of Sciences tends to have the highest scientific and expert status in the country. Their functioning is ensured mostly by the government, and in many countries they are under the auspices of the President or Prime Minister. Academy organizations of the world are performers of basic research aimed at generation of new knowledge in natural sciences, engineering, humanities and social sciences, and applied research contributing to developments of products or technologies.

II.1. Cooperation and International Associations of Academies of Sciences

Cooperation between national Academies of Sciences of different countries is an integral part of their work aimed at setting up new relations and combining efforts of the global research community to address critical scientific issues. Academician V.I. Vernadsky believed that the union of academies can be a form of international work, creating a framework for collaborative action and integrating the nations and states as a single entity.

The end of the nineteenth century was marked the creating of the International Union of Academies of

Sciences, founded in 1898 by the initiative of the Royal Society of London. In 90s of the twentieth century, establishment of international associations of Academies of Sciences became a globalization trend. InterAcademy Panel on International Issues (IAP), founded in 1993, brings together the National Academies of Sciences from more than hundred countries. Recent integration processes in the Academy environment in Europe also began 20 years ago. The first step was establishment of the International Association of Academies of Sciences (IAAS) in 1993 by the initiative of the National Academy of Sciences of Ukraine. A year later the Federation of European Scientific Academies – All European Academies (ALLEA) was founded, bringing together 57 academies from more than 40 countries. Besides that, ALLEA incorporates six national scientific academies with IAAS membership (Academies of Armenia, Belarus, Georgia, Moldova, Russia, and Ukraine).

IAAS was founded as an international non-governmental organization to combine efforts of Academies of Sciences, on the multilateral basis, to find solutions for most important scientific problems preserve the historically established academic links and expand new relations between researchers. The Constituent Assembly of IAAS was held in Kiev, on September 23, 1993. The members of IAAS became the Academy of Sciences of the twelve CIS states (Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Uzbekistan, and Ukraine), and the Academies of Sciences of Vietnam, Slovakia and the Czech Republic (the latter two with the observer status). In 1994, IAAS was granted the official status by the Decree of the President of Ukraine; its head office is located in Kiev. The president of the Academy of Sciences of Ukraine Academician Boris Paton is the IAAS president since its beginning.

The institute of associated membership was founded in IAAS in 1996. Currently, IAAS has seven associate members: Joint Institute for Nuclear Research (Russian Federation) since 1997; Russian Humanitarian Science Foundation and Russian Foundation for Basic Research (1999); Moscow Institute of Physics and Technology (State University) (2000); Belarusian Republican Foundation for Basic Research (2000); M. V. Lomonosov Moscow State University (2002); National Research Center “Kurchatov Institute”.

IAAS has 13 scientific councils: Scientific Council on New Materials (founded in 1995); Joint Scientific Council on Fundamental Geographical Problems (1996); Board of Directors of Libraries and Information Centers of the National Academies of Sciences (1996); Advisory Council on Protection of Intellectual Property and Technology Transfer (1997); International Coordinating Committee on Computational Mathematics (1997); International Council for CIS Program “Modern Problems of Radiobiology: Science and Practice” (2001); Council of Physiological Societies of CIS (2003); International Association of Institutes of History of CIS (2005); Council on Printing and Publishing (2006); Scientific Council on Science of Science (2009); Council of Botanical Gardens of CIS (2012); Scientific Council on Functional Materials for Electronic Engineering (2012); Scientific Council on Biomedicine and Biotechnology (2013).

Apart from revitalization and development of R&D, especially basic research in the Academies with IAAS membership, objectives dated from the beginning of IAAS are promotion of effective government support to R&D, integration of R&D and education, training of research staff, setting up appropriate conditions for utilization of R&D and increased contributions of R&D in social and economic

development of nations whose Academies of Sciences are incorporated in IAAS.

These goals cannot be achieved by IAAS efforts and resources. IAAS, therefore, is committed to maintaining constructive dialogue with the authorities in the IAAS member countries, to strengthen cooperation with them. By the IAAS initiative, Council of Heads of CIS States adopted the Resolution “On Concerted Measures for Reproduction and Preservation of the Common Research Area within the CIS” in 1995, whereas Heads of CIS governments signed “Agreement on the Establishment of the Common Science and Technology Area of the Commonwealth countries members”. This Agreement contains the items specifying practical functions and role of IAAS in creating this area.

An important task for IAAS was to launch the effort in the Academies of Sciences incorporated in IAAS, aimed at creating the legal framework for preservation and development of R&D. In 2007, IAAS was granted the observer status at the Interparliamentary Assembly of CIS by the Assembly’s Resolution. IAAS achievements in lawmaking were thus recognized, which enhanced the IAAS capacities to influence on adopting by the Interparliamentary Assembly of model laws in the scientific and science and technology spheres of activity states.

IAAS is an unique mechanism for international scientific cooperation and an authoritative international organization. In 2003, IAAS was recognized by UNESCO: the resolution to include IAAS to the organizations with which UNESCO maintains business relations was adopted at the session of the UNESCO Executive Council in Paris. In 2012, these relations got the status of consultative partnership. These two statuses of relations refer to the highest category of relations with UNESCO according to the UNESCO criterion.

An important event in the life IAAS was International Symposium “Interactions of Governments and National

Scientific Societies with International Organizations for the Development and Application of Scientific Knowledge”, held in Kyiv in October 2015, under the IAAS auspices, in cooperation with UNESCO and other organizations. This representative forum has discussed issues of reforms in R&D sphere and Academies of Sciences of IAAS members and outlined the steps for further cooperation of Academies of Sciences of the IAAS members.

II.2. National academies of sciences in the world countries*

National academies of sciences in the world countries by year establishing and geographic region**

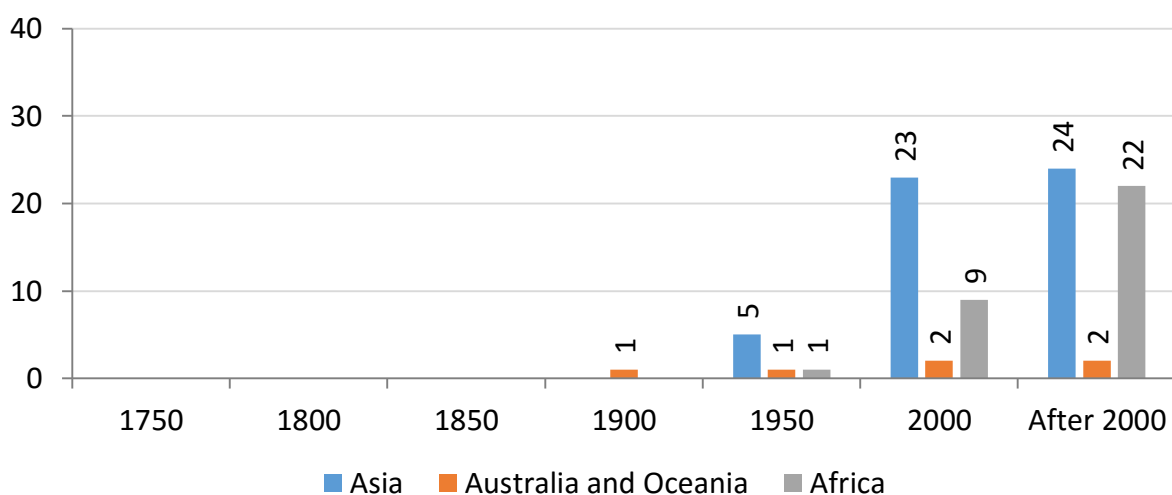
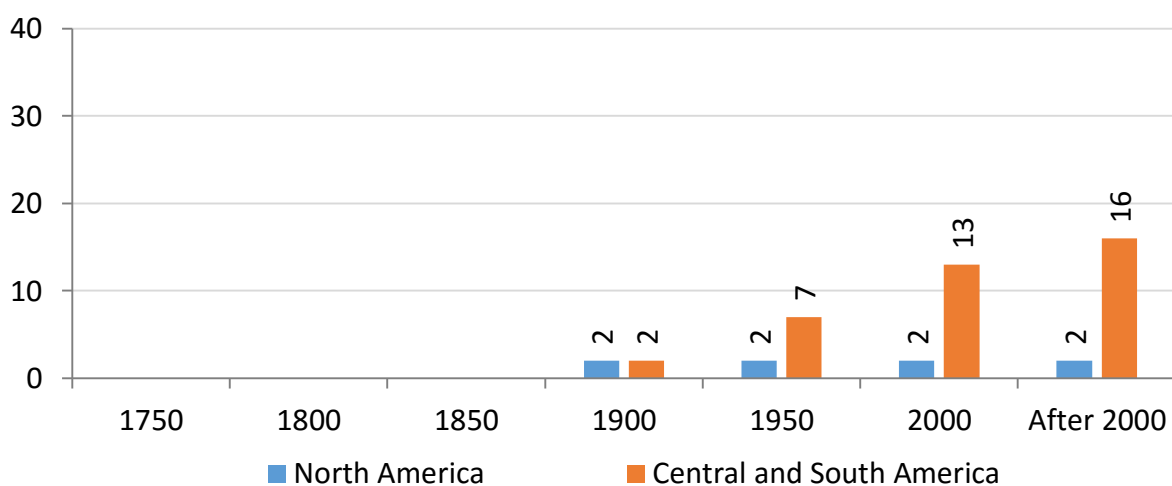
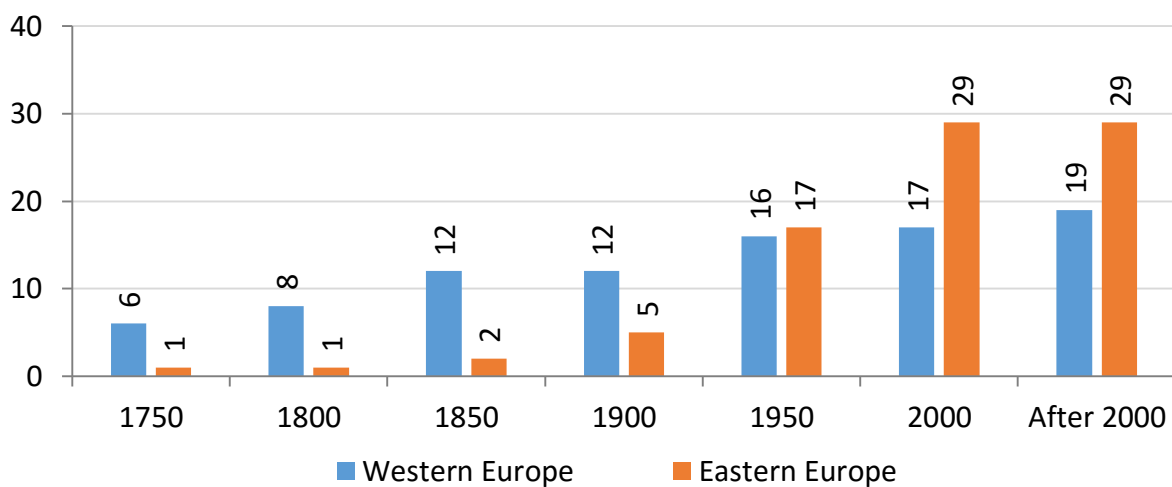
	1750	1800	1850	1900	1950	2000	After 2000
Total	7	9	14	22	49	95	114
including national academies of sciences in:							
Europe	7	9	14	17	33	46	48
of them:							
Western Europe	6	8	12	12	16	17	19
Eastern Europe	1	1	2	5	17	29	29
North America	0	0	0	2	2	2	2
Central and South America	0	0	0	2	7	13	16
Asia	0	0	0	0	5	23	24
Australia and Oceania	0	0	0	1	1	2	2
Africa	0	0	0	0	1	9	22

* Data on national academies of sciences in 114 countries is given.

Source: Data from <http://www.interacademies.net/Academies.aspx> and its regional partners. See details in the text.

** Total, since 1600.

Dynamics of establishing of national academies of sciences in the world countries by geographic regions



III. NATIONAL ACADEMY OF SCIENCES OF UKRAINE IN THE SCIENCE AND TECHNOLOGY OF UKRAINE

III.1. Academy sector in Ukraine: national academies of sciences⁴

Date of foundation and S&T indicators of national academies of sciences*

	Year estab- lished	Organi- zations	Employees, <i>head- count</i> **	Doctors of sciences, ***	Candidates of sciences, ***
National Academy of Sciences of Ukraine	1918	196	35725	2535	7752
National Academy of Agrarian Sciences of Ukraine	1931	93	8934	334	1638
National Academy of Medical Sciences of Ukraine	1993	35	4798	588	1258
National Academy of Arts of Ukraine	1996	2	105	7	23
National Academy of Pedagogical Sciences of Ukraine	1992	16	1469	130	450
National Academy of Law Sciences of Ukraine	1993	6	277	16	77

* As of December 31, 2014.

** R&D personnel.

*** Persons performing R&D are included only.

⁴ Here and in both sections V and VI statistical data is taken from annual statistical books “Science and Innovation Activities in Ukraine”, compiled by the State Statistics Service of Ukraine, if other sources are not referred to. They may not correspond with departmental statistical data given in sections IV, V and IX, due to different methodologies for statistical reporting.

Personal membership of national academies of sciences, *headcount*

	As of	Full members	Corresponding members	Foreign members	Honorary members
National Academy of Sciences of Ukraine	March 16, 2015	204	388	106	×
National Academy of Agrarian Sciences of Ukraine	January 1, 2015	102	111	63	30
National Academy of Medical Sciences of Ukraine	June 1, 2015	25	77	19	...
National Academy of Arts of Ukraine	June 1, 2015	43	57	16	21
National Academy of Pedagogical Sciences of Ukraine	January 1, 2015	60	84	37	9
National Academy of Law Sciences of Ukraine	January 1, 2015	50	79	5	...

III.2. R&D organizations by sector of performance

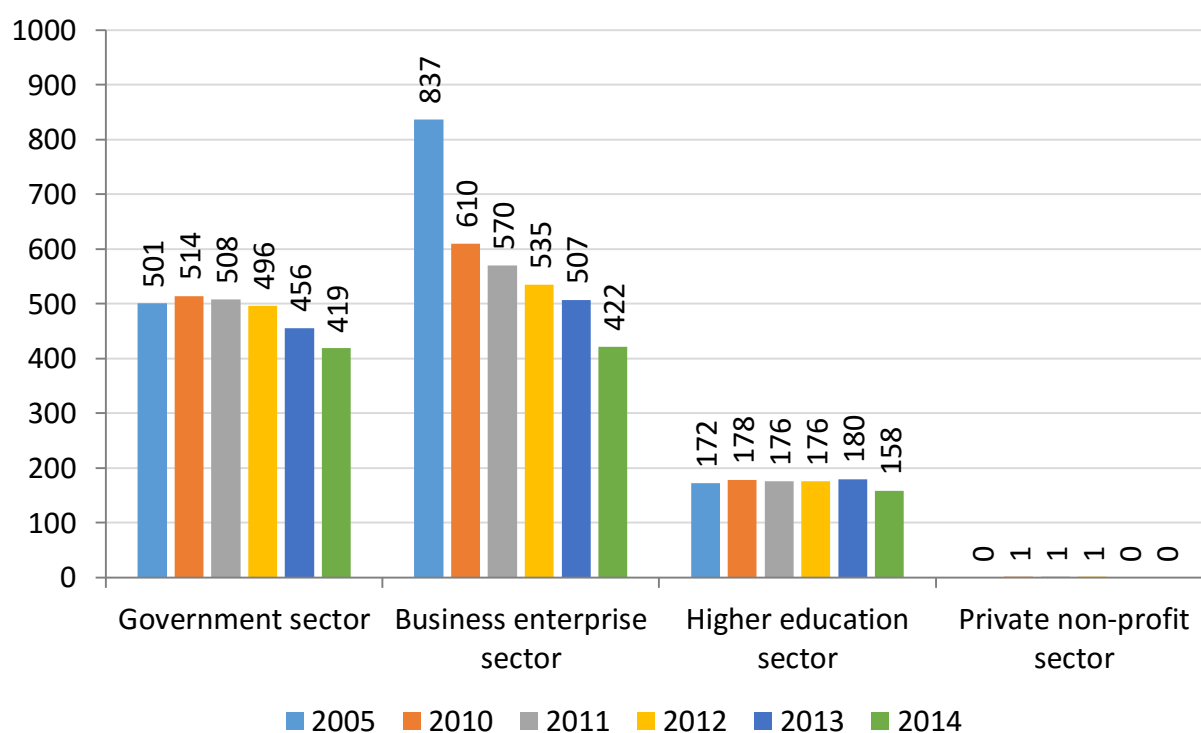
Organizations - total

	2005	2010	2011	2012	2013	2014
Total	1510	1303	1255	1208	1143	999
Government sector	501	514	508	496	456	419
including national academies	394	385	379	351	341	321
of them: NAS of Ukraine	216	206	203	199	196	178
Business enterprise sector	837	610	570	535	507	422

continued

	2005	2010	2011	2012	2013	2014
Higher education sector	172	178	176	176	180	158
Private non-profit sector	...	1	1	1
<i>(as % of total of each year)</i>						
Government sector	33.2	39.5	40.5	41.1	39.9	42.0
including national academies	26.1	29.6	30.2	29.1	29.8	32.1
of them: NAS of Ukraine	14.3	15.8	16.2	16.5	17.1	17.9
Business enterprise sector	55.4	46.8	45.4	44.3	44.4	42.2
Higher education sector	11.4	13.7	14.0	14.6	15.7	15.8
Private non-profit sector	...	0.1	0.1	0.1

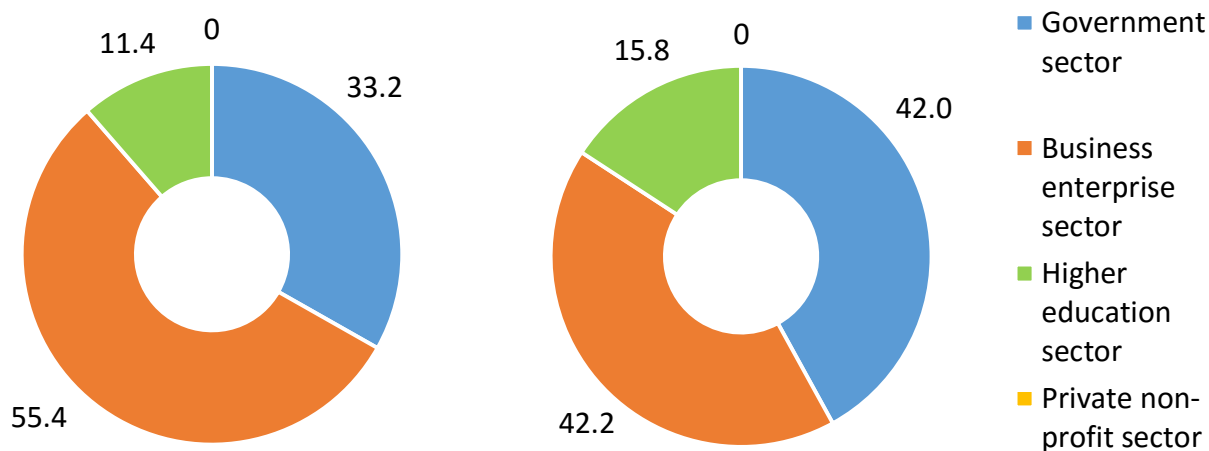
Trends in R&D organizations by sector of performance



Percentage distribution of R&D organizations

2005

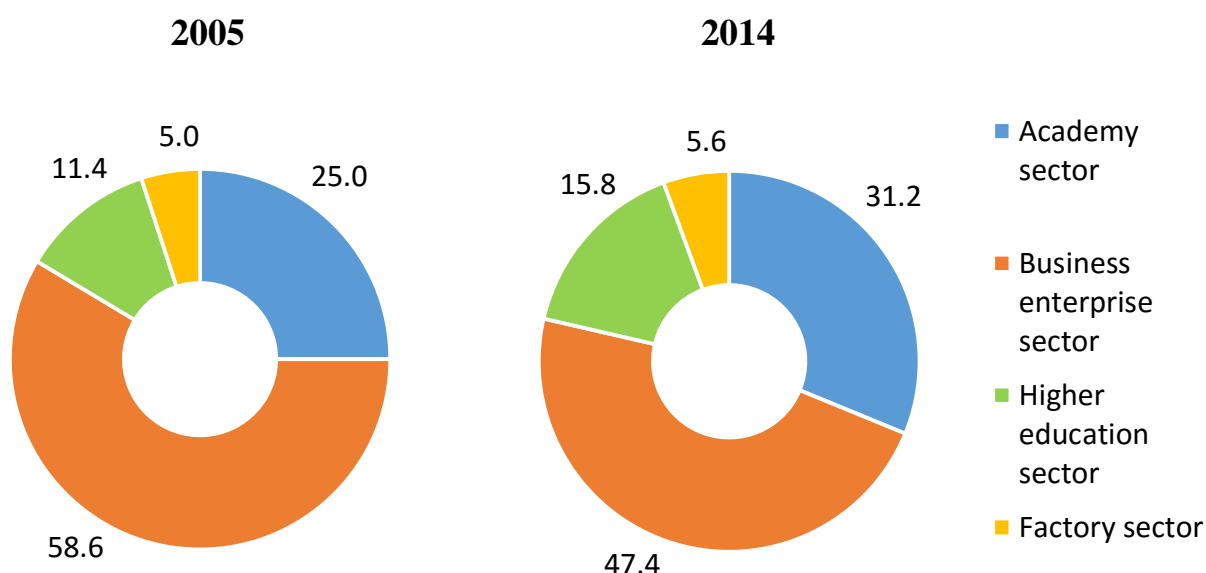
2014



III.3. Percentage distribution of R&D organizations by sector of science

as % of total of each year

	2005	2010	2011	2012	2013	2014
Academy sector	25.0	28.1	28.8	27.2	27.8	31.2
including						
NAS of Ukraine	14.3	15.8	16.2	16.5	17.1	17.8
Business enterprise sector	58.6	53.4	52.2	52.8	50.7	47.4
Higher education sector	11.4	13.7	14.0	14.6	15.7	15.8
Factory sector	5.0	4.8	5.0	5.4	5.8	5.6



III.4. R&D organizations by national academies of sciences and ministries

	2005	2010	2011	2012	2013	2014
Total	1510	1303	1255	1208	1143	999
Total for national academies of sciences*	394	385	379	351	341	321
including:						
National Academy of Sciences	216	206	203	199	196	178
National Academy of Agrarian Sciences (Ukrainian Academy of Agrarian Sciences before 2011)	127	119	114	93	86	86
National Academy of Medical Sciences (Academy of Medical Sciences before 2011)	34	37	37	35	35	34
National Academy of Arts (Academy of Fine Arts before 2011)	2	2	2	2
National Academy of Pedagogical Sciences (Academy of Pedagogical Sciences before 2011)	13	17	17	16	16	15
National Academy of Law Sciences (Academy of Law Sciences before 2011)	4	6	6	6	6	6
Total for ministries and agencies*	1116	918	876
of them:						

continued

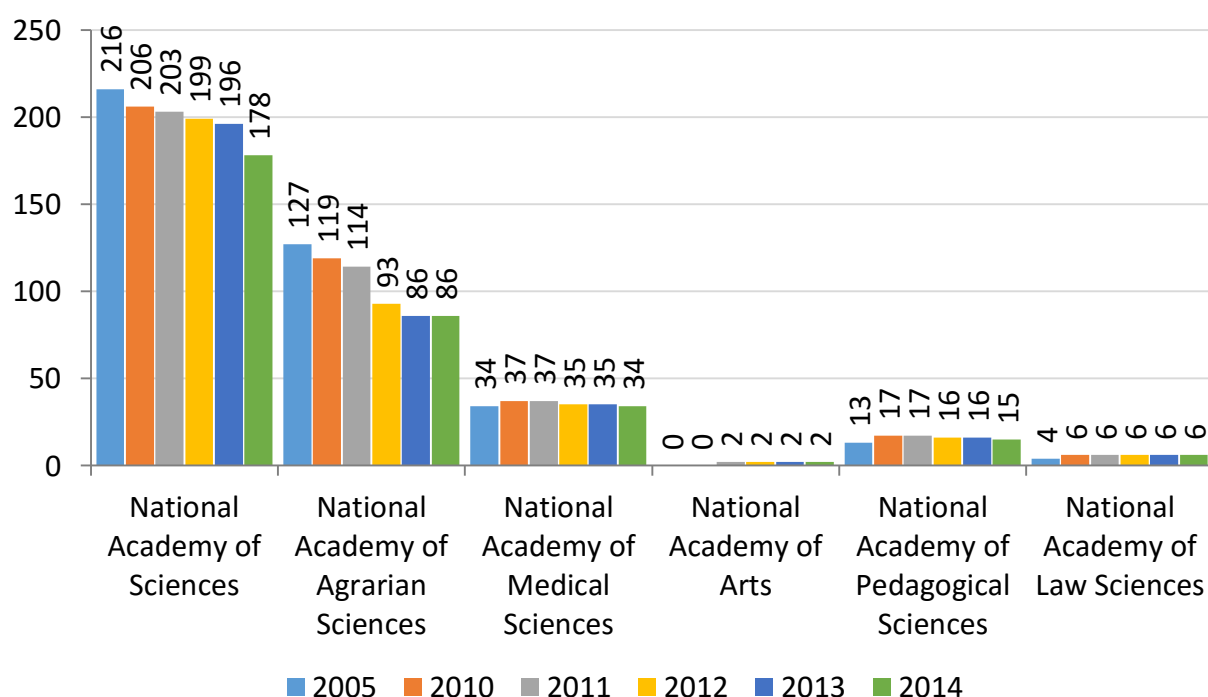
	2005	2010	2011	2012	2013	2014
Ministry of Agrarian Policy and Food (Ministry of Agriculture before 2011)	93	90	82
Ministry of Energy and Coal Industry (Ministry of Fuels and Energy before 2011)	37	27	35
Ministry of Education and Science (Ministry of Education and Science, Youth and Sport before 2011)	147	144	134
Ministry of Healthcare	45	39	37

* Hereinafter data in tables is given in conformity with changes in the names of academies, ministries and departments.

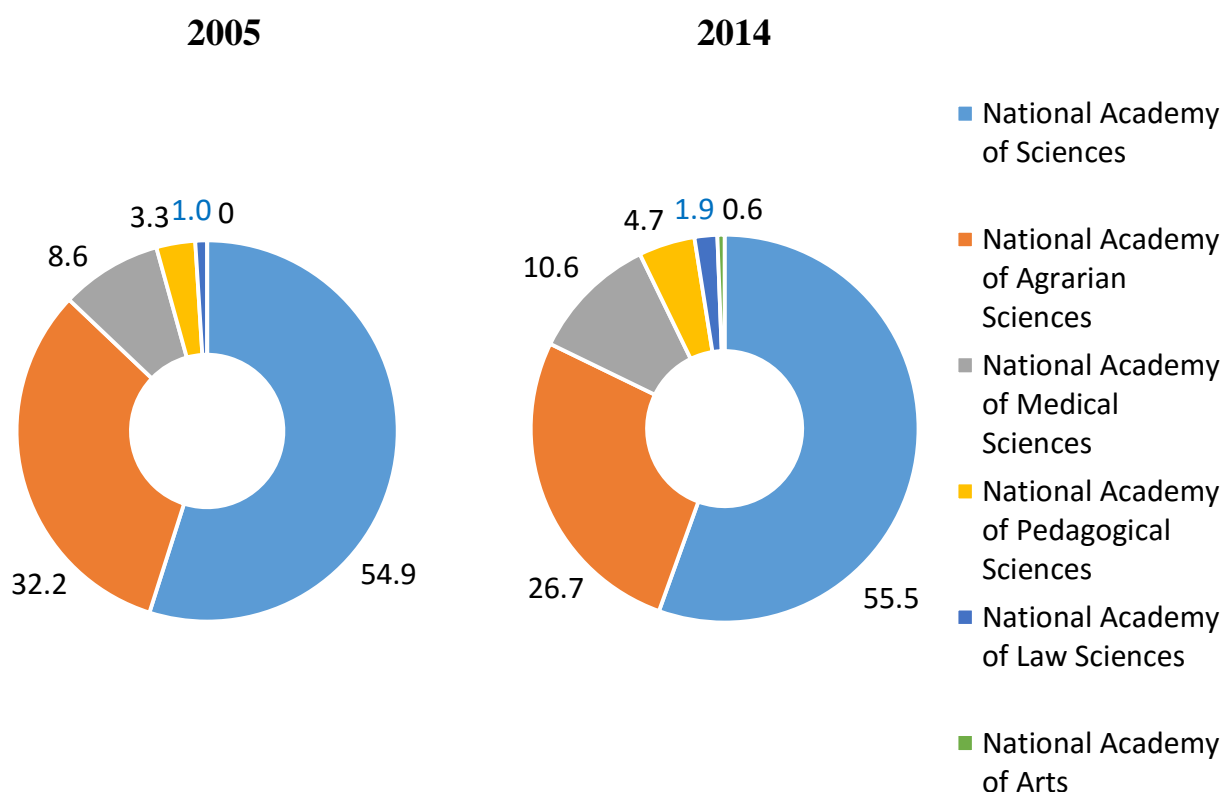
The figures in the line “Total in national academies” before 2011 are calculated as sums of figures for each Academy of Sciences; data for 2011–2014 are extracted from the annual statistical book “R&D and Innovation in Ukraine in 2014” issued by the State Statistics Service of Ukraine.

The figures in line “Total for ministries and agencies” are calculated using statistical data for all the ministries and departments (including the line “Other ministries and agencies”), shown in the annual statistical book “R&D and Innovation in Ukraine” for respective years. Data for ministries is not given in the annual statistical book “R&D and Innovation in Ukraine” for 2012–2014.

Trends in organizations, enterprises, and institutions by national academies of sciences



Percentage distribution of organizations by national academies of sciences



III.5. Personnel by sector of performance

Main activity personnel, *headcount*

	2005	2010	2011	2012	2013	2014
Total	170579	141086	134741	129945	123219	109636
Government sector including national academies of sciences	67629	63307	60834	62086	59921	54574
of them: NAS of Ukraine	38705	37480	36789	36162	35725	32548
Business enterprise sector	91981	67472	64550	58586	54532	47479
Higher education sector	10969	10303	9355	9272	8766	7583
Private non-profit sector	...	4	2	1

continued

	2005	2010	2011	2012	2013	2014
<i>(as % of total of each year)</i>						
Government sector	39.7	44.9	45.1	47.8	48.6	49.8
including national						
academies of sciences	34.7	40.3	39.7	40	41.6	42.8
of them: NAS of						
Ukraine	22.7	24.5	27.3	27.8	29.0	29.7
Business enterprise sector	53.9	47.8	47.9	45.1	44.3	43.3
Higher education sector	6.4	7.3	6.9	7.1	7.1	6.9
Private non-profit sector	...	0	0	0

R&D personnel (researches and technicians), headcount

	2005	2010	2011	2012	2013	2014
Total	105512	89564	84969	82032	77853	69404
Government sector	44974	42949	41275	41931	40752	37244
including national						
academies of sciences	39506	38675	36363	35278	34955	32215
of them: NAS of						
Ukraine	25768	25196	24499	24058	23815	21716
Business enterprise sector	50986	37568	35445	32023	29528	25669
Higher education sector	9552	9045	8247	8077	7573	6491
Private non-profit sector	...	2	2	1
<i>(as % of total of each year)</i>						
Government sector	42.6	48.0	48.6	51.1	52.3	53.7
including national						
academies of sciences	37.4	43.2	42.8	43.0	44.9	46.4
of them: NAS of						
Ukraine	24.4	28.1	28.8	29.3	30.6	31.3
Business enterprise sector	48.3	41.9	41.7	39.0	37.9	37.0
Higher education sector	9.1	10.1	9.7	9.9	9.7	9.4
Private non-profit sector	...	0	0	0

Supporting staff, *headcount*

	2005	2010	2011	2012	2013	2014
Total	32052	26032	24779	23866	22649	20128
Government sector	9432	8404	7848	8137	7694	6913
including national academies of sciences	8449	7763	7181	7045	6860	6178
of them: NAS of Ukraine	5216	4904	4826	4748	4622	4177
Business enterprise sector	21697	16742	16200	14946	14151	12575
Higher education sector	923	886	731	783	804	640
Private non-profit sector
<i>(as % of total of each year)</i>						
Government sector	29.4	32.3	31.7	34.1	34.0	34.3
including national academies of sciences	26.4	29.8	29	29.5	30.3	30.7
of them: NAS of Ukraine	16.3	18.8	19.5	19.9	20.4	20.8
Business enterprise sector	67.7	64.3	65.4	62.6	62.5	62.5
Higher education sector	2.9	3.4	3.0	3.3	3.5	3.2
Private non-profit sector

III.6. Personnel of national academies of sciences and ministries by occupation

Main activity personnel, *headcount*

	2005	2010	2011	2012	2013	2014
Total	170579	141086	134741	129945	123219	109636
Total for national academies of sciences	59226	56814	53550	51950	51308	46876

continued

	2005	2010	2011	2012	2013	2014
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including:

National Academy of Sciences	38705	37480	36789	36162	35725	32548
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National Academy of Agrarian Sciences	14220	12434	9887	9075	8934	7853
---------------------------------------	-------	-------	------	------	------	------

National Academy of Medical Sciences	4998	5162	5110	4895	4798	4673
--------------------------------------	------	------	------	------	------	------

National Academy of Arts	...	110	114	113	105	106
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National Academy of Pedagogical Sciences	1148	1380	1393	1444	1469	1415
--	------	------	------	------	------	------

National Academy of Law Sciences	155	248	257	261	277	281
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Total for ministries and agencies	111353	84272	81191
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of them:

Ministry of Agrarian Policy and Food	3458	2967	2583
--------------------------------------	------	------	------	-----	-----	-----

Ministry of Energy and Coal Industry	3470	2014	2825
--------------------------------------	------	------	------	-----	-----	-----

Ministry of Education and Science	10972	8591	7939
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Ministry of Healthcare	3385	2466	2268
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R&D personnel (researches and technicians), *headcount*

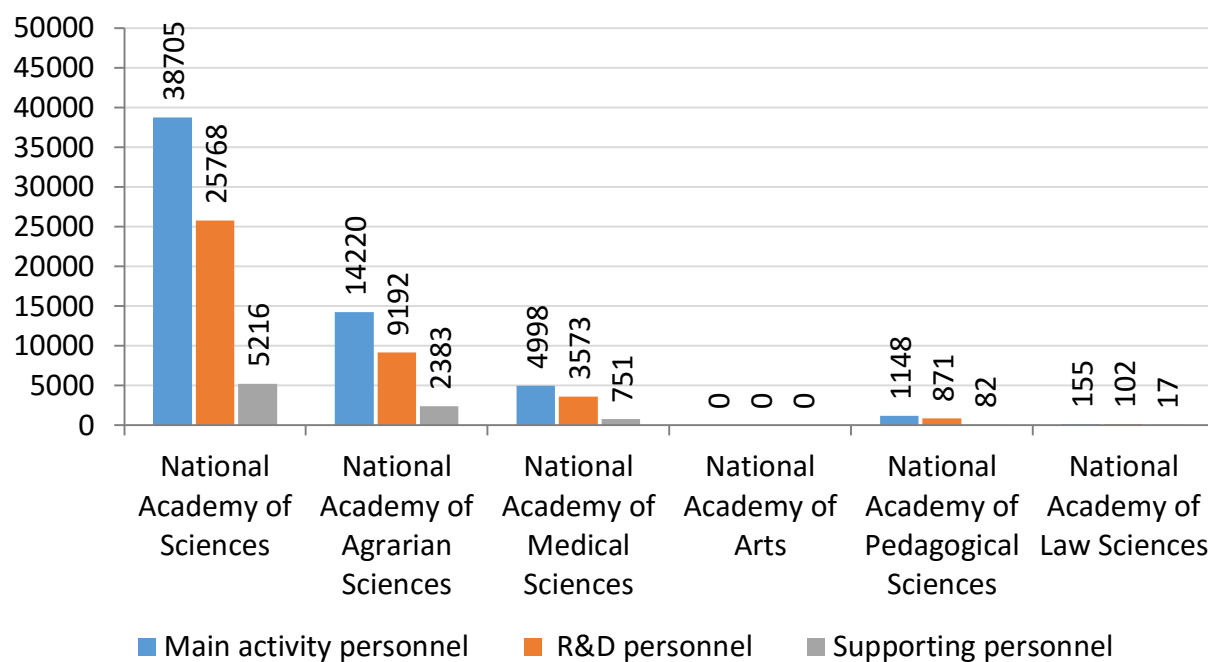
	2005	2010	2011	2012	2013	2014
Total	105512	89564	84969	82032	77853	69404
Total for national academies of sciences	39506	38675	36363	35278	34955	32215
including:						
National Academy of Sciences	25768	25196	24499	24058	23815	21716
National Academy of Agrarian Sciences	9192	8586	6976	6451	6384	5857
National Academy of Medical Sciences	3573	3589	3565	3372	3324	3246
National Academy of Arts	...	62	64	62	60	62
National Academy of Pedagogical Sciences	871	1066	1074	1138	1160	1117
National Academy of Law Sciences	102	176	185	197	212	217
Total for ministries and agencies	66006	50889	48606
of them:						
Ministry of Agrarian Policy and Food	2270	1893	1720
Ministry of Energy and Coal Industry	2091	1343	1834
Ministry of Education and Science	9004	7092	6516
Ministry of Healthcare	1834	1492	1340

Supporting staff, *headcount*

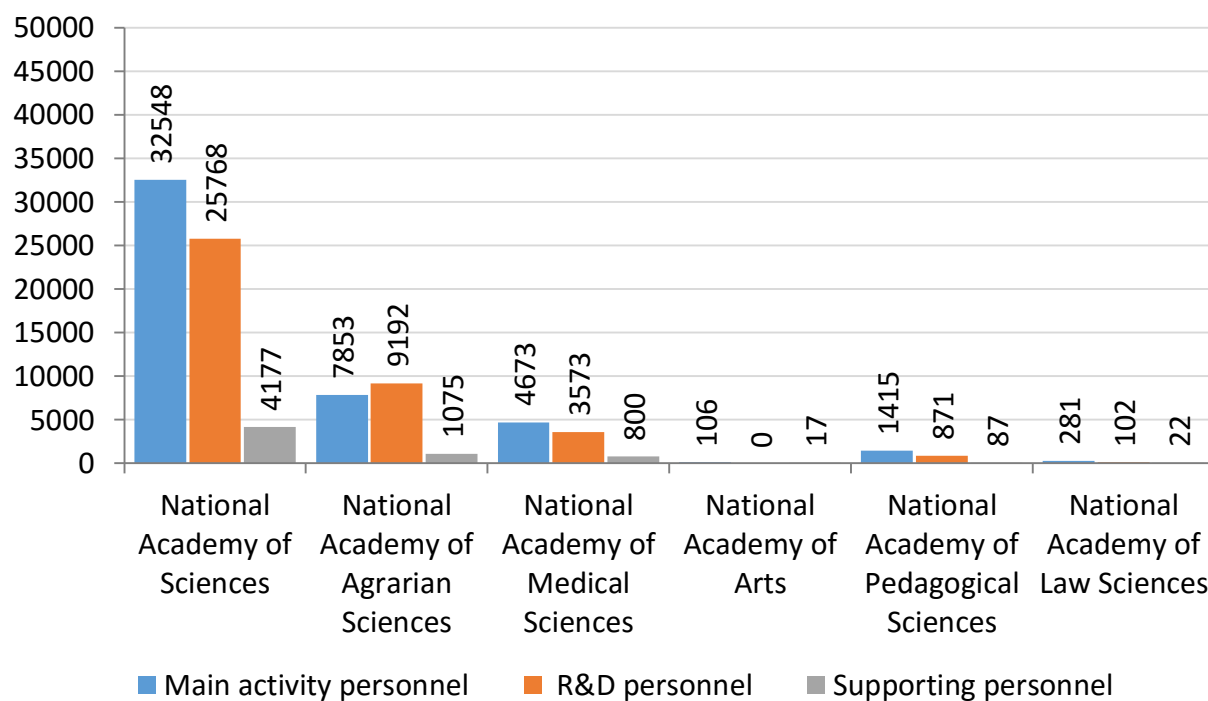
	2005	2010	2011	2012	2013	2014
Total	32052	26032	24779	23866	22649	20128
Total for national academies of sciences	8449	7763	7181	7045	6860	6178
including:						
National Academy of Sciences	5216	4904	4826	4748	4622	4177
National Academy of Agrarian Sciences	2383	1894	1399	1345	1290	1075
National Academy of Medical Sciences	751	838	812	824	819	800
National Academy of Arts	...	25	26	22	17	17
National Academy of Pedagogical Sciences	82	77	94	86	91	87
National Academy of Law Sciences	17	25	24	20	21	22
Total for ministries and agencies	23603	18269	17598
of them:						
Ministry of Agrarian Policy and Food	419	451	347
Ministry of Energy and Coal Industry	467	302	392
Ministry of Education and Science	1104	943	813
Ministry of Healthcare	513	312	290

Personnel in national academies of sciences by occupation, *headcount*

2005



2014



III.7. R&D personnel by scientific degree

Doctors of sciences, *headcount*

	2005	2010	2011	2012	2013	2014
Total	4180	4478	4416	4485	4528	4256
Total for national academies of sciences	3456	3599	3514	3534	3610	3461
including:						
National Academy of Sciences	2524	2557	2486	2491	2535	2410
National Academy of Agrarian Sciences	325	314	296	310	334	296
National Academy of Medical Sciences	538	593	600	586	588	587
National Academy of Arts	...	9	12	12	7	9
National Academy of Pedagogical Sciences	63	116	108	123	130	134
National Academy of Law Sciences	6	10	12	12	16	25
Total for ministries and agencies	724	879	902
of them:						
Ministry of Agrarian Policy and Food	20	28	37
Ministry of Energy and Coal Industry	17	13	21
Ministry of Education and Science	264	284	304
Ministry of Healthcare	724	879	902

Candidates of sciences, *headcount*

	2005	2010	2011	2012	2013	2014
Total	16983	16944	16139	15887	15850	14736
Total for national academies of sciences	11174	11673	11207	11077	11190	10538
including:						
National Academy of Sciences	7692	7938	7745	7696	7746	7205
National Academy of Agrarian Sciences	1889	1894	1659	1608	1638	1556
National Academy of Medical Sciences	1275	1351	1300	1260	1256	1234
National Academy of Arts	...	35	38	26	23	23
National Academy of Pedagogical Sciences	296	401	406	415	450	440
National Academy of Law Sciences	22	54	59	72	77	80
Total for ministries and agencies	5809	5271	4932
of them:						
Ministry of Agrarian Policy and Food	122	143	137
Ministry of Energy and Coal Industry	183	109	157
Ministry of Education and Science	1785	1627	1522
Ministry of Healthcare	468	372	350

III.8. Researchers in organizations of national academies of sciences and ministries by scientific degree

Researchers - total, *headcount*

	2005	2010	2011	2012	2013	2014
Total	76147	73413	70378	68599	65641	58695
Total for national academies of sciences	32825	32567	31137	30551	30343	27862
including:						
National Academy of Sciences	22424	22377	21729	21488	21297	19278
National Academy of Agrarian Sciences	6119	5819	5052	4787	4782	4425
National Academy of Medical Sciences	3199	3180	3145	2991	2945	2876
National Academy of Arts	...	62	64	60	60	62
National Academy of Pedagogical Sciences	938	967	974	1041	1061	1017
National Academy of Law Sciences	145	162	173	184	198	204
Total for ministries and agencies	...	40846	39241
of them:						
Ministry of Agrarian Policy and Food	...	1496	1440
Ministry of Energy and Coal Industry	...	1127	1634
Ministry of Education and Science	...	6318	5822
Ministry of Healthcare	...	1226	1130

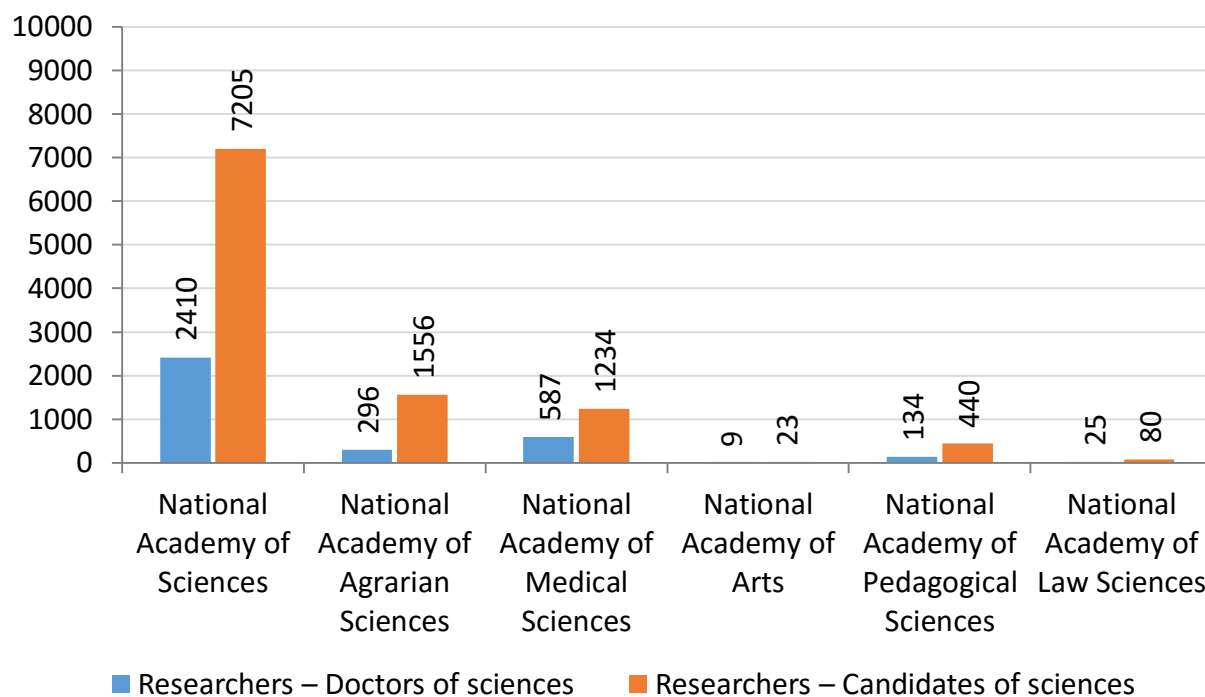
Researchers with doctor of sciences degree, *headcount*

	2005	2010	2011	2012	2013	2014
Total	4439	4477	4415	4485	4528	4256
Total for national academies of sciences	3527	3599	3514	3534	3610	3461
including:						
National Academy of Sciences	2539	2557	2486	2491	2535	2410
National Academy of Agrarian Sciences	320	314	296	310	334	296
National Academy of Medical Sciences	575	593	600	586	588	587
National Academy of Arts	...	9	12	12	7	9
National Academy of Pedagogical Sciences	87	116	108	123	130	134
National Academy of Law Sciences	6	10	12	12	16	25
Total for ministries and agencies	...	878	901
of them:						
Ministry of Agrarian Policy and Food	...	28	37
Ministry of Energy and Coal Industry	...	13	21
Ministry of Education and Science	...	284	304
Ministry of Healthcare	...	117	108

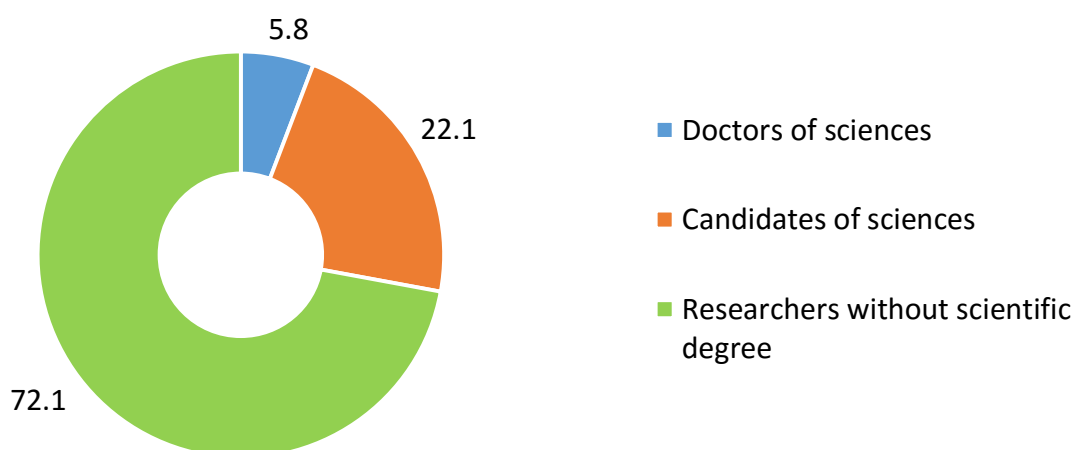
Researchers with candidate of sciences degree, *headcount*

	2005	2010	2011	2012	2013	2014
Total	17054	16923	16117	15866	15833	14718
Total for national academies of sciences	11617	11666	11195	11066	11190	10538
including:						
National Academy of Sciences	7952	7931	7735	7687	7746	7205
National Academy of Agrarian Sciences	1914	1894	1659	1608	1638	1556
National Academy of Medical Sciences	1358	1351	1298	1258	1256	1234
National Academy of Arts	...	35	38	26	23	23
National Academy of Pedagogical Sciences	349	401	406	415	450	440
National Academy of Law Sciences	44	54	59	72	77	80
Total for ministries and agencies	...	5257	4922
of them:						
Ministry of Agrarian Policy and Food	...	143	137
Ministry of Energy and Coal Industry	...	108	156
Ministry of Education and Science	...	1627	1522
Ministry of Healthcare	...	372	350

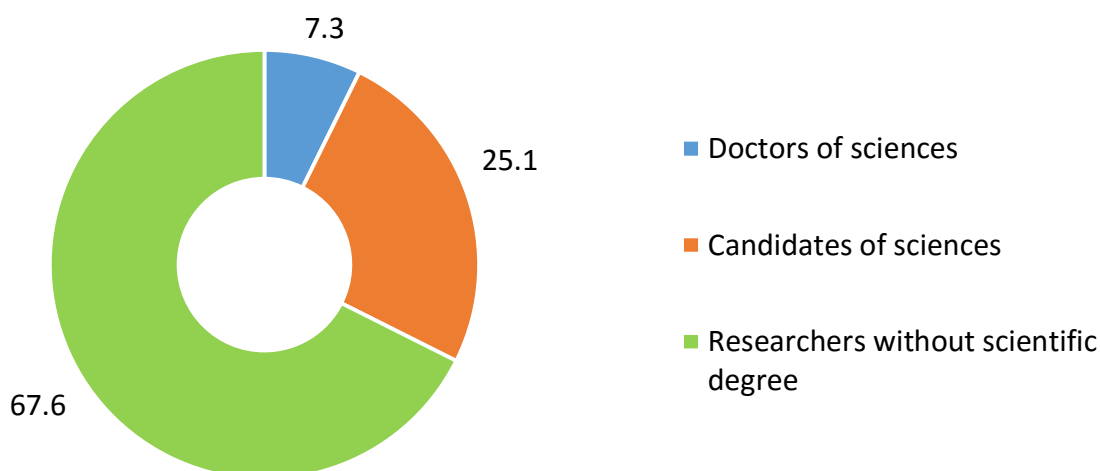
Researchers in organizations of national academies of sciences and ministries by scientific degree: 2014



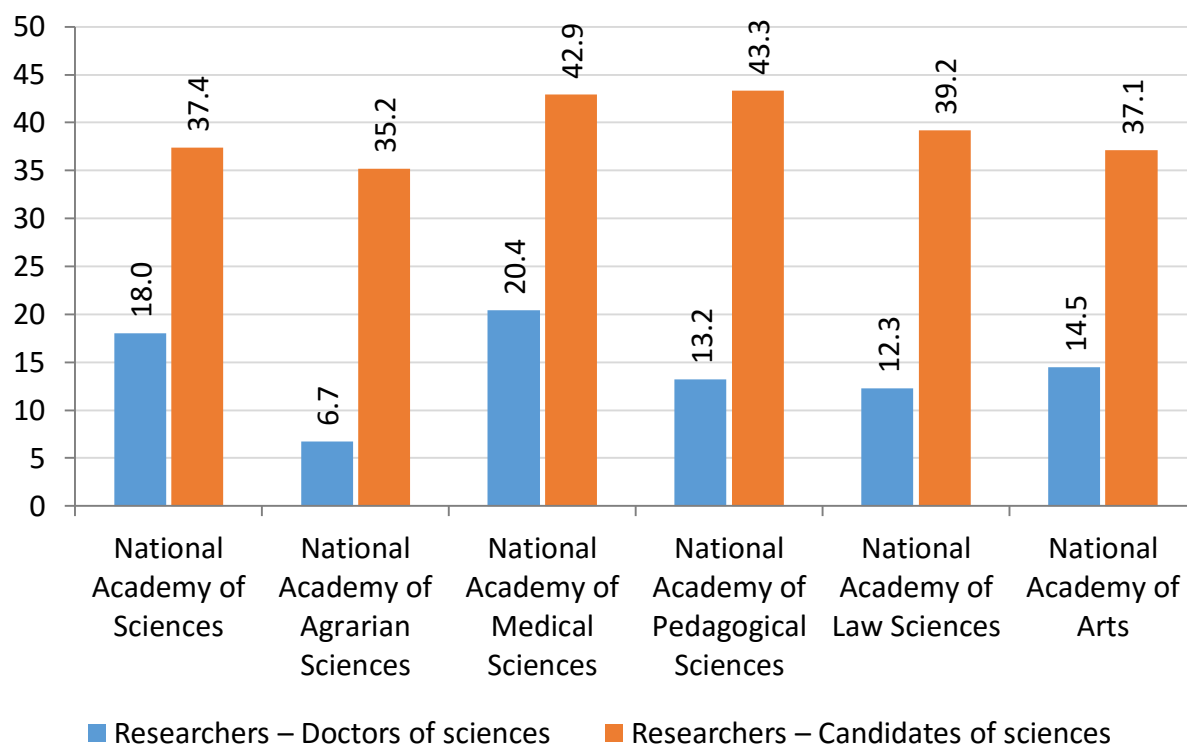
Share of researchers with scientific degree, % in total number 2008



2014



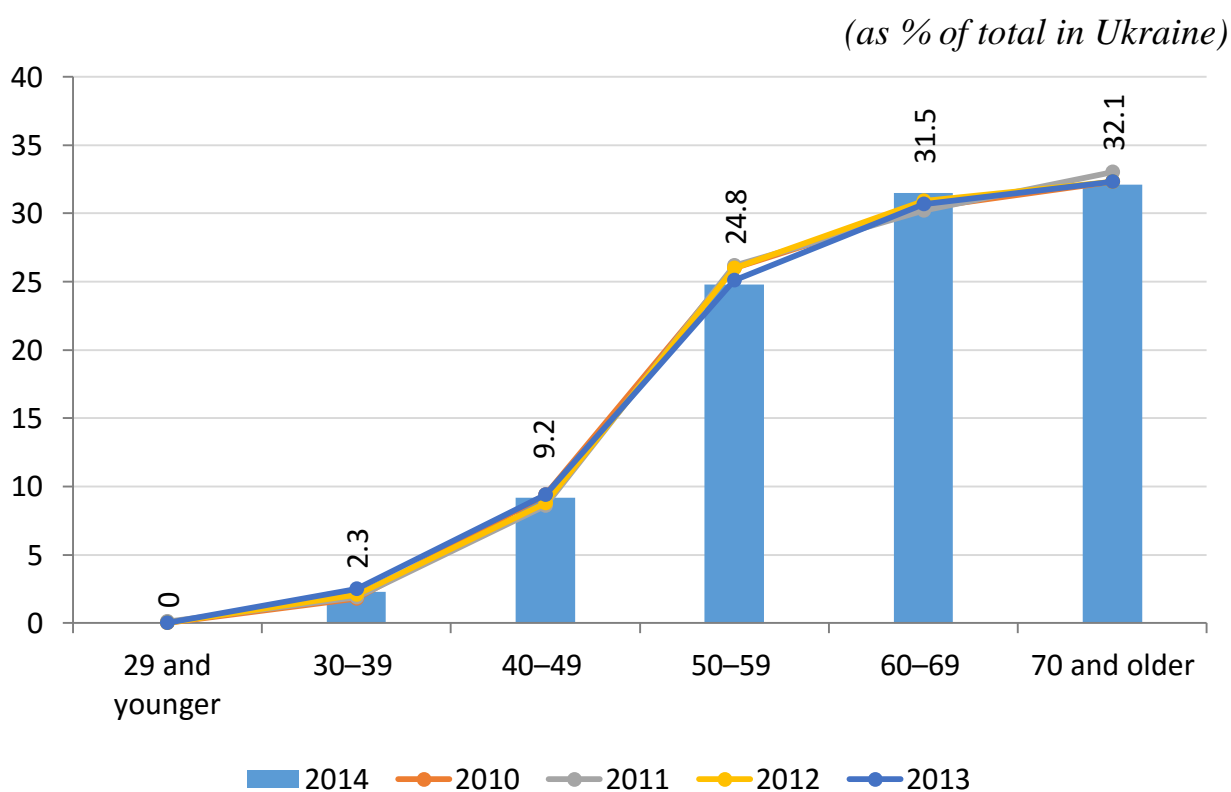
Share of researchers with scientific degree in organizations of national academies of sciences: 2014



III.9. Researchers by scientific degree and age

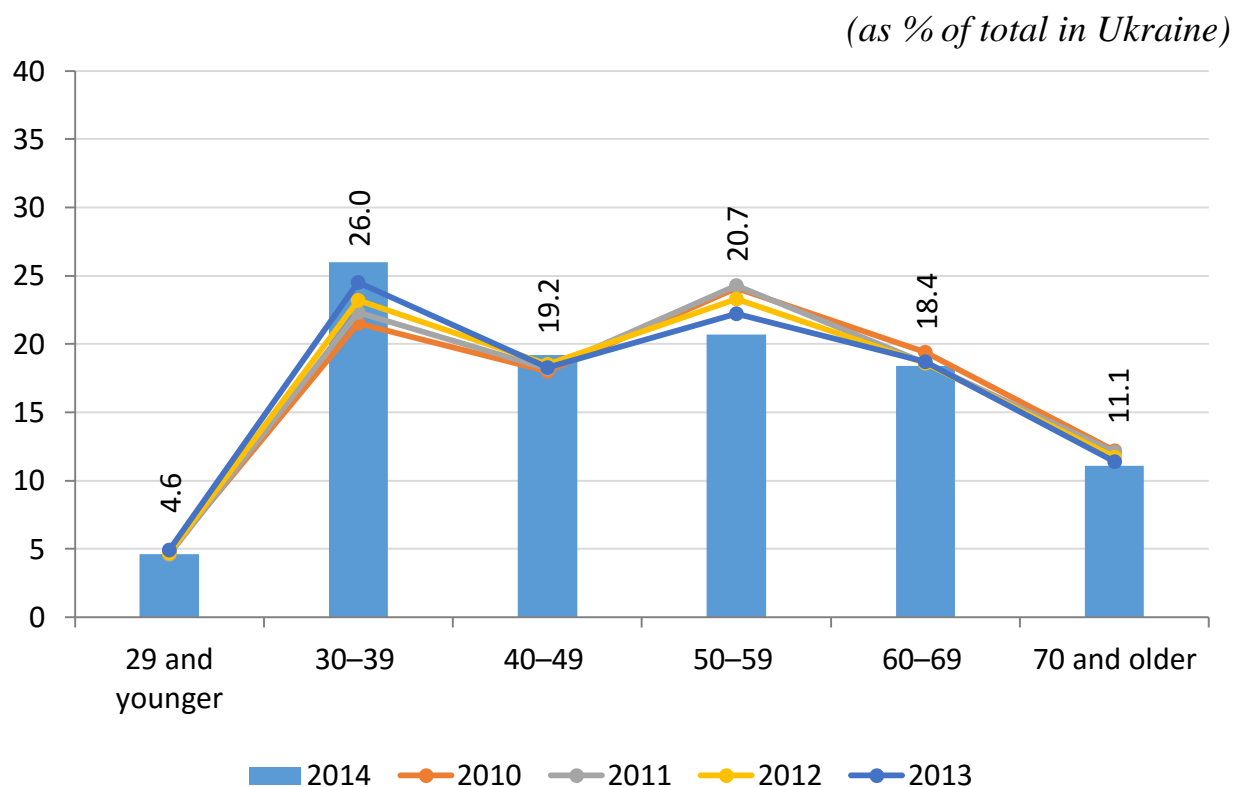
Doctors of science by age, *headcount*

	2008	2009	2010	2011	2012	2013	2014
Total	4451	4439	4477	4415	4485	4528	4256
of them:							
29 and younger	4	1	2	3	–	–	–
30–39	70	81	81	86	93	111	99
40–49	390	402	422	380	396	426	393
50–59	1268	1228	1164	1156	1162	1136	1057
60–69	1431	1363	1362	1333	1384	1391	1339
70 and older	1288	1364	1446	1457	1450	1464	1368



Candidates of sciences by age, *headcount*

	2008	2009	2010	2011	2012	2013	2014
Total	17070	17054	16923	16117	15866	15833	14718
of them:							
29 and younger	724	782	814	739	739	776	681
30–39	2924	3436	3644	3590	3684	3880	3826
40–49	3400	3182	3035	2932	2931	2895	2821
50–59	4645	4307	4083	3916	3698	3515	3052
60–69	3680	3416	3279	2994	2957	2967	2708
70 and older	1555	1931	2068	1946	1857	1800	1630



III.10. Women performing R&D in organizations of national academies of sciences and ministries by scientific degree

Women performing R&D - total, *headcount*

	2005	2010	2011	2012	2013	2014
Total	34126	33159	32018	31426	30079	26890
Total for national academies of sciences	15159	15155	14577	14413	14542	13365
including:						
National Academy of Sciences	9216	9303	8979	8942	9063	8137
National Academy of Agrarian Sciences	3121	2975	2702	2595	2605	2381
National Academy of Medical Sciences	2088	2097	2059	1980	1934	1920
National Academy of Arts	36	35	37	39
National Academy of Pedagogical Sciences	646	679	695	751	781	769
National Academy of Law Sciences	88	101	106	110	122	119
Total for ministries and agencies	...	18004	17441
of them:						
Ministry of Agrarian Policy and Food	...	836	823
Ministry of Energy and Coal Industry	...	500	682
Ministry of Education and Science	...	2837	2655
Ministry of Healthcare	...	825	751

Women - doctors of sciences, *headcount*

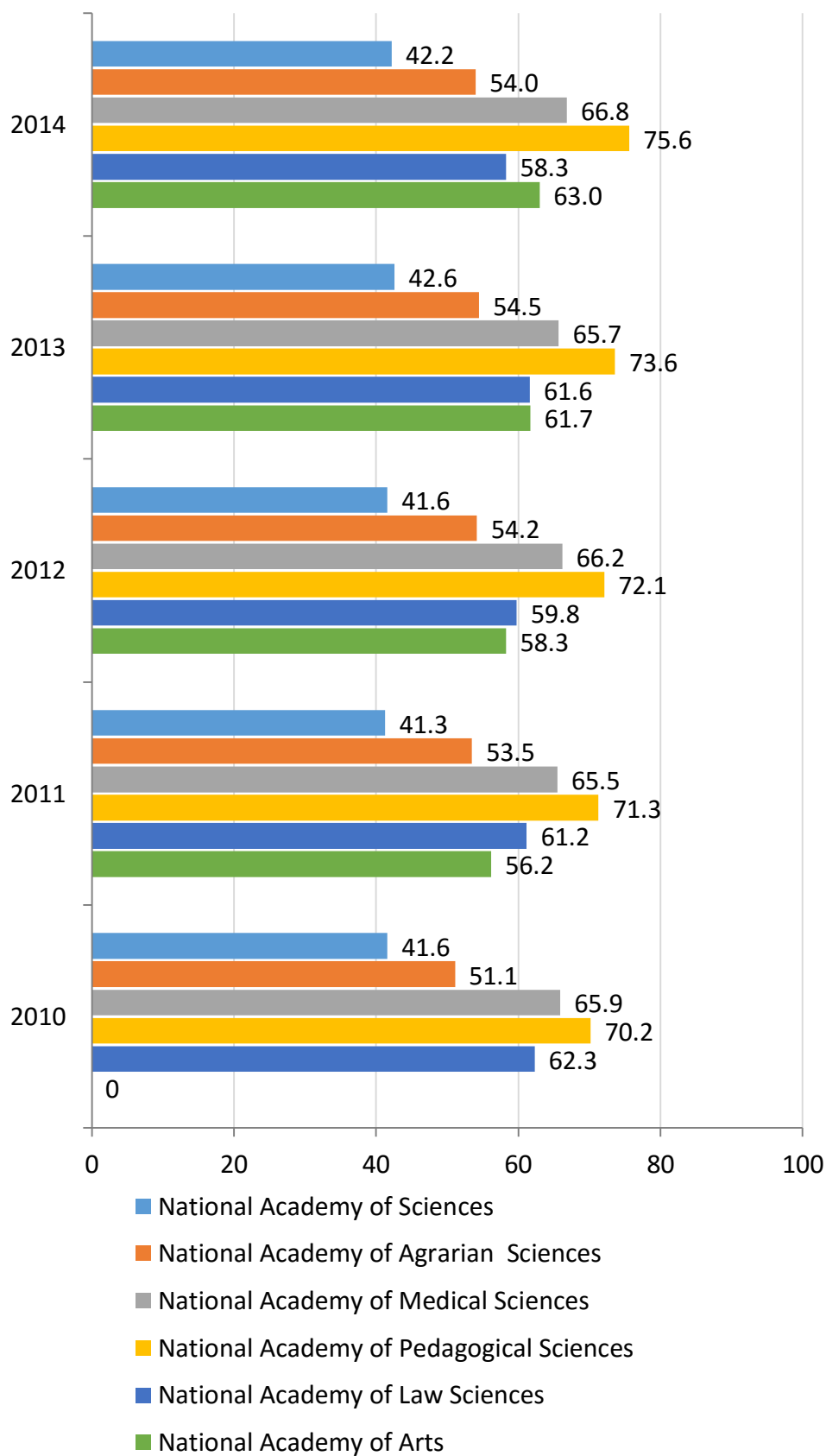
	2005	2010	2011	2012	2013	2014
Total	955	981	984	1049	1087	1063
Total for national academies of sciences	811	825	819	854	891	887
including:						
National Academy of Sciences	467	468	453	459	487	473
National Academy of Agrarian Sciences	53	51	49	55	59	55
National Academy of Medical Sciences	243	248	254	262	262	268
National Academy of Arts	5	5	3	4
National Academy of Pedagogical Sciences	47	55	52	68	75	79
National Academy of Law Sciences	1	3	6	5	5	8
Total for ministries and agencies	...	156	165
of them:						
Ministry of Energy and Coal Industry	...	6	9
Ministry of Education and Science	...	1	1
Ministry of Healthcare	...	37	43

Women - candidates of sciences, *headcount*

	2005	2010	2011	2012	2013	2014
Total	6731	6898	6621	6735	6853	6513
Total for national academies of sciences	5002	5126	4940	5063	5194	4955
including:						
National Academy of Sciences	3028	3095	2989	3077	3129	2952
National Academy of Agrarian Sciences	792	810	735	761	795	757
National Academy of Medical Sciences	915	919	880	877	880	858
National Academy of Arts	27	19	17	17
National Academy of Pedagogical Sciences	248	277	284	292	332	328
National Academy of Law Sciences	19	25	25	37	41	43
Total for ministries and agencies	...	1772	1681
of them:						
Ministry of Agrarian Policy and Food	...	59	60
Ministry of Energy and Coal Industry	...	19	20
Ministry of Education and Science	...	547	499
Ministry of Healthcare	...	234	213

Share of female researchers in national academies of sciences, %

2010–2014



III.11. Part-time R&D performers in organizations of national academies of sciences and ministries

Part-time R&D performers - total*, *headcount*

	2005	2010	2011	2012	2013	2014
Total	68499	69380	68151	61077	57135	48523
Total for national academies of sciences	7018	5569	5574	5295	5089	4528
including:						
National Academy of Sciences	5187	4000	3789	3468	3304	2998
National Academy of Agrarian Sciences	967	468	553	559	632	541
National Academy of Medical Sciences	416	527	539	462	515	370
National Academy of Arts	...	6	7	7	22	38
National Academy of Pedagogical Sciences	334	368	478	582	406	387
National Academy of Law Sciences	114	200	208	217	210	194
Total for ministries and agencies	61481	63811	62577
of them:						
Ministry of Agrarian Policy and Food	1499	1518	2274
Ministry of Energy and Coal Industry	167	114	137
Ministry of Education and Science	41992	50884	46830
Ministry of Healthcare	5364	3897	3713

* Since 2006 all the research and lecturing staff of HEEs have been included in part-time R&D performers by the State Statistics Service of Ukraine.

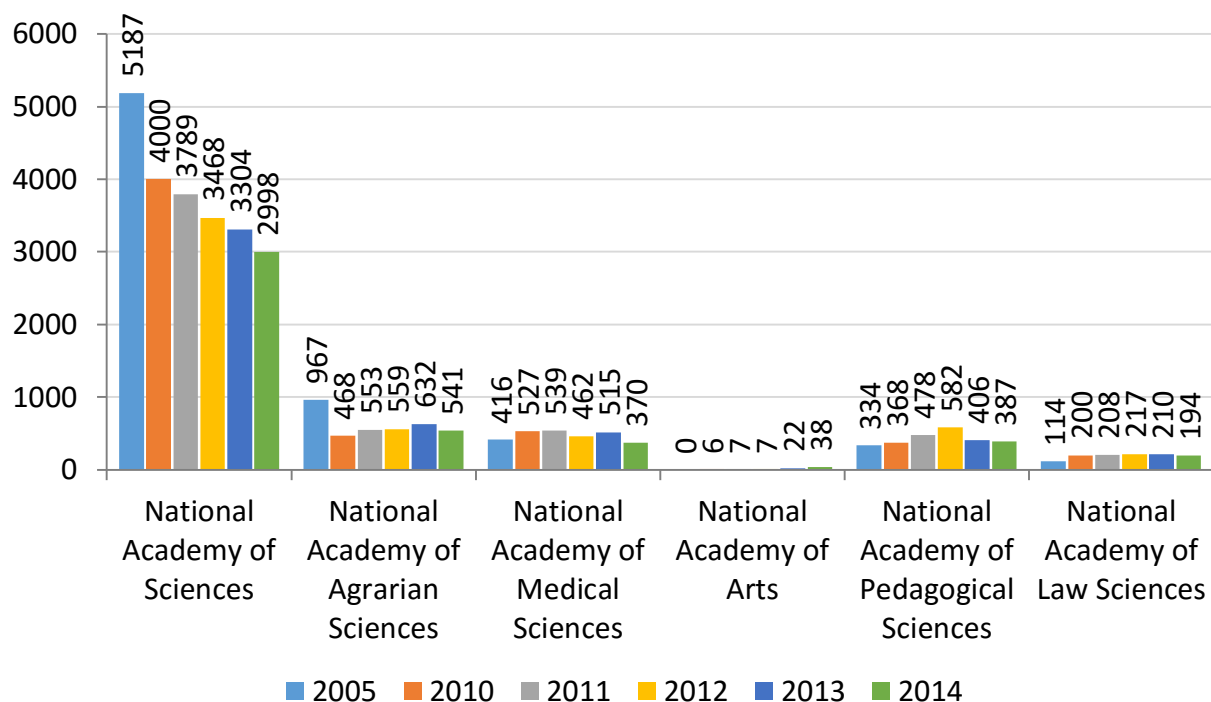
Part-time R&D doctors of sciences, *headcount*

	2005	2010	2011	2012	2013	2014
Total	6935	7493	7260	6684	6623	5723
Total for national academies of sciences	981	962	906	882	845	771
including:						
National Academy of Sciences	662	640	588	572	545	473
National Academy of Agrarian Sciences	125	88	45	47	52	49
National Academy of Medical Sciences	74	79	74	78	96	93
National Academy of Arts	...	—	—	—	7	12
National Academy of Pedagogical Sciences	92	91	126	105	69	66
National Academy of Law Sciences	28	64	73	80	76	78
Total for ministries and agencies	5954	6531	6354
of them:						
Ministry of Agrarian Policy and Food	138	180	214
Ministry of Energy and Coal Industry	6	10	14
Ministry of Education and Science	3906	5107	4682
Ministry of Healthcare	870	589	607

Part-time R&D candidates of sciences, *headcount*

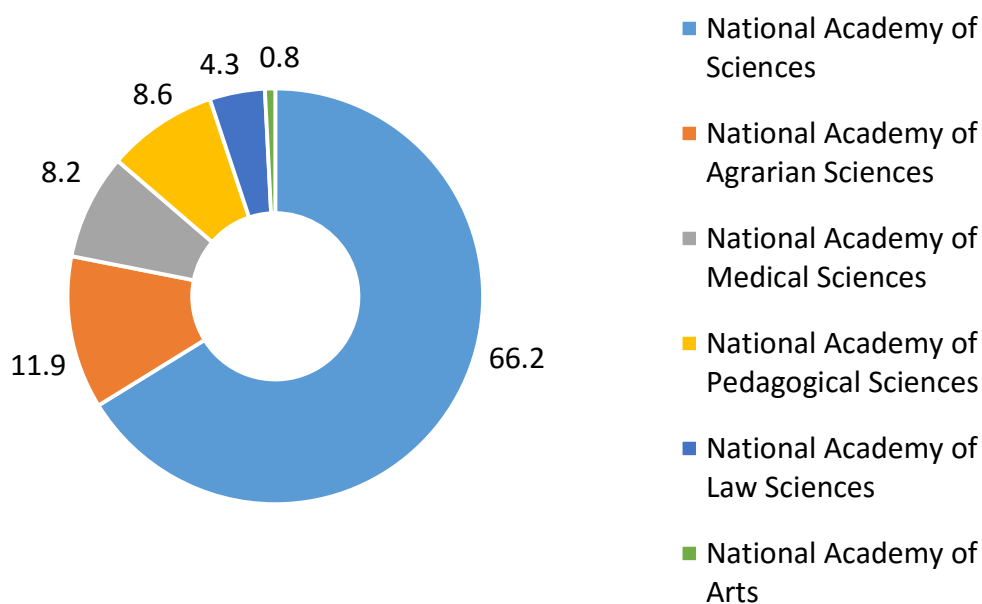
	2005	2010	2011	2012	2013	2014
Total	25670	29696	30145	26121	25303	22302
Total for national academies of sciences	1675	1372	1322	1266	1166	1154
including:						
National Academy of Sciences	1171	961	896	862	791	802
National Academy of Agrarian Sciences	218	63	48	51	52	47
National Academy of Medical Sciences	121	145	157	138	97	94
National Academy of Arts	...	—	—	—	3	8
National Academy of Pedagogical Sciences	114	104	127	114	125	113
National Academy of Law Sciences	51	99	94	101	98	90
Total for ministries and agencies	23995	28324	28823
of them:						
Ministry of Agrarian Policy and Food	556	787	1186
Ministry of Energy and Coal Industry	9	13	10
Ministry of Education and Science	17283	23721	22502
Ministry of Healthcare	3153	2198	2194

Trends in part -time R&D personnel in organizations of national academies of sciences, *headcount*



Percentage distribution of part-time R&D personnel in organizations of national academies of sciences

2014

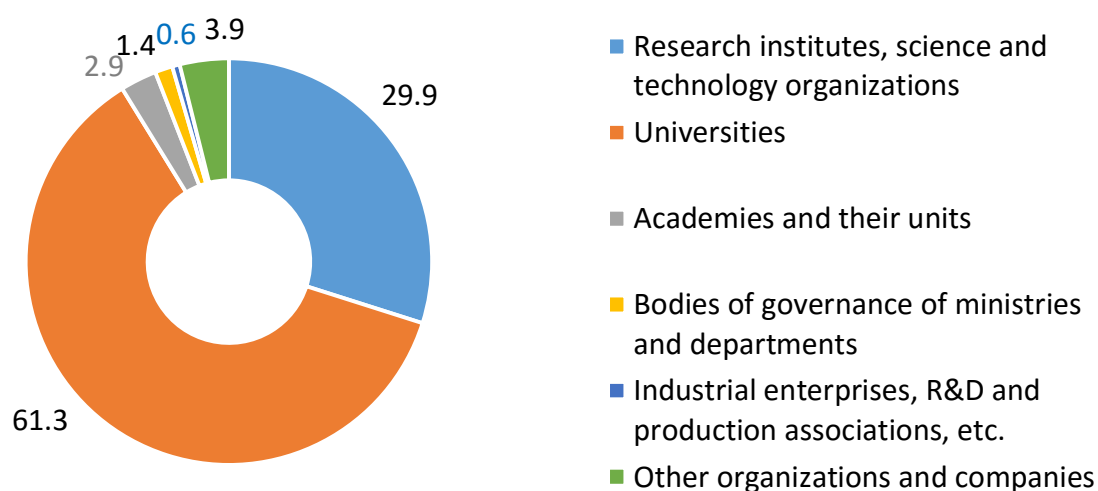


III.12. Doctors of sciences employed in the Ukraine's economy by type of organization

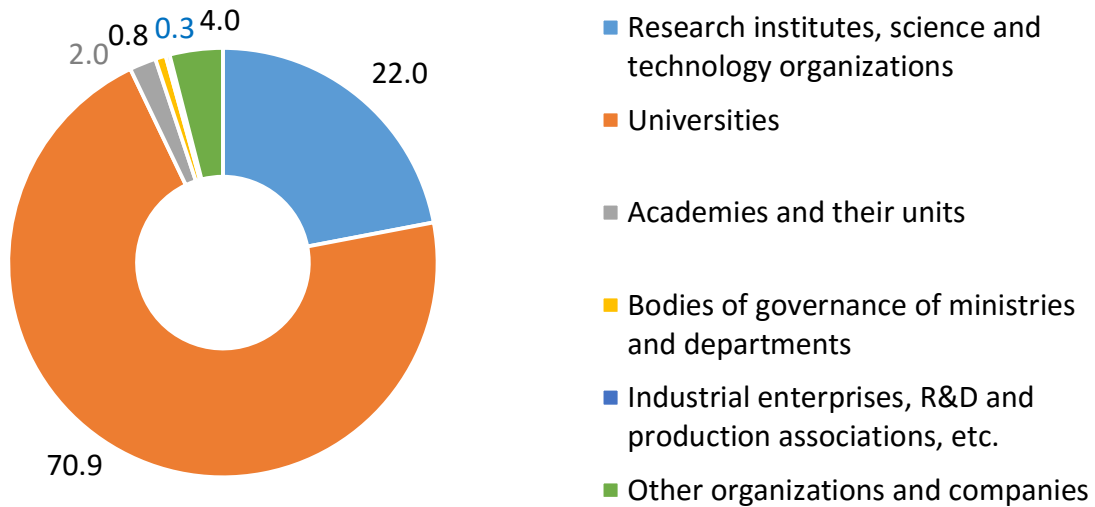
	<i>headcount</i>					
	2005	2010	2011	2012	2013	2014
Total	12014	14418	14895	15592	16450	16090
Research institutes, science and technology organizations	3596	3599	3565	3581	3627	3534
Higher education institutes	7369	9758	10264	10928	11638	11407
Academies and their units	344	321	322	318	324	328
Bodies of governance of ministries and departments (since 2009 - public authorities)	173	177	178	163	167	128
Industrial enterprises, R&D and production associations, etc.	67	46	41	45	47	45
Other organizations and companies	465	517	525	557	647	648

Percentage distribution of doctors of sciences employed in the Ukraine's economy by type of organization

2005



2014



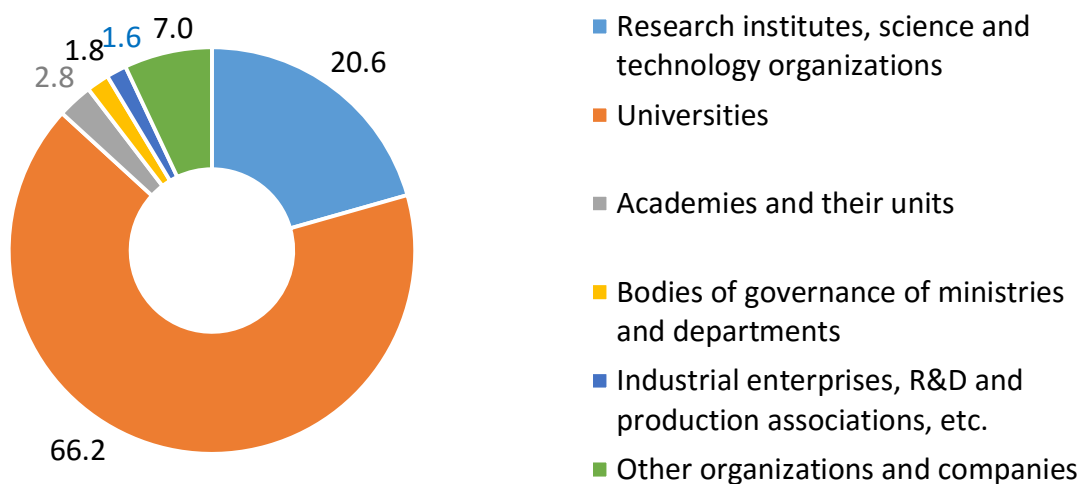
III.13. Candidates of sciences employed in the Ukraine's economy by type of organization

headcount

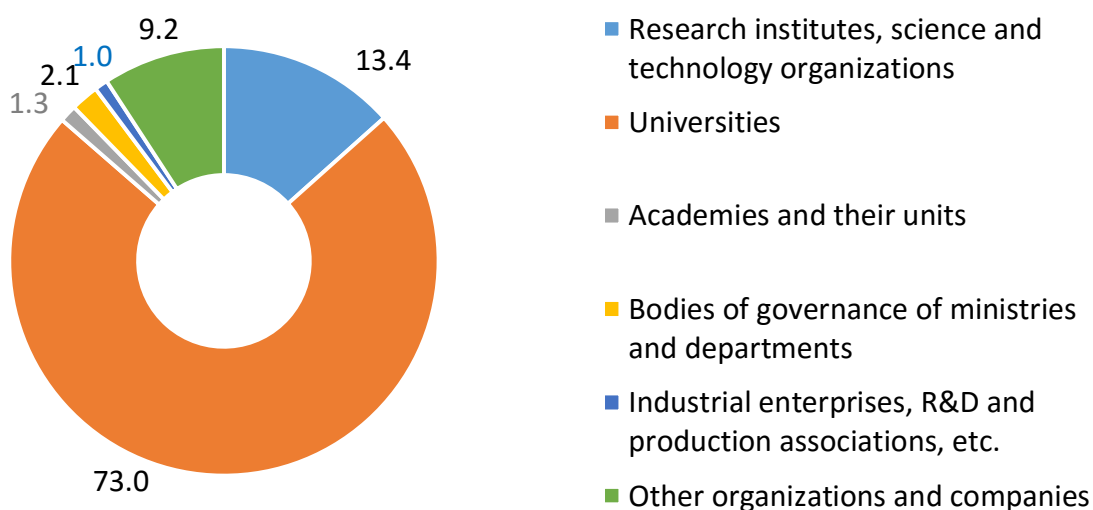
	2005	2010	2011	2012	2013	2014
Total	68291	84000	84979	88057	90113	86230
Research institutes, science and technology organizations	14005	13177	12710	12480	12613	11651
Universities	45229	60302	61670	64235	65882	62874
Academies and their units	1916	1158	1121	1095	1104	1094
Bodies of governance of ministries and departments (before 2009 public administration bodies)	1230	1694	1905	1725	1876	1814
Industrial enterprises, R&D and production associations, etc.	1104	948	857	885	927	894
Other organizations and companies	4807	6721	6716	7637	7711	7903

Percentage distribution of candidates of sciences employed in the Ukraine's economy by type of organization

2005



2014



III.14. R&D funding of scientific organizations of Ukraine by sector of performance

Expenditure on R&D, *million UAH*

	2005	2010	2011	2012	2013	2014
Total	5160.4	8995.9	9591.3	10558.5	11161.1	10320.3
Government sector including national academies of sciences	1556.9	3274.4	3639.8	4270.3	4305.4	3905.9
of them: NAS of Ukraine	1003.5	2070.2	2188.9	2542.8	2683.1	2401.3
Business enterprise sector	3359.7	5156.2	5343.4	5558.3	6167.6	5820.2
Higher education sector	243.7	565.1	608.0	729.8	688.0	594.3
Private non-profit sector	—	0.2	0.2	—	—	—
<i>(as % of total of each year)</i>						
Government sector including national academies of sciences	30.2	36.4	37.9	40.4	38.6	37.8
of them: NAS of Ukraine	19.4	23.0	22.8	24.1	24.0	23.3
Business enterprise sector	65.1	57.3	55.7	52.6	55.3	56.4
Higher education sector	4.7	6.3	6.3	6.9	6.1	5.8
Private non-profit sector	—	×	×	×	×	×

Expenditure on R&D from the state budget, *million UAH*

	2005	2010	2011	2012	2013	2014
Total	1711.2	3704.3	3859.7	4709.1	4762.1	4021.5
Government sector including national academies of sciences	1260.4	2792.9	2913.4	3613.3	3688.5	3355.2
of them: NAS of Ukraine	815.7	1838.1	1880.4	2236.4	2398.7	2173.0
Business enterprise sector	315.2	523.6	544.0	612.4	635.0	302.1

continued

	2005	2010	2011	2012	2013	2014
Higher education sector	135.6	387.9	402.3	483.4	438.5	364.2
Private non-profit sector	—	—	—	—	—	—
<i>(as % of total of each year)</i>						
Government sector	73.7	75.4	75.5	76.7	77.5	83.4
including national						
academies of sciences	63.8	69.1	68.2	65.4	67.2	73.1
of them: NAS of						
Ukraine	47.7	49.6	48.7	47.5	50.4	54.0
Business enterprise						
sector	18.4	14.1	14.1	13.0	13.3	7.5
Higher education sector	7.9	10.5	10.4	10.3	9.2	9.1
Private non-profit sector	—	—	—	—	—	—

Expenditure on R&D from customers*, million UAH

	2005	2010	2011	2012	2013	2014
Total	2938.1	4277.1	4764.0	4503.4	4718.1	4195.4
Government sector	204.9	334.1	542.0	442.4	401.7	391.5
including national						
academies of sciences	198.7	232.1	299.5	315.1	303.5	264.3
of them: NAS of						
Ukraine	153.8	173.0	227.4	233.9	217.4	178.5
Business enterprise						
sector	2646.1	3814.2	4071.7	3878.2	4132.2	3639.5
Higher education sector	87.1	128.6	150.0	182.7	184.2	164.5
Private non-profit sector	—	0.2	0.2	—	—	—
<i>(as % of total of each year)</i>						
Government sector	7.0	7.8	11.4	9.8	8.5	9.3
including national						
academies of sciences	6.8	5.4	6.3	7.0	6.4	6.3
of them: NAS of						
Ukraine	5.2	4.0	4.8	5.2	4.6	4.3
Business enterprise						
sector	90.1	89.2	85.5	86.1	87.6	86.7
Higher education sector	3.0	3.0	3.1	4.1	3.9	3.9
Private non-profit sector	—	—	—	—	—	—

* “Customers” mean domestic and foreign enterprises and organizations.

R&D projects performed by own resources, *million UAH*

	2005	2010	2011	2012	2013	2014
Total	4818.6	9867.1	10359.9	11252.7	11781.1	10950.7
Government sector	1493.7	3302.9	3683.6	4312.5	4339.8	3950.2
including national						
academies of sciences	1316.5	2928.4	3119.9	3567.5	3669.2	3348.9
of them: NAS of						
Ukraine	961.6	2079.4	2196.8	2549.5	2688.1	2417.0
Business enterprise						
sector	3075.8	5990.2	6054.6	6210.4	6741.3	6397.7
Higher education sector	249.0	573.9	611.7	729.8	699.9	602.7
Private non-profit sector	—	0.1	—	—	—	—
<i>(as % of total of each year)</i>						
Government sector	31.0	33.5	35.6	38.3	36.8	36.1
including national						
academies of sciences	27.3	29.8	30.1	31.7	31.1	30.6
of them: NAS of						
Ukraine	20.0	21.1	21.2	22.7	22.8	22.1
Business enterprise						
sector	63.8	60.7	58.5	55.2	57.3	58.4
Higher education sector	5.2	5.8	5.9	6.5	5.9	5.5
Private non-profit sector	—	—	—	—	—	—

Basic research performed by own resources, *million UAH*

	2005	2010	2011	2012	2013	2014
Total	902.2	2188.4	2205.8	2621.9	2695.4	2475.2
Government sector	797.6	1775.8	1810.0	2325.1	2395.7	2237.8
including national						
academies of sciences	766.8	1859.3	1900.7	2260.3	2347.4	2181.2
of them: NAS of						
Ukraine	602.6	1466.1	1492.1	1820.8	1925.7	1764.6
Business enterprise						
sector	15.1	199.4	179.8	59.0	76.9	45.1
Higher education sector	89.5	213.2	216.0	237.8	222.8	192.3
Private non-profit sector	—	—	—	—	—	—

continued

	2005	2010	2011	2012	2013	2014
	<i>(as % of total of each year)</i>					
Government sector	88.4	81.1	82.0	88.7	88.9	90.4
including national						
academies of sciences	85.0	85.0	86.2	86.2	87.1	88.1
of them: NAS of						
Ukraine	66.8	67.0	67.7	69.4	71.4	71.3
Business enterprise						
sector	1.7	9.1	8.2	2.3	2.9	1.8
Higher education sector	9.9	9.8	9.8	9.0	8.3	7.8
Private non-profit sector	—	—	—	—	—	—

Applied research performed by own resources,
million UAH

	2005	2010	2011	2012	2013	2014
Total	708.9	1617.1	1866.7	2057.7	2087.8	1910.2
Government sector	423.5	1037.3	1182.6	1325.6	1311.6	1194.6
including national						
academies of sciences	324.2	779.4	847	909.5	908.6	834.7
of them: NAS of						
Ukraine	193.4	405.5	431.9	444.2	461.9	410.6
Business enterprise						
sector	194.5	349.8	436.7	409.9	479.2	453.0
Higher education sector	90.9	230.0	247.4	322.1	297.0	262.5
Private non-profit sector	—	—	—	—	—	—
	<i>(as % of total of each year)</i>					
Government sector	59.8	64.2	63.3	64.4	62.8	62.5
including national						
academies of sciences	45.7	48.2	45.4	44.2	43.5	43.7
of them: NAS of						
Ukraine	27.3	25.1	23.1	21.6	22.1	21.5
Business enterprise						
sector	27.4	21.6	23.4	19.9	23.0	23.7
Higher education sector	12.8	14.2	13.3	15.7	14.2	13.7
Private non-profit sector	—	—	—	—	—	—

Intramural current R&D expenditure performed by own resources,
million UAH

	2005	2010	2011	2012	2013	2014
Total	4386.2	8825.6	9365.0	10335.1	10890.9	10083.6
Government sector	1429.6	3221.4	3551.6	4192.6	4227.1	3877.7
Business enterprise sector	2729.7	5050.6	5216.9	5425.2	5985.4	5617.2
Higher education sector	227.0	553.3	596.3	717.4	678.4	588.8
Private non-profit sector	—	0.2	0.2	—	—	—
<i>(as % of total of each year)</i>						
Government sector	32.6	36.5	37.9	40.6	38.8	38.5
Business enterprise sector	62.2	57.2	55.7	52.5	55.0	55.7
Higher education sector	5.2	6.3	6.4	6.9	6.2	5.8
Private non-profit sector	—	—	—	—	—	—

III.15. R&D funding of national academies of sciences and ministries

R&D funding - total, million UAH

	2005	2010	2011	2012	2013	2014
Total	5160.4	8995.9	9591.3	10558.5	11161.1	10320.3
Total for national academies of sciences	1370.9	2923.5	3105.7	3563.0	3667.2	3332.3
including:						
National Academy of Sciences	1003.5	2070.2	2188.9	2542.8	2683.1	2401.3
National Academy of Agrarian Sciences	256.2	521.1	541.1	612.6	583.5	527.1
National Academy of Medical Sciences	88.3	228.1	261.0	269.2	264.8	275.3
National Academy of Arts	...	7.2	6.9	8.2	8.6	7.2
National Academy of Pedagogical Sciences	15.7	58.4	64.9	76.8	71.2	70.5

continued

	2005	2010	2011	2012	2013	2014
National Academy of Pedagogical Sciences	18.0	80.6	90.4	111.0	104.6	99.8
National Academy of Law Sciences	4.9	16.3	17.4	19.2	22.6	21.4
Total for ministries and agencies	3789.5	6072.4	6485.6
of them:						
Ministry of Agrarian Policy and Food	76.0	137.7	141.6
Ministry of Energy and Coal Industry	78.9	112.9	164.5
Ministry of Education and Science	270.0	426.0	460.6
Ministry of Healthcare	79.0	133.1	142.6

R&D funding per 1 employee of main activity, *thousand UAH*

	2005	2010	2011	2012	2013	2014
Total	30.3	63.8	71.2	81.3	90.6	94.2
Total for national academies of sciences	23.2	51.5	58.0	68.6	71.5	71.1
including:						
National Academy of Sciences	25.9	55.2	59.5	70.3	75.1	73.8
National Academy of Agrarian Sciences	18.0	41.9	54.7	67.5	65.3	67.1
National Academy of Medical Sciences	17.7	44.2	51.1	55	55.2	58.9
National Academy of Arts	60.5	72.9	81.9	67.9

continued

	2005	2010	2011	2012	2013	2014
National Academy of Law Sciences	31.6	65.7	67.7	73.7	81.6	76.2
Total for ministries and agencies	×	×	×
of them:						
Ministry of Agrarian Policy and Food	22.0	46.4	54.8
Ministry of Energy and Coal Industry	22.7	56.1	58.2
Ministry of Education and Science	79.8	172.7	203.0
Ministry of Healthcare	7.2	15.5	18.0

III.16. R&D funding of national academies of sciences and ministries by source of funds

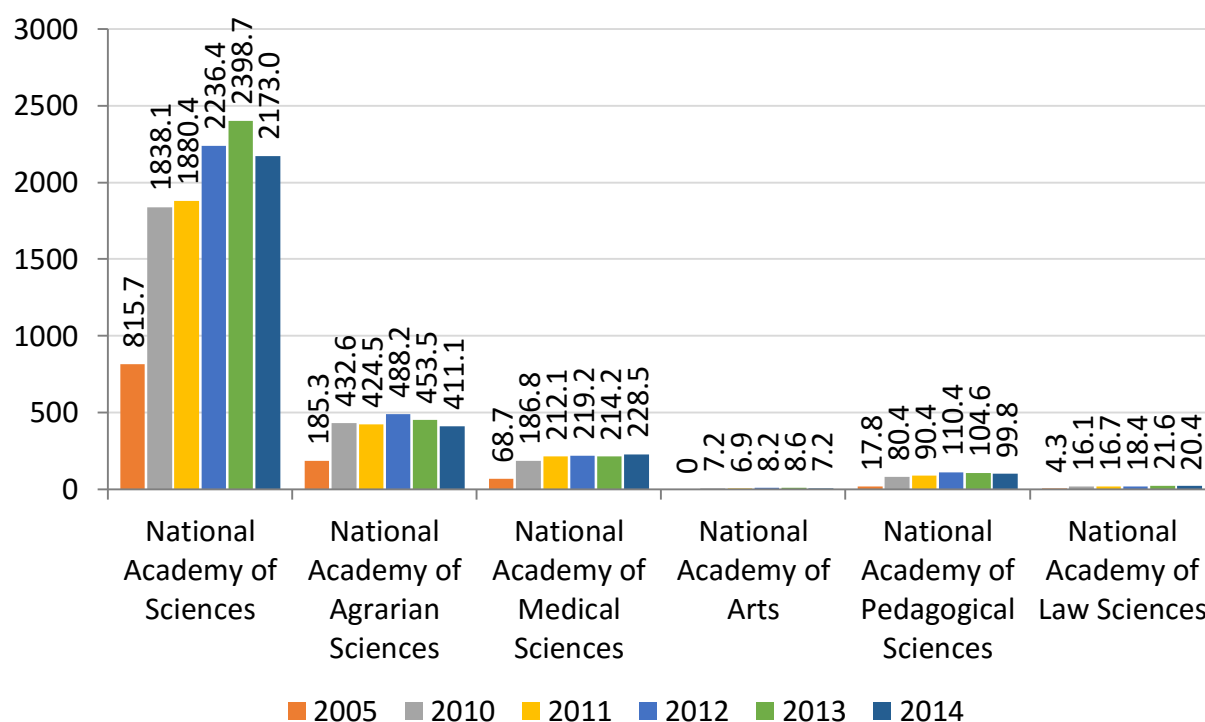
R&D funding from the state budget, *million UAH*

	2005	2010	2011	2012	2013	2014
Total	1711.2	3704.3	3859.7	4709.1	4762.1	4021.5
Total for national academies of sciences	1091.8	2561.2	2631	3080.8	3201.3	2939.8
including:						
National Academy of Sciences	815.7	1838.1	1880.4	2236.4	2398.7	2173.0
National Academy of Agrarian Sciences	185.3	432.6	424.5	488.2	453.5	411.1
National Academy of Medical Sciences	68.7	186.8	212.1	219.2	214.2	228.5
National Academy of Arts	...	7.2	6.9	8.2	8.6	7.2

continued

	2005	2010	2011	2012	2013	2014
National Academy of Pedagogical Sciences	17.8	80.4	90.4	110.4	104.6	99.8
National Academy of Law Sciences	4.3	16.1	16.7	18.4	21.6	20.4
Total for ministries and agencies	619.4	1143.1	1228.7
of them:						
Ministry of Agrarian Policy and Food	53.6	95.7	99.4
Ministry of Energy and Coal Industry	12.5	12.4	33.1
Ministry of Education and Science	122.7	303.1	326.9
Ministry of Healthcare	21.9	53.5	54.4

Trends in R&D funding from the state budget, *million UAH*



R&D funding from special purpose funds*, *million UAH*

	2005	2010	2011	2012	2013	2014
Total	24.9	48.3	16.9	22.7	20.6	20.7
Total for national academies of sciences	15.4	4.1	3.6	2.2	2.9	3.0
including:						
National Academy of Sciences	3.7	1.1	2.0	1.8	2.7	2.9
National Academy of Agrarian Sciences	11.7	3.0	1.6	0.4	0.1	0
National Academy of Medical Sciences	—	—	—	—	—	—
National Academy of Arts	—	—	—	—
National Academy of Pedagogical Sciences	—	—	—	—	—	—
National Academy of Law Sciences	—	—	—	—	—	—
Total for ministries and agencies	9.5	44.2	13.3
of them:						
Ministry of Agrarian Policy and Food	0.3	2.4	3.4
Ministry of Energy and Coal Industry	—	—	—
Ministry of Education and Science	2.3	8.6	6.0
Ministry of Healthcare	0	—	0

* Up to 2010 - extrabudgetary funds.

R&D funding by own costs, *million UAH*

	2005	2010	2011	2012	2013	2014
Total	338.5	872.0	841.8	1121.3	1466.6	1927.8
Total for national academies of sciences	46.8	114.0	160.1	148.0	144.4	118.1
including:						
National Academy of Sciences	17.3	48.4	71.1	55.0	51.1	41.5
National Academy of Agrarian Sciences	29.1	65.6	89.0	91.9	92	75.8
National Academy of Medical Sciences	0.2	0	0.6	0.2
National Academy of Arts
National Academy of Pedagogical Sciences	0.2	0	0	0.6	0	
National Academy of Law Sciences	0	0.5	0.6	0.7
Total for ministries and agencies	291.7	758.0	681.7
of them:						
Ministry of Agrarian Policy and Food	2.4	7.5	6.8
Ministry of Energy and Coal Industry	6.4	5.5	6.0
Ministry of Education and Science	2.6	4.0	3.7
Ministry of Healthcare	3.3	8.6	10.8

**R&D funding by costs of domestic customers -
(Ukrainian companies and organizations), *million UAH***

	2005	2010	2011	2012	2013	2014
Total	1680.1	1961.2	2285.9	2458.4	2306.6	2152.4
Total for national academies of sciences	159.2	158.7	196.1	206.0	224.5	187.7
including:						
National Academy of Sciences	116.8	102.9	128.5	128.6	142.9	110.5
National Academy of Agrarian Sciences	23.2	16.7	21.0	30.1	33.4	34.8
National Academy of Medical Sciences	18.6	38.9	46.0	47.0	47.9	42.1
National Academy of Arts
National Academy of Pedagogical Sciences
National Academy of Law Sciences	0.6	0.2	0.6	0.3	0.3	0.2
Total for ministries and agencies	1520.9	1802.5	2089.8
of them:						
Ministry of Agrarian Policy and Food	16.1	27.9	29.3
Ministry of Energy and Coal Industry	57.3	91.8	119.6
Ministry of Education and Science	91.1	87.9	98.5
Ministry of Healthcare	42.0	60.7	54.5

R&D funding by costs of foreign customers, *million UAH*

	2005	2010	2011	2012	2013	2014
Total	1258.0	2315.9	2478.1	2045.0	2411.5	2043
Total for national academies of sciences	39.4	73.5	103.5	109.2	79.0	76.6
including:						
National Academy of Sciences	37.0	70.1	99	105.3	74.6	67.9
National Academy of Agrarian Sciences	1.9	1.8	2.6	1.4	2.8	5.4
National Academy of Medical Sciences	0.5	1.6	1.9	2.5	1.6	3.3
National Academy of Arts	—	—	—	—
National Academy of Pedagogical Sciences	—	—	—	—	—	—
National Academy of Law Sciences	—	—	—	—	—	—
Total for ministries and agencies	1218.6	2242.4	2374.6
of them:						
Ministry of Agrarian Policy and Food	1.7	3.9	2.2
Ministry of Energy and Coal Industry	2.6	2.3	5.1
Ministry of Education and Science	38.4	15.8	18.5
Ministry of Healthcare	0.0	8.4	8.4

III.17. R&D projects performed by own resources of national academies of sciences and ministries

Total, million UAH

	2005	2010	2011	2012	2013	2014
Total	4818.6	9867.1	10349.9	11252.7	11781.1	10950.7
Total for national academies of sciences	1316.2	2928.4	3119.8	3567.5	3669.2	3348.9
including:						
National Academy of Sciences	961.6	2079.4	2196.8	2549.5	2688.1	2417
National Academy of Agrarian Sciences	243.5	523.7	546.3	609.2	576.5	523.8
National Academy of Medical Sciences	88.5	228.5	262.0	270.4	266.6	279.6
National Academy of Arts	—	—	6.9	8.2	8.6	7.2
National Academy of Pedagogical Sciences	17.8	80.5	90.4	111	106.7	99.8
National Academy of Law Sciences	4.9	16.3	17.4	19.2	22.6	21.4
Total for ministries and agencies	3502.3	6938.7	7230.1
of them:						
Ministry of Agrarian Policy and Food	74.2	140.3	141.3
Ministry of Energy and Coal Industry	78.5	119.8	182.0
Ministry of Education and Science	264.6	431.5	460.9
Ministry of Healthcare	93.7	148.6	163.4

Basic projects, *million UAH*

	2005	2010	2011	2012	2013	2014
Total	902.2	2188.4	2205.8	2621.9	2695.4	2475.2
Total for national academies of sciences	766.8	1859.6	1900.7	2260.3	2347.4	2181.2
including:						
National Academy of Sciences	602.6	1466.1	1492.1	1820.8	1925.7	1764.6
National Academy of Agrarian Sciences	116.1	257.4	257.3	244.0	244.0	241.9
National Academy of Medical Sciences	27.2	67.5	71.3	70.8	69.1	72.5
National Academy of Arts	6.9	8.2	8.6	7.2
National Academy of Pedagogical Sciences	17.2	53.0	56.8	98.5	78.6	74.7
National Academy of Law Sciences	3.7	15.6	16.3	18.0	21.3	20.4
Total for ministries and agencies	135.2	328.8	305.1
of them:						
Ministry of Agrarian Policy and Food	8.0	15.7	13.7
Ministry of Education and Science	79.3	168.4	173.2
Ministry of Healthcare	5.0	13.8	14.1

Applied projects, *million UAH*

	2005	2010	2011	2012	2013	2014
Total	707.9	1617.1	1866.7	2057.7	2087.8	1910.2
Total for national academies of sciences	324.1	779.4	847.1	909.5	908.6	834.7
including:						
National Academy of Sciences	193.4	405.5	431.9	444.2	461.9	410.7
National Academy of Agrarian Sciences	72.0	198.4	204.2	266.7	236.0	207.7
National Academy of Medical Sciences	58.0	148.2	177.3	186.3	182.3	191.2
National Academy of Arts	—	—	—	—	—	—
National Academy of Pedagogical Sciences	0.1	26.8	33.3	11.9	28.1	25.1
National Academy of Law Sciences	0.6	0.5	0.4	0.4	0.3	
Total for ministries and agencies	384.7	837.7	1019.6
of them:						
Ministry of Agrarian Policy and Food	31.0	76.6	72.1
Ministry of Energy and Coal Industry	15.5	21.4	32.2
Ministry of Education and Science	56.3	147.1	167.5
Ministry of Healthcare	32.6	66.0	78.7

Development projects, *million UAH*

	2005	2010	2011	2012	2013	2014
Total	2406.9	5037.0	4985.9	5370.0	5772.8	5341.5
Total for national academies of sciences	137.9	191.4	241.8	236.5	250.4	206.9
including:						
National Academy of Sciences	120.9	172.9	219.1	207.4	222.8	190.2
National Academy of Agrarian Sciences	16.0	16.7	21.9	29.1	27.5	16.6
National Academy of Medical Sciences	1.0	1.1	0.6	0	0.2	
National Academy of Arts	—	—	—	—
National Academy of Pedagogical Sciences	—	0.7	0.2	—	—	—
National Academy of Law Sciences	—	—	—	—	—	—
Total for ministries and agencies	2268.7	4845.7	4744.1
of them:						
Ministry of Agrarian Policy and Food	20.9	34.8	41.1
Ministry of Energy and Coal Industry	49.6	81.8	123.2
Ministry of Education and Science	45.5	83.8	81.9
Ministry of Healthcare	1.5	8.8	8.6

R&D services, *million UAH*

	2005	2010	2011	2012	2013	2014
Total	800.7	1024.5	1291.5	1203.2	1225.1	1223.8
Total for national academies of sciences	87.0	97.9	130.3	161.2	162.7	126.1
including:						
National Academy of Sciences	44.7	34.8	53.7	77.0	77.7	51.5
National Academy of Agrarian Sciences	39.3	51.2	63.0	69.4	69.0	57.6
National Academy of Medical Sciences	2.2	11.6	12.9	13.4	15.0	15.9
National Academy of Arts	—	—	—	—
National Academy of Pedagogical Sciences	0.2	—	0.1	0.6	0	0
National Academy of Law Sciences	0.6	0.3	0.7	0.8	1.0	1.1
Total for ministries and agencies	713.7	926.7	1161.1
of them:						
Ministry of Agrarian Policy and Food	14.2	13.3	14.4
Ministry of Energy and Coal Industry	13.3	16.5	25.6
Ministry of Education and Science	83.5	32.2	38.3
Ministry of Healthcare	54.5	60.0	62.0

IV. MEMBERS OF NATIONAL ACADEMY OF SCIENCES OF UKRAINE

According to the Statute of the National Academy of Sciences of Ukraine, their membership category includes full members, corresponding members and foreign members. Members of the NAS of Ukraine are elected at least once in three years and appointed by the Presidium of the NAS of Ukraine, which approves the nomenclature of the number and vacancies of full members, corresponding members and foreign members. The Presidium of the NAS of Ukraine appoints the date of elections. As a result of the last election of new members to the NAS of Ukraine in March 2015, the Academy ranks were replenished by 12 full members and 51 corresponding members. Among the newly elected full members seven scientists are in the field of natural sciences, four – in the field of technical sciences, one - in the field of medicine. Of the newly elected corresponding members, 26 are in natural sciences, 17 - in engineering, seven - in social sciences, and one - in humanities. The proportion of women in 63 newly elected members of the NAS of Ukraine is 12.7%, but all of them are corresponding members.

New members to the NAS of Ukraine are elected on base of R&D performance criterion, after a lengthy discussion by the general public and thorough evaluation in the relating departments of the NAS of Ukraine. Newly members are elected both in traditional and cutting-edge areas of R&D in natural, technical, medical, social and humanitarian sciences. One full member was elected in each of the following R&D field of critical importance for Ukraine: “Computer technology and information security”, “Mechanics of rocket and space systems”, “Material sciences for oil and gas industry”, “Chemistry of medicinal compounds”, “Forecasting of ecosystems”, “Isotopic geology”, “Military medicine, and

emergency surgery”. New corresponding members are elected in the R&D fields “Imaginative information technology” (2 persons), “New methods of welding” (2 persons), of which the former one is novel and the latter one is traditional for Ukraine; each of the following R&D fields is represented by one newly elected member: “Space research”, “Nanobiophysics, Physics of complex systems”, “Nanosedymethology”, “Safety of exploitation of the nuclear power stations”, “Chemistry of high-energy substances”, “Biology of receptors”, “Institutional Economics”; “Socio-economics”; “Econometrics” and “Culturology, social communications”.

Basically, the age structure of the members of the NAS of Ukraine follows its trends for doctors of sciences in Ukraine. Since 2000, the average age of doctors of sciences has exceeded 60, and candidates of sciences – 50. In 2009, the average age for the elected full members of the NAS of Ukraine was 62.3, and for corresponding members of the NAS of Ukraine it was 61.1, which actually coincided with the average age of all doctors of sciences in the country (62.0). As of 01.01.2015, the average age of researchers was 52.0, doctors of sciences – 63.9, candidates of sciences – 50.8.

In 2012, more than half (52.4%) of doctors of sciences employed in the Ukraine’s economy, and almost two thirds (63.2%) of candidates of sciences among researchers were older than 59. In 2009–2012, the number of doctors of sciences older than 70, engaged in R&D, increased by 6%, and the number of doctors of sciences employed in all sectors of the Ukrainian economy grew by 35%. The number of full members and corresponding members of the NAS of Ukraine in this age group increased in the same period by 16%. In 2015, the share of persons aged 69 and older was 78.2% in the total number of full members, and 46.6% in the total of the corresponding members.

Representation of women among the members of the NAS of Ukraine in the past 50 years gradually increased (from 3.2%

in 1964 to 4.5% in 2012); in 2015 women accounted for more than 5% of the total number of Academy members. In 2012, 4 women and 22 women were full and corresponding members, respectively, while in 2015 there were 3 women among full members and 35 female corresponding members. In 2014, it is worth noting the proportion of women with doctor of sciences degree in organizations of the NAS of Ukraine was 19.7% of the total researchers, and in all Ukrainian R&D organizations it was 25%.

From distribution of the members of the NAS of Ukraine by position in 2015 it follows that most of them worked on senior positions in research institutions (55.8% of the total full members and 68.9% of the total corresponding members). These figures were lower than in 2012 (66.5% for full members and 81.1% for corresponding members).

R&D achievements of the members of the NAS of Ukraine have high recognition in Ukraine and beyond. Only in 2013–2014, 7 persons were awarded the order of Prince Yaroslav the Wise. Honorary title “Honored scientist of Ukraine” was granted to one full member and three corresponding Members. Laureates of the State Prize of Ukraine in Science and Technology in the 2013–2014 were 4 full members and 10 corresponding members of the NAS of Ukraine. 6 full members and 7 corresponding members of the NAS of Ukraine were awarded other state awards of Ukraine. Winners of international prizes and awards in the past two years were seven full members of the NAS of Ukraine.

Another evidence to international recognition of R&D achievements of Academy members is their participation in the European scientific academies: five full members of the NAS of Ukraine have membership in the Academy of Europe (*Academia Europaea*), and three full members and two corresponding members of NAS of Ukraine are members in the European Academy of Sciences.

IV.1. Full members of National Academy of Sciences of Ukraine by field of science*

	1964	1989	2009	2012	2015
Total	97	159	204	203	197
Natural sciences	65	99	120	116	115
including:					
Mathematics	9	10	12	11	14
Informatics	1	7	12	14	11
Physics	18	29	34	34	34
Chemistry	13	18	14	12	12
Life sciences	19	21	37	33	32
Earth sciences	5	12	11	12	12
Technical sciences	21	41	50	52	49
including:					
Material sciences	7	16	23	26	24
Mechanics	11	17	15	14	13
Energetics	3	8	12	12	12
Humanitarian sciences	8	11	15	17	17
including:					
History	1	4	3	2	2
Philosophy	1	2	3	4	4
Archeology	—	—	1	1	1
Literary criticism	4	3	4	5	4
Linguistics	2	2	2	3	4
Ethnology	—	—	2	2	2
Social sciences	3	10	19	18	16
including:					
Economics	2	8	12	11	11
Law sciences	1	2	3	3	3
Sociology	—	—	1	2	1
Politology	—	—	1	1	—
Culturology	—	—	2	1	1

* Tables IV.1–IV.10 are made using data from statistical books of the NAS of Ukraine as of 15.12.1964, 01.12.1989, 04.08.2009, 27.07.2012, 11.10.2015.

IV.2. Full members of National Academy of Sciences of Ukraine by age group

	1964	1989	2009	2012	2015
Total	97	159	204	203	197
of them:					
29 and younger	—	—	—	—	—
30–39	—	—	—	—	—
40–49	8	5	2	2	1
50–59	32	34	20	8	7
60–69	32	53	49	48	35
70 and older	25	67	133	145	154

IV.3. Corresponding members of National Academy of Sciences of Ukraine by field of science

	1964	1989	2009	2012	2015
Total	125	192	375	375	380
Natural sciences	83	109	218	218	224
including:					
Mathematics	9	11	18	19	20
Informatics	4	10	23	23	16
Physics	20	27	60	57	71
Chemistry	7	17	27	28	28
Life sciences	33	31	66	68	64
Earth sciences	10	13	24	23	25
Technical sciences	24	57	98	97	92
including:					
Material sciences	9	24	45	45	41
Mechanics	14	21	22	22	22
Energetics	1	12	31	30	29

continued

	1964	1989	2009	2012	2015
Humanitarian sciences	12	18	30	29	29
including:					
History	3	9	9	9	9
Philosophy	1	3	3	2	2
Archeology	7	4	6	5	5
Literary criticism	1	1	7	6	5
Linguistics	—	1	4	5	6
Ethnology	—	—	1	1	1
	—	—	—	1	1
Social sciences	6	8	29	31	35
including:					
Economics	6	7	19	20	24
Law sciences	—	1	5	4	4
Sociology	—	—	3	4	3
Politology	—	—	2	3	3
Culturology	—	—	—	—	1

IV.4. Corresponding members of National Academy of Sciences of Ukraine by age group

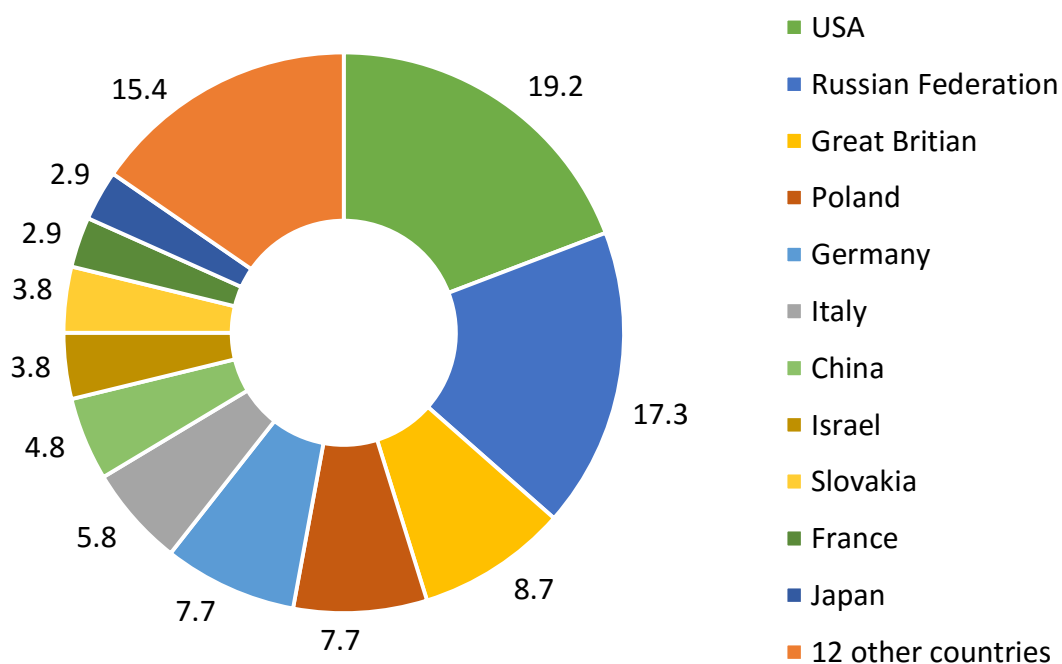
	1964	1989	2009	2012	2015
Total	125	192	375	375	380
of them:					
29 and younger	—	—	—	—	—
30–39	1	2	—	—	—
40–49	13	9	12	7	3
50–59	58	70	59	59	53
60–69	39	66	154	126	147
70 and older	13	46	150	183	177

IV.5. Foreign members of National Academy of Sciences of Ukraine

Foreign members of the NAS of Ukraine are 104 outstanding scientists from 23 countries, including five Nobel Laureates (Zhores Alferov, Physics, 2000; Zakmann Bert and Neher Ervin, physiology, medicine, 1991; Lehn Jean-Marie Pierre, chemistry, 1987; Ciechanover Aaron, chemistry, 2004). Of the foreign members of NAS of Ukraine, 69 are from Europe, 22 from the Americas, 13 from Asia. The largest proportion of them is from the United States and the Russian Federation (19.2 and 17.3% of the total number of foreign members). 9 foreign members are from UK; 8 from Germany; 8 from Poland; 6 from Italy; 5 from China; 4 from Israel; 4 from Slovakia, 3 from France; 3 from Japan. Scientists from the above 11 countries constitute 84.6% of all foreign members of the NAS of Ukraine. Other 12 countries are represented by 1 or 2 prominent scientists elected as foreign members of the NAS of Ukraine. 22 foreign members of the NAS of Ukraine are full members of the Academies of Sciences with IAAS membership. The number of scientists from different countries, elected in the NAS of Ukraine, did not significantly change compared to 2012. Distribution of the foreign members of the NAS of Ukraine by field of science in 2015 was the following: natural sciences – 51.9% of the total number of foreign members, technical sciences – 21.2%, humanities – 13.5%, social sciences – 9.6%, medical sciences – 3.8%. In comparison with 2012, the share of foreign members in technical sciences grew by 5% in 2015, in natural sciences it decreased by nearly 5%, in social sciences it grew by 2%, and the shares in humanities and medical sciences fell by nearly 1%.

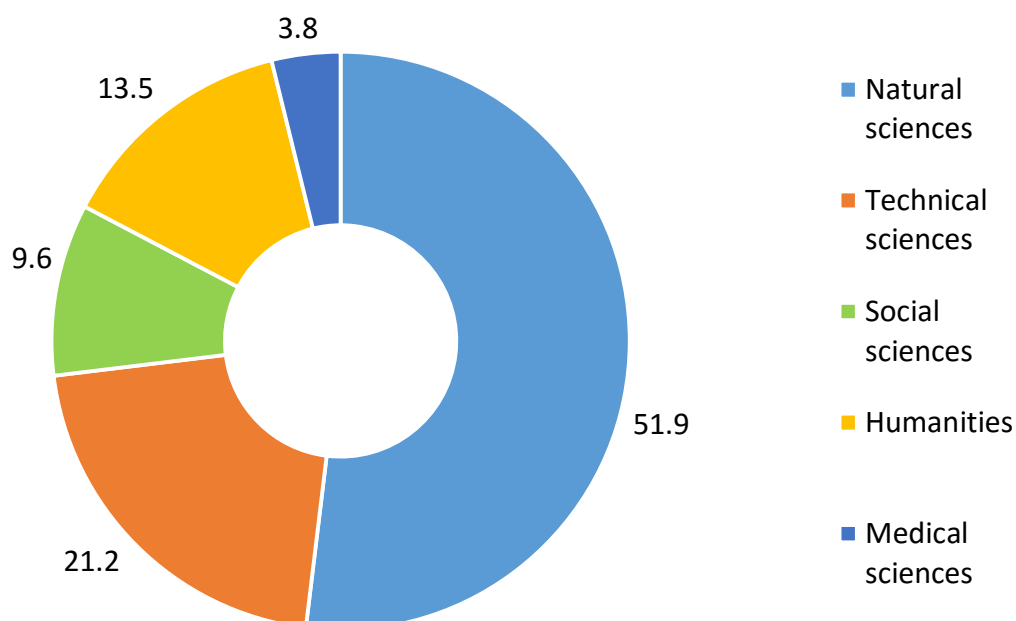
Percentage distribution of foreign members of NAS of Ukraine by countries of the world

2015



Percentage distribution of foreign members of NAS of Ukraine by field of science

2015



IV.6. Full members and corresponding members of National Academy of Sciences of Ukraine, employed in the Ukrainian economy by type of organization: 2015

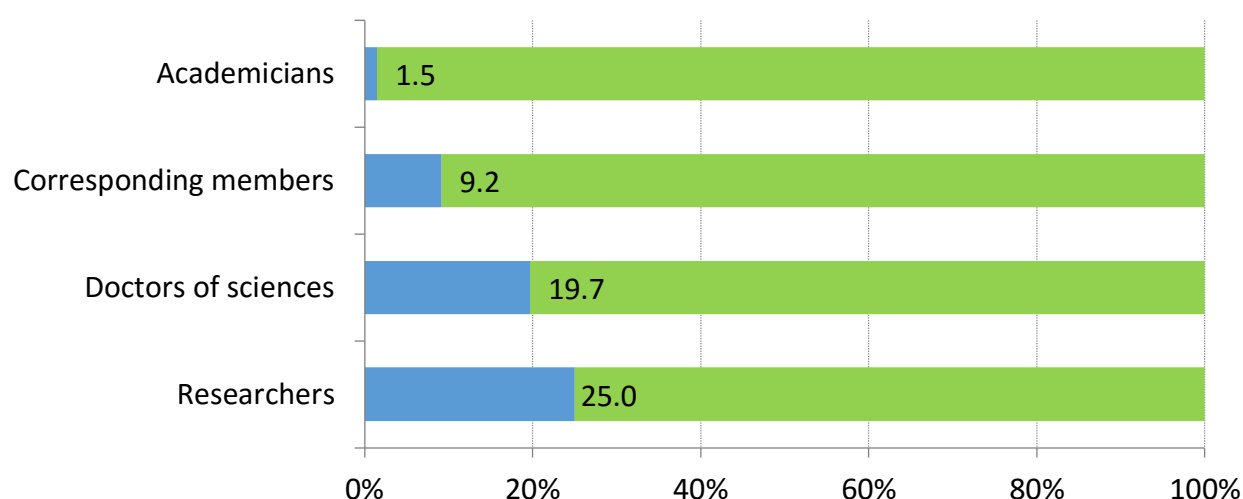
	Full members	Corresponding members
Total	197	380
including:		
Research institutes, science and technology organizations	135	309
Higher educational institutions	21	57
Academies and their units	32	1
Bodies of governance of ministries and departments (before 2009 public administration bodies)	3	4
Industrial enterprises, R&D and production associations, etc.	2	7
Other organizations and companies	4	2

IV.7. Women – full members and corresponding members of National Academy of Sciences of Ukraine, *headcount*

	1964	1989	2009	2012	2015
Total	7	10	30	26	38
of them:					
full members	1	1	4	4	3
corresponding members	6	9	26	22	35

The share of women in 2015 among the full members was 1.5%, corresponding members - 9.2%. In 2014 the proportion of women in the total number of researchers who hold a doctorate in organizations of the NAS of Ukraine was 19.7% and in R&D Ukrainian organizations - 25 percent.

Percentage distribution of women in full members, corresponding members, doctors of sciences and researchers of National Academy of Sciences of Ukraine in 2015



IV.8. Full members and corresponding members of National Academy of Sciences of Ukraine by position: 2015,
headcount

	Full members	Corresponding members
Total	197	380
including:		
director of institute	59	51
deputy director	13	52
rector	8	8
pro-rector	2	3
dean	1	4
adviser at directorate	14	6
department head (institute)	38	158
chief researcher	10	36
department head (university)	6	26
professor of department (university)	4	14
leading researcher	3	13
member of Presidium of NAS of Ukraine	32	—
scientific secretary	—	1
others	7	8

IV.9. Full members and corresponding members of National Academy of Sciences of Ukraine – awarded by state and foreign prizes and awards, *headcount*

	2008	2009	2010	2011	2012	2013	2014
--	------	------	------	------	------	------	------

Full members

winners of the State Prize of Ukraine	3	1	–	2	4	3	1
winners of international prizes and awards	1	6	2	6	4	4	3
received awards:							
the title of Hero of Ukraine	1	1	–	1	–	–	–
the order of Prince Yaroslav the Wise	19	8	1	4		3	2
other awards	34	17	8	7	10	6	–
Honored scientist of Ukraine	9	1	–	1	–	1	–

Corresponding members

winners of the State Prize of Ukraine	13	7	1	4	7	6	4
winners of international prizes and awards	–	3	–	4	2	–	–
received awards:							
the title of Hero of Ukraine	–	2	–	–	–	–	–
the order of Prince Yaroslav the Wise	3	2	1	–	1	2	–
other awards	16	11	2	7	6	4	3
Honored scientist of Ukraine	12	6	–	5	4	3	–

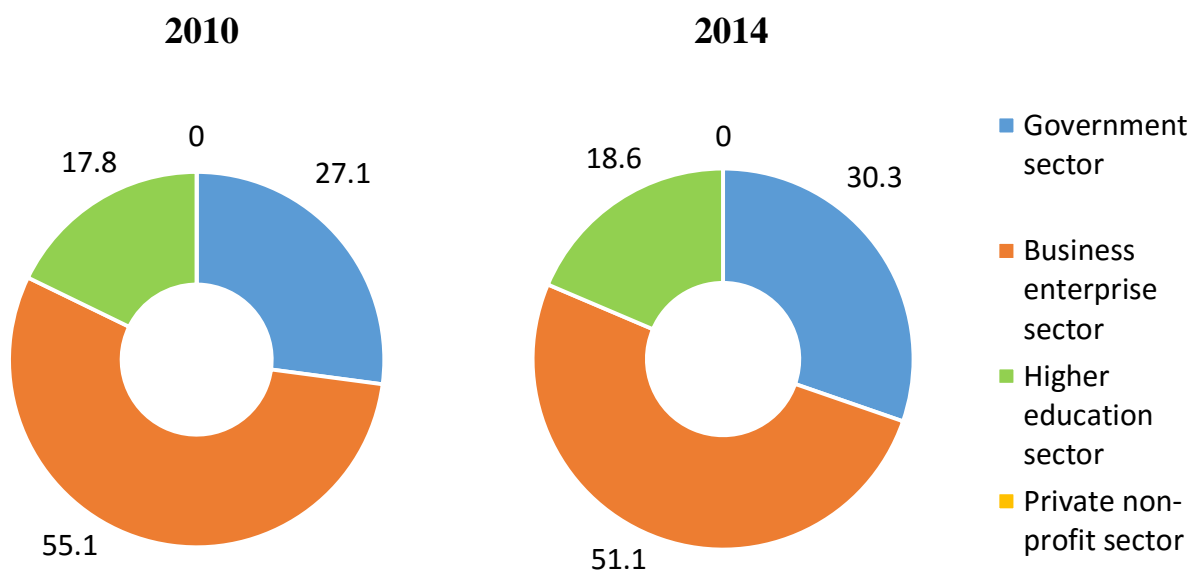
V. R&D OUTPUT IN UKRAINE

V.1. Main R&D indicators of organizations by sector of performance

Research and developments

	2005	2010	2011	2012	2013	2014
Total	63926	52037	52354	53190	47875	42953
Government sector	15782	14113	14190	14581	15730	13035
including national academies of sciences	10627	11169	11574	10718	11559	9565
of them:						
NAS of Ukraine	6694	6828	7585	6674	7274	5703
Business enterprise sector	39861	28680	28361	28440	21486	21952
Higher education sector	8283	9235	9784	10154	10659	7966
Private non-profit sector	—	9	19	15	—	—
	<i>(as % of total of each year)</i>					
Government sector	24.7	27.1	27.1	27.4	32.8	30.3
including national academies of sciences	16.6	21.5	22.1	20.2	24.1	22.3
of them:						
NAS of Ukraine	10.5	13.1	14.5	12.6	15.2	13.3
Business enterprise sector	62.3	55.1	54.2	53.5	44.9	51.1
Higher education sector	13.0	17.8	18.7	19.1	22.3	18.6
Private non-profit sector	×	×	×	×	×	×

Percentage distribution of R&D by sector of performance

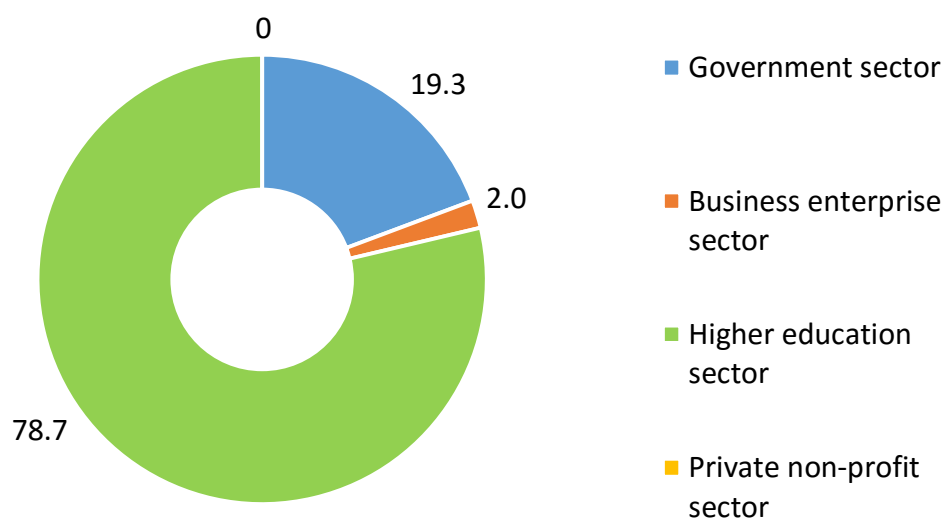


Scientific publications by sector of performance

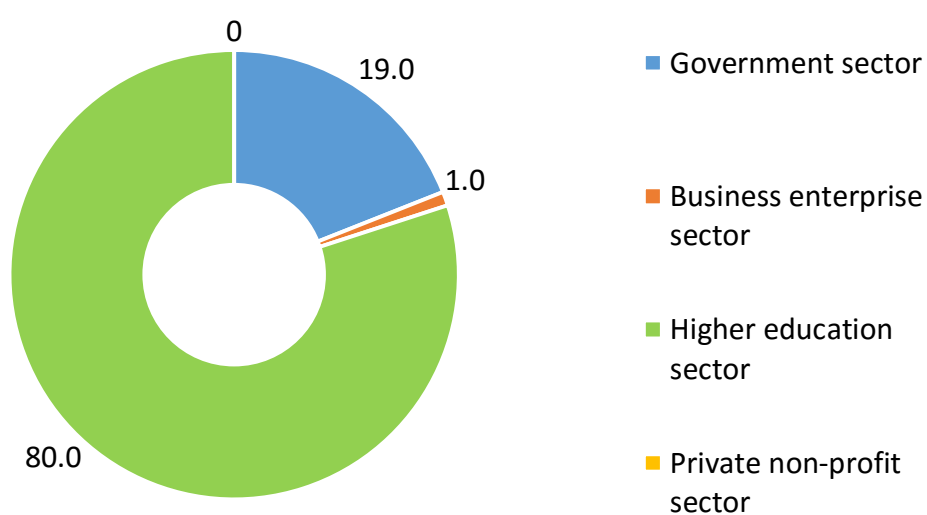
	2005	2010	2011	2012	2013	2014
Total	241942	345338	354703	374897	391398	327919
Government sector	59532	66796	66940	67169	66924	62326
including national academies of sciences	50652	57460	57749	57130	58394	51658
of them:						
NAS of Ukraine	31271	37642	37211	36122	37871	32987
Business enterprise sector	7983	6882	6501	4521	4308	3312
Higher education sector	174427	271649	281243	303192	320166	262281
Private non-profit sector	—	11	19	15	—	—
<i>(as % of total of each year)</i>						
Government sector	24.6	19.3	18.9	17.9	17.1	19.0
including national academies of sciences	20.9	16.6	16.3	15.2	15.0	15.8
of them:						
NAS of Ukraine	12.9	10.9	10.5	9.6	9.7	10.1
Business enterprise sector	3.3	2.0	1.8	1.2	1.1	1.0
Higher education sector	72.1	78.7	79.3	80.9	81.8	80.0
Private non-profit sector	×	×	×	×	×	×

Percentage distribution of scientific publications by sector of performance

2010



2014



**Patents and certificates for inventions obtained in
the State Intellectual Property Service of Ukraine
by sector of performance**

	2010	2011	2012	2013	2014
Total	7748	8757	8552	8432	7864
Government sector	1886	2065	1807	1821	1902
including national academies of sciences	1668	1885	1552	1552	1668
of them: NAS of Ukraine	790	897	750	856	808
Business enterprise sector	443	494	360	269	226
Higher education sector	5419	6198	6385	6342	5736
Private non-profit sector	—	—	—	—	—
	<i>(as % of total of each year)</i>				
Government sector	24.3	23.6	21.1	21.6	24.2
including national academies of sciences	21.5	21.5	18.1	18.4	21.2
of them: NAS of Ukraine	10.2	10.2	8.7	10.2	10.3
Business enterprise sector	5.7	5.6	4.2	3.2	2.9
Higher education sector	70.0	70.8	74.7	75.2	73.0
Private non-profit sector	×	×	×	×	×

**Patents and certificates for inventions obtained in foreign patent
offices by sector of performance**

	2010	2011	2012	2013	2014
Total	84	72	86	72	62
Government sector	33	30	25	21	11
including national academies of sciences	22	21	22	20	7
of them: NAS of Ukraine	20	12	7	19	7
Business enterprise sector	35	29	47	37	16
Higher education sector	16	13	14	14	35
Private non-profit sector	—	—	—	—	—
	<i>(as % of total of each year)</i>				
Government sector	35.2	41.7	29.1	29.2	17.7
including national academies of sciences	26.2	29.2	18.1	27.8	11.3
of them: NAS of Ukraine	23.8	16.7	8.1	26.4	11.3
Business enterprise sector	41.7	40.3	54.7	51.4	26.0
Higher education sector	19.1	18.0	16.2	19.4	56.5
Private non-profit sector	×	×	×	×	×

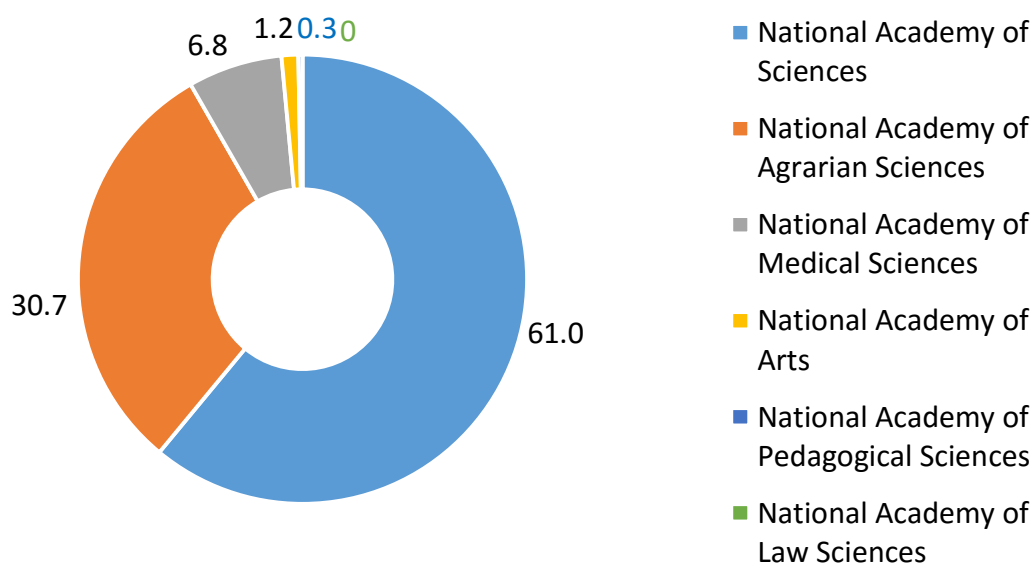
V.2. R&D projects performed by organizations of national academies of sciences and ministries

R&D projects – total

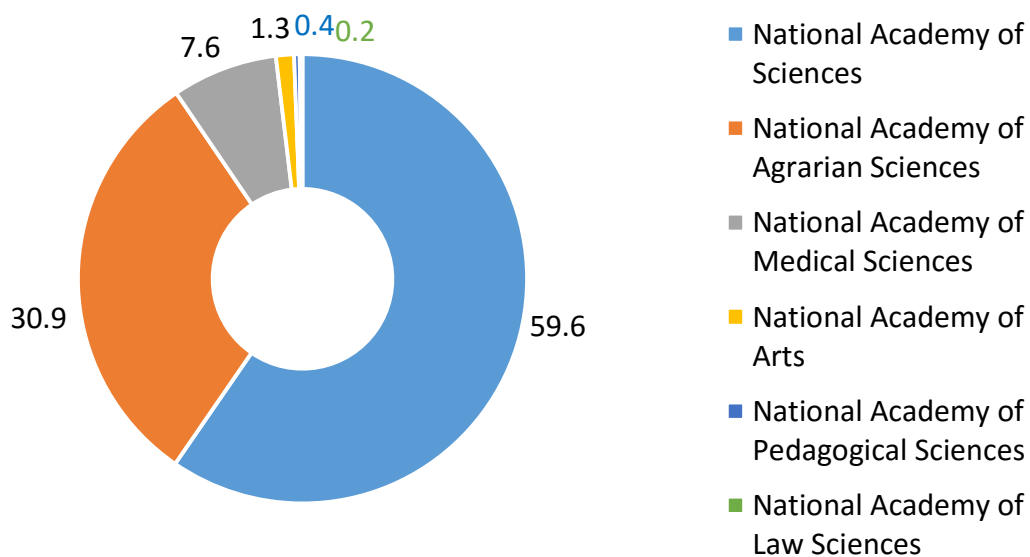
	2005	2010	2011	2012	2013	2014
Total	63926	52037	52354	53190	47875	42953
Total for national academies of sciences	13067	11189	11574	10718	11559	9565
including:						
National Academy of Sciences	6694	6828	7385	6674	7274	5703
National Academy of Agrarian Sciences	3178	3433	3204	3163	3313	2954
National Academy of Medical Sciences	559	759	795	691	784	721
National Academy of Arts	20	20	20	20
National Academy of Pedagogical Sciences	182	139	133	127	130	129
National Academy of Law Sciences	14	36	37	43	38	38
Total for ministries and agencies	53299	40848	40800
of them:						
Ministry of Agrarian Policy and Food	2503	2321	2141
Ministry of Energy and Coal Industry	2304	1087	3005
Ministry of Education and Science	6769	6794	6781
Ministry of Healthcare	1167	1724	1308			

Percentage distribution of R&D projects performed by organizations of national academies of sciences

2010



2014



R&D projects on creating new methods and theories

	2005	2010	2011	2012	2013	2014
Total	5381	7733	7692	7682	7570	7462
Total for national academies of sciences	1825	2661	2741	2661	2846	2787
including:						
National Academy of Sciences	1130	1767	1835	1765	1766	1987
National Academy of Agrarian Sciences	319	548	548	529	733	455
National Academy of Medical Sciences	231	277	290	302	260	246
National Academy of Arts	8	20	20
National Academy of Pedagogical Sciences	137	57	57	40	54	66
National Academy of Law Sciences	8	12	11	17	13	13
Total for ministries and agencies						
of them:	3556	5072	4951
Ministry of Agrarian Policy and Food	472	471	537
Ministry of Energy and Coal Industry	84	27	152
Ministry of Education and Science	1232	2104	2012
Ministry of Healthcare	271	926	593

R&D projects on creating new products

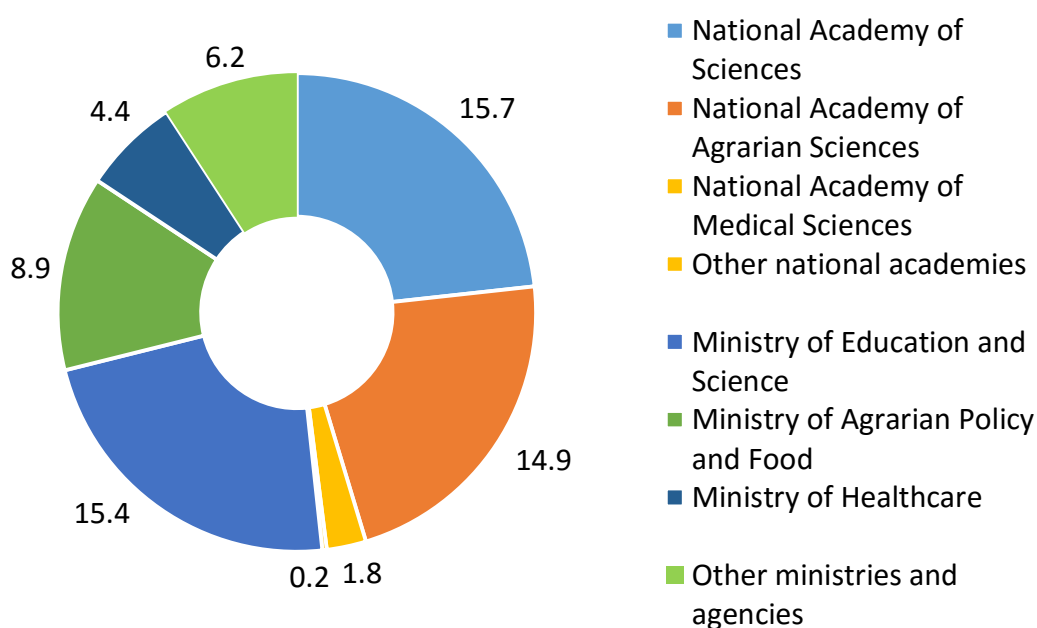
	2005	2010	2011	2012	2013	2014
Total	6264	6240	6475	6397	5645	4652
Total for national academies of sciences	925	1008	1074	920	837	988
including:						
National Academy of Sciences	651	632	699	664	562	439
National Academy of Agrarian Sciences	214	293	283	184	217	486
National Academy of Medical Sciences	42	83	92	72	58	61
National Academy of Arts	—	—	—	—
National Academy of Pedagogical Sciences	—	—	—	—	—	2
National Academy of Law Sciences	—	—	—	—	—	—
Total for ministries and agencies						
of them:	5339	5232	5401
Ministry of Agrarian Policy and Food	119	251	290
Ministry of Energy and Coal Industry	227	77	165
Ministry of Education and Science	580	839	754
Ministry of Healthcare	78	58	52

R&D projects on creating new technologies

	2005	2010	2011	2012	2013	2014
Total	5380	5738	5331	5012	5008	3220
Total for national academies of sciences	1585	1873	1546	1610	1548	1345
including:						
National Academy of Sciences	720	901	750	890	715	638
National Academy of Agrarian Sciences	786	856	693	631	671	568
National Academy of Medical Sciences	79	106	96	83	156	131
National Academy of Arts	—	—	—	—
National Academy of Pedagogical Sciences	—	7	6	6	6	8
National Academy of Law Sciences	—	3	1	—	—	—
Total for ministries and agencies						
of them:	3795	3865	3785
Ministry of Agrarian Policy and Food	162	512	413
Ministry of Energy and Coal Industry	217	358	539
Ministry of Education and Science	997	883	819
Ministry of Healthcare	33	250	232

Percentage distribution of R&D projects on creating new technologies by national academy of sciences and ministries

2010



R&D projects on creating new materials

	2005	2010	2011	2012	2013	2014
Total	1163	1419	1553	1342	1171	1070
Total for national academies of sciences	436	646	645	537	501	585
including:						
National Academy of Sciences	360	531	513	463	449	529
National Academy of Agrarian Sciences	73	114	127	73	52	32
National Academy of Medical Sciences	3	1	5	1	...	24
Total for ministries and agencies	727	773	908

continued

	2005	2010	2011	2012	2013	2014
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of them:

Ministry of Agrarian Policy and Food	30	18	16
Ministry of Energy and Coal Industry	6	20	37
Ministry of Education and Science	282	327	296
Ministry of Healthcare	2	2	33

R&D projects on creating new plant varieties and animal breeds

	2005	2010	2011	2012	2013	2014
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Total	758	669	601	515	745	2165
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Total for national academies of sciences	560	561	515	445	454	485
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including:

National Academy of Sciences	35	35	57	28	17	21
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National Academy of Agrarian Sciences	501	526	458	417	437	464
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National Academy of Medical Sciences	24	—	—	—	—	—
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Total for ministries and agencies	198	108	143
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of them:

Ministry of Agrarian Policy and Food	112	59	70
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Ministry of Education and Science	11	3	3
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Ministry of Healthcare	8	15	—
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V.3. Publication activity of national academies of sciences and ministries*

Publications – total

	2005	2010	2011	2012	2013	2014
Total	241942	345338	354703	374897	391398	327919
Total for national academies of sciences	50652	57460	57749	57130	58394	51658
including:						
National Academy of Sciences	31271	37642	37211	36122	37871	32987
National Academy of Agrarian Sciences	7808	7398	7449	8089	8704	7336
National Academy of Medical Sciences	7798	7947	7958	8227	7568	7071
National Academy of Arts	122	265	178	173
National Academy of Pedagogical Sciences	3087	3561	3983	3530	3310	3139
National Academy of Law Sciences	688	912	1026	897	763	952
Total for ministries and agencies	191290	287878	296976
of them:						
Ministry of Agrarian Policy and Food	10896	19009	15340
Ministry of Energy and Coal Industry	841	558	492
Ministry of Education and Science	122645	202905	206721
Ministry of Healthcare	29284	32652	32450

* Publications other than books, textbooks, manuals and articles in scientific journals are not included in Table. V.3.

Monographs, textbooks, manuals

	2005	2010	2011	2012	2013	2014
Total	14200	23360	24408	23696	25262	21846
Total for national academies of sciences	1712	2344	2888	1671	1980	1710
including:						
National Academy of Sciences	942	1141	1817	906	1142	885
National Academy of Agrarian Sciences	204	204	277	268	367	252
National Academy of Medical Sciences	151	319	248	202	197	151
National Academy of Arts	32	23	15	7
National Academy of Pedagogical Sciences	363	603	433	177	172	334
National Academy of Law Sciences	52	77	81	95	87	81
Total for ministries and agencies	12488	21016	21517
of them:						
Ministry of Agrarian Policy and Food	619	1314	807
Ministry of Energy and Coal Industry	73	118	66
Ministry of Education and Science	8163	15643	16075
Ministry of Healthcare	1359	1538	1495

Articles in scientific journals

	2005	2010	2011	2012	2013	2014
Total	139027	194378	196194	201872	203975	179727
Total for national academies of sciences	29472	35438	33968	34793	36495	33894
including:						
National Academy of Sciences	19875	22908	21770	22922	23596	21573
National Academy of Agrarian Sciences	4615	5507	5487	5795	6494	5802
National Academy of Medical Sciences	2997	4239	3715	3532	3921	3457
National Academy of Arts	90	149	163	159
National Academy of Pedagogical Sciences	1586	2273	2296	1859	1832	2277
National Academy of Law Sciences	399	511	610	536	489	626
Total for ministries and agencies	109555	158940	161861
of them:						
Ministry of Agrarian Policy and Food	7060	13120	11823
Ministry of Energy and Coal Industry	439	360	402
Ministry of Education and Science	68437	106737	108820
Ministry of Healthcare	16077	17718	17023

V.4. Applications for inventions to the State Intellectual Property Service of Ukraine by organizations of national academies of sciences and ministries

Filled applications for inventions, utility models, industrial designs, trademarks, plant varieties – total

	2010	2011	2012	2013	2014
Total	8894	8849	8514	8348	8029
Total for national academies of sciences	1971	1788	1656	1578	1478
including:					
National Academy of Sciences	863	825	800	816	726
National Academy of Agrarian Sciences	641	484	448	424	431
National Academy of Medical Sciences	467	479	408	338	321
Total for ministries and agencies	6923	7061
of them:					
Ministry of Agrarian Policy and Food	470	448
Ministry of Energy and Coal Industry	20	54
Ministry of Education and Science	4100	4071
Ministry of Healthcare	1451	1276

Filled applications for inventions

	2010	2011	2012	2013	2014
Total	2252	2913	2887	2965	2338
Total for national academies of sciences	742	841	823	733	585
including:					
National Academy of Sciences	436	481	501	462	331
National Academy of Agrarian Sciences	191	216	189	172	172

continued

	2010	2011	2012	2013	2014
National Academy of Medical Sciences	115	144	133	99	82
Total for ministries and agencies	1510	2072
of them:					
Ministry of Agrarian Policy and Food	208	221
Ministry of Energy and Coal Industry	7	22
Ministry of Education and Science	846	956
Ministry of Healthcare	166	187

Filled applications for the plant varieties

	2010	2011	2012	2013	2014
Total	328	281	263	206	226
Total for national academies of sciences	307	205	239	190	215
including:					
National Academy of Sciences	18	19	39	9	40
National Academy of Agrarian Sciences	289	186	200	181	175
National Academy of Medical Sciences	—	—	—	—	—
Total for ministries and agencies	21	262
of them:					
Ministry of Agrarian Policy and Food	3	43
Ministry of Energy and Coal Industry	—	—
Ministry of Education and Science	3	13
Ministry of Healthcare	—	—

V.5. Obtained patents and certificates for inventions in the State Intellectual Property Service of Ukraine in the organizations of the national academies of sciences and ministries

Obtained patents and certificates for inventions, utility models, industrial designs, trademarks, plant varieties – total

	2010	2011	2012	2013	2014
Total	7748	8757	8552	8483	7864
Total for national academies of sciences	1688	1885	1552	1552	1668
including:					
National Academy of Sciences	790	897	750	856	808
National Academy of Agrarian Sciences	437	520	382	355	550
National Academy of Medical Sciences	461	468	420	340	310
Total for ministries and agencies	6060	5848			
of them:		
Ministry of Agrarian Policy and Food	471	382			
Ministry of Energy and Coal Industry	22	53
Ministry of Education and Science	3362	3926
Ministry of Healthcare	1273	1474

Obtained patents and certificates for inventions

	2010	2011	2012	2013	2014
Total	1931	2661	2694	2731	2244
Total for national academies of sciences	635	815	776	678	659
including:					
National Academy of Sciences	370	468	483	431	389
National Academy of Agrarian Sciences	146	218	157	160	68

continued

	2010	2011	2012	2013	2014
National Academy of Medical Sciences	119	129	136	86	102
National Academy of Pedagogical Sciences	—	—	—	1	—
Total for ministries and agencies	1296	1866
of them:					
Ministry of Agrarian Policy and Food	195	181
Ministry of Energy and Coal Industry	9	24
Ministry of Education and Science	683	917
Ministry of Healthcare	121	198

Obtained patents and certificates for plant varieties

	2010	2011	2012	2013	2014
Total	218	299	205	129	397
Total for national academies of sciences	194	272	186	120	375
including:					
National Academy of Sciences	28	72	14	19	67
National Academy of Agrarian Sciences	166	200	172	101	308
National Academy of Medical Sciences	—	—	—	—	—
Total for ministries and agencies	24	27
of them:					
Ministry of Agrarian Policy and Food	6	7
Ministry of Energy and Coal Industry	—	—
Ministry of Education and Science	3	10
Ministry of Healthcare	—	—

V.6. Applications for inventions to the foreign patent offices in organizations of the national academies of sciences and ministries

Filled applications – total

	2010	2011	2012	2013	2014
Total	112	68	98	90	51
Total for national academies of sciences	41	19	42	37	23
including:					
National Academy of Sciences	10	18	19	20	18
National Academy of Agrarian Sciences	31	1	23	17	—
Total for ministries and agencies	71	49
of them:					
Ministry of Agrarian Policy and Food	2	—
Ministry of Energy and Coal Industry	—	—
Ministry of Education and Science	15	6
Ministry of Healthcare	—	—

Filled applications for inventions

	2010	2011	2012	2013	2014
Total	56	42	58	38	28
Total for national academies of sciences	10	18	19	12	7
including:					
National Academy of Sciences	10	18	13	12	7
National Academy of Agrarian Sciences	—	—	6	—	—
Total for ministries and agencies	46	24
of them:					
Ministry of Agrarian Policy and Food	2	—
Ministry of Energy and Coal Industry	—	—
Ministry of Education and Science	14	6
Ministry of Healthcare	—	—

Filled applications for plant varieties

	2010	2011	2012	2013	2014
Total	33	1	16	20	11
Total for national academies of sciences	31	1	16	20	11
including:					
National Academy of Sciences	—	—	—	3	11
National Academy of Agrarian Sciences	31	1	16	17	—
Total for ministries and agencies	2	—
of them:					
Ministry of Agrarian Policy and Food	—	—

V.7. Obtained patents and certificates for inventions in foreign patent offices by organizations of national academies of sciences and ministries

Obtained patents and certificates – total

	2010	2011	2012	2013	2014
Total	84	72	86	72	62
Total for national academies of sciences	22	21	22	20	7
including:					
National Academy of Sciences	20	12	7	19	7
National Academy of Agrarian Sciences	2	9	15	1	—
Total for ministries and agencies	62	51
of them:					
Ministry of Agrarian Policy and Food	2	2
Ministry of Energy and Coal Industry	2	—
Ministry of Education and Science	12	10
Ministry of Healthcare	3	1

Obtained patents and certificates for inventions

	2010	2011	2012	2013	2014
Total	60	42	49	55	26
Total for national academies of sciences	19	12	6	16	7
including:					
National Academy of Sciences	19	12	6	16	7
National Academy of Agrarian Sciences	—	—	—	—	—
Total for ministries and agencies	41	30
of them:					
Ministry of Agrarian Policy and Food	2	—
Ministry of Energy and Coal Industry	1	—
Ministry of Education and Science	10	10
Ministry of Healthcare	3	—

Obtained patents and certificates for plant varieties

	2010	2011	2012	2013	2014
Total	2	11	13	3	—
Total for national academies of sciences	2	9	13	3	—
including:					
National Academy of Sciences	—	—	—	2	—
National Academy of Agrarian Sciences	2	9	13	1	—
Total for ministries and agencies	—	2
of them:					
Ministry of Agrarian Policy and Food	—	2

VI. INTERNATIONAL COOPERATION OF NATIONAL ACADEMY OF SCIENCES OF UKRAINE

VI.1. International connections of National Academy of Sciences of Ukraine*



* Source: Brief annual report of NAS of Ukraine for 2014.

VI.2. Indicators of international scientific cooperation, by sector of performance

R&D personnel traveling abroad, *headcount*

	2010	2011	2012	2013	2014
Total	9898	10264	10453	11060	7316
Government sector	3070	2974	2837	2818	1965
including national academies of sciences	2791	2702	2503	2473	1689
of them: NAS of Ukraine	2398	2298	2149	2111	1403

continued

	2010	2011	2012	2013	2014
Business enterprise sector	1978	2005	2312	2552	1285
Higher education sector	4850	5285	5304	5690	4066
Private non-profit sector	—	—	—	—	—
	<i>(as % of total of each year)</i>				
Government sector	31.0	29.0	27.1	25.5	26.9
including national academies of sciences	28.2	26.3	23.9	22.4	23.1
of them: NAS of Ukraine	24.2	22.4	20.6	19.1	19.2
Business enterprise sector	20.0	19.5	22.2	23.1	17.6
Higher education sector	49.0	51.5	50.7	51.4	55.6
Private non-profit sector	×	×	×	×	×

Foreign trips of R&D personnel to international seminars, conferences etc., headcount

	2010	2011	2012	2013	2014
Total	9737	11369	10661	10890	7638
Government sector	3107	3630	3227	3236	1924
including national academies of sciences	2794	3180	2689	2683	1515
of them: NAS of Ukraine	2136	2394	2104	2057	1068
Business enterprise sector	841	818	644	778	433
Higher education sector	5789	6921	6790	6876	5281
Private non-profit sector	—	—	—	—	—
	<i>(as % of total of each year)</i>				
Government sector	31.9	31.9	30.3	29.7	25.2
including national academies of sciences	28.7	28.0	25.2	24.6	19.8
of them: NAS of Ukraine	21.9	21.1	20.7	18.9	14.0
Business enterprise sector	8.6	7.1	6.0	7.1	5.7
Higher education sector	59.5	60.9	63.7	63.1	69.1
Private non-profit sector	×	×	×	×	×

International conferences, seminars and etc. hosted by organizations

	2010	2011	2012	2013	2014
Total	2201	2516	2508	2619	2023
Government sector	655	766	749	718	561
including national academies of sciences	512	643	616	594	448
of them: NAS of Ukraine	358	378	381	427	323
Business enterprise sector	129	173	104	99	38
Higher education sector	1416	1577	1655	1802	1424
Private non-profit sector	—	—	—	—	—
	<i>(as % of total of each year)</i>				
Government sector	29.8	30.4	29.9	27.4	27.7
including national academies of sciences	23.3	25.6	24.6	22.7	22.1
of them: NAS of Ukraine	16.3	15.0	15.2	16.3	16.0
Business enterprise sector	5.9	6.9	4.1	3.8	1.9
Higher education sector	64.3	62.7	66.0	68.8	70.4
Private non-profit sector	×	×	×	×	×

R&D grants obtained from international foundations

	2010	2011	2012	2013	2014
Total	1723	1727	1855	2147	1885
Government sector	508	431	402	396	360
including national academies of sciences	499	415	385	365	316
of them: NAS of Ukraine	461	379	359	333	289
Business enterprise sector	26	20	14	8	10
Higher education sector	1189	1276	1439	1743	1515
Private non-profit sector	—	—	—	—	—
	<i>(as % of total of each year)</i>				
Government sector	29.5	25.0	21.7	18.4	19.1
including national academies of sciences	29.0	24.0	21.0	17.0	16.8
of them: NAS of Ukraine	26.8	21.9	19.4	15.5	15.3
Business enterprise sector	1.5	1.1	0.7	0.4	0.5
Higher education sector	69.0	73.9	77.6	81.2	80.4
Private non-profit sector	×	×	×	×	×

R&D personnel doing R&D by grants, *headcount*

	2010	2011	2012	2013	2014
Total	4541	5155	5319	5083	4513
Government sector	1766	1880	1798	1766	1613
including national academies of sciences	1779	1817	1671	1613	1472
of them: NAS of Ukraine	1670	1629	1596	1530	1378
Business enterprise sector	144	625	644	42	175
Higher education sector	2631	2650	2877	3275	2725
Private non-profit sector	—	—	—	—	—
	<i>(as % of total of each year)</i>				
Government sector	38.9	36.5	33.8	34.7	35.7
including national academies of sciences	39.2	35.2	31.4	31.7	32.6
of them: NAS of Ukraine	36.8	31.6	30.0	30.1	30.5
Business enterprise sector	3.2	12.1	12.1	0.8	3.9
Higher education sector	57.9	51.4	54.1	64.4	60.4
Private non-profit sector	×	×	×	×	×

VI.3. Foreign trips of R&D personnel

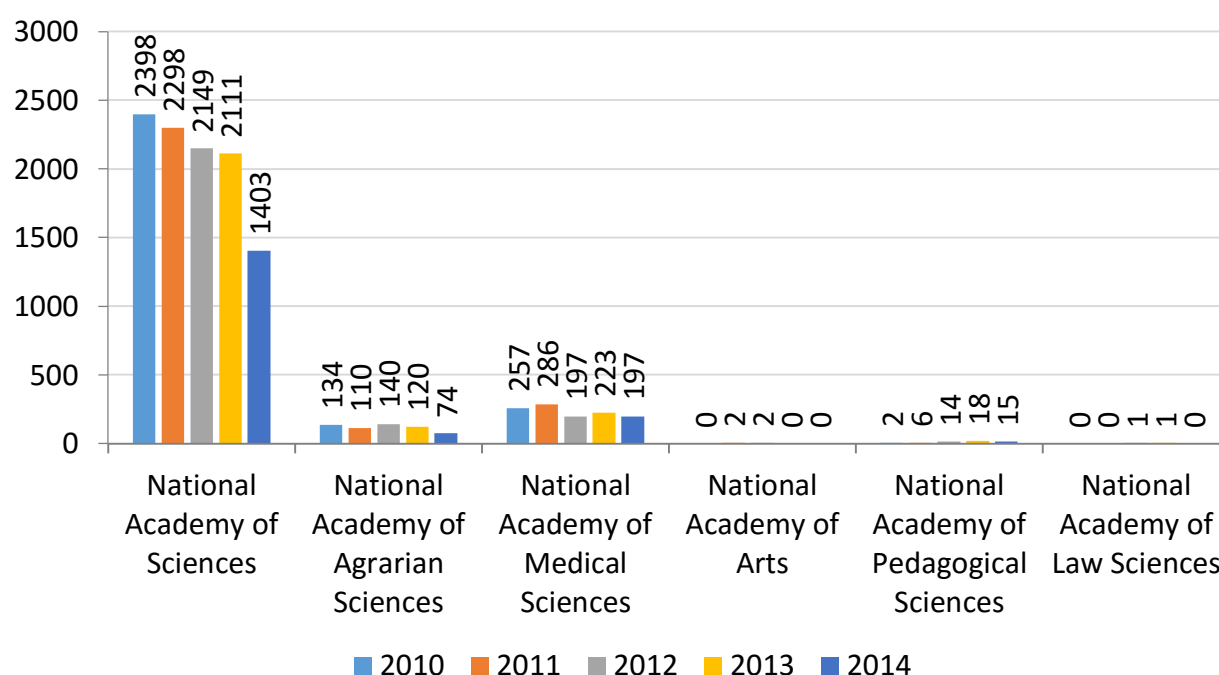
R&D personnel of national academies of sciences and ministries, traveling abroad, *headcount*

	2010	2011	2012	2013	2014
Total	9898	10264	10453	11060	7316
Total for national academies of sciences	2791	2702	2503	2473	1689
including:					
National Academy of Sciences	2398	2298	2149	2111	1403
National Academy of Agrarian Sciences	134	110	140	120	74
National Academy of Medical Sciences	257	286	197	223	197
National Academy of Arts	...	2	2

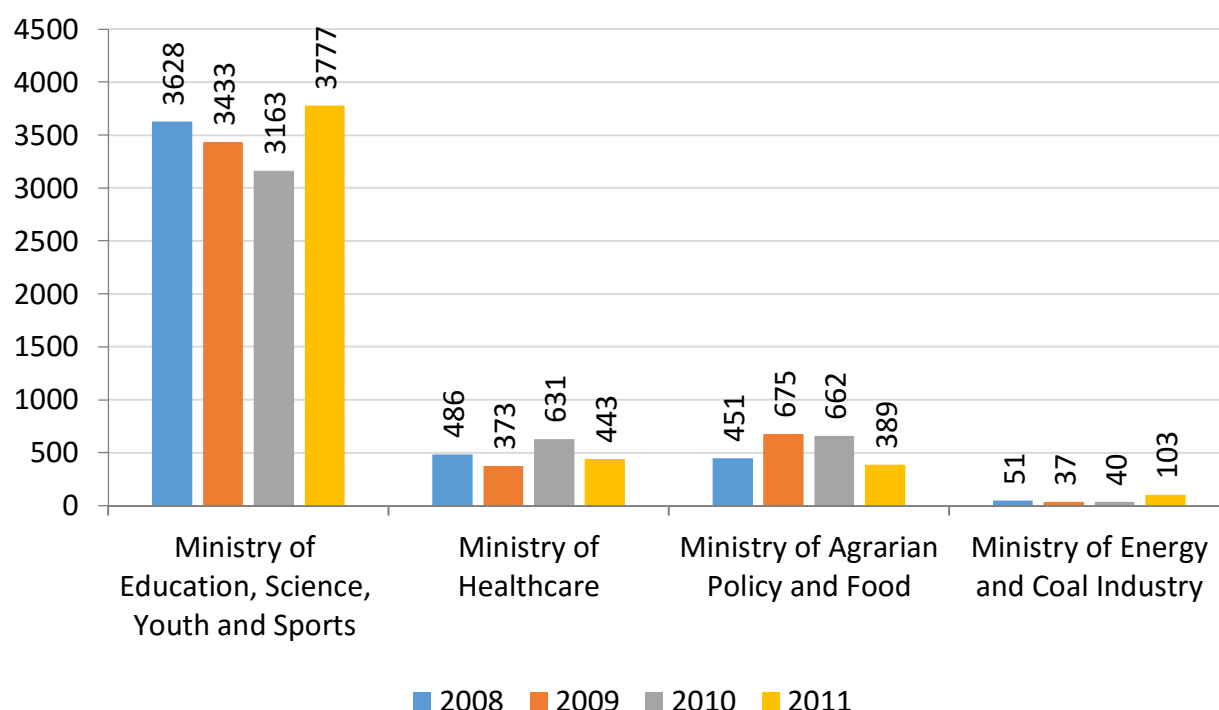
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	2010	2011	2012	2013	2014
National Academy of Pedagogical Sciences	2	6	14	18	15
National Academy of Law Sciences	...	—	1	1	...
Total for ministries and agencies	7107	7564
of them:					
Ministry of Agrarian Policy and Food	662	389
Ministry of Energy and Coal Industry	40	103
Ministry of Education and Science	3163	3777
Ministry of Healthcare	631	443

R&D personnel of national academies of sciences traveling abroad



R&D personnel of ministries traveling abroad



R&D personnel traveling abroad for performing R&D, *headcount*

	2010	2011	2012	2013	2014
Total	5391	5988	5845	6217	3641
Total for national academies of sciences	2027	2089	1826	1656	1075
including:					
National Academy of Sciences	1926	1897	1732	1583	986
National Academy of Agrarian Sciences	51	53	45	40	34
National Academy of Medical Sciences	50	134	48	18	40
National Academy of Arts	...	2	—	—	—
National Academy of Pedagogical Sciences	—	3	1	15	15
National Academy of Law Sciences	...	—	—	—	—
Total for ministries and agencies	2640	3901
of them:					

continued

	2010	2011	2012	2013	2014
Ministry of Agrarian Policy and Food	190	118
Ministry of Energy and Coal Industry	30	95
Ministry of Education and Science	987	1382			
Ministry of Healthcare	250	111

R&D personnel traveling abroad for university teaching, *headcount*

	2010	2011	2012	2013	2014
Total	574	489	477	435	281
Total for national academies of sciences	80	94	68	51	52
including:					
National Academy of Sciences	56	91	62	40	45
National Academy of Agrarian Sciences	6	—	5	2	
National Academy of Medical Sciences	18	3	—	8	7
National Academy of Arts	...	—	—	—	—
National Academy of Pedagogical Sciences	—	—	—	—	—
National Academy of Law Sciences	...	—	1	1	—
Total for ministries and agencies	489	395
of them:					
Ministry of Agrarian Policy and Food	167	44
Ministry of Energy and Coal Industry	2	5
Ministry of Education and Science	261	247
Ministry of Healthcare	29	10

R&D personnel traveling abroad for training, education and professional development, *headcount*

	2010	2011	2012	2013	2014
Total	3933	3787	4131	4408	3394
Total for national academies of sciences	684	519	609	766	562
including:					
National Academy of Sciences	416	310	355	488	372
National Academy of Agrarian Sciences	77	57	95	78	40
National Academy of Medical Sciences	189	149	144	197	150
National Academy of Arts	...	—	2	—	—
National Academy of Pedagogical Sciences	2	3	13	3	—
National Academy of Law Sciences	...	—	—	—	—
Total for ministries and agencies	3052	3268
of them:					
Ministry of Agrarian Policy and Food	305	227
Ministry of Energy and Coal Industry	8	3
Ministry of Education and Science	1915	2148
Ministry of Healthcare	352	322

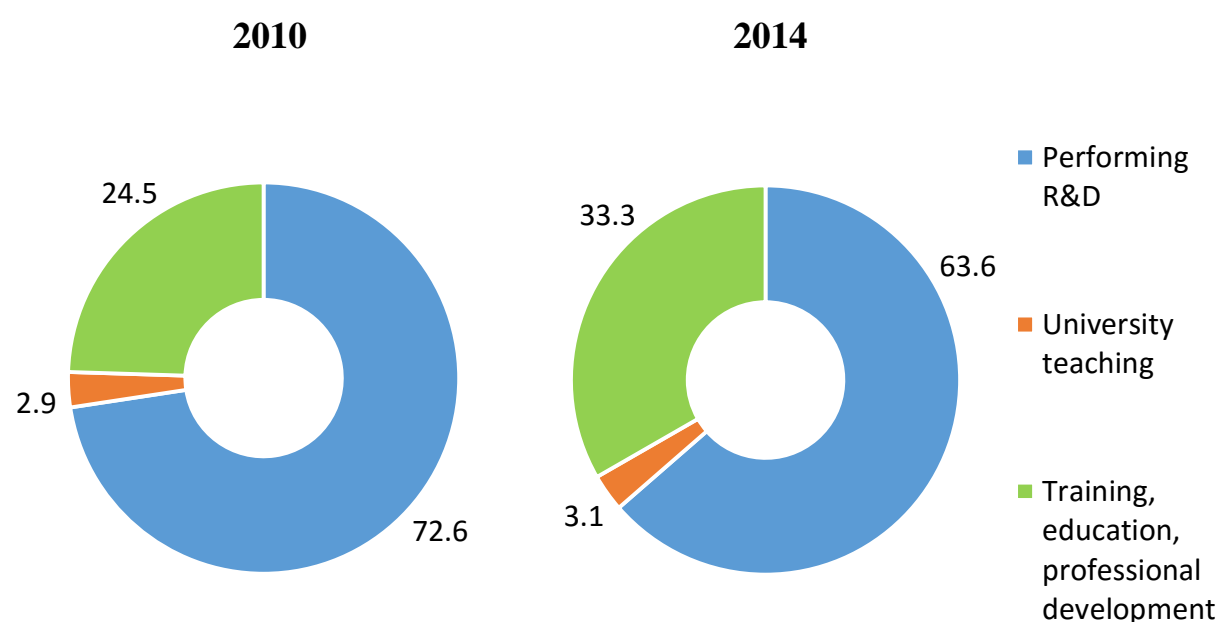
R&D personnel traveling abroad to international seminars and conferences, etc.

	2010	2011	2012	2013	2014
Total	9737	11369	10661	10890	7638
Total for national academies of sciences	2794	3180	2689	2683	1515
including:					
National Academy of Sciences	2136	2394	2104	2057	1068

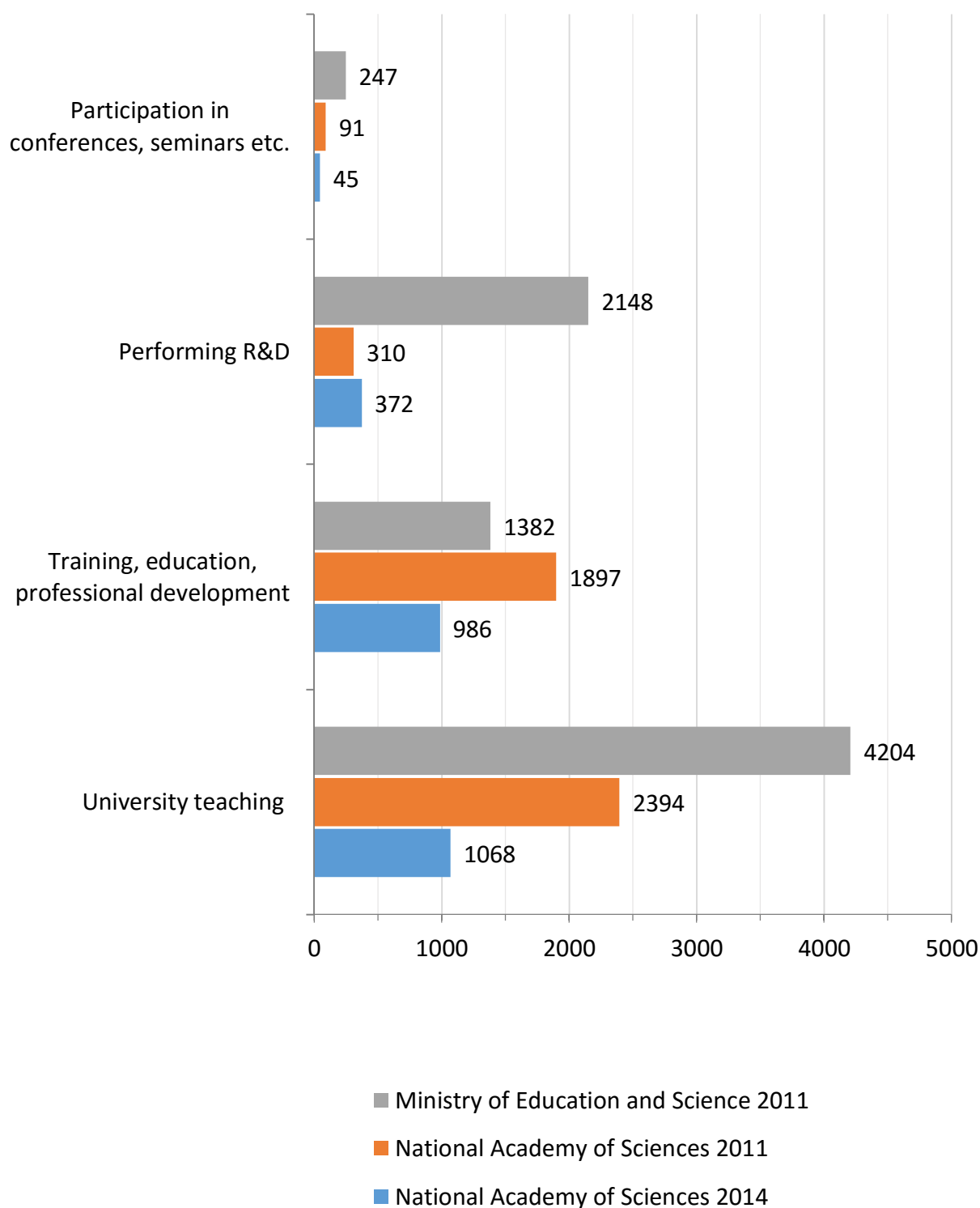
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	2010	2011	2012	2013	2014
National Academy of Agrarian Sciences	152	160	164	184	102
National Academy of Medical Sciences	474	548	370	394	336
National Academy of Arts	...	—	2	—	1
National Academy of Pedagogical Sciences	32	78	47	45	8
National Academy of Law Sciences	—	—	2	3	—
Total for ministries and agencies	6943	8189
of them:					
Ministry of Agrarian Policy and Food	568	955
Ministry of Energy and Coal Industry	38	31
Ministry of Education and Science	3863	4204
Ministry of Healthcare	866	1057

Percentage distribution of R&D personnel of national academies of sciences traveling abroad by purpose



R&D personnel of NAS of Ukraine and MES of Ukraine traveling abroad by purpose, *headcount*



VI.4. Foreign trips of R&D personnel of national academies of sciences and ministries by trip duration

R&D personnel traveling abroad for up to 3 months, *headcount*

	2010	2011	2012	2013	2014
Total	8906	9356	9549	10208	6489
Total for national academies of sciences	2487	2462	2307	2327	1546
including:					
National Academy of Sciences	2124	2066	1968	1970	1265
National Academy of Agrarian Sciences	108	105	132	117	73
National Academy of Medical Sciences	255	283	193	221	193
National Academy of Arts	...	2	—	—	—
National Academy of Pedagogical Sciences	—	6	13	18	15
National Academy of Law Sciences	...	—	1	1	—
Total for ministries and agencies	5489	6894
of them:					
Ministry of Agrarian Policy and Food	651	375
Ministry of Energy and Coal Industry	40	103
Ministry of Education and Science	2630	3230
Ministry of Healthcare	567	401

R&D personnel traveling for 3 months to 1 year, *headcount*

	2010	2011	2012	2013	2014
Total	819	786	776	750	777
Total for national academies of sciences	220	187	160	126	125
including:					
National Academy of Sciences	204	180	149	121	121
National Academy of Agrarian Sciences	13	5	5	3	1
National Academy of Medical Sciences	1	2	3	2	3
National Academy of Arts	2	—	—
National Academy of Pedagogical Sciences	2	—	1	—	—
National Academy of Law Sciences	...	—	—	—	—
Total for ministries and agencies	593	599
of them:					
Ministry of Agrarian Policy and Food	11	13
Ministry of Energy and Coal Industry	—	—
Ministry of Education and Science	490	520
Ministry of Healthcare	29	6

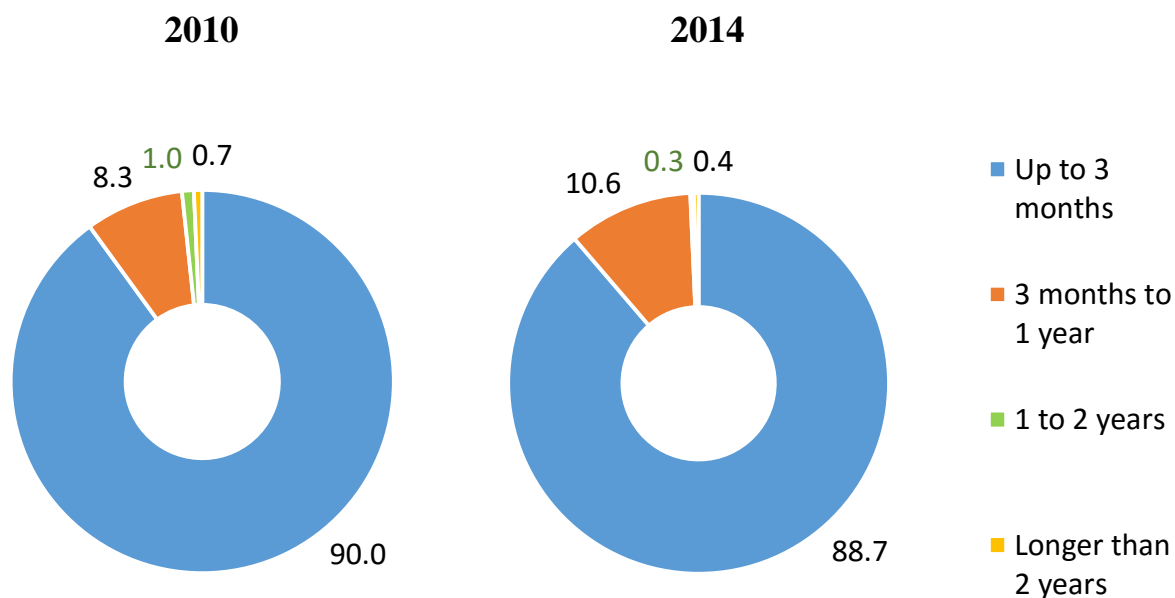
R&D personnel traveling for 1 to 2 years, *headcount*

	2010	2011	2012	2013	2014
Total	96	49	86	55	21
Total for national academies of sciences	48	19	22	12	13
including:					
National Academy of Sciences	36	19	22	12	12
National Academy of Agrarian Sciences	12	—	—	—	—
National Academy of Medical Sciences	—	—	—	—	1
National Academy of Arts	...	—	—	—	—
National Academy of Pedagogical Sciences	—	—	—	—	—
National Academy of Law Sciences	...	—	—	—	—
Total for ministries and agencies	48	30
of them:					
Ministry of Agrarian Policy and Food	—	—
Ministry of Energy and Coal Industry	—	—
Ministry of Education and Science	19	8
Ministry of Healthcare	20	18

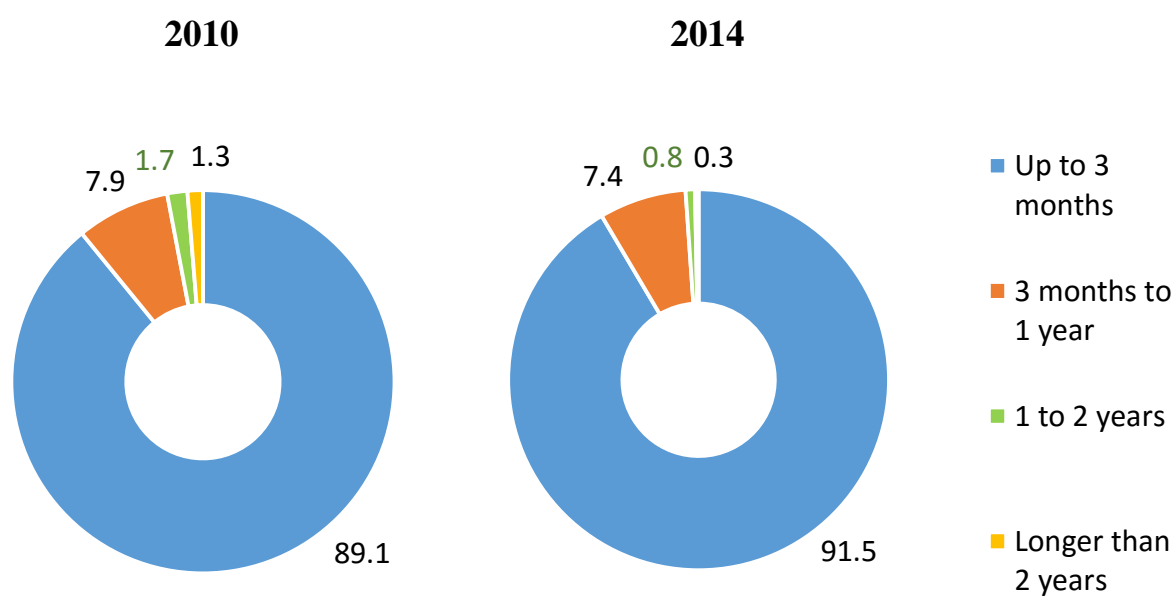
R&D personnel traveling for longer than 2 years, *headcount*

	2010	2011	2012	2013	2014
Total	77	75	42	47	29
Total for national academies of sciences	36	34	14	8	5
including:					
National Academy of Sciences	34	33	10	8	5
National Academy of Agrarian Sciences	1	—	3	—	—
National Academy of Medical Sciences	1	1	1	—	—
National Academy of Arts	...	—	—	—	—
National Academy of Pedagogical Sciences	—	—	—	—	—
National Academy of Law Sciences	...	—	—	—	—
Total for ministries and agencies	41	41
of them:					
Ministry of Agrarian Policy and Food	—	1
Ministry of Energy and Coal Industry	—	—
Ministry of Education and Science	24	19
Ministry of Healthcare	15	18

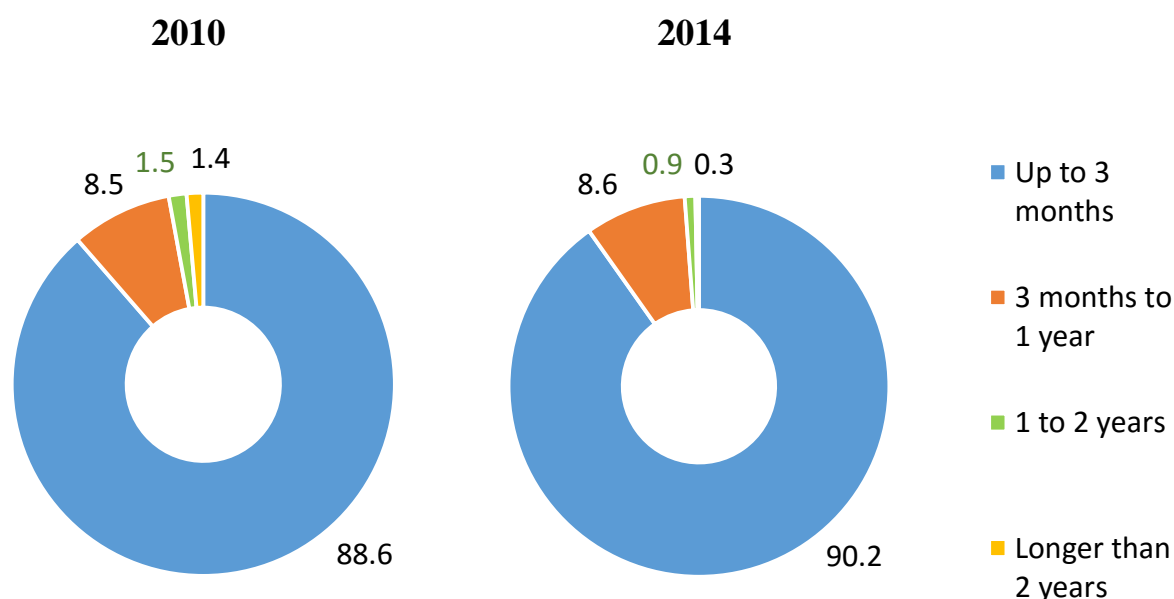
Percentage distribution of R&D personnel of national academies of sciences and ministries traveling abroad by trip duration



Percentage distribution of R&D personnel of national academies of sciences traveling abroad by trip duration



Percentage distribution of R&D personnel of NAS of Ukraine traveling abroad by trip duration



VI.5. R&D grants obtained from international funds by research institutions of national academies of sciences and ministries

Obtained grants – total

	2000	2005	2010	2011	2012	2013	2014
Total	1138	1464	1723	1727	1855	2147	1885
Total for national academies of sciences	576	473	499	415	385	365	316
including:							
National Academy of Sciences	530	447	461	379	359	333	289
National Academy of Agrarian Sciences	7	7	14	23	15	12	9
National Academy of Medical Sciences	27	17	17	11	8	20	18
National Academy of Arts	2	3	—	—
National Academy of Pedagogical Sciences	1	2	7	—	—	—	—

continued

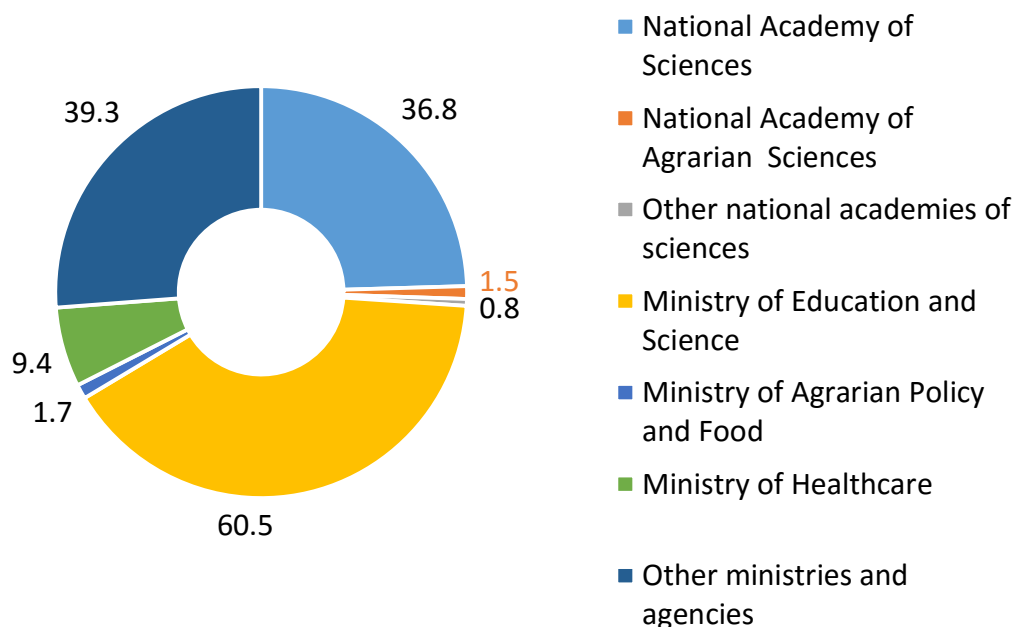
	2000	2005	2010	2011	2012	2013	2014
National Academy of Law Sciences	11	—	—	—	—	—	—
Total for ministries and agencies of them:	532	764	1221	1312
Ministry of Agrarian Policy and Food	9	16	13	16
Ministry of Energy and Coal Industry	2	2	—	—
Ministry of Education and Science	443	678	758	835
Ministry of Healthcare	—	—	187	236

R&D personnel performing R&D by grants

	2010	2011	2012	2013	2014
Total	4541	5155	5319	5083	4513
Total for national academies of sciences including:	1779	1817	1671	1613	1472
National Academy of Sciences	1670	1629	1596	1530	1378
National Academy of Agrarian Sciences	68	159	61	54	75
National Academy of Medical Sciences	7	27	11	29	19
National Academy of Arts	...	2	3	—	—
National Academy of Pedagogical Sciences	34	—	—	—	—
National Academy of Law Sciences	—	—	—	—	—
Total for ministries and agencies of them:	2746	3340
Ministry of Agrarian Policy and Food	76	71
Ministry of Energy and Coal Industry	—	—
Ministry of Education and Science	1787	1785
Ministry of Healthcare	425	344

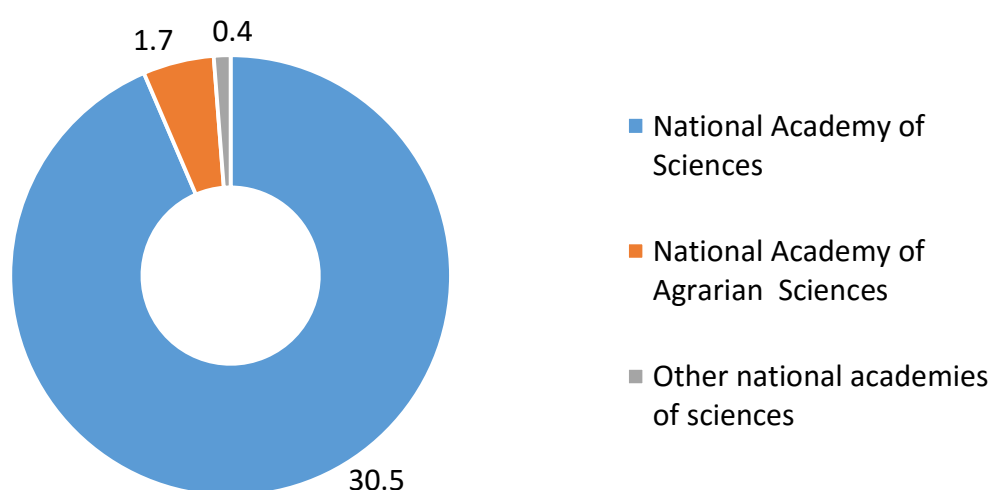
Percentage distribution of R&D personnel performing R&D by grants by national academy of sciences and ministries: 2010,

% of total researchers performing R&D by grants



Percentage distribution of R&D personnel performing R&D by grants by national academy of sciences: 2014,

% of total researchers performing R&D by grants



VII. NATIONAL ACADEMY OF SCIENCES OF UKRAINE IN THE DOMESTIC AND GLOBAL RESEARCH AREA

VII.1. Publications of Ukrainian researchers in “Scopus” database*

Trends in Ukrainian publication activity, 2001-2014

Year	Number of papers	Number of citations	Year	Number of papers	Number of citations
2001	6625	38189	2008	7183	39767
2002	5887	37471	2009	7041	30182
2003	6040	45048	2010	7511	27342
2004	6942	45604	2011	8237	30575
2005	7324	45792	2012	9168	23854
2006	6640	40907	2013	9561	11410
2007	6809	42926	2014	9218	2727

* As of December 2014.

Source: Scimago Journal & Country Rank – URL:

<http://www.scimagojr.com/countrysearch.php?country=UA>

Research papers by field of science: 2001-2014*

	Number of papers	% of total
Total	165575	100.0
fields of science:		
Physics and astronomy	38641	23.3
Mechanical engineering	32061	19.4
Material sciences	27225	16.4
Chemistry	14866	9.0
Mathematics	11592	7.0
Informatics	11165	6.7
Biochemistry Genetics and Molecular		
Biology	7419	4.5
Earth Sciences	5861	3.5

continued

	Number of papers	% of the total
Chemical industry	5367	3.2
Medicine	4449	2.7
Ecology	3519	2.1
Agrarian sciences	3410	2.0
Others

* As of December 2014.

Source: Scimago Journal & Country Rank – URL:

<http://www.scimagojr.com/countrysearch.php?country=UA>

Top 50 research organizations and universities by Hirsch Index in “Scopus” database

		Number of papers	Number of citations	Hirsch Index
1	M.M. Bogolyubov Institute for Theoretical Physics	2766	33523	74
2	National Science Center ‘Kharkiv Institute of Physics and Technology’	4675	34959	73
3	<i>Kyiv Taras Shevchenko National University</i>	<i>12416</i>	<i>49991</i>	<i>70</i>
4	Institute of Physics	3634	29285	65
5	O.O. Bohomolets Institute of Physiology	2344	20049	58
6	Institute for Nuclear Research	2263	18939	58
7	Institute of molecular biology and genetics	1910	18812	58
8	B.I. Verkin Institute for Low Temperature Physics and Engineering	4446	31195	56
9	Institute of Bioorganic Chemistry and Petrochemistry	1152	12418	56
10	Main Astronomical Observatory	926	14384	55
11	<i>V.N. Karazin Kharkiv National University</i>	<i>7117</i>	<i>31308</i>	<i>54</i>
12	G.V. Kurdyumov Institute for Metal Physics	2741	19947	54
13	I.M. Frantsevich Institute for Problems of Materials Sciences	6987	23469	53

continued

		Number of papers	Number of citations	Hirsch Index
14	O.V. Palladin Institute of Biochemistry	1891	12226	53
15	V.Ye. Lashkaryov Institute of Semiconductor Physics	4088	22934	51
16	Institute of Magnetism under NAS and MES of Ukraine	841	9884	47
17	O.O. Chuiko Institute of Surface Chemistry	1445	12623	45
18	<i>Lviv Ivan Franko National University</i>	4976	21899	44
19	<i>Odessa I.I.Mechnikov National University</i>	2508	10490	44
20	Institute of Organic Chemistry	2590	12749	42
21	<i>Chernivtsi Yu. Fed'kovych National University</i>	2186	7336	42
22	L.V. Pisarzhevsky Institute of Physical Chemistry	2602	10283	40
23	Donetsk O.O. Galkin Institute of Physics and Engineering	1810	9831	39
24	Institute for Condensed Matter Physics	1128	10488	39
25	O.Ya. Usikov Institute for Radio Physics and Electronics	3405	9967	38
26	Institute of Mathematics	2769	10674	38
27	A.V. Dumansky Institute of Colloid and Water Chemistry	1667	7092	38
28	<i>National Technical University of Ukraine "Kyiv Polytechnic Institute"</i>	4817	9369	37
29	'Institute for Single Crystals' State R&D Corporation	1786	10523	36
30.	<i>Donetsk M. Gorky National Medical University</i>	906	4780	35
31.	Institute of Radio Astronomy	941	7295	34
32.	S.P. Timoshenko Institute of Mechanics	2987	11515	32
33.	Institute of Macromolecular Chemistry	789	5552	32

continued

	Number of papers	Number of citations	Hirsch Index
34. <i>Dnipro Oles Honchar National University</i>	2728	7337	32
35. <i>National Technical University "Kharkiv Polytechnic Institute"</i>	2021	5932	31
36. L.M. Litvinenko Institute of Physical-Organic Chemistry and Coal Chemistry	710	4168	30
37. <i>National University "Lvivska Politechnika"</i>	3142	5931	29
38. V.N. Bakul Institute for Superhard Materials	1430	5014	28
39. V.I. Vernadsky Institute of General and Inorganic Chemistry	1195	4443	28
40. I.I. Schmalhausen Institute of Zoology	791	3706	28
41. <i>Vasyl Stefanyk Precarpathian National University</i>	308	2716	28
42. <i>Danylo Galytsky Lviv National Medical University</i>	472	2339	28
43. Institute of Cell Biology	348	5755	27
44. <i>Uzhgorod National University</i>	1498	5273	27
45. M.G. Kholodny Institute of Botany	486	4330	26
46. Institute of Cell Biology and Genetic Engineering	222	2466	26
47. <i>Donetsk National University</i>	1530	3116	25
48. O.V. Bogatsky Physico-Chemical Institute	509	2710	25
49. <i>Sumy State University</i>	1123	5102	24
50. Institute for Scintillation Materials	658	2845	24

Source: Information and analytical system "Bibliometryka Ukrainian Science" of V.I. Vernadsky National Library of Ukraine of the NAS of Ukraine – URL: <http://www.nbuv.gov.ua/bpnu/index.html> - As of August 2015.

VII.2. Publications of research institutions of National Academy of Sciences of Ukraine and higher education institutions and research organizations of Ministry of Education and Science of Ukraine indexed in “Scopus” database: 2000-2013

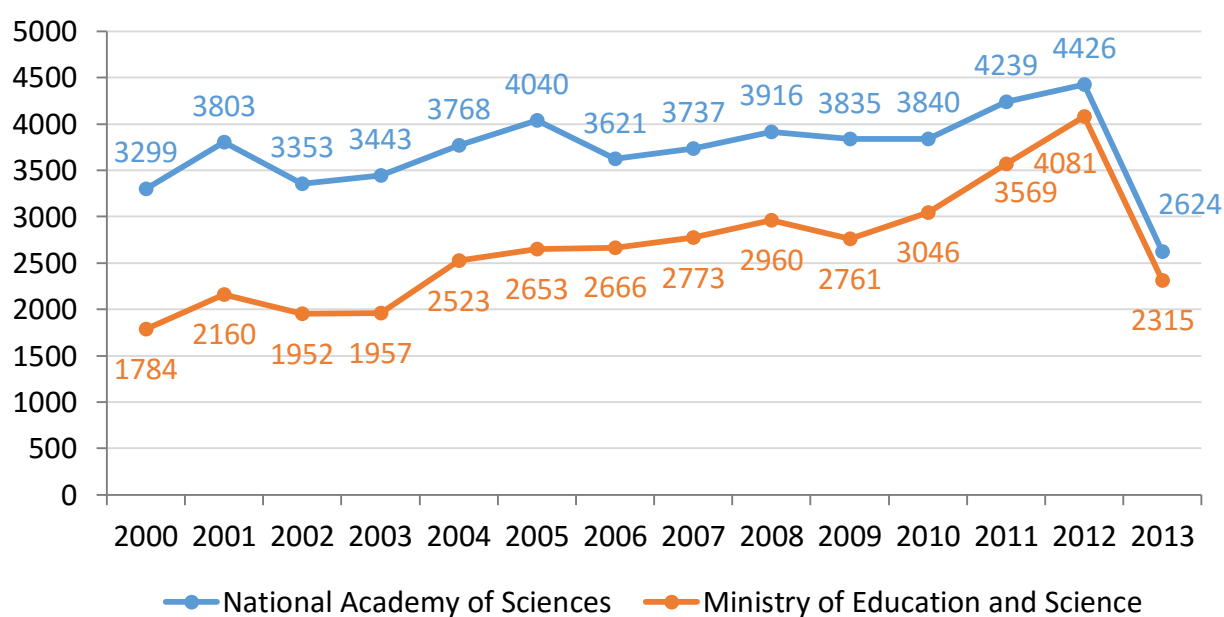
Papers indexed in “Scopus” database: 2000–2013*

Year	National Academy of Sciences	Ministry of Education and Science	Year	National Academy of Sciences	Ministry of Education and Science
2000	3299	1784	2007	3737	2773
2001	3803	2160	2008	3916	2960
2002	3353	1952	2009	3835	2761
2003	3443	1957	2010	3840	3046
2004	3768	2523	2011	4239	3569
2005	4040	2653	2012	4426	4081
2006	3621	2666	2013*	2624	2315

* As of September 2013.

Source: Science of Ukraine in the mirror of scientometrics database “SciVerse Scopus”/Ukrainian Research and Academic Network –

URL: http://jsi.net.ua/scopus/ratings_nanu/index.html



VII.3. Representation of research centers in “Ranking Web of World Research Centers”*

Numbers and ranks of research organizations in Commonwealth of Independent States and Baltic states

	Number of organizations	World web ranking**	
		maximal	minimal
The World	7353	1	7353
Europe	4061	7	7353
European Union	3379	7	7353
Central and Eastern Europe	798	13	7353
Commonwealth of Independent States			
Armenia	14	371	7140
Azerbaijan	1	3374	3374
Belarus	11	1188	7353
Kazakhstan	42	1899	7386
Kyrgyzstan	1	6276	6276
Moldova	19	346	7333
Russia	181	54	7353
Tajikistan
Turkmenistan
Ukraine	47	169	6785
Uzbekistan	2	3342	4826
Baltic states			
Estonia	14	677	3492
Latvia	5	1221	3492
Lithuania	29	362	7036

* As of January 2016. According to the methodology of “Ranking Web of World Research Centers” the international rank of an organization is derived by web metric indicators measuring “visibility” domain of this organization in Internet and “activity” of this organization in the search system of Google (number of web pages amount of files of different types and number of publications in “Google Scholar” database) – URL:

<http://research.webometrics.info/en/Europe/Ukraine%20>;

<http://research.webometrics.info/en/Methodology>

** Not including higher education institutions indexed in “Ranking Web of World Universities” – URL: <http://www.webometrics.info/en/Europe/Ukraine%20>

Source: “Ranking Web of World Research Centers” – URL:

<http://research.webometrics.info/en>

VII.4. Representation of scientific journals published in Ukraine in international databases by national academy of sciences and ministry

Journals published in Ukraine are indexed in “Web of Science” database*

	Number of journals		Impact factor**			
			maximal		minimal	
	2013	2014	2013	2014	2013	2014
Total	18	16	1.299	1.245	0.102	0.136
National academies of sciences:						
National Academy of Sciences	17	15	1.299	1.245	0.102	0.136
National Academy of Agrarian Sciences	—	—	—	—	—	—
National Academy of Medical Sciences	—	—	—	—	—	—
National Academy of Arts	—	—	—	—	—	—
National Academy of Pedagogical Sciences	—	—	—	—	—	—
National Academy of Law Sciences	—	—	—	—	—	—
Ministries						
Ministry of Education and Science	1	1	0.880	0.880	0.558	0.558
Ministry of Healthcare	—	—	—	—	—	—

* Journals published inside Ukraine are included only.

** According to the Journal Citation Reports (Scientometric data of Web of Science platform of the corporation Thomson Reuters). Impact factor is an indicator of the intensity of citations of articles of the journal.

Source: Information and analytical system “Bibliometryka Ukrainian Science” of V.I. Vernadsky National Library of Ukraine of the National Academy of Sciences of Ukraine – URL: <http://www.nbuviap.gov.ua/bpnu/index.html> – As of August 2015.

Scientific journals published in Ukraine and indexed in “Scopus” database*

	Number of journals		Impact factor**			
			maximal		maximal	
	2013	2014	2013	2014	2013	2014
Total	33	37	0.675	0.641	0.100	0.100
National academies of sciences:						
National Academy of Sciences	18	19	0.569	0.477	0.105	0.107
National Academy of Agrarian Sciences	—	—	—	—	—	—
National Academy of Medical Sciences	—	—	—	—	—	—
National Academy of Arts	—	—	—	—	—	—
National Academy of Pedagogical Sciences	—	—	—	—	—	—
National Academy of Law Sciences	—	—	—	—	—	—
Ministries:						
Ministry of Education and Science	10	11	0.242	0.304	0.100	0.100
Ministry of Healthcare	2	2	0.103	0.101	0.101	0.101
Others	3	5	0.250	0.198	0.127	0.100

* Journals published inside Ukraine are included only.

** According to SCImago Journal & Country Rank (Scientometric data platform SciVerse Scopus Corporation Elsevier). “Science Journal Rankings” is the indicator of intensity of citations of papers published in a journal, based on weight of reference sources.

Source: Information and analytical system “Bibliometryka Ukrainian Science” of V.I. Vernadsky National Library of Ukraine of the National Academy of Sciences of Ukraine – URL: <http://www.nbuviap.gov.ua/bpnu/index.html> – As of August 2015.

**Journals of National Academy of Sciences
published abroad in foreign languages**

	Publisher	First edition year
Cybernetics and Systems Analysis	Springer	1965
Theoretical and Experimental Chemistry	Springer	1965
Materials Science	Springer	1966
Ukrainian Mathematical Journal	Springer	1967
International Applied Mechanics	Springer	1969
Strength of Materials	Springer	1969
Journal of Low Temperature Physics	Springer	1969
Neurophysiology	Springer	1969
Journal of Automation and Information Sciences	Begell House	1996
Telecommunication and Radio Engineering	Begell House	1997
Hydrobiological Journal	Begell House	1998
International Journal on Algae	Begell House	1999
Kinematics and Physics of Celestial Bodies	Springer	2007
Journal of Superhard Materials	Springer	2007
Cytology and Genetics	Springer	2007
Journal of Water Chemistry and Technology	Springer	2007
Zoological Herald	Walter de Gruyter GmbH	2008

continued

	Publisher	First edition year
Radio Physics and Radio Astronomy	Begell House	2010 – 2012
Technical Diagnostics and Non-Destructive Testing	Cambridge International Science Publishing Ltd.	...
The Ukrainian Biochemical Journal	Elsevier B.V.	...

Source: Scientific Publishing Council of the National Academy of Sciences of Ukraine – URL: <http://www.nas.gov.ua/publications/news/Pages/contents.aspx?ffn1=ID&fft1=Eq&ffv1=307> – As of September 2015.

Journals of National Academy of Sciences published in Ukraine in English

	First edition year
Biopolymers and Cell	1985
Semiconductor Physics, Quantum Electronics & Optoelectronics	1998
Functional Materials	1998
Ukrainian Journal of Physics	2000
The Paton Welding Journal	2000
Advances in Electrometallurgy	2001
Journal of Mathematical Physics, Analysis, Geometry	2006
Experimental oncology	2006
Problems of Cryobiology and Cryomedicine	2006
Journal of Thermoelectricity	Selected editions till 2012
Science and Innovations	2014

Source: Scientific Publishing Council of the National Academy of Sciences of Ukraine – URL: <http://www.nas.gov.ua/publications/news/Pages/contents.aspx?ffn1=ID&fft1=Eq&ffv1=307> – As of September 2015.

VII.5. Impact indices of scientific journals of National Academy of Sciences of Ukraine published in Ukraine and included in international databases: 2014

	“Web of Science”	“Scopus”*	
	Impact factor	Science Journal Rankings	<i>h</i> -index
Symmetry, Integrability and Geometry: Methods and Applications (SIGMA)	1.245	0.511	15
Theoretical and Experimental Chemistry	0.815	—	—
Journal of Low Temperature Physics	0.786	—	—
Condensed Matter Physics	0.748	0.276	16
Journal of Superhard Materials	0.573	—	—
Cytology and Genetics	0.379	0.156	9
Strength of Materials	0.376	—	—
Kinematics and Physics of Celestial Bodies	0.282	—	—
Journal of Water Chemistry and Technology	0.231	—	—
Ukrainian Mathematical Journal	0.230	—	—
Powder metallurgy	0.219	—	—
Neurophysiology	0.195	—	—
Materials Science	0.195	—	—
Journal of Mathematical Physics, Analysis, Geometry	0.157	0.323	5
Problems of Atomic Science and Technology	0.136	0.201	6
Experimental Oncology	—	0.641	28
Nonlinear Dynamics and Systems Theory	—	0.307	9
Functional Materials	—	0.247	6
Zoological Herald	—	0.234	4
Metal Physics and Advanced Technologies	—	0.208	9
Ukrainian Journal of Physics	—	0.198	8
Nuclear Physics and Atomic Energy	—	0.187	4
Technical Electrodynamics	—	0.186	4
Biopolymers and Cell	—	0.162	10
Theory of Stochastic Processes	—	0.149	2
The Ukrainian Biochemical Journal	—	0.132	10
Physiological Journal	—	0.114	7

continued

	“Web of Science”	“Scopus”*	
	Impact factor	Science Journal Rankings	<i>h</i> -index
Microbiological Journal	—	0.109	6
Journal of Thermoelectricity	—	0.100	1

* According to SCImago Journal & Country Rank (Scientometric data platform SciVerse Scopus Corporation Elsevier). Hirsch index (*h*-index) – *h* is the number of journal articles referenced in more than *h* publications.

Source: information and analytical system “Bibliometryka Ukrainian Science” of V.I. Vernadsky National Library of Ukraine of the National Academy of Sciences of Ukraine – URL: <http://www.nbuv.gov.ua/bpnu/index.html> – As of August 2015.

VII.6. Representation of Ukrainian research organizations and higher education institutions in “Google Scholar” database

Bibliometric portraits of Ukrainian researchers indexed in the “Google Scholar” database

	Number of bibliometric portraits	% of the total
Total	14000	100.0
Total for national academies of sciences	3325	22.7
including:		
National Academy of Sciences	2120	14.5
National Academy of Agrarian Sciences	820	5.6
National Academy of Medical Sciences	60	0.4
National Academy of Arts	—	—
National Academy of Pedagogical Sciences	295	2.0
National Academy of Law Sciences	30	0.2
Total for ministries and agencies	10675	73.0
of them:		
Ministry of Education and Science	9840	67.3
Ministry of Healthcare	835	5.7
Other scientific organizations	630	4.3

Source: information and analytical system “Bibliometryka Ukrainian Science” of V.I. Vernadsky National Library of Ukraine of the National Academy of Sciences of Ukraine – URL: <http://www.nbuv.gov.ua/bpnu/index.html> – As of January 2016.

**Ranks of research organizations and higher education institutions
by number of researchers whose papers in “Google Scholar” have
Hirsch index ≥ 30**

	Number of bibliometric portraits	Hirsch index
National Academy of Sciences		
Institute of Molecular Biology and Genetics	96	5
M.M. Bogolyubov Institute for Theoretical Physics	43	5
Institute of Mathematics	75	3
O.O. Bohomolets Institute of Physiology	162	3
Institute for Nuclear Research	8	3
Institute of Physics	60	2
National Science Center “Kharkiv Institute of Physics and Technology”	14	2
Main Astronomical Observatory	23	1
F.D. Ovcharenko Institute of Biocolloidal Chemistry	5	1
M.V. Ptukha Institute for Demography and Social Studies	51	1
V.M. Glushkov Institute of Cybernetics	40	1
G.V. Kurdyumov Institute for Metal Physics	31	1
S.P. Timoshenko Institute of Mechanics	3	1
O.Ya. Usikov Institute for Radio Physics and Electronics	11	1
O.O. Chuiko Institute of Surface Chemistry	11	1
The National Academy of Agrarian Sciences		
Institute of Agrarian Economics	28	1
Ministry of Education and Science		
Chernivtsi Yu. Fed’kovych National University	49	2
National University of Physical Education and Sport of Ukraine	56	1
Sumy State University	218	1
Bohdan Khmelnytsky National University of Cherkassy	39	1
Ministry of Healthcare		
Dnipro Medical Academy	5	1

Source: Information and analytical system “Bibliometryka Ukrainian Science” of V.I. Vernadsky National Library of Ukraine of the National Academy of Sciences of Ukraine – URL: <http://www.nbuviap.gov.ua/bpnu/index.html> – As of January 2016.

VII.7. Monitoring of publications about National Academy of Sciences of Ukraine in mass media*

Articles in domestic mass media devoted to NAS of Ukraine 2011–2015

	2011	2012	2013	2014	2015
All articles on the development of science in Ukraine	1300	1135	1535	1283	1681
including:					
articles on the operation of the NAS of Ukraine	135	100	125	82	154
of them: articles on analytical matters	75	30	58	58	73
including:					
constructive discussions	50	23	50	44	55
Others	25	7	8	14	18
<i>(% of total number of articles on the development of science)</i>					
articles on the operation of NAS of Ukraine	10.4	8.8	11.4	6.3	9.2
of them: articles on analytical matters	5.8	2.6	5.8	2.6	4.3
including:					
constructive discussions	3.9	2.0	3.4	3.4	3.2
Others	1.9	0.6	0.5	1.1	1.1

* Monitoring covers publications of 27 leading newspapers published in Ukraine including several Russian editions. Methodology of monitoring was published in: Golovashchenko L. R. and Khomenko L. O. (2005). The bibliographic analysis and monitoring of mapping the problems of science and the NAS of Ukraine in mass media. *Science and Science of Science*. – 2005. – No 4 (Annex). – P.113 – 121.

Mass media publications on the development of science in Ukraine by thematic heading: 2010 – 2015

	2010	2011	2012	2013	2014	2015	2010- 2015 total
All publications	546	475	545	557	1195	1386	4704
headings:							
Problems of science development in Ukraine							
Operation and capacity building of science in Ukraine including its possible reorganization	178	135	100	125	258	154	960
The role of science in addressing environmental issues especially in relation to Chernobyl theme	58	33	58	56	165	144	514
Future development of national and global science; new areas of scientific research; new discoveries	63	69	91	61	78	80	442
Anniversaries of scientists and scientific events, awards and prizes for scientific work	26	23	36	28	64	163	340
Interactions of science and society, the role of the state in the development of scientific research issues of practical cooperation of NAS of Ukraine with the government	4	18	13	11	17	58	121
The role of science in improving medical technologies and tools	27	15	25	25	29	59	180

continued

	2010	2011	2012	2013	2014	2015	2010- 2015 total
Interactions of science and education; problems of status and development of university science	53	57	69	84	155	21	439
Our own innovation	29	25	31	35	50	42	212
Conferences symposia	40	27	37	38	42	45	229
The role of science in economic development	19	17	18	26	43	58	181
The role of science in improving mining energy and environmental technologies	21	23	27	17	141	81	310
International scientific cooperation	13	15	21	27	44	27	147
Contributions of Ukrainian science and technology in space exploration	8	13	11	12	54	77	175
Regulatory acts on research institutions including the NAS Ukraine	—	—	—	—	37	76	113
Operation of technoparks	2	—	—	—	1	-	3
Information about Press Club of the NAS of Ukraine	—	—	—	—	—	—	—
Science, politics and ideology	5	5	8	12	17	309	356

VIII. INTERNATIONAL COMPARISONS OF R&D

VIII.1. R&D personnel

Researchers performing R&D, by region, association, country: 2007 and 2013

	Researchers, <i>thousand persons</i>		% of total		Researchers per 1,000,000 populations	
	2007	2013	2007	2013	2007	2013
The World	6400.9	7758.9	100.0	100.0	959	1083
North America	1284.9	1433.3	20.1	18.5	3 814	4034
Latin America	222.6	280.0	3.5	3.6	416	488
Europe	2125.6	2408.1	33.2	31.0	2635	2941
Asia	2498.1	3318.0	39.0	42.8	630	785
Africa	150.1	187.5	2.3	2.4	157	169
OECD	3899.2	4481.6	60.9	57.8	3205	3542
G20	5605.1	6742.1	87.6	86.9	1276	1460
European Union	1458.1	1726.3	22.8	22.2	2911	3388
India	154.8	192.8	2.6	2.7	137	159
China	...	1484.0	...	19.1	...	1071
Republic of Korea	221.9	321.8	3.5	4.1	4665	6533
Russia	469.1	440.6	7.3	5.7	3265	3085
USA	1133.6	1265.1	17.7	16.7	3731	3984
Japan	684.3	660.5	10.7	8.5	5377	5194

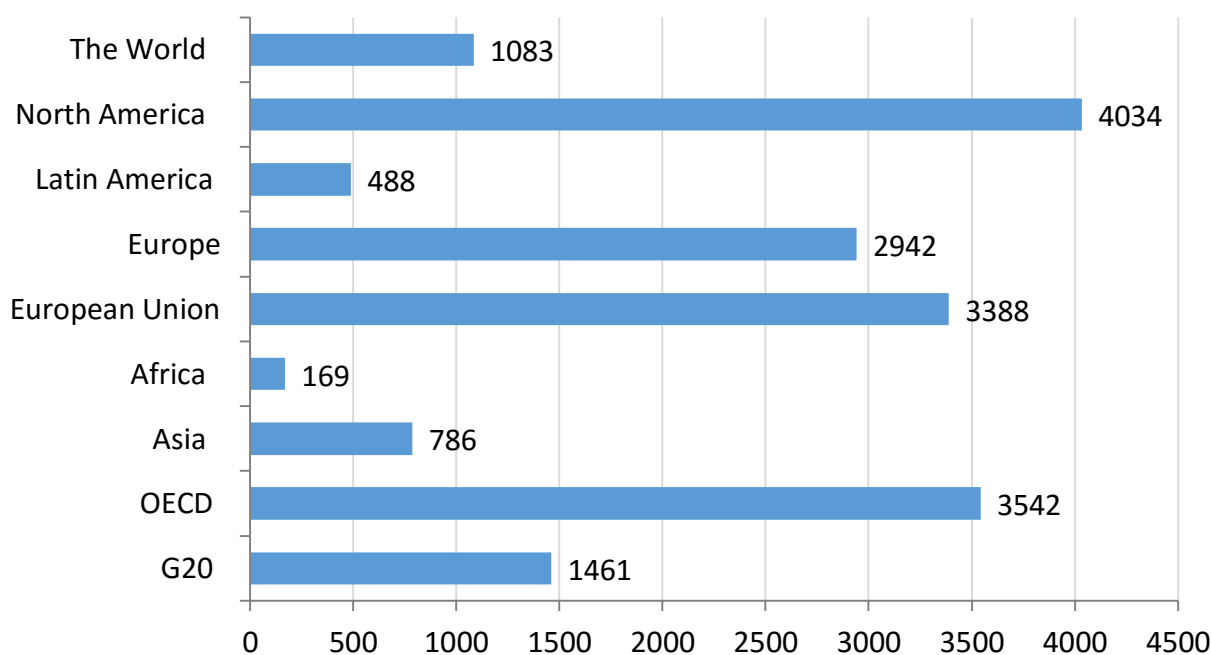
Source: UNESCO Science Report: towards 2030 – Executive Summary –
URL: https://en.unesco.org/unesco_science_report

Researchers per 1,000,000 populations, by region and association: 2007 and 2013*

	Researchers per 1,000,000 populations			
	2007	2009	2011	2013
The World	959	1009	1050	1083
North America	3815	4081	4052	4034
Latin America	416	448	483	488
Europe	2635	2717	2816	2942
Africa	157	152	164	169
Asia	631	684	741	786
OECD	3206	3346	3434	3542
G20	1277	1353	1408	1461
European Union	2912	3082	3202	3388

Source: UNESCO Science Report: towards 2030 – Executive Summary –
URL: https://en.unesco.org/unesco_science_report

Researchers per 1,000,000 populations, by region and association: 2013



R&D personnel in EU and Ukraine: 2005-2013*

	2005	2010	2011	2012	2013
Ukraine	105512	89564	84969	82032	77853
EU members:					
Austria	47625	59923	61171	64876	65800
Belgium	53517	60075	62895	64732	66406
Bulgaria	15853	16574	16986	16758	17545
Croatia	9270	10859	10622	10368	10448
Cyprus	1157	1302	1297	1241	1245
Czech Republic	43370	52290	55697	60329	61976
Denmark	43499	56623	57585	58657	58530
Estonia	4362	5277	5724	5855	5858
Finland	57471	55897	54526	54047	52972
France	349681	397756	402492	412003	420588
Germany	475278	548723	575099	591261	603861
Greece	33603	...	36913	37361	42030
Hungary	23239	31480	33960	35732	38163
Ireland	16690	19722	21560	22501	...
Italy	175248	225632	228094	240179	252648
Latvia	5483	5563	5432	5593	5396
Lithuania	11002	12315	11173	10416	11080
Luxemburg	4392	4988	5351	4880	5003
Malta	825	1121	1383	1458	1473
Netherlands	93599	100544	117436	122206	123192
Poland	76761	81843	85219	90716	93751
Portugal	25728	47616	49599	47554	47931
Romania	33222	26171	29749	31135	...
Slovakia	14404	18188	18112	18127	17166
Slovenia	8994	12940	15269	14974	15229
Spain	174773	222022	215079	208831	203302
Sweden	77704	77418	77950	81272	80957
United Kingdom	324917	350766	356258	356484	362061

* In full-time equivalent.

Source: data of Statistics Division of the UN Economic Commission for Europe. –
URL: <http://ec.europa.eu/eurostat/publications/recently-published>

**R&D personnel in total employment in EU and Ukraine:
2005-2013*, %**

	2005	2010	2011	2012	2013
Ukraine	0.51	0.44	0.42	0.40	0.33
EU members:					
Austria	1.23	1.46	1.46	1.53	1.54
Belgium	1.26	1.34	1.38	1.42	1.46
Bulgaria	0.53	0.54	0.57	0.57	0.60
Croatia	0.59	0.70	0.71	0.72	0.69
Cyprus	0.33	0.33	0.33	0.32	0.34
Czech Republic	0.88	1.03	1.10	1.19	1.22
Denmark	1.58	2.05	2.09	2.13	2.13
Estonia	0.71	0.96	0.98	0.99	0.97
Finland	2.38	2.25	2.17	2.13	2.12
France	1.33	1.48	1.49	1.52	1.56
Germany	1.21	1.34	1.38	1.41	1.43
Greece	0.72	...	0.84	0.93	1.08
Hungary	0.56	0.78	0.84	0.88	0.93
Ireland	0.85	1.05	1.17	1.22	...
Italy	0.72	0.91	0.92	0.97	1.04
Latvia	0.56	0.65	0.63	0.64	0.60
Lithuania	0.77	0.99	0.89	0.82	0.86
Luxemburg	1.43	1.39	1.45	1.29	1.29
Malta	0.55	0.69	0.83	0.86	0.84
Netherlands	1.12	1.15	1.33	1.39	1.42
Poland	0.55	0.53	0.55	0.59	0.61
Portugal	0.51	0.98	1.04	1.04	1.07
Romania	0.36	0.29	0.33	0.36	...
Slovakia	0.69	0.84	0.82	0.82	0.78
Slovenia	0.97	1.35	1.61	1.60	1.65
Spain	0.88	1.13	1.12	1.13	1.13
Sweden	1.79	1.72	1.70	1.76	1.73
United Kingdom	1.13	1.21	1.22	1.21	1.21

* In full-time equivalent.

Source: Data of Eurostat. – URL: <http://ec.europa.eu/eurostat/publications/recently-published>

Researchers in EU and Ukraine: 2005-2013

	2005	2010	2011	2012	2013
Ukraine	85246	73413	70378	68599	65641
EU members:					
Austria	28470	36581	37114	39362	39923
Belgium	33146	40832	42686	43813	44649
Bulgaria	10053	10979	11902	11300	12275
Croatia	5727	7104	6847	6688	6529
Cyprus	682	905	915	877	885
Czech Republic	24169	29228	30682	33217	34271
Denmark	28179	37435	39180	40946	40858
Estonia	3331	4077	4511	4582	4407
Finland	39582	41425	40003	40468	39196
France	202507	243533	249247	259066	265177
Germany	272148	327996	338689	352419	360365
Greece	19593	...	24674	24800	29055
Hungary	15878	21342	23019	23837	25038
Ireland	11587	14176	15172	15732	...
Italy	82489	103424	106151	110695	117973
Latvia	3282	3896	3947	3904	3625
Lithuania	7637	8599	8390	8023	8557
Luxemburg	2227	2636	3031	2491	2615
Malta	479	599	759	848	878
Netherlands	47854	53703	61335	73252	76815
Poland	62162	64511	64133	67001	71472
Portugal	21126	41523	44056	42498	43321
Romania	22958	19780	16080	18016	...
Slovakia	10921	15183	15326	15271	14727
Slovenia	5253	7703	8774	8884	8707
Spain	109720	134653	130235	126778	123225
Sweden	55090	49312	48589	49280	62294
United Kingdom	248599	256585	251358	256156	259347

Source: Data of Eurostat – URL: <http://ec.europa.eu/eurostat/publications/recently-published>

**R&D personnel and researchers per 1,000 employment
(15–70 years old): 2010-2013**

	R&D personnel per 1,000 employment				Researchers per 1,000 employment			
	2010	2011	2012	2013	2010	2011	2012	2013
Ukraine	6.0	5.7	5.5	5.2	3.8	3.7	3.6	3.4
EU members:	<i>17.4</i>	<i>18.3</i>	<i>11.2</i>	<i>11.6</i>
Bulgaria	6.8	7.0	7.4	...	4.6	5.0	5.2	...
Czech Republic	15.9	16.9	17.9	...	8.9	9.4	9.7	...
Estonia	17.7	16.8	19.4	...	13.2	12.7	12.4	...
Germany	...	21.5	13.5
Hungary	14.3	14.5	14.6	...	9.4	9.7	9.5	...
Latvia	10.8	11.7	12.3	...	7.7	8.6	9.1	...
Lithuania	15.2	17.9	17.3	...	11.3	13.8	13.9	...
Poland	8.4	8.6	9.0	...	6.5	6.5	6.6	...
Romania	4.2	4.6	4.6	...	3.3	2.8	3.0	...
Slovakia	12.1	12.4	12.4	11.9	10.4	10.7	10.8	10.5
Spain	19.2	19.2	19.4	...	12.0	12.0	12.2	...

* Researchers, technicians and supporting staff.

**Researchers, technicians and supporting staff in total
R&D personnel: 2010-2013, %**

	Researchers			Technicians			Supporting staff		
	2010	2012	2013	2010	2012	2013	2010	2012	2013
Ukraine	63.5	64.8	65.3	14.0	12.7	12.2	22.5	22.5	22.5
EU members:	<i>64.0</i>
Bulgaria	67.9	70.2	...	21.5	10.6
Czech Republic	55.7	54.5	...	30.4	30.7	...	13.9	14.9	...
Estonia	74.4	74.8	...	17.8	17.9	...	7.9	7.3	...
Germany	...	62.5*	21.7*	15.8*	...
Hungary	66.1	65.5	...	17.3	18.1	...	16.6	16.4	...
Latvia	71.0	74.1	...	17.6	11.3
Lithuania	74.3	80.0	...	12.2	13.5
Poland	77.8	74.2	...	13.2	16.6	...	9.1	9.2	...
Romania	78.6	65.2	...	8.7	13.6	...	12.7	21.2	...
Slovakia	85.5	86.8	87.8	10.1	9.5	8.7	4.4	3.7	3.4
Spain	62.2	62.9	...	23.9	24.2	...	13.9	12.9	...

* Data for 2011.

VIII.2. R&D funding in the world

Domestic R&D expenditure in purchasing power parity (PPP) USD* by region and association: 2007–2013

	R&D expenditure, in <i>USD billion PPP</i>				% in global total			
	2007	2009	2011	2013	2007	2009	2011	2013
The World	1132.3	1225.5	1340.2	1477.7	100.0	100.0	100.0	100.0
North America	382.7	396.5	404.8	427.0	33.8	32.4	30.2	28.9
Latin America	35.5	39.8	45.6	50.1	3.1	3.3	3.4	3.4
Europe	297.1	311.6	327.5	335.7	26.2	25.4	24.4	22.7
Africa	12.9	15.5	17.1	19.9	1.1	1.3	1.3	1.3
Asia	384.9	440.7	524.8	622.9	34.0	36.0	39.2	42.2
OECD	860.8	882.2	926.1	975.6	76.0	72.0	69.1	66.0
G20	1042.6	1127.0	1231.1	1358.5	92.1	92.0	91.9	91.9
European Union	251.3	262.8	278.0	282.0	22.2	21.4	20.7	19.1

* Purchasing power parity (PPP) - the amount of currency needed to buy a standard set of goods and services, which can be bought in one currency unit of the base country (or one unit of common currency of country group). In its simplest form, the PPP is the ratio of prices. PPP is calculated not only on individual products, but also on product groups and for each of the different levels of aggregation costs down to the level of GDP.

Source: UNESCO Science Report: towards 2030 – Executive Summary –
URL: [https:// en.unesco.org /unesco_science_report](https://en.unesco.org/unesco_science_report)

Domestic R&D expenditure by region and association: 2007 and 2013

	Domestic R&D expenditure in <i>GDP, %</i>		Domestic R&D expenditure per capita, in <i>USD PPP</i>		Domestic R&D expenditure per researcher, in <i>USD thousand PPP</i>	
	2007	2013	2007	2013	2007	2013
The World	1.57	1.70	169.7	206.3	176.9	190.4
North America	2.57	2.71	1136.2	1201.8	297.9	297.9
Latin America	0.59	0.69	66.3	87.2	159.5	178.9
Europe	1.58	1.75	368.3	410.1	139.8	139.4
Africa	0.36	0.45	13.5	17.9	86.2	106.1
Asia	1.39	1.62	97.2	147.5	154.1	187.7
OECD	2.23	2.42	707.7	771.2	220.8	217.7
G20	1.80	1.97	237.5	294.3	186.0	201.5
European Union	1.71	1.92	501.9	553.5	172.4	163.4

Domestic R&D expenditure in selected countries: 2007-2013

	R&D expenditure, in <i>USD billion PPP</i>				% in global total			
	2007	2009	2011	2013	2007	2009	2011	2013
Argentina	2.5	3.1	4.0	4.6	0.2	0.3	0.3	0.3
Brazil	23.9	26.1	30.2	31.3	2.1	2.1	2.3	2.2
Canada	23.3	23.0	22.7	21.5	2.1	1.9	1.7	1.5
China	116.0	169.4	220.6	290.1	10.2	13.8	16.5	19.6
Egypt	1.6	3.0	4.0	5.3	0.1	0.2	0.3	0.4
India	31.1	36.2	42.8	...	2.7	3.0	3.2	...
Israel	8.6	8.4	9.1	10.0	0.8	0.7	0.8	0.7
Japan	139.9	126.9	133.2	141.4	12.4	10.4	9.9	9.6
Malaysia	2.7	4.8	5.7	6.4	0.3	0.4	0.4	0.5
Mexico	5.3	6.0	6.4	7.9	0.5	0.5	0.5	0.5
Republic of Korea	38.8	44.1	55.4	64.7	3.4	3.6	4.1	4.4
Russia	22.2	24.2	23.0	24.8	2.0	2.0	1.7	1.7
Turkey	6.3	7.1	8.5	10.0	0.6	0.6	0.6	0.7
USA	359.4	373.5	382.1	396.7	31.7	30.5	28.5	28.1

Source: UNESCO Science Report: towards 2030 – Executive Summary –
URL: https://en.unesco.org/unesco_science_report

Domestic R&D expenditure in selected countries: 2007 and 2013

	Domestic R&D expenditure in GDP, %		Domestic R&D expenditure per capita, in <i>USD PPP</i>		Domestic R&D expenditure per researcher, in <i>USD thousand PPP</i>	
	2007	2013	2007	2013	2007	2013
Argentina	0.40	0.58	64.5	110.7	65.6	88.2
Brazil	1.11	1.15	126.0	157.5	205.8	...
Canada	1.92	1.63	707.5	612.0	154.2	141.9
China	1.40	2.08	87.0	209.3	-	195.4
Egypt	0.26	0.68	21.5	64.8	32.4	111.6
India	0.79	...	26.8	...	171.4	...
Israel	4.48	4.21	1238.9	1290.5	...	152.9
Japan	3.46	3.47	1099.5	1112.2	204.5	214.1
Malaysia	0.61	1.13	101.1	219.9	274.6	123.5
Mexico	0.37	0.50	46.6	65.0	139.3	...
Republic of Korea	3.00	4.15	815.6	1312.7	174.8	200.9
Russia	1.12	1.12	154.7	173.5	47.4	56.3
Turkey	0.72	0.95	90.9	133.5	127.1	112.3
USA	2.63	2.81	1183.0	1249.3	317.0	313.6

Source: UNESCO Science Report: towards 2030 – Executive Summary –
URL: https://en.unesco.org/unesco_science_repor

Expenditure on basic research as percent of GDP in selected countries: 2012, %

Country	Expenditure on basic research in GDP
China	0.10
Ukraine (2014)	0.18
Hungary	0.21
Poland	0.23
Spain	0.26
Slovakia (2013)	0.31
Slovenia	0.30
Italy	0.32
Estonia	0.35
Singapore	0.40

continued

Country	Expenditure on basic research in GDP
Japan (2013)	0.44
Israel (2013)	0.46
Australia (2008)	0.45
USA	0.46
Austria (2011)	0.51
Denmark	0.52
Czech Republic	0.54
Netherlands	0.55
Iceland (2011)	0.62
France	0.64
Republic of Korea	0.74
Switzerland	0.90

Source: OECD. Main Science and Technology Indicators, Vol. – 2014, – Issue 2, March 12, 2015. – URL: http://www.oecd-ilibrary.org/science-and-technology/main-science-and-technology-indicators_2304277x

Budgetary appropriations on R&D in selected countries: 1991, 2000, 2014

	1991	2000	2014	Ratio 2014 to 2000
	USD million PPP			
Brazil		6761.5	14440.1	2.1
Canada	3728.8	4589.9	7736.3	1.7
China	...	10904.0	71000.5	6.5
France	13855.3	14747.5	17872.4	1.2
Germany	15667.7	16817.0	32666.2	1.9
Italy	7613.1	9374.8	11084.6	1.2
Japan	10767.4	21193.4	34685.2	1.6
Republic of Korea	...	5020.2	19933.5	4.0
United Kingdom	8145.5	10520.2	13744.3	1.3
USA	65897.0	83612.5	135665.0	1.6

Source: Compiled according to - URL: http://www.oecd-ilibrary.org/science-and-technology/main-science-and-technology-indicators_2304277x.

Domestic R&D expenditure in EU countries: 2005-2013

	2005	2010	2012	2013	Ratio 2013/ 2005
	<i>USD million PPP</i>				
EU members:	230237.9	308606.8	338648.6	336367.4	1.46
Austria	6802.6	9585.9	10910.2	11282.2	1.66
Belgium	6171.1	8766.0	10334.0	10603.4	1.72
Bulgaria	347.4	637.1	749.1
Croatia	590.4	624.1	672.4
Cyprus	74.8	127.3	125.6
Czech Republic	2664.5	3796.4	5388.0	5812.9	2.18
Denmark	4418.9	6811.8	7362.8	7513.4	1.70
Estonia	207.2	444.3	706.2	592.2	2.86
Finland	5601.2	7653.1	7443.9	7175.6	1.28
France	39235.7	50730.0	54541.0	55218.1	1.41
Germany	64298.8	87822.0	100699.1	100991.4	1.57
Greece	1615.5	1927.3	1945.4	2273.9	1.41
Hungary	1615.7	2472.6	2842.7	3249.6	2.01
Ireland	2009.4	3166.4	3271.5
Italy	17999.0	25151.5	26849.6	26520.4	1.47
Latvia	167.6	223.1	292.2	...	1.74
Lithuania	364.6	487.1	656.1	...	1.80
Luxemburg	495.3	641.4	563.8	571.5	1.15
Malta	48.0	75.3	102.3
Netherlands	10904.4	12822.2	15071.0	15377.4	1.41
Poland	2982.4	5722.6	7827.4	7918.1	2.65
Portugal	1755.2	4362.8	3911.6	3942.7	2.25
Romania	831.8	1516.6	1738.4	1452.9	1.75
Slovakia	440.1	816.1	1127.5	1190.6	2.71
Slovenia	674.9	1162.9	1508.9	1537.8	2.28
Spain	13330.8	20336.2	19452.9	19133.2	1.44
Sweden	10509.9	12585.4	13703.2	14151.3	1.35
United Kingdom	34080.7	38139.3	38851.8	39858.8	1.17

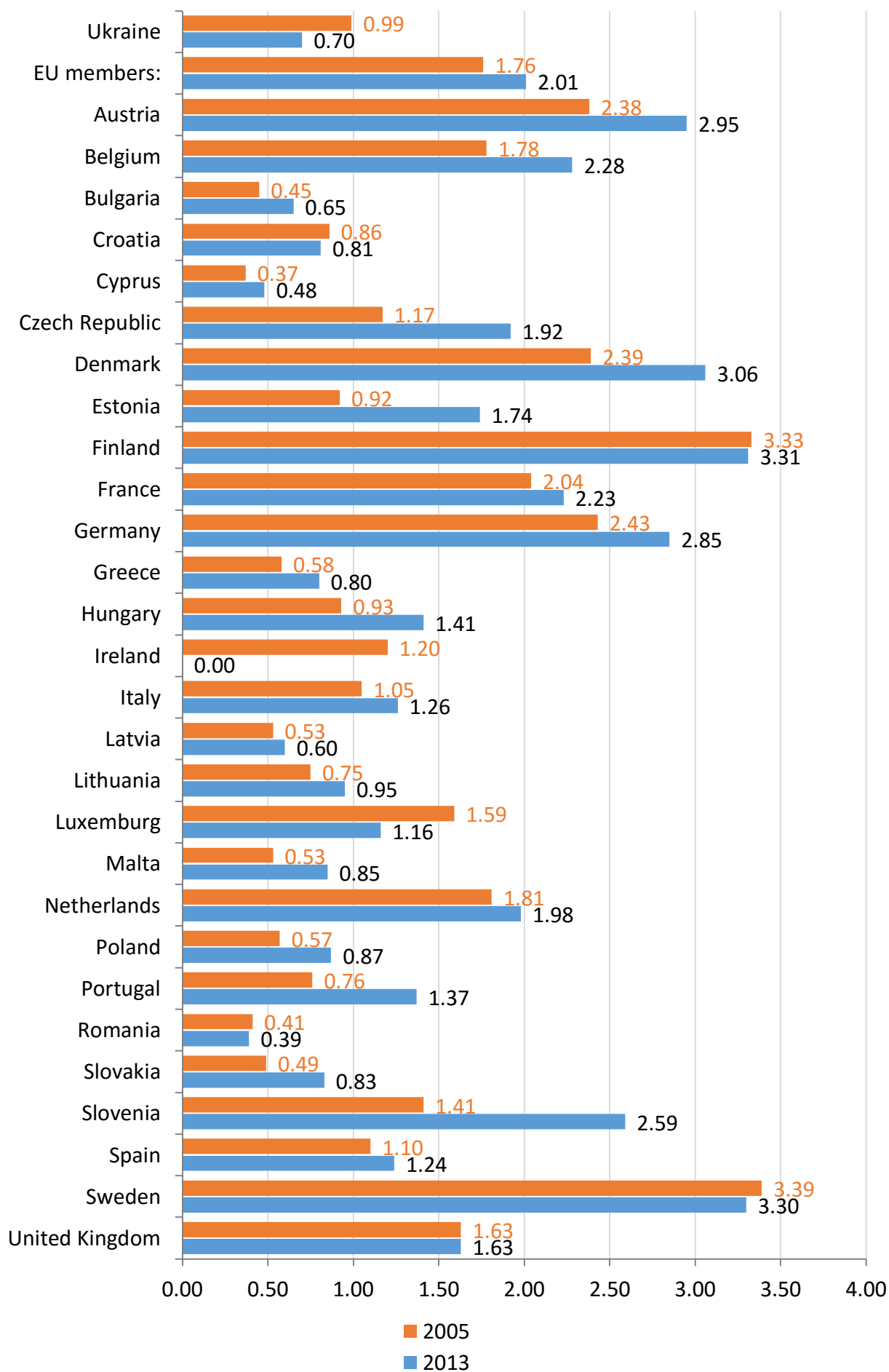
Source: Data of Eurostat. – URL: <http://ec.europa.eu/eurostat/publications/recently-published>

**Domestic R&D expenditure in GDP in EU countries and Ukraine:
2005-2013, %**

	2005	2010	2011	2012	2013
Ukraine*	0.99	0.83	0.74	0.75	0.70
EU members:	1.76	1.93	1.97	2.01	2.01
Austria	2.38	2.74	2.68	2.88	2.95
Belgium	1.78	2.05	2.15	2.24	2.28
Bulgaria	0.45	0.59	0.55	0.62	0.65
Croatia	0.86	0.74	0.75	0.75	0.81
Cyprus	0.37	0.45	0.46	0.43	0.48
Czech Republic	1.17	1.34	1.56	1.79	1.92
Denmark	2.39	2.94	2.97	3.02	3.06
Estonia	0.92	1.58	2.34	2.16	1.74
Finland	3.33	3.73	3.64	3.42	3.31
France	2.04	2.18	2.19	2.23	2.23
Germany	2.43	2.72	2.80	2.88	2.85
Greece	0.58	0.60	0.67	0.69	0.80
Hungary	0.93	1.15	1.20	1.27	1.41
Ireland	1.20	1.62	1.53	1.58	...
Italy	1.05	1.22	1.21	1.27	1.26
Latvia	0.53	0.60	0.70	0.66	0.60
Lithuania	0.75	0.78	0.90	0.90	0.95
Luxemburg	1.59	1.50	1.41	1.16	1.16
Malta	0.53	0.64	0.70	0.86	0.85
Poland	0.57	0.72	0.75	0.89	0.87
Portugal	0.76	1.53	1.46	1.38	1.37
Romania	0.41	0.45	0.49	0.48	0.39
Slovakia	0.49	0.62	0.67	0.81	0.83
Slovenia	1.41	2.06	2.43	2.58	2.59
Spain	1.10	1.35	1.32	1.27	1.24
Sweden	3.39	3.22	3.22	3.28	3.30
Netherlands	1.81	1.72	1.90	1.95	1.98
United Kingdom	1.63	1.69	1.69	1.63	1.63

* 0.66% in 2014.

Source: Data of Eurostat. – URL: <http://ec.europa.eu/eurostat/publications/recently-published>.



Domestic R&D expenditure in EU countries
by sector of performance: 2013*,
USD million PPP

	Total	including			
		Government sector	Business enterprise sector	Higher education sector	Private non-profit sector
EU members:					
Austria	11282.2	579.7	7760.4	2886.6	55.5
Belgium	10603.4	932.7	7326.6	2298.8	45.4
Bulgaria	749.1	225.0	453.3	60.2	10.6
Croatia	672.4	184.8	308.2	178.4	...
Cyprus	125.6	20.9	17.4	70.5	16.7
Czech Republic	5812.9	1064.5	3145.7	1582.7	20.0
Denmark	7513.4	179.8	4916.2	2387.2	30.2
Estonia	592.2	52.9	282.6	250.5	6.2
Finland	7175.6	640.3	4940.8	1543.8	50.7
France	55218.1	7259.5	35756.4	11457.3	745.0
Germany	100991.4	15243.3	67569.5	18178.6	...
Greece	2273.9	636.3	758.2	851.1	28.3
Hungary	3249.6	484.0	2256.2	467.7	...
Ireland	3271.5	158.6	2356.5	756.4	...
Italy	26520.4	3957.3	14316.5	7481.9	764.8
Latvia	292.2	79.2	66.0	146.9	...
Lithuania	656.1	129.1	174.5	352.6	...
Luxemburg	571.5	133.2	350.8	87.5	...
Malta	102.3	3.8	61.4	37.1	...
Netherlands	15377.4	1881.1	8561.3	4935.0	...
Poland	7918.1	2124.4	3453.6	2316.8	23.3
Portugal	3942.7	228.4	1875.5	1492.0	346.8
Romania	1452.9	715.3	445.5	286.5	5.8
Slovakia	1190.6	243.9	550.8	394.1	1.8
Slovenia	1537.8	200.1	1176.9	160.3	0.6
Spain	19133.2	3582.7	10155.5	5363.3	31.7
Sweden	14151.3	521.2	9757.1	3841.2	31.8
United Kingdom	39858.8	2913.8	25713.6	10483.2	748.3

* For 2013 or the year for which data is available.

Source: Data of Eurostat – URL: <http://ec.europa.eu/eurostat/publications/recently-published>

Domestic R&D expenditure in EU countries and Ukraine
by sector of performance: 2013*, % of total

	Government sector	Business enterprise sector	Higher education sector	Private non- profit sector
Ukraine	38.6	55.2	6.2	...
EU members:	12.3	63.5	23.4	0.9
Austria	5.1	68.8	25.6	0.5
Belgium	8.8	69.1	21.7	0.4
Bulgaria	29.7	61.1	8.6	0.6
Croatia	25.5	50.1	24.4	...
Cyprus	14.4	15.4	57.3	12.9
Czech Republic	18.3	54.1	27.2	0.3
Denmark	2.4	65.4	31.8	0.4
Estonia	8.9	47.7	42.3	1.1
Finland	8.9	68.9	21.5	0.7
France	13.1	64.8	20.7	1.4
Germany	15.1	66.9	18.0	...
Greece	28.0	33.3	37.4	1.3
Hungary	14.9	69.4	14.4	...
Ireland	4.8	72.0	23.1	...
Italy	14.9	54.0	28.2	2.9
Latvia	28.9	28.2	42.9	...
Lithuania	19.7	26.6	53.7	...
Luxemburg	23.3	61.4	15.3	...
Malta	10.2	54.3	35.6	...
Netherlands	12.2	55.7	32.1	...
Poland	26.8	43.6	29.3	0.3
Portugal	5.8	47.6	37.8	8.8
Romania	49.2	30.7	19.7	0.4
Slovakia	20.5	46.3	33.1	0.1
Slovenia	13.0	76.5	10.4	0.0
Spain	18.7	53.1	28.0	0.2
Sweden	3.7	68.9	27.1	0.2
United Kingdom	7.3	64.5	26.3	1.9

* For 2013 or the year for which data is available.

Source: Data of Eurostat – URL: <http://ec.europa.eu/eurostat/publications/recently-published>

Domestic R&D expenditure in EU countries and Ukraine
by source of funds: 2013*, % of total

	Government	Business	Other domestic sources	From abroad
Ukraine	47.7	29.0	0.3	21.6
EU members:	32.8	55.0	2.5	9.7
Austria	36.8	47.4	0.4	15.4
Belgium	23.4	60.2	3.5	13.0
Bulgaria	31.6	19.5	0.6	48.3
Croatia	39.7	42.8	2.0	15.5
Cyprus	66.4	10.9	5.3	17.5
Czech Republic	34.7	37.6	0.5	27.2
Denmark	29.3	59.8	3.8	7.2
Estonia	47.2	42.1	0.4	10.3
Finland	26.0	60.8	1.6	11.5
France	35.0	55.4	2.0	7.6
Germany	29.8	65.2	0.3	4.4
Greece	52.3	30.3	3.5	14.0
Hungary	35.9	46.8	0.8	16.6
Ireland	27.3	50.3	1.0	21.4
Italy	42.5	44.3	3.7	9.5
Latvia	23.9	21.8	2.7	51.6
Lithuania	34.5	27.5	0.9	37.1
Luxemburg	30.5	47.8	1.3	20.4
Malta	33.9	44.3	1.5	20.3
Netherlands	33.3	51.1	3.4	12.2
Poland	47.2	37.3	2.3	13.1
Portugal	43.1	46.0	5.7	5.2
Romania	52.3	31.0	1.2	15.5
Slovakia	38.9	40.2	2.9	18.0
Slovenia	26.9	63.8	0.4	8.9
Spain	41.6	46.3	4.7	7.4
Sweden	28.2	61.0	4.0	6.8
United Kingdom	27.0	46.5	5.8	20.6

* For 2013 or the year for which data is available.

Source: Data of Eurostat – URL: <http://ec.europa.eu/eurostat/publications/recently-published>

VIII.3. R&D output

Global indicators of publication activity: 2008 and 2014

	Publications		2014 to 2008, %	% in global total		Publications per 1,000,000 inhabitants	
	2008	2014		2008	2014	2008	2014
The World	1029471	1270425	23.4	100.0	100.0	153	176
Europe	438450	498817	13.8	42.6	39.3	542	609
Asia	292230	501798	71.7	28.4	39.5	73	118
Africa	20786	33282	60.1	2.0	2.6	21	29
OECD	801151	899810	12.3	77.8	70.8	654	707
G20	949949	1189605	25.2	92.3	93.6	215	256
European Union	379154	432195	14.0	36.8	34.0	754	847
China	102368	256834	150.9	9.9	20.2	76	184
France	59304	65086	9.7	5.8	5.1	948	1007
Germany	79402	91631	15.4	7.7	7.2	952	1109
India	37228	53733	44.3	3.6	4.2	32	42
Japan	76244	73128	-4.1	7.4	5.8	599	576
Republic of Korea	33431	50258	50.3	3.2	4.0	698	1015
United Kingdom	77116	87948	14.0	7.5	6.9	1257	1385
USA	289769	321846	11.1	28.1	25.3	945	998

Source: Data of UNESCO Science Report: towards 2030 – Executive Summary – URL:
https://en.unesco.org/unesco_science_report

Publications and citations in scientific journals indexed in WEB of Science: 2010-2014*

(by Essential Science Indicators Thomson Reuters)

	Number of publications*	Number of citations**	Average citation per publication
EU members:			
Austria	65994	521672	7.90
Belgium	96824	730185	7.95
Bulgaria	11267	55094	4.89
Croatia	17704	81778	4.62
Cyprus	4474	27854	6.23
Czech Republic	51907	287242	5.53
Denmark	72674	638497	8.79
Estonia	7808	58579	7.50
Finland	56041	429418	7.66
France	339425	2463475	7.26
Germany	486406	3731215	7.67
Greece	53750	332545	6.19
Hungary	30833	185059	6.00
Ireland	36740	286529	7.80
Italy	290675	2011572	6.92
Latvia	2851	13248	4.65
Lithuania	9965	41342	4.15
Luxemburg	3895	22852	5.87
Malta	952	4136	4.34
Netherlands	177148	1595233	9.01
Poland	112211	454808	4.05
Portugal	58742	343120	5.84
Romania	36813	126246	3.43
Slovakia	15720	71448	4.55
Slovenia	18499	91009	4.92
Spain	258921	1682625	6.50
Sweden	114429	912568	7.97
United Kingdom***	540636	4462239	8.18

* Publications indexed in Web of Science database (articles reviews and reports at conferences) are included. Data is for 2010–2014.

** The number of citations indexed in Web of Science database for 2010–2014.

*** For United Kingdom the number of publications and citations consists of the figures for England, Scotland, Wales and Northern Ireland and the average number of citations per article is the average figure of these territories.

Source: URL: <http://ec.europa.eu/eurostat/publications/recently-published>.

Patents presented by USPTO* by origin: 2008, 2013

	Number of patents		2013 to 2008	% in global total	
	2008	2013		2008	2013
The World	157768	277832	1.8	100.0	100.0
North America	83097	145114	1.7	52.7	52.2
Europe	25780	48737	1.9	16.3	17.5
European Union	24121	45401	1.9	15.3	16.3
Asia	46773	83904	1.8	29.6	30.2
OECD	148658	257066	1.7	94.2	92.5
G20	148608	260904	1.8	94.2	93.9
Canada	3936	7761	2.0	2.5	2.8
China	1757	7568	4.3	1.1	2.7
France	3683	7287	2.0	2.3	2.6
Germany	9901	17586	1.8	6.3	6.3
India	848	3317	3.9	0.5	1.2
Israel	1337	3405	2.5	0.8	1.2
Japan	34198	52835	1.5	21.7	19.0
Republic of Korea	7677	14839	1.9	4.9	5.3
United Kingdom	3828	7476	2.0	2.4	2.7
USA	79968	139139	1.7	50.7	50.1

* USPTO (United States Patent and Trademark Office) – US Patent Office.

Source: Patent Office and Trademark United States (USPTO) PATSTAT. -

URL: <http://www.uspto.gov>

**Patent applications for inventions filled in EU countries
by national and foreign applicants: 2013***

	Total patent applications	including applicants	
		national	foreign
EU members:			
Austria	2406	2162	244
Belgium	876	715	161
Bulgaria	297	282	15
Croatia	253	230	23
Cyprus	3	2	1
Czech Republic	1081	984	97
Denmark	1534	1341	193
Estonia	42	25	17
Finland	1737	1596	141
France	16886	14690	2196
Germany	63167	47353	15814
Greece	717	698	19
Hungary	708	642	66
Ireland	390	333	57
Italy	9212	8307	905
Latvia	233	225	8
Lithuania	137	117	20
Luxemburg	169	113	56
Malta	17	13	4
Netherlands	2764	2315	449
Poland	4411	4237	174
Portugal	669	647	22
Romania	1046	993	53
Slovakia	210	184	26
Slovenia	481	470	11
Spain	3244	3026	218
Sweden	2495	2332	163
United Kingdom	22938	14972	7966

* Or in the nearest years for which data is available.

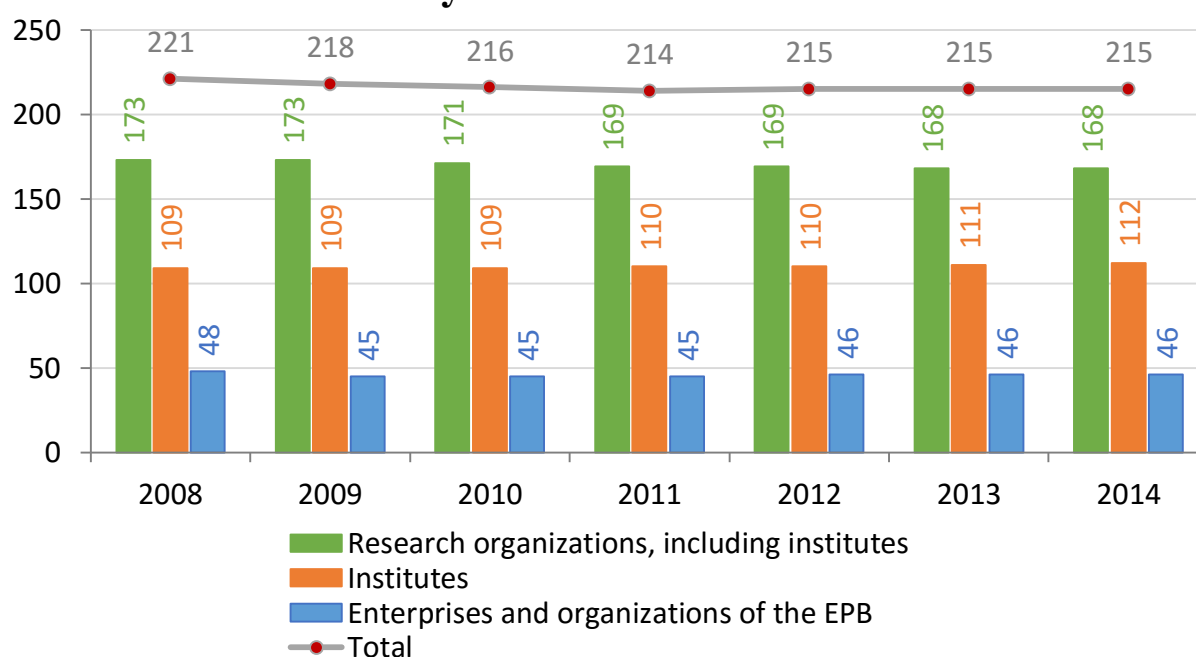
Source: Data of Eurostat. – URL: <http://ec.europa.eu/eurostat/publications/recently-published>

IX. SUPPLEMENTARY INTERNAL STATISTICS OF NATIONAL ACADEMY OF SCIENCES OF UKRAINE ⁵

IX.1. Institutional structure of National Academy of Sciences of Ukraine

Year	Total	including		
		Research organizations	Institutes	Enterprises and organizations of the experimental and production base (EPB)
1963	56	56	55	—
1988	173	88	66	85
2008	221	173	109	48
2009	218	173	109	45
2010	216	171	109	45
2011	214	169	110	45
2012	215	169	110	46
2013	215	168	111	46
2014	215	168	112	46

Dynamics of framework

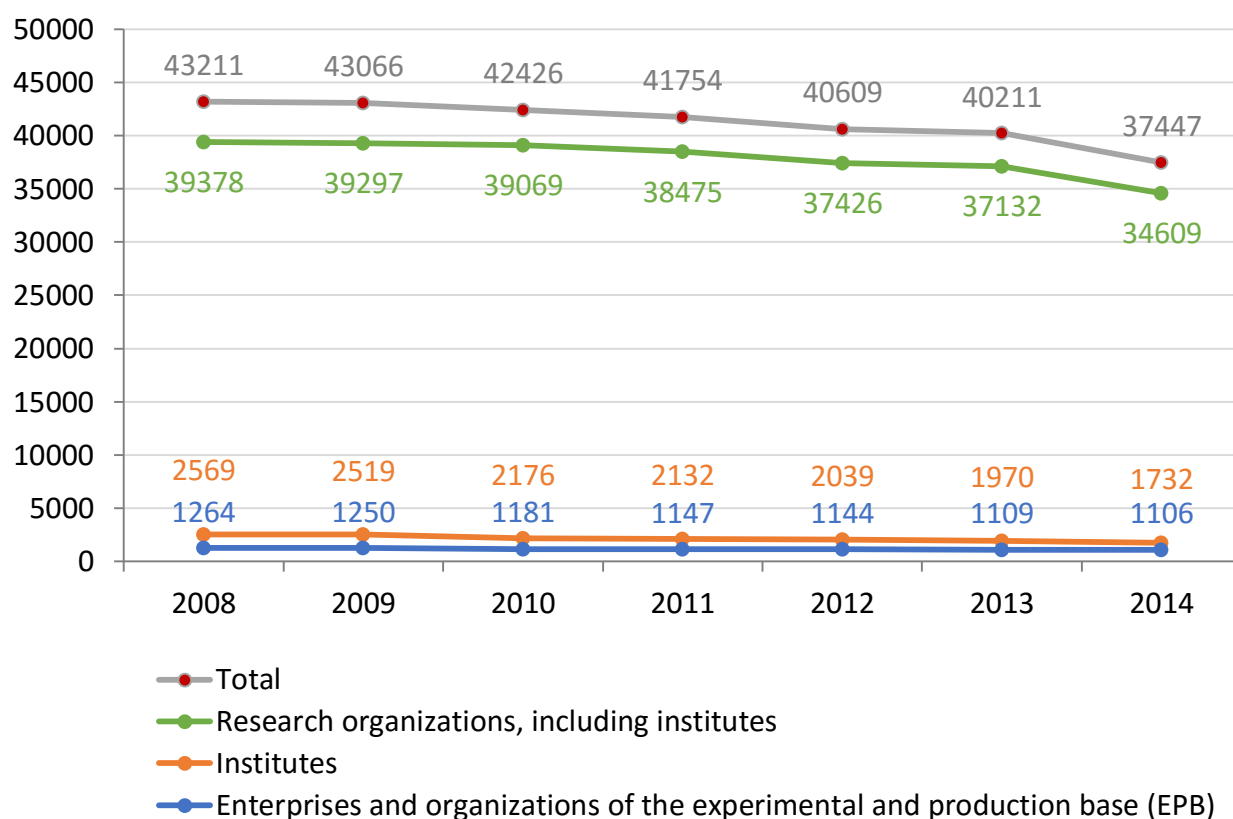


⁵ Used statistical indicators of annual reports on the activities of National Academy of Sciences of Ukraine for 2000-2014.

IX.2. Employees in National Academy of Sciences of Ukraine

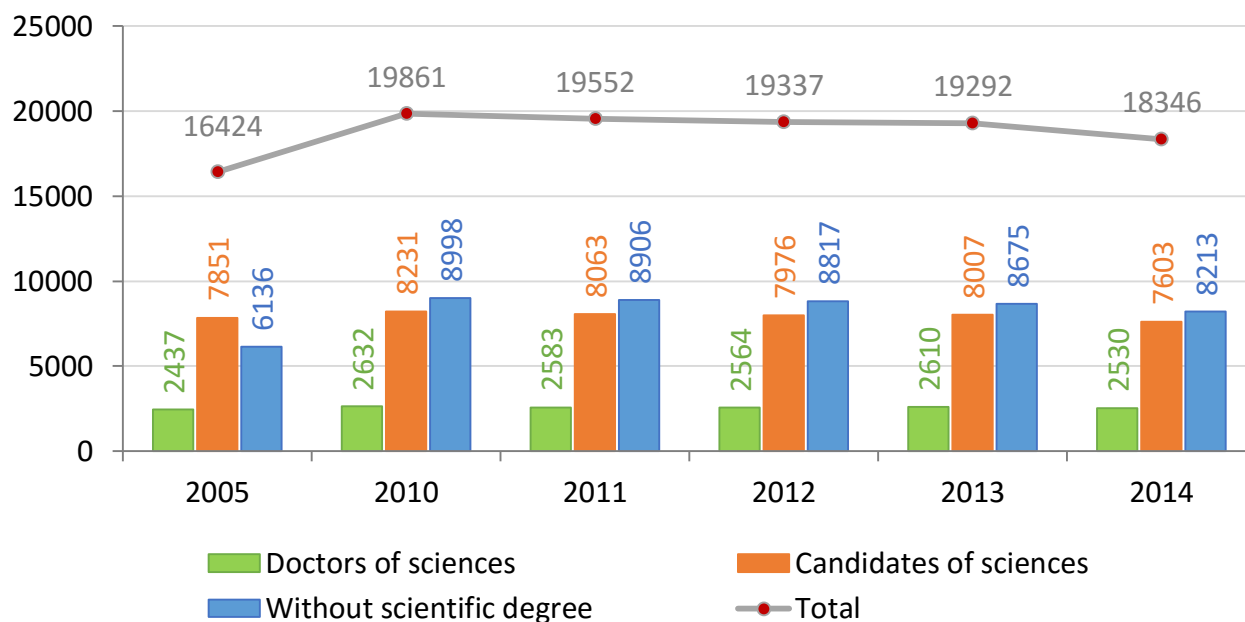
Dynamics of number of employees, *headcount*

Year	Total	including		
		Research organizations	Institutes	Enterprises and organizations of the experimental and production base (EPB)
2008	43211	39378	2569	1264
2009	43066	39297	2519	1250
2010	42426	39069	2176	1181
2011	41754	38475	2132	1147
2012	40609	37426	2039	1144
2013	40211	37132	1970	1109
2014	37447	34609	1732	1106

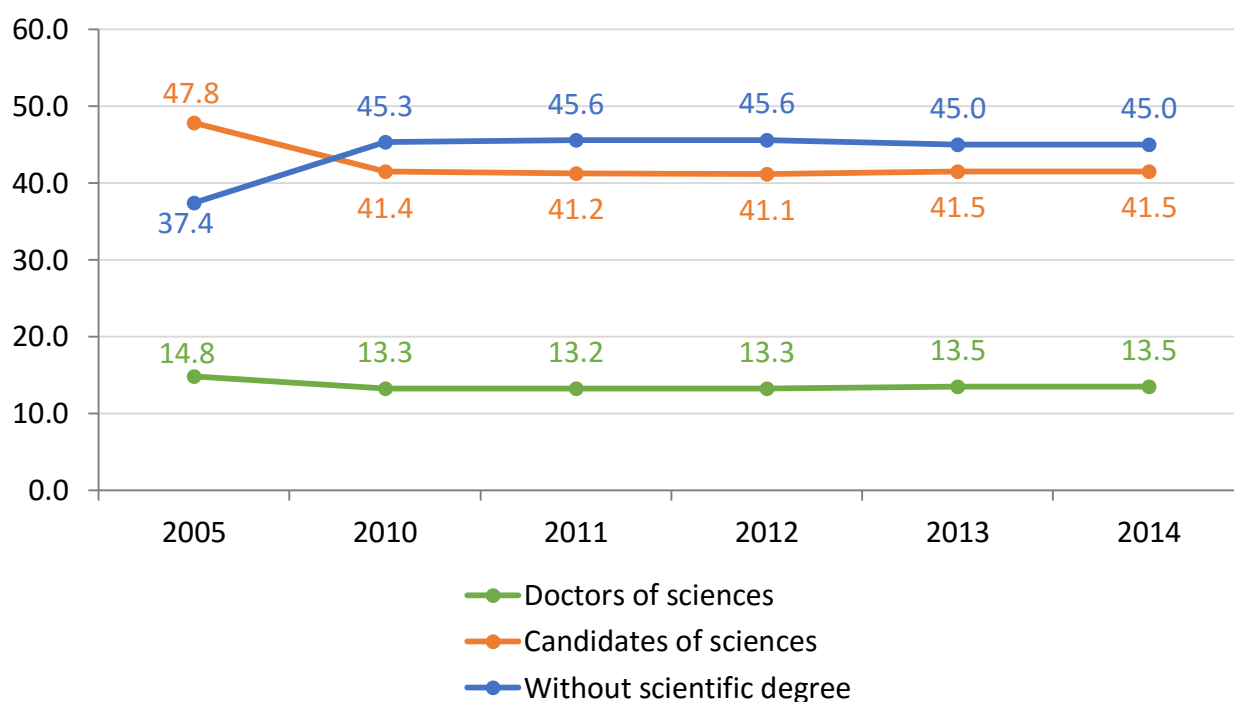


IX.3. Researchers in National Academy of Sciences of Ukraine by scientific degree

Number of researchers, *headcount*



Share of doctors of sciences, candidates of sciences and researchers without scientific degree in total number of researchers, %

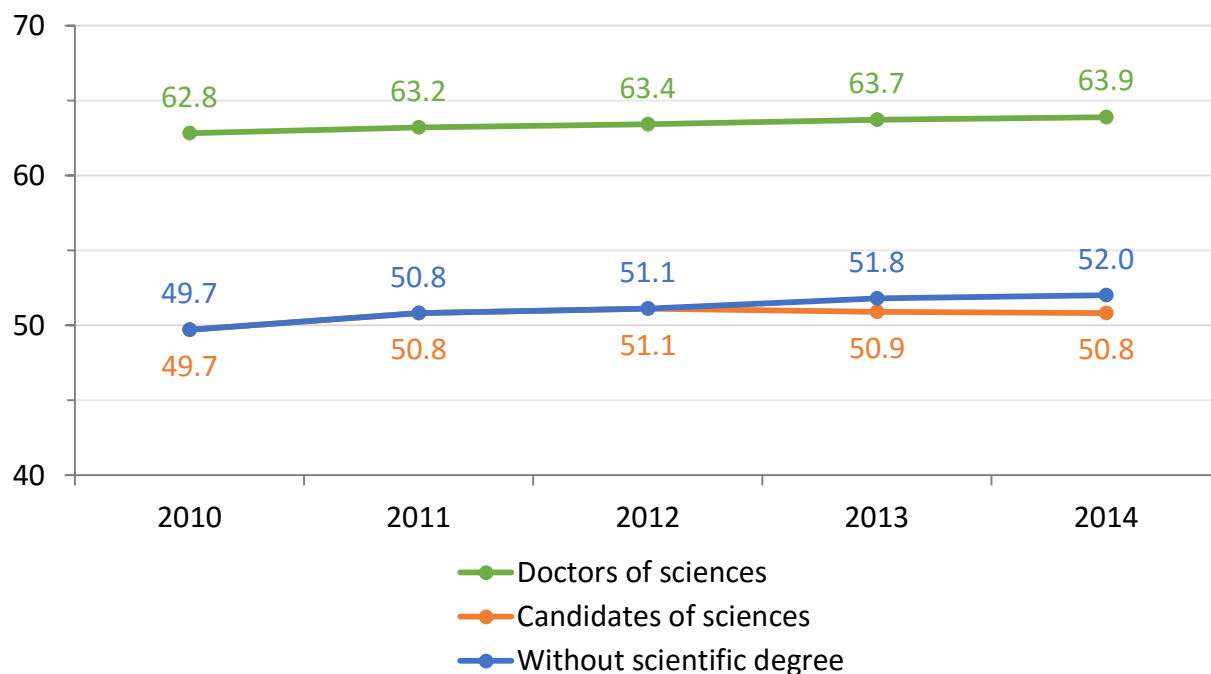


IX.4. Researchers in National Academy of Sciences of Ukraine by field of science and department

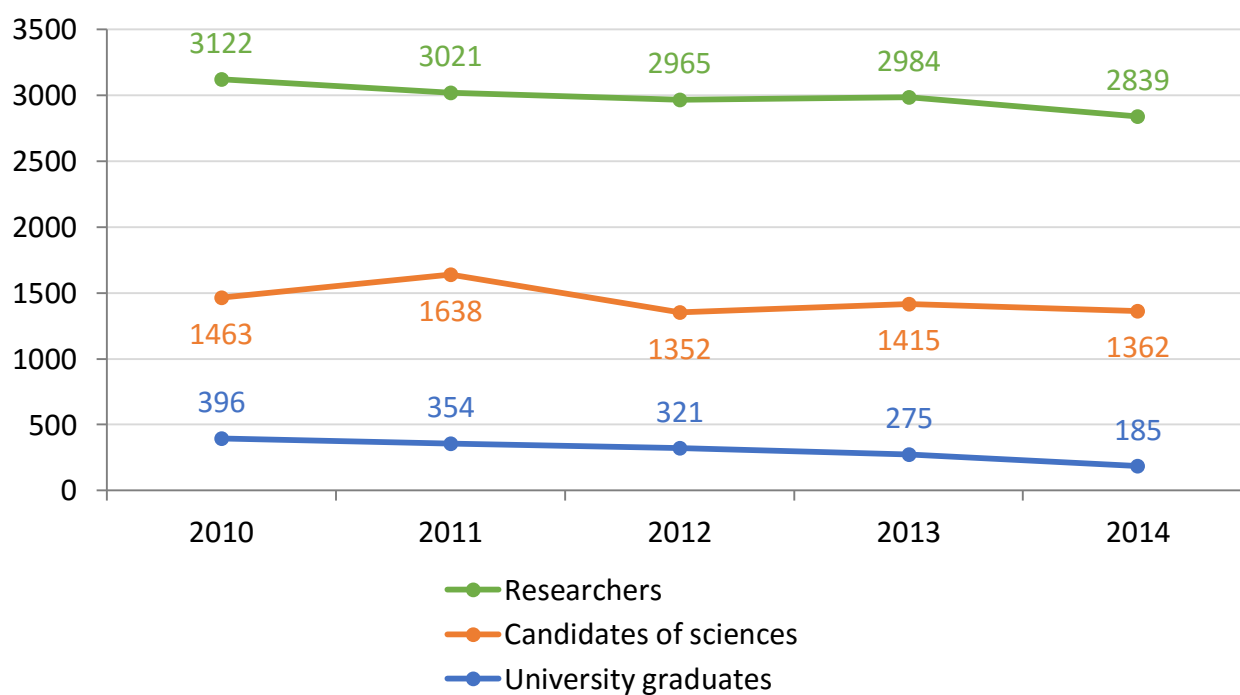
Departments	<i>headcount</i>					
	2013			2014		
	Total	including		Total	including	
		Doctors of sciences	Candidates of sciences		Doctors of sciences	Candidates of sciences
Mathematics	424	130	230	377	109	198
Informatics	1033	114	347	967	103	319
Mechanics	851	146	327	838	150	316
Physics and Astronomy	2656	492	1135	2608	486	1109
Geosciences	1215	155	463	899	113	359
Physical and Technical Problems of Materials Science	3046	305	950	2979	296	955
Physical and Technical Problems of Power Engineering	1142	136	418	1117	140	410
Nuclear Physics and Power Engineering	1570	162	529	1584	166	516
Chemistry	1399	160	723	1350	165	705
Biochemistry, Physiology and Molecular Biology	1206	172	619	1189	177	588
General Biology	1491	158	674	1220	139	550
Economics	748	129	356	684	117	330
History, Philosophy and Law	1414	203	704	1408	215	706
Literature, Language and Art Criticism	509	76	292	523	77	291

IX.5. Researchers in National Academy of Sciences of Ukraine by age

Average age of researchers by scientific degree, *years*



Researchers younger than 35 years old, *headcount*

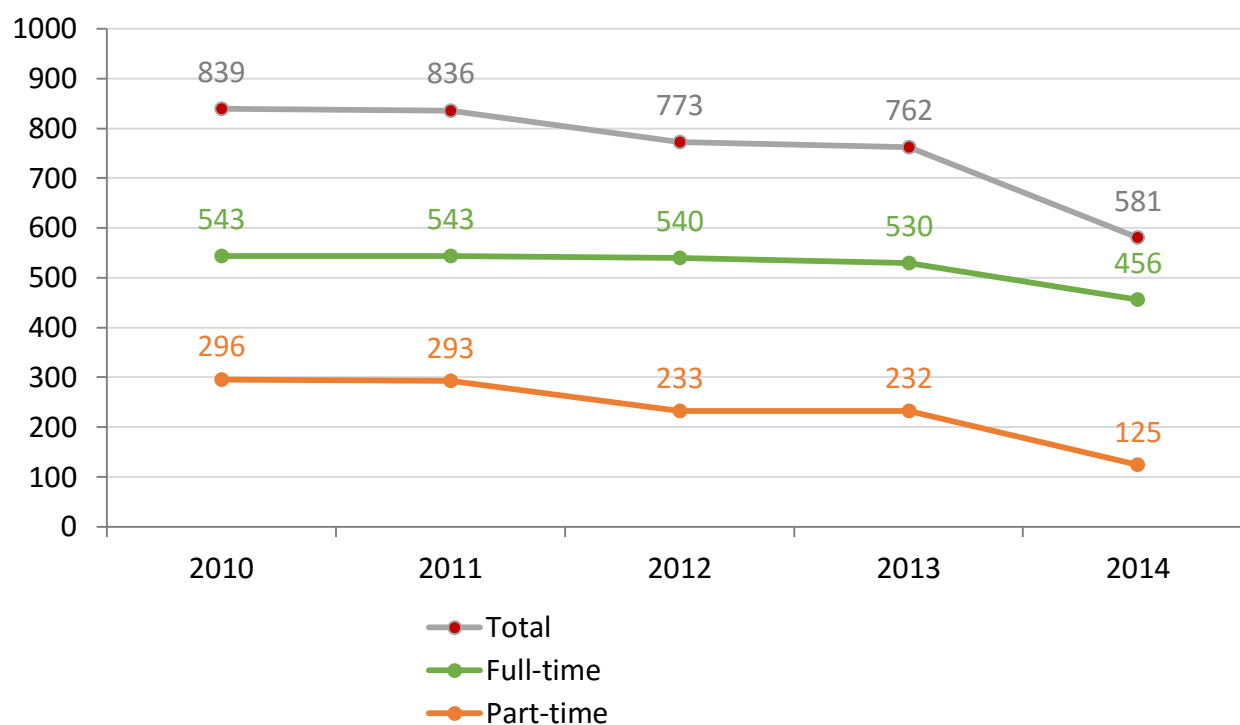


IX.6. Post-graduate and doctoral training in National Academy of Sciences of Ukraine: 2010-2014

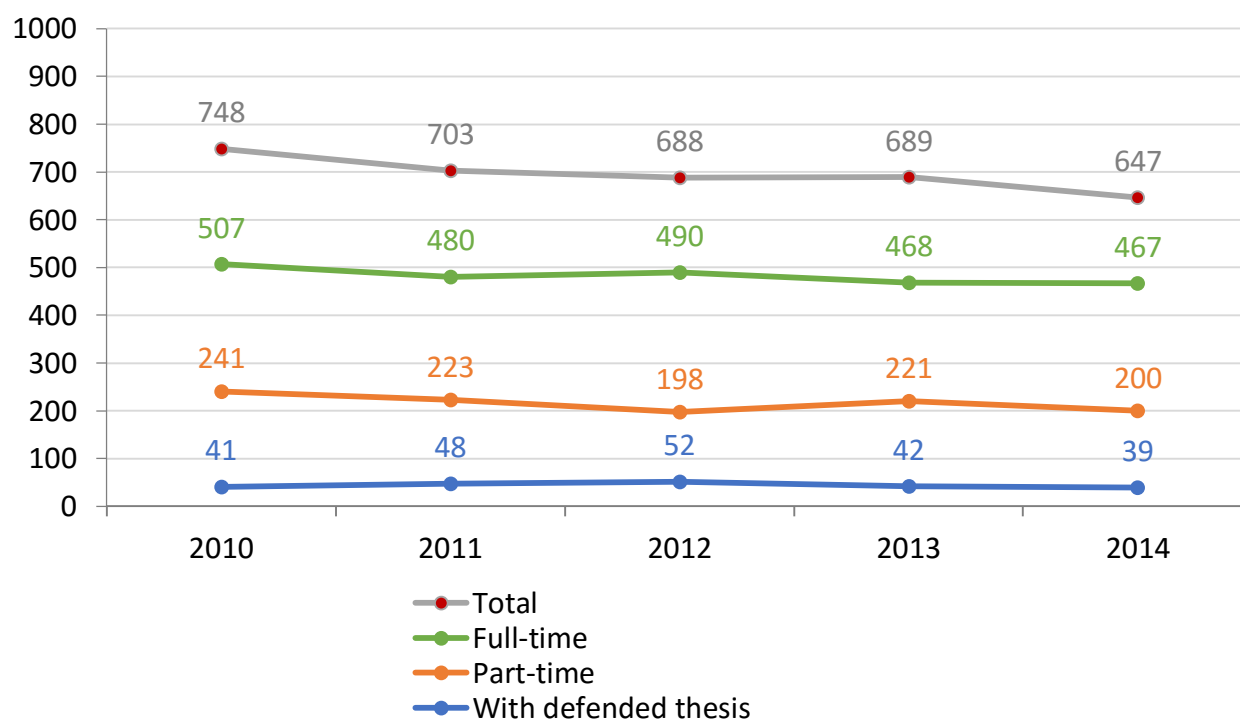
Post-graduate courses, *headcount*

	2010	2011	2012	2013	2014
Institutions with postgraduate courses	143	142	142	142	137
Postgraduate students	2716	2669	2559	2349	2045
Admission to postgraduate courses					
Total	839	836	773	636	581
including:					
full-time	543	543	540	473	456
part-time	296	293	233	163	125
Graduates of postgraduate courses					
Total	748	703	688	689	647
including:					
full-time	507	480	490	468	467
part-time	241	223	198	221	180
with defended thesis	41	48	52	42	39

Admission to postgraduate courses, *headcount*



Graduates of postgraduate courses, *headcount*

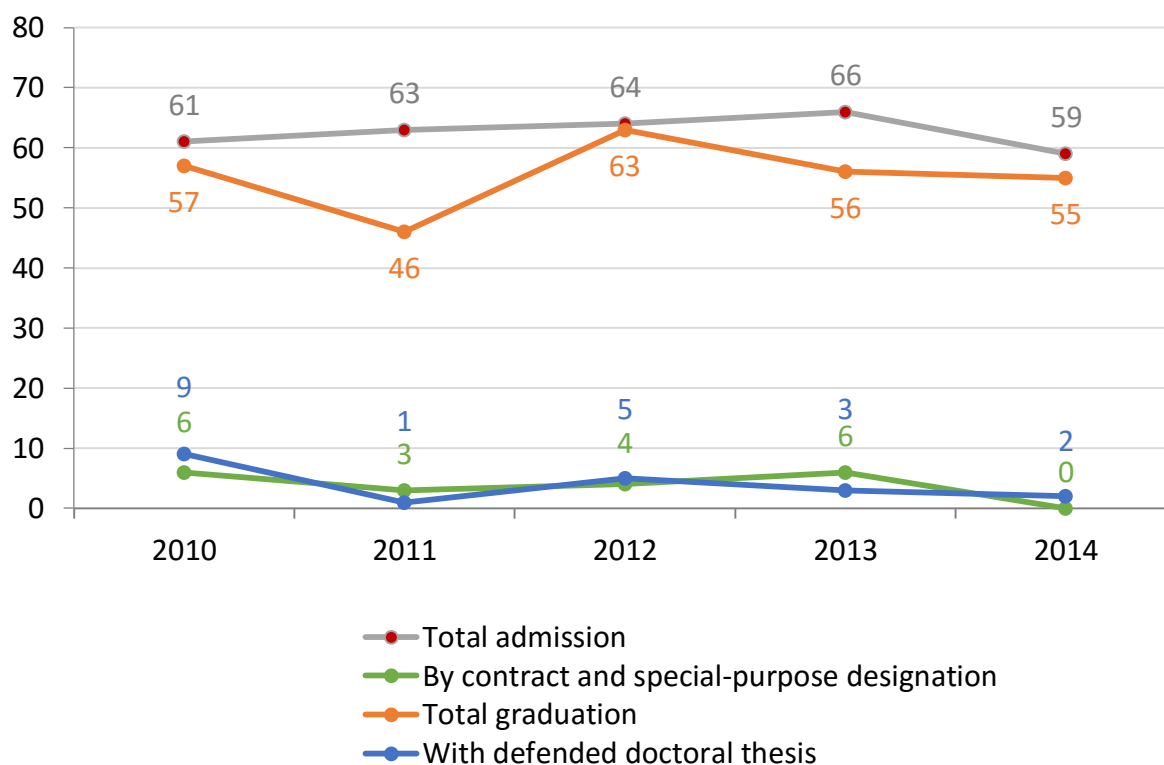


Doctoral courses*

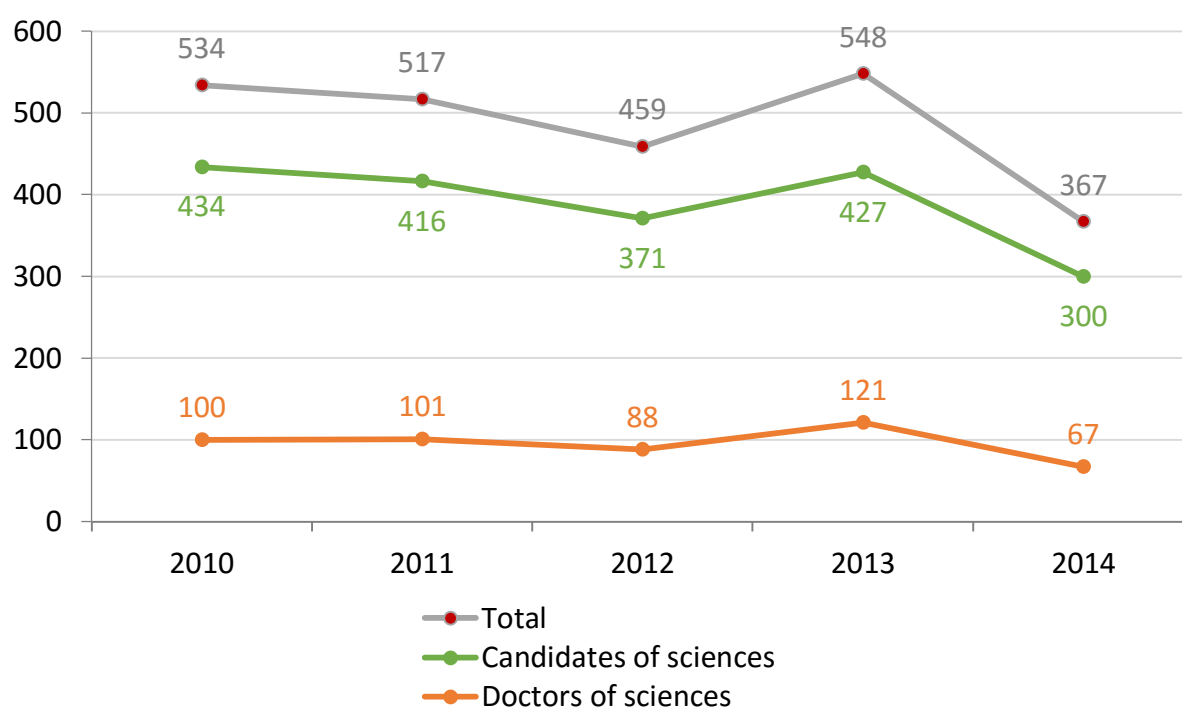
	2010	2011	2012	2013	2014
Institutions with the doctoral courses	60	63	62	65	65
Doctoral students	169	182	181	189	177
Admission to doctoral courses					
Total	61	63	64	66	59
including:					
by contract and special-purpose designation	6	3	4	6	-
Graduates of doctoral courses					
Total	57	46	63	56	56
including:					
with defended doctoral thesis	9	1	5	3	2

* Doctoral courses have operated in National Academy of Sciences of Ukraine since 1988.

Admission and graduation of doctoral courses, *headcount*



Trends in defending theses



Women among postgraduate and doctoral students*, *headcount*

	2010	2011	2012	2013	2014
Female postgraduate students – total	20817	20628	20219	19073	16563
including NAS of Ukraine	1336	1307	1249	1139	995
Female doctoral students – total	790	855	943	964	916
including NAS of Ukraine	60	60	61	64	68
<i>(as % in total of each year)</i>					
Female postgraduate students – total	60.1	60.3	60.1	60.6	60.0
including NAS of Ukraine	49.2	49.0	48.8	48.5	48.7
Female doctoral students – total	50.6	52.4	52.0	52.6	52.1
including NAS of Ukraine	35.5	33	33.3	33.9	38.4

* According to department of scientific and managerial personnel of NAS of Ukraine.

Postgraduate students by source of funding: 2010-2014, *headcount*

	2010	2011	2012	2013	2014
Total	2716	2669	2558	2349	2045
including:					
state budget	2456	2439	2383	2214	1949
private funds	241	217	168	128	93
other sources	19	13	7	7	3
Admission – total	839	836	773	636	581
including:					
state budget	782	782	744	611	563
private funds	54	53	29	24	17
other sources	3	1	–	1	–
Graduates – total	748	703	688	689	647
including:					
state budget	677	647	638	641	618
private funds	66	49	46	48	27
other sources	5	7	4	-	2

Doctoral students, by source of funding: 2010-2014*

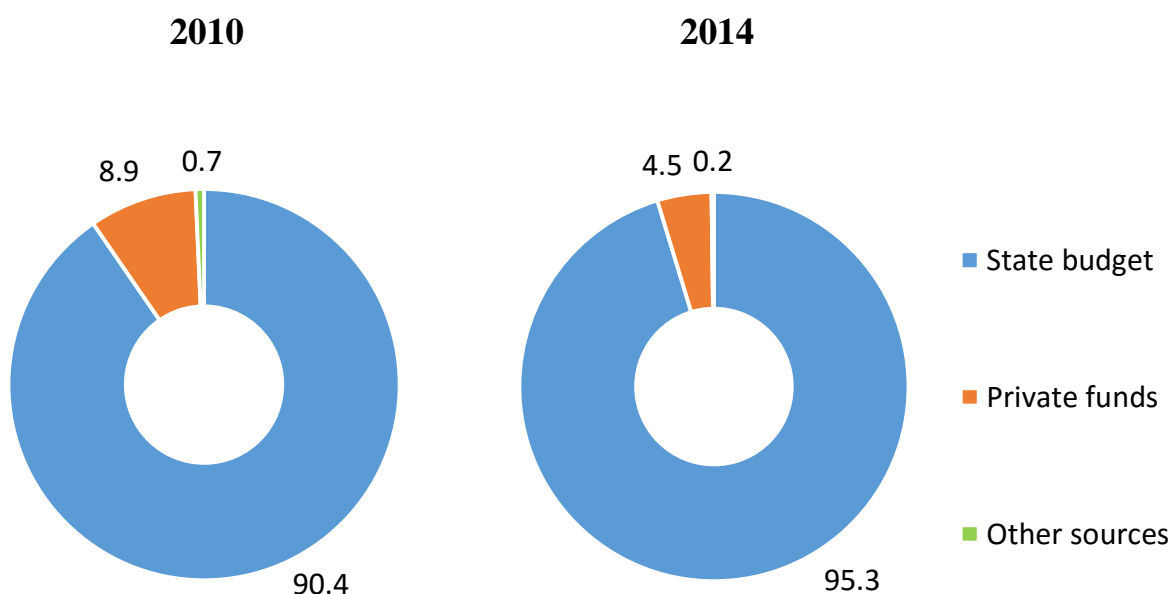
	2010	2011	2012	2013	2014
Total	169	182	183	189	177
including:					
state budget	152	168	170	178	169
private funds	14	12	9	9	6
other sources	3	2	4	2	2

continued

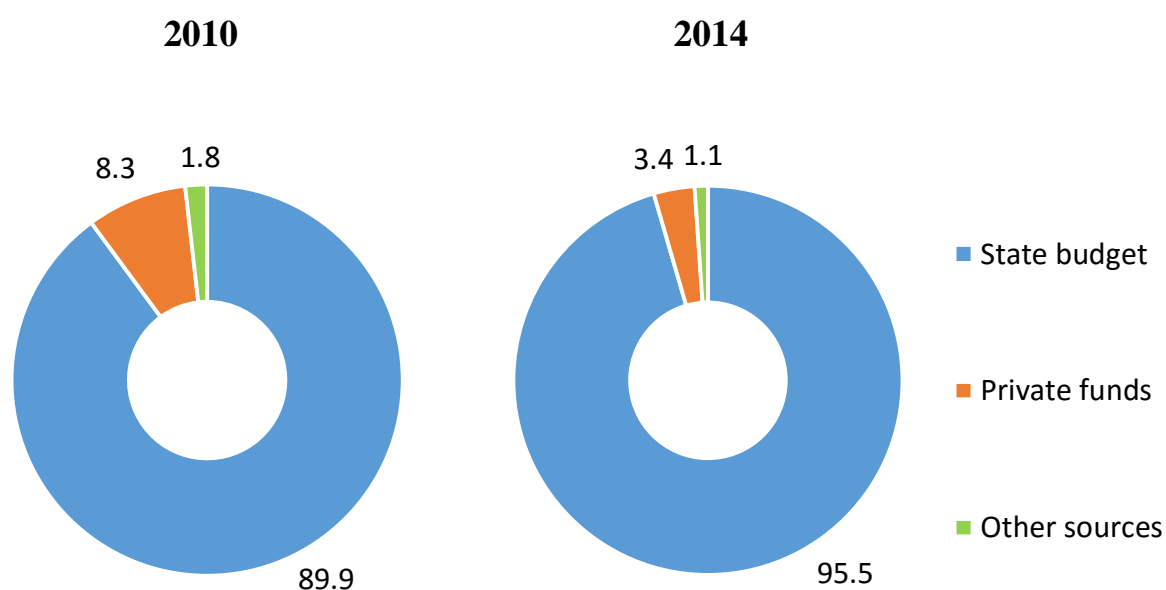
	2010	2011	2012	2013	2014
Admission – total	61	63	64	66	59
including:					
state budget	56	61	60	66	59
private funds	5	2	4	6	–
other sources	–	–	–	–	–
Graduates – total	57	46	63	56	56
including:					
state budget	49	44	56	50	53
private funds	5	2	5	4	1
other sources	3	–	2	2	2

* Data from the department of research and administrative personnel of NAS of Ukraine.

Postgraduate students by source of funding, %

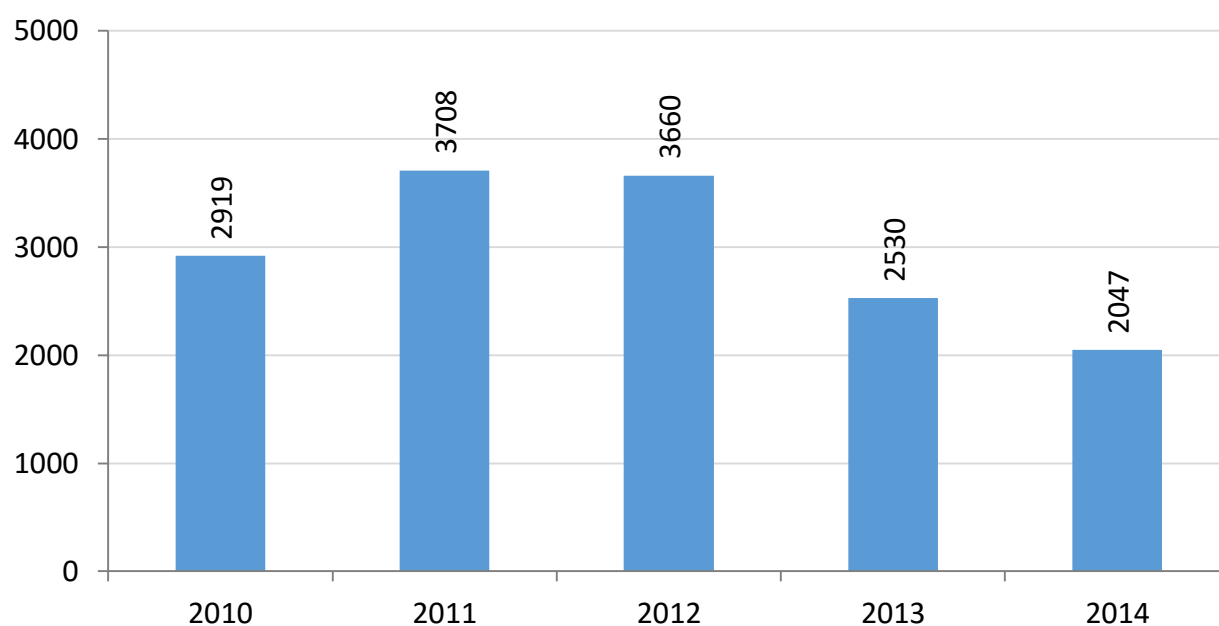


Doctoral students by source of funding, %

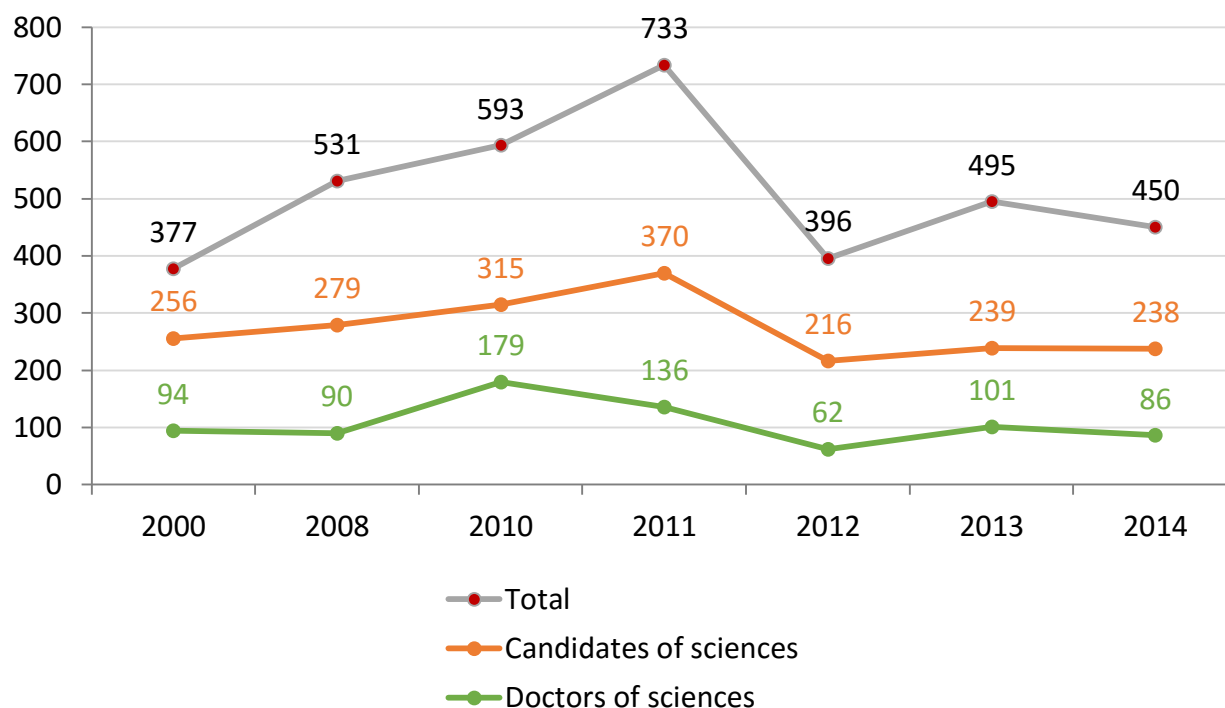


IX.7. Foreign trips of researchers of National Academy of Sciences of Ukraine

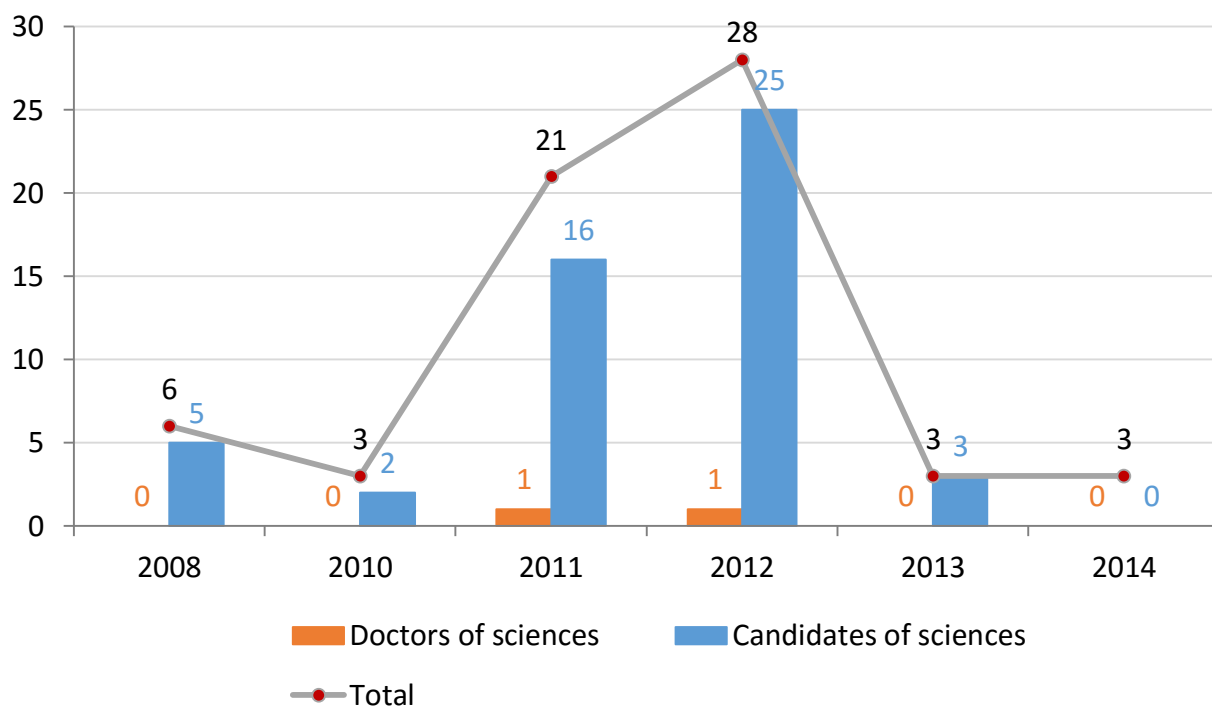
Trends in visiting researchers of NAS of Ukraine in foreign R&D institutions, *headcount*



Visiting researchers of NAS of Ukraine for training or temporal work in foreign R&D institutions, *headcount*



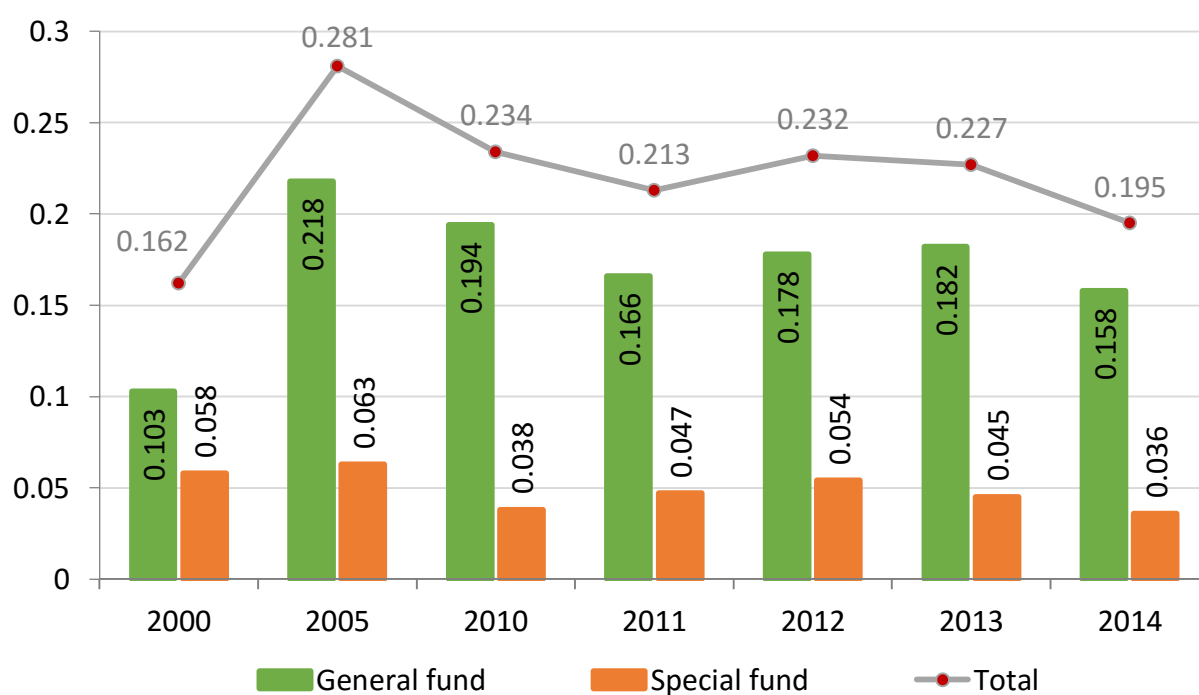
Researchers of NAS of Ukraine emigrated for permanent residence



IX.8. Funding of National Academy of Sciences of Ukraine from state budget

Year	Total funding, <i>million UAH</i>			Special fund, %
	Total	including:		
		General fund	Special fund	
2000	274.9	175.7	99.2	36
2005	1241.1	963.4	277.7	22
2010	2536.3	2095.1	441.2	17
2011	2805.8	2180.9	624.9	22
2012	3269.3	2513.0	756.3	23
2013	3322.5	2661.7	660.8	20
2014	3054.5	2482.7	571.9	19

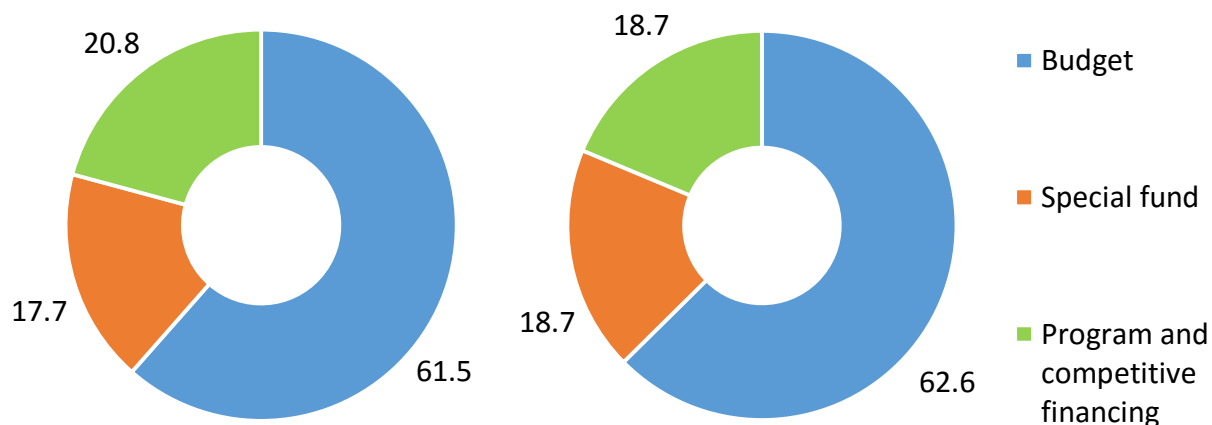
Share in funding of National Academy of Sciences of Ukraine in GDP



Percentage distribution of funding by source

2010

2014



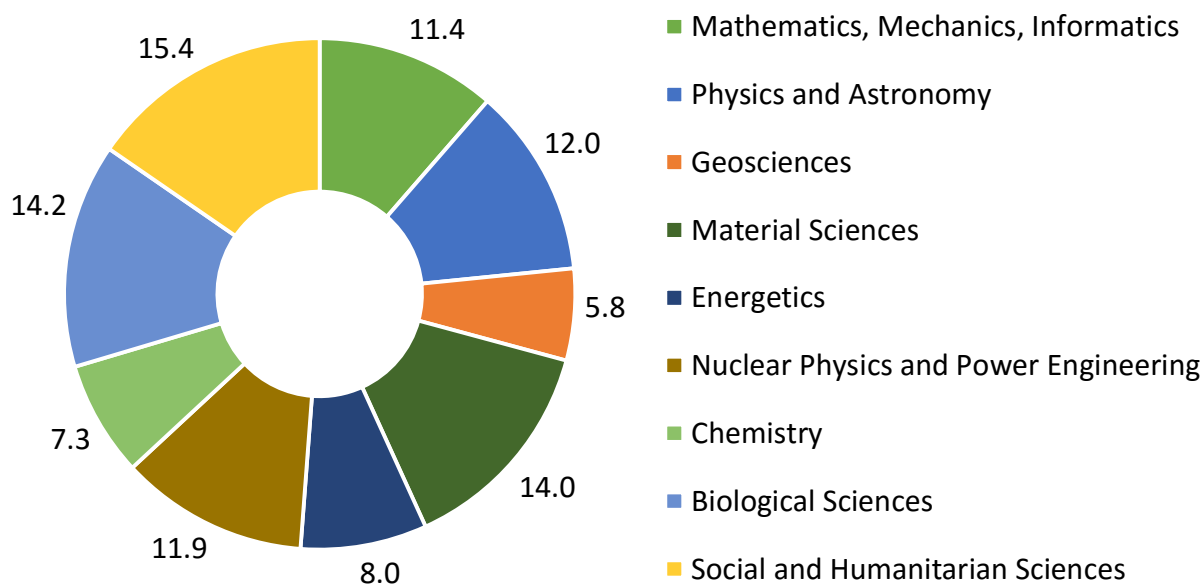
Main sources of special fund revenues: 2012 and 2014

	2012		2014	
	<i>Million UAH</i>	<i>%</i>	<i>Million UAH</i>	<i>%</i>
Total	756.3	100.0	571.9	100.0
including:				
services provided by budgetary institutions	353.1	46.7	240.6	42.1
commercial and industrial activities	43.6	5.8	30.7	5.4
leases of assets	152.0	20.1	139.6	24.3
charitable contributions, grants and gifts	199.2	26.3	148.4	26.0
sales of assets	1.4	0.2	1.0	0.2
specific orders	6.0	0.8	11.5	2.0
other sources	1.0	0.1	0.1	...

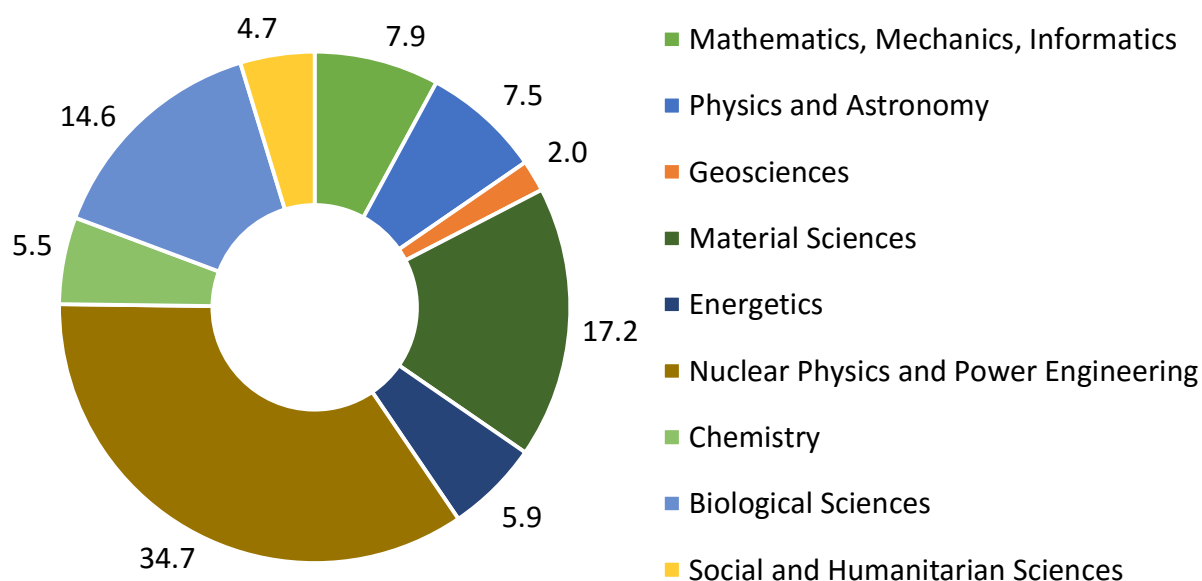
Funding of NAS of Ukraine from state budget by department: 2014

	Total volume of funding				
	Total, <i>million UAH</i>	General fund		Special fund	
		total, <i>million UAH</i>	% of total	total, <i>million UAH</i>	% of total
Total	3054.5	2482.7	81	571.8	19
including by departments:					
Mathematics	45.0	43.0	95	2.0	5
Informatics	134.2	115.2	86	1908	14
Mechanics	119.7	97.5	81	22.2	19
Physics and Astronomy	338.82	297.6	88	41.2	12
Geosciences	145.6	134.7	92	10.9	8
Physical and Technical Problems of Materials Science	411.2	316.6	77	94.6	23
Physical and Technical Problems of Power Engineering	202.9	170.7	84	32.2	16
Nuclear Physics and Power Engineering	427.4	236.7	55	190.7	45
Chemistry	201.5	171.2	85	30.2	15
Biochemistry, Physiology and Molecular Biology	179.8.	149.1	83	30.7	17
General Biology	224.4	174.5	78	49.9	22
Economics	96.8	86.7	90	10.1	10
History, Philosophy and Law	214.3	200.8	94	13.5	6
Literature, Language and Art Criticism	55.0	52.8	96	2.2	4
Institutions at Presidium of NAS of Ukraine	208.9	188.2	90	20.7	10
Other institutions	48.8	47.3	97	1.5	3

Percentage distribution of base budget funding by departments of NAS of Ukraine: 2014



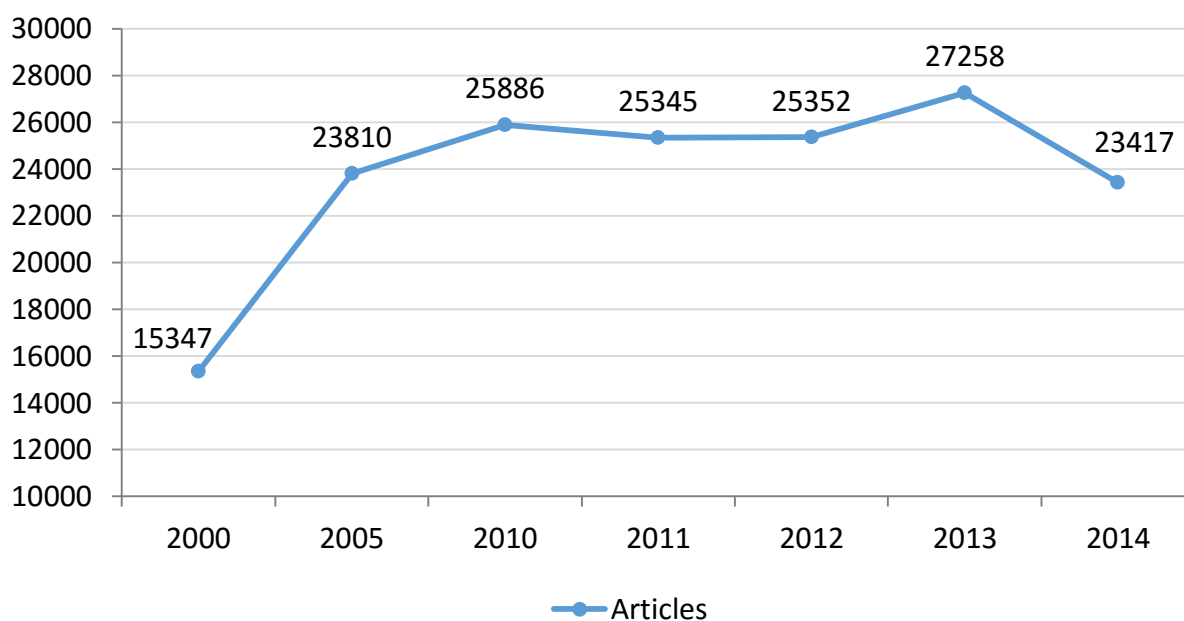
Percentage distribution of special funding by departments of NAS of Ukraine: 2014

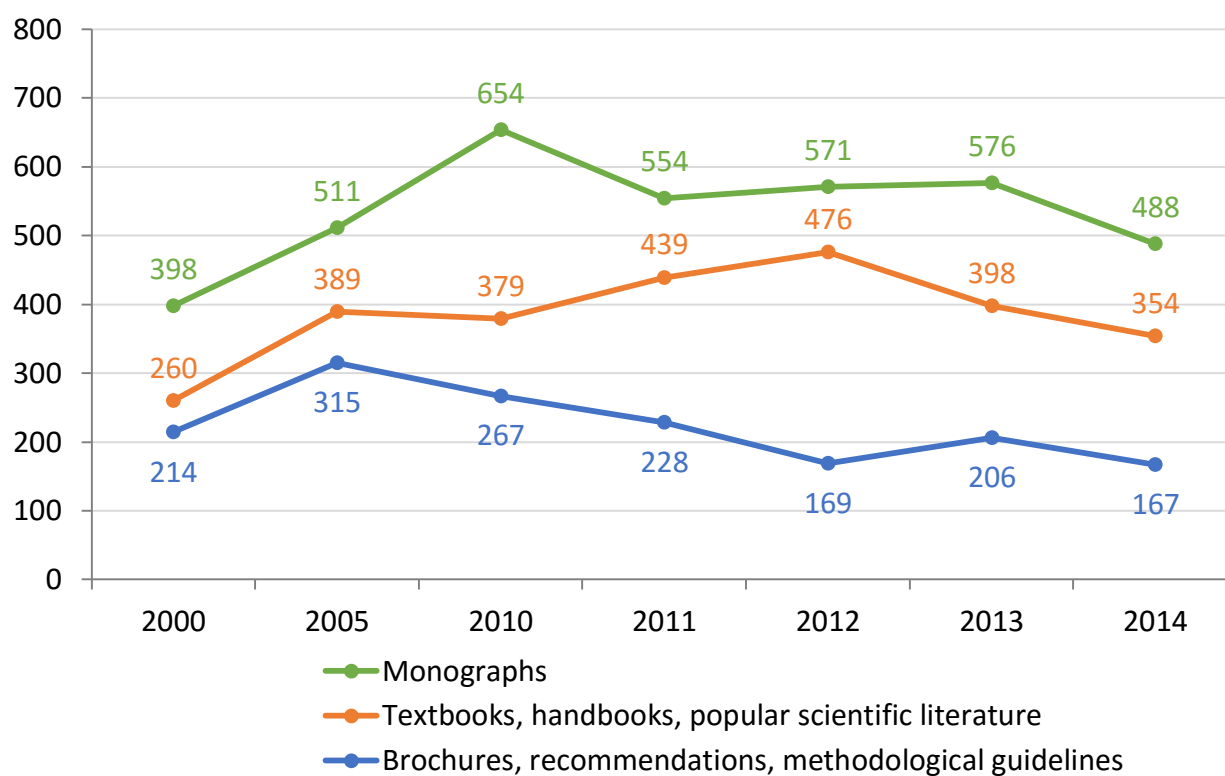


IX.9. Publishing in National Academy of Sciences of Ukraine

	Total	including:				
		Monographs	Textbooks, handbooks, popular scientific literature	Brochures, recommen- dations, methodo- logical guidelines	Articles	Preprints
2000	16290	398	260	214	15347	71
2005	25400	511	389	315	23810	375
2010	27231	654	379	267	25886	45
2011	26616	554	439	228	25345	50
2012	26586	571	476	169	25352	18
2013	28465	576	398	206	27258	27
2014	24441	488	354	167	23417	15

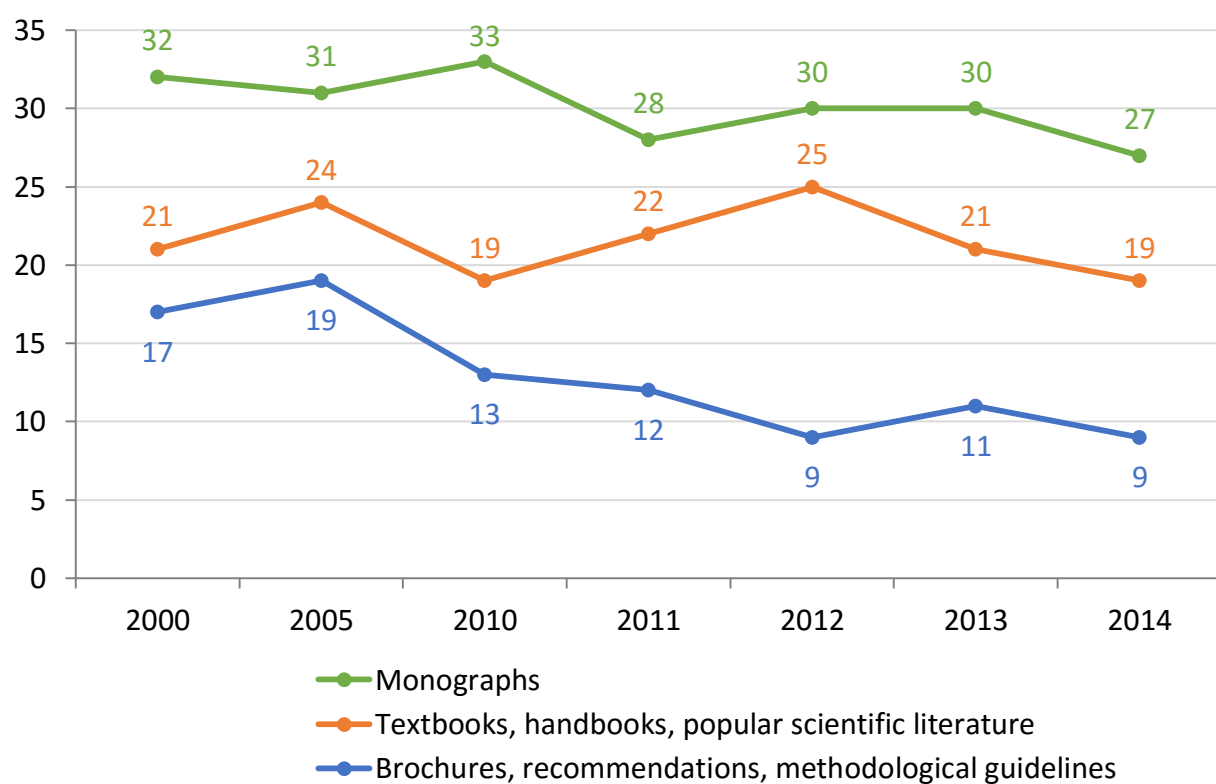
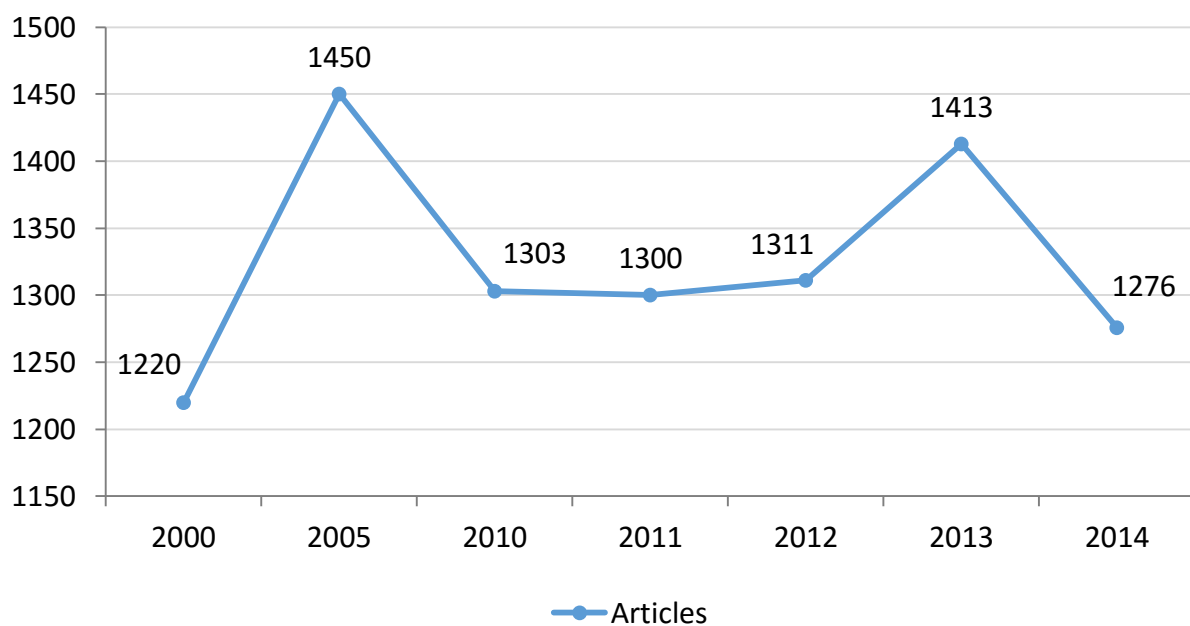
Output of printed matter





Output of printed matter per 1,000 researchers

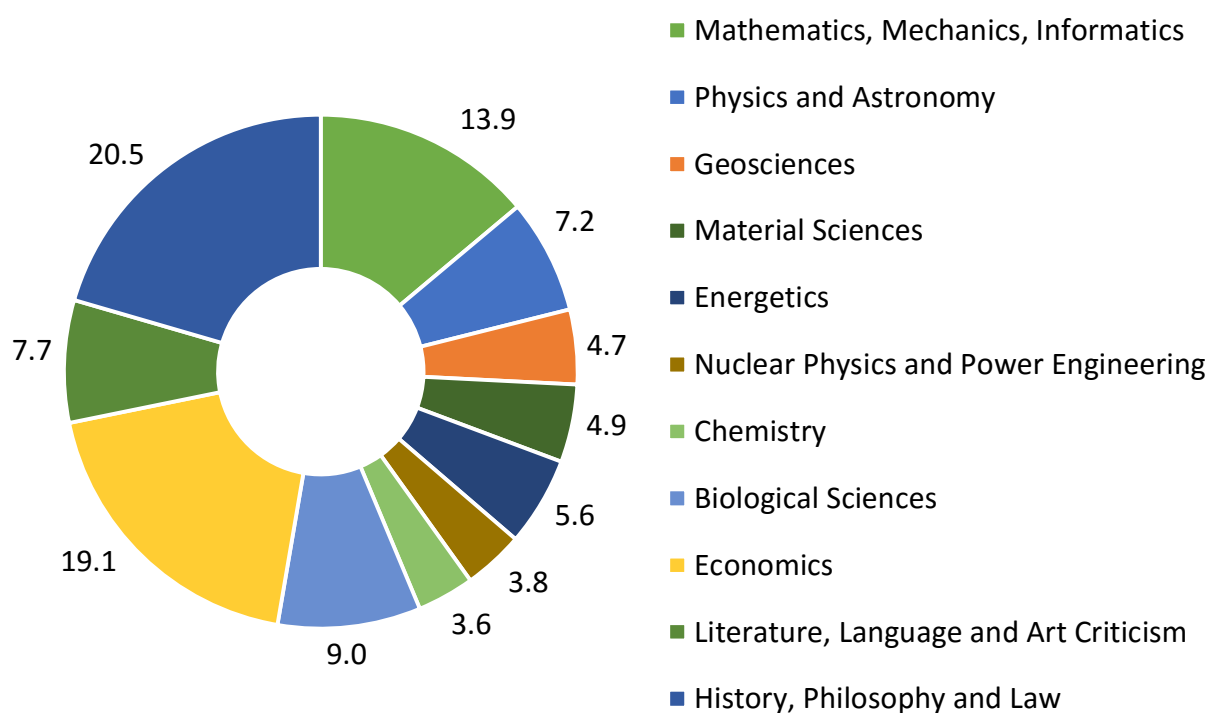
	2000	2005	2010	2011	2012	2013	2014
Articles	1220	1450	1303	1300	1311	1413	1276
Monographs	32	31	33	28	30	30	27
Textbooks	21	24	19	22	25	21	19
Brochures, Recommendations, Methodological guidelines	17	19	13	12	9	11	9



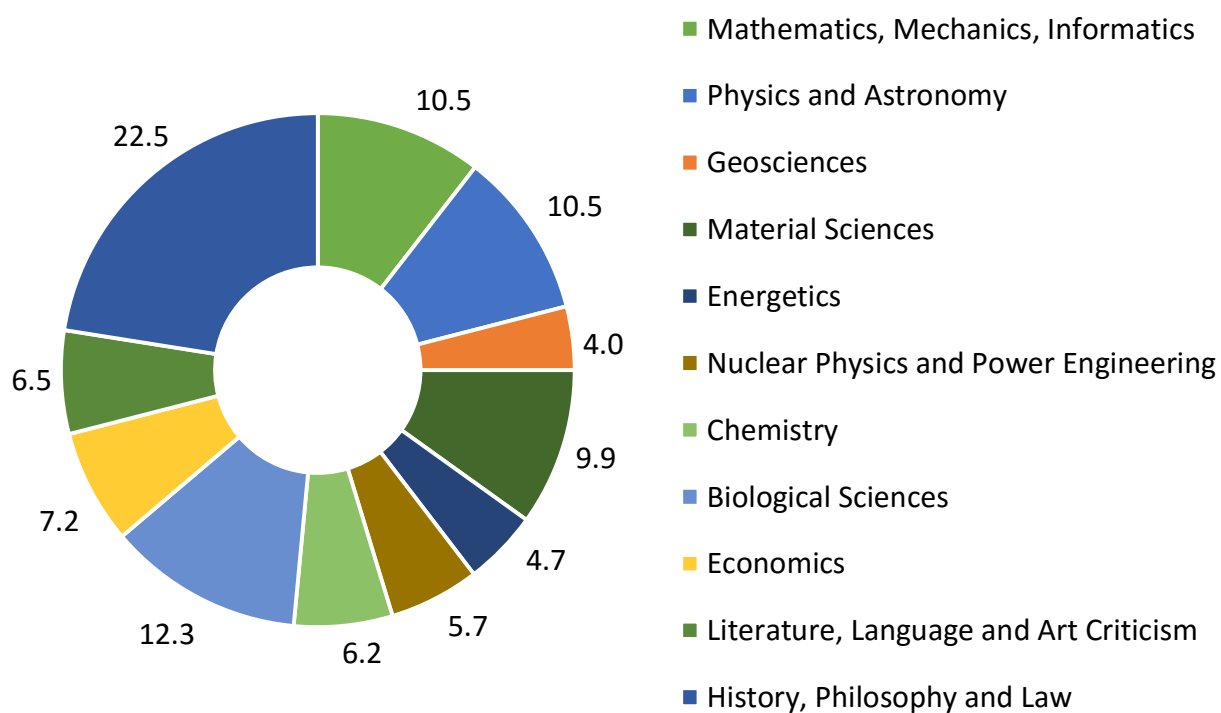
Output of printed matter by department: 2014

	Mono- graphs	Textbooks, handbooks, popular scientific literature	Brochures, recommen- dations, methodo- logical guidelines	Articles	Preprints
Total	488	354	167	23417	15
including by departments:					
Mathematics	16	14	2	705	8
Informatics	31	26	16	818	1
Mechanics	18	4	5	864	0
Physics and Astronomy	34	16	11	2408	0
Geosciences	22	7	10	913	0
Physical and Technical Problems of Materials Science	23	8	3	2259	1
Physical and Technical Problems of Power Engineering	26	10	27	1069	—
Nuclear Physics and Power Engineering	18	3	1	1298	4
Chemistry	17	7	4	1405	—
Biochemistry, Physiology and Molecular Biology	7	3	14	1120	—
General Biology	35	27	33	1694	—
Economics	90	12	12	1663	1
History, Philosophy and Law	96	118	15	5132	—
Literature, Language and Art Criticism	36	66	5	1493	—
Institutions of NAS of Ukraine and MES of Ukraine	3	1	—	19	—
Institutions at Presidium of NAS of Ukraine	16	32	9	566	—

Percentage distribution of output of monographs by departments



Percentage distribution of output of articles by departments



Output of printed matter in NAS of Ukraine: 2009-2014

Year	Books		Of them monographs		Articles	
	Titles	Volume (account. publ. pages)	Titles	including ones published abroad	Total	including in foreign journals
2009	901	17888.7	671	45	25963	4495
2010	871	17769.4	654	55	25886	5048
2011	786	15197.0	554	67	25345	5495
2012	785	16574.0	571	74	25352	5405
2013	776	14644.9	576	90	27258	5949
2014	630	10530.1	488	74	23417	6392

Publishing in Research and Production Enterprise “Publishing House ‘Naukova Dumka’” of NAS of Ukraine: 2009-2014

Year	Title of books	Volume, account. publ. pages	Circulation, thousand copies	Title of monographs*
2009	37	957.0	5.6	13
2010	68	1717.3	38.3	54
2011	51	1484.2	46.3	32
2012	59	1648.0	47.6	40
2013	54	1401.1	34.7	39
2014	75	1502.4	33.1	59

* published by state order.

IX.10. Applications for invention and obtained patents and certificates for inventions in the State Intellectual Property Service of Ukraine

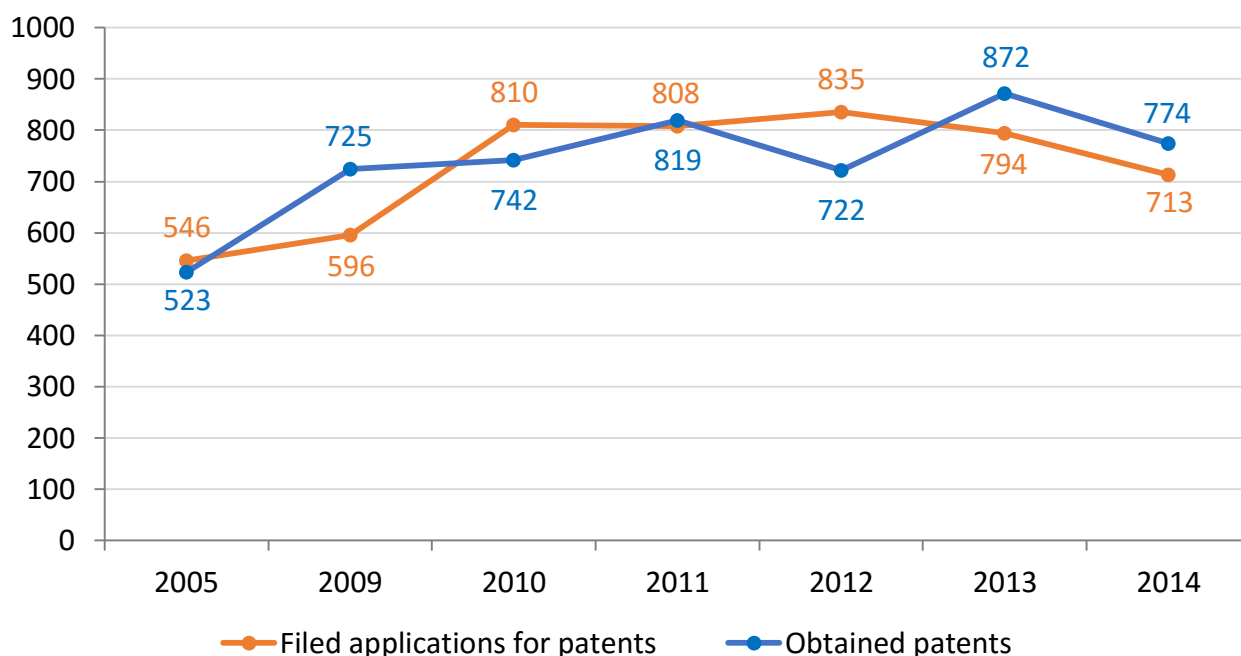
	Applications for inventions					Obtained patents and certificates for inventions				
	2010	2011	2012	2013	2014	2010	2011	2012	2013	2014
Total	800	792	813	794	713	723	815	702	872	774
including by departments:										
Mathematics	1	2	2	4	2	3	1	4	4	—
Informatics	62	39	57	60	32	58	38	34	55	46
Mechanics	76	80	68	89	73	66	79	66	80	74
Physics and Astronomy	64	72	82	85	96	68	81	69	96	96
Geosciences	22	32	50	43	36	29	45	33	54	43
Physical and Technical Problems of Materials Science	241	220	256	189	182	201	231	174	262	204
Physical and Technical Problems of Power Engineering	75	73	57	59	64	62	77	70	71	46
Nuclear Physics and Power Engineering	17	14	9	17	13	13	15	11	14	17
Chemistry	154	166	140	157	130	137	144	159	141	150
Biochemistry, Physiology and Molecular Biology	56	61	60	61	51	63	61	58	58	67
General Biology	32	41	32	16	18	23	43	24	30	20

IX.11. Applications for inventions and obtained patents and certificates for inventions in foreign patent offices

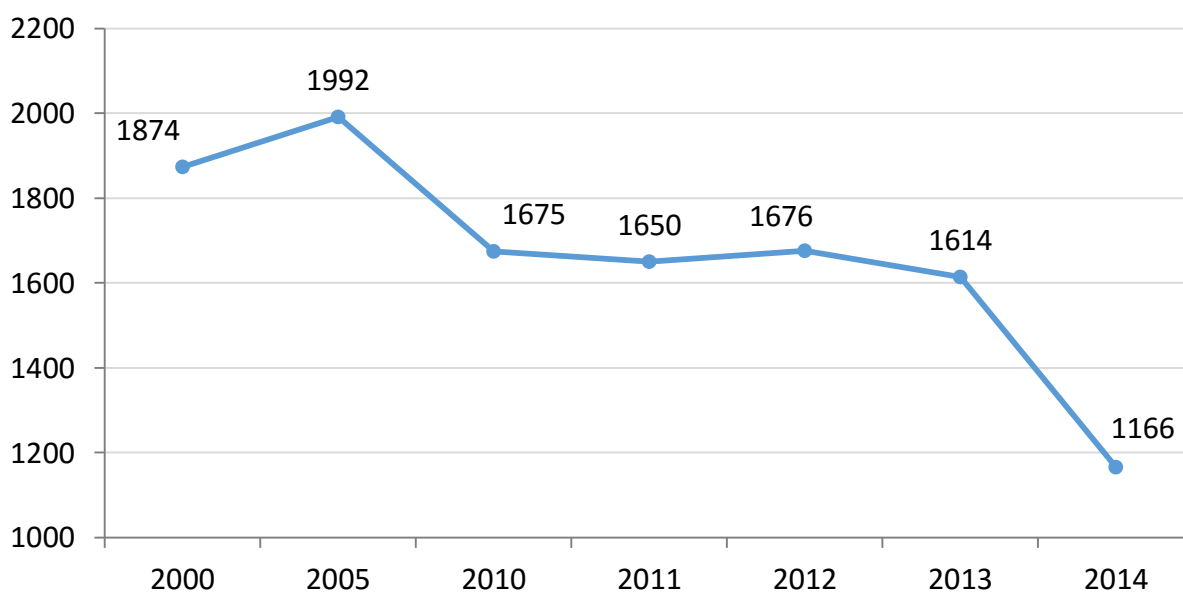
	Applications for inventions					Obtained patents and certificates for inventions				
	2010	2011	2012	2013	2014	2010	2011	2012	2013	2014
Total	10	16	14	14	11	19	4	11	13	9
including by departments:										
Mathematics	—	—	—	—	—	—	—	—	—	—
Informatics	3	—	—	—	1	6	—	—	2	—
Mechanics	—	—	—	2	2	—	—	—	—	1
Physics and Astronomy	2	5	1	3	—	—	—	3	1	—
Geosciences	2	—	—	—	—	2	1	—	2	—
Physical and Technical Problems of Materials Science	2	4	3	2	8	9	3	1	2	7
Physical and Technical Problems of Power Engineering	—	—	—	—	—	—	—	—	—	—
Nuclear Physics and Power Engineering	—	2	3	6	—	—	—	—	—	1
Chemistry	1	2	5	—	—	2	—	1	2	—
Biochemistry, Physiology and Molecular Biology	—	3	2	1	—	—	—	5	1	—
General Biology	—	—	—	—	—	—	—	1	3	—

IX.12. Creating and using of intellectual property objects, implementing R&D

Creating objects of intellectual property

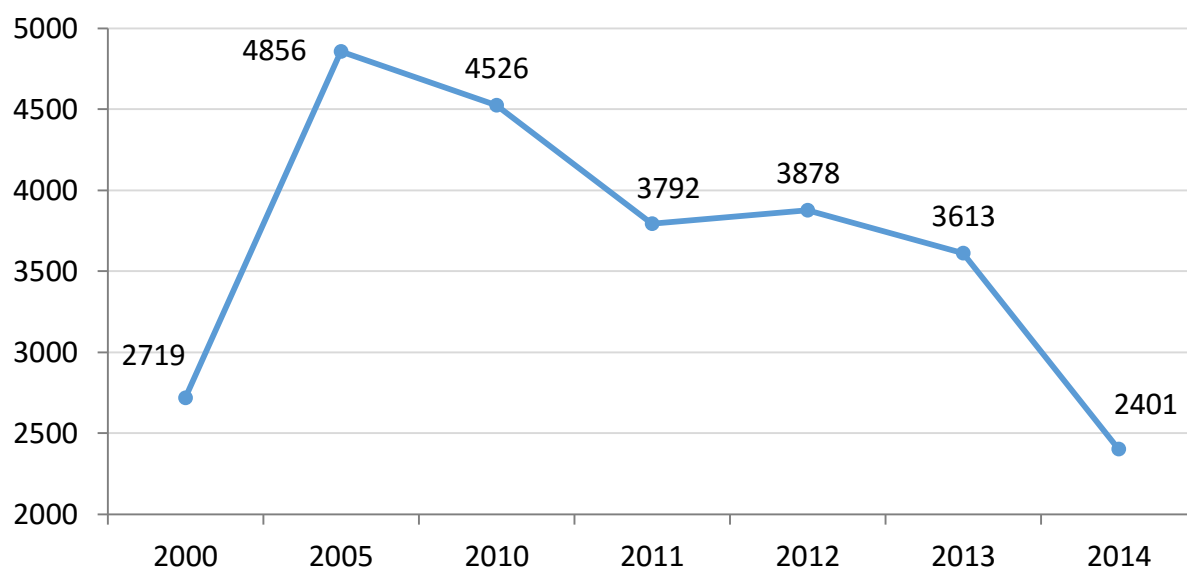


Implementing R&D

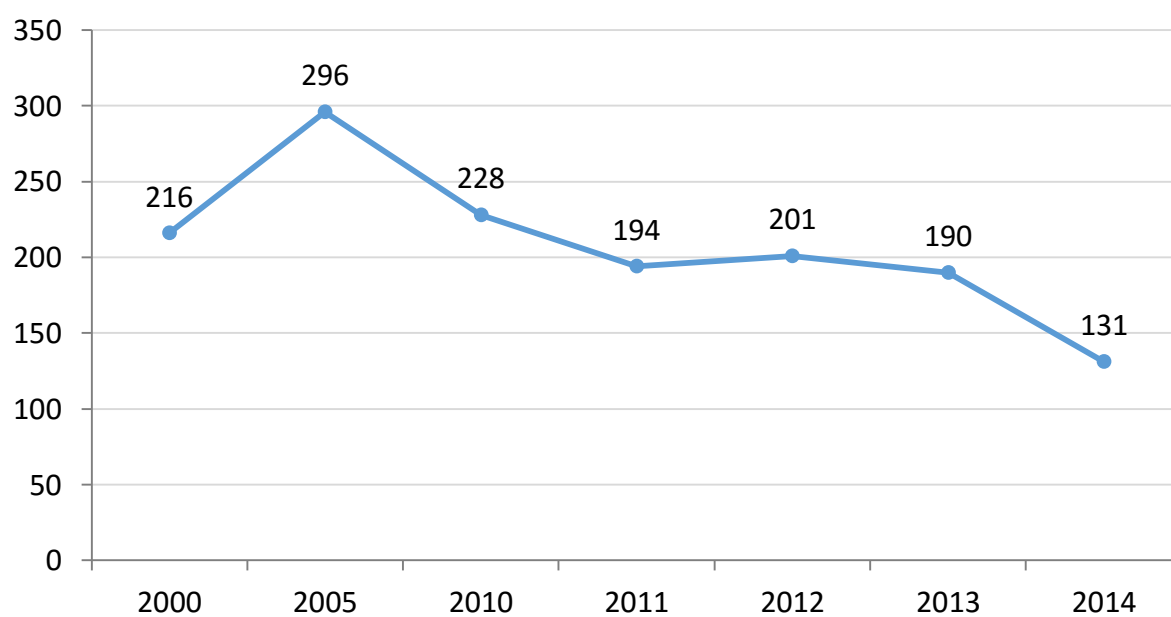


IX.13. Commercial agreements and contracts

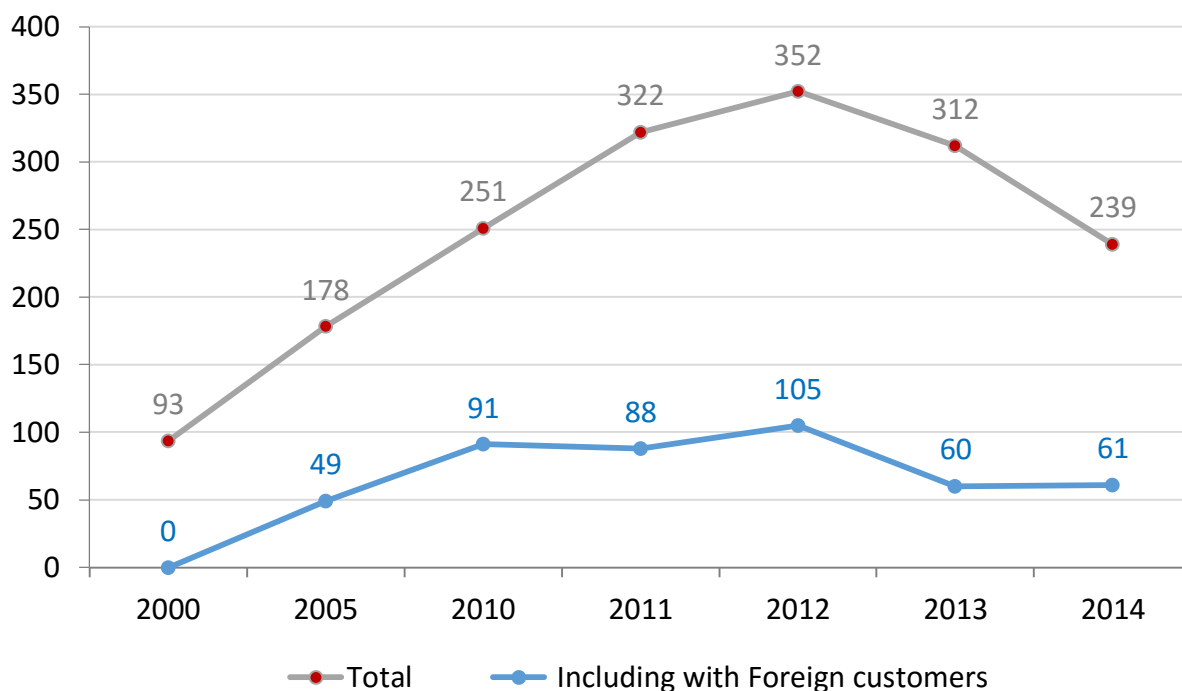
Trends in commercial agreements and contracts



Trends in commercial agreements and contracts per 1,000 researchers



Trends in funding R&D by commercial agreements and contracts, *million UAH*



IX.14. Foreign economic activities of National Academy of Sciences of Ukraine*

	2009	2010	2011	2012	2013	2014
Contracts with foreign companies	314	295	364	335	316	195
Funding of contracts with foreign customers, million UAH	84.0	91.3	88.2	105.0	59.7	61.2
Implemented developments	2119	1675	1650	1676	1614	1166

* Institutions of NAS of Ukraine cooperated with customers from 50 countries in 2009–2014.

IX.15. Commercial agreements and contracts with domestic and foreign customers in 2014

	Commercial agreements and contracts		Funding, <i>thousands UAH</i>		% in total funding	Implemented developments
	Total	including with foreign customers	Total	including with foreign customers		
Total	2401	195	239432.2	61190.6	8.0	1166
including by departments:						
Mathematics	18	—	856.6	—	1.9	1
Informatics	49	7	14596.6	2476.4	10.9	25
Mechanics	157	9	11110.3	2018.2	9.3	106
Physics and Astronomy	70	13	12047.1	4984.5	3.6	25
Geosciences	88	1	4844.1	43.9	3.3	61
Physical and Technical Problems of Materials Science	696	104	59540.4	23700.6	14.5	264
Physical and Technical Problems of Power Engineering	163	3	20238.5	1102.0	10.0	84
Nuclear Physics and Power Engineering	179	40	53017.6	20959.4	12.4	7
Chemistry	169	12	14427.5	3822.1	7.2	18
Biochemistry, Physiology and Molecular Biology	153	3	9465.5	1533.3	5.3	132
General Biology	383	—	22137.1	—	9.9	246
Economics	34	3	2991.3	550.2	3.1	14
History, Philosophy and Law	78	—	5363.6	—	2.5	28
Literature, Language and Art Criticism	5	—	645.6	—	1.2	—
Other institutions	166	—	8150.4	—	3.9	155

IX.16. Researchers of National Academy of Sciences of Ukraine awarded by state prizes of Ukraine: 2000-2014

2000	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
State Prizes of Ukraine in field of Science and Technology										
42	57	41	61	63	43	42	43	56	28	72
T.H. Shevchenko State Prize of Ukraine in field of Literature, Journalism and Arts										
–	1	1	–	–	–	–	–	–	–	–

IX.17. Researchers of National Academy of Sciences of Ukraine awarded by state awards of Ukraine: 2000-2014

2000	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Title of the Hero of Ukraine										
1	4	1	4	2	3	1	1	–	–	–
The Order of Prince Yaroslav the Wise										
2	6	6	6	21	13	3	5	9	8	5
Other state awards										
13	17	21	31	90	41	12	25	26	–	–
The Honored Scientist of Ukraine										
13	11	10	24	40	22	3	10	11	21	2

IX.18. Institutions of NAS of Ukraine – holders of scientific objects of national heritage

Title of institution	Name of scientific object	Year status
G.V. Kurdyumov Institute for Metal Physics	Diffraction complex of new generation	2001
Main Astronomical Observatory	Laser satellite rangefinders "Kyiv-Golosiiv" of scientific object: Satellite Laser rangefinders "Kyiv-Golosiiv" and "Katsively-1893"	2001
B.I. Verkin Institute for Low Temperature Physics and Engineering	Complex for Physical Research at very low temperatures	2001
Institute of Radio Astronomy	Radio telescope UTR-2 with a system of interferometers Uranus -1 and Uranus-4 of research facility Radio telescope UTR-2 with a system of interferometers Uranus	2001
Poltava Gravimetric Observatory within S.I. Subbotin Institute of Geophysics	Interferometer Uranus -2 of research facility Radio telescope UTR-2 with a system of interferometers Uranus	2001
H.V. Karpenko Physico-Mechanical Institute	Interferometer Uranus -3 of research facility Radio telescope UTR-2 with a system of interferometers Uranus	2001
National Science Center "Kharkiv Institute of Physics and Technology"	Nuclear-Physical Installation"	2001
Institute for Nuclear Research	Nuclear-Physical Installation: Research Nuclear Reactor with "hot cells", Isochronous Cyclotron "U-240"	2001
O.O. Bohomolets Institute of Physiology	Bank of cell lines	2001

continued

Title of institution	Name of scientific object	Year status
D.K. Zabolotny Institute of Microbiology and Virology	The collection of microorganisms	2001
R.E. Kavetsky Institute of Experimental Pathology, Oncology and Radiobiology	The cell bank of lines from human tissue and animals	2001
M.G. Kholodny Institute of Botany	National Herbarium of Ukraine (collection of plants) and the culture collection of mushrooms	2001
I.I. Schmalhausen Institute of Zoology	Scientific zoological stock collections	2001
M.M. Gryshko National Botanical Garden	Collection of tropical and subtropical plants	2001
Donetsk Botanical Garden	Exhibition "Steppes of Ukraine"	2001
State Museum of Natural History (Lviv)	Scientific collections and exhibition	2001
National Museum of Natural History (Kyiv)	Scientific collections and exhibition	2001
Institute of Archaeology	Collection "Treasures of Ancient History of Ukraine"	2001
V.I. Vernadsky National Library of Ukraine	Fund of manuscripts, early printed books, rare books, historical collections, archive funds of Ukraine and Depository	2001
V. Stefanyk Lviv National Academic Library	Collection Ucrainica and collections of old books and manuscripts	2001
Institute of Electron Physics	Microtron M-30	2002
Institute for Problems of Cryobiology and Cryomedicine	Low temperature bank of biological objects	2002
Institute of Plant Physiology and Genetics	Collection of samples of winter wheat and maize - variety, population, unique mutant and recombinant lines, inbred lines	2002
Institute of Cell Biology and Genetic Engineering	Collection of plant germplasm flora Ukraine and world flora	2002

continued

Title of institution	Name of scientific object	Year status
State arboretum "Alexandria"	The genetic fund of trees, shrubs, herbaceous and flowering plants	2002
National historical-archeological reserve "Olbia"	Complex of historical monuments	2002
Institute of Magnetism under NAS and MES of Ukraine	Magnetodynamic complex	2004
Krivy Rig Botanical Garden	Collections of introduced trees and shrubs	2004
National Arboretum "Sofiivka"	Collection of exotic species of trees and shrubs	2004
State Arboretum "Trostanets"	Collection of exotic species of woody plants	2004
Ukrainian Steppe Nature Reserve	Geological landscape and biological diversity of biota "Stone graves"	2004
T.H. Shevchenko Institute of Literature	Archive of Manuscript funds	2004
M.T. Rylsky Institute for Art Studies, Folklore and Ethnology	Archival scientific funds of manuscripts and phonorecordings	2004
Institute of Ethnology	Scientific stock collection and exhibition of the Museum of Ethnography and Art Crafts	2004
Ukrainian Lingua-Information Fund	National dictionary base	2004
G.S. Pisarenko Institute for Problems of Strength	The complex test benches to study the strength of materials and structural elements under extreme conditions of temperature and force load	2006
O.Ya. Usikov Institute for Radio Physics and Electronics	Cryo-magnetic radio-spectroscopic complex of millimeter diapason of wavelengths	2006

continued

Title of institution	Name of scientific object	Year status
Scientific Engineering Centre "Materialobrobka explosion" Paton Electric Welding	Experimental testing ground for the material processing by explosion, destruction of ammunition and missiles	2006
A.M. Pidhorny Institute for Mechanical Engineering Problems	Hydrodynamic stands	2006
M.M. Gryshko National Botanical Garden	Collection of flowers and ornamentals and monocultural gardens	2006
Donetsk Botanical Garden	Exhibition and collection of tropical and subtropical plants	2006
Lugansk Nature Reserve	Vegetable-animal complex and etalon black soil	2006
International Centre for Astronomical, Medical and Environmental Research	Astronomical complex on the basis of the two meters alpine mirror telescope of high mountain observatory "Terskol"	2007
Institute of Hydromechanics	Experimental complex for hydrodynamic studies	2008
Odessa Archaeological Museum	Scientific collections on the history of ancient cultures and civilizations	2008
State Institution "Institute of Food Biotechnology and Genomics of the National Academy of Sciences of Ukraine"	Collection of microorganism strains and lines of plants for food and Agrarian biotechnology	2009
Institute of Technical Mechanics under NAS and National Space Agency of Ukraine	The plazma-electrodynamic stand	2013
V.Ye. Lashkaryov Institute of Semiconductor Physic	Center for testing of photoconverters and photoelectric panels	2013

continued

Title of institution	Name of scientific object	Year status
Institute of Radio Astronomy	Complex electromagnetic sensing of the environment	2013
M.G. Kholodny Institute of Botany	Collection of culture of algae Ukraine (Institute of Botany of National Academy of Sciences of Ukraine - algological)	2013
Black Sea Biosphere Reserve	Natural complex of the arena plots and associated coast	2013
O.V. Palladin Institute of Biochemistry	Collection of recombinant human antibodies and hybridom-producers of monoclonal antibodies	2015
Institute of Plant Physiology and Genetics	Collection strains of symbiotic and associative nitrogen-fixing microorganisms	2015
M.M. Gryshko National Botanical Garden	Collection fund of energetic and aromatic plants	2015

METHODOLOGICAL NOTES

MAIN INDICATORS OF STATE STATISTICS⁶

Types of Research and Development

Basic research is understood as experimental or theoretical studies aimed at acquisition of new knowledge on regularities of nature, society, human being, and their relationship. Its output is embodied in hypotheses, theories, and methods. Results of basic research may be expressed in the form of recommendations for practical application of obtained scientific knowledge, scientific publications, etc.

Applied research is considered as original investigation aimed at acquisition of new knowledge with the purpose of solving particular practical problems. Applied research determines possible ways to use basic research output and new methods of achieving previously formulated problems.

Development are understood as systematic works drawing on existing knowledge gained from scientific research and / or practical experience and is aimed at creating new materials, products, devices, processes, services, systems or methods. This work can also imply a significant improvement of existing objects. Such work comprises design and engineering works, technological works, the creation of pilot prototypes (consignment) of the ware (product), and projecting works for.

Scientific and technical services mean an activity in the field of scientific and technical information, patent and

⁶Source: Scientific and Innovation activities in Ukraine: Statistical Collection / State Statistics Service in Ukraine. – K., 2015. – P. 247-255.

licensing activities, standardization, metrology and quality control, scientific and technical consulting and related services to promote technological development, other activities; to promote acquiring, dissemination and utilization of scientific knowledge.

Sectors of performance

Government sector includes R&D institutions subordinated to government ministries and agencies responsible for state administration and ensuring social needs in general (public administration, defense, public order, public health, culture, education, social security, etc.), as well as to local executive bodies. These organizations primarily serve government and are not for profit as well as non-profit institutions completely or mainly financed and controlled by the government. *Government sector includes national academies of sciences.*

Business enterprise sector includes organizations and enterprises whose main activity is related to the production of goods and services for profit. These are the sectoral research institutes, design organizations, design and research organizations, industry enterprises, research facilities and others.

Higher education sector includes all universities and other higher education institutions irrespective of funding sources and legal status, as well as research institutes (centers), experimental stations, design organizations, clinics, and hospitals directly controlled by higher education institutions or associated with them. *Higher education sector does not include institutions of the national academies of sciences, despite the fact the latter provide postgraduate and doctoral courses.*

Private non-profit sector consists of private organizations not aimed at obtaining profit (voluntary associations, professional societies, professional units, philanthropic organizations, etc.) except for organizations of government sector and partly funded by the government.

Science Sectors

Academic sector includes organizations subordinated to the national academies of sciences such as the National Academy of Sciences of Ukraine, the National Academy of Agricultural Sciences of Ukraine, the National Academy of Medical Sciences of Ukraine, the National Academy of Arts of Ukraine, the Academy of Pedagogical Sciences of Ukraine and the National Academy of Law Sciences of Ukraine;

Industry sector includes organizations of various economic branches that perform scientific and technical works;

Higher education sector includes universities that have specialized units (scientific-research units and sectors, scientific - research laboratories, etc.), as well as carrying out scientific and technical works at the teaching departments;

Factory sector includes research and design-engineering departments in the industry

Employment in organization

Number of employees of main activities is the total number of workers employed in the main or auxiliary activities, which are classified under code 72 NACE 2010.

R&D personnel is a population of persons whose systematic creative activities are aimed at the advancement of scientific knowledge or search for new areas of its application, as well as direct services related to the performance of R&D.

R&D personnel

Researchers are professionals engaged in R&D and performing the creation of new knowledge, products, processes, methods, and systems, as well as in the management of these activities (including heads of scientific organizations and R&D departments). Researchers usually have higher education (university or equivalent) degrees.

Technicians are employees whose main function requires technical competencies and experiences in one or more fields of natural, engineering, social sciences and humanities; take part in R&D performing technical functions (operation and maintenance of scientific instruments, laboratory equipment, computer equipment, bibliographic search, preparing materials, drawings, conducting experiments, tests and analyses, and so on), as a rule, under the supervision of researchers.

Supporting staff includes staff members performing supporting functions connecting with R&D: employees of planning and finance units, patent services, S&T information units, S&T libraries; workers engaged in assembling, adjustment, maintenance and repair of scientific equipment and instruments; workers of pilot (experimental) production units; laboratory assistance without higher or special secondary educations.

Other auxiliary personnel include staff members engaged in services and in other general functions connected with the activities of an organization (employees of accounting departments, personnel departments, units for materials and technical supplies, secretarial and clerical stuff, etc.) as well as workers mainly providing scientific and technical services to the public or other activities not related to research and development.

The category of "**professional**" includes "**researchers**" and "**technicians**" (together). **R&D performers** include categories of "**researchers**", "**technicians**" and "**supporting staff**".

Funding

Total volume of scientific and technical works is determined as the net value (without value added tax) of projects performed during the reference year by own resources under direct contracts (excluding projects performed by subcontractors).

Gross domestic expenditure on R&D is the actual cost of implementation of research and development (at cost) during the reference year regardless of the source of funds, including both current and capital expenditures (less amortization and depreciation of assets). The costs of works (services) that are not science & technology ones, as well as paid services are not included.

Intramural current expenditure on R&D comprises intramural expenditure on implementation R&D by own resources regardless capital expenditure (less amortization and depreciation of assets).

Funding means the repayment of internal costs to carry out R&D from all resources (budget, domestic and foreign customers, own funds, etc.).

Notes of the statistics

Since 2006, organizations and enterprises performing only science and technology services do not render the report

Since 2006, *all teaching staff in higher education institutions is considered as specialists performing R&D part-time.*

Since 2012, the organizations and enterprises incorporated in industrial ministries and departments do not render the report.

Information on doctors and candidates of science employed in Ukraine's economy is given as of October 1 up to 2012 and of December 31 since 2012.

Since 2014, the State Statistics Service of Ukraine presents data excluding organizations and enterprises located in areas out of the Ukrainian government control.

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