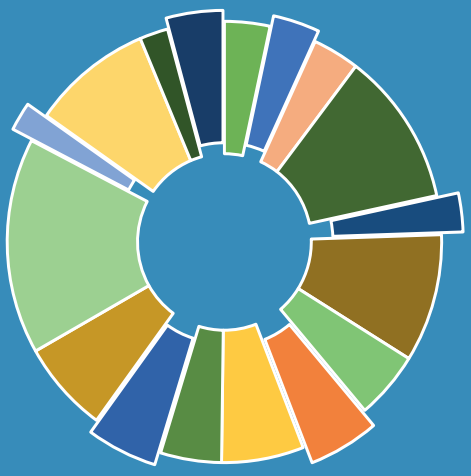
NATIONAL ACADEMY OF SCIENCES OF UKRAINE
State Institution "G.M. Dobrov Institute for Scientific and Technological Potential and Science History Studies"

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

100 years
NAS of Ukraine



Kyiv 2018

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3rd issue. The guide provides basic statistical data on scientific and technical potential and performance of the National Academy of Sciences of Ukraine. Representation of the place and the role of the National Academy of Sciences of Ukraine in the system of scientific organizations of the state, including in the context of the sector and in the global context is given. Statistical data mainly covers the period from 2012 and 2017. 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
EU	– European Union
UNESCO	– United Nations Educational, Scientific and Cultural Organization
OECD	– Organization for Economic Cooperation and Development
EUROSTAT	– European Statistical Office
GDP	– Gross Domestic Product

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 and reference edition “National Academy of Sciences of Ukraine: Statistical and Scientometrical Analysis of the Effectiveness of Scientific Potential” is a realization of the tradition to publish (every other year) a reference book on a regular basis. The third edition, as well as the previous ones, issued in 2014 and 2016, contains the most important statistical data on the development of scientific and technical potential and the results of the activities of the National Academy of Sciences of Ukraine, obtained as a result of monitoring the activities of the Academy. The presented publication introduces the material, expanded both in the time dimension and in the content presentation. Compared to the previous edition, the guide is complemented not only by data in recent years, but also by additional information that reproduces the 100-year-old path that has passed our Academy of Sciences.

In determining the conceptual approach to the development of the content and structure of the directory, the authors proceeded from the goal that the material contained in the reference book should objectively reflect the place and role of the NAS of Ukraine in the scientific sphere of the country, primarily in the academic sectoral system, and in the world scientific space taking into account 100-year anniversary, which the NAS of Ukraine will mark in November 2018.

The bulk of the directory consists of nine sections, which primarily contain statistical data, as well as introductory articles, comments and other analytical materials. The main part is preceded by the introductory words of the chief editor of the publication, the Chief Scientific Secretary of the NAS of Ukraine, Academician of the NAS of Ukraine V.L. Bogdanov.

The *first* section provides the brief information on outstanding scientists which led the Academy of Sciences, starting from the first Joint Meeting of the Ukrainian Academy of Sciences on November 27, 1918, as well as the current President of the National Academy of Sciences of Ukraine, Academician of the National Academy of Sciences of Ukraine B.Ye. Paton, who heads the Academy for the 56th year in a row, and also, like the Academy, will celebrate the 100th anniversary at November 27, 2018.

The section, for the first time, provides information on the development of the internal institutional structure of the NAS of Ukraine for 100 years: data on changes in the list of the Departments of the NAS of Ukraine within the Academy of Sciences and, respectively, their leaders – academic secretaries (until 1963 – heads of departments of the Academy of Sciences of the Ukrainian SSR). Also it highlights general information on the current state of the Academy – its status, management bodies, structure, scientific potential, main directions and results of its activity (cooperation with educational institutions, coordination of scientific research, innovation activities along with implementation of scientific developments, scientific and expert and publishing activities, and also international scientific cooperation). In addition, an excerpt from the current Law of Ukraine “On Scientific and Scientific-Technical Activity” regarding the regulation of the legal status of the National Academy of Sciences of Ukraine and national sectoral academies of sciences is given.

The *second* section provides overview information and data on the types, prevalence and significance of the academic form of science organization as a result of the study of the activities of about 160 national academies of sciences and their analogues, which exist in 117 countries of the world. The dynamics of the formation of academies of sciences, the first of which appeared in the XVII century, gender component

among members of national academies of sciences, as well as the dynamics of the formation of 45 youth ("young") academies and their analogues are analyzed. The focus is on the composition and activities of international associations of academies of sciences, both world and regional as well as international associations of scientists – members of the academies of sciences. Special attention was given to the International Association of Academies of Sciences, which was established in 1993 on the initiative of the President of the National Academy of Sciences B.Ye. Paton.

The *third* section contains statistical data, which reflect the place of the NAS of Ukraine in the structure of the scientific potential of our country: the comparative data of its scientific potential with the scientific potential of other national sectoral academies of science of Ukraine and the main research-intensive ministries of the country are given. It is worth noting here that the state statistical surveys of the State Statistics Service of Ukraine on scientific and scientific and technical activities of organizations and enterprises of sectoral ministries and departments are limited to 2011.

The *fourth* section includes a historical commentary and statistical data on the personal composition and scientific achievements of the members of the NAS of Ukraine. The information about distribution of members of the Academy by fields of sciences, age groups, as well as the gender aspect, is given.

The *fifth* section contains statistical data, which characterize the effectiveness of scientific and technical activities of scientific organizations of the country – the dynamics of the volume of scientific and scientific works performed, publications and inventive activity, etc.

The *sixth* section is devoted to the statistical indicators of international cooperation of scientific institutions of the

National Academy of Sciences of Ukraine, national sectoral academies of sciences and some ministries of Ukraine on foreign travel of scientific workers, their participation in international conferences, research on international and foreign grants, and so on.

This section is connected with the next *seventh* section – "NAS of Ukraine in the domestic and world information space", which provides scientometric evaluations of the representation of academic organizations, higher educational establishments and periodicals of national academies of sciences and ministries of Ukraine in international databases on publications indexed therein, as well as in the world rankings of research centers. The section contains the list of journals of the NAS of Ukraine that are republished abroad in foreign languages or published domestically in English.

The *eighth* section contains international comparisons of scientific and technical activities in Ukraine, EU countries and other countries of the world in terms of comparing statistics on their scientific and technical potential. These data largely outline the place and role of the scientific sphere which directed by the central state authorities of the country to solving urgent problems and meeting the spiritual and socioeconomic needs of citizens and achieving the goals of sustainable development of society.

The *ninth* chapter deals with statistics on the dynamics of scientific and technical potential and the performance of the departments, research institutions and research and production organizations of the NAS of Ukraine in the aspect of departmental statistics.

Finally, the main methodological explanations used in the statistical collections of the State Statistics Service of Ukraine "Scientific and Innovative Activities in Ukraine" are presented. Separate methodological explanations for sections

II, IV, V, and VIII are given in the notes and footnotes to the corresponding tables and figures. Additional indicators in the IX section are presented in accordance with the methodology of departmental statistics of the NAS of Ukraine. Specific changes were also noted in the methodology of state statistical observations introduced by the State Statistics Committee of Ukraine since 2006 and resulted in the limitation of time series and the possibilities of comparing certain statistical indicators and the implementation of stable statistical monitoring.

During the preparation of this scientific and reference publication data from state and departmental statistics, as well as materials of separate scientific publications and special analytical references, domestic and international web resources were used.

The guide contains 170 tables and 112 figures that are aggregated by type of indicators in 72 blocks (are listed in the contents of the directory).

This scientific reference book is the third edition of this kind, prepared by the State institution “G.M. Dobrov Institute for Scientific and Technological Potential and Science History Studies of the National Academy of Sciences of Ukraine”. The authors are grateful to all colleagues who participated in the preparation of this publication, as well as to all readers who gave their feedback, comments or suggestions to previous editions, and express their hopes for further constructive cooperation in the preparation of future editions of the directory. In separate tables of the guide, specified or corrected data are given, namely those that were noticed by the readers of the previous editions.

The publication is intended for employees of state authorities, scientists, students of higher educational establishments, journalists, and the general public. Authors will consider the goal achieved, if it will contribute to the search for impartial reasoning when discussing problems and elaborating proposals and decisions on the development of the

whole of Ukrainian science and the National Academy of Sciences of Ukraine, the 100th anniversary of which is devoted this publication.

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* Bibliography of previous editions of the publication:

1. National Academy of Sciences of Ukraine: Structure, Dynamics and Efficiency of Scientific Potential: table. and a science meter. analysis / Malitsky B.A., Grachev O.O., Kornilov V.A., Rybachuk V.P., Etokov V.I., Horevin V.I., Videnina N.G., Holovashchenko L.R.; Goal. Ed. Corr. National Academy of Sciences of Ukraine Bogdanov V.L.; NAS of Ukraine, G.M. Dobrov Research Center Sci.-Tech. Potential and Science History Studies of NAS of Ukraine. – K.: Phoenix, 2014. – 142 p. URL: http://www.nas.gov.ua/publications/books/SiteBook/Pages/default.aspx?ffn1=ISBN&fft1=Eq&ffv1=978-966-136-137-8

2. National Academy of Sciences of Ukraine: Statistical and Scientometric Analysis of the Efficiency of Scientific Potential: Scientific Publication. / B.A. Malitsky, O.O. Grachev, O.N. Kubalsky, V.A. Kornilov, V.P. Rybachuk, V.I. Horevin, N.G. Videnina, L.R. Golovashchenko, L.P. Ovcharova; Editor in Chief. Acad. of the NAS of Ukraine V.L. Bogdanov / NAS of Ukraine, State Enterprise "G.M. Dobrov Institute for Sci.-Tech. Potential and Science History Studies". – K.: Phoenix, 2016. – 228 p. – URL: http://files.nas.gov.ua/text/infNASU/nasudovidnyk2016.pdf

3. National Academy of Sciences of Ukraine: Scientometric and Statistical Analysis of Effectiveness of Scientific Potential: / B.A. Malitsky, O.O. Grachev, O.N. Kubalsky, V.A. Kornilov, V.P. Rybachuk V.I. Horevin, N.G. Videnina, L.R. Golovashchenko, L.P. Ovcharova; Editor in Chief. Acad. of the NAS of Ukraine V.L. Bogdanov; NAS of Ukraine, State Institution "G.M. Dobrov Institute for Scientific. -Tech. Potential and Science History Studies of NAS of Ukraine" – K.: Phoenix, 2016. – 228 p. – English.; ill.

INTRODUCTION BY THE CHIEF EDITOR

This issue of the traditional statistical collection of the National Academy of Sciences of Ukraine dates back to the year of its centennial anniversary. This is due to its specificity in comparison with previous releases. In addition to statistical data that illustrates the dynamics of key indicators characterizing the life of the Academy over the past years, the editorial board has found it appropriate to supplement them with some materials that would give an idea of its centennial history. In particular, the first section gives brief information about all the presidents of the National Academy of Sciences of Ukraine and provides a concise description of their contribution to the formation of the Academy. In the second section, an interested reader has the opportunity to get information on the history of the development of the institutional structure of the higher scientific organization of Ukraine, which, according to the law, is the National Academy of Sciences of Ukraine.

Substantially supplemented and updated in the handbook materials describing the place of the National Academy of Sciences of Ukraine in academic science and in general in the scientific system of the state. The sections on international cooperation of Ukrainian scientists and international comparisons of indicators of scientific and scientific-technical activity of countries of the world are enriched with new data.

The handbook was enriched with new science-based and scientometric information. In particular, for the first time ever, there are measured webometric indices for 75 national academies of the world, which testify to the high rating and representation of the National Academy of Sciences of Ukraine in the both domestic and world information space. Also, the analytical information prepared by the information-analytical system “Bibliometrics of Ukrainian Science” of the

V.I. Vernadsky National Library of Ukraine of the NAS of Ukraine, cannot but cause the interest of researchers and the general public of Ukraine.

Traditional attention is paid to the indicators characterizing the effectiveness of scientific and scientific and technical activities of scientific organizations of the country. They are supplemented, in particular, by the data on the performance indicators of all state budget programs.

I hope that our guide will be useful to everyone who cares about the fate of Ukrainian science in our difficult times. After all, even without looking at it with an impartial eye, one can be convinced that despite all the difficulties and losses (and, unfortunately, they are also evidenced by the dynamics presented in the edition of statistical indicators), the science of Ukraine and, in particular, its advanced detachment, the National Academy of Sciences Ukraine lives and works fruitfully for the good of its people.

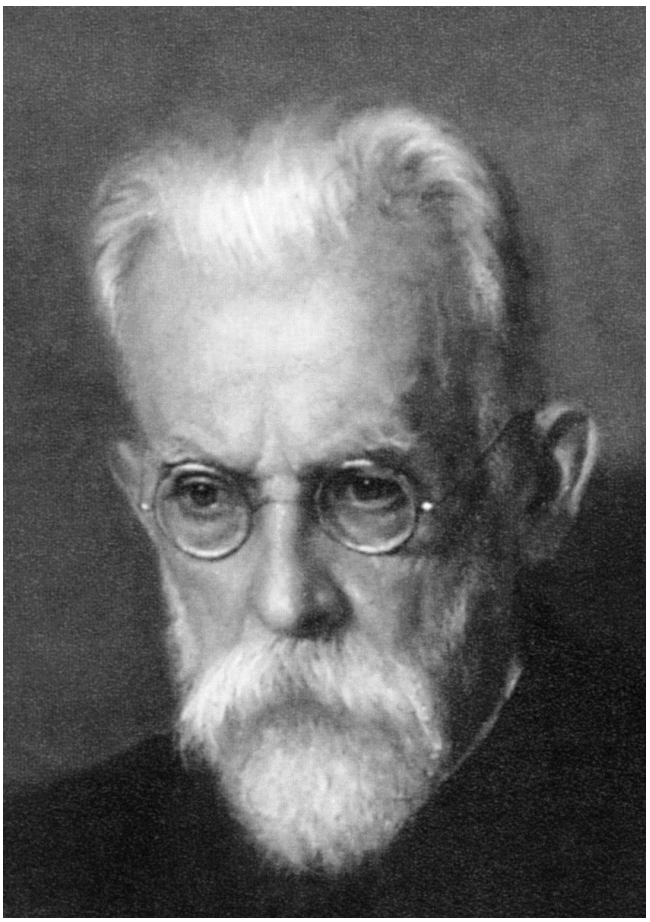
Editor in Chief
Academician
of the NAS of Ukraine
V.L. Bogdanov

I. NATIONAL ACADEMY OF SCIENCES OF UKRAINE

I.1. Presidents the National Academy of Sciences of Ukraine

The National Academy of Sciences of Ukraine was founded on November 27, 1918 in Kyiv, where at the premises of the Ukrainian Scientific Society at the address of the street Velyka Pidvalna, 36 (now Yaroslaviv Val, 36), the first Joint Meeting of the Ukrainian Academy of Sciences (UAS) took place. Its first president Academician **Volodymyr Ivanovych Vernadsky**, a world renowned academic was elected.

V.I. Vernadsky was born on February 28 (March 12) in 1863 in St. Petersburg in the family of an economist. Coming from an old Cossack family, he passed the childhood in Kharkiv and Poltava. In 1885 he graduated the Faculty of Physics and Mathematics of the St. Petersburg University. In 1890-1911 he worked at the Moscow University, since 1898 as a professor of mineralogy. In 1908 V.I. Vernadsky was elected as Academician of the Imperial St. Petersburg Academy of Sciences. In 1914-1917 he was director of the Geological and Mineralogical Museum of the Imperial St. Petersburg Academy of Sciences. Since June 1917 he lived in Ukraine. In the summer of 1918 he headed the commission for creating the UAS. According to V.I. Vernadsky point of view, the UAS should not only exist as a community of prominent scientists, but also as a union of state institutions, including “institutes for research and humanities, national museums, libraries, archives,” etc. Such a model of organization of the UAS had been born during discussions with M. Hrushevsky and his associates who believed that the UAS should be similar to the Western European academies and on the structure to the Shevchenko Scientific Society in Lviv and to the Ukrainian



Volodymyr Ivanovych Vernadsky
President of the Ukrainian Academy of Sciences
(1918-1921)

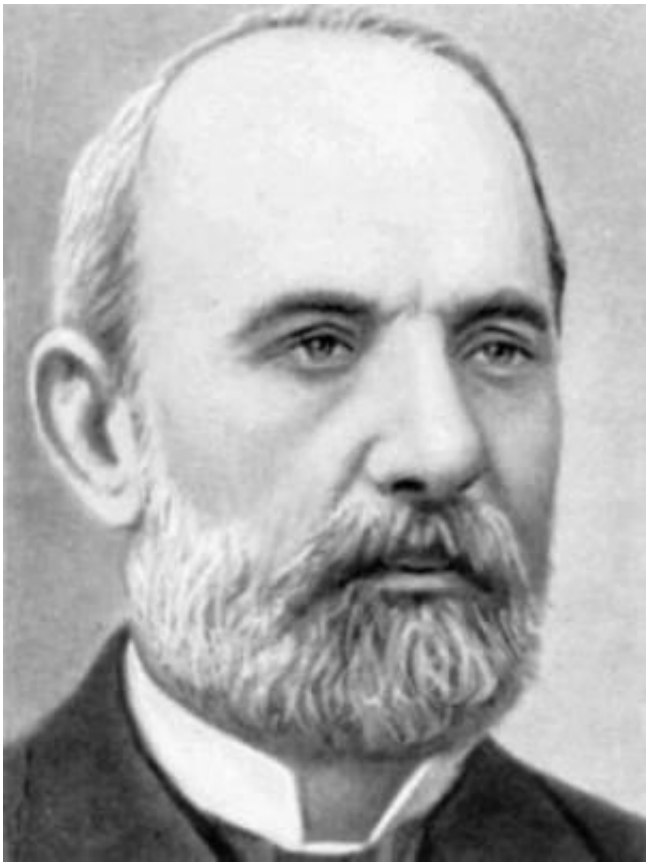
Scientific Society in Kyiv. The newly created organization, according to M. Hrushevsky, would be oriented mainly on historical and philological sciences, would have the status of self-organized public organization. The scientific community and authorities have preferred the V.I. Vernadsky model, who was elected as the Head-President of the UAS. In March, Volodymyr Ivanovych also became the Head of the commission to study the productive forces of Ukraine. Since 1922 he had worked in Petrograd, where he participated in the creation of the Radium Institute, and afterwards the Biogeochemical Laboratory, eventually transformed into the V.I. Vernadsky Institute of Geochemistry and Analytical Chemistry of the RAS. He died on January, 1945. He has scientific works in the field of mineralogy, crystallography, history and philosophy of natural sciences, as well as geochemistry, biogeochemistry and radiogeochemistry, the founder of which he is. Hi has also developed the theory of the biosphere, in particular on the noosphere as the unity of nature and culture.

Well-known scholars and organizers of science were presidents of the Academy in subsequent periods. In 1921-1922, **Mykola Prokopovych Vasylenko** was the President of the UAS, which, since June 1921, was named the All-

Mykola Prokopovych Vasilenko
President of the Ukrainian Academy of Sciences
since 1921 the All-Ukrainian Academy of Sciences
(1921-1922)

Ukrainian Academy of Sciences (AUAS). He was born on February 2 (14), 1866 in the Yessman village (now Glukhiv district, Sumy region) in the employee's family. He graduated from the University of Dorpat in 1890. Then he worked as a teacher at high school in Kyiv, participated in the political movement, worked in the justice system, taught at the Faculty of History and Philology of Kyiv University. Member of the Shevchenko Scientific Society since 1911. In 1917 he was a trustee of the Kyiv Educational District, worked as a history lecturer at the Kyiv University, at the same time as a professor at the Ukrainian National University and Law Institute. In April-October 1918 – Minister of Education and Arts of Ukraine. In 1920 he was elected a full member of the UAS in Law, Head of the Commission for the study of the history of Western-Russian and Ukrainian law at the Department of Economics and Social Studies of the UAS. In 1925-1929 – Head of the Department of Economics and Social Studies of the AUAS. He died on October 3, 1935. His scientific works are devoted to the history of state and law, history and historiography of Ukraine, as well as biography studies.

Orest Ivanovych Levitsky was born on December 13 (25), 1848 in Mayachka village (now Novo-Sanzharsky district of



Orest Ivanovych Levitsky
the President of the All Ukrainian
Academy of Sciences
(1922)

Poltava region) in the priest's family. He graduated from Kyiv University in 1874, was a student of V. Antonovych. He was a member of the commission for the analysis of ancient acts. He was one of the organizers of the UAS, was among the 12 scientists who became the first academicians of the UAS. From December 1919 to July 1921, in the absence of V.I. Vernadsky as the oldest one he served as the President of the Academy. In March 1922, he was elected as the President of the AUAS. He died on May 9, 1922. The main subject of his scientific works is the history of Ukraine, history of law, ethnography, and historiography.

Volodymyr Ipolitovych Lipsky was the President of the AUAS in 1922-1928. He was born on February 27 (March 11), 1863 in the village of Samostrily (now Koretsky District of Rivne region). He graduated the P. Galagan Collegium (1881), Kyiv University (1886), where afterwards he worked at the Department of Botany and in the University Botanical Garden. In 1894-1917 he worked in the Botanical Garden in St. Petersburg as the Curator, Chief Botanist, and Head of department of living plants. After returning to Ukraine, he worked as Director of the Botanical Garden in Kyiv, in 1919 he was elected as a full member of the UAS, while in 1921-1922, as a Vice President of AUAS, and thereafter in 1924 he was elected as Corresponding Member of the AS of USSR.

Volodymyr Ipolitovych Lipsky
the President of the All Ukrainian
Academy of Sciences
(1922-1928)

On June 21, 1928, Lipsky was resigned from the position of the President of the AUAS and went to Odessa, where he headed the Botanical Garden. In 1928-1937 he worked as the Director and the Sector Head of the Odessa Botanical Garden. He died on February 2, 1937. His scientific works are devoted to floristics, systematics of plants, geography of higher plants, the organization of botanical gardens, and the history of domestic botany. He participated in the expeditions to Central Asia, the Caucasus and Moldova. He described more than 200 new plant species, 45 of which are named after him.

Danylo Kyrylovych Zabolotny was the President of the AUAS in 1928-1929. He was born on December 16 (28), 1868 in the Chebotarka village (now Zabolotne village of Kryzhopil district of Vinnitsa region) in the peasant family. He graduated the Faculty of Physics and Mathematics of the Novorossiysk University in 1891 and the Medical Faculty of the Kyiv University in 1894. During his studies and at the beginning of his work as a physician in the Podilsky province, he had already calling of epidemiologist and bacteriologist, and awareness to develop these areas of medical science.

D.K. Zabolotny is an outstanding scientist in the field of epidemiology and bacteriology. He has repeatedly participated in the expeditions on the study of plague and cholera in India, Arabia, Central Asia, the Volga region and Scotland. In 1898, for the

Danylo Kyrylovych Zabolotny
the President of the All Ukrainian
Academy of Sciences
(1928-1929)

proposal of I.I. Mechnikov he worked at the Pasteur Institute in Paris, and was awarded by the French Order of the Honor Legion. Following L. Pasteur D.K. Zabolotny did much in the study and interpretation of the role of microbiological factors, biological properties of pathogens of various diseases in the emergence, development and fading of epidemics, which brought him the world recognition. In 1898 he founded Department of Bacteriology at the St. Petersburg Women's Medical Institute, where he had been working until 1928, while in 1920 established Department of Epidemiology at Odessa Medical Institute. D.K. Zabolotny was elected as a full member of the AUAS in February 1922 and a full member of the AS of USSR in January 1929. Since 1921 he took an active part in public life as a member of both the All-Ukrainian Central Executive Committee and the All-Union Central Executive Committee. In the spring of 1928 he was elected as the President of AUAS. D.K. Zabolotny was able to rally a team of famous scientists and specialists, who filled the ranks of the Academy, among them O.O. Bogomoletz, M.I. Vavilov, O.M. Dynnyk, Yanka Kupala, Ye.O. Paton, P.G. Tychyna, M.M. Fedorov, and D.I. Yavornytsky. In 1928 he founded the Institute of Microbiology and Epidemiology, which since 1963 became the D.K. Zabolotny Institute of Microbiology and Virology of the AS of UkrSSR. Due to the flu, he died

suddenly on December 15, 1929 and was buried in the village where he was born.

Oleksandr Oleksandrovych Bogomoletz was the President of the Academy during1930-1946. He was born on May 12 (24), 1881 in Lukyanivska prison, where his mother S.N. Bogomoletz (Prysetskaya) was under investigation in the case of radical populist organization of the left-wing "South-Russian Workers' Union". His father O.M. Bogomoletz was a zemsky doctor (general practitioner), a member of the revolutionary movement. O.O. Bogomoletz studied at the Kyiv University (since 1900), and then at the Novorossiysk University, which he graduated in 1907. His first scientific work was published in 1902. After graduating, he remained at the University, for preparing his doctoral thesis. The opponent at the thesis' defense was I.P. Pavlov, the Nobel Prize winner in 1904 in the field of physiology, medicine, who highly appreciated the work. O.O. Bogomoletz became the all-time Russian youngest doctor of medicine, receiving this degree in 28. In 1911-1925 he worked as professor at the Saratov University, while in 1925-1931 he was the professor of medical faculty of the 2nd Moscow Medical Institute and thereafter the director of the Institute of Blood Transfusion (1928-1931). In 1929 O.O. Bogomoletz was elected as a full member of AUAS, and in 1932 – as a full member of AS of USSR.

During the years of presidency of O.O. Bogomoletz, the AUAS, and since 1936 the Academy of Sciences of the UkrSSR, has become a powerful scientific organization, fully subordinated to the interests of science and technology development in the country. The Academy was reorganized and a research institute became as its main structural unit instead of the numerous chairs, commissions and committees. In 1934, as much as 36 institutes already worked at the Academy. The material and technical resources of the Academy improved, the capital construction of scientific institutions unfolded. To the ranks of the Academy the

Oleksandr Oleksandrovych Bogomoletz
President of the All-Ukrainian Academy of Sciences,
since 1936 the Academy of Sciences of the Ukrainian SSR
(1930-1946)

young promising scientists who ensured its development were engaged. Shortly after the election of the President of AUAS, O.O. Bogomoletz founded the Institute of Experimental Biology and Pathology of the Health People's Commissariat of the UkrSSR and the Institute of Clinical Physiology of AUAS, on the basis of which the O.O. Bogomoletz Institute of Physiology of the AS of UkrSSR was founded in 1953. This institute currently is one of the leading scientific biological organization in the world.

O.O. Bogomoletz is an outstanding scientist and organizer of science, a well-known public figure. During the years when he headed the Academy, the important scientific discoveries were made (e.g. for the first time in the USSR the atomic nucleus was cleaved by artificially accelerated particles, and the technologies of welding of defense significance were developed), as well as pioneering works in the field of chemistry and studies of the stress, reviving the organism, determining the environmental impact on a living organism were provided.

Since 1931 O.O. Bogomoletz was a member of the of the All-Ukrainian Central Executive Committee and the All-Union Central Executive Committee, a deputy of the Supreme Soviet of the 1st and 2nd convocations, a deputy of the Supreme Soviet of the UkrSSR of the first convocation, Vice-President of the AS of USSR from May 6, 1942 to May 23, 1945; awarded by the title

of Hero of Socialist Labor in 1944. He is the founder of the world-recognized school of pathophysiologists. He has also determined the role of the nervous system and connective tissue in the course of the disease. His work contributed to the development of new trends in modern endocrinology, immunology, oncology, gerontology, etc. He died on July 16, 1946 and was buried on the territory of the institute founded by him.

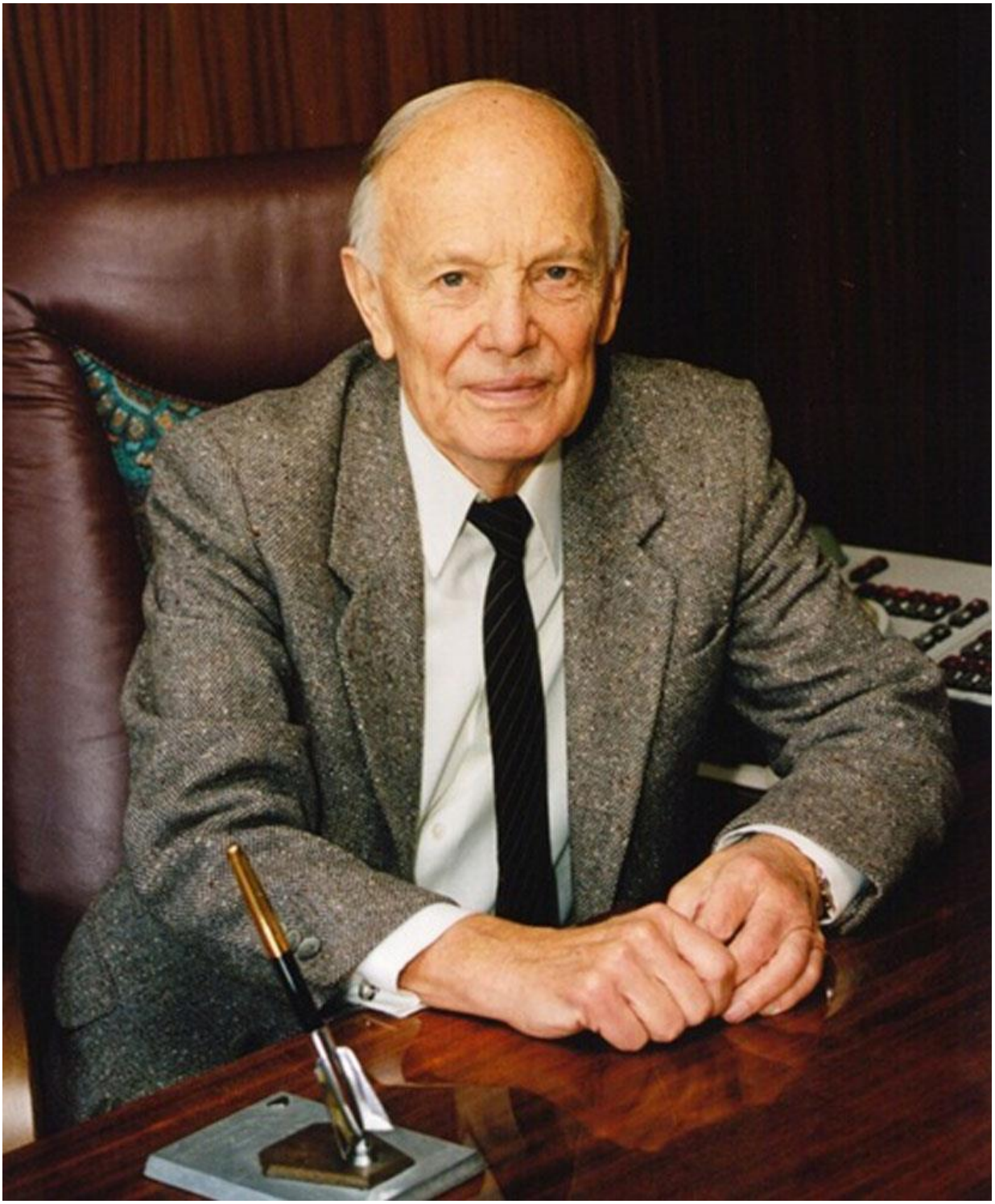
Oleksandr Volodymyrovych Palladin was the President of the Academy during 1946-1962. He was born on August 29 (September 10), 1885 in the family of a scientist in Moscow. His father V.I. Palladin was a teacher, and later – a professor at Moscow and Kharkiv Universities, Academician (since 1914) of the Imperial St. Petersburg Academy of Sciences, a scholar in the field of botany, biochemistry and plant physiology. O.V. Palladin graduated the Department of Physics and Mathematics of the St. Petersburg University (1908). He performed scientific work under the direction of the prominent scientists, members of the Imperial St. Petersburg Academy of Sciences, I.P. Pavlov and M.E. Vvedensky in his student years. Then he worked as a lecturer at higher educational institutions of St. Petersburg and Kharkiv; in 1921-1931 he was in charge of the Department of Physiological Chemistry of the Kharkiv Medical Institute. From 1925 to 1970 he headed the Ukrainian Biochemical Institute (the Institute of Biochemistry of AUAS in Kyiv, since 1972 – the O.V. Palladin Institute of Biochemistry of the AS of UkrSSR). In 1926 O.V. Palladin was elected as a corresponding member of AUAS, and then in 1929 he became a full member of AUAS, and in 1942 – a full member of the AS of USSR. In 1935-1938 he was the Permanent Secretary of the Presidium of the AS of UkrSSR, and then in 1939-1946 – its Vice President.

During the presidency of O.V. Palladin, the quantitative growth of the AS of UkrSSR was continued, namely providing institutions with up-to-date equipment and necessary hardware.

Oleksandr Volodymyrovych Palladin
President of the Academy of Sciences
of the Ukrainian SSR
(1946-1962)

The construction of a computer center, a home for institutes of humanitarian sciences, premises for new institutions or the expansion of existing ones, in particular in the regions, was started. O.V. Palladin is an outstanding scientist in the field of biochemistry of muscular activity and nervous system, the study of the influence of dietary nutrition on the metabolism, vitamin biochemia and avitaminoses. O.V. Palladin was awarded by the title of Hero of Socialist Labor in 1955. His work on the creation of vikasol, a medicine for the cessation of bleeding, was marked in the war years by the Order of the Red Star. O.V. Palladin resigned in 1962 and died on December 6, 1972.

Since 1962 the National Academy of Sciences of Ukraine is headed by **Boris Yevhenovych Paton**. He was born on November 27, 1918 in Kyiv in the family of scientist – Ye.O. Paton, a professor of the Kyiv Polytechnic Institute. In 1941 B.Ye. Paton graduated from the Kyiv Polytechnic Institute. His scientific and production activities began at Uralvagonzavod in Nizhny Tagil in February 1942 in the evacuated laboratories of the Institute of Electric Welding of the AS of UkrSSR. During the next 11 years he had worked at the Institute of Electric Welding of the AS of UkrSSR, headed by his father, Academician Ye.O. Paton, and in 1953 he was appointed as a director of the institute.



Borys Yevhenovych Paton
President of the National Academy of Sciences of Ukraine

Since 1962, the President of the Academy of Sciences of the Ukrainian SSR
since 1991 the Academy of Sciences of Ukraine
since 1994 the National Academy of Sciences of Ukraine
(1962- till now)

B.Ye. Paton is a world-famous scientist in the field of metallurgy, welding and metal technology, and the organizer of science, state and public figure. Since 1958 he is Academician of the NAS of Ukraine, then Academician of the AS of USSR, and the Russian Academy of Sciences (from 1992), as well as a member of other foreign academies of sciences, President of the International Association of Academies of Sciences (from 1993 to 2016). He was twice presented with the title of Hero of Socialist Labor (1969 and 1978), and is the first holder of the title of Hero of Ukraine (1998). He is also the Laureate of Lenin (1957) and Stalin's (State) Awards (1950) and was twice awarded the State Prizes of Ukraine (1970 and 2004) as well as awarded the highest honour of the AS of USSR – the M.V. Lomonosov Great Gold Medal (1980), the highest award of the National Academy of Sciences of Ukraine – the V.I. Vernadsky Gold Medal (2003), and is the winner of the international award "Global Energy" (2010).

The main directions of his scientific activity are the automation of welding processes and their management, the development of space technologies of welding and devices for their realization, solving problems of creation of gas transportation systems, methods and technologies of special electrometallurgy, welding of living tissue, development of scientific principles of management of academic science and scientific and technical progress. He is the author of more than 1000 scientific works, including 20 monographs and over 400 inventions.

For 56 years under the leadership of B.Ye. Paton a rapid development of the Academy of Sciences of the Ukrainian SSR, took place, and subsequently, in accordance with the Concept of Development and the improvement of the activities of the National Academy of Sciences of Ukraine, in accordance with the world trends of modern science and the current tasks of state construction and development of society was provided. The Academy has become the main focus of cutting-edge fundamental and applied research and development in Ukraine, a recognized world center for

material science and various areas of natural sciences and a national leader in the field of social sciences and the humanities.

B.Ye. Paton, in the early days of his career, as the President of the Academy, put forward and provided the full support of prominent personalities in all areas of scientific research, primarily in the field of fundamental research. During the 1960's and early 1970's the outstanding scientists were nominated for academic positions at scientific institutes and the Presidium of the AS of UkrSSR, namely: the mathematicians – V.M. Glushkov, Academician of the AS of USSR and the AS of UkrSSR, and O.V. Pogoryelov, Academician of the AS of USSR and the AS of UkrSSR; the physicist – O.S. Davydov – Academician of the AS of UkrSSR; physicist and material scientist – S.I. Pekar, Academician of the AS of UkrSSR; material scientist – I.K. Pokhodnya, Academician of the AS of UkrSSR; chemists – O.V. Bogatsky, Yu.S. Lipatov, K.B. Yatsymirsky, Academicians of the AS of UkrSSR; physiologist – P.G. Kostyuk, Academician of the AS of USSR and the AS of UkrSSR; linguist – I.K. Bilodid, Academician of the AS of USSR and the AS of UkrSSR; philosopher – P.V. Kopnin, Academician of the AS of UkrSSR and others.

B.Ye. Paton gave a considerable attention to representatives of the older generation of academic scholars (mathematicians and mechanics M.M. Bogolyubov, Yu.O. Mitropolsky, and M.K. Yangel, all – Academicians of the AS of USSR and the AS of UkrSSR; V.S. Budnyk and H.S. Pysarenko, both – Academicians of the AS of UkrSSR; specialist in the field of management H.Ye. Pukhov, Academician of the AS of UkrSSR; in the field of medicine and cybernetics – M.M. Amosov, Academician of the AS of UkrSSR; biologists V.O. Belitser and S.M. Gershenzon – Academicians of the AS of UkrSSR; physicists A.F. Pryhot'ko and O.Ya. Usikov; geologists M.P. Semenenko, V.G Bondarchuk, and O.S. Vyalov; chemists O.V. Kirsanov, and O.I. Brodsky and others), which ensured continuity in scientific research and creation of new scientific schools.

Due to the careful selection of leading scientific personnel from talented scientists, the scientific institutions of the AS of UkrSSR in the 70-80s of the 20th century became the widely known in the USSR and abroad as advanced centers in their fields, ensuring the priority of national science in many areas of natural, technical and social sciences. B.Ye. Paton' invitation of famous writers and literary critics M.P. Stel'makh and O.T. Gonchar to the ranks of the Academy by B.Ye. Paton, and later of the poet and literary critic B.I. Oliynyk caused positive publicity in society, contributed to the development of the humanities and a comprehensive discussion of issues of scientific and technological development.

The rapid development of the economy and the task of ensuring the country's defense capabilities in the 60-80 years of the last century required the creation of breakthrough technologies and fundamentally new materials, which prompted rapid growth of the scale and pace of scientific and scientific and technical activity. The implementation of the physical and technical directions to academic organizations of the AS of UkrSSR, which on the proposal of B.Ye. Paton was called "purposeful fundamental research", that was, such studies, that may result in new knowledge, previously unknown to anyone, with a concrete practical result, has led to a significant development of applied research. The Academy created a powerful research and production base, which included a network of design bureaus, research plants and manufactories. This allowed the establishments of the AS of UkrSSR to provide a full cycle of work, from basic research through applied research to create research samples or working models or industrial technologies that meet certain needs. The number of employees in the organizations and enterprises of the research and production base of the AS of UkrSSR at the end of the 90s was almost the same as in scientific institutions. B.Ye. Paton initiated the creation of large integrated scientific and technical programs with the participation of the Academy's institutions, which became an integral part of the inter-branch scientific and technical complexes, to meet the needs of

interests of the military-industrial complex and certain branches of the economy.

From the 90s of the last century under the conditions of a long-term economic crisis it is managed to preserve both the Academy itself and its main scientific schools due to the authority and skillful leadership of B.Ye. Paton. The NAS of Ukraine received the legal status of a supreme national scientific self-governing organization, which is based on state ownership with the right to independently determine the subject and organize research and decision of scientific-organizational, economic, personnel issues of activity. The structure of research in the field of natural, technical, social and humanitarian sciences has been reorganized in accordance with urgent modern problems in the field of science, economics and society.

I.2. Development of institutional structure National Academy of Sciences of Ukraine (1918-2018):

1918 On November 14 the Law on the Establishment of the Ukrainian Academy of Sciences (UAS) was approved. The Hetman of Ukraine P. Skoropadsky approved an order to appoint the first 12 full members (academicians) of the UAS. After the first General Meeting, which took place on November 27, the Academy in accordance with the Law organized three departments: Historical and Philological Department (Head – Academician of the UAS D.I. Bahaliy), Department of Physics and Mathematics (Head – Academician of the UAS M.F. Kashchenko) and Department of Economics and Social Studies (Head – Academician of the UAS M.I. Tuhan-Baranovsky). Each department had four academicians. Three scientific research institutes and other scientific divisions were created in the UAS.

1919 The first election of scientists to the UAS took place in January. During the year, fourteen new members were added to the Academy ranks.

1921 On June 14 the Council of People's Commissars of UkrSSR adopted the Regulation "On the All-Ukrainian Academy of Sciences" according to it the UAS was renamed the All-Ukrainian Academy of Sciences (AUAS), to emphasize the unification in the ranks of the Academy of all scholars of Ukraine, including ones from the western lands of Ukraine, which were under the power of other states. The Ukrainian Scientific Society became a part of the AUAS.

1929 An academic council consisting of full members of the Academy and senior representatives of the People's Commissariat of Education of UkrSSR has been defined as the highest body of the AUAS.

1930 Two departments instead of three were created in the AUAS: Natural and Technical Sciences (Head – Academician of the UAS O.V. Fomin) and Economic and Social Studies (Head – Academician of the UAS O.G. Shlichter).

1934 In January the six-line system of organization of the AUAS was liquidated (cabinet – commission – chair – cycle – department – presidium). A research institute, the total number of which was equal to twenty-two units, was decided to consider as the main structural unit.

1935 Since April 1, according to the decision of the All-Ukrainian Central Executive Committee, the AUAS was subordinated directly to the Council of the People's Commissars of the UkrSSR.

1936 On February 21 the AUAS received both the new name – Academy of the AS of UkrSSR and a new structure. The higher body of the Academy instead of the academic council became the general meeting of members. In the structure of the Academy there were formed three scientific departments; which were headed by Academician of the AS of UkrSSR O.G. Shlichter – the Department of Social Sciences, Academician of the AS of UkrSSR O.G. Goldman – Department of Mathematical and Natural Sciences

and – Academician of the AS of UkrSSR Ye.O. Paton – Department of Technical Sciences.

1939 Four scientific departments were approved in the structure of AS of UkrSSR, namely Department of Social Sciences (Head – Academician of the AS of UkrSSR M.Ya. Kalynovych); Department of Physico-Chemical and Mathematical Sciences (Head – Academician of the AS of UkrSSR I.K. Matsurevych); Department of Biological Sciences (Head – Academician of the AS of UkrSSR V.P. Pospelov) and Department of Technical Sciences (Head – Academician of the AS of UkrSSR S.V. Serensen). At the end of 1939, the Academy had 27 research institutions.

1941-1944 On June 25, 1941, the general meeting of the AS of UkrSSR adopted a decision that all scientific and organizational activities of the Academy in the shortest possible time were completely rebuilt in the interests of the country's defense. In July-August 1941 according to the decision of the Soviet Government forced by the advancement of the fascist invaders deep into the USSR territory the main part of the Academy's institutes and employees was evacuated to the capital of Bashkir Autonomic SSR – Ufa city. Some institutes were soon transferred to other cities of the eastern regions of the USSR. For instance, the Institute of Electric Welding was evacuated to Nizhny Tagil city, the Institute of Physics and Technology – to Alma-Ata city, the Institute of Ferrous Metallurgy – to Sverdlovsk city. The institutes of the AS of UkrSSR also carried out activities in Tashkent, Frunze, Krasnoyarsk, Bukhara and other cities. The evacuees of the Academy were united in 15 institutes according to their occupations and tasks set by the Soviet Government. The process of evacuation was organized, the main cadres of scientists were saved, the valuable scientific equipment was equipment is rescued, and a significant part of the library funds was saved. With high patriotism, the scientists worked with a maximum load and dedication. At the first meetings of the AS of UkrSSR in Ufa on July 21-30, 1941, the directions and forms of research activity of each institute in the conditions of war were clearly defined. Due to

the assistance of the local party bodies, the Academy in the shortest term, overcoming all the difficulties, organized the activity of their institutions. Already, in the Radinformbureau message to the soviet citizens as early as September 4, 1941 was noted that "Institutes of the AS of UkrSSR had made a number of valuable proposals aimed at strengthening the country's military might". In August-September 1943 a large part of the institutes of the AS of UkrSSR moved to Moscow. In March 1944 the transfer of academic institutions to Ukraine began, and on June 23, on his first visit to Kyiv, the President of the AS of UkrSSR O.O. Bogomoletz at the Presidium meeting announced the end of the re-evacuation. The structure of the Academy had been restored in the form of four scientific departments: Department of Physical, Chemical and Mathematical Sciences, Department of Biological Sciences, Department of Technical Sciences, and Department of Social Sciences.

1945 Department of Agricultural Sciences of the AS of UkrSSR was created (headed by Academician of the AS of UkrSSR M.M. Gryshko and then during 1948-1956 – by Academician of the AS of UkrSSR P.A. Vlasyuk), which included four institutes, created on the basis of divisions of other sectors of sciences, and two academic institutions as well. This Department was liquidated in 1956, and four institutions were transferred to the Ukrainian Academy of Agricultural Sciences, except the Botanical Institute and Botanical Garden.

1946 Heads of the departments of the AS of UkrSSR were appointed as follows: Department of Physical-Chemical and Mathematical Sciences – Academician of the AS of UkrSSR V.Ye. Lashkaryov and since 1948 – Academician of the AS of UkrSSR A.I. Kiprianov; Department of Biological Sciences – Academician of the AS of UkrSSR D.K. Tretyakov then since 1948 – Academician of the AS of UkrSSR P.O. Svyrydenko, during 1952-1960 and 1963-1966 – Academician of the AS of UkrSSR R.Ye. Kavetsky, while during – 1961-1962 – Academician of the AS of UkrSSR O.F. Makarchenko; Department of Agricultural Science

– Academician of the AS of UkrSSR P.A. Vlasyuk; Department of Technical Sciences – Academician of the AS of UkrSSR G.F. Proskura, then since 1948 – Academician of the AS of UkrSSR M.M. Dobrokhotov, while during 1952-1954 – Academician of the AS of UkrSSR M.V. Kornoukhov and during 1954-1964 – Academician of the AS of UkrSSR and Corresponding Member of the AS of USSR K.K. Khrenov; Department of Social Sciences – Academician of the AS of UkrSSR and Corresponding Member of the AS of USSR M.V. Ptukha – till 1950, then during 1952-1957 – Doctor of philological sciences (since 1957 – Academician of the AS of UkrSSR) I.K. Bilodid, and during 1957-1963 – Doctor of Economic Sciences (since 1961 – Corresponding Member of the AS of UkrSSR) O.S. Koroyid. In 1949 there was altogether as a part of the AS of UkrSSR 46 research establishments, among them 33 institutes.

1956 There were 5 departments in the Academy, three of which functioned earlier: Department of Biological Sciences (headed by Academician of the AS of UkrSSR R.Ye. Kavetsky during 1952-1960), Department of Technical Sciences (headed by an Academician of the AS of UkrSSR, Corresponding Member of the AS of USSR K.K. Khrenov during 1954-1964) and Department of Social Sciences (headed by Doctor of Philological Sciences I.K. Bilodid). On the basis of Department of Physical-Chemical and Mathematical Sciences, two new departments were created: Department of Physics and Mathematics (headed by Academician of the AS of UkrSSR B.V. Gniedenko during 1956-1957, Corresponding Member of the AS of UkrSSR V.N. Hridnyev during 1957-1961, and Academician of the AS of UkrSSR Yu.O. Mitropolsky during 1961-1963) and Department of Chemical and Geological Sciences (headed by Academician of the AS of UkrSSR A.I. Kiprianov during 1956-1957, Academician of the AS of UkrSSR Yu.K. Delimarsky during 1957-1959, Corresponding Member of the AS of UkrSSR S.P. Rodionov during 1959-1961). Meantime, Department of Agricultural Science of the AS of UkrSSR was liquidated.

1963 The AS of UkrSSR established a new organizational structure: three sections, which united nine departments.

Section of Physical-Technical and Mathematical Sciences (headed by Academician of the AS of UkrSSR (and since 1964 Academician of AS of USSR) V.M. Glushkov during 1962-1982, Academician of the AS of UkrSSR (and since 1987 Academician of the AS of USSR) V.I. Trefilov during 1982-1993, Academician of the NAS of Ukraine V.G. Bariakhtar during 1993-1998) consisted of four departments: Mathematics, Mechanics and Cybernetics (Academician-Secretary – Academician of the AS of UkrSSR Yu.O. Mitropolsky, 1963-1983); Physics (Academician-Secretary – Academician of the AS of UkrSSR A.A. Smirnov,1963-1966; Academician of the AS of UkrSSR O.S. Parasyuk, 1966-1970; Academician of the AS of UkrSSR V.N. Hridnyev, 1970-1982); Sciences of Earth and Space (Academician-Secretary – Academician of the AS of UkrSSR S.I. Subbotin, 1963-1976); Physical and Technical Problems of Material Science (Academician-Secretary – Academician of the AS of UkrSSR I.M. Fedorchenko, 1963-1988; Academician of the AS of UkrSSR I.K. Pohodnya, 1988-2015; Academician of the NAS of Ukraine L.M. Lobanov, since 2015)

Section of Chemical-Technological and Biological Sciences (headed by Academician of the AS of UkrSSR V.S. Gutyrya during 1963-1974, Academician of the AS of UkrSSR K.M. Sytnyk during 1974-1978, Academician of the AS of UkrSSR F.S. Babichev during 1978-1988, Academician of the AS of UkrSSR and AS of USSR V.I. Skok during 1988-1993, Academician of the NAS of Ukraine and the AS of USSR P.G. Kostyuk during 1993-1998, Academician of the NAS of Ukraine V.D. Pokhodenko during 1998-2015, Academician of the NAS of Ukraine V.G. Koshechko, since 2015) consisted of three departments: Chemistry and Chemical Technology (Academician-Secretary – Academician of the AS of UkrSSR K. B. Yatsymirsky, 1966-1978, Academician of the AS of UkrSSR V.P. Kukhar, 1978-1988); Biochemistry, Biophysics and Physiology (Academician-Secretary – Academician of the AS of

UkrSSR R.Ye. Kavetsky, 1963-1966, Academician of the AS of UkrSSR R.V. Chagovets, 1966-1972, Corresponding Member of the AS of UkrSSR V.I. Skok, 1972-1978, Academician of the AS of UkrSSR P.G. Bogach, 1978-1981, Academician of the AS of UkrSSR and since 1987 Academician of the AS of USSR V.I. Skok, 1981-1988, Academician of the AS of UkrSSR G.Kh. Matsuka, 1988-2004); General Biology (Academician-Secretary – Corresponding Member of the AS of UkrSSR O.V. Topachevsky, 1962-1966; Academician of the AS of UkrSSR I.G. Pidoplichko, 1966-1970; Academician of the AS of UkrSSR O.P. Markevych, – 1970-1972, Academician of the AS of UkrSSR K.M. Sytnyk, 1972-1974; Academician of the AS of UkrSSR A.M. Grodzynsky, 1974-1988; Academician of the AS of UkrSSR Yu.Yu. Gleba, 1990-1998, Academician of the NAS of Ukraine D.M. Grodzynsky, 1998-2009; Academician of the NAS of Ukraine V.V. Morgun, since 2009).

Section of Social Sciences (headed by Academician of the AS of UkrSSR (and since 1972 Academician of AS of USSR) I.K. Bilodid during 1963-1978, Academician of AS of UkrSSR P.T. Tronko during 1978-1979, Academician of the AS of UkrSSR (and since 1984 an Academician of AS of USSR) I.I. Lukinov during 1979-1993; Academician of the NAS of Ukraine P.P. Tolochko during 1993-1998) included two departments: Economics, History, Philosophy and Law (Academician- Secretary – Corresponding Member of the AS of UkrSSR I.O. Hurzhiy, 1963-1968; Academician of the AS of UkrSSR B.M. Babiy, 1970-1978) and Literature, Language and Art Studies (Academician-Secretary – Academician of the AS of UkrSSR I.K. Bilodid, 1963-1965; Academician of the AS of UkrSSR M.Z. Shamota, 1966-1971; Academician of the AS of UkrSSR O.S. Melnichuk, 1971-1978; Academician of the AS of UkrSSR V.M. Rusanivsky,1978-1993; Academician of the NAS of Ukraine L.M. Novychenko, 1993-1996; Academician of the NAS of Ukraine I.M. Dzyuba, 1998-2004; Academician of the NAS of Ukraine V.G. Sklyarenko, 2004-2009; Academician of the NAS of Ukraine M.G. Zhulynsky, since 2009).

1969 Department of Physical and Technical Problems of Power Engineering was established (Academician-Secretary – Academician of the AS of UkrSSR I.T. Shvets – 1970-1978, Academician of the AS of UkrSSR H.Ye. Pukhov – 1978-1988, Academician of the AS of UkrSSR A.K. Shydlovsky – 1988-1998, Academician of the NAS of Ukraine B.S. Stohnii – 1998-2015, Academician of the NAS of Ukraine O.V. Kirilenko – since 2015).

1971 Department of Biochemistry, Biophysics and Physiology was reorganized into Department of Biochemistry, Physiology and Theoretical Medicine (Academician-Secretary – Academician of the AS of UkrSSR R.V. Chagovets, 1972-1976). The Academy had 81 research institutes and 33 self-supporting research and production, and experimental organizations[1].

1972 Department of Earth and Space Sciences was transformed into Department of Geosciences (Academician-Secretary – Academician of the AS of UkrSSR S.I. Subbotin, 1966-1976; Academician of the AS UkrSSR M.P. Shcherbak, 1976-1980).

1976 On the basis of Department of Economics, History, Philosophy and Law two new Departments were organized: Economics (Academician-Secretary – Academician of the AS of UkrSSR I.I. Lukinov, 1976-1980; Corresponding Member of the AS of UkrSSR (and since 1982 Academician of the AS UkrSSR) M.G. Chumachenko, 1981-1982; Academician of the AS of UkrSSR A.M. Shlepakov, 1983-1988; Academician of the AS of UkrSSR Yu.M. Pakhomov, 1988-1993; Academician of the NAS of UkrSSR and Academician of the AS of USSR I.I. Lukinov, 1993-1998; Academician of the NAS of Ukraine V.M. Heyets, 1998-2009; Academician of the NAS of Ukraine E.M. Libanova, since 2009) and History, Philosophy and Law (Academician-Secretary – Academician of the AS of UkrSSR B.M. Babiy 1978-1988, Academician of the AS of UkrSSR I.F. Kuras, 1988-1993;

[1] The dynamics of changes in the number of institutions of the NAS of Ukraine is given in Chapter IX.1.

Academician of the NAS of Ukraine Ya.D. Isaievych, 1993-1998; Academician of NAS of Ukraine O.S. Onishchenko, 1998-2015; Academician of the NAS of Ukraine V.A. Smoliy, since 2015).

1979 Department of Physics changed the name to Department of Physics and Astronomy (Academician-Secretary – Academician of the AS of UkrSSR V.N. Hridnyev, 1979-1982; Academician of the AS of UkrSSR V.G. Baryakhtar, 1983-1993; Academician of the NAS of Ukraine M.S. Brodin, 1993-1998; Academician of the NAS of Ukraine A.G. Naumovets, 1998-2004; Academician of the NAS of Ukraine V.M. Loktev, since 2004).

1980 On March 12 Department of Oceanology, Hydrophysics and Geography was established (Academician-Secretary – Academician of the AS of UkrSSR B.O. Nelyepo, 1981-1983), while in 1983 this department was disbanded. Department of Geosciences was renaming for Department of Geology, Geophysics and Geochemistry (Academician-Secretary – Academician of the AS of UkrSSR M.P. Shcherbak, 1976-1983).

1983 On the basis of Department of Mathematics, Mechanics and Cybernetics, two new departments were organized: Department of Mathematics and Cybernetics (Academician-Secretary – Academician of the AS of UkrSSR (and since 1984 Academician of AS of USSR) Yu.O. Mitropolsky, 1983-1988) and Department of Mechanics (Academician-Secretary – Academician of the AS of UkrSSR O.M. Guz, 1983-1988; Academician of the AS of UkrSSR V.T. Troshchenko, 1988-1993; Academician of the NAS of Ukraine V.V. Pilipenko, 1993-2004; Academician of the NAS of Ukraine A.F. Bulat, since 2004). Department of Geology, Geophysics and Geochemistry returned the previous name – Department of Geosciences (Academician-Secretary – Academician of the AS of UkrSSR A.V. Chekunov, 1983-1988; Academician of the AS of UkrSSR V.I. Starostenko, 1988-2004; Academician of the NAS of Ukraine V.M. Shestopalov, 2004-2015; Academician of the NAS of Ukraine O.M. Ponomarenko, since 2015).

1988 Department of Mathematics and Cybernetics of the AS of UkrSSR was divided into two branches: Department of Mathematics (Academician-Secretary – Academician of AS of USSR and USSR Academy of Sciences Yu.O. Mitropolsky, 1988-1993; Academician of the NAS of Ukraine I.V. Skrypnyk, 1993-2006; Academician of the NAS of Ukraine A.M. Samoilenko, since 2006) and Department of Computer Science, Computer Engineering and Automation (Academician-Secretary – Academician of the AS of UkrSSR and Academician of the AS of USSR V.S. Mykhalyvych, 1988-1994; Academician of the NAS of Ukraine I.M. Kovalenko, 1995-1997).

1990 Department of Problems of Medicine was created (Academician-Secretary – Academician of the AS of UkrSSR Yu.I. Kundijev), while Department of Biochemistry, Physiology and Theoretical Medicine was transformed into Department of Biochemistry, Physiology and Molecular Biology (Academician-Secretary – Academician of the NAS of Ukraine G.K. Matsuka, 1988-2004; Academician of the NAS of Ukraine S.V. Komisarenko, since 2004).

1991 Department of Chemistry and Chemical Technology was transformed into Department of Chemistry (Academician-Secretary – Academician of the NAS of Ukraine V.D. Pokhodenko, 1988-1998; Academician of the NAS of Ukraine V.V. Goncharuk, 1998-2015, Academician of the NAS of Ukraine M.T. Kartel, since 2015).

1995 Department of Problems of Medicine was liquidated, and its institutions were transferred to the newly established the National Academy of Medical Sciences of Ukraine. Department of Biochemistry, Physiology and Molecular Biology was transformed into Department of Molecular Biology, Biochemistry and Clinical Physiology, which in 2007 returned its previous name – Department of Biochemistry, Physiology and Molecular Biology (Academician-Secretary – Academician of the NAS of Ukraine S.V. Komisarenko).

1997 Department of Informatics, Cybernetics and Automation was transformed into Department of Informatics (Academician-Secretary – Academician of the NAS of Ukraine I.V. Sergyenko, 1998-2009; Academician of the NAS of Ukraine V.S. Deineka, 2010-2014; Academician of the NAS of Ukraine P.I. Andon, since 2015).

1998 There were clarifications to the research directions and three sections of the NAS of Ukraine was approved: Section of Physical, Engineering and Mathematical Sciences (headed by Academician of the NAS of Ukraine A.K. Shydlovsky during1998-2004, and since 2004 – by Academician of the NAS of Ukraine A.G. Naumovets); Section of Chemical and Biological Sciences (headed by Academician of the NAS of Ukraine V.D. Pokhodenko and since 2015 – by Academician of the NAS of Ukraine V.G. Koshechko); Section of Social Sciences and Humanities (headed by Academician of the NAS of Ukraine I.F. Kuras during 1998-2005, Academician of the NAS of Ukraine V.M. Lytvyn during 2006-2009, Academician of the NAS of Ukraine V.M. Heyets during 2009-2015 and since 2015 – by Academician of the NAS of Ukraine S.I. Pyrozhkov).

2004 Department of Nuclear Physics and Power Engineering was created (Academician-Secretary – Academician of the NAS of Ukraine I.M. Neklyudov, 2004-2015, Academician of the NAS of Ukraine M.F. Shul'ga, since 2015).

2018 There are currently fourteen departments in three sections of the National Academy of Sciences of Ukraine. In Section of Physical, Engineering and Mathematical Sciences (headed by Academician of the NAS of Ukraine A.G. Naumovets) there are eight departments: Mathematics (Academician-Secretary – Academician of the NAS of Ukraine A.M. Samoilenko), Informatics (Academician-Secretary – Academician of the NAS of Ukraine P.I. Andon), Mechanics (Academician-Secretary – Academician of the NAS of Ukraine A.F. Bulat), Physics and

Astronomy (Academician-Secretary – Academician of the NAS of Ukraine V.M. Loktev), Geosciences (Academician-Secretary – Academician of the NAS of Ukraine O.M. Ponomarenko), Physical and Technical Problems of Material Science (Academician-Secretary – Academician of the NAS of Ukraine L.M. Lobanov), Physical and Technical Problems of Power Engineering (Academician-Secretary – Academician of the NAS of Ukraine O.V. Kirilenko), Nuclear Physics and Power Engineering (Academician-Secretary – Academician of the NAS of Ukraine M.F. Shul'ga). Section of Chemical and Biological Sciences (headed by Academician of the NAS of Ukraine V.G. Koshechko) consists of three departments: Chemistry (Academician-Secretary – Academician of the NAS of Ukraine M.T. Kartel), Molecular Biology, Biochemistry, Experimental and Clinical Physiology (Academician-Secretary – Academician of the NAS of Ukraine S.V. Komisarenko), General Biology (Academician-Secretary – Academician of the NAS of Ukraine V.V. Morgun). Section of Social Sciences and Humanities (headed by Academician of the NAS of Ukraine S.I. Pyrozhkov) unites three departments: Economics (Academician-Secretary – Academician of the NAS of Ukraine E.M. Libanova), History, Philosophy and Law (Academician-Secretary – Academician of the NAS of Ukraine V.A. Smoliy), Literature, Language and Art Studies (Academician-Secretary –Academician of the NAS of Ukraine M.G. Zhulynsky).

I.3. Background information[2]

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

[2] As of 1 January 2018.

Source: Materials of Information of the National Academy of Sciences of Ukraine. – URL: http://www.nas.gov.ua/UA/About/Documents/2017_dovidka.pdf.

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. Five acting members of the Presidium and 14 Presidium advisors also participate in the Presidium meetings in advisory capacity.

Structure. The NAS of Ukraine has 3 sections (Section of Physical, Engineering 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. Gryshko 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 the 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 160, and research organizations of industrial base – 36.

Cooperation with education institutions. In 2017, the NAS of Ukraine signed nearly 260 agreements with universities on cooperation, externship and internship of students, etc. There were nearly 220 joint research projects. The network of joint research and education organizations (more than 260 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 2017, 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 90 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 78 scientific councils, 18 committees, 16 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 2017, research institutions of the NAS of Ukraine introduced in various sectors of Ukrainian economy over 1000 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 21 license agreements in Ukraine and abroad, obtained 583 patents for inventions and utility models. They implemented 32 innovation projects, selected on competitive basis at the beginning of the year.

The tasks of the state target scientific and technical program were performed: "State target scientific and technical program for the development and creation of sensory science-intensive products for 2008-2017", the state customer of which was determined the NAS of Ukraine.

In 2017, institutions of the NAS of Ukraine realized nearly 167 contracts with corporations, companies, enterprises and centers from more than 30 developed countries on line of foreign economic activities. Sales of R&D products, science & technology services, and technology transfer amounted to over UAH 115.6 million.

R&D of the NAS of Ukraine were presented at 9 large exhibitions, in particular at the international exhibition MEDICAEXPO and the international pharmaceutical exhibition PHARMAEXPO, the exhibition-presentation of scientific achievements of the National Academy of Sciences of Ukraine (within the framework of the XI All-Ukrainian Science Festival), the annual exhibition-presentation of industrial products "Made in Kyiv", and the international specialized exhibitions "LabComplEX. Analytics. Laboratory. Biotechnology", "HI-TECH EXPO. High Technologies", "PHARMATechExpo", XXII International Exhibition "Security 2017", International Forum "INNOVATION MARKET".

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 of the

public policy development in the sphere of scientific and scientific and technological activity.

In 2017, institutions of the NAS of Ukraine commissioned by various power authorities issued over 2200 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.

On a regular basis, an expert evaluation of the thematic of fundamental research of scientific institutions of the country which were performed at the expense of the state budget of Ukraine was carried out.

During 2017, 393 research projects of six main spending units were considered, on each of which provided an expert opinion on the appropriateness of its financing from the state budget.

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 10% of the Academy output of books in 2017. During current year "Naukova Dumka" published 39 titles of scientific monographs prepared by employees of the NAS of Ukraine, with a total amount of more than 850 accounting and publishing pages.

268 issues of the Academy journals with the circulation of over 44.2 thousand and more than 3.19 thousand accounting and publishing pages were published in "Academperiodicals". In particular, 211 issues of 37 editions within the Program of support of the journals of the NAS of Ukraine, among them the only academic popular science magazine "Worldview". Also, Publishing House "Academperiodicals" issued 5 scientific monographs in volume more than 119.0 accounting and publishing pages.

In 2017, institutions of the NAS of Ukraine published 421 scientific monographs, 159 titles of scientific papers collections,

96 educational publications and 223 reference and scientific and popular books.

The total number of articles in periodicals is 18.84 thousand of which almost 15.0 thousand (over 79%) were published in professional domestic and foreign journals. 62 (15%) scientific books and over 5.3 thousand articles in periodicals were published abroad.

In 2017, papers of scientific workers were printed in 84 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 the Academy research institutions.

International scientific cooperation is carried out within 128 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, in particular the International Association of Academies of Sciences (IAAS), the International Committee on Space Research (COSPAR), the International Union of Academies (IUA), the European Federation of Academies of Sciences and Humanities (ALLEA) and actively participates in activity of the 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 Program Authorities, in particular the Intergovernmental Oceanographic Commission, the

UNESCO-MAB Strategic Group for the development of the Strategy for this program over the next decade, etc. For each of these areas, there are separate scientific groups.

Researchers of the NAS of Ukraine are active participants of the international research programs of the European Commission, STCU, NATO, UNESCO, DFG, CRDF and etc. Approximately 300 projects for research, coordination and support to scientific exchange are realized by grants of the above organizations, obtained annually on competitive basis.

In accordance with the Association Agreement with the EU, are expanding the relations with the research centers of the EU countries and European Commission organizations, in particular on participation in the EU programs on research and innovation "Horizon 2020", Euroatom, on continuous interactions with the Joint Research Center of the European Commission (JRC).

As part of the NAS programs for researchers exchange, over 100 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, 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.

Scientific and technical cooperation is actively developing with institutions and organizations of the People's Republic of China, especially successfully in terms of commercialization of scientific and technological developments and technologies created by scientists of the Academy. Joint Ukrainian-Chinese innovation centers and enterprises, mainly in the field of materials science and information technologies, are initiated and actively working.

Staffing. The total employment in the NAS of Ukraine as of 01.01.2018 was 29,870, including 15 529 scientific workers, of which 2.362 doctors of sciences and 6.807 candidates of sciences. The average age of scientific workers was 52.8; the average age of doctors of sciences is 64.9, candidates of science – 50.1.

Personal composition. As of 01.04.2018, the NAS of Ukraine consists of 193 full members (academicians), 385 corresponding members and 96 foreign members.

I.4. Legal status of National Academy of Sciences of Ukraine and national sectoral academies of Ukraine

(Extract from the Law of Ukraine "On scientific and scientific and technical activity"[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.

[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).

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 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 it's 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

II.1. Academy of sciences in the world countries

An academic science is widespread in the world and has different forms of its organization. The core of all forms of academic science is the community of members of the academy, which brings together the prominent scholars and specialists, which far outstrip as all other scientists and specialists of a country and also many foreign colleagues in their fields. The main features of the Academy's members are the high level of education and outstanding achievements in the main directions of modern science. Other constituents of academic science that provide the high and comprehensive education and outstanding academic achievements are institutions that employ academic members: universities and non-university research institutes or institutions that are not related to teaching of students. In some countries, the academy members mostly work in universities that have a research status and devote a significant share of their activities to research and development at the modern scientific level. In other countries, the most members of academies are working in non-university research institutes or institutions of the academies of sciences. They also take part in the training of specialists after graduating from universities and providing a modern scientific level of education at all levels from primary to postgraduate, including post-graduate and doctoral studies.

The academies of sciences, with prominent scholars in their ranks, as well as research institutions, most effectively contribute to the establishment (definition) of new knowledge and its dissemination, which corresponds to academic traditions, which was begun by the Academy of Plato.

The National Academy of Sciences of Ukraine unites the full members (academicians), corresponding members and foreign members as well as all scientists of its institutions. The majority of academicians and corresponding members (over 80% of persons) are working in the scientific research institutes and units of the Academy; approximately 10% of the Academy members are working in the universities, while 5% – in academic institutions of other scientific sectors of the country, remainder – in industrial organizations and state authorities.

The place of the National Academy of Sciences of Ukraine in the world research system, its peculiarities, is considered in the global context by comparing the structure and activity of the National Academy of Sciences of Ukraine with similar national academies of sciences or their analogues worldwide.

The list of national academies throughout the world has been taken from the website of the Global Community (Network) of the Academies of Sciences (IAP). IAP was founded in 1993 as the InterAcademy Panel on International Issues (IAP), and it assumed the functions of bringing together the national, regional and global academies. This organization has eventually been transformed into the Global Network of Science Academies (IAP). The basic organization for the IAP was the Third World Academy of Sciences, which functions in the framework of one of UNESCO's programs and since 2012 received its modern name – the Academy of Sciences for the Advancement of Science in Developing Countries (TWAS). In March 2016 a new organization, the InterAcademy Partnership (IAP), this unites the Global Network of Science Academies, the InterAcademy Medical Panel (IAMP) and the Inter-Academic Council (InterAcademy Council – IAC). There is a unique opportunity to work together for more than 130 national and regional academies of sciences within the framework of the new organization in order to support the special role of science and its efforts to

find the ways to solve the most complex problems in the world.

The national academies of sciences are represented in the IAP on principle one country – one academy of sciences. According to the its Charter, IAR should act as the independent international forum bringing together the academies of sciences from different countries in order to stimulate the cooperation between them, to discuss the scientific aspects of global problems, and to provide to academies of sciences mutual support, etc.

According to the information available on both IAP and its regional partners sites (as of 2017), the national academies of sciences or their counterparts, exist in 117 countries throughout the world, including: 29 in the Eastern Europe, 19 in the Western Europe, 2 in the North America, 17 in the Central and South America, 24 in Asia, 2 in Australia and Oceania, and 24 in Africa. This number includes all the academies of sciences with their own website, and those academies (Royal Academy Cambodia and the Academy of Sciences of the Korean People's Democratic Republic) that are known from web resources.

The national academies of sciences are divided here into three types. Organizations of the first type are represented only by the community of prominent national and foreign scientists and specialists. The second type includes academies, which consist of a community of prominent national and foreign scientists and a network of research institutes. The third type of academic organization is composed only from research institutes or research institutions.

The world countries, depending on the presence in their composition of national academies of sciences of different types, are divided into four groups. The first group includes 62 countries with academies of type I. In that number there are 5 Eastern European countries, 7 Western European countries, 14 New World countries, 14 Asian and Australian countries, as well as 22 African countries.

The academies of sciences of the 41 countries include the scientific community and research institutes or institutions and classified as academies of type II. The group unites 24 Eastern European countries, 6 Western European countries, 7 Asian and Oceania countries, as well as 3 Latin American countries and a country from Africa.

Two countries (Vietnam and Jordan) represent academies of type III.

In the 12 developed countries (USA, UK, India, Spain, Italy, Canada, South Korea, South Africa, Germany, France, Switzerland, and Japan) there are academies of sciences of all three above mentioned types. These countries have formed the fourth group.

Distribution of the countries upon different types of national academies of sciences*

Type of academies and countries	Number of countries
Type I. Countries with academies incorporating only scientific community	62
5 Eastern European countries: Estonia, Georgia, Kazakhstan, Latvia, and Lithuania	
7 Western European countries: Belgium, Denmark, Finland, Iceland, Ireland, Turkey, and Vatican	
14 countries in North and South America: Brazil, Costa Rica, Cuba, Dominican Republic, Ecuador, Guatemala, Mexico, Nicaragua, Panama, Peru, Uruguay, and Venezuela	
14countries in Asia and Oceania: Afghanistan, Australia, Bangladesh, Indonesia, Iran, Israel, Lebanon, Malaysia, Pakistan, Palestine, Philippines, Singapore, Sri Lanka, and Thailand	
22 African countries: Benin, Botswana, Burkina-Faso, Cameroon, Republic of the Congo, Ethiopia, Ghana, Kenya, Cote d'Ivoire, Madagascar, Mauritius, Morocco, Mozambique, Nigeria, Senegal, Sudan, Tanzania, Togo, Uganda, Zambia, and Zimbabwe	

Continued

Type of academies and countries	Number of countries
Type II. Countries with academies incorporating scientific community plus research institutes *24 Eastern European countries:* 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, and Uzbekistan *6 Western Europe countries*: Austria, Greece, Netherlands, Norway, Portugal, and Sweden *7 countries in Asia and Oceania:* Cambodia, China, North Korea, Mongolia, Nepal, New Zealand, and Taiwan *3 countries in Central and South America:* Argentina, Bolivia, and Columbia 1 *country in Africa:* Egypt	41
Type III. Countries with academies incorporating research institutes only Vietnam and Jordan	2
Type IV. Countries with academies of various types Canada, France, Germany, India, Italy, Japan, Republic Korea, South African Republic, Spain, Switzerland, United Kingdom, and USA	12
Total	117

* Note: Countries from the Caucasus and Central Asia that were part of the Soviet Union as well as Turkey are referred as European ones due to the existing practice of their classification.

The national academies of sciences, as a rule, have a status of high scientific, as well as scientific and expert institution in the state. The functioning of academies is largely ensured by a state, including the patronage of president or prime minister in many countries. The both fundamental researches aimed to obtain new knowledge in the natural, technical, humanitarian and social sciences and applied researches, which on the basis of already known knowledge provide the development of new specific products and technologies are carried out in academic institutions worldwide.

The presence of academies of sciences is an indicator of the development of society in a country, an evidence of indicating the objective need and, at the same time, the readiness of a society to solve the problems of economic, social and spiritual development based on the scientific knowledge.

The formation of academies took place at a certain maturity of social relations. In the Western Europe this process evolved in the seventeenth and eighteenth centuries, while in America in the second half of the nineteenth century and in the most countries of Eastern Europe after the World War I. In the former colonies and semi colonies of Africa, Asia and Latin America this happened in the second half of the twentieth century.

Trends in the number of national academies of sciences depending from the year of foundation*

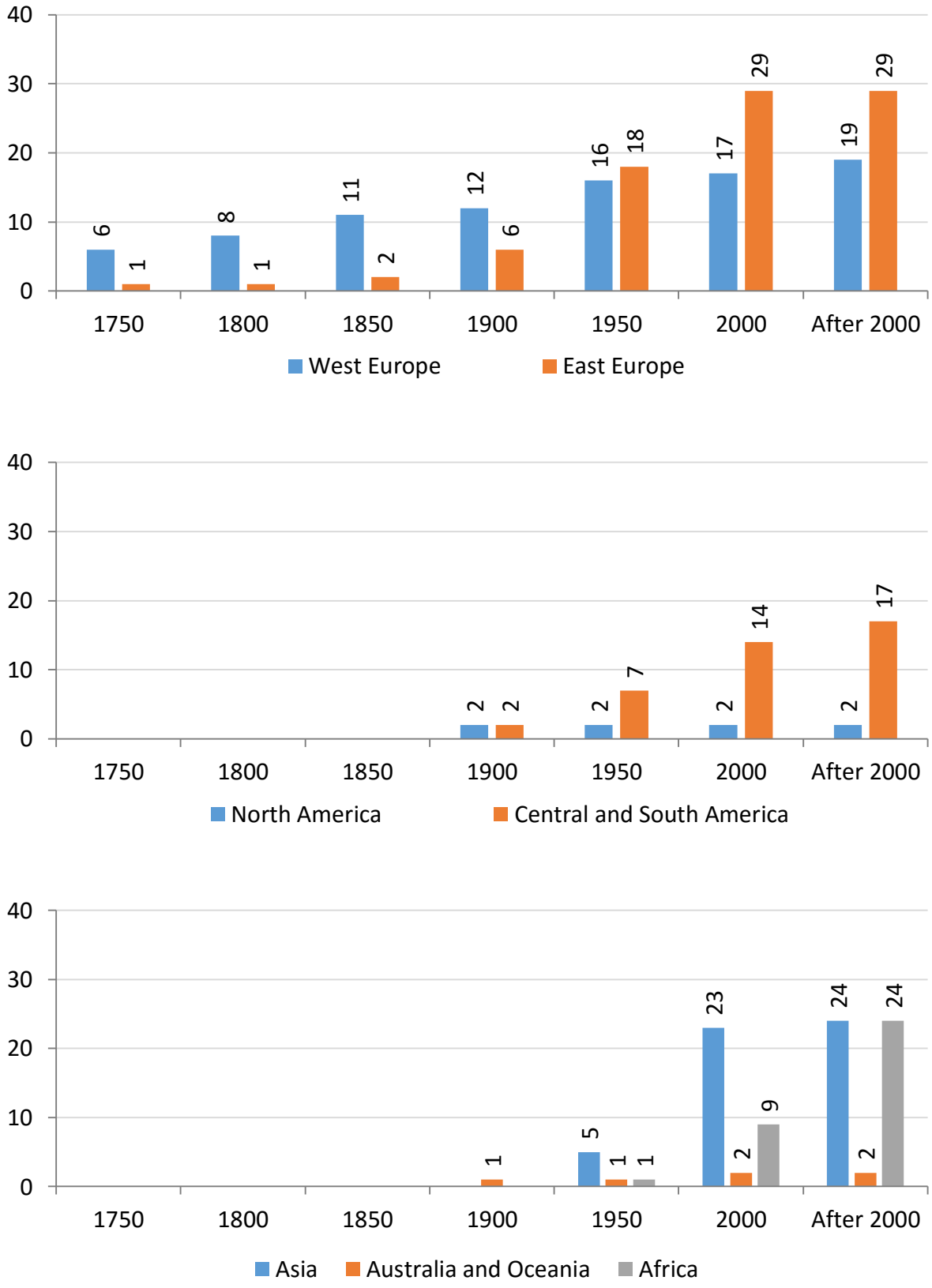
	1750	1800	1850	1900	1950	2000	After 2000
Total	**7**	**9**	**16**	**22**	**49**	**96**	**117**
including national academies of sciences in:							
Europe	7	9	14	17	33	46	48
of them:							
Western Europe	6	8	12	12	16	17	19
Eastern Europe	1	1	2	5	17	29	29
North America	0	0	0	2	2	2	2
Central and South America	0	0	0	2	7	14	17
Asian countries	0	0	0	0	5	23	24
Australia and Oceania	0	0	0	1	1	2	2
Africa	0	0	0	0	1	9	24

* Data on national academies of sciences in 117 countries is given.

Source: data from http://www.interacademies.net/Academies.aspx and its regional partners. Details are given in the text.

** Total, since 1600.

Trends in the number of national academies of sciences by geographic region



The oldest from the existing academies of sciences, the National Academy of Sciences dei Lincei, was founded in Rome as early as in 1603. In recent years (2007-2017) the academy of sciences emerged in 11 countries of the world, including 7 ones in Africa, 3 – in the Central and South America, and one – in Asia. There is also known that the academies of sciences were established in four other African countries, but unfortunately the dates of their foundation are not known yet.

The academies of sciences are constantly in search of improving organization and relations with society by directing their activities to the social needs and global challenges. In order to attract more representatives of the scientific community, the academies of sciences increase the representation of young people and women among their members. For example, in the Academy of Sciences of Cuba put into practice that the proportion of young members (up to 40 years old) of the Academy should be not less than 10% of the total number of its members, and in cases of ceteris paribus the preference to women during the election to of the members of Academy will be done.

The Academies of Sciences of Denmark, Mexico, and Thailand due to the state support are participating in the L'Oréal-UNESCO (L'Oréal-UNESCO) programs for women in science.

Owing to the policy of the number of academies, the proportion of women elected to the national academies of sciences in the current century has doubled in comparison with the previous years.

The National Academy of Sciences of the Republic of South Africa, a country that suffered from the racial and other forms of discrimination still some 25 years ago, is an example of such efforts to change the gender composition. As a result, the share of black people and women in this academy founded in 1996 accounted for respectively 27% and 25% as of 2014.

Based on information gathered during the project under the auspices of the Global Network of Science Academies in 2013-2014, it was determined that women represented an average of

12% of the number of members of national academies of sciences. The analysis covered 63 national academies of sciences, including 20 European countries, 19 North, South America and the Caribbean countries, 13 countries from Asia and Oceania, and 11 states from Africa.

According to our data, which is based on the analysis of the websites of various national academies, the share of women among all national academies in 2013-2014 was on average 10% in the Western Europe, 5% in the Eastern Europe, 15% in the North America, 11,3% in the Central and South America, 5% in Asia, and 12.6% in Africa. During 2015-2017 the representation of women in national academies of sciences has been increased. Thus the share of women among all the national members of the 24 East European countries at the beginning of 2018 amounted to 8,1%, and among 17 Western European countries – to 12%. Data on the representation of women in national academies of sciences in other parts of the world also indicate that the number of women among academics is now increasing compared to 2013-2014.

II.2. International academic organizations

The development of modern science is characterized by internationalization and interdisciplinary, which is achieved by the active collaboration of scientists and specialists from different countries in various scientific and technical areas. The international academic organizations that unite national academies of sciences or prominent scientists and specialists throughout the world play an important role in the integration processes of the formation of the common scientific environment.

This section summarizes the activities of International academic organizations supported by UNESCO-related programs and/or is part of the Global Network of Science

Academies(IAP). The IAP abbreviation remained from the former title – International Academic Panel.

All international academic organizations (associations) are divided into four groups. The first two groups include the association of collective members – national academies of sciences or their analogues: the first group includes world associations (5 organizations), while the second one – regional (9 organizations). The third and fourth groups consist of associations of individual members, i.e. well known scientists and specialists: the third group unites the world associations (3 organizations), while the fourth one – regional (11 organizations).

1. World international organizations consisting of collective members – national academies of sciences or their analogues.

The International Union of Academies (IUA), a worldwide organization of national academies in the humanities and social sciences, founded in 1919 in Paris, at the suggestion of the Academy of Inscriptions and Belles-Letters of the Institute of France, and the International Council for Science (ICSU), founded in 1931 to promote international scholarly activities in various fields of science and its application, were the initial from the existing international academic organizations that united collective members and were formed in the twentieth century in the interwar period.

The International Union of Academies now comprises over one hundred academies from 63 countries all over the continents and aims to study the culture of different peoples and territories, including Europe, the Middle East, China, India, and America. To date, 76 projects have been completed. The NAS of Ukraine participates in the activity of the IAU since 2006.

The International Scientific Council is the result of the development and expansion of two previous organizations known as the International Association of Academies (1899-1914) and the International Research Council (1919-1931). The ICSU consists of national academic members and international scientific unions, and now it unites 31 international scientific unions and 122 national scientific members covering 142 countries. The NAS of Ukraine is a national scientific member of ICSU since 1992. The ICSU's strategic direction focuses on three key areas, namely the international scholarly cooperation, the scientific policy and the universality of science.

The main modern ICSU programs include the international geosphere and biosphere program, the global climate research program, the international biodiversity research program and the international human dimension program for global environmental change.

The Global Network of Science Academies (IAP) operates on the basis of the Abdus Salam Institute of Theoretical Physics in Trieste. The organization was established in 1993 with the support of the Government of Italy.

The IAP, in accordance with its charter, acts as an independent international forum that brings together academies of sciences from all over the world to stimulate cooperation between academies, to discuss the scientific aspects of world affairs, to prepare and disseminate the general statements on global issues, and to provide the mutual support of academies of sciences. The right to participate in the IAP can obtained the national, regional, or global academies of sciences upon their scientific achievements. The member of the IAP may be national academy of science, consisting of institutions of scientists and specialists selected on the basis of their scientific achievements. It is assumed that the representation in the IAP is carried out by the national academy of sciences on the principle: one country – one academy of sciences.

Currently, IAP unites 111 scientific academies all over the world, including both the national academies/institutions and the regional/global groups of scientists. Thirteen scientific organizations participate in the IAP as the observers. It should be reminding that there are national academies of sciences in 117 countries currently in the world.

The IAP management bodies are the general assembly, the executive committee, and the secretariat. The general assembly is the supreme body of IAP that is empowered to make decisions on all issues related to its activities, and consists of the presidents or their representatives from all the academies that are members of the IAP. The sessions of the general assembly are usually held every three years and coincide with the general conference of the IAP.

The IAP executive committee consists of two co-chairs and 11 members of the committee, including six members from national academies of sciences of developing countries and 5 members from developed countries. For the period 2016-2018 a member of the Indian National Academy of Sciences and a representative of the German National Academy of Sciences Leopoldina were elected as the Co-Chairs of the executive committee of the IAP. The IAP currently supports the programs and projects on education, biosecurity, water supply, scientific communications, “women in science” and scientific youth.

The InterAcademy Partnership (IAP) was formally established in 2016 by integrating the Global Network of Science Academies, the InterAcademy Medical Panel (IAMP), and the InterAcademy Council (IAC). The newly formed organization unites more than 130 national and regional academies of sciences which will give the opportunity to use the experience of world scientific, medical and engineering leaders to promote a well-founded policy, to increase the level of scientific education, and to improve health care, etc.

The InterAcademy Council (IAC) was founded in 2000 and is a multinational organization of academies of sciences created to receive reports on scientific issues related to the global challenges of our time and provide information and advice to national governments and international organizations, such as the UN and the World Bank. In its activity, the IAC uses the international experts working on a voluntary basis to prepare reports.

The InterAcademy Medical Panel (IAMP), founded in 2000, unites the academic institutions working in the field of health improvement worldwide. In 2016the IAMP consisted from 73 academies. The IAMP Secretariat is located in Trieste, Italy, and is managed under the auspices of the IAP.

2. Regional international organizations, consisting of collective members –the national academies of sciences or their analogues, from the countries of certain regions of the world.

This group of institutions includes organizations that are regional partners of the IAP and have got the status of observer. Among them there are four organizations that provide cooperation between the national academies of sciences within a certain part or region of the world: the European Federation of Academies of Natural Sciences and Humanities, the Inter-American Network of Academies of Sciences, the Association of Academies and Associations of Sciences in Asia, the Network of African Academies of Sciences and scientific institutions, which provide the scientific cooperation within a certain part of one or neighboring continents.

The European Academies of Natural Sciences and Humanities (ALLEA) is the largest international regional academic organization in the world. It was founded in 1994 and involves 59 academic organizations in the field of natural

sciences and humanities from 38 countries, including national academies of sciences in all European countries.

The ALLEA mission includes as follows: facilitating the exchange of information and experience among academies, the development of excellence and high ethical standards in conducting research, as well as inter- and multidisciplinary approaches in all scientific endeavors. The governing bodies of ALLEA are the general assembly, the council and the president. Sessions of the general assembly usually consist of two parts: a scientific conference and a meeting devoted to the organization's activities.

The ALLEA secretariat is located in the Berlin-Brandenburg Academy of Natural Sciences and Humanities. ALLEA's research work focuses on working groups, including two permanent groups: Intellectual Property Rights, and Science and Ethics, and three other groups targeting the 9th Framework Program; Science Education as well as the use of information systems in the humanities (E-Humanities).

The Scientific Advice for Policy by European Academies (SAPEA) was founded for supporting Scientific Advice Mechanism (SAM) which provides independent scientific policy advice for the European Commission. ALLEA, along with the other European academic institutions, leads the SAPEA project which represents more than 100 academies from more than 40 European countries.

The ALLEA's All-European Academy Madame de Stael Prize for Cultural Values is awarded annually since 2014, an outstanding scientists whose work is a major contribution to the cultural and intellectual values of Europe as well as to the idea of European integration.

The Inter-American Network of Academies of Sciences (IANAS) was founded in 2004 and is a regional network of academies of sciences in both parts of the New World, which

brings together 18 national academies of sciences and the Panama Association for the Advancement of Science.

The Association of Academies and Societies of Sciences in Asia (AASSA) is organized in 2012 as a result of the merger of the Association of Academies of Sciences in Asia and the Federation of Asian Academies of Academies and Societies (The Federation of Asian Academic Academies and Societies) as a non-profit international organization. It includes 34 national academies of sciences and scientific societies from 30 countries in Asia as well as Australia and New Zealand.

The Network of African Science Academies (NASAC) was established in 2001 and unites the African Academy of Sciences which consists of individual scholars mostly from the continent countries along with 23 national academies of sciences.

The International Association of Academies of Sciences (IAAS), was founded in 1993 in Kyiv and became the first regional association of national academies of sciences. The founders of the IAAS were national academies of sciences from 15 countries, including twelve CIS countries. Since 1996, when the Institute of Associate Members was created in order to attract the world-renowned scientific centers, foundations, leading universities and other legal entities engaged in innovation and closely related to the scientific field, the composition of the IAAS expanded, and currently six associate members are involved in the activity of the IAAS and there are 18 scientific councils.

Among the goals of the Association since its foundation, is the development of cooperation and improvement of the coordination of scientific research, the restoration and maintenance of the growth of scientific potential and above all, the development of fundamental science in the academies of sciences – members of the Association, promoting the provision

of effective support and assistance from state authorities in the field of science, the integration of science and education, the training of scientific personnel, the creation of appropriate conditions for the use of scientific equipment, scientific achievements and increasing the contribution of science to socio-economic development for states national academies of sciences which are members of the IAAS.

The highest authority of the IAAS is the council which includes the presidents of the national academies of sciences – members of the IAAS. The council decisions are usually taken by consensus and are advisory in nature for the academies of sciences – its members.

Based on its goals, the IAAS from the first steps of its activity sought to establish a constructive dialogue with the state authorities, informing them about the common opinion of the scientists. The initiative to develop an Agreement on the establishment of a common CIS countries scientific and technological space was one of the important initial achievements of the IAAS. In 1995 the above-mentioned Agreement was signed by the heads of governments of the CIS countries. The Agreement defines the functions and place of the IAAS in terms of the practical creation of such a space. Nowadays the Association continues to serve as a collective expert and advisor to CIS leaders on science, education and innovation activities.

During the 25 years of the activity, the IAAS members and associate members strengthened cooperation also on a bilateral, less tripartite basis. More than 60 such agreements were signed and half of them – with the participation of associated members. The important achievement of the IAAS is the possibility for scientists of the academies of sciences – members of the IAAS to use the unique objects and equipment that are located outside their countries.

The International Association of Academies of Sciences was recognized by UNESCO: since 2003 the IAAS are being among

organizations with which UNESCO supports the working relations, and in 2012 the IAAS obtained the status of a consultative partner.

On December 12, 2017, a regular meeting of the Council of the IAAS took place in Minsk, which set out the priority tasks of the IAAS for the short and medium term.

The Network of Academies of Sciences in the Countries of the Organization of Islamic Cooperation (NASIC) was founded in 2004 in Islamabad and now unites 20 national academies of sciences.

NASIC provides a platform for academies of member countries of the Organization of Islamic Cooperation, which includes 57 countries with a population of 1.2 billion people, to conduct joint scientific programs and exchange of experience and knowledge and to assist in the establishment of academies of sciences in those countries of the Organization of Islamic Cooperation, where they do not exist yet.

The Euro-Mediterranean Academic Network (EMAN), an international association, was established in 2007, and currently (as of January 2017) unites 30 organizations, focusing on two regions: The Mediterranean and sub-Saharan Africa.

The Caribbean Scientific Union (CSU) was founded in 2000 with the aim to integrate academies of science of the Caribbean region, to strengthen academic fellowship and to increase their impact on local communities.

The European Academies Science Advisory Council (EASAC) was founded in 2000. EASAC together with the national academies of sciences of the European Union`s countries and two other European academies (Academia Europaea and ALLEA) provides the authoritative scientific conclusions for those leaders who define the European Union’s policy on a wide range of issues (the environmental protection, agriculture, energy, fisheries, protection health and food safety).

The governing body of the organization is a board composed of the representatives from all member academies. The EASAC bureau consists of a president and four vice-presidents working at the Brussels office of the organization, while the secretariat – at the premises of the German National Academy of Sciences Leopoldina.

3. World-wide international academic organizations which consist of individual members – the prominent scientists

The World Academy of Arts and Sciences (WAAS) was founded in 1960 by the prominent personalities who were concerned about the effects of the fast growth of knowledge. WAAS's activities are aimed to solve the global problems related to social and political consequences of knowledge. The spirit of the Academy can be expressed in the words of Albert Einstein: "The creation of our minds should be a blessing, not a curse for mankind," and its motto is "Leadership in the minds that leads to action." Currently, the Academy includes 730 members from all over the world, representing all branches of natural sciences, social sciences and the humanities, arts, as well as educators, political leaders, diplomats and leaders of major international organizations. Among WAAS members are the presidents of national academies of sciences, the former presidents of countries, and the members of the Rome Club. The largest number in the WAAS are represented by United States (119 members), United Kingdom (28 members), Italy (25 members), India (23 members), Canada (19 members), Spain (15 members), France and Sweden (12 members each). Other 70 countries are represented from one to 10 persons; among them are the President of the NAS of Ukraine, an Academician of the NAS of Ukraine B.Ye. Paton.

The headquarters of the organization is located in the United States, and its representative offices operate in both Europe and India. The WAAS is run by two bodies: the executive committee

and the board of trustees. The executive committee consists of the president, the chief executive officer, the chairman of the board, the treasurer and co-chairman of the fund raising committee, the secretary general, the former president and one more member. The board of trustees consists of 17 members, including members of the executive committee. The applicants to the Academy are nominated by members of the WAAS, then are considered by the nomination committee, elected directly by the WAAS members and approved by the board of trustees. Currently Gurgulino de Souza, Heitor, a Brazilian physics scientist, the president of the World University Consortium and vice-president of the Club of Rome is the president of the WAAS.

The WAAS activities are carried out in the following programs:

a new paradigm that seeks to explore the root causes of many problems in order to formulate an integrated perspective, a comprehensive strategy and policy framework that focuses on the realities, needs and new twenty-first centuries opportunities;

trans-disciplinary dialogue on individuality, that is the study of the essential nature of individuality, its role in social development and its numerous original manifestations, the definition of the best means of upbringing individuality through education;

abolition of nuclear weapons;

a new economic theory– in cooperation with the Club of Rome to develop a new human-oriented economic theory that reflects the recent changes brought about by the emergence of a service-based economy, the globalization, etc.;

the challenge of global employment;

the limits of rationality – the study of the philosophical practice of rationality in various fields of knowledge for the identification of general deviations and constraints and the definition of ways to compensate the limits of rationality;

a new paradigm for a global legal law – the definition of the relationship between the social, political and legal aspects

of global rule of law in order to formulate the boundaries of a broader approach to the evolution of global governance.

The World University Consortium was established in 2013 to implement the WAAS initiative to create a global system of higher education focused on new opportunities and challenges.

In its activities the WAAS tries to study in detail the essence of processes that take place in the society, avoiding the simplifications and mechanical transfer of ideas about the nature of the world, which are formed as a result of recent scientific advances, especially in the field of life sciences and the world community.

The World Academy of Sciences (WAS) was founded in 1983 with the participation of Abdus Salam, a Pakistan descent, the 1979 Nobel Prize winner in the field of physics, and 20 other founding members. In 2016 the WAS had got 1176 members from 90 countries of the world, who were elected for life on the basis of their internationally recognized scientific achievements. Among the Academy members are 15 Nobel Laureates. 85% of Academy members live and work in developing countries.

Until 2004, the Academy was called as the Third World Academy of Sciences. The modern name of the organization is set up in 2012 as the World Academy of Sciences for the advancement of science in developing countries (WAS).

Since 1991 an agreement between the WAS and UNESCO was signed, in which the latter assumed the responsibility for managing WAS funds and personnel as one of UNESCO's programs. Under the law, adopted by the Italian Government in 2004, it is foreseen to provide the annual funding for the WAS. The representatives of the Italian government and UNESCO are members of the WAS steering committee which annually holds meetings to discuss the financial issues. The Academy's headquarters is located in Trieste, Italy on the territory of the Abdus Salam International Center for Theoretical Physics.

The main objective of the WAS is to promote the development of scientific potential, dissemination of best practices in the field of sustainable development in developing countries and to overcome the lagging behind these countries from the more developed. Numerous organizations, in that number the Italian Ministry of Foreign Affairs; Swedish International Development Agency; the Standing Committee on Scientific and Technical Cooperation (COMSTEC), of the Organization of Islamic Cooperation, Lenovo Corporation, American Association for the Advancement of Science (AAAS), Kuwait Science Development Fund, Elsevier Foundation, the Ministry of Science, Research and Technology of the Islamic Republic of Iran, the African Union; the National Academy of Sciences of the United States, Chinese Academy (Taiwan) and the Academy of Sciences of Chile provide the financial assistance of the WAS.

The WAS activity is being implemented through its associated organizations and five regional centers in Rio de Janeiro, Beijing, Alexandria, Bangalore, and Pretoria.

The supreme body of the WAS is the general assembly of all its members which meets annually, and are authorized to solve all issues related to the activity of the organization. The prominent personalities – leaders of India, Iran, China and other countries, the well-known politicians attended the general assembly of the WAS. The council which is elected at the general assembly for every three years carries out the routine activity of the organization.

For the 2016-2018 period, the WAS council consists of president Bai Chunli (the president of the Academy of Sciences of the People's Republic of China), the former president, five vice presidents, the general secretary; the treasurer and five members of the council, among which are representatives from Africa, the Arabian region, the Central and South Asia, the East and South-East Asia, the Latin America and the Caribbean.

The WAS regional centers selected annually for up to 25 young scientists under the age of 40 (young affiliates) who have got at least 10 international publications and the potential for further careers and take part in its activity during a five-year stay in the Academy rank.

The WAS has developed an extensive system of support programs for scientists from the developing countries. Such programs include annual fellowships for obtaining a degree for 470 people; the internship after obtaining a degree – from 6 months to three years in Brazil, India, Iran, Kenya, Malaysia, Mexico, Pakistan, and Thailand; the research grants in the field of fundamental research for individual scientists, groups of scientists and associations of scientists from 81 developing countries; granting about 15 awards and prizes with cash payment; the organization of scientific forums and the provision of scholarships to scientists from countries with poorly developed scientific infrastructure for research in the more developed countries.

The organization provides the numerous awards in various fields of expertise to celebrate researchers, mostly from the least developed countries. Each of the five regional centers of the Academy annually rewards a prize (WAS regional prizes) in the amount of 3 thousand US dollars. The prizes are awarded in turn in four directions: the popularization of science, the development of scientific educational material, the creation of scientific institutions and the scientific diplomacy.

The Global Young Academy (GYA) was officially established in February 2010. The successful activities of the young academies of Germany, the Netherlands and Austria which relied on the assistance of their “adult” academies of sciences, and the vague activity of the World Association of Young Scientists which was volunteering, determined the structure of the Global Young Academy.

The GYA is an organization with a clear statute, discretion of members based on their scientific achievements and social activity, the annual rotation of leadership and significant financial and scientific support from the countries and international institutions.

The GYA office is currently located in Halle, in the administrative building of the German National Academy of Sciences Leopoldina. The Federal Ministry of Education and Research of Germany provides basic funding for the GYA.

The GYA is an international academic organization that unites the prominent young scientists and professionals and is trying to create national organizations of young scholars around the world. The motto of the GYA is “trying to be the voice of young scientists around the world”.

Under the GYA statute, members of the organization may be active scholars of an average age of 35 years who have obtained an academic degree (PhD.) or an equivalent degree in the field of natural sciences, engineering, social sciences, arts or humanities, or equivalent experience in the research environment no later than 7 years before joining the GYA.

The GYA governance bodies are the general assembly as its supreme body, consisting of all members of the GYA and the executive committee. The GYA’s global activities focus on science and society, education and outreach, studies on the scientific environment.

The United Nations Secretary General`s Scientific Advisory Board (UN SAB), set up in 2013, is one of the important expert organizations to provide advice to UN organizations on science, technology and innovation in the sustainable world development. The organization bases its activities on the UNESCO support, generalizing the overall potential of scientific industries with the proper consideration of all social and ethical aspects of sustainable development.

The UN SAB consists of 25 prominent scientists which represent both all regions of the world, as well as the main disciplines and their subdivisions are associated with numerous studies in the interests of sustainable development. The board members carry out their functions for two years with the possibility of extending the authorities for another two years. The changes in the scientific advisory board are consistent with the UN Secretary-General.

The UN SAB has recently printed the following documents on the future development of civilization: “Science and Agenda for Sustainable Development by 2030”; “Assessment of Climate Change Risks”; “A Brief Outline of Policy: Food Safety and Health”; “Knowledge of Indigenous Peoples and Local Knowledge for Sustainable Development”.

4. Regional international academic organizations, which consist of individual members from different countries.

The African Academy of Sciences was founded one of the first in this group as early as in 1986. The AAS has got three main tasks: to achieve perfection through the recognition of continent’s scientists, to undertake both advisory and analytical functions for the development of continental strategies and policies; and to execute key scientific, technological and innovative programs.

The personal membership of the AAS consists of full, associate and honorary members. The AAS management bodies are the general assembly, the governing council, the executive committee, and the secretariat. The general assembly consists of full members who elect the president of the AAS and members of the governing council, and also approve the Academy programs. The governing council is elected from 13 members, and controls the implementation of academic programs, selects and approves new members, prepares a general meeting agenda, and appoints auditors. The executive

committee consists of the president, the general secretary, the treasurer and the executive director. Its task is to control the activity of other committees that are set up by the governing council. The organization has got five regional offices, each of which is headed by one of the five vice-presidents.

The AAS elections are held annually by selecting and executing all procedures for evaluating candidates. The committees of experts evaluate and select candidates to the Academy, and also evaluate those who recommended candidates for election. After the voting procedure by the full members of the AAS, the list of elected persons is approved by the governing council of the AAS.

In addition, since 2015 the AAS annually chooses, perspective scientists, who are younger than 40 years of age, have got both a scientific degree and experience in the research institutions, as affiliated members for next five years.

In April 2017 the Academy had got 330 full, associate and honorary members from 38 countries, including 31 African countries, United States, Great Britain, Denmark, India, Canada, China, and Germany, as well affiliated members from eight continental countries. South Africa (26 people), Nigeria (21 members), and Kenya (19 members) had got the largest representation in the AAS. In 2015 38 new members were elected, of which 33 were full members and five associate members from Great Britain, India, Canada, and China.

The current strategic plan for AAS (2013-2018) identifies the following six areas: climate change; health and well-being; STEM (science, technology, engineering and mathematics); water supply and sanitation; food safety and healthy eating and sustainable energy.

In 2015 the AAS launched the program aimed at accelerating the creation of a modern scientific potential in Africa (AESA). The AESA leadership philosophy is to support the brightest people in Africa who work in the proper places and environments to implement key programs that can

contribute to scientific perfection, leadership and innovation that affects the health of the population and the problems of the continent's development.

The Academy of Europe (Academia Europaea – AE) is the most numerous among regional international academic organizations, which consist of some prominent scholars and professionals. The total number of AE members was over 4000 people as of 2016, and there were seventy-two Nobel laureates among them. United Kingdom (610 members), Germany (520 people), France (430 members), Italy (230 members), the Netherlands (185 members), Switzerland (170 members), United States (150 members) had got the largest representation in the organization. Full members of the NAS of Ukraine, namely the President of the NAS of Ukraine B.Ye. Paton, Yu.Yu. Gleba, O.M. Guz, O.O. Krystal, and P.P. Tolochko are also included in the AE as its members. An Academician of the NAS of Ukraine P.G. Kostyuk was in the AE ranks during 1991-2010.

The organization was founded in 1988 in accordance with the concept of united Europe and carry out the activity in the field of natural sciences, social sciences and humanities.

The AE's mission is: to promote a wider recognition of the value of European science and research, and to advice national governments and international institutions on science issues.

The personal composition of the AE includes four categories of members: the ordinary or full members who are residents of European countries; the foreign members – scientists, non-residents of Europe, who are closely connected with the scientist community of the continent; the honorary members – individuals who have made a significant contribution to the activity of the AE, and the patrons – individuals or organizations that provide assistance to the Academy in the different forms.

The governing bodies of the AE are the general meeting of members, the council and the bureau of the council. The council consists of the president, vice president, the treasurer and three to six other members. The bureau of the council consists of the president, vice president and the treasurer and three to five other members. All council members are elected at the general meeting of members of the AE. Each AE member is included in one of 20 sections. The members of the section elect the head of the section, which is a member of the bureau of the council. The authority of all AE executives is three years with the possibility of a reelection.

The Academy has got its headquarters in London, four representative offices in Barcelona, Bergen, Wroclaw, and Cardiff, and the information center in Graz.

The Academy of Europe together with four other pan-European academic organizations has set up an advisory consortium that provides scientifically-based interdisciplinary advices for the European Commission and senior advisers.

The Academy awards are as follows: Erasmus medal (since 1992); the scholarships in honor of A. Buhren, the president-founder of the Academy (since 2010); the Academy gold medal for rewarding non-members of the Academy and organizations (since 1997); Russian awards – 25 prizes (US$ 1000) annually for young Russian scientists (since 1993).

The European Academy of Sciences and Arts (EASA) was founded in 1990 in Salzburg city by the cardiac surgeon F. Unger, who carried out the first successful heart transplant in Europe, archbishop of Vienna Card. F. Kennig, and political scientist and philosopher N. Lobkovich. The Academy concentrates its efforts in three areas: the development of knowledge, the dissemination of scientific information, and the implementation of international projects. 1700 outstanding scientists and specialists are members of the Academy, including 29 Nobel laureates. All the countries of

Europe, including two members from Ukraine, as well as experts from 27 countries from other continents are represented at the Academy. The academy has got 34 representations, including 27 European countries, UNESCO headquarters, Jordan, Israel, and United States (four offices).

The European Academy of Sciences (EAS) was founded in 2003 and employs approximately 570 members, including more than 15 Nobel laureates. Its purpose is the development of science and technology to strengthen the socio-economic advance of Europe. Three full members of the National Academy of Sciences of Ukraine, namely O.M. Guz, V.V. Panasyuk, A.M. Samoilenko, and V.V. Pilipenko (until 2015) are the part of organization. There are nine sections in the EAS. The permanent secretary of the Academy for 2014-2021 is prof. H. Rode (prof. Helene de Rode), a lawyer from Belgium. The Academy has the following awards: the award of Leonardo da Vinci, the medal of B. Pascal – up to 6 awards annually, and the prize for young scientists.

The Islamic World Academy of Sciences (IAS) was established in 1986 as an international academy of sciences which serves for 57 member states of the Organization of Islamic cooperation. The IAS is a scientific advisory body of the Organization of Islamic cooperation and serves as the community of scholars that promotes the values of modern science, honors high achievements and disseminates scientific discoveries through meetings and publications, provides a forum for discussing science and scientific problems. It also represents the academic repository of the history of science, in particular in the context of Islamic civilization. The IAS consists of two benefactors (the prince of the Hashemite Kingdom of Jordan and president of the Islamic Republic of Pakistan), 12 honorary members, the executive council, and the general assembly. Among the honored members are two Nobel Prize winners (Richard R. Ernst, 1991 chemistry award,

Switzerland and Ferid Murad, 1998 prize for medicine, physiology, USA), the representatives of powerful international companies from Kuwait and Saudi Arabia, president of Kazakhstan N. Nazarbayev, the former prime ministers of Qatar (sheikh Hamad J.J.) and Malaysia (Dr. Mahathir Mohamad), the secretary general of the Organization of Islamic cooperation during 2004-2014 (Ekmeleddin Ihsanoglu). The executive Board consists of 12 members elected for four years on the general assembly. The general assembly consists of founders and elected members, all of them are full members of the IAS. The number of the IAS full members as of December 1, 2016 was 110 persons, including approximately 10,0% of women. All full members have got a professor rank and represent more than 40 countries and a wide range of academic disciplines. Since 2013 professor Abdelsalam al-Majali, a Jordanian physician and politician, who was twice the Prime Minister of Jordan, is the current president of the Academy.

Organization for Women in Science in the Developing World (OWSD) is a non-governmental organization that was founded in 1987, and based on the WAS offices in Trieste, Italy. The OWSD is the first international forum that brings together prominent women scientists from the developed and developing countries to strengthen their role in the development process and to promote their representation in scientific and technical guidance. The OWSD offices run by authoritative experts from leading women scientists are established on all continents.

The OWSD personal composition includes three categories of members: the full, associate, and affiliated members. The total number of members working in developed countries should not exceed 20 percent of their total number. Persons willing to be members of the OWSD must submit a written application to the executive council. The council decides and defines the membership category within three months.

The OWSD has got over 5300 active members of women scientists from 250 countries and state entities worldwide (as of April 2017). The distribution of members between countries in different parts of the world was as follows: Africa – 2515 members from 47 countries, the Arab world – 782 members from 19 countries, Asia and the Pacific Ocean – 1354 members from 40 countries; Latin America and the Caribbean – 624 members from 30 countries; and from other 114 countries – 210 members.

The general assembly of the members is the supreme body of the OWSD and forms both the executive council consisting of the president, four vice-presidents (one from each region), four members (one from each region) and a former president, and the international secretariat. Professor Jennifer Thomson, a microbiologist, a member of the South African Academy of Sciences, was elected in 2016 as the president of the OWSD.

The OWSD has established programs supporting poor countries to prepare their skilled staff in more developed countries, such as India, China, Malaysia, as well as in 16 leading scientific institutions in Africa. The OWSD offers grants for obtaining the PhD degree, namely for 250 African women, 40 people from Arab countries (Yemen and Sudan), and 40 people from Asia (Bangladesh, Myanmar, and Nepal).

The Elsevier Fund, OWSD and WAS jointly have founded an award for successful career of female scientists, living and working in the developing countries. Since 2012 five female scientists from Africa, the Middle East, Asia, Latin America and the Caribbean get all an annual award for achievements in the amount of 5 thousand US dollars, a free annual Science Direct subscription and free participation in the annual conference of the American Association for the Advancement of Science (AAAS), which takes place in United States in February. The OWSD organizes annually regional seminars for all postgraduate students at the place of study, which provides

opportunities for meetings and cooperation with colleagues in their scientific fields.

The Young Academy of Europe (YAE) was established in 2012 to enhance the young scientists impact on the scientific policy of Europe.

The organization is currently in progress of reform to ensure the participation of outstanding young scientists from whole Europe, not just those who have previously received grants from the European Commission. The number of the YAE members was limited at 500 people, one hundred of whom should leave the organization every year (relations with the organization are not interrupted), while 100 other new members should be elected. The governing bodies of the YAE are the board which represents the YAE at the Academy of Europe and other organizations, the chairman, his deputy, and three departments of physical and engineering sciences, life sciences, social sciences and the humanities.

The Arab-German Young Academy of Sciences and Humanities (AGYA) was founded in 2013 at the Berlin-Brandenburg Academy of Natural Sciences and Humanities with the participation of the University of the Persian Gulf in Bahrain as the first bilateral young worldwide academy. Twenty-five Arab and twenty-five German scientists out of 600 candidates from 22 countries, which have expressed a desire to take part in the activity of the AGYA, were selected. The AGYA aims to create a community of prominent researchers who are at the initial stage of their academic career. The potential members of the AGYA are young researchers from Germany and 19 Arab countries.

There are also two regional academies in Latin America, namely **the Academia de Ciencias de America Latina** (ACAL), founded in 1982, and **the Caribbean Academy of Sciences** (CAS), founded in 1988.The total number of members of these academies defined at 170 and 200 persons,

respectively. The goal of these institutions is to provide a forum for exchanging among the scientists on important issues related to the application of science and technology for the development of Latin America and the Caribbean. However, the information available on the sites of these organizations is outdated, that indicates a low activity of academic organizations in Latin America.

II.3. Young scientists' academic organizations

The creation of the Junge Akademie in Germany, which took place in 2000, with the participation of the German National Academy of Sciences of Leopoldina and the Berlin-Brandenburg Academy of Natural Sciences and Humanities, begun the process of formation of similar institutions in other countries of the world (the Netherlands – 2005, Austria – 2007, Sudan – 2007, and Pakistan – 2009).

Due to the high international activity of Junge Akademie, the prerequisites to bring young scientists together in the world have been created.

The first World Youth Organization in the field of science was the World Academy of Young Scientists (WAYS). It was founded in December 2004 in Marrakech, Morocco, by the joint efforts of UNESCO, the Academy for the Developing World, the Islamic Educational, Scientific and Cultural Organization, and two Morocco's organizations: – The Ministry of education and research and the National commission of UNESCO.

The purpose of the WAYS is to create a resource and network for young scientists to realize their energy and experience. The members of this organization could be active young scientists under the age of 40. One hundred and fifty young scientists from 87 countries participated in the first WAYS congress. In 2008 the volunteer character of the organization led to change its name to the World Association of

Young Scientists, which reflected the lack of electoral membership as established in academic institutions. According to the president of the WAYS, Gaell Mainguy, “The WAYS is a social network, a kind of scientific Facebook.” About one third of the people joining the WAYS were from Africa. The organization has created several platforms to support young scientists. Nowadays, unfortunately, there are no virtual data on current WAYS activity.

The Global Young Academy (GYA) was established in February 2010 in Berlin. The German National Academy of Sciences Leopoldina, the Berlin-Brandenburg Academy of Natural Sciences and Humanities, and the Junge Akademie with the assistance of the IAP participated in the creation of the GYA. During 2011-2016 the GYA office was located at the Berlin-Brandenburg Academy of Natural Sciences and Humanities, and since 2017 it is located in Halle, in the administrative building of the German National Academy of Sciences Leopoldina. The Federal Ministry of education and research provides the necessary basic funding for the GYA. Despite the fact that the organization has already been mentioned in paragraph II.2, here we will present more detailed information.

The GYA is a unique international academic organization that unites together the prominent young scientists and professionals and is trying to create national organizations of young scholars around the world. The motto of the GYA is “trying to be the voice of young scientists around the world”. Under the GYA statute, members of the organization may be active young scientists aged below 35 years old (30 to 40 years old) who have obtained PhD at least 7 years before joining the GYA. The selection of candidates takes place on a multi-stage basis by groups of the international experts in terms of all research work, non-academic activity; commitment to the GYA goals, including support for young researchers at the national

level, performing actions that play a significant role in the national young academies. The term of membership in the organization is 5 years.

The maximum number of the GYA members is set to be 200 people. Persons who were previously in the Academy (alumni) continue to participate in its activities. As of May 2018, the GYA had got 207 active and 211 former from a total of 83 countries. Exceeding the existing limit of 200 members may be due to the fact that according to the statute, members may suspend their stay in the GYA ranks for the valid reasons (illness, child care, etc.).

In 2015, the GYA included 32% of women, while 33% of the GYA members were from Europe, 28.5% from Asia, 14.5% from North America, 14% from Africa, 6.5% from the Southern of America, 3.5% – from Australia. The GYA governance bodies are: the general assembly as its supreme organ, consisting of all members of the GYA, and the executive committee. The executive committee is elected by the general assembly and consists of two co-chairs, one resident from the developing countries, another – from developed countries, and nine members. The election of co-chairmen and members of the executive committee is held annually at the regular general meeting by secret ballot. The GYA is supported by an advisory board composed of the prominent scholars and organizers of science.

As part of its global competence, the GYA intends to reduce the scientific gap between developed and developing countries through the pooling of young scientists from different countries. During their stay in the GYA, members are involved in the development of international scientific policy and the resolution of issues related to the creation and operation of national young academies.

The GYA also supports the creation and coordination of national youth academies throughout the world. The GYA

website provides access to up-to-date information on the activities of national young academies.

Currently 35 young academies and 11 of their counterparts conduct their activity globally, including 18 organizations in Europe, 3 in the North and South America, 12 in Asia, 13 in Africa.

The candidates for young academies must, as a rule, be within 25-45 years old, obtained a degree in the last 3-10 years (up to 15 years in the case of the Youth Academy of Vietnam), to hold scientific position in the country, to have the scientific authority and publications in rating journals. The duration of the membership is set at an average of 5 years (8 years in the case of the Young Academy of the Austrian Academy of Sciences), and includes the activity aimed to solve the current scientific problems and to realize the dialogue of science and society. The structure of the newly created organizations consist of a community of selected young scientists and authorities that are represented by the general meeting, and an executive body elected by members of the organization.

The activities of young academies (and their counterparts), which have passed the period of formation, are aimed to solve the actual problems that young scientists face in their countries.

In those countries (Austria, Germany, the Netherlands, and Sweden), where the national academies of sciences are very active in supporting youth and there are numerous funds, the young academies are focused on solving such problems of general scientific and public importance.

In other countries (the countries of the former USSR, the Middle East and Africa), in which the reform of scientific systems or their creation takes places yet, the young academies are aimed at supporting the research work of young people, solving the problems of their employment, as well as life issues.

Information about young academies

Organization	Established	Number of members	Share of women, %
Junge Academy (Germany)	2000	50	40.0
De Jonge Akademie – The Young Academy of the Royal Netherlands Academy of Arts and Sciences	2005	49	51.0
Junge Akademie – The Young Academy of the Austrian Academy of Sciences	2007	56	30.3
Sudanese Academy of Young Scientists	2007	…	…
National Academy of Young Scientists, Pakistan	2009	500	…
Nigerian Young Academy	2010	25	16.0
Polish Young Academy of the Poland Academy of Sciences	2010	35	23.0
Det Unge Akademi– Young Academy of Denmark	2011	34	38.0
Zimbabwe Young Academy of Science	2011	…	…
Thai Young Scientists Academy (Thailand)	2011	15	46.7
Philippine Academy of Young Scientists	2011	300	…
Young Academy of Sweden	2011	34	50.0
RSE Young Academy of Scotland (Royal Society at Edinburg, United Kingdom)	2011	131	53.0
South African Young Academy of Science	2011	50	44.0
Young Academy of Japan	2011	…	…
Jonge Academie (Young Academy of the Royal Flemish Academy of Belgium for Science and the Arts)	2011	…	…
Israel Young Academy	2012	31	41.8
Young Scientists Network – Academy of Sciences Malaysia	2012	52	28.8
Sri Lanka Academy of Young Scientists	2012	25 (up to 100)	…
Vietnam Young Academy (VYA)	2014	…	…
Ghana Young Academy	2014	…	…
Egyptian Young Academy of Sciences	2014	15	…
Indian National Young Academy of Science	2014	20 (up to 100)	…
Kenya National Young Academy of Sciences	2014	…	…
Indonesian Young Academy of Sciences (AIMI)	2015	40	…
College of New Scholars, Artists and Scientists of the Royal Society of Canada	2014	220	37.6

continued

Organization	Established	Number of members	Share of women, %
The Young Academy of Norway	2015	20	…
Académie Nationale des Jeunes Scientifiques du Sénégal	2015	…	…
Uganda National Young Academy	2015	…	…
Ethiopian Young Academy of Science	2015	20	…
Tanzania Young Academy of Sciences	2016	…	…
Albanian Young Academy	2017	…	…
Young Korean Academy of Science and Technology	2017	73	6.0
Young Academy of Finland	2017	34	44.0

Young Scientists Organizations –Young Academies Analogues

Organization	Established	Number of members	Share of women, %
Council of Young Scientists of the National Academy of Sciences of Belarus	2003	…	…
Association of Latvian Young Scientists	2005	300	…
Council of Young Scientists at the Foundation of the First President of the Republic of Kazakhstan	2007	…	…
Young Affiliates of the Brazilian Academy of Sciences	2007	217	21.2
Council of Young Researchers of the Russian Academy of Sciences	2009	28	…
Venezuelan Young Scientists Network (RedJIV)	2010	64	…
Centre for Young Scientists at the Montenegrin Academy of Sciences and Arts	2010	72	26.4
Liberian Young Association for the Advancement of Science	2012	…	…
Council of Young Scientists and Specialists of the Azerbaijan National Academy of Science	2013	52	…
Council of Young Scientists (at the Women Scientist Association of Uzbekistan)	2016	…	…
Burundi Council of Young Scientists	2016	…	…

III. NATIONAL ACADEMY OF SCIENCES OF UKRAINE IN THE SCIENCE AND TECHNOLOGY OF UKRAINE[4]

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

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

	Year established	Number of organizations	Employees, *headcount*,**	Doctors of sciences, *headcount*,***	Candidates of sciences, *headcount*,***
National Academy of Sciences of Ukraine	**1918**	181	23683	2624	6981
National Academy of Agrarian Sciences of Ukraine	1931	86	6337	371	1555
National Academy of Medical Sciences of Ukraine	1993	35	4156	627	1226
National Academy of Arts of Ukraine	1996	2	104	16	32
National Academy of Pedagogical Sciences of Ukraine	1992	12	1163	158	409
National Academy of Law Sciences of Ukraine	1993	6	386	75	136

* As of January 01, 2018.

** 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 (academi-cians)	Corres-ponding members	Foreign members	Honorary members
National Academy of Sciences of Ukraine	**March 27, 2018**	**193**	**395**	**96**	**–**
National Academy of Agrarian Sciences of Ukraine	January 1, 2018	111	113	41	25
National Academy of Medical Sciences of Ukraine	January 1, 2018	42	82	19	–
National Academy of Arts of Ukraine	January 1, 2018	53	52	25	19
National Academy of Pedagogical Sciences of Ukraine	January 1, 2018	70	87	34	14
National Academy of law Sciences of Ukraine	January 1, 2018	52	77	2	–

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

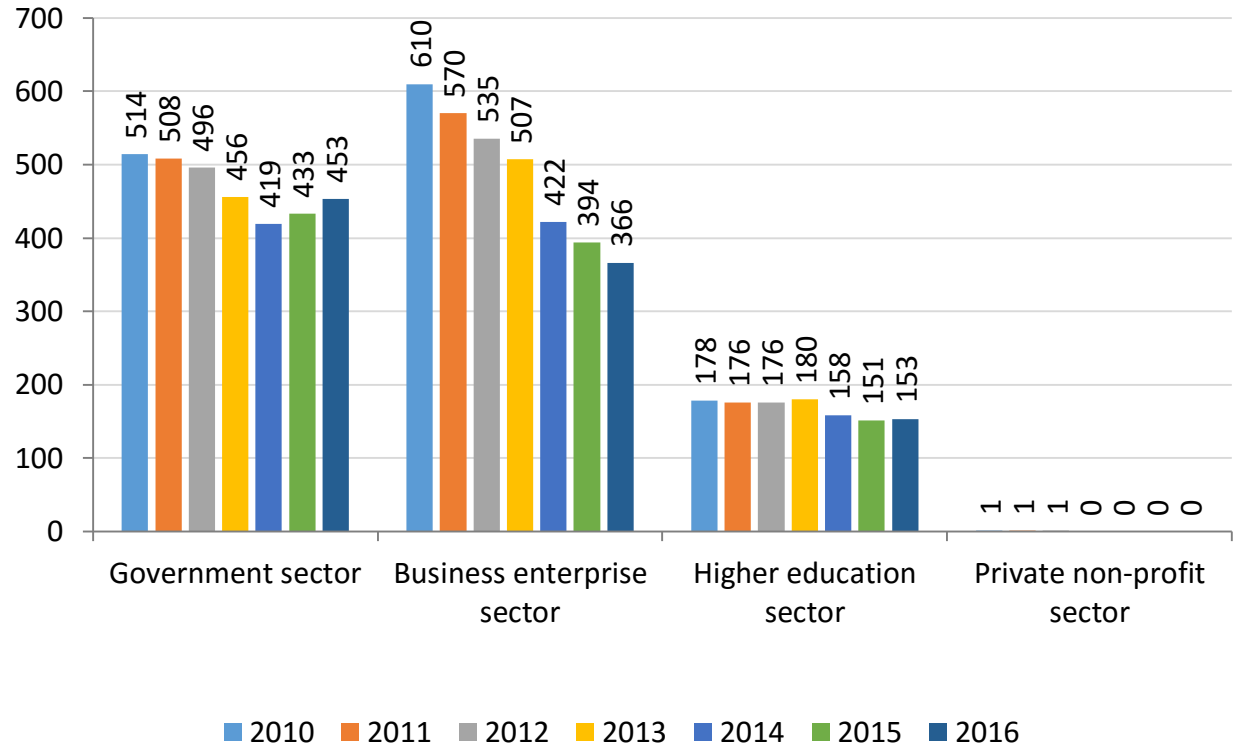
Organizations – total, *units*

	2010	2011	2012	2013	2014	2015	2016
Total	**1303**	**1255**	**1208**	**1143**	**999**	**978**	**972**
Government sector	514	508	496	456	419	433	453
including national academies	385	379	351	341	321	323	322
of them: **NAS of Ukraine**	**206**	**203**	**199**	**196**	**178**	**183**	**181**
Business enterprise sector	610	570	535	507	422	394	366

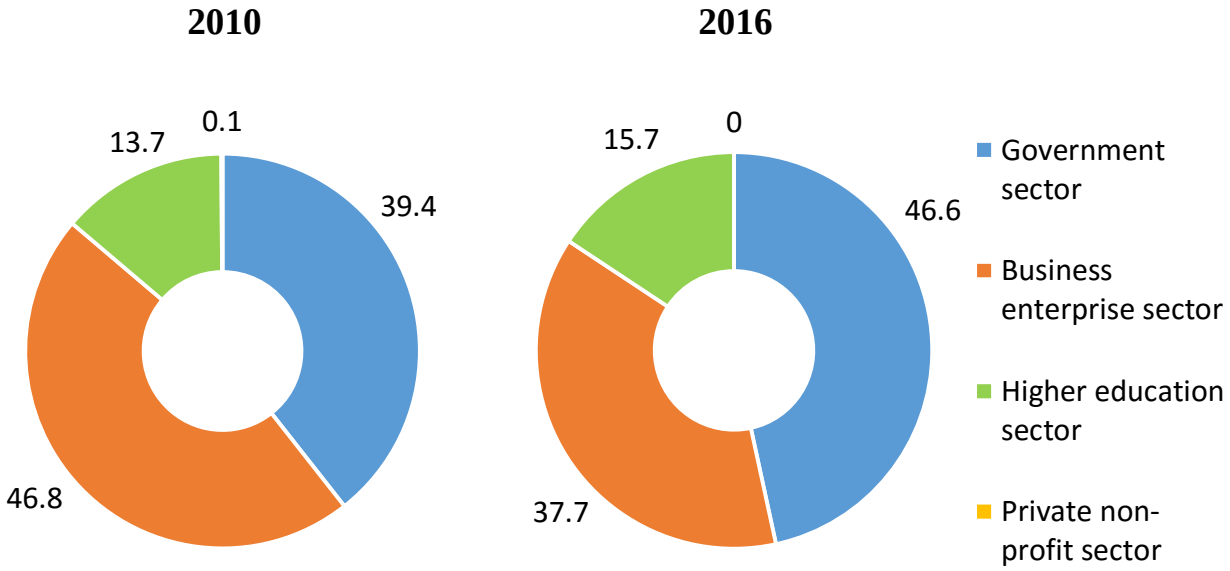
continued

	2010	2011	2012	2013	2014	2015	2016
Higher education sector	178	176	176	180	158	151	153
Private non-profit sector	1	1	1	…	…	…	…
							(as % of total of each year)
Government sector	39.4	40.5	41.1	39.9	42.0	44.3	46.6
including national academies	29.6	30.2	29.1	29.8	32.1	33.0	33.1
of them: **NAS of Ukraine**	**15.8**	**16.2**	**16.5**	**17.1**	**17.9**	**18.7**	**18.6**
Business enterprise sector	46.8	45.4	44.3	44.4	42.2	40.3	37.7
Higher education sector	13.7	14.0	14.6	15.7	15.8	15.4	15.7
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, *%*



III.3. R&D organizations by national academies of sciences and ministries

(units)

	2010	2011	2012	2013	2014	2015	2016
Total	**1303**	**1255**	**1208**	**1143**	**999**	**978**	**972**
Total for national academies of sciences*	385	379	351	341	321	323	322
including:							
National Academy of Sciences	**206**	**203**	**199**	**196**	**178**	**183**	**181**
National Academy of Agrarian Sciences of Ukraine (Ukrainian Academy of Agrarian Sciences before 2011)	119	114	93	86	86	85	86
National Academy of Medical Sciences (Academy of Medical Sciences before 2011)	37	37	35	35	34	34	35
National Academy of Arts (Academy of Fine Arts before 2011)	…	2	2	2	2	2	2

continued

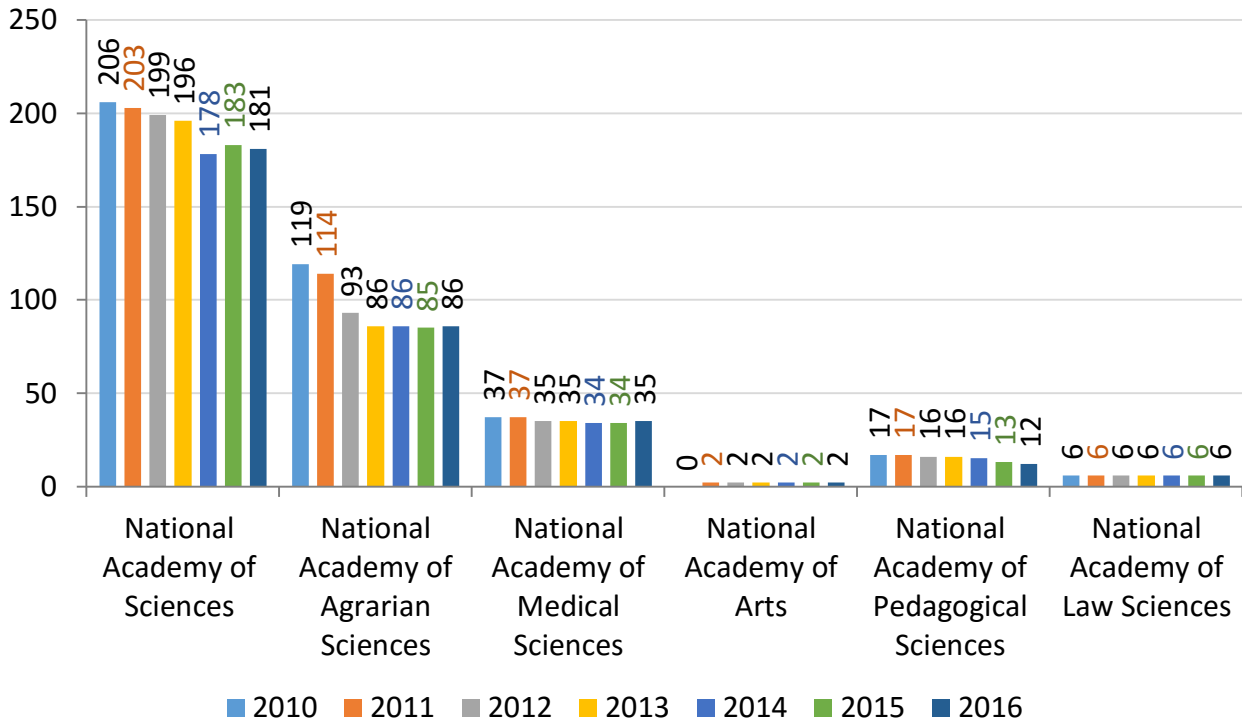
	2010	2011	2012	2013	2014	2015	2016
National Academy of Pedagogical Sciences (Academy of Pedagogical Sciences before 2011)	17	17	16	16	15	13	12
National Academy of Law Sciences (Academy of Law Sciences before 2011)	6	6	6	6	6	6	6
Total for ministries and agencies*	918	876	…	…	…	…	…
Ministry of Agrarian Policy and Food (Ministry of Agriculture before 2011)	90	82	…	…	…	…	…
Ministry of Energy and Coal Industry (Ministry of Fuels and Energy before 2011)	27	35	…	…	…	…	…
Ministry of Education and Science (Ministry of Education and Science, Youth and Sport before 2011)	144	134	…	…	…	…	…
Ministry of Healthcare	39	37	…	…	…	…	…

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

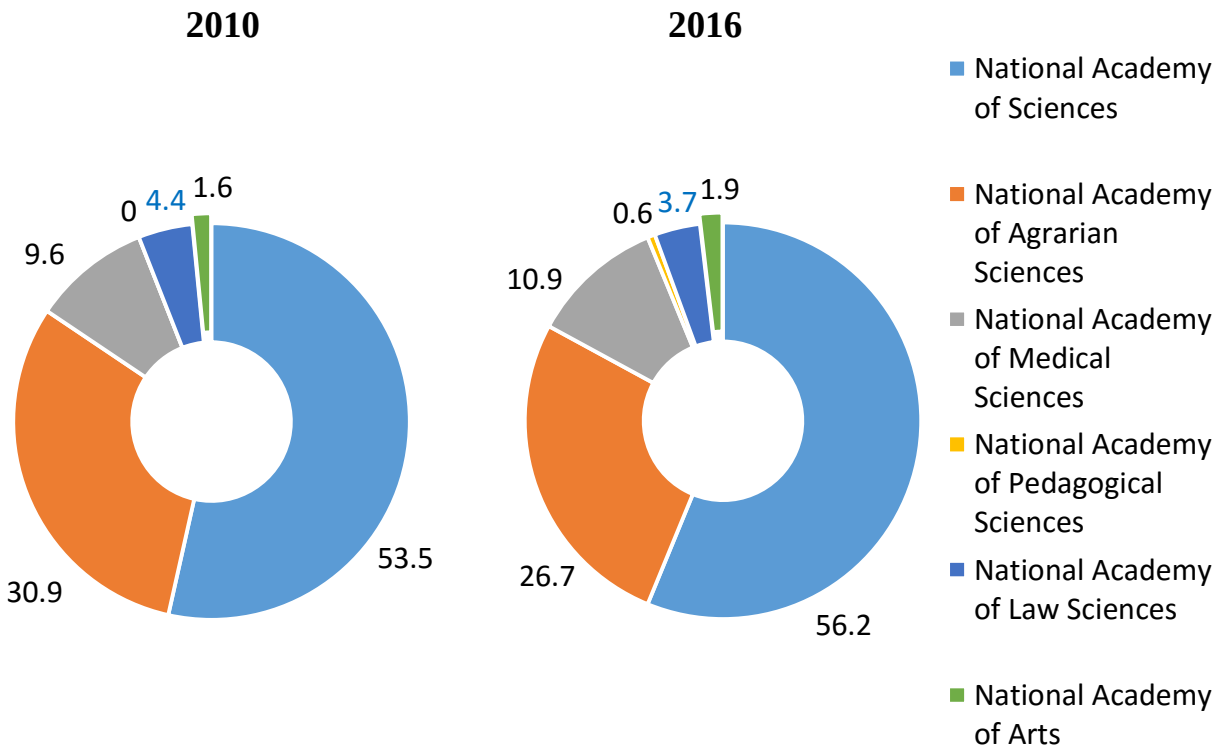
The figures in the line "Total in national academies" before 2011 are calculated as sums of figures for each Academy of Sciences; data for 2011-2014 are extracted from the annual statistical book "R&D and Innovation in Ukraine in 2014" issued by the State Statistics Service of Ukraine.

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 Collection "Scientific and innovation activity in Ukraine" for respective years. Data for ministries is not given in the annual Statistical Collection "Scientific and innovation activity in Ukraine" for 2012-2014.

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



Percentage distribution of organizations by national academies of sciences, *%*



III.4. Personnel by sector of performance

Main activity personnel, *headcount*

	2010	2011	2012	2013	2014	2015	2016
Total	**141086**	**134741**	**129945**	**123219**	**109636**	**101598**	**97912**
Government sector	63307	60834	62086	59921	54574	51622	41662
including national academies of sciences	56814	53550	51950	51308	46876	44187	35829
of them:							
NAS of Ukraine	**37480**	**36789**	**36162**	**35725**	**32548**	**30824**	**23683**
Business enterprise sector	67472	64550	58586	54532	47479	43310	35533
Higher education sector	10303	9355	9272	8766	7583	6666	20717
Private non-profit sector	4	2	1	…	…	…	…
							(as % of total of each year)
Government sector	44.9	45.1	47.8	48.6	49.8	50.8	42.6
including national academies of sciences	40.3	39.7	40	41.6	42.8	43.5	36.6
of them:							
NAS of Ukraine	**24.5**	**27.3**	**27.8**	**29.0**	**29.7**	**30.3**	**24.2**
Business enterprise sector	47.8	47.9	45.1	44.3	43.3	42.6	36.3
Higher education sector	7.3	6.9	7.1	7.1	6.9	6.6	21.2
Private non-profit sector	0	0	0	…	…	…	…

* In the statistics for 2010-2015, the permanent and temporary workers (part-time employees and persons working under civil-law contracts, including scientific and pedagogical workers) are taken into account.

R&D personnel (researchers and technicians), *headcount*

	2010	2011	2012	2013	2014	2015	2016
Total	**89564**	**84969**	**82032**	**77853**	**69404**	**63864**	**73694**
Government sector	42949	41275	41931	40752	37244	34923	34097
including national academies of sciences	38675	36363	35278	34955	32215	30169	29531
of them:							
NAS of Ukraine	**25196**	**24499**	**24058**	**23815**	**21716**	**20393**	**19675**

continued

	2010	2011	2012	2013	2014	2015	2016
Business enterprise sector	37568	35445	32023	29528	25669	23212	20634
Higher education sector	9045	8247	8077	7573	6491	5729	18963
Private non-profit sector	2	2	1	…	…	…	…
							(as % of total of each year)
Government sector	48.0	48.6	51.1	52.3	53.7	54.7	46.3
including national academies of sciences	43.2	42.8	43.0	44.9	46.4	47.2	40.1
of them:							
NAS of Ukraine	**28.1**	**28.8**	**29.3**	**30.6**	**31.3**	**31.9**	**26.7**
Business enterprise sector	41.9	41.7	39.0	37.9	37.0	36.3	28.0
Higher education sector	10.1	9.7	9.9	9.7	9.4	9.0	25.7
Private non-profit sector	0	0	0	0	…	…	…

Supporting staff, *headcount*

	2010	2011	2012	2013	2014	2015	2016
Total	**26032**	**24779**	**23866**	**22649**	**20128**	**19057**	**24218**
Government sector	8404	7848	8137	7694	6913	6502	7565
including national academies of sciences	7763	7181	7045	6860	6178	5789	6298
of them:							
NAS of Ukraine	**4904**	**4826**	**4748**	**4622**	**4177**	**3967**	**4008**
Business enterprise sector	16742	16200	14946	14151	12575	11979	14899
Higher education sector	886	731	783	804	640	576	1754
Private non-profit sector	…	…	…	…	…	…	…
							(as % of total of each year)
Government sector	32.3	31.7	34.1	34.0	34.3	34.1	31.2
including national academies of sciences	29.8	29	29.5	30.3	30.7	30.4	26.0
of them:							
NAS of Ukraine	**18.8**	**19.5**	**19.9**	**20.4**	**20.8**	**20.8**	16.5
Business enterprise sector	64.3	65.4	62.6	62.5	62.5	62.9	61.5
Higher education sector	3.4	3.0	3.3	3.5	3.2	3.0	7.2
Private non-profit sector	…	…	…	…	…	…	…

III.5. Personnel of national academies of sciences and ministries by occupation

Main activity personnel, *headcount*

	2010	2011	2012	2013	2014	2015	2016
Total	**141086**	**134741**	**129945**	**123219**	**109636**	**101598**	**97912**
Total for national academies of sciences	56814	53550	51950	51308	46876	44187	35829
including:							
National Academy of Sciences	**37480**	**36789**	**36162**	**35725**	**32548**	**30824**	**23683**
National Academy of Agrarian Sciences	12434	9887	9075	8934	7853	7319	6337
National Academy of Medical Sciences	5162	5110	4895	4798	4673	4493	4156
National Academy of Arts	110	114	113	105	106	102	104
National Academy of Pedagogical Sciences	1380	1393	1444	1469	1415	1187	1163
National Academy of Law Sciences	248	257	261	277	281	262	386
Total for ministries and agencies	84272	81191	…	…	…	…	…
of them:							
Ministry of Agrarian Policy and Food	2967	2583	…	…	…	…	…
Ministry of Energy and Coal Industry	2014	2825	…	…	…	…	…
Ministry of Education and Science	8591	7939	…	…	…	…	…
Ministry of Healthcare	2466	2268	…	…	…	…	…

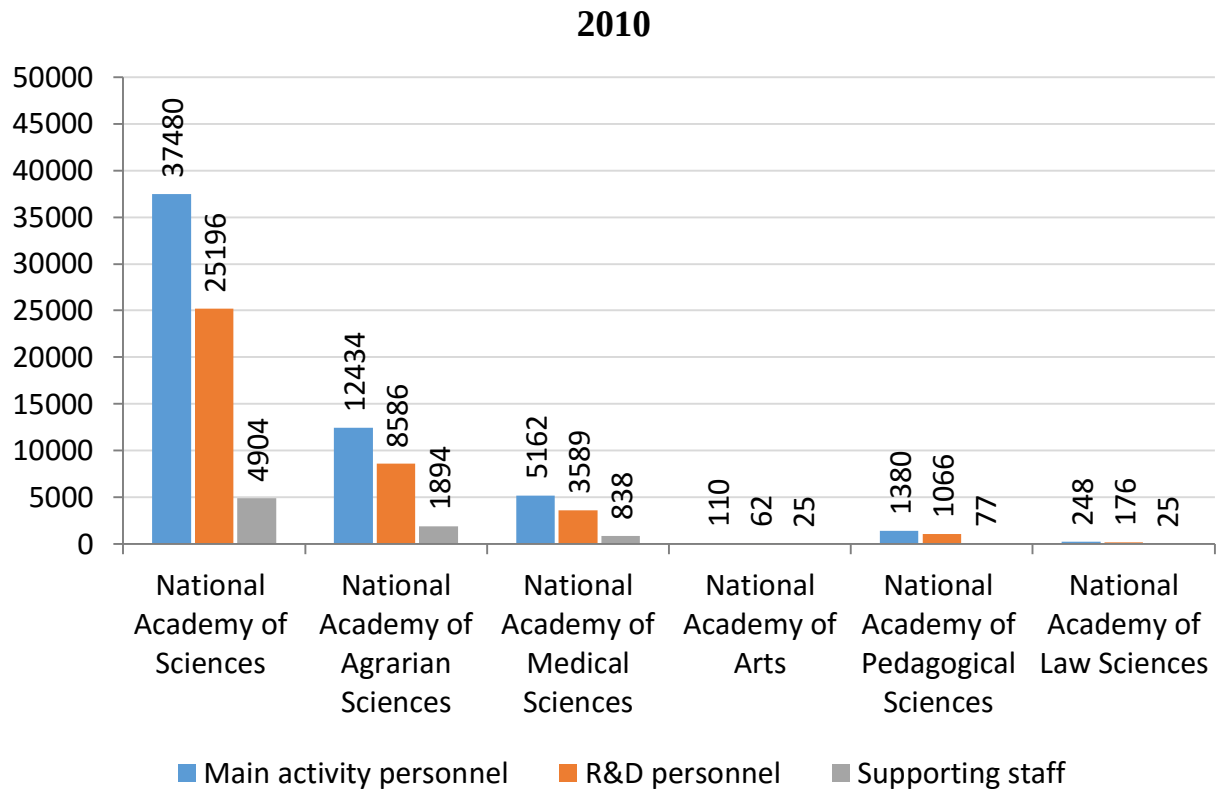
R&D personnel (researchers and technicians), *headcount*

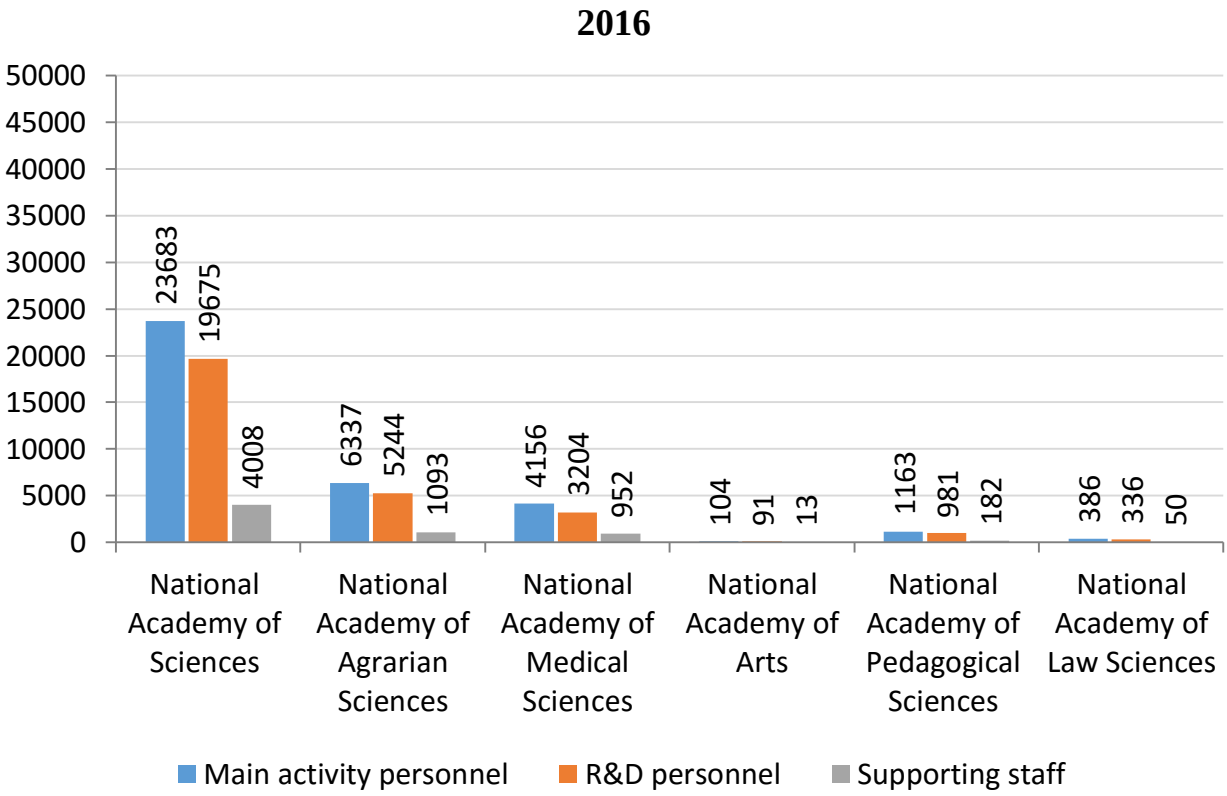
	2010	2011	2012	2013	2014	2015	2016
Total	**89564**	**84969**	**82032**	**77853**	**69404**	**63864**	**73694**
Total for national academies of sciences	38675	36363	35278	34955	32215	30169	29531
including:							
National Academy of Sciences	**25196**	**24499**	**24058**	**23815**	**21716**	**20393**	**19675**
National Academy of Agrarian Sciences	8586	6976	6451	6384	5857	5477	5244
National Academy of Medical Sciences	3589	3565	3372	3324	3246	3125	3204
National Academy of Arts	62	64	62	60	62	58	91
National Academy of Pedagogical Sciences	1066	1074	1138	1160	1117	911	981
National Academy of Law Sciences	176	185	197	212	217	205	336
Total for ministries and agencies	50889	48606	…	…	…	…	…
of them:							
Ministry of Agrarian Policy and Food	1893	1720	…	…	…	…	…
Ministry of Energy and Coal Industry	1343	1834	…	…	…	…	…
Ministry of Education and Science	7092	6516	…	…	…	…	…
Ministry of Healthcare	1492	1340	…	…	…	…	…

Supporting staff, *headcount*

	2010	2011	2012	2013	2014	2015	2016
Total	**26032**	**24779**	**23866**	**22649**	**20128**	**19057**	**24218**
Total for national academies of sciences	7763	7181	7045	6860	6178	5789	6298
including:							
National Academy of Sciences	**4904**	**4826**	**4748**	**4622**	**4177**	**3967**	**4008**
National Academy of Agrarian Sciences	1894	1399	1345	1290	1075	974	1093
National Academy of Medical Sciences	838	812	824	819	800	758	952
National Academy of Arts	25	26	22	17	17	16	13
National Academy of Pedagogical Sciences	77	94	86	91	87	56	182
National Academy of Law Sciences	25	24	20	21	22	18	50
Total for ministries and agencies	18269	17598	…	…	…	…	…
of them:							
Ministry of Agrarian Policy and Food	451	347	…	…	…	…	…
Ministry of Energy and Coal Industry	302	392	…	…	…	…	…
Ministry of Education and Science	943	813	…	…	…	…	…
Ministry of Healthcare	312	290	…	…	…	…	…

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





III.6. Personnel in national academies of sciences by field of science and technology

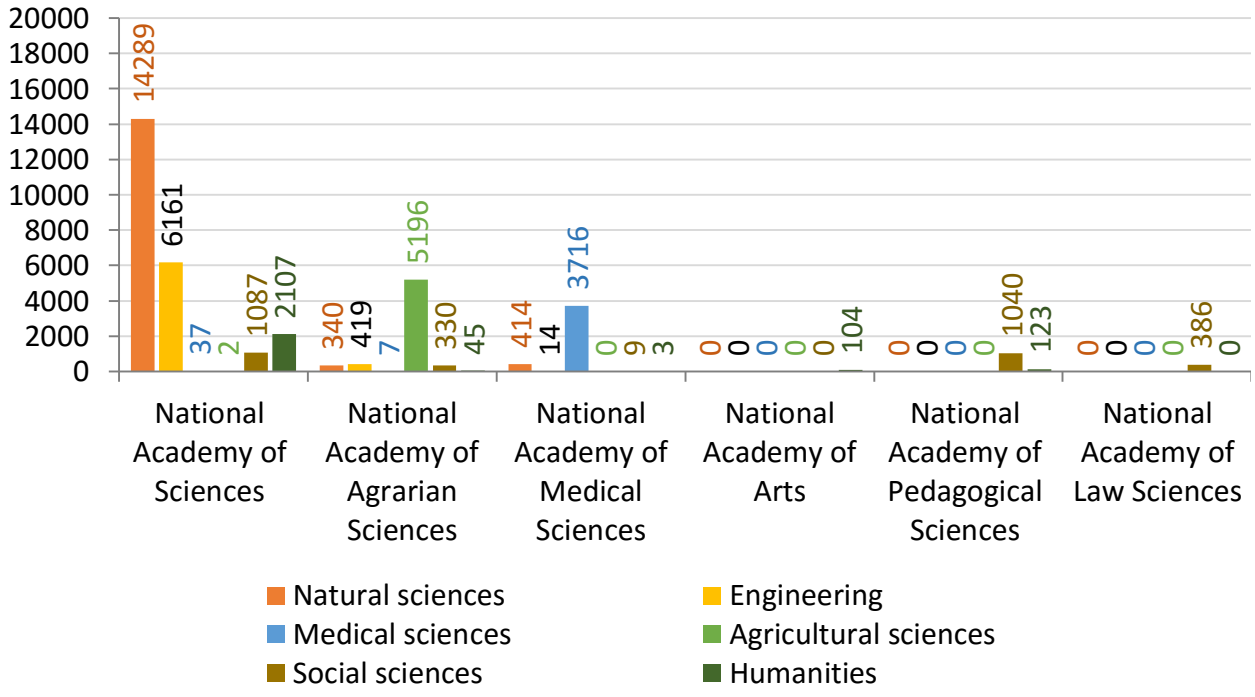
Main activity personnel: 2016, *headcount*

	Total	Including					
		Natural sciences	Engine-ering	Medical sciences	Agri-cultural sciences	Social sciences	Huma-nities
Total	**97912**	**24777**	**47816**	**6410**	**7283**	**7731**	**3895**
Total for national academies of sciences	35829	15043	6594	3760	5198	2852	2382
including:							
National Academy of Sciences	23683	14289	6161	37	2	1087	2107
National Academy of Agrarian Sciences	6337	340	419	7	5196	330	45
National Academy of Medical Sciences	4156	414	14	3716	–	9	3
National Academy of Arts	104	–	–	–	–	–	104
National Academy of Pedagogical Sciences	1163	–	–	–	–	1040	123
National Academy of Law Sciences	386	–	–	–	–	386	–
				(as % of total of field of science and technology)			
Total for national academies of sciences	36.6	60.7	13.8	58.7	71.4	36.9	61.2
National Academy of Sciences	24.2	57.7	12.9	0.6	0.0	14.1	54.1

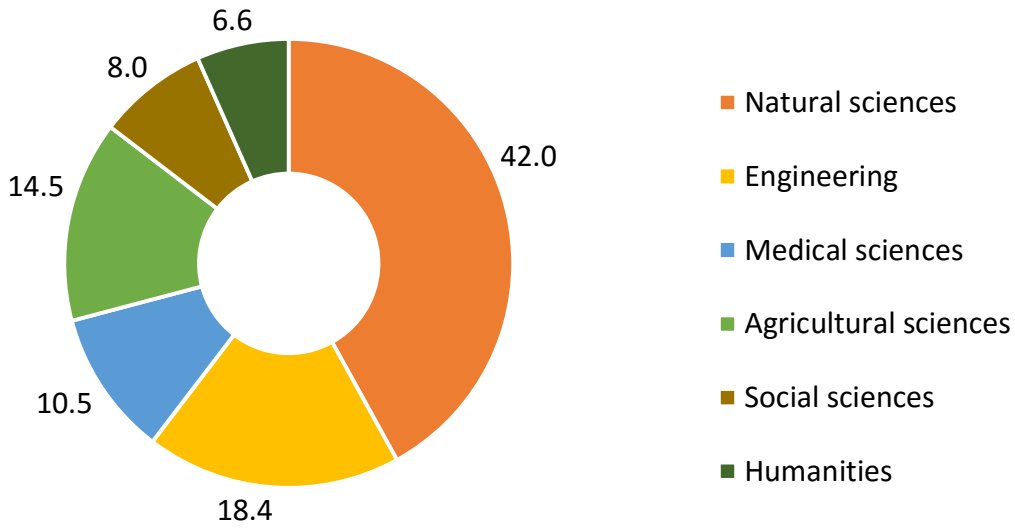
continued

	Total	Including					
		Natural sciences	Engine-ering	Medical sciences	Agri-cultural sciences	Social sciences	Huma-nities
National Academy of Agrarian Sciences	6.5	1.4	0.9	0.1	71.3	4.3	1.2
National Academy of Medical Sciences	4.2	1.7	0.0	58.0	–	0.1	0.1
National Academy of Arts	0.1	–	–	–	–	–	2.7
National Academy of Pedagogical Sciences	1.2	–	–	–	–	13.5	3.2
National Academy of Law Sciences	0.4	–	–	–	–	5.0	–

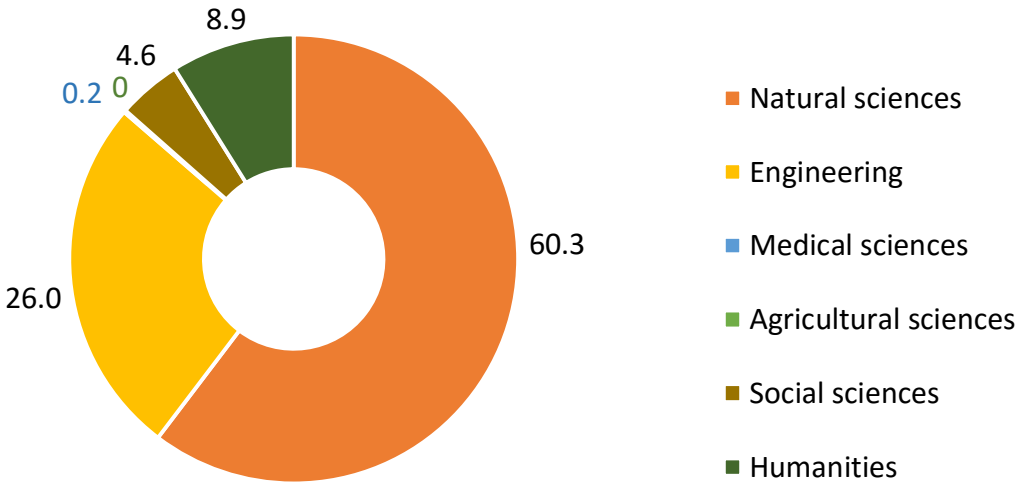
Personnel of national academies of sciences by field of science and technology, *headcount*



Percentage distribution of personnel of national academies of sciences by field of science and technology, %



Percentage distribution of personnel of National Academy of Sciences by field of science and technology, %



III.7. R&D personnel by scientific degree

Doctors of sciences, *headcount*

	2010	2011	2012	2013	2014	2015	2016
Total	**4478**	**4416**	**4485**	**4528**	**4256**	**4120**	**7091**
Total for national academies of sciences	3599	3514	3534	3610	3461	3356	3871
including:							
National Academy of Sciences	**2557**	**2486**	**2491**	**2535**	**2410**	**2342**	**2624**
National Academy of Agrarian Sciences	314	296	310	334	296	299	371
National Academy of Medical Sciences	593	600	586	588	587	563	627
National Academy of Arts	9	12	12	7	9	9	16
National Academy of Pedagogical Sciences	116	108	123	130	134	119	158
National Academy of Law Sciences	10	12	12	16	25	24	75
Total for ministries and agencies	879	902	…	…	…	…	…
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	879	902	…	…	…	…	…

PhD (Candidates of sciences), *headcount*

	2010	2011	2012	2013	2014	2015	2016
Total	**16944**	**16139**	**15887**	**15850**	**14736**	**13813**	**20208**
Total for national academies of sciences	11673	11207	11077	11190	10538	10008	10339
including:							
National Academy of Sciences	**7938**	**7745**	**7696**	**7746**	**7205**	**6801**	**6981**
National Academy of Agrarian Sciences	1894	1659	1608	1638	1556	1527	1555
National Academy of Medical Sciences	1351	1300	1260	1256	1234	1190	1226
National Academy of Arts	35	38	26	23	23	26	32
National Academy of Pedagogical Sciences	401	406	415	450	440	388	409
National Academy of Law Sciences	54	59	72	77	80	76	136
Total for ministries and agencies	5271	4932	…	…	…	…	…
of them:							
Ministry of Agrarian Policy and Food	143	137	…	…	…	…	…
Ministry of Energy and Coal Industry	109	157	…	…	…	…	…
Ministry of Education and Science	1627	1522	…	…	…	…	…
Ministry of Healthcare	372	350	…	…	…	…	…

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

Researchers – total, *headcount*

	2010	2011	2012	2013	2014	2015	2016
Total	**73413**	**70378**	**68599**	**65641**	**58695**	**53835**	**63694**
Total for national academies of sciences	32567	31137	30551	30343	27862	26267	26027
including:							
National Academy of Sciences	**22377**	**21729**	**21488**	**21297**	**19278**	**18329**	**17820**
National Academy of Agrarian Sciences	5819	5052	4787	4782	4425	4077	4025
National Academy of Medical Sciences	3180	3145	2991	2945	2876	2777	2860
National Academy of Arts	62	64	60	60	62	58	91
National Academy of Pedagogical Sciences	967	974	1041	1061	1017	832	916
National Academy of Law Sciences	162	173	184	198	204	194	315
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	…	…	…	…	…

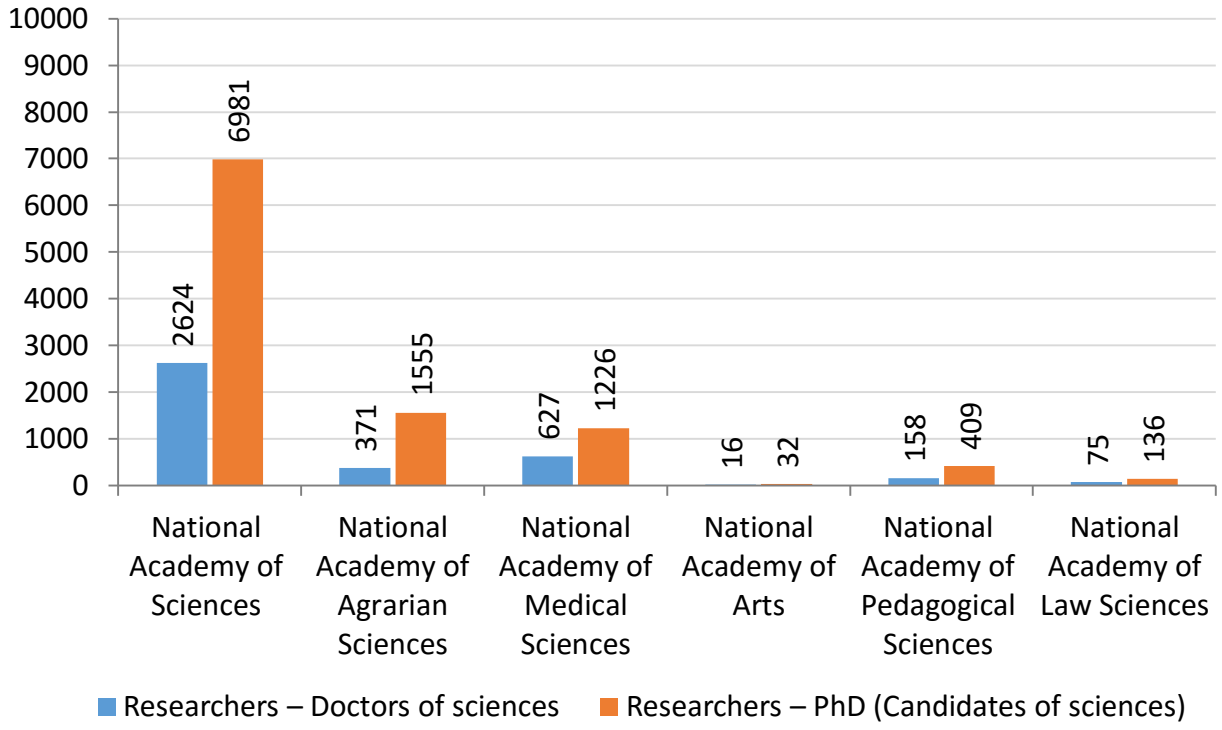
Researchers with doctor of sciences degree, *headcount*

	2010	2011	2012	2013	2014	2015	2016
Total	**4477**	**4415**	**4485**	**4528**	**4256**	**4120**	**7071**
Total for national academies of sciences	3599	3514	3534	3610	3461	3356	3871
including:							
National Academy of Sciences	**2557**	**2486**	**2491**	**2535**	**2410**	**2342**	**2624**
National Academy of Agrarian Sciences	314	296	310	334	296	299	371
National Academy of Medical Sciences	593	600	586	588	587	563	627
National Academy of Arts	9	12	12	7	9	9	16
National Academy of Pedagogical Sciences	116	108	123	130	134	119	158
National Academy of Law Sciences	10	12	12	16	25	24	75
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	…	…	…	…	…

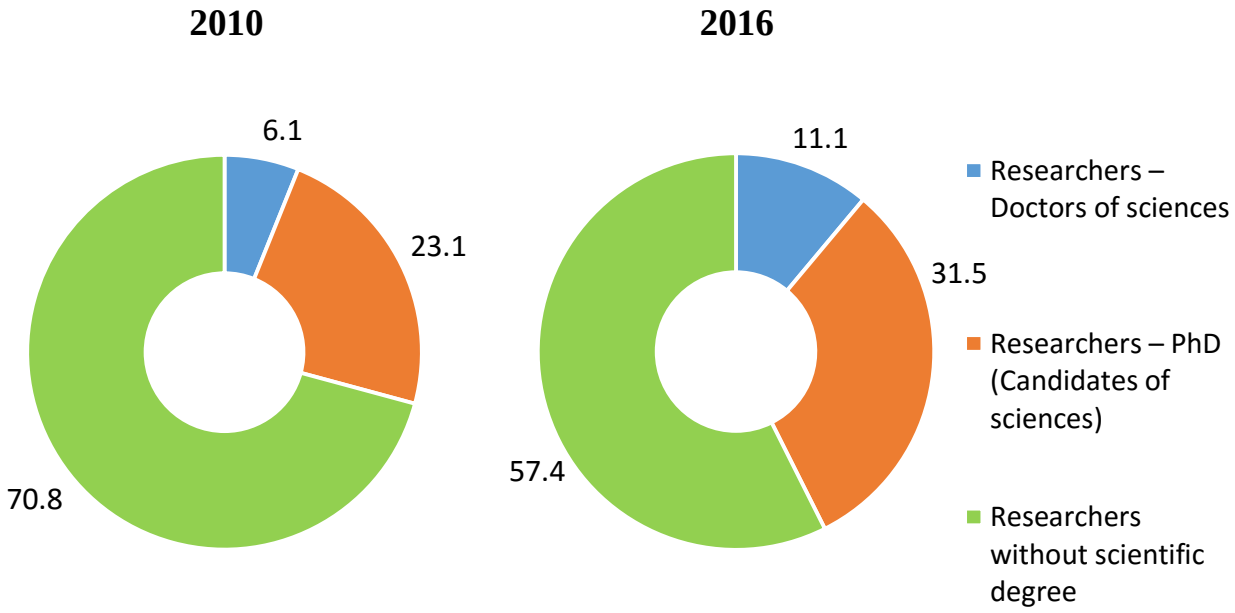
Researchers with PhD (candidate of sciences) degree, *headcount*

	2010	2011	2012	2013	2014	2015	2016
Total	**16923**	**16117**	**15866**	**15833**	**14718**	**13813**	**20085**
Total for national academies of sciences	11666	11195	11066	11190	10538	9967	10339
including:							
National Academy of Sciences	**7931**	**7735**	**7687**	**7746**	**7205**	**6778**	**6981**
National Academy of Agrarian Sciences	1894	1659	1608	1638	1556	1513	1555
National Academy of Medical Sciences	1351	1298	1258	1256	1234	1187	1226
National Academy of Arts	35	38	26	23	23	26	32
National Academy of Pedagogical Sciences	401	406	415	450	440	388	409
National Academy of Law Sciences	54	59	72	77	80	75	136
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 by scientific degree: 2016, *headcount*



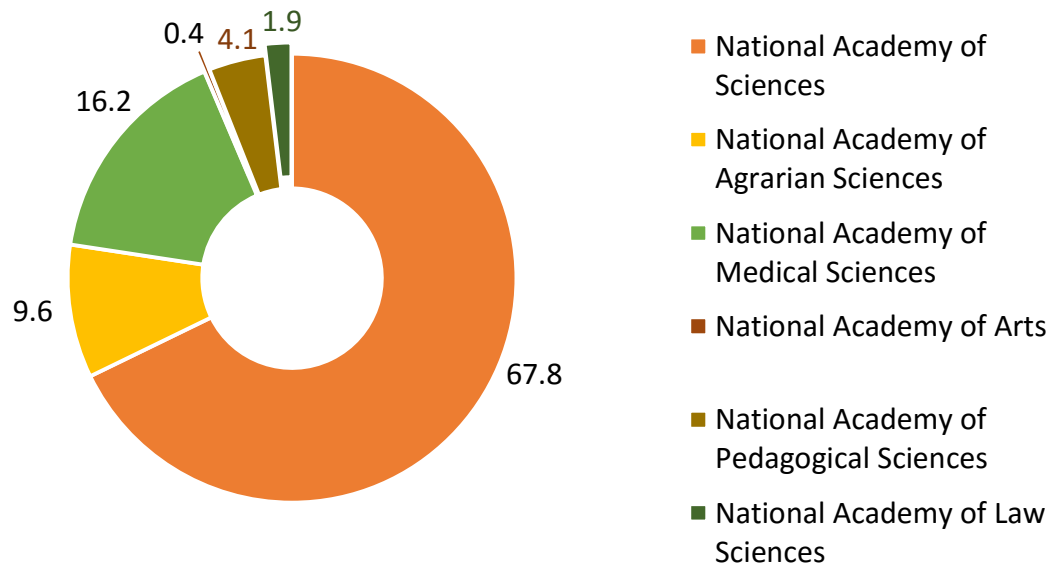
Share of researchers with scientific degree, *% in the total number*



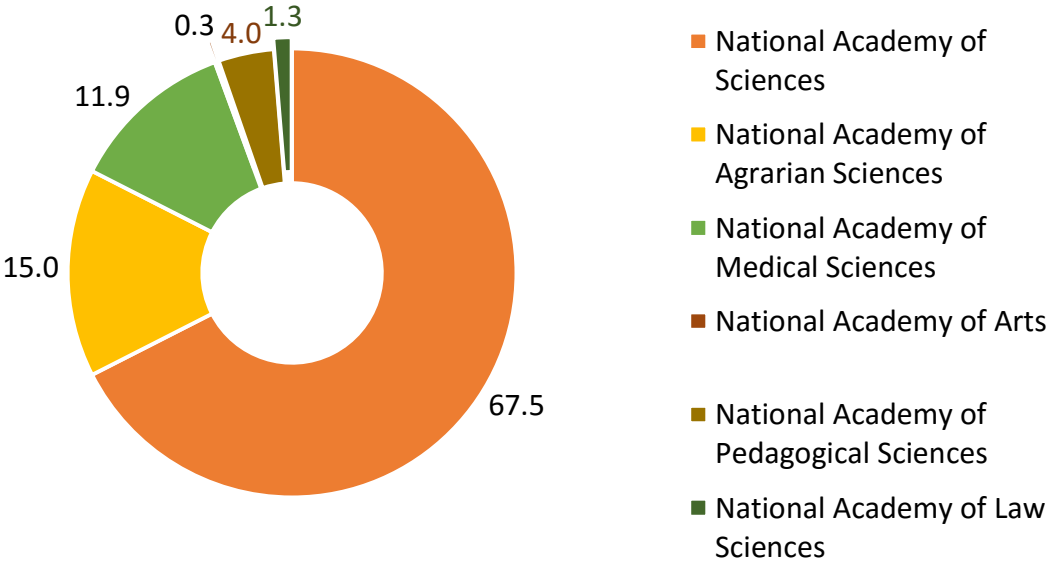
Share of researchers with scientific degree in organizations of national academies of sciences by academies: 2016,

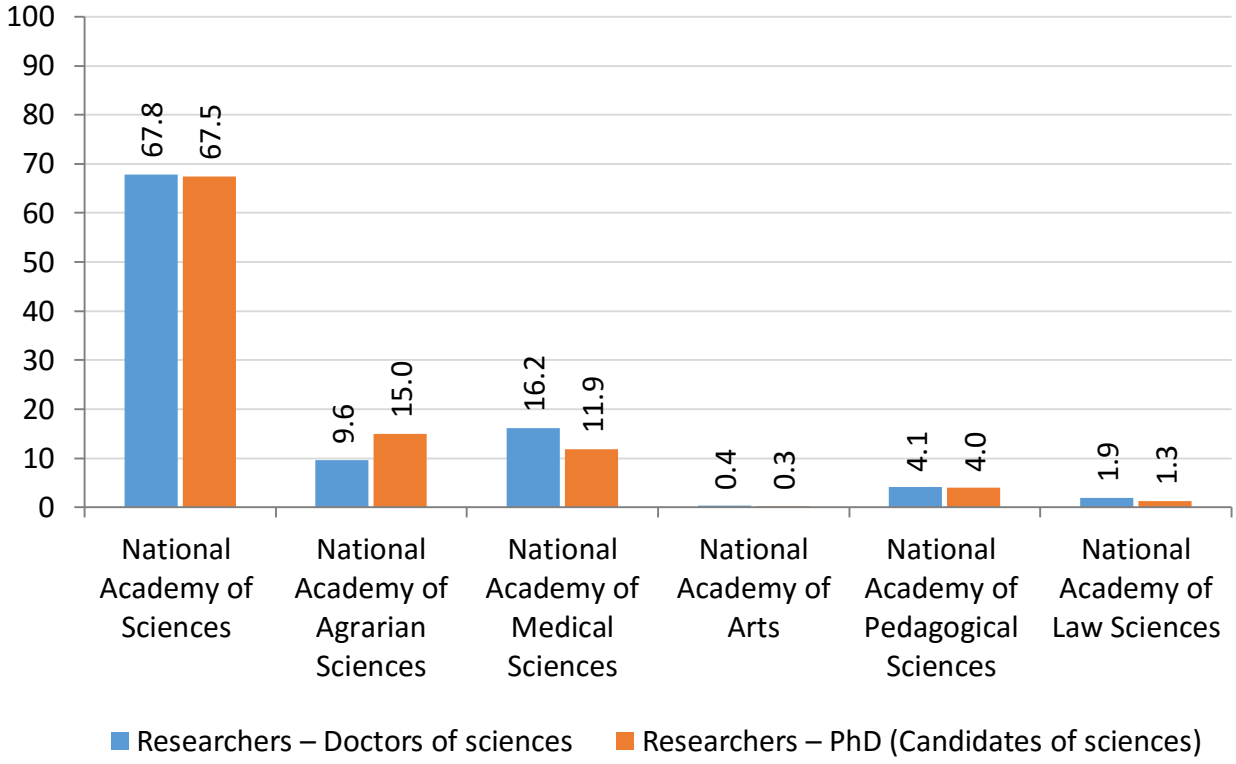
% in the total number

Researchers – Doctors of sciences

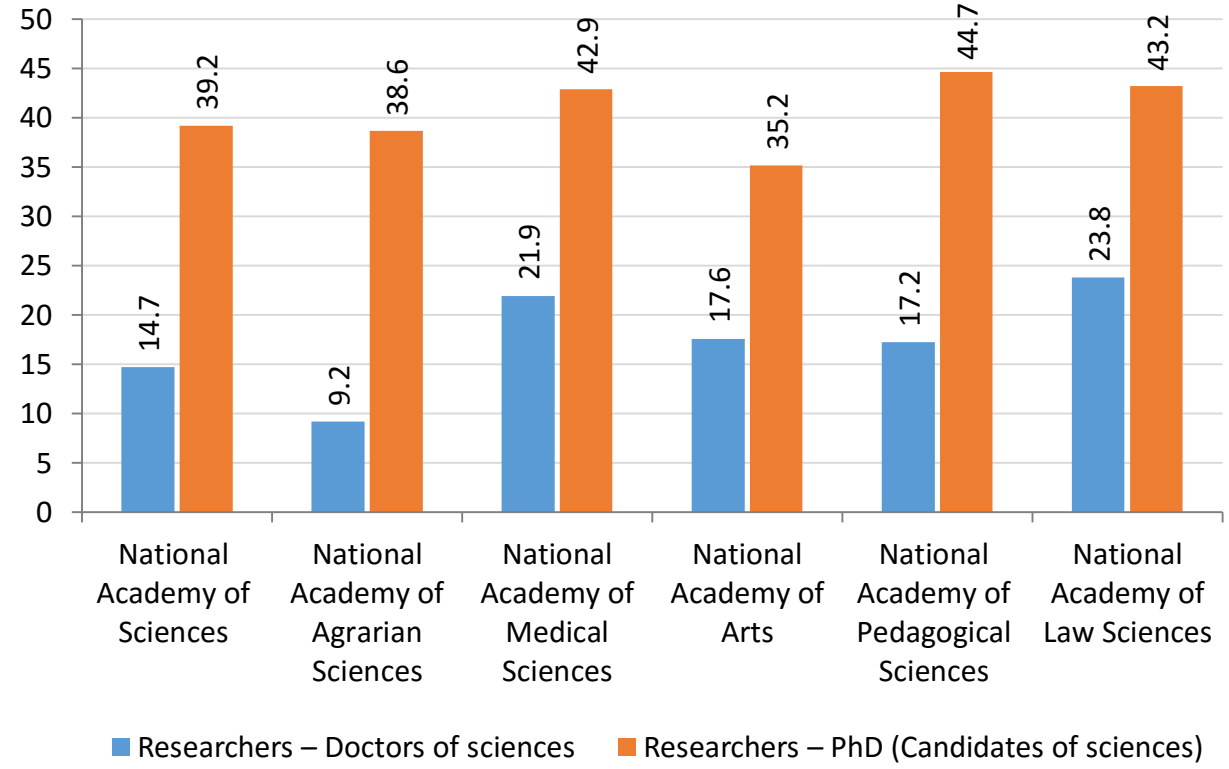


Researchers – PhD (Candidates of sciences)





Share of researchers with scientific degree in organizations of national academies of sciences: 2016, *%*



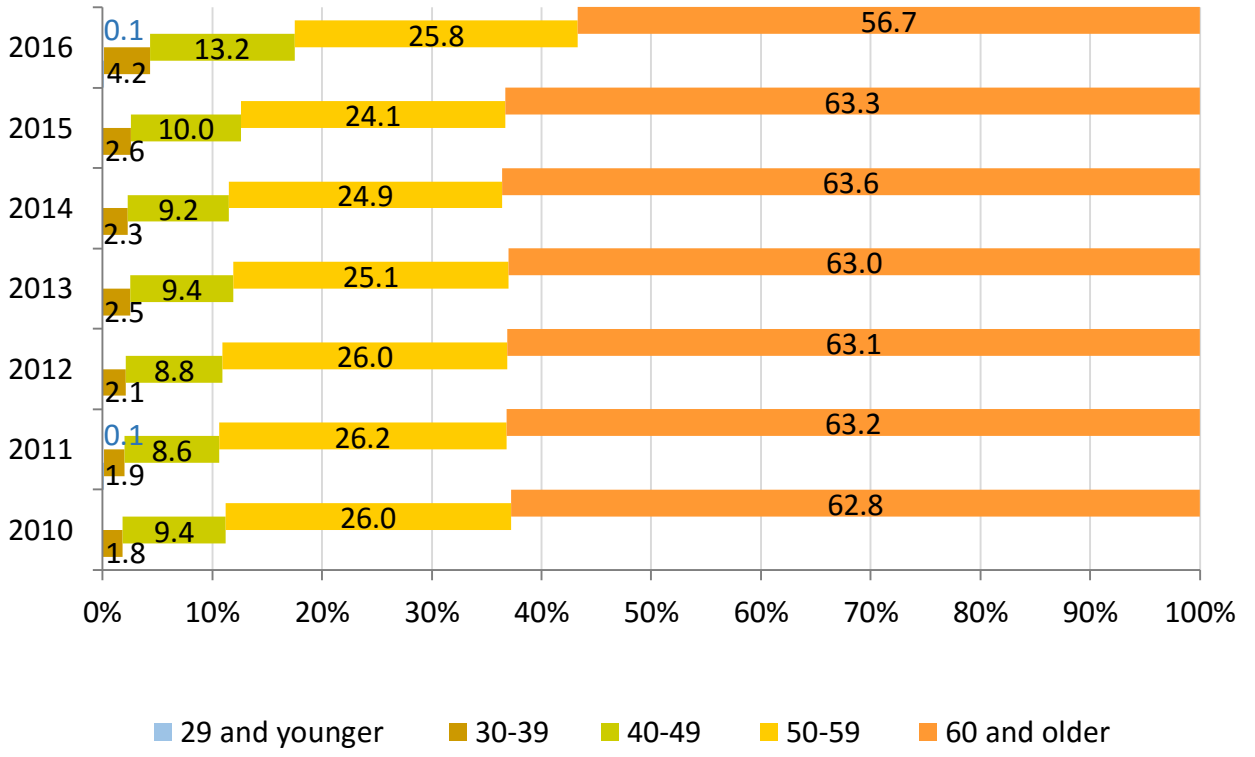
III.9. Researchers by scientific degree and age

Doctors of sciences by age, *headcount*

	2010	2011	2012	2013	2014	2015	2016
Total	**4477**	**4415**	**4485**	**4528**	**4256**	**4120**	**7071**
of them:							
29 and younger	2	3	–	–	–	1	4
30–39	81	86	93	111	99	108	300
40–49	422	380	396	426	393	413	936
50–59	1164	1156	1162	1136	1057	991	1821
60–69	1362	1333	1384	1391	1339	1352	4100*
70 and older	1446	1457	1450	1464	1368	1255	

* 60-70 and older.

(as % of total in Ukraine)

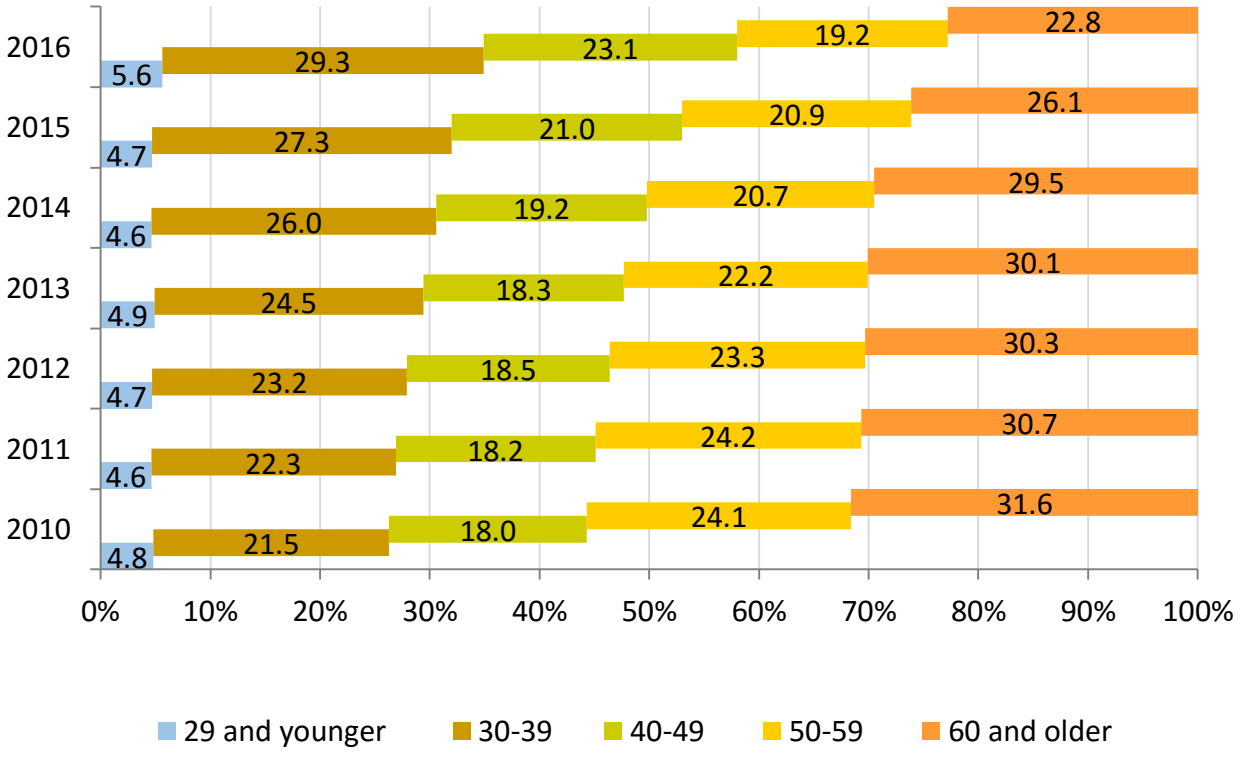


PhD (Candidates of sciences) by age, *headcount*

	2010	2011	2012	2013	2014	2015	2016
Total	**16923**	**16117**	**15866**	**15833**	**14718**	**13813**	**20085**
of them:							
29 and younger	814	739	739	776	681	648	1131
30–39	3644	3590	3684	3880	3826	3763	5884
40–49	3035	2932	2931	2895	2821	2899	4630
50–59	4083	3916	3698	3515	3052	2892	3855
60–69	3279	2994	2957	2967	2708	2376	4585*
70 and older	2068	1946	1857	1800	1630	1235	

* 60-70 and older.

(as % of total in Ukraine)



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

Women performing R&D – total, *headcount*

	2010	2011	2012	2013	2014	2015	2016
Total	**33159**	**32018**	**31426**	**30079**	**26890**	**24930**	**28660**
Total for national academies of sciences	15155	14577	14413	14542	13365	12723	12439
including:							
National Academy of Sciences	**9303**	**8979**	**8942**	**9063**	**8137**	**7876**	**7321**
National Academy of Agrarian Sciences	2975	2702	2595	2605	2381	2215	2249
National Academy of Medical Sciences	2097	2059	1980	1934	1920	1844	1941
National Academy of Arts	…	36	35	37	39	37	58
National Academy of Pedagogical Sciences	679	695	751	781	769	640	692
National Academy of Law Sciences	101	106	110	122	119	111	178
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	…	…	…	…	…

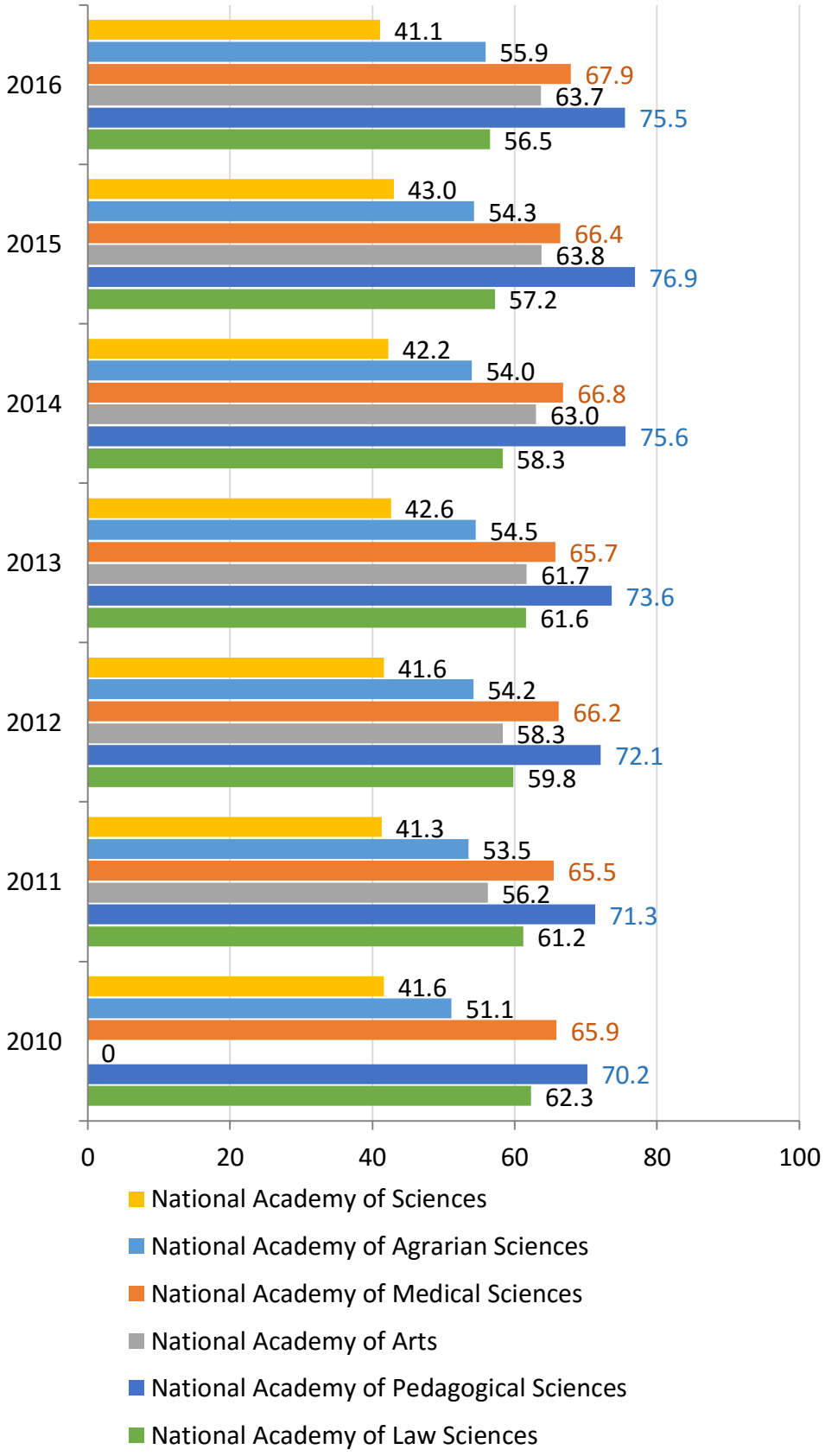
Women – doctors of sciences, *headcount*

	2010	2011	2012	2013	2014	2015	2016
Total	**981**	**984**	**1049**	**1087**	**1063**	**1041**	**1902**
Total for national academies of sciences	825	819	854	891	887	858	1055
including:							
National Academy of Sciences	**468**	**453**	**459**	**487**	**473**	**460**	**529**
National Academy of Agrarian Sciences	51	49	55	59	55	59	85
National Academy of Medical Sciences	248	254	262	262	268	253	304
National Academy of Arts	…	5	5	3	4	4	7
National Academy of Pedagogical Sciences	55	52	68	75	79	74	101
National Academy of Law Sciences	3	6	5	5	8	8	29
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 – PhD (Candidates of sciences), *headcount*

	2010	2011	2012	2013	2014	2015	2016
Total	**6898**	**6621**	**6735**	**6853**	**6513**	**6262**	**9448**
Total for national academies of sciences	5126	4940	5063	5194	4955	4763	5007
including:							
National Academy of Sciences	**3095**	**2989**	**3077**	**3129**	**2952**	**2811**	**2926**
National Academy of Agrarian Sciences	810	735	761	795	757	769	806
National Academy of Medical Sciences	919	880	877	880	858	826	869
National Academy of Arts	…	27	19	17	17	20	22
National Academy of Pedagogical Sciences	277	284	292	332	328	294	314
National Academy of Law Sciences	25	25	37	41	43	44	70
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 women in the total number of researchers in national academies of sciences: 2010-2016, %

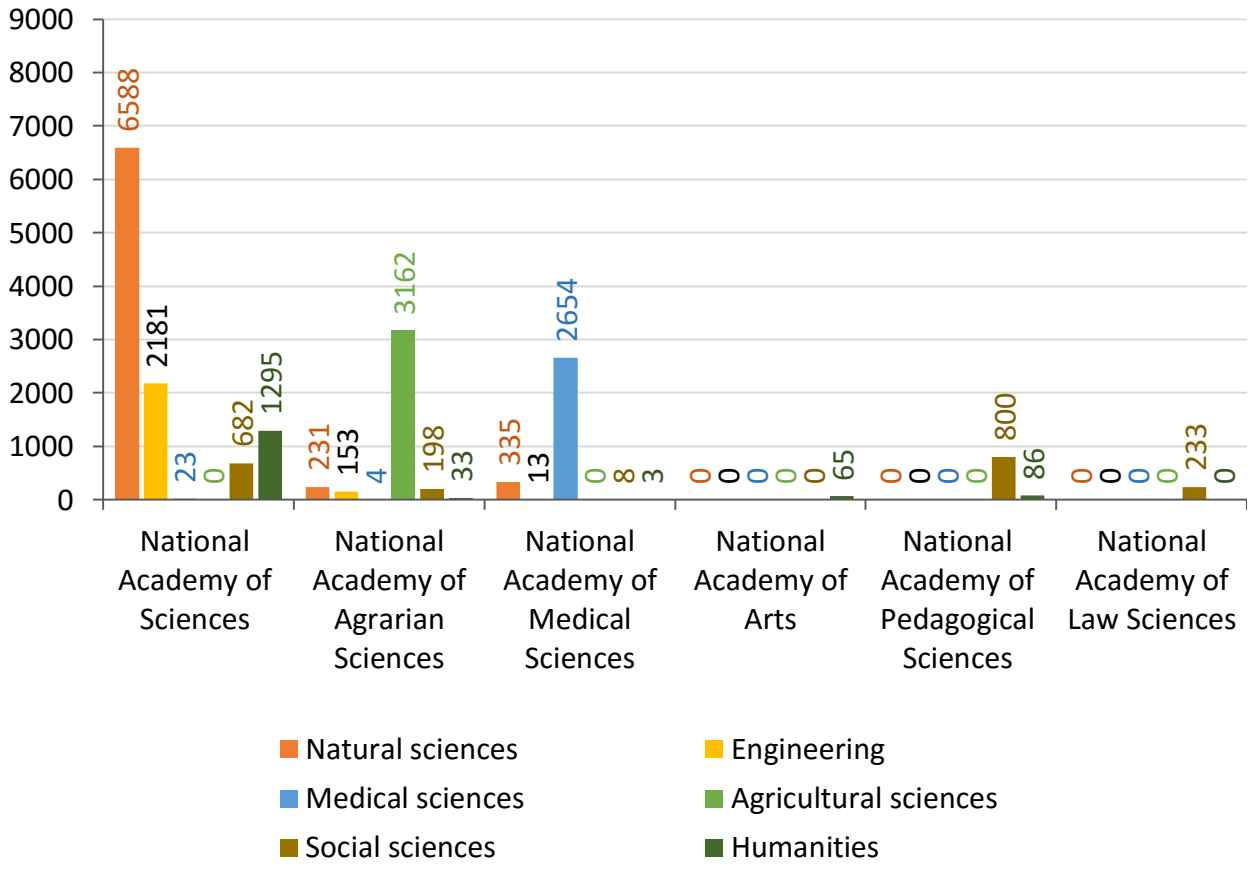


Women in the total number of researches in national academies of sciences by field of science and technology: 2016, *headcount*

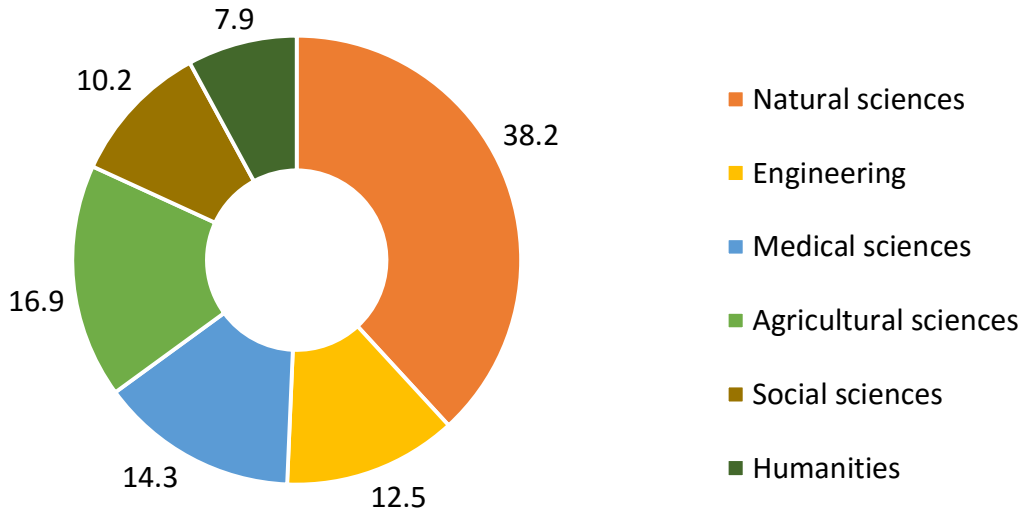
	Total	Including					
		Natural sciences	Engine-ering	Medical sciences	Agri-cultural sciences	Social sciences	Huma-nities
Total for national academies of sciences	18747	7154	2347	2681	3162	1921	1482
including:							
National Academy of Sciences	10769	6588	2181	23	–	682	1295
National Academy of Agrarian Sciences	3781	231	153	4	3162	198	33
National Academy of Medical Sciences	3013	335	13	2654	–	8	3
National Academy of Arts	65	–	–	–	–	–	65
National Academy of Pedagogical Sciences	886	–	–	–	–	800	86
National Academy of Law sciences	233	–	–	–	–	233	–
		(as % of the total of field of science and technology)					
National Academy of Sciences	57.4	92.1	92.9	0.9	–	35.5	87.4
National Academy of Agrarian Sciences	20.2	3.2	6.5	0.1	100.0	10.3	2.2

continued

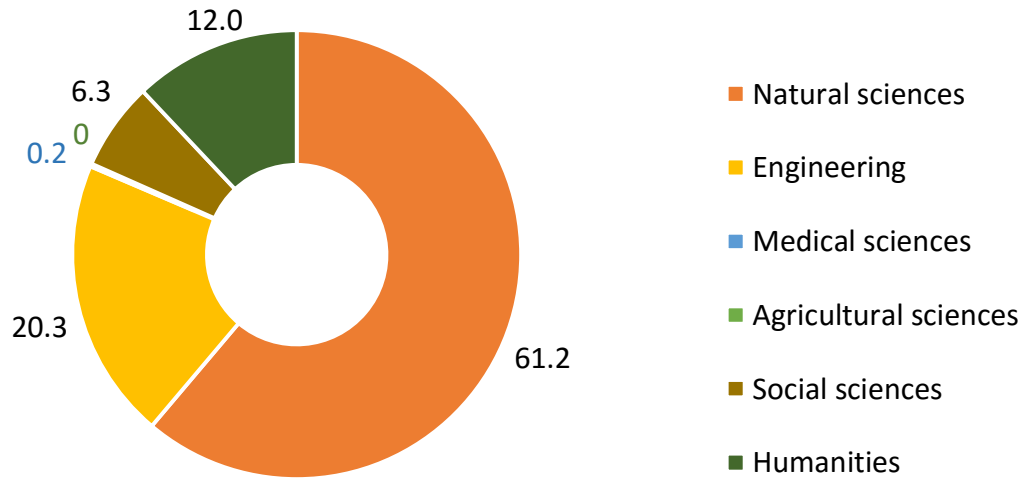
	Total	Including					
		Natural sciences	Engine-ering	Medical sciences	Agri-cultural sciences	Social sciences	Huma-nities
National Academy of Medical Sciences	16.1	4.7	0.6	99.0	–	0.4	0.2
National Academy of Arts	0.3	–	–	–	–	–	4.4
National Academy of Pedagogical Sciences	4.7	–	–	–	–	41.6	5.8
National Academy of Law sciences	1.2	–	–	–	–	12.1	–



Percentage distribution of women in the total number of researchers in national academies of sciences by field of science and technology, *%*



Percentage distribution of women in the total number of researchers in National Academy of Sciences by field of science and technology, *%*



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

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

	2010	2011	2012	2013	2014	2015
Total	**69380**	**68151**	**61077**	**57135**	**48523**	**41739**
Total for national academies of sciences	5569	5574	5295	5089	4528	4472
including:						
National Academy of Sciences	**4000**	**3789**	**3468**	**3304**	**2998**	**3081**
National Academy of Agrarian Sciences	468	553	559	632	541	531
National Academy of Medical Sciences	527	539	462	515	370	381
National Academy of Arts	6	7	7	22	38	33
National Academy of Pedagogical Sciences	368	478	582	406	387	279
National Academy of Law Sciences	200	208	217	210	194	167
Total for ministries and agencies	63811	62577	…	…	…	…
of them:						
Ministry of Agrarian Policy and Food	1518	2274	…	…	…	…
Ministry of Energy and Coal Industry	114	137	…	…	…	…
Ministry of Education and Science	50884	46830	…	…	…	…
Ministry of Healthcare	3897	3713	…	…	…	…

* Since 2006 all the research and lecturing staff of HEIs has been included in part-time R&D performers by the State Statistics Service of Ukraine. Since 2016 the research and lecturing staffs of HEIs have not been included in part-time R&D performers.

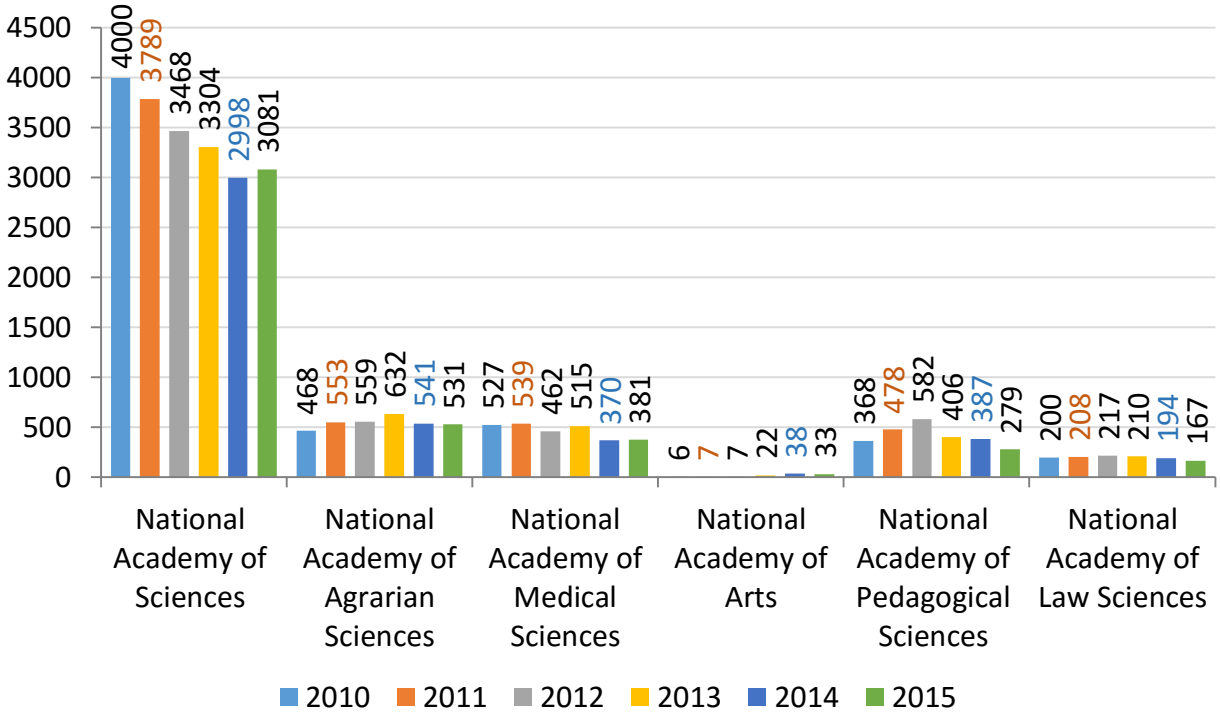
Part-time R&D doctors of sciences, *headcount*

	2010	2011	2012	2013	2014	2015
Total	**7493**	**7260**	**6684**	**6623**	**5723**	**5447**
Total for national academies of sciences	962	906	882	845	771	737
including:						
National Academy of Sciences	**640**	**588**	**572**	**545**	**473**	**488**
National Academy of Agrarian Sciences	88	45	47	52	49	50
National Academy of Medical Sciences	79	74	78	96	93	66
National Academy of Arts	–	–	–	7	12	11
National Academy of Pedagogical Sciences	91	126	105	69	66	60
National Academy of Law Sciences	64	73	80	76	78	62
Total for ministries and agencies	6531	6354	…	…	…	…
of them:						
Ministry of Agrarian Policy and Food	180	214	…	…	…	…
Ministry of Energy and Coal Industry	10	14	…	…	…	…
Ministry of Education and Science	5107	4682	…	…	…	…
Ministry of Healthcare	589	607	…	…	…	…

Part-time R&D PhD (Candidates of sciences), *headcount*

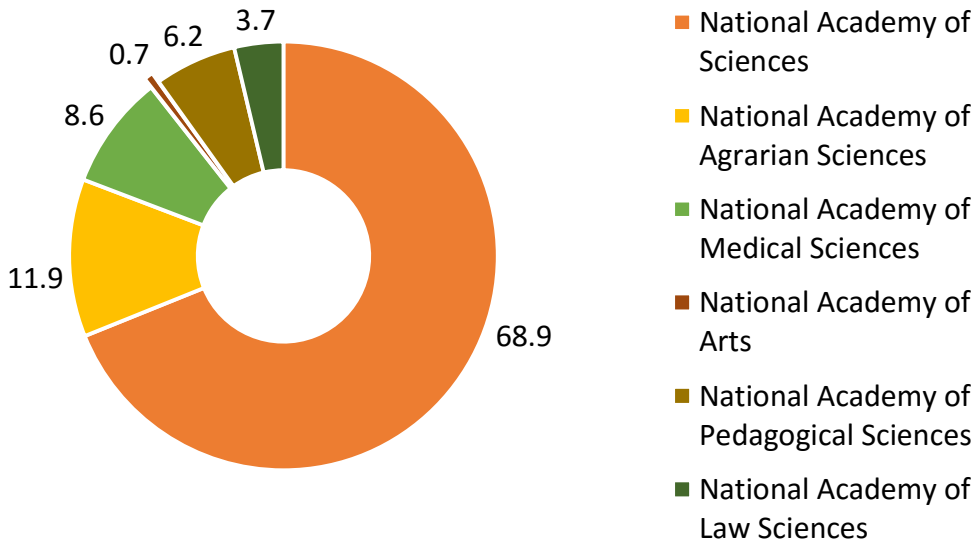
	2010	2011	2012	2013	2014	2015
Total	**29696**	**30145**	**26121**	**25303**	**22302**	**18945**
Total for national academies of sciences	1372	1322	1266	1166	1154	1105
including:						
National Academy of Sciences	**961**	**896**	**862**	**791**	**802**	**783**
National Academy of Agrarian Sciences	63	48	51	52	47	56
National Academy of Medical Sciences	145	157	138	97	94	106
National Academy of Arts	–	–	–	3	8	9
National Academy of Pedagogical Sciences	104	127	114	125	113	71
National Academy of Law Sciences	99	94	101	98	90	80
Total for ministries and agencies	28324	28823	…	…	…	…
of them:						
Ministry of Agrarian Policy and Food	787	1186	…	…	…	…
Ministry of Energy and Coal Industry	13	10	…	…	…	…
Ministry of Education and Science	23721	22502	…	…	…	…
Ministry of Healthcare	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, *%*

2015



III.12. Doctors of sciences and PhD (Candidates of sciences) employed in the Ukraine's economy by type of organization*

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

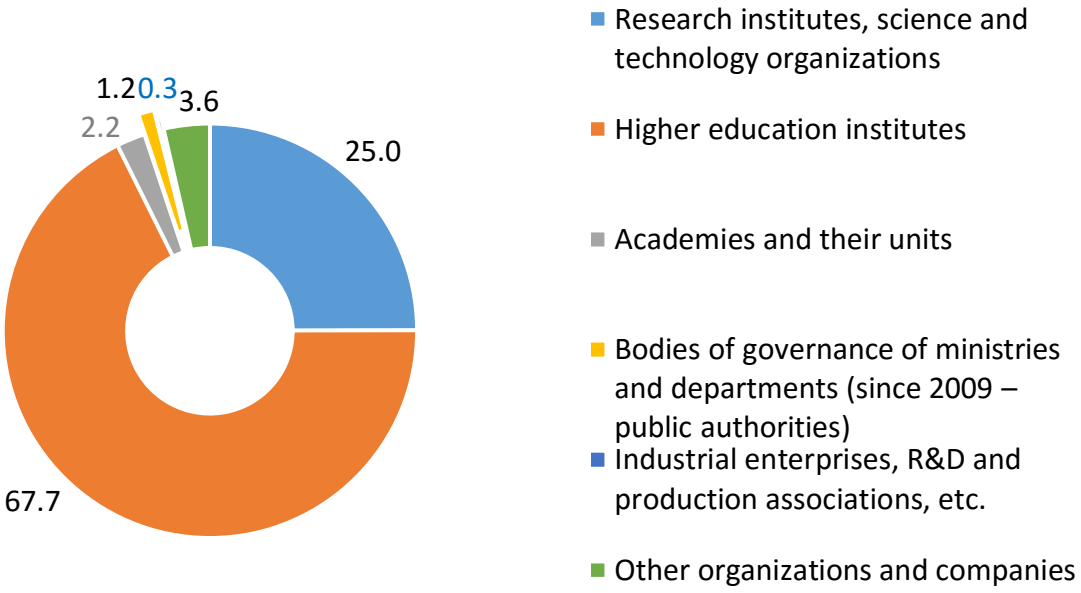
(headcount)

	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

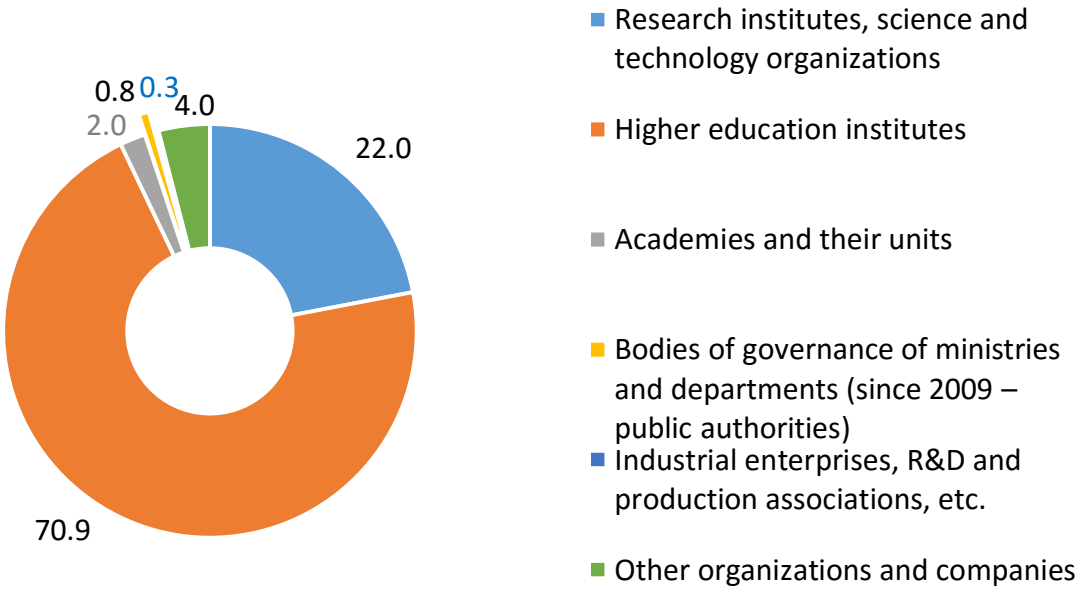
* Since 2016 statistical data on Doctors of sciences and PhD (Candidates of sciences) employed in the Ukraine's economy are not published by the State Statistics Service of Ukraine.

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

2010



2014



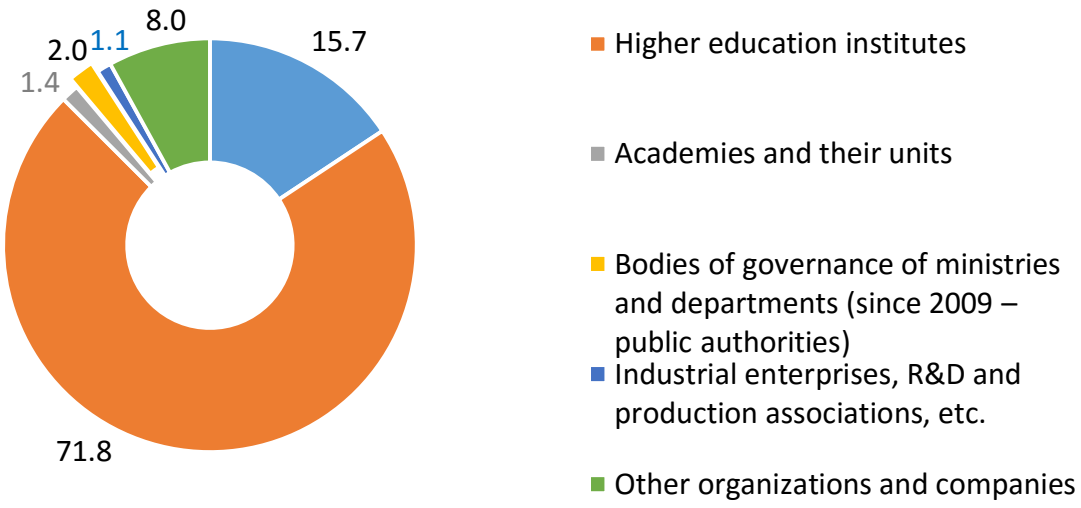
PhD (Candidates of sciences) employed in the Ukraine's economy by type of organization

(headcount)

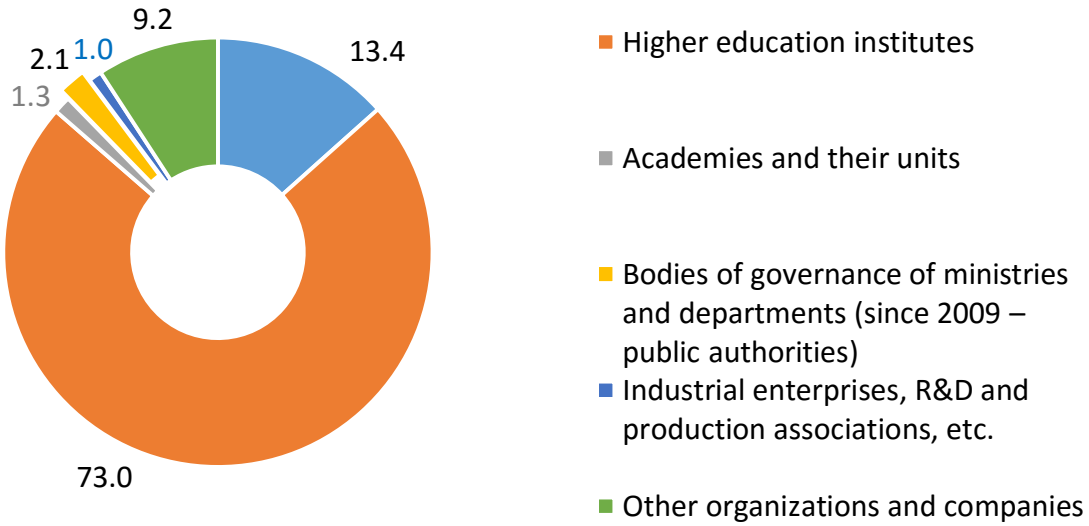
	2005	2010	2011	2012	2013	2014
Total	**68291**	**84000**	**84979**	**88057**	**90113**	**86230**
Research institutes, science and technology organizations	14005	13177	12710	12480	12613	11651
Higher education institutes	45229	60302	61670	64235	65882	62874
Academies and their units	**1916**	**1158**	**1121**	**1095**	**1104**	**1094**
Bodies of governance of ministries and departments (since 2009 – public authorities)	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 PhD (Candidates of sciences) employed in the Ukraine's economy by type of organization, %

2010



2014



III.13. R&D funding indicators of scientific organizations of Ukraine by sector of performance

Funding for R&D expenditure, *million UAH*

	2010	2011	2012	2013	2014	2015	2016
Total	**8995.9**	**9591.3**	**10558.5**	**11161.1**	**10320.3**	**12223.2**	**11530.7**
Government sector	3274.4	3639.8	4270.3	4305.4	3905.9	3996.0	3672.2
including national academies of sciences	2916.3	3105.7	3563.1	3667.2	3332.2	3341.9	3154.9
of them:							
NAS of Ukraine	**2070.2**	**2188.9**	**2542.8**	**2683.1**	**2401.3**	**2398.6**	**2259.1**
Business enterprise sector	5156.2	5343.4	5558.3	6167.6	5820.2	7573.6	7133.0
Higher education sector	565.1	608.0	729.8	688.0	594.3	653.5	725.5
Private non-profit sector	0.2	0.2	–	–	–	–	–
							(as % of total of each year)
Government sector	36.4	37.9	40.4	38.6	37.8	32.7	31.8
including national academies of sciences	32.5	32.4	33.7	32.9	32.3	27.3	27.4
of them:							
NAS of Ukraine	**23.0**	**22.8**	**24.1**	**24.0**	**23.3**	**19.6**	**19.6**
Business enterprise sector	57.3	55.7	52.6	55.3	56.4	62.0	61.9
Higher education sector	6.3	6.3	6.9	6.1	5.8	5.3	6.3
Private non-profit sector	×	×	×	×	×	×	×

* Data on R&D expenditure for 2016 is presented according to the new methodology for organizing and conducting the State Statistical Observation "Performance of R&D", introduced since 2016 (excluding the scientific and technical services costs).

Funding for R&D expenditure from the state budget, *million UAH*

	2010	2011	2012	2013	2014	2015	2016
Total	**3704.3**	**3859.7**	**4709.1**	**4762.1**	**4021.5**	**4214.2**	**3700.9**
Government sector	2792.9	2913.4	3613.3	3688.5	3355.2	3304.7	2749.1
including national academies of sciences	2561.2	2631.1	3080.9	3201.3	2939.8	2819.0	2345.4
of them:							
NAS of Ukraine	**1838.1**	**1880.4**	**2236.4**	**2398.7**	**2173.0**	**2099.8**	**1779.1**
Business enterprise sector	523.6	544.0	612.4	635.0	302.1	531.7	480.9
Higher education sector	387.9	402.3	483.4	438.5	364.2	377.7	470.8
Private non-profit sector	–	–	–	–	–	–	–
							(as % of total of each year)
Government sector	75.4	75.5	76.7	77.5	83.4	78.4	74.3
including national academies of sciences	69.1	68.2	65.4	67.2	73.1	66.9	63.4
of them:							
NAS of Ukraine	49.6	48.7	47.5	50.4	54.0	49.8	48.1
Business enterprise sector	14.1	14.1	13.0	13.3	7.5	12.6	13.0
Higher education sector	10.5	10.4	10.3	9.2	9.1	9.0	12.7
Private non-profit sector	–	–	–	–	–	–	–

* Data on R&D expenditure for 2016 is presented excluding the scientific and technical services cost.

Funding for R&D expenditure from customers*, *million UAH*

	2010	2011	2012	2013	2014	2015	2016
Total	**4277.1**	**4764.0**	**4503.4**	**4718.1**	**4195.4**	**4678.1**	**6291.6**
Government sector	334.1	542.0	442.4	401.7	391.5	491.3	547.1
including national academies of sciences	232.1	299.5	315.1	303.5	264.3	327.2	450.4
of them:							
NAS of Ukraine	**173.0**	**227.4**	**233.9**	**217.4**	**178.5**	**227.9**	**341.4**
Business enterprise sector	3814.2	4071.7	3878.2	4132.2	3639.5	4010.4	5551.5
Higher education sector	128.6	150.0	182.7	184.2	164.5	176.4	193.0
Private non-profit sector	0.2	0.2	–	–	–	–	–
							(as % of total of each year)
Government sector	7.8	11.4	9.8	8.5	9.3	10.5	8.7
including national academies of sciences	5.4	6.3	7.0	6.4	6.3	7.0	7.2
of them:							
NAS of Ukraine	**4.0**	**4.8**	**5.2**	**4.6**	**4.3**	**4.9**	**5.4**
Business enterprise sector	89.2	85.5	86.1	87.6	86.7	85.7	88.2
Higher education sector	3.0	3.1	4.1	3.9	3.9	3.8	3.1
Private non-profit sector	–	–	–	–	–	–	–

* Funding from domestic and foreign enterprises and organizations.

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

	2010	2011	2012	2013	2014	2015
Total	**9867.1**	**10359.9**	**11252.7**	**11781.1**	**10950.7**	**12611.0**
Government sector	3302.9	3683.6	4312.5	4339.8	3950.2	4037.7
including national academies of sciences	2928.4	3119.9	3567.5	3669.2	3348.9	3349.4
of them:						
NAS of Ukraine	**2079.4**	**2196.8**	**2549.5**	**2688.1**	**2417.0**	**2405.2**
Business enterprise sector	5990.2	6054.6	6210.4	6741.3	6397.7	7911.6
Higher education sector	573.9	611.7	729.8	699.9	602.7	661.7
Private non-profit sector	0.1	–	–	–	–	–
				(as % of total of each year)		
Government sector	33.5	35.6	38.3	36.8	36.1	32.0
including national academies of sciences	29.8	30.1	31.7	31.1	30.6	26.6
of them:						
NAS of Ukraine	**21.1**	**21.2**	**22.7**	**22.8**	**22.1**	**19.1**
Business enterprise sector	60.7	58.5	55.2	57.3	58.4	62.7
Higher education sector	5.8	5.9	6.5	5.9	5.5	5.2
Private non-profit sector	–	–	–	–	–	–

Basic research performed by own resources of R&D institutions, *million UAH*

	2010	2011	2012	2013	2014	2015
Total	**2188.4**	**2205.8**	**2621.9**	**2695.4**	**2475.2**	**2465.6**
Government sector	1775.8	1810.0	2325.1	2395.7	2237.8	2204.4
including national academies of sciences	1859.3	1900.7	2260.3	2347.4	2181.2	2122.8
of them:						
NAS of Ukraine	**1466.1**	**1492.1**	**1820.8**	**1925.7**	**1764.6**	**1702.1**
Business enterprise sector	199.4	179.8	59.0	76.9	45.1	41.7
Higher education sector	213.2	216.0	237.8	222.8	192.3	219.5
Private non-profit sector	–	–	–	–	–	–

continued

	2010	2011	2012	2013	2014	2015
						(as % of total of each year)
Government sector	81.1	82.0	88.7	88.9	90.4	89.4
including national academies of sciences	85.0	86.2	86.2	87.1	88.1	86.1
of them: **NAS of Ukraine**	**67.0**	**67.7**	**69.4**	**71.4**	**71.3**	**69.0**
Business enterprise sector	9.1	8.2	2.3	2.9	1.8	1.7
Higher education sector	9.8	9.8	9.0	8.3	7.8	8.9
Private non-profit sector	–	–	–	–	–	–

Applied research performed by own resources of R&D institutions,

million UAH

	2010	2011	2012	2013	2014	2015
Total	**1617.1**	**1866.7**	**2057.7**	**2087.8**	**1910.2**	**2271.3**
Government sector	1037.3	1182.6	1325.6	1311.6	1194.6	1178.6
including national academies of sciences	779.4	847	909.5	908.6	834.7	803.9
of them: **NAS of Ukraine**	**405.5**	**431.9**	**444.2**	**461.9**	**410.6**	**407.0**
Business enterprise sector	349.8	436.7	409.9	479.2	453.0	819.8
Higher education sector	230.0	247.4	322.1	297.0	262.5	272.9
Private non-profit sector	–	–	–	–	–	–
						(as % of total of each year)
Government sector	64.2	63.3	64.4	62.8	62.5	51.9
including national academies of sciences	48.2	45.4	44.2	43.5	43.7	35.4
of them: **NAS of Ukraine**	**25.1**	**23.1**	**21.6**	**22.1**	**21.5**	**17.9**
Business enterprise sector	21.6	23.4	19.9	23.0	23.7	36.1
Higher education sector	14.2	13.3	15.7	14.2	13.7	12.0
Private non-profit sector	–	–	–	–	–	–

Trends in gross domestic expenditure on R&D performed by own resources of research institutions, *million UAH*

	2010	2011	2012	2013	2014	2015	2016
Total	**8825.6**	**9365.0**	**10335.1**	**10890.9**	**10083.6**	**11884.1**	**10954.7**
Government sector	3221.4	3551.6	4192.6	4227.1	3877.7	3915.5	3597.7
Business enterprise sector	5050.6	5216.9	5425.2	5985.4	5617.2	7323.7	6649.7
Higher education sector	553.3	596.3	717.4	678.4	588.8	644.9	707.3
Private non-profit sector	0.2	0.2	–	–	–	–	–
							(as % of total of each year)
Government sector	36.5	37.9	40.6	38.8	38.5	32.9	32.8
Business enterprise sector	57.2	55.7	52.5	55.0	55.7	61.6	60.7
Higher education sector	6.3	6.4	6.9	6.2	5.8	5.4	6.5
Private non-profit sector	–	–	–	–	–	–	–

Trends in gross domestic expenditure on R&D by type of research*, *million UAH*

	2010	2015	2016
Total	**8107.1**	**11003.6**	**11530.7**
Basic research	2175.0	2460.2	2225.7
Applied research	1589.4	1960.6	2561.2
Development	4342.7	6582.8	6743.8
			(as % of total of each year)
Basic research	26.8	22.4	19.3
Applied research	19.6	17.8	22.2
Development	53.6	59.8	58.5

* Data on R&D expenditure from 2010 to 2015 is updated with new methodology for organizing and conducting the State Statistical Observation “Performance of R&D”, introduced since 2016 (excluding the scientific and technical services costs).

Gross domestic expenditure on R&D by sector of performance and type of research: 2016, *million UAH*

	Total	Including		
		Basic research	Applied research	Development
Total	**10954.7**	**2201.8**	**2450.9**	**6302.0**
Government sector	3597.7	1910.8	1228.0	458.9
Business enterprise sector	6649.7	50.6	869.2	5729.9
Higher education sector	707.3	240.4	353.7	113.2
Private non-profit sector	–	–	–	–
			(as % of total expenditure)	
Government sector	32.8	86.8	50.1	7.3
Business enterprise sector	60.7	2.3	35.5	90.9
Higher education sector	6.5	10.9	14.4	1.8
Private non-profit sector	–	–	–	–

Gross domestic expenditure on R&D organizations of the national academies of sciences by type of research: 2016, *million UAH*

	Total	Including		
		Basic research	Applied research	Development
Total for national academies of sciences	3154.9	1900.5	841.8	412.6
including:				
National Academy of Sciences	**2259.1**	**1514.7**	**444.6**	**299.8**
National Academy of Agrarian Sciences	557.9	253.6	195.6	108.6
National Academy of Medical Sciences	250.8	62.1	184.5	4.1
National Academy of Arts	6.8	6.8	–	–
National Academy of Pedagogical Sciences	65.8	48.8	17.0	–
National Academy of Law Sciences	14.6	14.6	–	–
			(as % of total expenditure)	
National Academy of Sciences	**71.6**	**79.7**	**52.8**	**72.7**
National Academy of Agrarian Sciences	17.7	13.3	23.2	26.3
National Academy of Medical Sciences	7.9	3.3	21.9	1.0
National Academy of Arts	0.2	0.4	–	–
National Academy of Pedagogical Sciences	2.1	2.6	2.0	–
National Academy of Law Sciences	0.5	0.8	–	–

Gross domestic expenditure on R&D organizations of national academies of sciences by field of science and technology: 2016,

million UAH

	Total	Including					
		Natural sciences	Engine-ering	Medical sciences	Agri-cultural sciences	Social sciences	Huma-nities
Total for national academies of sciences	3154.9	1279.3	818.6	210.7	486.3	194.9	165.1
including:							
National Academy of Sciences	**2259.1**	**1208.3**	**793.9**	**2.6**	**0.8**	**99.7**	**153.8**
National Academy of Agrarian Sciences	557.9	24.7	24.7	0.4	485.4	22.6	0.02
National Academy of Medical Sciences	250.8	43.1	–	207.7	–	–	–
National Academy of Arts	6.8	–	–	–	–	–	6.8
National Academy of Pedagogical Sciences	65.8	3.3	–	–	–	58.0	4.5
National Academy of Law Sciences	14.6	–	–	–	–	14.6	–

Gross domestic expenditure on R&D by field of science and technology and type of research: 2016, *million UAH*

	Total	Including		
		Basic research	Applied research	Development
Total	**11530.7**	**2225.7**	**2561.2**	**6743.8**
including:				
natural sciences	2435.6	1050.6	628.3	756.7
engineering	7514.8	550.0	1149.1	5815.7
medical sciences	324.0	69.7	237.3	17.0
agricultural sciences	642.7	221.3	284.5	136.9
social sciences	380.4	176.1	190.6	13.7
humanities	233.3	158.0	71.3	3.9
			(as % of total expenditure)	
natural sciences	21.1	47.2	24.5	11.2
engineering	65.2	24.7	44.9	86.2
medical sciences	2.8	3.1	9.3	0.3
agricultural sciences	5.6	10.0	11.1	2.0
social sciences	3.3	7.9	7.4	0.2
humanities	2.0	7.1	2.8	0.1

Gross domestic expenditure on R&D by field of science and technology and sector of performance: 2016, *million UAH*

	Total	Including			
		Govern-ment sector	Business enterprise sector	Higher education sector	Private non-profit sector
Total	**11530.7**	**3672.2**	**7133.0**	**725.5**	–
including:					
natural sciences	2435.6	1338.7	868.1	228.9	–
engineering	7514.8	1006.5	6191.9	316.4	–
medical sciences	324.0	260.6	17.1	46.3	–
agricultural sciences	642.7	552.8	47.9	41.9	–
social sciences	380.4	294.1	6.7	79.6	–
humanities	233.3	219.5	1.3	12.4	–
				(as % of total expenditure)	
natural sciences	21.1	36.5	12.2	31.5	–
engineering	65.2	27.4	86.8	43.6	–
medical sciences	2.8	7.1	0.2	6.4	–
agricultural sciences	5.6	15.1	0.7	5.8	–
social sciences	3.3	8.0	0.1	11.0	–
humanities	2.0	6.0	0.0	1.7	–

III.14. Funding for R&D expenditure in organizations of and ministries

R&D funding – total, *million UAH*

	2010	2011	2012	2013	2014	2015	2016
Total	**8995.9**	**9591.3**	**10558.5**	**11161.1**	**10320.3**	**12223.2**	**11530.7**
Total for national academies of sciences	2923.5	3105.7	3563.0	3667.2	3332.3	3341.9	3154.9
including:							
National Academy of Sciences	**2070.2**	**2188.9**	**2542.8**	**2683.1**	**2401.3**	**2398.6**	**2259.1**
National Academy of Agrarian Sciences	521.1	541.1	612.6	583.5	527.1	548.5	557.9
National Academy of Medical Sciences	228.1	261.0	269.2	264.8	275.3	288.3	250.8
National Academy of Arts	7.2	6.9	8.2	8.6	7.2	7.6	6.8
National Academy of Pedagogical Sciences	80.6	90.4	111.0	104.6	99.8	80.3	65.8
National Academy of Law Sciences	16.3	17.4	19.2	22.6	21.4	18.5	14.6
Total for ministries and agencies	6072.4	6485.6	…	…	…	…	…
of them:							
Ministry of Agrarian Policy and Food	137.7	141.6	…	…	…	…	…
Ministry of Energy and Coal Industry	112.9	164.5	…	…	…	…	…
Ministry of Education and Science	426.0	460.6	…	…	…	…	…
Ministry of Healthcare	133.1	142.6	…	…	…	…	…

R&D funding per capita of main activity personnel, *thousand UAH*

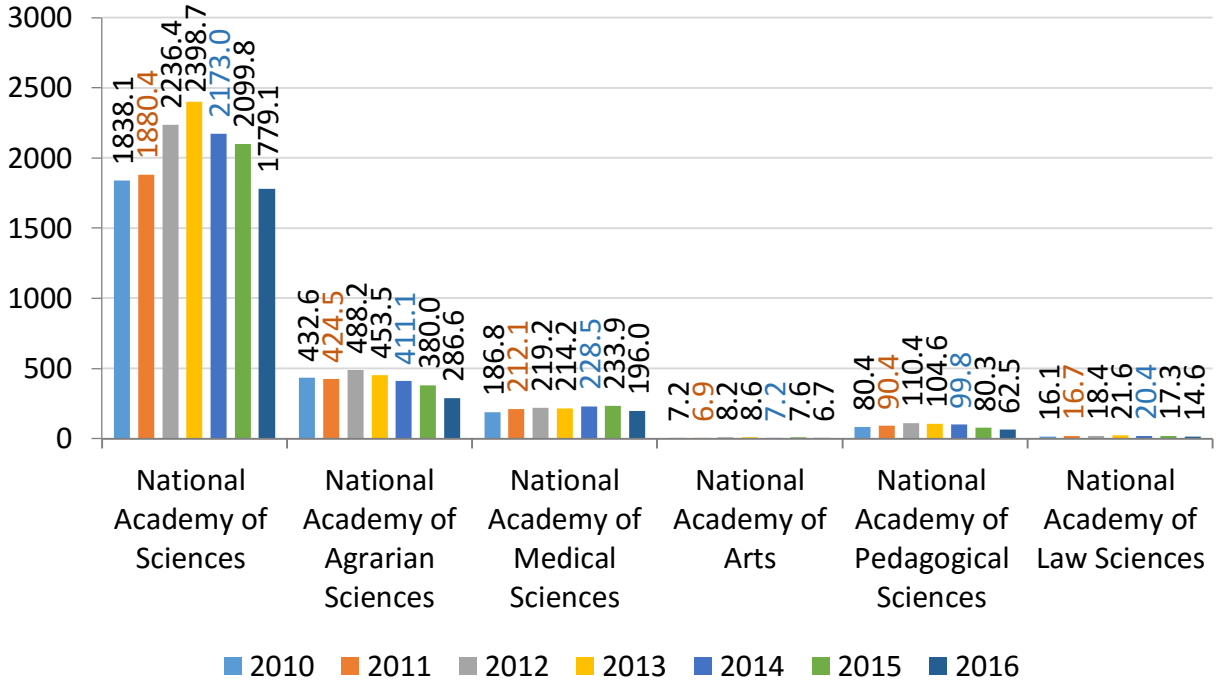
	2010	2011	2012	2013	2014	2015	2016
Total	**63.8**	**71.2**	**81.3**	**90.6**	**94.2**	**99.8**	**117.8**
Total for national academies of sciences	51.5	58.0	68.6	71.5	71.1	75.6	88.1
including:							
National Academy of Sciences	**55.2**	**59.5**	**70.3**	**75.1**	**73.8**	**77.8**	**95.4**
National Academy of Agrarian Sciences	41.9	54.7	67.5	65.3	67.1	74.9	88.0
National Academy of Medical Sciences	44.2	51.1	55	55.2	58.9	64.2	60.3
National Academy of Arts	…	60.5	72.9	81.9	67.9	74.7	65.4
National Academy of Pedagogical Sciences	58.4	64.9	76.8	71.2	70.5	67.7	56.6
National Academy of Law Sciences	65.7	67.7	73.7	81.6	76.2	70.6	37.7
Total for ministries and agencies	×	×	…	…	…	…	…
of them:							
Ministry of Agrarian Policy and Food	46.4	54.8	…	…	…	…	…
Ministry of Energy and Coal Industry	56.1	58.2	…	…	…	…	…
Ministry of Education and Science	172.7	203.0	…	…	…	…	…
Ministry of Healthcare	15.5	18.0	…	…	…	…	…

III.15. Funding for R&D expenditure in organizations of of national academies of sciences and ministries by source of funds

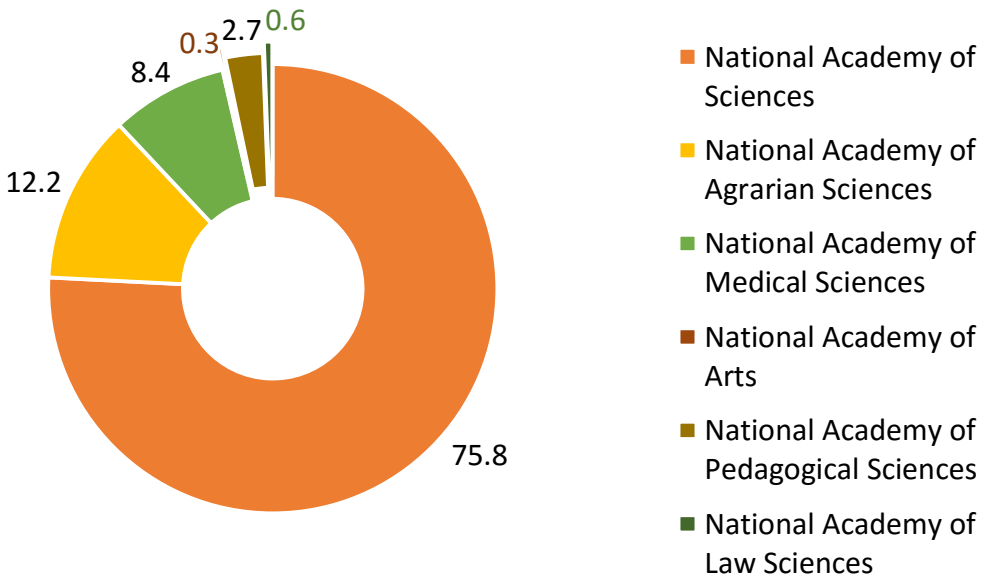
R&D funding from the state budget, *million UAH*

	2010	2011	2012	2013	2014	2015	2016
Total	**3704.3**	**3859.7**	**4709.1**	**4762.1**	**4021.5**	**4214.2**	**3700.9**
Total for national academies of sciences	2561.2	2631.0	3080.8	3201.3	2939.8	2819.0	2345.4
including:							
National Academy of Sciences	**1838.1**	**1880.4**	**2236.4**	**2398.7**	**2173.0**	**2099.8**	**1779.1**
National Academy of Agrarian Sciences	432.6	424.5	488.2	453.5	411.1	380.0	286.6
National Academy of Medical Sciences	186.8	212.1	219.2	214.2	228.5	233.9	196.0
National Academy of Arts	7.2	6.9	8.2	8.6	7.2	7.6	6.7
National Academy of Pedagogical Sciences	80.4	90.4	110.4	104.6	99.8	80.3	62.5
National Academy of Law Sciences	16.1	16.7	18.4	21.6	20.4	17.3	14.6
Total for ministries and agencies	1143.1	1228.7	…	…	…	…	…
of them:							
Ministry of Agrarian Policy and Food	95.7	99.4	…	…	…	…	…
Ministry of Energy and Coal Industry	12.4	33.1	…	…	…	…	…
Ministry of Education and Science	303.1	326.9	…	…	…	…	…
Ministry of Healthcare	53.5	54.4	…	…	…	…	…

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



Percentage distribution of R&D funding from the state budget: 2016, *%*



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

	2010	2011	2012	2013	2014
Total	**48.3**	**16.9**	**22.7**	**20.6**	**20.7**
Total for national academies of sciences	4.1	3.6	2.2	2.9	3.0
including:					
National Academy of Sciences	**1.1**	**2.0**	**1.8**	**2.7**	**2.9**
National Academy of Agrarian Sciences	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	44.2	13.3	…	…	…
of them:					
Ministry of Agrarian Policy and Food	2.4	3.4	…	…	…
Ministry of Energy and Coal Industry	–	–	…	…	…
Ministry of Education and Science	8.6	6.0	…	…	…
Ministry of Healthcare	–	0	…	…	…

* Up to 2010 – extra budgetary funds.

R&D funding by own funds of R&D institutions, *million UAH*

	2010	2011	2012	2013	2014	2015	2016
Total	**872.0**	**841.8**	**1121.3**	**1466.6**	**1927.8**	**3003.6**	**1146.0**
Total for national academies of sciences	114.0	160.1	148.0	144.4	118.1	185.5	262.1
including:							
National Academy of Sciences	**48.4**	**71.1**	**55.0**	**51.1**	**41.5**	**63.4**	**52.9**
National Academy of Agrarian Sciences	65.6	89.0	91.9	92	75.8	118.8	208.8
National Academy of Medical Sciences	…	…	0	0.6	0.2	3.2	0.3
National Academy of Arts	…	…	…	…	…	…	…
National Academy of Pedagogical Sciences	0	0	0.6	0	…	…	…
National Academy of Law Sciences	…	0	0.5	0.6	0.7	…	…
Total for ministries and agencies	758.0	681.7	…	…	…	…	…
of them:							
Ministry of Agrarian Policy and Food	7.5	6.8	…	…	…	…	…
Ministry of Energy and Coal Industry	5.5	6.0	…	…	…	…	…
Ministry of Education and Science	4.0	3.7	…	…	…	…	…
Ministry of Healthcare	8.6	10.8	…	…	…	…	…

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

	2010	2011	2012	2013	2014	2015	2016
Total	**1961.2**	**2285.9**	**2458.4**	**2306.6**	**2152.4**	**2455.9**	**3741.2**
Total for national academies of sciences	158.7	196.1	206.0	224.5	187.7	224.1	301.4
including:							
National Academy of Sciences	**102.9**	**128.5**	**128.6**	**142.9**	**110.5**	**134.0**	**199.0**
National Academy of Agrarian Sciences	16.7	21.0	30.1	33.4	34.8	47.2	53.3
National Academy of Medical Sciences	38.9	46.0	47.0	47.9	42.1	42.6	48.2
National Academy of Arts	…	…	…	…	…	…	…
National Academy of Pedagogical Sciences	…	…	…	…	…	…	…
National Academy of Law Sciences	0.2	0.6	0.3	0.3	0.2	…	…
Total for ministries and agencies	1802.5	2089.8	…	…	…	…	…
of them:							
Ministry of Agrarian Policy and Food	27.9	29.3	…	…	…	…	…
Ministry of Energy and Coal Industry	91.8	119.6	…	…	…	…	…
Ministry of Education and Science	87.9	98.5	…	…	…	…	…
Ministry of Healthcare	60.7	54.5	…	…	…	…	…

R&D funding by funds from abroad, *million UAH*

	2010	2011	2012	2013	2014	2015
Total	**2315.9**	**2478.1**	**2045.0**	**2411.5**	**2043.0**	**2222.2**
Total for national academies of sciences	73.5	103.5	109.2	79.0	76.6	103.1
including:						
National Academy of Sciences	**70.1**	**99**	**105.3**	**74.6**	**67.9**	**93.9**
National Academy of Agrarian Sciences	1.8	2.6	1.4	2.8	5.4	2.2
National Academy of Medical Sciences	1.6	1.9	2.5	1.6	3.3	7.0
National Academy of Arts	…	–	–	–	–	–
National Academy of Pedagogical Sciences	–	–	–	–	–	–
National Academy of Law Sciences	–	–	–	–	–	–
Total for ministries and agencies	2242.4	2374.6	…	…	…	…
of them:						
Ministry of Agrarian Policy and Food	3.9	2.2	…	…	…	…
Ministry of Energy and Coal Industry	2.3	5.1	…	…	…	…
Ministry of Education and Science	15.8	18.5	…	…	…	…
Ministry of Healthcare	8.4	8.4	…	…	…	…

III.16. R&D projects performed by own resources of national academies of sciences and ministries

Total, *million UAH*

	2010	2011	2012	2013	2014	2015
Total	**9867.1**	**10349.9**	**11252.7**	**11781.1**	**10950.7**	**12611.0**
Total for national academies of sciences	2928.4	3119.8	3567.5	3669.2	3348.9	3349.4
including:						
National Academy of Sciences	**2079.4**	**2196.8**	**2549.5**	**2688.1**	**2417.0**	**2405.2**
National Academy of Agrarian Sciences	523.7	546.3	609.2	576.5	523.8	543.3
National Academy of Medical Sciences	228.5	262.0	270.4	266.6	279.6	294.4
National Academy of Arts	–	6.9	8.2	8.6	7.2	7.6
National Academy of Pedagogical Sciences	80.5	90.4	111.0	106.7	99.8	80.3
National Academy of Law Sciences	16.3	17.4	19.2	22.6	21.4	18.5
Total for ministries and agencies	6938.7	7230.1	…	…	…	…
of them:						
Ministry of Agrarian Policy and Food	140.3	141.3	…	…	…	…
Ministry of Energy and Coal Industry	119.8	182.0	…	…	…	…
Ministry of Education and Science	431.5	460.9	…	…	…	…
Ministry of Healthcare	148.6	163.4	…	…	…	…

Basic research projects, *million UAH*

	2010	2011	2012	2013	2014	2015
Total	**2188.4**	**2205.8**	**2621.9**	**2695.4**	**2475.2**	**2465.6**
Total for national academies of sciences	1859.6	1900.7	2260.3	2347.4	2181.2	2122.8
including:						
National Academy of Sciences	**1466.1**	**1492.1**	**1820.8**	**1925.7**	**1764.6**	**1702.1**
National Academy of Agrarian Sciences	257.4	257.3	244.0	244.0	241.9	269.0
National Academy of Medical Sciences	67.5	71.3	70.8	69.1	72.5	69.0
National Academy of Arts	…	6.9	8.2	8.6	7.2	7.6
National Academy of Pedagogical Sciences	53.0	56.8	98.5	78.6	74.7	57.8
National Academy of Law Sciences	15.6	16.3	18.0	21.3	20.4	17.3
Total for ministries and agencies	328.8	305.1	…	…	…	…
of them:						
Ministry of Agrarian Policy and Food	15.7	13.7	…	…	…	…
Ministry of Education and Science	168.4	173.2	…	…	…	…
Ministry of Healthcare	13.8	14.1	…	…	…	…

Applied research projects, *million UAH*

	2010	2011	2012	2013	2014	2015
Total	**1617.1**	**1866.7**	**2057.7**	**2087.8**	**1910.2**	**2271.3**
Total for national academies of sciences	779.4	847.1	909.5	908.6	834.7	803.9
including:						
National Academy of Sciences	**405.5**	**431.9**	**444.2**	**461.9**	**410.7**	**407.0**
National Academy of Agrarian Sciences	198.4	204.2	266.7	236.0	207.7	170.0
National Academy of Medical Sciences	148.2	177.3	186.3	182.3	191.2	204.4
National Academy of Arts	–	–	–	–	–	–
National Academy of Pedagogical Sciences	26.8	33.3	11.9	28.1	25.1	22.5
National Academy of Law Sciences	0.5	0.4	0.4	0.3	–	–
Total for ministries and agencies	837.7	1019.6	…	…	…	…
of them:						
Ministry of Agrarian Policy and Food	76.6	72.1	…	…	…	…
Ministry of Energy and Coal Industry	21.4	32.2	…	…	…	…
Ministry of Education and Science	147.1	167.5	…	…	…	…
Ministry of Healthcare	66.0	78.7	…	…	…	…

Development projects, *million UAH*

	2010	2011	2012	2013	2014	2015
Total	**5037.0**	**4985.9**	**5370.0**	**5772.8**	**5341.5**	**6522.9**
Total for national academies of sciences	191.4	241.8	236.5	250.4	206.9	250.1
including:						
National Academy of Sciences	**172.9**	**219.1**	**207.4**	**222.8**	**190.2**	**227.4**
National Academy of Agrarian Sciences	16.7	21.9	29.1	27.5	16.6	22.7
National Academy of Medical Sciences	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	4845.7	4744.1	…	…	…	…
of them:						
Ministry of Agrarian Policy and Food	34.8	41.1	…	…	…	…
Ministry of Energy and Coal Industry	81.8	123.2	…	…	…	…
Ministry of Education and Science	83.8	81.9	…	…	…	…
Ministry of Healthcare	8.8	8.6	…	…	…	…

R&D services, *million UAH*

	2010	2011	2012	2013	2014	2015
Total	**1024.5**	**1291.5**	**1203.2**	**1225.1**	**1223.8**	**1351.1**
Total for national academies of sciences	97.9	130.3	161.2	162.7	126.1	172.5
including:						
National Academy of Sciences	**34.8**	**53.7**	**77.0**	**77.7**	**51.5**	**68.7**
National Academy of Agrarian Sciences	51.2	63.0	69.4	69.0	57.6	81.6
National Academy of Medical Sciences	11.6	12.9	13.4	15.0	15.9	21.0
National Academy of Arts	…	–	–	–	–	–
National Academy of Pedagogical Sciences	–	0.1	0.6	0	0	0
National Academy of Law Sciences	0.3	0.7	0.8	1.0	1.1	1.2
Total for ministries and agencies	926.7	1161.1	…	…	…	…
of them:						
Ministry of Agrarian Policy and Food	13.3	14.4	…	…	…	…
Ministry of Energy and Coal Industry	16.5	25.6	…	…	…	…
Ministry of Education and Science	32.2	38.3	…	…	…	…
Ministry of Healthcare	60.0	62.0	…	…	…	…

IV. MEMBERS OF NATIONAL ACADEMY OF SCIENCES OF UKRAINE

According to the current Statute of the National Academy of Sciences of Ukraine, the membership of the NAS of Ukraine includes full members, corresponding members, and foreign members. The formation of the Institute members of the Academy, its structure and principles of organization has been taking in accordance with the requirements of time during 1918-2018.

The first members of the Academy were appointed by Hetman of Ukraine P. Skoropadsky (Order number 322) simultaneously with the approval of the Law on the founding of the Ukrainian Academy of Sciences (UAS) on November 14, 1918. The membership of the founding members of the Academy included 12 prominent Ukrainian scholars: D.I. Bahaliy, V.I. Vernadsky, M.F. Kashchenko, V.A. Kosins'ky, A.Yu. Krymsky, O.I. Levits'ky, M.I. Petrov, S.O. Smal'-Stotsky, F.V. Taranovsky, S.P. Tymoshenko, M.I. Tugan-Baranovsky, and P.A. Tutkovsky. A lot of these scientists made a significant contribution to the development of world science. Founding members of the UAS were evenly distributed on a professional basis between three departments, namely the Historical and Philological Department, the Department of Physics and Mathematics, and the Department of Economics and Social Studies.

The first elections to the Ukrainian Academy of Sciences were held in 1919, when 14 new academicians (M.I. Andrusov, M.G. Bilyashivsky, K.H. Voblyy, O.O. Eykhenval'd, S.O. Yefremov, B.O. Kistyakovsky, V.O. Kistyakovsky, V.I. Lipsky, R.M. Orzhensky, O.Ya. Orlov, A.M. Nikolsky, V.M. Peretz, M.V. Sumtsov, and K.V. Kharlampovych) were elected at various sessions of the joint meeting of the full members of the Academy, five of them entered the Historical and Philological Department, six – to the Department of Physics and

Mathematics, and other three – to the Department of Economics and Social Studies

The main or first department of the UAS was considered the Historical and Philological Department. In the 40s years of the 20th century, the Department of Physics and Mathematics or branches that were formed in the field of natural and technical sciences came to the leading positions in the Academy.

The election of new members to the Academy during the first ten years since its establishing took place within the departments, and then – on vacancies determined by the leadership of the Academy due to the necessary scientific fields development.

The corresponding members (D.I. Yavornytsky – History, Ya.P. Novytsky – Ethnography, V.I. Shcherbyna – History and Ethnography) were elected to the Academy initially in 1924. This year the UAS included the first foreign members (Olaf Broch, Philology, Norway; Antoine Meillet Paul-Jules, Philology, France; Irzi Polivka, Ethnography, Czechoslovakia), but only since 1990 the Academy began regularly select foreign members.

Elections of the Academy full members, starting 1929, were held simultaneously in different specialties at one session of the general meeting. Since 1934 the same procedure was instituted for the election of corresponding members when nine full members and 17 corresponding members were elected on May 27, 1934. This was in line with the practice, established in the world, for the formation of the membership of the academies, including the world's largest scientific institutions: The Royal Society in London, the National Academy of Sciences of United States and the French Academy of Sciences. The newly elected corresponding members exceeded approximately twice the number of elected the AUAS full members.

During 30 years (1929-1958), the number of full members remained unchanged; there were approximately 90 people, with an increase in the representation of scientists from Natural and Technical Sciences. In 1929 the share of specialists in the field of Natural Sciences accounted for 51% of the total number of full

members, Technical Sciences – 7%, Humanities – 29%, and Social Sciences – 13%.

During 1939-1958 the number of academicians in the Humanities dropped by a half, and in the Social Sciences – by three times, while the number of full members in the field of natural sciences increased by 8%, and in the field of Technical Sciences – by three times. The share of specialists in the field of Natural Sciences in 1958 was 60% of the total number of full members of the Academy of Sciences of the Ukrainian SSR, 22% – of the Technical Sciences, 16% – of the Humanities, and 4% – of the Social Sciences.

In the next 40 years, the share of full members in the field of natural sciences was approximately 60% of the total number of academicians, while in Technical Sciences – 24-29%. At the same time the number of academicians of Humanities remained relatively constant (10-13 persons), which, with the increase in the total number of full members of the Academy of Sciences of the Ukrainian SSR, led to a decrease in their relative representation. The Social Sciences in the 50's and 60's was represented by individual members of the Academy of Sciences of the Ukrainian SSR (3-4 persons). In the 70's and 90's, an increase in their number to 7-10 people was happened.

In 2000-2015 the share of specialists in Natural and Technical sciences has fallen by an average of 2%, while the representation of Humanities and Social Sciences in the academic community has grown approximately by 2%. In 2018 full members in the field of the Natural Sciences accounted for 58.6% of the total number of this category of members of the Academy; in Technical Sciences – 24.9%, in Humanities – 8.8%, and in Social Sciences – 7.7%.

The dynamics of the relative number of representatives of the Natural, Technical, Humanitarian and Social Sciences during 1929-2018 among all corresponding members is similar to the above described quantitative characteristics of the professional distribution of the full members of the Academy. In 2018 the share of specialists in the field of Natural Sciences made up 56.6% of the

total of all corresponding members, in Technical Sciences – 25.0%, in Humanities – 8.3%, and in Social Sciences – 10.1%.

During 60's, the current practice of forming the actual members of the Academy, elected only from those correspondent members which after obtaining this title achieved even greater scientific excellence and made a significant contribution to domestic and world science. An exception to this provision was the election of a few prominent artists by the full members of the Academy: literary critics (writers O.T. Gonchar – in 1978, B.I. Oliynyk – in 1990, and M.P. Stelmakh – in 1979), art critics (composer L.M. Revutsky – in 1957). After 1958 the number of corresponding members was more than 100 people, and began to exceed the number of full members of the Academy of Sciences of the Ukrainian SSR.

Since the mid-60`s there was a gradual increase in the membership of the Academy. In 1989 the number of full members of the Academy reached 160 people, the corresponding members – 192 people, while in the beginning of the twenty-first century – approximately 200 and 375 people, respectively. The Law of Ukraine "On Science and Science and Technology Policy" adopted in 2016 stated the fact that the number of full members of the Academy cannot exceed 200 persons, and corresponding members – 400 people.

In the last 30 years the age structure of the staff of the Academy has demonstrated its aging within full members and corresponding members, which is in line with the general tendency to increase the share of older age groups among the entire population of Ukraine, including among scientific workers. The share of persons aged 69 years and over, continued in the years of 1939-1967, was relatively constant and amounted to about a quarter of the total number of full members, and in the subsequent time slices, it began to grow.

The share of persons aged 69 and older in 1967 was less than 20% of the total number of corresponding members of the Academy of Sciences of Ukrainian SSR. In 1978-1989 it did not exceed 25%, and in 2000 and later its quantity began to grow.

The age structure of the membership of the members of the National Academy of Sciences of Ukraine in the last fifteen years did not differ from the trends characteristic of the age-related data on the domestic doctors of sciences. Since 2000 the average age of doctors of sciences has exceeded 60 years, while candidates of sciences – 50 years. In 2009 the average age of the elected full members of the NAS of Ukraine was 62.3 years, while the corresponding members of the NAS of Ukraine – 61.1 years, which actually coincided with the average age of all doctors of sciences in the country, namely 62.0 years. As of January 1, 2015, the average age of scientific workers was 52.0 years, doctors of sciences – 63.9 years, candidates of sciences – 50.8 years. In 2012 more than a half of the doctors of science (52.4%) employed in the domestic economy and almost two-thirds (63.2%) of the doctors of sciences among researchers were over 59 years old. After the period of 2009-2012, the number of doctors of sciences aged over 70 years was increased among researchers by 6%, and among those employed in all sectors of the economy – by 35%. The share of full members and corresponding members of the NAS of Ukraine in this age category was increased by 16%. In 2018 the proportion of people aged 70 and over was 74.1% among the total number of full members, and 52.5% - among corresponding members.

The international comparisons of the age structure of members of national academies of sciences indicate that this problem is relevant for many countries. At the Austrian Academy of Sciences, the proportion of people aged 70 and over was 53.7% from the number of full members and corresponding members (as of December 31, 2017). Within the German National Academy of Sciences Leopoldina, whose membership is defined in 1000 people under the age of 75, as of January 20, 2018 36.6% from the total of 1576 members were over 75 years old. In the Finnish Academy of Sciences and Literature, the proportion of people aged 65 and older was 53.2% from total 712 full members (as of October 2017), and in the Swedish Academy of Sciences – 63% from 473 full members (as of January 1, 2018). At the Academy of Sciences of the People’s

Republic of China, 65.9% from total 798 full members were 70 years of age and older, and 40% of full members were aged 80 or over (as of December 2017). The age of 34.2% of all foreign 92 members of this Academy of Sciences was 70 years and more, and 19% of all members reached the age of 80 and older (as of April 2017).

In order to improve the age structure of academicians, the quotas were set for the election of new members from candidates under the age of 50. A similar event, for example, has been foreseen since 2001 at the French Academy of Sciences. National academies of sciences currently form their personal composition, based on the need for greater representation of women, young members, and representatives of national minorities, however the scientific achievements of candidates remain as early as the decisive factor.

Nowadays the election of the members of the National Academy of Sciences of Ukraine is held at least once every other two years and is appointed by the Presidium of the National Academy of Sciences of Ukraine, which approves the number and the list of vacancies of all actual members, correspondent members and foreign members of the National Academy of Sciences of Ukraine, and prescribes the election time.

The last election of new members of the National Academy of Sciences of Ukraine took place in March 2018. At the general meeting of the NAS of Ukraine its President Academician B.Ye. Paton informed the attendees on the preparation for the elections, their course in the departments and the results of the election before the final vote on March 7. According to this information, the Presidium of the National Academy of Sciences of Ukraine announced 22 vacancies of academicians and 69 vacancies of corresponding members from 84 specialties. This was done according to the provisions of the Law of Ukraine “On Scientific and Scientific-Technical Activity” regarding the maximum number of members of the National Academy of Sciences of Ukraine in 200 academicians and 400 corresponding members. According to B.Ye. Paton the scientific community has shown a great interest in

the election of new members of the Academy, as evidenced by the high competition applicants. In the 22 vacancies of academicians, 60 candidates were nominated and registered, and 69 vacancies of corresponding members – 229 candidates. Of the nominated candidates, 219 are employees of the institutions of the National Academy of Sciences of Ukraine, which is 75.7% of the total number of applicants. 70 people (24.3%) represented higher educational establishments, scientific institutions of different departmental subordination and other organizations. This testifies to the fact that, despite the difficult conditions of the present, the authority of the National Academy of Sciences of Ukraine in society remains high and reflects its importance as the highest scientific institution of the state.

66.7% of the total number of all candidates for membership of the National Academy of Sciences of Ukraine (18 candidates for academicians and 42 candidates for corresponding members) worked in Kyiv. Two candidates for academicians worked in Kharkiv and two – in Lviv. Among the candidates for corresponding members were 9 people from Kharkiv, four from the Dnieper, three from Lviv and Odessa, and by one from each of the following cities: Nikolayev, Ivano-Frankivsk, Ternopil and Slavic, Donetsk region. Thus, 33.3% of all elected candidates are workers of the National Academy of Sciences of Ukraine in the regional scientific centers. The average age of academicians of the National Academy of Sciences of Ukraine on the eve of the elections was 77.3 years, the corresponding members – 71 years. The average age of the selected candidates for the academician of the National Academy of Sciences of Ukraine is 65.1 years, that is 12 years less than before, and the candidates for correspondent members – 63.4 years, which is 7.5 years less than before.

These data given by the President of the NAS of Ukraine B.Ye. Paton, practically characterize a set of new full members and corresponding members, despite the fact that one candidate from each category of members was not elected. The age structure of the full members and corresponding members reflects the present

realities. As of April 1, 2017, the average age of doctors of sciences working at the NAS of Ukraine was 64.3 years. In early April 2018, only 3.1% of the total number of full members was younger than 60 years of age, and among corresponding members this value was 12.9%.

Following the secret ballot, on March 7, 2018, 21 academics and 67 members were elected. Among the newly elected members there were 14 scientists in the field of natural sciences, 3 in the field of technical sciences, 2 in social sciences and one in the humanities. The distribution of 67 scholars elected by corresponding members in 2018 was the following: 34 specialists in the field of natural sciences, 17 – in the field of the sciences 8 – in the field of social sciences, 8 – in the field of humanities. The election of new members of the NAS of Ukraine took place after a lengthy discussion by the general public and a thorough evaluation in the relevant departments of the NAS of Ukraine on the scientific achievements of candidates. The new members of the Academy are selected in both traditional and newest areas of research in the field of natural, technical, medical, social and human sciences.

The representation of women among members of the National Academy of Sciences of Ukraine during the last 30 years was at several percentages, which is typical for the national academies of sciences in the countries Eastern Europe, which considerably inferior to the academic organizations of other parts of the world on the participation of women in their work. In the history of the National Academy of Sciences of Ukraine, there were 54 women in her personal composition (over 2200 national members), including 9 full members and 45 corresponding members of the NAS of Ukraine. The first women elected to the Academy were: the full member, paleozoologist M.V. Pavlova (1921), and corresponding members – literary critics O.P. Kosach (1925) and V.P. Adrianova-Peretz (1926). For almost ten years (1939-1948) there were three women in the Academy, elected as corresponding members, and only in 1951 the patophysiologist O.I. Smirnova-Zamkova (31.05.1880-22.09.1962) entered the

ranks of the full members of the Academy of Sciences of the Ukrainian SSR. After her death, a physicist A.F. Prychot'ko was elected a full member of the Academy, who was the only an academician for more than a quarter of a century.

In the last 50 years, the proportion of women among members of the NAS of Ukraine has gradually increased (from 3.2% in 1964 to 4.5% in 2012), and in 2015 it has become more than 5% of the total number of members of the Academy.

In 2012, there were 4 women among the full members and 22 – among corresponding members of the Academy and in 2017 there were 3 women among the full members and 31 women among the corresponding members. It should be noted that in 2014, the proportion of women in the total number of researchers who had a doctor of sciences degree in the organizations of the NAS of Ukraine was 19.7%, while in organizations of Ukraine that performed scientific and scientific-technical works – 25.7%. The share of women among the 63 newly elected members of the National Academy of Sciences of Ukraine in 2015 was 12.7%, but they were all only among the corresponding members. Among the elected National Academy of Sciences of Ukraine in 2018 there were 9 women; of them were 2 full members and 7 correspondent members. This is more than what was chosen at any previous election for the entire time of the existence of the NAS of Ukraine. As for the current membership of the Academy, women are now 2.6% among academicians and approximately 9% among corresponding members and 7.1% of the total number of Academy full and corresponding members.

The distribution of members of the NAS of Ukraine in 2018 indicates that that most of them worked on management positions in scientific institutions, holding positions of directors, deputy directors and heads of scientific departments (46.6% of the total number of actual members and 67.6% of corresponding members). Compared to 2015, these indicators became smaller (55.8% for full members and 68.7% for corresponding members of the NAS of Ukraine), that is connected with the transition of the members of

the NAS of senior age groups to the positions of advisers under the directorate, the chief and leading scientific researchers and retirement.

The academic achievements of the members of the NAS of Ukraine were highly recognized both within the country and abroad. 39 members of the National Academy of Sciences of Ukraine became the winners of the State Prizes of Ukraine in the field of science and technology in 2012-2016, including 14 people in the last two years; 64 members of the National Academy of Sciences of Ukraine were awarded with state awards, among them 27 scientists over the past 2 years.

The honorary title of the Honored worker of science and technology of Ukraine in 2012-2016 was awarded to 5 full members and 14 corresponding members of the National Academy of Sciences of Ukraine, including the last two years 4 full members and 7 corresponding members.

17 members of the National Academy of Sciences of Ukraine became the laureates of foreign awards and awards in 2015-2016.

The international recognition of scientific achievements of the members of the Academy also testifies their participation in the work of the European academies of sciences: The Academy of Europe (Academia European) includes five full members of the NAS of Ukraine (to composition of this organization were elected in 1990 -1992 – the President of the NAS of Ukraine, Academician of the NAS of Ukraine B.Ye. Paton, full members of the NAS of Ukraine Yu.Yu. Gleba, O.M. Guz, O.O. Kryshtal, P.P. Tolochko and Academician of the NAS of Ukraine P.G. Kostyuk – 1991-2010) and the European Academy of Sciences - three full members of the NAS of Ukraine (O.M. Guz, V.V. Panasyuk, A.M. Samoilenko, and in 2002-2015 – V.V. Pilipenko).

IV.1. Full members of National Academy

	1918	1920	1929	1939	1948	1958	
Total	**12**	**30**	**92**	**78**	**89**	**92**	
Natural sciences	3	14	47	41	48	53	
including:							
Mathematics	–	2	5	6	5	5	
Informatics	–	–	–	–	1	–	
Physics	–	4	4	4	8	8	
Chemistry	–	2	7	9	6	8	
Life sciences	1	3	23	14	22	27	
Earth sciences	2	3	8	3	6	5	
Technical sciences	1	1	6	15	19	21	
including:							
Material sciences	–	–	1	7	9	8	
Mechanics	1	1	5	7	10	10	
Energetics	–	–	–	1	–	1	
Humanitarian sciences	4	8	27	15	13	14	
including:							
History	1	3	11	2	3	4	
Philosophy	–	–	4	–	1	–	
Archeology	–	1	–	–	1	1	
Literary criticism	1	1	6	9	5	6	
Linguistics	2	3	3	4	3	2	
Ethnology	–	–	1	–	–	2	
Social sciences	4	7	12	7	9	4	
including:							
Economics	2	4	7	6	7	3	
Law sciences	2	3	5	1	2	1	
Sociology	–	–	–	–	–	–	
Politology	–	–	–	–	–	–	
Culturology	–	–	–	–	–	–	

* Tables IV.1.-IV.10. are compiled according to the data of the edition “National Academy of National Academy of Sciences of Ukraine as of December 15, 1964; December 1, 1989; 04.08.2009;

of Sciences of Ukraine by field of science*

(headcount)

	1964	1967	1978	1989	2000	2009	2012	2015	2018
97	**115**	**148**	**159**	**192**	**204**	**203**	**197**	**193**
65	70	85	97	112	120	116	115	113
9	10	15	10	15	12	11	14	15
1	3	6	7	10	12	14	11	11
18	15	17	29	24	34	34	34	31
13	12	16	18	11	14	12	12	12
19	22	21	21	42	37	33	32	31
5	8	10	12	10	11	12	12	13
21	33	46	41	51	50	52	49	48
7	12	18	16	22	23	26	24	23
11	16	20	17	19	15	14	13	13
3	5	8	8	10	12	12	12	12
8	9	10	11	13	15	17	17	15
1	1	3	4	2	3	2	2	2
1	2	2	2	2	3	4	4	3
–	1	–	–	1	1	1	1	1
4	3	4	3	6	4	5	4	3
2	1	1	2	1	2	3	4	4
–	–	–	–	–	2	2	2	2
3	3	7	10	16	19	18	16	17
2	2	5	8	10	12	11	11	12
1	1	2	2	3	3	3	3	3
–	–	–	–	–	1	2	1	1
–	–	–	–	1	1	1	–	–
–	–	–	–	2	2	1	1	1

Sciences of Ukraine. Chronology of 1918-2013" on election day and reference books of the 27.07.2012; 10.10.2015, and as of 21.03.2018, respectively.

IV.2. Corresponding members of National by field

	1918	1924	1934	1939	1948	1958	
Total		**3**	**24**	**71**	**91**	**121**	
Natural sciences	–	–	16	43	64	78	
including:							
Mathematics	–	–	3	5	5	8	
Informatics	–	–	–	–	–	–	
Physics	–	–	–	4	7	13	
Chemistry	–	–	4	7	12	11	
Life sciences	–	–	9	24	35	36	
Earth sciences	–	–	–	3	2	10	
Technical sciences	–	–	1	18	22	28	
including:							
Material sciences	–	–	–	4	6	6	
Mechanics	–	–	1	13	13	16	
Energetics	–	–	–	1	2	6	
Humanitarian sciences	–	3	5	6	9	12	
including:							
History	–	2	2	–	1	2	
Philosophy	–	–	–	–	–	1	
Archeology	–	–	–	1	1	2	
Literary criticism	–	–	2	4	4	7	
Linguistics	–	–	1	1	2	–	
Social sciences	–	–	2	4	3	3	
including:							
Economics	–	–	–	2	2	3	
Law sciences	–	–	2	2	1	–	
Sociology	–	–	–	–	–	–	
Politology	–	–	–	–	–	–	
Culturology	–	–	–	–	–	–	

Academy of Sciences of Ukraine
of science

(headcount)

	1964	1967	1978	1989	2000	2009	2012	2015	2018
	125	**151**	**195**	**192**	**306**	**375**	**375**	**380**	**395**
	83	94	119	109	179	218	218	224	224
	9	13	16	11	15	18	19	20	18
	4	6	7	10	22	23	23	16	19
	20	16	29	27	44	60	57	71	72
	7	11	18	17	19	27	28	28	29
	33	37	35	31	59	66	68	64	62
	10	11	14	13	20	24	23	25	24
	24	36	46	57	81	98	97	92	99
	9	10	18	24	24	45	45	41	44
	14	20	20	21	39	22	22	22	22
	1	6	8	12	18	31	30	29	33
	12	13	20	18	27	30	29	29	33
	2	2	7	9	8	9	9	9	11
	1	1	2	3	3	3	2	2	3
	2	2	1	4	2	6	5	5	4
	7	7	8	1	5	7	6	5	4
	–	1	2	1	7	4	5	6	7
	6	8	10	8	19	29	31	35	40
	6	7	8	7	12	19	20	24	27
	–	1	2	1	4	5	4	4	4
	–	–	–	–	2	3	4	3	4
	–	–	–	–	1	2	3	3	4
	–	–	–	–	–	–	–	1	1

IV.3. Full members of National Academy

	1918	1920	1929	1939	1948	1958	
Total	**12**	**27**	**91**	**78**	**89**	**90**	
of them:							
29 and younger	–	–	–	–	–	–	
30–39	–	2	3	6	3	1	
40–49	4	9	20	9	18	2	
50–59	3	10	30	30	18	37	
60–69	3	6	21	14	33	21	
70 and older	2	–	17	19	17	29	

IV.4. Corresponding members of National by age

	1918	1924	1934	1939	1948	1958	
Total	–	–	**3**	**24**	**71**	**94**	
of them:							
29 and younger	–	–	–	4	1	–	
30–39	–	–	–	6	26	5	
40–49	–	–	–	7	18	46	
50–59	–	–	–	2	21	27	
60–69	–	–	–	3	4	14	
70 and older	–	–	3	2	1	2	

of Sciences of Ukraine by age group

(headcount)

	1964	1967	1978	1989	2000	2009	2012	2015	2018
	97	**115**	**138**	**159**	**193**	**204**	**203**	**197**	**193**
	–	–	–	–	–	–	–	–	–
	–	–	1	–	–	–	–	–	–
	8	7	12	5	–	2	2	1	–
	32	27	27	34	23	20	8	7	6
	32	57	46	53	76	49	48	35	42
	25	24	52	67	94	133	145	154	145

Academy of Sciences of Ukraine group

(headcount)

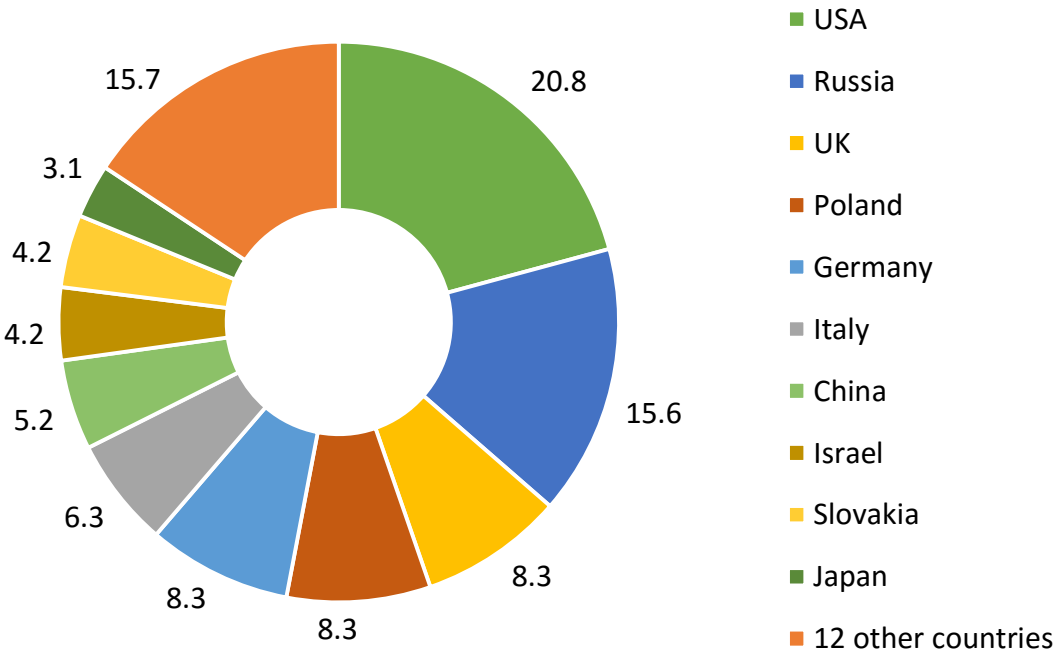
	1964	1967	1978	1989	2000	2009	2012	2015	2018
	125	**151**	**195**	**192**	**306**	**375**	**375**	**380**	**395**
	–	–	–	–	–	–	–	–	–
	2	7	4	1	1	–	–	–	1
	13	29	55	9	16	12	7	3	6
	58	46	58	70	75	59	59	53	44
	39	53	42	66	138	154	126	147	137
	13	16	36	46	76	150	183	177	207

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

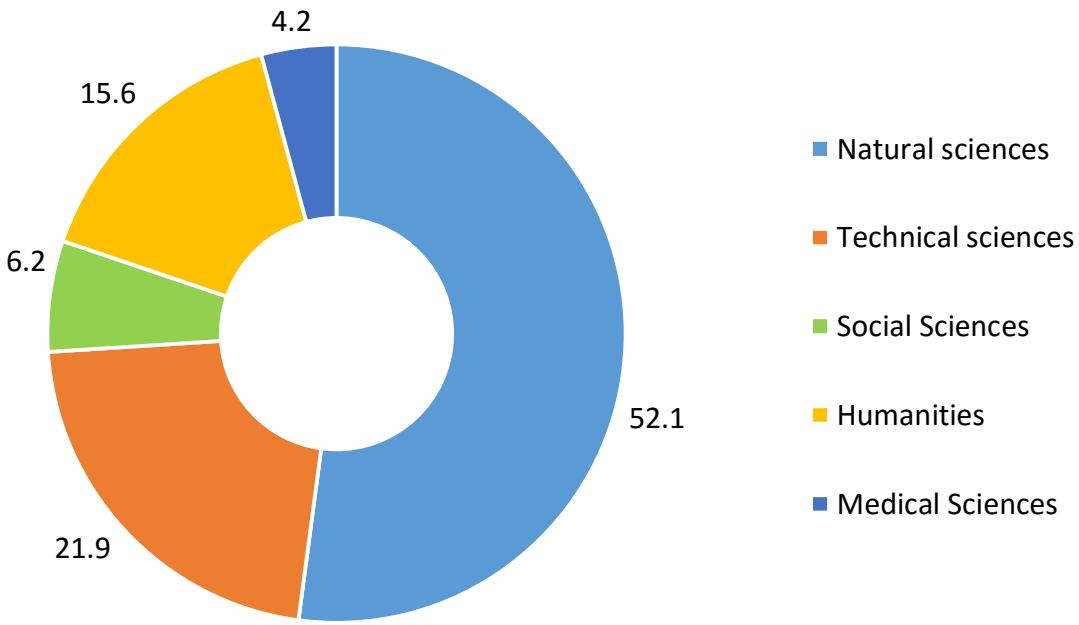
The foreign members of the NAS of Ukraine are represented by 96 well-known scientists from 22 countries of the world, among them six Nobel laureates (Alferov Zhores Ivanovich, Physics, 2000; Zakmann Bert and Neher Ervin, Physiology, Medicine, 1991; Lehn Jean-Marie Pierre, Chemistry, 1987; Francesco Calogerô, Peace Prize, 1995; Chehainover Aaron, Chemistry, 2004). Among foreign members of the NAS of Ukraine there are 62 scientists from European countries, 21 – from the countries of America, and 13 – from Asia. The largest share makes up specialists from the USA and the Russian Federation (20.8 and 15.6% of the total number of foreign members of the Academy). Poland, Great Britain and Germany are represented by 8 scientists, Italy – 6, China – 5 scientists. There are four scholars from Israel and Slovakia, 3 specialists – from Japan. Scientists from the 10 abovementioned countries account for 84.4% of the total number of foreign members of the NAS of Ukraine. The NAS of Ukraine is composed of one or two famous scientists of 13 other countries. Most foreign members work in Europe (64.6% of the total number of this category of members of the NAS of Ukraine), 21.9% – in North America, the rest (13.5%) in Asia. 17 foreign members of the NAS of Ukraine are full members of the academies of sciences – members of the IAAS.

Compared to previous years, the representation of scientists from different countries in the NAS of Ukraine and their professional division did not change significantly. The share of specialists in the natural sciences among all foreign members of the National Academy of Sciences of Ukraine in 2018 was 52.1%, technical sciences – 21.9%, humanities – 15.5%, social sciences – 6.3%, medical sciences – 4.2 percent.

Percentage distribution of foreign members of NAS of Ukraine by countries of the world: 2018, %



Percentage distribution foreign members of NAS of Ukraine by field of science: 2018, %



IV.6. Full members and corresponding members of National Academy of Sciences of Ukraine, employed in the Ukrainian economy by type of organization: 2018

(headcount)

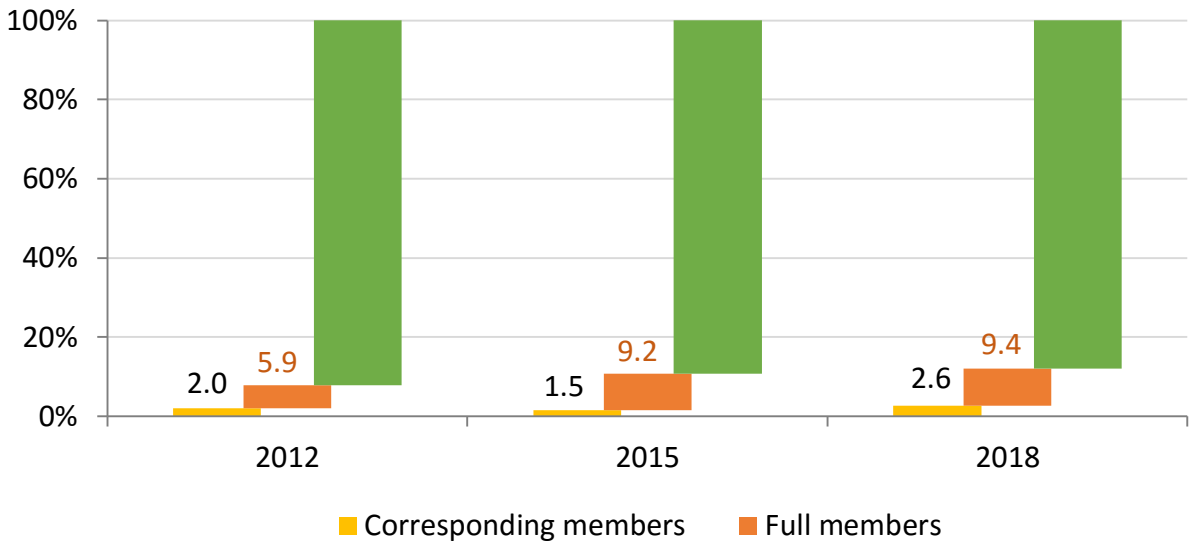
	Full members	Corresponding members
Total	**193**	**395**
including:		
Research institutes, science and technology organizations	121	314
Higher educational institutions	24	58
Academies and their units	32	1
Bodies of governance of ministries and departments (before 2009 public administration bodies)	3	2
Industrial enterprises, R&D and production associations, etc.	2	6
Other organizations and companies	11	14

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

(*headcount)*

	1964	1989	2009	2012	2015	2018
Total	**7**	**10**	**30**	**26**	**38**	**42**
of them:						
full members	1	1	4	4	3	5
corresponding members	6	9	26	22	35	37

Share of women among full members and corresponding members of NAS of Ukraine



IV.8. Full members and corresponding members of National Academy of Sciences of Ukraine by position: 2018

(headcount)

	Full members	Corresponding members
Total	**193**	**395**
of them:		
director of institute	49	53
deputy director	13	56
rector	3	9
pro-rector	3	4
dean	1	5
adviser at directorate	15	6
department head (institute)	28	158
chief researcher	19	34
department head (university)	11	24
professor of department (university)	4	15
leading researcher	2	14
member of Presidium of NAS of Ukraine	32	–
others	13	17

IV.9. Full members and corresponding members of National Academy of Sciences of Ukraine – awarded by State and Foreign Prizes and Awards

(headcount)

	2010	2011	2012	2013	2014	2015	2016
Full members							
of them:							
winners of the State Prize of Ukraine	–	2	4	3	1	2	–
winners of international prizes and awards	2	10	6	4	3	–	2
received awards:							
the title of Hero of Ukraine	–	1	–	–	–	–	–
the order of Prince Yaroslav the Wise	1	4		3	2	3	5
other awards	8	7	10	6	–	7	6
Honored worker of science and technology of Ukraine	–	1	–	1	–	1	3
Corresponding members							
of them:							
winners of the State Prize of Ukraine	1	4	7	6	4	10	2
winners of international prizes and awards	–	4	2	–	–	–	–
received awards:							
the title of Hero of Ukraine	–	–	–	–	–	–	–
the order of Prince Yaroslav the Wise	1	–	1	2	–	–	–
other awards	2	7	6	4	3	1	5
Honored worker of science and technology of Ukraine	–	5	4	3	–	3	4

V. R&D OUTPUT OF SCIENTIFIC INSTITUTIONS IN UKRAINE

V.1. R&D by type of research and source of funds: 2016

	Total R&D	Source of	
		general fund	special fund
Total	**12280**	**7702**	**4578**
of them:			
Basic researches	4520	3800	720
Applied researches and development	7568	3710	3858
State target scientific and scientific and technical programs	98	98	–
Development by government funding	44	44	–
Projects on international scientific and technical cooperation	50	50	–

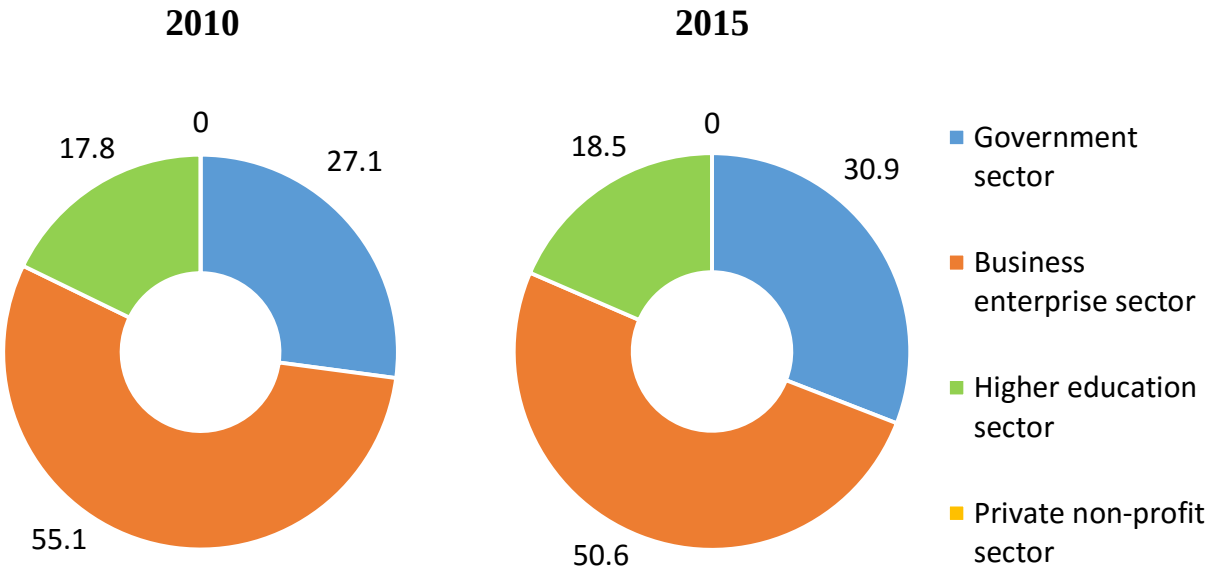
Source: Analytical survey of the Ministry of Education and Science of Ukraine "The state of development of science and technology, the results of scientific and scientific and technical activities for 2016", P. 22. – URL: *https://mon.gov.ua/storage/app/media/nauka/informatsiyno-analitychni/na-sajt-mon-ad-kmu-11.07.17.pdf.*

V.2. Main R&D indicators of scientific organizations of Ukraine by sector of performance

Research and development

	2010	2011	2012	2013	2014	2015
Total	**52037**	**52354**	**53190**	**47875**	**42953**	**41070**
Government sector	14113	14190	14581	15730	13035	12708
including national academies of sciences	11169	11574	10718	11559	9565	9546
of them:						
NAS of Ukraine	**6828**	**7585**	**6674**	**7274**	**5703**	**5544**
Business enterprise sector	28680	28361	28440	21486	21952	20785
Higher education sector	9235	9784	10154	10659	7966	7577
Private non-profit sector	9	19	15	–	–	–
				(as % of total of each year)		
Government sector	27.1	27.1	27.4	32.8	30.3	30.9
including national academies of sciences	21.5	22.1	20.2	24.1	22.3	23.2
of them:						
NAS of Ukraine	**13.1**	**14.5**	**12.6**	**15.2**	**13.3**	**13.5**
Business enterprise sector	55.1	54.2	53.5	44.9	51.1	50.6
Higher education sector	17.8	18.7	19.1	22.3	18.6	18.5
Private non-profit sector	×	×	×	×	×	×

Percentage distribution of R&D by sector of performance, *%*

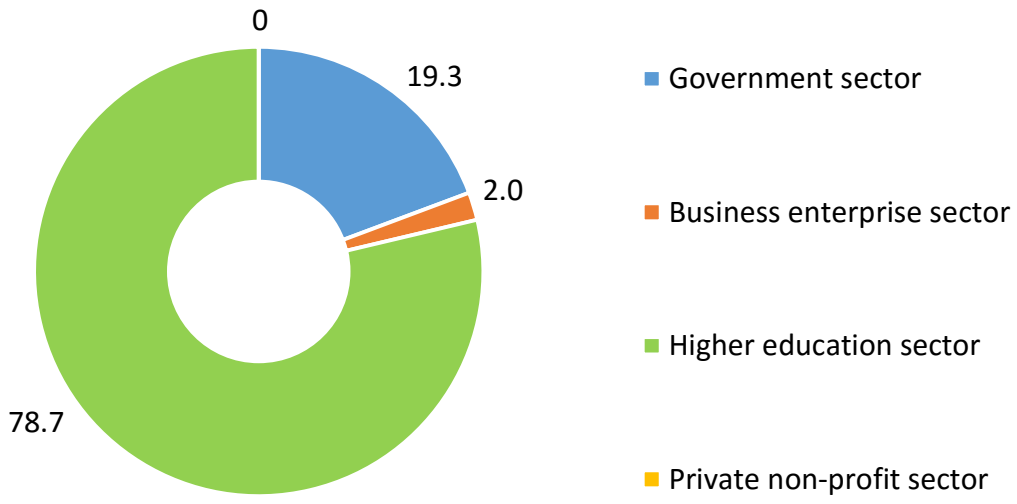


Scientific publications by sector of performance

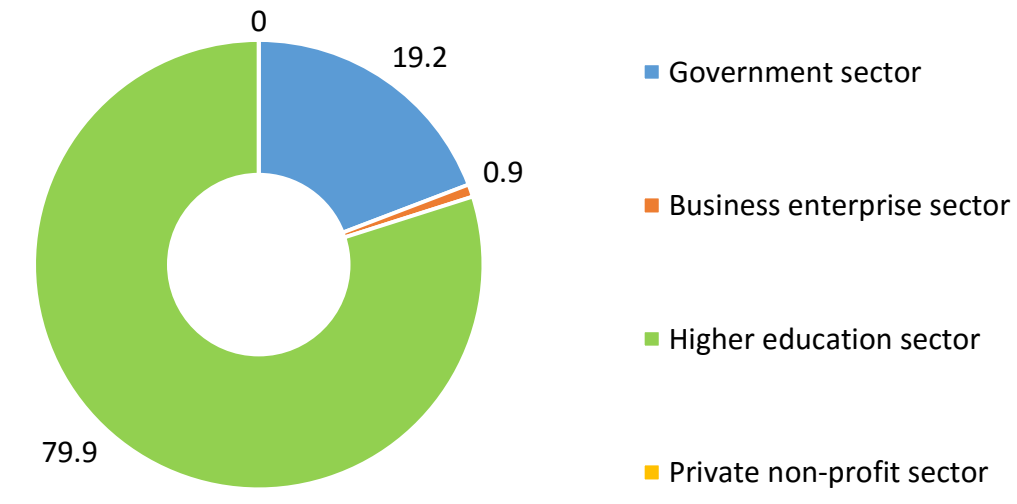
	2010	2011	2012	2013	2014	2015
Total	**345338**	**354703**	**374897**	**391398**	**327919**	**313021**
Government sector	66796	66940	67169	66924	62326	59966
including national academies of sciences	57460	57749	57130	58394	51658	50221
of them:						
NAS of Ukraine	**37642**	**37211**	**36122**	**37871**	**32987**	**32899**
Business enterprise sector	6882	6501	4521	4308	3312	2657
Higher education sector	271649	281243	303192	320166	262281	250398
Private non-profit sector	11	19	15	–	–	–
				(as % of total of each year)		
Government sector	19.3	18.9	17.9	17.1	19.0	19.2
including national academies of sciences	16.6	16.3	15.2	15.0	15.8	16.0
of them:						
NAS of Ukraine	**10.9**	**10.5**	**9.6**	**9.7**	**10.1**	**10.5**
Business enterprise sector	2.0	1.8	1.2	1.1	1.0	0.9
Higher education sector	78.7	79.3	80.9	81.8	80.0	79.9
Private non-profit sector	×	×	×	×	×	×

Percentage distribution of scientific publications by sector of performance, %

2010



2015



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

	2010	2011	2012	2013	2014	2015
Total	**7748**	**8757**	**8552**	**8432**	**7864**	**7334**
Government sector	1886	2065	1807	1821	1902	1843
including national academies of sciences	1668	1885	1552	1552	1668	1599
of them: **NAS of Ukraine**	**790**	**897**	**750**	**856**	**808**	**675**
Business enterprise sector	443	494	360	269	226	528
Higher education sector	5419	6198	6385	6342	5736	4963
Private non-profit sector	–	–	–	–	–	–
						(as % of total of each year)
Government sector	24.3	23.6	21.1	21.6	24.2	25.1
including national academies of sciences	21.5	21.5	18.1	18.4	21.2	21.8
of them: **NAS of Ukraine**	**10.2**	**10.2**	**8.7**	**10.2**	**10.3**	**9.2**
Business enterprise sector	5.7	5.6	4.2	3.2	2.9	7.2
Higher education sector	70.0	70.8	74.7	75.2	73.0	67.7
Private non-profit sector	×	×	×	×	×	×

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

	2010	2011	2012	2013	2014	2015
Total	**84**	**72**	**86**	**72**	**62**	**27**
Government sector	33	30	25	21	11	2
including national academies of sciences	22	21	22	20	7	2
of them: **NAS of Ukraine**	**20**	**12**	**7**	**19**	**7**	**2**
Business enterprise sector	35	29	47	37	16	20
Higher education sector	16	13	14	14	35	5
Private non-profit sector	–	–	–	–	–	–
						(as % of total of each year)
Government sector	35.2	41.7	29.1	29.2	17.7	7.4
including national academies of sciences	26.2	29.2	18.1	27.8	11.3	7.4
of them: **NAS of Ukraine**	**23.8**	**16.7**	**8.1**	**26.4**	**11.3**	**7.4**
Business enterprise sector	41.7	40.3	54.7	51.4	26.0	74.1
Higher education sector	19.1	18.0	16.2	19.4	56.5	18.5
Private non-profit sector	×	×	×	×	×	×

V.3. R&D projects performed by organizations of national academies of sciences and ministries[5]

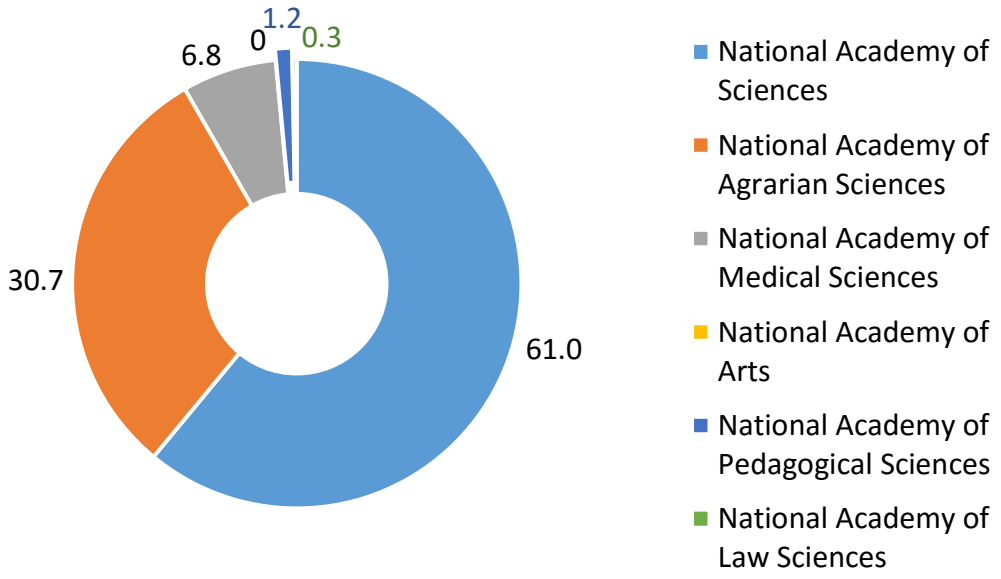
R&D projects – total

	2010	2011	2012	2013	2014	2015
Total	**52037**	**52354**	**53190**	**47875**	**42953**	**41070**
Total for national academies of sciences	11189	11574	10718	11559	9565	9546
including:						
National Academy of Sciences	**6828**	**7385**	**6674**	**7274**	**5703**	**5544**
National Academy of Agrarian Sciences	3433	3204	3163	3313	2954	3175
National Academy of Medical Sciences	759	795	691	784	721	649
National Academy of Arts	…	20	20	20	20	20
National Academy of Pedagogical Sciences	139	133	127	130	129	120
National Academy of Law Sciences	36	37	43	38	38	38
Total for ministries and agencies	40848	40800	…	…	…	…
of them:						
Ministry of Agrarian Policy and Food	2321	2141	…	…	…	…
Ministry of Energy and Coal Industry	1087	3005	…	…	…	…
Ministry of Education and Science	6794	6781	…	…	…	…
Ministry of Healthcare	1724	1308	…	…	…	…

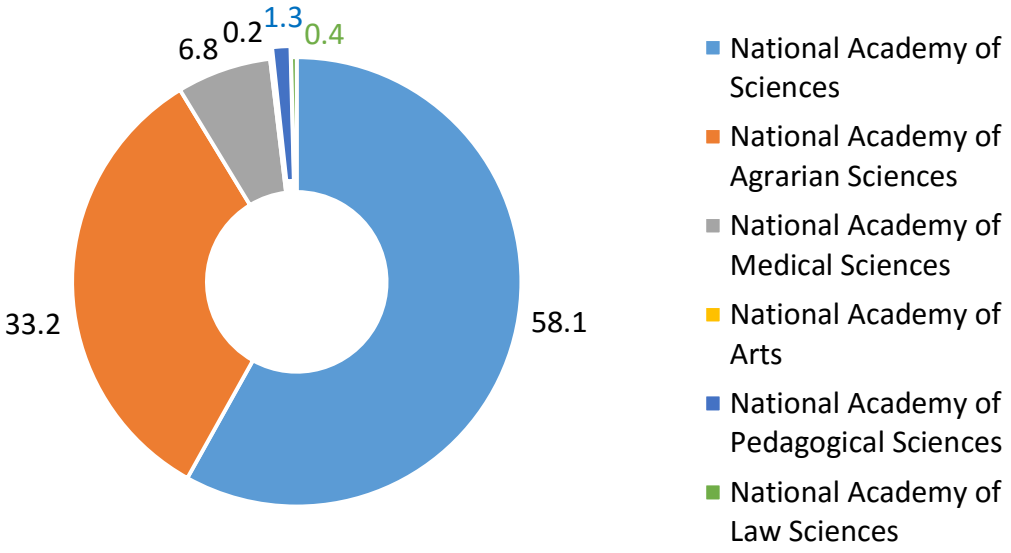
[5] Hereinafter in sections V.1., and V.3.-V.8. the statistics for 2016 are provided by the analytical survey of the Ministry of Education and Science of Ukraine "The state of development of science and technology, the results of scientific and scientific and technical activities for 2016", unless otherwise indicated. – URL: *https://mon.gov.ua/storage/app/media/nauka/informatsiyno-analitychni/na-sajt-mon-ad-kmu-11.07.17.pdf.*

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

2010



2015



R&D projects on creating new methods, theories

	2010	2011	2013	2014	2015	2016
Total	**7733**	**7692**	**7570**	**7462**	**6779**	**5025**
Total for national academies of sciences	2661	2741	2846	2787	2794	1701
including:						
National Academy of Sciences	**1767**	**1835**	**1766**	**1987**	**1937**	**1151**
National Academy of Agrarian Sciences	548	548	733	455	567	101
National Academy of Medical Sciences	277	290	260	246	223	433
National Academy of Arts	…	…	20	20	20	–
National Academy of Pedagogical Sciences	57	57	54	66	34	–
National Academy of Law Sciences	12	11	13	13	13	16
Total for ministries and agencies	5072	4951	…	…	…	…
of them:						
Ministry of Agrarian Policy and Food	471	537	…	…	…	17
Ministry of Energy and Coal Industry	27	152	…	…	…	–
Ministry of Education and Science	2104	2012	…	…	…	1699
Ministry of Healthcare	926	593	…	…	…	660

R&D projects on creating new products

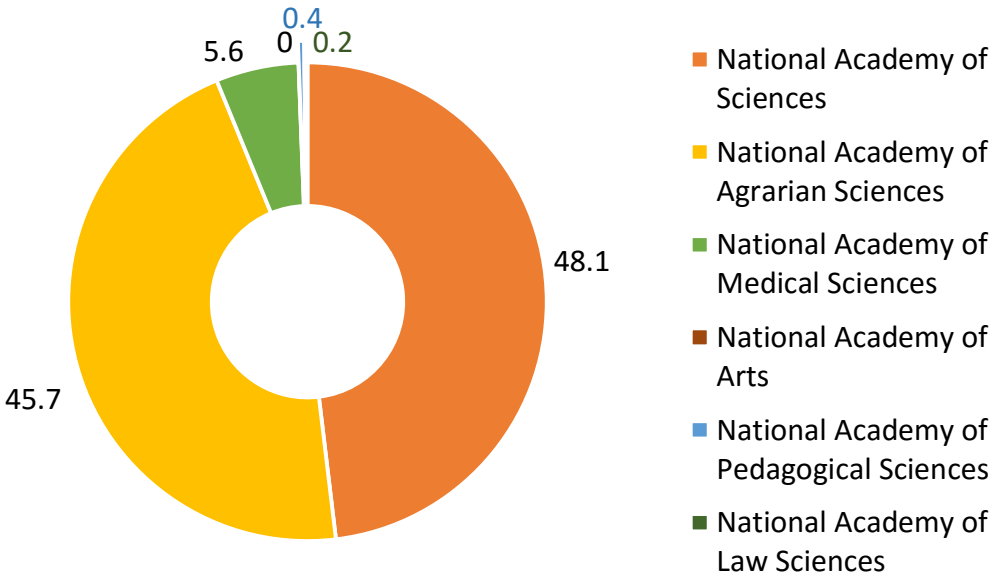
	2010	2011	2013	2014	2015	2016
Total	**6240**	**6475**	**5645**	**4652**	**4082**	**910**
Total for national academies of sciences	1008	1074	837	988	965	208
including:						
National Academy of Sciences	**632**	**699**	**562**	**439**	**469**	**196**
National Academy of Agrarian Sciences	293	283	217	486	432	12
National Academy of Medical Sciences	83	92	58	61	64	–
National Academy of Arts	…	–	–	–	–	–
National Academy of Pedagogical Sciences	–	–	–	2	–	–
National Academy of Law Sciences	–	–	–	–	–	–
Total for ministries and agencies	5232	5401	…	…	…	…
of them:						
Ministry of Agrarian Policy and Food	251	290	…	…	…	8
Ministry of Energy and Coal Industry	77	165	…	…	…	4
Ministry of Education and Science	839	754	…	…	…	175
Ministry of Healthcare	58	52	…	…	…	1

R&D projects on creating new technologies

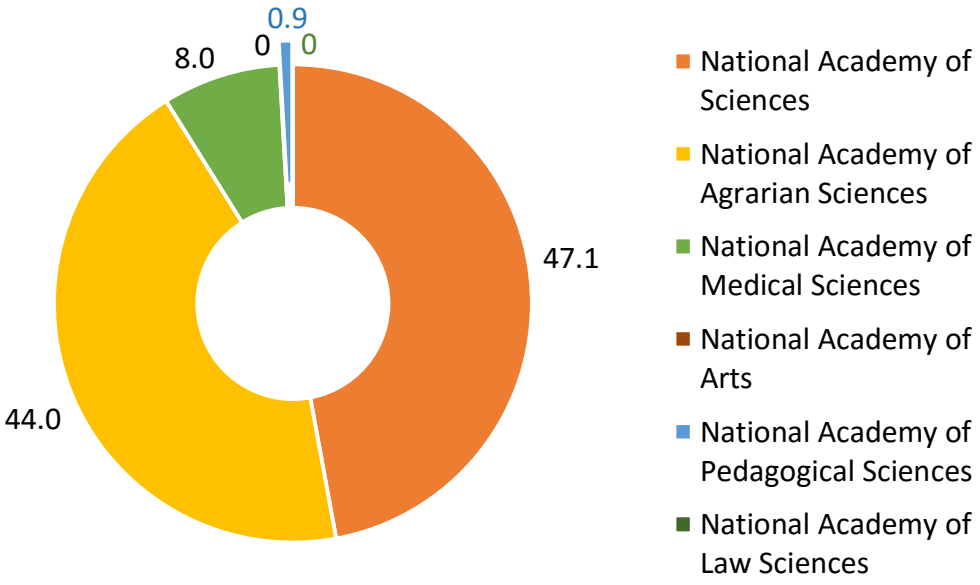
	2010	2011	2013	2014	2015	2016
Total	**5738**	**5331**	**5008**	**3220**	**3065**	**1337**
Total for national academies of sciences	1873	1546	1548	1345	1173	472
including:						
National Academy of Sciences	**901**	**750**	**715**	**638**	**552**	**245**
National Academy of Agrarian Sciences	856	693	671	568	516	106
National Academy of Medical Sciences	106	96	156	131	94	121
National Academy of Arts	…	–	–	–	–	–
National Academy of Pedagogical Sciences	7	6	6	8	11	–
National Academy of Law Sciences	3	1	–	–	–	–
Total for ministries and agencies	3865	3785	…	…	…	…
of them:						
Ministry of Agrarian Policy and Food	512	413	…	…	…	2
Ministry of Energy and Coal Industry	358	539	…	…	…	1
Ministry of Education and Science	883	819	…	…	…	390
Ministry of Healthcare	250	232	…	…	…	4

Percentage distribution of R&D projects on creating new technologies by national academies of sciences, %

2010



2015



R&D projects on creating new materials

	2010	2011	2013	2014	2015	2016
Total	**1419**	**1553**	**1171**	**1070**	**911**	**724**
Total for national academies of sciences	646	645	501	585	441	302
including:						
National Academy of Sciences	**531**	**513**	**449**	**529**	**389**	**281**
National Academy of Agrarian Sciences	114	127	52	32	33	21
National Academy of Medical Sciences	1	5	…	24	19	–
Total for ministries and agencies	773	908	…	…	…	–
of them:						
Ministry of Agrarian Policy and Food	18	16	…	…	…	–
Ministry of Energy and Coal Industry	20	37	…	…	…	–
Ministry of Education and Science	327	296	…	…	…	…
Ministry of Healthcare	2	33	…	…	…	–

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

	2010	2011	2012	2013	2014	2015
Total	**669**	**601**	**515**	**745**	**2165**	**226**
Total for national academies of sciences	561	515	445	454	485	211
including:						
National Academy of Sciences	**35**	**57**	**28**	**17**	**21**	**21**
National Academy of Agrarian Sciences	526	458	417	437	464	190
National Academy of Medical Sciences	–	–	–	–	–	–
Total for ministries and agencies	108	143	…	…	…	–
of them:						
Ministry of Agrarian Policy and Food	59	70	…	…	…	–
Ministry of Education and Science	3	3	…	…	…	–
Ministry of Healthcare	15	–	…	…	…	…

V.4. Publication activity of national academies of sciences and ministries*

Publications – total

	2010	2011	2013	2014	2015	2016
Total	**345338**	**354703**	**391398**	**327919**	**313021**	**215482**
Total for national academies of sciences	57460	57749	58394	51658	50221	43945
including:						
National Academy of Sciences	**37642**	**37211**	**37871**	**32987**	**32899**	**31537**
National Academy of Agrarian Sciences	7398	7449	8704	7336	7110	4935
National Academy of Medical Sciences	7947	7958	7568	7071	7061	4833
National Academy of Arts	…	122	178	173	82	125
National Academy of Pedagogical Sciences	3561	3983	3310	3139	1990	2084
National Academy of Law Sciences	912	1026	763	952	1079	431
Total for ministries and agencies	287878	296976	…	…	…	…
of them:						
Ministry of Agrarian Policy and Food	19009	15340	…	…	…	644
Ministry of Energy and Coal Industry	558	492	…	…	…	7
Ministry of Education and Science	202905	206721	…	…	…	61922
Ministry of Healthcare	32652	32450	…	…	…	2904

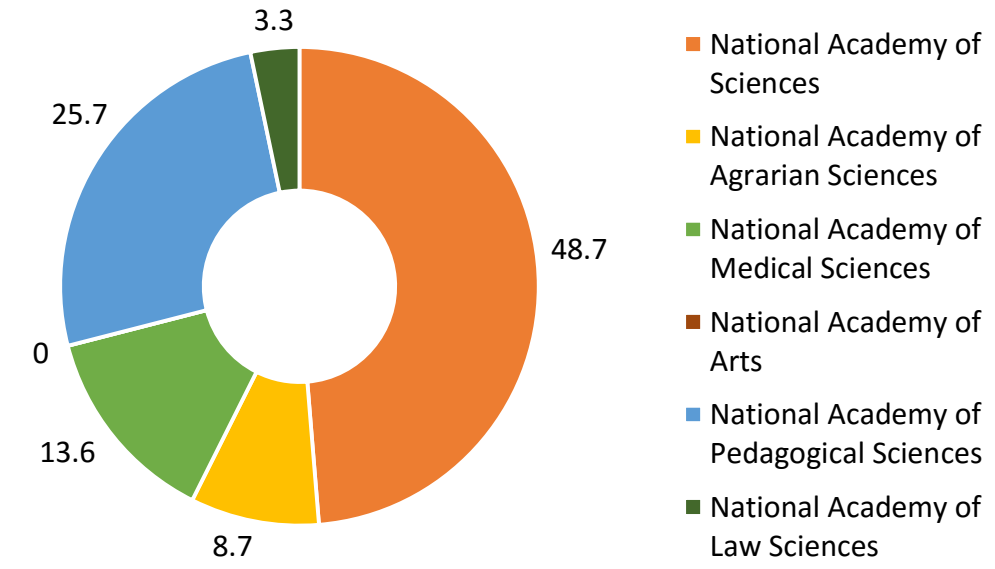
* Publications other than books, textbooks, manuals, and articles in scientific journals are not included in Table. V.3.

Monographs, textbooks, and manuals

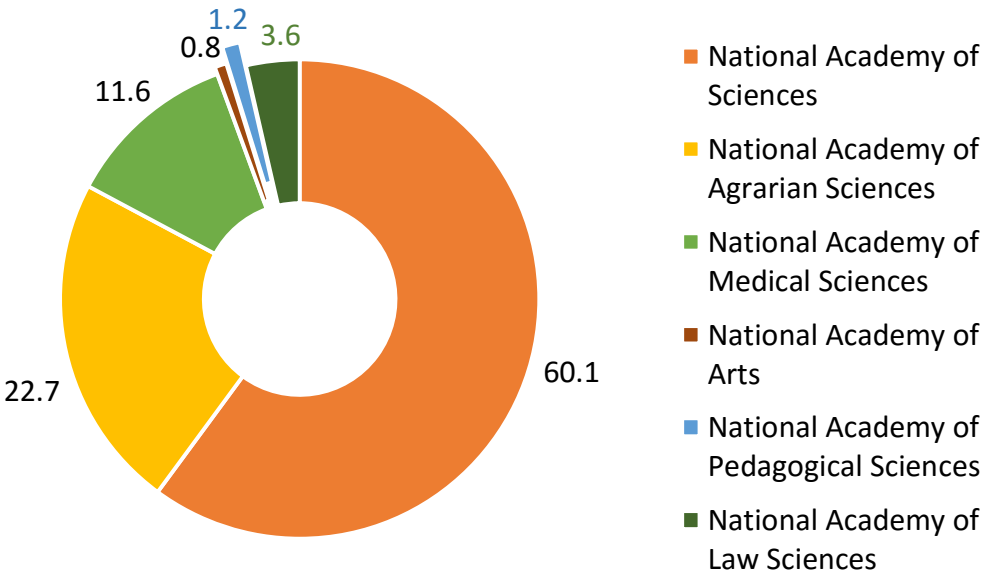
	2010	2011	2013	2014	2015	2016
Total	**23360**	**24408**	**25262**	**21846**	**20957**	**15306**
Total for national academies of sciences	2344	2888	1980	1710	2576	856
including:						
National Academy of Sciences	**1141**	**1817**	**1142**	**885**	**2021**	**515**
National Academy of Agrarian Sciences	204	277	367	252	287	194
National Academy of Medical Sciences	319	248	197	151	131	99
National Academy of Arts	…	32	15	7	1	7
National Academy of Pedagogical Sciences	603	433	172	334	66	10
National Academy of Law Sciences	77	81	87	81	70	31
Total for ministries and agencies	21016	21517	…	…	…	…
of them:						
Ministry of Agrarian Policy and Food	1314	807	…	…	…	20
Ministry of Energy and Coal Industry	118	66	…	…	…	–
Ministry of Education and Science	15643	16075	…	…	…	4528
Ministry of Healthcare	1538	1495	…	…	…	84

Percentage distribution of monographs, textbooks and manuals by national of sciences, *%*

2010



2016

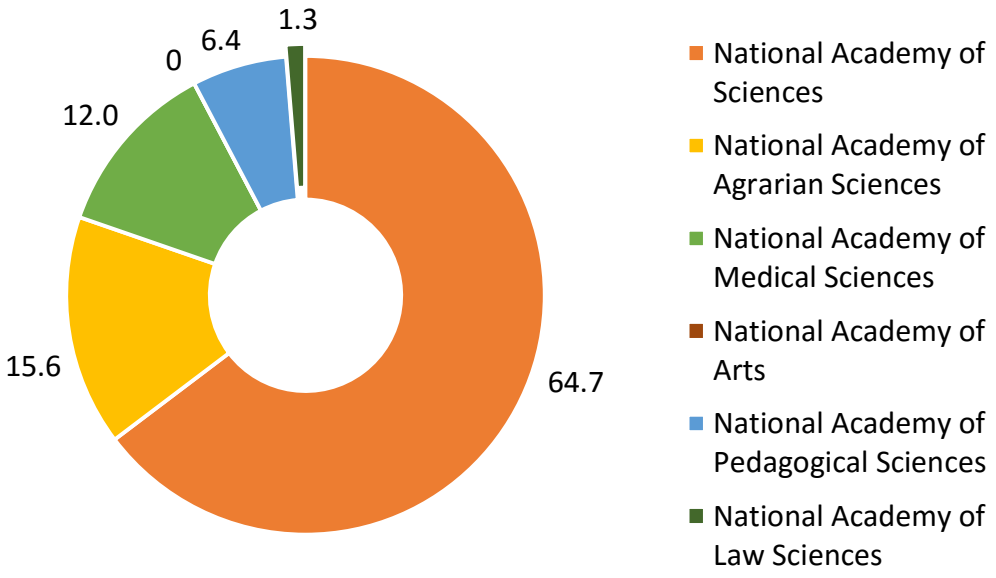


Articles in scientific journals

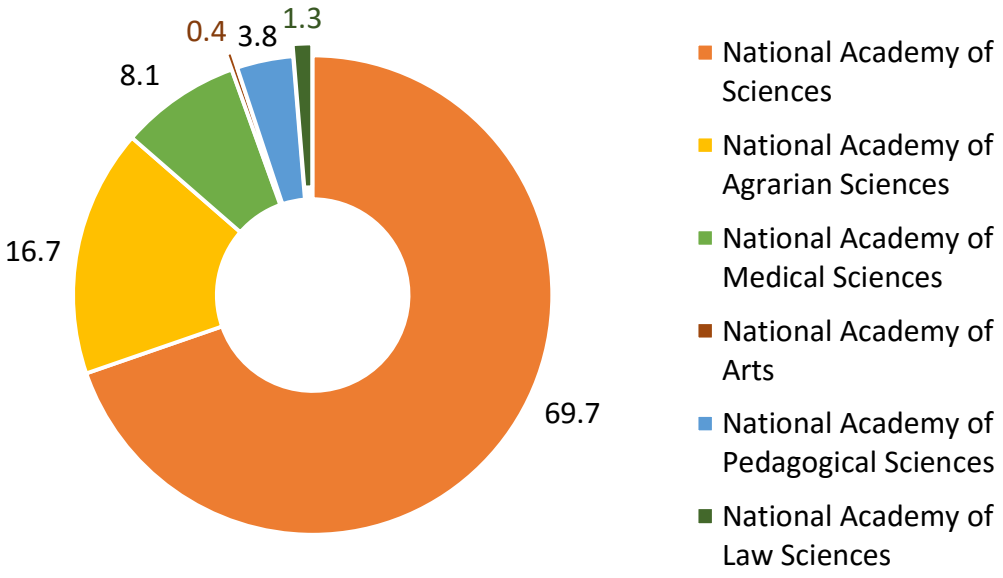
	2010	2011	2013	2014	2015	2016
Total	**194378**	**196194**	**203975**	**179727**	**157319**	**175649**
Total for national academies of sciences	35438	33968	36495	33894	30656	28476
including:						
National Academy of Sciences	**22908**	**21770**	**23596**	**21573**	**20274**	**19848**
National Academy of Agrarian Sciences	5507	5487	6494	5802	5225	4741
National Academy of Medical Sciences	4239	3715	3921	3457	3400	2318
National Academy of Arts	…	90	163	159	74	118
National Academy of Pedagogical Sciences	2273	2296	1832	2277	1260	1073
National Academy of Law Sciences	511	610	489	626	423	378
Total for ministries and agencies	158940	161861	…	…	…	…
of them:						
Ministry of Agrarian Policy and Food	13120	11823	…	…	…	4
Ministry of Energy and Coal Industry	360	402	…	…	…	–
Ministry of Education and Science	106737	108820	…	…	…	4416
Ministry of Healthcare	17718	17023	…	…	…	801

Percentage distribution of articles in scientific journals by national academy of sciences, %

2010



2016



V.5. Patent applications to the State Intellectual Property Service of Ukraine by organizations of national academies of sciences and ministries

Application for inventions, utility models, industrial designs, trademarks, and plant varieties – total

	2010	2011	2013	2014	2015	2016
Total	**8894**	**8849**	**8348**	**8029**	**7358**	**8769**
Total for national academies of sciences	1971	1788	1578	1478	1449	1236
including:						
National Academy of Sciences	**863**	**825**	**816**	**726**	**565**	**593**
National Academy of Agrarian Sciences	641	484	424	431	554	276
National Academy of Medical Sciences	467	479	338	321	330	364
Total for ministries and agencies	6923	7061	…	…	…	…
of them:						
Ministry of Agrarian Policy and Food	470	448	…	…	…	3
Ministry of Energy and Coal Industry	20	54	…	…	…	…
Ministry of Education and Science	4100	4071	…	…	…	4708
Ministry of Healthcare	1451	1276	…	…	…	1153

Application for inventions

	2010	2011	2012	2013	2014	2015
Total	**2252**	**2913**	**2887**	**2965**	**2338**	**1917**
Total for national academies of sciences	742	841	823	733	585	584
including:						
National Academy of Sciences	**436**	**481**	**501**	**462**	**331**	**345**
National Academy of Agrarian Sciences	191	216	189	172	172	172
National Academy of Medical Sciences	115	144	133	99	82	67
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	…	…	…	…

Application for plant varieties

	2010	2011	2012	2013	2014	2015
Total	**328**	**281**	**263**	**206**	**226**	**328**
Total for national academies of sciences	307	205	239	190	215	321
including:						
National Academy of Sciences	**18**	**19**	**39**	**9**	**40**	**31**
National Academy of Agrarian Sciences	289	186	200	181	175	290
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.6. Patents and certificates granted by the State Intellectual Property Service of Ukraine in national academies of sciences and ministries

Patents granted – total

	2010	2011	2012	2013	2014	2015
Total	**7748**	**8757**	**8552**	**8483**	**7864**	**7334**
Total for national academies of sciences	1688	1885	1552	1552	1668	1599
including:						
National Academy of Sciences	**790**	**897**	**750**	**856**	**808**	**675**
National Academy of Agrarian Sciences	437	520	382	355	550	621
National Academy of Medical Sciences	461	468	420	340	310	303
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	…	…	…	…

Patents and certificates for invention granted – total

	2010	2011	2012	2013	2014	2015
Total	**1931**	**2661**	**2694**	**2731**	**2244**	**1805**
Total for national academies of sciences	635	815	776	678	659	586
including:						
National Academy of Sciences	**370**	**468**	**483**	**431**	**389**	**385**
National Academy of Agrarian Sciences	146	218	157	160	168	144
National Academy of Medical Sciences	119	129	136	86	102	57
National Academy of Pedagogical Sciences	–	–	–	1	–	–

continued

	2010	2011	2012	2013	2014	2015
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	…	…	…	…

Patents and certificates for plant varieties granted

	2010	2011	2012	2013	2014	2015
Total	**218**	**299**	**205**	**129**	**397**	**452**
Total for national academies of sciences	194	272	186	120	375	434
including:						
National Academy of Sciences	**28**	**72**	**14**	**19**	**67**	**57**
National Academy of Agrarian Sciences	166	200	172	101	308	377
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.7. Patent applications to foreign patent offices: national academies of sciences and ministries

Patent applications – total

	2010	2011	2012	2013	2014	2015
Total	**112**	**68**	**98**	**90**	**51**	**52**
Total for national academies of sciences	41	19	42	37	23	2
including:						
National Academy of Sciences	**10**	**18**	**19**	**20**	**18**	**1**
National Academy of Agrarian Sciences	31	1	23	17	_	1
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	–	–	…	…	…	…

Patent applications for inventions

	2010	2011	2012	2013	2014	2015
Total	**56**	**42**	**58**	**38**	**28**	**16**
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	–	–	…	…	…	…

Patent applications for plant varieties

	2010	2011	2012	2013	2014	2015
Total	**33**	**1**	**16**	**20**	**11**	**1**
Total for national academies of sciences	31	1	16	20	11	1
including:						
National Academy of Sciences	–	–	–	**3**	**11**	–
National Academy of Agrarian Sciences	31	1	16	17	–	1
Total for ministries and agencies	2	–	…	…	…	…
of them:						
Ministry of Agrarian Policy and Food	–	–	…	…	…	…

V.8. Patents and certificates granted by foreign patent offices: national academies of sciences and ministries

Patents and certificates granted – total

	2010	2011	2013	2014	2015	2016
Total	**84**	**72**	**72**	**62**	**27**	**16**
Total for national academies of sciences	22	21	20	7	2	1
including:						
National Academy of Sciences	**20**	**12**	**19**	**7**	**2**	**1**
National Academy of Agrarian Sciences	2	9	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	…	…	…	10
Ministry of Healthcare	3	1	…	…	…	…

Patents and certificates for inventions granted

	2010	2011	2012	2013	2014	2015
Total	**60**	**42**	**49**	**55**	**26**	**24**
Total for national academies of sciences	19	12	6	16	7	1
including:						
National Academy of Sciences	**19**	**12**	**6**	**16**	**7**	**1**
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	–	…	…	…	…

Patents and certificates for plant varieties granted

	2010	2011	2012	2013	2014	2015
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	…	…	…	…

V.9. Output indicators of budget programs*

Output indicators by national academies and ministries: 2016-2017

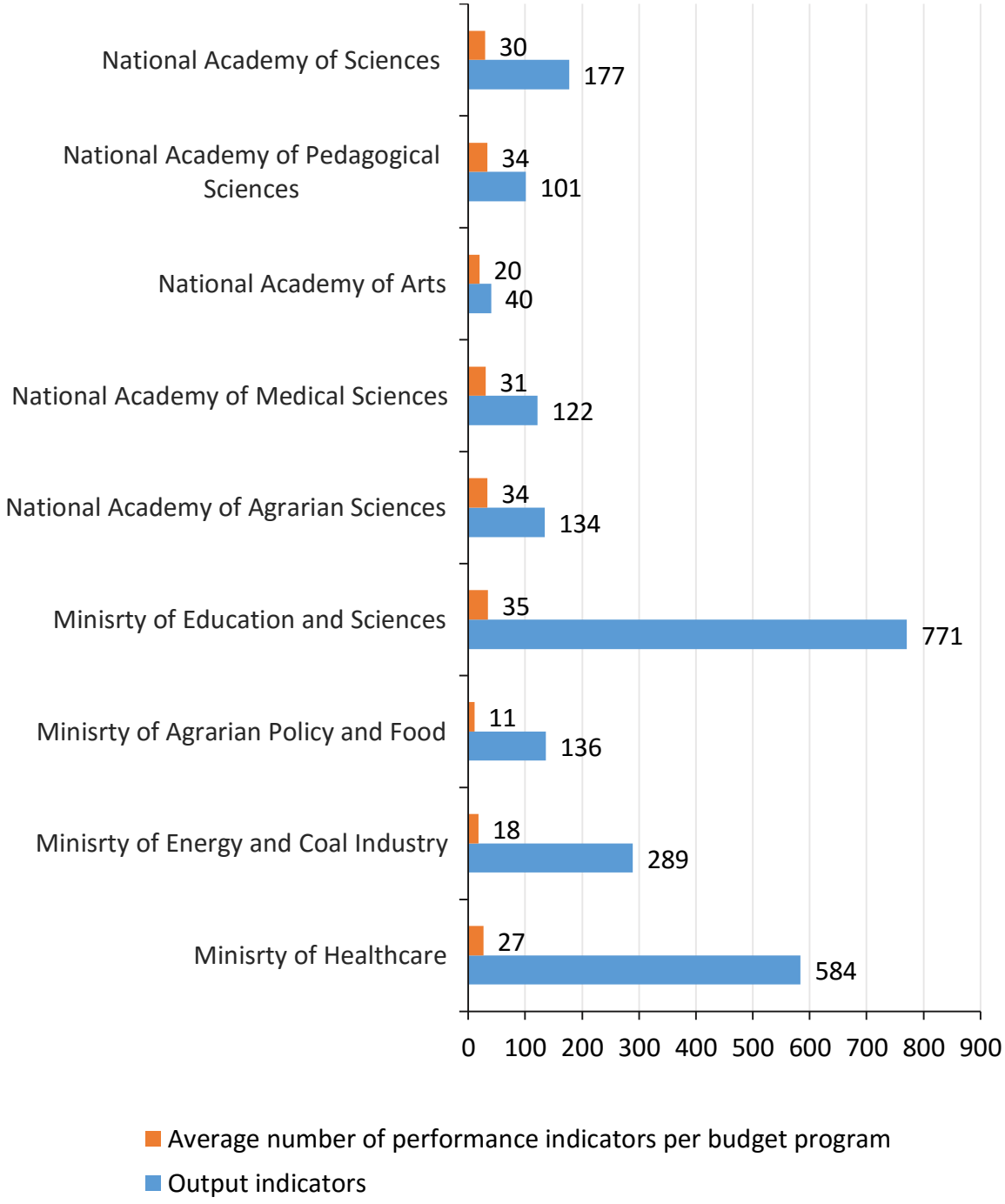
	2016	2017
Total for national academies of sciences**	758	574
including:		
National Academy of Sciences	**225**	**177**
National Academy of Pedagogical Sciences	140	101
National Academy of Arts	58	40
National Academy of Medical Sciences	147	122
National Academy of Agrarian Sciences	188	134
National Academy of Law	…	…
Total for ministries and agencies	…	…
of them:		
Ministry of Education and Sciences	771	600
Ministry of Agrarian Policy and Food	136	194
Ministry of Energy and Coal Industry	289	262
Ministry of Healthcare	584	606

* The indicators of the budget program (subprogram) contain quantitative and qualitative indicators that determine the outcome of the implementation of the budget program (subprogram), characterize the progress of its implementation, the degree of achievement of the set goal, the execution of tasks of the budget program (subprogram) and the effectiveness of the use of budget funds provided for their implementation.

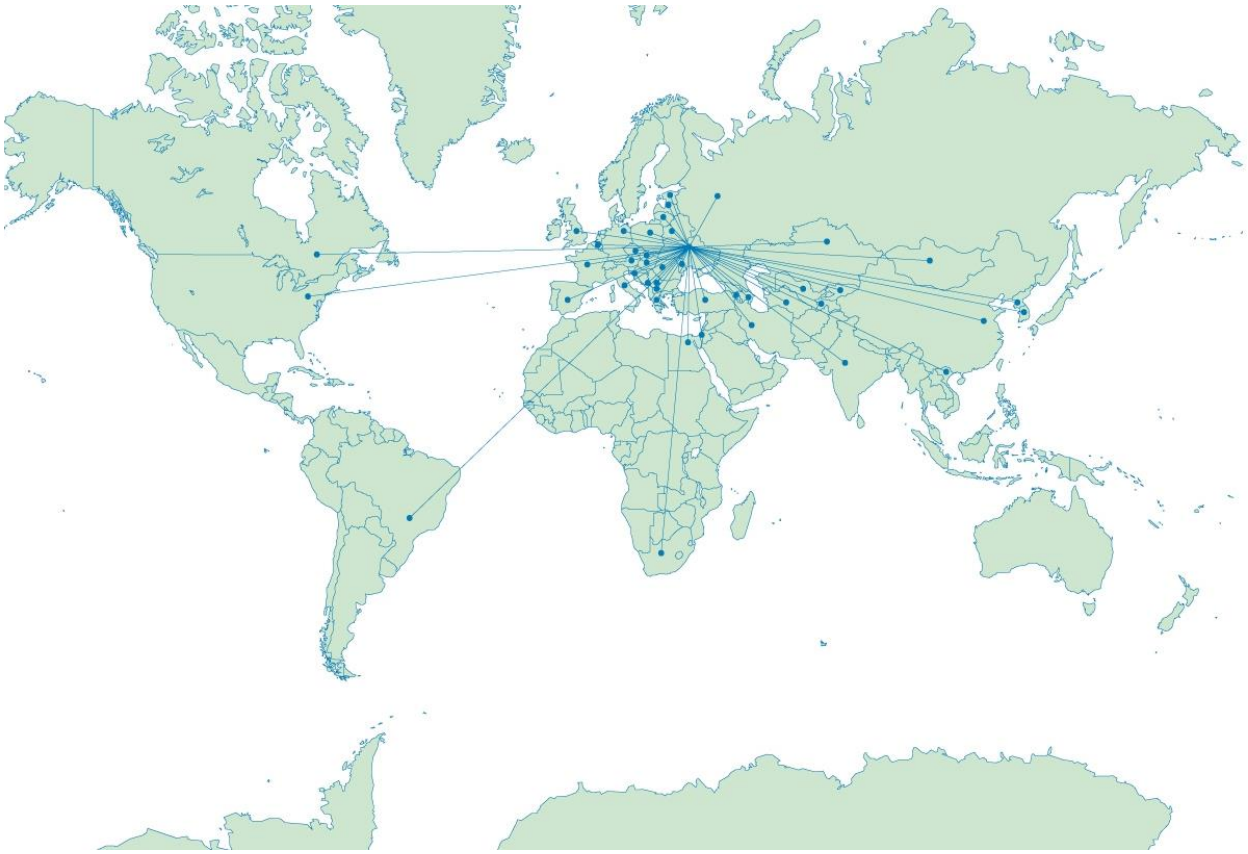
Source: According to the office of financial and economic analysis in the Verkhovna Rada of Ukraine "Analysis of performance indicators of the main spending units in 2016-2017." – URL: https://feao.org.ua/wp-content/uploads/2015/11/2017-12-18-kpis-2016-2017.pdf

** Aligned with according to the above source of information.

Average number of performance indicators per budget program: 2017



VI. INTERNATIONAL COOPERATION OF NATIONAL ACADEMY OF SCIENCES OF UKRAINE



VI.1. Indicators of international scientific cooperation by sector of performance: scientific organizations of Ukraine

R&D personnel traveling abroad, *headcount*

	2010	2011	2012	2013	2014	2015
Total	**9898**	**10264**	**10453**	**11060**	**7316**	**7077**
Government sector	3070	2974	2837	2818	1965	2025
including national academies of sciences	2791	2702	2503	2473	1689	1620
of them: **NAS of Ukraine**	**2398**	**2298**	**2149**	**2111**	**1403**	**1310**
Business enterprise sector	1978	2005	2312	2552	1285	1059

continued

	2010	2011	2012	2013	2014	2015
Higher education sector	4850	5285	5304	5690	4066	3993
Private non-profit sector	–	–	–	–	–	–
						(as % of total of each year)
Government sector	31.0	29.0	27.1	25.5	26.9	28.6
including national academies of sciences	28.2	26.3	23.9	22.4	23.1	22.9
of them: **NAS of Ukraine**	**24.2**	**22.4**	**20.6**	**19.1**	**19.2**	**18.5**
Business enterprise sector	20.0	19.5	22.2	23.1	17.6	15.0
Higher education sector	49.0	51.5	50.7	51.4	55.6	56.4
Private non-profit sector	×	×	×	×	×	×

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

	2010	2011	2012	2013	2014	2015
Total	**9737**	**11369**	**10661**	**10890**	**7638**	**7573**
Government sector	3107	3630	3227	3236	1924	2224
including national academies of sciences	2794	3180	2689	2683	1515	1836
of them: **NAS of Ukraine**	**2136**	**2394**	**2104**	**2057**	**1068**	**1452**
Business enterprise sector	841	818	644	778	433	356
Higher education sector	5789	6921	6790	6876	5281	4993
Private non-profit sector	–	–	–	–	–	–
						(as % of total of each year)
Government sector	31.9	31.9	30.3	29.7	25.2	29.4
including national academies of sciences	28.7	28.0	25.2	24.6	19.8	24.2
of them: **NAS of Ukraine**	**21.9**	**21.1**	**20.7**	**18.9**	**14.0**	**19.2**
Business enterprise sector	8.6	7.1	6.0	7.1	5.7	4.7
Higher education sector	59.5	60.9	63.7	63.1	69.1	65.9
Private non-profit sector	×	×	×	×	×	×

International conferences, seminars and etc. hosted by scientific organizations

	2010	2011	2012	2013	2014	2015
Total	**2201**	**2516**	**2508**	**2619**	**2023**	**2321**
Government sector	655	766	749	718	561	675
including national academies of sciences	512	643	616	594	448	502
of them: **NAS of Ukraine**	**358**	**378**	**381**	**427**	**323**	**327**
Business enterprise sector	129	173	104	99	38	52
Higher education sector	1416	1577	1655	1802	1424	1594
Private non-profit sector	–	–	–	–	–	–
						(as % of total of each year)
Government sector	29.8	30.4	29.9	27.4	27.7	29.1
including national academies of sciences	23.3	25.6	24.6	22.7	22.1	21.6
of them: **NAS of Ukraine**	**16.3**	**15.0**	**15.2**	**16.3**	**16.0**	**14.1**
Business enterprise sector	5.9	6.9	4.1	3.8	1.9	2.2
Higher education sector	64.3	62.7	66.0	68.8	70.4	68.7
Private non-profit sector	×	×	×	×	×	×

R&D grants obtained from international foundations

	2010	2011	2012	2013	2014	2015
Total	**1723**	**1727**	**1855**	**2147**	**1885**	**1882**
Government sector	508	431	402	396	360	325
including national academies of sciences	499	415	385	365	316	280
of them: **NAS of Ukraine**	**461**	**379**	**359**	**333**	**289**	**261**
Business enterprise sector	26	20	14	8	10	15
Higher education sector	1189	1276	1439	1743	1515	1542
Private non-profit sector	–	–	–	–	–	–
						(as % of total of each year)
Government sector	29.5	25.0	21.7	18.4	19.1	17.3
including national academies of sciences	29.0	24.0	21.0	17.0	16.8	14.9

continued

	2010	2011	2012	2013	2014	2015
of them: **NAS of Ukraine**	**26.8**	**21.9**	**19.4**	**15.5**	**15.3**	**13.9**
Business enterprise sector	1.5	1.1	0.7	0.4	0.5	0.8
Higher education sector	69.0	73.9	77.6	81.2	80.4	81.9
Private non-profit sector	×	×	×	×	×	×

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

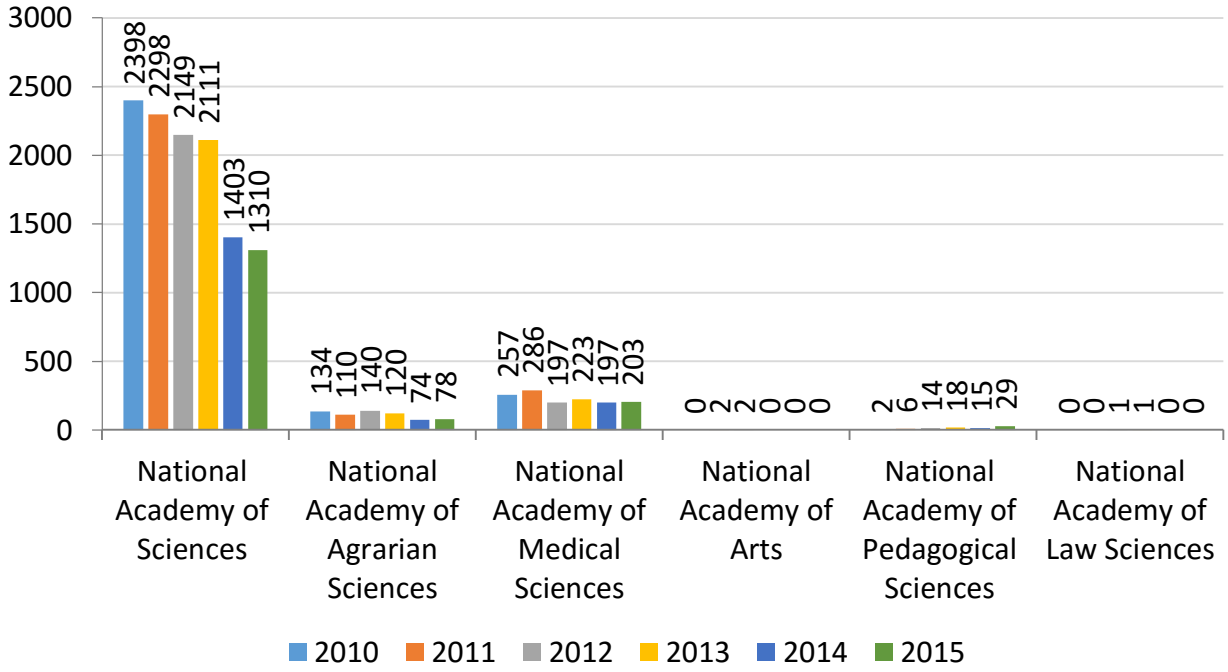
	2010	2011	2012	2013	2014	2015
Total	**4541**	**5155**	**5319**	**5083**	**4513**	**4300**
Government sector	1766	1880	1798	1766	1613	1462
including national academies of sciences	1779	1817	1671	1613	1472	1308
of them: **NAS of Ukraine**	**1670**	**1629**	**1596**	**1530**	**1378**	**1238**
Business enterprise sector	144	625	644	42	175	157
Higher education sector	2631	2650	2877	3275	2725	2681
Private non-profit sector	–	–	–	–	–	–
						(as % of total of each year)
Government sector	38.9	36.5	33.8	34.7	35.7	34.0
including national academies of sciences	39.2	35.2	31.4	31.7	32.6	30.4
of them: **NAS of Ukraine**	**36.8**	**31.6**	**30.0**	**30.1**	**30.5**	**28.8**
Business enterprise sector	3.2	12.1	12.1	0.8	3.9	3.7
Higher education sector	57.9	51.4	54.1	64.4	60.4	62.3
Private non-profit sector	×	×	×	×	×	×

VI.2. Foreign trips of R&D personnel

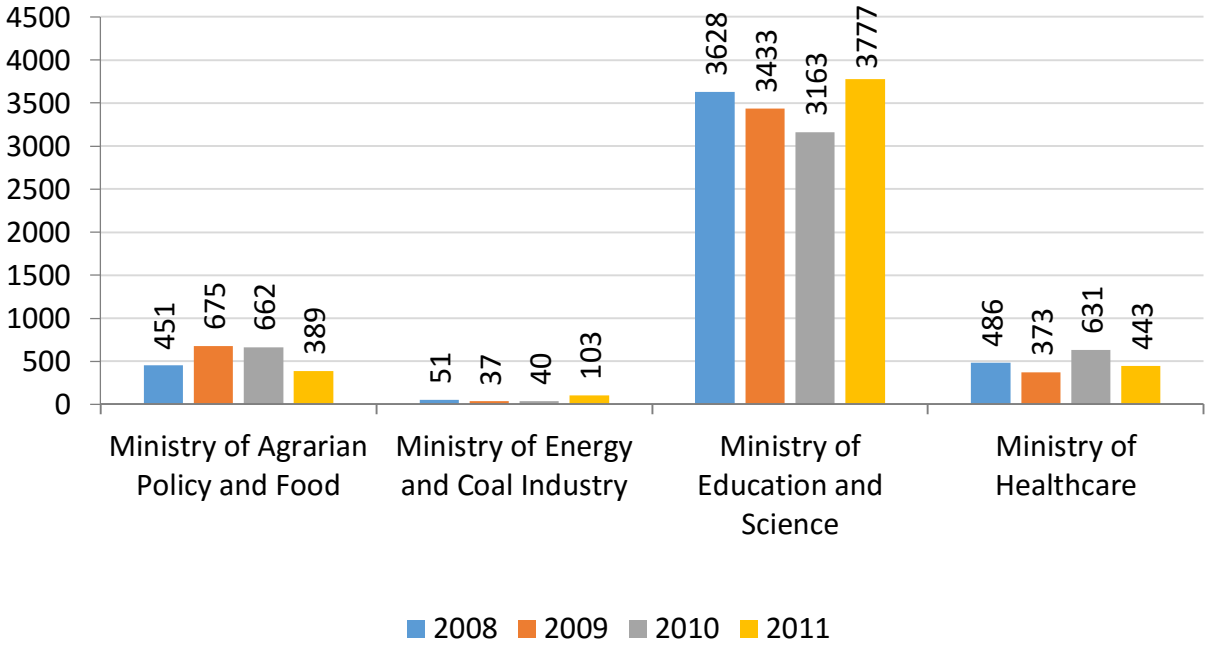
R&D personnel of national academies of sciences and ministries, traveling abroad, *headcount*

	2010	2011	2012	2013	2014	2015
Total	**9898**	**10264**	**10453**	**11060**	**7316**	**7077**
Total for national academies of sciences	2791	2702	2503	2473	1689	1620
including:						
National Academy of Sciences	**2398**	**2298**	**2149**	**2111**	**1403**	**1310**
National Academy of Agrarian Sciences	134	110	140	120	74	78
National Academy of Medical Sciences	257	286	197	223	197	203
National Academy of Arts	…	2	2	…	…	…
National Academy of Pedagogical Sciences	2	6	14	18	15	29
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, *headcount*



R&D personnel of ministries traveling abroad*, *headcount*



* Since 2012the State Statistics Service of Ukraine has not conducted state statistical observation and has not provided data for ministries as well.

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

	2010	2011	2012	2013	2014	2015
Total	**5391**	**5988**	**5845**	**6217**	**3641**	**3335**
Total for national academies of sciences	2027	2089	1826	1656	1075	996
including:						
National Academy of Sciences	**1926**	**1897**	**1732**	**1583**	**986**	**904**
National Academy of Agrarian Sciences	51	53	45	40	34	32
National Academy of Medical Sciences	50	134	48	18	40	45
National Academy of Arts	…	2	–	–	–	–
National Academy of Pedagogical Sciences	–	3	1	15	15	15
National Academy of Law Sciences	…	–	–	–	–	–
Total for ministries and agencies	2640	3901	…	…	…	…
of them:						
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	2015
Total	**574**	**489**	**477**	**435**	**281**	**343**
Total for national academies of sciences	80	94	68	51	52	58
including:						
National Academy of Sciences	**56**	**91**	**62**	**40**	**45**	**52**
National Academy of Agrarian Sciences	6	–	5	2		–
National Academy of Medical Sciences	18	3	–	8	7	6
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	2015
Total	**3933**	**3787**	**4131**	**4408**	**3394**	**3399**
Total for national academies of sciences	684	519	609	766	562	566
including:						
National Academy of Sciences	**416**	**310**	**355**	**488**	**372**	**354**
National Academy of Agrarian Sciences	77	57	95	78	40	46
National Academy of Medical Sciences	189	149	144	197	150	152
National Academy of Arts	…	–	2	–	–	–
National Academy of Pedagogical Sciences	2	3	13	3	–	14
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	…	…	…	…

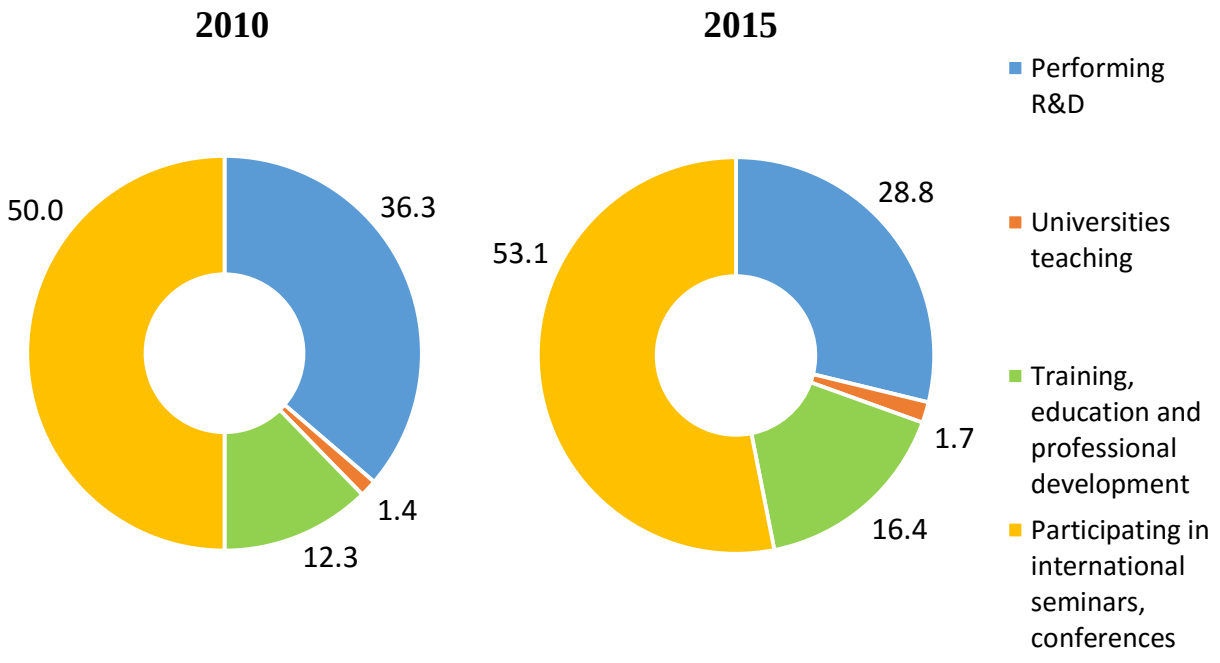
R&D personnel traveling abroad to international seminars, Conferences, etc.

	2010	2011	2012	2013	2014	2015
Total	**9737**	**11369**	**10661**	**10890**	**7638**	**7573**
Total for national academies of sciences	2794	3180	2689	2683	1515	1836
including:						
National Academy of Sciences	**2136**	**2394**	**2104**	**2057**	**1068**	**1452**

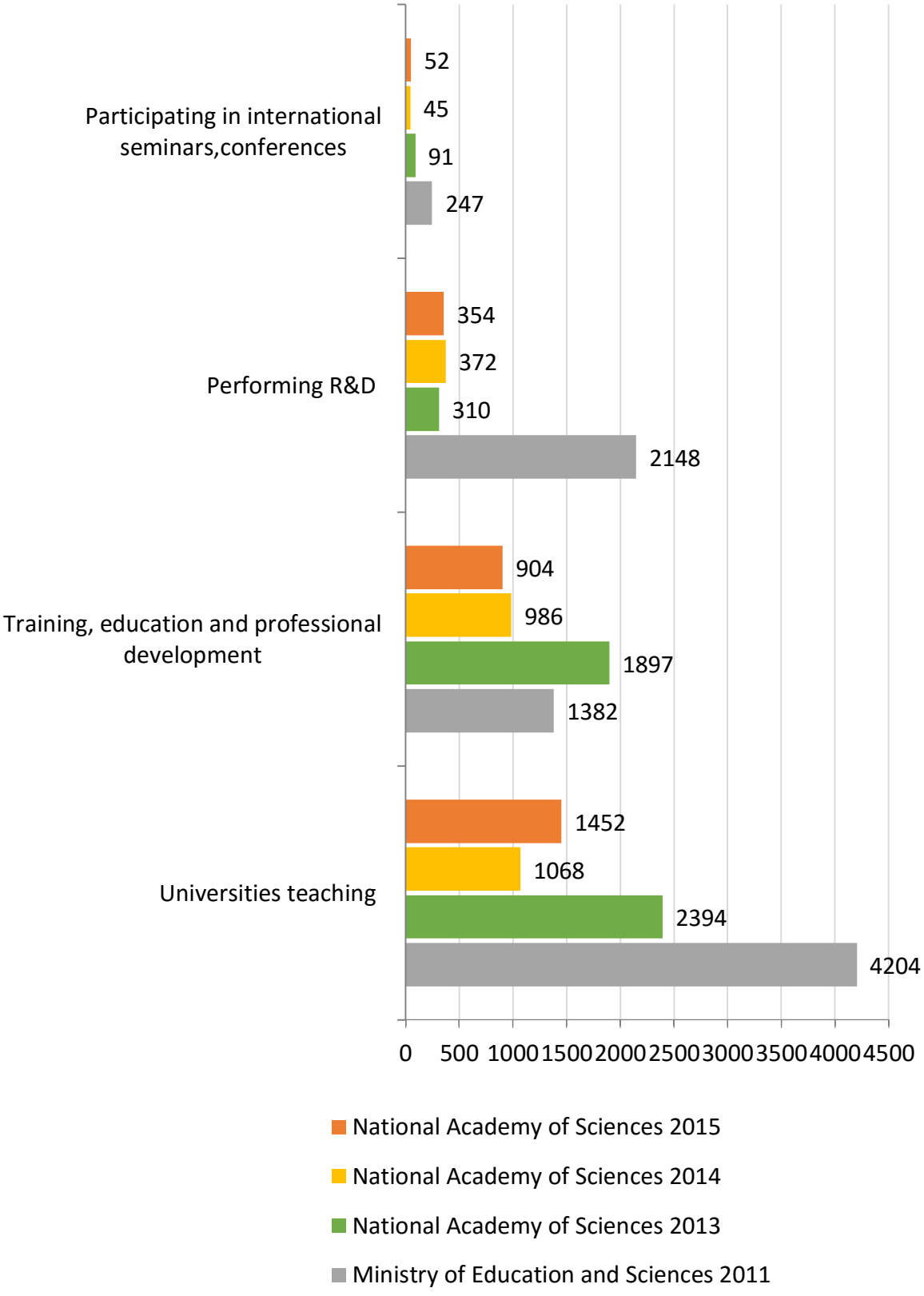
continued

	2010	2011	2012	2013	2014	2015
National Academy of Agrarian Sciences	152	160	164	184	102	99
National Academy of Medical Sciences	474	548	370	394	336	274
National Academy of Arts	…	–	2	–	1	–
National Academy of Pedagogical Sciences	32	78	47	45	8	10
National Academy of Law Sciences	–	–	2	3	–	1
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.3. 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	2015
Total	**8906**	**9356**	**9549**	**10208**	**6489**	**6216**
Total for national academies of sciences	2487	2462	2307	2327	1546	1435
including:						
National Academy of Sciences	**2124**	**2066**	**1968**	**1970**	**1265**	**1130**
National Academy of Agrarian Sciences	108	105	132	117	73	77
National Academy of Medical Sciences	255	283	193	221	193	199
National Academy of Arts	…	2	–	–	–	–
National Academy of Pedagogical Sciences	–	6	13	18	15	29
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	2015
Total	**819**	**786**	**776**	**750**	**777**	**777**
Total for national academies of sciences	220	187	160	126	125	158
including:						
National Academy of Sciences	**204**	**180**	**149**	**121**	**121**	**153**
National Academy of Agrarian Sciences	13	5	5	3	1	1
National Academy of Medical Sciences	1	2	3	2	3	4
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	…	…	…	…

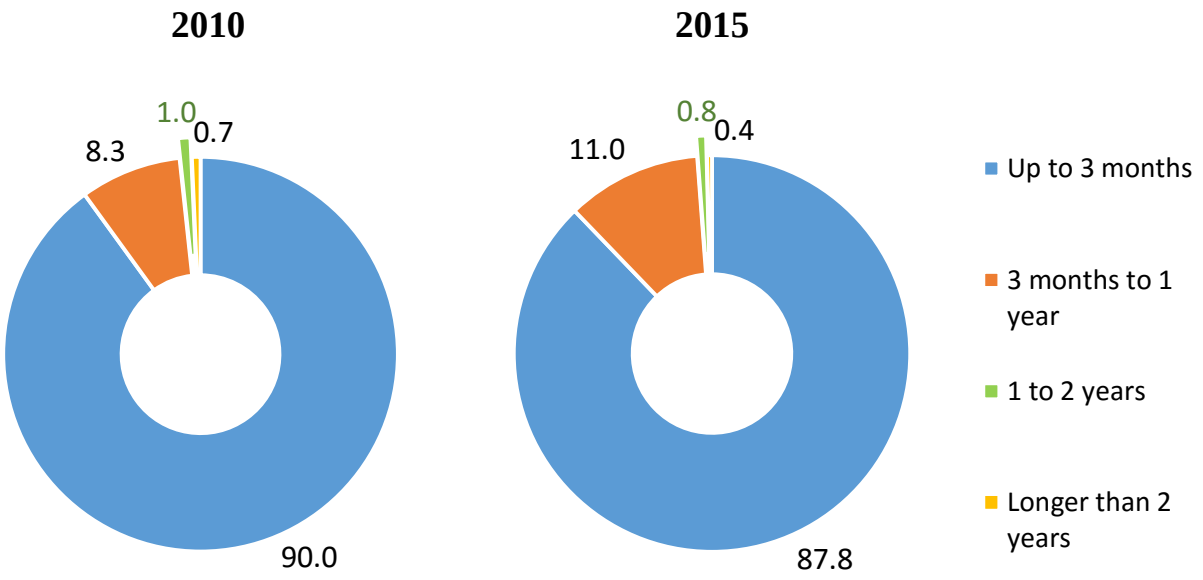
R&D personnel traveling for 1 to 2 years, *headcount*

	2010	2011	2012	2013	2014	2015
Total	**96**	**49**	**86**	**55**	**21**	**53**
Total for national academies of sciences	48	19	22	12	13	16
including:						
National Academy of Sciences	**36**	**19**	**22**	**12**	**12**	**16**
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	…	…	…	…

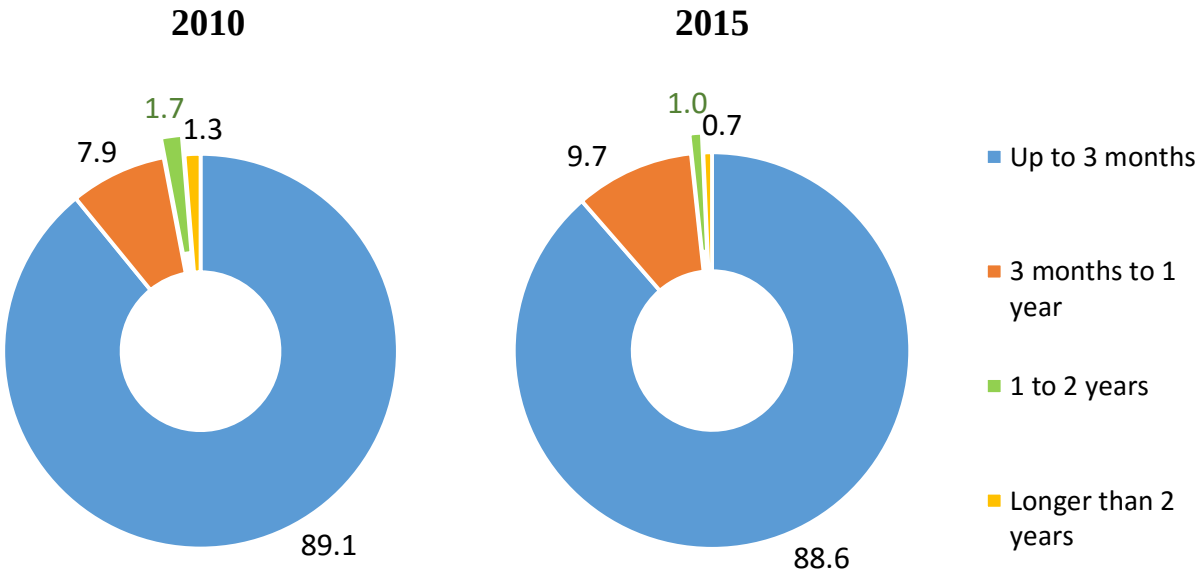
R&D personnel traveling for longer than 2 years, *headcount*

	2010	2011	2012	2013	2014	2015
Total	**77**	**75**	**42**	**47**	**29**	**31**
Total for national academies of sciences	36	34	14	8	5	11
including:						
National Academy of Sciences	**34**	**33**	**10**	**8**	**5**	**11**
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	…	…	…	…

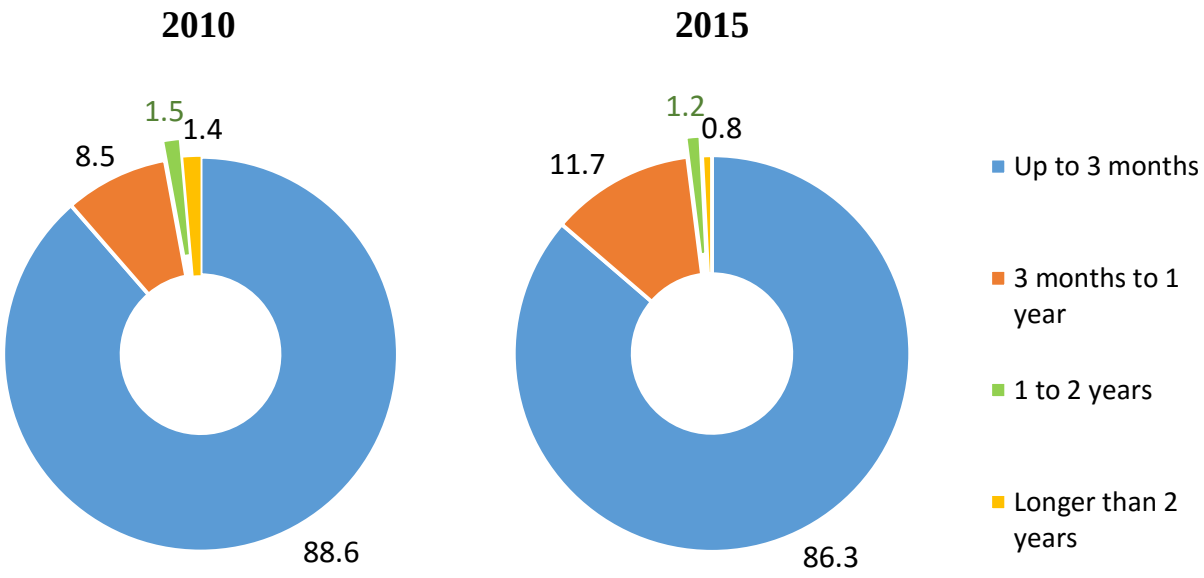
Percentage distribution of R&D personnel of national academies of sciences and ministries traveling abroad by trip duration, %



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.4. R&D grants obtained from international funds: research institutions of national academies of sciences and ministries

Obtained grants – total

	2010	2011	2012	2013	2014	2015
Total	**1723**	**1727**	**1855**	**2147**	**1885**	**1882**
Total for national academies of sciences	499	415	385	365	316	280
including:						
National Academy of Sciences	**461**	**379**	**359**	**333**	**289**	**261**
National Academy of Agrarian Sciences	14	23	15	12	9	9
National Academy of Medical Sciences	17	11	8	20	18	10
National Academy of Arts	…	2	3	–	–	–
National Academy of Pedagogical Sciences	7	–	–	–	–	–

continued

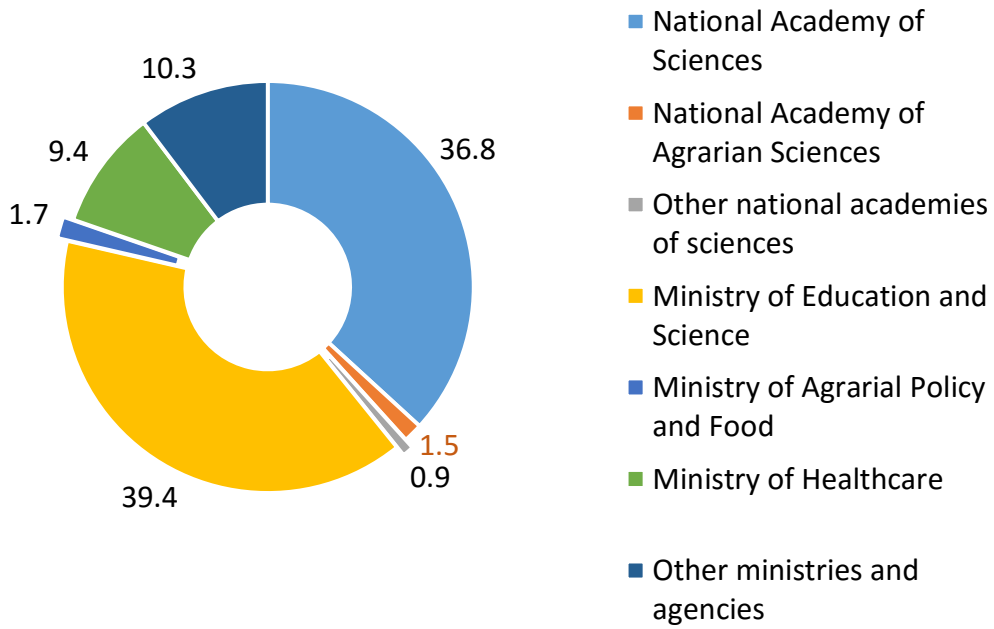
	2010	2011	2012	2013	2014	2015
National Academy of Law Sciences	–	–	–	–	–	–
Total for ministries and agencies	1221	1312	…	…	…	…
of them:						
Ministry of Agrarian Policy and Food	13	16	…	…	…	…
Ministry of Energy and Coal Industry	–	–	…	…	…	…
Ministry of Education and Science	758	835	…	…	…	…
Ministry of Healthcare	187	236	…	…	…	…

R&D personnel performing R&D by grants

	2010	2011	2012	2013	2014	2015
Total	**4541**	**5155**	**5319**	**5083**	**4513**	**4300**
Total for national academies of sciences	1779	1817	1671	1613	1472	1308
including:						
National Academy of Sciences	**1670**	**1629**	**1596**	**1530**	**1378**	**1238**
National Academy of Agrarian Sciences	68	159	61	54	75	58
National Academy of Medical Sciences	7	27	11	29	19	12
National Academy of Arts	…	2	3	–	–	–
National Academy of Pedagogical Sciences	34	–	–	–	–	–
National Academy of Law Sciences	–	–	–	–	–	–
Total for ministries and agencies	2762	3340	…	…	…	…
of them:						
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	…	…	…	…

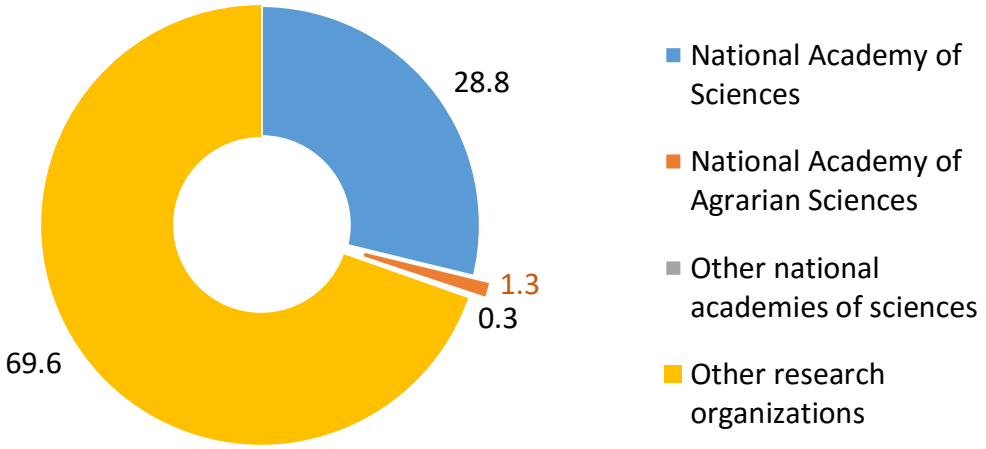
Percentage distribution of R&D personnel performing R&D by grants by national academies of sciences and ministries: 2010,

as % of the total researchers performing R&D by grants



Percentage distribution of R&D personnel performing R&D by grants by national academies of sciences: 2015,

as % of the 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: Scopus*

World's top 50 countries by Hirsch Index: Scopus, 1996-2017**, *units*

	Publications	of them: cited publications	Average number of citations per publication	Hirsch Index
USA	11036243	9875662	24.25	2077
United Kingdom	3150874	2705067	21.84	1281
Germany	2790169	2590028	19.65	1131
Canada	1594391	1446619	21.92	1033
France	1967157	1837639	19.25	1023
Japan	2539441	2437565	15.38	920
Italy	1583746	1451214	18.03	898
Netherlands	886135	806509	25.58	893
Switzerland	650079	598455	26.50	866
Australia	1226552	1093833	19.04	848
Sweden	600233	557344	24.31	778
Spain	1256556	1156724	16.44	775
China	5133924	5052579	7.64	712
Belgium	485937	448557	22.07	702
Denmark	355418	326297	24.97	662
Israel	346372	319737	22.54	624
Austria	354524	326433	19.74	577
South Korea	1004042	973360	12.25	576
Finland	305791	286738	21.97	571
Norway	281530	254884	19.95	526

continued

	Publications	of them: cited publications	Average number of citations per publication	Hirsch Index
India	1472192	1379217	8.58	521
Russia	956025	936928	7.07	503
Singapore	265452	246176	18.03	492
Brazil	834526	794371	10.44	489
Poland	580205	558878	9.93	479
Hong Kong	263602	245629	19.06	479
New Zealand	218100	195224	18.95	459
Ireland	185268	165001	18.78	451
Taiwan	614487	593852	12.61	437
Greece	290718	266402	15.52	434
Portugal	270634	251622	14.16	416
Czech Republic	292956	282474	10.80	396
South Africa	241587	220567	12.94	391
Hungary	174351	165311	14.91	390
Mexico	284868	269516	11.45	378
Turkey	531899	496582	9.49	368
Argentina	190637	179674	14.13	364
Chile	130556	123966	13.47	318
Thailand	156829	148862	11.10	289
Saudi Arabia	155805	148836	9.30	271
Iran	448079	434656	7.52	257
Slovenia	86384	82321	12.30	255
Malaysia	248457	239537	6.50	249
Slovakia	100082	96967	9.27	241
Croatia	95058	90901	8.47	236
Colombia	84734	80170	9.00	235
Estonia	35913	33917	16.28	234
Egypt	177824	172042	8.83	231
Ukraine	**171571**	**168607**	**5.96**	**225**
Pakistan	127817	121836	7.38	217

* As of January 2018.

Source: Scimago Journal & Country Rank. – URL: *http://www.scimagojr.com/countryrank.php*

** Hirsch Index (*h*-Index) – *h* number of articles in the journal, that are cited by in more than *h* publications

Trends in Ukrainian publication activity: 2001-2014*, *units*

Year	Papers	Citations	Year	Papers	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*

	Papers	as % 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
Chemical industry	5367	3,2
Medicine	4449	2,7
Ecology	3519	2,1
Agrarian sciences	3410	2,0
Others	…	…

* As of December 2014.

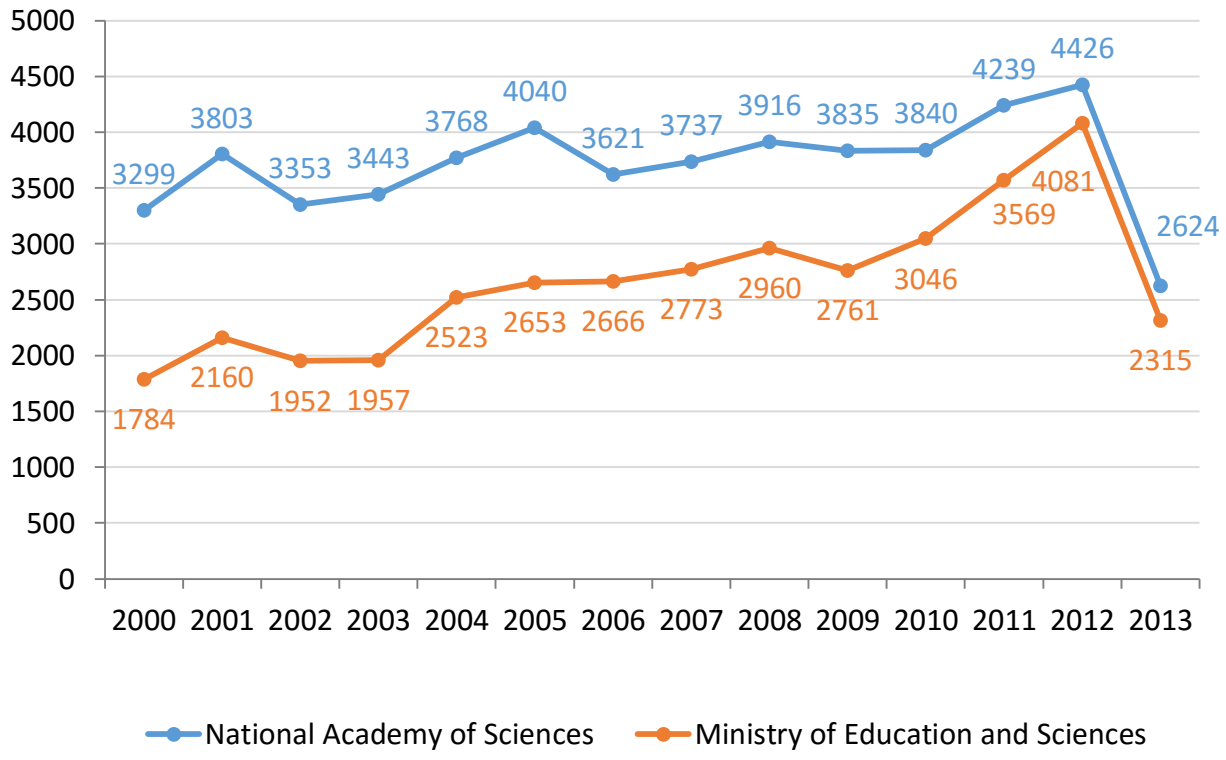
Source: Scimago Journal & Country Rank – URL: *http://www.scimagojr.com/countrysearch.php?country=UA*

Trends in publications of research institutions of National Academy of Sciences of Ukraine as well as higher education institutions and research organizations of Ministry of Education and Science of Ukraine, 2000-2013: Scopus*, *units*

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



Top 50 research organizations and universities by Hirsch Index: Scopus*

		Papers	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	*Kyiv Taras Shevchenko National University*	*12416*	*49991*	*70*
4	Institute of Physics	3634	29285	65
5	O.O. Bogomolets 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	*V.N. Karazin Kharkiv National University*	*7117*	*31308*	*54*
12	G.V. Kurdyumov Institute for Metal Physics	2741	19947	54
13	I.M. Frantsevich Institute for Problems of Materials Sciences	6987	23469	53
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	*Lviv Ivan Franko National University*	*4976*	*21899*	*44*

continued

		Papers	Citations	Hirsch Index
19	*Odessa I.I. Mechnikov National University*	*2508*	*10490*	*44*
20	Institute of Organic Chemistry	2590	12749	42
21	*Chernivtsi Yu. Fed'kovych National University*	*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	*National Technical University of Ukraine "Kyiv Polytechnic Institute"*	*4817*	*9369*	*37*
29	"Institute for Single Crystals" State R&D Corporation	1786	10523	36
30.	*Donetsk M. Gorky National Medical University*	*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
34.	*Dnipro Oles Honchar National University*	*2728*	*7337*	*32*
35.	*National Technical University "Kharkiv Polytechnic Institute"*	*2021*	*5932*	*31*
36.	L.M. Litvinenko Institute of Physical-Organic Chemistry and Coal Chemistry	710	4168	30

continued

		Papers	Citations	Hirsch Index
37.	*National University "Lvivska Politechnika"*	*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.	*Vasyl Stefanyk Precarpathian National University*	*308*	*2716*	*28*
42.	*Danylo Galytsky Lviv National Medical University*	*472*	*2339*	*28*
43.	Institute of Cell Biology	348	5755	27
44.	*Uzhgorod National University*	*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.	*Donetsk National University*	*1530*	*3116*	*25*
48.	O.V. Bogatsky Physico-Chemical Institute	509	2710	25
49.	*Sumy State University*	*1123*	*5102*	*24*
50.	Institute for Scintillation Materials	658	2845	24

* 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 NAS of Ukraine. – URL: *http://www.nbuviap.gov.ua/bpnu/index.html.* – As of August 2015.

VII.2. Representation of scientific journals published in Ukraine by national academies of sciences and ministries: international databases

Scientific journals published in Ukraine: Web of Science*

	Journals		Impact factor**			
			Maximal		Minimal	
	2015	2016	2015	2016	2015	2016
Total	**15**	**15**	**1.04**	**1.071**	**0.143**	**0.187**
National academies of sciences:						
National Academy of Sciences	**14**	**14**	**1.04**	**0.882**	**0.143**	**0.187**
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	0.783	1.071	0.783	1.071
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. – As of March 2018.

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.

Impact indices of scientific journals of National Academy of Sciences of Ukraine published in Ukraine: international databases

(units)

	Web of Science		Scopus	
	Impact factor*		Science Journal Rankings**	
	2014	2016	2014	2017
Condensed Matter Physics	0.748	0.882	0.276	0.254
Journal of Low Temperature Physics	0.786	0.804	–	0.264
Symmetry, Integrability and Geometry: Methods and Applications (SIGMA)	1.245	0.765	0.511	0.712
Journal of Superhard Materials	0.573	0.689	–	0.396
Theoretical and Experimental Chemistry	0.815	0.500	–	0.247
Kinematics and Physics of Celestial Bodies	0.282	0.452	–	0.328
Strength of Materials	0.376	0.443	–	0.266
Journal of Water Chemistry and Technology	0.231	0.343	–	–
Powder metallurgy	0.219	0.342	–	0.221
Cytology and Genetics	0.379	0.324	0.156	0.161
Ukrainian Mathematical Journal	0.230	0.228	–	0.325
Neurophysiology	0.195	0.207	–	0.154
Journal of Mathematical Physics, Analysis, Geometry	0.157	0.205	0.323	0.491
Materials Science	0.195	0.187	–	0.279
Problems of Atomic Science and Technology	0.136	–	0.201	0.232
Experimental Oncology	–	–	0.641	0.444
Metal Physics and Advanced Technologies	–	–	–	0.434
Nonlinear Dynamics and Systems Theory	–	–	0.307	0.388

continued

	Web of Science		Scopus	
	Impact factor*		Science Journal Rankings**	
	2014	2016	2014	2017
Chemistry and Chemical Technology	–	–	–	0.292
Zoological Herald	–	–	0.234	0.268
Cybernetics and Systems Analysis	–	–	–	0.263
Algebra and Discrete Mathematics	–	–	–	0.241
Nuclear Physics and Atomic Energy	–	–	0.187	0.231
Hydrobiological Journal	–	–	–	0.217
The Ukrainian Biochemical Journal	–	–	0.132	0.214
Functional Materials	–	–	0.247	0.212
Metal Physics and Advanced Technologies	–	–	0.208	0.212
Theory of Stochastic Processes	–	–	0.149	0.207
Technical Electrodynamics	–	–	0.186	0.195
Ukrainian Journal of Physics	–	–	0.198	0.182
Problems of Cryobiology and Cryomedicine	–	–	–	0.180
Physiological Journal	–	–	0.114	0.159
Biopolymers and Cell	–	–	0.162	0.147
Nanosystems, Nanomaterial, Nanotechnologies	–	–	–	0.141
Microbiological Journal	–	–	0.109	0.104
Journal of Thermoelectricity	–	–	0.100	0.101
Methods of Functional Analysis and Topology	–	–	–	–

* According to the Journal Citation Reports (Scientometric data of Web of Science platform of the corporation Thomson Reuters).

** According to SCImago Journal & Country Rank (Scientometric data platform SciVerse Scopus Corporation Elsevier).

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 March 2018.

Scientific journals of National Academy of Sciences published abroad in foreign languages

	Publisher	First edition year
The Ukrainian Biochemical Journal	Elsevier	1926
Fiziologichnyi Zhurnal= International Journal of Physiology and Pathophysiology	Begell House, Inc.	1955
Kibernetika i Sistemnyi Analiz= Cybernetics and Systems Analysis	Springer	1965
Teoreticheskaia i Eksperimentalnaia Khimiia = Theoretical and Experimental Chemistry	Springer	1965
Fizyko-Khimichna Mekhanika Materialiv = Materials Science	Springer	1966
Ukrains'kyi Matematychnyi Zhurnal= Ukrainian Mathematical Journal	Springer	1967
Neirofiziolohiia = Neurophysiology	Springer	1969
Prykladni Problemy Mekhaniky= International Applied Mechanics	Springer	1969
Problemy Prochnosti= Strength of Materials	Springer	1969
Fizika Nizkikh Temperatur= Low Temperature Physics	American Institute of Physics	1969
Sovremennaia Elektrometallurhiia = Advances in Electrometallurgy	Cambridge International Science Publishing Ltd.	1985
Tekhnicheskaia Diagnostika i Nerazrushaiuschii Kontrol = Technical Diagnostics and Non-Destructive Testing	Cambridge International Science Publishing Ltd.	1989
Problemy Upravleniia i Informatiki = Journal of Automation and Information Sciences	Begell House	1996
Radiofizika i Elektronika= Telecommunication and Radio Engineering	Begell House	1997
Hydrobiological Journal	Begell House	1998
Альгология = Inernational Journal on Algae	Begell House	1999

continued

	Publisher	First edition year
Kinematika i Fizika Nebesnykh Tel = Kinematics and Physics of Celestial Bodies	Pleiades Publishing, Inc	2007
Sverkhtverdye Materialy= Journal of Superhard Materials	Pleiades Publishing, Inc	2007
Khimiia i Tekhnolohiia Vody= Journal of Water Chemistry and Technology	Pleiades Publishing, Inc	2007
Tsitolohiia i Henetika= Cytology and Genetics	Pleiades Publishing, Inc	2007
Vestnik Zoologii = Zoological Herald	Walter de Gruyter GmbH	2008
Radiofizika i Radioastronomiia= Radio Physics and Radio Astronomy	Begell House	2010-2012

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 2017.

Scientific journals of National Academy of Sciences published in English: Ukraine

	First edition year
Biopolymers and Cell	1985
Functional Materials	1998
Semiconductor Physics, Quantum Electronics & Optoelectronics	1998
The Paton Welding Journal	2000
Ukrainian Journal of Physics	2000
Experimental Oncology	2006
Journal of Mathematical Physics, Analysis, Geometry	2006
Problems of Cryobiology and Cryomedicine	2006
Journal of Thermoelectricity	Separate numbers by 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 2017.

VII.3. Representation of world's research centers: Ranking Web of World Research Centers*

Research organizations ranking: Commonwealth of Independent States and Baltic states

	Organizations	World web ranking	
		maximal	minimal
World	**7953**	**1**	**7953**
Europe	4646	3	7953
European Union	3326	3	7953
Central and Eastern Europe	1472	30	7951
Commonwealth of Independent States			
Armenia	1	1872	1872
Azerbaijan	14	1330	7851
Belarus	14	582	7620
Kazakhstan	38	4056	7854
Kyrgyzstan	1	6279	6279
Moldova	19	659	7842
Russia	856	30	7951
Tajikistan	…	…	…
Turkmenistan	…	…	…
Uzbekistan	2	2698	3357
Ukraine	**49**	**290**	**7577**
Baltic states			
Estonia	5	2465	6675
Latvia	27	1547	7708
Lithuania	13	1625	7793

* As of January 2017. 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 engine 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».

Source: «Ranking Web of World Research Centers». – URL: *http://research.webometrics.info/en*

Rank distribution of academies of sciences by world ranking (R_{world}): Ranking Web of Research Centers (*top 20*)*

Academy	Country	R_{world}	$R_{academy}$
Chinese Academy of Sciences	China	9	1
Russian Academy of Sciences	Russia	30	2
Polish Academy of Sciences	Poland	83	3
Royal Netherlands Academy of Arts and Sciences	Netherlands	84	4
Austrian Academy of Sciences	Austria	91	5
Hungarian Academy of Sciences	Hungary	122	6
Bulgarian Academy of Sciences	Bulgaria	137	7
National Academy of Sciences of Ukraine	**Ukraine**	290	8
Slovak Academy of Sciences	Slovakia	408	9
Academy of Sciences of the Czech Republic	Czech Republic	479	10
Serbian Academy of Sciences and Arts	Serbia	635	11
Academy of Sciences of Moldova	Moldova	659	12
Romanian Academy of Sciences	Romania	673	13
Academy of Athens	Greece	771	14
National Academy of Sciences of Armenia	Armenia	791	15
Slovenian Academy of Sciences and Arts	Slovenia	839	16
US National Academy of Sciences	USA	957	17
National Academy of Sciences of Belarus	Belarus	1330	18
Georgian National Academy of Sciences	Georgia	1851	19
Azerbaijan National Academy of Sciences	Azerbaijan	1872	20

***** *Symbols:* R_{world} – world ranking of an academy of sciences among scientific centers: Ranking Web of Research Centers (top 20); $R_{academy}$ – an academy of sciences rank by R_{world};

Source: Ranking Web of Research Centers. (Annual 2017 Edition. Data collected during January 2017). URL: http://research.webometrics.info/en/search/Rankings/Academy%20of%20Sciences (As of 24.06.2017).

VII.4. Representation of Ukrainian research organizations and higher education institutions: Google Scholar

Bibliometric portraits of Ukrainian researchers: Google Scholar

	Number of bibliometric portraits	% of the total
Total	**37500**	**100.0**
Total for national academies of sciences	6300	16.8
including:		
National Academy of Sciences	**4320**	**11.5**
National Academy of Agrarian Sciences	910	2.4
National Academy of Pedagogical Sciences	360	0.9
National Academy of Medical Sciences	20	0.0
National Academy of Law Sciences	640	1.7
National Academy of Arts	50	0.0
Total for ministries and agencies	29680	79.1
of them:		
Ministry of Education and Science	24620	65.8
Ministry of Healthcare	3800	10.1
Ministry of Internal Affairs	810	2.1
Ministry of Culture	450	1.1
Other scientific organizations	1520	4.1

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 March 2018.

Ranks of the world academies of sciences by cited publications: Google Scholar (*top 20*)*

Academy	Country	N_{eng}	N_{nat}	R Eng
Chinese Academy of Sciences (Zhōngguó Kēxuéyuàn)	China	1920000	27	1
Russian Academy of Sciences (Российская академия наук)	Russia	793000	140000	2
Polish Academy of Sciences (Polska Akademia Nauk)	Poland	535000	44800	3
The Royal Society	United Kingdom	265000	265000	4
Hungarian Academy of Sciences (Magyar Tudományos Akadémia)	Hungary	207000	17200	5
Academy of Sciences of the Czech Republic (Akademie věd České republiky)	Czech Republic	161000	9790	6
Royal Society of Edinburgh	United Kingdom	115000	115000	7
Slovak Academy of Sciences (Slovenska Akadémia Vied)	Slovakia	111000	6870	8
Australian Academy of Science	Australia	105000	105000	9
The British Academy (The British Academy of Sciences)	United Kingdom	104000	104000	10
Bulgarian Academy of Sciences (Българска академия на науките)	Bulgaria	95300	2750	11
Indian Academy of Sciences (Sahitya Akademi)	India	82800	19700	12
National Academy of Sciences of Ukraine (Національна академія наук України)	**Ukraine**	**73900**	**58700**	**13**
Academy of Inscriptions and Belles Lettres **(**Académie des Inscriptions et Belles-Lettres)	France	47600	47600	14
Austrian Academy of Sciences (Österreichische Akademie der Wissenschaften)	Austria	45700	20100	15

continued

Academy	Country	N_{eng}	N_{nat}	R_{eng}
Brazilian Academy of Sciences (Academia Brasileira de Ciências)	Brazil	45100	45100	16
Royal Swedish Academy of Sciences (Kungliga Vetenskapsakademien)	Sweden	44400	1010	17
Japan Academy (日本学士院)	Japan	43500	3320	18
Romanian Academy of Sciences (Academia Română)	Romania	42300	10600	19
American Academy of Arts and Sciences	USA	41800	41800	20

* *Symbols: N* – the number of web pages in response to a request by the relevant search key (the name of the academy) in English (Neng) and in the native or other state (Nnat) languages; *R* is an academy rank among the academies of the International Association of Academies of Sciences (IAAS) and the Federation of European Academies (All European Academies), as well as a number of other world academies by the maximum number of Neng web pages.

Source: Google Scholar. URL: https://scholar.google.com. As of 05.07.2017.

Ranks of research organizations and higher education institutions by number of researchers with Hirsch index ≥ 40: Google Scholar

	Number of researchers with Hirsch index≥ 40: Google Scholar
National Academy of Sciences	**30**
M.M. Bogolyubov Institute for Theoretical Physics	6
Institute for Nuclear Research	4
Institute of Molecular Biology and Genetics	3
O.O. Bohomolets Institute of Physiology	2
Main Astronomical Observatory	1
F.D. Ovcharenko Institute of Biocolloidal Chemistry	1
V.P. Kukhar Institute of Bioorganic Chemistry and Petrochemistry	–
O.V. Palladin Institute of Biochemistry	–

continued

	Number of researchers with Hirsch index≥ 40: Google Scholar
M.V. Ptukha Institute for Demography and Social Studies	1
Institute of Economics and Forecasting	
V.M. Glushkov Institute of Cybernetics	1
Institute of Mathematics	1
S.P. Timoshenko Institute of Mechanics	1
Institute of Problems of Materials Science named after. I.M. Frantsevich	–
Institute of Scintillation Materials	1
Institute of Physics	1
O.O. Chuiko Institute of Surface Chemistry	1
National Science Center "Kharkiv Institute of Physics and Technology	1
B.I. Verkina Physics and Technical Institute of Low Temperatures	–
National Academy of Sciences	**2**
V.P. Komisasarenko Institute of Endocrinology and Metabolism	2
Ministry of Education and Science	**2**
Bohdan Khmelnytsky National University of Cherkasy	1
Chernivtsi Yu. Fed'kovych National University	1
Ministry of Healthcare	**1**
Dnipro Medical Academy	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 March 2018.

VII.5. Representation of National Academy of Sciences of Ukraine: Google*

Ranking of NAS of Ukraine among the leading European academies of sciences by cited publications: Google (*top 20*)

Academy	Country	N_{eng}	N_{nat}	R Eng
Chinese Academy of Sciences (Zhōngguó Kēxuéyuàn)	China	6950000	1910	1
Russian Academy of Sciences (Российская академия наук)	Russia	4320000	507000	2
Academy of Sciences of the Czech Republic (Akademie věd České republiky)	Czech Republic	2360000	238000	3
The Royal Society	United Kingdom	714000	714000	4
US National Academy of Sciences	USA	633000	633000	5
Hungarian Academy of Sciences (Magyar Tudományos Akadémia)	Hungary	535000	449000	6
Polish Academy of Sciences (Polska Akademia Nauk)	Poland	503000	358000	7
American Academy of Arts and Sciences	USA	501000	501000	8
Royal Society of Edinburgh	United Kingdom	467000	467000	9
Academy of Athens (Academia Athenon)	Greece	462000	48	10
The British Academy (The British Academy of Sciences)	United Kingdom	452000	452000	11
Royal Society of Canada (La société royale du Canada)	Canada	450000	47900	12
Slovak Academy of Sciences (Slovenska Akadémia Vied)	Slovakia	410000	80700	13
Bulgarian Academy of Sciences (Българска академия на науките)	Bulgaria	408000	109000	14

continued

Academy	Country	N_{eng}	N_{nat}	R Eng
Royal Swedish Academy of Sciences (Kungliga Vetenskapsakademien)	Sweden	398000	159000	15
Australian Academy of Science	Australia	397000	397000	16
National Academy of Sciences of Ukraine (Національна академія наук України)	**Ukraine**	**387000**	**333000**	**17**
Japan Academy (日本学士院)	Japan	377000	169000	18
Austrian Academy of Sciences (Österreichische Akademie der Wissenschaften)	Austria	332000	215000	19
Romanian Academy of Sciences (Academia Română)	Romania	299000	373000	20

* The titles of the academies are listed in the search key format. For the Royal Society of Great Britain, the search key is used: "the royal society" [AND] "United Kingdom".

Symbols: N – a number of web pages in response to a request by the relevant search key (the name of the academy) both in English (Neng) and native or in other state (Nnat) languages; *R* is an academy rank among the academies of the International Association of Academies of Sciences (IAAS) and the Federation of European Academies (All European Academies), as well as a number of other world academies by the maximum number of Neng web pages.

Sources: Data published in the paper of V. Rybachuk, G. Kvict "*Webometric Parameters of the National Academies of Sciences of Europe"*, Library. Science. Communication: Strategic Challenges for the Development of Scientific Libraries. Proceedings of the international scientific conferences (Kyiv, 3-5 October, 2017). K., 2017. P.563-569 is used in tables from Section VII.5.

Rank distribution of academies of sciences by externality coefficient (K_{ext})*

Academy	Country	N_{eng}	N_{nat}	K_{ext}
(A) Information is mainly presented in the external scientific and information space (*K*ext > 100)				
Academy of Athens (Academia Athenon)	Greece	462000	48	9625
Tajik Academy of Sciences (Академияи илмҳои чумҳурии Точикистон)	Tajikistan	16700	4	4175
Academy of Sciences of Kazakhstan (Қазақстан Ұлттық ғылым академиясы)	Kazakhstan	124000	33	3758
Chinese Academy of Sciences (Zhōngguó Kēxuéyuàn)	China	6950000	1910	3639
Academy of Sciences of Turkmenistan (Türkmenistanyň Ylymlar akademiýasy)	Turkmenistan	42500	63	675
(B) Information is in particular presented in the external scientific and information space (*K*ext = 10.0-100.0)				
National Academy of Sciences of Armenia (Հայաստանի Հանրապետության գիտությունների ազգային ակադեմիա)	Armenia	111000	6460	17.2
Royal Academy of Sciences of Spain (Instituto de España; Reales Academias)	Spain	66900	5210	12.8
(C) Information is largely presented in the external scientific and information space (*K*ext = 1.5-10.0)				
Academy of Sciences of the Czech Republic (Akademie věd České republiky)	Czech Republic	2360000	238000	9.9

continued

Academy	Country	N_{eng}	N_{nat}	K_{ext}
Russian Academy of Sciences (Российская академия наук)	Russia	4320000	507000	8.5
Georgian National Academy of Sciences (საქართველოს მეცნიერებათა აკადემია)	Georgia	160000	19100	8.4
Slovak Academy of Sciences (Slovenska Akadémia Vied)	Slovakia	410000	80700	5.1
National Academy of Sciences of Belarus (Нацыянальная акадэмія навук Беларусі)	Belarus	186000	43900	4.2
Israel Academy of Sciences and Humanities (**האקדמיה הלאומית הישראלית למדעים**)	Israel	77400	20300	3.8
Bulgarian Academy of Sciences (Българска академия на науките)	Bulgaria	408000	109000	3.7
National Academy of Sciences of the Kyrgyz Republic (Кыргыз Республикасынын Улуттук Илимдер Академиясы)	Kyrgyzstan	11400	4070	2.8
Royal Swedish Academy of Sciences (Kungliga Vetenskapsakademien)	Sweden	398000	159000	2.5
Japan Academy (日本学士院)	Japan	377000	169000	2.2
Royal Flemish Academy of Belgium for Science and the Arts (Koninklijke Vlaamse Academie van België voor Wetenschappen en Kunsten)	Belgium	18700	10900	1.7
Academy of Sciences of the Republic of Uzbekistan (O'Zbekiston Respublikasi Fanlar Akademiyasi)	Uzbekistan	137000	85900	1.6

continued

Academy	Country	N_{eng}	N_{nat}	K_{ext}
(D) Information is equally presented both in the internal and external scientific and information space (*K*ext = 1.00±0.50)				
Austrian Academy of Sciences (Österreichische Akademie der Wissenschaften)	Austria	332000	215000	1.5
Lithuanian Academy of Sciences (Lietuvos mokslu akademija)	Lithuania	68900	44900	1.5
Polish Academy of Sciences (Polska Akademia Nauk)	Poland	503000	358000	1.4
Latvian Academy of Sciences (Latvijas Zinātņu akadēmija)	Latvia	87500	67800	1.3
Hungarian Academy of Sciences (Magyar Tudományos Akadémia)	Hungary	535000	449000	1.2
National Academy of Sciences of Ukraine (Національна академія наук України)	**Ukraine**	**387000**	**333000**	**1.2**
Serbian Academy of Sciences and Arts (Srpska Akademija Nauka I Umetnosti)	Serbia	85400	70300	1.2
Academy of Ethics and Political Science (Académie des Sciences Morales et Politiques)	France	283000	261000	1.1
Royal Netherlands Academy of Arts and Sciences (Koninklijke Nederlandse Akademie van Wetenschappen)	Netherlands	137000	135000	1.0
Romanian Academy of Sciences (Academia Română)	Romania	299000	373000	0.8
Royal Danish Academy of Sciences and Letters (Det Kongelige Danske Videnskabernes Selskab)	Denmark	29700	38300	0.8

continued

Академія	Країна	N_{eng}	N_{nat}	K_{ext}
Indian Academy of Sciences (Sahitya Akademi)	India	287000	414000	0.7
Academy of Sciences of Moldova (Academia de Științe a Moldovei)	Moldova	168000	236000	0.7
Slovenian Academy of Sciences and Arts **(**Slovenska Akademija Znanosti in Umetnosti**)**	Slovenia	55200	77900	0.7
Estonian Academy of Sciences (Eesti Teaduste Akadeemia)	Estonia	86500	169000	0.5
Azerbaijan National Academy of Sciences (Azərbaycan Milli Elmlər Akademiyası)	Azerbaijan	83600	168000	0.5
(E) Information is in particular presented in the internal scientific and information space (*K*ext = 0.1-0.5)				
German Academy of Sciences Leopoldina (Deutsche Akademie der Naturforscher Leopoldina)	Germany	15700	42300	0.4
German Academy of Sciences (Deutsche Akademie der Wissenschaften)	Germany	43800	137000	0.3
Norwegian Academy of Science and Letters (Det Norske Videnskaps-Akademi)	Norway	52700	241000	0.2
Turkish Academy of Sciences (Türkiye Bilimler Akademisi)	Turkey	37000	226000	0.2
Academy of Sciences of Lisbon (Academia das Ciências de Lisboa)	Portugal	35000	191000	0.2
Vietnamese Academy of Science and Technology (Viện Khoa học và Công nghệ Việt Nam)	Vietnam	18000	197000	0.1
French Academy of Sciences (Institut de France)	France	247000	3370000	0.07

continued

Academy	Country	N_{eng}	N_{nat}	K_{ext}
Academy of Inscriptions and Belles Lettres (Académie des Inscriptions et Belles-Lettres)	France	18700	348000	0.05
Finnish Academies of Science and Letters (Suomen Tiedeakatemiain Valtuuskunta; Academia Scientiarum Fennica)	Finland	1090	23400	0.05
(F) Information is mainly presented in the internal scientific and information space (*K*ext < 0.1)				
Royal Academy of Sciences, Letters and Arts of Belgium (Académie Royale des Sciences des Lettres et des Beaux-Arts de Belgique)	Belgium	1180	77900	0.02
Royal Spanish Academy of Moral and Political Sciences (Real Academia de Ciencias Morales y Políticas)	Spain	1340	62100	0.02
Academy of the Lincei (Accademia Nazionale dei Lincei)	Italy	4190	284000	0.01
Polish Academy of Arts and Sciences Krakow (Polska Akademia Umiejetnosci)	Poland	936	63100	0.01
Icelandic Society of Sciences (Vísindafélag Islendinga)	Iceland	8	2610	0.003

* The externality coefficients (*Kext*) are calculated as a ratio of the share of information arrays (the number of Web pages N to the request by name of the academy) in English (Neng) and in the national or other state (Nnat).

Distribution of information flow about NAS of Ukraine by national web-segments of countries *(by domains)**

#	Country	DN	$N_{\text{d-eng}}$	$R_{\text{d-eng}}$	$N_{\text{d-rus}}$	$R_{\text{d-rus}}$	$N_{\text{d-ukr}}$	$R_{\text{d-ukr}}$
1	**Ukraine**	.ua	**92000**	1	**83800**	1	**297000**	1
2	France	.fr	18900	2	73	12	271	9
3	**Russia**	.ru	**16200**	3	**14700**	2	**12600**	2
4	China	.cn	5540	4	2	35-37	3	40-43
5	Poland	.pl	5220	5	44	15	571	5
6	Germany	.de	3650	6	77	11	586	4
7	Sweden	.se	2550	7	4	28-33	2	44-46
8	United Kingdom	.uk	2400	8-9	86	9	343	7
9	Italy	.it	2400	8-9	4	28-33	7	30-31
10	Belgium	.be	2200	10	1	38-41	3	40-43
11	India	.in	2050	11	42	17	31	18
12	Slovenia	.si	1910	12	10	20-21	8	25-29
13	Austria	.at	1500	13	1	38-41	8	25-29
14	Israel	.il	1480	14	6	23-25	3	40-43
15	**Belarus**	.by	**1470**	15	**1630**	3	**1980**	3
16	USA	.us	1400	16	5	26-27	34	17
17	Canada	.ca	1380	17	5	26-27	24	19
18	Turkey	.tr	1330	18	4	28-33	4	38-39
19	Switzerland	.ch	1220	19	4	28-33	41	16
20	Japan	.jp	1010	20	59	13	8	25-29
21	Romania	.ro	920	21	3	34	5	34-37
22	Croatia	.hr	901	22	0	42-52	9	22-24
23	Czech Republic	.cz	779	23	6	23-25	79	11
24	Iceland	.is	776	24	8	22	476	6
25	Netherlands	.nl	734	25	2	35-37	6	32-33
26	Greece	.gr	707	26	4	28-33	9	22-24
27	Finland	.fi	665	27	0	42-52	5	34-37
28	Spain	.es	640	28	10	20-21	341	8
29	**Kazakhstan**	.kz	**639**	29	**400**	6	**8**	25-29
30	**Moldova**	.md	**611**	30	**719**	4	**6**	32-33
31	Denmark	.dk	572	31	0	42-52	7	30-31
32	Slovakia	.sk	556	32	1	38-41	10	21
33	Hungary	.hu	538	33	4	28-33	57	13

continued

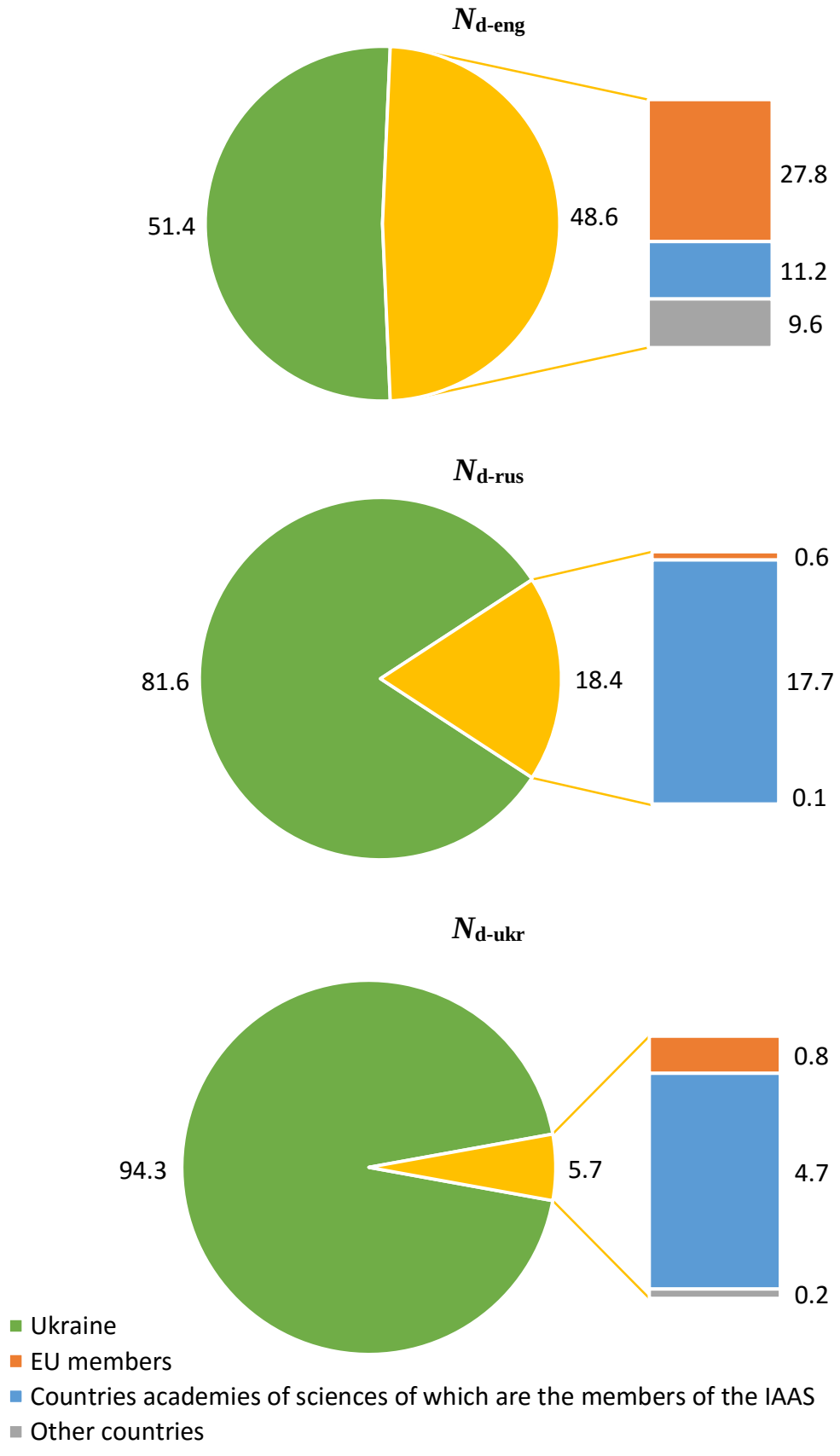
#	Country	DN	$N_{d\text{-}eng}$	$R_{d\text{-}eng}$	$N_{d\text{-}rus}$	$R_{d\text{-}rus}$	$N_{d\text{-}ukr}$	$R_{d\text{-}ukr}$
34	Lithuania	.lt	506	34	34	18	66	12
35	Latvia	.lv	449	35	49	14	2	44-46
36	Australia	.au	429	36	0	42-52	22	20
37	Bulgaria	.bg	421	37	43	16	9	22-24
38	Estonia	.ee	373	38	146	7	212	10
39	Ireland	.ie	354	39	0	42-52	0	50-52
40	**Azerbaijan**	.az	**335**	40	**79**	10	**1**	47-49
41	**Armenia**	.am	**303**	41	**495**	5	**8**	25-29
42	Norway	.no	288	42	2	35-37	46	15
43	**Georgia**	.ge	**258**	43	**6**	23-25	**5**	34-37
44	Macedonia	.mk	224	44	0	42-52	5	34-37
45	**Vietnam**	.vn	**163**	45	**0**	42-52	**3**	40-43
46	**Uzbekistan**	.uz	**118**	46	**94**	8	**4**	38-39
48	Bosnia and Herzegovina	.ba	32	48	0	42-52	2	44-46
47	Albania	.al	16	47	0	42-52	55	14
49	**Tajikistan**	.tj	**8**	49	**1**	38-41	**0**	50-52
50	**Kyrgyzstan**	.kg	**5**	50	**22**	19	**1**	47-49
51	**Turkmenistan**	.tm	**4**	51	**0**	42-52	**1**	47-49
52	Vatican City State	.va	0	52	0	42-52	0	50-52
Total flow, *units*		–	179134	–	102685	–	314987	–
including (%):								
Ukraine		–	51.4	–	81.6	–	94.3	–
Foreign states		–	48.6	–	18.4	–	5.7	–
of them:								
– EU members		–	27.8	–	0.6	–	0.8	–
– countries academies of sciences of which are the members of the IAAS (*excluding Ukraine)*		–	11.2	–	17.7	–	4.7	–
– other countries		–	9.6	–	0.1	–	0.2	–

* Bold types data for countries whose national academies of sciences are members of the IAAS.

Symbols: DN - country domain name on the Internet; Nd- the number of web pages in the full name of the NAS of Ukraine in English (Nd *eng*), Russian (Nd-*rus*) and Ukrainian (Nd-*ukr*); Rd-rank of the country for Nd in the national sector of the Internet for the names of NAS of Ukraine in English (Rd-eng), Russian (Rd-rus) and Ukrainian (Rd-ukr).

Percentage distribution of information flow about NAS of Ukraine on national web-segments of countries,

(as % of the total number of web pages Nd in the appropriate language)



VII.6. Monitoring of publications about National Academy of Sciences of Ukraine in mass media*

Articles in domestic mass media concerning the issues of NAS of Ukraine: 2011-2017, *units*

	2011	2012	2013	2014	2015	2016	2017
All articles on the development of science in Ukraine	**1300**	**1135**	**1535**	**1283**	**1681**	**1450**	**1065**
including:							
articles on the operation of NAS of Ukraine	**135**	**100**	**125**	**82**	**154**	**147**	**153**
of them: articles on analytical matters	75	30	58	58	73	38	45
including:							
constructive discussions	50	23	50	44	55	23	29
others	25	7	8	14	18	15	16
(% of total number of articles on the development of science)							
articles on the operation of NAS of Ukraine	**10.4**	**8.8**	**11.4**	**6.3**	**9.2**	**10.1**	**14.4**
of them: articles on analytical matters	5.8	2.6	5.8	2.6	4.3	2.6	4.2
including:							
constructive discussions	3.9	2.0	3.4	3.4	3.2	1.6	2.7
others	1.9	0.6	0.5	1.1	1.1	1.1	1.5

* 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 reflecting the problems of science and 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: 2015-2017, *units*

	2015	2016	2017
Total	**1118**	**1217**	**613**
of them by:			
«Golos Ukraijny»	205	231	84
«Den'»	283	227	109
«Dzerkalo Tyzsnya»	157	188	107
«Osvita Ukraijny»	134	140	88
«Svit»	78	97	70
«Uryadovyj Kur'eyr»	186	246	117
«2000»	75	88	38
including:			
articles on the operation of NAS of Ukraine	**160**	**166**	**164**
of them by:			
«Golos Ukraijny»	26	21	15
«Den'»	17	19	31
«Dzerkalo Tyzsnya»	29	31	29
«Osvita Ukraijny»	13	16	12
«Svit»	42	43	47
«Uryadovyj Kur'eyr»	26	28	20
«2000»	7	8	10
of them: articles on analytical matters	72	60	44
of them by:			
«Golos Ukraijny»	9	6	5
«Den'»	11	8	6
«Dzerkalo Tyzsnya»	14	13	12
«Osvita Ukraijny»	10	8	11
«Svit»	11	7	3
«Uryadovyj Kur'eyr»	10	8	4
«2000»	7	10	3

continued

	2015	2016	2017
including:	54	42	29
articles on constructive discussions			
of them by:			
«Golos Ukraijny»	5	4	3
«Den'»	9	5	4
«Dzerkalo Tyzsnya»	9	7	8
«Osvita Ukraijny»	7	5	8
«Svit»	10	6	2
«Uryadovyj Kur'eyr»	8	6	2
«2000»	6	9	2
others	18	18	15
of them by:			
«Golos Ukraijny»	4	2	2
«Den'»	2	3	2
«Dzerkalo Tyzsnya»	5	6	4
«Osvita Ukraijny»	3	3	3
«Svit»	1	1	1
«Uryadovyj Kur'eyr»	2	2	2
«2000»	1	1	1
(% of total number of articles on science development)			
articles on the operation of NAS of Ukraine	14.3	13.6	26.8
of them: articles on analytical matters	6.4	4.9	7.2
including:			
constructive discussions	4.8	3.5	4.7
others	1.6	1.5	2.4

Mass media publications on the development of science in Ukraine by thematic heading: 2010-2017, *units*

	2010	2011	2012	2013	2014	2015	2016	2017	2010-2017 total
All publications	**546**	**475**	**545**	**557**	**1195**	**1386**	**1450**	**1065**	**7219**
headings:									
Problems of science development in Ukraine. Operation and capacity building of NAS of Ukraine including its possible reorganization	178	135	100	125	258	154	55	34	**1039**
The role of science in addressing environmental issues especially in relation to Chernobyl theme	58	33	58	56	165	144	60	60	**634**
Future development of national and global science; new areas of scientific research; new discoveries	63	69	91	61	78	80	123	63	**628**
Anniversaries of scientists and scientific events, awards and prizes for scientific work	26	23	36	28	64	163	86	80	**506**
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	7	13	**141**

continued

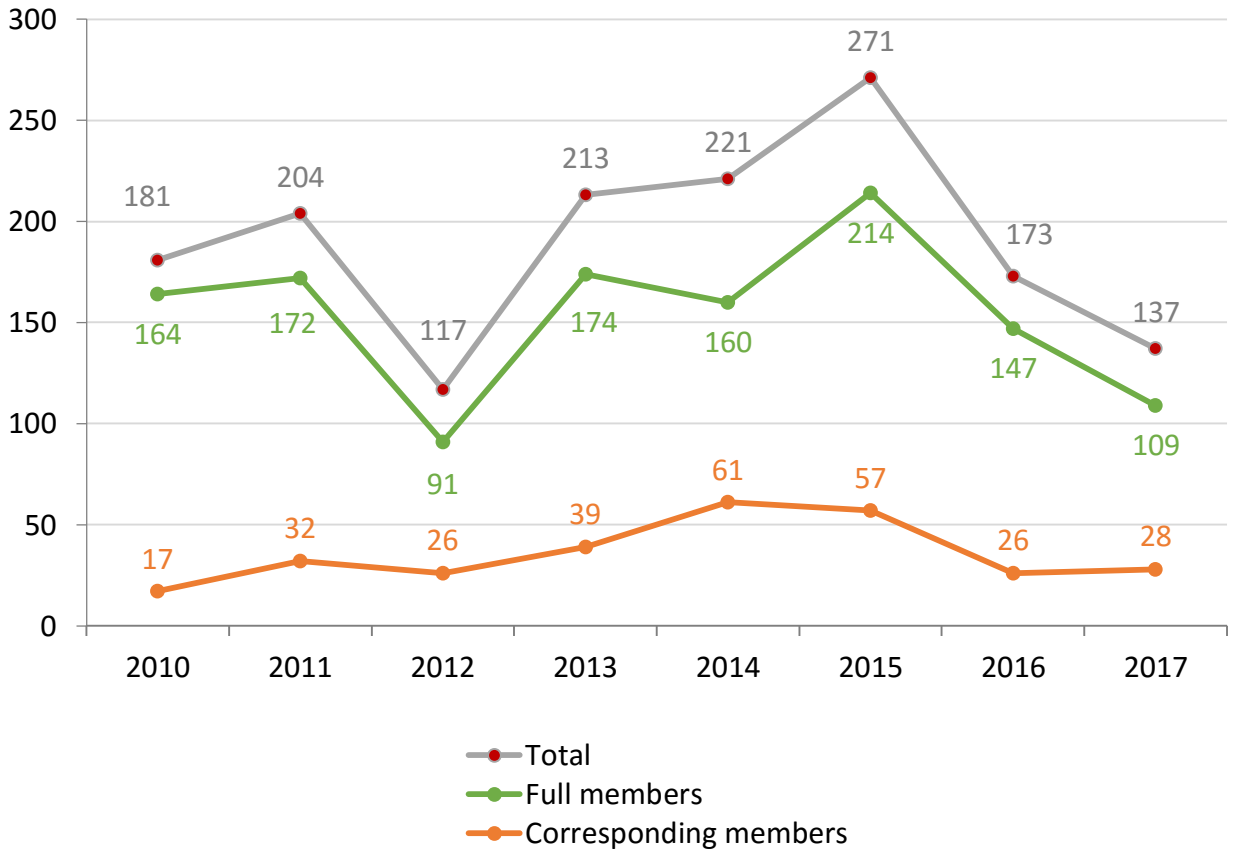
	2010	2011	2012	2013	2014	2015	2016	2017	2010-2017 total
The role of science in improving medical technologies and tools	27	15	25	25	29	59	26	19	**225**
Interactions of science and education; problems of status and development of university science	53	57	69	84	155	21	106	86	**684**
Own innovative activities	29	25	31	35	50	42	67	40	**319**
Conferences, symposia etc.	40	27	37	38	42	45	128	83	**430**
The role of science in economic development	19	17	18	26	43	58	34	17	**232**
The role of science in improving mining energy and environmental technologies	21	23	27	17	141	81	35	28	**373**
International scientific collaboration	13	15	21	27	44	27	14	24	**185**
Contributions of Ukrainian science and technology in space exploration	8	13	11	12	54	77	64	48	**287**
Regulatory acts on research institutions including the NAS of Ukraine	–	–	–	–	37	76	74	27	**214**
Operation of technoparks	2	–	–	–	1	–	78	54	**132**
Information about Press Club of the NAS of Ukraine	–	–	–	–	–	–	250	191	**797**
Science, politics and ideology	5	5	8	12	17	309	106	86	**684**

Mass media publications of the full members and corresponding members of National Academy of Sciences of Ukraine

(units)

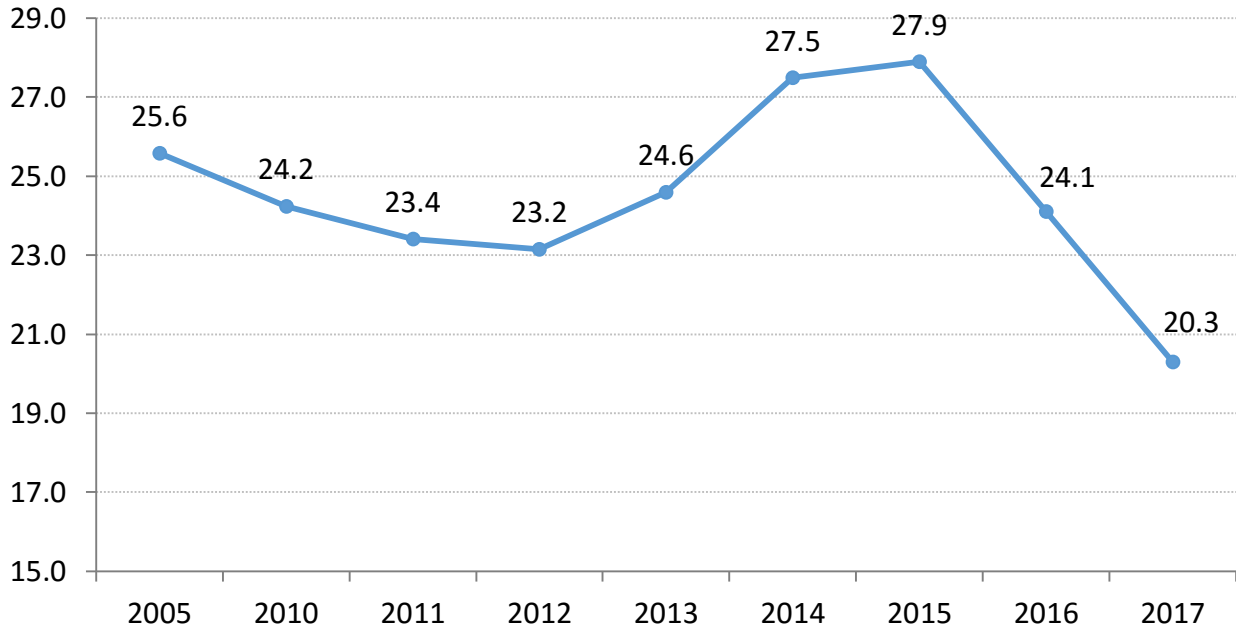
	2010	2011	2012	2013	2014	2015	2016	2017
Total publications of NAS of Ukraine	900	1300	1135	1535	1283	1681	1450	1065
Including articles written by full members and corresponding members	181	204	117	213	221	271	173	137
of them by:								
full members	164	172	91	174	160	214	147	109
corresponding members	17	32	26	39	61	57	26	28

Trends in publication activity of the full members and corresponding members of National Academy of Sciences of Ukraine: 2010-2017, *units*



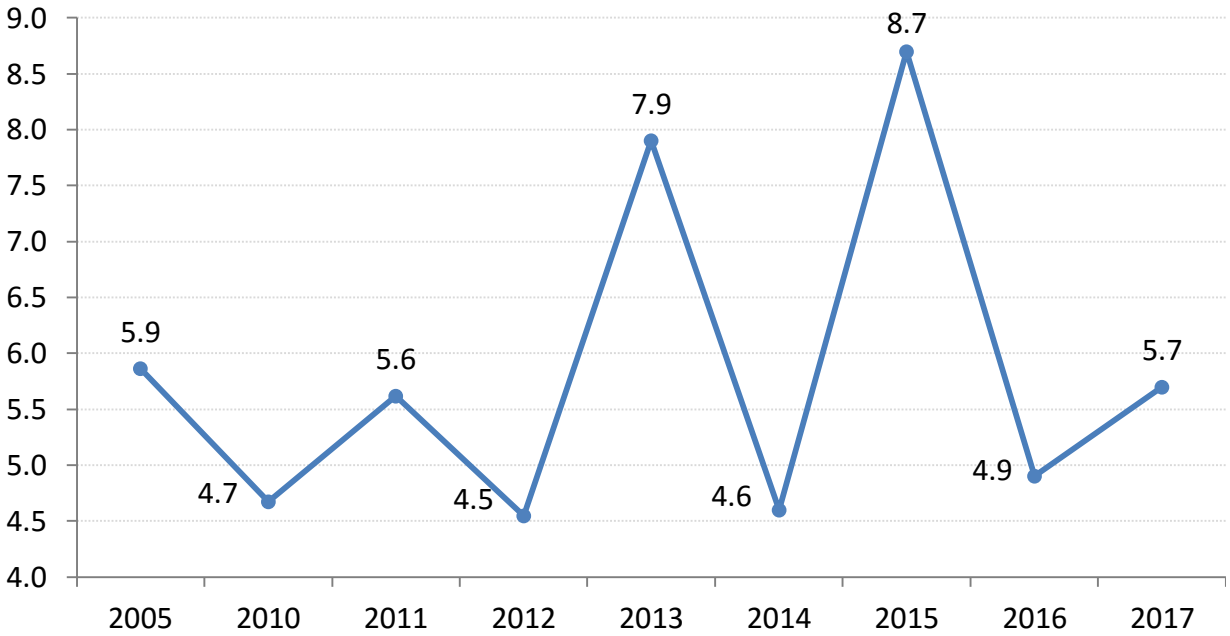
Trends in publication activity of the full members of National Academy of Sciences of Ukraine: 2005-2017

(as % of total number of the full members and corresponding members of NAS of Ukraine)



Trends in publication activity of the corresponding members of National Academy of Sciences of Ukraine: 2005-2017

(as % of total number of the full members and corresponding members of NAS of Ukraine)



VIII. INTERNATIONAL COMPARISONS OF R&D[6]

VIII.1. R&D personnel

R&D personnel in OECD and Ukraine: 2015*, *persons*

	R&D personnel		Researchers	
	Total	per 10000 employment	Total	per 10000 employment
Ukraine	**101598**	**62**	**53835**	**33**
Australia	147809	132	100414	90
Austria	69318	162	42339	99
Belgium	77864	169	55087	120
Canada	226620	126	159190	88
Chile	15261	19	8175	10
Czech Republic	66433	128	38081	74
Denmark	59532	210	42425	150
Estonia	5636	90	4186	67
Finland	50367	202	37516	150
France	428643	156	277631	101
Germany	640516	149	387982	90
Greece	50512	126	35069	87
Hungary	36847	86	25316	59
Iceland	2941	160	1944	106

[6] Hereinafter in the section, the statistical tables are compiled (unless otherwise specified) on the materials of UNESCO, OECD and Eurostat databases.

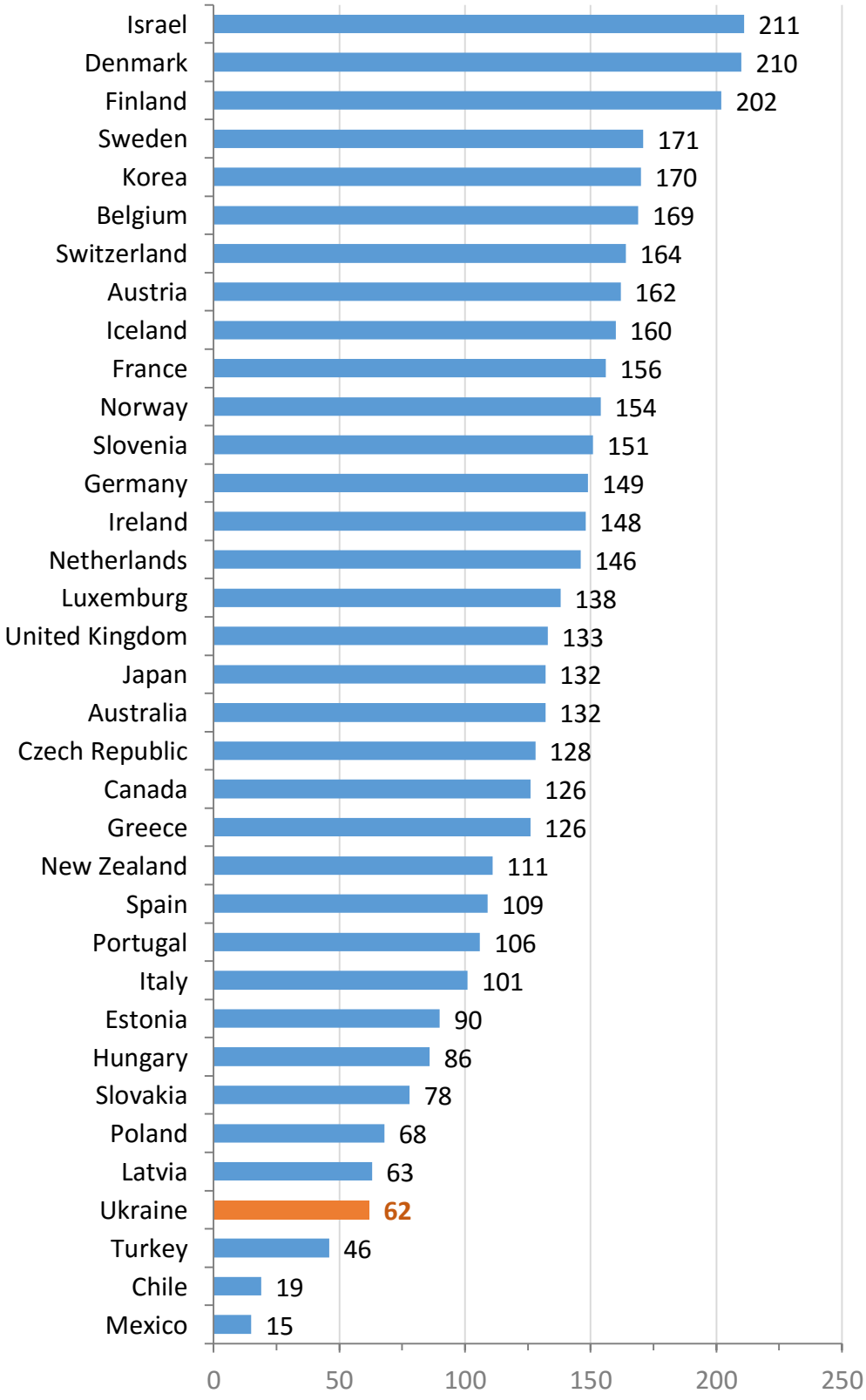
Sources: Main Science and Technology Indicators, Vol. 2017, Issue 1. [Electronic resource] / OECD. URL: *https://www.oecd-ilibrary.org/sites/msti-v2017-1-en/table-9.html?itemId=/ content/component/msti-v2017-1-table9-en*

continued

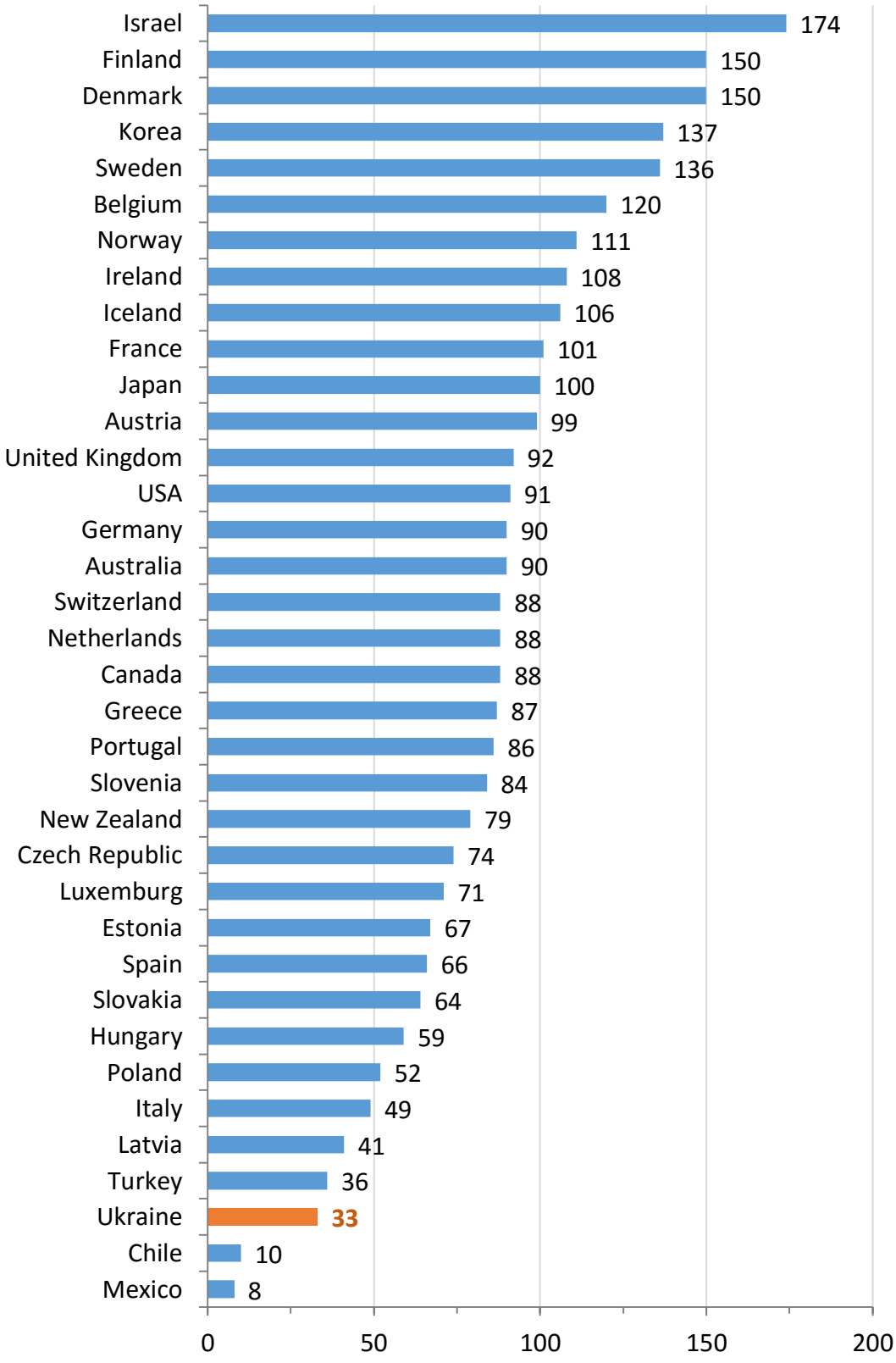
	R&D personnel		Researchers	
	Total	per 10000 employment	Total	per 10000 employment
Ireland	29444	148	21451	108
Israel	77143	211	63521	174
Italy	248140	101	120677	49
Japan	875005	132	662071	100
Korea	442027	170	356447	137
Latvia	5570	63	3613	41
Luxemburg	5593	138	2869	71
Mexico	59073	15	29921	8
Netherlands	128327	146	76977	88
New Zealand	26400	111	18700	79
Norway	42409	154	30632	111
Poland	109249	68	82594	52
Portugal	48478	106	39580	86
Slovakia	17591	78	14406	64
Slovenia	14225	151	7900	84
Spain	200866	109	122437	66
Sweden	82156	171	65333	136
Switzerland	81451	164	43740	88
Turkey	122288	46	95161	36
United Kingdom	416538	133	289330	92
USA	…	…	1379977	91

* Or the years for which data are available.

R&D personnel per 10000 employments: OECD countries and Ukraine, 2015, *persons*



Researchers per 10000 employments: OECD countries and Ukraine, 2015, *persons*

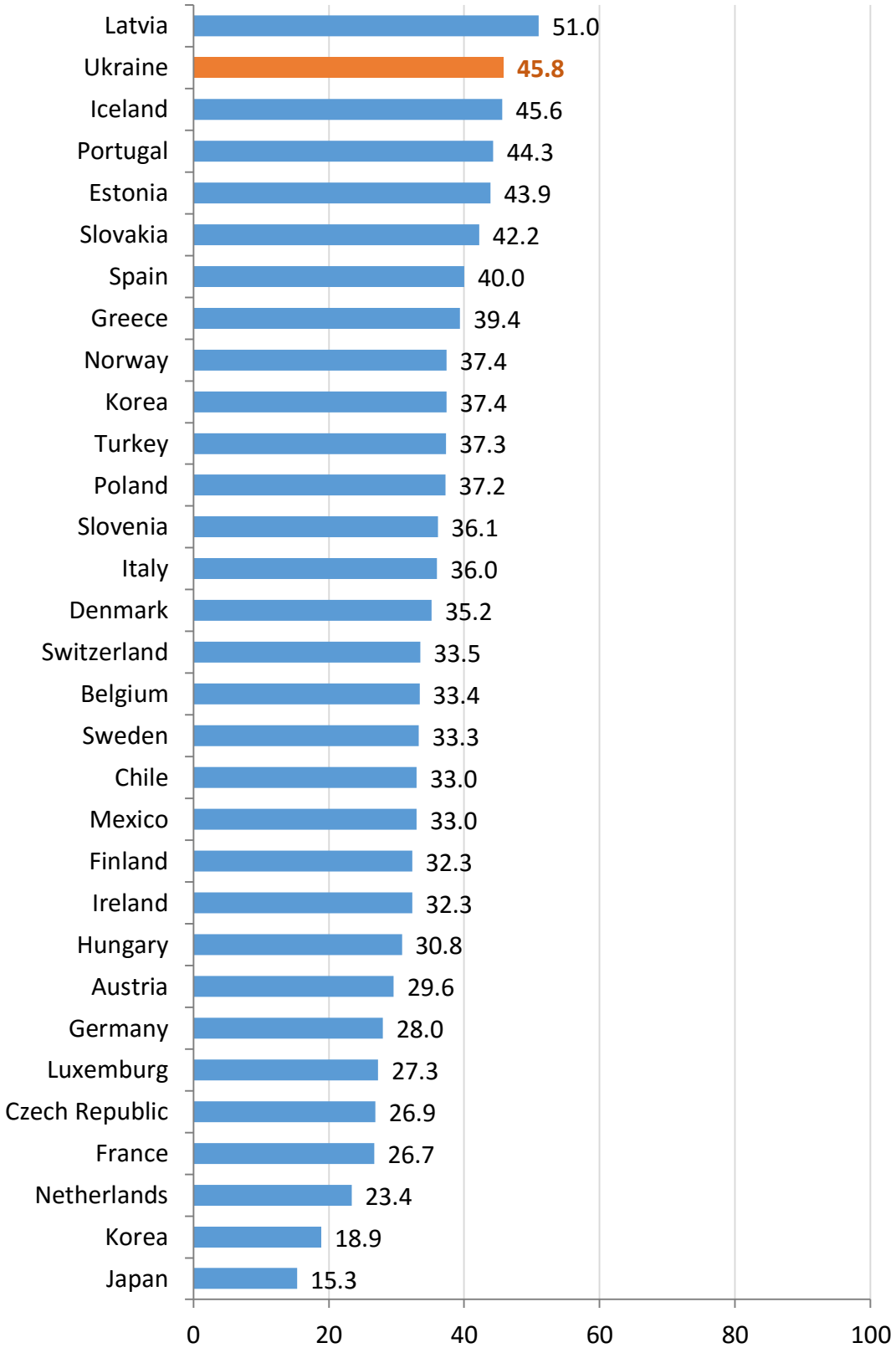


Percentage distribution of researches by sector of performance: OECD countries and Ukraine: 2015*, *%*

	Government sector	Business sector	Higher education sector	Private non-profit sector
Ukraine	**57.0**	**33.2**	**9.8**	**–**
Australia	8.9	29.9	57.8	3.3
Austria	3.9	63.7	31.8	0.6
Belgium	8.4	48.3	42.9	0.4
Canada	5.7	56.0	37.9	0.4
Chile	10.6	27.4	49.0	13.1
Czech Republic	19.4	50.3	29.8	0.4
Denmark	3.4	58.0	38.2	0.5
Estonia	12.3	27.5	58.1	2.1
Finland	9.5	56.8	32.6	1.1
France	10.2	59.7	28.7	1.3
Greece	19.8	14.3	65.2	0.6
Germany	13.9	59.5	26.6	–
Hungary	18.5	59.4	22.2	–
Iceland	12.3	41.8	45.9	–
Ireland	2.3	53.8	43.9	–
Israel	0.8	83.7	14.9	0.7
Italy	17.6	38.6	40.0	3.8
Japan	4.6	73.4	20.7	1.3
Korea	7.4	79.7	11.5	1.4
Latvia	19.1	16.7	64.2	–
Luxemburg	27.4	36.0	36.6	–
Mexico	24.3	24.5	48.2	3.0
Netherlands	11.9	59.1	29.0	–
New Zealand	10.2	36.9	52.9	–
Norway	15.5	48.7	35.8	–
Poland	16.5	34.8	48.6	0.1
Portugal	3.4	29.0	66.4	1.2
Slovakia	21.4	19.4	59.1	0.2
Slovenia	20.6	53.1	26.2	0.1
Spain	16.3	36.9	46.6	0.2
Sweden	5.1	69.0	25.7	0.2
Switzerland	1.1	50.1	48.9	–
Turkey	6.9	47.6	45.5	–
United Kingdom	2.6	38.2	58.3	0.9
USA	…	71.1	…	…

* Or the years for which data are available. Full-time equivalents.

Share of women among researches: OECD countries and Ukraine, 2015, *%*



R&D personnel in EU and Ukraine: 2010-2015*, *persons*

	2010	2011	2012	2013	2014	2015
Ukraine	**141086**	**134741**	**129945**	**123219**	**109636**	**101598**
EU members:						
Austria	59923	61171	64876	65800	68101	69318
Belgium	60075	62895	64732	66406	68701	77864
Bulgaria	16574	16986	16758	17545	19335	22421
Croatia	10859	10622	10368	10448	10027	10645
Cyprus	1302	1297	1241	1245	1269	1245
Czech Republic	52290	55697	60329	61976	64444	66433
Denmark	56623	57585	58657	58530	58361	59532
Estonia	5277	5724	5855	5858	5790	5636
Germany	548723	575099	591261	603861	605252	640516
Greece	…	36913	37361	42030	43316	50512
Finland	55897	54526	54047	52972	52130	50367
France	397756	402492	412003	418141	417129	428643
Hungary	31480	33960	35732	38163	37329	36847
Ireland	19722	21560	22501	…	28379	29444
Italy	225632	228094	240179	246648	249467	248140
Latvia	5563	5432	5593	5396	5739	5570
Lithuania	12315	11173	10416	11080	11791	10523
Luxemburg	4972	5191	4743	4975	5243	5593
Malta	1121	1383	1458	1473	1444	1391
Netherlands	100544	117436	122206	123192	124066	128327
Poland	81843	85219	90716	93751	104359	109249
Portugal	47616	49599	47554	46711	46878	48478
Romania	26171	29749	31135	32507	31391	31331
Slovakia	18188	18112	18127	17166	17594	17591
Slovenia	12940	15269	14974	15229	14866	14225
Spain	222022	215079	208831	203302	200233	200866
Sweden	77418	78445	81272	80957	83473	82156
United Kingdom	350766	356258	356484	362061	396281	416538

* Full-time equivalents.

Share of S&T personnel in the total of employees: EU members and Ukraine, 2010-2015*, *%*

	2010	2011	2012	2013	2014	2015
Ukraine**	**0.70**	**0.66**	**0.64**	**0.60**	**0.61**	**0.60**
EU members:						
Austria	1.46	1.46	1.53	1.54	1.60	1.62
Belgium	1.34	1.38	1.42	1.46	1.51	1.69
Bulgaria	0.54	0.57	0.57	0.60	0.66	0.75
Croatia	0.70	0.71	0.72	0.69	0.65	0.68
Cyprus	0.33	0.33	0.32	0.34	0.36	0.36
Czech Republic	1.03	1.10	1.19	1.22	1.26	1.28
Denmark	2.05	2.09	2.13	2.13	2.09	2.10
Estonia	0.96	0.98	0.99	0.97	0.96	0.90
Finland	2.25	2.17	2.13	2.12	2.08	2.02
France	1.48	1.49	1.52	1.56	1.52	…
Germany	1.34	1.38	1.41	1.43	1.42	1.43
Greece	…	0.84	0.93	1.08	1.08	1.26
Hungary	0.78	0.84	0.88	0.93	0.89	0.86
Ireland	1.05	1.17	1.22	…	1.46	1.48
Italy	0.91	0.92	0.97	1.04	1.02	1.01
Latvia	0.65	0.63	0.64	0.60	0.65	0.63
Lithuania	0.99	0.89	0.82	0.86	0.92	0.81
Luxemburg	1.39	1.45	1.29	1.29	1.32	1.38
Malta	0.69	0.83	0.86	0.84	0.81	0.76
Netherlands	1.15	1.33	1.39	1.42	1.42	1.46
Poland	0.53	0.55	0.59	0.61	0.66	0.68
Portugal	0.98	1.04	1.04	1.07	1.04	1.06
Romania	0.29	0.33	0.36	…	0.36	0.37
Slovakia	0.84	0.82	0.82	0.78	0.79	0.78
Slovenia	1.35	1.61	1.60	1.65	1.60	1.51
Spain	1.13	1.12	1.13	1.13	1.11	1.08
Sweden	1.72	1.70	1.76	1.73	1.76	1.76
United Kingdom	1.21	1.22	1.21	1.21	1.29	1.33

* In full-time equivalent.

** Share of R&D specialists in the total number of employees.

Researchers in EU and Ukraine: 2010-2015, *persons*

	2010	2011	2012	2013	2014	2015
Ukraine	**73413**	**70378**	**68599**	**65641**	**58695**	**53835**
EU members:						
Austria	36581	37114	39362	39923	41595	42339
Belgium	40832	42686	43813	44649	46880	55087
Bulgaria	10979	11902	11300	12275	13201	14224
Hungary	21342	23019	23837	25038	26213	25316
Croatia	7104	6847	6688	6529	6117	6367
Cyprus	905	915	877	885	888	860
Czech Republic	29228	30682	33217	34271	36040	38081
Denmark	37435	39180	40946	40858	41409	42425
Estonia	4077	4511	4582	4407	4324	4187
Finland	41425	40003	40468	39196	38281	37516
France	243533	249247	259066	265177	267308	277631
Germany	327996	338689	352419	360365	351923	387982
Greece	…	24674	24800	29055	29877	35069
Ireland	14176	15172	15732	16844	20727	21451
Italy	103424	106151	110695	117973	118183	120677
Latvia	3896	3947	3904	3625	3748	3613
Lithuania	8599	8390	8023	8557	9075	8124
Luxemburg	2636	3031	2491	2615	2629	2869
Malta	599	759	848	878	786	817
Netherlands	53703	61335	73252	76815	76229	76977
Poland	64511	64133	67001	71472	78622	82594
Portugal	41523	44056	42498	43321	38155	39580
Romania	19780	16080	18016	18576	18109	17459
Slovakia	15183	15326	15271	14727	14742	14406
Slovenia	7703	8774	8884	8707	8574	7900
Spain	134653	130235	126778	123225	122235	122437
Sweden	49312	48589	49280	62294	66643	65333
United Kingdom	256585	251358	256156	259347	276584	289330

Percentage distribution of researchers by sector of performance: EU and Ukraine, 2015*, *%*

	Government sector	Business sector	Higher education sector
Ukraine	**57.0**	**33.2**	**9.8**
EU members:			
Austria	3.9	63.7	31.8
Belgium	8.4	48.3	42.9
Bulgaria	33.4	38.6	27.2
Croatia	27.6	16.7	55.7
Cyprus	9.9	21.5	61.0
Czech Republic	19.4	50.3	29.8
Denmark	3.4	58.0	38.2
Estonia	12.3	27.5	58.1
Finland	9.5	56.8	32.6
France	10.2	59.7	28.7
Germany	13.9	59.5	26.6
Greece	19.8	14.3	65.2
Hungary	18.5	59.4	22.2
Ireland	2.3	53.8	43.9
Italy	17.6	38.6	40.0
Latvia	19.1	16.7	64.2
Lithuania	17.8	22.7	59.5
Luxemburg	27.4	36.0	36.6
Malta	2.3	58.0	39.8
Netherlands	11.9	59.1	29.0
Poland	16.5	34.8	48.6
Portugal	3.4	29.0	66.4
Romania	38.1	24.3	37.1
Slovakia	21.4	19.4	59.1
Slovenia	20.6	53.1	26.2
Spain	16.3	36.9	46.6
Sweden	5.1	69.0	25.7
United Kingdom	2.6	38.2	58.3

* As a percentage of the total number of researchers in the country. In full-time equivalent.

R&D personnel: scientific organizations of CIS

Main activity personnel, *persons*

	2010	2012	2013	2014	2015	2016
Ukraine	**141086**	**129945**	**123219**	**109636**	**101598**	**97912**
Azerbaijan	17924	21573	22358	23329	23093	22527
Armenia	6558	5598	5230	5627	5044	4881
Belarus	31712	30437	28937	27208	26153	25942
Kazakhstan	17021	20404	23712	25793	24735	22985
Kyrgyzstan	3129	3264	4241	4242	4557	4496
Republic of Moldova	5114	5121	4981	5038	5033	4734
Russia	736540	727263	727029	732274	738857	722291
Tajikistan	2827	3511	3389	3593	3704	3894
Turkmenistan	…	…	…	…	…	…
Uzbekistan	…	…	…	…	…	…

Researchers, *persons*

	2010	2012	2013	2014	2015	2016
Ukraine	**73413**	**68599**	**65641**	**58695**	**53835**	**63694**
Azerbaijan	11037	15335	15784	16337	16137	15548
Armenia	4981	4056	3870	4144	3856	3682
Belarus	19879	19315	18353	17372	16953	16879
Kazakhstan	10870	13494	17195	18930	18454	17421
Kyrgyzstan	1974	2349	3063	3013	3441	3454
Republic of Moldova	3267	3338	3250	3315	3368	3210
Russia	368915	372620	369015	373905	379411	370379
Tajikistan	1802	2210	2152	2332	2467	2601
Turkmenistan	…	…	…	…	…	…
Uzbekistan	…	…	…	…	…	…

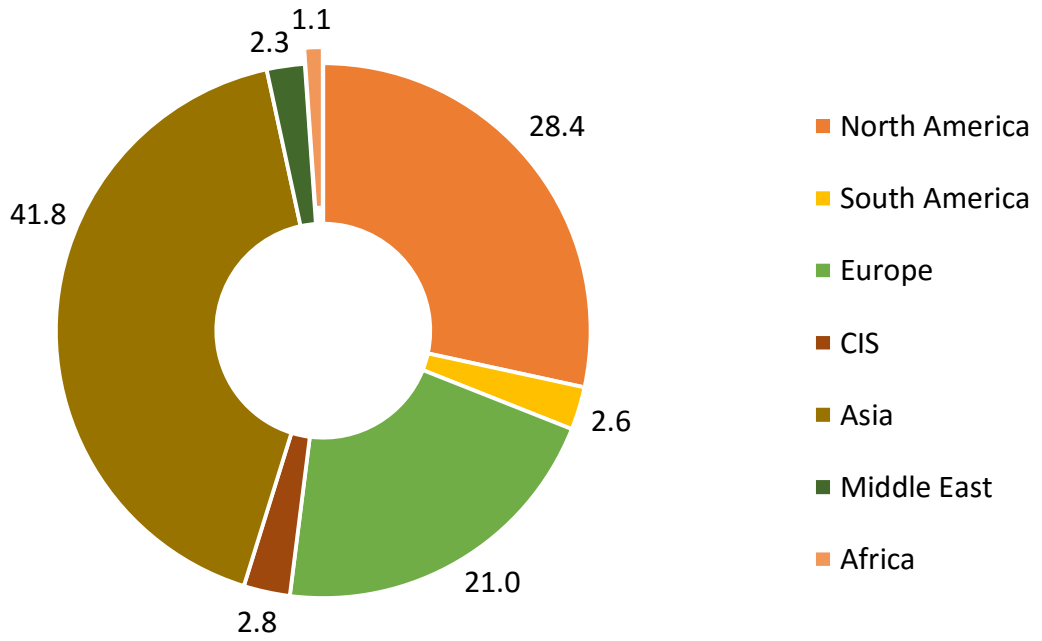
VIII.2. R&D funding in the world

Gross domestic expenditure on R&D by regions and associations*

Regions	Share in global expenditure, %		
	2014	2015	2016
North America	29.2	28.6	28.4
of which USA	27.0	26.5	26.5
South America	2.8	2.6	2.6
Europe	21.5	21.3	21.0
CIS	3.1	2.9	2.8
Asia	40.2	41.2	41.8
of which China	19.1	19.8	20.4
Middle East	2.2	2.3	2.3
Africa	1.0	1.1	1.1

* In purchasing power parity (PPP) National Currency.

Percentage distribution of gross domestic expenditure on R&D by regions and associations: 2016, %



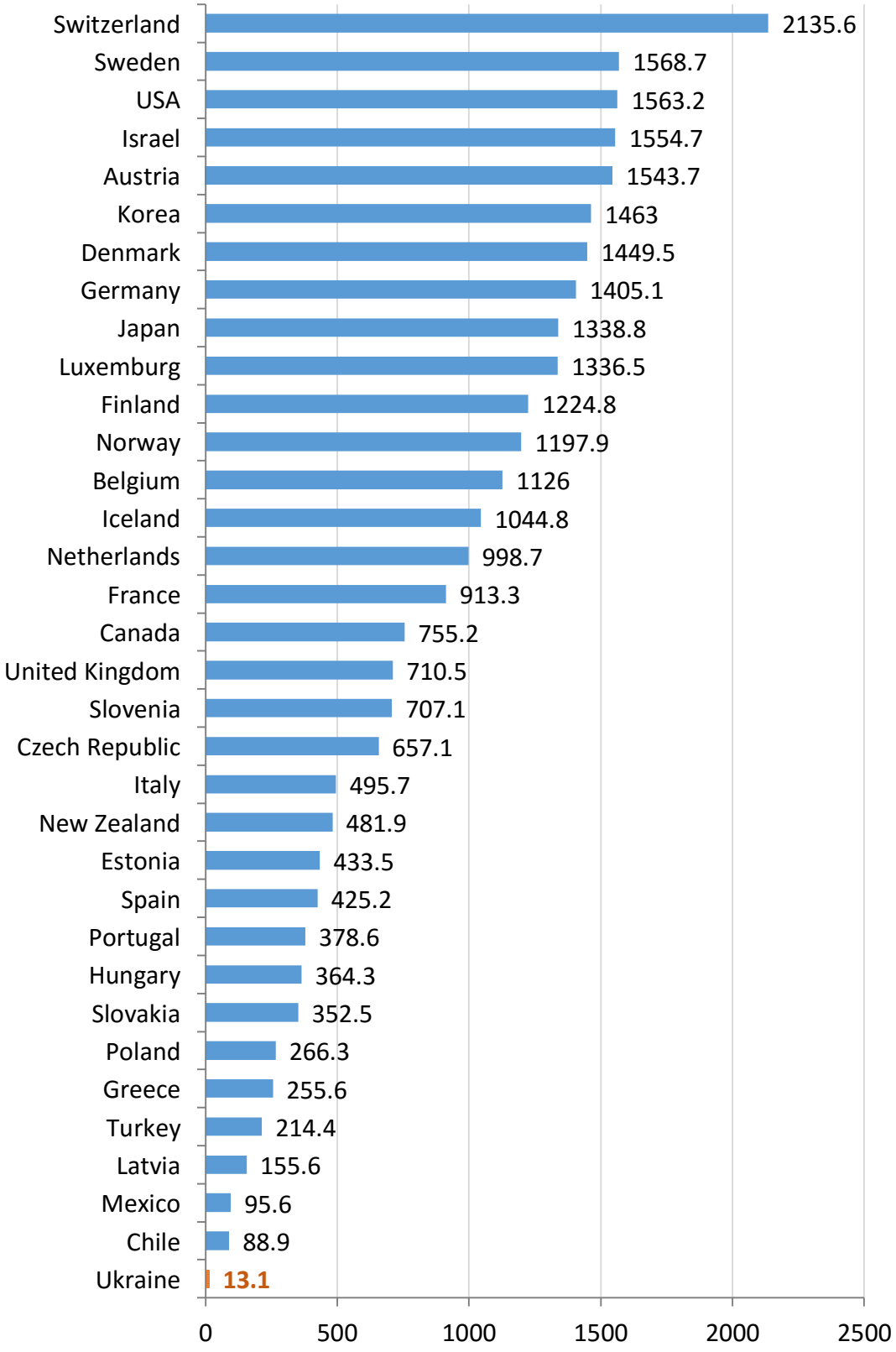
Gross domestic expenditure on R&D: OECD and Ukraine

	Total *million USD**		Share of GDP, *%*		Per capita, *USD*	
	2014	2015	2014	2015	2014	2015
Ukraine**	**868.2**	**559.6**	**0.65**	**0.62**	**19.2**	**13.1**
Australia	23133.6	…	2.10	…	986.1	…
Austria	12847.1	13321.2	3.09	3.12	1503.7	1543.7
Belgium	12370.6	12624.6	2.46	2.46	1108.8	1126.0
Canada	27873.0	27071.1	1.74	1.71	784.2	755.2
Chile	1522.1	1603.7	0.37	0.38	85.3	88.9
Czech Republic	6719.0	6927.4	1.97	1.95	638.4	657.1
Denmark	7877.4	8236.2	2.92	2.96	1396.0	1449.5
Estonia	544.5	569.3	1.45	1.50	413.8	433.5
Germany	109802.5	114778.1	2.88	2.93	1355.9	1405.1
Greece	2408.7	2765.9	0.84	0.97	221.1	255.6
Finland	7185.4	6712.4	3.17	2.90	1315.4	1224.8
France	59529.2	60818.7	2.23	2.22	898.0	913.3
Hungary	3424.4	3584.8	1.36	1.38	347.1	364.3
Iceland	292.0	345.6	2.01	2.19	891.9	1044.8
Ireland	3638.7	…	1.54	…	788.5	…
Israel	12253.8	13023.6	4.27	4.25	1492.2	1554.7
Italy	30324.1	30102.1	1.37	1.33	498.8	495.7
Japan	170512.3	170003.0	3.40	3.29	1341.3	1338.8
Korea	73195.5	74051.5	4.29	4.23	1451.6	1463.0
Latvia	328.1	307.7	0.69	0.62	164.5	155.6
Luxemburg	714.0	761.0	1.26	1.28	1278.8	1336.5
Mexico	11581.8	11563.4	0.54	0.53	96.7	95.6
Netherlands	16541.4	16909.7	2.00	1.99	980.9	998.7
New Zealand	…	2227.9	…	1.28	…	481.9
Norway	5785.5	6218.4	1.72	1.93	1126.2	1197.9
Poland	9187.2	10239.8	0.94	1.00	238.7	266.3
Portugal	3864.2	3921.5	1.29	1.28	371.5	378.6
Slovakia	1386.5	1911.6	0.88	1.18	255.9	352.5
Slovenia	1524.0	1458.9	2.38	2.21	739.2	707.1
Spain	19341.5	19734.5	1.24	1.22	416.3	425.2
Switzerland	…	17688.3	…	3.42	…	2135.6
Sweden	14154.7	15371.7	3.15	3.28	1459.8	1568.7
Turkey	15324.2	16604.5	0.86	0.88	200.0	214.4
United Kingdom	44163.8	46259.8	1.68	1.70	683.7	710.5
USA	479358.0	502893.0	2.76	2.79	1501.6	1563.2

* In PPP of National Currency.

** At the official rate of the National Bank of Ukraine.

Gross domestic expenditure on R&D: OECD and Ukraine, 2015,
USD



Gross domestic expenditure on R&D: OECD, EU, and Ukraine by source of funds, 2015*, *%*

	Government	Business enterprises sector	Other domestic sources	Funds from abroad
Ukraine	**40.1**	**39.6**	**1.4**	**18.9**
OECD countries:				
Australia	34.6	61.9	1.9	1.6
Austria	35.7	48.4	0.5	15.4
Belgium	24.1	61.3	1.4	13.2
Canada	33.0	44.3	14.0	8.7
Chile	42.6	32.8	11.7	12.9
Czech Republic	32.2	34.5	0.8	32.5
Denmark	29.4	59.4	4.7	6.5
Estonia	46.4	41.0	0.4	12.2
Finland	28.9	54.8	1.8	14.5
France	34.6	55.7	2.0	7.8
Germany	27.9	65.6	0.4	6.2
Greece	53.1	31.4	2.9	12.7
Hungary	34.6	49.7	0.7	15.0
Iceland	32.0	33.3	8.4	26.4
Ireland	27.5	52.1	1.7	18.7
Israel	12.5	37.0	1.3	49.2
Italy	40.8	46.2	3.6	9.3
Japan	15.4	78.0	6.1	0.5
Korea	23.7	74.5	1.0	0.8
Latvia	32.7	20.1	2.2	45.0
Luxemburg	48.4	16.5	2.8	32.3
Mexico	70.3	19.7	9.6	0.5
Netherlands	33.4	48.7	2.8	15.1
New Zealand	37.1	43.1	11.5	8.2
Norway	44.9	44.2	1.6	9.2
Poland	41.8	39.0	2.4	16.7
Portugal	47.1	41.8	5.4	5.6
Slovakia	31.9	25.1	3.6	39.4
Slovenia	19.9	69.2	0.3	10.6
Spain	40.9	45.8	5.2	8.0

continued

	Government	Business enterprises sector	Other domestic sources	Funds from abroad
Switzerland	24.4	63.5	1.9	10.2
Sweden	28.3	61.0	4.1	6.7
Turkey	27.6	50.1	21.3	1.1
United Kingdom	28.0	48.4	6.0	17.6
USA	24.0	64.2	7.1	4.7
EU countries outside the OECD				
Bulgaria	26.4	22.3	0.5	50.9
Croatia	36.4	46.6	2.5	14.5
Cyprus	56.5	13.7	6.2	23.7
Lithuania	35.6	28.0	1.8	34.6
Malta	33.3	44.1	1.3	21.3
Romania	41.7	37.3	1.8	19.2

Government budget appropriation for R&D: OECD, *million USD*

	1995	2000	2005	2010	2015
Australia	2324.6	2859.3	3729.1	4677.2	4731.4
Austria	1230.3	1430.3	1827.3	2699.4	3484.1
Belgium	1164.9	1597.8	1987.2	2782.5	3180.3
Canada	3833.3	4589.9	6777.1	8489.6	7700.1
Chile	…	…	…	…	867.4
Czech Republic	…	834.7	1148.4	1620.9	2262.0
Denmark	792.3	1171.2	1326.1	2302.1	2636.3
Estonia	…	44.9	90.1	196.3	264.1
Finland	929.9	1302.9	1651.7	2272.8	2039.6
France	13264.7	14743.5	18084.5	19106.4	17387.3
Germany	16069.2	16812.5	19865.0	28916.9	35421.6
Greece	400.6	619.8	889.5	975.3	1498.4
Hungary	…	…	708.7	767.5	1034.8
Iceland	44.9	76.2	91.0	120.3	140.3

continued

	1995	2000	2005	2010	2015
Ireland	209.6	314.1	711.7	979.0	915.0
Israel	883.5	1292.4	1044.9	1355.2	1805.0
Italy	6731.0	9372.3	11050.6	12245.3	11511.2
Japan	14324.8	21193.4	27617.8	32150.0	33862.0
Korea	-	5017.9	9886.5	16300.1	21207.5
Luxemburg	…	25.1	81.0	244.3	360.5
Mexico	1263.3	2119.1	2599.5	4698.4	6718.5
Netherlands	2830.8	3793.3	4529.7	5721.9	6242.4
New Zealand	307.7	…	…	681.5	989.6
Norway	823.2	1057.5	1554.6	2418.4	3084.6
Poland	1141.0	1539.9	1547.5	2884.9	4160.8
Portugal	560.3	1019.8	1581.1	2799.1	2870.3
Slovakia	171.7	213.0	244.1	496.0	568.5
Slovenia	…	174.0	272.7	339.9	273.3
Spain	3011.2	5175.9	6479.5	11589.5	8922.9
Switzerland	…	1474.8	…	3076.0	4709.7
Sweden	2087.4	1731.5	2535.0	3282.6	3713.5
Turkey	…	…	…	4027.7	5551.9
United Kingdom	8799.5	10517.4	13476.8	13538.9	14696.1
USA	68791.0	83612.5	131259.0	148962.0	148999.0

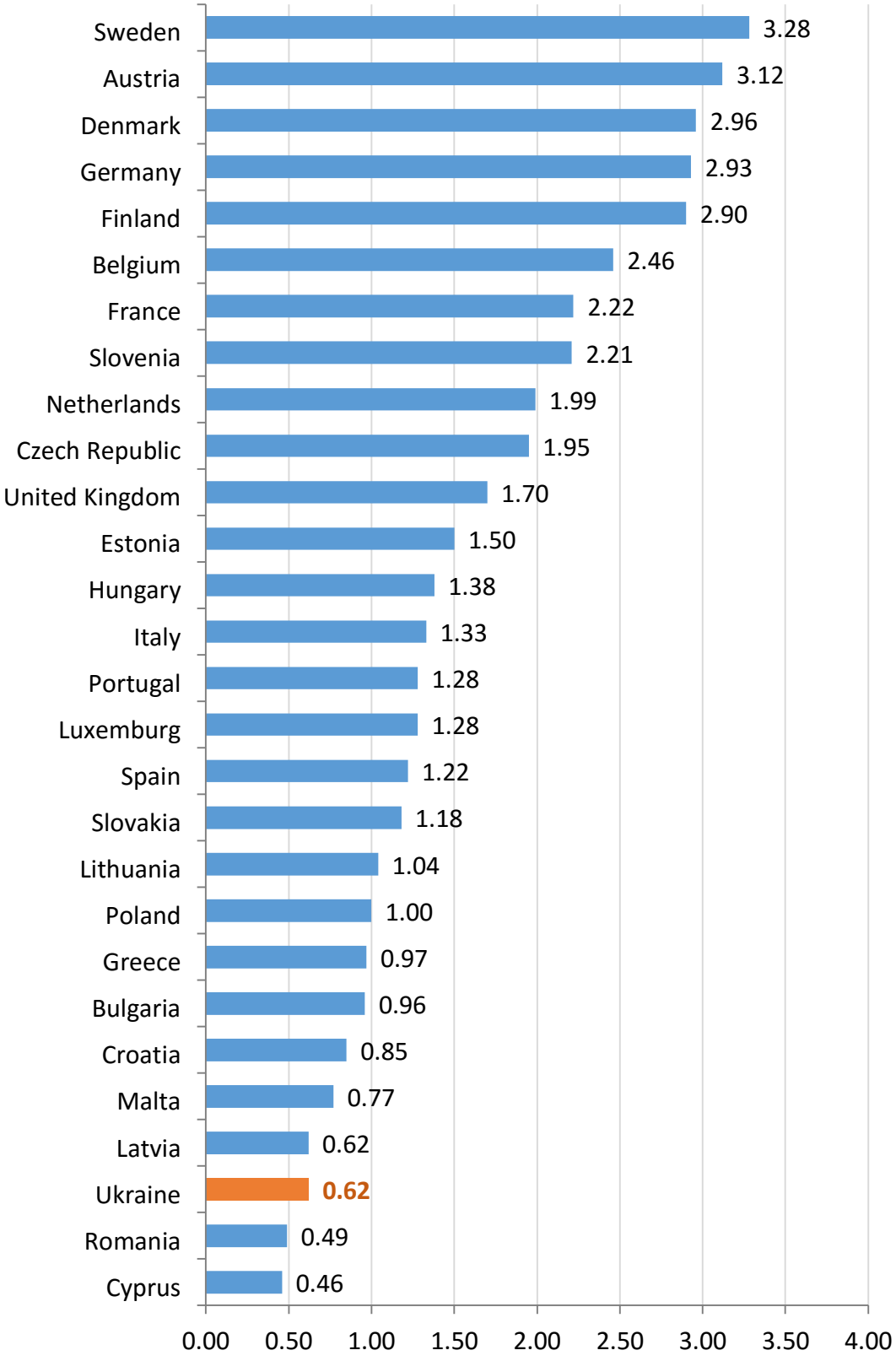
Gross domestic expenditure on R&D by sector of performance: OECD, EU, and Ukraine: 2015, *%*

	Government sector	Business enterprises sector	Higher education sector	Private non-profit sector
Ukraine	**33.9**	**60.7**	**5.4**	…
OECD countries:				
Australia	11.2	56.3	29.6	2.8
Austria	4.4	70.8	24.3	0.4
Belgium	7.8	71.9	19.9	0.3
Canada	8.5	52.7	38.4	0.4
Chile	7.8	34.3	38.5	19.4
Czech Republic	20.4	54.3	24.9	0.4

continued

	Government sector	Business enterprises sector	Higher education sector	Private non-profit sector
Denmark	2.3	64.0	33.4	0.4
Estonia	10.8	46.1	41.4	1.8
Finland	8.2	66.7	24.4	0.8
France	13.1	65.1	20.3	1.5
Germany	14.1	68.7	17.3	–
Greece	28.1	33.0	37.8	1.1
Hungary	13.3	73.4	12.1	…
Ireland	4.4	71.0	24.7	–
Iceland	4.8	64.7	30.5	–
Italy	13.3	55.3	28.6	2.9
Japan	7.9	78.5	12.3	1.3
Korea	11.7	77.5	9.1	1.6
Latvia	25.6	24.8	49.6	–
Luxemburg	31.1	51.0	17.8	–
Netherlands	12.3	55.6	32.1	–
New Zealand	20.3	49.8	29.9	–
Norway	15.0	53.9	31.1	–
Poland	24.4	46.6	28.9	0.2
Portugal	5.9	47.1	45.5	1.5
Slovakia	27.9	28.0	43.8	0.4
Slovenia	13.5	76.3	10.2	0.04
Spain	19.1	52.5	28.1	0.2
Switzerland	0.9	71.0	26.7	1.5
Sweden	3.4	69.7	26.7	0.2
Turkey	10.3	50.0	39.7	–
United Kingdom	6.8	65.7	25.6	1.9
USA	11.2	71.5	13.2	4.1
EU countries outside the OECD				
Bulgaria	20.8	73.3	5.4	0.5
Croatia	24.5	51.2	24.2	…
Cyprus	13.6	16.5	53.7	16.2
Lithuania	17.2	26.9	55.9	…
Malta	17.5	48.5	34.0	…
Romania	38.3	44.0	17.4	0.3

Gross domestic expenditure on R&D as share of GDP: OECD, EU, and Ukraine: 2015, *%*



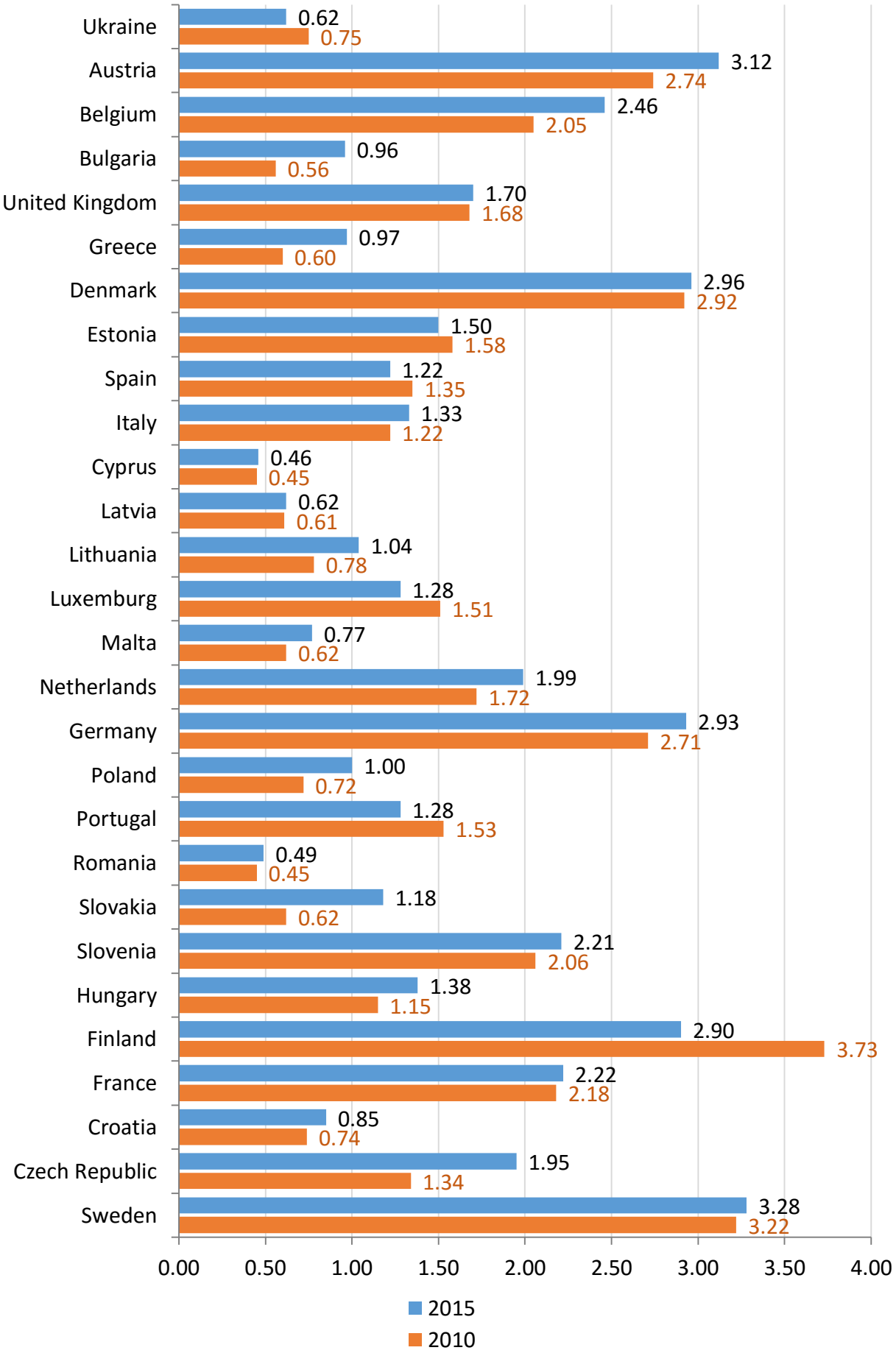
Gross domestic expenditure on R&D: EU*, *million USD (PPP)*

	2010	2011	2012	2013	2014	2015
EU members:						
Austria	9595.7	9955.0	11415.1	12018.8	12847.1	13321.2
Belgium	8966.8	9822.0	11133.8	11851.5	12370.6	12624.6
Bulgaria	624.0	612.7	716.2	767.9	999.5	1253.0
Croatia	631.8	666.8	677.4	752.5	736.7	808.1
Cyprus	123.3	127.2	117.9	122.1	124.4	121.9
Czech Republic	3881.8	4702.3	5441.6	6094.8	6719.0	6927.4
Denmark	6972.1	7283.7	7468.8	7800.6	7877.4	8236.2
Estonia	455.4	751.5	730.6	624.7	544.5	569.3
Finland	7756.1	7976.8	7520.0	7389.5	7185.4	6712.4
France	50956.9	53617.3	55097.7	58406.1	59529.2	60818.7
Germany	87131.0	95810.0	100490.1	102998.5	109802.5	114778.1
Greece	1876.8	1950.7	1953.7	2323.8	2408.7	2765.9
Hungary	2458.5	2708.1	2895.0	3364.4	3424.4	3584.8
Ireland	3148.3	3206.1	3321.6	3470.9	3638.7	…
Italy	25430.8	26111.7	27419.6	28485.1	30324.1	30102.5
Latvia	225.4	283.7	287.2	279.7	328.1	307.7
Lithuania	488.5	625.5	659.1	750.5	851.0	871.4
Luxemburg	653.4	697.6	619.1	677.2	714.0	761.0
Malta	71.0	80.5	103.0	102.4	103.9	112.9
Netherlands	12777.0	14634.4	15177.7	15983.6	16541.4	16909.7
Poland	5782.0	6487.5	7990.8	8193.2	9187.2	10239.8
Portugal	4433.6	4119.0	3832.4	3873.3	3864.2	3921.5
Romania	1516.6	1726.2	1738.4	1452.9	1508.0	2025.2
Slovakia	830.8	925.0	1159.9	1245.0	1386.5	1911.6
Slovenia	1171.5	1433.1	1529.9	1585.1	1524.0	1458.9
Spain	20105.9	19862.4	19269.2	19299.9	19341.5	19734.5
Sweden	12567.5	13433.8	13970.4	14509.5	14154.7	15371.7
United Kingdom	37609.3	38778.6	38490.2	41569.6	44163.8	46259.8

* In PPP National Currency.

Gross domestic expenditure on R&D as share of GDP: EU and Ukraine, *%*

	2010	2011	2012	2013	2014	2015
Ukraine	**0.83**	**0.74**	**0.75**	**0.70**	**0.65**	**0.62**
EU members:	**1.93**	**1.97**	**2.01**	**2.01**	–	–
Austria	2.74	2.68	2.93	2.97	3.09	3.12
Belgium	2.05	2.16	2.36	2.44	2.46	2.46
Bulgaria	0.56	0.53	0.60	0.63	0.79	0.96
Croatia	0.74	0.75	0.75	0.82	0.79	0.85
Cyprus	0.45	0.45	0.43	0.46	0.48	0.46
Czech Republic	1.34	1.56	1.78	1.90	1.97	1.95
Denmark	2.92	2.94	2.98	2.97	2.92	2.96
Estonia	1.58	2.31	2.12	1.73	1.45	1.50
Finland	3.73	3.64	3.42	3.29	3.17	2.90
France	2.18	2.19	2.23	2.24	2.23	2.22
Germany	2.71	2.80	2.87	2.82	2.88	2.93
Greece	0.60	0.67	0.70	0.81	0.84	0.97
Hungary	1.15	1.19	1.27	1.39	1.36	1.38
Ireland	1.60	1.54	1.56	1.56	1.54	…
Italy	1.22	1.21	1.27	1.31	1.37	1.33
Latvia	0.61	0.70	0.67	0.61	0.69	0.62
Lithuania	0.78	0.90	0.89	0.95	1.03	1.04
Luxemburg	1.51	1.47	1.28	1.31	1.26	1.28
Malta	0.62	0.67	0.83	0.77	0.75	0.77
Netherlands	1.72	1.90	1.94	1.95	2.00	1.99
Poland	0.72	0.75	0.88	0.87	0.94	1.00
Portugal	1.53	1.46	1.38	1.33	1.29	1.28
Romania	0.45	0.49	0.48	0.39	0.38	0.49
Slovakia	0.62	0.66	0.80	0.82	0.88	1.18
Slovenia	2.06	2.42	2.58	2.60	2.38	2.21
Spain	1.35	1.33	1.29	1.27	1.24	1.22
Sweden	3.22	3.25	3.28	3.31	3.15	3.28
United Kingdom	1.68	1.68	1.61	1.68	1.70	1.70


Ukraine 0.62 0.75
Austria 3.12 2.74
Belgium 2.46 2.05
Bulgaria 0.96 0.56
United Kingdom 1.70 1.68
Greece 0.97 0.60
Denmark 2.96 2.92
Estonia 1.50 1.58
Spain 1.22 1.35
Italy 1.33 1.22
Cyprus 0.46 0.45
Latvia 0.62 0.61
Lithuania 1.04 0.78
Luxemburg 1.28 1.51
Malta 0.77 0.62
Netherlands 1.99 1.72
Germany 2.93 2.71
Poland 1.00 0.72
Portugal 1.28 1.53
Romania 0.49 0.45
Slovakia 1.18 0.62
Slovenia 2.21 2.06
Hungary 1.38 1.15
Finland 2.90 3.73
France 2.22 2.18
Croatia 0.85 0.74
Czech Republic 1.95 1.34
Sweden 3.28 3.22
0.00 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00
2015
2010

VIII.3. R&D output

Global indicators of publication activity

	Publications, total		2014 to 2008, %	% of world publications		Publications per 1000000 population	
	2008	2014		2008	2014	2008	2014
The World	**1029471**	**1270425**	**23.4**	**100.0**	**100.0**	**153**	**176**
including by region:							
USA	289769	321846	11.1	28.1	25.3	945	998
Europe	**438450**	**498817**	**13.8**	**42.6**	**39.3**	**542**	**609**
of them:							
United Kingdom	77116	87948	14.0	7.5	6.9	1257	1385
Germany	79402	91631	15.4	7.7	7.2	952	1109
France	59304	65086	9.7	5.8	5.1	948	1007
Asia	**292230**	**501798**	**71.7**	**28.4**	**39.5**	**73**	**118**
of them:							
India	37228	53733	44.3	3.6	4.2	32	42
China	102368	256834	150.9	9.9	20.2	76	184
Republic of Korea	33431	50258	50.3	3.2	4.0	698	1015
Japan	76244	73128	-4.1	7.4	5.8	599	576
Africa	**20786**	**33282**	**60.1**	**2.0**	**2.6**	**21**	**29**
including by associations:							
European Union	379154	432195	14.0	36.8	34.0	754	847
OECD	801151	899810	12.3	77.8	70.8	654	707

Source: Compiled from Scopus SciVal. [Electronic resource] / Elsevier. URL: *https:// www.elsevier.com/solutions/scival/features*

Publications and cited publications in scientific journals: WEB of Science 2012-2016, *units*

	Publications	Cited publications*	Cites per publication	Average normalized citation**
Ukraine	**31285**	**132970**	**4.25**	**0.76**
CIS countries				
Armenia	4577	49006	10.71	1.31
Azerbaijan	3004	22887	7.62	1.04
Belarus	6681	50160	7.51	1.02
Kazakhstan	5881	14910	2.54	0.75
Kyrgyzstan	580	4370	7.53	1.18
Republic of Moldova	1775	8156	4.59	0.80
Russia	205641	781266	3.80	0.82
Tajikistan	378	1200	3.17	0.54
Turkmenistan	110	555	5.05	1.82
Uzbekistan	1863	5660	3.04	0.56
OECD countries				
Australia	340253	2882174	8.47	1.36
Austria	90622	811427	8.95	1.41
Belgium	127597	1229616	9.64	1.47
Canada	389785	3325445	8.53	1.31
Chile	42309	293199	6.93	1.08
Czech Republic	92432	483011	5.23	1.13
Denmark	99217	1064130	10.73	1.61
Estonia	1435	8845	6.16	1.33
Finland	77093	677781	8.79	1.43
France	444073	3705532	8.34	1.26
Germany	638113	5598676	8.77	1.33
Greece	69450	528949	7.62	1.23
Hungary	41529	297868	7.17	1.11
Iceland	6209	77613	12.50	1.85

continued

	Publications	Cited publications*	Cites per publication	Average normalized citation**
Ireland	49057	453074	9.24	1.39
Israel	81008	679476	8.39	1.25
Italy	396833	3210117	8.09	1.32
Japan	486917	3024943	6.21	0.91
Korea	311588	1965259	6.31	0.91
Latvia	8175	26864	3.29	1.00
Luxemburg	6926	51723	7.47	1.5
Mexico	77035	397746	5.16	0.81
Netherlands	224584	2402284	10.7	1.56
New Zealand	53990	433546	8.03	1.31
Norway	75439	656103	8.7	1.46
Poland	160162	825771	5.16	1.05
Portugal	88775	612898	6.9	1.15
Slovakia	30433	122579	4.03	1.18
Slovenia	23472	153519	6.54	1.07
Spain	334892	2670680	7.97	1.20
Sweden	151756	1456822	9.6	1.46
Switzerland	168983	1935600	11.45	1.66
Turkey	161212	633581	3.93	0.73
United Kingdom	689046	6151513	8.93	1.39
USA	2358165	20710228	8.78	1.32
EU countries outside OECD				
Bulgaria	15082	90661	6.01	0.93
Croatia	22792	124748	5.47	0.89
Cyprus	7763	62438	8.04	1.51
Lithuania	15104	73568	4.87	0.95
Malta	1940	10886	5.61	1.19
Romania	71303	239120	3.35	0.87

continued

	Publications	Cited publications*	Cites per publication	Average normalized citation**
Other countries				
Argentina	49347	316756	6.42	0.93
Brazil	239726	1134227	4.73	0.80
China	1662153	9112437	5.48	0.89
Egypt	53949	261221	4.84	0.86
Georgia	3461	52541	15.18	1.92
India	392812	1780040	4.53	0.78
Indonesia	21976	67650	3.08	0.97
Iran	158666	763682	4.81	0.83
Malaysia	88328	345016	3.91	0.97
Pakistan	44019	216360	4.92	0.89
Saudi Arabia	65373	493132	7.54	1.25
Serbia	31486	155765	4.95	0.81
Singapore	79907	822830	10.30	1.53
South Africa	70962	457849	6.45	1.10
Taiwan	169754	961081	5.66	0.87
Thailand	46774	242776	5.19	0.93

* The number of cited publications from 2012 to September 9, 2017.

** Average citation normalized by field of sciences as to world average level

Source: Compiled from Scopus SciVal. ScopusSciVal. [Electronic resource] / Elsevier. URL: *https://www.elsevier.com/solutions/scival/features*

Publications and cited publications in scientific journals: Scopus, 2012-2016, *units*

	Publications	Cited publications*	Cites per publication	Average normalized citation**
Ukraine	**48618**	**168916**	**3.47**	**0.63**
CIS countries				
Armenia	5378	54314	10.10	1.32
Azerbaijan	3870	25968	6.71	0.94
Belarus	8484	57459	6.77	0.98
Kazakhstan	10290	20600	2.00	0.53
Kyrgyzstan	727	5854	8.05	1.27
Republic of Moldova	2137	10504	4.92	0.95
Russia	281925	977176	3.47	0.73
Tajikistan	540	1586	2.94	0.48
Turkmenistan	108	477	4.42	1.25
Uzbekistan	2476	6859	2.77	0.50
OECD countries				
Australia	386085	3681503	9.54	1.56
Austria	105089	1024008	9.74	1.56
Belgium	142673	1541196	10.80	1.69
Canada	442695	4243191	9.58	1.50
Chile	49995	345903	6.92	1.13
Czech Republic	103012	603440	5.86	1.07
Denmark	111655	1321932	11.84	1.86
Estonia	13185	142776	10.83	1.78
Finland	89135	862935	9.68	1.66
France	526129	4596617	8.74	1.36
Germany	749039	6873157	9.18	1.44
Greece	83239	697315	8.38	1.36
Hungary	48085	362363	7.54	1.20
Iceland	6542	97345	14.88	2.25
Ireland	57715	590226	10.23	1.61

continued

	Publications	Cited publications*	Cites per publication	Average normalized citation**
Israel	88350	847828	9.60	1.48
Italy	465192	4141373	8.90	1.48
Japan	609650	3743874	6.14	0.95
Korea	371397	2474282	6.66	1.04
Latvia	8331	39012	4.68	1.06
Luxemburg	7629	69305	9.08	1.80
Mexico	94117	511191	5.43	0.88
Netherlands	251861	3001506	11.92	1.80
New Zealand	62185	559053	8.99	1.48
Norway	86831	836921	9.64	1.65
Poland	191985	1020295	5.31	0.98
Portugal	102949	790462	7.68	1.28
Slovakia	34383	161957	4.71	1.02
Slovenia	27584	191768	6.95	1.17
Spain	392333	3318585	8.46	1.31
Sweden	170852	1832023	10.72	1.69
Switzerland	191623	2393492	12.49	1.85
Turkey	187210	832242	4.45	0.79
United Kingdom	785738	7857363	10.00	1.59
USA	2748726	26293339	9.57	1.49
EU countries outside OECD				
Bulgaria	19344	111977	5.79	0.90
Croatia	29372	157780	5.37	0.86
Cyprus	8955	79202	8.84	1.57
Lithuania	15529	91160	5.87	1.03
Malta	2478	15669	6.32	1.26
Romania	69610	287482	4.13	0.82

continued

	Publications	Cited publications*	Cites per publication	Average normalized citation**
Other countries				
Argentina	58793	395139	6.72	1.00
Brazil	312959	1528478	4.88	0.84
China	2258048	11666349	5.17	0.85
Egypt	75370	374837	4.97	0.88
Georgia	5433	63987	11.78	1.70
India	586472	2524731	4.30	0.76
Indonesia	33567	107708	3.21	0.85
Iran	215616	1070333	4.96	0.88
Malaysia	127487	534159	4.19	0.89
Pakistan	56532	293434	5.19	0.96
Saudi Arabia	80540	630869	7.83	1.36
Serbia	35379	196044	5.54	0.92
Singapore	89049	1037998	11.66	1.81
South Africa	84897	575820	6.78	1.20
Taiwan	194772	1196282	6.14	0.99
Thailand	61768	326594	5.29	0.92

* The number of cited publications from 2012 to September 9, 2017.

** Average citation normalized by field of sciences as to world average level

Source: Compiled from Scopus SciVal. ScopusSciVal. [Electronic resource] / Elsevier. URL: *https://www.elsevier.com/solutions/scival/features*

Applications for inventions by resident and non-resident applicants to Patent office of the country, *units*

	1995	2000	2005	2010	2015
Ukraine	**5960**	**7224**	**5592**	**5312**	**4497**
CIS countries					
Armenia	285	127	208	142	115
Azerbaijan	251	–	287	271	184
Belarus	1039	1198	1462	1933	691
Kazakhstan	1373	1515	1626	1964	1503
Kyrgyzstan	148	84	131	140	126
Republic of Moldova	309	250	388	150	124
Russia	22202	28688	32254	42500	45517
Tajikistan	65	52	36	10	1
Turkmenistan	–	–	–	–	–
Uzbekistan	1058	968	444	632	507
OECD countries					
Australia	14061	22001	23857	24887	28605
Austria	2186	2301	2505	2673	2441
Belgium	1087	820	622	760	1097
Canada	26592	39622	39888	35449	36964
Chile	1706	3120	3007	1076	3274
Czech Republic	3519	4939	830	982	952
Denmark	1484	1870	1823	1768	1732
Estonia	79	804	38	97	36
Finland	3791	2903	2059	1833	1416
France	15896	17353	17275	16580	16300
Germany	46158	62142	60222	59245	66893
Greece	312	340	482	744	573
Hungary	2889	4937	1202	696	633
Iceland	68	876	592	76	46
Ireland	990	1080	864	792	440
Israel	4425	6802	6826	7306	6908
Italy	8574	9273	9331	9723	9687
Japan	368831	419543	427078	344598	318721
Korea	78499	102010	160921	170101	213694
Luxemburg	104	176	88	100	247

continued

	1995	2000	2005	2010	2015
Mexico	5234	13061	14435	14576	18071
Netherlands	2692	2994	2850	2767	2494
New Zealand	4719	7048	7005	6636	6501
Norway	5408	6700	5986	1813	1805
Poland	3860	7303	6583	3430	4815
Portugal	201	146	205	545	945
Slovakia	1669	2040	250	282	256
Slovenia	430	431	373	453	–
Spain	2600	3194	3353	3779	3020
Sweden	4865	5068	2960	2549	2428
Switzerland	3720	2551	2098	2155	1923
Turkey	1690	3433	1146	3357	5841
United Kingdom	27521	32747	27988	21929	22801
USA	228142	295895	390733	490226	589410
EU countries outsides OECD					
Bulgaria	731	940	313	260	291
Croatia	600	875	1012	278	186
Cyprus		70	64	8	7
Latvia	300	179	169	185	137
Lithuania	133	127	115	114	119
Malta	24	116	–	19	11
Romania	2232	1290	984	1418	1053
Other countries					
Argentina	4264	6636	5269	4717	4125
Brazil	7448	17376	20005	22686	30219
China	18699	51906	173327	391177	1101864
Georgia	707	456	461	359	271
India	6566	8538	24382	39762	45658
Indonesia	2874	3890	4304	5630	9153
Iran	407	616	4494	11636	14279
Malaysia	4052	6227	6286	6383	7727
Singapore	2557	8236	8605	9773	10814
South Africa	6365	3295	7004	6383	7497

	Postgraduate and doctoral graduates (ISCED 6) per 1000 population aged 25 to 34, *persons*	Venture capital share in GDP (seed and start-up stage, growth and expansion), *%*	Share of SMEs implementing product or process innovations, *%*
Ukraine	**1.0**	**0.002**	**7.4**
Austria	2.0	0.051	35.7
Belarus	0.6	–	2.97
Belgium	1.8	0.072	42.3
Bulgaria	1.4	0.015	13.6
Croatia	1.5	0.054	21.6
Cyprus	0.4	0.071	29.2
Czech Republic	1.7	0.013	30.9
Denmark	3.2	0.059	33.9
Estonia	1.1	0.136	33.0
Finland	2.9	0.107	40.1
France	1.7	0.083	32.4
Germany	2.8	0.049	42.4
Greece	1.0	0.001	29.6
Hungary	0.9	0.055	12.8
Iceland	0.9	–	54.2
Ireland	2.1	0.086	35.7
Israel	1.5	0.009	22.2
Italy	1.5	0.022	38.8
Latvia	0.9	0.098	15.7
Lithuania	1.1	0.081	16.1
Luxemburg	0.8	0.047	43.1
Malta	0.4	0.000	32.0
Netherlands	2.2	0.096	40.9
Norway	2.1	0.077	22.5
Poland	0.6	0.029	13.1
Portugal	3.1	0.069	38.3
Romania	1.4	0.013	5.2
Serbia	0.8	0.000	28.6
Slovakia	2.5	0.008	17.7
Slovenia	3.9	0.007	28.7
Spain	1.8	0.043	18.4
Sweden	2.9	0.081	39.9
Switzerland	3.5	0.067	32.6
Turkey	0.4	0.051	24.0
United Kingdom	2.9	0.103	27.8

* According to European Innovation Scoreboards (EIS 5-2016).

Symbols: ISCED – International Standard Classification of Education (ISCED),

Source: Science and Innovation Activity in the Republic of Belarus: Statistical data book. http://www.belstat.gov.by

countries and Ukraine: 2016*

	Share of knowledge-intensive activities in total employment, %	Share of medium and high technology output in exports, %	Share of new-to-market and new to firm innovations in sales, %
	12.9	**31.8**	**3.3**
	14.7	57.4	9.8
	32.3	32.7	15.3
	15.4	48.5	11.2
	9.4	31.2	4.2
	10.7	37.9	10.0
	17.2	43.0	11.4
	12.7	64.0	13.4
	15.4	47.7	22.1
	11.4	42.6	7.8
	15.8	44.6	11.1
	14.0	58.5	13.5
	14.6	67.4	13.0
	12.2	22.7	11.8
	12.3	69.5	9.7
	18.2	11.5	6.1
	20.2	52.1	9.3
	26.9	51.5	11.9
	13.6	52.3	11.0
	10.9	32.1	5.0
	8.8	34.4	5.5
	27.5	52.1	7.9
	17.9	56.7	10.2
	17.3	48.0	11.8
	16.3	13.6	5.2
	9.9	49.6	6.3
	10.3	36.7	12.4
	6.9	52.8	3.7
	14.4	40.0	12.4
	9.9	66.6	19.6
	14.0	56.0	10.5
	12.3	47.7	14.3
	17.9	54.7	6.1
	21.4	49.9	16.1
	5.7	36.6	33.6
	18.0	54.8	14.1

SMEs – small and medium enterprises.
National Statistical Committee of the Republic of Belarus, Minsk, 2017. – P/ 133-138 URL:

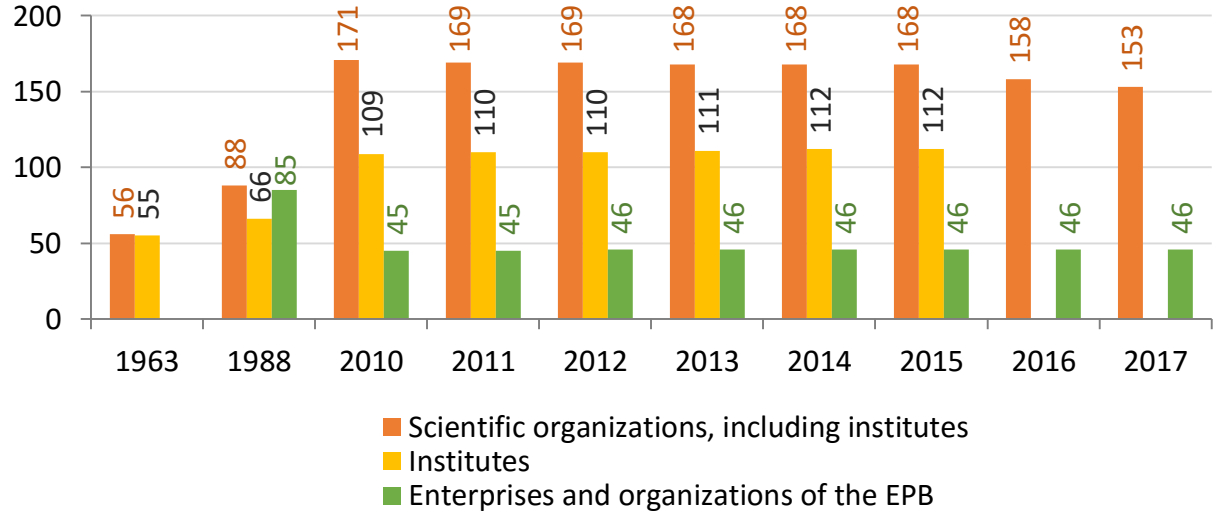
IX. SUPPLEMENTARY INTERNAL STATISTICS OF NATIONAL ACADEMY OF SCIENCES OF UKRAINE [7]

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

(units)

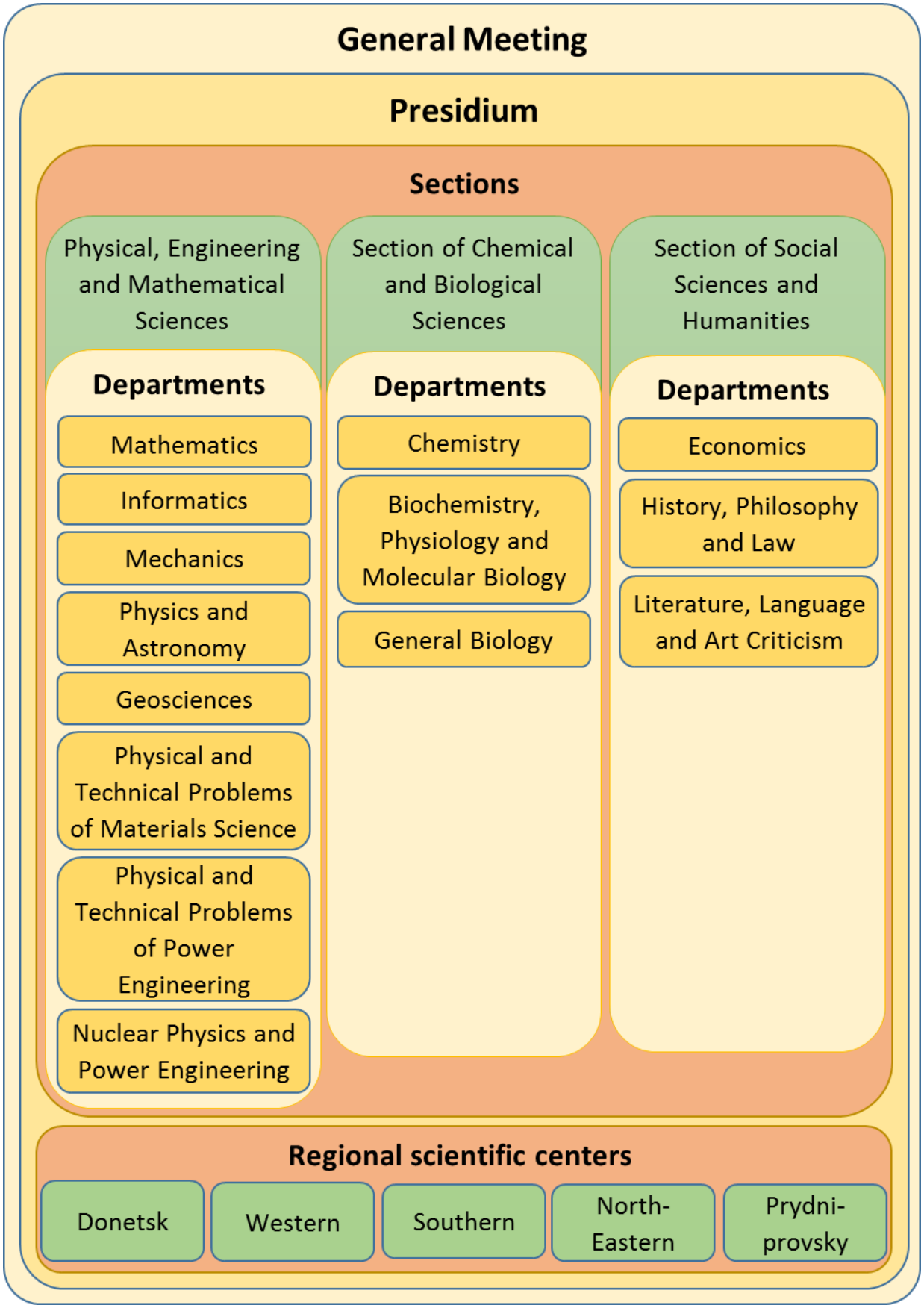
Year	Total	including		
		scientific organizations	institutes	enterprises and organizations of the experimental and production base (EPB)
1963	56	56	55	–
1988	173	88	66	85
2010	216	171	109	45
2011	214	169	110	45
2012	215	169	110	46
2013	215	168	111	46
2014	215	168	112	46
2015	214	168	112	46
2016	204	158	–	46
2017	199	153	–	46

Dynamics of framework, *units*



[7] Statistical indicators of annual reports on the activities of the National Academy of Sciences of Ukraine for 2000-2017 years are used.

Management structure of National Academy of Sciences of Ukraine



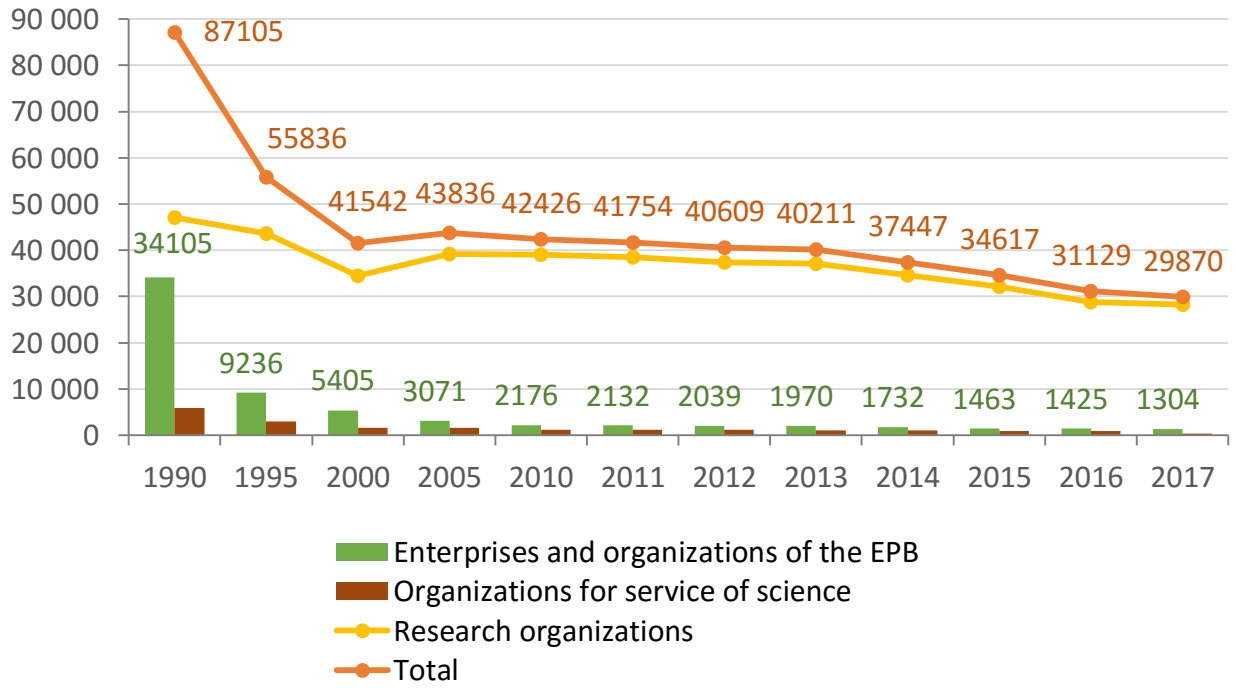
Differentiation of the institutional structure by departments: **2017**, *units*

Departments	Scientific organizations	Enterprises and organizations of the experimental and production base	Scientific objects of national heritage	Centers of collective use
Section of Physical, Engineering and Mathematical Sciences				
Mathematics	4	–	–	–
Informatics	7	–	–	–
Mechanics	6	3	3	6
Physics and Astronomy	16	3	9	16
Geosciences	14	1	–	5
Physical and Technical Problems of Materials Science	11	18	1	12
Physical and Technical Problems of Power Engineering	11	7	2	4
Nuclear Physics and Power Engineering	6	2	2	6
Section of Chemical and Biological Sciences				
Chemistry	13	7	–	11
Biochemistry, Physiology and Molecular Biology	8	1	5	9
General Biology	22	1	19	12
Section of Social Sciences and Humanities				
Economics	9	–	–	–
History, Philosophy and Law	17	3	5	–
Literature, Language and Art Criticism	9	–	4	–

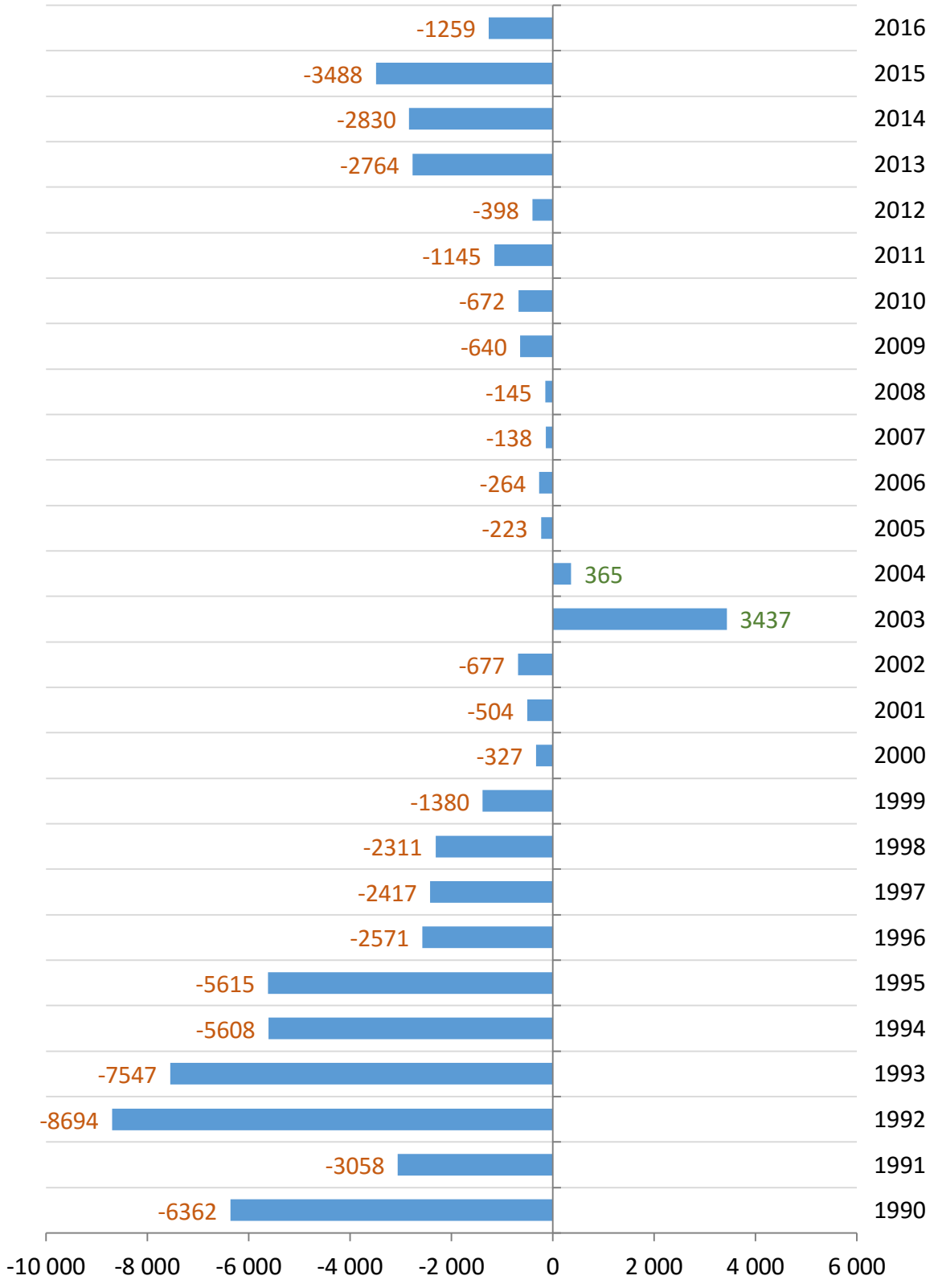
IX.2. Employees of National Academy of Sciences of Ukraine

Trends in the number of employees: 1990-2017, *headcount*

Year	Total	including employees of		
		Research organizations	Enterprises and organizations of the experimental and production base (EPB)	Organizations for service of science
1990	87105	47110	34105	5890
1995	55836	43583	9236	3017
2000	41542	34466	5405	1671
2005	43836	39190	3071	1575
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
2015	34617	32183	1463	971
2016	31129	28769	1425	935
2017	29870	28225	1304	341



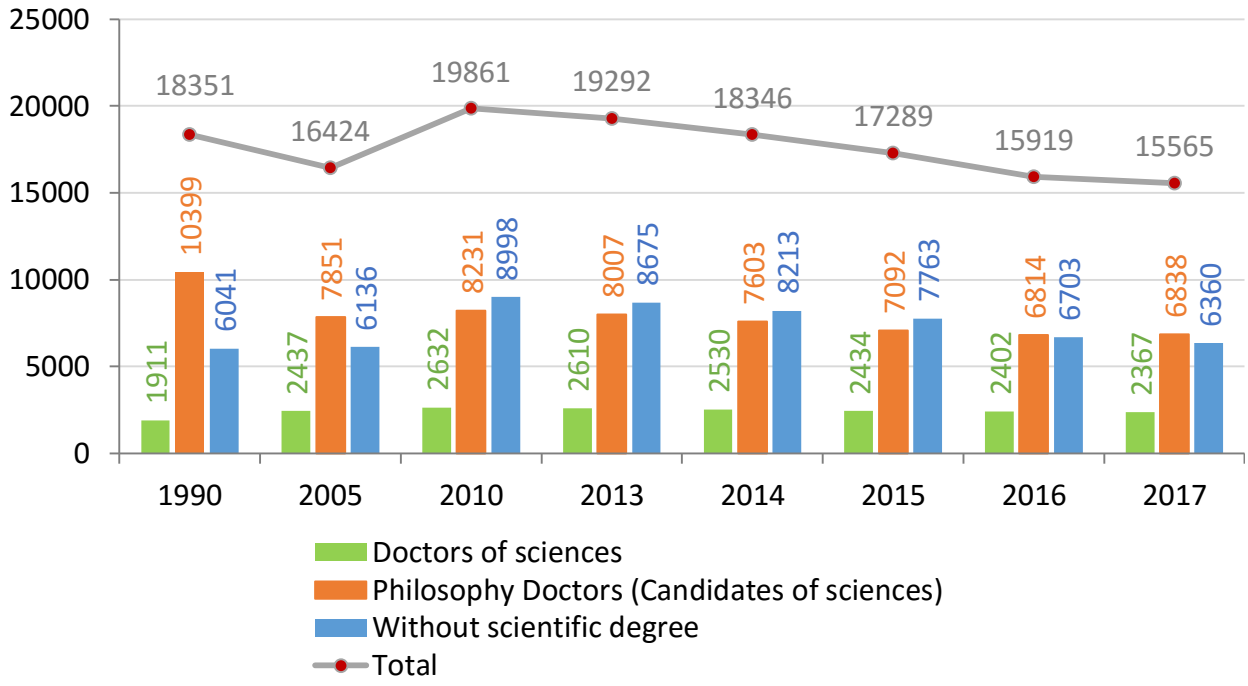
Change in the number of employees over previous year: 1990-2016, *headcount*



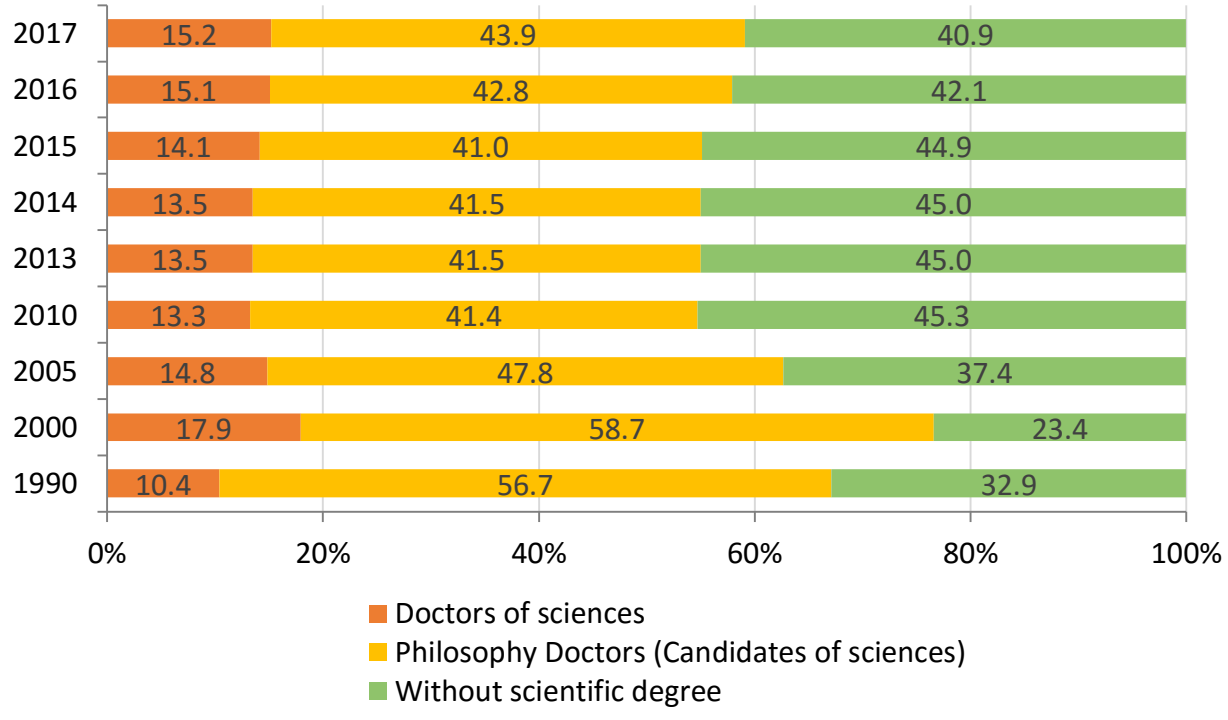
IX.3. Distribution of the number of scientific workers by scientific degree

Trends in of the number of scientific workers of NAS of Ukraine,

headcount



Share of Doctors of sciences, Philosophy Doctors (Candidates of sciences) and scientific workers without scientific Degree in the total number of scientists of NAS of Ukraine



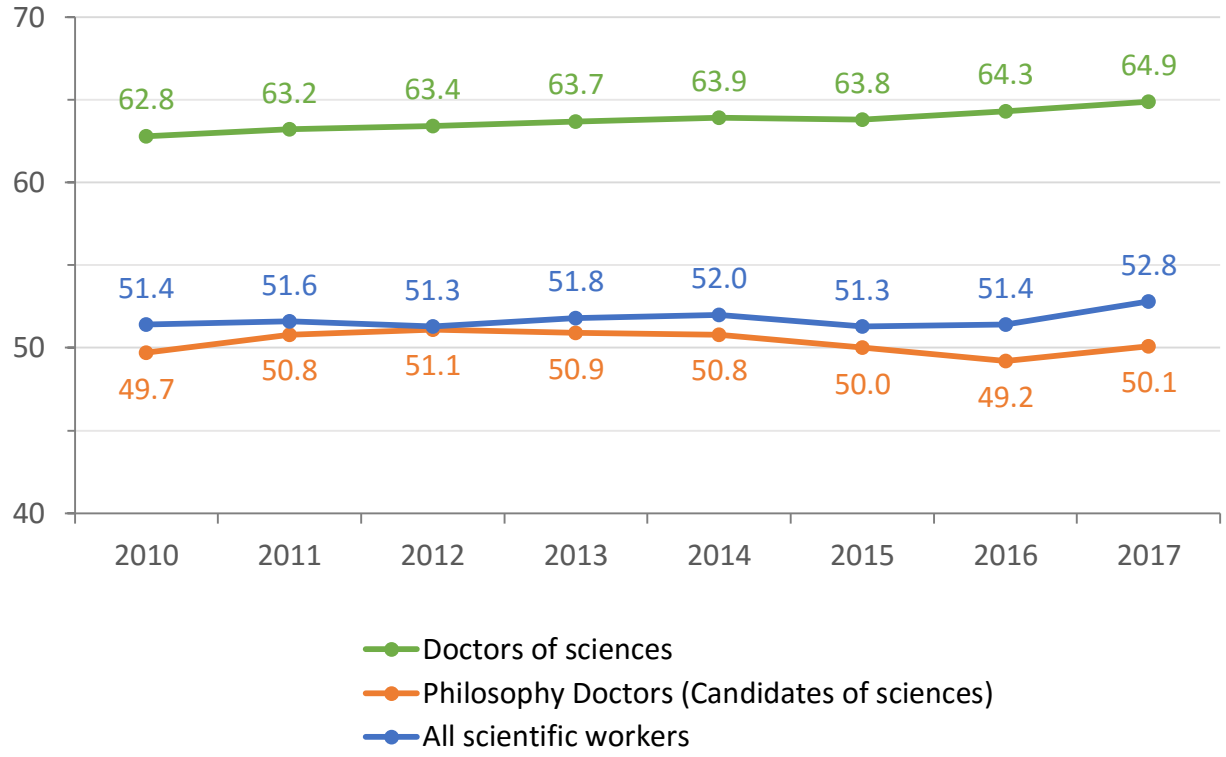
IX.4. Scientific workers in National Academy of Sciences of Ukraine by scientific department

(headcount)

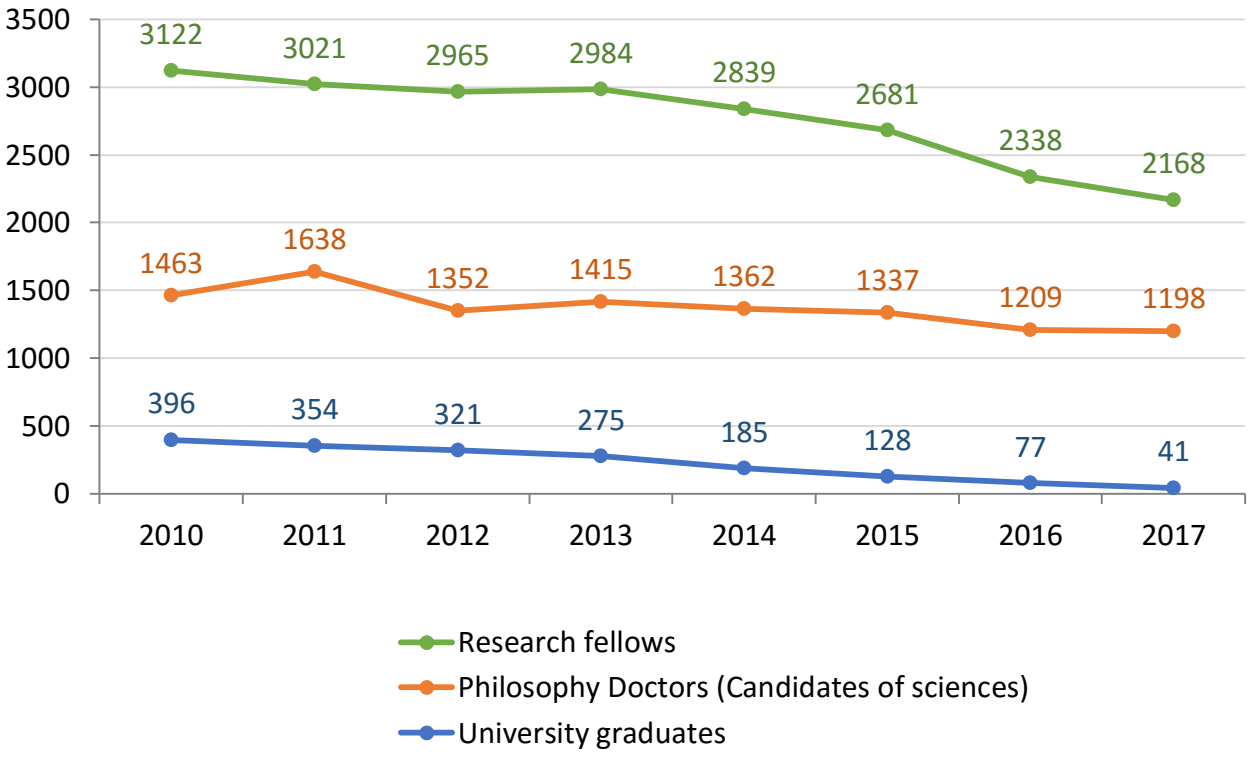
Departments	2016			2017		
	Total	including		Total	including	
		Doctors of sciences	PhD (Candi-dates of sciences)		Doctors of sciences	PhD (Candi-dates of sciences)
Mathematics	348	106	197	344	110	196
Informatics	813	106	276	791	101	276
Mechanics	703	133	274	674	133	266
Physics and Astronomy	2132	438	902	2130	433	903
Geosciences	832	114	339	816	116	344
Physical and Technical Problems of Materials Science	2477	269	830	2407	266	817
Physical and Technical Problems of Power Engineering	982	134	374	948	135	376
Nuclear Physics and Power Engineering	1495	159	490	1409	148	472
Chemistry	1118	152	628	1074	153	629
Biochemistry, Physiology and Molecular Biology	1034	166	535	1021	160	540
General Biology	1065	128	499	1044	126	513
Economics	586	120	293	561	114	282
History, Philosophy and Law	1296	222	660	1302	221	679
Literature, Language and Art Criticism	476	66	284	471	67	292

IX.5. Age structure of scientific workers

Average age of scientific workers, *years*



Number of employees under the age of 35, *headcount*

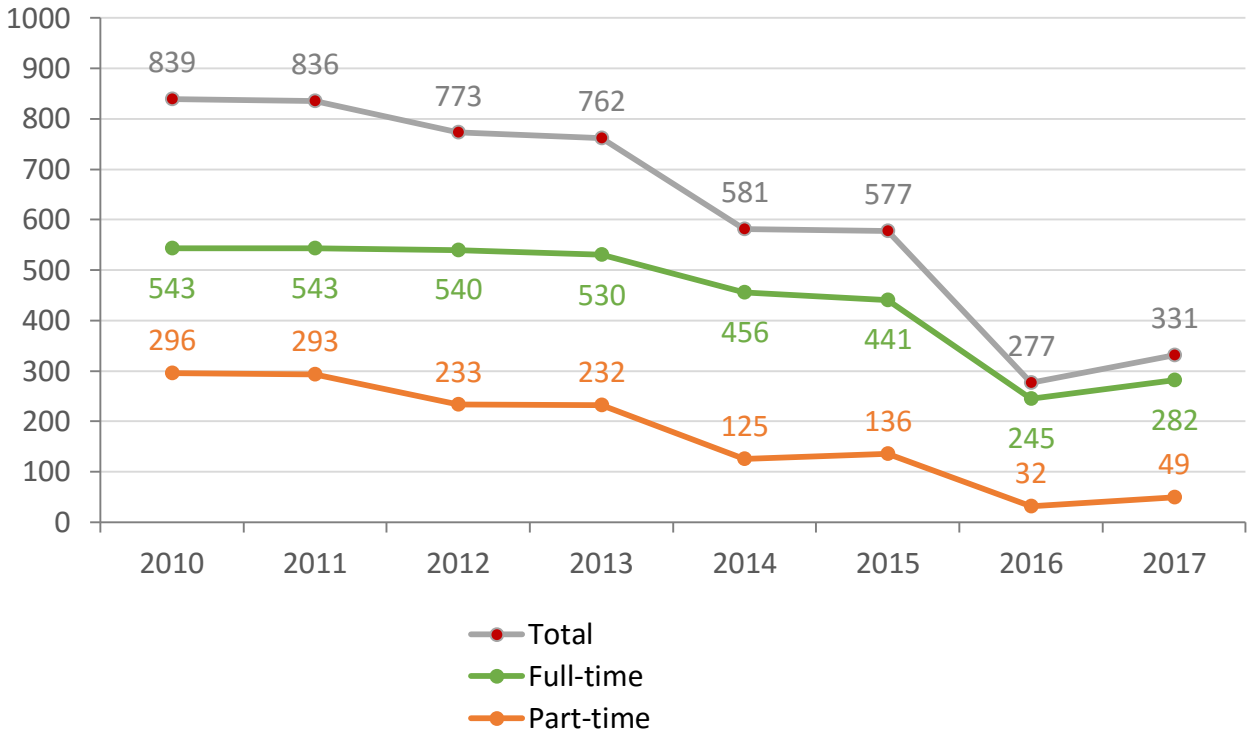


IX.6. Post-graduate and doctoral training in National Academy of Sciences of Ukraine: 2010-2017

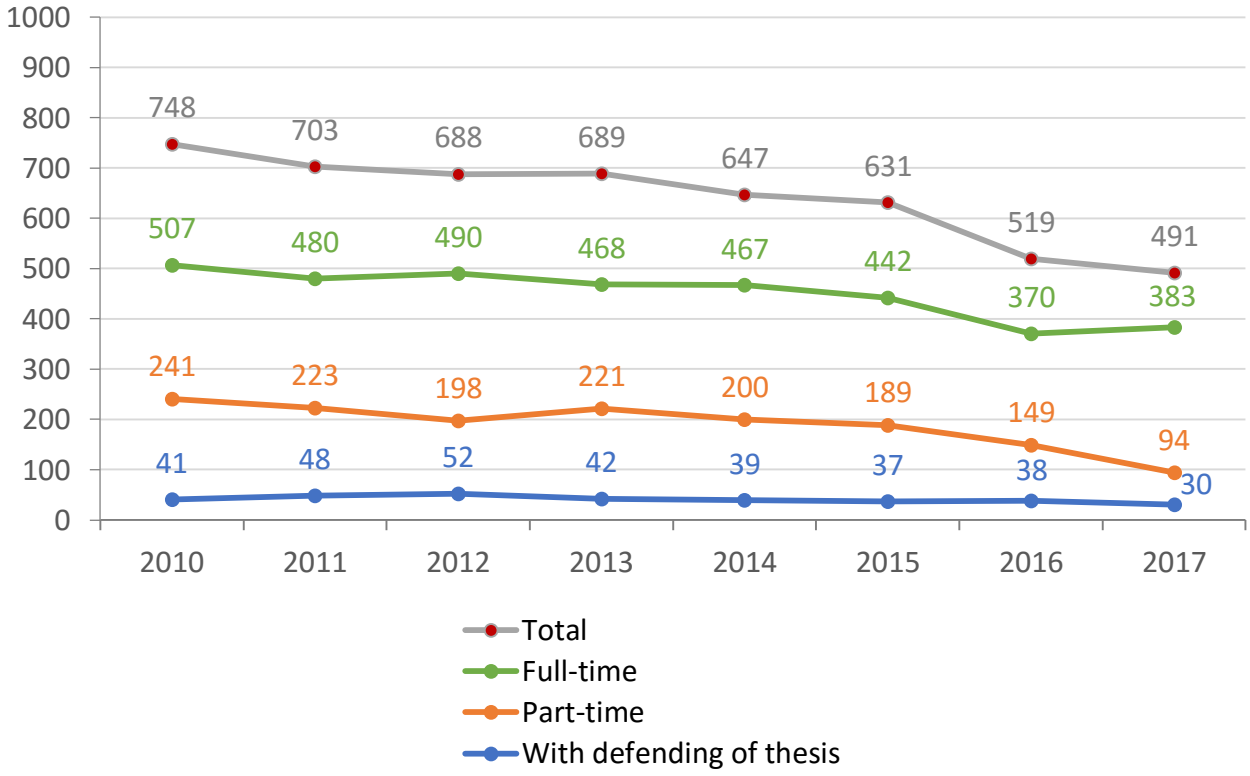
Post-graduate courses, *headcount*

	2010	2012	2013	2014	2015	2016	2017
Institutions with postgraduate courses, *units*	143	142	142	137	136	136	128
Postgraduate students	2716	2559	2349	2045	1855	1500	1224
Admission to postgraduate courses							
Total	839	773	636	581	577	277	331
including:							
full-time	543	540	473	456	441	245	282
part-time	296	233	163	125	136	32	49
Graduates of postgraduate courses							
Total	748	688	689	647	631	519	491
including:							
full-time	507	490	468	467	442	370	383
part-time	241	198	221	180	189	149	94
with defending of thesis	41	52	42	39	37	38	30

Admission to postgraduate courses, *headcount*



Graduates of postgraduate courses, *headcount*

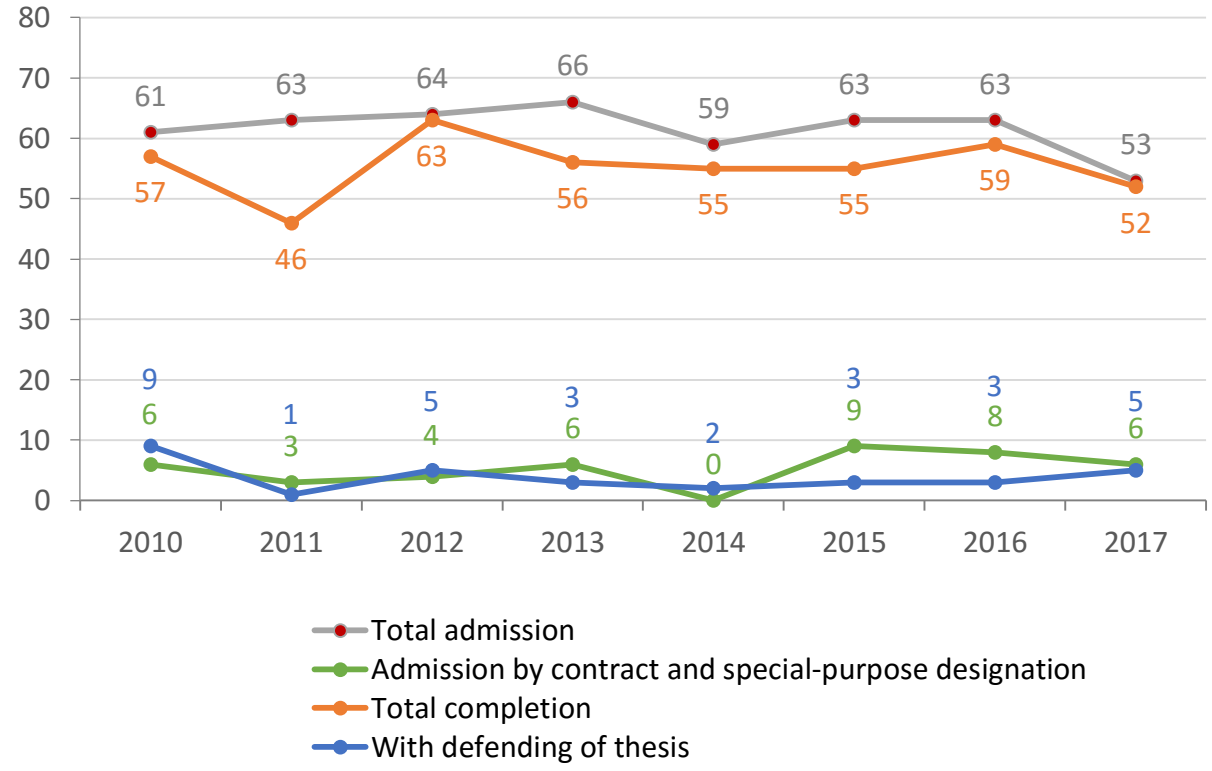


Doctoral courses*, *headcount*

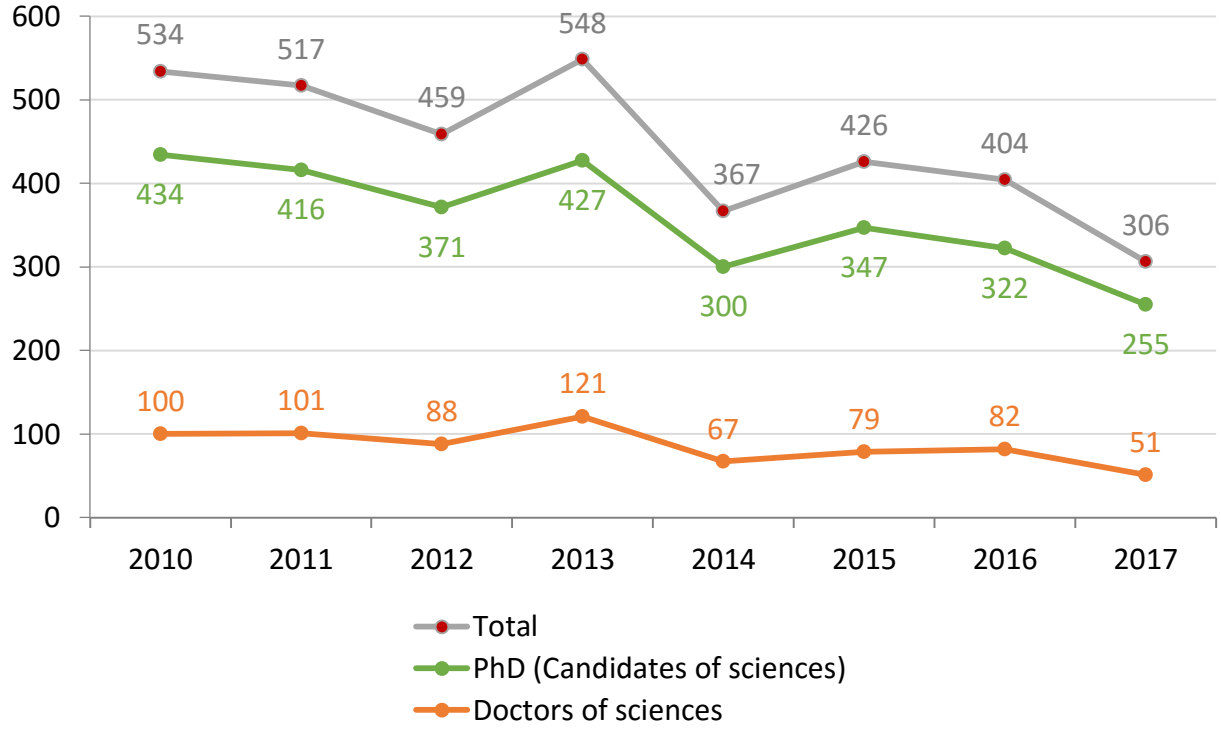
	2010	2012	2013	2014	2015	2016	2017
Institutions with the doctoral courses	60	62	65	65	64	60	59
Number of doctoral students	169	181	189	177	176	174	166
Admission to doctoral courses							
Total	61	64	66	59	63	63	53
including:							
by contract and special-purpose designation	6	4	6	–	9	8	6
Graduates of doctoral courses							
Total	57	63	56	56	55	59	52
including:							
with defending of doctoral thesis	9	5	3	2	3	3	5

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

Trends in admission to the doctoral courses and its completion, *headcount*



Trends in defending theses, *headcount*



Women among postgraduate and doctoral students*, *headcount*

	2010	2011	2012	2013	2014	2015	2016
Female postgraduate students – total	20817	20628	20219	19073	16563	15267	13611
including **NAS of Ukraine**	1336	1307	1249	1139	995	795	639
Female doctoral students – total	790	855	943	964	916	912	920
including **NAS of Ukraine**	60	60	61	64	68	66	77
							(as % in total of each year)
Female postgraduate students – total	60.1	60.3	60.1	60.6	60.0	53.6	52.4
including **NAS of Ukraine**	49.2	49.0	48.8	48.5	48.7	42.9	42.6
Female doctoral students – total	50.6	52.4	52.0	52.6	52.1	50.1	51.3
including **NAS of Ukraine**	35.5	33.0	33.3	33.9	38.4	37.5	44.3

* According to the Department of Scientific and Managerial Personnel of NAS of Ukraine.

Postgraduate students by source of funding: 2010-2017, *headcount*

	2010	2012	2013	2014	2015	2016	2017
Total	**2716**	**2558**	**2349**	**2045**	**1855**	**1500**	**1224**
including:							
Public Budget	2456	2383	2214	1949	1729	1332	1051
Private Funds	241	168	128	93	126	168	173
Other Sources	19	7	7	3	–	–	–
Admission – total	**839**	**773**	**636**	**581**	**577**	**277**	**331**
including:							
Public Budget	782	744	611	563	511	243	282
Private Funds	54	29	24	17	66	34	49
Other Sources	3	–	1	–	–	–	–
Graduates – total	**748**	**688**	**689**	**647**	**631**	**519**	**491**
including:							
Public Budget	677	638	641	618	607	504	466
Private Funds	66	46	48	27	24	15	25
Other Sources	5	4	–	2	–	–	–

Distribution of doctoral students, by source of funding: 2010-2017*, *headcount*

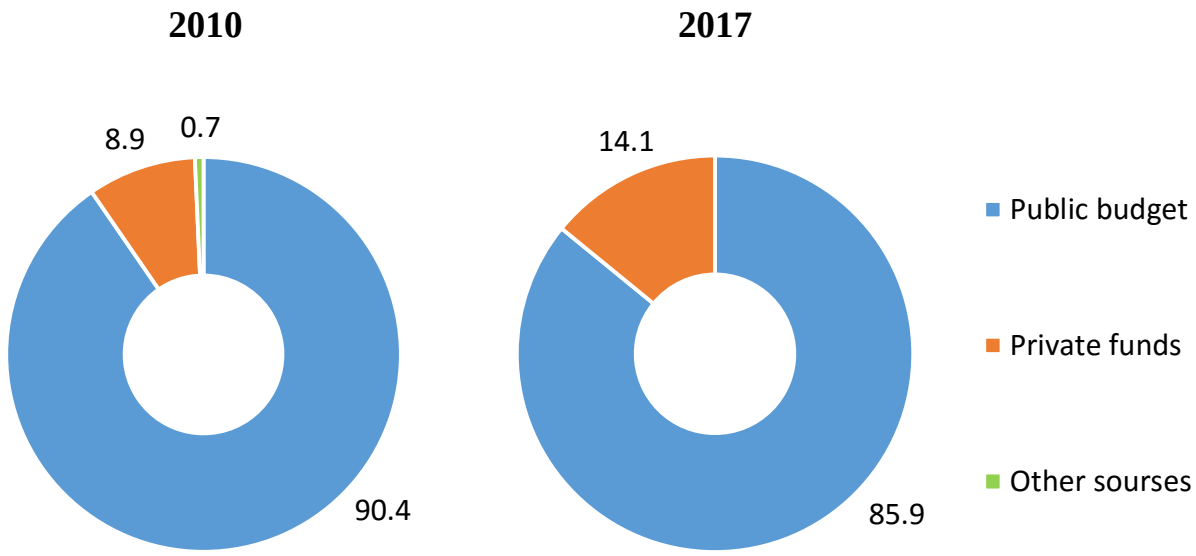
	2010	2012	2013	2014	2015	2016	2017
Total	**169**	**183**	**189**	**177**	**176**	**174**	**59**
including:							
Public Budget	152	170	178	169	168	163	166
Private Funds	14	9	9	6	8	11	14
Other Sources	3	4	2	2	–	–	–

continued

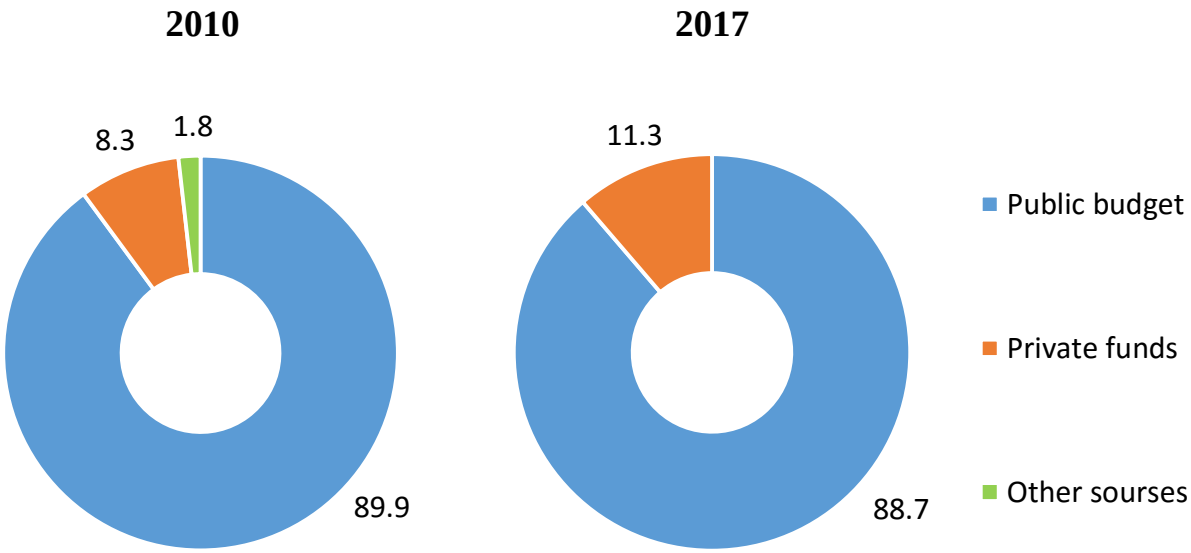
	2010	2012	2013	2014	2015	2016	2017
Admission – total	**61**	**64**	**66**	**59**	**63**	**63**	**53**
including:							
Public Budget	56	60	66	59	54	55	47
Private Funds	5	4	6	–	9	8	6
Other Sources	–	–	–	–	–	–	–
Graduates – total	**57**	**63**	**56**	**56**	**55**	**59**	**52**
including:							
Public Budget	49	56	50	53	53	56	51
Private Funds	5	5	4	1	2	3	1
Other Sources	3	2	2	2	–	–	–

* According to the Department of Scientific and Managerial Personnel of the NAS of Ukraine.

Percentage distribution of postgraduate students by source of funding: 2010, 2017, *%*

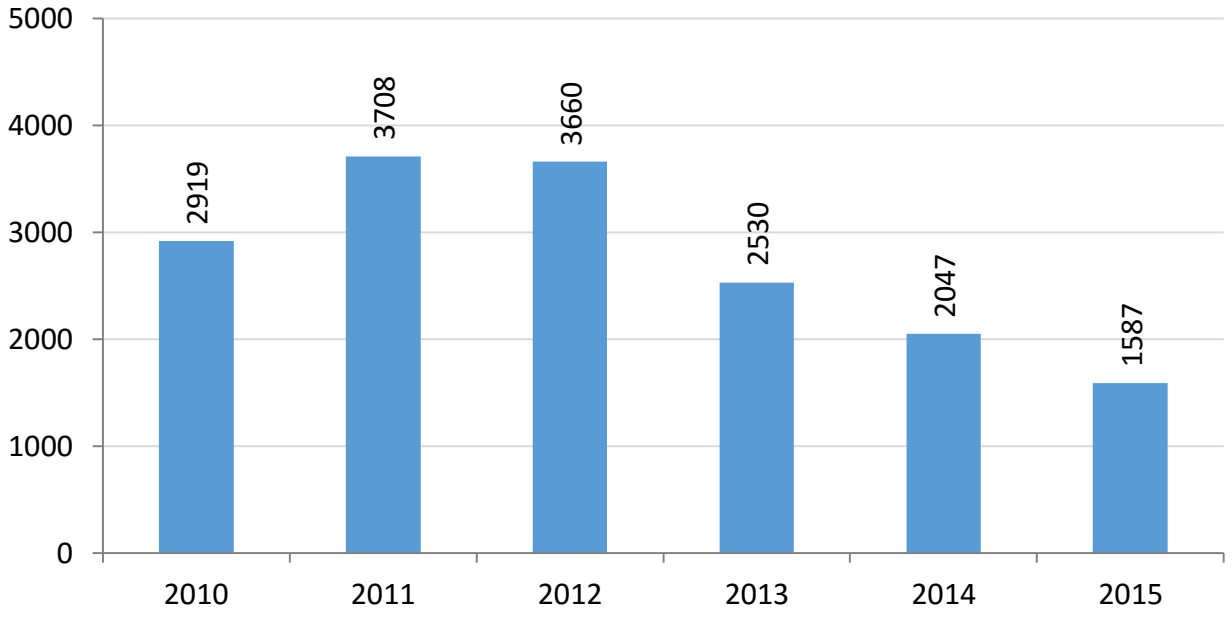


Percentage distribution of doctoral students by source of funding, *%*

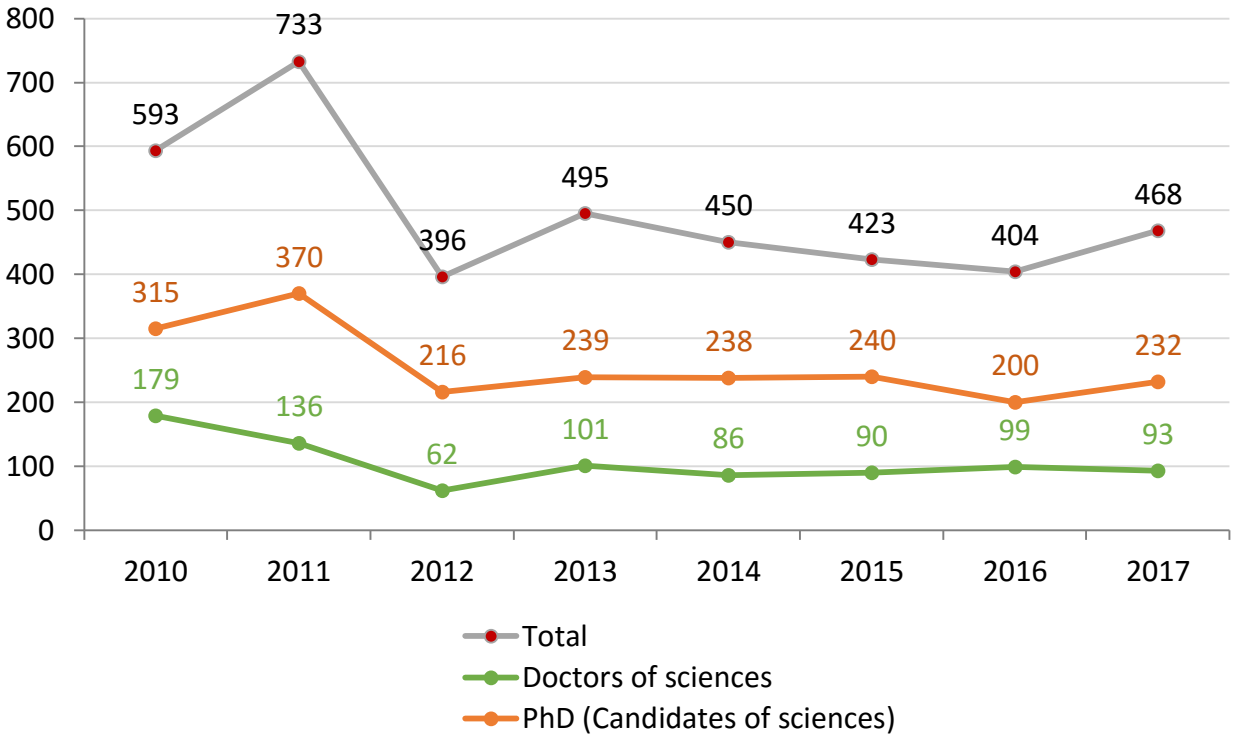


IX.7. Foreign trips of scientists of National Academy of Sciences of Ukraine

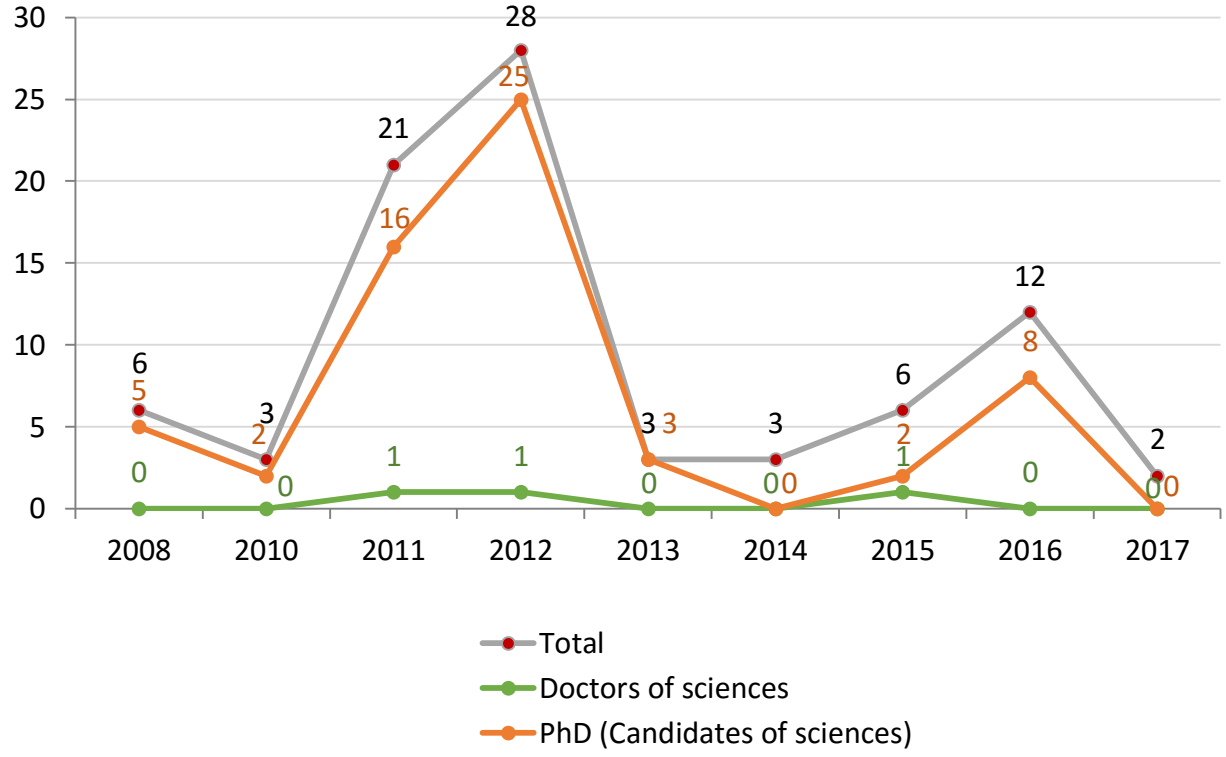
Trends in visiting of scientists of NAS of Ukraine abroad, *headcount*



Trends in visiting researchers of NAS of Ukraine for training or temporal work in foreign R&D Institutions, *headcount*



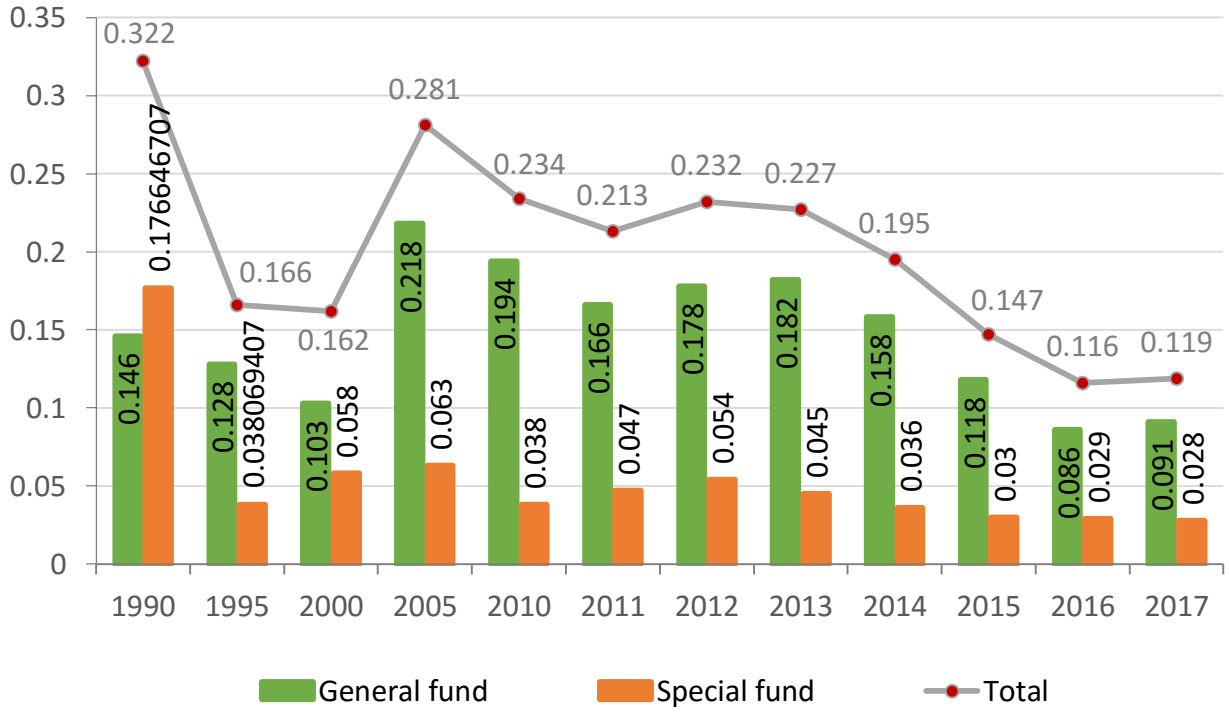
Trends in emigration of scientists for permanent residence, *headcount*



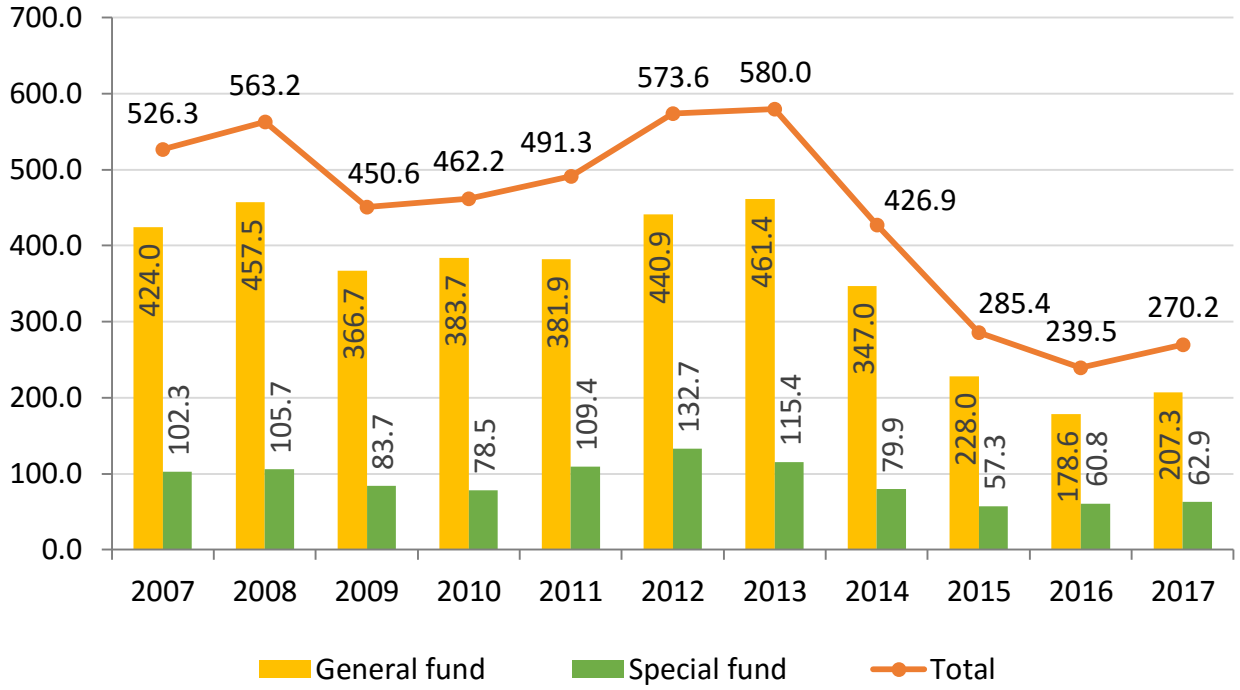
IX.8. Actual funding of National Academy of Sciences of Ukraine from public budget

Year	Total funding, *million UAH*			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	3303.7	2642.9	660.8	20
2014	3054.5	2482.7	571.9	19
2015	2925.6	2337.9	587.7	20
2016	2759.8	2058.7	701.1	25
2017	3539.9	2716.3	823.6	23

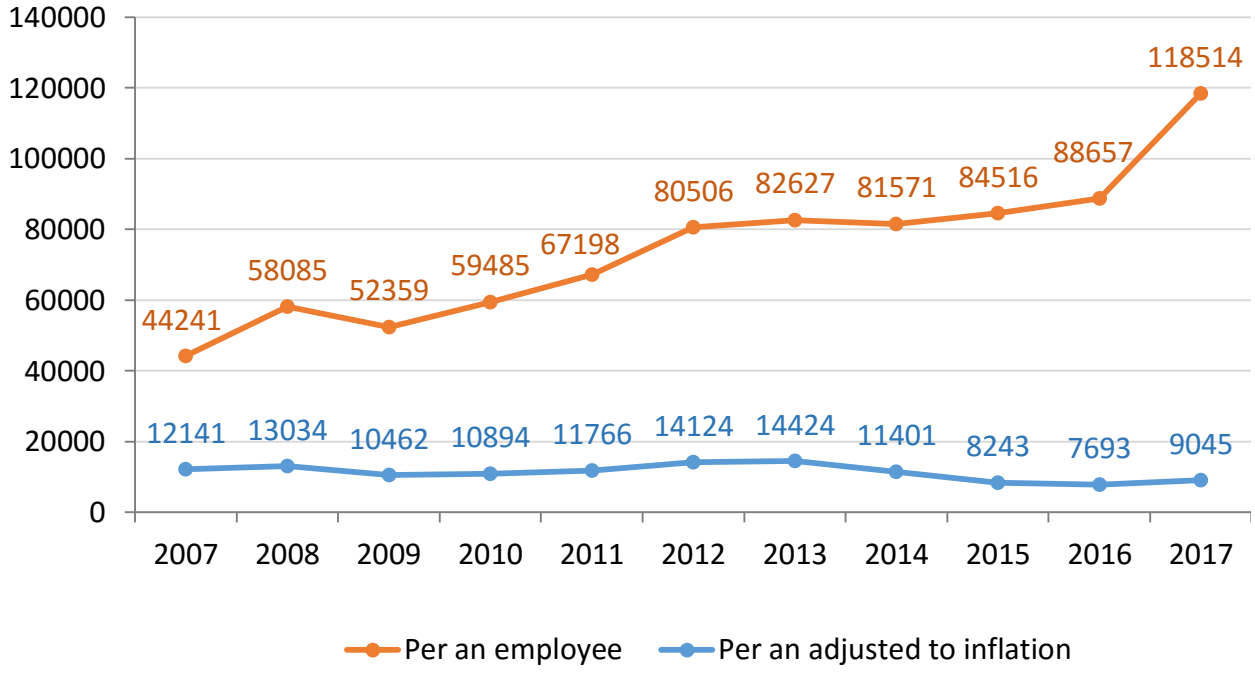
Share in funding of National Academy of Sciences of Ukraine in GDP, *%*



Dynamics of funding adjusted to inflation in comparable prices in 2006*: 2007-2017, *million UAH*

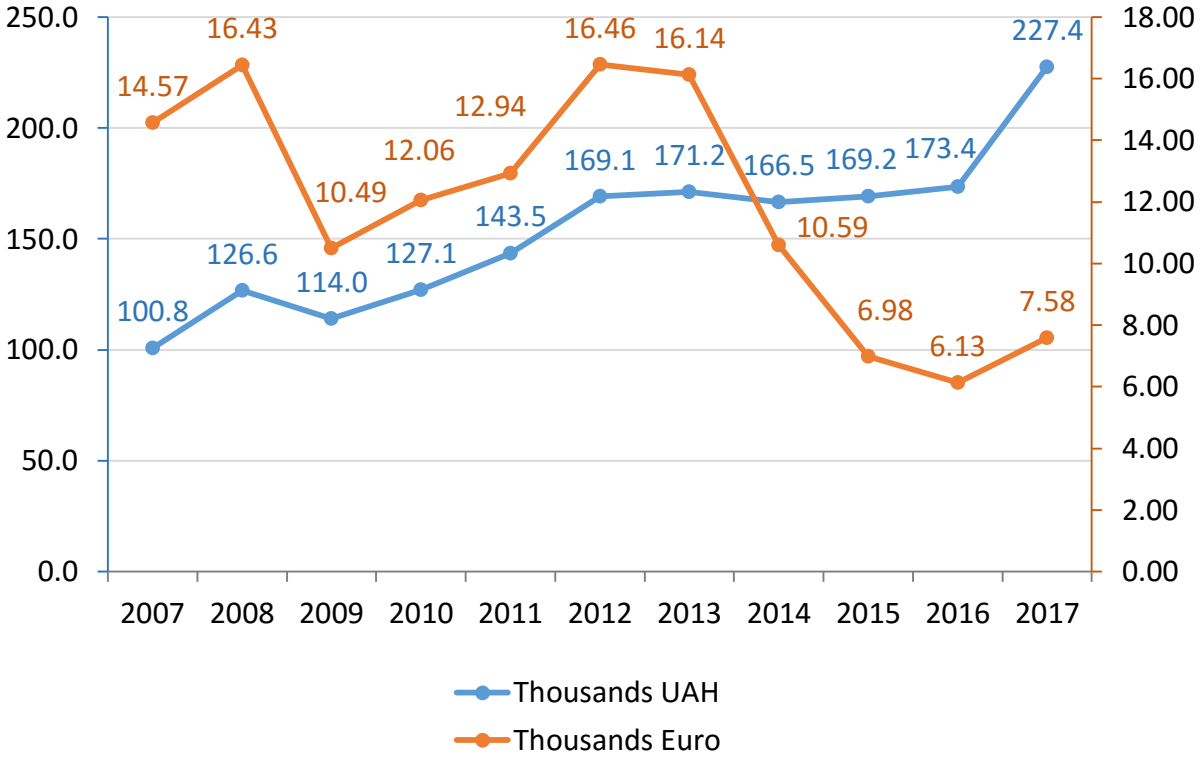


Dynamics of funding per an employee adjusted to inflation in comparable prices in 2006*: 2007-2017, *UAH*

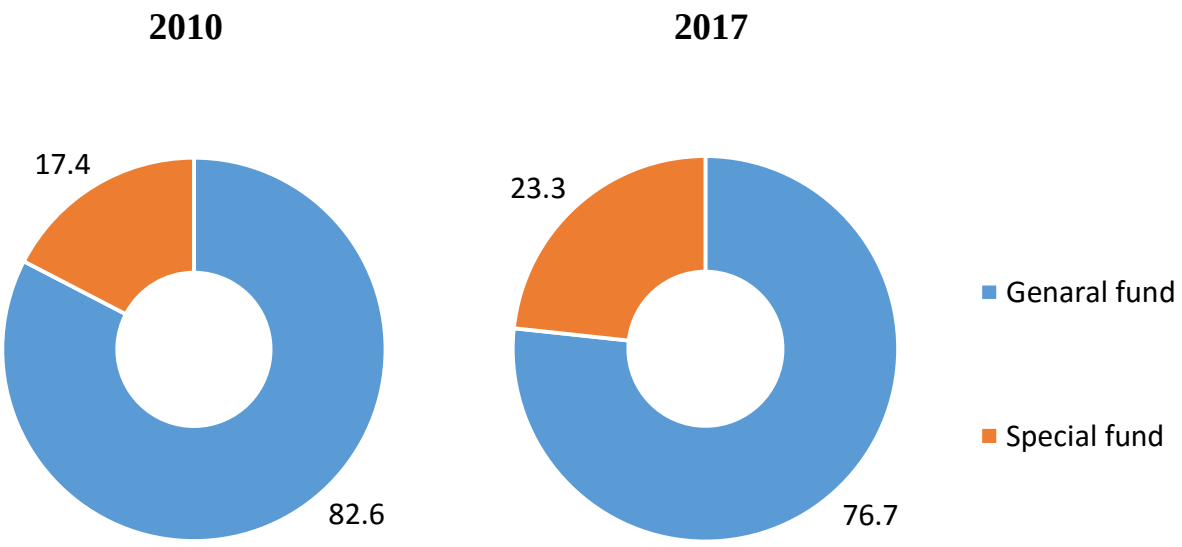


* Calculation is carried out according to the method proposed in the article: Grachev O.O., Etokov V.I. Analysis of Transformation Processes in Financial Support of the NAS of Ukraine. Science and Science of Sciences. 2013. № 1. P.47 – 56.

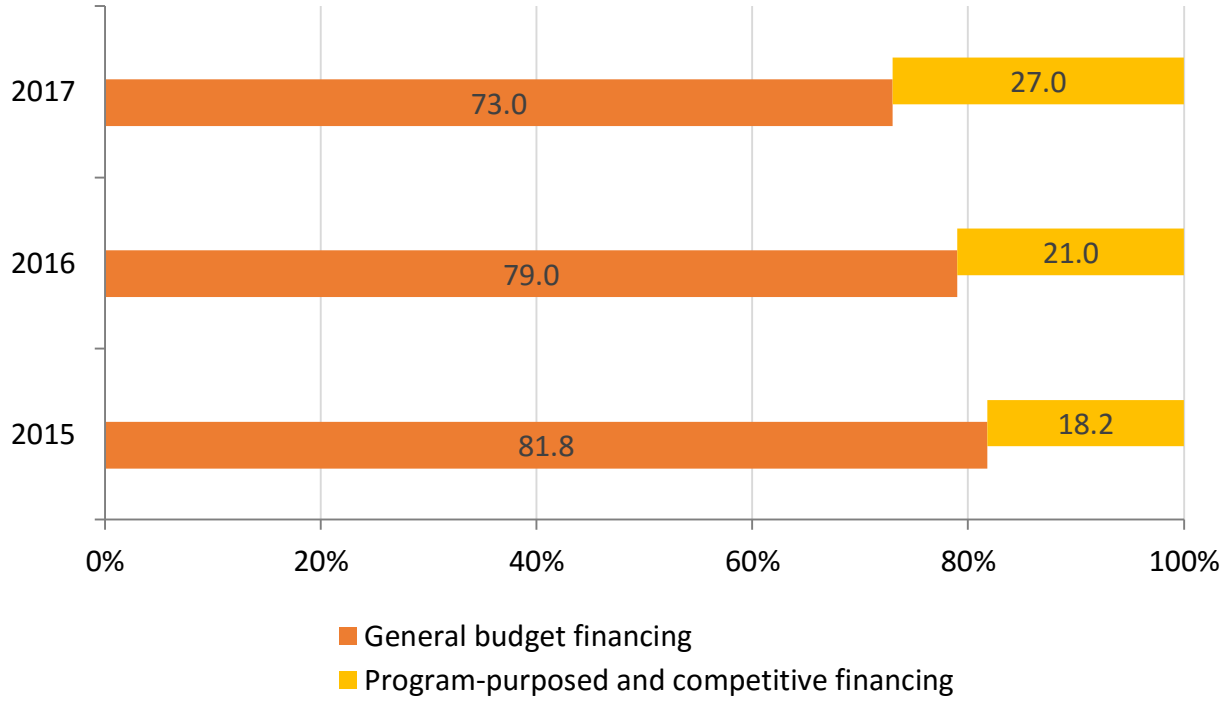
Dynamics of funding per scientist: 2007-2017



Distribution of funding by source, %



Percentage distribution of general funding: 2015-2017

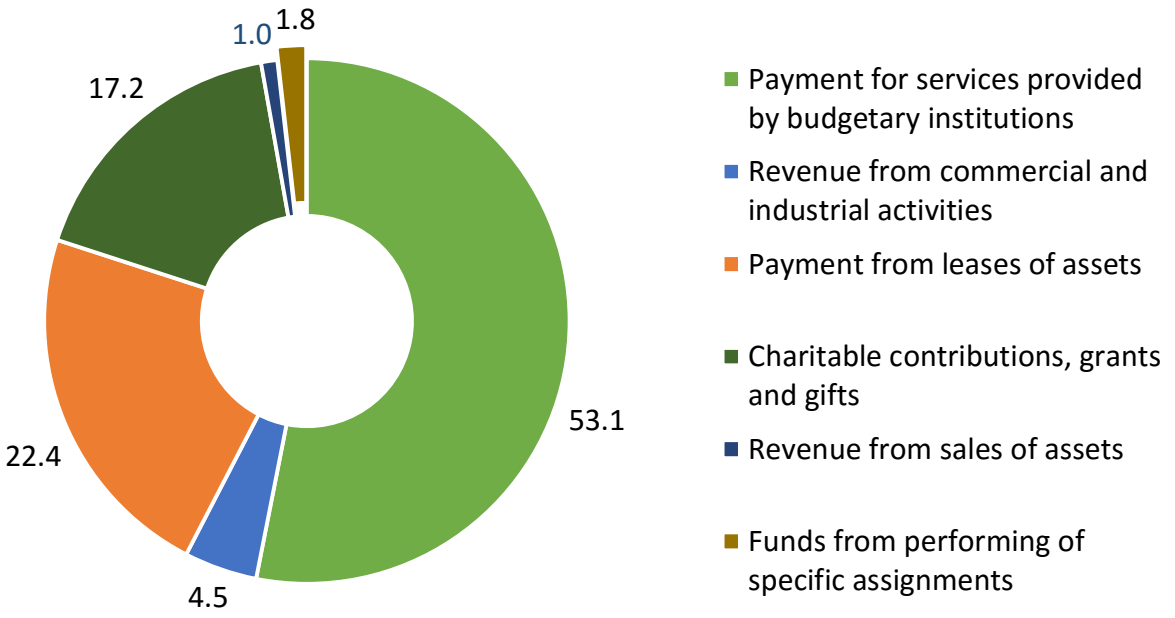


Main sources of special fund revenues of NAS of Ukraine: 2016, 2017

	2016		2017	
	Million UAH	*%*	*Million UAH*	*%*
Total	**701.1**	**100.0**	**823.6**	**100.0**
including:				
Payment for services provided by budgetary institutions	425.7	60.7	438.1	53.1
Revenue from commercial and industrial activities	30.8	4.4	37.3	4.5
Payment from leases of assets	186.1	26.5	184.3	22.4
Charitable contributions, grants and gifts	41.9	6.0	141.1	17.2
Revenue from sales of assets	2.9	0.5	8.2	1.0
Funds from performing of specific assignments	13.5	1.9	14.6	1.8

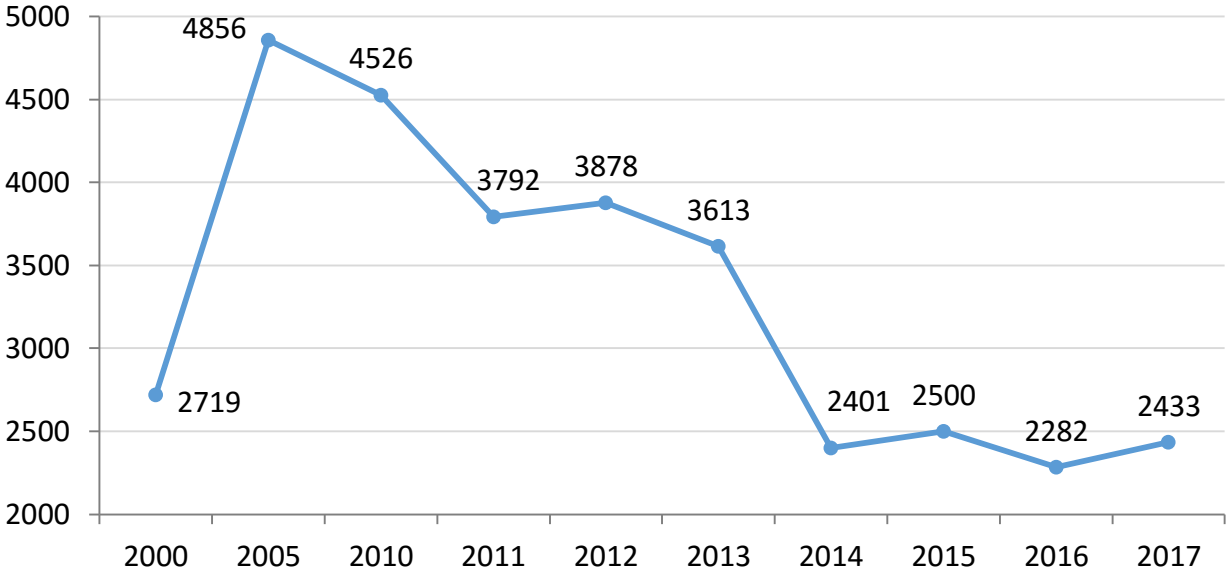
Percentage distribution of main sources of special fund revenues, *%*

2017

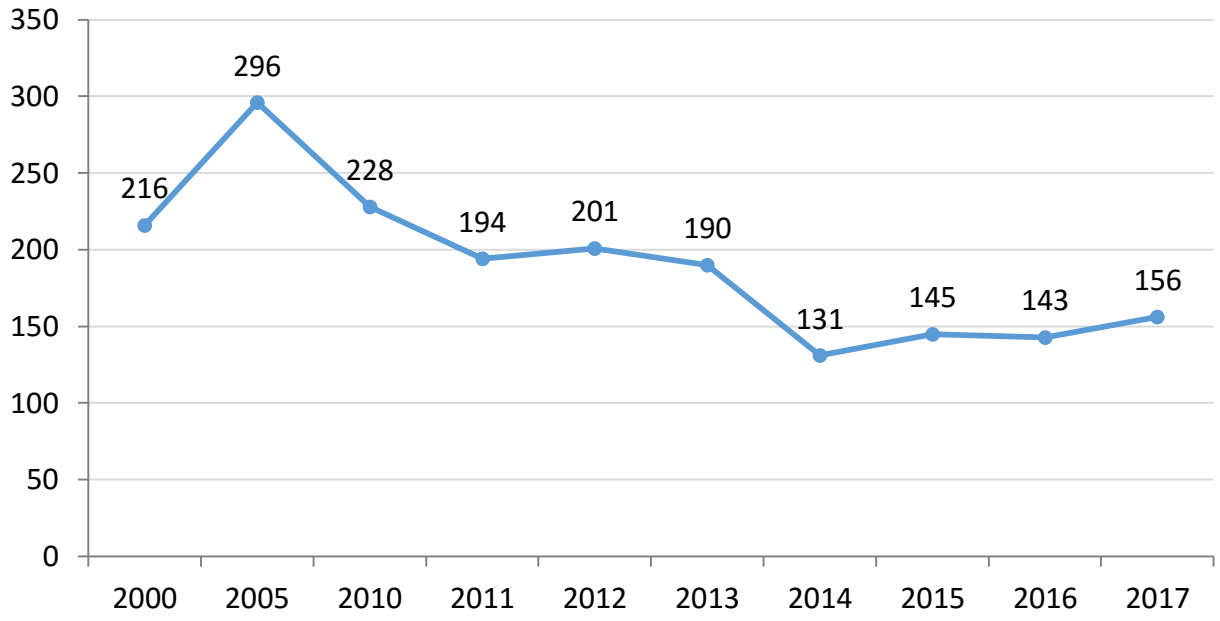


IX.9. Economic agreements and contracts and their financing

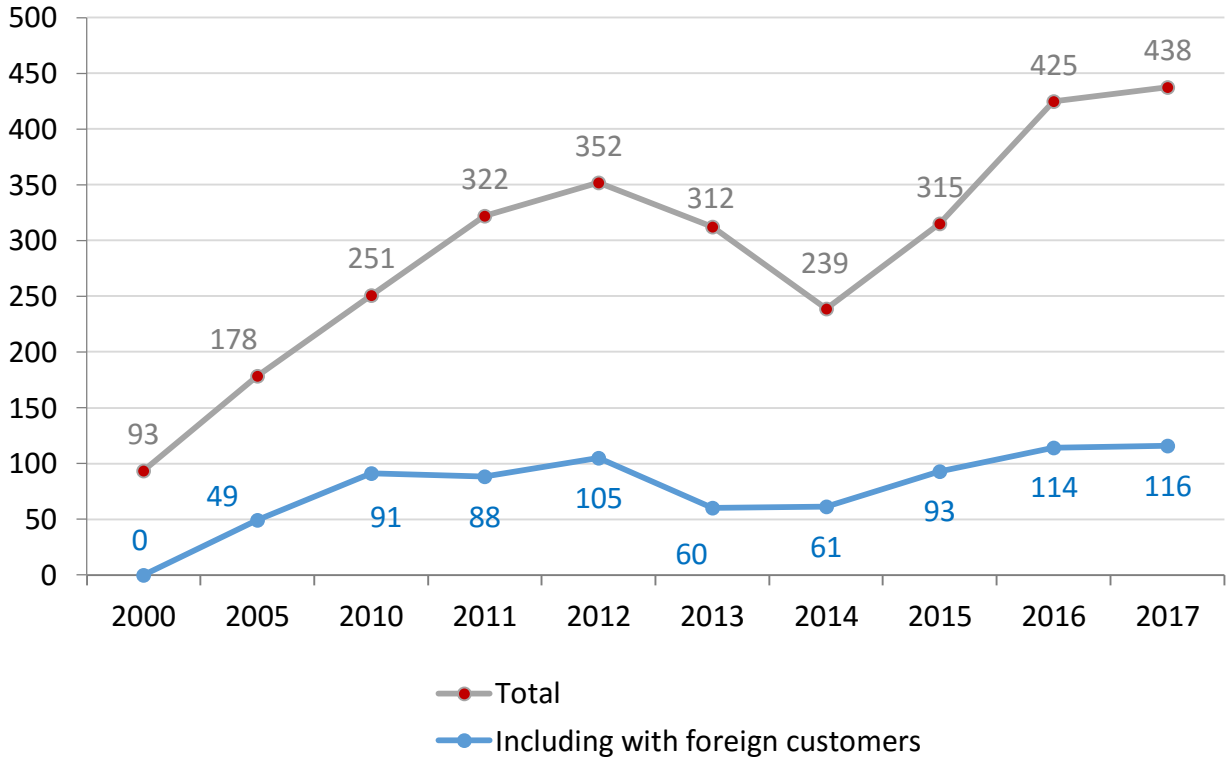
Trends in the number of economic agreements and contracts, *units*



Trends in the number of economic agreements and contracts per 1000 scientific workers, *units*



Trends in financing of works under economic agreements and contracts, *million UAH*



IX.10. Foreign economic activity of National Academy of Sciences of Ukraine*

	2010	2012	2013	2014	2015	2016	2017
Contracts with foreign companies, *units*	295	335	316	195	158	263	167
Funding of contracts with foreign customers, *million UAH*	91.3	105.0	59.7	61.2	92.9	114.3	116.0

* Institutions of NAS of Ukraine cooperated with customers from 50 countries in 2010-2017.

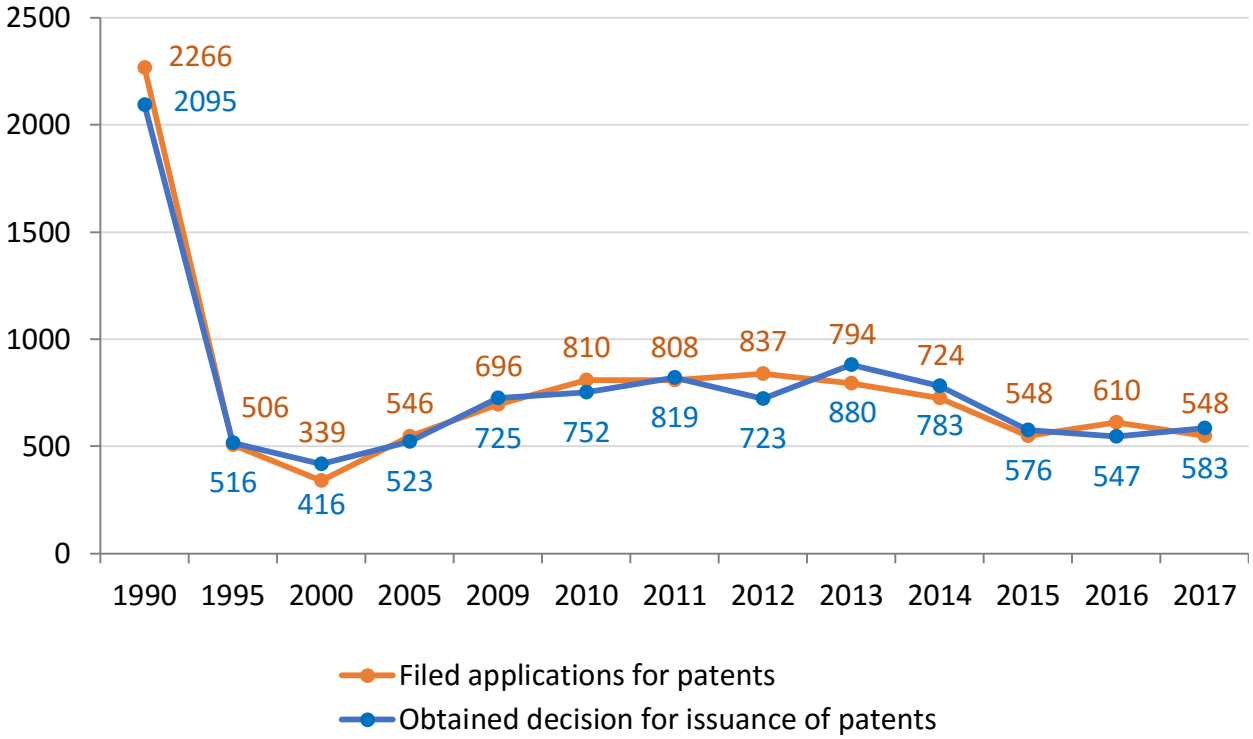
IX.11. Creating and using objects of intellectual property and the implementation of scientific development

Number of applications for the issuance of security documents and received security document

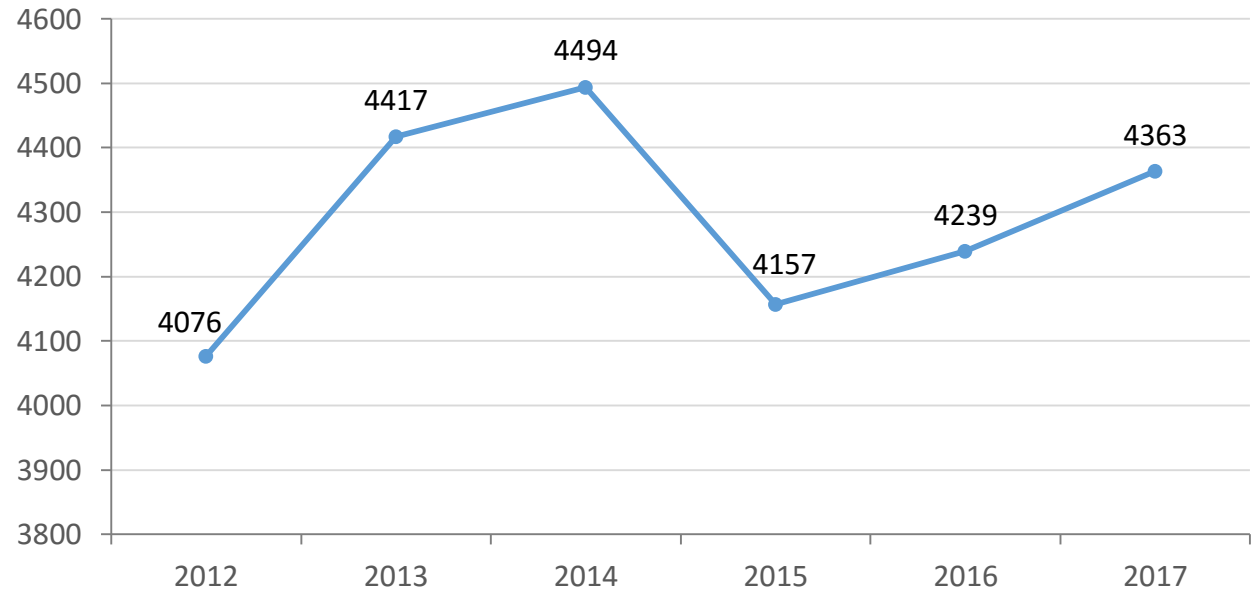
(units)

	Applications for inventions					Received patents and certificates for inventions				
	2013	2014	2015	2016	2017	2013	2014	2015	2016	2017
Total including:	794	713	548	610	558	872	774	576	547	583
in the State Intellectual Property Service of Ukraine	780	702	545	608	556	859	765	572	546	578
in the Patent Offices of Foreign States	14	11	3	2	2	13	9	4	1	5

Trends in creation of objects of intellectual property, *units*

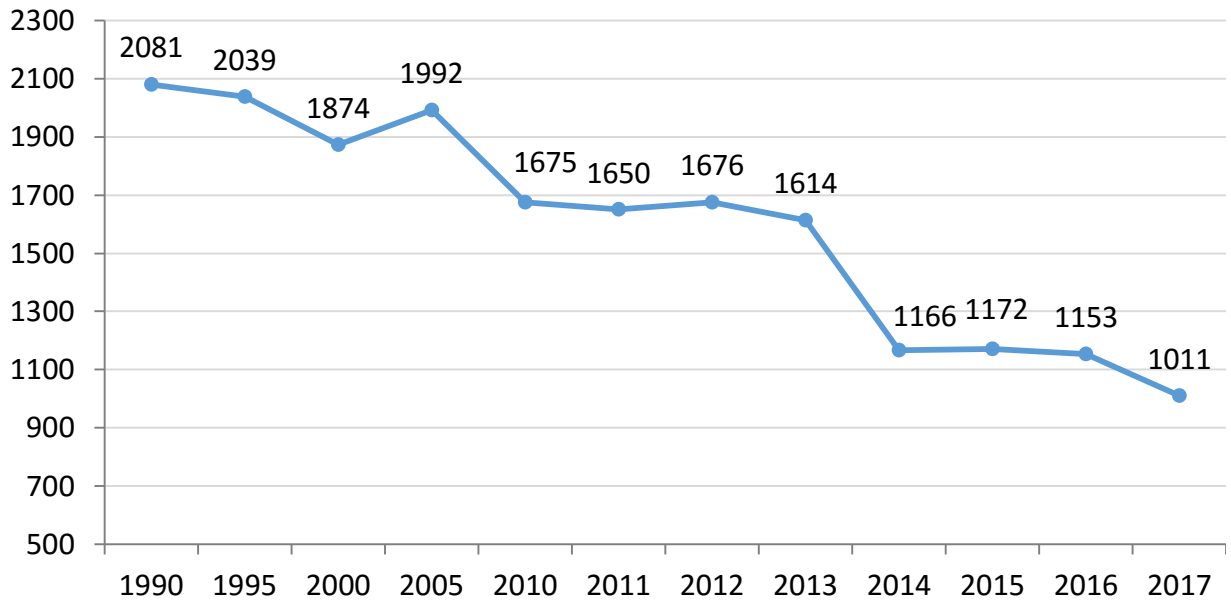


Number of valid security documents for objects of intellectual property, *units*



IX.12. Implementation of innovative projects

Trends in implementation of scientific development, *units*



Most important scientific and scientific and technical development of NAS of Ukraine by department: 2016-2017, *units*

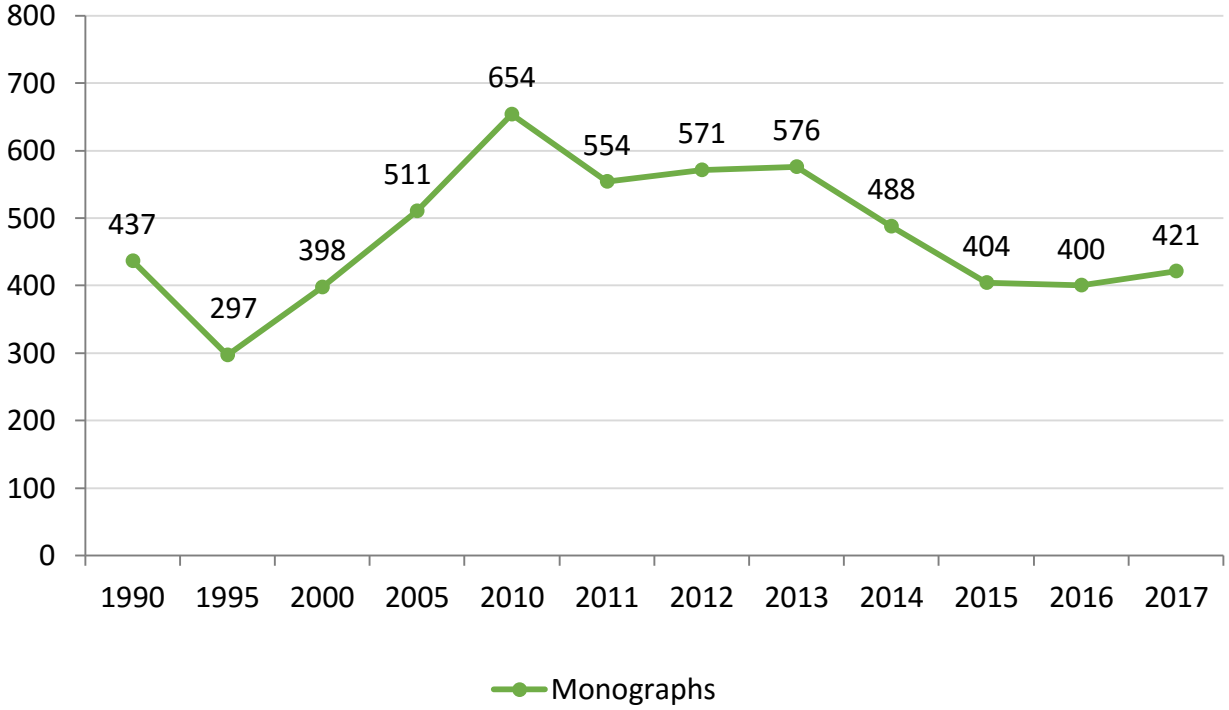
Department	2016	2017
Total	**38**	**64**
including :		
Mathematics	3	4
Informatics	2	7
Mechanics	1	3
Physics and Astronomy	5	9
Geosciences	2	9
Physical and Technical Problems of Materials Science	3	3
Physical and Technical Problems of Power Engineering	2	3
Nuclear Physics and Power Engineering	3	3
Chemistry	3	3
Biochemistry, Physiology and Molecular Biology	2	2
General Biology	4	3
Economics	2	10
History, Philosophy and Law	4	3
Literature, Language and Art Criticism	2	2

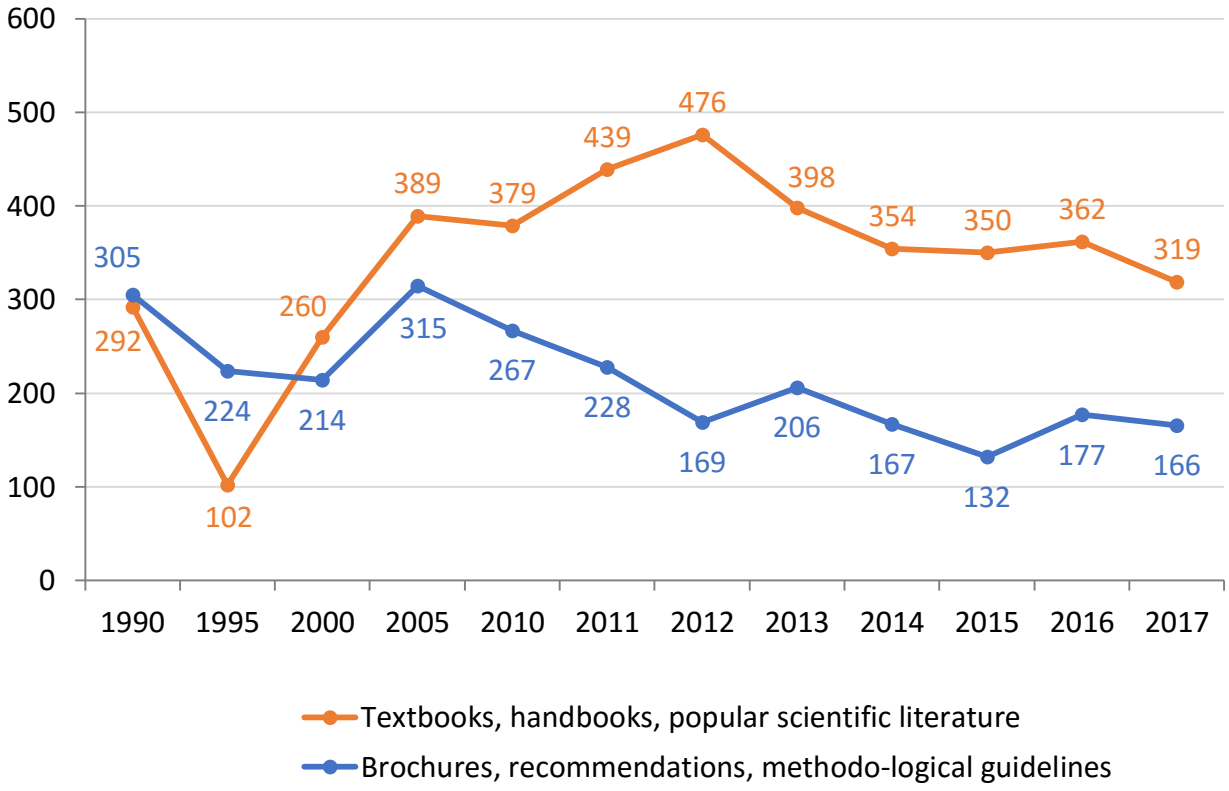
IX.13. Publishing in National Academy of Sciences of Ukraine

Trends in output of printed matter: 1987-2017, *units*

Year	Total	including:				
		Mono-graphs	Textbooks, handbooks, popular scientific literature	Brochures, recommen-dations, methodological guidelines	Articles	Preprints
1987	18944	465	…	231	18248	…
1988	18011	446	156	256	16203	950
1989	18733	509	204	276	16612	1132
1990	16976	437	292	305	15063	879
1991	16593	375	152	260	15056	750
1992	16858	407	175	254	15390	632
1993	15861	359	177	222	14435	668
1994	13886	264	148	209	12752	513
1995	13300	297	102	224	12288	389
1996	13691	277	191	240	12799	184
1997	14632	357	146	217	13680	232
1998	15252	415	159	284	14296	98
1999	15920	420	225	252	14929	94
2000	16290	398	260	214	15347	71
2001	18758	440	236	234	17744	104
2002	20696	447	269	243	19619	118
2003	20647	489	350	268	19459	81
2004	23145	549	270	333	21751	242
2005	25400	511	389	315	23810	375
2006	25513	561	389	306	24146	111
2007	24641	685	376	268	23228	84
2008	27524	676	397	212	26151	88
2009	27285	671	367	223	25963	61
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
2015	22192	404	350	132	21251	55
2016	21216	400	362	177	20256	21
2017	19768	421	319	166	18841	21

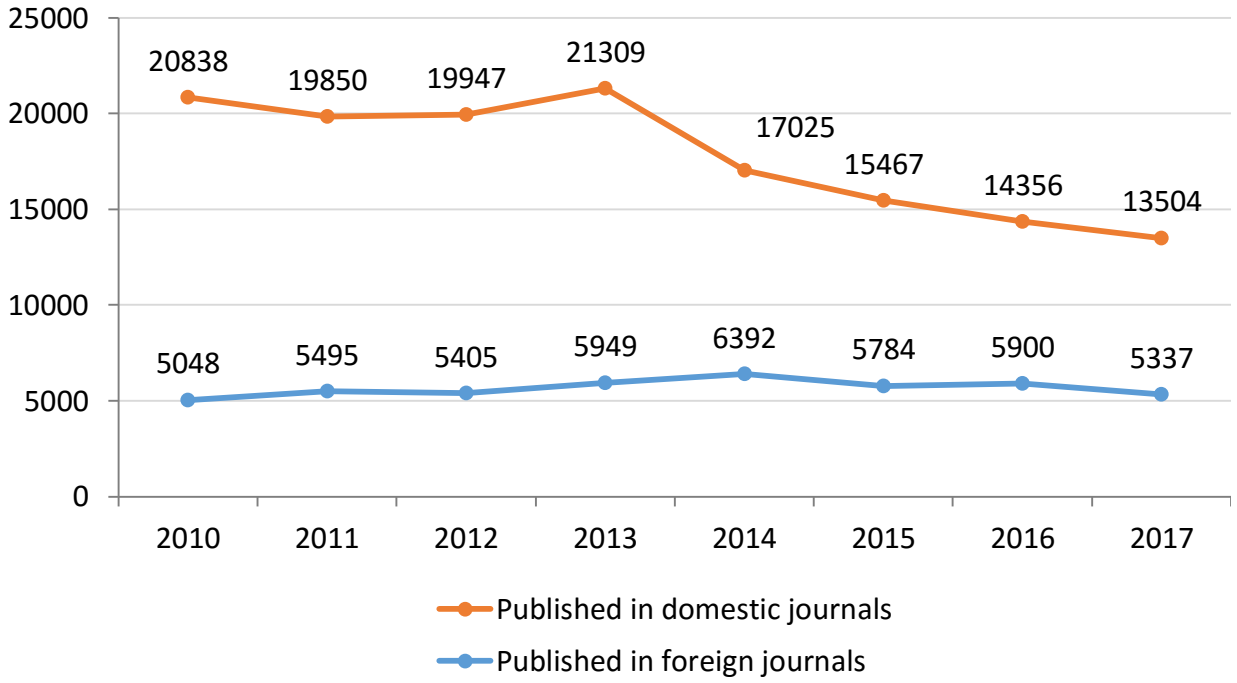
Trends in output of issue of book editions, *units*



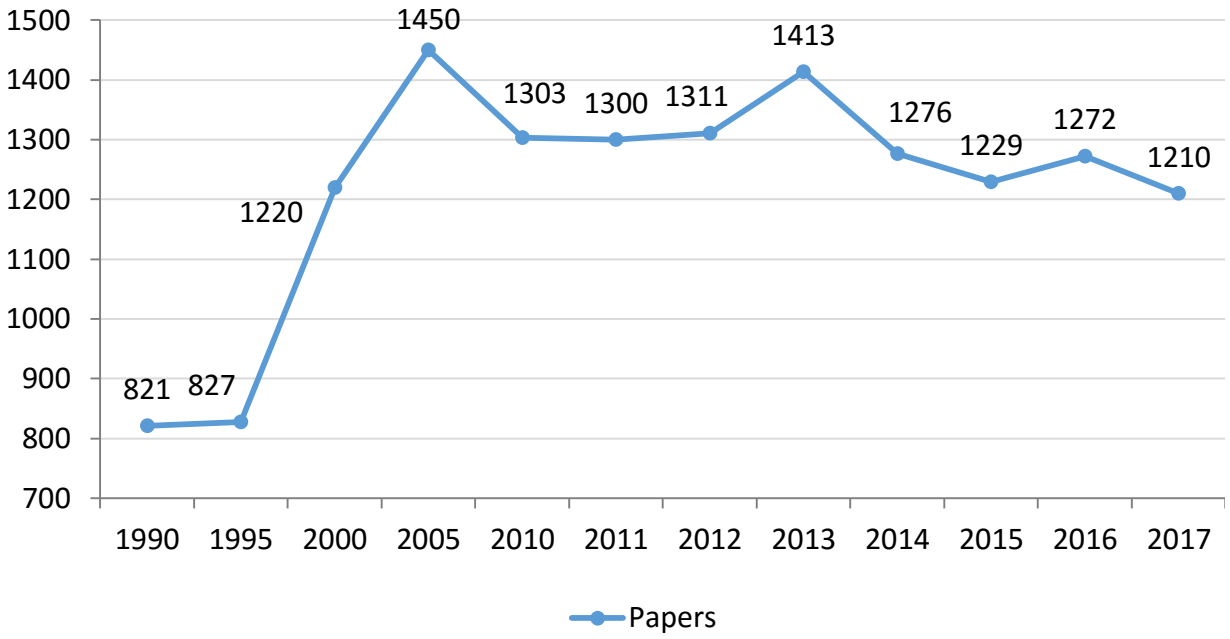


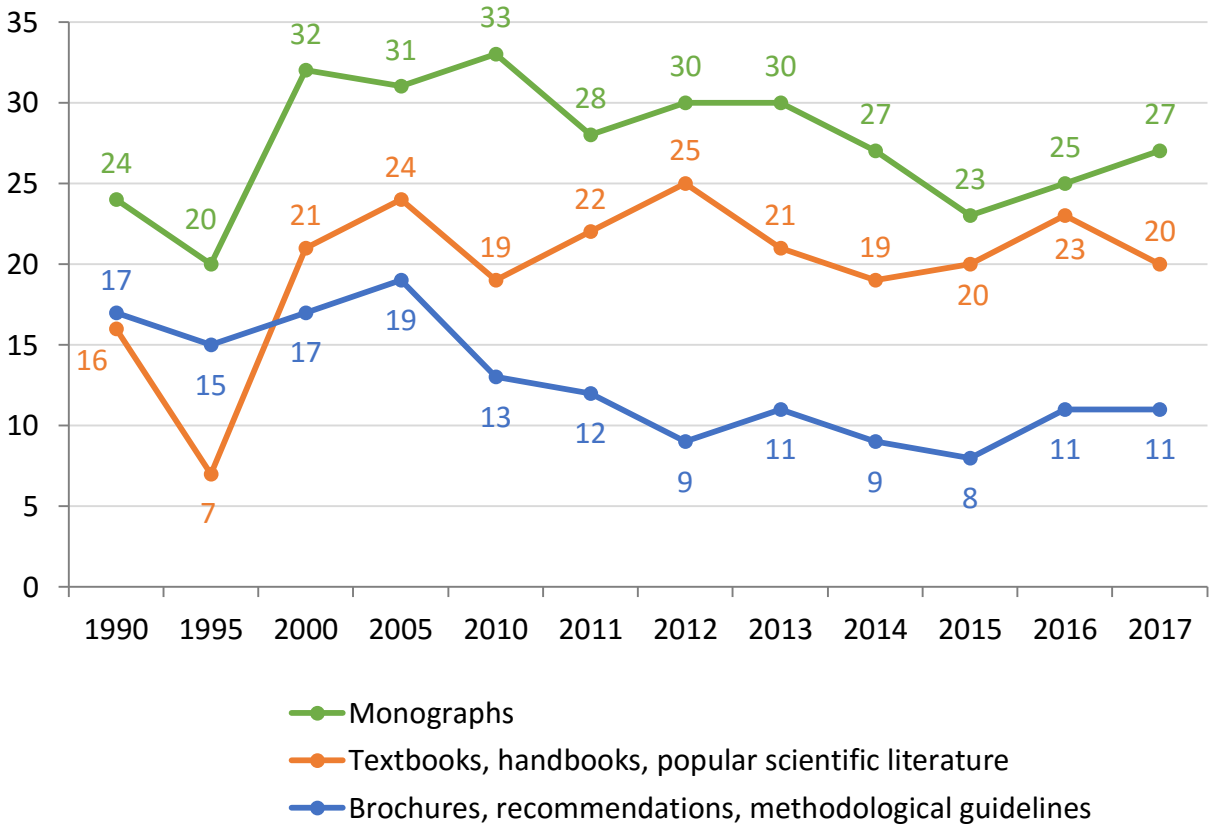
Trends in output of issue of scientific monographs, *units*

Trends in output of issue of scientific papers, *units*



Trends in output of issue of printed matter per 1,000 scientists, *units*



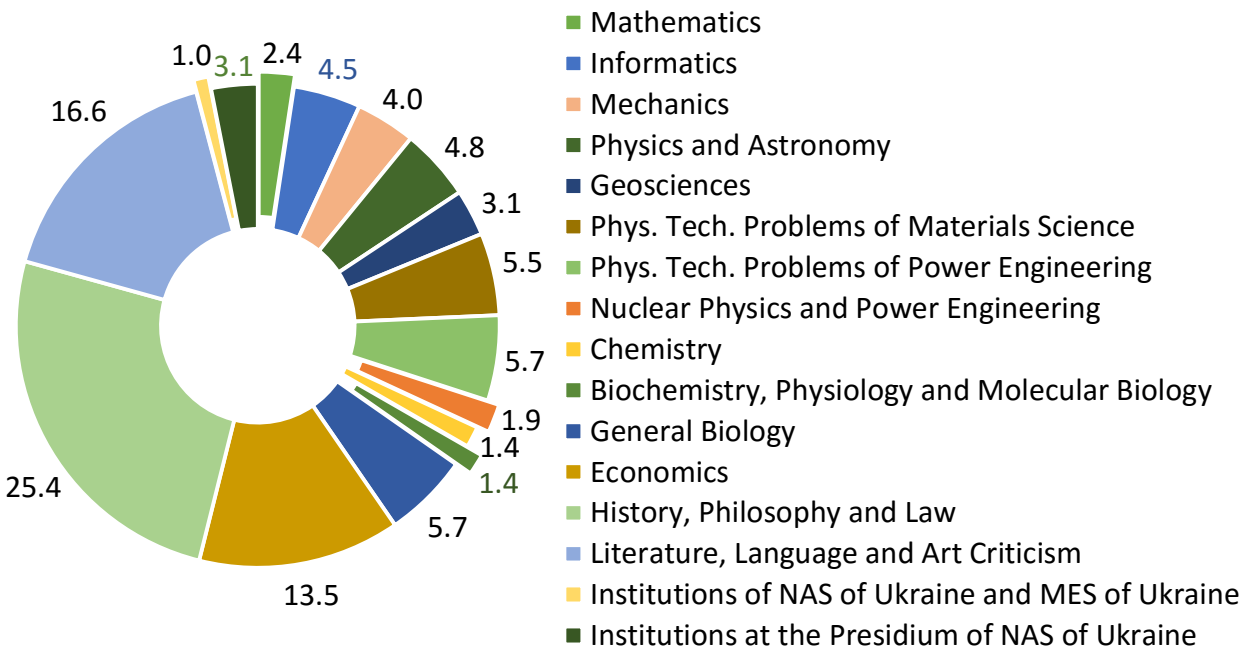


Distribution of printed matter by scientific departments of NAS of Ukraine and other divisions: 2017

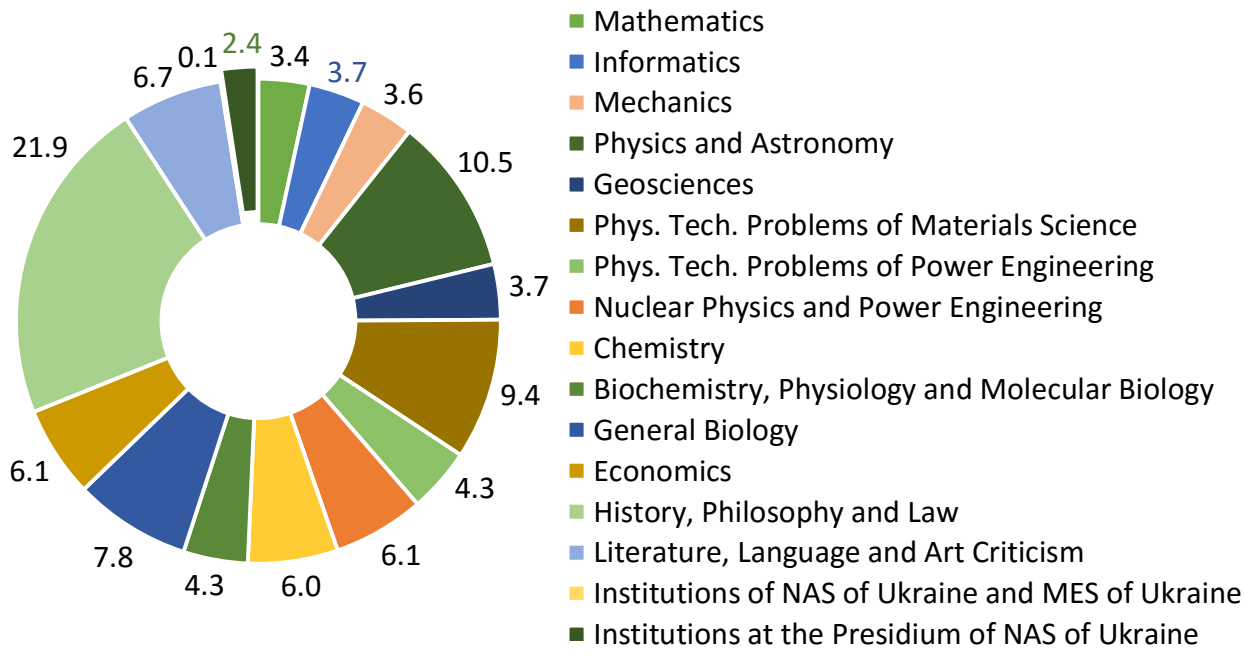
(units)

	Mono-graphs	Textbooks, handbooks, popular scientific literature	Brochures, recommen-dations, methodological guidelines	Articles	Preprints
Total	**421**	**319**	**166**	**18841**	**21**
including by departments:					
Mathematics	10	9	2	645	1
Informatics	19	13	14	698	1
Mechanics	17	6	9	681	0
Physics and Astronomy	20	23	10	1976	9
Geosciences	13	11	4	707	1
Physical and Technical Problems of Materials Science	23	10	1	1772	3
Physical and Technical Problems of Power Engineering	24	9	33	803	1
Nuclear Physics and Power Engineering	8	6	2	1146	3
Chemistry	6	13	4	1134	0
Biochemistry, Physiology and Molecular Biology	6	7	11	801	1
General Biology	24	20	18	1468	0
Economics	57	3	12	1148	1
History, Philosophy and Law	107	101	23	4131	0
Literature, Language and Art Criticism	70	52	10	1263	0
Institutions of NAS of Ukraine and MES of Ukraine	4	4	1	22	0
Institutions at the Presidium of NAS of Ukraine	13	32	12	452	0

Percentage distribution of the issue of monographs by field of science (by scientific department): 2017, %



Percentage distribution of the issue of papers by field of science (by scientific department): 2017, %



Quantitative indicators of State Enterprise "Scientific-Production Enterprise" Publishing House "Naukova Dumka" of NAS of Ukraine: 2010-2016

Year	Title of books	Volume, account. publ. pages	Circulation, thousand copies	Title of monographs*
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
2015	28	628.4	12.4	13
2016	47	989.8	24.6	37
2017	39	866.2	18.1	34

* Issued by state order

IX.14. Number of scientific and expert opinions and proposals submitted to the State Authorities*

(units)

	2012	2013	2014	2015	2016	2017
Total	**1880**	**1560**	**1500**	**1200**	**2150**	**2200**
including:						
Program Documents	6	4	7	8	8	15
Presidential Administration	30	80	30	70	80	15
Cabinet of Ministers of Ukraine	100	170	80	70	60	100
Ministries and Departments	1200	1100	1000	1200	1300	1400
Verkhovna Rada of Ukraine	120	100	100	200	160	200
Bodies of Standardization and Metrology	–	–	–	27	300	200
Expert Evaluations of the Subject of Fundamental Research	661	457	492	1752	606	393

* The estimated data (with the exception of the number of expert assessments of the subject of fundamental research) are presented according to the materials of sections 3.1 of the official reports on the activities of the National Academy of Sciences of Ukraine for the relevant year.

IX.15. Cooperation with higher education establishments: 2017

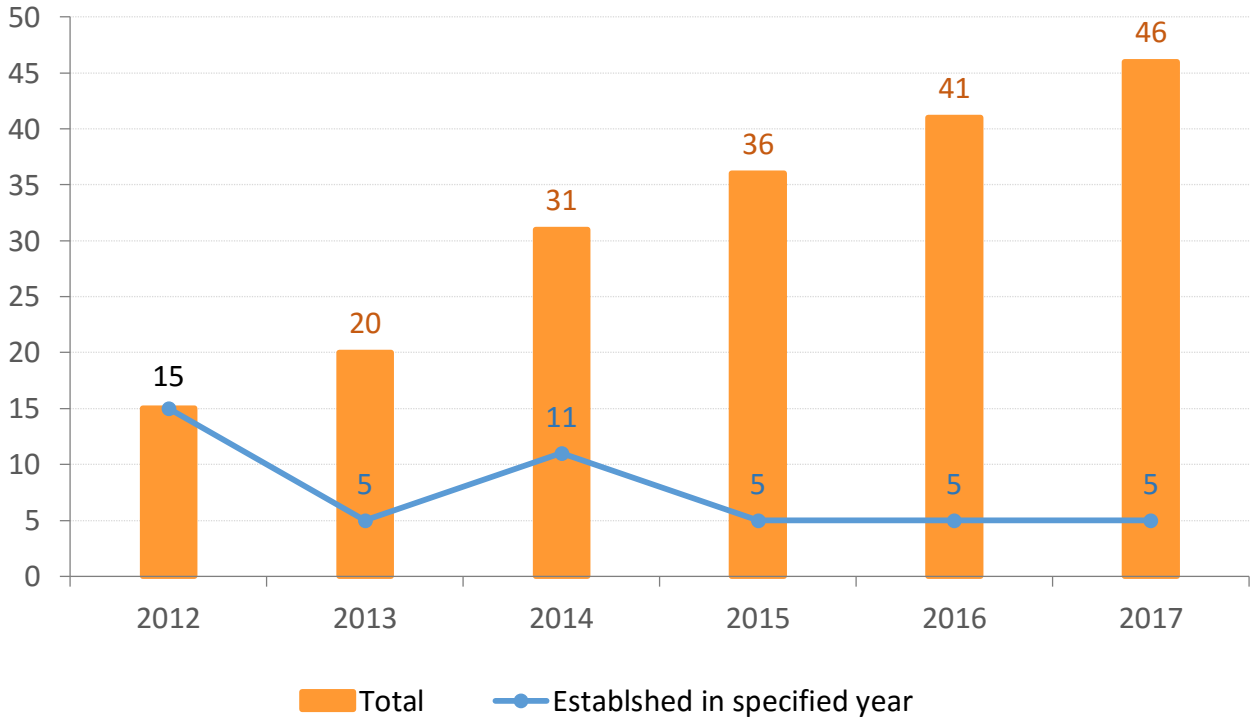
The direction of cooperation	Number, *units*
Number of concluded agreements on cooperation between scientific institutions and higher educational establishments	268
Number of joint research projects carried out with educators	223
Number of co-authorship with educational monographs	93
Number of co-authorship with educators of textbooks and textbooks for higher education	75
Number of scientists of the National Academy of Sciences of Ukraine, who worked as teachers in the education system	1333
Number of scientists of the NAS of Ukraine, who headed the department at higher educational establishments	77
Number of scientists of scientific institutions of the National NAS, which were included into specialized councils at higher educational establishments	610
Number of scientists-educators who were part of the specialized academic councils at the scientific institutions of the NAS of Ukraine	490
Number of scientific staff and teachers of higher educational institutions and institutions of the MES of Ukraine, that increased their qualifications in scientific institutions of the NAS of Ukraine	445
Number of students of higher educational establishments that have undergone master's training in joint scientific and educational structures that operate on the basis of scientific institutions of the NAS of Ukraine*:	
in the 2015/2016 academic year	407
in the 2016/2017 academic year	440
Number of students who performed theses in scientific institutions of the NAS of Ukraine	1225

continued

The direction of cooperation	Number, *units*
Number of specialists with higher education employed at the NAS of Ukraine who worked in circles of the Small Academy of Sciences	15
Number of dissertation works of scientists-educators that were defended in specialized scientific councils at scientific institutions of the NAS of Ukraine	192

* Based on scientific institutions of the NAS of Ukraine a network of joint scientific and educational structures for the master's training of students of higher educational establishments has been established. During 2016 five new joint structures were created: the educational-scientific complex, the scientific and educational association, two joint laboratories, a branch and departments.

Trends in network of joint scientific and educational structures of NAS of Ukraine and MES of Ukraine, *units*



IX.16. Scientists of National Academy of Sciences of Ukraine, awarded by State Prizes of Ukraine: 2005-2017

(headcount)

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
State Prizes of Ukraine in field of Science and Technology												
57	41	61	63	43	42	43	56	28	72	57	52	41
T.H. Shevchenko State Prize of Ukraine in field of Literature, Journalism and Arts												
1	1	–	–	–	–	–	–	–	–	–	–	–

IX.17. Scientists of National Academy of Sciences of Ukraine, awarded by State Awards of Ukraine: 2005-2017

(headcount)

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
The Title of Hero of Ukraine												
4	1	4	2	3	1	1	–	–	–	–	–	–
The Order of Prince Yaroslav the Wise												
6	6	6	21	13	3	5	9	8	5	4	8	6
Other State Awards												
17	21	31	90	41	12	25	26	–	–	10	40	22
Honored Worker of Science and Technology of Ukraine												
11	10	24	40	22	3	10	11	21	2	9	12	9

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

Title of institution	Name of scientific object	Year status
G.V. Kurdyumov Institute for Metal Physics	Diffractometric complex of new generation	2001
Main Astronomical Observatory	Laser satellite rangefinders “Kyiv-Golosiiv”	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 –1and Uranium-4	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. Bogomoletz Institute of Physiology	Bank of cell lines	2001
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

continued

Title of institution	Name of scientific object	Year status
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	Scientific collections and exhibition	2001
National Museum of Natural History	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
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
Kriviy Rig Botanical Garden	Collections of introduced trees and shrubs	2004
National Arboretum “Sofiivka”	Collection of exotic species of trees and shrubs	2004
State Arboretum “Trostianets”	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

continued

Title of institution	Name of scientific object	Year status
O.Ya. Usikov Institute for Radio Physics and Electronics	Cryo-magnetic radio-spectroscopic complex of millimeter diapason of wavelengths	2006
Scientific Engineering Centre "Materialoobrobka 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

continued

Title of institution	Name of scientific object	Year status
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
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 STATISTICS[8]

Types of Research and Development

Basic scientific research is understood as theoretical or experimental 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 scientific research may be expressed in the form of recommendations for practical application of obtained scientific knowledge, scientific publications, etc.

Applied scientific research is considered as theoretical and experimental 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.

Scientific and technical (experimental) development is 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

[8] *Sources:* Law of Ukraine "On scientific and scientific and technical activity"; Statistical Yearbook of Ukraine for 2016. / State Statistics Service of Ukraine. – K., 2017. – P. 499-500; Scientific and innovation activity in Ukraine, 2016: Statistical collection / State Statistics Service of Ukraine. – K., 2017. – P. 135-139; Scientific and innovation activity in Ukraine, 2015: Statistical collection / State Statistics Service of Ukraine. – K., 2016. – P. 251-257.

(consignment) of the ware (product), and projecting works for.

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, industrial enterprises, research bases 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, creative societies, associations, public, charitable organizations and foundations), except for

organizations of government sector and more than half 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

R&D performers include researchers, technicians and supporting staff of independent research, design, and engineering organizations, as well as laboratory or subdivision staff in higher education establishments or in enterprises whose main activity is the performance of scientific research and development.

Number of employees engaged in the implementation of research and development is the total number of employees of a scientific organization directly involved in the implementation of scientific research and development. These include both permanent and temporary workers, who are

wholly or partly engaged in scientific research and development, as well as contractors and persons working under civil-law contracts. At the same time, data incorporates only persons performed scientific research and development or auxiliary and other related functions. Persons providing supporting services that are not related to scientific research and development (e.g. workers of catering and security) are not included.

R&D personnel

Specialists who carry out scientific research and development ("specialists") include researchers and technicians.

"Researchers" are scientific and engineering workers who are professionally engaged in scientific research and development 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 units that carry out scientific research and development).

"Technicians" are employees whose main functions require technical competencies and experience in one or more fields of natural, engineering, social sciences and humanities; take part in scientific research and development, performing technical functions (preparation of computer programs; bibliographic search and selection of relevant materials from archives and libraries; conducting experiments, tests and analyses; registration of measurements, performing calculation, preparation of drawings and diagrams, statistical surveys, etc.) usually under the guidance of researchers.

"Supporting staff" includes employees who carry out supporting functions related to research and development: employees of planning economic and financial subdivisions,

patent services, S&T information units, S&T libraries; workers engaged in assembling, adjustment, maintenance and repair of scientific equipment and devices; workers of pilot (experimental) production; laboratory assistants without a complete higher, basic higher or elementary higher education.

Funding

Gross domestic expenditure on R&D is the actual costs of implementation of scientific research and development (at cost) in the reporting period regardless of the source of funds, including both current and capital expenses (less amortization and depreciation of assets). The costs of works (services) that are not related to scientific R&D, as well as paid services to the population are not included.

Intramural expenditure on R&D comprises total expenditure on scientific research and development implementation by own resources of the organization. The pay, material costs and other current expenses (less amortization and depreciation of assets) are recognized.

Funding of intramural expenditure on the R&D implementation is the sum of funds received by the organization (enterprise) during the reporting year from all sources (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 establishments 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 31 December* (as of October 1 up to 2012).

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

Since 2015, the classifications of scientific organizations by sectors of science are not maintained.

Since 2016, the State Statistics Committee of Ukraine introduced additional changes in the methodology of organizing and conducting state statistical observation for the implementation of scientific researches and developments. In particular, expenses on S&T services are not included into the expenses on research work; the number of scientific and pedagogical workers is not included into the number of the part-time workers (according to this, data published earlier for 2010-2015, was recalculated).

Наукове видання

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