



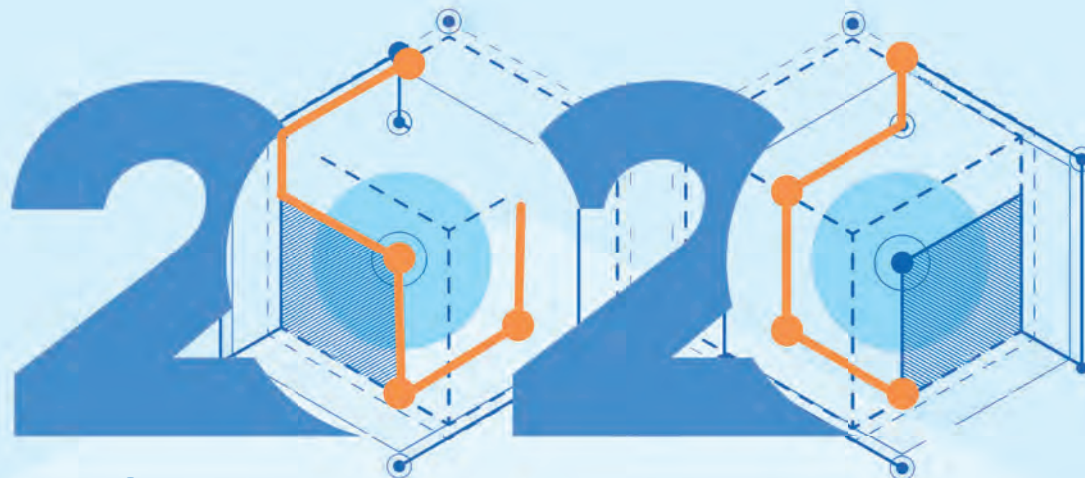
Ministry of Science and Higher Education  
of the Russian Federation



Federal State  
Statistics Service



HIGHER SCHOOL OF ECONOMICS  
NATIONAL RESEARCH UNIVERSITY



# Science and Technology Indicators in the Russian Federation

Data Book



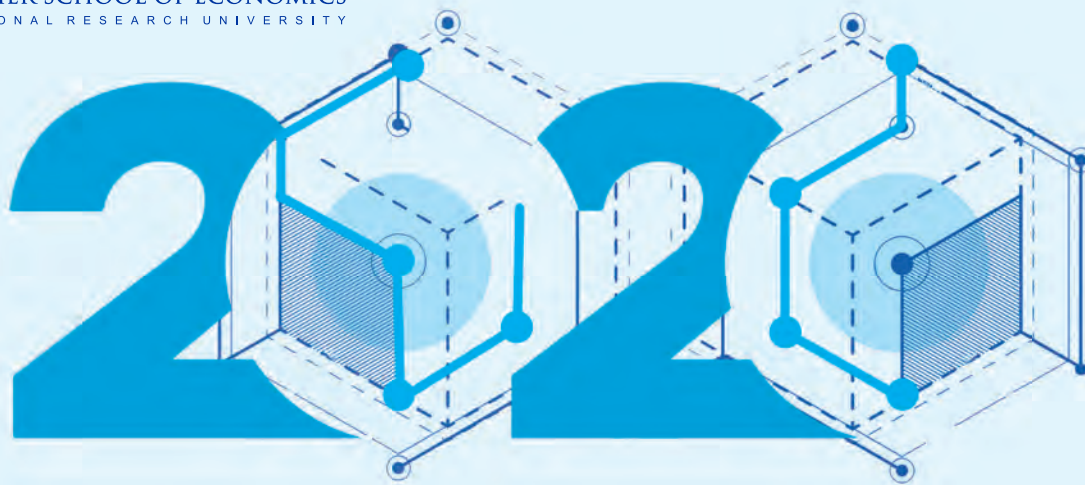
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NATIONAL RESEARCH UNIVERSITY



# Science and Technology Indicators in the Russian Federation

**Data Book**

Moscow 2020

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**Science and Technology Indicators in the Russian Federation :** Data Book / K. Ditkovskiy, E. Evnevich, S. Fridlyanova et al.; National Research University Higher School of Economics. – Moscow : HSE, 2020. – 336 p.

This data book is another publication in the series describing various aspects of scientific development in the Russian Federation. It begins with the tables, where main science and technology indicators are provided alongside the data concerning main innovative activities. The publication presents statistical data on R&D organisations, personnel, and funding, as well as on material and technical facilities of the Russian science. In some sections, it contains information about intellectual property, commercialisation and usage of technologies, and international comparisons.

The data book includes information of the Russian Federal State Statistics Service, Ministry of Science and Higher Education of the Russian Federation, Federal Service for Intellectual Property (Rospatent), CIS Interstate Statistical Committee, Organisation for Economic Co-operation and Development (OECD), European Commission, Eurostat, UNESCO, World Intellectual Property Organisation (WIPO), and results of own methodological and analytical studies of the HSE Institute for Statistical Studies and Economics of Knowledge.

In some cases, the presented data specify those published earlier.

## CONTENTS

<b>Infographics: 2018</b> .....	<b>15</b>
Main science and technology indicators.....	25
Main indicators of science and technology for the arctic zone of the Russian Federation .....	27
Main indicators of innovation .....	29
<b>1. R&amp;D Institutions</b> .....	<b>35</b>
1.1. R&D institutions by type .....	36
1.2. Trends in the total number of R&D institutions.....	37
1.3. Percentage distribution of R&D institutions by type .....	38
1.4. R&D institutions by ownership .....	39
1.5. Percentage distribution of R&D institutions by size .....	41
1.6. R&D institutions by type of economic activity.....	42
<b>2. R&amp;D Personnel</b> .....	<b>43</b>
2.1. R&D personnel .....	44
2.2. R&D personnel by occupation .....	44
2.3. Percentage distribution of R&D personnel by occupation .....	45
2.4. R&D personnel by ownership of R&D institutions .....	46
2.5. Percentage distribution of R&D personnel by size of R&D institutions .....	48
2.6. R&D personnel by type of economic activity .....	49
2.7. R&D personnel by educational attainment.....	50
2.8. Researchers by gender and age.....	51
2.9. Percentage distribution of researchers by age .....	53
2.10. Average age of researchers .....	54
2.11. Researchers with scientific degrees.....	55
2.12. Researchers with scientific degrees as a percentage of the total number of researchers .....	55
2.13. Researchers by field of science and technology .....	56
2.14. Percentage distribution of researchers by field of science and technology: 2018 .....	56
2.15. Flows of R&D personnel.....	57
2.16. Inflow of higher institution graduates in R&D institutions .....	58
2.17. Trends in inflow and outflow of R&D personnel.....	59



<b>Training of R&amp;D Personnel .....</b>	<b>60</b>		
2.18. Main indicators of postgraduate studies .....	60	2.27. Doctoral enrolment, entrants, and graduates by general group of scientific professions .....	80
2.19. Number of higher education graduates of the reporting year admitted to postgraduate studies by mode of study.....	63	2.28. Graduates with defended doctoral thesis who have been granted a diploma by the state Commission for Academic Degrees and Titles of the Ministry of Science and Higher Education of the Russian Federation by general group of scientific professions .....	83
2.20. Higher education graduates of the reporting year as a percentage of the total postgraduate enrolment .....	64	2.29. Doctors and candidates of sciences as a percentage of the total number of researchers with scientific degrees approved by the state commission for academic degrees and titles of the Ministry of Science and Higher Education of the Russian Federation .....	86
2.21. Postgraduate enrolment by gender and age: 2018.....	65		
2.22. Postgraduate enrolment, entrants, and graduates by field of education and general group of scientific professions .....	66	<b>3. R&amp;D Funding.....</b>	<b>87</b>
2.23. Postgraduate enrolment, entrants, and graduates by field of education corresponding to priority areas of economical modernisation and technological development.....	71	3.1. Gross domestic expenditure on R&D .....	88
2.24. Postgraduate graduates with defended thesis who have been granted a diploma by the state commission for academic degrees and titles of the Ministry of Science and higher education of the Russian Federation by general group of scientific professions .....	73	3.2. Growth rates of gross domestic expenditure on R&D and GDP .....	89
2.25. Main indicators of doctoral studies .....	76	3.3. Federal budget appropriations on civil S&T at current prices .....	90
2.26. Doctoral enrolment by gender and age: 2017 .....	79	3.4. Federal budget appropriations on civil S&T at constant 2010 prices .....	91
		3.5. Federal budget appropriations on civil S&T as a percentage of GDP .....	92

3.6. Federal budget appropriations on civil S&T as a percentage of federal budget expenditure .....	93	3.18. Percentage distribution of gross domestic expenditure on R&D by priority S&T area and source of funds: 2019 .....	107
3.7. Percentage distribution of federal budget appropriations on civil S&T by subsection of budget expenditure classification and type of R&D activity .....	94	3.19. Gross domestic expenditure on R&D by socio-economic objective.....	108
3.8. Gross domestic expenditure on R&D by source of funds.....	95	3.20. Percentage distribution of gross domestic expenditure on R&D by socio-economic objective.....	110
3.9. Trends in gross domestic expenditure on R&D by source of funds.....	96	3.21. Current expenditure on R&D by type of R&D activity and field of science and technology .....	111
3.10. Subsidies, grants and other competitive R&D funding: 2018.....	97	3.22. Percentage distribution of current expenditure on R&D by type of R&D activity .....	113
3.11. Gross domestic expenditure on R&D funded from abroad .....	97	3.23. Gross domestic expenditure on R&D as a percentage of GDP by type of R&D activity.....	114
3.12. R&D funding by sector of performance: 2018 .....	98	3.24. Average monthly salary of R&D personnel.....	115
3.13. Gross domestic expenditure on R&D by ownership of R&D institutions .....	99	3.25. Tax incentives on R&D by type.....	116
3.14. Gross domestic expenditure on R&D by type of economic activity.....	101	<b>4. R&amp;D Fixed Assets.....</b>	<b>117</b>
3.15. Gross domestic expenditure on R&D by type of expenditure .....	103	4.1. R&D fixed assets .....	118
3.16. Gross domestic expenditure on R&D by type: 2018 .....	105	4.2. Trends in R&D fixed assets value .....	120
3.17. Gross domestic expenditure on R&D by priority S&T area and source of funds: 2018 .....	106	4.3. Machinery and equipment as a percentage of the total R&D fixed assets value.....	120
		4.4. R&D fixed assets by ownership of R&D institutions .....	121

4.5. Percentage distribution of R&D fixed assets by ownership of R&D institutions.....	123
4.6. R&D fixed assets by type of economic activity.....	124
<b>5. Sectors of R&amp;D Performance.....</b>	<b>125</b>
<b>5.1. Composite indices .....</b>	<b>126</b>
5.1.1. R&D institutions by sector of performance .....	126
5.1.2. Percentage distribution of R&D institutions by sector of performance.....	127
5.1.3. R&D personnel by sector of performance and occupation .....	128
5.1.4. R&D personnel by sector of performance and educational attainment .....	129
5.1.5. Researchers with scientific degrees by sector of performance.....	131
5.1.6. Percentage distribution of researchers with scientific degrees by sector of performance .....	132
5.1.7. Researchers assigned to work (internship) placements at foreign scientific organisations by sector of performance: 2018 .....	133
5.1.8. Percentage distribution of researchers assigned to work (internship) placements at foreign scientific organisations by sector of performance: 2018 .....	133
5.1.9. Gross domestic expenditure on R&D by sector of performance.....	134
5.1.10. Percentage distribution of gross domestic expenditure on R&D by sector of performance .....	135
5.1.11. Gross domestic expenditure on R&D as a percentage of GDP by sector of performance.....	136
5.1.12. Gross domestic expenditure on R&D by sector of performance and source of funds .....	137
5.1.13. Subsidies, grants, and other competitive R&D funding by sector of performance: 2018 .....	139
5.1.14. Gross domestic expenditure on R&D by priority S&T area and sector of performance: 2018.....	140
5.1.15. Percentage distribution of gross domestic expenditure on R&D by priority S&T area and sector of performance: 2019 .....	141
5.1.16. Sources of funds for gross domestic expenditure on R&D by priority S&T area and sector of performance: 2019 .....	142
5.1.15. Percentage distribution of gross domestic expenditure on R&D by priority S&T area and source of funds: 2018 .....	143
5.1.18. Gross domestic expenditure on R&D by sector of performance and socio-economic objective .....	144

5.1.19. Percentage distribution of gross domestic expenditure on R&D by sector of performance and socio-economic objective: 2018 .....	146	5.2.8. Percentage distribution of researchers in the government sector by age.....	157
5.1.20. Current expenditure on R&D by sector of performance and type of R&D activity .....	148	5.2.9. Average age of researchers in the government sector .....	158
5.1.21. Average monthly salary of R&D personnel by sector of performance.....	150	5.2.10. Researchers with scientific degrees in the government sector .....	158
<b>5.2. Government sector .....</b>	<b>151</b>	5.2.11. Researchers with scientific degrees as a percentage of the total number of researchers in the government sector.....	159
5.2.1. R&D institutions in the government sector by type .....	151	5.2.12. Researchers in the government sector by field of science and technology .....	160
5.2.2. R&D personnel in the government sector by type of R&D institutions .....	151	5.2.13. R&D personnel turnover in the government sector by occupation .....	161
5.2.3. R&D personnel in the government sector by occupation .....	152	5.2.14. Inflow and outflow of R&D personnel in the government sector .....	162
5.2.4. Percentage distribution of R&D personnel in the government sector by occupation .....	152	5.2.15. Inflow of higher education graduates into government sector institutions .....	163
5.2.5. R&D personnel in the government sector as a percentage of the total number of R&D personnel by occupation .....	153	5.2.16. Gross domestic expenditure on R&D in the government sector by type of R&D institutions .....	164
5.2.6. R&D personnel in the government sector by educational attainment .....	154	5.2.17. Gross domestic expenditure on R&D in the government sector .....	165
5.2.7. Researchers in the government sector by gender and age.....	156	5.2.18. Gross domestic expenditure on R&D in the government sector by source of funds.....	166

5.2.19. Government sector as a percentage of gross domestic expenditure on R&D by type of expenditure.....	168	5.3.4. Percentage distribution of R&D personnel in the business enterprise sector by occupation .....	177
5.2.20. Gross domestic expenditure on R&D in the government sector by type .....	169	5.3.5. R&D personnel in the business enterprise sector as a percentage of the total number of R&D personnel by occupation .....	178
5.2.21. Current expenditure on R&D in the government sector by type of R&D activity and field of science and technology.....	170	5.3.6. R&D personnel in the business enterprise sector by educational attainment .....	179
5.2.22. Government sector as a percentage of current expenditure on R&D by type of R&D activity.....	172	5.3.7. Researchers in the business enterprise sector by gender and age .....	181
5.2.23. Percentage distribution of current expenditure on R&D in the government sector by type of R&D activity .....	173	5.3.8. Percentage distribution of researchers in the business enterprise sector by age.....	182
5.2.24. Average monthly salary of R&D personnel in the government sector .....	174	5.3.9. Average age of researchers in the business enterprise sector.....	183
<b>5.3. Business enterprise sector .....</b>	<b>175</b>	5.3.10. Researchers with scientific degrees in the business enterprise sector .....	184
5.3.1. R&D institutions in the business enterprise sector by type .....	175	5.3.11. Researchers with scientific degrees as a percentage of the total number of researchers in the business enterprise sector .....	184
5.3.2. R&D personnel in the business enterprise sector by type of R&D institutions .....	176	5.3.12. Researchers in the business enterprise sector by field of science and technology.....	185
5.3.3. R&D personnel in the business enterprise sector by occupation .....	176	5.3.13. R&D personnel turnover in the business enterprise sector by occupation.....	186

5.3.14. Inflow and outflow of researchers in the business enterprise sector .....	187
5.3.15. Inflow of higher education graduates into business enterprise sector institutions .....	188
5.3.16. Gross domestic expenditure on R&D in the business enterprise sector by type of R&D institutions .....	189
5.3.17. Gross domestic expenditure on R&D in the business enterprise sector .....	190
5.3.18. Gross domestic expenditure on R&D in the business enterprise sector by source of funds.....	191
5.3.19. Business enterprise sector as a percentage of gross domestic expenditure on R&D by type of expenditure.....	193
5.3.20. Gross domestic expenditure on R&D in the business enterprise sector by type.....	194
5.3.21. Current expenditure on R&D in the business enterprise sector by type of R&D activity and field of science and technology .....	195
5.3.22. Business enterprise sector as a percentage of current expenditure on R&D by type of R&D activity .....	197

5.3.23. Percentage distribution of current expenditure on R&D in the business enterprise sector by type of R&D activity .....	198
5.3.24. Average monthly salary of R&D personnel in the business enterprise sector .....	199
<b>5.4. Higher education sector .....</b>	<b>200</b>
5.4.1. R&D institutions in the higher education sector by type .....	200
5.4.2. R&D personnel in the higher education sector by type of R&D institutions .....	201
5.4.3. R&D personnel in the higher education sector by occupation .....	202
5.4.4. Percentage distribution of R&D personnel in the higher education sector by occupation .....	203
5.4.5. R&D personnel in the higher education sector as a percentage of the total number of R&D personnel by occupation .....	204
5.4.6. R&D personnel in the higher education sector by educational attainment .....	205
5.4.7. Researchers in the higher education sector by gender and age.....	207
5.4.8. Percentage distribution of researchers in the higher education sector by age.....	208

5.4.9. Average age of researchers in the higher education sector.....	209	5.4.20. Gross domestic expenditure on R&D in the higher education sector by type of expenditure .....	220
5.4.10. Researchers with scientific degrees in the higher education sector .....	209	5.4.21. Current expenditure on R&D in the higher education sector by type of R&D activity and field of science and technology .....	221
5.4.11. Researchers with scientific degrees as a percentage of the total number of researchers in the higher education sector.....	210	5.4.22. Higher education sector as a percentage of current expenditure on R&D by type of R&D activity .....	223
5.4.12. Researchers in the higher education sector by field of science and technology .....	211	5.4.23. Percentage distribution of current expenditure on R&D in the higher education sector by type of R&D activity .....	224
5.4.13. R&D personnel turnover in the higher education sector by occupation.....	212	5.4.24. Average monthly salary of R&D personnel in the higher education sector .....	224
5.4.14. Inflow and outflow of R&D personnel in the higher education sector .....	213	<b>6. R&amp;D Output.....</b>	<b>225</b>
5.4.15. Inflow of higher education graduates into higher education sector institutions .....	214	<b>Publication activity .....</b>	<b>226</b>
5.4.16. Gross domestic expenditure on R&D in the higher education sector by type of R&D institutions .....	215	6.1. Number of publications by russian authors in scientific journals indexed in Scopus by document type .....	226
5.4.17. Gross domestic expenditure on R&D in the higher education sector .....	216	6.2. Number of publications by russian authors in scientific journals indexed in Web of Science by document type .....	227
5.4.18. Gross domestic expenditure on R&D in the higher education sector by source of funds .....	217	6.3. Publications in the selected research fields as a percentage of the total number of publications in scientific journals indexed in Scopus .....	228
5.4.19. Higher education sector as a percentage of gross domestic expenditure on R&D by type of expenditure.....	219		

6.4. Publications in the selected research fields as a percentage of the total number of publications in scientific journals indexed in Web of Science .....	229
6.5. Russia's scientific specialisation indices by publications in scientific journals indexed in Scopus by field of science and technology .....	230
6.6. Russia's scientific specialisation indices by publications in scientific journals indexed in Web of Science by field of science and technology .....	232
6.7. Main indicators of russian authors' contribution to the world total number of publications in scientific journals indexed in Scopus by field of research: 2018 .....	234
6.8. Main indicators of russian authors' contribution to the world total number of publications in scientific journals indexed in Web of Science by field of research: 2019 .....	236
6.9. Main citation indicators of publications by russian authors in scientific journals indexed in Scopus .....	238
6.10. Main citation indicators of publications by russian authors in scientific journals indexed in Web of Science .....	239

6.11. Number of publications by russian authors with international collaboration in scientific journals indexed in Scopus by partner country: 2018 .....	240
6.12. Number of publications by russian authors with international collaboration in scientific journals indexed in Web of Science by partner country: 2018 .....	241
<b>Patent activity .....</b>	<b>242</b>
6.13. Patent applications and patent grants .....	242
6.14. Patent activity indicators .....	243
6.15. Patent grants received in the Russian Federation by section of the international patent classification .....	244
6.16. Percentage distribution of patent grants received in the Russian Federation by assignee and section of the international patent classification: 2018 .....	245
6.17. Utility model applications and grants .....	246
6.18. Utility model grants received in the Russian Federation by section of the international patent classification .....	247
6.19. Registration of intellectual property items in the field of information technology .....	248



<b>Development and use of advanced manufacturing technologies .....</b>	<b>249</b>	<b>Commercialisation of technology in domestic market.....</b>	<b>258</b>
6.20. Development of advanced manufacturing technologies by type .....	249	6.29. State registration of dispositions of the exclusive rights to inventions, utility models, and industrial designs by patent assignment and patent licensing contracts .....	258
6.21. Development of advanced manufacturing technologies by degree of novelty and type .....	250	6.30. Percentage distribution of dispositions by type of agreements .....	259
6.22. Development of advanced manufacturing technologies by degree of novelty and type of economic activity .....	251	6.31. State registration of dispositions under agreements and patents with registered dispositions by type of intellectual property .....	260
6.23. Use of advanced manufacturing technologies by type .....	252	6.32. Percentage distribution of dispositions under agreements and patents with registered dispositions by type of intellectual property: 2018 .....	260
6.24. Use of advanced manufacturing technologies by type and duration .....	253	6.33. State registration of dispositions of exclusive rights to inventions, utility models, and industrial designs by technology field .....	261
6.25. Use of advanced manufacturing technologies by type of economic activity and duration.....	254	6.34. Percentage distribution of dispositions of exclusive rights to inventions, utility models, and industrial designs by technology field .....	262
6.26. Use of advanced manufacturing technologies by type and source of acquisition: 2018 .....	255	6.35. Percentage distribution of dispositions of exclusive rights to inventions, utility models, and industrial designs by category of economic entity.....	263
6.27. Use of advanced manufacturing technologies by type of economic activity and source of acquisition: 2018 .....	256		
6.28. Use of advanced manufacturing technologies developed on the basis of invention patents by type .....	257		

<b>International technological exchange</b> .....	<b>264</b>
6.36. Technology balance of payments by category of contracts .....	264
6.37. Percentage distribution of technology exports and imports by category of contract.....	266
6.38. Number and net value of technology exports and imports by category of contract.....	267
6.39. Technology balance of payments by country .....	268
6.40. Percentage distribution of technology exports and imports by country group .....	271
6.41. Technology balance of payments by sector of performance.....	271
6.42. Technology balance of payments by type of economic activity: 2018 .....	272
<b>7. Public Attitudes towards Science and Technology</b> .....	<b>273</b>
7.1. Public opinion of the role of science in Russia and the world .....	274
7.2. Public opinion on the good and harm brought about by science and technologies .....	275
7.3. Public opinion concerning the impact of science and technology on different aspects of life.....	276
7.4. Public attitude towards receiving science and technology news.....	277

7.5. Public awareness of science and technology achievements: 2019 .....	278
7.6. Demand for popular science content: 2019.....	279
7.7. Attendance of cultural and educational institutions .....	280
<b>8. International Comparisons</b> .....	<b>281</b>
8.1. Gross domestic expenditure on R&D .....	282
8.2. Gross domestic expenditure on R&D as a percentage of GDP: 2018 .....	285
8.3. Percentage distribution of gross domestic expenditure on R&D by sector of performance: 2018 .....	286
8.4. Percentage distribution of gross domestic expenditure on R&D by source of funds: 2018 .....	289
8.5. Percentage distribution of gross domestic expenditure on R&D by sector of performance: 2018 .....	292
8.6. Percentage distribution of current expenditure on R&D by type of R&D activity: 2018.....	294
8.7. Government budget appropriations on R&D .....	297
8.8. R&D personnel: 2018.....	299
8.9. R&D personnel per 10,000 employment: 2018 .....	302
8.10. Percentage distribution of researchers by sector of performance: 2018 .....	303

8.11. Female researchers as a percentage of the total number of researchers: 2018.....	306	8.17. Publications co-authored with foreign researchers as a percentage of the total number of country's publications in scientific journals indexed in Web of Science: 2018.....	318
8.12. Number of publications and citations in scientific journals indexed in Scopus: 2014–2018.....	307	8.18. Resident and abroad patent applications by patent office.....	319
8.13. Number of publications and citations in scientific journals indexed in Web of Science: 2014–2018.....	311	8.19. Percentage distribution of patent applications by applicant and country: 2018.....	322
8.14. Countries' shares in the world total number of publications in scientific journals indexed in Scopus: 2018.....	315	8.20. Resident and abroad patent applications by country of origin.....	323
8.15. Countries' shares in the world total number of publications in scientific journals indexed in Web of Science: 2018.....	316	8.21. Percentage distribution of patent applications by applicant and patent office: 2018.....	326
8.16. Publications co-authored with foreign researchers as a percentage of the total number of country's publications in scientific journals indexed in Scopus: 2018.....	317	8.22. Number of triadic patent families.....	327
		<b>Technical notes.....</b>	<b>329</b>

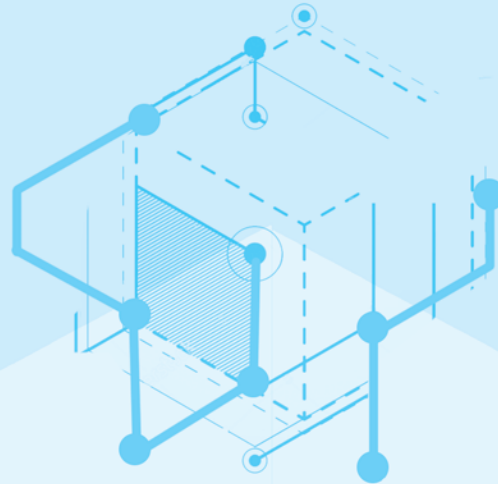
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**SYMBOLS USED IN TABLES ARE:**

- ... data not available and not included in the totals,
- data not applicable,
- 0.0 insignificant value.

In some tables, the sum of the breakdown may not add to the total because of rounding.

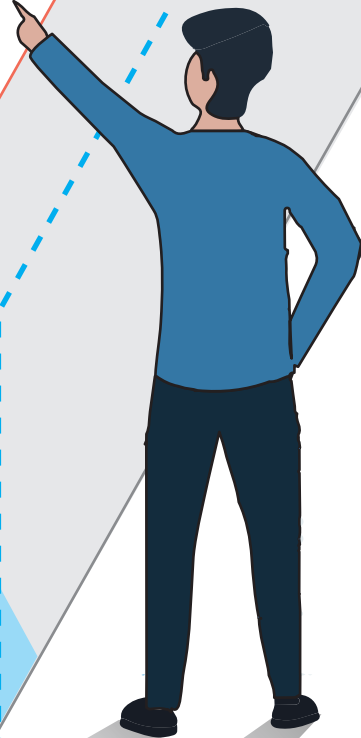
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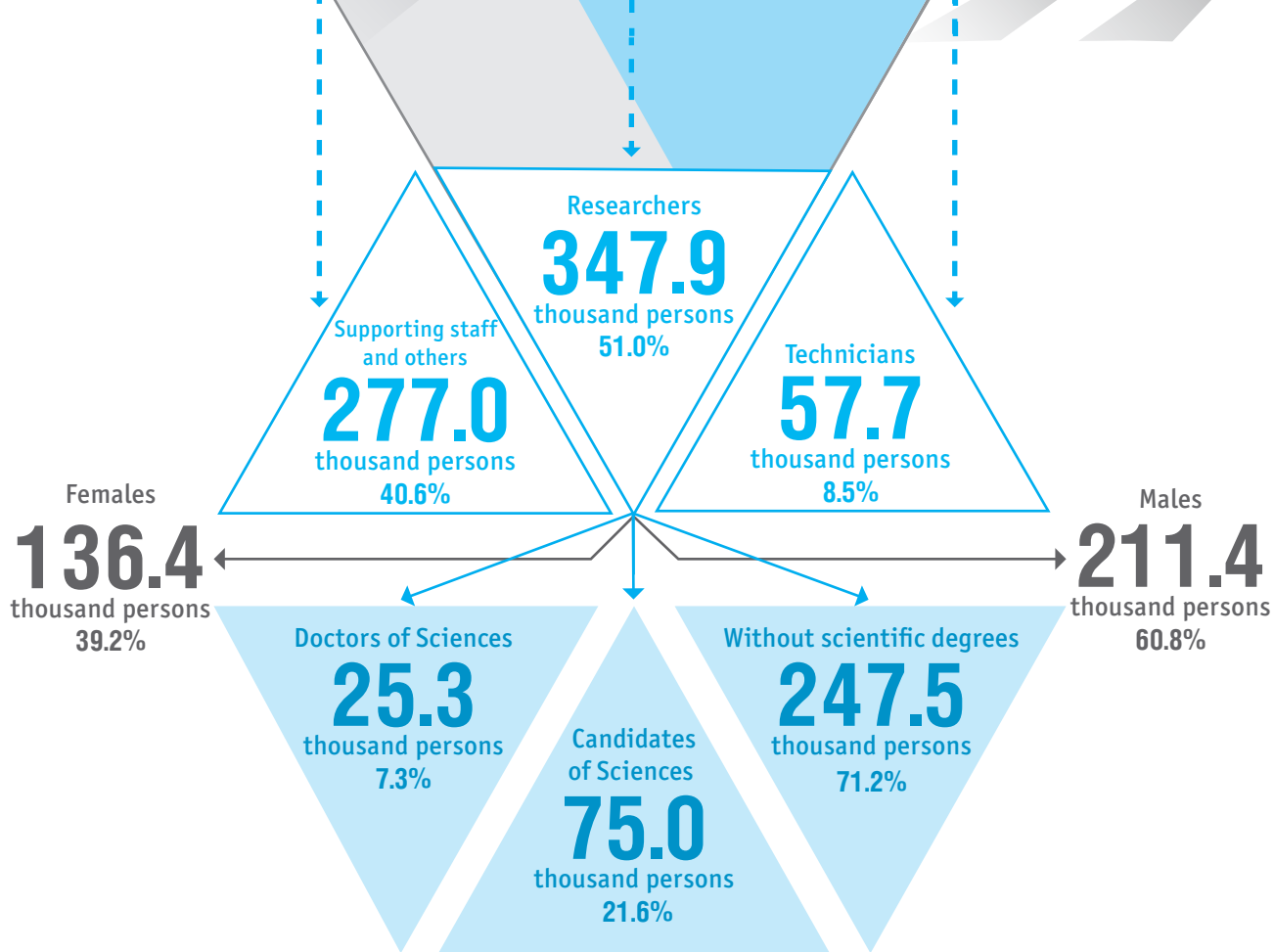


# Infographics: 2018

16

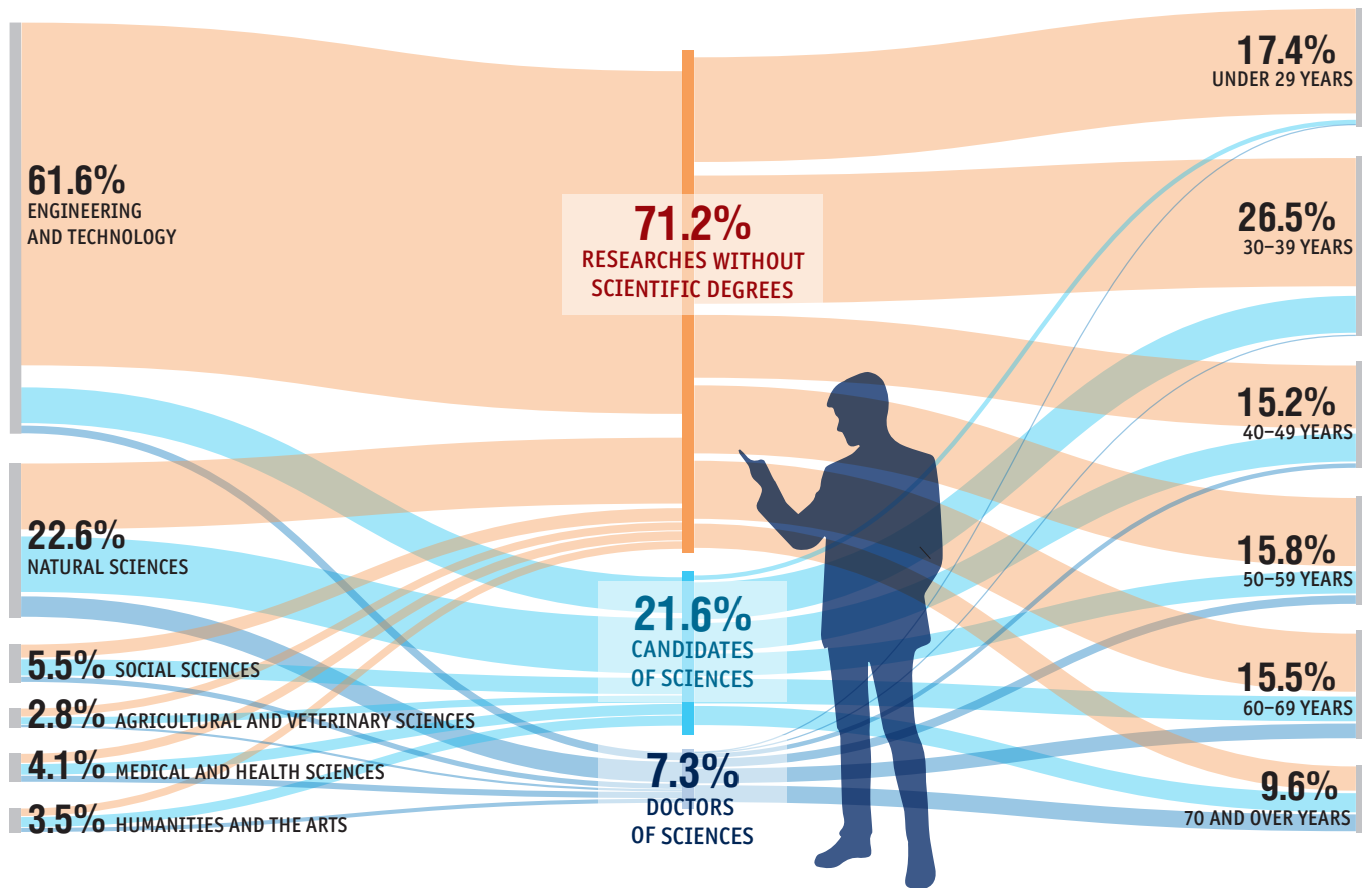
R&D personnel  
**682.6**  
thousand persons





PERCENTAGE DISTRIBUTION OF RESEARCHERS

18



**POSTGRADUATE STUDIES**

**1,223**

Institutions implementing postgraduate programmes



**27,008**

Enrolment

**17,729**

Graduates

**2,198**

Graduates with defended thesis

**213**

Institutions implementing postgraduate programmes

**393**

Enrolment

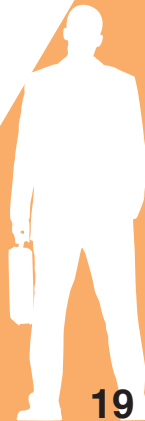
**330**

Graduates

**82**

Graduates with defended thesis

**19**

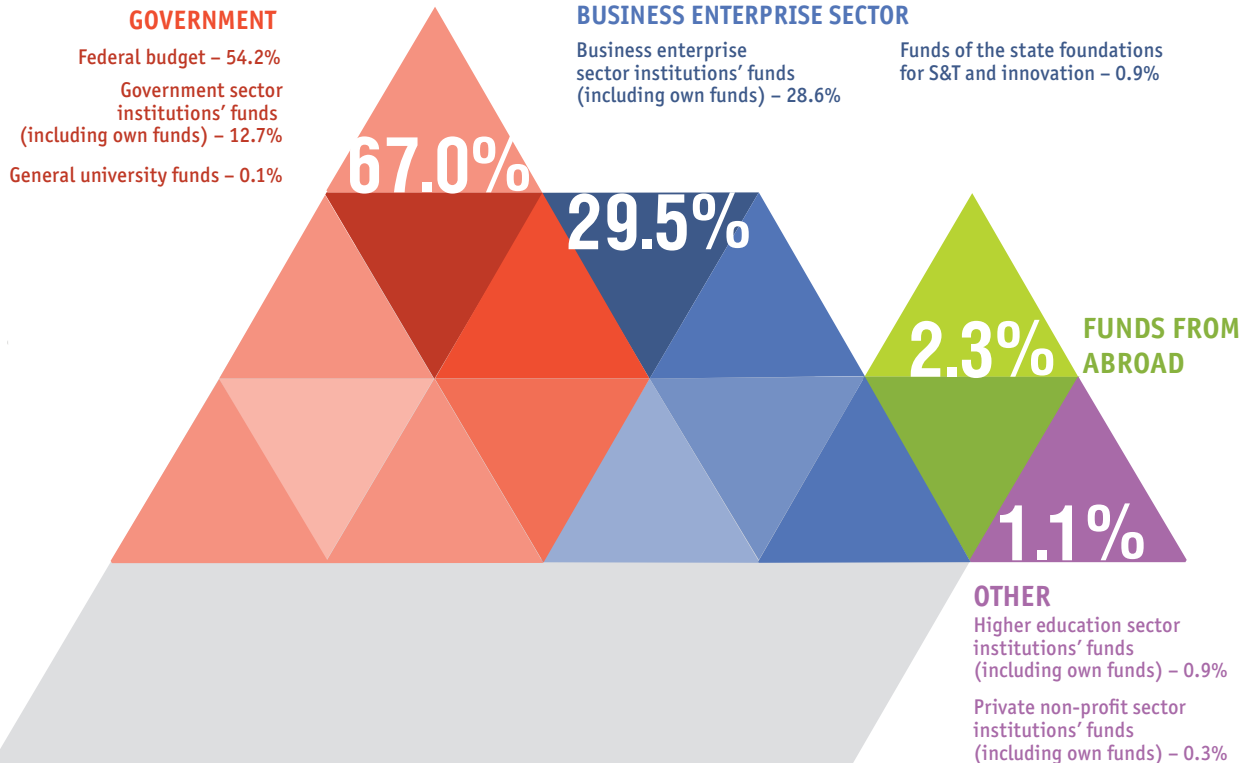


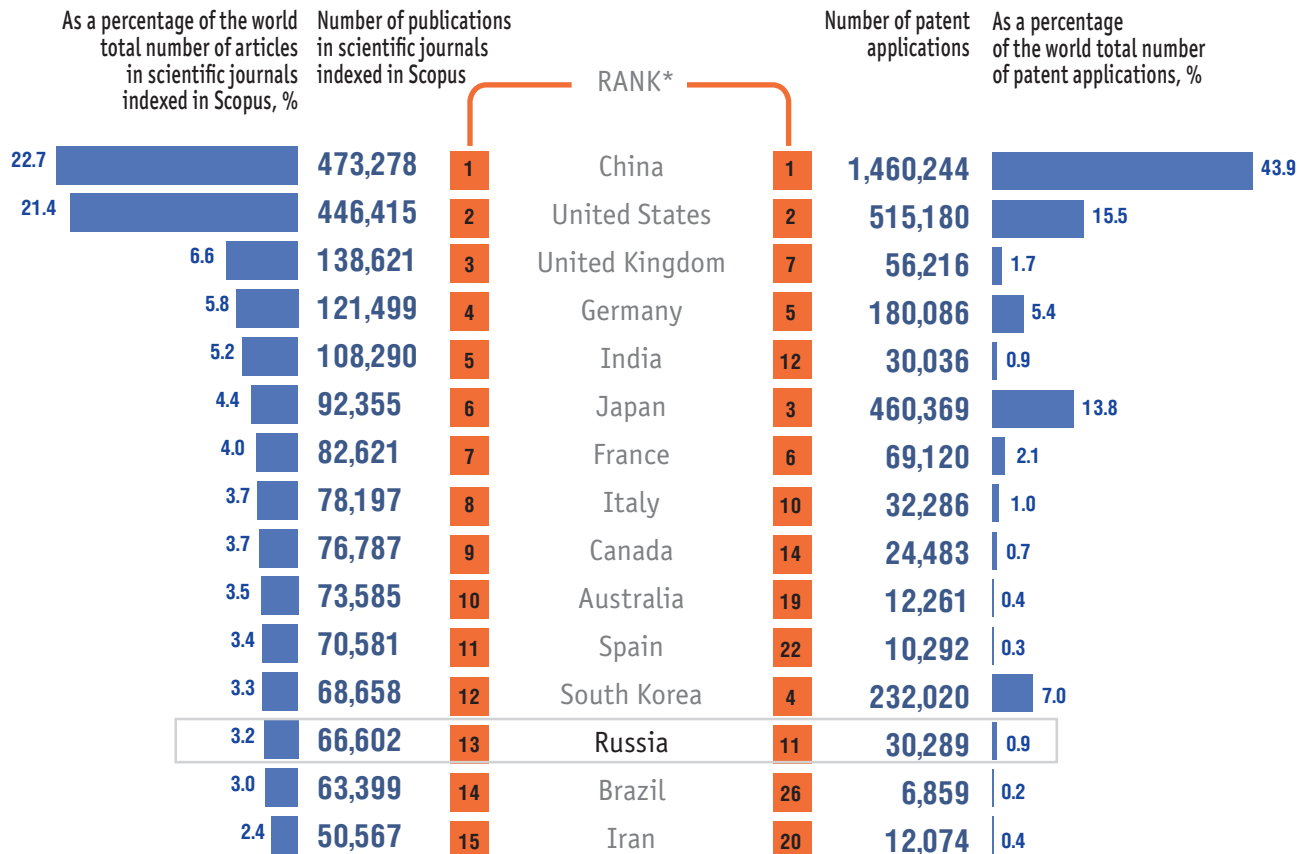
**DOCTORAL STUDIES**

HIGHLY-QUALIFIED PERSONNEL TRAINING



TOTAL – 1,028.2 billion roubles (0.99% OF GDP)

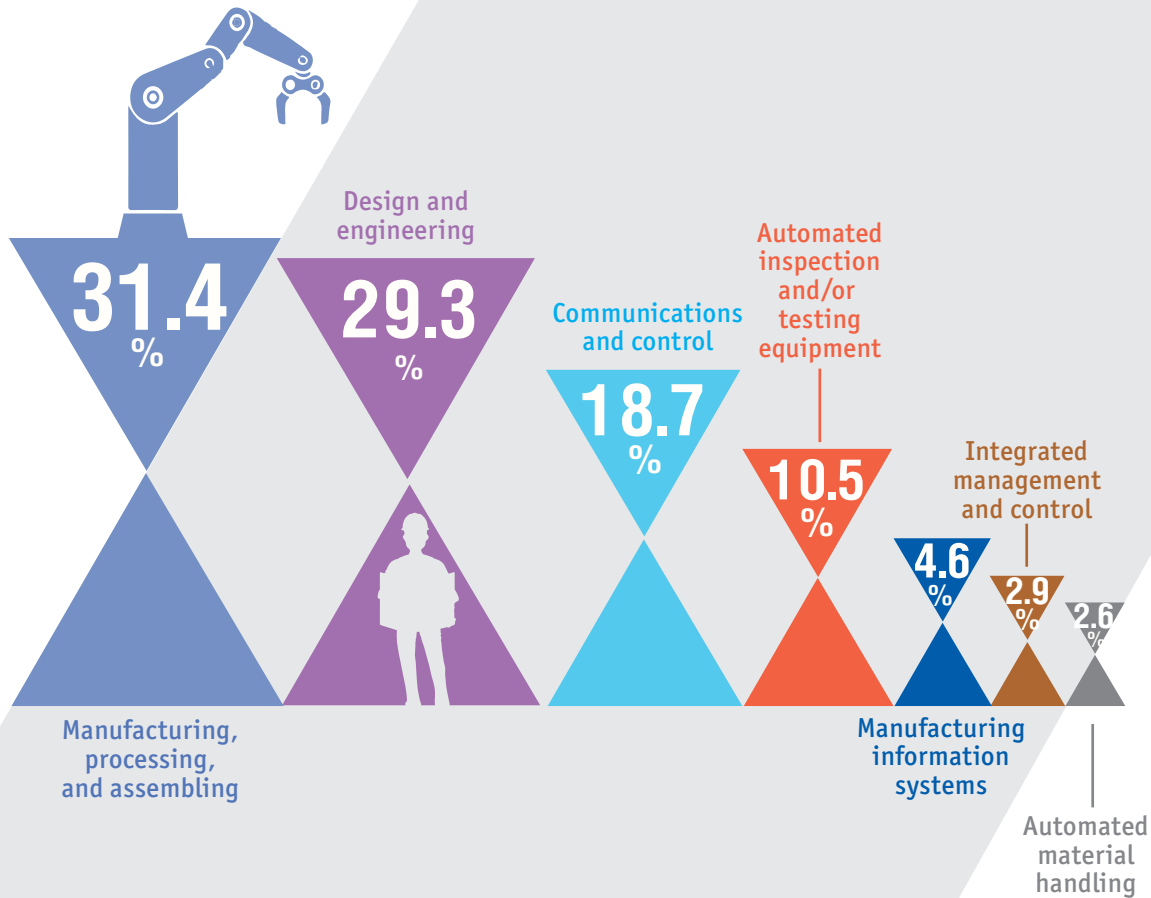




R&D OUTPUT

\* The data are provided for top 15 countries by the number of articles in scientific articles indexed in Scopus in 2018. The data for patent applications refer to 2018.





**86%**

think that science plays an increasingly higher role in Russia



24



**54%**

say it is enough to have a general understanding of the recent developments in the world of science and technology

**70%**

think that, in general, science and technologies are doing more good than harm

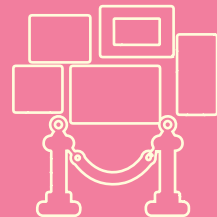
**27%**

within the last year have visited a museum, zoo, planetarium, or botanical garden at least once



**37%**

think they are very well or fairly well informed about the science and technology agenda



## MAIN SCIENCE AND TECHNOLOGY INDICATORS\*

	2010	2012	2013	2014	2015	2016	2017	2018
Gross domestic expenditure on R&D, <i>million roubles:</i>								
at current prices	523377.2	699869.8	749797.6	847527.0	914669.1	943815.2	1019152.4	1028247.6
at constant 2010 prices	523377.2	553475.5	562573.3	591518.0	595487.7	598298.1	612950.3	558132.6
Gross domestic expenditure on R&D:								
as a percentage of GDP	1.13	1.03	1.03	1.07	1.10	1.10	1.11	0.99
as a percentage of the previous year at constant 2010 prices	94.3	105.1	101.6	105.1	100.7	100.5	102.5	91.1
Gross domestic expenditure on R&D per R&D institution, <i>thousand roubles</i>	149878.9	196261.9	207988.2	235162.9	219082.4	234081.2	258405.8	260315.9
Gross domestic expenditure on R&D per R&D employee, <i>thousand roubles</i>	710.6	963.6	1031.3	1157.4	1238.0	1306.7	1439.7	1506.4
Gross domestic expenditure on R&D per researcher, <i>thousand roubles</i>	1418.7	1878.2	2031.9	2266.7	2410.8	2548.2	2832.6	2956.0
Federal budget appropriations on civil S&T, <i>million roubles:</i>								
at current prices	237644.0	355921.1	425301.7	437273.3	439392.8	402722.3	377882.2	420472.3
at constant 2010 prices	237644.0	281471.8	319103.9	305188.0	286063.0	255291.5	227270.2	228232.3
Federal budget appropriations on civil S&T as a percentage of GDP	0.51	0.52	0.58	0.55	0.53	0.47	0.41	0.40
R&D personnel, <i>thousand persons</i>	736.5	726.3	727.0	732.3	738.9	722.3	707.9	682.6
As a percentage of the previous year	99.2	98.8	100.1	100.7	100.9	97.8	98.0	96.4
R&D personnel per R&D institution, <i>headcount</i>	211	204	202	203	177	179	179	173
R&D personnel per 10,000 employment, <i>headcount</i>	109	107	107	108	102	100	99	95

(continued)

	2010	2012	2013	2014	2015	2016	2017	2018
Researchers, <i>thousand persons</i>	368.9	372.6	369.0	373.9	379.4	370.4	359.8	347.9
As a percentage of the previous year	99.9	99.4	99.0	101.3	101.5	97.6	97.1	96.7
Researchers per R&D institution, <i>headcount</i>	106	104	102	104	91	92	91	88
Researchers per 10,000 employment, <i>headcount</i>	55	55	54	55	52	51	50	49
Patent applications filed in the Russian Federation	42500	44211	44914	40308	45517	41587	36454	37957
Patent grants received in the Russian Federation	30322	32880	31638	33950	34706	33536	34254	35774
Number of developed advanced manufacturing technologies	864	1323	1429	1409	1398	1534	1402	1565
Number of advanced manufacturing technologies in use	203330	191372	193830	204546	218018	232388	240054	254927
Total receipts from technology exports, <i>thousand USD</i>	627887.5	688469.9	770584.8	1279213.1	1654732.1	1277023.5	1181183.9	1405475.1
Total payments for technology imports, <i>thousand USD</i>	1425983.3	2043187.9	2463626.3	2455830.7	2207406.8	2498677.8	3305202.5	3064747.9

\* The data in constant prices are calculated taking into account the GDP deflator as at February 03, 2020.

## MAIN INDICATORS OF SCIENCE AND TECHNOLOGY FOR THE ARCTIC ZONE OF THE RUSSIAN FEDERATION\*

	2016	2017	2018
Gross domestic expenditure on R&D, <i>thousand roubles</i> :			
at current prices	4396169.3	3545165.6	4749615.6
at constant 2010 prices	2786795.1	2132173.9	2578090.2
Gross domestic expenditure on R&D as a percentage of the previous year at constant 2010 prices	–	76.5	120.9
Gross domestic expenditure on R&D per R&D institution, <i>thousand roubles</i>	60221.5	52134.8	64184.0
Gross domestic expenditure on R&D per R&D employee, <i>thousand roubles</i>	1216.1	1172.7	1443.2
Gross domestic expenditure on R&D per researcher, <i>thousand roubles</i>	2395.7	2355.6	2818.8
Number of R&D institutions	73	68	74
R&D personnel, <i>headcount</i>	3615	3023	3291
As a percentage of the previous year	–	83.6	108.9
R&D personnel per R&D institution, <i>headcount</i>	50	44	44
Researchers, <i>headcount</i>	1835	1505	1685
Researchers per R&D institution, <i>headcount</i>	25	22	23
Number of institutions implementing postgraduate programmes	18	16	10
Postgraduate enrolment, <i>headcount</i>	716	623	643
Postgraduate graduates, <i>headcount</i>	174	202	111
Of whom with defended thesis	8	4	4



(continued)

	2016	2017	2018
Number of institutions implementing doctoral programmes	3	2	2
Doctoral enrolment, <i>headcount</i>	3	5	5
Doctoral graduates, <i>headcount</i>	8	–	3
Of whom with defended thesis	–	–	–
Number of organisations that have used advanced manufacturing technologies	786	479	537
Number of advanced manufacturing technologies in use	10390	7570	7719
Of which acquired abroad	2840	1519	1425

\* Including the data on R&D institutions located on the land territories of the Arctic zone of the Russian Federation. The data in constant prices are calculated taking into account the GDP deflator as at February 03, 2020.

## MAIN INDICATORS OF INNOVATION\*

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Innovation activity of enterprises (enterprises engaged in technological, marketing, and organisational innovation as a percentage of the total number of enterprises)**, <i>percentage</i>	9.4	9.3	9.5	10.4	10.3	10.1	9.9	9.3	8.4	14.6	12.8
Industrial production***	11.0	11.0	10.8	11.1	11.1	10.9	10.9	10.6	10.5	17.8	15.6
Telecommunications; computer programming, consultancy and related activities; IT industry****	13.4	13.2	13.6	12.1	11.7	12.2	10.7	10.8	9.3	12.4	9.5
Construction*****	...	...	...	...	...	...	...	2.0	1.5	9.6	7.6
Agriculture*****	...	...	...	...	...	...	...	...	4.0	4.6	4.2
Enterprises engaged in technological innovation as a percentage of the total number of enterprises*****	8.0	7.7	7.9	8.9	9.1	8.9	8.8	8.3	7.3	20.8	19.8
Industrial production	9.6	9.4	9.3	9.6	9.9	9.7	9.7	9.5	9.2	19.6	18.5
Telecommunications; computer programming, consultancy and related activities; IT industry	10.9	10.1	10.8	9.9	10.3	10.3	9.5	9.4	7.7	15.7	14.3
Construction	...	...	...	...	...	...	...	2.0	1.1	10.5	9.5
Agriculture	...	...	...	...	...	...	...	...	3.4	5.2	5.4

(continued)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Expenditure on technological, marketing and organisational innovation, <i>million roubles</i> :											
at current prices	317710.2	408689.5	411008.8	748540.1	915366.2	1134237.5	1231476.9	1211294.4	1298444.5	1416922.8	1484901.1
at constant 2010 prices	370068.9	466723.4	411008.8	645849.9	723895.7	851018.6	859489.7	788603.1	823102.7	852181.9	806004.0
Industrial production:											
at current prices	283194.8	365785.1	356163.5	474587.1	590341.6	756183.9	778263.5	741283.8	787232.5	856794.0	893881.3
at constant 2010 prices	329865.3	417726.6	356163.5	409479.8	466857.7	567364.8	543176.6	482606.7	499038.0	515302.8	485198.5
Telecommunications; computer programming, consultancy and related activities; IT industry:											
at current prices	27076.7	34821.9	40223.1	146419.4	86002.9	68115.1	48612.3	67749.9	54681.7	55565.9	61734.7
at constant 2010 prices	31538.9	39766.6	40223.1	126332.5	68013.5	51106.8	33928.2	44108.0	34663.5	33419.1	33509.6
Construction:											
at current prices	...	...	...	...	...	...	...	13.4	7.3	196.4	49.7
at constant 2010 prices	...	...	...	...	...	...	...	8.7	4.6	118.1	27.0
Agriculture:											
at current prices	...	...	...	...	...	...	...	...	15073.6	15942.0	22033.3
at constant 2010 prices	...	...	...	...	...	...	...	...	9555.4	9588.0	11959.7
Expenditure on technological, marketing and organisational innovation as a percentage of total sales:											
Industrial production	1.4	2.0	1.6	2.2	2.5	3.0	3.0	2.7	2.5	2.5	2.2
	1.4	1.9	1.5	1.6	1.8	2.2	2.1	1.8	1.8	1.7	1.5

(continued)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Telecommunications; computer programming, consultancy and related activities; IT industry	2.3	2.8	3.0	9.4	8.6	3.7	2.5	3.4	2.4	2.4	2.6
Construction	...	...	...	...	...	...	...	0.01	0.01	0.2	0.03
Agriculture	...	...	...	...	...	...	...	...	0.9	1.0	1.2
Sales of innovative goods and services, <i>million roubles:</i>											
at current prices	1103365.5	934589.0	1243712.5	2106740.7	2872905.1	3507866.0	3579923.8	3843428.7	4364321.7	4166998.7	4516276.4
at constant 2010 prices	1285200.2	1067300.7	1243712.5	1817722.8	2271969.3	2631952.3	2498551.0	2502232.2	2766606.5	2506163.9	2451433.7
Industrial production:											
at current prices	1046960.0	877684.8	1165747.6	1847370.4	2509604.4	3072530.8	3037407.3	3258254.6	3723693.4	3403055.2	3693061.6
at constant 2010 prices	1219499.0	1002316.0	1165747.6	1593934.8	1984661.4	2305320.2	2119910.2	2121259.5	2360502.9	2046704.3	2004593.0
Telecommunications; computer programming, consultancy and related activities; IT industry:											
at current prices	48839.0	46854.7	62636.4	74437.8	56092.2	71094.4	62928.5	86048.9	80955.8	111254.6	138610.7
at constant 2010 prices	56887.7	53508.1	62636.4	64225.9	44359.2	53342.1	43919.9	56021.4	51319.0	66912.0	75237.9
Construction:											
at current prices	...	...	...	...	...	...	...	600.3	2351.0	152.9	48.7
at constant 2010 prices	...	...	...	...	...	...	...	390.8	1490.4	92.0	26.4

(continued)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Agriculture:											
at current prices	...	...	...	...	...	...	...	...	22222.9	28446.0	33829.1
at constant 2010 prices	...	...	...	...	...	...	...	...	14087.4	17108.3	18362.5
Innovative goods and services as a percentage of total sales:											
Industrial production	5.0	4.5	4.8	6.3	8.0	9.2	8.7	8.4	8.5	7.2	6.5
Telecommunications; computer programming, consultancy and related activities; IT industry	4.2	3.8	4.7	4.8	3.0	3.9	3.3	4.3	3.5	4.8	5.7
Construction	...	...	...	...	...	...	...	0.6	1.7	0.1	0.03
Agriculture	...	...	...	...	...	...	...	...	1.4	1.8	1.9
Expenditure on technological innovation, million roubles											
at current prices	307186.9	399122.0	400803.8	733816.0	904560.8	1112429.2	1211897.1	1203638.1	1284590.3	1404985.3	1472822.3
at constant 2010 prices	357811.3	455797.4	400803.8	633145.8	715350.6	834655.8	845824.3	783618.5	814320.3	845002.3	799447.6
Industrial production:											
at current prices	276262.3	358861.1	349763.3	469442.2	583660.6	746778.2	762774.1	735757.7	777518.6	848045.9	886785.8
at constant 2010 prices	321790.3	409819.4	349763.3	405040.7	461574.2	560307.8	532366.1	479008.9	492880.3	510041.4	481347.1
Telecommunications; computer programming, consultancy and related activities; IT industry:											
at current prices	24148.0	32790.9	38684.0	137754.0	83230.6	66133.4	47066.3	66722.8	52733.5	54625.5	59827.4
at constant 2010 prices	28127.6	37447.2	38684.0	118855.9	65821.0	49619.9	32849.2	43439.3	33428.6	32853.5	32474.3

(continued)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Construction:											
at current prices	...	...	...	...	...	...	...	13.4	6.3	196.0	49.7
at constant 2010 prices	...	...	...	...	...	...	...	8.7	4.0	117.9	27.0
Agriculture:											
at current prices	...	...	...	...	...	...	...	...	14963.3	15806.0	21960.5
at constant 2010 prices	...	...	...	...	...	...	...	...	9485.5	9506.2	11920.2
Expenditure on technological innovation as a percentage of total sales:											
Industrial production	1.4	1.9	1.6	2.2	2.5	2.9	2.9	2.6	2.5	2.4	2.1
Telecommunications; computer programming, consultancy and related activities; IT industry	2.1	2.7	2.9	8.8	4.4	3.6	2.4	3.3	2.3	2.3	2.5
Construction	...	...	...	...	...	...	...	0.01	0.0	0.2	0.03
Agriculture	...	...	...	...	...	...	...	...	0.9	1.0	1.2
Innovative goods and services as a percentage of total sales in small enterprises	...	1.4	...	1.5	...	2.1	...	1.6	...	1.6	...
Small enterprises engaged in technological innovation as a percentage of the total number of small enterprises	...	4.1	...	5.1	...	4.8	...	4.5	...	5.2	...

(continued)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Expenditure on technological innovation in small enterprises, <i>million roubles</i> :											
at current prices	...	6793.5	...	9479.3	...	13510.5	...	12151.8	...	19220.4	...
at constant 2010 prices	...	7758.2	...	8179.0	...	10137.0	...	7911.4	...	11559.7	...
Expenditure on technological innovation as a percentage of total sales in small enterprises	...	0.9	...	0.9	...	1.0	...	0.6	...	0.8	...

\* The data in constant prices are calculated taking into account the GDP deflator as at February 03, 2020.

\*\* Aggregate data on surveyed enterprises covering the following types of economic activity: for 2017 and further – OKVED2 codes: 01.1, 01.2, 01.3, 01.4, 01.5, 01.6, Sections B, C, D (without 35.14; 35.23, 35.30.6), Section E, codes 43.91, 43.99, 58, 61, 62, 63, 69, 70, 71, 72, 73, 74; until 2017 – в OKVED1 codes: Sections C, D, E (since 2011 – without 40.13.2; 40.22.2; since 2014 – including without 40.30.6), codes 64, 72, 74, including code 73 since 2011; for 2015 – codes 45.21.7, 45.22, 45.25, for 2016 – codes 01.1, 01.2, 01.3, 01.4. Since 2018, this indicator is calculated according to the methodology approved by Order no. 788 of Rosstat of December 27, 2019. Any changes in 2017 data are due to the recalculation of indicators according to the specified method.

\*\*\* Aggregate data on surveyed enterprises covering the following types of economic activity: for 2017 and further – OKVED2 codes: Sections B, C, D without 35.14; 35.23, 35.30.6), Section E; until 2017 – OKVED1 codes: Sections C, D, E (since 2011 – without 40.13.2; 40.22.2, since 2014 – including without 40.30.6).

\*\*\*\* Aggregate data on surveyed enterprises covering the following types of economic activity: for 2017 and further – OKVED2 codes 61, 62, 63; until 2017 – OKVED1 codes 64, 72.

\*\*\*\*\* Aggregate data on surveyed enterprises covering the following types of economic activity: for 2017 and further – OKVED2: codes 43.91, 43.99; until 2017 – OKVED1: codes 45.21.7, 45.22, 45.25.

\*\*\*\*\* Aggregate data on surveyed enterprises covering the following types of economic activity: for 2017 and further – OKVED2: codes 01.1, 01.2, 01.3, 01.4, 01.5, 01.6; until 2017 – OKVED1: codes 01.1, 01.2, 01.3, 01.4.

\*\*\*\*\* Since 2018, the indicator is calculated according to the methodology approved by Order no. 788 of Rosstat of December 20, 2019 for the purpose of information support of Clause 1e of Decree no. 204 of the President of the Russian Federation of May 07, 2018 'On the National Goals and Strategic Tasks of the Development of the Russian Federation until 2024'. Any changes in 2017 data are due to the recalculation of indicators according to the specified method.



**R&D Institutions**

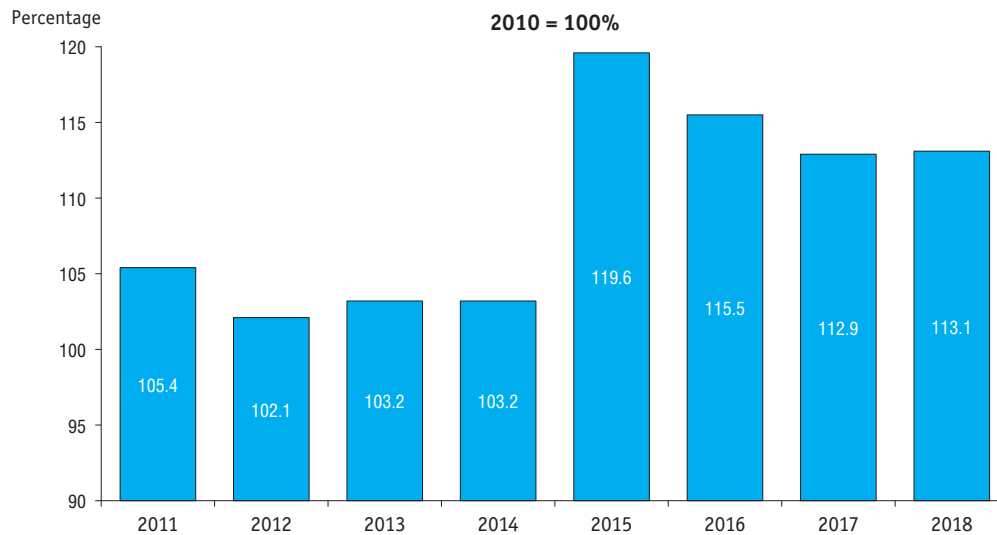


## 1.1. R&amp;D INSTITUTIONS BY TYPE

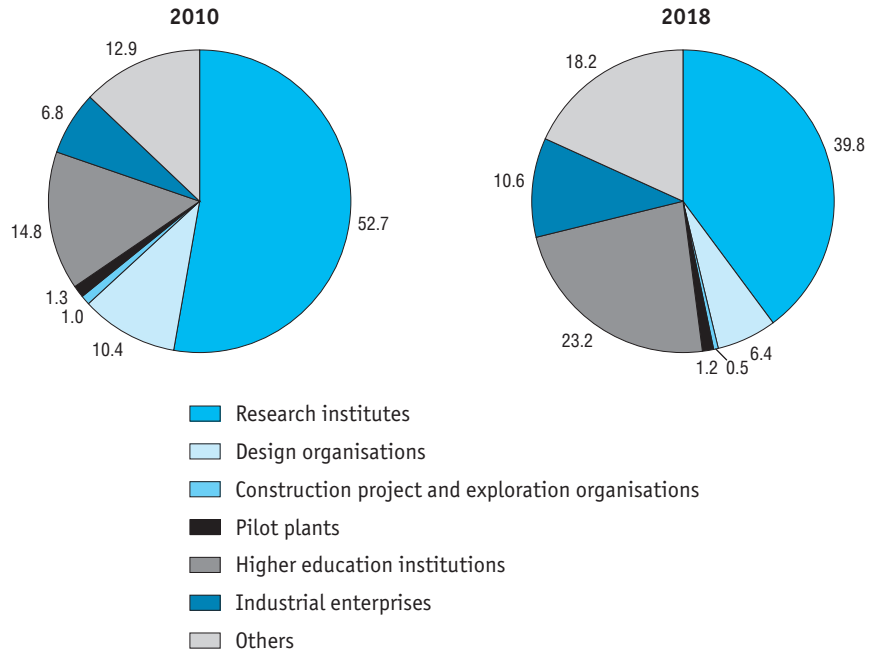
	2000	2005*	2010	2012	2013	2014	2015	2016	2017	2018
<b>Total</b>	<b>4099</b>	<b>3566</b>	<b>3492</b>	<b>3566</b>	<b>3605</b>	<b>3604</b>	<b>4175</b>	<b>4032</b>	<b>3944</b>	<b>3950</b>
Research institutes	2686	2115	1840	1744	1719	1689	1708	1673	1577	1574
Design organisations	318	489	362	338	331	317	322	304	273	254
Construction project and exploration organisations	85	61	36	33	33	32	29	26	23	20
Pilot plants	33	30	47	60	53	53	61	62	63	49
Higher education institutions	390	406	517	562	673	702	1040	979	970	917
Industrial enterprises	284	231	238	274	266	275	371	363	380	419
Others	303	234	452	555	530	536	644	625	658	717

\* In 2005, the R&D institutions classification by type was changed due to the abolition of the All-Russian Classifier of Economy Branches.

## 1.2. TRENDS IN THE TOTAL NUMBER OF R&D INSTITUTIONS



### 1.3. PERCENTAGE DISTRIBUTION OF R&D INSTITUTIONS BY TYPE (percentage)



#### 1.4. R&D INSTITUTIONS BY OWNERSHIP

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Total</b>	<b>4099</b>	<b>3566</b>	<b>3492</b>	<b>3566</b>	<b>3605</b>	<b>3604</b>	<b>4175</b>	<b>4032</b>	<b>3944</b>	<b>3950</b>
Russian ownership	4035	3513	3436	3506	3542	3538	4077	3940	3859	3862
Public ownership	2938*	2632	2610	2561	2526	2520	2684	2592	2520	2510
Federal	2755	2483	2467	2390	2363	2351	2494	2414	2343	2314
Regional	181	149	140	170	163	169	190	178	177	196
Municipal ownership	11	6	14	14	14	13	15	14	14	12
Ownership by voluntary associations	60	27	28	25	27	28	43	44	41	41
Private ownership	388	422	470	545	607	614	881	865	875	880
Ownership by Russian citizens permanently living abroad	...	...	...	1	1	1	1	1	1	1
Ownership by consumers' cooperatives*	3	4	4	2	2	2	5	6	6	1
Mixed ownership	635	422	304	298	300	296	358	326	296	304
Mixed ownership with a share of public ownership	...	...	268	247	236	231	275	248	221	206
Other mixed ownership	...	...	...	51	64	65	83	78	75	98
Ownership by state corporations	...	...	6	60	65	64	90	92	106	113
Foreign ownership	6	7	16	16	16	17	36	39	43	42
Joint ownership (with both Russian and foreign participation)	58	46	40	44	47	49	62	53	42	46

(continued)

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Total, percentage</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
Russian ownership	98.4	98.5	98.4	98.3	98.3	98.2	97.7	97.7	97.8	97.8
Public ownership	71.7	73.8	74.7	71.8	70.1	69.9	64.3	64.3	63.9	63.5
Federal	67.2	69.6	70.6	67.0	65.5	65.2	59.7	59.9	59.4	58.6
Regional	4.4	4.2	4.0	4.8	4.5	4.7	4.6	4.4	4.5	5.0
Municipal ownership	0.3	0.2	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.3
Ownership by voluntary associations	1.5	0.8	0.8	0.7	0.7	0.8	1.0	1.1	1.0	1.0
Private ownership	9.5	11.8	13.5	15.3	16.8	17.0	21.1	21.5	22.2	22.3
Ownership by Russian citizens permanently living abroad	...	...	...	0.03	0.03	0.03	0.02	0.02	0.0	0.03
Ownership by consumers' cooperatives*	0.07	0.1	0.1	0.1	0.06	0.1	0.1	0.1	0.2	0.03
Mixed ownership	15.5	11.8	8.7	8.4	8.3	8.2	8.6	8.1	7.5	7.7
Mixed ownership with a share of public ownership	...	...	7.7	6.9	6.5	6.4	6.6	6.2	5.6	5.2
Other mixed ownership	...	...	...	1.4	1.8	1.8	2.0	1.9	1.9	2.5
Ownership by state corporations	...	...	0.2	1.7	1.8	1.8	2.2	2.3	2.7	2.9
Foreign ownership	0.1	0.2	0.5	0.4	0.4	0.5	0.9	1.0	1.1	1.1
Joint ownership (with both Russian and foreign participation)	1.4	1.3	1.1	1.2	1.3	1.4	1.5	1.3	1.1	1.2

\* The sum of the breakdown may not add to the total because some institutions have shared ownership.

### 1.5. PERCENTAGE DISTRIBUTION OF R&D INSTITUTIONS BY SIZE

	2000	2005	2010	2015	2018
		<b>Total</b>			
<b>R&amp;D institutions</b>	<b>4099</b>	<b>3566</b>	<b>3492</b>	<b>4175</b>	<b>3950</b>
Number of employees, <i>headcount</i> :					
under 100	2377	2023	2094	2822	2718
101–500	1344	1199	1076	1033	933
501–1,000	222	199	194	183	170
1,001–5,000	145	136	120	131	122
over 5,000	11	9	8	6	7
		<b>As a percentage of the total</b>			
<b>R&amp;D institutions</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
Number of employees, <i>headcount</i> :					
under 100	58.0	56.7	60.0	67.6	68.8
101–500	32.8	33.6	30.8	24.7	23.6
501–1,000	5.4	5.6	5.6	4.4	4.3
1,001–5,000	3.5	3.8	3.4	3.1	3.1
over 5,000	0.3	0.3	0.2	0.1	0.2

## 1.6. R&amp;D INSTITUTIONS BY TYPE OF ECONOMIC ACTIVITY\*

	2017	2018
<b>Total</b>	<b>3944</b>	<b>3950</b>
Agriculture, forestry and fishing	32	23
Mining and quarrying	3	5
Manufacturing	453	464
Electricity, gas, steam and air-conditioning supply	5	9
Water supply; sewerage, waste management and remediation activities	2	4
Construction	3	2
Wholesale and retail trade; repair of motor vehicles and motorcycles	7	12
Transportation and storage	4	4
Accommodation and food service activities	1	1
Information and communication	39	43
Financial and insurance activities	4	1
Real estate operations	11	9
Professional, scientific and technical activities	2164	2178
Of which research and development	2089	2104
Administrative and support service activities	4	4
Public administration and defence; compulsory social security	2	6
Education	1030	991
Of which higher education	986	945
Human health and social work activities	38	53
Art, entertainment and recreation	132	127
Other service activities	10	14

\* In accordance with Russian Classification of Economic Activity (OKVED2).



**R&D Personnel**



### 2.1. R&D PERSONNEL (headcount)

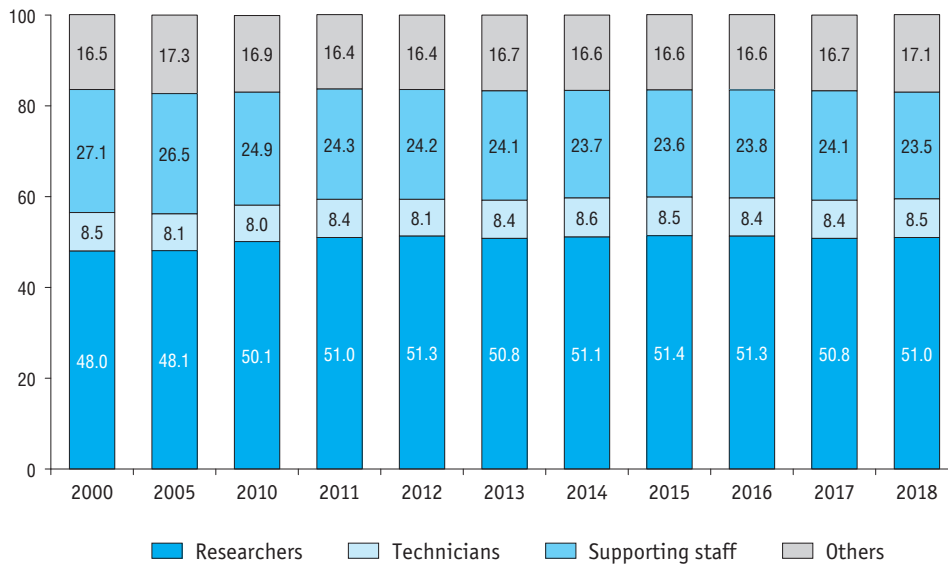
	2000	2005*	2010	2012	2013	2014	2015	2016	2017	2018
<b>Total</b>	<b>887729</b>	<b>813207</b>	<b>736540</b>	<b>726318</b>	<b>727029</b>	<b>732274</b>	<b>738857</b>	<b>722291</b>	<b>707887</b>	<b>682580</b>
Research institutes	718434	510523	435304	430677	434243	435129	435502	427158	407962	394402
Design organisations	56488	184785	157146	138295	137098	139608	136263	133742	125272	115565
Construction project and exploration organisations	6811	5443	6324	6772	4907	4776	2849	1801	1537	1296
Pilot plants	6145	1232	1558	2330	2383	2653	3023	2996	6030	5747
Higher education institutions	31110	33942	46776	53699	54092	58573	60151	59124	56571	58573
Industrial enterprises	54721	43524	51807	52071	52232	49358	53868	50740	59421	52977
Others	14020	33758	37625	42474	42074	42177	47201	46730	51094	54020

\* In 2005, the R&D institutions classification by type was changed due to the abolition of the All-Russian Classifier of Economy Branches.

### 2.2. R&D PERSONNEL BY OCCUPATION (headcount)

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Total</b>	<b>887729</b>	<b>813207</b>	<b>736540</b>	<b>726318</b>	<b>727029</b>	<b>732274</b>	<b>738857</b>	<b>722291</b>	<b>707887</b>	<b>682580</b>
Researchers	425954	391121	368915	372620	369015	373905	379411	370379	359793	347854
Technicians	75184	65982	59276	58905	61401	63168	62805	60441	59690	57722
Supporting staff	240506	215555	183713	175790	175365	173554	174056	171915	170347	160591
Others	146085	140549	124636	119003	121248	121647	122585	119556	118057	116413

### 2.3. PERCENTAGE DISTRIBUTION OF R&D PERSONNEL BY OCCUPATION



## 2.4. R&amp;D PERSONNEL BY OWNERSHIP OF R&amp;D INSTITUTIONS

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
	<b>Headcount</b>									
<b>Total</b>	<b>887729</b>	<b>813207</b>	<b>736540</b>	<b>726318</b>	<b>727029</b>	<b>732274</b>	<b>738857</b>	<b>722291</b>	<b>707887</b>	<b>682580</b>
Russian ownership	866386	797394	726234	715691	710336	723101	729121	714043	699449	673100
Public ownership	673658*	641310	575035	536212	518460	522994	485424	458989	424666	390604
Federal	657696	629207	564238	525200	508083	508938	472548	447382	415705	381171
Regional	15957	12103	10450	10947	10377	14056	12876	11607	8961	9433
Municipal ownership	725	77	170	142	208	155	141	150	142	137
Ownership by voluntary associations	1207	231	512	600	740	821	1010	959	1144	1229
Private ownership	53408	58480	66906	73260	77830	76920	85798	99312	104995	103793
Ownership by Russian citizens permanently living abroad	...	...	...	25	...*	...*	...*	...*	...*	...*
Ownership by consumers' cooperatives*	16	27	268	2	...*	...*	20	23	28	...*
Mixed ownership	137372	97269	78464	82862	87532	95863	124661	121142	124785	125224
Mixed ownership with a share of public ownership	...	...	66574	59406	67452	75024	90907	91932	93247	87428
Other mixed ownership	...	...	...	23456	20080	20839	33754	29210	31538	37796
Ownership by state corporations	...	...	4879	22588	25560	26324	32063	33464	43685	52108
Foreign ownership	146	1145	1130	1233	1955	2344	2898	2881	3030	2993
Joint ownership (with both Russian and foreign participation)	21197	14668	9176	9394	14738	6829	6838	5367	5408	6487

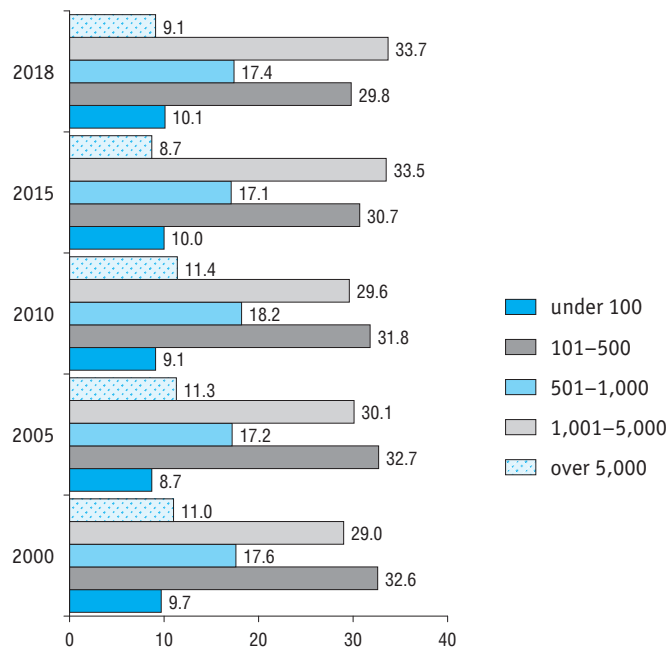
(continued)

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
	<b>Percentage</b>									
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
Russian ownership	97.6	98.1	98.6	98.5	97.7	98.7	98.7	98.9	98.8	98.6
Public ownership	75.9	78.9	78.1	73.8	71.3	71.4	65.7	63.5	60.0	57.2
Federal	74.1	77.4	76.6	72.3	69.9	69.5	64.0	61.9	58.7	55.8
Regional	1.8	1.49	1.4	1.5	1.4	1.9	1.7	1.6	1.3	1.4
Municipal ownership	0.08	0.01	0.02	0.02	0.03	0.02	0.02	0.0	0.0	0.02
Ownership by voluntary associations	0.1	0.028	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2
Private ownership	6.0	7.19	9.1	10.1	10.7	10.5	11.6	13.7	14.8	15.2
Ownership by Russian citizens permanently living abroad	...	...	...	0.003	...**	...**	...**	...**	...**	...**
Ownership by consumers' cooperatives*	0.002	0.003	0.04	0.0	...**	...**	0.003	0.003	0.0	...**
Mixed ownership	15.5	11.96	10.7	11.4	12.0	13.1	16.9	16.8	17.6	18.3
Mixed ownership with a share of public ownership	...	...	9.0	8.2	9.3	10.2	12.3	12.7	13.2	12.8
Other mixed ownership	...	...	...	3.2	2.8	2.8	4.6	4.0	4.5	5.5
Ownership by state corporations	...	...	0.7	3.1	3.5	3.6	4.3	4.6	6.2	7.6
Foreign ownership	0.02	0.14	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.4
Joint ownership (with both Russian and foreign participation)	2.4	1.8	1.2	1.3	2.0	0.9	0.9	0.7	0.8	1.0

\* The sum of the breakdown may not add to the total because some institutions have shared ownership.

\*\* The data are not published in order to ensure the confidentiality of primary statistics received from organisations, in accordance with Federal Law no. 282-FL 'On the Official Statistical Accounting and State Statistics System of the Russian Federation' of November 29, 2007 (art. 4, para. 5; art. 9, para. 1).

## 2.5. PERCENTAGE DISTRIBUTION OF R&amp;D PERSONNEL BY SIZE OF R&amp;D INSTITUTIONS



## 2.6. R&D PERSONNEL BY TYPE OF ECONOMIC ACTIVITY\*

(headcount)

	R&D personnel		Researchers	
	2017	2018	2017	2018
<b>Total</b>	<b>707887</b>	<b>682580</b>	<b>359793</b>	<b>347854</b>
Agriculture, forestry and fishing	821	529	242	157
Mining and quarrying	429	422	372	369
Manufacturing	70598	69527	37420	37038
Electricity, gas, steam and air-conditioning supply	146	162	127	154
Water supply; sewerage, waste management and remediation activities	...**	157	...**	86
Construction	75	16	41	13
Wholesale and retail trade; repair of motor vehicles and motorcycles	358	447	277	430
Transportation and storage	128	114	72	57
Accommodation and food service activities	...**	...**	...**	...**
Information and communication	3538	3310	2354	2280
Financial and insurance activities	22	–	21	–
Real estate operations	688	151	533	91
Professional, scientific and technical activities	564623	540272	272400	260801
Of which research and development	559836	535895	268884	257559
Administrative and support service activities	37	135	28	108
Public administration and defence; compulsory social security	...**	1385	...**	695
Education	58297	59854	41890	42337
Of which higher education	57482	59175	41222	41776
Human health and social work activities	3796	3338	1795	1470
Art, entertainment and recreation	3102	2647	1730	1686
Other service activities	73	77	38	45

\* In accordance with Russian Classification of Economic Activity (OKVED2).

\*\* The data are not published in order to ensure the confidentiality of primary statistics received from organisations, in accordance with Federal Law no. 282-FL of November 29, 2007 'On the Official Statistical Accounting and State Statistics System of the Russian Federation' (art. 4, para. 5; art. 9, para. 1).

## 2.7. R&amp;D PERSONNEL BY EDUCATIONAL ATTAINMENT

*(headcount)*

	Total	Higher education	Secondary vocational education	Other education
2000	887729	530649	144503	212577
2005	813207	501718	134222	177267
2010	736540	493852	109158	133530
2011	735273	506330	103873	125070
2012	726318	508057	99503	118758
2013	727029	512017	97867	117145
2014	732274	522726	95564	113984
2015	738857	537118	95640	106099
2016	722291	529418	93123	99750
2017	707887	522779	90607	94501
2018	682580	511222	85539	85819

## 2.8. RESEARCHERS BY GENDER AND AGE (headcount)

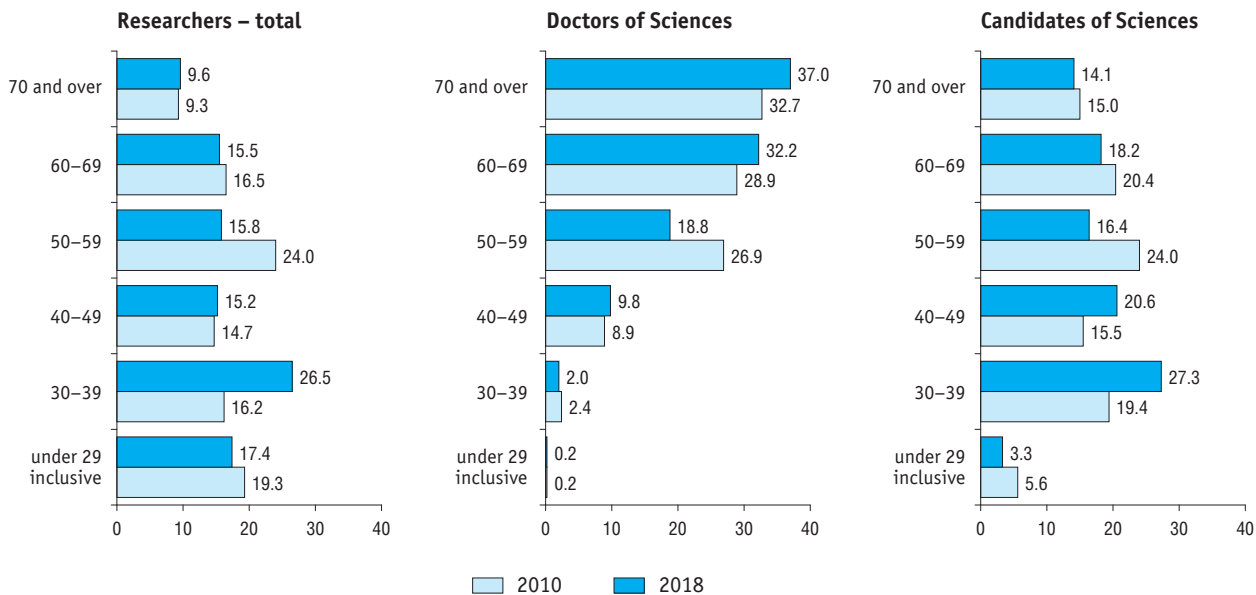
	2010			2017			2018		
	Researchers	Of whom		Researchers	Of whom		Researchers	Of whom	
		Doctors of Sciences	Candidates of Sciences		Doctors of Sciences	Candidates of Sciences		Doctors of Sciences	Candidates of Sciences
<b>Total</b>	<b>368915</b>	<b>26789</b>	<b>78325</b>	<b>359793</b>	<b>26076</b>	<b>77251</b>	<b>347854</b>	<b>25288</b>	<b>75042</b>
<i>Age, years:</i>									
under 29 inclusive	71194	52	4354	66376	32	3153	60634	40	2507
30–39	59910	632	15229	91429	566	20772	92109	518	20459
40–49	54113	2394	12157	51149	2473	14906	52801	2474	15466
50–54	42853	3086	8807	26749	1987	5938	24159	1791	5538
55–59	45509	4125	9998	33144	3173	7300	30673	2972	6772
60–69	60997	7743	16001	57414	8484	14351	54077	8145	13693
70 and over	34339	8757	11779	33532	9361	10831	33401	9348	10607
<b>Males</b>	<b>215052</b>	<b>20676</b>	<b>47427</b>	<b>217503</b>	<b>19260</b>	<b>44986</b>	<b>211423</b>	<b>18559</b>	<b>43539</b>
<i>Age, years:</i>									
under 29 inclusive	43973	47	2708	42388	32	1930	38500	37	1499
30–39	34132	450	8185	55983	408	11541	56840	381	11475
40–49	27271	1637	6432	28400	1573	7384	30170	1561	7682
50–54	22601	2237	5152	14019	1256	3108	12585	1117	2820
55–59	25191	3036	6339	18275	2195	4298	16919	2002	3913
60–69	37253	6263	10609	34866	6237	9277	32776	5923	8795
70 and over	24631	7006	8002	23572	7559	7448	23633	7538	7355



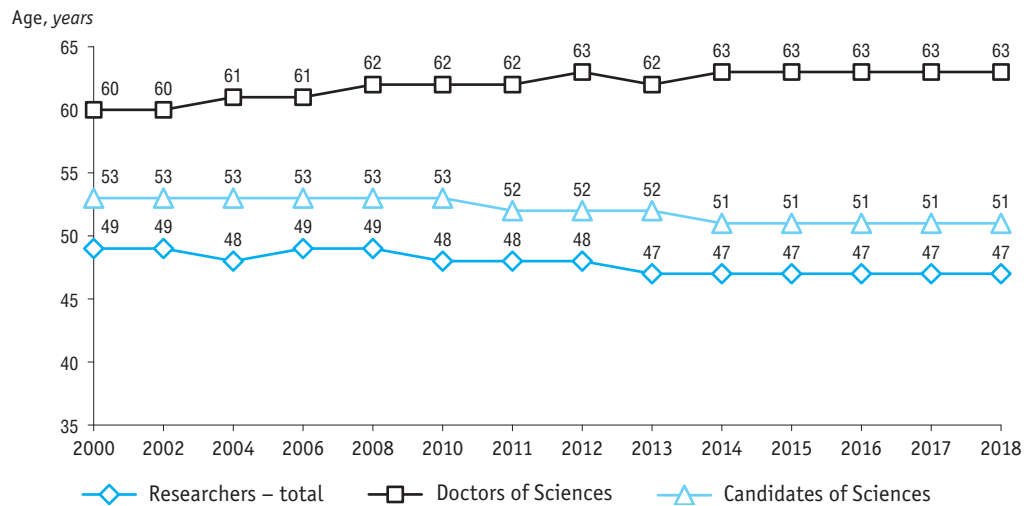
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	2010			2017			2018		
	Researchers	Of whom		Researchers	Of whom		Researchers	Of whom	
		Doctors of Sciences	Candidates of Sciences		Doctors of Sciences	Candidates of Sciences		Doctors of Sciences	Candidates of Sciences
<b>Females</b>	<b>153863</b>	<b>6113</b>	<b>30898</b>	<b>142290</b>	<b>6816</b>	<b>32265</b>	<b>136431</b>	<b>6729</b>	<b>31503</b>
<i>Age, years:</i>									
under 29 inclusive	27221	5	1646	23988	–	1223	22134	3	1008
30–39	25778	182	7044	35446	158	9231	35269	137	8984
40–49	26842	757	5725	22749	900	7522	22631	913	7784
50–54	20252	849	3655	12730	731	2830	11574	674	2718
55–59	20318	1089	3659	14869	978	3002	13754	970	2859
60–69	23744	1480	5392	22548	2247	5074	21301	2222	4898
70 and over	9708	1751	3777	9960	1802	3383	9768	1810	3252

## 2.9. PERCENTAGE DISTRIBUTION OF RESEARCHERS BY AGE



## 2.10. AVERAGE AGE OF RESEARCHERS

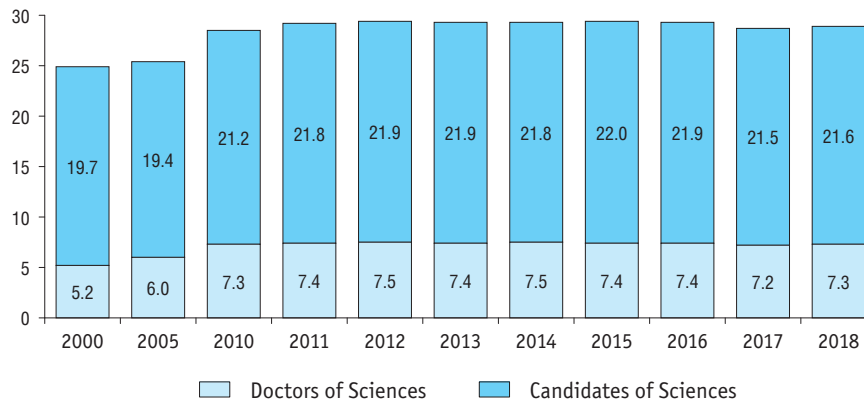


## 2.11. RESEARCHERS WITH SCIENTIFIC DEGREES

(headcount)

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Researchers with scientific degrees</b>	<b>105911</b>	<b>99428</b>	<b>105114</b>	<b>109330</b>	<b>108248</b>	<b>109598</b>	<b>111533</b>	<b>108388</b>	<b>103327</b>	<b>100330</b>
Doctors of Sciences	21949	23410	26789	27784	27485	27969	28046	27430	26076	25288
Candidates of Sciences	83962	76018	78325	81546	80763	81629	83487	80958	77251	75042

## 2.12. RESEARCHERS WITH SCIENTIFIC DEGREES AS A PERCENTAGE OF THE TOTAL NUMBER OF RESEARCHERS



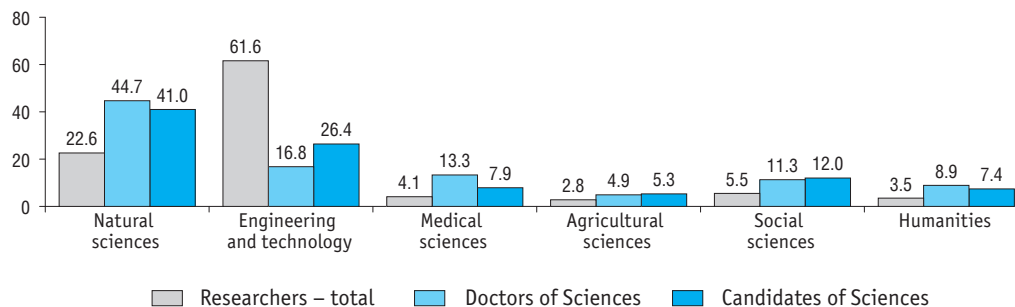
## 2.13. RESEARCHERS BY FIELD OF SCIENCE AND TECHNOLOGY

(headcount)

	2010			2017			2018		
	Researchers	Of whom		Researchers	Of whom		Researchers	Of whom	
		Doctors of Sciences	Candidates of Sciences		Doctors of Sciences	Candidates of Sciences		Doctors of Sciences	Candidates of Sciences
<b>Total</b>	<b>368915</b>	<b>26789</b>	<b>78325</b>	<b>359793</b>	<b>26076</b>	<b>77251</b>	<b>347854</b>	<b>25288</b>	<b>75042</b>
Natural sciences	89375	12251	33664	79980	11503	31703	78661	11302	30804
Engineering and technology	224641	4620	21260	224111	4435	20581	214233	4259	19816
Medical sciences*	16516	4045	7475	14942	3621	6133	14327	3365	5947
Agricultural sciences	12734	1542	5004	10343	1384	4183	9575	1243	3940
Social sciences	14347	2057	5861	18126	2726	8811	19046	2862	8970
Humanities	11302	2274	5061	12291	2407	5840	12012	2257	5565

\* Including psychophysiology.

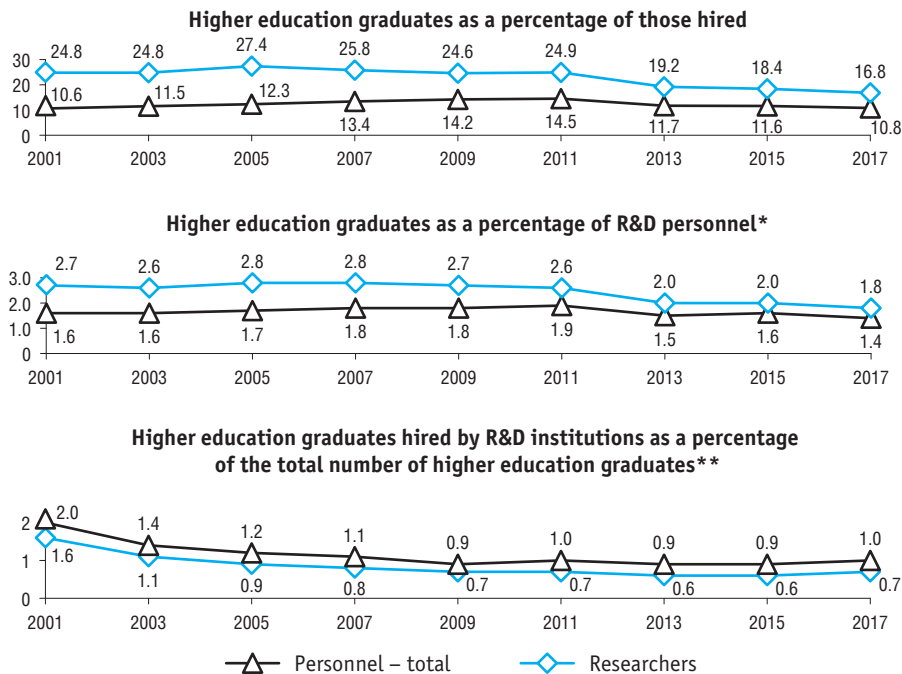
## 2.14. PERCENTAGE DISTRIBUTION OF RESEARCHERS BY FIELD OF SCIENCE AND TECHNOLOGY: 2018



## 2.15. FLOWS OF R&D PERSONNEL (headcount)

	Number at the beginning of the reporting year	Inflow				Outflow				Number at the end of the reporting year
		Total	Of whom			Total	Of whom			
			higher education graduates	other research institutes' graduates	others		resigned	were made redundant	left due to other reasons	
2001	890718	132757	14122	21549	97086	137932	93587	3542	40803	885568
2003	867456	120298	13777	20702	85819	129284	89513	5917	33854	858470
2005	826007	109973	13495	15618	80860	122773	81623	6598	34552	813207
2007	814329	105758	14150	19778	71830	118952	80536	4617	33799	801135
2009	745978	93526	13235	13529	66762	97071	58295	5776	33000	742433
2011	741183	94939	13725	11881	69333	100849	62848	2973	35028	735273
2013	725591	94550	11075	13210	70265	93112	59214	2015	31883	727029
2015	737210	100290	11662	14026	74602	98643	58285	4238	36120	738857
2017	714384	92300	9985	12539	69776	98797	57974	4327	36496	707887

## 2.16. INFLOW OF HIGHER INSTITUTION GRADUATES IN R&amp;D INSTITUTIONS



\* The ratio of the higher education graduates hired during the year to the number of employees at the end of the year.

\*\* Including private higher education institutions

## 2.17. TRENDS IN INFLOW AND OUTFLOW OF R&D PERSONNEL

	2001	2005	2007	2009	2011	2013	2015	2017
R&D personnel balance by inflow*	0.152	0.138	0.135	0.131	0.135	0.138	0.144	0.142
R&D personnel balance by outflow**	0.158	0.154	0.152	0.136	0.144	0.136	0.142	0.152
Labour force replacement ratio***	0.962	0.896	0.889	0.963	0.941	1.015	1.017	0.934

\* The ratio of the R&D personnel inflow during the year to the average employment in the organisation.

\*\* The ratio of the R&D personnel outflow during the year to the average employment in the organisation.

\*\*\* The ratio of R&D personnel inflow during the year to the outflow during the same period.



## Training of R&D personnel

### 2.18. MAIN INDICATORS OF POSTGRADUATE STUDIES

	Number of institutions (at the end of the year)	Enrolment, <i>headcount</i> (at the end of the year)	Entrants, <i>headcount</i>	Graduates, <i>headcount</i>	Of whom with defended thesis*, <i>headcount</i>
<b>Total</b>					
2000	1362	117714	43100	24828	7503
2005	1473	142899	46896	33561	10650
2006	1493	146111	50462	35530	11893
2007	1490	147719	51633	35747	10970
2008	1529	147674	49638	33670	8831
2009	1547	154470	55540	34235	10770
2010	1568	157437	54558	33763	9611
2011	1570	156279	50582	33082	9635
2012	1575	146754	45556	35162	9195
2013	1557	132002	38971	34733	8979
2014	1519	119868	32981	28273	5189
2015	1446	109936	31647	25826	4651
2016	1359	98352	26421	25992	3730
2017	1284	93523	26081	18069	2320
2018	1223	90823	27008	17729	2198

\* Here and below, the headcount of those who defended the thesis during their postgraduate studies (i.e., during the period of time specified in the order of admission).

(continued)

	Number of institutions (at the end of the year)	Enrolment, <i>headcount</i> (at the end of the year)	Entrants, <i>headcount</i>	Graduates, <i>headcount</i>	Of whom with defended thesis*, <i>headcount</i>
<b>Research institutes</b>					
2000	797	17502	6075	3813	873
2005	833	19986	6577	4806	1009
2006	820	19542	6330	4865	852
2007	799	18346	6072	4847	895
2008	811	17397	5381	4781	715
2009	800	16549	5549	4359	734
2010	809	16936	5655	4335	729
2011	805	15865	4784	4028	693
2012	820	14823	4555	4101	655
2013	818	13593	4166	3943	674
2014	805	12175	3126	3331	397
2015	771	11528	3189	2728	313
2016	733	10581	2949	2954	331
2017	670	10231	3133	2209	247
2018	618	10527	3253	2039	211

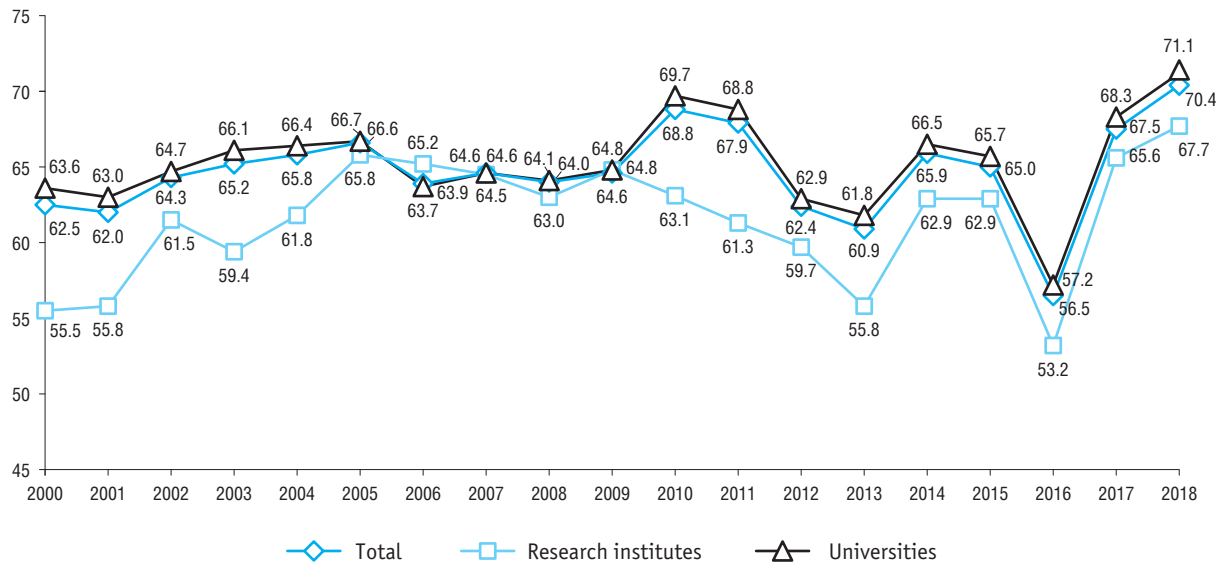
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	Number of institutions (at the end of the year)	Enrolment, <i>headcount</i> (at the end of the year)	Entrants, <i>headcount</i>	Graduates, <i>headcount</i>	Of whom with defened thesis*, <i>headcount</i>
<b>Higher education institutions</b>					
2000	565	100212	37025	21015	6630
2005	640	122913	40319	28755	9641
2006	673	126569	44132	30665	11041
2007	691	129373	45561	30900	10075
2008	718	130277	44257	28889	8116
2009	730	137068	49736	29678	9996
2010	748	139908	48748	29268	8854
2011	750	139542	45561	28847	8869
2012	740	131226	40802	30885	8480
2013	724	117790	34643	30639	8257
2014	698	107083	29700	24836	4770
2015	661	97847	28285	22971	4318
2016	611	87180	23281	22917	3379
2017	599	82633	22749	15753	2063
2018	585	79583	23580	15546	1977
<b>Additional professional (vocational) education institutions and others</b>					
2009	17	853	255	198	40
2010	11	593	155	160	28
2011	15	872	237	207	73
2012	15	705	199	176	60
2013	15	619	162	151	48
2014	16	610	155	106	22
2015	14	561	173	127	20
2016	15	591	191	121	20
2017	15	659	199	107	10
2018	20	713	175	144	10

## 2.19. NUMBER OF HIGHER EDUCATION GRADUATES OF THE REPORTING YEAR ADMITTED TO POSTGRADUATE STUDIES BY MODE OF STUDY (headcount)

	2000	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Total</b>	<b>26926</b>	<b>37528</b>	<b>34326</b>	<b>28411</b>	<b>23736</b>	<b>21720</b>	<b>20585</b>	<b>14928</b>	<b>17605</b>	<b>19022</b>
In the total enrolment – by mode of study:										
Intramural full-time	22076	28507	24754	21528	19432	18180	17544	12567	14766	16420
Intramural part-time	4850	9021	9572	6883	4304	3540	3041	2361	2839	2602
Research institutes	3370	3569	2933	2718	2326	1965	2005	1570	2055	2203
In the total enrolment – by mode of study:										
Intramural full-time	2677	2877	2379	2226	1852	1652	1772	1374	1801	1990
Intramural part-time	693	692	554	492	474	313	233	196	254	213
Higher education institutions	23556	33955	31356	25671	21398	19746	18572	13324	15533	16772
In the total enrolment – by mode of study:										
Intramural full-time	19399	25628	22347	19298	17578	16525	15770	11185	12965	14407
Intramural part-time	4157	8327	9009	6373	3820	3221	2802	2139	2568	2365
Additional professional (vocational) education institutions and other institutions	–	4	37	22	12	9	8	34	17	47
In the total enrolment – by mode of study:										
Intramural full-time	–	2	28	4	2	3	2	8	–	23
Intramural part-time	–	2	9	18	10	6	6	26	17	24

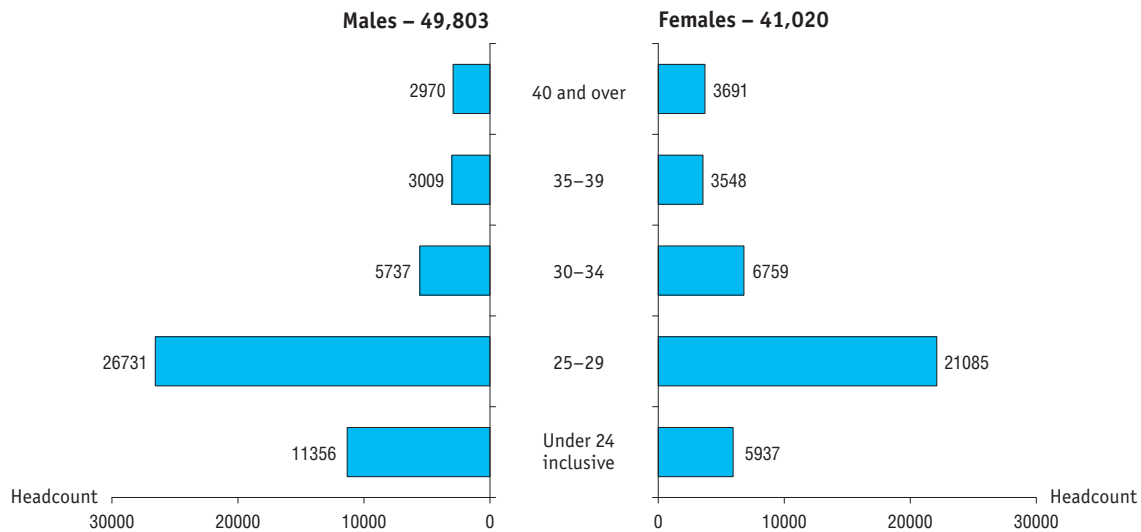
## 2.20. HIGHER EDUCATION GRADUATES OF THE REPORTING YEAR AS A PERCENTAGE OF THE TOTAL POSTGRADUATE ENROLMENT\*



\* Additional professional (vocational) education institutions: for 2010 – 2.6%, 2011 – 15.6%, 2012 – 11.1%, 2013 – 7.4%, 2014 – 5.8%, 2015 – 4.6%, 2016 – 17.8%, 2017 – 8.5%, 2018 Additional professional (vocational) education institutions and other institutions – 26.9%.

## 2.21. POSTGRADUATE ENROLMENT BY GENDER AND AGE: 2018

(the end of the year)



**2.22. POSTGRADUATE ENROLMENT, ENTRANTS, AND GRADUATES BY FIELD OF EDUCATION AND GENERAL GROUP  
OF SCIENTIFIC PROFESSIONS\***  
(headcount)

	Enrolment		Entrants		Graduates		Of whom with defended thesis	
	2017*	2018**	2017	2018**	2017	2018	2017	2018
<b>Total</b>	<b>93523</b>	<b>90823</b>	<b>26081</b>	<b>27008</b>	<b>18069</b>	<b>17729</b>	<b>2320</b>	<b>2198</b>
<b>By field of education</b>	<b>91922</b>	<b>90823</b>	<b>26081</b>	<b>27008</b>	<b>7457</b>	<b>15465</b>	<b>865</b>	<b>1843</b>
Engineering mathematics	2501	2465	713	670	49	377	11	73
Computer and information sciences	300	332	107	125	26	57	6	5
Physics and astronomy	4318	4269	1166	1131	102	735	33	152
Chemistry	2700	2681	726	743	57	506	18	134
Earth sciences	2935	2868	970	928	480	557	37	32
Biological sciences	4488	4470	1179	1199	128	686	15	68
Architecture	474	457	135	141	53	85	3	3
Civil engineering and technology	2039	2097	592	604	26	280	6	35
Computer engineering	7594	7530	2021	2114	130	1138	22	122
Information security	453	494	145	155	3	46	–	12
Electronics and communications engineering	1829	1889	517	519	40	272	8	51
Photonics, instrumentation engineering, optical and biomedical engineering	967	988	285	279	9	135	4	24
Power engineering and thermal power engineering	1949	1947	542	564	25	318	5	61
Nuclear power engineering and technology	302	334	83	106	5	29	–	3
Mechanical engineering	2238	2300	635	632	29	307	6	33
Engineering physics and technology	35	33	8	9	1	7	–	–
Weapons and armaments systems	12	24	5	18	–	–	–	–
Chemical engineering	1262	1290	336	344	9	240	2	44
Industrial ecology and biotechnology	872	830	192	228	17	163	5	15

(continued)

	Enrolment		Entrants		Graduates		Of whom with defended thesis	
	2017*	2018**	2017	2018**	2017	2018	2017	2018
Technosphere safety and environmental engineering	406	431	117	125	–	48	–	10
Applied geology, mining and quarrying, oil and gas engineering, geodesy	1114	1210	323	387	15	137	6	38
Materials engineering	1087	1178	337	309	12	142	2	29
Surface transport engineering and technology	779	834	229	230	16	81	1	6
Aircraft and aerospace engineering	720	932	208	258	12	100	1	17
Flight navigation and aircraft and aerospace equipment operation	145	166	51	51	–	10	–	1
Shipbuilding and water-borne transportation engineering and technology	444	439	102	100	8	40	–	4
Engineering systems management	953	1057	284	291	18	105	9	17
Nanotechnologies and nanomaterials	37	36	10	8	–	6	–	2
Light industry technological processes	201	198	66	58	32	33	1	2
Basic medicine	978	1052	311	327	122	166	26	22
Clinical medicine	6808	6628	1975	1981	915	1219	139	160
Health sciences and preventive medicine	668	672	229	198	62	91	4	8
Pharmacology and pharmacy	362	345	116	94	60	71	10	11
Agriculture, forestry and fisheries	3077	3052	838	884	241	506	43	89
Veterinary science and animal science	1376	1212	419	412	225	231	47	69
Psychology	2107	2051	567	595	220	361	16	18
Economics and management	9527	9013	2653	3004	1333	1810	79	106
Sociology and social work	1256	1291	341	374	162	234	15	22
Law	5400	5076	1570	1602	600	953	46	54
Political sciences and area studies	1511	1445	511	448	178	266	7	9
Mass media, library and information science	384	371	112	112	59	71	8	9
Education and educational research	5145	5126	1434	1598	497	875	31	56
Linguistics and literary studies	3815	3624	1055	1110	552	775	88	121
History and archaeology	2568	2377	733	757	414	520	58	57



(continued)

	Enrolment		Entrants		Graduates		Of whom with defended thesis	
	2017*	2018**	2017	2018**	2017	2018	2017	2018
Philosophy, ethics and religion	1519	1362	424	404	237	295	30	23
Theology	22	33	13	18	–	2	–	–
Physical training and sport	678	709	225	238	88	93	3	5
Art (arts, history of arts, etc.)	952	983	298	345	112	164	6	5
Cultural studies and sociocultural projects	615	622	173	181	78	122	8	6
<b>By general group of scientific professions</b>	<b>1601</b>	<b>–</b>	<b>–</b>	<b>–</b>	<b>10612</b>	<b>2264</b>	<b>1455</b>	<b>355</b>
Mathematics	12	–	–	–	22	13	3	–
Mechanics	38	–	–	–	203	38	17	3
Astronomy	3	–	–	–	21	1	4	–
Physics	57	–	–	–	661	98	119	15
Chemistry	34	–	–	–	428	39	106	13
Physico-chemical biology	19	–	–	–	210	47	46	6
General biology	67	–	–	–	384	82	40	8
Physiology	18	–	–	–	169	28	18	3
Geometric engineering and computer-generated graphics	1	–	–	–	7	–	–	–
Mechanical engineering and engineering science	26	–	–	–	282	28	35	14
Energy, metallurgical and chemical engineering	8	–	–	–	60	3	10	2
Transportation, mining and civil engineering	6	–	–	–	22	2	3	1
Aircraft and aerospace engineering	54	–	–	–	165	54	21	11
Shipbuilding	10	–	–	–	41	12	5	2
Electrical machinery	33	–	–	–	178	26	26	1
Instrumentation engineering, metrology and data measuring instruments and systems	31	–	–	–	208	26	32	2
Radio-frequency engineering and communication	48	–	–	–	272	32	31	9

(continued)

	Enrolment		Entrants		Graduates		Of whom with defened thesis	
	2017*	2018**	2017	2018**	2017	2018	2017	2018
Computer engineering and control	133	–	–	–	846	144	130	25
Energy sector	27	–	–	–	153	24	22	5
Metallurgy and materials engineering	42	–	–	–	133	31	30	5
Chemical engineering	23	–	–	–	240	19	40	6
Food technology	12	–	–	–	46	19	10	5
Technology of textile materials and light industry products	6	–	–	–	7	–	–	–
Processes and machines in agro-engineering systems	5	–	–	–	74	18	22	6
Technology, machinery and equipment for logging and forestry, wood processing and biomass chemical conversion	1	–	–	–	27	6	9	2
Transport	12	–	–	–	69	24	8	1
Construction and architecture	59	–	–	–	116	39	10	5
Documentary information	2	–	–	–	25	1	2	–
Civil defence	6	–	–	–	40	4	5	2
Electronics	21	–	–	–	93	15	17	7
Agronomy	35	–	–	–	142	57	35	8
Veterinary science and animal science	7	–	–	–	209	77	53	23
Forestry	1	–	–	–	26	7	6	2
Fishing	1	–	–	–	4	–	2	–
History and archaeology	30	–	–	–	219	41	28	6
Economics	234	–	–	–	1030	135	72	16
Philosophy	21	–	–	–	162	46	19	2
Literary studies	10	–	–	–	133	27	14	6
Linguistics	33	–	–	–	310	69	41	5
Law	84	–	–	–	497	78	24	8
Pedagogy	59	–	–	–	529	162	46	14

(continued)

	Enrolment		Entrants		Graduates		Of whom with defended thesis	
	2017*	2018**	2017	2018**	2017	2018	2017	2018
Clinical medicine	109	–	–	–	933	404	173	75
Preventive medicine	11	–	–	–	103	37	7	5
Life sciences	19	–	–	–	144	54	32	8
Pharmacology and pharmacy	2	–	–	–	33	8	7	2
Art (arts, history of arts, etc.)	10	–	–	–	97	22	12	1
Psychology	23	–	–	–	169	27	7	2
Sociology	20	–	–	–	123	23	11	3
Political science	14	–	–	–	130	11	4	–
Culturology	10	–	–	–	69	13	10	–
Earth sciences	50	–	–	–	336	93	29	10
Other sciences	4	–	–	–	12	–	2	–

\* In accordance with Federal Law no. 273-FL of December 12, 2012 'On the Education in the Russian Federation', since January 01, 2014, the fields of studies that postgraduate students can enrol in are listed according to Order of the Ministry of Education and Science of the Russian Federation no. 1061 of September 12, 2013 'On the Approval of the Lists of Professions and Fields of Education in Higher Education.'

\*\* The 2018 data on postgraduate entrants and enrolment refer only to fields of education; the data on postgraduate graduates, including with defended thesis, refer to fields of education and groups of scientific professions.

## 2.23. POSTGRADUATE ENROLMENT, ENTRANTS, AND GRADUATES BY FIELD OF EDUCATION CORRESPONDING TO PRIORITY AREAS OF ECONOMICAL MODERNISATION AND TECHNOLOGICAL DEVELOPMENT\*

(headcount)

	Enrolment		Entrants		Graduates		Of whom with defended thesis	
	2017*	2018*	2017	2018*	2017	2018	2017	2018
<b>Fields of education, by priority areas of economical modernisation and technological development</b>	<b>48874</b>	<b>49207</b>	<b>13778</b>	<b>14015</b>	<b>2550</b>	<b>7760</b>	<b>435</b>	<b>1158</b>
Engineering mathematics	2501	2465	713	670	49	377	11	73
Computer and information sciences	300	332	107	125	26	57	6	5
Physics and astronomy	4318	4269	1166	1131	102	735	33	152
Biological sciences	4488	4470	1179	1199	128	686	15	68
Civil engineering and technology	2039	2097	592	604	26	280	6	35
Computer engineering	7594	7530	2021	2114	130	1138	22	122
Information security	453	494	145	155	3	46	–	12
Electronics and communications engineering	1829	1889	517	519	40	272	8	51
Photonics, instrumentation engineering, optical and biomedical engineering	967	988	285	279	9	135	4	24
Power engineering and thermal power engineering	1949	1947	542	564	25	318	5	61
Nuclear power, thermal power engineering, and renewable related technologies	302	334	83	106	5	29	–	3
Mechanical engineering	2238	2300	635	632	29	307	6	33
Engineering physics and technology	35	33	8	9	1	7	–	–
Weapons and armaments systems	12	24	5	18	–	–	–	–
Chemical engineering	1262	1290	336	344	9	240	2	44
Technosphere safety	406	431	117	125	–	48	–	10
Geology, exploration, and exploitation of minerals	1042	1146	304	358	8	128	6	36
Materials engineering	1087	1178	337	309	12	142	2	29
Aircraft and aerospace engineering	720	932	208	258	12	100	1	17
Flight navigation and aircraft and aerospace equipment operation	145	166	51	51	–	10	–	1

(continued)

	Enrolment		Entrants		Graduates		Of whom with defended thesis	
	2017*	2018*	2017	2018*	2017	2018	2017	2018
Shipbuilding and water-borne transportation engineering and technology	444	439	102	100	8	40	–	4
Engineering systems management	953	1057	284	291	18	105	9	17
Nanotechnologies and nanomaterials	37	36	10	8	–	6	–	2
Basic medicine	978	1052	311	327	122	166	26	22
Clinical medicine	6808	6628	1975	1981	915	1219	139	160
Medical and preventive care	668	672	229	198	62	91	4	8
Pharmacology and pharmacy	362	345	116	94	60	71	10	11
Technology, mechanisation tools and power equipment for agriculture, forestry, and fishing	1122	1039	345	336	199	232	32	37
Linguistics and literary studies	3815	3624	1055	1110	552	775	88	121

\* In accordance with Federal Law no. 273-FL of December 12, 2012 'On the Education in the Russian Federation', since January 01, 2014, the fields of studies that postgraduate students can enrol in are listed according to Order of the Ministry of Education and Science of the Russian Federation no. 1061 of September 12, 2013 'On the Approval of the Lists of Professions and Fields of Education in Higher Education'.

**2.24. POSTGRADUATE GRADUATES WITH DEFENDED THESIS WHO HAVE BEEN GRANTED A DIPLOMA BY THE STATE COMMISSION FOR ACADEMIC DEGREES AND TITLES OF THE MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION BY GENERAL GROUP OF SCIENTIFIC PROFESSIONS**

*(headcount)*

	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Total</b>	<b>21155</b>	<b>22827</b>	<b>21144</b>	<b>20014</b>	<b>9896</b>	<b>12524</b>	<b>10497</b>	<b>9572</b>	<b>8703</b>
Mathematics	216	226	207	227	162	185	178	117	84
Mechanics	163	201	172	219	115	130	134	97	102
Astronomy	22	30	21	26	21	26	31	23	23
Physics	640	655	651	697	452	483	542	474	416
Chemistry	665	672	604	794	355	486	463	395	352
Physico-chemical biology	321	348	377	390	185	207	209	188	122
General biology	576	709	691	694	311	363	292	285	232
Physiology	291	311	272	276	100	165	126	107	77
Geometric engineering and computer-generated graphics	3	3	3	6	1	–	3	2	2
Mechanical engineering and engineering science	283	286	292	301	117	156	131	153	122
Energy, metallurgical and chemical engineering	44	55	59	53	24	34	50	34	25
Transportation, mining and civil engineering	54	45	78	62	32	47	39	38	30
Aircraft and aerospace engineering	50	44	47	36	23	32	31	47	37
Shipbuilding	28	34	36	36	15	17	17	17	19
Electrical machinery	139	122	137	159	78	80	107	92	75
Instrumentation engineering, metrology and data measuring instruments and systems	156	185	184	197	117	127	142	116	120
Radio-frequency engineering and communication	114	126	142	136	85	108	90	91	80
Computer engineering and control	964	1058	925	1046	539	588	475	450	434
Energy sector	112	113	130	135	79	79	82	77	95
Metallurgy and materials engineering	156	175	163	211	116	137	147	127	141
Chemical engineering	172	217	217	250	94	114	152	108	111

(continued)

	2010	2011	2012	2013	2014	2015	2016	2017	2018
Food technology	176	247	188	274	120	128	104	88	74
Technology of textile materials and light industry products	58	49	64	50	20	26	15	24	12
Processes and machines in agro-engineering systems	154	168	183	205	81	111	107	118	102
Technology, machinery and equipment for logging and forestry, wood processing and biomass chemical conversion	51	59	54	94	28	59	35	52	48
Transport	132	129	142	120	68	87	70	69	51
Construction and architecture	252	262	248	312	157	190	189	132	113
Documentary information	48	52	60	37	32	25	16	13	19
Civil defence	59	82	74	80	24	50	39	43	50
Electronics	44	63	66	88	43	54	50	57	45
Agronomy	171	368	341	304	133	201	180	168	149
Veterinary science and animal science	314	413	397	487	124	230	207	231	221
Forestry	17	56	50	71	22	32	34	28	28
Fishing	–	3	6	4	–	7	6	9	2
History and archaeology	819	820	681	574	251	389	401	367	298
Economics	3449	3644	3387	2745	1156	1445	813	622	552
Philosophy	375	462	399	293	198	218	213	180	125
Literary studies	412	431	393	391	182	266	261	248	193
Linguistics	910	975	876	753	345	494	480	421	398
Law	1186	1440	1185	895	522	630	514	490	449
Pedagogy	1799	1694	1648	1256	731	939	571	524	492
Clinical medicine	2581	2470	2238	2261	1265	1580	1355	1321	1402
Preventive medicine	309	322	284	230	138	154	72	86	82
Life sciences	463	510	454	425	227	262	210	214	208
Pharmacology and pharmacy	46	124	101	138	58	83	71	60	59

(continued)

	2010	2011	2012	2013	2014	2015	2016	2017	2018
Art (arts, history of arts, etc.)	177	206	192	204	84	101	126	144	110
Psychology	547	542	486	387	195	246	180	150	135
Sociology	323	375	332	283	128	192	150	153	109
Political science	283	365	294	294	124	201	114	95	60
Culturology	178	239	202	152	90	99	91	85	80
Earth sciences	653	642	711	656	329	461	382	341	337
Theology	–	–	–	–	–	–	–	1	1

Source: Ministry of Science and Higher Education of the Russian Federation.



## 2.25. MAIN INDICATORS OF DOCTORAL STUDIES

	Number of institutions <i>(at the end of the year)</i>	Enrolment, headcount <i>(at the end of the year)</i>	Entrants, <i>headcount</i>	Graduates, <i>headcount</i>	Of whom with defended thesis*, <i>headcount</i>
<b>Total</b>					
2000	492	4213	1637	1251	486
2005	535	4282	1457	1417	516
2006	548	4189	1499	1383	450
2007	579	4109	1520	1320	429
2008	593	4242	1517	1216	297
2009	598	4294	1569	1302	435
2010	602	4418	1650	1259	336
2011	608	4562	1696	1321	382
2012	597	4554	1632	1371	394
2013	585	4572	1582	1356	323
2014	478	3204	166	1359	231
2015	437	2007	419	1386	181
2016	385	921	397	1346	151
2017	223	1059	439	253	65
2018	213	1048	393	330	82

\* Here and below in this section, the headcount of those who defended the thesis during their doctoral studies (i.e., during the period of time specified in the order of admission).

(continued)

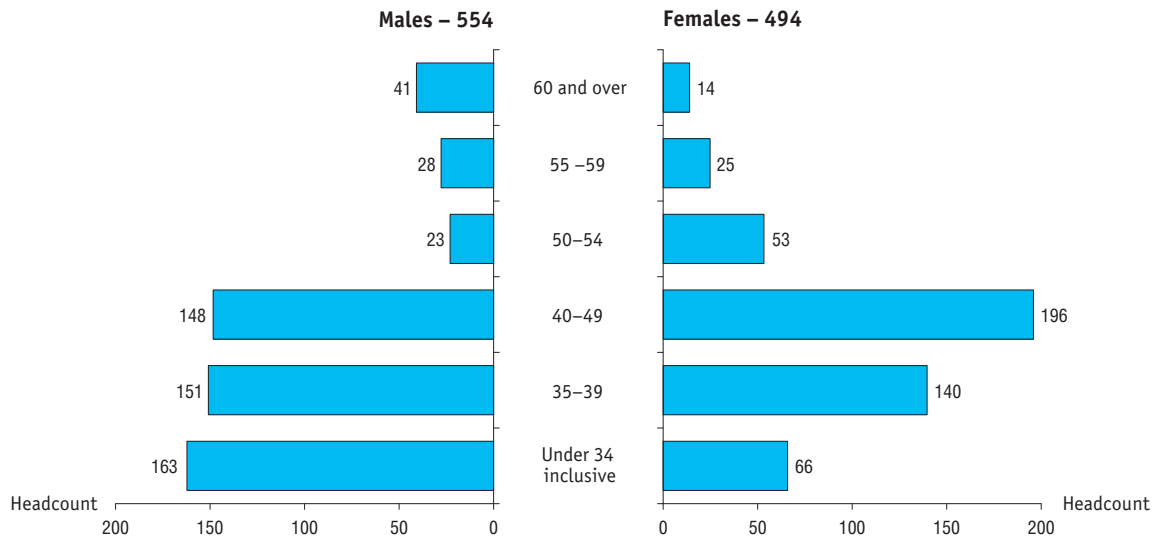
	Number of institutions <i>(at the end of the year)</i>	Enrolment, headcount <i>(at the end of the year)</i>	Entrants, <i>headcount</i>	Graduates, <i>headcount</i>	Of whom with defended thesis*, <i>headcount</i>
<b>Research institutes</b>					
2000	178	505	192	151	63
2005	173	445	147	148	48
2006	178	426	142	139	35
2007	201	358	118	116	33
2008	205	336	111	123	23
2009	204	327	114	107	23
2010	192	299	100	95	20
2011	192	303	106	100	17
2012	183	254	87	99	16
2013	184	262	110	73	9
2014	105	194	23	78	14
2015	91	153	46	67	8
2016	82	96	29	76	8
2017	45	97	26	27	9
2018	45	95	26	25	16

(continued)

	Number of institutions (at the end of the year)	Enrolment, headcount (at the end of the year)	Entrants, headcount	Graduates, headcount	Of whom with defended thesis*, headcount
<b>Higher education institutions</b>					
2000	314	3708	1445	1100	423
2005	362	3837	1310	1269	468
2006	370	3763	1357	1244	415
2007	378	3751	1402	1204	396
2008	388	3906	1406	1093	274
2009	391	3962	1454	1193	412
2010	407	4116	1548	1162	316
2011	412	4256	1589	1220	365
2012	410	4296	1543	1271	378
2013	398	4307	1471	1281	314
2014	372	3009	143	1281	217
2015	345	1853	373	1319	173
2016	303	825	368	1270	143
2017	178	962	413	226	56
2018	167	951	366	303	66
<b>Additional professional (vocational) education institutions and other institutions</b>					
2009	3	5	1	2	–
2010	3	3	2	2	–
2011	4	3	1	1	–
2012	4	4	2	1	–
2013	3	3	1	2	–
2014	1	1	–	–	–
2015	1	1	–	–	–
2016	–	–	–	–	–
2017	–	–	–	–	–
2018	1	2	1	2	–

## 2.26. DOCTORAL ENROLMENT BY GENDER AND AGE: 2017

(at the end of the year)



### 2.27. DOCTORAL ENROLMENT, ENTRANTS, AND GRADUATES BY GENERAL GROUP OF SCIENTIFIC PROFESSIONS (headcount)

	Enrolment, <i>headcount</i> ( <i>at the end of the year</i> )		Entrants		Graduates		Of whom with defended thesis	
	2017	2018	2017	2018	2017	2018	2017	2018
<b>Total</b>	<b>1059</b>	<b>1048</b>	<b>439</b>	<b>393</b>	<b>253</b>	<b>330</b>	<b>65</b>	<b>82</b>
Mathematics	4	3	1	–	1	1	–	–
Mechanics	6	4	1	2	4	6	1	2
Physics	52	58	23	21	9	14	4	7
Chemistry	20	23	6	11	4	7	1	1
Physico-chemical biology	7	3	–	2	2	4	1	–
General biology	14	13	7	3	1	1	1	–
Physiology	6	7	2	–	6	–	1	–
Geometric engineering and computer-generated graphics	1	1	–	1	–	1	–	1
Mechanical engineering and engineering science	43	43	18	10	8	7	1	1
Energy, metallurgical and chemical engineering	7	4	6	2	1	1	–	–
Transportation, mining and civil engineering	3	2	2	2	1	2	–	1
Aircraft and aerospace engineering	4	6	2	2	–	–	–	–
Shipbuilding	2	1	–	–	1	1	–	–
Electrical machinery	13	17	9	11	3	3	1	1
Instrumentation engineering, metrology and data measuring instruments and systems	23	16	10	3	3	7	1	2
Radio-frequency engineering and communication	7	7	4	4	–	3	–	1

**(continued)**

	Enrolment, <i>headcount</i> ( <i>at the end of the year</i> )		Entrants		Graduates		Of whom with defened thesis	
	2017	2018	2017	2018	2017	2018	2017	2018
Computer engineering and control	78	97	43	30	13	15	2	7
Energy sector	5	5	5	2	4	1	–	–
Metallurgy and materials engineering	18	10	4	4	8	8	2	–
Chemical engineering	19	21	9	5	2	3	1	1
Food technology	26	22	7	6	–	11	–	1
Technology of textile materials and light industry products	–	–	–	–	–	–	–	–
Processes and machines in agro-engineering systems	8	13	4	8	3	2	1	–
Technology, machinery and equipment for logging and forestry, wood processing and biomass chemical conversion	6	1	1	1	2	5	2	–
Transport	16	17	5	5	–	4	–	1
Construction and architecture	26	27	10	16	1	12	–	1
Civil defence	2	2	2	1	–	4	–	3
Electronics	2	3	–	2	–	1	–	–
Agronomy	5	10	1	3	5	5	3	3
Veterinary science and animal science	16	11	8	2	8	4	1	1
Forestry	2	5	1	3	–	–	–	–
Fishing		–	–	–	–	–	–	–
History and archaeology	32	32	8	14	12	14	4	–
Economics	172	169	66	65	38	56	5	7

(continued)

	Enrolment, headcount (at the end of the year)		Entrants		Graduates		Of whom with defended thesis	
	2017	2018	2017	2018	2017	2018	2017	2018
Philosophy	31	31	19	10	6	7	1	4
Literary studies	18	17	9	3	4	2	1	1
Linguistics	36	39	18	13	11	9	3	2
Law	73	85	32	47	24	29	5	12
Pedagogy	88	79	36	29	17	26	3	3
Clinical medicine	42	38	19	10	15	8	7	6
Preventive medicine	–	7	–	3	–	–	–	–
Life sciences	6	10	3	6	1	1	1	–
Pharmacology and pharmacy	2	3	–	–	–	–	–	–
Art (arts, history of arts, etc.)	3	2	2	1	7	1	2	1
Psychology	24	17	6	5	6	7	2	–
Sociology	20	21	7	6	6	4	2	1
Political science	27	19	8	6	8	12	–	5
Culturology	15	9	7	3	3	7	2	3
Earth sciences	24	18	6	10	5	14	3	2
Other sciences	5	–	2	–	–	–	–	–

**2.28. GRADUATES WITH DEFENDED DOCTORAL THESIS WHO HAVE BEEN GRANTED A DIPLOMA BY THE STATE COMMISSION FOR ACADEMIC DEGREES AND TITLES OF THE MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION BY GENERAL GROUP OF SCIENTIFIC PROFESSIONS**

*(headcount)*

	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Total</b>	<b>2685</b>	<b>3079</b>	<b>2875</b>	<b>2380</b>	<b>1573</b>	<b>1615</b>	<b>1449</b>	<b>1353</b>	<b>1293</b>
Mathematics	48	44	38	37	31	16	28	20	16
Mechanics	29	29	24	28	22	14	23	18	22
Astronomy	8	10	9	7	7	4	7	3	2
Physics	144	156	125	115	88	69	92	69	81
Chemistry	78	95	87	83	65	42	52	48	44
Physico-chemical biology	42	66	54	35	33	29	22	31	28
General biology	94	113	99	87	53	58	65	64	45
Physiology	38	57	51	38	39	31	28	23	14
Geometric engineering and computer-generated graphics	–	1	1	1	1	–	–	–	1
Mechanical engineering and engineering science	34	44	35	38	22	9	16	18	24
Energy, metallurgical and chemical engineering	9	9	6	3	8	3	1	5	4
Transportation, mining and civil engineering	8	9	8	7	6	5	8	3	1
Aircraft and aerospace engineering	4	5	5	3	2	1	4	3	7
Shipbuilding	6	4	6	1	2	2	4	3	2
Electrical machinery	10	10	15	13	9	10	7	11	10
Instrumentation engineering, metrology and data measuring instruments and systems	18	15	19	17	14	15	13	17	9
Radio-frequency engineering and communication	14	14	12	10	13	8	7	3	9
Computer engineering and control	123	117	108	76	68	36	61	51	56
Energy sector	7	14	14	21	10	7	8	7	14
Metallurgy and materials engineering	27	20	29	22	8	12	15	9	21



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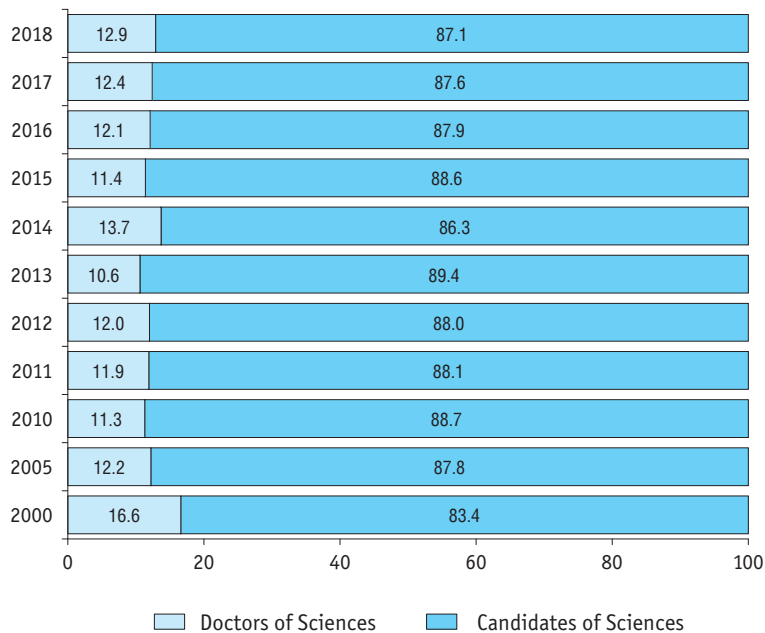
	2010	2011	2012	2013	2014	2015	2016	2017	2018
Chemical engineering	30	23	23	24	9	23	13	12	7
Food technology	22	27	28	30	21	11	18	17	8
Technology of textile materials and light industry products	5	18	6	2	3	2	1	5	4
Processes and machines in agro-engineering systems	28	29	24	26	15	14	13	22	23
Technology, machinery and equipment for logging and forestry, wood processing and biomass chemical conversion	5	8	5	8	3	10	10	7	4
Transport	9	15	11	11	11	5	5	8	7
Construction and architecture	23	22	24	16	10	21	20	8	8
Documentary information	7	2	3	9	4	2	4	3	1
Civil defence	9	15	6	11	2	5	7	4	11
Electronics	14	4	7	4	5	7	4	7	4
Agronomy	27	51	47	38	26	23	24	21	40
Veterinary science and animal science	39	77	68	68	39	37	31	35	37
Forestry	3	6	10	7	5	5	6	5	4
Fishing	–	–	2	–	–	1	1	1	–
History and archaeology	130	144	130	99	49	74	69	55	52
Economics	335	403	434	281	141	170	92	101	77
Philosophy	71	102	78	47	29	43	46	37	48
Literary studies	72	62	58	47	32	41	24	39	17
Linguistics	91	97	74	76	52	58	54	56	34
Law	94	106	91	72	49	93	56	46	54
Pedagogy	144	150	188	124	73	93	56	46	45
Clinical medicine	378	385	357	375	234	249	220	206	197
Preventive medicine	58	70	56	60	55	38	21	30	29
Life sciences	89	92	93	79	61	64	40	38	54

(continued)

	2010	2011	2012	2013	2014	2015	2016	2017	2018
Pharmacology and pharmacy	5	15	20	12	6	6	6	15	9
Art (arts, history of arts, etc.)	23	24	31	27	15	18	18	11	15
Psychology	38	42	60	29	25	24	18	21	12
Sociology	33	42	32	35	19	17	21	23	10
Political science	35	44	26	34	12	21	20	3	12
Culturology	26	47	43	21	14	19	15	18	17
Earth sciences	101	125	95	66	53	50	55	47	43
Theology	–	–	–	–	–	–	–	–	–

Source: Ministry of Science and Higher Education of the Russian Federation.

**2.29. DOCTORS AND CANDIDATES OF SCIENCES AS A PERCENTAGE OF THE TOTAL NUMBER OF RESEARCHERS WITH SCIENTIFIC DEGREES APPROVED BY THE STATE COMMISSION FOR ACADEMIC DEGREES AND TITLES OF THE MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION**





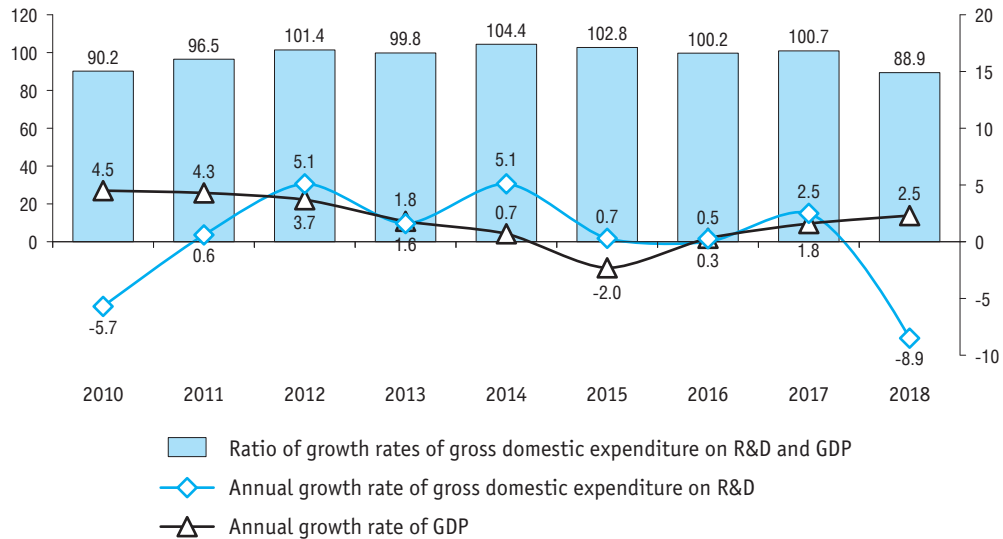
**R&D Funding**

**3.1. GROSS DOMESTIC EXPENDITURE ON R&D\***  
(thousand roubles)

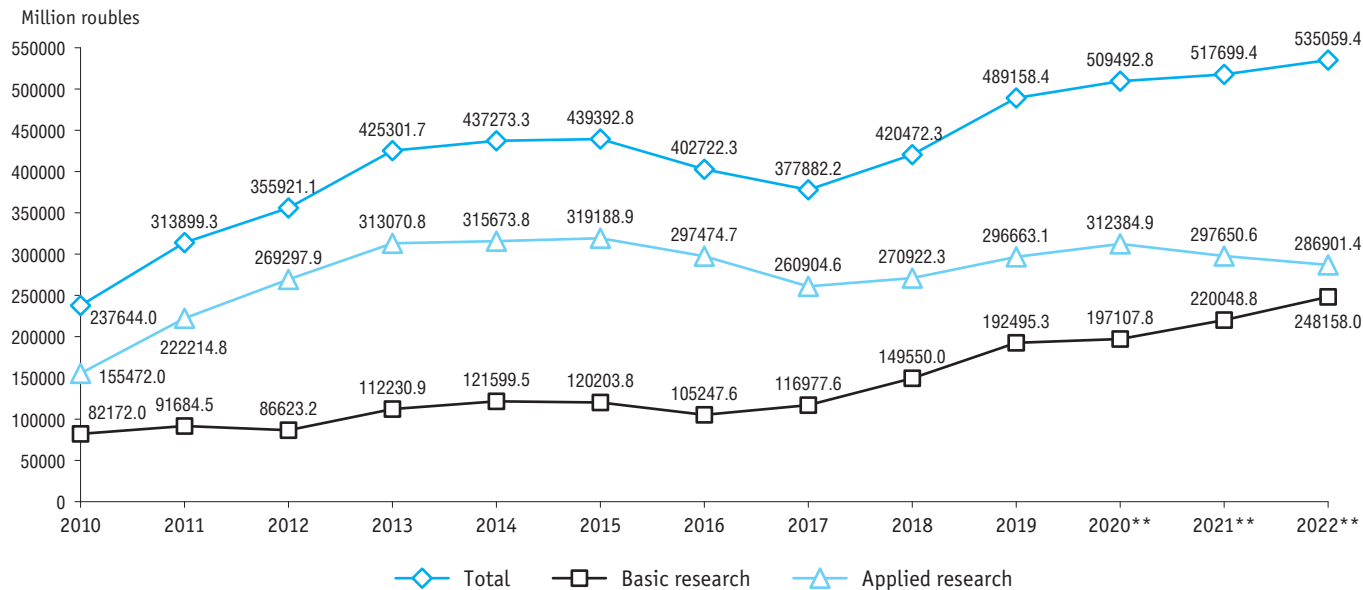
	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Gross domestic expenditure on R&amp;D</b>									
at current prices	523377233.9	610426680.6	699869784.8	749797638.8	847526992.9	914669057.2	943815219.6	1019152437.1	1028247644.8
at constant 2010 prices	523377233.9	526683934.9	553475511.9	562573258.4	591518001.7	595487667.4	598298079.0	612950283.9	558132576.0

\* Here and below in this section, the data in constant prices are calculated taking into account the GDP deflator as of February 03, 2020.

### 3.2. GROWTH RATES OF GROSS DOMESTIC EXPENDITURE ON R&D AND GDP (percentage)



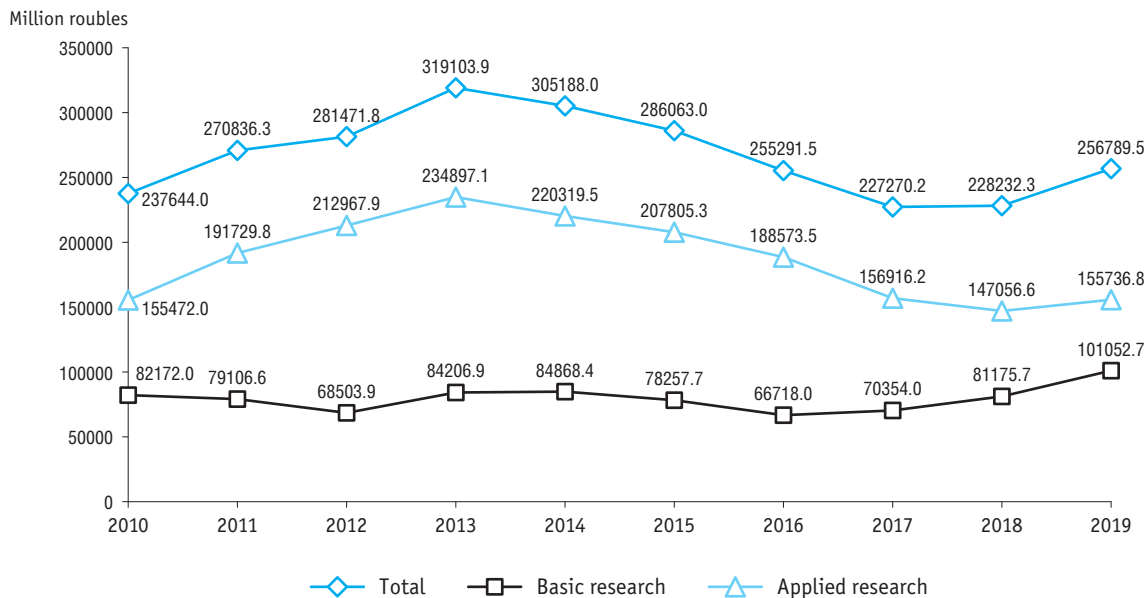
## 3.3. FEDERAL BUDGET APPROPRIATIONS ON CIVIL S&amp;T AT CURRENT PRICES\*



\* Sources for 2010–2019: annual reports on the implementation of the consolidated budget of the Russian Federation and the budgets of state extra-budgetary funds (according to the Federal Treasury).

\*\* In accordance with Federal Law no. 380-FZ of December 2, 2019 'On the 2020 Federal Budget and the 2021–2022 Budget Plan' as amended by Federal Law no. 52-FZ of March 18, 2020 'On amendments to the Federal Law "On the 2020 Federal Budget and the 2021–2022 Budget Plan."'

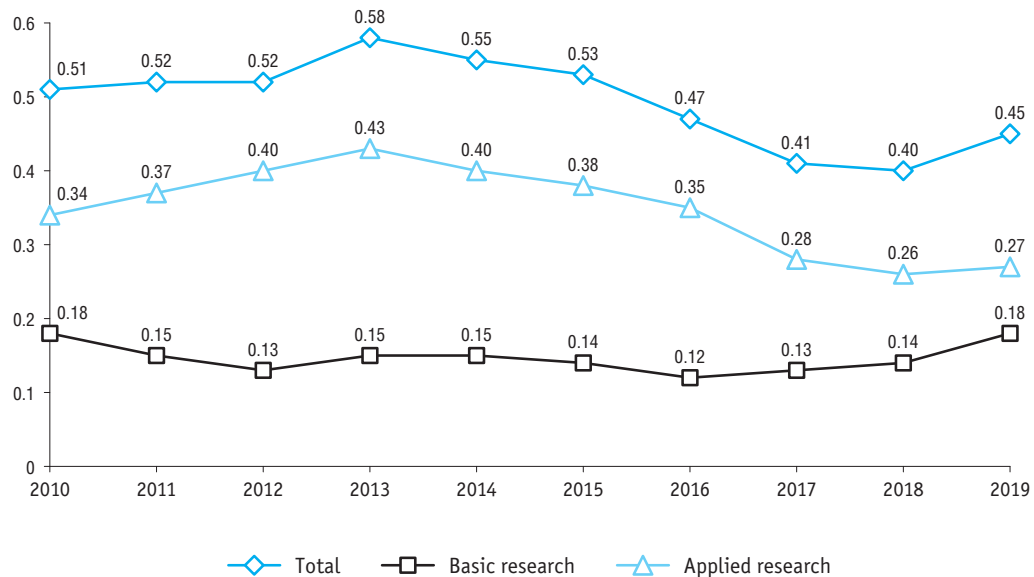
### 3.4. FEDERAL BUDGET APPROPRIATIONS ON CIVIL S&T AT CONSTANT 2010 PRICES\*



\* Sources for 2010–2019: annual reports on the implementation of the consolidated budget of the Russian Federation and the budgets of state extra-budgetary funds (according to the Federal Treasury).

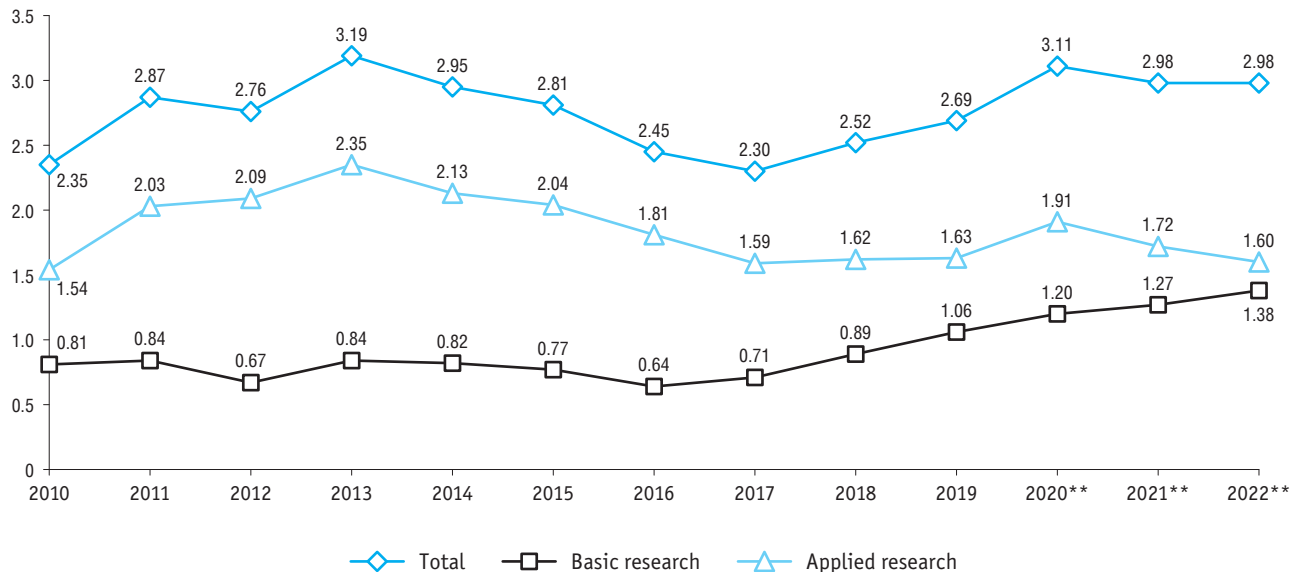


## 3.5. FEDERAL BUDGET APPROPRIATIONS ON CIVIL S&amp;T AS A PERCENTAGE OF GDP\*



\* Sources for 2010–2019: annual reports on the implementation of the consolidated budget of the Russian Federation and the budgets of state extra-budgetary funds (according to the Federal Treasury).

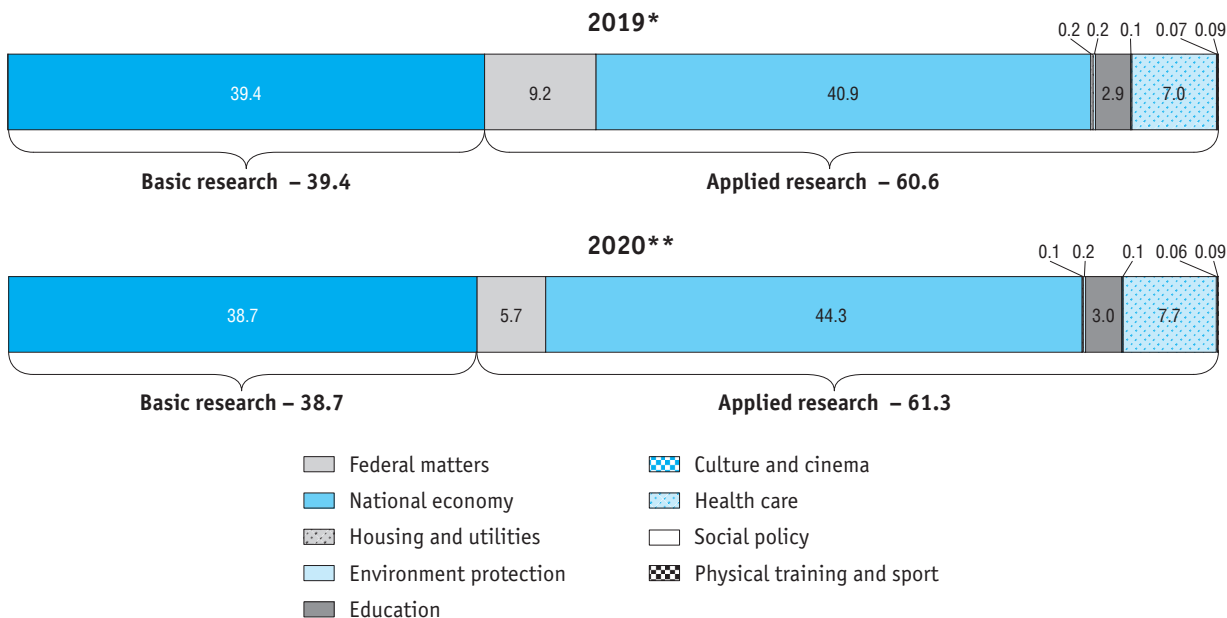
### 3.6. FEDERAL BUDGET APPROPRIATIONS ON CIVIL S&T AS A PERCENTAGE OF FEDERAL BUDGET EXPENDITURE\*



\* Sources for 2010–2019: annual reports on the implementation of the consolidated budget of the Russian Federation and the budgets of state extra-budgetary funds (according to the Federal Treasury).

\*\* In accordance with Federal Law no. 380-FZ of December 2, 2019 'On the 2020 Federal Budget and the 2021–2022 Budget Plan' as amended by Federal Law no. 52-FZ of March 18, 2020 'On amendments to the Federal Law "On the 2020 Federal Budget and the 2021–2022 Budget Plan."'

### 3.7. PERCENTAGE DISTRIBUTION OF FEDERAL BUDGET APPROPRIATIONS ON CIVIL S&T BY SUBSECTION OF BUDGET EXPENDITURE CLASSIFICATION AND TYPE OF R&D ACTIVITY



\* Source for 2019, annual reports on the implementation of the consolidated budget of the Russian Federation and the budgets of state extra-budgetary funds (according to the Federal Treasury).

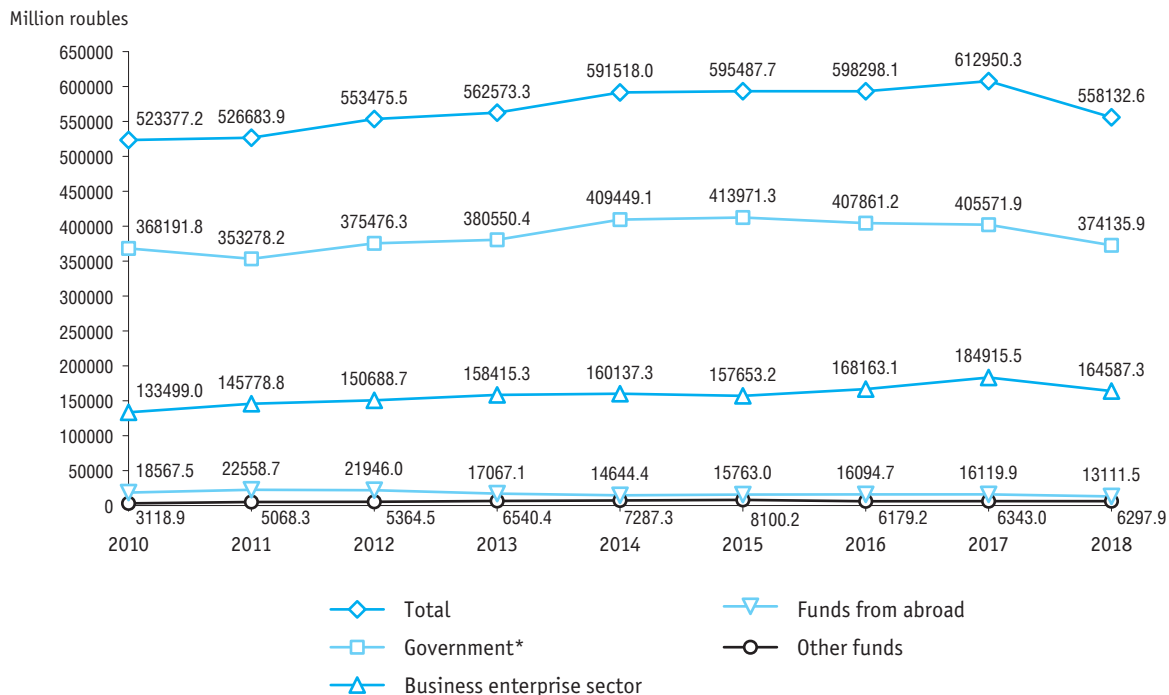
\*\* In accordance with Federal Law no. 380-FZ of December 2, 2019 'On the 2020 Federal Budget and the 2021–2022 Budget Plan' as amended by Federal Law no. 52-FZ of March 18, 2020 'On amendments to the Federal Law "On the 2020 Federal Budget and the 2021–2022 Budget Plan."'

### 3.8. GROSS DOMESTIC EXPENDITURE ON R&D BY SOURCE OF FUNDS

	Gross domestic expenditure on R&D	Government funds*	Business enterprise sector	Higher education sector	Private non-profit sector funds	Funds from abroad
<b>At current prices, thousand roubles</b>						
2010	523377233.9	368191779.8	133498976.0	2436564.1	682378.0	18567536.0
2011	610426680.6	409449448.8	168957596.6	4664465.3	1209661.5	26145508.4
2012	699869784.8	474789779.0	190545904.2	5905489.1	877937.6	27750674.9
2013	749797638.8	507197614.5	211135955.9	7820677.9	896366.0	22747024.5
2014	847526992.9	586658713.4	229444656.4	9069176.1	1372014.1	20982432.9
2015	914669057.2	635859865.4	242155382.4	10875090.0	1566750.2	24211969.2
2016	943815219.6	643401009.6	265277238.1	8210528.3	1537132.8	25389310.8
2017	1019152437.1	674344339.3	307459020.2	7901322.1	2645187.7	26802567.8
2018	1028247644.8	689270557.4	303219233.8	8841468.3	2761098.4	24155286.9
<b>Percentage</b>						
2010	100	70.3	25.5	0.5	0.1	3.5
2011	100	67.1	27.7	0.8	0.2	4.3
2012	100	67.8	27.2	0.8	0.1	4.0
2013	100	67.6	28.2	1.0	0.1	3.0
2014	100	69.2	27.1	1.1	0.2	2.5
2015	100	69.5	26.5	1.2	0.2	2.6
2016	100	68.2	28.1	0.9	0.2	2.7
2017	100	66.2	30.2	0.8	0.2	2.6
2018	100	67.0	29.5	0.9	0.3	2.3

\* Including budget funds, budget appropriations for higher education institutions, and government sector institutions' funds (including own funds).

## 3.9. TRENDS IN GROSS DOMESTIC EXPENDITURE ON R&amp;D BY SOURCE OF FUNDS

*(at constant 2010 prices)*

\* Including budget funds, budget appropriations for higher education institutions, and government sector institutions' funds (including own funds).

### 3.10. SUBSIDIES, GRANTS AND OTHER COMPETITIVE R&D FUNDING: 2018

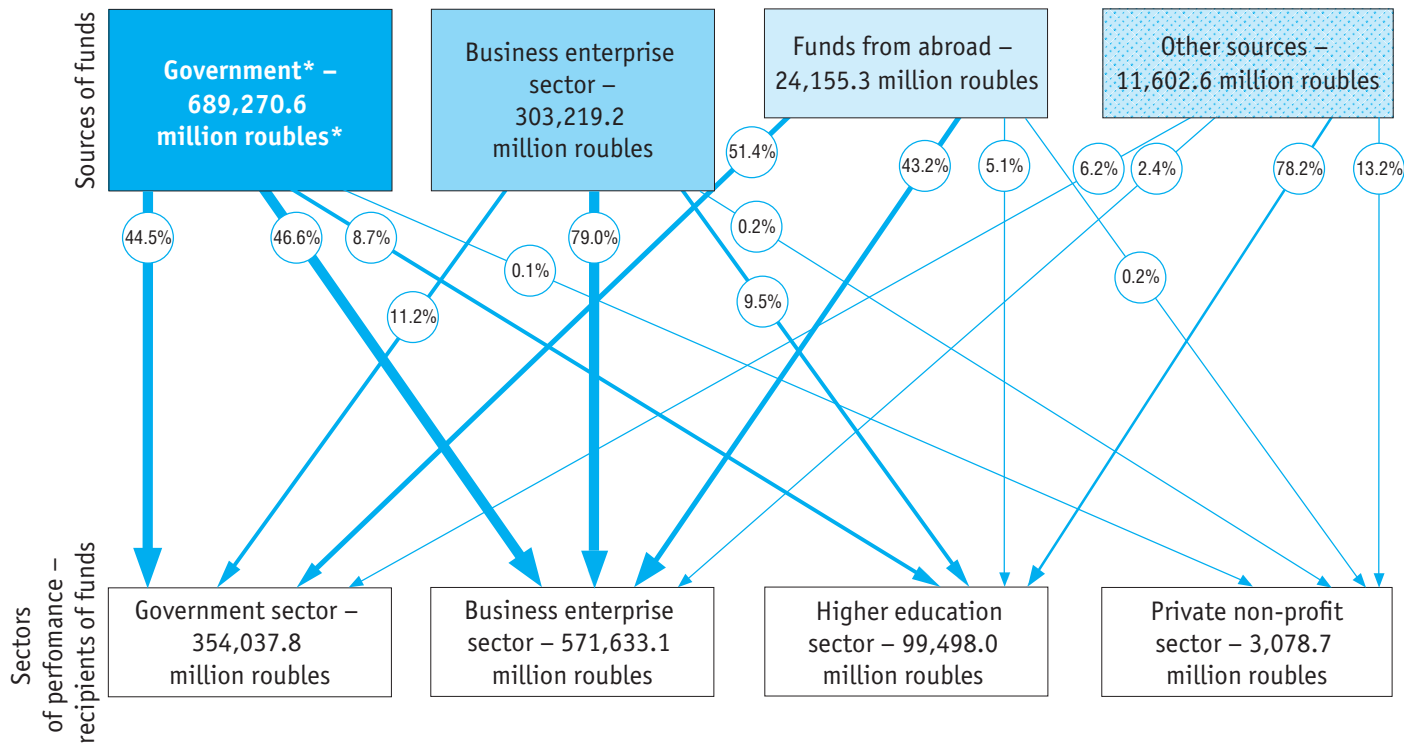
(thousand roubles)

	Total	Budgets of all levels	of which federal budget appropriations
<b>Gross domestic expenditure on R&amp;D</b>	<b>1028247644.8</b>	<b>557421276.6</b>	<b>539896707.8</b>
Of which:			
budget subsidies for institutional R&D funding	68277492.3	68277492.3	64206898.3
budget subsidies for performing R&D	46677597.2	46677597.2	45886136.0
grants from foundations for S&T and innovation	30024519.4	25066040.0	22968295.3
other types of competitive financing	65041924.8	52450533.8	50028661.7

### 3.11. GROSS DOMESTIC EXPENDITURE ON R&D FUNDED FROM ABROAD

	2016		2017		2018	
	Total, thousand roubles	Percentage	Total, thousand roubles	Percentage	Total, thousand roubles	Percentage
<b>Gross domestic expenditure on R&amp;D funded from abroad</b>	<b>25389310.8</b>	<b>100</b>	<b>26802567.8</b>	<b>100</b>	<b>24155286.9</b>	<b>100</b>
Including:						
international organisations	1477734.1	5.8	1096341.7	4.1	1505142.9	6.2
government organisations of foreign countries	8104574.3	31.9	9260504.9	34.6	7288330.8	30.2
business enterprise sector institutions of foreign countries	14204550.0	55.9	14644054.6	54.6	14667781.2	60.7
other foreign institutions (educational institutions, funds, non-profit organisations)	1602452.4	6.3	1801666.6	6.7	694032.0	2.9

3.12. R&D FUNDING BY SECTOR OF PERFORMANCE: 2018



\* Including budget funds, budget appropriations for higher education institutions, and government sector institutions' funds (including own funds).

### 3.13. GROSS DOMESTIC EXPENDITURE ON R&D BY OWNERSHIP OF R&D INSTITUTIONS

	2000	2005	2010	2013	2014	2015	2016	2017	2018
<i>At current prices, thousand roubles</i>									
<b>Total</b>	<b>76697100.5</b>	<b>230785150.3</b>	<b>523377233.9</b>	<b>749797638.8</b>	<b>847526992.9</b>	<b>914669057.2</b>	<b>943815219.6</b>	<b>1019152437.1</b>	<b>1028247644.8</b>
Russian ownership	74254897.9	226582085.6	514058161.4	725512775.4	831700355.3	897702466.4	930156714.4	1002767874.7	1008118341.7
Public ownership	56254567.1	171855852.1	394615118.0	510811584.2	588219503.3	570759794.5	569769183.6	553896563.1	559124268.0
Federal	55150426.2	168986692.6	389105256.8	502816626.9	577892310.2	559987658.5	555862200.4	543888734.1	547008790.1
Regional	1099762.3	2869159.5	5396479.0	7994957.3	10327193.1	10772136.0	13906983.2	10007829.0	12115477.9
Municipal ownership	50381.9	17253.5	50304.2	93873.2	78104.2	93960.3	90712.5	113977.1	114978.0
Ownership by voluntary associations	209229.3	339129.1	525085.2	1246181.6	1181906.2	2010818.4	2083134.9	2478750.5	2112286.5
Private ownership	4948266.7	20957744.5	60263592.5	94280978.5	100226515.2	116626956.5	149005447.9	181015620.9	166351736.8
Ownership by Russian citizens permanently living abroad	...	...	...	...*	...*	...*	...*	...*	...*
Ownership by consumers' cooperatives*	1095.2	4354.5	36590.0	...**	–	20664.7	22065.5	21885.2	...*
Mixed ownership	12791357.7	33407751.9	55954325.1	89367594.5	114333241.0	168031713.1	168078029.2	204497889.4	207408687.4
Mixed ownership with a share of public ownership	...	...	49557690.9	73525307.2	97555613.4	129154411.8	138670373.3	170078332.1	160105661.3
Other mixed ownership	...	...	...	15842287.3	16777627.6	38877301.3	29407655.9	34419557.3	47303026.1
Ownership by state corporations	...	...	2613146.4	29695934.9	27615092.9	40134256.9	41085157.5	60722748.5	73003244.8
Foreign ownership	117265.0	697993.4	1390905.3	7059984.4	7945428.4	5684831.2	7007423.6	8754129.1	7698848.2
Joint ownership (with both Russian and foreign participation)	2324937.6	3505071.3	7928167.2	17224879.0	7881209.2	11281759.6	6651081.6	7630433.3	12430454.9



(continued)

	2000	2005	2010	2013	2014	2015	2016	2017	2018
	<b>Percentage</b>								
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
Russian ownership	96.8	98.2	98.2	96.8	98.1	98.1	98.6	98.4	98.0
Public ownership	73.3	74.5	75.4	68.1	69.4	62.4	60.4	54.4	54.4
Federal	71.9	73.2	74.3	67.1	68.2	61.2	58.9	53.4	53.2
Regional	1.4	1.2	1.0	1.1	1.2	1.2	1.5	1.0	1.2
Municipal ownership	0.07	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Ownership by voluntary associations	0.3	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.2
Private ownership	6.5	9.1	11.5	12.6	11.8	12.8	15.8	17.8	16.2
Ownership by Russian citizens permanently living abroad	...	...	...	...*	...*	...*	...*	...*	...*
Ownership by consumers' cooperatives*	0.0	0.0	0.0	...*	–	0.002	0.002	0.002	...*
Mixed ownership	16.7	14.5	10.7	11.9	13.5	18.4	17.8	20.1	20.2
Mixed ownership with a share of public ownership	...	...	9.5	9.8	11.5	14.1	14.7	16.7	15.6
Other mixed ownership	...	...	...	2.1	2.0	4.3	3.1	3.4	4.6
Ownership by state corporations	...	...	0.5	4.0	3.3	4.4	4.4	6.0	7.1
Foreign ownership	0.2	0.3	0.3	0.9	0.9	0.6	0.7	0.9	0.7
Joint ownership (with both Russian and foreign participation)	3.0	1.5	1.5	2.3	0.9	1.2	0.7	0.7	1.2

\* The data are not published in order to ensure the confidentiality of primary statistics received from organisations, in accordance with Federal Law no. 282-FL 'On the Official Statistical Accounting and State Statistics System of the Russian Federation' of November 29, 2007 (art. 4, para. 5; art. 9, para. 1).

### 3.14. GROSS DOMESTIC EXPENDITURE ON R&D BY TYPE OF ECONOMIC ACTIVITY\*

(thousand roubles)

	2017	2018
<b>Total</b>	<b>1019152437.1</b>	<b>1028247644.8</b>
Agriculture, forestry and fishing	568513.0	357792.4
Mining and quarrying	1071551.7	1142672.3
Manufacturing	98333308.1	93123821.2
Electricity, gas, steam and air-conditioning supply	23972.7	46699.7
Water supply; sewerage, waste management and remediation activities	... **	444375.8
Construction	59649.5	... **
Wholesale and retail trade; repair of motor vehicles and motorcycles	1071838.3	1838733
Transportation and storage	156279.0	160440.7
Accommodation and food service activities	... **	... **
Information and communication	5788816.2	6255130.4
Financial and insurance activities	47805.6	–
Real estate operations	990685.6	215566.6
Professional, scientific and technical activities	815599917.9	821344532.6
Of which research and development	808225650.4	813186745.3

(continued)

	2017	2018
Administrative and support service activities	54238.3	103639.2
Public administration and military security; social security	...**	1326467.6
Education	87955797.0	94545631.4
Of which higher education	87079971.1	93738837.1
Human health and social work activities	3628315.9	4747779.4
Art, entertainment and recreation	2337314.1	2162753.5
Other service activities	233374.4	405530.3

\* In accordance with Russian Classification of Economic Activity (OKVED2).

\*\* The data are not published in order to ensure the confidentiality of primary statistics received from organisations, in accordance with Federal Law no. 282-FL 'On the Official Statistical Accounting and State Statistics System of the Russian Federation' of November 29, 2007 (art. 4, para. 5; art. 9, para. 1).

### 3.15. GROSS DOMESTIC EXPENDITURE ON R&D BY TYPE OF EXPENDITURE

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<i>At current prices, thousand roubles</i>										
<b>Gross domestic expenditure on R&amp;D</b>	<b>76697100.5</b>	<b>230785150.3</b>	<b>523377233.9</b>	<b>699869784.8</b>	<b>749797638.8</b>	<b>847526992.9</b>	<b>914669057.2</b>	<b>943815219.6</b>	<b>1019152437.1</b>	<b>1028247644.8</b>
Current expenditure	73873345.0	221119537.6	489450798.7	655061743.4	699948879.0	795407850.6	854288043.8	873778705.8	950256965.4	960689437.2
Salaries	27762734.2	94274453.3	241472234.1	307881674.7	334769102.6	372215515.4	398143690.1	402793518.7	437788837.4	457267132.6
Of which for R&D personnel*	24452200.6	83218561.7	211660690.5	268058587.8	293118611.5	325421624.4	346425420.7	349060524.6	381564501.7	390093269.5
Social security payments**	10419152.6	22597417.5	47904606.9	75417597.8	82806275.3	92645219.2	104167630.5	105441328.0	114318768.6	119930831.0
Equipment	3433380.7	9936177.7	18067655.4	25365780.5	23529482.7	26062433.8	28480160.0	24412188.2	21750617.6	19610481.8
Other material costs	17470855.0	51304357.4	89279048.7	123689963.6	134096570.4	158082737.1	157810431.8	174467767.8	186670110.7	175201149.9
Other current expenditure	14787222.5	43007131.7	92727253.6	122706726.8	124747448.0	146401945.1	165686131.4	166663903.1	189728631.1	188679841.9
Capital expenditure	2823755.5	9665612.7	33926435.2	44808041.4	49848759.8	52119142.3	60381013.4	70036513.8	68895471.7	67558207.6
Land and buildings	496202.4	1647639.4	8077521.7	11692714.0	8721163.4	9987854.6	10029243.3	12419641.1	15624626.2	11008455.8
Including:										
land	...	...	...	...	...	...	...	...	3340264.1	120680.1
buildings	...	...	...	...	...	...	...	...	12284362.1	10887775.7
Equipment	1448665.0	5818068.7	19887596.3	25459703.1	27306873.6	29421964.1	33807469.6	37427491.3	36339715.7	37177474.3
Intellectual property items and results of intellectual activity	...	...	...	...	...	...	...	...	3499599.3	6352075.5
Other capital expenditure	878888.1	2199904.6	5961317.2	7655624.3	13820722.8	12709323.6	16544300.5	20189381.4	13431530.5	13020202.0

(continued)

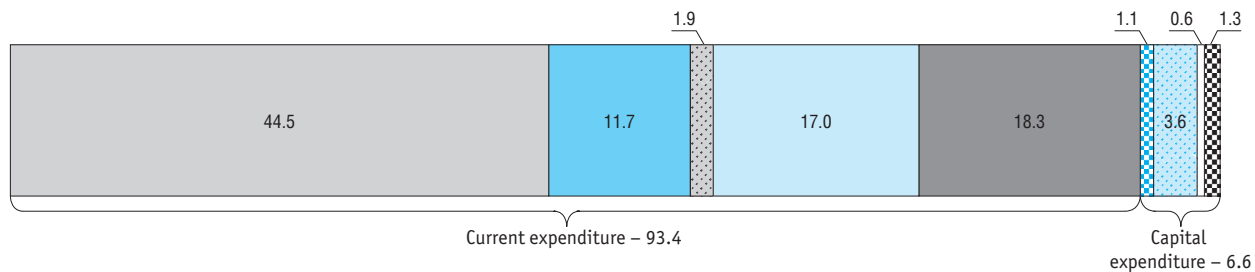
	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Percentage</b>										
<b>Gross domestic expenditure on R&amp;D</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
Current expenditure	96.3	95.8	93.5	93.6	93.4	93.9	93.4	92.6	93.2	93.4
Salaries	36.2	40.8	46.1	44.0	44.6	43.9	43.5	42.7	43.0	44.5
Of which for R&D personnel*	31.9	36.1	40.4	38.3	39.1	38.4	37.9	37.0	37.4	37.9
Social security payments**	13.6	9.8	9.2	10.8	11.0	10.9	11.4	11.2	11.2	11.7
Equipment	4.5	4.3	3.5	3.6	3.1	3.1	3.1	2.6	2.1	1.9
Other material costs	22.8	22.2	17.1	17.7	17.9	18.7	17.3	18.5	18.3	17.0
Other current expenditure	19.3	18.6	17.7	17.5	16.6	17.3	18.1	17.7	18.6	18.3
Capital expenditure	3.7	4.2	6.5	6.4	6.6	6.1	6.6	7.4	6.8	6.6
Land and buildings	0.6	0.7	1.5	1.7	1.2	1.2	1.1	1.3	1.5	1.1
Including:										
land	...	...	...	...	...	...	...	...	0.3	0.01
buildings	...	...	...	...	...	...	...	...	1.2	1.1
Equipment	1.9	2.5	3.8	3.6	3.6	3.5	3.7	4.0	3.6	3.6
Intellectual property items and results of intellectual activity	...	...	...	...	...	...	...	...	0.3	0.6
Other capital expenditure	1.1	0.95	1.1	1.1	1.8	1.5	1.8	2.1	1.3	1.3

\* Excluding external multiple jobholders and independent contractors.

\*\* National pension insurance, national health insurance, national social insurance.

### 3.16. GROSS DOMESTIC EXPENDITURE ON R&D BY TYPE: 2018

(percentage)



- Salaries
- Social security payments
- Equipment
- Other material costs
- Other current expenditure
- Land and buildings
- Equipment
- Intellectual property items and results of intellectual activity
- Other capital expenditure

## 3.17. GROSS DOMESTIC EXPENDITURE ON R&amp;D BY PRIORITY S&amp;T AREA AND SOURCE OF FUNDS: 2018

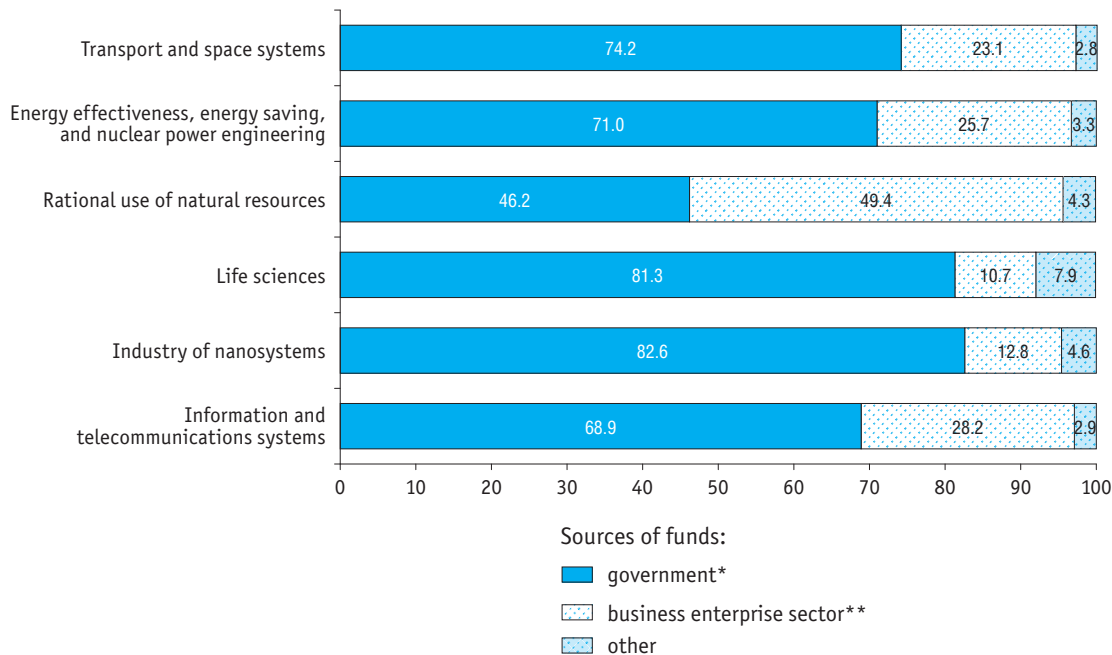
*(thousand roubles)*

	Total	Information and telecommunications systems	Industry of nanosystems	Life sciences	Rational use of natural resources	Energy effectiveness, energy saving, and nuclear power engineering	Transport and space systems
<b>Gross domestic expenditure on R&amp;D by priority S&amp;T area</b>	<b>717541092.0</b>	<b>76116066.8</b>	<b>25417480.2</b>	<b>61911609.7</b>	<b>52376027.4</b>	<b>99915719.5</b>	<b>227725685.8</b>
Sources of funds:							
government*	499834660.5	52470844.2	20993659.6	50355534.3	24212269.8	70984339.4	168909548.1
of which federal budget appropriations	406395214.5	43344755.0	17433445.6	44194214.2	21435090.8	55520191.4	140556500.4
business enterprise sector**	192383815.3	21453665.1	3252328.1	6649608.1	25899501.9	25677082.4	52538144.1
other	25322616.2	2191557.5	1171492.5	4906467.3	2264255.7	3254297.7	6277993.6

\* Including budget appropriations and government sector institutions' funds (including own funds).

\*\* Business enterprise sector institutions' funds (including own funds).

### 3.18. PERCENTAGE DISTRIBUTION OF GROSS DOMESTIC EXPENDITURE ON R&D BY PRIORITY S&T AREA AND SOURCE OF FUNDS: 2019



\* Including budget appropriations and government sector institutions' funds (including own funds).

\*\* Business enterprise sector institutions' funds (including own funds).



## 3.19. GROSS DOMESTIC EXPENDITURE ON R&amp;D BY SOCIO-ECONOMIC OBJECTIVE

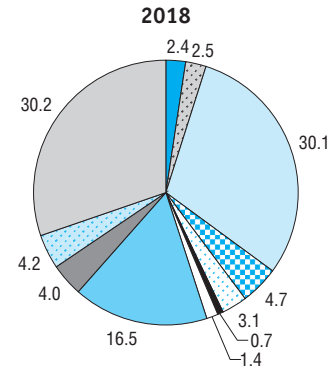
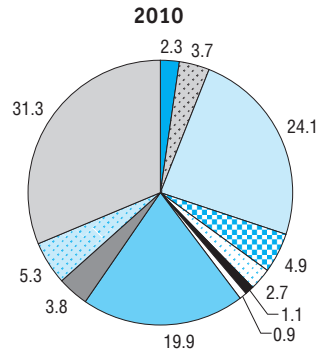
*(thousand roubles)*

	2010	2012	2013	2014	2015	2016	2017	2018
<b>Gross domestic expenditure on R&amp;D</b>	<b>523377233.9</b>	<b>699869784.8</b>	<b>749797638.8</b>	<b>847526992.9</b>	<b>914669057.2</b>	<b>943815219.6</b>	<b>1019152437.1</b>	<b>1028247644.8</b>
Economic development	183113782.3	295901906.0	303849005.2	319943400.5	335508245.3	356656937.7	405957250.5	408881985.5
Agriculture, forestry and fishing	12090814.9	16151602.6	18162639.9	19356066.3	20507885.2	19839916.9	22158788.8	24651341.9
Production, distribution, and rational use of energy	19174764.6	30798200.6	32391136.1	30009786.7	28233810.5	27986109.3	29764264.2	26099381.3
Industrial production	126029410.7	200459644.4	211581275.8	225973823.4	247190324.1	267198733.4	310831962.7	309387473.2
Increasing economic efficiency and technological level of production	14916168.9	22472542.8	23766954.4	26183678.7	27970190.2	32603056.9	35330996.0	33663416.2
Extraction and processing of non-energy minerals	1279265.4	1863605.2	2857681.5	1893285.1	2979762.1	3515879.2	3088792.3	3146341.5
Manufacture of chemicals and chemical products	5839135.5	9155732.6	9253596.1	12102652.2	18046159.1	16726672.0	22666897.6	21569350.6
Manufacture of motor vehicles and other vehicles	21495410.4	32391176.2	43571684.0	37432847.4	38496344.6	47336591.0	52963468.8	52907681.8
Electronics industry, manufacture of radio, television and communication equipment, office equipment	13389386.0	26449997.0	30121503.4	30917362.1	34152557.2	28696420.2	38512032.2	33269372.0
Software development	6740442.6	8932282.7	10343013.7	8906139.6	10935776.1	13858343.1	16942170.0	17048206.3
Manufacture of electrical machinery and appliances	2879253.1	5235647.6	10666259.5	6852593.2	6855694.7	9068432.3	11649795.4	7562423.8
Manufacture of instruments	13466912.8	29563984.4	26441262.5	25964146.5	24545740.1	30199136.8	29594205.1	30799561.6
Manufacture of other machinery and equipment	13654259.2	15781575.2	14251449.9	21053098.6	19618563.5	23208998.1	35130556.7	33230211.9
Manufacture of wearing apparel, textiles, and leather goods	97483.3	254582.3	116171.9	125925.2	152999.3	112320.3	331649.1	1832109.0
Production of food and beverages	565348.2	758191.9	1043282.0	777287.7	883049.0	815777.0	924618.2	1061783.6
Other sectors of manufacturing industry	31706345.3	47600326.5	39148416.9	53764807.1	62553488.2	61057106.5	63696781.3	73297014.9

(continued)

	2010	2012	2013	2014	2015	2016	2017	2018
Construction	5513681.4	8504203.4	5514071.6	7302858.5	4100727.2	4527423.8	4492617.8	4630356.3
Transport	12686004.3	23986235.6	26950369.3	25052775.9	28936996.8	28935628.1	29024172.8	32376301.6
Communication	6704734.7	14147246.2	7577748.3	10809004.6	5137035.8	6753395.9	8343946.4	9142616.9
Infrastructure and general planning of urban and rural settlements	354546.0	912451.2	702102.6	754005.3	720423.3	750011.5	594804.6	1485742.9
Services sector	559825.7	942322	969661.6	685079.8	681042.4	665718.8	746693.2	1108771.4
Social objectives	24966176.4	33070785.7	39876895.8	45328439.6	47512609.4	53126847.1	51110186.9	54264887.5
Environment control and environmental conservation	5950018.6	6972125.5	6139294.7	7690689.6	7698790.1	6978201.4	6241376.7	7599352.2
Medical and other public health care activities	14373675.7	19694713.1	22382779.3	27197492.2	27779185.8	33577707.1	30526694.5	32012099.3
Social development and community building	4642482.1	6403947.1	11354821.8	10440257.8	12034633.5	12570938.6	14342115.7	14653436.0
General advancement of science	104294714.1	117873370.5	130695141.4	136414580.0	145154435.8	139556056.0	139964844.3	169868470.5
Exploration and exploitation of the Earth and the atmosphere	19821817.2	25474648.5	32889936.2	39068691.1	43206894.0	35280752.7	40987614.3	40888641.4
Peaceful uses of outer space	27503697.9	37558965.0	51558366.4	48996185.8	57441295.9	46367115.9	41270828.6	43631330.1
Other	163677046.0	189990109.1	190928293.8	257775695.9	285845576.8	312827510.2	339861712.5	310712329.8

3.20. PERCENTAGE DISTRIBUTION OF GROSS DOMESTIC EXPENDITURE ON R&D BY SOCIO-ECONOMIC OBJECTIVE



- Agriculture
- Energy industry
- Industrial development
- Other economic objectives
- Public health
- Environment control and environmental conservation

- Social development
- General advancement of science
- Exploration and exploitation of the Earth and the atmosphere
- Peaceful uses of outer space
- Other expenditure

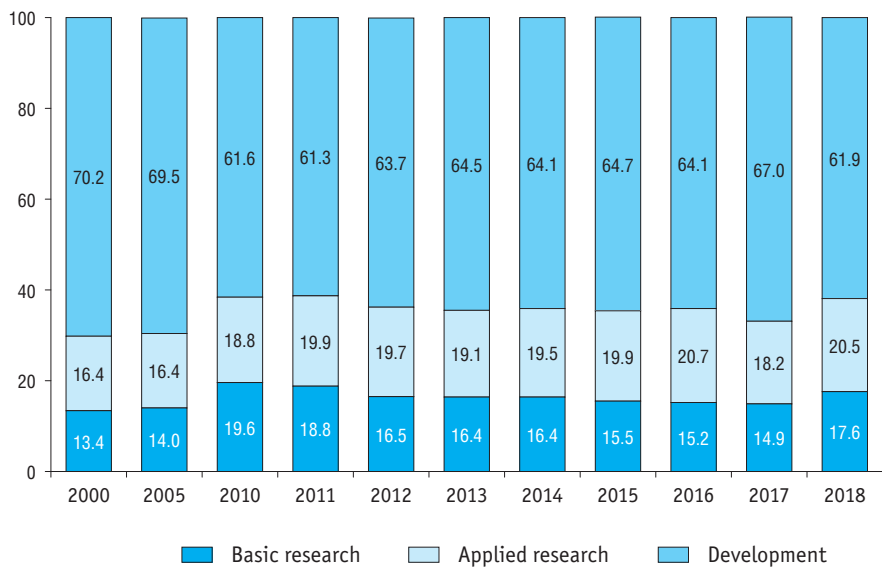
### 3.21. CURRENT EXPENDITURE ON R&D BY TYPE OF R&D ACTIVITY AND FIELD OF SCIENCE AND TECHNOLOGY (thousand roubles)

	Total	Natural sciences	Engineering and technology	Medical sciences	Agricultural sciences	Social sciences	Humanities
<b>2005</b>							
<b>Current expenditure on R&amp;D</b>	<b>221119537.6</b>	<b>34579040.8</b>	<b>171109626.3</b>	<b>4571313.8</b>	<b>4159368.3</b>	<b>4628535.6</b>	<b>2071652.8</b>
Basic research	31022855.8	19345182.8	4579039.5	1865239.8	1947227.1	1723405.3	1562761.3
Applied research	36360266.9	8860755.5	21725918.2	2051910.3	1409317.9	1957292.2	355072.8
Development	153736414.9	6373102.5	144804668.6	654163.7	802823.3	947838.1	153818.7
<b>2010</b>							
<b>Current expenditure on R&amp;D</b>	<b>489450798.7</b>	<b>96010015.2</b>	<b>348621966.4</b>	<b>15462300.4</b>	<b>8887624.5</b>	<b>13752461.7</b>	<b>6716430.5</b>
Basic research	95881364.3	50550000.6	22866475.2	6378644.4	4766037.6	6074153.0	5246053.5
Applied research	92010677.2	27202686.8	46841680.2	7900476.3	2582521.1	6199410.7	1283902.1
Development	301558757.2	18257327.8	278913811.0	1183179.7	1539065.8	1478898.0	186474.9
<b>2014</b>							
<b>Current expenditure on R&amp;D</b>	<b>795407850.6</b>	<b>144536189.4</b>	<b>578160024.6</b>	<b>25016451.2</b>	<b>13156185.8</b>	<b>22959524.1</b>	<b>11579475.5</b>
Basic research	130618045.6	72493481.3	22849372.1	10263113.4	7535996.1	9379368.0	8096714.7
Applied research	155231401.5	41403579.4	84622052.5	12393369.8	3703331.5	10613069.7	2495998.6
Development	509558403.5	30639128.7	470688600.0	2359968.0	1916858.2	2967086.4	986762.2

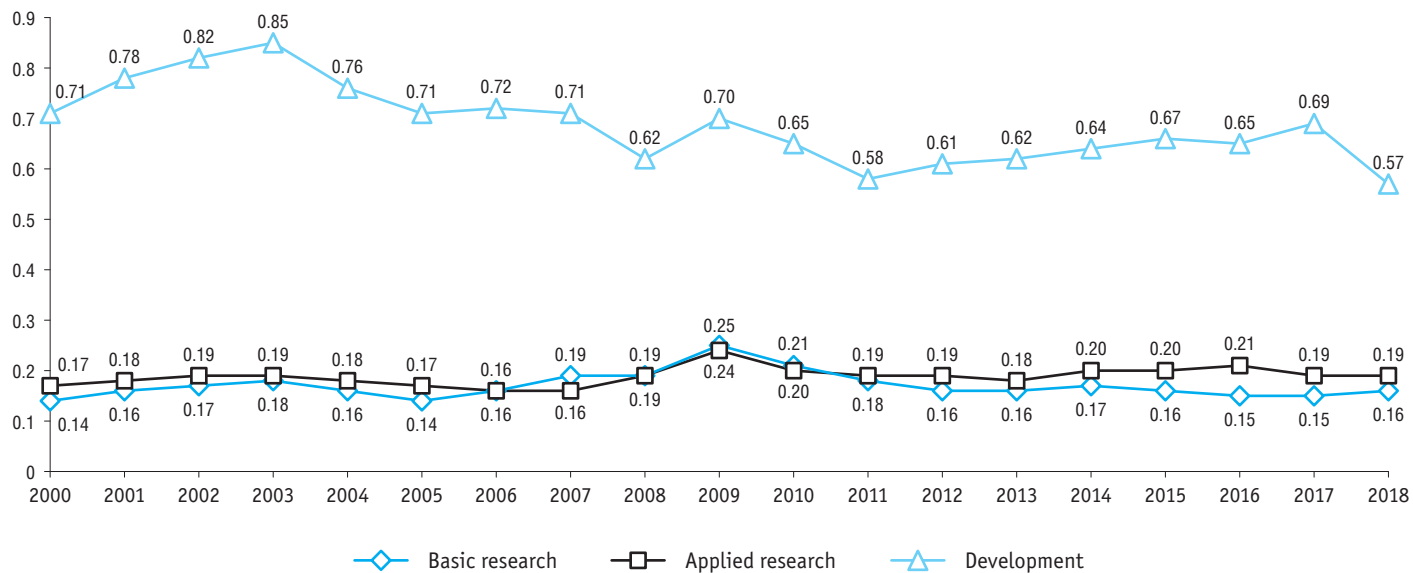
(continued)

	Total	Natural sciences	Engineering and technology	Medical sciences	Agricultural sciences	Social sciences	Humanities
<b>2015</b>							
<b>Current expenditure on R&amp;D</b>	<b>854288043.8</b>	<b>148980051.6</b>	<b>624144576.7</b>	<b>29945902.1</b>	<b>13664068.9</b>	<b>23961543.0</b>	<b>13591901.5</b>
Basic research	132064934.3	75057491.5	20557380.6	9996433.7	8047617.4	9160226.3	9245784.8
Applied research	169654641.2	43503918.7	90396242.3	16630952.5	3699011.9	12207246.2	3217269.6
Development	552568468.3	30418641.4	513190953.8	3318515.9	1917439.6	2594070.5	1128847.1
<b>2016</b>							
<b>Current expenditure on R&amp;D</b>	<b>873778705.8</b>	<b>150065638.1</b>	<b>639426488.3</b>	<b>34010751.8</b>	<b>13862990.4</b>	<b>23858523.9</b>	<b>12554313.3</b>
Basic research	132565068.0	75583175.8	19980288.1	10033815.9	8052319.3	9528971.1	9386497.8
Applied research	181157915.6	42247364.2	99021927.6	20821845.4	4000996.8	12612505.1	2453276.5
Development	560055722.2	32235098.1	520424272.6	3155090.5	1809674.3	1717047.7	714539.0
<b>2017</b>							
<b>Current expenditure on R&amp;D</b>	<b>950256965.4</b>	<b>155186614.5</b>	<b>706493153.9</b>	<b>35829672.6</b>	<b>14167508.6</b>	<b>25687644.1</b>	<b>12892371.7</b>
Basic research	141299165.2	77361415.5	23807892.1	11414915.1	8234831.6	10958118.6	9521992.3
Applied research	172547880.5	40122849.0	91653902.6	20594962.9	4407671.8	12992561.9	2775932.3
Development	636409919.7	37702350.0	591031359.2	3819794.6	1525005.2	1736963.6	594447.1
<b>2018</b>							
<b>Current expenditure on R&amp;D</b>	<b>960689437.2</b>	<b>173022401.1</b>	<b>684924043.2</b>	<b>39639658.0</b>	<b>16692222.2</b>	<b>30698357.3</b>	<b>15712755.4</b>
Basic research	169174956.7	96339608.1	26082030.5	12875130.6	9714906.8	12681749.4	11481531.3
Applied research	197209324.5	43416306.3	105317837.9	23622352.9	5316803.0	15872396.2	3663628.2
Development	594305156.0	33266486.7	553524174.8	3142174.5	1660512.4	2144211.7	567595.9

### 3.22. PERCENTAGE DISTRIBUTION OF CURRENT EXPENDITURE ON R&D BY TYPE OF R&D ACTIVITY



3.23. GROSS DOMESTIC EXPENDITURE ON R&amp;D AS A PERCENTAGE OF GDP BY TYPE OF R&amp;D ACTIVITY



### 3.24. AVERAGE MONTHLY SALARY OF R&D PERSONNEL

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Average monthly salary, roubles</b>	2322.9	8672.0	25043.5	32539.9	35618.8	39549.3	41511.8	43539.5	48833.6	53272.0
As a percentage of the salary:										
in the national economy (=100%)	104.5	101.4	119.5	122.2	119.6	121.7	122.0	118.6	124.7	121.8
in manufacturing (=100%)	98.2	103.0	131.3	132.8	131.7	134.0	130.1	125.9	126.8	130.8
in construction (=100%)	88.0	95.9	118.3	125.4	128.6	134.7	138.6	134.7	145.0	138.3



## 3.25. TAX INCENTIVES ON R&amp;D BY TYPE

*(million roubles)*

	2013	2014	2015	2016	2017	2018
<b>Tax expenditure on R&amp;D – total</b>	<b>107402.9</b>	<b>116585.6</b>	<b>122800.1</b>	<b>139891.0</b>	<b>143133.1</b>	<b>144925.2</b>
VAT exemption	95538.4	105469.1	111953.9	128150.0	128925.2	128188.3
R&D funded from budget and special foundations	71446.5	81656.7	82718.1	96199.2	95200.5	86585.6
Sales of exclusive rights on R&D results	18622.4	18572.8	21976.3	24882.9	27767.7	34651.3
R&D aimed at development/improvement of new technologies and products (for selected types of economic activity)	5469.5	5239.6	7259.6	7067.9	5956.9	6951.4
Income tax reduction	9682.7	8873.1	8790.2	9552.2	12005.1	14158.8
Accelerated depreciation of fixed assets for S&T activity	80.9	51.6	41.0	37.2	36.6	35.4
Accelerated R&D expenditure write-off	9585.0	8821.5	8749.2	9514.2	11968.5	14123.4
Contributions to the state foundations for R&D and innovation support	16.9	–	–	0.8	–	–
Property tax exemption	2181.8	2243.4	2056.0	2188.9	2202.9	2578.1
State Research Centres	2181.8	2243.4	2056.0	2188.9	2202.9	2578.1

Sources: national statistical surveys on the structure of VAT calculation, on the tax base and the structure of income tax calculation for organisations, on the tax base and the structure of property tax calculation for organisations.



## **R&D Fixed Assets**

## 4.1. R&amp;D FIXED ASSETS

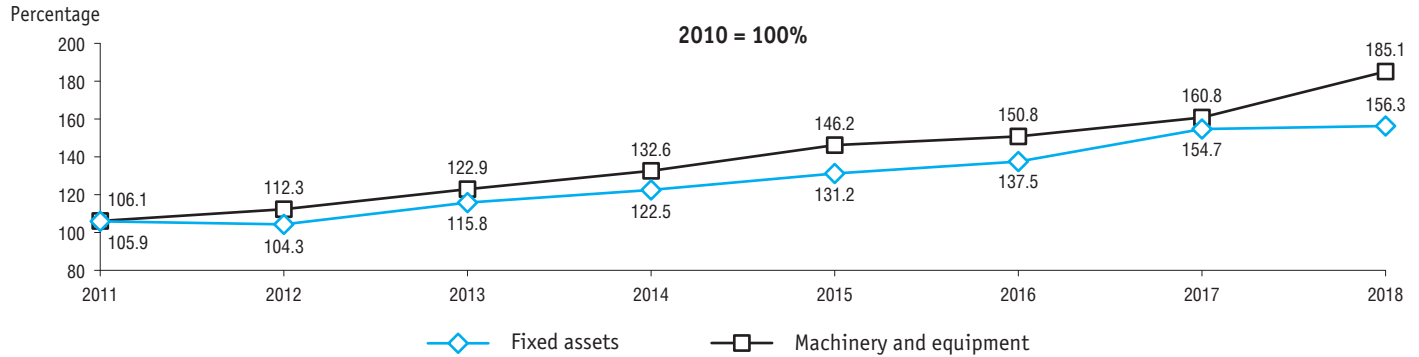
	2010	2012	2013	2014	2015	2016	2017	2018
	<b>At current prices</b>							
<b>Fixed assets – total, million roubles</b>	<b>741512.1</b>	<b>914572.2</b>	<b>1086445.9</b>	<b>1235780.3</b>	<b>1498990.8</b>	<b>1696171.4</b>	<b>1966209.0</b>	<b>2092417.2</b>
Per employee, <i>thousand roubles</i>	1006.8	1259.2	1494.4	1687.6	2028.8	2348.3	2777.6	3065.5
Per researcher, <i>thousand roubles</i>	2010.0	2454.4	2944.2	3305.1	3950.8	4579.6	5464.8	6015.2
<b>Machinery and equipment, million roubles</b>	<b>300165.9</b>	<b>398562.4</b>	<b>466609.0</b>	<b>541617.9</b>	<b>676194.6</b>	<b>753104.4</b>	<b>827473.9</b>	<b>1002702.6</b>
Per employee, <i>thousand roubles</i>	407.5	548.7	641.8	739.6	915.2	1042.7	1168.9	1469.0
Per researcher, <i>thousand roubles</i>	813.6	1069.6	1264.5	1448.5	1782.2	2033.3	2299.9	2882.5
<b>Machinery and equipment under 5 years, million roubles</b>	<b>...</b>	<b>169683.3</b>	<b>205062.6</b>	<b>257269.1</b>	<b>320676.7</b>	<b>352080.8</b>	<b>347976.6</b>	<b>405001.4</b>
As a percentage of the total value of machinery and equipment	...	42.6	43.9	47.5	47.4	46.8	42.1	40.4

(continued)

	2010	2012	2013	2014	2015	2016	2017	2018
<b>At constant 2010 prices*</b>								
<b>Fixed assets – total, million roubles</b>	<b>741512.1</b>	<b>773749.8</b>	<b>858850.5</b>	<b>907994.4</b>	<b>972739.0</b>	<b>1019333.8</b>	<b>1147146.4</b>	<b>1159233.9</b>
Per employee, <i>thousand roubles</i>	1006.8	1065.3	1181.3	1240.0	1316.5	1411.3	1620.5	1698.3
Per researcher, <i>thousand roubles</i>	2010.0	2076.5	2327.4	2428.4	2563.8	2752.1	3188.4	3332.5
<b>Machinery and equipment, million roubles</b>	<b>300165.9</b>	<b>337193.2</b>	<b>368860.8</b>	<b>397955.9</b>	<b>438802.5</b>	<b>452586.8</b>	<b>482773.6</b>	<b>555513.9</b>
Per employee, <i>thousand roubles</i>	407.5	464.3	507.4	543.5	593.9	626.6	682.0	813.8
Per researcher, <i>thousand roubles</i>	813.6	904.9	999.6	1064.3	1156.5	1222.0	1341.8	1597.0
<b>Machinery and equipment under 5 years, million roubles</b>	<b>...</b>	<b>143556.1</b>	<b>162104.8</b>	<b>189029.4</b>	<b>208096.5</b>	<b>211587.0</b>	<b>203020.2</b>	<b>224377.5</b>

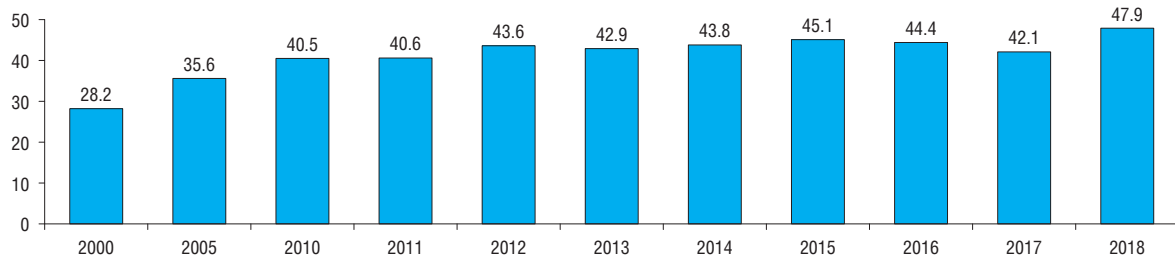
\* The data in constant prices are calculated taking into account the GDP deflator as at February 03, 2020.

#### 4.2. TRENDS IN R&D FIXED ASSETS VALUE\* (at constant 2010 prices)



\* The data in constant prices are calculated taking into account the GDP deflator as at February 03, 2020.

#### 4.3. MACHINERY AND EQUIPMENT AS A PERCENTAGE OF THE TOTAL R&D FIXED ASSETS VALUE



#### 4.4. R&D FIXED ASSETS BY OWNERSHIP OF R&D INSTITUTIONS (million roubles)

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Fixed assets</b>										
<b>Total</b>	<b>237564.4</b>	<b>399515.9</b>	<b>741512.1</b>	<b>914572.2</b>	<b>1086445.9</b>	<b>1235780.3</b>	<b>1498990.8</b>	<b>1696171.4</b>	<b>1966209.0</b>	<b>2092417.2</b>
Russian ownership	232793.0	393181.0	725165.1	897838.2	1052994.8	1218842.6	1469213.6	1671745.0	1940826.9	2033060.1
Public ownership	194659.0*	344693.4	635491.6	757158.0	886578.4	1005741.7	1126242.5	1225443.7	1326141.4	1413339.4
Federal	191972.3	336223.9	617118.2	733671.7	861801.5	960098.3	1090290.3	1188742.5	1291470.8	1376810.5
Regional	2686.3	8469.5	18110.1	23477.9	24776.9	45643.4	35952.3	36701.2	34670.7	36528.9
Municipal ownership	541.7	28.2	35.9	17.3	53.0	38.0	104.4	113.7	115.0	122.3
Ownership by voluntary associations	221.8	38.9	82.1	164.4	372.6	495.7	832.5	898.4	1221.7	1000.7
Private ownership	10499.1	17478.8	43615.5	56938.0	64420.2	80213.8	107275.4	154400.3	173735.1	217269.3
Ownership by Russian citizens permanently living abroad	...	...	...	17.0	...**	...**	...**	...**	...**	...**
Ownership by consumers' cooperatives*	0.09	0.9	1.7	...**	...**	...**	28.9	29.9	28.6	...**
Mixed ownership	26871.3	30940.7	42862.9	59170.5	68104.5	93511.6	157314.6	194653.9	294699.8	253602.1
Mixed ownership with a share of public ownership	...	...	38571.0	47722.7	56261.7	72454.4	117386.6	155829.6	238539.2	178219.6
Other mixed ownership	...	...	...	11447.8	11842.7	21057.3	39928.0	38824.3	56160.6	75382.5
Ownership by state corporations	...	...	3075.4	24373.1	33451.8	38817.0	77404.6	96193.8	144874.1	147713.2
Foreign ownership	49.0	114.9	1131.5	1177.8	3064.9	2571.1	6198.6	7957.3	9896.2	4901.1
Joint ownership (with both Russian and foreign participation)	4722.4	6220.1	15215.5	15556.2	30386.2	14366.6	23578.6	16469.1	15485.9	54456.0

(continued)

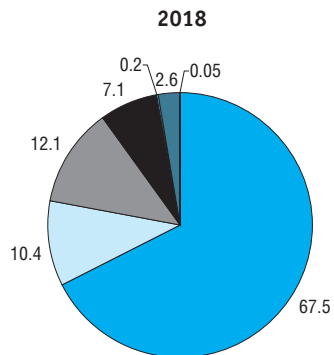
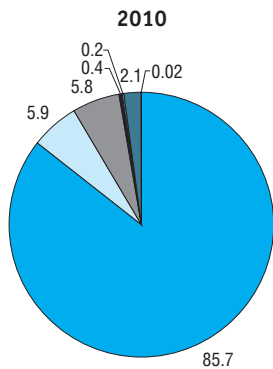
	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Machinery and equipment</b>										
<b>Total</b>	<b>66938.3</b>	<b>142154.7</b>	<b>300165.9</b>	<b>398562.4</b>	<b>466609.0</b>	<b>541617.9</b>	<b>676194.6</b>	<b>753104.4</b>	<b>827473.9</b>	<b>1002702.6</b>
Russian ownership	65631.5	140294.5	290440.4	390464.6	457596.7	533892.2	659628.5	737057.5	810671.5	966639.8
Public ownership	53434.4*	121662.2	256172.4	332053.6	382612.7	433814.9	503877.8	538303.6	569891.9	668862.3
Federal	52750.5	117529.4	248766.8	323644.7	371352.8	422330.3	487747.4	523789.9	552906.2	653949.1
Regional	683.5	4132.8	7284.9	8401.9	11259.9	11484.6	16130.4	14513.7	16985.7	14913.2
Municipal ownership	176.0	4.7	6.2	4.4	6.7	7.2	26.0	25.3	26.7	29.4
Ownership by voluntary associations	41.6	20.4	49.5	62.6	98.2	134.7	209.1	225.2	370.1	298.3
Private ownership	4235.7	8094.0	17150.5	26610.2	30837.6	41712.6	50474.8	70650.8	76991.6	113624.8
Ownership by Russian citizens permanently living abroad	...	...	...	16.0	...**	...**	...**	...**	...**	...**
Ownership by consumers' cooperatives*	0.09	0.2	1.0	...**	...**	...**	7.0	7.0	7.0	...**
Mixed ownership	7743.7	10513.1	15944.0	22090.9	30297.8	41440.4	70093.0	89889.1	107805.3	121003.1
Mixed ownership with a share of public ownership	...	...	13870.9	16689.3	25209.2	31476.5	52907.6	68716.0	75338.9	77292.4
Other mixed ownership	...	...	...	5401.6	5088.6	9964.0	17185.5	21173.2	32466.4	43710.8
Ownership by state corporations	...	...	1116.7	9627.0	13730.4	16767.1	34931.1	37946.0	55567.9	62809.1
Foreign ownership	48.2	61.0	630.0	438.0	668.9	975.0	2958.5	5835.9	7104.1	3389.1
Joint ownership (with both Russian and foreign participation)	1258.6	1799.2	9095.5	7659.8	8343.4	6750.7	13607.6	10211.0	9698.2	32673.6

\* The sum of the breakdown may not add to the total because some institutions have shared ownership.

\*\* The data are not published in order to ensure the confidentiality of primary statistics received from organisations, in accordance with Federal Law no. 282-FL 'On the Official Statistical Accounting and State Statistics System of the Russian Federation' of November 29, 2007 (art. 4, para. 5; art. 9, para. 1).

#### 4.5. PERCENTAGE DISTRIBUTION OF R&D FIXED ASSETS BY OWNERSHIP OF R&D INSTITUTIONS

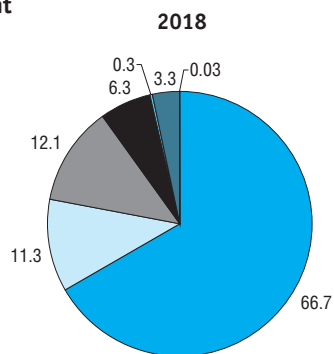
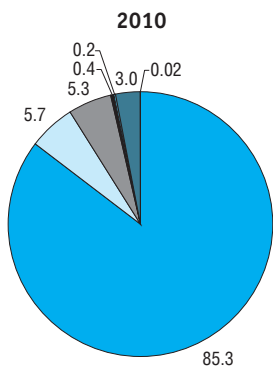
Fixed assets



Ownership:

- public ownership
- private ownership
- mixed ownership
- ownership of state corporations
- foreign ownership
- joint ownership (with both Russian and foreign participation)
- other ownership

Machinery and equipment





**4.6. R&D FIXED ASSETS BY TYPE OF ECONOMIC ACTIVITY**  
(million roubles)

	Fixed assets		Machinery and equipment	
	2017	2018	2017	2018
<b>Total</b>	<b>1966209.0</b>	<b>2092417.2</b>	<b>827473.9</b>	<b>1002702.6</b>
Agriculture, forestry and fishing	1306.4	1378.3	412.1	483.1
Mining and quarrying	636.0	654.4	600.1	624.8
Manufacturing	206597.3	253295.5	106843.8	131133.1
Electricity, gas, steam and air-conditioning supply	699.7	32044.8	187.8	22699.9
Water supply; sewerage, waste management and remediation activities	...*	95147.3	...*	170.4
Construction	80.7	...*	61.1	...*
Wholesale and retail trade; repair of motor vehicles and motorcycles	1171.5	169.3	570.4	90.9
Transportation and storage	142.5	160.4	77.5	87.1
Information and communication	6831.2	6720.3	4499.4	5096.9
Financial and insurance activities	58.1	–	51.7	–
Real estate operations	1123.8	296.0	764.5	36.9
Professional, scientific and technical activities	1378514.5	1433326.5	606571.8	728715.4
Of which research and development	1369473.4	1426817.6	600525.0	724207.7
Administrative and support service activities	2.4	166.6	2.4	124.5
Public administration and defence; compulsory social security	...*	2708.8	...*	1688.6
Education	240116.6	234746.3	90331.1	94912.5
Of which higher education	237609.3	231409.7	88866.1	92895.7
Human health and social work activities	28481.3	28320.7	13306.4	16182.8
Art, entertainment and recreation	3527.4	2980.7	526.5	485.5
Other service activities	117.6	295.7	43.7	164.6

\* The data are not published in order to ensure the confidentiality of primary statistics received from organisations, in accordance with Federal Law no. 282-FL of November 29, 2007 'On the Official Statistical Accounting and State Statistics System of the Russian Federation' (art. 4, para. 5; art. 9, para. 1).



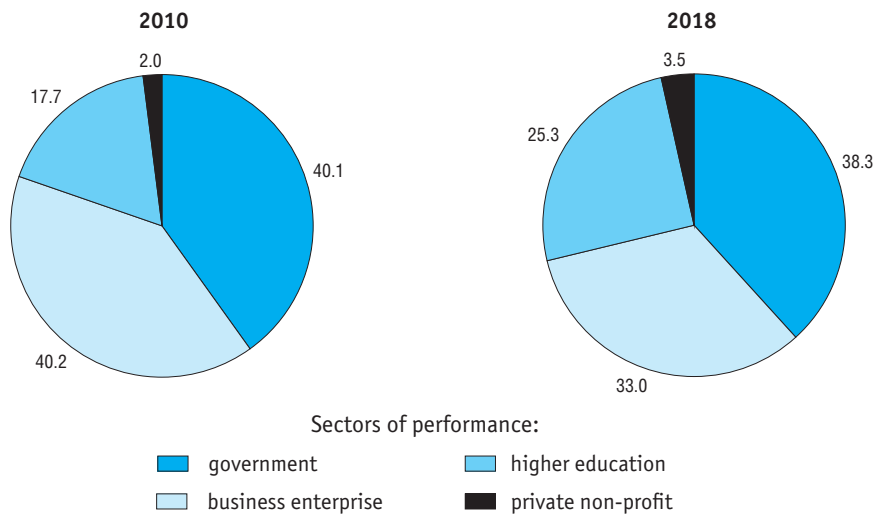
**Sectors of R&D Performance**

## 5.1. Composite indices

### 5.1.1. R&D INSTITUTIONS BY SECTOR OF PERFORMANCE

	Total	Government sector	Business enterprise sector	Higher education sector	Private non-profit sector
2000	4099	1247	2278	526	48
2005	3566	1282	1703	539	42
2006	3622	1341	1682	540	59
2007	3957	1483	1742	616	116
2008	3666	1429	1540	603	94
2009	3536	1406	1446	603	81
2010	3492	1400	1405	617	70
2011	3682	1457	1450	696	79
2012	3566	1465	1362	662	77
2013	3605	1495	1269	762	79
2014	3604	1491	1265	777	71
2015	4175	1560	1400	1124	91
2016	4032	1546	1326	1064	96
2017	3944	1493	1292	1038	121
2018	3950	1511	1304	998	137

### 5.1.2. PERCENTAGE DISTRIBUTION OF R&D INSTITUTIONS BY SECTOR OF PERFORMANCE



## 5.1.3. R&amp;D PERSONNEL BY SECTOR OF PERFORMANCE AND OCCUPATION

*(headcount)*

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Total</b>	<b>887729</b>	<b>813207</b>	<b>736540</b>	<b>726318</b>	<b>727029</b>	<b>732274</b>	<b>738857</b>	<b>722291</b>	<b>707887</b>	<b>682580</b>
Researchers	425954	391121	368915	372620	369015	373905	379411	370379	359793	347854
Technicians	75184	65982	59276	58905	61401	63168	62805	60441	59690	57722
Supporting staff	240506	215555	183713	175790	175365	173554	174056	171915	170347	160591
Others	146085	140549	124636	119003	121248	121647	122585	119556	118057	116413
Government sector	255850	272718	259007	271466	261869	263712	265429	269056	268080	270357
Researchers	129725	139378	131734	136442	132117	132701	134794	134225	130081	131366
Technicians	25085	25462	24009	28094	27777	27761	27090	26075	26040	24923
Supporting staff	59706	61448	56530	60067	56795	56744	56552	61140	62961	63570
Others	41334	46430	46734	46863	45180	46506	46993	47616	48998	50498
Business enterprise sector	590646	496706	423112	394182	405268	405529	408802	388385	377150	347080
Researchers	267640	221445	197785	192285	193736	196320	198123	190378	186347	171205
Technicians	46535	36837	30063	26720	28920	29452	29850	27519	26788	26012
Supporting staff	175261	147980	120485	106306	109691	107215	108230	101219	98139	88124
Others	101210	90444	74779	68871	72921	72542	72599	69269	65876	61739
Higher education sector	40787	43500	53290	59469	59247	62400	63870	63046	59729	64073
Researchers	28325	30111	38640	43103	42692	44427	45967	44994	42113	44489
Technicians	3509	3658	5095	3998	4670	5939	5836	6789	6584	6736
Supporting staff	5463	6098	6564	9264	8828	9538	9217	8929	8391	8838
Others	3490	3633	2991	3104	3057	2496	2850	2334	2641	4010
Private non-profit sector	446	283	1131	1201	645	633	756	1804	2928	1070
Researchers	264	187	756	790	470	457	527	782	1252	794
Technicians	55	25	109	93	34	16	29	58	278	51
Supporting staff	76	29	134	153	51	57	57	627	856	59
Others	51	42	132	165	90	103	143	337	542	166

#### 5.1.4. R&D PERSONNEL BY SECTOR OF PERFORMANCE AND EDUCATIONAL ATTAINMENT

(headcount)

	Total	Government sector	Business enterprise sector	Higher education sector	Private non-profit sector
<b>R&amp;D personnel</b>					
2005	813207	272718	496706	43500	283
2010	736540	259007	423112	53290	1131
2015	738857	265429	408802	63870	756
2016	722291	269056	388385	63046	1804
2017	707887	268080	377150	59729	2928
2018	682580	270357	347080	64073	1070
<b>Higher education</b>					
2005	501718	177676	288649	35159	234
2010	493852	178026	268821	46112	893
2015	537118	194608	283664	58144	702
2016	529418	196289	274477	57504	1148
2017	522779	195127	270951	54664	2037
2018	511222	198459	253804	57980	979
<b>Secondary vocational education</b>					
2005	134222	40495	89265	4430	32
2010	109158	36091	69552	3394	121
2015	95640	33163	60370	2071	36
2016	93123	34452	56221	2066	384
2017	90607	33905	54342	1866	494
2018	85539	34300	48957	2224	58

(continued)

	Total	Government sector	Business enterprise sector	Higher education sector	Private non-profit sector
Other education					
2005	177267	54547	118792	3911	17
2010	133530	44890	84739	3784	117
2015	106099	37658	64768	3655	18
2016	99750	38315	57687	3476	272
2017	94501	39048	51857	3199	397
2018	85819	37598	44319	3869	33

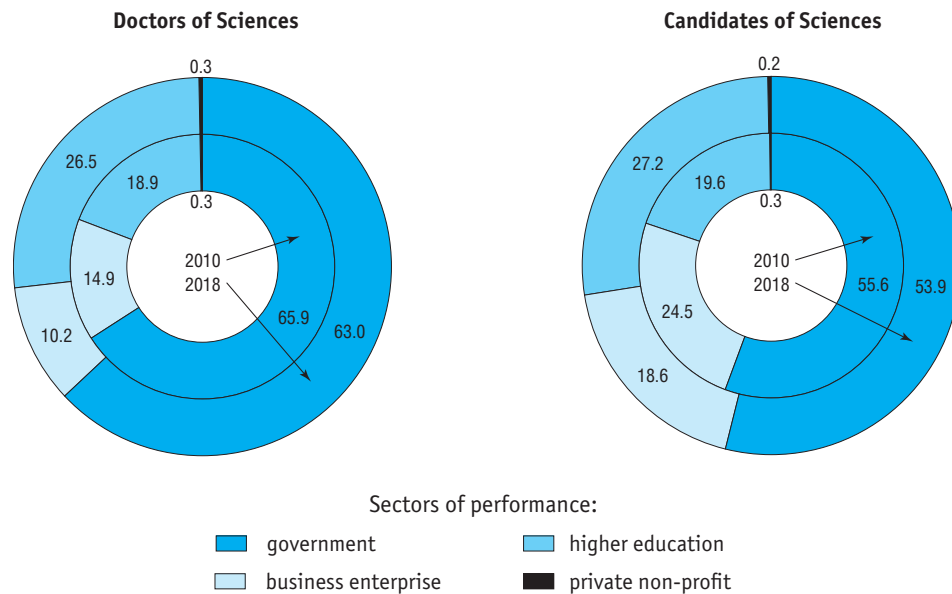
### 5.1.5. RESEARCHERS WITH SCIENTIFIC DEGREES BY SECTOR OF PERFORMANCE

(headcount)

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Researchers with scientific degrees</b>	<b>105911</b>	<b>99428</b>	<b>105114</b>	<b>109330</b>	<b>108248</b>	<b>109598</b>	<b>111533</b>	<b>108388</b>	<b>103327</b>	<b>100330</b>
Doctors of Sciences	21949	23410	26789	27784	27485	27969	28046	27430	26076	25288
Candidates of Sciences	83962	76018	78325	81546	80763	81629	83487	80958	77251	75042
Government sector	58901	60066	61194	63092	62837	62944	63906	62285	59138	56387
Doctors of Sciences	14987	16511	17646	18181	18184	18198	18264	17781	16948	15934
Candidates of Sciences	43914	43555	43548	44911	44653	44746	45642	44504	42190	40453
Business enterprise sector	34775	26661	23169	21758	20955	20595	20270	18833	18107	16575
Doctors of Sciences	4806	4222	3987	3767	3622	3511	3413	3071	2873	2591
Candidates of Sciences	29969	22439	19182	17991	17333	17084	16857	15762	15234	13984
Higher education sector	12113	12618	20423	24144	24306	25899	27184	27109	25812	27132
Doctors of Sciences	2120	2654	5068	5753	5638	6218	6318	6532	6185	6692
Candidates of Sciences	9993	9964	15355	18391	18668	19681	20866	20577	19627	20440
Private non-profit sector	122	83	328	336	150	160	173	161	270	236
Doctors of Sciences	36	23	88	83	41	42	51	46	70	71
Candidates of Sciences	86	60	240	253	109	118	122	115	200	165



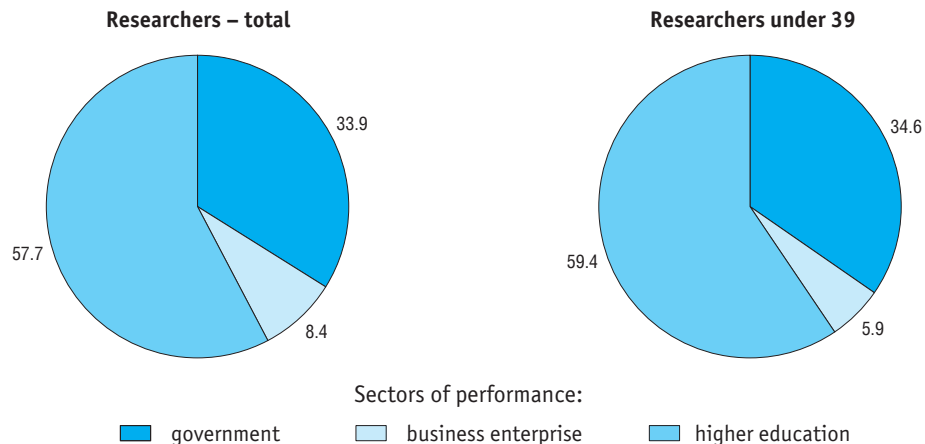
## 5.1.6. PERCENTAGE DISTRIBUTION OF RESEARCHERS WITH SCIENTIFIC DEGREES BY SECTOR OF PERFORMANCE



### 5.1.7. RESEARCHERS ASSIGNED TO WORK (INTERNSHIP) PLACEMENTS AT FOREIGN SCIENTIFIC ORGANISATIONS BY SECTOR OF PERFORMANCE: 2018

	Total	Government sector	Business enterprise sector	Higher education sector
Number of institutions that assigned researchers to work (internship) placements at foreign scientific organisations	211	92	16	103
Number of researchers assigned to work (internship) placements at foreign scientific organisations	3173	1075	266	1832
Of whom under 39	1487	515	88	884

### 5.1.8. PERCENTAGE DISTRIBUTION OF RESEARCHERS ASSIGNED TO WORK (INTERNSHIP) PLACEMENTS AT FOREIGN SCIENTIFIC ORGANISATIONS BY SECTOR OF PERFORMANCE: 2018



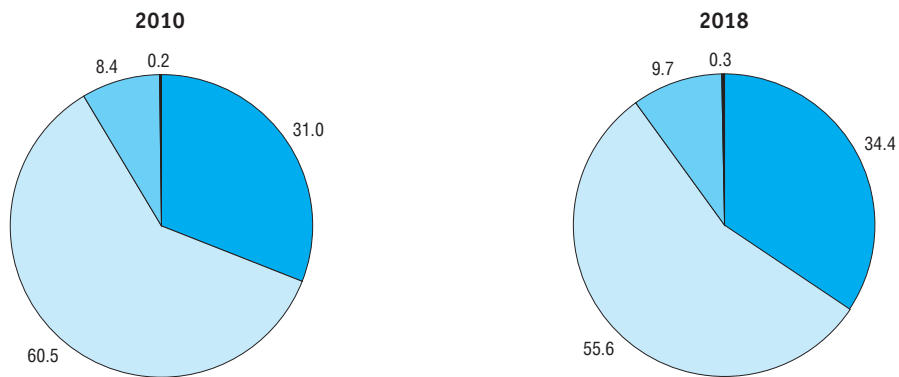
## 5.1.9. GROSS DOMESTIC EXPENDITURE ON R&amp;D BY SECTOR OF PERFORMANCE\*

*(thousand roubles)*

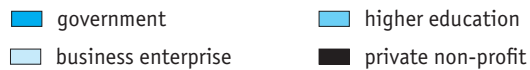
	2010	2012	2013	2014	2015	2016	2017	2018
<b>At current prices</b>								
<b>Gross domestic expenditure on R&amp;D</b>	<b>523377233.9</b>	<b>699869784.8</b>	<b>749797638.8</b>	<b>847526992.9</b>	<b>914669057.2</b>	<b>943815219.6</b>	<b>1019152437.1</b>	<b>1028247644.8</b>
Sectors of R&D performance:								
government	161988411.4	224982089.2	226590120.7	258023009.1	284154288.3	301775305.3	310029734.6	354037790.2
business enterprise	316701679.9	408284378.5	454409251.0	505210341.3	541533094.3	554093599.1	612960678.4	571633146.1
higher education	43714007.3	65334232.1	67858855.1	83205260.1	87730781.4	85932983.0	91934601.3	99497983.2
private non-profit	973135.3	1269085.0	939412.0	1088382.4	1250893.2	2013332.2	4227422.8	3078725.3
<b>At constant 2010 prices</b>								
<b>Gross domestic expenditure on R&amp;D</b>	<b>523377233.9</b>	<b>553475511.9</b>	<b>562573258.4</b>	<b>591518001.7</b>	<b>595487667.4</b>	<b>598298079.0</b>	<b>612950283.9</b>	<b>558132576.0</b>
Sectors of R&D performance:								
government	161988411.4	177921778.7	170010594.8	180083060.5	184996281.4	191299718.1	186461619.4	192171628.0
business enterprise	316701679.9	322882070.8	340943315.6	352603532.5	352560608.3	351247923.4	368653803.1	310282335.2
higher education	43714007.3	51668036.5	50914507.1	58071789.6	57116394.1	54474157.2	55292356.6	54007481.5
private non-profit	973135.3	1003625.9	704840.9	759619.2	814383.6	1276280.3	2542504.8	1671131.4

\* Here and below the data in constant prices are calculated taking into account the GDP deflator as of February 03, 2020.

### 5.1.10. PERCENTAGE DISTRIBUTION OF GROSS DOMESTIC EXPENDITURE ON R&D BY SECTOR OF PERFORMANCE



Sectors of performance:



## 5.1.11. GROSS DOMESTIC EXPENDITURE ON R&amp;D AS A PERCENTAGE OF GDP BY SECTOR OF PERFORMANCE

	Total	Government sector	Business enterprise sector	Higher education sector
2000	1.05	0.26	0.74	0.05
2005	1.07	0.28	0.73	0.06
2006	1.07	0.29	0.72	0.07
2007	1.12	0.32	0.72	0.07
2008	1.04	0.31	0.66	0.07
2009	1.25	0.38	0.78	0.09
2010	1.13	0.35	0.68	0.09
2011	1.01	0.30	0.62	0.09
2012	1.03	0.33	0.60	0.10
2013	1.03	0.31	0.62	0.09
2014	1.07	0.33	0.64	0.11
2015	1.10	0.34	0.65	0.11
2016	1.10	0.35	0.65	0.10
2017	1.11	0.34	0.67	0.10
2018	0.99	0.34	0.55	0.10

## 5.1.12. GROSS DOMESTIC EXPENDITURE ON R&D BY SECTOR OF PERFORMANCE AND SOURCE OF FUNDS

(thousand roubles)

	Total	Government funds*	Business enterprise sector funds	Higher education sector funds	Private non-profit sector funds	Funds from abroad
<b>2014</b>						
<b>Gross domestic expenditure on R&amp;D</b>	<b>847526992.9</b>	<b>586658713.4</b>	<b>229444656.4</b>	<b>9069176.1</b>	<b>1372014.1</b>	<b>20982432.9</b>
Sectors of R&D performance:						
government	258023009.1	219020381.4	29660844.5	357181.2	100284.6	8884317.4
business enterprise	505210341.3	316622608.3	177116134.2	442911.7	359214.0	10669473.1
higher education	83205260.1	50496387.8	22607546.6	8215233.9	506189.0	1379902.8
private non-profit	1088382.4	519335.9	60131.1	53849.3	406326.5	48739.6
<b>2015</b>						
<b>Gross domestic expenditure on R&amp;D</b>	<b>914669057.2</b>	<b>635859865.4</b>	<b>242155382.4</b>	<b>10875090.0</b>	<b>1566750.2</b>	<b>24211969.2</b>
Sectors of R&D performance:						
government	284154288.3	240265758.8	32877099.7	321525.4	163335.5	10526568.9
business enterprise	541533094.3	343396867.3	185037359.3	561703.2	421868.8	12115295.7
higher education	87730781.4	51570251.1	24028351.9	9979551.2	671465.0	1481162.2
private non-profit	1250893.2	626988.2	212571.5	12310.2	310080.9	88942.4
<b>2016</b>						
<b>Gross domestic expenditure on R&amp;D</b>	<b>943815219.6</b>	<b>643401009.6</b>	<b>265277238.1</b>	<b>8210528.3</b>	<b>1537132.8</b>	<b>25389310.8</b>
Sectors of R&D performance:						
government	301775305.3	263326940.4	27544205.3	363329.0	253809.8	10287020.8
business enterprise	554093599.1	326710613.8	213215672.3	153457.6	149519.8	13864335.6
higher education	85932983.0	52444188.9	23832576.7	7658742.4	832874.6	1164600.4
private non-profit	2013332.2	919266.5	684783.8	34999.3	300928.6	73354.0

(continued)

	Total	Government funds*	Business enterprise sector funds	Higher education sector funds	Private non-profit sector funds	Funds from abroad
<b>2017</b>						
<b>Gross domestic expenditure on R&amp;D</b>	<b>1019152437.1</b>	<b>674344339.3</b>	<b>307459020.2</b>	<b>7901322.1</b>	<b>2645187.7</b>	<b>26802567.8</b>
Sectors of R&D performance:						
government	310029734.6	268775672.5	29924193.6	210118.7	608620.0	10511129.8
business enterprise	612960678.4	346858742.5	250875477.9	161779.1	125995.6	14938683.3
higher education	91934601.3	56486622.7	25896640.8	7528724.3	717720.7	1304892.8
private non-profit	4227422.8	2223301.6	762707.9	700.0	1192851.4	47861.9
<b>2018</b>						
<b>Gross domestic expenditure on R&amp;D</b>	<b>1028247644.8</b>	<b>689270557.4</b>	<b>303219233.8</b>	<b>8841468.3</b>	<b>2761098.4</b>	<b>24155286.9</b>
Sectors of R&D performance:						
government	354037790.2	306902140.4	34001536.7	263610.1	450830.9	12419672.1
business enterprise	571633146.1	321302048.6	239608783.5	140133.6	137267.2	10444913.2
higher education	99497983.2	60269300.1	28911169.3	8436774.6	638991.1	1241748.1
private non-profit	3078725.3	797068.3	697744.3	950.0	1534009.2	48953.5

\* Including budget funds, budget appropriations for higher education institutions, and government sector institutions' funds (including own funds).

**5.1.13. SUBSIDIES, GRANTS, AND OTHER COMPETITIVE R&D FUNDING BY SECTOR OF PERFORMANCE: 2018**  
(thousand roubles)

	Total	Government sector	Business enterprise sector	Higher education sector	Private non-profit sector
Budget subsidies for institutional R&D funding	68277492.3	62827451.3	2073499.6	3355282.1	21259.3
Of which federal	64206898.3	58978602.4	2065444.5	3141592.1	21259.3
Budget subsidies for performing R&D	46677597.2	12393667.3	25273617.9	8979678.8	30633.2
Of which federal	45886136.0	12061379.5	25091840.5	8732916.0	
Grants from foundations for S&T and innovation	30024519.4	16043730.6	565808.1	13383565.7	31415.0
Funds from budgets of all levels	25066040.0	13287222.3	497814.8	11249773.1	31229.8
Of which federal	22968295.3	12393778.3	493489.8	10049797.4	31229.8
Other types of competitive financing	65041924.8	16739186.0	40260433.0	7994243.7	48062.1
Funds from budgets of all levels	52450533.8	12102808.1	36660052.2	3656611.9	31061.6
Of which federal	50028661.7	11739742.6	35077161.5	3191384.8	20372.8

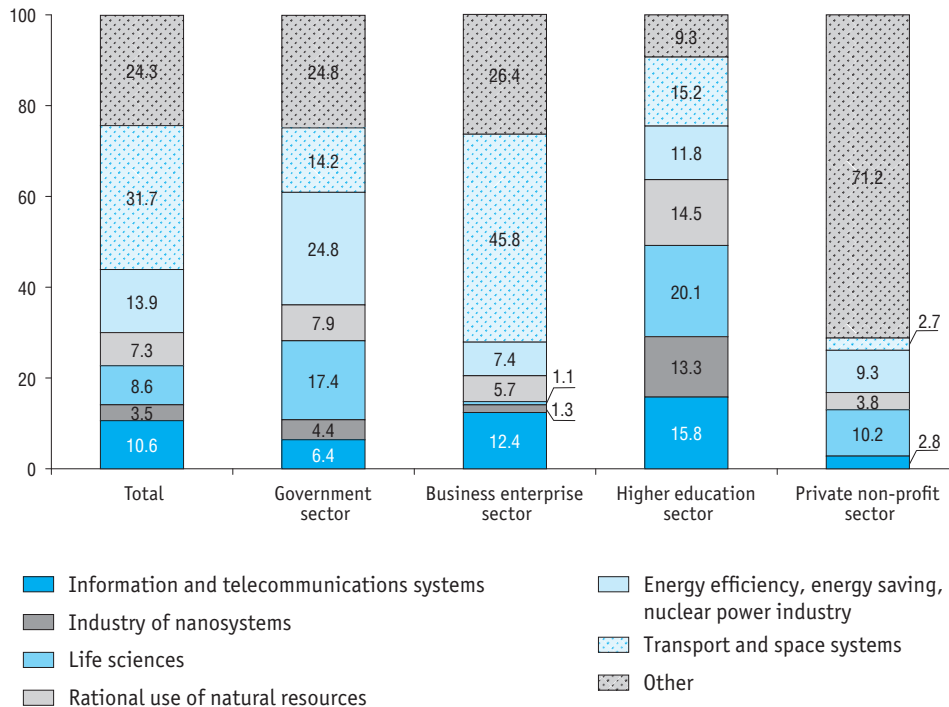


## 5.1.14. GROSS DOMESTIC EXPENDITURE ON R&amp;D BY PRIORITY S&amp;T AREA AND SECTOR OF PERFORMANCE: 2018

*(thousand roubles)*

	Total	Government sector	Business enterprise sector	Higher education sector	Private non-profit sector
<b>Gross domestic expenditure on R&amp;D by priority S&amp;T area</b>	<b>717541092.0</b>	<b>250125682.3</b>	<b>395946587.0</b>	<b>70137929.6</b>	<b>1330893.1</b>
Of which:					
information and telecommunications systems	76116066.8	16066242.7	48905271.6	11107049.6	37502.9
industry of nanosystems	25417480.2	11082819.6	5006617.3	9328043.3	–
life sciences	61911609.7	43498295.8	4208453.8	14069521.2	135338.9
rational use of natural resources	52376027.4	19703622.5	22444482.5	10176812.8	51109.6
energy effectiveness, energy saving, and nuclear power engineering	99915719.5	62102362.1	29437191.5	8252762.9	123403.0
transport and space systems	227725685.8	35579010.4	181462396.2	10647760.1	36519.1

### 5.1.15. PERCENTAGE DISTRIBUTION OF GROSS DOMESTIC EXPENDITURE ON R&D BY PRIORITY S&T AREA AND SECTOR OF PERFORMANCE: 2019



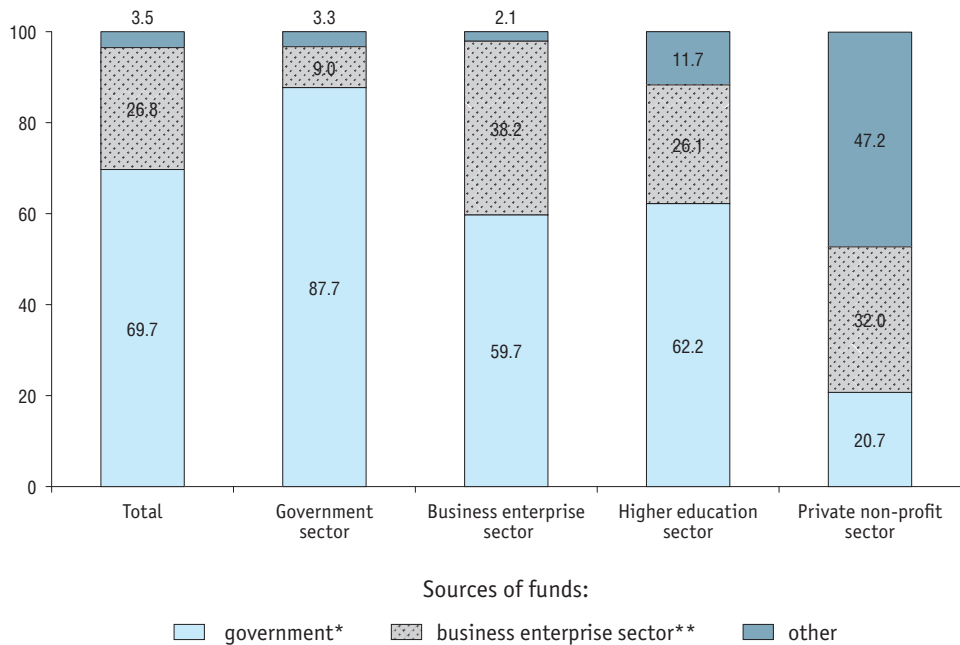
**5.1.16. SOURCES OF FUNDS FOR GROSS DOMESTIC EXPENDITURE ON R&D BY PRIORITY S&T AREA AND SECTOR OF PERFORMANCE: 2019**  
(thousand roubles)

	Total	Government sector	Business enterprise sector	Higher education sector	Private non-profit sector
<b>Gross domestic expenditure on R&amp;D by priority S&amp;T area</b>	<b>717541092.0</b>	<b>250125682.3</b>	<b>395946587.0</b>	<b>70137929.6</b>	<b>1330893.1</b>
Including by sources of funds:					
government*	499834660.5	219349355.0	236568295.6	43640863.8	276146.1
of which federal budget appropriations	406395214.5	176045464.2	191673864.3	38510059.4	165826.6
business enterprise sector**	192383815.3	22477969.6	151180672.1	18299105.8	426067.8
other	25322616.2	8298357.7	8197619.3	8197960.0	628679.2

\* Including budget appropriations and government sector institutions' funds (including own funds).

\*\* Business enterprise sector institutions' funds (including own funds)

### 5.1.15. PERCENTAGE DISTRIBUTION OF GROSS DOMESTIC EXPENDITURE ON R&D BY PRIORITY S&T AREA AND SOURCE OF FUNDS: 2018



\* Including budget appropriations and government sector institutions' funds (including own funds).

\*\* Business enterprise sector institutions' funds (including own funds).

## 5.1.18. GROSS DOMESTIC EXPENDITURE ON R&amp;D BY SECTOR OF PERFORMANCE AND SOCIO-ECONOMIC OBJECTIVE

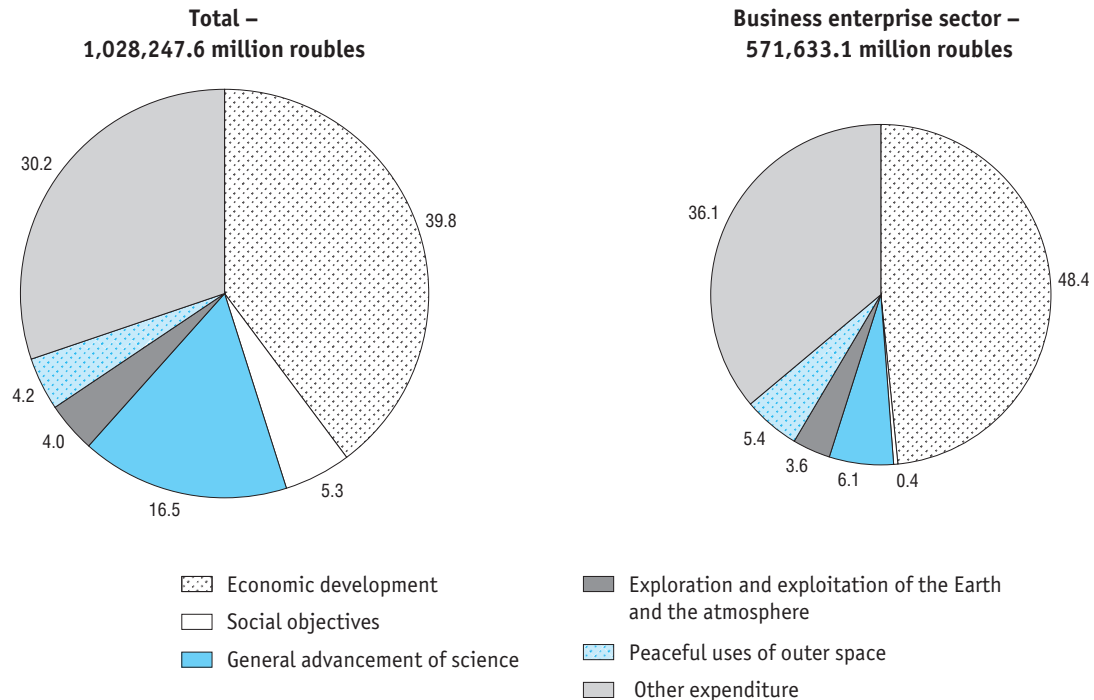
*(thousand roubles)*

	Total	Government sector	Business enterprise sector	Higher education sector	Private non-profit sector
		<b>2014</b>			
<b>Gross domestic expenditure on R&amp;D</b>	<b>847526992.9</b>	<b>258023009.1</b>	<b>505210341.3</b>	<b>83205260.1</b>	<b>1088382.4</b>
Economic development	319943400.5	58260041.0	224881936.8	36680335.6	121087.1
Social objectives	45328439.6	24604406.8	4745913.8	15848699.1	129419.9
General advancement of science	136414580.0	75836748.8	36193754.2	23948358.6	435718.4
Exploration and exploitation of the Earth and the atmosphere	39068691.1	19049241.1	17826089.6	2155683.5	37676.9
Peaceful uses of outer space	48996185.8	10308768.0	37455033.6	1189438.9	42945.3
Other	257775695.9	69963803.4	184107613.3	3382744.4	321534.8
		<b>2015</b>			
<b>Gross domestic expenditure on R&amp;D</b>	<b>914669057.2</b>	<b>284154288.3</b>	<b>541533094.3</b>	<b>87730781.4</b>	<b>1250893.2</b>
Economic development	335508245.3	66498291.0	229892147.1	38839549.5	278257.7
Social objectives	47512609.4	26204488.0	3635210.6	17511474.7	161436.1
General advancement of science	145154435.8	84086241.6	37477260.5	23092224.3	498709.4
Exploration and exploitation of the Earth and the atmosphere	43206894.0	18496276.7	22445320.5	2221571.2	43725.6
Peaceful uses of outer space	57441295.9	10919478.4	45009580.3	1437968.4	74268.8
Other	285845576.8	77949512.6	203073575.3	4627993.3	194495.6
		<b>2016</b>			
<b>Gross domestic expenditure on R&amp;D</b>	<b>943815219.6</b>	<b>301775305.3</b>	<b>554093599.1</b>	<b>85932983.0</b>	<b>2013332.2</b>
Economic development	356656937.7	64707900.8	254029442.5	37581748.3	337846.1
Social objectives	53126847.1	31261859.3	3544044.4	18168104.3	152839.1

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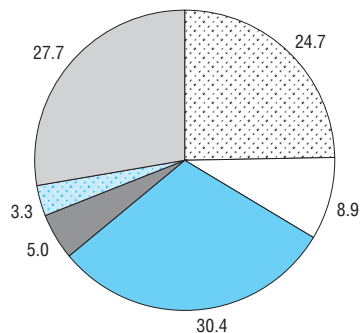
	Total	Government sector	Business enterprise sector	Higher education sector	Private non-profit sector
General advancement of science	139556056.0	82344016.1	33634645.2	22815366.6	762028.1
Exploration and exploitation of the Earth and the atmosphere	35280752.7	18048272.4	14855580.6	2340775.9	36123.8
Peaceful uses of outer space	46367115.9	12322365.9	33087370.1	941866.2	15513.7
Other	312827510.2	93090890.8	214942516.3	4085121.7	708981.4
		<b>2017</b>			
<b>Gross domestic expenditure on R&amp;D</b>	<b>1019152437.1</b>	<b>310029734.6</b>	<b>612960678.4</b>	<b>91934601.3</b>	<b>4227422.8</b>
Economic development	405957250.5	68613261.9	294054323.3	42389518.2	900147.1
Social objectives	51110186.9	27741889.2	4652612.0	18431794.6	283891.1
General advancement of science	139964844.3	78610103.3	37414969.0	23044595.5	895176.5
Exploration and exploitation of the Earth and the atmosphere	40987614.3	16017815.0	23009090.2	1916479.4	44229.7
Peaceful uses of outer space	41270828.6	11852982.8	28324873.5	1007750.0	85222.3
Other	339861712.5	107193682.4	225504810.4	5144463.6	2018756.1
		<b>2018</b>			
<b>Gross domestic expenditure on R&amp;D</b>	<b>1028247644.8</b>	<b>354037790.2</b>	<b>571633146.1</b>	<b>99497983.2</b>	<b>3078725.3</b>
Economic development	408881985.5	87448534.4	276559143.7	43910298.2	964009.2
Social objectives	54264887.5	31469966.4	2171080.2	20318937.0	304903.9
General advancement of science	169868470.5	107649755.5	34995204.0	26310367.5	913143.5
Exploration and exploitation of the Earth and the atmosphere	40888641.4	17546248.8	20805154.5	2496650.9	40587.2
Peaceful uses of outer space	43631330.1	11858878.8	30876915.6	880112.3	15423.4
Other	310712329.8	98064406.3	206225648.1	5581617.3	840658.1

### 5.1.19. PERCENTAGE DISTRIBUTION OF GROSS DOMESTIC EXPENDITURE ON R&D BY SECTOR OF PERFORMANCE AND SOCIO-ECONOMIC OBJECTIVE: 2018

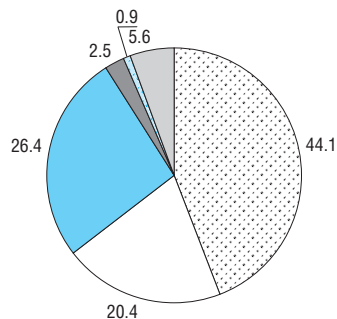


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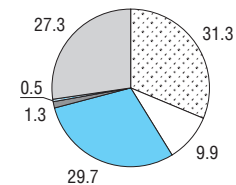
**Government sector –  
354,037.8 million roubles**









**Higher education sector –  
99,498.0 million roubles**



**Private non-profit sector –  
3,078.7 million roubles**



 Economic development  
 Social objectives  
 General advancement of science

 Exploration and exploitation of the Earth and the atmosphere  
 Peaceful uses of outer space  
 Other expenditure



**5.1.20. CURRENT EXPENDITURE ON R&D BY SECTOR OF PERFORMANCE AND TYPE OF R&D ACTIVITY**  
(thousand roubles)

	Total	Government sector	Business enterprise sector	Higher education sector	Private non-profit sector
<b>Current expenditure on R&amp;D</b>					
2005	221119537.6	56342327.7	151228693.6	13144292.5	404223.8
2010	489450798.7	151825126.6	294103827.7	42552245.4	969599.0
2015	854288043.8	265478556.9	503088818.5	84495233.0	1225435.4
2016	873778705.8	279027077.7	509168604.8	83579171.0	2003852.3
2017	950256965.4	283231733.5	573687801.6	89400111.3	3937319.0
2018	960689437.2	325114767.7	535192496.3	97311000.9	3071172.3
<b>Basic research</b>					
2005	31022855.8	24586195.8	2591506.7	3841327.6	3825.7
2010	95881364.3	65041375.9	16935403.4	13647906.8	256678.2
2015	132064934.3	99987000.6	7122577.4	24839057.2	116299.1
2016	132565068.0	97607131.4	8206064.7	26537618.5	214253.4
2017	141299165.2	100604310.0	14087182.4	26153702.4	453970.4
2018	169174956.7	121640034.7	15069244.8	31730954.7	734722.5
<b>Applied research</b>					
2005	36360266.9	10603039.3	20026408.8	5405410.3	325408.5
2010	92010677.2	30948555.6	42872394.0	17804762.0	384965.6
2015	169654641.2	66248286.3	61520451.3	41098469.1	787434.5
2016	181157915.6	77012901.0	62485456.3	40348147.3	1311411.0
2017	172547880.5	67859495.4	57168047.3	46822282.4	698055.4
2018	197209324.5	82114839.9	65737130.8	48963848.7	393505.1

(continued)

	Total	Government sector	Business enterprise sector	Higher education sector	Private non-profit sector
<b>Development</b>					
2005	153736414.9	21153092.6	128610778.1	3897554.6	74989.6
2010	301558757.2	55835195.1	234296030.3	11099576.6	327955.2
2015	552568468.3	99243270.0	434445789.8	18557706.7	321701.8
2016	560055722.2	104407045.3	438477083.8	16693405.2	478187.9
2017	636409919.7	114767928.1	502432571.9	16424126.5	2785293.2
2018	594305156.0	121359893.1	454386120.7	16616197.5	1942944.7

## 5.1.21. AVERAGE MONTHLY SALARY OF R&amp;D PERSONNEL BY SECTOR OF PERFORMANCE

*(roubles)*

	Total	Government sector	Business enterprise sector	Higher education sector	Private non-profit sector
2000	2322.9	2015.6	2519.9	1400.3	1836.1
2005	8672.0	7220.9	9599.6	7042.0	5767.4
2006	10840.9	9678.8	11744.8	8348.7	9409.1
2007	14683.4	14208.3	15203.6	12233.1	13237.3
2008	19263.3	19561.0	19345.3	16812.7	21161.2
2009	22104.3	22979.7	21674.1	21191.5	24253.8
2010	25043.5	24792.1	25359.7	23716.4	24438.5
2011	28387.5	27869.4	29174.9	24963.9	25956.5
2012	32539.9	31990.2	33165.2	30915.1	25983.7
2013	35618.8	34532.8	36540.8	34101.0	27979.8
2014	39549.3	38715.6	39855.8	41258.6	37197.0
2015	41511.8	40513.5	42102.7	41850.5	41898.6
2016	43539.5	42125.9	44611.1	43370.8	26588.1
2017	48833.6	44614.8	51648.5	49437.9	54279.4
2018	53272.0	54193.9	51766.7	57848.0	94276.2

## 5.2. Government sector

### 5.2.1. R&D INSTITUTIONS IN THE GOVERNMENT SECTOR BY TYPE

	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Total</b>	<b>1282</b>	<b>1400</b>	<b>1465</b>	<b>1495</b>	<b>1491</b>	<b>1560</b>	<b>1546</b>	<b>1493</b>	<b>1511</b>
Research institutes	1145	1124	1114	1144	1139	1173	1167	1117	1098
Design organisations, design-and-engineering organisations	62	61	64	56	55	55	55	43	44
Construction project and exploration organisations	6	5	6	7	6	8	5	5	3
Pilot plants	14	30	37	43	42	48	47	45	35
Others	55	180	244	245	249	276	272	283	331

### 5.2.2. R&D PERSONNEL IN THE GOVERNMENT SECTOR BY TYPE OF R&D INSTITUTIONS

(headcount)

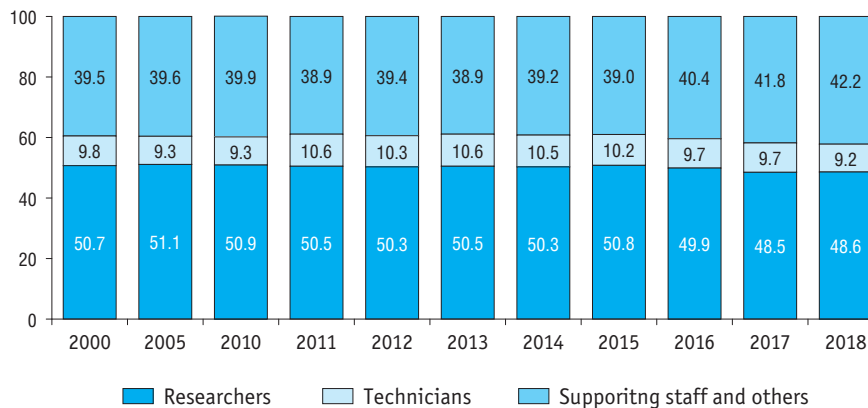
	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Total</b>	<b>272718</b>	<b>259007</b>	<b>271466</b>	<b>261869</b>	<b>263712</b>	<b>265429</b>	<b>269056</b>	<b>268080</b>	<b>270357</b>
Research institutes	248214	222613	232655	225798	228146	230893	232100	228743	218296
Design organisations, design-and-engineering organisations	21499	26473	26084	22979	23448	19459	23544	24404	30128
Construction project and exploration organisations	159	1419	1370	1156	1174	1220	52	50	43
Pilot plants	367	631	1375	1762	1278	1519	1365	1372	2040
Others	2479	7871	9982	10174	9666	12338	11995	13511	19850

## 5.2.3. R&amp;D PERSONNEL IN THE GOVERNMENT SECTOR BY OCCUPATION

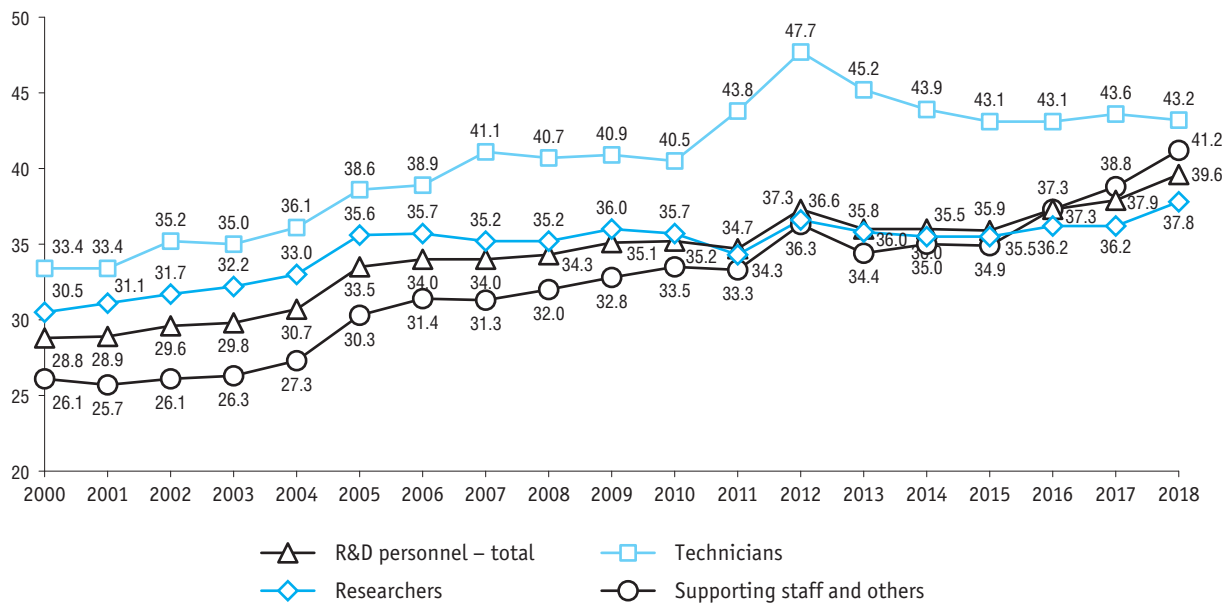
*(headcount)*

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Total</b>	<b>255850</b>	<b>272718</b>	<b>259007</b>	<b>271466</b>	<b>261869</b>	<b>263712</b>	<b>265429</b>	<b>269056</b>	<b>268080</b>	<b>270357</b>
Researchers	129725	139378	131734	136442	132117	132701	134794	134225	130081	131366
Technicians	25085	25462	24009	28094	27777	27761	27090	26075	26040	24923
Supporting staff	59706	61448	56530	60067	56795	56744	56552	61140	62961	63570
Others	41334	46430	46734	46863	45180	46506	46993	47616	48998	50498

## 5.2.4. PERCENTAGE DISTRIBUTION OF R&amp;D PERSONNEL IN THE GOVERNMENT SECTOR BY OCCUPATION



### 5.2.5. R&D PERSONNEL IN THE GOVERNMENT SECTOR AS A PERCENTAGE OF THE TOTAL NUMBER OF R&D PERSONNEL BY OCCUPATION



## 5.2.6. R&amp;D PERSONNEL IN THE GOVERNMENT SECTOR BY EDUCATIONAL ATTAINMENT

*(headcount)*

	Total	Higher education	Secondary vocational education	Other education
<b>R&amp;D personnel</b>				
2005	272718	177676	40495	54547
2010	259007	178026	36091	44890
2014	263712	189447	33699	40566
2015	265429	194608	33163	37658
2016	269056	196289	34452	38315
2017	268080	195127	33905	39048
2018	270357	198459	34300	37598
<b>Researchers</b>				
2005	139378	139378	–	–
2010	131734	131734	–	–
2014	132701	132701	–	–
2015	134794	134794	–	–
2016	134225	134225	–	–
2017	130081	130081	–	–
2018	131366	131366	–	–
<b>Technicians</b>				
2005	25462	7802	12177	5483
2010	24009	9110	10155	4744
2014	27761	13245	9310	5206
2015	27090	13761	8609	4720
2016	26075	12877	8616	4582
2017	26040	13514	7951	4575
2018	24923	12851	7888	4184

(continued)

	Total	Higher education	Secondary vocational education	Other education
Supporting staff				
2005	61448	19119	15834	26495
2010	56530	21762	14287	20481
2014	56744	24586	13038	19120
2015	56552	26144	13119	17289
2016	61140	29283	13611	18246
2017	62961	30829	13884	18248
2018	63570	30949	14079	18542
Others				
2005	46430	11377	12484	22569
2010	46734	15420	11649	19665
2014	46506	18915	11351	16240
2015	46993	19909	11435	15649
2016	47616	19904	12225	15487
2017	48998	20703	12070	16225
2018	50498	23293	12333	14872

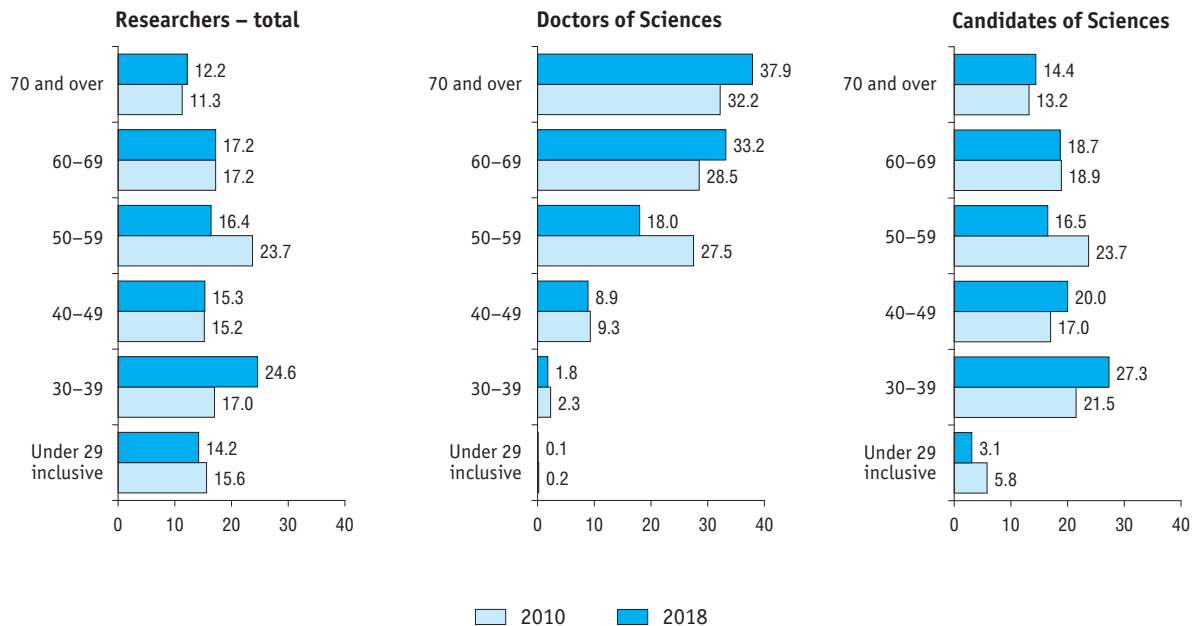


## 5.2.7. RESEARCHERS IN THE GOVERNMENT SECTOR BY GENDER AND AGE

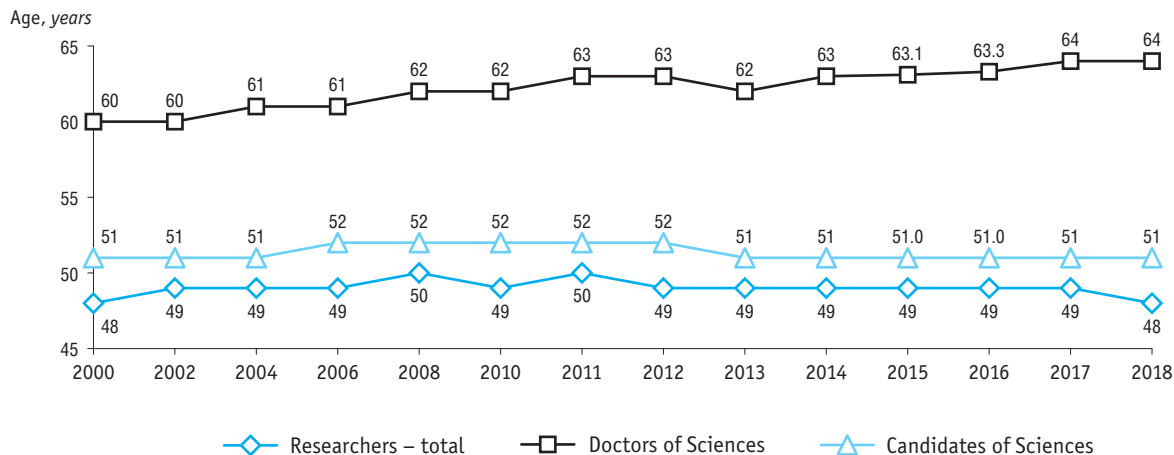
(headcount)

	2010			2018		
	Researchers	Of whom		Researchers	Of whom	
		Doctors of Sciences	Candidates of Sciences		Doctors of Sciences	Candidates of Sciences
<b>Total</b>	<b>131734</b>	<b>17646</b>	<b>43548</b>	<b>131366</b>	<b>15934</b>	<b>40453</b>
<i>Age, years:</i>						
under 29 inclusive	20490	32	2506	18702	19	1251
30–39	22351	411	9346	32283	285	11057
40–49	20085	1643	7406	20117	1418	8075
50–54	15093	2082	5029	9514	1056	2995
55–59	16077	2777	5303	12058	1815	3680
60–69	22698	5022	8215	22608	5295	7565
70 and over	14940	5679	5743	16084	6046	5830
<b>Males</b>	<b>72596</b>	<b>13178</b>	<b>23735</b>	<b>75207</b>	<b>11535</b>	<b>21982</b>
<i>Age, years:</i>						
under 29 inclusive	11879	28	1477	10822	16	714
30–39	11457	282	4649	18527	208	5814
40–49	9806	1099	3583	10561	873	3807
50–54	7763	1474	2699	4795	662	1439
55–59	8725	1988	3055	6292	1198	1980
60–69	13093	3935	4787	13272	3784	4523
70 and over	9873	4372	3485	10938	4794	3705
<b>Females</b>	<b>59138</b>	<b>4468</b>	<b>19813</b>	<b>56159</b>	<b>4399</b>	<b>18471</b>
<i>Age, years:</i>						
under 29 inclusive	8611	4	1029	7880	3	537
30–39	10894	129	4697	13756	77	5243
40–49	10279	544	3823	9556	545	4268
50–54	7330	608	2330	4719	394	1556
55–59	7352	789	2248	5766	617	1700
60–69	9605	1087	3428	9336	1511	3042
70 and over	5067	1307	2258	5146	1252	2125

## 5.2.8. PERCENTAGE DISTRIBUTION OF RESEARCHERS IN THE GOVERNMENT SECTOR BY AGE

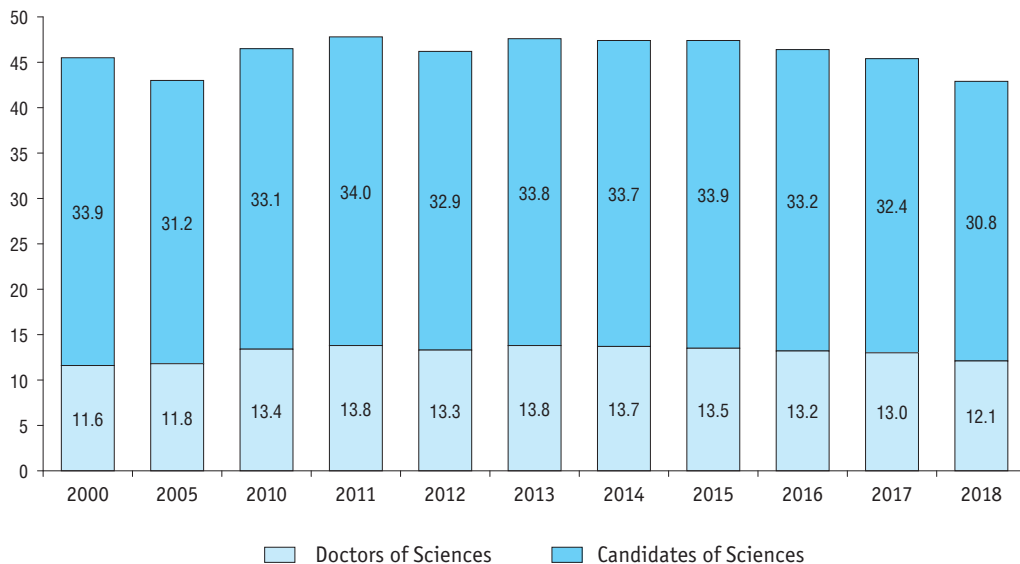


## 5.2.9. AVERAGE AGE OF RESEARCHERS IN THE GOVERNMENT SECTOR

5.2.10. RESEARCHERS WITH SCIENTIFIC DEGREES IN THE GOVERNMENT SECTOR  
(headcount)

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Researchers with scientific degrees</b>	<b>58901</b>	<b>60066</b>	<b>61194</b>	<b>63092</b>	<b>62837</b>	<b>62944</b>	<b>63906</b>	<b>62285</b>	<b>59138</b>	<b>56387</b>
Doctors of Sciences	14987	16511	17646	18181	18184	18198	18264	17781	16948	15934
Candidates of Sciences	43914	43555	43548	44911	44653	44746	45642	44504	42190	40453

### 5.2.11. RESEARCHERS WITH SCIENTIFIC DEGREES AS A PERCENTAGE OF THE TOTAL NUMBER OF RESEARCHERS IN THE GOVERNMENT SECTOR



## 5.2.12. RESEARCHERS IN THE GOVERNMENT SECTOR BY FIELD OF SCIENCE AND TECHNOLOGY

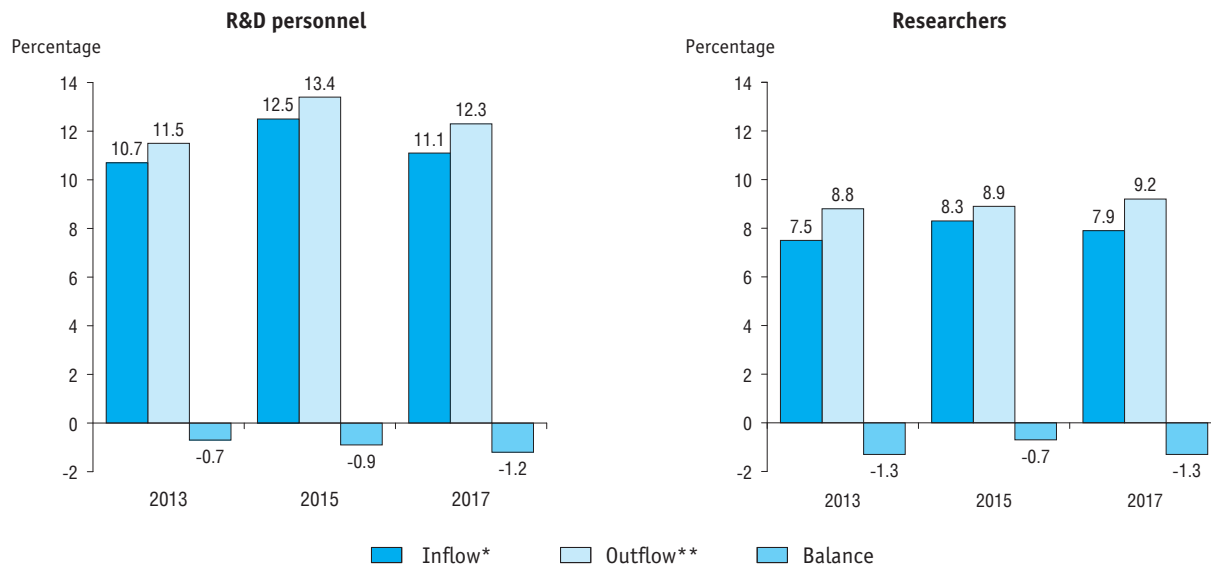
*(headcount)*

	2010			2016			2017			2018		
	Researchers	Of whom		Researchers	Of whom		Researchers	Of whom		Researchers	Of whom	
		Doctors of Sciences	Candidates of Sciences		Doctors of Sciences	Candidates of Sciences		Doctors of Sciences	Candidates of Sciences		Doctors of Sciences	Candidates of Sciences
<b>Total</b>	<b>131734</b>	<b>17646</b>	<b>43548</b>	<b>134225</b>	<b>17781</b>	<b>44504</b>	<b>130081</b>	<b>16948</b>	<b>42190</b>	<b>131366</b>	<b>15934</b>	<b>40453</b>
Natural sciences	53265	8683	22210	55827	8850	23180	53705	8530	22568	53002	8296	21914
Engineering and technology	42472	1692	5802	43059	1682	5864	43728	1620	5550	47560	1600	5520
Medical sciences	13131	3454	6086	12838	3241	5577	11989	3154	5179	11099	2788	4713
Agricultural sciences	10147	1265	3988	9798	1303	3936	9275	1204	3669	8108	984	3174
Social sciences	5937	1044	2571	6235	1203	2940	4955	1044	2299	5429	1069	2458
Humanities	6782	1508	2891	6468	1502	3007	6429	1396	2925	6168	1197	2674

### 5.2.13. R&D PERSONNEL TURNOVER IN THE GOVERNMENT SECTOR BY OCCUPATION (headcount)

	Number at the beginning of the reporting year	Inflow				Outflow				Number at the end of the reporting year
		Total	Of whom			Total	Of whom			
			higher education graduates	other research institutes' graduates	others		resigned	were made redundant	left due to other reasons	
<b>Total</b>										
2005	275249	32634	3990	5456	23188	35165	24924	851	9390	272718
2013	264121	28184	2650	3461	22073	30436	20179	642	9615	261869
2015	268080	33169	3182	4136	25851	35820	20622	1319	13879	265429
2017	271650	29850	2815	4564	22471	33420	21146	999	11275	268080
<b>Researchers</b>										
2005	139746	11715	3127	3121	5467	12087	8871	358	2858	139378
2013	133682	10035	1894	2211	5930	11819	8172	277	3370	132117
2015	136237	11127	2147	2347	6633	12169	7725	505	3939	134794
2017	132188	10287	1811	2622	5854	12118	7685	330	4103	130081
<b>Technicians</b>										
2005	25569	4128	336	630	3162	4227	2892	83	1252	25462
2013	28152	4034	349	292	3393	4371	2696	55	1620	27777
2015	28250	4634	463	439	3732	5846	2689	138	3019	27090
2017	26083	3852	447	424	2981	4079	2560	78	1441	26040
<b>Supporting staff and others</b>										
2005	109934	16791	527	1705	14555	18851	13161	410	5280	107878
2013	102287	14115	407	958	12750	14246	9311	310	4625	101975
2015	103593	17408	572	1350	15486	17805	10208	676	6921	103545
2017	113379	15711	557	1518	13636	17223	10901	591	5731	111959

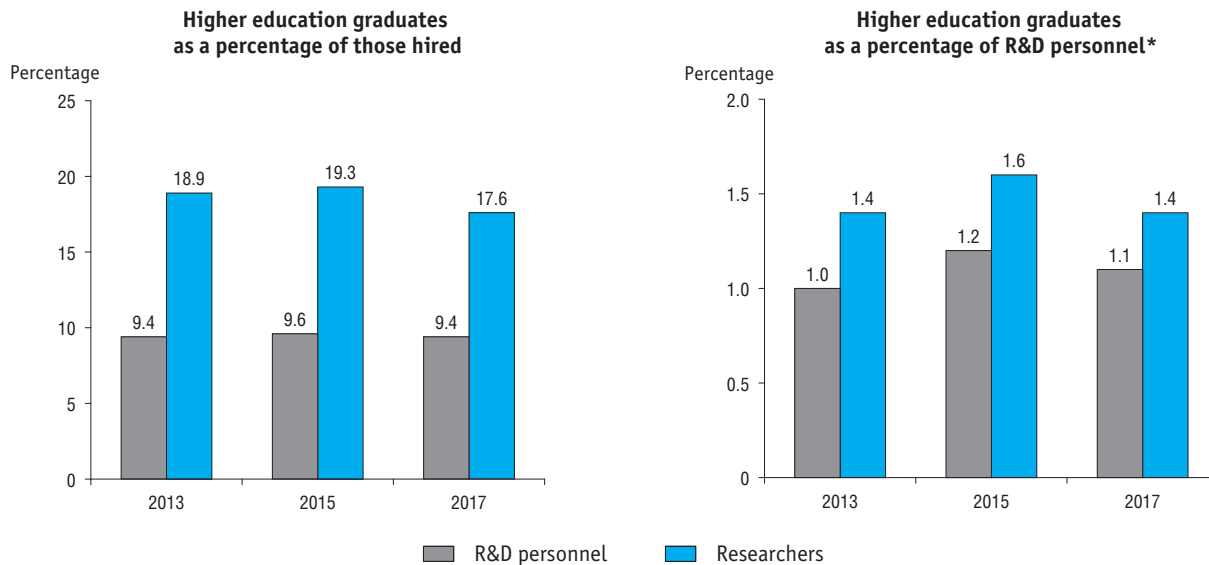
## 5.2.14. INFLOW AND OUTFLOW OF R&amp;D PERSONNEL IN THE GOVERNMENT SECTOR



\* The ratio of those hired during the year to the total employment at the end of the year.

\*\* The ratio of those who left during the year to the total employment at the beginning of the year.

### 5.2.15. INFLOW OF HIGHER EDUCATION GRADUATES INTO GOVERNMENT SECTOR INSTITUTIONS



\* The ratio of the higher education graduates hired during the year to the number of employees at the end of the year.

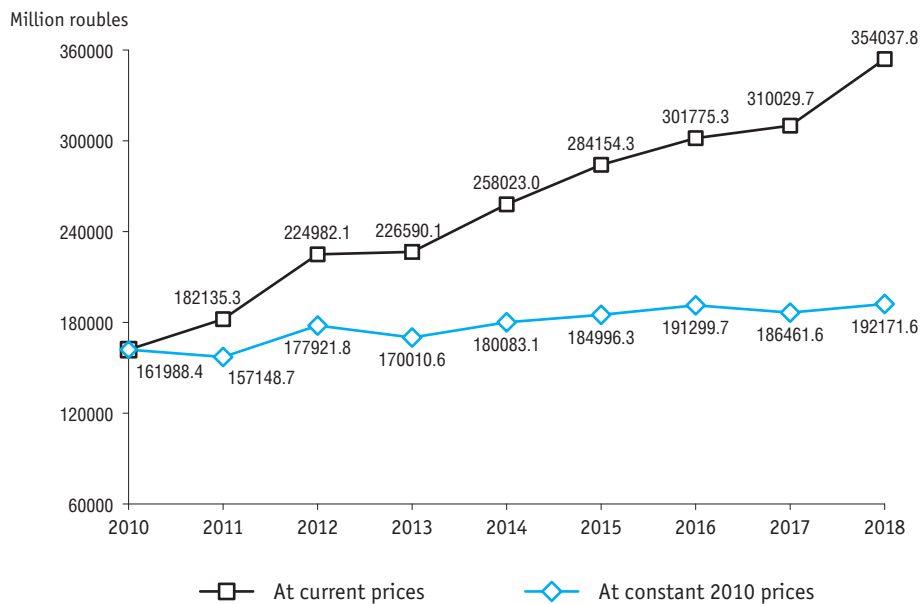


### 5.2.16. GROSS DOMESTIC EXPENDITURE ON R&D IN THE GOVERNMENT SECTOR BY TYPE OF R&D INSTITUTIONS

(thousand roubles)

	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Total</b>	<b>60158166.6</b>	<b>161988411.4</b>	<b>224982089.2</b>	<b>226590120.7</b>	<b>258023009.1</b>	<b>284154288.3</b>	<b>301775305.3</b>	<b>310029734.6</b>	<b>354037790.2</b>
Research institutes	55762222.6	136870186.3	190774482.9	191023430.1	222183967.5	241159555.3	254408906.6	260728834.1	286050599.4
Design organisations, design-and-engineering organisations	4007361.7	20163653.6	24722611.1	25707283.0	27081699.7	31243788.5	35387725.2	34575060.4	41726660.0
Construction project and exploration organisations	21993.6	524208.6	561026.1	433811.9	449560.6	384269.6	27093.9	29684.9	31895.0
Pilot plants	20300.0	139733.5	970655.0	1076831.6	925741.2	998142.5	1093828.8	2877813.2	3559682.4
Others	346288.7	4290629.4	7953314.1	8348764.1	7382040.1	10368532.4	10857750.8	11818342.0	22668953.4

### 5.2.17. GROSS DOMESTIC EXPENDITURE ON R&D IN THE GOVERNMENT SECTOR



## 5.2.18. GROSS DOMESTIC EXPENDITURE ON R&amp;D IN THE GOVERNMENT SECTOR BY SOURCE OF FUNDS

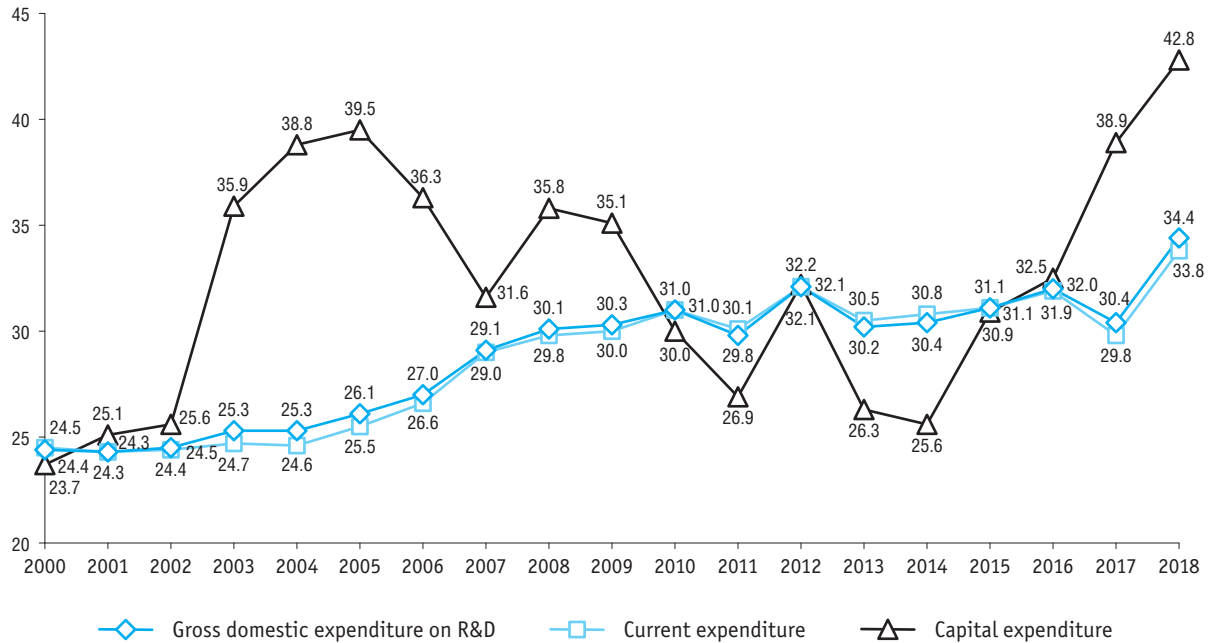
	Total	Government funds*	Business enterprise sector funds	Higher education sector funds	Private non-profit sector funds	Funds from abroad
<b>At current prices, thousand roubles</b>						
2000	18748588.2	15060439.1	2028296.2	11323.4	3898.5	1644631.0
2005	60158166.6	50589802.5	6845507.2	46912.8	21976.9	2653967.2
2006	77950634.9	65449102.1	9136754.4	111817.6	52071.9	3200888.9
2007	107984917.2	85896140.4	14355790.2	80481.6	12412.3	7640092.7
2008	129871228.3	108231726.8	16119227.3	183124.2	120667.0	5216483.0
2009	147023165.7	124027349.4	16292839.6	90578.1	38990.4	6573408.2
2010	161988411.4	134275595.6	20873979.0	205154.5	73117.4	6560564.9
2011	182135309.9	153529403.4	21528707.1	244802.6	61568.4	6770828.4
2012	224982089.2	186513895.7	29459319.3	197336.7	75635.7	8735901.8
2013	226590120.7	186895055.8	31300159.7	211201.3	105228.8	8078475.1
2014	258023009.1	219020381.4	29660844.5	357181.2	100284.6	8884317.4
2015	284154288.3	240265758.8	32877099.7	321525.4	163335.5	10526568.9
2016	301775305.3	263326940.4	27544205.3	363329.0	253809.8	10287020.8
2017	310029734.6	268775672.5	29924193.6	210118.7	608620.0	10511129.8
2018	354037790.2	306902140.4	34001536.7	263610.1	450830.9	12419672.1

(continued)

	Total	Government funds*	Business enterprise sector funds	Higher education sector funds	Private non-profit sector funds	Funds from abroad
	<b>Percentage</b>					
2000	100	80.3	10.8	0.06	0.02	8.8
2005	100	84.1	11.4	0.08	0.04	4.4
2006	100	84.0	11.7	0.10	0.07	4.1
2007	100	79.5	13.3	0.07	0.01	7.1
2008	100	83.3	12.4	0.10	0.09	4.0
2009	100	84.4	11.1	0.06	0.03	4.5
2010	100	82.9	12.9	0.10	0.05	4.1
2011	100	84.3	11.8	0.10	0.03	3.7
2012	100	82.9	13.1	0.09	0.03	3.9
2013	100	82.5	13.8	0.09	0.05	3.6
2014	100	84.9	11.5	0.10	0.04	3.4
2015	100	84.6	11.6	0.10	0.06	3.7
2016	100	87.3	9.1	0.10	0.10	3.4
2017	100	86.7	9.7	0.10	0.20	3.4
2018	100	86.7	9.6	0.07	0.13	3.5

\* Including budget appropriations, own funds, and government sector institutions' funds.

## 5.2.19. GOVERNMENT SECTOR AS A PERCENTAGE OF GROSS DOMESTIC EXPENDITURE ON R&amp;D BY TYPE OF EXPENDITURE



## 5.2.20. GROSS DOMESTIC EXPENDITURE ON R&D IN THE GOVERNMENT SECTOR BY TYPE

(thousand roubles)

	2005	2010	2013	2014	2015	2016	2017	2018
<b>Gross domestic expenditure on R&amp;D</b>	<b>60158166.6</b>	<b>161988411.4</b>	<b>226590120.7</b>	<b>258023009.1</b>	<b>284154288.3</b>	<b>301775305.3</b>	<b>310029734.6</b>	<b>354037790.2</b>
Current expenditure	56342327.7	151825126.6	213468794.6	244655172.5	265478556.9	279027077.7	283231733.5	325114767.7
Salaries	25406848.5	80849201.5	112439789.3	126267663.6	134412102.1	139090202.7	144850814.7	175612670.0
Of which for R&D personnel*	23066423.6	73752076.2	102744281.9	114929478.2	121375793.9	125987971.1	131753641.2	155235548.2
Social security payments**	6257309.9	16436614.4	2923058.9	32567448.4	36154760.9	37718124.5	39027533.6	47184795.5
Equipment	3086873.3	5458681.5	6600021.2	7776357.0	7442689.6	5766984.9	6071286.9	5151450.8
Other material costs	9781232.9	22464861.8	32362326.9	39503365.7	42451174.6	53280149.8	44970239.0	49198458.4
Other current expenditure	11810063.1	26615767.4	32836118.3	38540337.8	45017829.7	43171615.8	48311859.3	47967393.0
Capital expenditure	3815838.9	10163284.8	13121326.1	13367836.6	18675731.4	22748227.6	26798001.1	28923022.5
Land and buildings	399698.5	3113137.6	2467555.2	3248423.4	3903611.8	5480973.9	8823840.7	7111357.9
Including:								
land	...	...	...	...	...	...	2917843.6	10637.9
buildings	...	...	...	...	...	...	5905997.1	7100720.0
Equipment	2485274.0	4647644.5	7352490.4	7037782.8	10358881.1	14661765.0	14481293.8	17172755.7
Intellectual property items and results of intellectual activity	...	...	...	...	...	...	782015.5	818388.8
Other capital expenditure	930866.4	2402502.7	3301280.5	3081630.4	4413238.5	2605488.7	2710851.1	3820520.1

\* Excluding external multiple jobholders and independent contractors.

\*\* National pension insurance, national health insurance, national social insurance.

**5.2.21. CURRENT EXPENDITURE ON R&D IN THE GOVERNMENT SECTOR BY TYPE OF R&D ACTIVITY  
AND FIELD OF SCIENCE AND TECHNOLOGY**  
(thousand roubles)

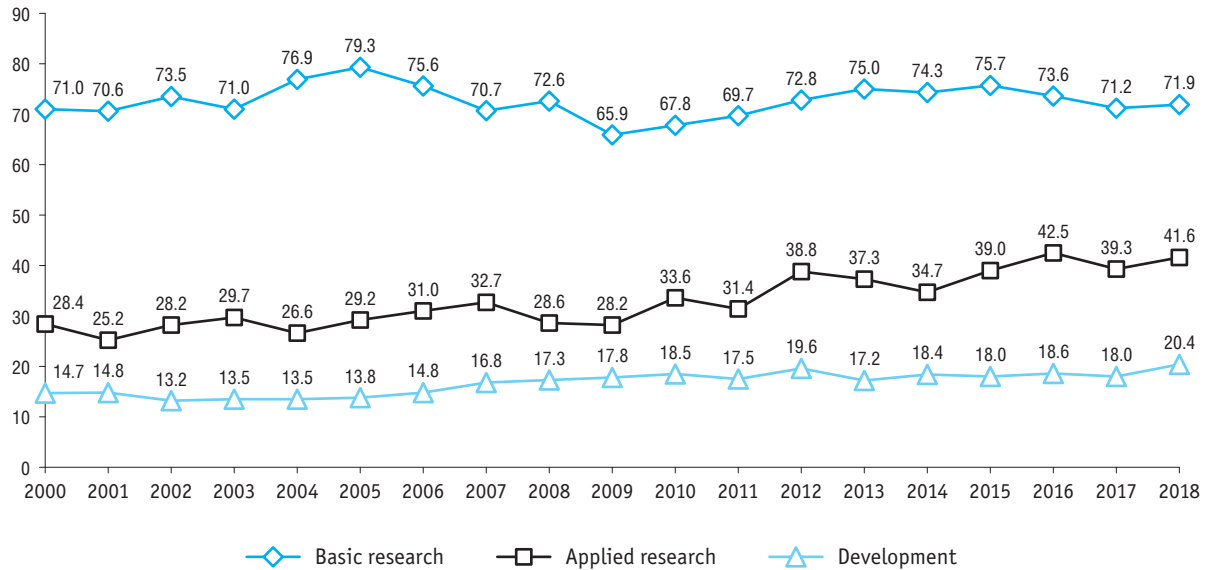
	Total	Natural sciences	Engineering and technology	Medical sciences	Agricultural sciences	Social sciences	Humanities
<b>2005</b>							
<b>Current expenditure on R&amp;D</b>	<b>56342327.7</b>	<b>20577533.0</b>	<b>25509704.3</b>	<b>3738833.2</b>	<b>2939051.4</b>	<b>1951167.1</b>	<b>1626038.7</b>
Basic research	24586195.8	15976354.8	2622298.0	1662238.3	1678543.7	1333808.2	1312952.8
Applied research	10603039.3	2644812.7	4734050.4	1703960.2	840824.2	475142.3	204249.5
Development	21153092.6	1956365.5	18153355.9	372634.7	419683.5	142216.6	108836.4
<b>2010</b>							
<b>Current expenditure on R&amp;D</b>	<b>151825126.6</b>	<b>56889173.8</b>	<b>65431955.8</b>	<b>12635358.1</b>	<b>6868458.0</b>	<b>4815854.6</b>	<b>5184326.3</b>
Basic research	65041375.9	38927125.1	8471457.1	5340161.8	4177771.0	3645798.9	4479062.0
Applied research	30948555.6	13265692.5	7766540.0	6615628.6	1773878.6	936306.6	590509.3
Development	55835195.1	4696356.2	49193958.7	679567.7	916808.4	233749.1	114755.0
<b>2015</b>							
<b>Current expenditure on R&amp;D</b>	<b>265478556.9</b>	<b>98742002.1</b>	<b>117329719.0</b>	<b>22341866.9</b>	<b>11448932.5</b>	<b>7440718.3</b>	<b>8175318.1</b>
Basic research	99987000.6	58183429.9	14273618.3	7951401.7	7804653.1	4972403.3	6801494.3
Applied research	66248286.3	24349761.4	23686724.2	13081555.6	2396404.2	1982310.8	751530.1
Development	99243270.0	16208810.8	79369376.5	1308909.6	1247875.2	486004.2	622293.7
<b>2016</b>							
<b>Current expenditure on R&amp;D</b>	<b>279027077.7</b>	<b>99526385.9</b>	<b>128071586.1</b>	<b>24495595.9</b>	<b>11531279.5</b>	<b>6971909.0</b>	<b>8430321.3</b>
Basic research	97607131.4	56737246.3	13250617.6	7883362.0	7886667.3	4689278.9	7159959.3
Applied research	77012901.0	25009861.2	30659177.7	16019142.9	2534441.0	1851405.6	938872.6
Development	104407045.3	17779278.4	84161790.8	593091.0	1110171.2	431224.5	331489.4

(continued)

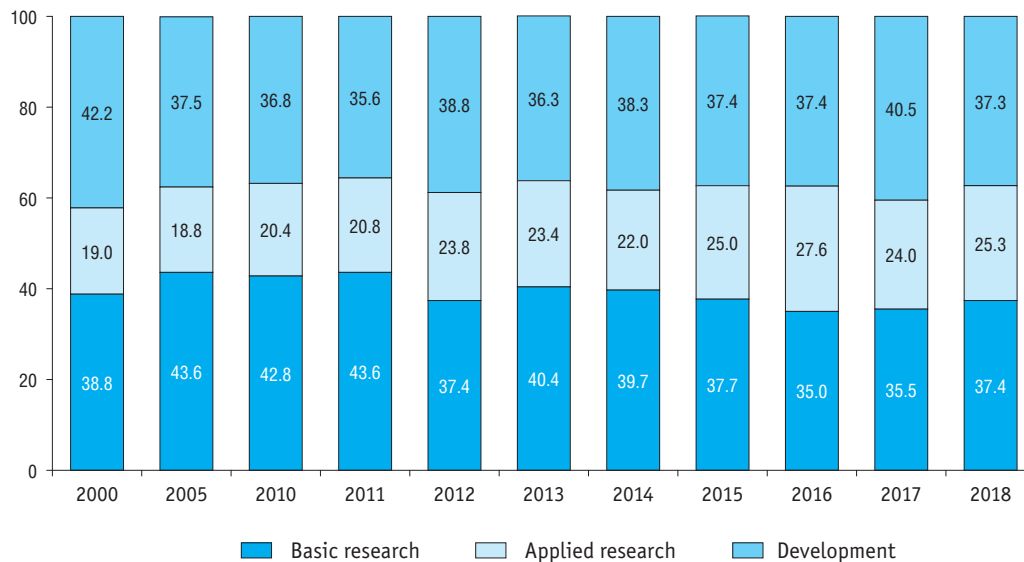
	Total	Natural sciences	Engineering and technology	Medical sciences	Agricultural sciences	Social sciences	Humanities
<b>2017</b>							
<b>Current expenditure on R&amp;D</b>	<b>283231733.5</b>	<b>99562126.5</b>	<b>130984910.0</b>	<b>25686220.2</b>	<b>11974692.2</b>	<b>6900206.2</b>	<b>8123578.4</b>
Basic research	100604310.0	59674407.1	11974890.7	9025639.6	8028433.8	4845029.9	7055908.9
Applied research	67859495.4	22044710.8	25189219.3	15215605.3	2865121.2	1711473.7	833365.1
Development	114767928.1	17843008.6	93820800.0	1444975.3	1081137.2	343702.6	234304.4
<b>2018</b>							
<b>Current expenditure on R&amp;D</b>	<b>325114767.7</b>	<b>114732306.6</b>	<b>147072618.3</b>	<b>29827734.8</b>	<b>13470698.3</b>	<b>10316052.8</b>	<b>9695356.9</b>
Basic research	121640034.7	75089158.3	13151656.4	10726414.0	8855848.4	5497294.9	8319662.7
Applied research	82114839.9	25855563.3	30593986.8	17428968.1	3467772.2	3545807.9	1222741.6
Development	121359893.1	13787585.0	103326975.1	1672352.7	1147077.7	1272950.0	152952.6



## 5.2.22. GOVERNMENT SECTOR AS A PERCENTAGE OF CURRENT EXPENDITURE ON R&amp;D BY TYPE OF R&amp;D ACTIVITY



### 5.2.23. PERCENTAGE DISTRIBUTION OF CURRENT EXPENDITURE ON R&D IN THE GOVERNMENT SECTOR BY TYPE OF R&D ACTIVITY



## 5.2.24. AVERAGE MONTHLY SALARY OF R&amp;D PERSONNEL IN THE GOVERNMENT SECTOR

	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Average monthly salary, roubles</b>	2015.6	7220.9	24792.1	27869.4	31990.2	34532.8	38715.6	40513.5	42125.9	44614.8	54193.9
As a percentage of the salary:											
in the national economy (=100%)	90.7	84.4	118.3	119.3	120.1	115.9	119.1	119.1	114.8	113.9	123.9
in manufacturing (=100%)	85.2	85.7	130.0	128.0	130.5	127.7	131.2	127.0	121.8	115.9	133.1
in construction (=100%)	76.4	79.9	117.1	117.7	123.3	124.7	131.9	135.2	130.3	132.5	140.7

## 5.3. Business enterprise sector

### 5.3.1. R&D INSTITUTIONS IN THE BUSINESS ENTERPRISE SECTOR BY TYPE

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Total</b>	<b>2278</b>	<b>1703</b>	<b>1405</b>	<b>1362</b>	<b>1269</b>	<b>1265</b>	<b>1400</b>	<b>1326</b>	<b>1292</b>	<b>1304</b>
Research institutes	1062	855	634	567	514	504	482	454	419	410
Design organisations, design-and-engineering organisations	564	410	290	262	265	254	260	244	229	209
Construction project and exploration organisations	94	55	31	27	26	26	21	21	18	17
Industrial enterprises	276	231	238	274	266	275	371	363	380	419
Pilot plants	32	16	16	19	9	10	11	14	18	14
Others	250	136	196	213	189	196	255	230	228	235

## 5.3.2. R&amp;D PERSONNEL IN THE BUSINESS ENTERPRISE SECTOR BY TYPE OF R&amp;D INSTITUTIONS

*(headcount)*

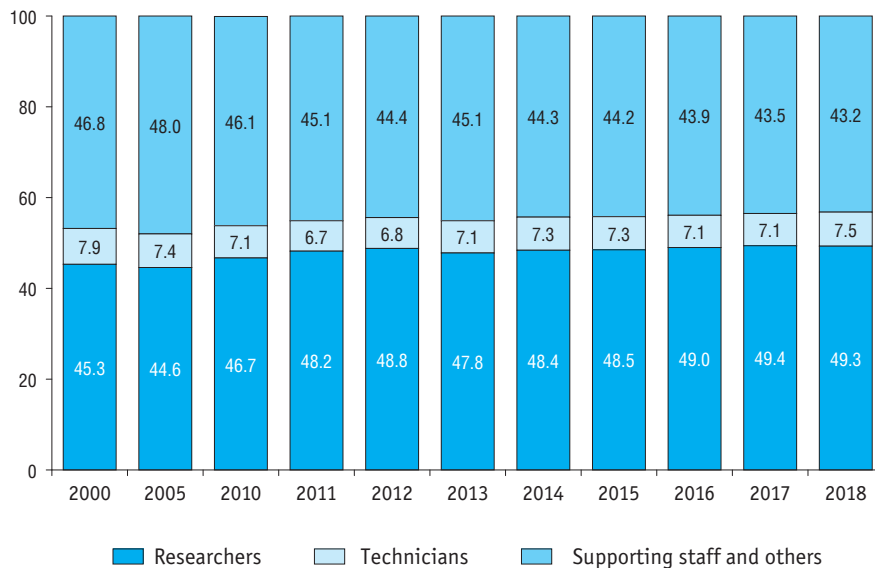
	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Total</b>	<b>590646</b>	<b>496706</b>	<b>423112</b>	<b>394182</b>	<b>405268</b>	<b>405529</b>	<b>408802</b>	<b>388385</b>	<b>377150</b>	<b>347080</b>
Research institutes	349242	255233	207166	194274	205511	204860	202431	192150	176736	172614
Design organisations, design-and-engineering organisations	151705	161295	129281	110381	112617	114752	115683	109359	100443	84579
Construction project and exploration organisations	8177	5284	4905	5402	3751	3602	1629	1749	1487	1253
Industrial enterprises	52598	43524	51807	52071	52232	49358	53868	50740	59421	52977
Pilot plants	3945	865	925	946	705	1374	1499	1630	4658	3707
Others	24979	30505	29028	31108	30536	31583	33692	32757	34405	31950

## 5.3.3. R&amp;D PERSONNEL IN THE BUSINESS ENTERPRISE SECTOR BY OCCUPATION

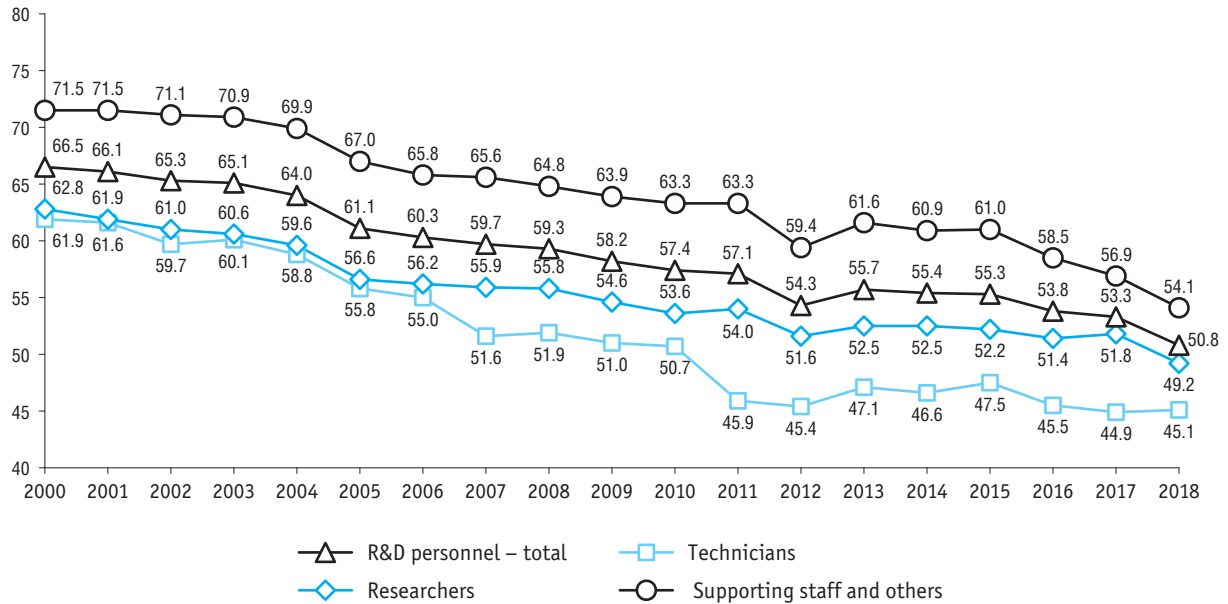
*(headcount)*

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Total</b>	<b>590646</b>	<b>496706</b>	<b>423112</b>	<b>394182</b>	<b>405268</b>	<b>405529</b>	<b>408802</b>	<b>388385</b>	<b>377150</b>	<b>347080</b>
Researchers	267640	221445	197785	192285	193736	196320	198123	190378	186347	171205
Technicians	46535	38837	30063	26720	28920	29452	29850	27519	26788	26012
Supporting staff	175261	147980	120485	106306	109691	107215	108230	101219	98139	88124
Others	101210	90444	74779	68871	72921	72542	72599	69269	65876	61739

### 5.3.4. PERCENTAGE DISTRIBUTION OF R&D PERSONNEL IN THE BUSINESS ENTERPRISE SECTOR BY OCCUPATION



### 5.3.5. R&D PERSONNEL IN THE BUSINESS ENTERPRISE SECTOR AS A PERCENTAGE OF THE TOTAL NUMBER OF R&D PERSONNEL BY OCCUPATION



### 5.3.6. R&D PERSONNEL IN THE BUSINESS ENTERPRISE SECTOR BY EDUCATIONAL ATTAINMENT (headcount)

	Total	Higher education	Secondary vocational education	Other education
<b>R&amp;D personnel</b>				
2005	496706	288649	89265	118792
2010	423112	268821	69552	84739
2014	405529	276675	59564	69290
2015	408802	283664	60370	64768
2016	388385	274477	56221	57687
2017	377150	270951	54342	51857
2018	347080	253804	48957	44319
<b>Researchers</b>				
2005	221445	221445	–	–
2010	197785	197785	–	–
2014	196320	196320	–	–
2015	198123	198123	–	–
2016	190378	190378	–	–
2017	186347	186347	–	–
2018	171205	171205	–	–
<b>Technicians</b>				
2005	36837	6274	21435	9130
2010	30063	7842	15051	7170
2014	29452	10215	12503	6734
2015	29850	11656	11794	6400
2016	27519	11023	11025	5471
2017	26788	10923	10333	5532
2018	26012	10757	9705	5550



(continued)

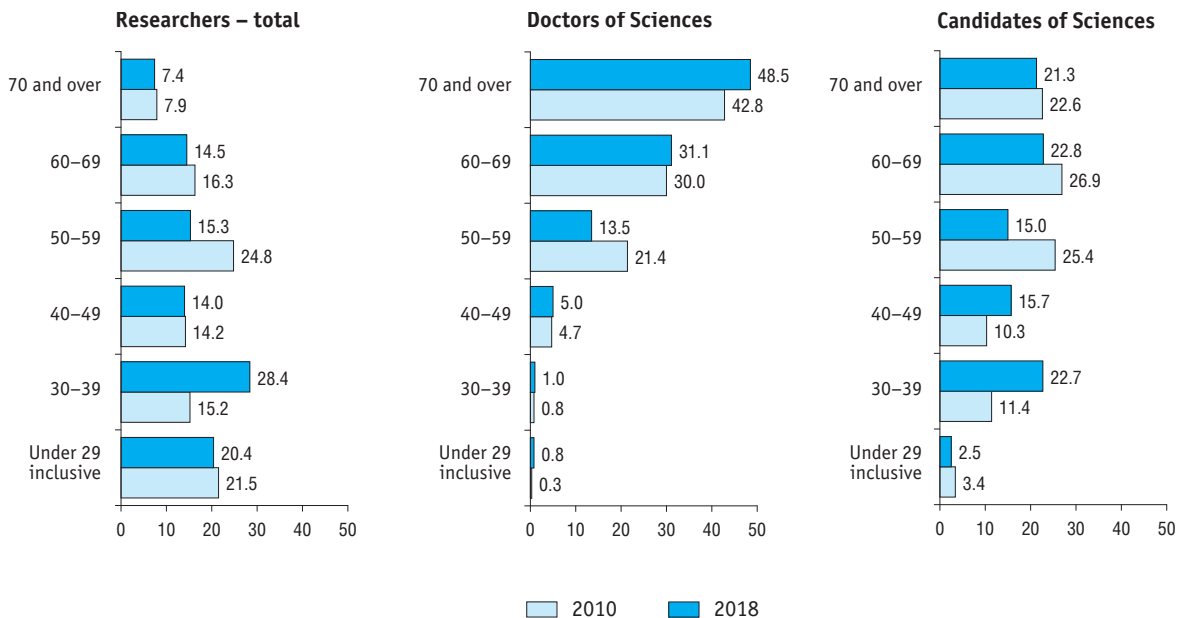
	Total	Higher education	Secondary vocational education	Other education
Supporting staff				
2005	147980	37101	42099	68780
2010	120485	38988	33362	48135
2014	107215	40615	28175	38425
2015	108230	42934	30297	34999
2016	101219	41629	27909	31681
2017	98139	42561	27490	28088
2018	88124	41035	24454	22635
Others				
2005	90444	23829	25733	40882
2010	74779	24206	21139	29434
2014	72542	29525	18886	24131
2015	72599	30951	18279	23369
2016	69269	31447	17287	20535
2017	65876	31120	16519	18237
2018	61739	30807	14798	16134

### 5.3.7. RESEARCHERS IN THE BUSINESS ENTERPRISE SECTOR BY GENDER AND AGE

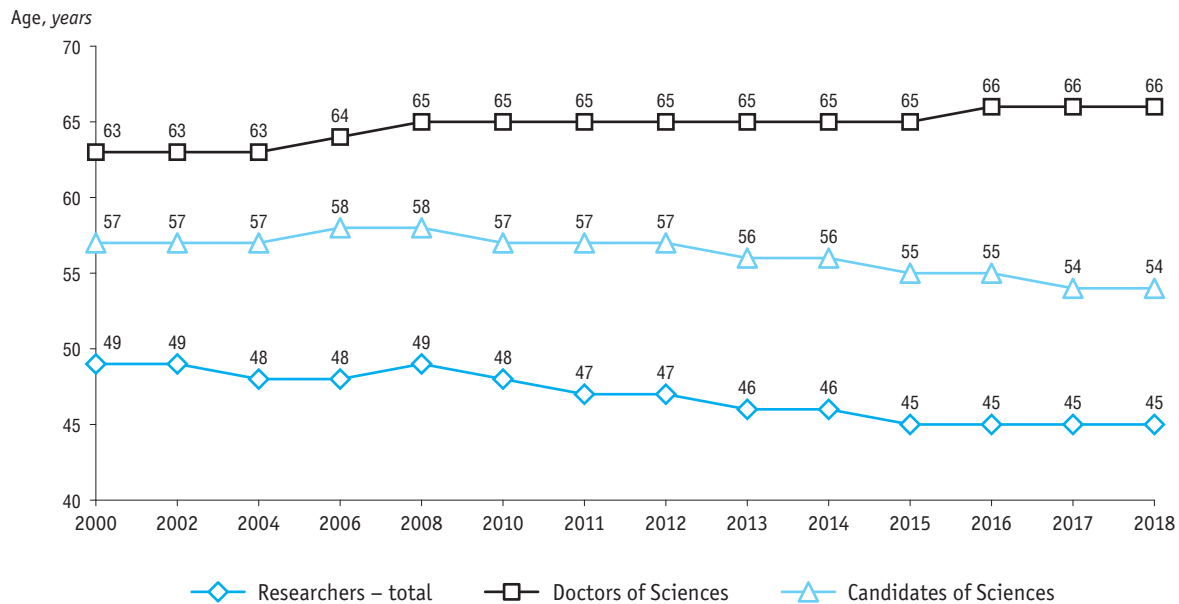
(headcount)

	2010			2018		
	Researchers	Of whom		Researchers	Of whom	
		Doctors of Sciences	Candidates of Sciences		Doctors of Sciences	Candidates of Sciences
<b>Total</b>	<b>197785</b>	<b>3987</b>	<b>19182</b>	<b>171205</b>	<b>2591</b>	<b>13984</b>
Age, years:						
under 29 inclusive	42600	11	651	34872	20	354
30–39	30058	33	2189	48655	27	3179
40–49	28071	187	1979	24023	129	2189
50–54	23804	337	2012	11269	99	842
55–59	25300	517	2860	14846	252	1259
60–69	32279	1196	5158	24884	807	3186
70 and over	15673	1706	4333	12656	1257	2975
Males	120440	3633	15297	111884	2397	11379
Age, years:						
under 29 inclusive	27174	11	490	23645	20	264
30–39	18867	27	1568	32330	21	2387
40–49	14411	166	1432	15554	111	1652
50–54	12781	293	1592	6229	90	665
55–59	14229	448	2278	8676	228	1062
60–69	20542	1105	4299	15820	737	2732
70 and over	12436	1583	3638	9630	1190	2617
Females	77345	354	3885	59321	194	2605
Age, years:						
under 29 inclusive	15426	–	161	11227	–	90
30–39	11191	6	621	16325	6	792
40–49	13660	21	547	8469	18	537
50–54	11023	44	420	5040	9	177
55–59	11071	69	582	6170	24	197
60–69	11737	91	859	9064	70	454
70 and over	3237	123	695	3026	67	358

## 5.3.8. PERCENTAGE DISTRIBUTION OF RESEARCHERS IN THE BUSINESS ENTERPRISE SECTOR BY AGE



### 5.3.9. AVERAGE AGE OF RESEARCHERS IN THE BUSINESS ENTERPRISE SECTOR

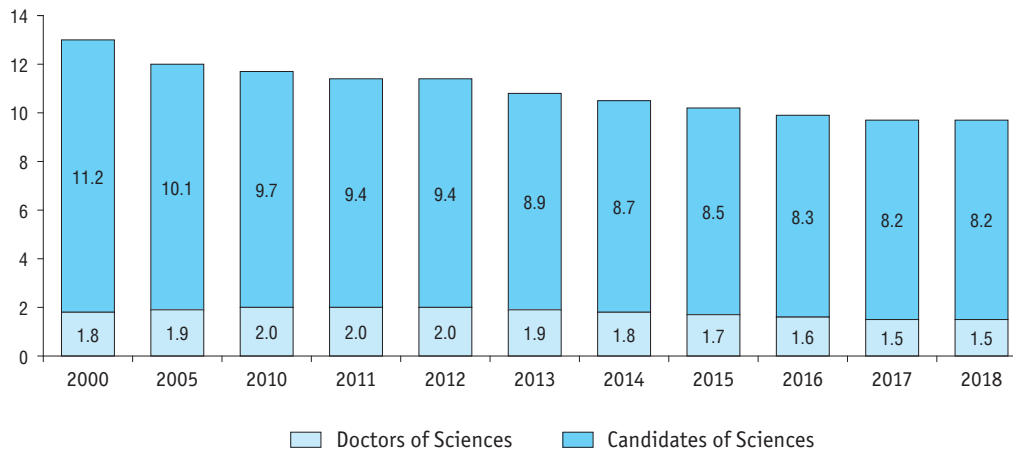


## 5.3.10. RESEARCHERS WITH SCIENTIFIC DEGREES IN THE BUSINESS ENTERPRISE SECTOR

*(headcount)*

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Researchers with scientific degrees</b>	<b>34775</b>	<b>26661</b>	<b>23169</b>	<b>21758</b>	<b>20955</b>	<b>20595</b>	<b>20270</b>	<b>18833</b>	<b>18107</b>	<b>16575</b>
Doctors of Sciences	4806	4222	3987	3767	3622	3511	3413	3071	2873	2591
Candidates of Sciences	29969	22439	19182	17991	17333	17084	16857	15762	15234	13984

## 5.3.11. RESEARCHERS WITH SCIENTIFIC DEGREES AS A PERCENTAGE OF THE TOTAL NUMBER OF RESEARCHERS IN THE BUSINESS ENTERPRISE SECTOR



### 5.3.12. RESEARCHERS IN THE BUSINESS ENTERPRISE SECTOR BY FIELD OF SCIENCE AND TECHNOLOGY (headcount)

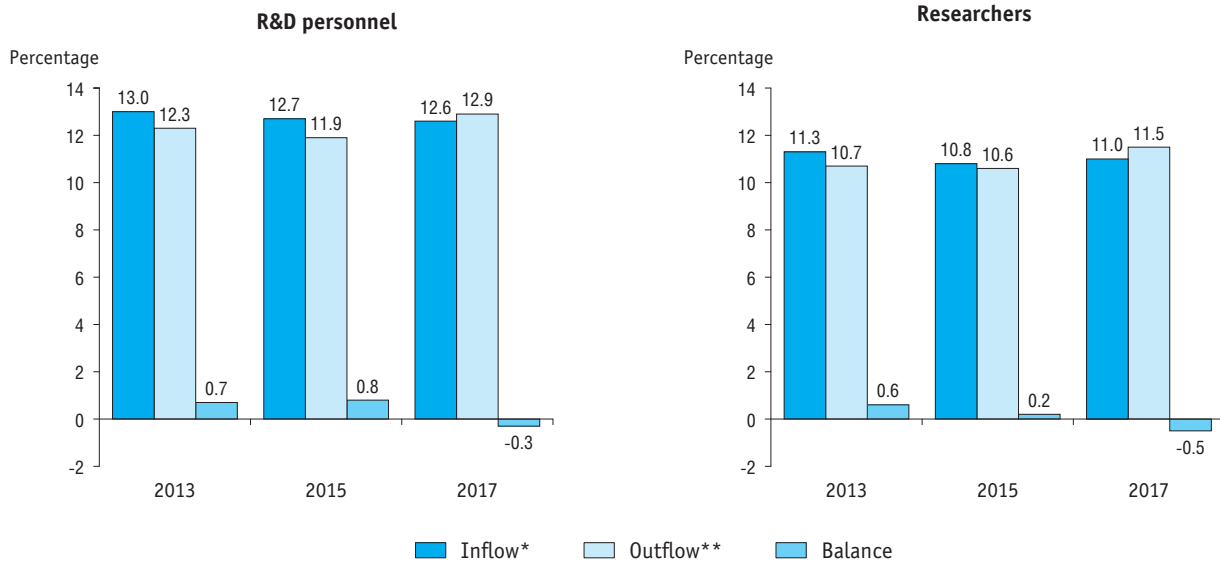
	2010			2016			2017			2018		
	Researchers	Of whom		Researchers	Of whom		Researchers	Of whom		Researchers	Of whom	
		Doctors of Sciences	Candidates of Sciences		Doctors of Sciences	Candidates of Sciences		Doctors of Sciences	Candidates of Sciences		Doctors of Sciences	Candidates of Sciences
<b>Total</b>	<b>197785</b>	<b>3987</b>	<b>19182</b>	<b>190378</b>	<b>3071</b>	<b>15762</b>	<b>186347</b>	<b>2873</b>	<b>15234</b>	<b>171205</b>	<b>2591</b>	<b>13984</b>
Natural sciences	22188	1244	4915	16913	853	3319	14006	716	2884	13473	649	2667
Engineering and technology	169887	2342	12793	169393	1991	11667	168561	1969	11627	154520	1780	10783
Medical sciences	1100	115	335	1222	68	188	1174	55	166	929	59	154
Agricultural sciences	1692	155	596	460	15	106	282	17	84	247	22	96
Social sciences	2639	112	484	2231	128	444	2193	102	440	1853	60	242
Humanities	279	19	59	159	16	38	131	14	33	183	21	42

## 5.3.13. R&amp;D PERSONNEL TURNOVER IN THE BUSINESS ENTERPRISE SECTOR BY OCCUPATION

(headcount)

	Number at the beginning of the reporting year	Inflow				Outflow				Number at the end of the reporting year
		Total	Of whom			Total	Of whom			
			higher education graduates	other research institutes' graduates	Others		resigned	were made redundant	left due to other reasons	
<b>Total</b>										
2005	508840	68528	8027	8756	51745	80662	52534	5722	22406	496706
2013	401809	52700	6758	7632	38310	49241	32584	1159	15498	405268
2015	405181	52033	6175	7075	38783	48412	30324	2568	15520	408802
2017	378521	47497	5116	5962	36419	48868	29951	2958	15959	377150
<b>Researchers</b>										
2005	227397	22807	6529	5028	11250	28822	19496	2053	7273	221445
2013	192306	21908	4703	4471	12734	20499	13769	380	6350	193736
2015	197658	21426	4225	3730	13471	20954	13382	831	6741	198123
2017	187881	20491	3610	3716	13165	21620	13324	1117	7179	186347
<b>Technicians</b>										
2005	38078	5739	301	729	4709	6965	4347	388	2230	36837
2013	28318	5409	506	665	4238	4779	2829	75	1875	28920
2015	30047	4897	546	574	3777	4977	2973	304	1700	29850
2017	26933	4654	505	417	3732	4911	2850	200	1861	26788
<b>Supporting staff and others</b>										
2005	243365	39982	1197	2999	35786	44875	28691	3281	12903	238424
2013	181185	25383	1549	2496	21338	23963	15986	704	7273	182612
2015	177476	25710	1404	2771	21535	22481	13969	1433	7079	180829
2017	163707	22352	1001	1829	19522	22337	13777	1641	6919	164015

### 5.3.14. INFLOW AND OUTFLOW OF RESEARCHERS IN THE BUSINESS ENTERPRISE SECTOR

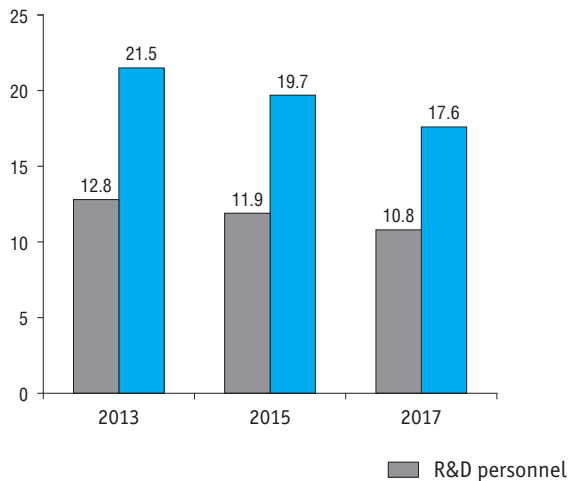
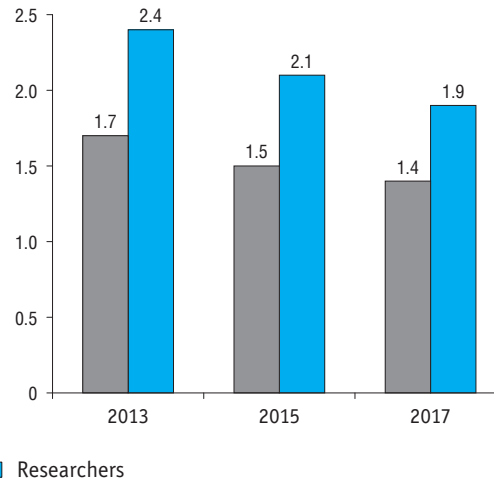


\* The ratio of those hired during the year to the total employment at the end of the year.

\*\* The ratio of those who left during the year to the total employment at the beginning of the year.



## 5.3.15. INFLOW OF HIGHER EDUCATION GRADUATES INTO BUSINESS ENTERPRISE SECTOR INSTITUTIONS

Higher education graduates  
as a percentage of those hiredHigher education graduates  
as a percentage of R&D personnel\*

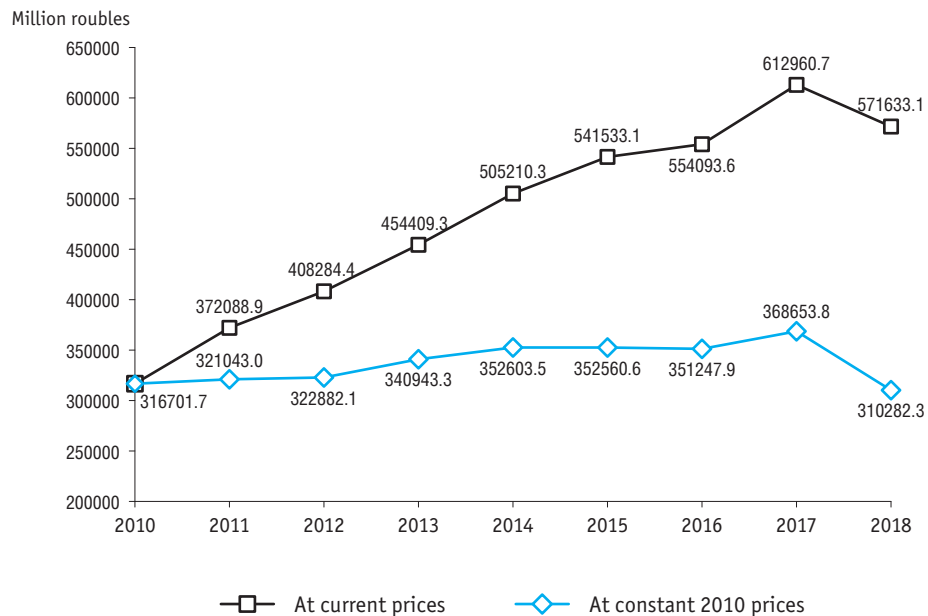
\* The ratio of the higher education graduates hired during the year to the number of employees at the end of the year.

### 5.3.16. GROSS DOMESTIC EXPENDITURE ON R&D IN THE BUSINESS ENTERPRISE SECTOR BY TYPE OF R&D INSTITUTIONS

(thousand roubles)

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Total</b>	<b>54288781.4</b>	<b>156880029.0</b>	<b>316701679.9</b>	<b>408284378.5</b>	<b>454409251.0</b>	<b>505210341.3</b>	<b>541533094.3</b>	<b>554093599.1</b>	<b>612960678.4</b>	<b>571633146.1</b>
Research institutes	31145022.1	79303185.8	149370680.2	200622676.3	223137546.4	246251822.0	264045184.4	271903397.6	294509447.1	287124067.4
Design organisations, design-and- engineering organisations	13115444.7	51857668.0	99778643.7	104269890.1	118708123.0	140108876.6	142841408.8	139631208.0	141773583.4	133684496.7
Construction project and exploration organisations	539721.1	1604470.7	3690958.0	5827594.8	3579155.2	3567752.9	2380598.7	2530918.6	2275602.3	2026386.8
Industrial enterprises	4726082.4	12633435.9	32838780.9	49952762.8	59346858.0	60962171.4	74693899.2	75747420.1	90217091.0	79760617.2
Pilot plants	294581.2	150835.5	398159.1	746678.7	808351.2	1749042.3	2223362.2	2105223.8	8459395.5	8414323.7
Others	4467929.9	11330433.1	30624458.0	46864775.8	48829217.2	52570676.1	55348641.0	62175431.0	75725559.1	60623254.3

## 5.3.17. GROSS DOMESTIC EXPENDITURE ON R&amp;D IN THE BUSINESS ENTERPRISE SECTOR



### 5.3.18. GROSS DOMESTIC EXPENDITURE ON R&D IN THE BUSINESS ENTERPRISE SECTOR BY SOURCE OF FUNDS

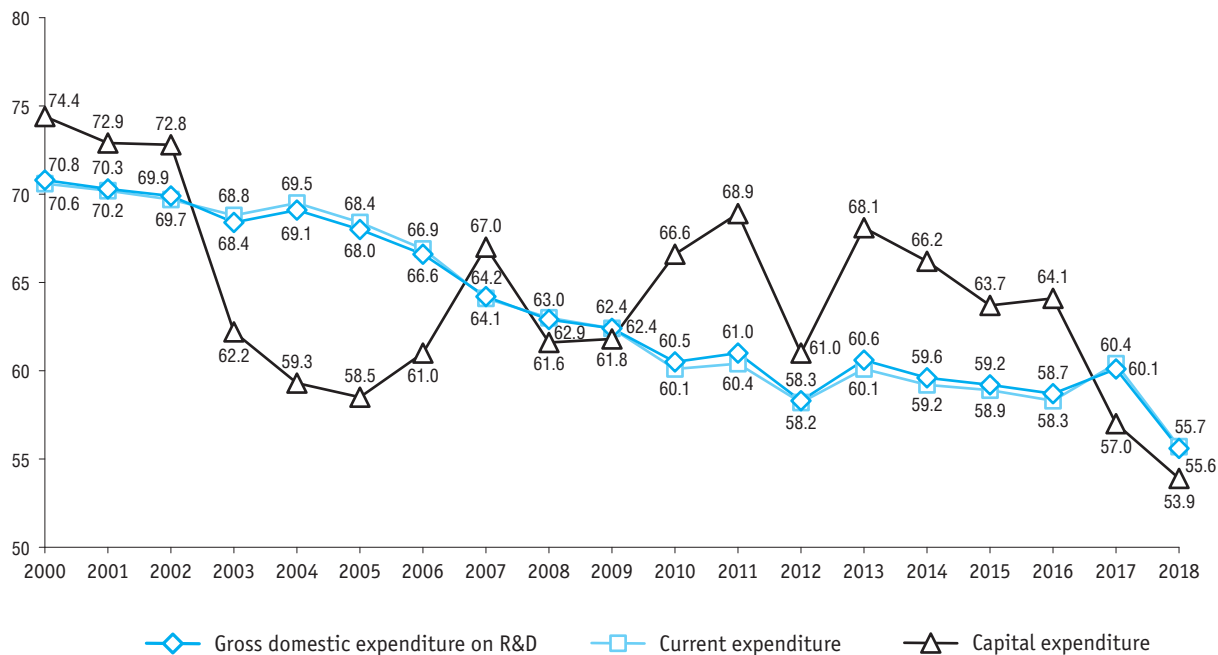
	Total	Government funds*	Business enterprise sector funds	Higher education sector funds	Private non-profit sector funds	Funds from abroad
<b>At current prices, thousand roubles, , 1995 – million roubles</b>						
2000	54288781.4	24674880.5	22199361.6	23662.7	18968.0	7371908.6
2005	156880029.0	84032725.4	58460580.8	46809.5	14570.8	14325342.5
2006	192484851.0	100122872.7	68769254.4	34681.0	160678.6	23397364.3
2007	238386207.4	131768069.7	87352197.2	616853.5	163906.9	18485180.1
2008	271206280.5	151975682.0	99123835.8	43931.1	468252.7	19594578.9
2009	303051131.5	173872629.4	104955691.5	60958.8	238908.1	23922943.7
2010	316701679.9	203267110.6	101760706.5	75409.3	427247.1	11171206.4
2011	372088873.4	218291814.8	134043614.4	376915.9	806970.4	18569557.9
2012	408284378.5	246761318.2	143181603.7	240986.2	152505.3	17947965.1
2013	454409251.0	279358934.6	161100909.7	515567.0	88727.4	13345112.3
2014	505210341.3	316622608.3	177116134.2	442911.7	359214.0	10669473.1
2015	541533094.3	343396867.3	185037359.3	561703.2	421868.8	12115295.7
2016	554093599.1	326710613.8	213215672.3	153457.6	149519.8	13864335.6
2017	612960678.4	346858742.5	250875477.9	161779.1	125995.6	14938683.3
2018	571633146.1	321302048.6	239608783.5	140133.6	137267.2	10444913.2

(continued)

	Total	Government funds*	Business enterprise sector funds	Higher education sector funds	Private non-profit sector funds	Funds from abroad
	<b>Percentage</b>					
2000	100	45.5	40.9	0.04	0.03	13.6
2005	100	53.6	37.3	0.03	0.01	9.1
2006	100	52.0	35.7	0.02	0.08	12.2
2007	100	55.3	36.6	0.30	0.07	7.8
2008	100	56.0	36.5	0.02	0.20	7.2
2009	100	57.4	34.6	0.02	0.08	7.9
2010	100	64.2	32.1	0.02	0.10	3.5
2011	100	58.7	36.0	0.10	0.20	5.0
2012	100	60.4	35.1	0.06	0.04	4.4
2013	100	61.5	35.5	0.10	0.02	2.9
2014	100	62.7	35.1	0.09	0.07	2.1
2015	100	63.4	34.2	0.10	0.08	2.2
2016	100	59.0	38.5	0.03	0.03	2.5
2017	100	56.6	40.9	0.03	0.02	2.4
2018	100	56.2	41.9	0.02	0.02	1.8

\* Including budget appropriations, own funds, and government sector institutions' funds.

### 5.3.19. BUSINESS ENTERPRISE SECTOR AS A PERCENTAGE OF GROSS DOMESTIC EXPENDITURE ON R&D BY TYPE OF EXPENDITURE



### 5.3.20. GROSS DOMESTIC EXPENDITURE ON R&D IN THE BUSINESS ENTERPRISE SECTOR BY TYPE

(thousand roubles)

	2005	2010	2013	2014	2015	2016	2017	2018
<b>Gross domestic expenditure on R&amp;D</b>	<b>156880029.0</b>	<b>316701679.9</b>	<b>454409251.0</b>	<b>505210341.3</b>	<b>541533094.3</b>	<b>554093599.1</b>	<b>612960678.4</b>	<b>571633146.1</b>
Current expenditure	151228693.6	294103827.7	420438999.3	470728154.3	503088818.5	509168604.8	573687801.6	535192496.3
Salaries	61762384.5	134771346.7	184301583.4	199981537.7	214055655.0	214443342.3	238808979.2	221491162.7
Of which for R&D personnel*	56579998.4	123576290.3	168490249.3	184318111.2	196822214.9	195079681.0	218756866.9	199279063.4
Social security payments**	14652167.0	26089246.1	44519677.6	49274407.7	55348833.5	55160883.4	61108594.2	57398180.0
Equipment	5919453.8	9955224.5	13592306.5	13499794.4	17319573.0	14429765.7	11511255.6	10677342.4
Other material costs	39963918.4	63367540.7	96060693.9	111940812.4	109075443.3	114649833.7	135209931.5	119871383.4
Other current expenditure	28930769.9	59920469.7	81964737.9	96031602.1	107289313.7	110484779.7	127049041.1	125754427.8
Capital expenditure	5651335.4	22597852.2	33970251.7	34482187.0	38444275.8	44924994.3	39272876.8	36440649.8
Land and buildings	1208092.5	4950198.0	6020259.0	6094066.5	5984058.2	6774304.9	6405412.6	3749751.1
Including:								
land	...	...	...	...	...	...	421752.0	103778.2
buildings	...	...	...	...	...	...	5983660.6	3645972.9
Equipment	3228403.1	14167838.2	17818744.0	19820476.8	21054397.0	20877238.1	19887421.2	18181174.7
Intellectual property items and results of intellectual activity	-	-	-	-	-	-	2525053.5	5391019.6
Other capital expenditure	1214839.8	3479816.0	10131248.7	8567643.7	11405820.6	17273451.3	10454989.5	9118704.4

\* Excluding external multiple jobholders and independent contractors.

\*\* National pension insurance, national health insurance, national social insurance.

**5.3.21. CURRENT EXPENDITURE ON R&D IN THE BUSINESS ENTERPRISE SECTOR BY TYPE OF R&D ACTIVITY  
AND FIELD OF SCIENCE AND TECHNOLOGY**  
(thousand roubles)

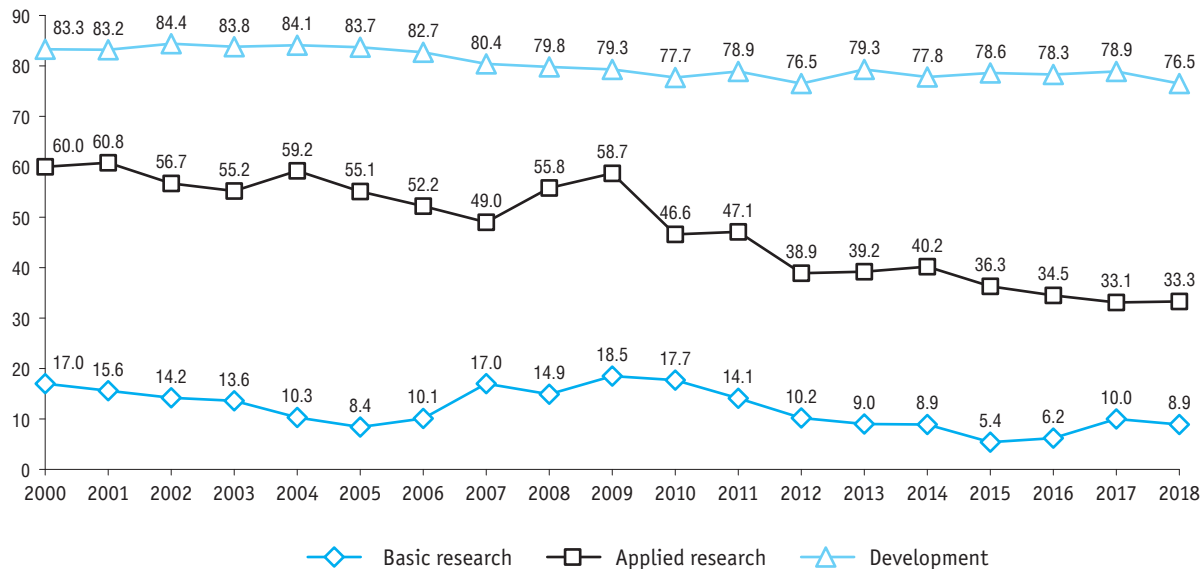
	Total	Natural sciences	Engineering and technology	Medical sciences	Agricultural sciences	Social sciences	Humanities
<b>2005</b>							
<b>Current expenditure on R&amp;D</b>	<b>151228693.6</b>	<b>10041430.0</b>	<b>138455122.3</b>	<b>450558.6</b>	<b>1020195.6</b>	<b>1212995.6</b>	<b>48391.5</b>
Basic research	2591506.7	1025517.8	1205156.9	53282.5	236864.8	47440.2	23244.5
Applied research	20026408.8	5053993.0	13842212.4	184566.8	446665.3	489579.6	9391.7
Development	128610778.1	3961919.2	123407753.0	212709.3	336665.5	675975.8	15755.3
<b>2010</b>							
<b>Current expenditure on R&amp;D</b>	<b>294103827.7</b>	<b>26739368.2</b>	<b>261926531.0</b>	<b>1507276.1</b>	<b>1288239.2</b>	<b>2550402.8</b>	<b>92010.4</b>
Basic research	16935403.4	3875649.0	11521941.3	565100.5	441953.0	467877.0	62882.6
Applied research	42872394.0	10638493.8	29871209.5	595697.1	321868.8	1436993.9	8130.9
Development	234296030.3	12225225.4	220533380.2	346478.5	524417.4	645531.9	20996.9
<b>2015</b>							
<b>Current expenditure on R&amp;D</b>	<b>503088818.5</b>	<b>25579412.6</b>	<b>470180938.1</b>	<b>3064111.9</b>	<b>695241.7</b>	<b>3421527.3</b>	<b>147586.9</b>
Basic research	7122577.4	3196716.9	2633478.4	696593.3	47856.6	494091.3	53840.9
Applied research	61520451.3	10793921.5	47539713.2	949480.0	127789.3	2074879.6	34667.7
Development	434445789.8	11588774.2	420007746.5	1418038.6	519595.8	852556.4	59078.3
<b>2016</b>							
<b>Current expenditure on R&amp;D</b>	<b>509168604.8</b>	<b>25624879.5</b>	<b>475773975.9</b>	<b>4000381.5</b>	<b>673777.2</b>	<b>3000612.8</b>	<b>94977.9</b>
Basic research	8206064.7	4117537.7	2718652.3	950371.0	1307.5	364799.4	53396.8
Applied research	62485456.3	9778329.1	49191363.8	1184425.6	193808.5	2136283.2	1246.1
Development	438477083.8	11729012.7	423863959.8	1865584.9	478661.2	499530.2	40335.0



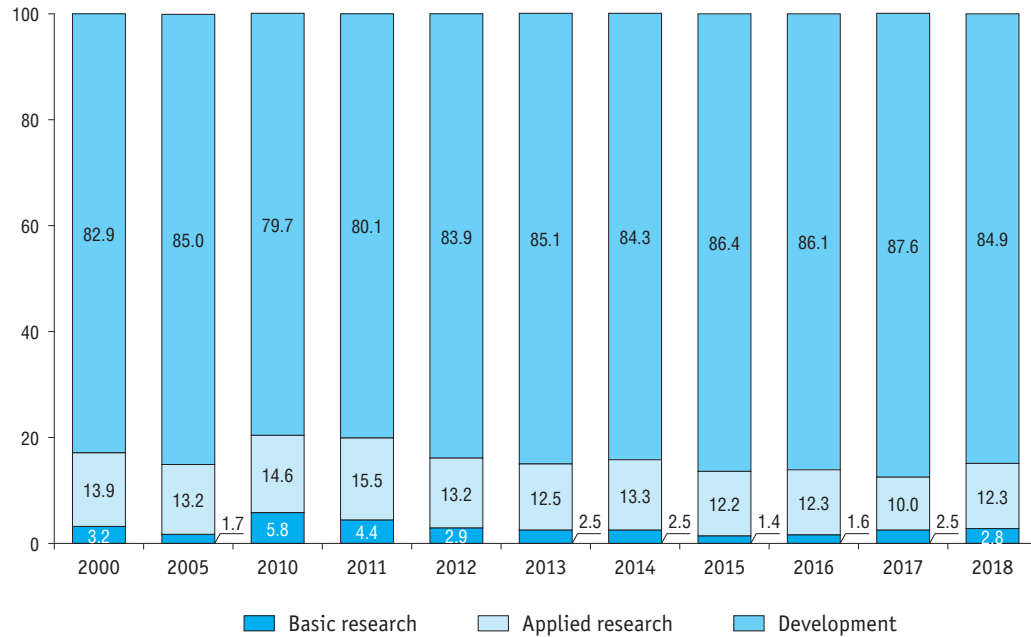
(continued)

	Total	Natural sciences	Engineering and technology	Medical sciences	Agricultural sciences	Social sciences	Humanities
<b>2017</b>							
<b>Current expenditure on R&amp;D</b>	<b>573687801.6</b>	<b>32238281.7</b>	<b>533389305.1</b>	<b>3597393.8</b>	<b>414042.1</b>	<b>3972933.9</b>	<b>75845.0</b>
Basic research	14087182.4	4171437.1	7605143.8	959432.6	18009.1	1275638.3	57521.5
Applied research	57168047.3	10653161.3	43450939.5	865220.4	165489.8	2024351.8	8884.5
Development	502432571.9	17413683.3	482333221.8	1772740.8	230543.2	672943.8	9439.0
<b>2018</b>							
<b>Current expenditure on R&amp;D</b>	<b>535192496.3</b>	<b>31320704.7</b>	<b>496301042.0</b>	<b>4187167.4</b>	<b>565072.9</b>	<b>2656308.4</b>	<b>162200.9</b>
Basic research	15069244.8	4454237.6	7857156.1	975478.5	203832.3	1482344.8	96195.5
Applied research	65737130.8	9900869.5	52506409.8	2110448.4	96928.9	1075093.1	47381.1
Development	454386120.7	16965597.6	435937476.1	1101240.5	264311.7	98870.5	18624.3

### 5.3.22. BUSINESS ENTERPRISE SECTOR AS A PERCENTAGE OF CURRENT EXPENDITURE ON R&D BY TYPE OF R&D ACTIVITY



### 5.3.23. PERCENTAGE DISTRIBUTION OF CURRENT EXPENDITURE ON R&D IN THE BUSINESS ENTERPRISE SECTOR BY TYPE OF R&D ACTIVITY



### 5.3.24. AVERAGE MONTHLY SALARY OF R&D PERSONNEL IN THE BUSINESS ENTERPRISE SECTOR

	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Average monthly salary, roubles</b>	2519.9	9599.6	25359.7	29174.9	33165.2	36540.8	39855.8	42102.7	44611.1	51648.5	51766.7
As a percentage of the salary:											
in the national economy (=100%)	113.3	112.2	121.0	124.8	124.5	122.7	122.7	123.7	121.5	131.9	118.4
in manufacturing (=100%)	106.5	114.0	132.9	133.9	135.3	135.1	135.1	131.9	129.0	134.1	127.1
in construction (=100%)	95.5	106.2	119.8	123.2	127.8	131.9	135.8	140.5	138.0	153.4	134.4

## 5.4. Higher education sector

### 5.4.1. R&D INSTITUTIONS IN THE HIGHER EDUCATION SECTOR BY TYPE

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Total</b>	<b>526</b>	<b>539</b>	<b>617</b>	<b>662</b>	<b>762</b>	<b>777</b>	<b>1124</b>	<b>1064</b>	<b>1038</b>	<b>998</b>
Higher education institutions	390	406	517	562	673	702	1040	979	970	917
Research institutes (centres)	107	109	71	54	51	37	43	40	25	41
Design organisations, design-and-engineering organisations	19	17	11	12	10	8	7	5	1	1
Pilot plants	2	–	1	4	1	1	2	1	–	–
Others	8	7	17	30	27	29	32	39	42	39

## 5.4.2. R&D PERSONNEL IN THE HIGHER EDUCATION SECTOR BY TYPE OF R&D INSTITUTIONS

(headcount)

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Total</b>	<b>40787</b>	<b>43500</b>	<b>53290</b>	<b>59469</b>	<b>59247</b>	<b>62400</b>	<b>63870</b>	<b>63046</b>	<b>59729</b>	<b>64073</b>
Higher education institutions	31110	33942	46776	53699	54092	58573	60151	59124	56571	58573
Research institutes (centres)	7254	7021	4796	3070	2864	2049	2092	1722	1128	3210
Design organisations, design-and-engineering organisations	2198	1991	1392	1830	1502	1408	1121	839	...*	...*
Pilot plants	4	–	2	9	...*	...*	...*	...*	–	–
Others	221	546	324	861	775	369	506	1360	1605	1432

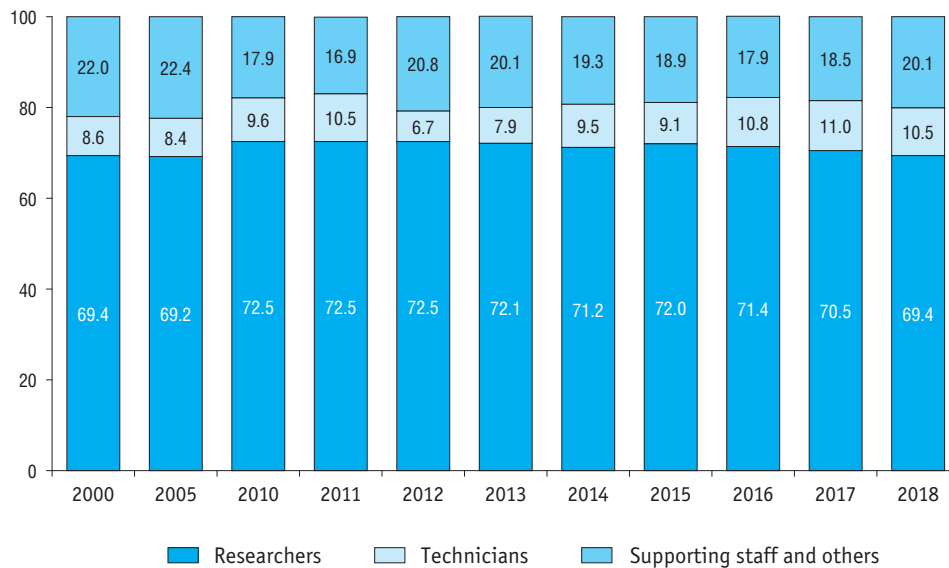
\* The data are not published in order to ensure the confidentiality of primary statistics received from organisations, in accordance with Federal Law no. 282-FL 'On the Official Statistical Accounting and State Statistics System of the Russian Federation' of November 29, 2007 (art. 4, para. 5; art. 9, para. 1).

## 5.4.3. R&amp;D PERSONNEL IN THE HIGHER EDUCATION SECTOR BY OCCUPATION

*(headcount)*

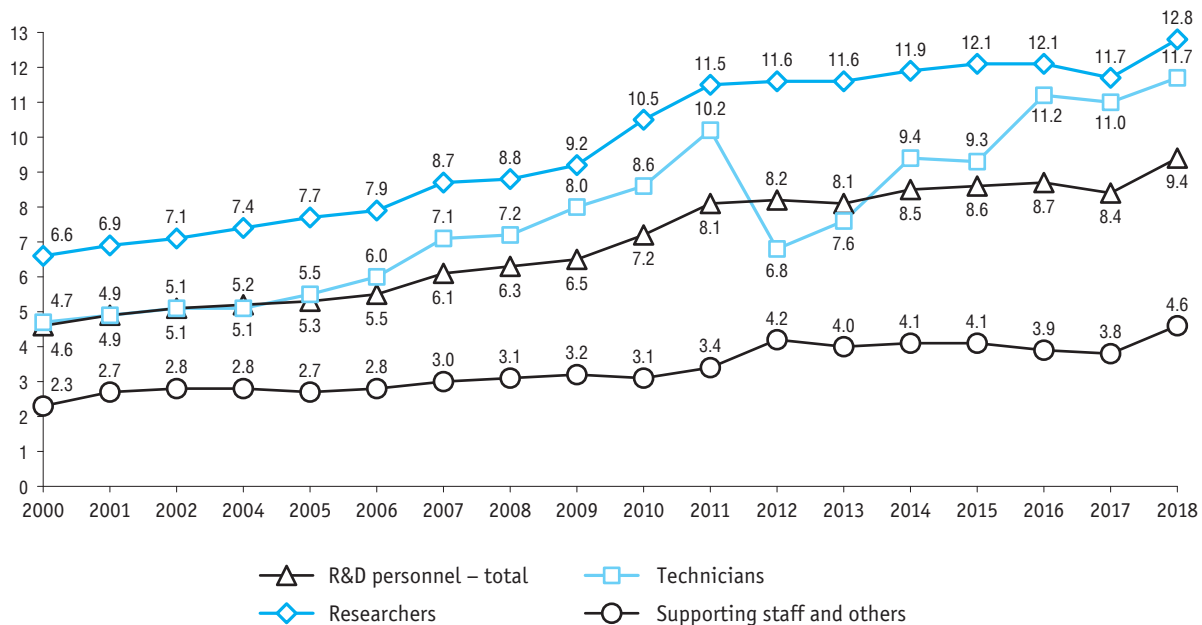
	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Total</b>	<b>40787</b>	<b>43500</b>	<b>53290</b>	<b>59469</b>	<b>59247</b>	<b>62400</b>	<b>63870</b>	<b>63046</b>	<b>59729</b>	<b>64073</b>
Researchers	28325	30111	38640	43103	42692	44427	45967	44994	42113	44489
Technicians	3509	3658	5095	3998	4670	5939	5836	6789	6584	6736
Supporting staff	5463	6098	6564	9264	8828	9538	9217	8929	8391	8838
Others	3490	3633	2991	3104	3057	2496	2850	2334	2641	4010

#### 5.4.4. PERCENTAGE DISTRIBUTION OF R&D PERSONNEL IN THE HIGHER EDUCATION SECTOR BY OCCUPATION





### 5.4.5. R&D PERSONNEL IN THE HIGHER EDUCATION SECTOR AS A PERCENTAGE OF THE TOTAL NUMBER OF R&D PERSONNEL BY OCCUPATION



#### 5.4.6. R&D PERSONNEL IN THE HIGHER EDUCATION SECTOR BY EDUCATIONAL ATTAINMENT (headcount)

	Total	Higher education	Secondary vocational education	Other education
<b>R&amp;D personnel</b>				
2005	43500	35159	4430	3911
2010	53290	46112	3394	3784
2014	62400	56009	2274	4117
2015	63870	58144	2071	3655
2016	63046	57504	2066	3476
2017	59729	54664	1866	3199
2018	64073	57980	2224	3869
<b>Researchers</b>				
2005	30111	30111	–	–
2010	38640	38640	–	–
2014	44427	44427	–	–
2015	45967	45967	–	–
2016	44994	44994	–	–
2017	42113	42113	–	–
2018	44489	44489	–	–
<b>Technicians</b>				
2005	3658	1079	2082	497
2010	5095	2460	1526	1109
2014	5939	3835	816	1288
2015	5836	4120	742	974
2016	6789	4761	779	1249
2017	6584	4651	752	1181
2018	6736	4600	746	1390

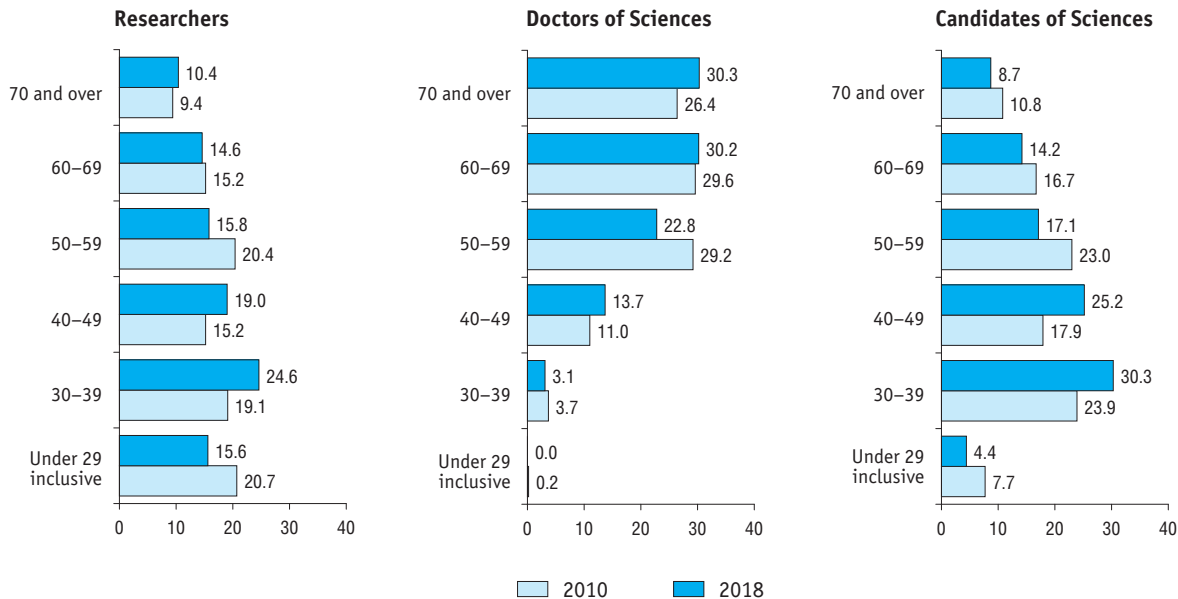
(continued)

	Total	Higher education	Secondary vocational education	Other education
Supporting staff				
2005	6098	2758	1465	1875
2010	6564	3695	1190	1679
2014	9538	6404	976	2158
2015	9217	6068	898	2251
2016	8929	6299	844	1786
2017	8391	5994	762	1635
2018	8838	6109	915	1814
Others				
2005	3633	1211	883	1539
2010	2991	1317	678	996
2014	2496	1343	482	671
2015	2850	1989	431	430
2016	2334	1450	443	441
2017	2641	1906	352	383
2018	4010	2782	563	665

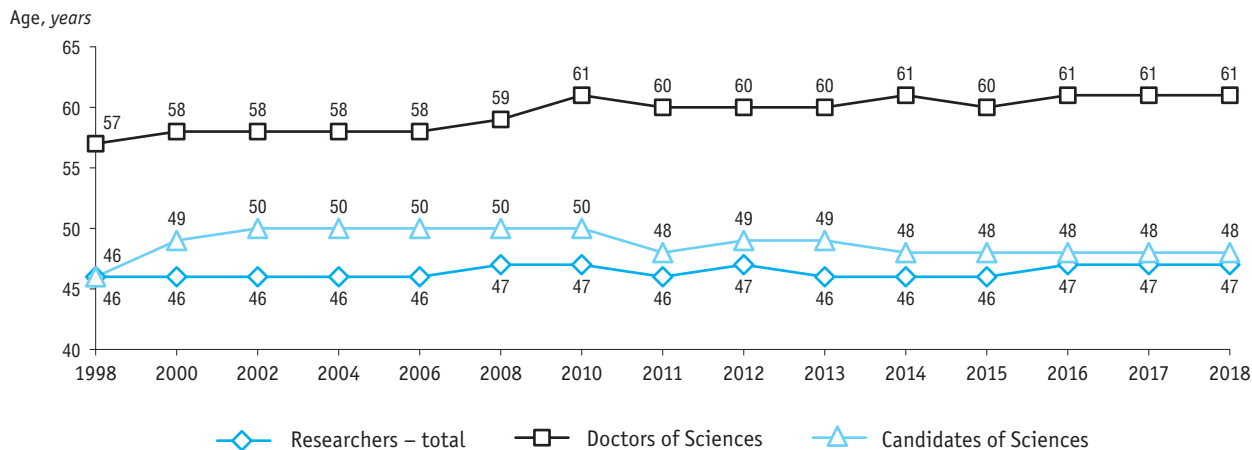
### 5.4.7. RESEARCHERS IN THE HIGHER EDUCATION SECTOR BY GENDER AND AGE

	2010			2018		
	Researchers	Of whom		Researchers	Of whom	
		Doctors of Sciences	Candidates of Sciences		Doctors of Sciences	Candidates of Sciences
<b>Total</b>	<b>38640</b>	<b>5068</b>	<b>15355</b>	<b>44489</b>	<b>6692</b>	<b>20440</b>
<i>Age, years:</i>						
under 29 inclusive	8003	9	1186	6954	1	893
30–39	7392	188	3667	10951	205	6188
40–49	5862	555	2751	8469	914	5161
50–54	3852	663	1731	3322	631	1689
55–59	4036	818	1798	3706	893	1814
60–69	5870	1498	2560	6477	2021	2908
70 and over	3625	1337	1662	4610	2027	1787
<b>Males</b>	<b>21526</b>	<b>3788</b>	<b>8220</b>	<b>23952</b>	<b>4572</b>	<b>10082</b>
<i>Age, years:</i>						
under 29 inclusive	4849	8	732	3981	1	515
30–39	3754	141	1952	5882	151	3252
40–49	2996	367	1401	3989	566	2202
50–54	1995	466	838	1533	361	710
55–59	2174	589	979	1919	569	859
60–69	3512	1200	1470	3619	1385	1520
70 and over	2246	1017	848	3029	1539	1024
<b>Females</b>	<b>17114</b>	<b>1280</b>	<b>7135</b>	<b>20537</b>	<b>2120</b>	<b>10358</b>
<i>Age, years:</i>						
under 29 inclusive	3154	1	454	2973	–	378
30–39	3638	47	1715	5069	54	2936
40–49	2866	188	1350	4480	348	2959
50–54	1857	197	893	1789	270	979
55–59	1862	229	819	1787	324	955
60–69	2358	298	1090	2858	636	1388
70 and over	1379	320	814	1581	488	763

## 5.4.8. PERCENTAGE DISTRIBUTION OF RESEARCHERS IN THE HIGHER EDUCATION SECTOR BY AGE

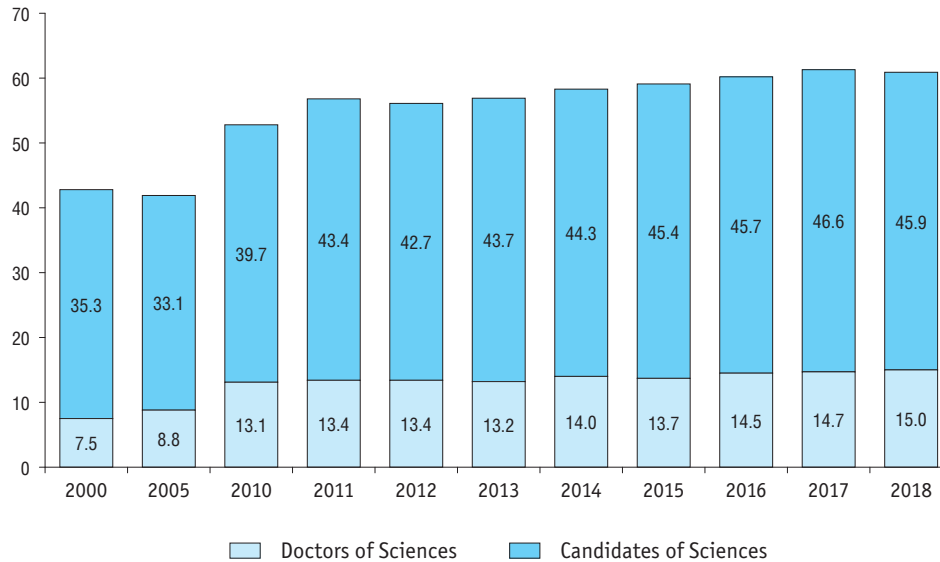


### 5.4.9. AVERAGE AGE OF RESEARCHERS IN THE HIGHER EDUCATION SECTOR



### 5.4.10. RESEARCHERS WITH SCIENTIFIC DEGREES IN THE HIGHER EDUCATION SECTOR (headcount)

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Researchers with scientific degrees</b>	<b>12113</b>	<b>12618</b>	<b>20423</b>	<b>24144</b>	<b>24306</b>	<b>25899</b>	<b>27184</b>	<b>27109</b>	<b>25812</b>	<b>27132</b>
Doctors of Sciences	2120	2654	5068	5753	5638	6218	6318	6532	6185	6692
Candidates of Sciences	9993	9964	15355	18391	18668	19681	20866	20577	19627	20440

**5.4.11. RESEARCHERS WITH SCIENTIFIC DEGREES AS A PERCENTAGE OF THE TOTAL NUMBER OF RESEARCHERS IN THE HIGHER EDUCATION SECTOR**

#### 5.4.12. RESEARCHERS IN THE HIGHER EDUCATION SECTOR BY FIELD OF SCIENCE AND TECHNOLOGY

(headcount)

	2010			2016			2017			2018		
	Researchers	Of whom		Researchers	Of whom		Researchers	Of whom		Researchers	Of whom	
		Doctors of Sciences	Candidates of Sciences		Doctors of Sciences	Candidates of Sciences		Doctors of Sciences	Candidates of Sciences		Doctors of Sciences	Candidates of Sciences
<b>Total</b>	<b>38640</b>	<b>5068</b>	<b>15355</b>	<b>44994</b>	<b>6532</b>	<b>20577</b>	<b>42113</b>	<b>6185</b>	<b>19627</b>	<b>44489</b>	<b>6692</b>	<b>20440</b>
Natural sciences	13652	2283	6424	13134	2370	6561	12165	2248	6223	12084	2347	6196
Engineering and technology	11938	554	2574	12148	964	3573	11025	815	3291	11815	856	3450
Medical sciences	2263	466	1047	2040	448	982	1696	397	764	2239	494	1068
Agricultural sciences	894	122	420	808	169	441	778	161	428	1167	230	644
Social sciences	5664	896	2783	11199	1646	6199	10760	1570	6043	11553	1727	6237
Humanities	4229	747	2107	5665	935	2821	5689	994	2878	5631	1038	2845

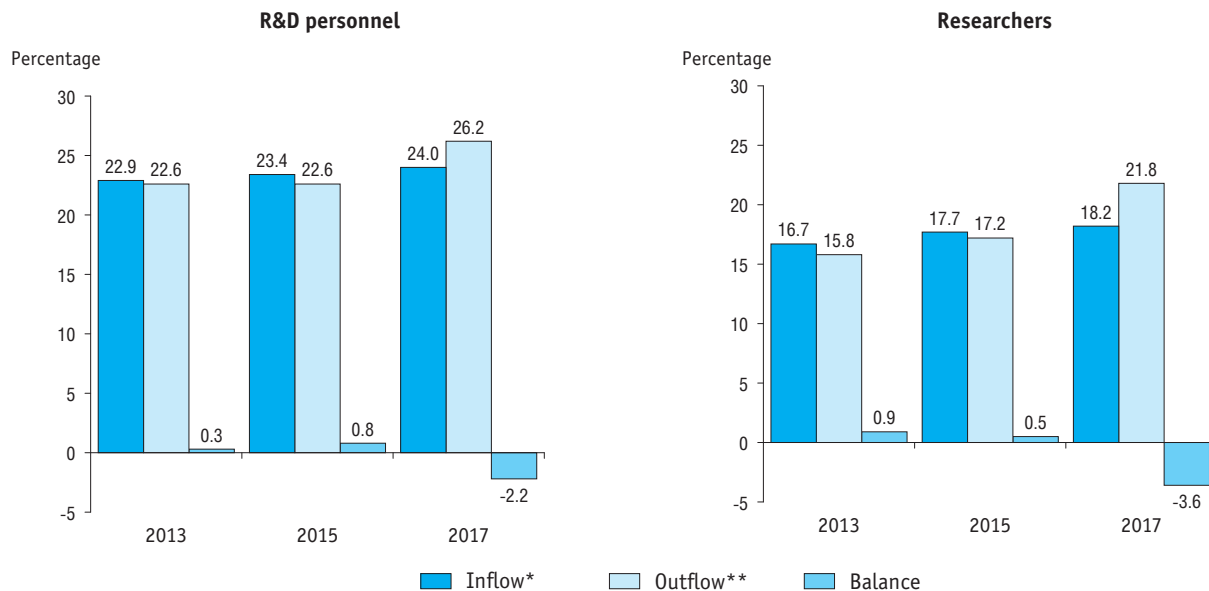


## 5.4.13. R&amp;D PERSONNEL TURNOVER IN THE HIGHER EDUCATION SECTOR BY OCCUPATION

*(headcount)*

	Number at the beginning of the reporting year	Inflow				Outflow				Number at the end of the reporting year
		Total	Of whom			Total	Of whom			
			higher education graduates	other research institutes' graduates	others		resigned	were made redundant	left due to other reasons	
<b>Total</b>										
2005	41601	8770	1475	1388	5907	6871	4096	25	2750	43500
2013	59043	13561	1648	2104	9809	13357	6381	212	6764	59247
2015	63192	14971	2293	2788	9890	14293	7256	350	6687	63870
2017	61561	14322	2019	1975	10328	16154	6692	357	9105	59729
<b>Researchers</b>										
2005	28951	5219	1229	1058	2932	4062	2470	16	1576	30111
2013	42229	7140	903	1604	4633	6663	3584	134	2945	42692
2015	45677	8141	1102	1934	5105	7854	4158	226	3470	45967
2017	44017	7685	1056	1306	5323	9587	3723	238	5626	42113
<b>Technicians</b>										
2005	3451	1030	114	115	801	820	467	1	352	3658
2013	4490	2260	277	187	1796	2081	870	37	1174	4670
2015	5443	2701	606	186	1909	2276	1318	28	930	5836
2017	6453	2770	470	417	1883	2671	1220	18	1433	6584
<b>Supporting staff and others</b>										
2005	9199	2521	132	215	2174	1989	1159	8	822	9731
2013	12324	4161	468	313	3380	4613	1927	41	2645	11885
2015	12072	4129	585	668	2876	4163	1780	96	2287	12067
2017	11091	3867	493	252	3122	3896	1749	101	2046	11032

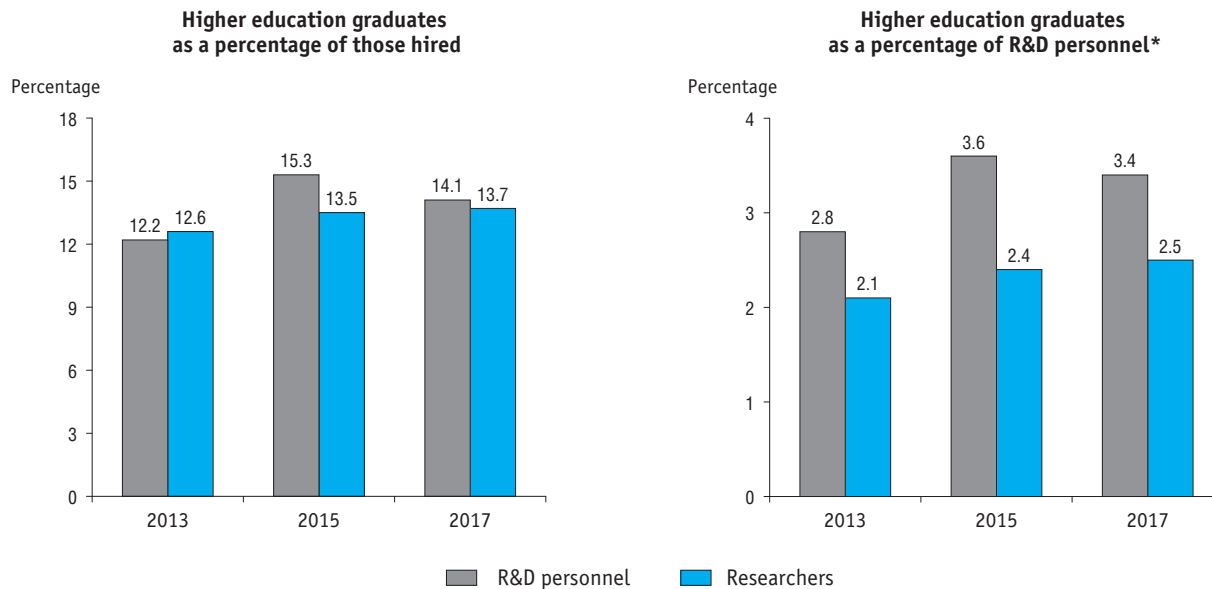
#### 5.4.14. INFLOW AND OUTFLOW OF R&D PERSONNEL IN THE HIGHER EDUCATION SECTOR



\* The ratio of those hired during the year to the total employment at the end of the year.

\*\* The ratio of those who left during the year to the total employment at the beginning of the year.

## 5.4.15. INFLOW OF HIGHER EDUCATION GRADUATES INTO HIGHER EDUCATION SECTOR INSTITUTIONS



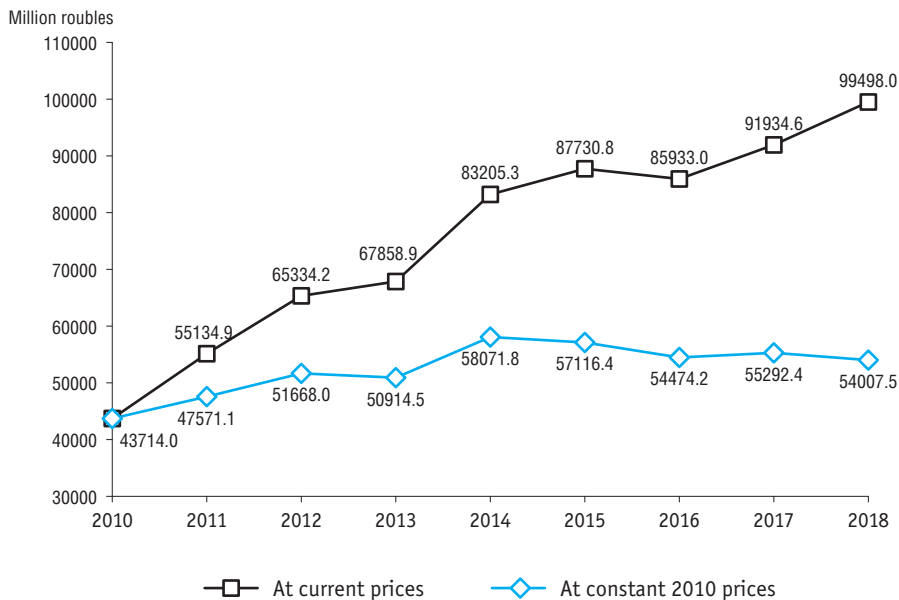
\* The ratio of the higher education graduates hired during the year to the number of employees at the end of the year.

#### 5.4.16. GROSS DOMESTIC EXPENDITURE ON R&D IN THE HIGHER EDUCATION SECTOR BY TYPE OF R&D INSTITUTIONS (thousand roubles)

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Total</b>	<b>3489342.2</b>	<b>13337987.1</b>	<b>43714007.3</b>	<b>65334232.1</b>	<b>67858855.1</b>	<b>83205260.1</b>	<b>87730781.4</b>	<b>85932983.0</b>	<b>91934601.3</b>	<b>99497983.2</b>
Higher education institutions	2777397.1	10963094.5	38787366.4	59717923.7	63138131.0	77975805.2	82972415.2	80424185.9	86842669.4	91741379.8
Research institutes (centres)	528449.7	1596818.1	3429235.6	3571846.1	3022702.5	3616147.7	3382500.2	2306867.9	2010103.7	4944445.9
Design organisations, design-and-engineering organisations	157818.5	519987.1	984428.5	1344028.6	1090711.3	1092686.4	1114835.9	1817239.9	...*	...*
Pilot plants	78.5	–	26584.0	14652.7	...*	...*	...*	...*	–	–
Others	25598.4	258087.4	486392.8	685781.0	596309.4	515769.8	253618.1	1379716.3	1518297.2	1326981.5

\* The data are not published in order to ensure the confidentiality of primary statistics received from organisations, in accordance with Federal Law no. 282-FL 'On the Official Statistical Accounting and State Statistics System of the Russian Federation' of November 29, 2007 (art. 4, para. 5; art. 9, para. 1).

## 5.4.17. GROSS DOMESTIC EXPENDITURE ON R&amp;D IN THE HIGHER EDUCATION SECTOR



#### 5.4.18. GROSS DOMESTIC EXPENDITURE ON R&D IN THE HIGHER EDUCATION SECTOR BY SOURCE OF FUNDS

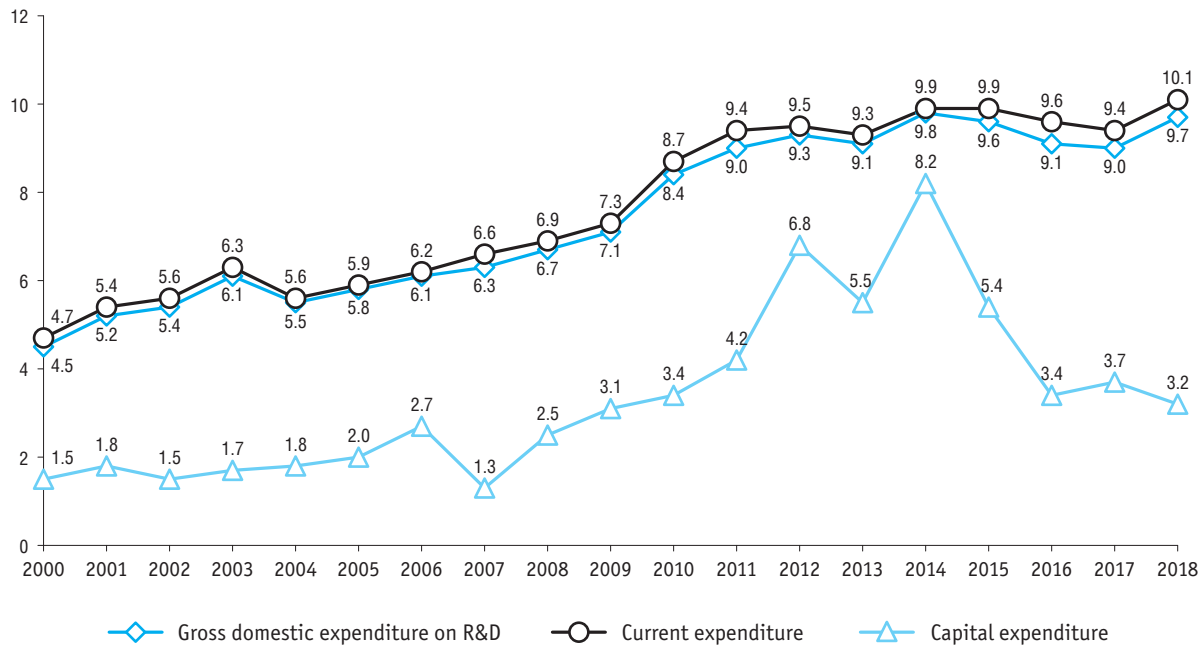
	Total	Government funds*	Business enterprise sector funds	Higher education sector funds	Private non-profit sector funds	Funds from abroad
<b>At current prices, thousand roubles</b>						
2000	3489342.2	2220574.3	951898.2	178004.2	6651.5	132214.0
2005	13337987.1	7982229.6	3911201.8	889069.7	20503.0	534983.0
2006	17639173.8	10350996.7	5169607.6	1505274.5	26181.7	587113.3
2007	23471870.9	13931491.1	7267861.9	1573278.8	64898.0	634341.1
2008	28868566.7	18003735.9	8244450.2	1758509.8	84419.2	777451.6
2009	34642216.7	24181368.4	7769897.9	1741764.5	95595.8	853590.1
2010	43714007.3	30017817.7	10724045.9	2154774.3	55055.8	762313.6
2011	55134893.9	37047554.1	13224580.6	4030900.0	93584.3	738274.9
2012	65334232.1	40803297.5	17709405.2	5441235.5	371292.2	1009001.7
2013	67858855.1	40378679.8	18663427.9	7080091.0	448892.7	1287763.7
2014	83205260.1	50496387.8	22607546.6	8215233.9	506189.0	1379902.8
2015	87730781.4	51570251.1	24028351.9	9979551.2	671465.0	1481162.2
2016	85932983.0	52444188.9	23832576.7	7658742.4	832874.6	1164600.4
2017	91934601.3	56486622.7	25896640.8	7528724.3	717720.7	1304892.8
2018	99497983.2	60269300.1	28911169.3	8436774.6	638991.1	1241748.1

(continued)

	Total	Government funds*	Business enterprise sector funds	Higher education sector funds	Private non-profit sector funds	Funds from abroad
	<b>Percentage</b>					
2000	100	63.6	27.3	5.1	0.2	3.8
2005	100	59.8	29.3	6.7	0.2	4.0
2006	100	58.7	29.3	8.5	0.1	3.3
2007	100	59.4	31.0	6.7	0.3	2.7
2008	100	62.4	28.6	6.1	0.3	2.7
2009	100	69.8	22.4	5.0	0.3	2.5
2010	100	68.7	24.5	4.9	0.1	1.7
2011	100	67.2	24.0	7.3	0.2	1.3
2012	100	62.5	27.1	8.3	0.6	1.5
2013	100	59.5	27.5	10.4	0.7	1.9
2014	100	60.7	27.2	9.9	0.6	1.7
2015	100	58.8	27.4	11.4	0.8	1.7
2016	100	61.0	27.7	8.9	1.0	1.4
2017	100	61.4	28.2	8.2	0.8	1.4
2018	100	60.6	29.1	8.5	0.6	1.2

\* Including budget appropriations, general university funds and government sector institutions' funds.

#### 5.4.19. HIGHER EDUCATION SECTOR AS A PERCENTAGE OF GROSS DOMESTIC EXPENDITURE ON R&D BY TYPE OF EXPENDITURE





## 5.4.20. GROSS DOMESTIC EXPENDITURE ON R&amp;D IN THE HIGHER EDUCATION SECTOR BY TYPE OF EXPENDITURE

*(thousand roubles)*

	2005	2010	2013	2014	2015	2016	2017	2018
<b>Gross domestic expenditure on R&amp;D</b>	<b>13337987.1</b>	<b>43714007.3</b>	<b>67858855.1</b>	<b>83205260.1</b>	<b>87730781.4</b>	<b>85932983.0</b>	<b>91934601.3</b>	<b>99497983.2</b>
Current expenditure	13144292.5	42552245.4	65103832.7	78939146.3	84495233.0	83579171.0	89400111.3	97311000.9
Salaries	6952057.5	25267352.4	37483889.6	45381722.2	48945642.1	48193431.8	51793629.5	58599453.3
Of which for R&D personnel*	3552276.8	14033490.5	21683297.6	25919161.2	27878480.3	27441222.3	29270588.6	34622697.5
Social security payments**	1654258.7	5260709.4	8920077.8	10651630.2	12471272.2	12307550.0	13626193.1	14985942.8
Equipment	917350.6	2639343.7	3288338.4	4767932.9	3708006.7	4202312.8	4151400.5	3335083.5
Other material costs	1501392.4	3344896.4	5585226.3	6487280.5	6193042.0	6139669.1	6005843.5	5977078.2
Other current expenditure	2119233.3	6039943.5	9826300.6	11650580.5	13177270.0	12736207.3	13823044.7	14413443.1
Capital expenditure	193694.6	1161761.9	2755022.4	4266113.8	3235548.4	2353812.0	2534490.0	2186982.3
Land and buildings	39711.4	14186.1	233349.2	645364.7	141573.3	164362.3	326991.9	144274.2
Including:								
land	...	...	...	...	...	...	668.5	6264.0
buildings	...	...	...	...	...	...	326323.4	138010.2
Equipment	104359.6	1068873.2	2133749.9	2561153.5	2375951.4	1884027.0	1830733.7	1820455.1
Intellectual property and results of intellectual activity	-	-	-	-	-	-	120854.4	142077.1
Other capital expenditure	49623.6	78702.6	387923.3	1059595.6	718023.7	305422.7	255910.0	80175.9

\* Excluding external multiple jobholders and independent contractors.

\*\* National pension insurance, national health insurance, national social insurance.

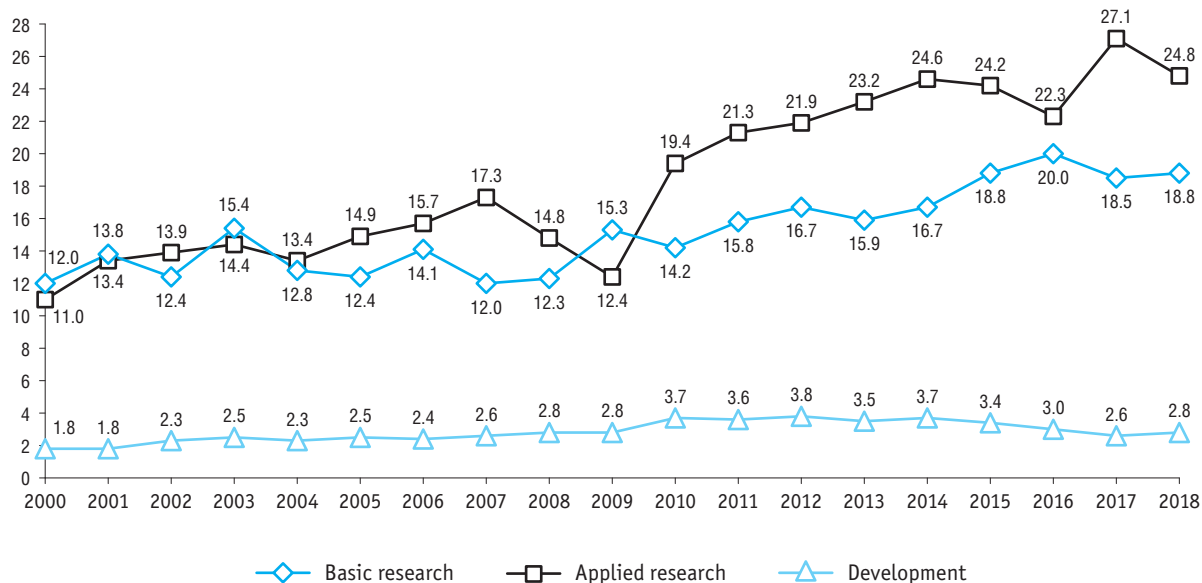
**5.4.21. CURRENT EXPENDITURE ON R&D IN THE HIGHER EDUCATION SECTOR BY TYPE OF R&D ACTIVITY  
AND FIELD OF SCIENCE AND TECHNOLOGY**  
(thousand roubles)

	Total	Natural sciences	Engineering and technology	Medical sciences	Agricultural sciences	Social sciences	Humanities
<b>2005</b>							
<b>Current expenditure on R&amp;D</b>	<b>13144292.5</b>	<b>3896908.4</b>	<b>6853399.7</b>	<b>378448.2</b>	<b>200121.3</b>	<b>1419552.8</b>	<b>395862.1</b>
Basic research	3841327.6	2342791.4	751584.6	147772.6	31818.6	342156.9	225203.5
Applied research	5405410.3	1112036.2	2918946.4	161855.9	121828.4	949311.8	141431.6
Development	3897554.6	442080.8	3182868.7	68819.7	46474.3	128084.1	29227.0
<b>2010</b>							
<b>Current expenditure on R&amp;D</b>	<b>42552245.4</b>	<b>12076614.1</b>	<b>20864675.6</b>	<b>1309942.7</b>	<b>730315.2</b>	<b>6137791.2</b>	<b>1432906.6</b>
Basic research	13647906.8	7585787.8	2819934.7	472436.1	145701.5	1919937.8	704108.9
Applied research	17804762.0	3177035.8	9056919.5	680400.6	486773.7	3723764.3	679868.1
Development	11099576.6	1313790.5	8987821.4	157106.0	97840.0	494089.1	48929.6
<b>2015</b>							
<b>Current expenditure on R&amp;D</b>	<b>84495233.0</b>	<b>24471293.5</b>	<b>36048768.8</b>	<b>4478205.2</b>	<b>1515246.7</b>	<b>12800336.7</b>	<b>5181382.1</b>
Basic research	24839057.2	13659393.9	3644828.6	1348438.7	193512.2	3664822.7	2328061.1
Applied research	41098469.1	8214107.1	18786848.4	2576517.7	1171765.9	7925797.8	2423432.2
Development	18557706.7	2597792.5	13617091.8	553248.8	149968.6	1209716.2	429888.8

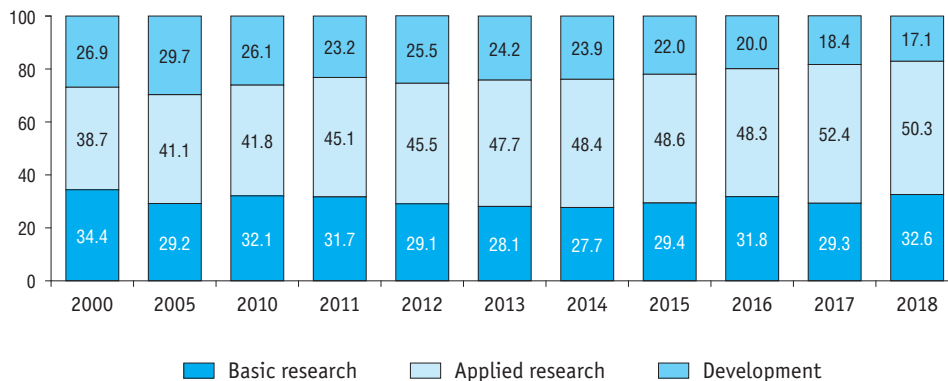
(continued)

	Total	Natural sciences	Engineering and technology	Medical sciences	Agricultural sciences	Social sciences	Humanities
<b>2016</b>							
<b>Current expenditure on R&amp;D</b>	<b>83579171.0</b>	<b>24514438.7</b>	<b>34467569.3</b>	<b>5441216.8</b>	<b>1650507.7</b>	<b>13574388.3</b>	<b>3931050.2</b>
Basic research	26537618.5	14627211.7	4005517.0	1200082.9	164344.5	4423359.6	2117102.8
Applied research	40348147.3	7284019.6	18295645.5	3589996.0	1265321.3	8413626.8	1499538.1
Development	16693405.2	2603207.4	12166406.8	651137.9	220841.9	737401.9	314409.3
<b>2017</b>							
<b>Current expenditure on R&amp;D</b>	<b>89400111.3</b>	<b>22805581.9</b>	<b>39562309.1</b>	<b>6275906.1</b>	<b>1761530.0</b>	<b>14424022.0</b>	<b>4570762.2</b>
Basic research	26153702.4	13303684.3	4142398.7	1429664.5	185433.3	4751446.3	2341075.3
Applied research	46822282.4	7235991.3	22947367.1	4320363.1	1366307.9	9032280.8	1919972.2
Development	16424126.5	2265906.3	12472543.3	525878.5	209788.8	640294.9	309714.7
<b>2018</b>							
<b>Current expenditure on R&amp;D</b>	<b>97311000.9</b>	<b>26187293.0</b>	<b>40110145.3</b>	<b>5472907.2</b>	<b>2548942.6</b>	<b>17318509.0</b>	<b>5673203.8</b>
Basic research	31730954.7	16471681.5	4984294.3	1069214.5	635154.9	5585547.4	2985062.1
Applied research	48963848.7	7554228.3	22204622.1	4069279.9	1719281.0	11038872.1	2377565.3
Development	16616197.5	2161383.2	12921228.9	334412.8	194506.7	694089.5	310576.4

### 5.4.22. HIGHER EDUCATION SECTOR AS A PERCENTAGE OF CURRENT EXPENDITURE ON R&D BY TYPE OF R&D ACTIVITY



## 5.4.23. PERCENTAGE DISTRIBUTION OF CURRENT EXPENDITURE ON R&amp;D IN THE HIGHER EDUCATION SECTOR BY TYPE OF R&amp;D ACTIVITY



## 5.4.24. AVERAGE MONTHLY SALARY OF R&amp;D PERSONNEL IN THE HIGHER EDUCATION SECTOR

	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Average monthly salary, roubles</b>	<b>1400.3</b>	<b>7042.0</b>	<b>23716.4</b>	<b>24963.9</b>	<b>30915.1</b>	<b>34101.0</b>	<b>41258.6</b>	<b>41850.5</b>	<b>43370.8</b>	<b>49437.9</b>	<b>57848.0</b>
As a percentage of the salary:											
in the national economy (=100%)	63.0	82.3	113.2	106.8	116.1	114.5	127.0	123.0	118.1	126.2	132.3
in manufacturing (=100%)	59.2	83.6	124.3	114.6	126.1	126.1	139.8	131.2	125.4	128.4	142.1
in construction (=100%)	53.0	77.9	112.0	105.4	119.1	123.1	140.6	139.7	134.1	146.8	150.2



**R&D Output**

## Publication activity

### 6.1. NUMBER OF PUBLICATIONS BY RUSSIAN AUTHORS IN SCIENTIFIC JOURNALS INDEXED IN SCOPUS BY DOCUMENT TYPE

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Total number of publications</b>										
<b>Publications – total</b>	<b>1309113</b>	<b>1917750</b>	<b>2462451</b>	<b>2750773</b>	<b>2867969</b>	<b>2916880</b>	<b>2882664</b>	<b>2977440</b>	<b>3109574</b>	<b>3156856</b>
Articles	1001702	1108385	1514163	1693871	1832534	1910578	1940606	1980440	2050332	2089232
Conference papers	140236	381889	496061	517149	493317	495057	419381	448807	475093	501129
Reviews	71301	182818	131206	153156	134192	142996	147810	168530	178503	179566
Other	95874	244658	321021	386597	407926	368249	374867	379663	405646	386929
<b>Number of publications by Russian authors</b>										
<b>Publications – total</b>	<b>34590</b>	<b>39900</b>	<b>40671</b>	<b>45217</b>	<b>50131</b>	<b>58664</b>	<b>68060</b>	<b>82488</b>	<b>90099</b>	<b>103001</b>
Articles	30865	29441	31847	33833	38939	44134	51575	57991	60529	66602
Conference papers	2779	8416	6636	7952	7545	11151	12333	18575	22500	28824
Reviews	757	1361	944	1474	1343	1511	2138	3171	4147	4332
Other	189	682	1244	1958	2304	1868	2014	2751	2923	3243
<b>Russia's share in the world total number of publications</b>										
<b>Publications – total</b>	<b>2.64</b>	<b>2.08</b>	<b>1.65</b>	<b>1.64</b>	<b>1.75</b>	<b>2.01</b>	<b>2.36</b>	<b>2.77</b>	<b>2.90</b>	<b>3.26</b>
Articles	3.08	2.66	2.10	2.00	2.12	2.31	2.66	2.93	2.95	3.19
Conference papers	1.98	2.20	1.34	1.54	1.53	2.25	2.94	4.14	4.74	5.75
Reviews	1.06	0.74	0.72	0.96	1.00	1.06	1.45	1.88	2.32	2.41
Other	0.20	0.28	0.39	0.51	0.56	0.51	0.54	0.72	0.72	0.84

## 6.2. NUMBER OF PUBLICATIONS BY RUSSIAN AUTHORS IN SCIENTIFIC JOURNALS INDEXED IN WEB OF SCIENCE BY DOCUMENT TYPE\*

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Total number of publications</b>										
<b>Publications – total</b>	<b>1348967</b>	<b>1755784</b>	<b>2352703</b>	<b>2602752</b>	<b>2720130</b>	<b>2843654</b>	<b>2930913</b>	<b>3061267</b>	<b>3139832</b>	<b>3071585</b>
Articles	797723	1025637	1414171	1587123	1679780	1746776	1808173	1880096	1954116	1983790
Conference papers	239392	306417	323207	342212	341786	374822	399755	423247	417517	330860
Reviews	33587	48390	70776	86323	89286	93726	99565	110786	120765	135318
Other	375736	499023	594964	615325	635424	650344	655203	682843	681509	658073
<b>Number of publications by Russian authors</b>										
<b>Publications – total</b>	<b>32777</b>	<b>32807</b>	<b>41543</b>	<b>44383</b>	<b>47947</b>	<b>54589</b>	<b>62898</b>	<b>73575</b>	<b>81397</b>	<b>84142</b>
Articles	27029	26244	34096	36101	38761	40857	46052	50054	54890	58918
Conference papers	7279	6436	4512	4581	4564	8953	11982	18288	21001	17986
Reviews	642	705	863	890	979	1029	1239	1449	1635	1999
Other	1440	2499	3395	3602	4377	4354	4771	5076	5411	6412
<b>Russia's share in the world total number of publications</b>										
<b>Publications – total</b>	<b>2.43</b>	<b>1.87</b>	<b>1.77</b>	<b>1.71</b>	<b>1.76</b>	<b>1.92</b>	<b>2.15</b>	<b>2.40</b>	<b>2.59</b>	<b>2.74</b>
Articles	3.39	2.56	2.41	2.27	2.31	2.34	2.55	2.66	2.81	2.97
Conference papers	3.04	2.10	1.40	1.34	1.34	2.39	3.00	4.32	5.03	5.44
Reviews	1.91	1.46	1.22	1.03	1.10	1.10	1.24	1.31	1.35	1.48
Other	0.38	0.50	0.57	0.59	0.69	0.67	0.73	0.74	0.79	0.97

\* The sum of the publications breakdown by document type does not add to the total, because one publication may belong to several types.



### 6.3. PUBLICATIONS IN THE SELECTED RESEARCH FIELDS AS A PERCENTAGE OF THE TOTAL NUMBER OF PUBLICATIONS IN SCIENTIFIC JOURNALS INDEXED IN SCOPUS\*

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Russia</b>										
Natural sciences and exact sciences	85.9	81.8	87.2	84.8	81.4	80.0	77.3	76.0	75.7	76.9
Engineering and technology	40.3	40.4	35.0	34.2	33.5	36.1	36.4	36.8	35.1	37.5
Medical sciences	13.1	8.6	9.0	11.0	11.4	11.4	11.5	13.9	14.4	14.2
Agricultural sciences	3.1	2.3	3.4	3.5	3.5	3.6	3.5	3.1	3.3	3.0
Social sciences	1.5	2.2	3.1	5.5	4.9	6.1	9.6	10.6	10.6	10.5
Humanities	0.4	0.5	0.7	1.1	1.1	2.8	4.7	3.2	4.0	4.4
<b>World</b>										
Natural sciences and exact sciences	55.9	53.5	57.6	56.6	56.2	56.7	57.9	58.4	58.7	61.3
Engineering and technology	28.7	32.9	30.4	30.7	31.1	32.2	31.3	31.4	33.5	33.2
Medical sciences	36.9	32.0	31.1	30.7	30.4	30.6	31.2	30.8	29.3	29.3
Agricultural sciences	5.6	5.1	5.9	6.5	6.8	6.6	6.7	6.5	6.5	6.4
Social sciences	10.3	10.1	12.4	11.9	11.8	12.1	12.7	13.1	13.1	13.6
Humanities	2.6	3.4	3.6	3.9	4.0	4.1	4.0	4.0	4.0	4.0

\* The sciences are grouped in accordance with the OECD Fields of Science Classification based on the transitional table provided by the Greek National Documentation Centre. The sum in the column does not add up to the total, because one publication may belong to two and more fields of science. The calculations are based on the data from the Scopus SciVal web-based analytics solutions.

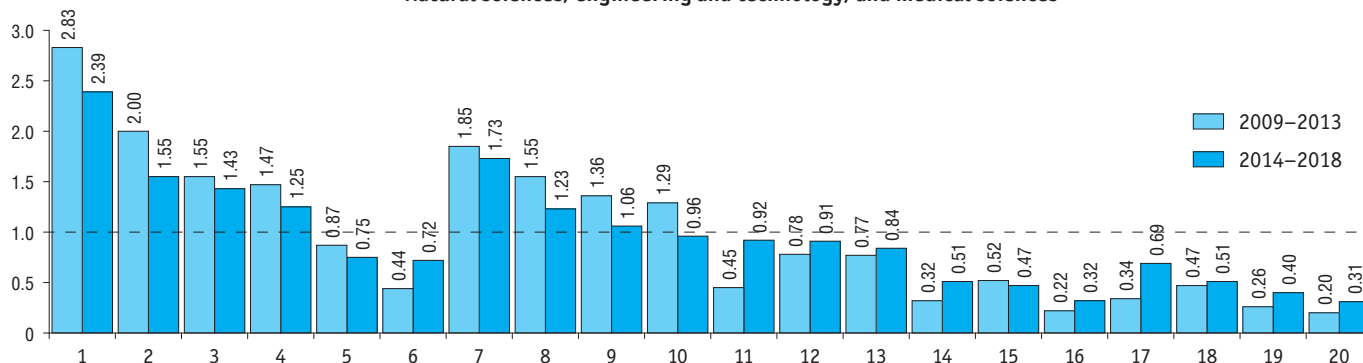
#### 6.4. PUBLICATIONS IN THE SELECTED RESEARCH FIELDS AS A PERCENTAGE OF THE TOTAL NUMBER OF PUBLICATIONS IN SCIENTIFIC JOURNALS INDEXED IN WEB OF SCIENCE\*

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Russia</b>										
Natural sciences and exact sciences	79.9	77.3	71.1	68.1	66.4	64.0	62.8	60.5	58.7	59.6
Engineering and technology	28.8	29.7	24.4	26.0	25.6	30.0	31.0	32.9	32.8	31.8
Medical sciences	6.5	7.1	8.2	8.7	8.8	7.3	7.1	7.1	7.0	7.5
Agricultural sciences	1.1	1.2	1.0	0.9	1.1	1.0	1.0	1.2	1.0	1.4
Social sciences	2.2	3.2	6.3	7.4	7.5	8.4	9.3	10.3	11.9	11.2
Humanities	0.5	1.1	2.4	3.1	3.6	5.0	5.4	5.4	7.1	6.8
<b>World</b>										
Natural sciences and exact sciences	51.3	50.4	45.6	43.8	43.5	43.8	44.4	44.1	43.8	44.4
Engineering and technology	27.0	27.4	28.0	29.7	29.8	30.3	30.1	30.8	31.4	30.7
Medical sciences	29.1	26.8	27.2	26.9	27.0	26.7	26.7	26.4	26.3	27.3
Agricultural sciences	4.7	4.2	4.3	4.2	4.1	3.9	3.9	3.9	3.9	4.0
Social sciences	8.1	10.3	13.4	13.0	13.3	13.3	13.6	13.6	14.0	12.9
Humanities	4.1	4.3	5.0	5.2	5.3	5.2	5.1	5.1	5.3	4.4

\* The sciences are grouped in accordance with the OECD Fields of Science Classification based on the transitional table provided by Thomson Reuters. The sum in the column does not add up to the total, because one publication may belong to two and more fields of science. The calculations are presented according to the data of the analytical system InCites (Clarivate Analytics).

### 6.5. RUSSIA'S SCIENTIFIC SPECIALISATION INDICES BY PUBLICATIONS IN SCIENTIFIC JOURNALS INDEXED IN SCOPUS BY FIELD OF SCIENCE AND TECHNOLOGY\*

#### Natural sciences, engineering and technology, and medical sciences



#### Natural sciences

- 1 – Physical sciences
- 2 – Chemical sciences
- 3 – Mathematics
- 4 – Earth and related environmental sciences
- 5 – Biological sciences
- 6 – Computer and information sciences

#### Engineering and technology

- 7 – Materials engineering
- 8 – Nanotechnology
- 9 – Chemical engineering
- 10 – Energy sector and rational use of natural resources

#### 11 – Medical technologies

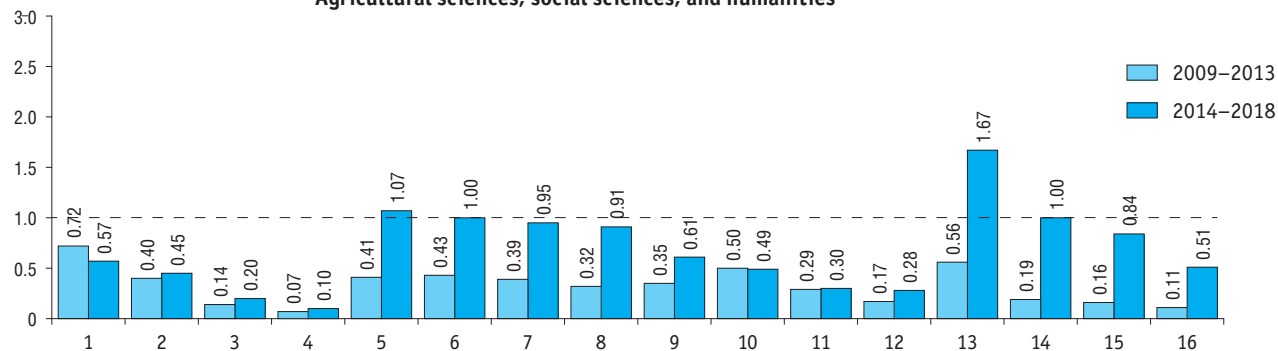
- 12 – Mechanical engineering
- 13 – Electrical engineering, electronic engineering, and information technology
- 14 – Industrial biotechnology
- 15 – Environmental biotechnology
- 16 – Construction and architecture

#### Medical sciences

- 17 – Medical biotechnologies
- 18 – Basic medicine
- 19 – Clinical medicine
- 20 – Health sciences

(continued)

### Agricultural sciences, social sciences, and humanities



#### Agricultural sciences

- 1 – Agriculture, forestry and fisheries
- 2 – Animal and dairy farming
- 3 – Veterinary science
- 4 – Agricultural biotechnologies

#### Social sciences

- 5 – Economics and business
- 6 – Political sciences
- 7 – Sociology
- 8 – Educational sciences

#### 9 – Law

- 10 – Social and economic geography
- 11 – Media and communications
- 12 – Psychology

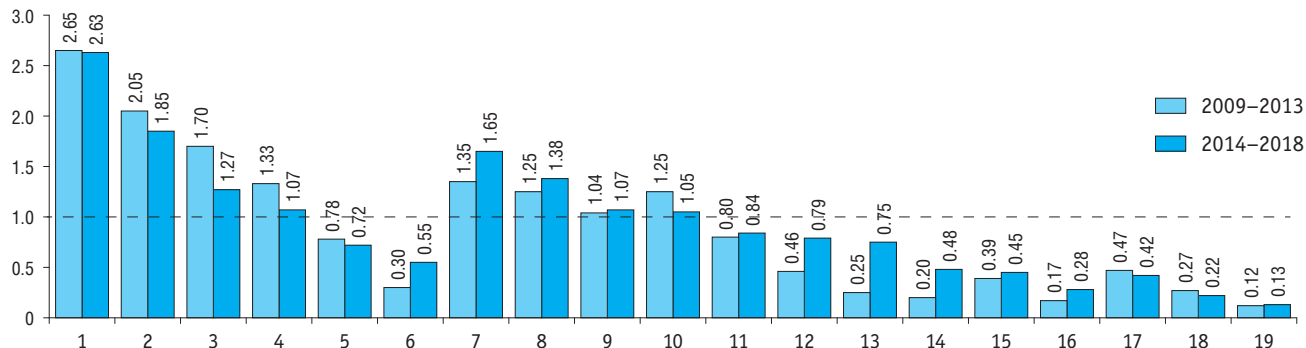
#### Humanities

- 13 – History and archaeology
- 14 – Philosophy, ethics, religion
- 15 – Languages and literature
- 16 – Art (arts, history of arts, etc.)

\* The sciences are grouped in accordance with the OECD Fields of Science Classification based on the transitional table provided by the Greek National Documentation Centre. The calculations are based on the data from the Scopus SciVal web-based analytics solutions.

## 6.6. RUSSIA'S SCIENTIFIC SPECIALISATION INDICES BY PUBLICATIONS IN SCIENTIFIC JOURNALS INDEXED IN WEB OF SCIENCE BY FIELD OF SCIENCE AND TECHNOLOGY\*

### Natural sciences, engineering and technology, and medical sciences



#### Natural sciences

- 1 – Physical sciences
- 2 – Mathematics
- 3 – Chemical sciences
- 4 – Earth and related environmental sciences
- 5 – Biological sciences
- 6 – Computer and information sciences

#### Engineering and technology

- 7 – Mechanical engineering
- 8 – Materials engineering
- 9 – Nanotechnology
- 10 – Chemical engineering

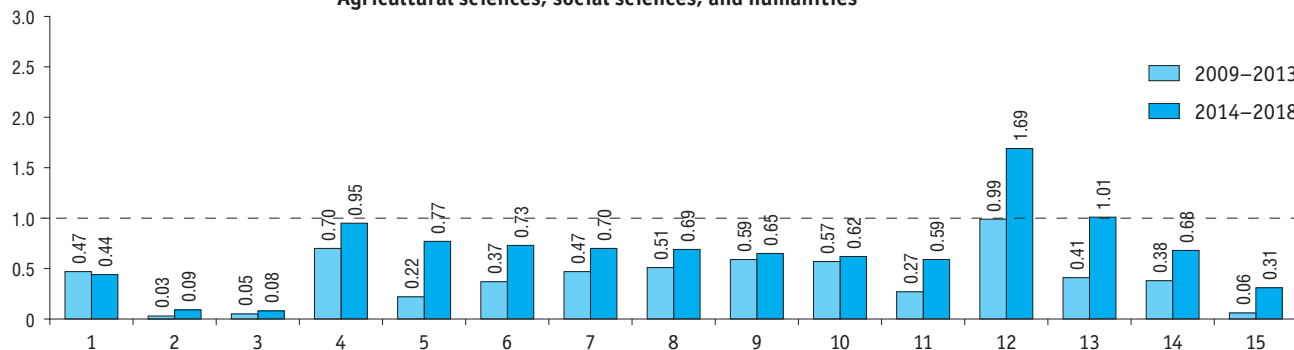
- 11 – Energy sector and rational use of natural resources
- 12 – Electrical engineering, electronic engineering, information engineering
- 13 – Construction and architecture
- 14 – Industrial biotechnology
- 15 – Environmental biotechnology
- 16 – Medical technologies

#### Medical sciences

- 17 – Basic medicine
- 18 – Clinical medicine
- 19 – Health sciences

(continued)

### Agricultural sciences, social sciences, and humanities



#### Agricultural sciences

- 1 – Agriculture, forestry, and fisheries
- 2 – Veterinary science
- 3 – Animal and dairy science

#### Social sciences

- 4 – Law
- 5 – Educational sciences
- 6 – Social and economic geography
- 7 – Economics and business
- 8 – Political science

#### 9 – Psychology

- 10 – Sociology
- 11 – Media and communication

#### Humanities

- 12 – History and archaeology
- 13 – Languages and literature
- 14 – Philosophy, ethics, and religion
- 15 – Art (arts, history of arts, etc.)

\* The sciences are grouped in accordance with the OECD Fields of Science Classification based on the transitional table provided by Thomson Reuters. The calculations are presented according to the data of the analytical system InCites (Clarivate Analytics).

### 6.7. MAIN INDICATORS OF RUSSIAN AUTHORS' CONTRIBUTION TO THE WORLD TOTAL NUMBER OF PUBLICATIONS IN SCIENTIFIC JOURNALS INDEXED IN SCOPUS BY FIELD OF RESEARCH: 2018

	Number of publications by Russian authors	Russia's share in the world total number of publications	Russia's rank by number of publications
<b>Natural sciences and exact sciences</b>			
Physical sciences	32701	7.50	4
Chemical sciences	16277	4.64	6
Earth and related environmental sciences	15030	4.06	10
Mathematics	11302	4.63	7
Biological sciences	11245	2.45	14
Computer and information sciences	10688	2.62	11
Interdisciplinary research	588	1.53	20
<b>Engineering and technology</b>			
Materials engineering	21309	5.97	4
Electrical engineering, electronic engineering, and information technology	6683	3.11	9
Mechanical engineering	6588	3.33	9
Chemical engineering	6585	3.70	8
Construction and architecture	801	1.34	20
Medical technologies	795	2.00	19
Nanotechnology	736	3.93	...
Energy sector and rational use of natural resources	725	1.01	28
Environmental biotechnology	296	1.33	...
Industrial biotechnology	74	1.00	...
<b>Medical sciences</b>			
Clinical medicine	9843	1.64	19
Basic medicine	4622	1.73	17
Health sciences	1919	1.37	19
Medical biotechnologies	593	1.82	18

(continued)

	Number of publications by Russian authors	Russia's share in the world total number of publications	Russia's rank by number of publications
<b>Agricultural sciences</b>			
Agriculture, forestry and fisheries	2806	1.70	19
Animal and dairy farming	828	1.38	24
Veterinary science	98	0.46	46
Agricultural biotechnologies	9	0.61	...
<b>Social sciences</b>			
Economics and business	3987	3.82	8
Sociology	2980	3.97	7
Educational Sciences	1987	3.80	9
Psychology	975	1.30	19
Political sciences	840	4.27	5
Social and economic geography	615	1.54	19
Law	346	1.70	14
Media and communications	149	1.07	25
<b>Humanities</b>			
History and archaeology	1963	6.37	3
Languages and literature	1331	3.71	6
Philosophy, ethics, religion	1297	5.39	3
Art (arts, history of arts, etc.)	308	2.25	9



### 6.8. MAIN INDICATORS OF RUSSIAN AUTHORS' CONTRIBUTION TO THE WORLD TOTAL NUMBER OF PUBLICATIONS IN SCIENTIFIC JOURNALS INDEXED IN WEB OF SCIENCE BY FIELD OF RESEARCH: 2019

	Number of publications by Russian authors	Russia's share in the world total number of publications	Russia's rank by number of publications
<b>Natural sciences and exact sciences</b>			
Physical sciences	19771	8.40	4
Chemical sciences	9905	3.70	9
Biological sciences	6459	2.41	15
Earth and related environmental sciences	5786	3.31	12
Mathematics	5044	5.72	5
Computer and information sciences	2561	1.60	17
Interdisciplinary research	834	10.72	2
<b>Engineering and technology</b>			
Materials engineering	7011	4.07	8
Electrical engineering, electronic engineering, and information technology	5704	2.48	11
Mechanical engineering	5443	6.58	3
Energy sector and rational use of natural resources	3695	2.80	13
Chemical engineering	1207	2.90	12
Nanotechnology	1202	2.52	12
Construction and architecture	1201	2.78	12
Environmental biotechnology	542	1.76	16
Medical technologies	186	0.76	29–31
Industrial biotechnology	129	1.38	21
<b>Medical sciences</b>			
Clinical medicine	2836	0.75	31
Basic medicine	2709	1.33	22
Health sciences	586	0.41	49

(continued)

	Number of publications by Russian authors	Russia's share in the world total number of publications	Russia's rank by number of publications
<b>Agricultural sciences</b>			
Agriculture, forestry and fisheries	748	1.70	19
Veterinary science	56	0.34	51–52
Animal and dairy farming	56	0.60	39
<b>Social sciences</b>			
Economics and business	1919	2.28	13
Social and economic geography	1490	3.07	10
Educational Sciences	1743	3.29	9
Psychology	1155	2.31	11
Sociology	661	1.82	13
Political sciences	657	2.73	9
Law	354	1.88	11
Media and communications	299	1.83	13
<b>Humanities</b>			
History and archaeology	1983	7.26	3
Languages and literature	1077	3.43	8
Philosophy, ethics, religion	691	2.87	9
Art (arts, history of arts, etc.)	193	1.13	14

## 6.9. MAIN CITATION INDICATORS OF PUBLICATIONS BY RUSSIAN AUTHORS IN SCIENTIFIC JOURNALS INDEXED IN SCOPUS

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
Ratio of average citation level of publications by Russian authors to the world citation average*	0.38	0.47	0.54	0.65	0.61	0.62	0.59	0.61	0.60	0.54
Citations of publications by Russian authors as a percentage of the world citation total	1.07	1.09	0.97	1.17	1.18	1.37	1.55	1.85	1.95	1.95
Number of highly cited publications by Russian authors**	78	116	144	206	248	326	280	408	420	458
Publications by Russian authors as a percentage of the world total number of highly cited publications**	0.64	0.69	0.67	0.87	1.00	1.26	1.11	1.55	1.55	1.61
Publications in Q1 journals as a percentage of the total number of publications by Russian authors***	25.0	22.9	20.8	21.9	21.5	20.1	18.0	16.9	15.6	15.7
Number of publications in Q1 journals as a percentage of the world total number of publications	43.0	38.8	37.2	38.8	39.9	40.3	40.9	41.1	40.1	41.5

\* Average citation level of publications is calculated as a ratio of the number of citations the publications have received in the specific year between the point in time when they were indexed in the Scopus base and the time of the analysis to the total number of publications of that year indexed in Scopus.

\*\* Highly cited publications are the top 1% of the most cited publications.

\*\*\* Q1 (first quartile) journals are the top 25% of journals having the highest SCIMago Journal (SJR) score for one of its classified subdisciplines. The calculations are based on the data from the Scopus SciVal web-based analytics solutions.

## 6.10. MAIN CITATION INDICATORS OF PUBLICATIONS BY RUSSIAN AUTHORS IN SCIENTIFIC JOURNALS INDEXED IN WEB OF SCIENCE

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
Ratio of average citation level of publications by Russian authors to the world citation average*	0.49	0.66	0.62	0.77	0.73	0.77	0.76	0.77	0.74	0.72
Citations of publications by Russian authors as a percentage in the world citation total	1.17	1.16	1.04	1.24	1.20	1.40	1.54	1.76	1.84	1.86
Number of highly cited publications by Russian authors**	...	...	106	149	178	223	207	266	293	276
Publications by Russian authors as a percentage of the world total number of highly cited publications**	...	...	0.87	1.09	1.24	1.50	1.34	1.66	1.78	1.63
Publications in Q1 journals as a percentage of the total number of publications by Russian authors***	20.7	21.9	18.5	22.3	22.0	24.0	23.7	23.7	24.2	24.7
Number of publications in Q1 journals as a percentage of the world total number of publications	42.4	43.6	43.0	44.3	44.2	44.9	43.2	43.2	42.9	42.1

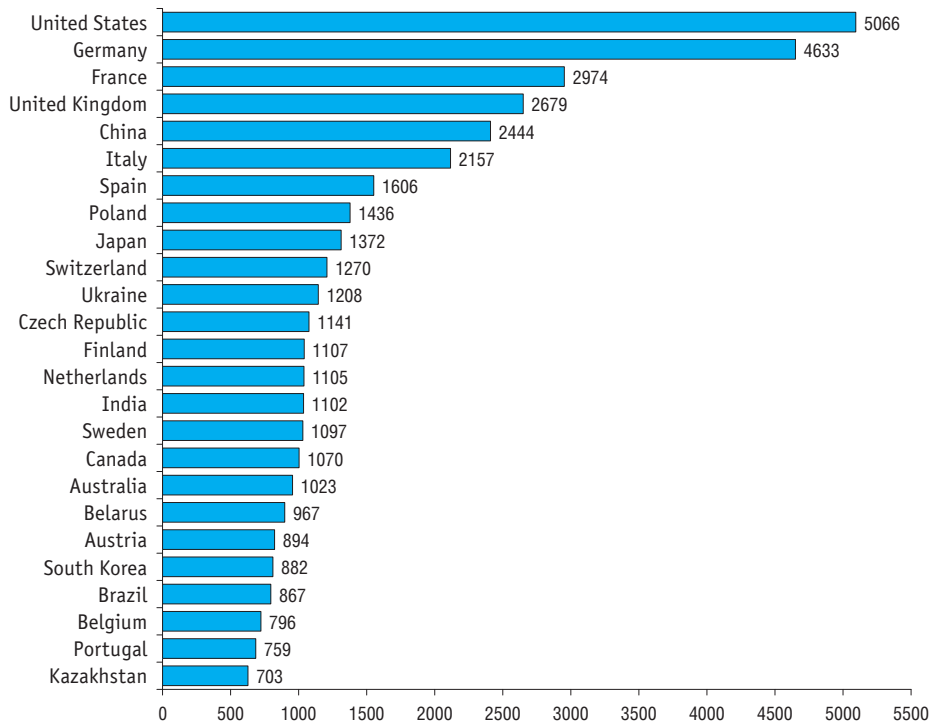
\* Average citation level of publications is calculated as a ratio of the number of citations the publications have received in the specific year between the point in time when they were indexed in the Web of Science base and the time of the analysis to the total number of publications of that year indexed in Web of Science.

\*\* Highly cited publications are the top 1% of the most cited publications.

\*\*\* Q1 (first quartile) journals have a highest Journal Impact Factor in the top 25% of journals for one of its classified subdisciplines. The calculations are presented according to the data of the analytical system InCites (Clarivate Analytics).

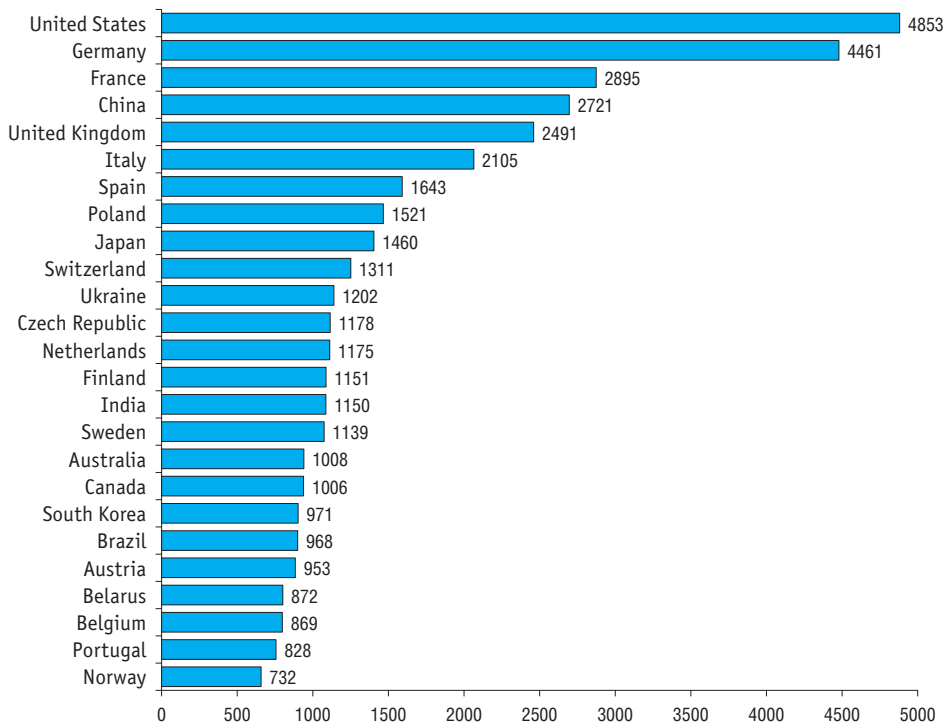
### 6.11. NUMBER OF PUBLICATIONS BY RUSSIAN AUTHORS WITH INTERNATIONAL COLLABORATION IN SCIENTIFIC JOURNALS INDEXED IN SCOPUS BY PARTNER COUNTRY: 2018

Total number of publications by Russian authors with international collaboration: 22,265



## 6.12. NUMBER OF PUBLICATIONS BY RUSSIAN AUTHORS WITH INTERNATIONAL COLLABORATION IN SCIENTIFIC JOURNALS INDEXED IN WEB OF SCIENCE BY PARTNER COUNTRY: 2018

Total number of publications by Russian authors with international collaboration: 19,945

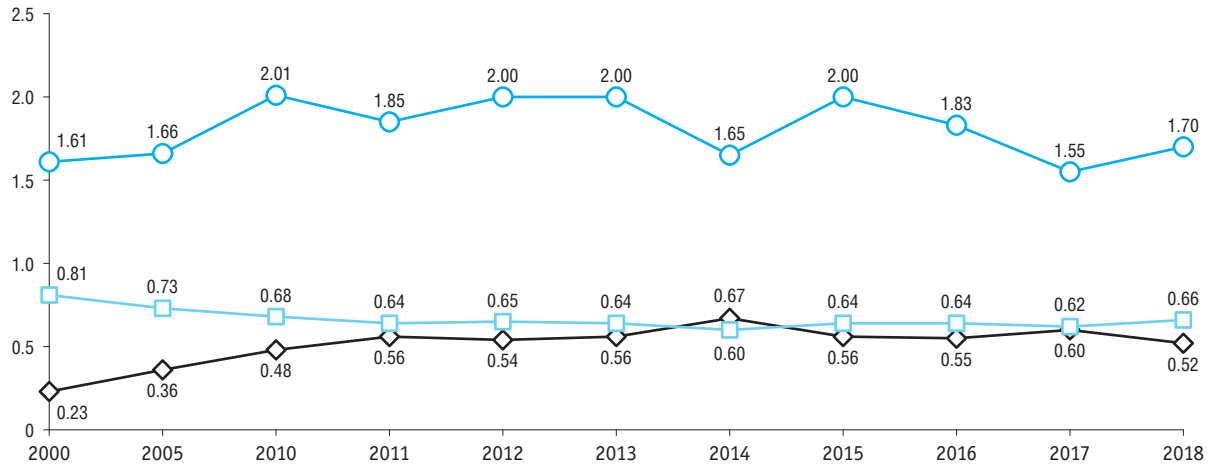


## Patent activity

### 6.13. PATENT APPLICATIONS AND PATENT GRANTS

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
Patent applications filed in the Russian Federation	28688	32254	42500	44211	44914	40308	45517	41587	36454	37957
By Russian residents	23377	23644	28722	28701	28765	24072	29269	26795	22777	24926
By non-residents	5311	8610	13778	15510	16149	16236	16248	14792	13677	13031
Patent grants received in the Russian Federation	17592	23390	30322	32880	31638	33950	34706	33536	34254	35774
By Russian residents	14444	19447	21627	22481	21378	23065	22560	21020	21037	20526
By non-residents	3148	3943	8695	10399	10260	10885	12146	12516	13217	15248
Patents in force in the Russian Federation	144325	123089	181904	181515	194248	208320	218974	230870	244321	256419

## 6.14. PATENT ACTIVITY INDICATORS



- Inventiveness ratio – number of patent applications filed in the Russian Federation by Russian residents per 10,000 population
- Self-sufficiency ratio – number of patent applications filed in the Russian Federation by Russian residents to the total number of patent applications filed in the Russian Federation
- ◇— Technological dependency ratio – number of patent applications filed in the Russian Federation by non-residents to the number of patent applications filed in the Russian Federation by Russian residents

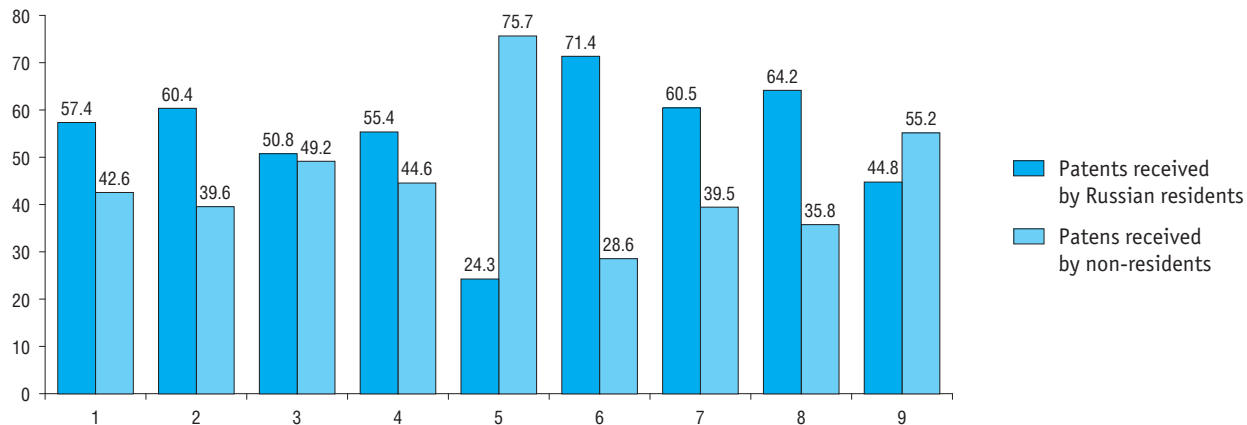


## 6.15. PATENT GRANTS RECEIVED IN THE RUSSIAN FEDERATION BY SECTION OF THE INTERNATIONAL PATENT CLASSIFICATION\*

	2000	2010	2012	2013	2014	2015	2016	2017	2018
<b>Total</b>	<b>17592</b>	<b>30322</b>	<b>32880</b>	<b>31638</b>	<b>33950</b>	<b>34706</b>	<b>33536</b>	<b>34254</b>	<b>35774</b>
A. Human necessities	4347	8468	9506	8042	9890	8283	7344	7577	7647
B. Performing operations; transporting	2905	4711	4969	4965	5331	5618	4689	5501	6216
C. Chemistry; metallurgy	3332	5167	5524	5779	5154	5910	7894	5677	5362
D. Textiles; paper	197	320	274	271	305	266	253	299	342
E. Fixed constructions; mining	1156	1977	1898	1807	2033	2068	1925	2087	2241
F. Mechanical engineering; lighting; heating; engines and pumps; weapons; blasting	2144	3062	3246	3453	3459	3824	3434	3972	4262
G. Physics	2172	3734	4381	4285	4484	5231	4785	5736	6041
H. Electricity	1339	2883	3082	3036	3294	3506	3212	3405	3663

\* Patent grants received by both Russian residents and non-residents.

## 6.16. PERCENTAGE DISTRIBUTION OF PATENT GRANTS RECEIVED IN THE RUSSIAN FEDERATION BY ASSIGNEE AND SECTION OF THE INTERNATIONAL PATENT CLASSIFICATION: 2018



1 – total

2 – human necessities

3 – performing operations; transporting

4 – chemistry; metallurgy

5 – textiles; paper

6 – fixed constructions; mining fixed constructions; mining

7 – mechanical engineering; lighting; heating; engines and pumps; weapons; blasting

8 – physics

9 – electricity

## 6.17. UTILITY MODEL APPLICATIONS AND GRANTS

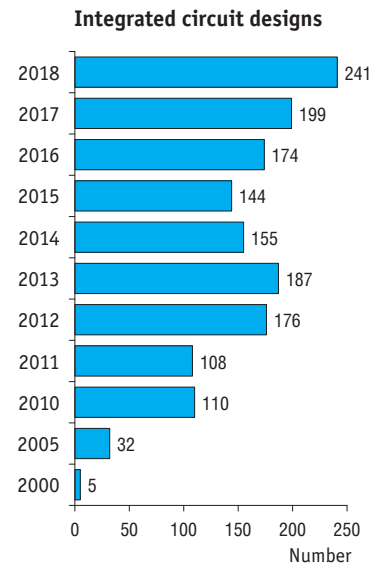
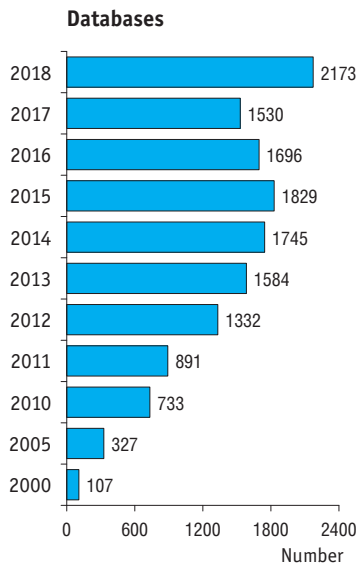
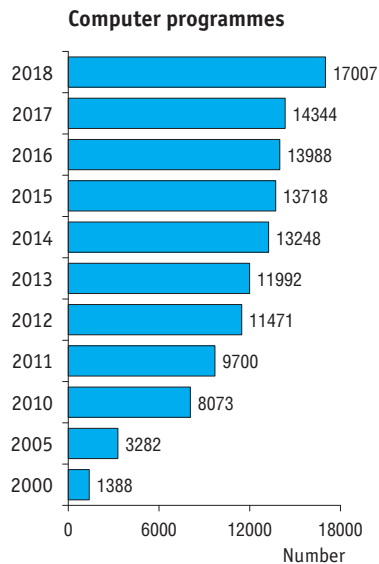
	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
Patent applications filed in the Russian Federation	4631	9473	12262	14069	14358	13952	11906	11112	10643	9747
By Russian residents	4549	9082	11757	13479	13589	13000	11403	10643	10152	9262
By non-residents	82	391	505	590	769	952	503	469	491	485
Patent grants received in the Russian Federation	4098	7242	10581	11671	12653	13080	9008	8875	8774	9867
By Russian residents	4041	6958	10187	11152	12154	12267	8390	8474	8376	9391
By non-residents	57	284	394	519	499	813	618	401	398	476
Patents in force in the Russian Federation	15498	28364	54848	50746	54420	58238	57448	53263	50078	49345

## 6.18. UTILITY MODEL GRANTS RECEIVED IN THE RUSSIAN FEDERATION BY SECTION OF THE INTERNATIONAL PATENT CLASSIFICATION\*

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Total</b>	<b>4098</b>	<b>7242</b>	<b>10581</b>	<b>11671</b>	<b>12653</b>	<b>13080</b>	<b>9008</b>	<b>8875</b>	<b>8774</b>	<b>9867</b>
A. Human necessities	835	1344	1914	1933	2091	2240	1579	1550	1717	2081
B. Performing operations; transporting	1004	1741	2411	2678	2917	2935	2021	2034	2143	2630
C. Chemistry; metallurgy	145	289	398	370	398	383	269	194	261	226
D. Textiles; paper	73	73	57	55	52	45	42	36	30	44
E. Fixed constructions; mining	465	1022	1503	1466	1611	1684	1192	1184	1058	1107
F. Mechanical engineering; lighting; heating; engines and pumps; weapons; blasting	679	1111	1701	1957	2112	2459	1557	1487	1419	1630
G. Physics	490	949	1580	1912	2017	2011	1376	1343	1193	1243
H. Electricity	407	713	1017	1300	1455	1323	972	1047	953	906

\* Patent grants received by both Russian residents and non-residents.

## 6.19. REGISTRATION OF INTELLECTUAL PROPERTY ITEMS IN THE FIELD OF INFORMATION TECHNOLOGY



## Development and use of advanced manufacturing technologies

### 6.20. DEVELOPMENT OF ADVANCED MANUFACTURING TECHNOLOGIES BY TYPE

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Advanced manufacturing technologies</b>	<b>688</b>	<b>637</b>	<b>864</b>	<b>1323</b>	<b>1429</b>	<b>1409</b>	<b>1398</b>	<b>1534</b>	<b>1402</b>	<b>1565</b>
Of which:										
design and engineering	165	138	216	305	426	445	359	402	417	458
fabrication, processing, and assembling	281	291	383	548	517	506	548	509	485	492
automated material handling	20	9	18	23	22	22	12	34	34	40
automated inspection and/or testing equipment	76	91	116	121	137	110	117	160	134	165
communications and control	90	57	70	204	206	202	232	285	218	292
manufacturing information systems	18	21	20	60	68	65	84	83	44	72
integrated management and control	38	30	41	62	53	59	46	61	70	46

## 6.21. DEVELOPMENT OF ADVANCED MANUFACTURING TECHNOLOGIES BY DEGREE OF NOVELTY AND TYPE

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Technologies new to the country</b>	<b>569</b>	<b>538</b>	<b>762</b>	<b>1188</b>	<b>1276</b>	<b>1245</b>	<b>1223</b>	<b>1342</b>	<b>1212</b>	<b>1384</b>
Of which:										
design and engineering	136	125	191	269	367	390	323	352	358	420
fabrication, processing, and assembling	231	239	336	491	469	450	471	449	417	441
automated material handling	19	8	16	21	21	20	10	29	27	37
automated inspection and/or testing equipment	66	72	98	101	108	84	82	111	107	114
communications and control	74	52	67	194	195	187	218	264	194	266
manufacturing information systems	14	20	17	55	66	59	78	80	44	65
integrated management and control	29	22	37	57	50	55	41	57	65	41
<b>Radically new technologies</b>	<b>72</b>	<b>60</b>	<b>102</b>	<b>135</b>	<b>153</b>	<b>164</b>	<b>175</b>	<b>192</b>	<b>190</b>	<b>181</b>
Of which:										
design and engineering	12	12	25	36	59	55	36	50	59	38
fabrication, processing, and assembling	32	30	47	57	48	56	77	60	68	51
automated material handling	1	–	2	2	1	2	2	5	7	3
automated inspection and/or testing equipment	6	12	18	20	29	26	35	49	27	51
communications and control	9	4	3	10	11	15	14	21	24	26
manufacturing information systems	4	1	3	5	2	6	6	3	–	7
integrated management and control	8	1	4	5	3	4	5	4	5	5

## 6.22. DEVELOPMENT OF ADVANCED MANUFACTURING TECHNOLOGIES BY DEGREE OF NOVELTY AND TYPE OF ECONOMIC ACTIVITY

	Total		Of which technologies			
	2017	2018	new to the country		radically new	
			2017	2018	2017	2018
<b>Advanced manufacturing technologies</b>	<b>1402</b>	<b>1565</b>	<b>1212</b>	<b>1384</b>	<b>190</b>	<b>181</b>
Mining and quarrying	23	22	23	21	–	1
Manufacturing	442	502	409	468	33	34
Electricity, gas, steam and air-conditioning supply	31	34	29	33	2	1
Water supply; sewerage, waste management and remediation activities	25	49	25	49	–	–
Wholesale and retail trade; repair of motor vehicles and motorcycles	1	1	1	1	–	–
Information and communication	86	118	75	106	11	12
Professional, scientific and technical activities	513	540	412	440	101	100
Of which research and development	490	518	391	419	99	99
Education	280	299	237	266	43	33
Of which higher education	280	299	237	266	43	33
Other service activities	1	–	1	–	–	–



## 6.23. USE OF ADVANCED MANUFACTURING TECHNOLOGIES BY TYPE

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Advanced manufacturing technologies</b>	<b>70069</b>	<b>140983</b>	<b>203330</b>	<b>191372</b>	<b>193830</b>	<b>204546</b>	<b>218018</b>	<b>232388</b>	<b>240054</b>	<b>254927</b>
Of which:										
design and engineering	14385	43273	56130	39664	38735	38598	39831	40658	41130	41097
fabrication, processing, and assembling	35408	42976	55438	55579	55424	58111	63379	67726	70160	80400
automated material handling	685	970	1853	1570	1823	1983	2129	2316	2484	2628
automated inspection and/or testing equipment	2409	4525	9106	9519	11314	12263	12876	13523	14329	13717
communications and control	13713	44135	72798	76479	78028	84730	89967	96846	99525	104060
manufacturing information systems	1823	3177	4848	5171	5293	5555	6300	7275	7733	8257
integrated management and control	1646	1927	3157	3390	3213	3306	3536	4044	4693	4768

## 6.24. USE OF ADVANCED MANUFACTURING TECHNOLOGIES BY TYPE AND DURATION

	Total		Of which technology used during the period of					
			less than 1 year		1–5 years		6 years and more	
	2017	2018	2017	2018	2017	2018	2017	2018
<b>Advanced manufacturing technologies</b>	<b>240054</b>	<b>254927</b>	<b>17243</b>	<b>17146</b>	<b>88721</b>	<b>90788</b>	<b>134090</b>	<b>146993</b>
Of which:								
design and engineering	41130	41097	4175	2706	15064	15469	21891	22922
fabrication, processing, and assembling	70160	80400	5083	6198	24274	24580	40803	49622
automated material handling	2484	2628	175	225	933	988	1376	1415
automated inspection and/or testing equipment	14329	13717	1148	1171	6760	5701	6421	6845
communications and control	99525	104060	5089	5952	37552	39003	56884	59105
manufacturing information systems	7733	8257	951	667	2732	3239	4050	4351
integrated management and control	4693	4768	622	227	1406	1808	2665	2733

## 6.25. USE OF ADVANCED MANUFACTURING TECHNOLOGIES BY TYPE OF ECONOMIC ACTIVITY AND DURATION

	Total		Of which technology used during the period of					
			less than 1 year		1–5 years		6 years and more	
	2017	2018	2017	2018	2017	2018	2017	2018
<b>Advanced manufacturing technologies</b>	<b>240054</b>	<b>254927</b>	<b>17243</b>	<b>17146</b>	<b>88721</b>	<b>90788</b>	<b>134090</b>	<b>146993</b>
Mining and quarrying	10181	11128	334	539	5116	5410	4731	5179
Manufacturing	157881	164906	10804	11197	55089	53969	91988	99740
Electricity, gas, steam and air-conditioning supply	21766	22473	1330	1322	8793	7880	11643	13271
Water supply; sewerage, waste management and remediation activities	4596	5522	359	480	1968	2449	2269	2593
Wholesale and retail trade; repair of motor vehicles and motorcycles	709	1730	9	154	523	1326	177	250
Information and communication	11865	14470	2107	1042	4504	5973	5254	7455
Professional, scientific and technical activities	27897	28104	1889	1934	10637	10810	15371	15360
Of which research and development	23628	24361	1614	1652	8870	9126	13144	13583
Education	5120	5679	411	429	2077	2212	2632	3038
Of which higher education	5120	5398	411	417	2077	2088	2632	2893
Other service activities	39	915	–	49	14	759	25	107

## 6.26. USE OF ADVANCED MANUFACTURING TECHNOLOGIES BY TYPE AND SOURCE OF ACQUISITION: 2018

	Total	Of which technologies		
		developed in the reporting entity	acquired	
			in Russia	abroad
<b>Advanced manufacturing technologies</b>	<b>254927</b>	<b>47261</b>	<b>132863</b>	<b>74803</b>
Of which:				
design and engineering	41097	11111	22917	7069
fabrication, processing, and assembling	80400	24777	27069	28554
automated material handling	2628	256	1156	1216
automated inspection and/or testing equipment	13717	1880	8402	3435
communications and control	104060	7086	65058	31916
manufacturing information systems	8257	1572	5194	1491
integrated management and control	4768	579	3067	1122

## 6.27. USE OF ADVANCED MANUFACTURING TECHNOLOGIES BY TYPE OF ECONOMIC ACTIVITY AND SOURCE OF ACQUISITION: 2018

	Total	Of which technologies		
		developed in the reporting entity	acquired	
			in Russia	abroad
<b>Advanced manufacturing technologies</b>	<b>254927</b>	<b>47261</b>	<b>132863</b>	<b>74803</b>
Mining and quarrying	11128	477	8627	2024
Manufacturing	164906	34861	72229	57816
Electricity, gas, steam and air-conditioning supply	22473	1305	17921	3247
Water supply; sewerage, waste management and remediation activities	5522	535	4464	523
Wholesale and retail trade; repair of motor vehicles and motorcycles	1730	9	1677	44
Information and communication	14470	841	10047	3582
Professional, scientific and technical activities	28104	7451	14115	6538
Of which research and development	24361	7293	10996	6072
Education	5679	1771	2912	996
Of which higher education	5398	1757	2675	966
Other service activities	915	11	871	33

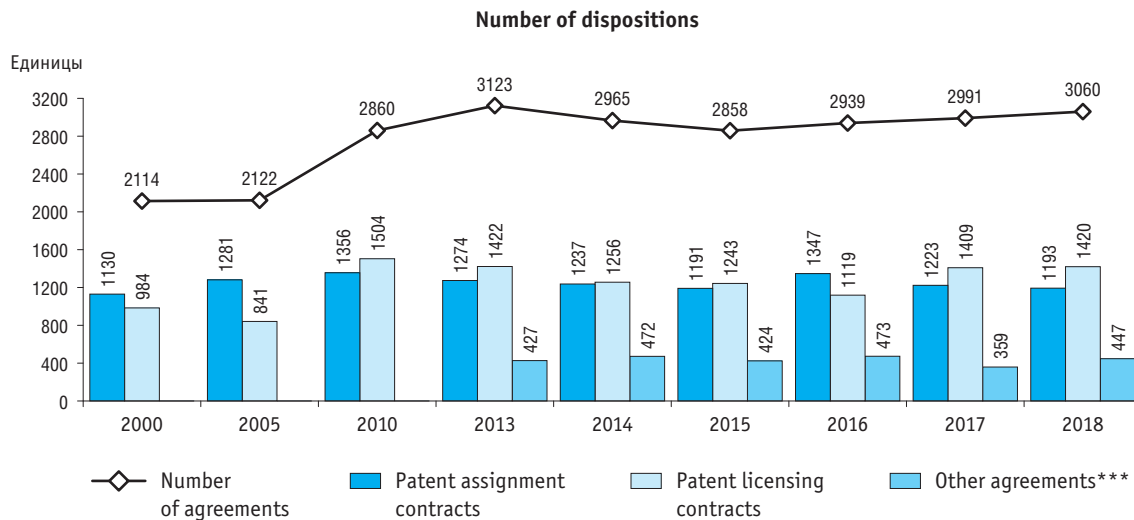
## 6.28. USE OF ADVANCED MANUFACTURING TECHNOLOGIES DEVELOPED ON THE BASIS OF INVENTION PATENTS BY TYPE

	2000	2005	2010	2012*	2013	2014	2015	2016	2017	2018
<b>Advanced manufacturing technologies</b>	<b>2804</b>	<b>3072</b>	<b>1012</b>	<b>6032</b>	<b>9099</b>	<b>9519</b>	<b>9249</b>	<b>9617</b>	<b>9127</b>	<b>8802</b>
Of which:										
design and engineering	1115	1055	274	1582	2193	2129	1819	1837	1606	1523
fabrication, processing, and assembling	1231	1411	337	2236	2670	3203	3274	3194	3190	2832
automated material handling	45	16	18	69	218	131	121	132	123	103
automated inspection and/or testing equipment	171	262	116	739	726	715	704	769	763	807
communications and control	182	258	209	1138	2844	2870	2775	3023	2844	2986
manufacturing information systems	9	44	31	172	321	316	395	500	470	386
integrated management and control	51	26	27	96	127	155	161	162	131	165

\* Due to the changes made in methodology in 2011, the data are not comparable with the results for previous years.

## Commercialisation of technology in domestic market

### 6.29. STATE REGISTRATION\* OF DISPOSITIONS OF THE EXCLUSIVE RIGHTS TO INVENTIONS, UTILITY MODELS, AND INDUSTRIAL DESIGNS BY PATENT ASSIGNMENT AND PATENT LICENSING CONTRACTS\*\*

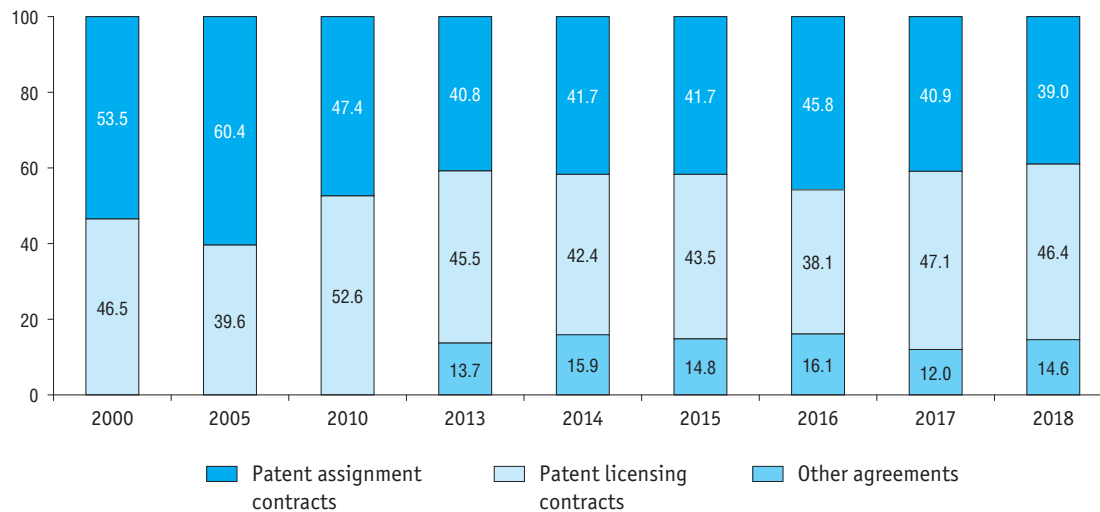


\* Here and below: until October 1, 2014, registration of exclusive licences.

\*\* Before 2008 – patent cession agreements.

\*\*\* Other agreements include pledge agreements, deeds of amendment to registered agreements, and early terminations of registered agreements.

### 6.30. PERCENTAGE DISTRIBUTION OF DISPOSITIONS BY TYPE OF AGREEMENTS

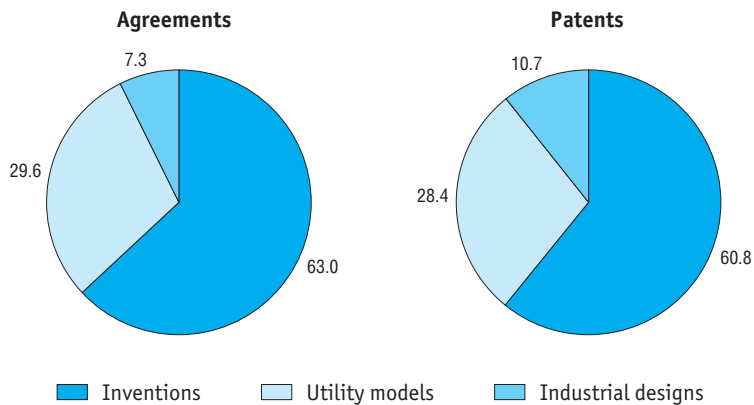




### 6.31. STATE REGISTRATION OF DISPOSITIONS UNDER AGREEMENTS AND PATENTS WITH REGISTERED DISPOSITIONS BY TYPE OF INTELLECTUAL PROPERTY

	Agreements					Patents				
	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018
<b>Total</b>	<b>2965</b>	<b>2858</b>	<b>2939</b>	<b>2991</b>	<b>3060</b>	<b>6375</b>	<b>6806</b>	<b>6633</b>	<b>7356</b>	<b>7357</b>
Inventions	1789	1693	1847	1864	1929	3483	4271	4224	4303	4475
Utility models	981	927	872	897	907	2243	1795	1899	2148	2093
Industrial designs	195	238	220	230	224	649	740	510	905	789

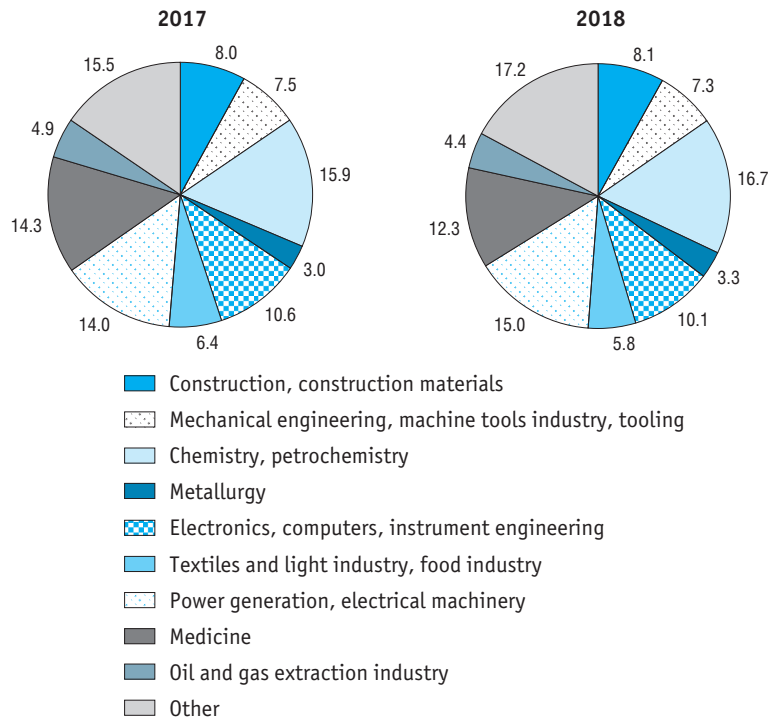
### 6.32. PERCENTAGE DISTRIBUTION OF DISPOSITIONS UNDER AGREEMENTS AND PATENTS WITH REGISTERED DISPOSITIONS BY TYPE OF INTELLECTUAL PROPERTY: 2018



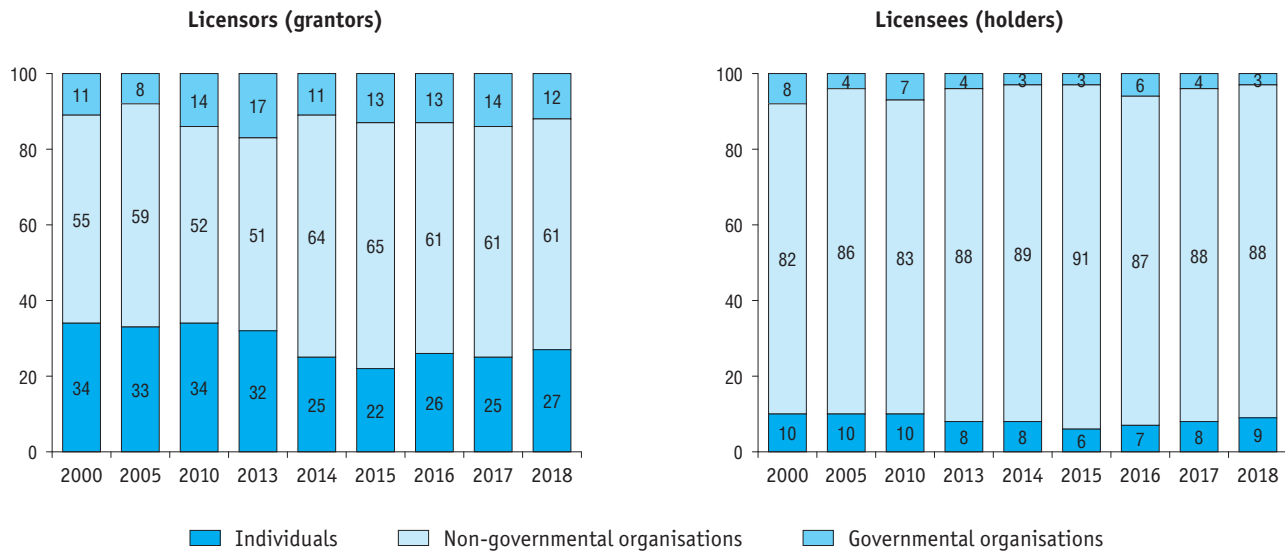
### 6.33. STATE REGISTRATION OF DISPOSITIONS OF EXCLUSIVE RIGHTS TO INVENTIONS, UTILITY MODELS, AND INDUSTRIAL DESIGNS BY TECHNOLOGY FIELD

	2000	2005	2010	2013	2014	2015	2016	2017	2018
<b>Total</b>	<b>2114</b>	<b>2122</b>	<b>2860</b>	<b>3123</b>	<b>2965</b>	<b>2858</b>	<b>2939</b>	<b>2991</b>	<b>3060</b>
I. Construction, construction materials	89	108	135	252	245	226	259	240	247
II. Mechanical engineering, machine tools industry, tooling	345	417	118	248	211	205	257	223	222
III. Chemistry, petrochemistry	203	268	286	382	407	406	406	475	510
IV. Metallurgy	85	69	86	108	100	62	118	89	101
V. Electronics, computers, instrument engineering	78	165	311	216	209	222	315	316	309
VI. Textiles and light industry, food industry	323	105	163	276	200	257	239	192	176
VII. Power generation, electrical machinery	150	223	421	490	470	511	409	418	459
VIII. Medicine	264	249	294	473	439	396	379	429	376
IX. Oil and gas extraction industry	224	136	162	168	135	142	166	146	134
X. Other	353	382	884	510	549	431	391	463	526

### 6.34. PERCENTAGE DISTRIBUTION OF DISPOSITIONS OF EXCLUSIVE RIGHTS TO INVENTIONS, UTILITY MODELS, AND INDUSTRIAL DESIGNS BY TECHNOLOGY FIELD



### 6.35. PERCENTAGE DISTRIBUTION OF DISPOSITIONS OF EXCLUSIVE RIGHTS TO INVENTIONS, UTILITY MODELS, AND INDUSTRIAL DESIGNS BY CATEGORY OF ECONOMIC ENTITY



## International technological exchange

### 6.36. TECHNOLOGY BALANCE OF PAYMENTS BY CATEGORY OF CONTRACTS

(thousand USD)

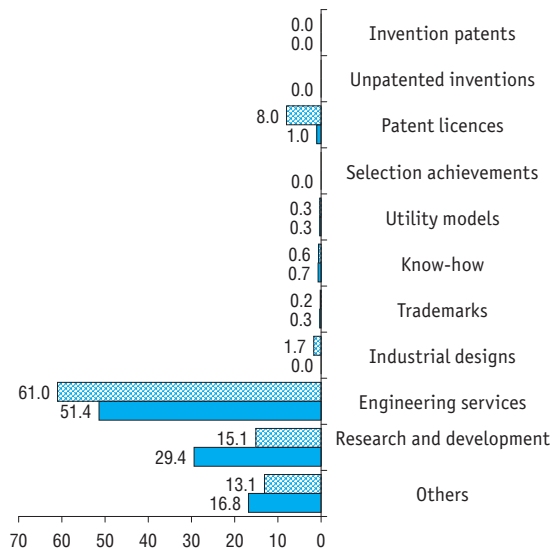
	Total	Invention patents	Unpatented inventions	Patent licences	Selection achievements	Utility models	Know-how	Trademarks	Industrial designs	Engineering services	Research and development	Others
<b>Receipts from technology exports</b>												
2005	389396.4	926.3	467.0	1788.0	...	...	517.9	5583.5	1017.3	150858.8	83214.4	145023.2
2010	627887.5	582.6	1987.0	11821.3	...	1718.9	13778.5	759.1	2531.0	368971.3	138356.8	87381.0
2011	584656.9	98.9	212.0	20334.7	...	688.0	4886.2	1251.7	2304.0	382161.5	111499.3	61220.6
2012	688469.9	21.0	–	21850.1	...	898.7	15653.4	999.4	2291.0	376428.2	170752.9	99575.2
2013	770584.8	81.0	110.0	25409.6	...	75.4	11798.9	388.2	2452.2	364000.7	235654.9	130613.9
2014	1279213.1	72.7	–	26610.9	...	35.9	11526.7	2765.3	2000.8	707674.2	356496.9	172029.7
2015	1654732.1	63.2	–	79062.3	...	4113.6	2474.5	3990.3	2492.1	1112557.2	164939.8	285039.1
2016	1277023.5	2.7	–	83102.3	...	2011.3	28737.5	861.6	50139.8	819004.6	140721.8	152441.9
2017	1181183.9	117.0	–	94811.6	...	3946.3	7026.2	2567.3	20044.9	720187.3	177833.0	154650.3
2018	1405475.1	156.0	118.9	13354.1	36.1	4481.2	9279.5	4876.6	445.4	723071.7	413637.8	236017.8
<b>Payments for technology imports</b>												
2005	954199.2	8730.3	2983.5	19315.4	...	...	9489.7	191045.0	1519.5	582813.8	16512.8	121789.2
2010	1425983.3	4024.2	–	82853.9	...	3665.6	62117.0	419009.3	2.2	526913.5	49631.8	277765.8
2011	1862566.6	3531.0	–	71764.2	...	2264.3	92153.1	406684.6	26.2	692495.2	72676.4	520971.6
2012	2043187.9	6970.5	14.0	64208.4	...	5138.4	158428.1	465370.3	997.0	806467.1	66295.4	469298.7
2013	2463626.3	22600.3	–	85973.2	...	1998.2	133742.2	587894.4	704.3	959742.4	171256.5	499714.8
2014	2455830.7	20879.5	–	100797.0	...	4066.3	121719.8	381160.4	182.6	1147892.0	151488.5	527644.6
2015	2207406.8	9636.1	3.4	66104.7	...	3461.5	179228.9	318504.5	24447.9	1277698.4	110310.7	218010.7
2016	2498677.8	5401.4	83.0	80561.5	...	1053.7	104879.1	444761.5	10494.0	1547859.8	149109.0	154474.8
2017	3305202.5	11054.5	11.1	106056.2	34.9	8409.2	152032.3	504369.2	1393.0	2132582.6	83500.7	305758.8
2018	3064747.9	27630.7	2550.3	238898	725.4	11545.3	274002.3	521023.6	1739.1	1406835.4	107374.8	472423.0

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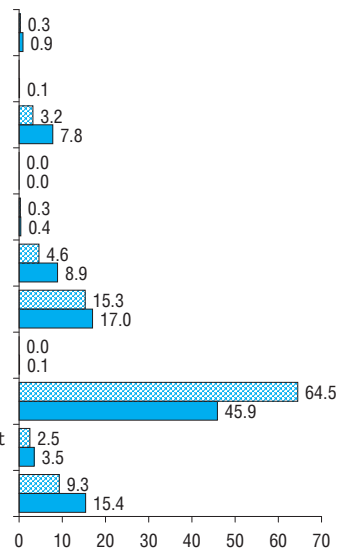
	Total	Invention patents	Unpatented inventions	Patent licences	Selection achievements	Utility models	Know-how	Trademarks	Industrial designs	Engineering services	Research and development	Others
<b>Technology balance of payments</b>												
2005	-564802.8	-7804.0	-2516.5	-17527.4	...	...	-8971.8	-185461.5	-502.2	-431955.0	66701.6	23234.0
2010	-798095.8	-3441.6	1987.0	-71032.6	...	-1946.7	-48338.5	-418250.2	2528.8	-157942.2	88725.0	-190384.8
2011	-1277909.7	-3432.1	212.0	-51429.5	...	-1576.3	-87266.9	-405432.9	2277.8	-310333.7	38822.9	-459751.0
2012	-1354718.0	-6949.5	-14.0	-42358.3	...	-4239.7	-142774.7	-464370.9	1294.0	-430038.9	104457.5	-369723.5
2013	-1693041.5	-22519.3	110.0	-60563.6	...	-1922.8	-121943.3	-587506.2	1747.9	-595741.7	64398.4	-369100.9
2014	-1176617.6	-20806.8	-	-74186.1	...	-4030.4	-110193.1	-378395.1	1818.2	-440217.8	205008.4	-355614.9
2015	-552674.7	-9572.9	-3.4	12957.6	...	652.1	-176754.4	-314514.2	-21955.8	-165141.2	54629.1	67028.4
2016	-1221654.3	-5398.7	-83.0	2540.8	...	957.6	-76141.6	-443899.9	39645.8	-728855.2	-8387.2	-2032.9
2017	-2124018.6	-10937.5	-11.1	-11244.6	-34.9	-4462.9	-145006.1	-501801.9	18651.9	-1412395.3	94332.3	-151108.5
2018	-1659272.8	-27474.7	-2431.4	-225543.9	-689.3	-7064.1	-264722.8	-516147.0	-1293.7	-683763.7	306263.0	-236405.2

## 6.37. PERCENTAGE DISTRIBUTION OF TECHNOLOGY EXPORTS AND IMPORTS BY CATEGORY OF CONTRACT

Receipts from technology exports



Payments for technology imports



■ 2017   ■ 2018

### 6.38. NUMBER AND NET VALUE OF TECHNOLOGY EXPORTS AND IMPORTS BY CATEGORY OF CONTRACT

	Number of contracts			Net value of the contract's subject matter, <i>thousand USD</i>		
	2010	2017	2018	2010	2017	2018
<b>Exports</b>						
<b>Total</b>	<b>1867</b>	<b>2757</b>	<b>3033</b>	<b>3474995.7</b>	<b>5517080.5</b>	<b>10747112.3</b>
Invention patents	7	5	5	295.6	119.2	972.2
Unpatented inventions	8	–	1	2753.0	–	118.9
Patent licences	42	117	130	17160.7	133165.1	124882.1
Selection achievements	–	–	1	–	–	36.1
Utility models	10	7	6	1737.6	4947.1	3797.7
Know-how	33	55	74	35781.9	10194.2	12166.0
Trademarks	19	28	46	2209.2	4331.5	8307.6
Industrial designs	1	4	6	26667.0	20111.4	482.3
Engineering services	682	1036	1030	2827690.4	4396379.0	9525681.2
Research and development	692	840	1049	378940.6	615821.3	754171.0
Others	373	665	685	181759.7	332011.7	316497.2
<b>Imports</b>						
<b>Total</b>	<b>1943</b>	<b>4358</b>	<b>4914</b>	<b>3028304.5</b>	<b>15894309.5</b>	<b>14615035.4</b>
Invention patents	5	63	56	15302.0	90209.8	97284.6
Unpatented inventions	–	1	6	–	9.3	4900.1
Patent licences	70	165	199	179354.3	571301.2	639821.8
Selection achievements	–	1	16	–	34.9	1192.5
Utility models	13	9	19	12845.7	8031.1	19460.0
Know-how	41	130	159	119611.1	255575.6	493461.9
Trademarks	108	314	366	490778.8	926576.0	991114.1
Industrial designs	1	40	25	16.4	3159.9	3422.6
Engineering services	1080	2133	2351	1744228.8	12838041.6	11227114.9
Research and development	89	339	543	45373.4	204501.2	186466.2
Others	536	1163	1174	420794.0	996868.9	950796.7



## 6.39. TECHNOLOGY BALANCE OF PAYMENTS BY COUNTRY

*(thousand USD)*

	Receipts from technology exports			Payments for technology imports			Technology balance of payments		
	2016	2017	2018	2016	2017	2018	2016	2017	2018
<b>Total</b>	<b>1277023.5</b>	<b>1181183.9</b>	<b>1405475.1</b>	<b>2498677.8</b>	<b>3305202.5</b>	<b>3064747.9</b>	<b>-1221654.3</b>	<b>-2124018.6</b>	<b>-1659272.8</b>
<b>CIS countries</b>	<b>154052.8</b>	<b>83154.2</b>	<b>134275.1</b>	<b>33756.3</b>	<b>40118.4</b>	<b>64928.0</b>	<b>120296.5</b>	<b>43035.8</b>	<b>69347.1</b>
Armenia	135.5	347.5	1474.7	81.4	139.1	260.6	54.1	208.4	1214.1
Azerbaijan	905.6	1004.9	1300.7	22.8	14.2	62.4	882.8	990.7	1238.3
Belarus	71940.4	38700.2	68472.9	10482.4	11022.3	18763.8	61458.0	27677.9	49709.1
Kazakhstan	56320.8	18037.7	23731.4	15980.9	11828.1	18183.5	40339.9	6209.6	5547.9
Kyrgyzstan	5442.5	4852.1	5237.1	113.7	191.2	372.1	5328.8	4660.9	4865.0
Moldova	962.9	1542.0	1554.5	1.3	556.5	9.2	961.6	985.5	1545.3
Tajikistan	5508.5	7971.1	9147.4	20.7	11.2	15.0	5487.8	7959.9	9132.4
Turkmenistan	3875.4	1795.4	3007.3	0.6	25.2	25.4	3874.8	1770.2	2981.9
Ukraine	6728.1	5222.8	5278.5	6968.6	16201.1	26356.2	-240.5	-10978.3	-21077.7
Uzbekistan	2233.1	3680.5	15070.6	83.9	129.5	879.8	2149.2	3551.0	14190.8
<b>OECD countries</b>	<b>511153.9</b>	<b>634192.5</b>	<b>828058.3</b>	<b>2317212.9</b>	<b>2608918.0</b>	<b>2485102.9</b>	<b>-1806059.0</b>	<b>-1974725.5</b>	<b>-1657044.6</b>
Australia	2485.9	2150.6	1091.7	852.7	6816.3	4651.6	1633.2	-4665.7	-3559.9
Austria	4475.2	7700.9	12389.4	132396.2	47173.0	55048.3	-127921.0	-39472.1	-42658.9
Belgium	1674.2	9606.1	17686.5	26447.6	21098.2	43827.7	-24773.4	-11492.1	-26141.2
Canada	1288.1	2613.5	523.5	21137.8	50518.6	44818.8	-19849.7	-47905.1	-44295.3
Chile	39.1	1.0	-	-	-	11.0	39.1	1.0	11.0
Czech Republic	1208.5	448.0	60896.9	16132.7	30160.8	92796.3	-14924.2	-29712.8	-31899.4
Denmark	4654.5	3928.6	6443.0	16883.5	56637.5	40949.3	-12229.0	-52708.9	-34506.3
Estonia	152.7	750.3	3065.6	2782.0	700.9	2524.1	-2629.3	49.4	541.5
Finland	7186.6	30928.1	13920.3	69424.8	43619.6	40313.0	-62238.2	-12691.5	-26392.7
France	41488.1	20464.3	25281.4	63516.7	122477.7	145310.8	-22028.6	-102013.4	-120029.4

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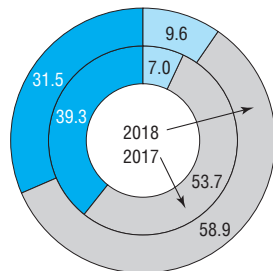
	Receipts from technology exports			Payments for technology imports			Technology balance of payments		
	2016	2017	2018	2016	2017	2018	2016	2017	2018
Germany	89801.3	54195.6	141940.9	714638.7	797123.0	505353.8	-624837.4	-742927.4	-363412.9
Greece	203.6	136.6	144.5	1532.0	3009.4	9466.9	-1328.4	-2872.8	-9322.4
Hungary	493.2	144659.5	6534.5	1559.7	476.5	10972.1	-1066.5	144183.0	-4437.6
Iceland	-	14.0	-	-	-	-	-	14.0	-
Ireland	3605.1	2180.0	19521.1	3397.1	4247.8	37177.2	208.0	-2067.8	-17656.1
Israel	1185.3	1222.3	1463.2	513.0	1389.1	973.3	672.3	-166.8	489.9
Italy	53900.0	27806.6	14034.2	67341.3	325977.3	115480.9	-13441.3	-298170.7	-101446.7
Japan	2717.0	5015.3	4441.5	30219.6	49916.0	69532.1	-27502.6	-44900.7	-65090.6
Latvia	936.5	2111.7	6810.7	195.6	7368.4	1314.2	740.9	-5256.7	5496.5
Luxembourg	10853.7	9941.1	7350.0	99212.2	98246.9	23569.0	-88358.5	-88305.8	-16219.0
Mexico	6892.2	1575.9	50.8	-	3.3	0.7	6892.2	1572.6	50.1
Netherlands	31024.7	31388.3	40397.0	79179.1	122632.0	177189.2	-48154.4	-91243.7	-136792.2
New Zealand	-	8.8	13.4	64.1	3909.0	1059.7	-64.1	-3900.2	-1046.3
Norway	4392.3	5039.8	6759.0	1134.4	4901.2	17966.8	3257.9	138.6	-11207.8
Poland	860.1	2183.2	1923.9	8974.9	10765.5	12377.8	-8114.8	-8582.3	-10453.9
Portugal	20.7	182.8	309.2	26.6	49.2	145.5	-5.9	133.6	163.7
Slovakia	65.8	302.5	282.2	591.3	453.4	229.2	-525.5	-150.9	53.0
Slovenia	499.0	355.4	103.8	1464.8	3548.7	2884.1	-965.8	-3193.3	-2780.3
South Korea	3994.8	7631.8	91.0	63857.0	73792.8	83803.0	-59862.2	-66161.0	-83712.0
Spain	1733.5	2578.6	976.8	28488.3	36810.6	62858.9	-26754.8	-34232.0	-61882.1
Sweden	2839.4	4771.6	11067.8	16566.3	27216.0	36388.0	-13726.9	-22444.4	-25320.2
Switzerland	28261.7	23299.4	90965.7	136724.6	148667.3	242570.3	-108462.9	-125367.9	-151604.6
Turkey	40125.7	3160.2	31335.6	193031.0	110647.5	9668.5	-152905.3	-107487.3	21667.1
United Kingdom	39939.1	58187.0	75975.7	140054.3	136391.0	173782.7	-100115.2	-78204.0	-97807.0
United States	122156.3	167653.1	224267.5	378873.0	262173.5	420088.1	-256716.7	-94520.4	-195820.6

(continued)

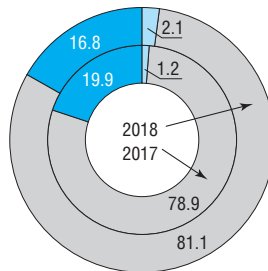
	Receipts from technology exports			Payments for technology imports			Technology balance of payments		
	2016	2017	2018	2016	2017	2018	2016	2017	2018
<b>Other countries</b>	<b>611816.8</b>	<b>463837.2</b>	<b>443141.7</b>	<b>147708.6</b>	<b>656166.1</b>	<b>514717.0</b>	<b>464108.2</b>	<b>-192328.9</b>	<b>-71575.3</b>
Brazil	96.7	498.7	319.1	44.8	1017.9	1043.2	51.9	-519.2	-724.1
Bulgaria	409.6	736.0	706.1	1554.1	2069.6	1266.7	-1144.5	-1333.6	-560.6
China	413321.1	135296.1	90778.9	49464.4	417345.5	165307.2	363856.7	-282049.4	-74528.3
Cyprus	9947.7	6103.3	51139.9	31669.5	58324.2	58980.2	-21721.8	-52220.9	-7840.3
Georgia	2287.9	4537.2	911.4	35.3	178.3	105.6	2252.6	4358.9	805.8
Hong Kong	3948.2	772.6	60.3	831.0	779.0	10951.1	3117.2	6.4	-10890.8
India	123348.1	230854.5	52325.5	1955.6	4724.6	2929.5	121392.5	226129.9	49396.0
Iran	17509.2	110.0	32107.8	29.0	35.7	-	17480.2	74.3	32107.8
Romania	49.4	335.4	1534.9	563.2	1216.1	1102.7	-513.8	-880.7	432.2
Singapore	1053.7	1223.8	2945.0	24690.4	7108.7	11273.2	-23636.7	-5884.9	-8328.2
South Africa	969.6	846.6	1035.7	82.0	118.5	292.7	887.6	728.1	743.0
Taiwan	53.7	316.0	481.5	637.0	2144.4	1007.7	-583.3	-1828.4	-526.2
Other	38821.9	82207.0	208795.6	36152.3	161103.6	260457.2	2669.6	-78896.6	-51661.6

## 6.40. PERCENTAGE DISTRIBUTION OF TECHNOLOGY EXPORTS AND IMPORTS BY COUNTRY GROUP

Receipts from technology exports



Payments for technology imports



■ CIS countries  
■ OECD countries  
■ Other countries

## 6.41. TECHNOLOGY BALANCE OF PAYMENTS BY SECTOR OF PERFORMANCE (thousand USD)

	Receipts from technology exports			Payments for technology imports			Technology balance of payments		
	2016	2017	2018	2016	2017	2018	2016	2017	2018
<b>Total</b>	<b>1277023.5</b>	<b>1181183.9</b>	<b>1405475.1</b>	<b>2498677.8</b>	<b>3305202.5</b>	<b>3064747.9</b>	<b>-1221654.3</b>	<b>-2124018.6</b>	<b>-1659272.8</b>
Sectors of performance:									
government	59424.3	20763.4	18193.9	136665.5	109745.4	48181.0	-77241.2	-88982.0	-29987.1
business enterprise	1211037.1	1099892.0	1374422.4	2358091.6	3194835.2	3015807.8	-1147054.5	-2094943.2	-1641385.4
higher education	4416.8	57986.5	7232.1	901.1	609.7	599.5	3515.7	57376.8	6632.6
private non-profit	2145.3	2542.0	5626.7	3019.6	12.2	159.6	-874.3	2529.8	5467.1

## 6.42. TECHNOLOGY BALANCE OF PAYMENTS BY TYPE OF ECONOMIC ACTIVITY: 2018

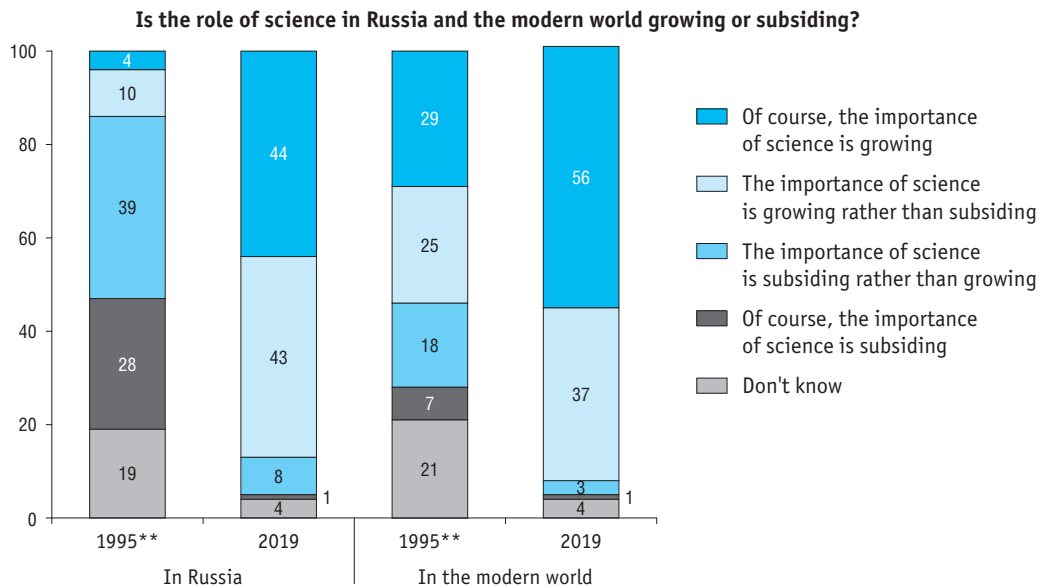
*(thousand USD)*

	Receipts from technology exports	Payments for technology imports	Technology balance of payments
<b>Total</b>	<b>1405475.1</b>	<b>3064747.9</b>	<b>-1659272.8</b>
Agriculture, forestry and fishing	1586.1	5125.8	-3539.7
Mining and quarrying	1005.2	254576.9	-253571.7
Manufacturing	88063.0	1902609.8	-1814546.8
Electricity, gas, steam and air-conditioning supply	266016.4	377.8	265638.6
Water supply; sewerage, waste management and remediation activities	–	1.2	-1.2
Construction	20359.9	12657.7	7702.2
Wholesale and retail trade; repair of motor vehicles and motorcycles	58615.2	359641.5	-301026.3
Transportation and storage	20945.8	46778.3	-25832.5
Accommodation and food service activities	320.2	82817.9	-82497.7
Information and communication	583653.1	51343.9	532309.2
Financial and insurance activities	1480	1248.0	232
Real estate operations	837.9	4036.6	-3198.7
Professional, scientific and technical activities	353979.8	333581.1	20398.7
Of which research and development	163133.9	68159	94974.9
Administrative and support service activities	483.3	7473.0	-6989.7
Education	6503.8	1048.2	5455.6
Of which higher education	6503.8	1048.2	5455.6
Human health and social work activities	–	69.4	-69.4
Art, entertainment and recreation	23.7	251.3	-227.6
Other service activities	1601.7	1109.5	492.2



## **Public Attitudes towards Science and Technology**

## 7.1. PUBLIC OPINION OF THE ROLE OF SCIENCE IN RUSSIA AND THE WORLD\*

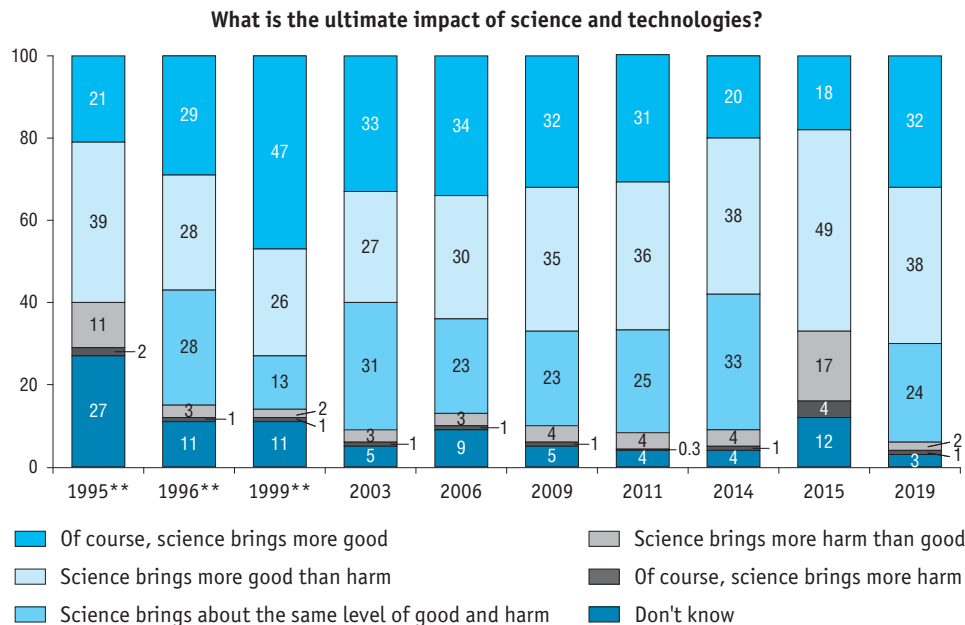
*(as a percentage of respondents aged 18–65)*

\* Sources: here and below in this section, the 2019 data are based on the results of a representative survey of the Russian population aged 18–65 organised by the Russia Longitudinal Monitoring Survey – Higher School of Economics within the framework of the HSE Basic Research Programme (conducted in December 2018 – January 2019); the 2005–2015 data, the data are based on the results of representative surveys of the adult Russian population published in the previous editions of this data book; the 2003 data – in the HSE (2005) Science in the Russian Federation : data book. Moscow: Higher School of Economics; the 1995 data – Leonid Gokhberg, Olga Shuvalova (1996) Public opinion on science. Moscow : CISN.

\*\* In 1995: aged 16 and over.

## 7.2. PUBLIC OPINION ON THE GOOD AND HARM BROUGHT ABOUT BY SCIENCE AND TECHNOLOGIES\*

(as a percentage of respondents aged 18–65)

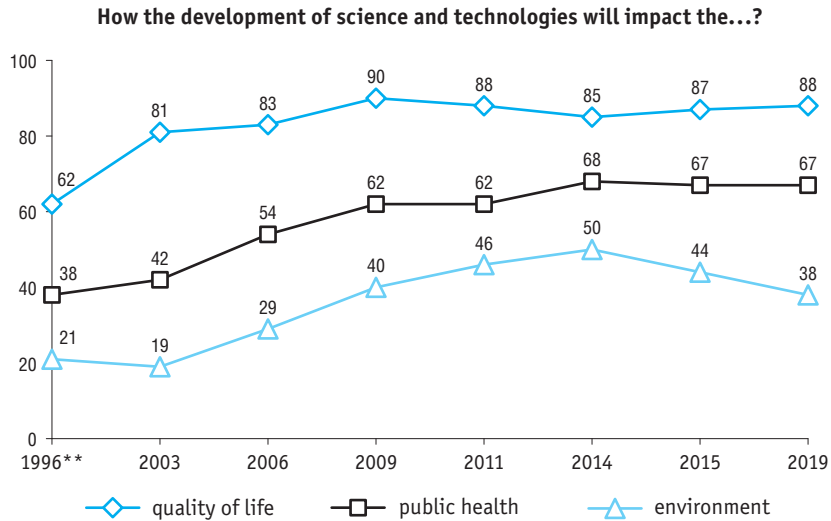


\* In 1995 and 2015, the option 'about the same level of good and harm' was not included in the list of possible answers. In 1995, this question was: 'What consequences – positive or negative – are predominant in the development of science?'.

\*\* In 1995–1999: aged 16 and over.



### 7.3. PUBLIC OPINION CONCERNING THE IMPACT OF SCIENCE AND TECHNOLOGY ON DIFFERENT ASPECTS OF LIFE\* (as a percentage of respondents aged 18-65)



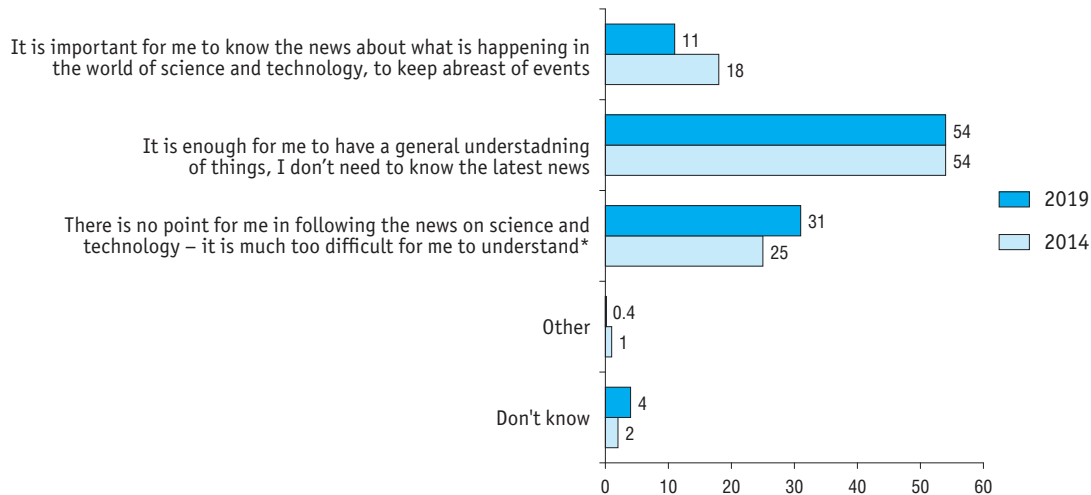
\* The share of respondents who gave the answers 'rather more good than harm' and 'certainly more good than harm'.

\*\* In 1996: aged 16 and over.

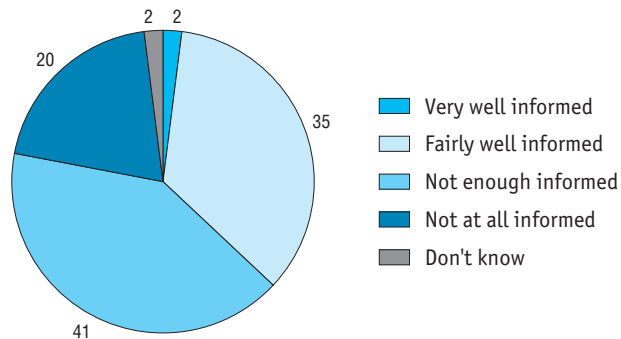
## 7.4. PUBLIC ATTITUDE TOWARDS RECEIVING SCIENCE AND TECHNOLOGY NEWS

(as a percentage of respondents aged 18-65)

What opinion about the role of news on science and technology is closest to you?



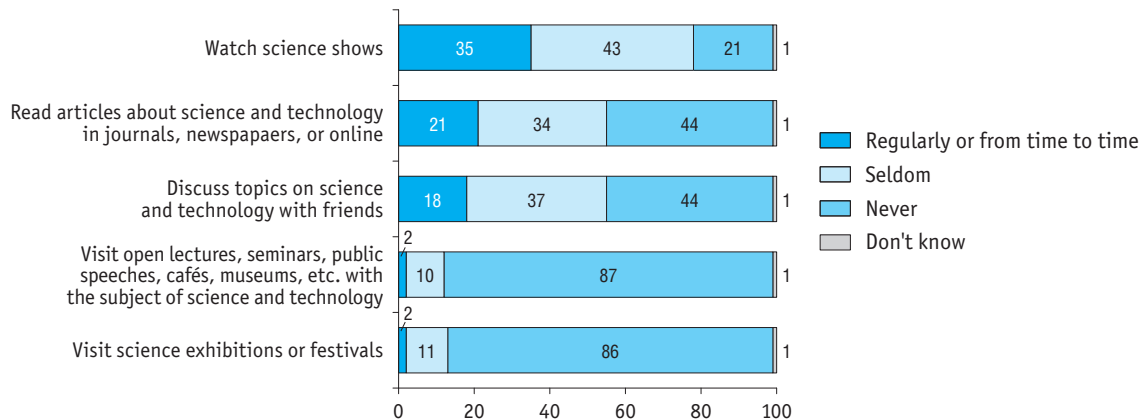
\* In 2014, this answer was used: 'Science is too complex for an untrained person: it is pointless to read the news of the world of science – I still do not understand them.'

**7.5. PUBLIC AWARENESS OF SCIENCE AND TECHNOLOGY ACHIEVEMENTS: 2019***(as a percentage of respondents aged 18–65)***How well informed do you feel about latest developments in science and technology?**

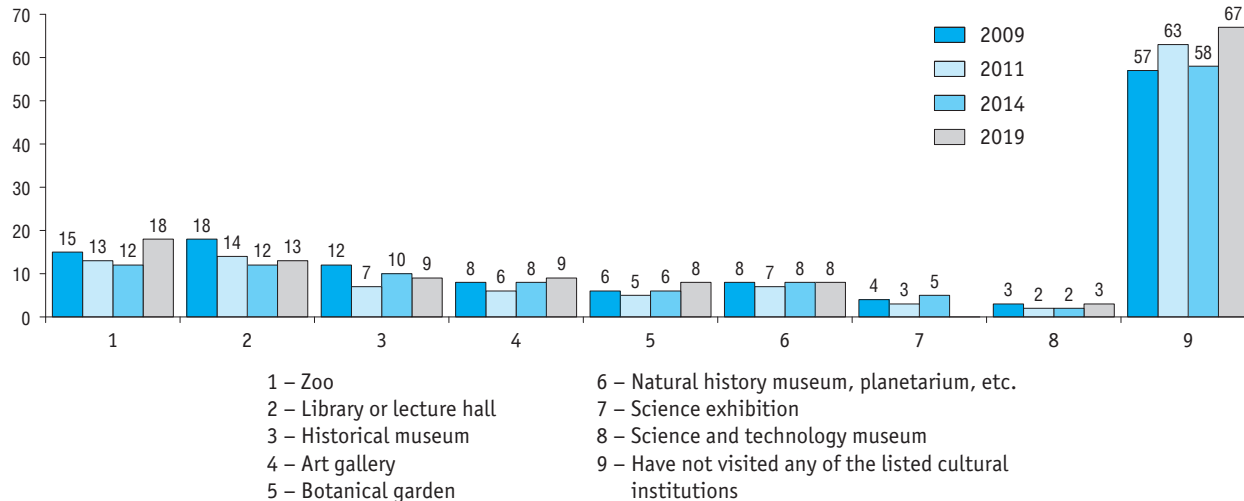
## 7.6. DEMAND FOR POPULAR SCIENCE CONTENT: 2019

(as a percentage of respondents aged 18–65)

How often do you participate in the following types of activities?



## 7.7. ATTENDANCE OF CULTURAL AND EDUCATIONAL INSTITUTIONS

*(as a percentage of respondents aged 18–65)***Which of the listed cultural institutions have you visited within the last year?**



## **International Comparisons**

## 8.1. GROSS DOMESTIC EXPENDITURE ON R&amp;D

*(million current USD PPPs)*

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Russia</b>	<b>10504.4</b>	<b>18120.5</b>	<b>33080.9</b>	<b>37911.5</b>	<b>38607.0</b>	<b>40330.2</b>	<b>38776.4</b>	<b>39008.6</b>	<b>42375.7</b>	<b>41505.1</b>
<b>CIS countries</b>										
Armenia	13.6	36.7	45.6	52.6	51.5	59.1	63.8	60.3	64.6	57.6
Azerbaijan	99.1	134.6	314.2	322.5	339.9	356.2	385.6	350.7	318.9	331.0
Belarus	434.3	656.1	986.6	1088.8	1129.2	907.5	872.5	860.9	1049.5	1151.4
Kazakhstan	213.4	612.9	492.9	621.8	695.3	720.6	747.1	638.7	619.9	624.9
Kyrgyzstan	12.6	21.7	23.1	27.2	27.6	24.6	24.5	24.1	24.8	...
Moldova	...	51.1	60.5	63.1	59.7	66.8	66.9	63.2	61.8	66.0
Tajikistan	...	10.0	14.1	21.6	24.5	26.2	26.3	27.8	33.0	30.4
Ukraine	1806.2	3152.7	2930.2	2906.8	2996.7	2436.0	2099.9	1710.0	1656.1	1839.6
Uzbekistan	178.2	170.4	231.6	292.2	312.5	280.7	327.5	367.1	335.0	300.2
<b>OECD countries</b>										
Australia	7942,1	...	20572,2	...	23129,7	...	21151,5	...	22555,2	...
Austria	4440,4	6837,0	9584,3	11415,1	12007,9	12863,3	13147,0	14331,3	14655,0	15962,5
Belgium	5516,9	6225,2	8956,2	10715,0	11358,6	11935,9	12651,2	13894,3	15355,5	16513,3
Canada	16745,6	23090,0	24897,8	26019,5	26504,1	27793,5	27005,5	29014,8	29659,6	29003,3
Chile	...	...	1021,0	1355,5	1532,6	1517,6	1552,2	1527,3	1556,4	...
Czech Republic	1848,8	2619,5	3877,2	5441,6	6089,3	6699,4	6854,8	6369,2	7302,4	8286,9
Denmark	...	4429,5	6963,8	7468,8	7793,6	7877,7	8518,0	9207,0	9682,6	10054,2
Estonia	79,0	206,7	454,8	730,6	624,1	544,2	563,5	512,1	570,3	675,0
Finland	4495,6	5588,7	7747,0	7520,0	7382,8	7178,2	6689,7	6726,7	7149,1	7504,4

(continued)

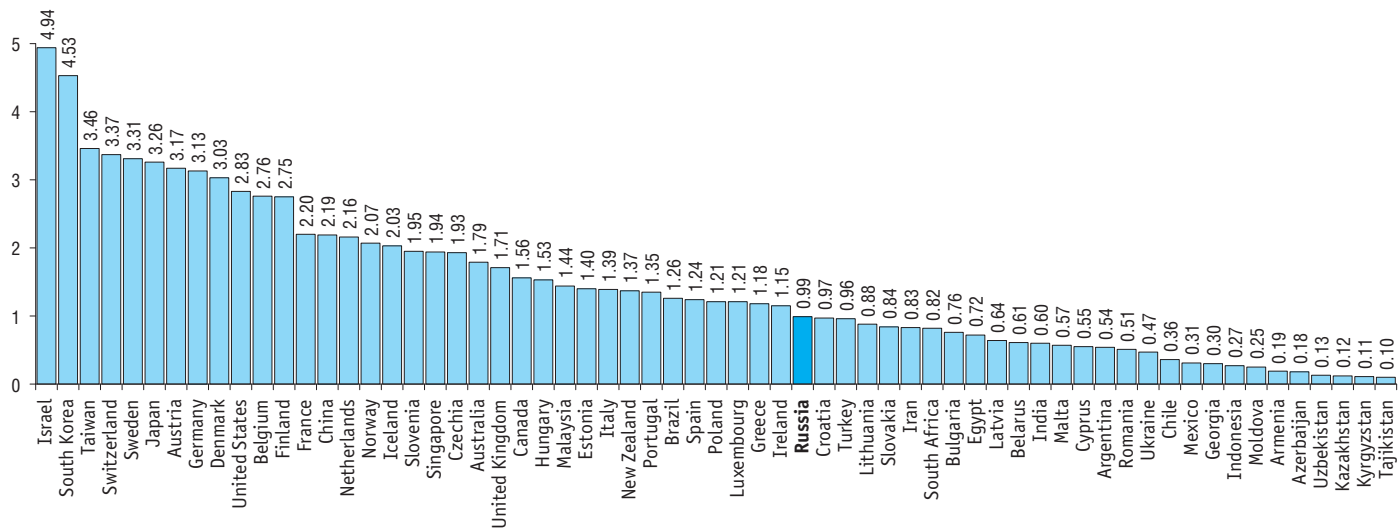
	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
France	33282.7	39530.1	50896.7	55097.7	58353.3	60585.6	61645.7	63645.0	66044.9	68440.9
Germany	53905.5	64028.3	87028.0	100490.1	102905.5	109562.7	114128.2	122459.8	134429.8	141433.5
Greece	...	1627.0	1874.6	1953.7	2321.7	2436.0	2798.2	2980.1	3538.5	3835.6
Hungary	957.7	1586.8	2455.6	2895.0	3361.4	3408.4	3534.5	3235.1	3849.7	4733.5
Iceland	215.5	296.8	...	...	243.3	291.6	355.1	378.4	401.6	415.8
Ireland	1246.2	2006.5	3144.5	3321.6	3467.8	3622.8	3840.1	3997.8	...	4713.0
Israel	6166.5	6966.3	8647.8	10433.4	11272.4	11732.3	12666.3	14591.7	16352.5	17669.9
Italy	15477.5	18241.2	25400.7	27419.6	28459.4	29448.3	30002.9	33073.3	34657.6	36006.5
Japan	98918.3	128694.6	140565.6	152325.6	164655.8	169554.1	168546.1	160295.0	166183.7	171293.6
Latvia	82.8	164.2	225.1	287.2	279.4	327.2	306.0	227.8	284.7	378.5
Lithuania	173.1	360.7	487.9	659.1	749.8	851.4	874.2	747.1	857.5	880.0
Luxembourg	380.8	498.8	652.6	619.1	676.6	712.3	751.7	810.3	853.5	860.0
Mexico	3357.6	5346.2	8616.0	8473.0	8774.7	9458.5	9577.9	9242.1	8112.5	8053.9
Netherlands	9087.7	10892.4	12761.9	15177.7	15969.2	16404.4	16913.4	17779.9	18803.2	21463.1
New Zealand	...	1189.3	...	...	1856.9	...	2125.4	...	2679.2	...
Norway	...	3275.8	4675.6	5316.3	5620.4	5805.6	6063.5	6307.4	6972.1	7447.0
Poland	2617.3	2984.9	5775.2	7990.8	8185.8	9149.3	10234.8	10353.6	11844.7	14622.0
Portugal	1402.1	1808.2	4428.3	3832.4	3869.8	3856.2	3820.8	4179.5	4496.1	4758.8
Slovakia	391.3	441.0	829.8	1159.9	1243.8	1379.5	1886.9	1273.4	1489.7	1486.9
Slovenia	487.0	676.5	1170.2	1529.9	1583.7	1505.7	1433.4	1406.8	1413.5	1567.4
South Korea	18533.0	30618.3	52152.9	64862.5	68234.1	73099.8	76932.4	80798.7	90386.1	98451.3
Spain	7732.6	13251.1	20082.2	19269.2	19282.4	19356.2	19820.6	20631.4	22319.3	23552.9
Sweden	...	10388.2	12552.6	13970.4	14496.4	14191.1	15493.2	16248.9	17837.3	18117.1
Switzerland	5969.6	...	...	14740.0	...	...	17854.9	...	19111.5	...
Turkey	2836.1	4595.6	10076.8	12807.9	13834.8	15933.0	17739.0	19853.1	21744.0	...
United Kingdom	25155.2	30639.7	37564.8	38490.2	41532.1	43811.1	45678.2	48106.5	49993.2	53137.8
United States	269513.0	328128.0	410093.0	434349.0	454823.0	476459.0	495094.0	516590.0	548984.0	581553.0



(continued)

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>EU countries which are not OECD members</b>										
Bulgaria	259.8	348.9	622.8	716.2	767.2	1005.4	1253.4	1084.2	1115.3	...
Croatia	497.0	564.7	630.6	677.4	751.9	732.2	812.7	883.2	937.6	...
Cyprus	33.5	75.3	123.1	120.7	127.3	131.7	128.6	153.3	171.9	...
Malta	...	47.6	69.9	102.2	102.3	103.2	119.2	99.1	105.0	...
Romania	480.9	844.7	1570.6	1837.3	1534.5	1569.5	2091.5	2301.2	2690.7	2857.4
<b>Other countries</b>										
Argentina	1776.6	2277.9	4262.0	5269.6	5348.9	5058.4	5483.0	4652.4	4971.3	...
Brazil	16614.0	20533.7	32509.1	34822.3	38727.5	42167.8	43414.1	39957.9	41121.0	...
China	33113.9	86639.8	213283.8	292577.7	335223.9	372326.1	409422.7	453054.8	499099.1	554327.8
Egypt	791.1	1321.7	3520.7	4474.9	5841.0	6101.4	7266.4	7557.4	7693.9	8827.8
Georgia	24.6	32.2	...	...	27.0	63.7	114.6	112.1	115.8	129.8
India	17249.6	28742.6	43742.4	...	...	...	49790.5	...	...	62716.0
Indonesia	661.6	...	...	...	2134.8	...	...	7446.9	7737.3	9275.7
Iran	...	6102.7	3465.4	4100.8	3324.3	...	5840.7	...	14073.5	...
Malaysia	1411.3	...	6022.0	7338.8	...	9758.7	10669.3	12425.1	...	...
Singapore	3049.2	5111.4	7016.9	8052.5	8607.4	9877.2	10743.6	10652.9	10516.0	...
South Africa	...	4048.6	4427.2	4840.5	4987.7	5506.3	5833.7	6096.7	...	...
Taiwan	9219.1	15308.9	25057.2	29111.7	30835.6	32642.2	33727.9	35764.3	39089.7	43342.7

## 8.2. GROSS DOMESTIC EXPENDITURE ON R&D AS A PERCENTAGE OF GDP: 2018\*



\* Or the nearest years for which data are available.

## 8.3. PERCENTAGE DISTRIBUTION OF GROSS DOMESTIC EXPENDITURE ON R&amp;D BY SECTOR OF PERFORMANCE: 2018\*

	Gross domestic expenditure on R&D	Government sector	Business enterprise sector	Higher education sector	Private non-profit sector
<b>Russia</b>	<b>100</b>	<b>34.4</b>	<b>55.6</b>	<b>9.7</b>	<b>0.3</b>
<b>CIS countries</b>					
Armenia	100	86.7	...	13.3	...
Azerbaijan	100	85.4	2.4	12.1	...
Belarus	100	21.6	68.7	9.6	...
Kazakhstan	100	30.6	42.9	15.9	10.5
Kyrgyzstan	100	58.8	29.3	11.9	...
Moldova	100	70.9	17.5	11.6	...
Tajikistan	100	90.6	...	9.4	...
Ukraine	100	34.9	58.5	6.7	...
Uzbekistan	100	41.6	40.4	16.8	1.2
<b>OECD countries</b>					
Australia	100	10.1	52.7	34.0	3.2
Austria	100	7.1	69.9	22.4	0.5
Belgium	100	9.5	70.5	19.4	0.6
Canada	100	6.9	50.9	41.7	0.5
Chile	100	13.1	34.2	45.8	6.8
Czech Republic	100	16.4	61.9	21.5	0.2
Denmark	100	3.0	64.3	32.4	0.3
Estonia	100	11.4	42.3	44.5	1.7
Finland	100	8.3	65.7	25.2	0.8
France	100	12.5	65.4	20.5	1.6
Germany	100	13.5	68.8	17.7	...

\* Or the nearest years for which data are available.

(continued)

	Gross domestic expenditure on R&D	Government sector	Business enterprise sector	Higher education sector	Private non-profit sector
Greece	100	22.3	48.3	28.4	1.0
Hungary	100	10.9	75.6	12.7	...
Iceland	100	4.2	64.3	31.5	...
Ireland	100	4.3	74.8	20.9	...
Israel	100	1.5	88.3	9.3	0.9
Italy	100	12.7	62.1	23.5	1.8
Japan	100	7.8	79.4	11.6	1.3
Latvia	100	22.8	24.9	52.4	...
Lithuania	100	21.4	37.5	38.6	...
Luxembourg	100	23.8	55.8	20.4	...
Mexico	100	26.2	22.1	50.6	1.1
Netherlands	100	5.8	67.1	27.2	...
New Zealand	100	20.1	55.2	24.7	...
Norway	100	13.7	51.9	34.4	...
Poland	100	1.9	66.1	31.7	0.3
Portugal	100	5.7	50.8	42.0	1.6
Slovakia	100	21.2	54.1	24.3	0.4
Slovenia	100	13.6	74.2	11.9	0.3
South Korea	100	10.1	80.3	8.2	1.4
Spain	100	16.8	56.5	26.4	0.3
Sweden	100	3.6	70.9	25.4	0.1
Switzerland	100	0.8	69.4	27.6	2.2
Turkey	100	9.6	56.9	33.5	...
United Kingdom	100	6.1	69.1	22.5	2.2
United States	100	10.4	72.6	12.8	4.2

(continued)

	Gross domestic expenditure on R&D	Government sector	Business enterprise sector	Higher education sector	Private non-profit sector
<b>EU countries which are not OECD members</b>					
Bulgaria	100	22.1	71.9	5.4	0.6
Croatia	100	19.9	48.0	32.0	...
Cyprus	100	9.6	36.9	41.9	11.7
Malta	100	1.3	60.9	37.8	...
Romania	100	30.6	59.3	9.8	0.2
<b>Other countries</b>					
Argentina	100	48.2	25.0	26.0	0.9
China	100	15.2	77.4	7.4	...
Egypt	100	28.0	3.9	68.0	0.0
Georgia	100	23.2	...	76.8	...
India	100	56.4	32.4	6.8	4.4
Indonesia	100	74.8	6.3	18.7	0.1
Iran	100	40.3	25.1	33.6	0.9
Malaysia	100	9.2	56.6	34.2	0.1
Singapore	100	11.0	59.7	29.3	...
South Africa	100	23.1	41.4	32.7	2.9
Taiwan	100	10.7	80.3	8.9	0.1

#### 8.4. PERCENTAGE DISTRIBUTION OF GROSS DOMESTIC EXPENDITURE ON R&D BY SOURCE OF FUNDS: 2018\*

	Gross domestic expenditure on R&D	Government funds	Business enterprise sector funds	Other national sources	Funds from abroad
<b>Russia</b>	<b>100</b>	<b>67.0**</b>	<b>29.5</b>	<b>1.1</b>	<b>2.3</b>
<b>CIS countries</b>					
Armenia	100	68.7	16.7	...	5.6
Azerbaijan	100	68.7	30.8	0.5	...
Belarus	100	41.8	45.0	...	13.2
Kazakhstan	100	44.5	47.4	...	2.7
Kyrgyzstan	100	89.5	6.4	0.2	3.1
Moldova	100	76.7	15.5	2.8	5.0
Tajikistan	100	100.0	...	...	...
Ukraine	100	46.3	30.5	0.4	21.7
Uzbekistan	100	54.3	42.4	...	0.3
<b>OECD countries</b>					
Australia	100	34.6	61.9	1.9	1.6
Austria	100	29.4	54.4	0.6	15.6
Belgium	100	20.0	63.5	3.5	13.0
Canada	100	33.1	41.1	16.5	9.3
Chile	100	47.0	31.4	17.1	4.5
Czech Republic	100	34.1	33.0	1.1	31.8
Denmark	100	27.2	58.5	5.4	8.9
Estonia	100	40.2	43.6	1.3	15.0

\* Or the nearest years for which data are available.

\*\* Including budget funds, budget appropriations for higher education institutions, and government sector institutions' funds (including own funds).

(continued)

	Gross domestic expenditure on R&D	Government funds	Business enterprise sector funds	Other national sources	Funds from abroad
Finland	100	29.0	58.0	2.2	10.8
France	100	32.4	56.1	3.7	7.8
Germany	100	27.7	66.2	0.3	5.8
Greece	100	40.6	42.6	2.5	14.2
Hungary	100	31.9	52.7	0.5	14.9
Iceland	100	36.0	40.2	5.2	18.6
Ireland	100	22.8	52.2	1.4	23.5
Israel	100	10.6	35.8	1.0	52.6
Italy	100	32.3	53.7	2.3	11.7
Japan	100	14.6	79.1	5.8	0.6
Latvia	100	43.6	24.1	2.5	29.8
Lithuania	100	36.4	35.4	3.8	24.4
Luxembourg	100	43.1	49.6	1.6	5.7
Mexico	100	76.8	18.6	3.7	0.9
Netherlands	100	31.4	51.6	2.7	14.3
New Zealand	100	35.8	46.4	10.1	7.7
Norway	100	46.7	42.8	1.7	8.8
Poland	100	38.3	52.5	3.2	6.0
Portugal	100	41.0	46.5	5.1	7.3
Slovakia	100	38.0	48.8	1.9	11.2
Slovenia	100	22.9	63.1	0.9	13.1
South Korea	100	20.5	76.6	0.9	1.9
Spain	100	38.9	47.8	5.1	8.2
Sweden	100	25.0	60.8	4.0	10.1
Switzerland	100	25.9	67.0	1.8	5.2
Turkey	100	33.6	49.4	13.5	3.5
United Kingdom	100	26.3	51.8	6.4	15.6
United States	100	23.0	62.4	7.4	7.3

(continued)

	Gross domestic expenditure on R&D	Government funds	Business enterprise sector funds	Other national sources	Funds from abroad
<b>EU countries which are not OECD members</b>					
Bulgaria	100	24.3	43.2	0.3	32.2
Croatia	100	43.1	42.6	3.6	10.8
Cyprus	100	38.5	32.8	6.2	22.5
Malta	100	31.3	56.4	1.6	10.8
Romania	100	35.9	54.4	1.7	7.9
<b>Other countries</b>					
Argentina	100	72.6	16.5	2.3	8.5
Brazil	100	49.7	47.5	2.8	...
China	100	20.2	76.6	...	0.4
Egypt	100	95.4	3.9	0.2	0.5
Georgia	100	42.5	1.7	43.8	10.3
India	100	63.2	36.8	...	...
Indonesia	100	89.5	6.8	2.8	0.1
Iran	100	61.6	30.9	7.4	...
Malaysia	100	28.8	56.9	12.8	0.9
Singapore	100	37.4	52.2	3.3	7.1
South Africa	100	46.0	39.4	2.9	11.7
Taiwan	100	18.8	80.3	0.7	0.1



## 8.5. PERCENTAGE DISTRIBUTION OF GROSS DOMESTIC EXPENDITURE ON R&amp;D BY SECTOR OF PERFORMANCE: 2018\*

	Total	Natural sciences	Engineering and technology	Medical sciences	Agricultural sciences	Social sciences	Humanities
<b>Russia</b>	<b>100</b>	<b>17.6</b>	<b>72.1</b>	<b>4.0</b>	<b>1.7</b>	<b>3.0</b>	<b>1.5</b>
<b>CIS countries</b>							
Armenia	100	50.1	25.6	3.9	1.1	10.4	8.9
Azerbaijan	100	23.9	43.8	6.9	7.9	7.8	9.9
Belarus	100	15.9	71.0	4.0	4.7	3.2	1.1
Kazakhstan	100	29.2	49.3	3.1	11.0	2.2	5.3
Kyrgyzstan	100	43.4	20.6	8.5	10.3	1.5	15.8
Moldova	100	35.9	24.0	10.4	14.7	8.2	6.9
Tajikistan	100	20.4	10.9	7.4	21.8	12.3	27.2
Ukraine	100	20.2	63.8	3.4	6.1	4.0	2.4
Uzbekistan	100	37.0	30.6	6.5	9.7	10.6	5.6
<b>OECD countries</b>							
Australia	100	30.8	41.8	15.2	4.8	6.0	1.5
Chile	100	26.5	34.2	10.4	16.1	10.5	2.3
Czech Republic	100	33.8	50.6	6.6	2.5	3.5	2.9
Denmark	100	16.9	41.4	30.6	2.6	5.3	3.1
Greece	100	12.5	49.4	16.9	4.0	8.8	8.4
Hungary	100	22.2	58.2	7.6	4.8	3.6	2.6
Iceland	100	9.0	3.6	8.8	2.7	8.5	3.3
Latvia	100	34.9	33.5	9.3	11.2	7.0	4.1
Luxembourg	100	10.7	10.3	6.8	0.0	8.3	3.2
Mexico	100	20.8	44.2	10.5	6.4	12.2	5.9
Netherlands	100	21.9	40.9	16.6	8.3	8.9	3.4
Poland	100	21.6	52.3	11.8	4.6	5.9	3.8

(continued)

	Total	Natural sciences	Engineering and technology	Medical sciences	Agricultural sciences	Social sciences	Humanities
Portugal	100	23.3	43.8	12.5	3.1	11.3	5.8
Slovakia	100	19.9	58.8	4.8	4.8	6.5	5.2
Slovenia	100	40.1	47.7	3.1	2.7	2.9	3.5
South Korea	100	16.6	73.3	4.7	1.8	2.2	1.4
Spain	100	19.1	53.1	14.2	5.9	5.1	2.5
Turkey	100	8.5	62.3	13.0	3.5	8.3	4.4
United Kingdom	100	7.2	5.2	8.0	1.4	6.7	6.2
<b>EU countries which are not OECD members</b>							
Bulgaria	100	13.9	56.9	17.0	5.2	3.2	3.8
Croatia	100	17.1	34.5	25.7	4.8	9.4	8.5
Cyprus	100	38.1	31.2	6.4	5.5	13.5	5.2
Malta	100	22.0	45.7	16.0	0.9	10.3	5.1
Romania	100	20.6	66.2	5.7	4.5	1.2	1.8
<b>Other countries</b>							
Argentina	100	19.0	25.5	5.6	9.0	10.2	6.2
China	100	16.6	70.8	3.4	7.1	2.1**	...
Georgia	100	14.2	21.8	14.7	...	15.6	17.4
India	100	22.6	47.6	6.8	14.5	2.9	...
Malaysia	100	51.6	24.2	8.2	4.4	9.9	1.7
Singapore	100	12.9	59.3	18.5	3.1	...	...
South Africa	100	31.3	18.2	19.2	7.7	21.0	2.6
Taiwan	100	9.5	78.5	7.1	1.9	2.2	0.8

\* Or the nearest years for which data are available. For individual countries, the total does not equal 100%.

\*\* Including humanities.

## 8.6. PERCENTAGE DISTRIBUTION OF CURRENT EXPENDITURE ON R&amp;D BY TYPE OF R&amp;D ACTIVITY: 2018\*

	Current expenditure on R&D	Basic research	Applied research	Development
<b>Russia</b>	<b>100</b>	<b>17.6</b>	<b>20.5</b>	<b>61.9</b>
<b>CIS countries</b>				
Armenia	100	30.1	17.1	52.7
Azerbaijan	100	51.2	22.4	6.6
Belarus	100	13.4	27.3	59.3
Kazakhstan**	100	14.7	59.9	25.4
Kyrgyzstan	100	62.5	11.7	25.8
Moldova	100	26.0	55.1	18.8
Tajikistan	100	35.6	51.9	12.5
Ukraine	100	22.9	23.4	53.7
Uzbekistan	100	19.9	33.8	20.2
<b>OECD countries</b>				
Australia**	100	20.1	38.7	41.2
Austria	100	17.9	35.1	47.0
Belgium**	100	11.0	45.9	43.1
Chile	100	32.6	43.4	24.0
Czech Republic**	100	25.8	39.7	34.5
Denmark**	100	18.5	31.1	50.4
Estonia**	100	27.2	21.8	51.0
France**	100	22.7	41.9	35.4
Greece**	100	31.3	32.7	36.0
Hungary	100	19.2	22.7	58.1
Iceland**	100	21.2	48.2	30.7
Ireland**	100	20.2	29.9	49.9

(continued)

	Current expenditure on R&D	Basic research	Applied research	Development
Israel**	100	11.3	11.0	77.7
Italy**	100	22.2	42.1	35.7
Japan	100	13.7	19.5	66.8
Latvia**	100	30.9	43.1	26.0
Lithuania**	100	26.5	42.0	31.5
Luxembourg**	100	36.6	37.9	25.5
Mexico**	100	28.2	30.1	41.7
Netherlands**	100	26.0	43.9	30.0
New Zealand**	100	25.1	40.0	35.0
Norway	100	17.7	37.5	44.8
Poland**	100	29.0	17.6	53.4
Portugal**	100	21.9	38.5	39.6
Slovakia**	100	40.1	24.1	35.8
Slovenia**	100	17.9	44.0	38.1
South Korea**	100	14.5	22.0	63.6
Spain**	100	21.3	41.2	37.6
Switzerland**	100	41.7	32.2	26.1
United Kingdom**	100	18.1	44.0	37.9
United States	100	17.0	20.4	62.6
<b>EU countries which are not OECD members</b>				
Bulgaria**	100	10.4	62.4	27.2
Croatia**	100	38.0	32.6	29.4
Cyprus**	100	14.8	53.1	32.1
Malta**	100	52.1	32.6	15.3
Romania**	100	19.3	62.0	18.7

(continued)

	Current expenditure on R&D	Basic research	Applied research	Development
<b>Other countries</b>				
Argentina**	100	26.3	50.8	22.9
China**	100	5.5	10.5	84.0
Georgia**	100	24.9	7.6	...
India**	100	16.0	22.3	23.5
Malaysia**	100	28.9	56.5	14.6
Singapore**	100	23.8	31.4	44.8
South Africa**	100	26.7	47.8	25.5
Taiwan**	100	7.8	22.9	69.2

\* Or the nearest years for which data are available. For individual countries, the total does not equal 100%.

\*\* As a percentage of gross domestic expenditure on R&D.

## 8.7. GOVERNMENT BUDGET APPROPRIATIONS ON R&D

(million current USD PPPs)

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Russia</b>	<b>4685.4</b>	<b>13258.0</b>	<b>26074.9</b>	<b>29850.1</b>	<b>34070.6</b>	<b>34328.8</b>	<b>33478.2</b>	<b>37311.5</b>	<b>28301.8</b>	<b>31350.3</b>
<b>OECD countries</b>										
Australia	2851.4	3729.1	4660.5	4487.1	4880.8	4841.0	4610.9	4731.9	5257.6	5057.2
Austria	1418.9	1836.6	2697.1	3014.8	3246.3	3314.3	3437.1	3701.0	3751.2	3797.5
Belgium	1581.8	2004.6	2840.9	3028.1	3129.0	3409.3	3172.5	3439.3	3792.2	3776.0
Canada	4589.7	6777.1	8478.8	7746.2	8192.0	7937.5	7947.1	8451.9	9168.8	...
Chile	...	...	...	725.1	801.4	843.3	821.7	907.7	944.3	...
Czech Republic	827.9	1129.0	1654.3	1966.6	2088.7	2147.8	2151.6	2224.9	2476.5	2692.3
Denmark	1135.9	1329.3	2351.8	2511.6	2673.5	2707.4	2795.2	2694.2	2837.2	2950.6
Estonia	43.6	89.9	200.8	279.9	294.7	269.2	261.3	275.0	268.3	336.7
Finland	1317.3	1648.0	2299.1	2272.1	2228.8	2206.3	2205.6	2084.5	2184.0	2274.2
France	14883.6	18220.2	19155.9	17925.9	18457.1	18349.2	17531.1	18007.6	17752.8	18453.3
Germany	17238.1	19732.0	28608.5	30575.2	32745.9	33186.3	34107.7	37664.0	40726.9	42515.9
Greece	627.5	895.8	948.0	1069.1	1360.1	1278.9	1515.9	1607.5	1535.7	1971.9
Hungary	...	696.1	761.7	777.0	1574.2	702.5	725.6	1060.2	1013.7	936.8
Iceland	75.8	94.0	119.3	130.7	145.6	78.8	85.6	99.4	114.8	...
Ireland	320.2	710.7	971.6	914.1	889.5	887.4	909.6	905.5	934.5	971.4
Israel	1293.2	1044.9	1353.5	1568.8	1686.1	1749.9	1837.5	1997.9	2065.9	2225.8
Italy	9510.7	11199.3	12358.1	11798.8	11453.0	11425.0	11336.0	12466.3	12806.2	13195.7
Japan	21227.8	27617.8	32140.4	35413.2	35633.5	35431.8	33616.8	33808.3	34048.5	36709.2
Latvia	34.4	57.4	59.3	64.4	64.9	76.8	93.7	108.5	123.9	130.5
Lithuania	...	169.8	262.3	264.2	283.4	284.7	273.8	278.6	299.2	296.4
Luxembourg	24.7	81.5	235.8	294.9	333.9	359.1	380.0	394.4	434.6	445.1
Mexico	2115.9	2963.4	5135.1	5850.8	6321.0	7184.7	7093.7	6597.9	5696.7	5596.4
Netherlands	3802.5	4391.9	5691.1	5672.9	6006.6	6026.0	6027.4	6192.2	6368.7	7075.1

(continued)

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
New Zealand	...	...	681.1	735.4	756.4	882.1	873.8	933.3	1037.7	...
Norway	1062.5	1535.9	2382.0	2564.1	2759.7	2903.4	2917.1	3080.8	3417.6	3560.8
Poland	1546.8	1548.8	2909.4	3192.1	3426.5	4185.8	4158.7	3526.6	4135.8	3450.9
Portugal	1079.5	1045.6	1564.3	974.0	1155.9	1087.4	1174.4	1240.1	1239.3	1225.7
Slovakia	216.8	244.6	504.0	584.1	588.9	595.9	673.0	600.6	609.7	649.9
Slovenia	175.8	273.3	341.7	313.1	295.6	272.9	268.6	282.0	300.4	336.6
South Korea	5017.8	9886.5	16293.9	18744.5	19730.2	20391.9	22032.6	22292.6	22372.3	22679.0
Spain	5136.2	6440.7	11436.8	8899.8	8420.5	8721.4	9092.2	9421.5	9516.8	9878.6
Sweden	1726.3	2508.0	3271.8	3602.1	3662.5	3766.5	3742.9	3897.4	4206.4	4245.7
Switzerland	1526.6	...	3166.8	4022.5	...	4451.7	4754.0	...	5368.3	...
Turkey	...	...	4554.0	5201.3	6403.2	6095.5	6915.3	7344.6	7800.3	8100.6
United Kingdom	9494.5	12116.1	13325.8	12974.6	14362.8	14571.5	14612.7	14879.6	15906.3	17525.3
United States	72681.0	111332.0	119382.0	116796.0	109608.0	112502.0	115220.0	126093.0	127306.0	144459.0
<b>Other countries</b>										
Argentina	1002.0	1221.0	2383.4	2713.2	...	...	...	...	...	...
Romania	182.8	448.5	968.4	821.2	818.3	872.6	1104.5	1338.2	1003.5	981.4
Taiwan	2978.7	4889.6	7042.4	7356.6	7318.2	7388.7	7585.4	7964.1	8366.5	8213.2

**8.8. R&D PERSONNEL: 2018\***  
(*person-years; in full-time equivalent*)

	R&D Personnel	Researchers
<b>Russia</b>	<b>758462</b>	<b>405772</b>
<b>CIS countries</b>		
Armenia	4822	3384
Azerbaijan	20580	14412
Belarus	26483	17804
Kazakhstan	16053	12218
Kyrgyzstan	4300	3281
Moldova	3900	2466
Tajikistan	3720	2654
Ukraine	67806	41713
Uzbekistan	20763	15465
<b>OECD countries</b>		
Australia	147809	100414
Austria	81534	50975
Belgium	88749	57678
Canada	223146	155128
Chile	16620	9111
Czech Republic	74969	41198
Denmark	64591	46396
Estonia	6183	4968

\* Or the nearest years for which data are available. For the CIS countries (except Russia, Kazakhstan, Moldova, Uzbekistan, and Ukraine), the calculation is headcount-based.



(continued)

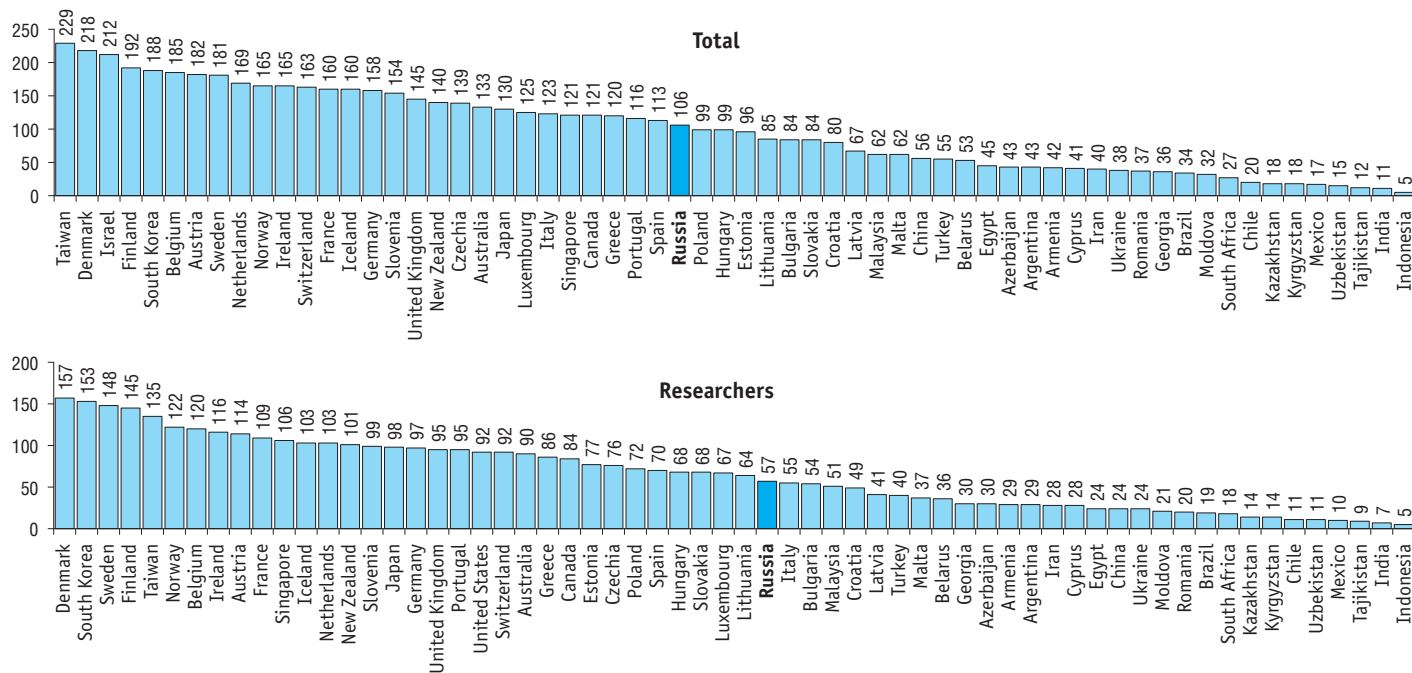
	R&D Personnel	Researchers
Finland	50011	37891
France	451423	306451
Germany	706557	433234
Greece	51092	36646
Hungary	45566	31430
Iceland	3172	2050
Ireland	35817	25265
Israel	77143	...
Italy	311734	139853
Japan	896901	678134
Latvia	6039	3689
Lithuania	11661	8773
Luxembourg	5624	2986
Mexico	65824	38882
Netherlands	157389	95611
New Zealand	36000	26000
Norway	46846	34519
Poland	161993	117789
Portugal	57150	46538
Slovakia	20268	16337
Slovenia	15698	10087
South Korea	501175	408370
Spain	225696	140120
Sweden	92011	75151
Switzerland	81751	46088
Turkey	153552	111893
United Kingdom	469647	309074
United States	...	1434415

(continued)

	R&D Personnel	Researchers
<b>EU countries which are not OECD members</b>		
Bulgaria	25809	16521
Croatia	13029	7985
Cyprus	1610	1100
Malta	1443	855
Romania	31933	17213
<b>Other countries</b>		
Argentina	78653	52383
Brazil	316495	179989
China	4381444	1866109
Egypt	122142	67589
Georgia	6935	5859
India	528219	341818
Indonesia	64635	57815
Iran	91722	64778
Malaysia	89178	73537
Singapore	44517	38829
South Africa	42533	27656
Taiwan	262307	153998

## 8.9. R&amp;D PERSONNEL PER 10,000 EMPLOYMENT: 2018\*

(headcount)



\* Or the nearest years for which data are available. For CIS countries (except Russia, Kazakhstan, Moldova, Uzbekistan, and Ukraine), the calculation is headcount-based, for the rest of the countries it is FTE-based.

## 8.10. PERCENTAGE DISTRIBUTION OF RESEARCHERS BY SECTOR OF PERFORMANCE: 2018\*

	Government sector	Business enterprise sector	Higher education sector
<b>Russia</b>	<b>35.6</b>	<b>44.2</b>	<b>19.9</b>
<b>CIS countries</b>			
Armenia	80.4	...	19.6
Azerbaijan	56.0	2.9	41.1
Belarus	28.9	59.7	11.4
Kazakhstan	32.0	17.1	43.4
Kyrgyzstan	32.2	17.1	50.7
Moldova	73.3	6.2	20.5
Tajikistan	72.6	...	27.4
Ukraine	52.9	27.3	19.8
Uzbekistan	24.1	12.9	62.5
<b>OECD countries</b>			
Australia	...	27.9	60.6
Austria	7.7	63.0	28.4
Belgium	8.1	56.3	34.6
Canada	4.8	56.7	38.2
Chile	12.8	29.0	49.6
Czech Republic	19.1	51.3	29.1
Denmark	3.7	60.5	35.3
Estonia	9.8	33.3	54.7

\* Or the nearest years for which data are available. For CIS countries (except Russia, Kazakhstan, Moldova, Uzbekistan, and Ukraine), the calculation is headcount-based, for the rest of the countries it is FTE-based.

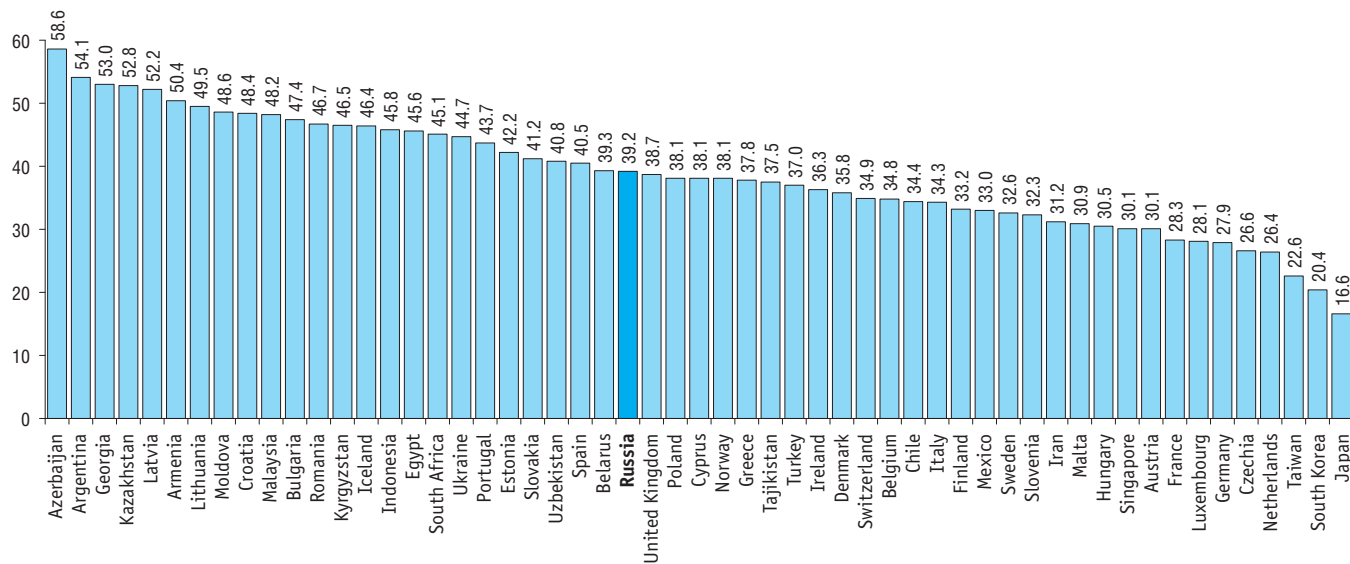
(continued)

	Government sector	Business enterprise sector	Higher education sector
Finland	8.5	56.3	33.8
France	9.5	62.3	26.7
Germany	13.1	60.4	26.5
Greece	21.1	27.4	50.7
Hungary	15.1	63.7	21.2
Iceland	12.0	42.7	45.2
Ireland	2.6	48.3	49.2
Italy	15.6	43.6	37.6
Japan	4.5	74.4	19.9
Latvia	15.5	18.5	66.0
Lithuania	18.1	30.4	51.5
Luxembourg	20.7	43.9	35.4
Mexico	17.2	37.3	43.7
Netherlands	6.1	70.0	23.8
New Zealand	6.9	31.2	61.5
Norway	13.3	48.9	37.8
Poland	2.6	48.2	48.4
Portugal	3.3	34.1	61.5
Slovakia	18.9	24.0	56.8
Slovenia	16.5	62.1	21.1
South Korea	6.7	82.0	10.0
Spain	15.3	38.8	45.7
Sweden	4.9	72.8	22.2
Switzerland	1.0	49.7	49.3
Turkey	6.0	55.7	38.4
United Kingdom	2.3	40.6	55.6
United States	...	71.3	...

(continued)

	Government sector	Business enterprise sector	Higher education sector
<b>EU countries which are not OECD members</b>			
Bulgaria	27.4	48.5	23.5
Croatia	23.5	22.7	53.9
Cyprus	8.2	27.3	56.8
Malta	1.9	52.9	45.4
Romania	38.3	27.0	33.9
<b>Other countries</b>			
Argentina	51.5	8.3	39.6
Brazil	3.4	26.6	71.4
China	19.8	61.3	18.9
Egypt	33.6	6.3	59.8
Georgia	11.1	...	88.9
India	23.1	34.0	36.5
Indonesia	13.1	7.5	78.0
Iran	22.5	19.2	57.2
Malaysia	6.6	21.9	71.4
Singapore	6.0	49.9	44.1
South Africa	10.5	17.3	71.0
Taiwan	10.2	71.0	18.7

## 8.11. FEMALE RESEARCHERS AS A PERCENTAGE OF THE TOTAL NUMBER OF RESEARCHERS: 2018\*



\* Or the nearest years for which data are available. The calculation is headcount-based.

## 8.12. NUMBER OF PUBLICATIONS AND CITATIONS IN SCIENTIFIC JOURNALS INDEXED IN SCOPUS: 2014–2018\*

	Number of publications	Number of citations**	Number of citations per publication	Ratio of the country's average citation level of publications to the world citation total
<b>Russia</b>	<b>388147</b>	<b>1577980</b>	<b>4.07</b>	<b>0.56</b>
<b>CIS countries</b>				
Armenia	5695	73201	12.85	1.76
Azerbaijan	4827	45929	9.52	1.30
Belarus	9559	81137	8.49	1.16
Kazakhstan	15504	58011	3.74	0.51
Kyrgyzstan	1054	26317	24.97	3.41
Moldova	2298	23782	10.35	1.41
Tajikistan	607	2326	3.83	0.52
Turkmenistan	82	422	5.15	0.70
Ukraine	56334	265957	4.72	0.65
Uzbekistan	2701	10866	4.02	0.55
<b>OECD countries</b>				
Australia	427875	5245383	12.26	1.68
Austria	114293	1367341	11.96	1.64
Belgium	152157	2019082	13.27	1.81
Canada	468876	5481692	11.69	1.60
Chile	60088	535553	8.91	1.22
Czech Republic	115628	832843	7.20	0.98
Denmark	123955	1816649	14.66	2.00
Estonia	14727	215846	14.66	2.00



(continued)

	Number of publications	Number of citations**	Number of citations per publication	Ratio of the country's average citation level of publications to the world citation total
Finland	95318	1190946	12.49	1.71
France	544337	5709245	10.49	1.43
Germany	790327	8645081	10.94	1.50
Greece	85101	897954	10.55	1.44
Hungary	51738	505992	9.78	1.34
Iceland	7340	143161	19.50	2.67
Ireland	61868	790018	12.77	1.75
Israel	94342	1116174	11.83	1.62
Italy	505550	5478680	10.84	1.48
Japan	607895	4491200	7.39	1.01
Latvia	10069	76906	7.64	1.04
Lithuania	17463	145022	8.30	1.14
Luxembourg	9106	133129	14.62	2.00
Mexico	106502	711698	6.68	0.91
Netherlands	265950	3795385	14.27	1.95
New Zealand	67797	737134	10.87	1.49
Norway	97916	1143536	11.68	1.60
Poland	217501	1487737	6.84	0.94
Portugal	112084	1098458	9.80	1.34
Slovakia	39403	246589	6.26	0.86
Slovenia	29207	269675	9.23	1.26
South Korea	396185	3327789	8.40	1.15
Spain	417929	4294259	10.28	1.40
Sweden	185797	2458436	13.23	1.81
Switzerland	206812	3098433	14.98	2.05

(continued)

	Number of publications	Number of citations**	Number of citations per publication	Ratio of the country's average citation level of publications to the world citation total
Turkey	202221	1203578	5.95	0.81
United Kingdom	843195	10295661	12.21	1.67
United States	2854919	32355581	11.33	1.55
<b>EU countries which are not OECD members</b>				
Bulgaria	21679	169716	7.83	1.07
Croatia	31695	222388	7.02	0.96
Cyprus	10863	134422	12.37	1.69
Malta	3242	42564	13.13	1.79
Romania	73984	426751	5.77	0.79
<b>Other countries</b>				
Algeria	31962	172228	5.39	0.74
Argentina	63733	511249	8.02	1.10
Bangladesh	21703	164822	7.59	1.04
Brazil	349901	2235219	6.39	0.87
China	2523771	19307092	7.65	1.05
Colombia	49012	319261	6.51	0.89
Ecuador	12531	76441	6.10	0.83
Egypt	88110	640321	7.27	0.99
Ethiopia	11751	109804	9.34	1.28
Georgia	7043	114065	16.20	2.21
Hong Kong	94834	1289299	13.60	1.86
India	691830	3881097	5.61	0.77
Indonesia	80381	244123	3.04	0.42
Iran	249281	1786544	7.17	0.98

(continued)

	Number of publications	Number of citations**	Number of citations per publication	Ratio of the country's average citation level of publications to the world citation total
Iraq	19735	104061	5.27	0.72
Jordan	15401	116684	7.58	1.04
Kenya	12620	158566	12.56	1.72
Lebanon	12983	134485	10.36	1.42
Malaysia	146661	894939	6.10	0.83
Morocco	28009	160711	5.74	0.78
Nigeria	33593	189419	5.64	0.77
Pakistan	73235	543011	7.41	1.01
Peru	11298	117447	10.40	1.42
Philippines	14034	111659	7.96	1.09
Qatar	16028	210700	13.15	1.80
Saudi Arabia	99012	1144834	11.56	1.58
Serbia	35893	289997	8.08	1.10
Singapore	103439	1495386	14.46	1.98
South Africa	101740	867819	8.53	1.17
Taiwan	182095	1427038	7.84	1.07
Thailand	72149	451427	6.26	0.86
Tunisia	37009	217304	5.87	0.80
United Arab Emirates	25258	202874	8.03	1.10
Vietnam	27972	221519	7.92	1.08

\* According to the Scopus SciVal web-based analytics solutions.

\*\* The analysis includes citations received by publications since the beginning of 2014 to November 13, 2019.

### 8.13. NUMBER OF PUBLICATIONS AND CITATIONS IN SCIENTIFIC JOURNALS INDEXED IN WEB OF SCIENCE: 2014–2018\*

	Number of publications	Number of citations**	Number of citations per publication	Ratio of the country's average citation level of publications to the world citation total
<b>Russia</b>	<b>329542</b>	<b>1275520</b>	<b>3.87</b>	<b>0.57</b>
<b>CIS countries</b>				
Armenia	5406	57087	10.56	1.55
Azerbaijan	4936	34123	6.91	1.02
Belarus	9020	64822	7.19	1.06
Kazakhstan	12049	36058	2.99	0.44
Kyrgyzstan	1032	12256	11.88	1.74
Moldova	2755	13759	4.99	0.73
Tajikistan	558	1884	3.38	0.50
Turkmenistan	91	526	5.78	0.85
Ukraine	54796	211927	3.87	0.57
Uzbekistan	2482	9327	3.76	0.55
<b>OECD countries</b>				
Australia	426157	4494493	10.55	1.55
Austria	108713	1166478	10.73	1.58
Belgium	147025	1734598	11.80	1.73
Canada	457844	4675741	10.21	1.50
Chile	57116	476220	8.34	1.22
Czech Republic	109343	701855	6.42	0.94
Denmark	121003	1567782	12.96	1.90
Estonia	14365	181867	12.66	1.86

(continued)

	Number of publications	Number of citations**	Number of citations per publication	Ratio of the country's average citation level of publications to the world citation total
Finland	91214	990836	10.86	1.60
France	499626	4917737	9.84	1.45
Germany	726700	7433429	10.23	1.50
Greece	81103	750050	9.25	1.36
Hungary	48498	434474	8.96	1.32
Iceland	7552	112878	14.95	2.19
Ireland	60215	675806	11.22	1.65
Israel	94477	968955	10.26	1.51
Italy	478145	4616651	9.66	1.42
Japan	535099	3871895	7.24	1.06
Latvia	10509	55288	5.26	0.77
Lithuania	17697	118130	6.68	0.98
Luxembourg	8997	101485	11.28	1.66
Mexico	103550	609647	5.89	0.86
Netherlands	256253	3282745	12.81	1.88
New Zealand	67602	632757	9.36	1.37
Norway	93904	962583	10.25	1.51
Poland	209130	1282619	6.13	0.90
Portugal	108880	911608	8.37	1.23
Slovakia	39454	196943	4.99	0.73
Slovenia	27243	223065	8.19	1.20
South Korea	363197	2864043	7.89	1.16
Spain	414529	3706916	8.94	1.31
Sweden	180106	2102161	11.67	1.71
Switzerland	198027	2685096	13.56	1.99
Turkey	210947	1013507	4.80	0.71

(continued)

	Number of publications	Number of citations**	Number of citations per publication	Ratio of the country's average citation level of publications to the world citation total
United Kingdom	831117	8754946	10.53	1.55
United States	2708257	27444280	10.13	1.49
<b>EU countries which are not OECD members</b>				
Bulgaria	21218	136242	6.42	0.94
Croatia	30422	183152	6.02	0.88
Cyprus	10500	103347	9.84	1.45
Malta	3217	24923	7.75	1.14
Romania	85409	379414	4.44	0.65
<b>Other countries</b>				
Algeria	28287	132433	4.68	0.69
Argentina	66798	443920	6.65	0.98
Bangladesh	19700	129904	6.59	0.97
Brazil	329630	1859652	5.64	0.83
China	2055261	15896824	7.73	1.14
Colombia	45378	261764	5.77	0.85
Ecuador	13816	59835	4.33	0.64
Egypt	81587	514594	6.31	0.93
Ethiopia	10627	89325	8.41	1.23
Georgia	4556	79813	17.38	2.55
Hong Kong	93362	1086637	11.64	1.71
India	573898	3050028	5.31	0.78
Indonesia	68641	164304	2.39	0.35
Iran	228190	1455570	6.38	0.94

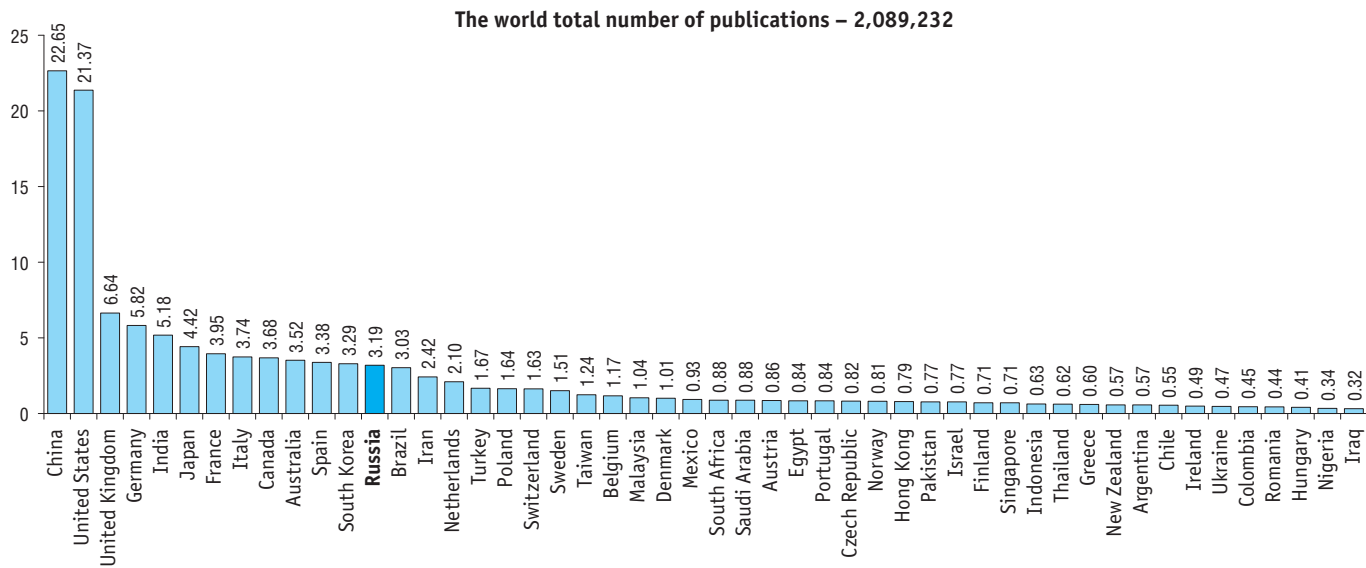
(continued)

	Number of publications	Number of citations**	Number of citations per publication	Ratio of the country's average citation level of publications to the world citation total
Iraq	13904	73367	5.28	0.77
Jordan	13144	89030	6.77	0.99
Kenya	12360	138822	11.23	1.65
Lebanon	11840	104921	8.86	1.30
Malaysia	122097	683706	5.60	0.82
Morocco	22073	114517	5.19	0.76
Nigeria	27746	146136	5.27	0.77
Pakistan	72343	457476	6.32	0.93
Peru	10636	103329	9.72	1.43
Philippines	12593	98809	7.85	1.15
Qatar	15274	176015	11.52	1.69
Saudi Arabia	92669	988961	10.67	1.57
Serbia	35949	237493	6.61	0.97
Singapore	94796	1209928	12.76	1.87
South Africa	100877	760864	7.54	1.11
Taiwan	170085	1233046	7.25	1.06
Thailand	61651	376360	6.10	0.90
Tunisia	33649	164229	4.88	0.72
United Arab Emirates	22450	160986	7.17	1.05
Vietnam	26790	188331	7.03	1.03

\* According to the analytical system InCites (Clarivate Analytics).

\*\* The analysis includes citations received by publications since the beginning of 2014 to September 30, 2019.

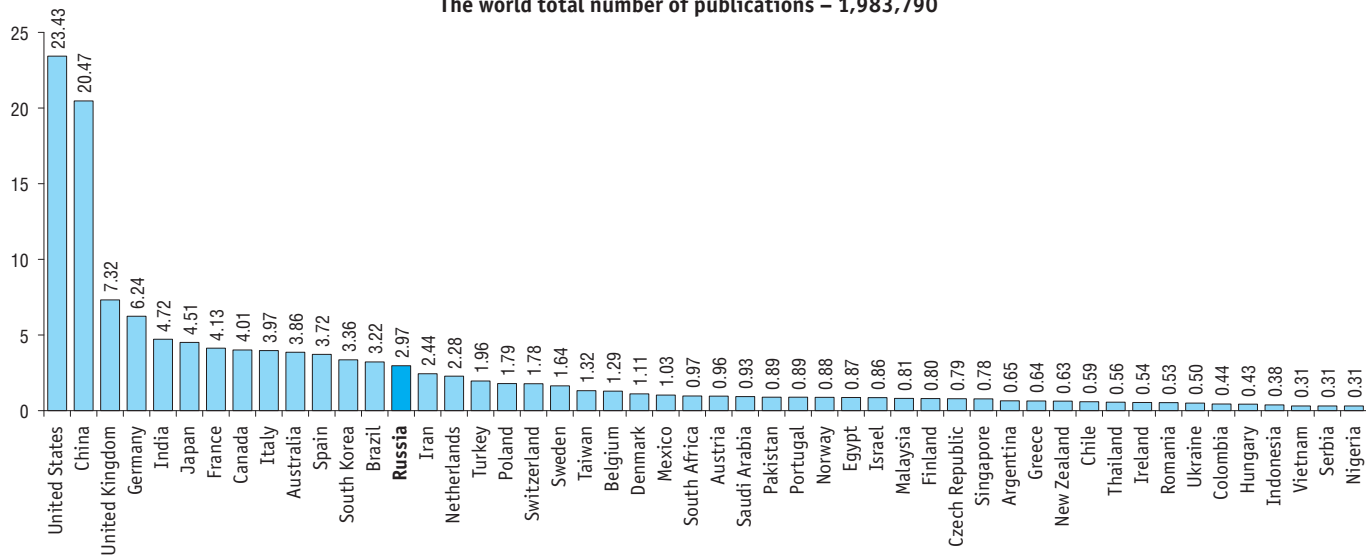
## 8.14. COUNTRIES' SHARES IN THE WORLD TOTAL NUMBER OF PUBLICATIONS IN SCIENTIFIC JOURNALS INDEXED IN SCOPUS: 2018



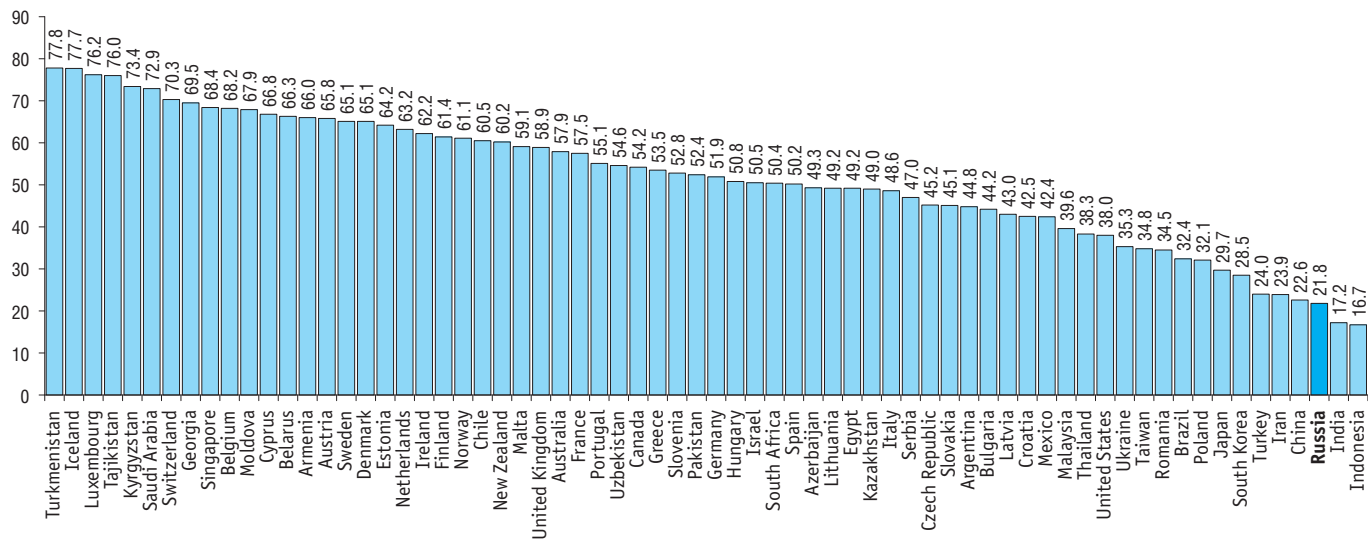


### 8.15. COUNTRIES' SHARES IN THE WORLD TOTAL NUMBER OF PUBLICATIONS IN SCIENTIFIC JOURNALS INDEXED IN WEB OF SCIENCE: 2018

The world total number of publications – 1,983,790

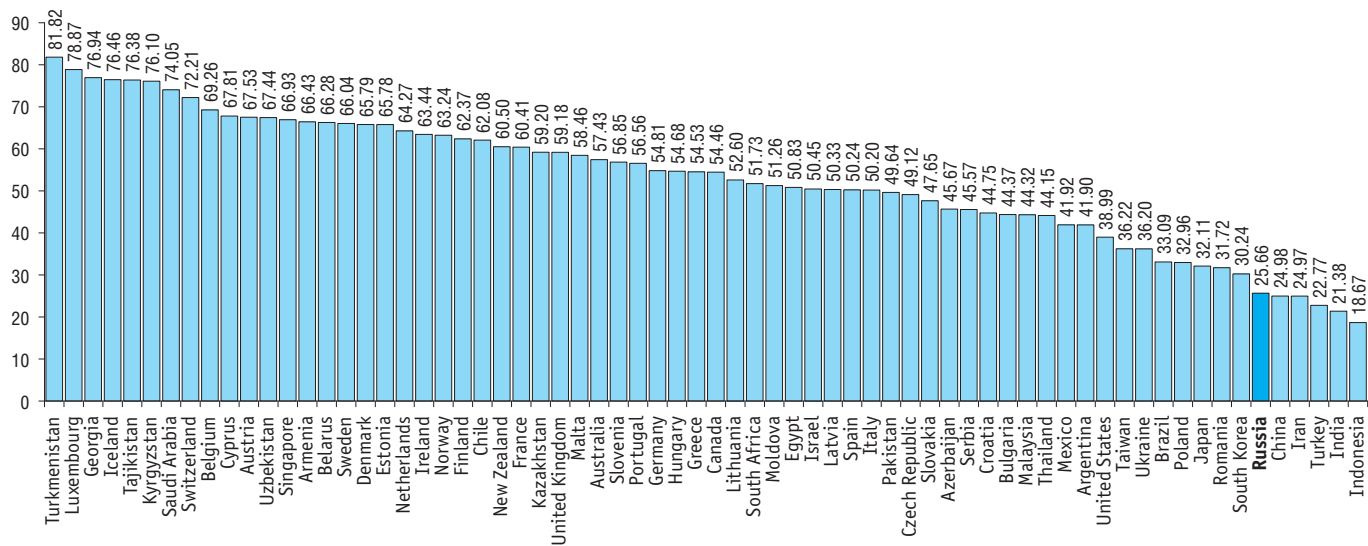


## 8.16. PUBLICATIONS CO-AUTHORED WITH FOREIGN RESEARCHERS AS A PERCENTAGE OF THE TOTAL NUMBER OF COUNTRY'S PUBLICATIONS IN SCIENTIFIC JOURNALS INDEXED IN SCOPUS: 2018\*



\* According to the Scopus SciVal web-based analytics solutions.

### 8.17. PUBLICATIONS CO-AUTHORED WITH FOREIGN RESEARCHERS AS A PERCENTAGE OF THE TOTAL NUMBER OF COUNTRY'S PUBLICATIONS IN SCIENTIFIC JOURNALS INDEXED IN WEB OF SCIENCE: 2018\*



\* According to the analytical system InCites (Clarivate Analytics).

## 8.18. RESIDENT AND ABROAD PATENT APPLICATIONS BY PATENT OFFICE

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>Russia</b>	<b>28688</b>	<b>32254</b>	<b>42500</b>	<b>44211</b>	<b>44914</b>	<b>40308</b>	<b>45517</b>	<b>41587</b>	<b>36454</b>	<b>37957</b>
<b>CIS countries</b>										
Armenia	127	208	142	141	131	123	115	126	110	105
Azerbaijan	...	287	271	144	156	168	184	163	226	171
Belarus	1198	1462	1933	1871	1634	757	691	521	524	547
Kazakhstan	1515	1626	1964	...	2202	2013	1503	1224	1228	982
Kyrgyzstan	84	131	140	111	114	139	126	89	146	...
Moldova	250	388	150	115	96	139	124	155	110	113
Tajikistan	52	36	10	6	4	...	1	...	...	...
Ukraine	7224	5592	5312	4955	5412	4813	4497	4095	4047	3968
Uzbekistan	968	444	632	510	557	568	507	555	553	650
<b>OECD countries</b>										
Australia	22001	23857	24887	26358	29717	25956	28605	28394	28906	29957
Austria	2301	2505	2673	2552	2406	2363	2441	2315	2305	2207
Belgium	820	622	760	882	876	1026	1097	1173	1217	1110
Canada	39622	39888	35449	35242	34741	35481	36964	34745	35022	36161
Chile	3120	3007	1076	3019	3072	3105	3274	2907	2894	3100
Czech Republic	4939	830	982	1071	1081	972	952	839	860	732
Denmark	1870	1823	1768	1635	1534	1583	1732	1850	1772	1501
Estonia	804	38	97	25	42	50	36	30	41	30
Finland	2903	2059	1833	1827	1737	1545	1416	1368	1529	1487

(continued)

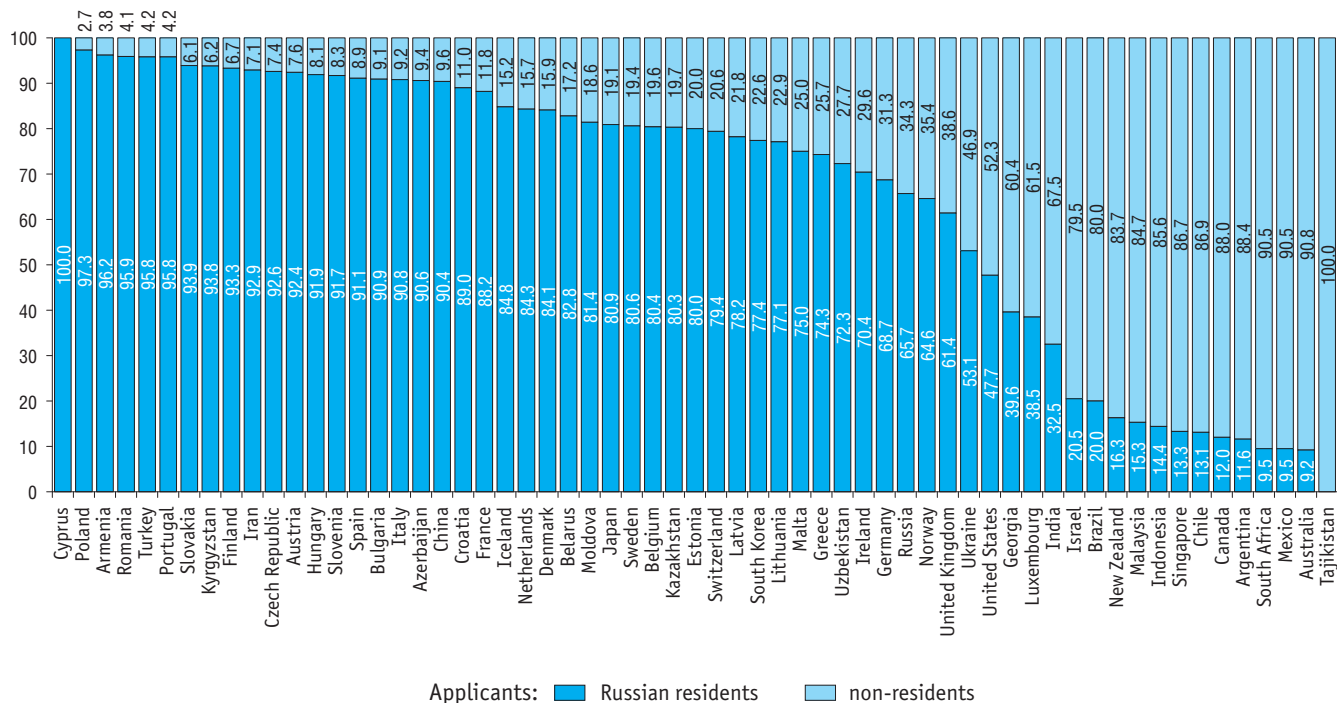
	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
France	17353	17275	16580	16632	16886	16533	16300	16218	16247	16222
Germany	62142	60222	59245	61340	63167	65965	66893	67899	67712	67898
Greece	340	482	744	656	717	670	573	646	589	579
Hungary	4937	1202	696	758	708	619	633	665	532	443
Iceland	876	592	76	44	46	64	46	38	44	66
Ireland	439	406	350	216	135	118	203	149	137	108
Israel	6802	6826	7306	6792	6185	6273	6908	6419	6813	7363
Italy	9273	9331	9723	9310	9212	9382	9687	9821	9674	9821
Japan	419543	427078	344598	342796	328436	325989	318721	318381	318479	313567
Latvia	179	169	185	205	233	107	137	113	97	110
Lithuania	127	115	114	124	137	165	119	153	127	105
Luxembourg	176	88	100	161	169	218	247	444	668	395
Mexico	13061	14435	14576	15314	15444	16135	18071	17413	17184	16424
Netherlands	2994	2850	2767	2713	2764	2582	2494	2604	2606	2505
New Zealand	7048	7005	6636	7099	6781	7728	6501	6386	6160	6238
Norway	6700	5986	1813	1564	1749	1563	1805	2060	2060	1674
Poland	7303	6583	3430	4657	4411	4096	4815	4396	4041	4322
Portugal	146	205	545	647	669	740	945	751	680	690
Slovakia	2040	250	282	203	210	234	256	235	206	231
Slovenia	431	373	453	...	...	...	...	...	...	278
South Korea	102010	160921	170101	188915	204589	210292	213694	208830	204775	209992
Spain	3194	3353	3779	3475	3244	3178	3020	2922	2343	1674
Sweden	5068	2960	2549	2436	2495	2425	2428	2384	2297	2280
Switzerland	2551	2098	2155	2988	2156	2048	1923	1771	1628	1615
Turkey	3433	1146	3357	4666	4661	5097	5841	6848	8555	7466
United Kingdom	32747	27988	21929	23235	22938	23040	22801	22059	22072	20941
United States	295895	390733	490226	542815	571612	578802	589410	605571	606956	597141

(continued)

	2000	2005	2010	2012	2013	2014	2015	2016	2017	2018
<b>EU countries which are not OECD members</b>										
Bulgaria	940	313	260	259	297	234	291	241	225	198
Croatia	875	1012	278	249	253	200	186	188	159	136
Cyprus	70	64	8	12	3	4	7	4	12	4
Malta	116	...	19	17	17	13	11	4	...	...
Romania	1290	984	1418	1077	1046	1036	1053	1063	1178	1147
<b>Other countries</b>										
Argentina	6636	5269	4717	4813	4772	4682	4125	3809	3443	3667
Brazil	17376	20005	22686	30116	30884	30342	30219	28010	25658	24857
China	51906	173327	391177	652777	825136	928177	1101864	1338503	1381594	1542002
Georgia	456	461	359	372	333	297	271	274	232	260
India	8538	24382	39762	43955	43031	42854	45658	45057	46582	50055
Indonesia	3890	4304	5630	...	7450	8023	9153	9639	9303	9754
Iran	616	4494	11636	11054	11643	13802	14279	15632	16259	12823
Malaysia	6227	6286	6383	6940	7205	7620	7727	7236	7072	7295
Singapore	8236	8605	9773	9685	9722	10312	10814	10980	10930	11845
South Africa	3295	7004	6383	7444	7295	7552	7497	7210	7544	6915

Source: WIPO database, November 2019.

8.19. PERCENTAGE DISTRIBUTION OF PATENT APPLICATIONS BY APPLICANT AND COUNTRY: 2018\*



\* Or the nearest years for which data are available.

Source: WIPO database, November 2019.

## 8.20. RESIDENT AND ABROAD PATENT APPLICATIONS BY COUNTRY OF ORIGIN

	Number of applications				Number of applications per 1,000,000 population				Number of applications per 1,000,000 labour force			
	2015	2016	2017	2018	2015	2016	2017	2018	2015	2016	2017	2018
<b>Russia</b>	<b>33796</b>	<b>31833</b>	<b>27807</b>	<b>30289</b>	<b>230.6</b>	<b>216.8</b>	<b>189.3</b>	<b>206.4</b>	<b>450.0</b>	<b>424.2</b>	<b>374.3</b>	<b>411.9</b>
<b>CIS countries</b>												
Armenia	160	192	187	165	54.7	65.4	63.5	55.9	114.5	139.8	136.1	119.8
Azerbaijan	499	498	479	414	51.7	51.0	48.6	41.6	102.3	100.2	95.2	81.9
Belarus	1967	1473	1525	1479	207.3	155.0	160.6	155.9	385.1	289.0	301.3	294.5
Kazakhstan	1797	1527	1771	1633	102.4	85.8	98.2	89.3	197.1	166.3	192.0	176.4
Kyrgyzstan	180	138	170	4	30.2	22.7	27.4	0.6	70.7	54.1	65.6	1.5
Moldova	98	101	103	160	27.6	28.4	29.0	45.1	74.2	78.9	81.4	127.5
Tajikistan	16	97	33	56	1.9	11.2	3.7	6.2	6.8	40.3	13.4	22.3
Ukraine	2879	2744	2793	2541	63.8	61.0	62.3	56.9	137.8	132.7	136.2	125.3
Uzbekistan	305	385	366	480	9.7	12.1	11.3	14.6	20.9	25.8	24.2	31.2
<b>OECD countries</b>												
Australia	11228	11753	11660	12261	471.4	485.8	473.9	490.6	893.6	923.8	899.0	933.6
Austria	14035	13874	13809	14561	1623.9	1588.0	1569.6	1645.9	3146.3	3061.9	3032.0	3188.7
Belgium	12392	12968	13778	14587	1099.1	1144.4	1211.2	1277.1	2477.9	2590.7	2735.1	2890.1
Canada	24745	24640	23927	24483	693.1	682.4	654.8	660.7	1258.8	1240.8	1189.1	1203.8
Chile	851	945	877	946	47.4	51.9	47.5	50.5	95.8	104.8	95.2	100.8
Czech Republic	2365	2152	2188	2251	224.3	203.7	206.5	211.8	443.1	399.4	403.8	416.6
Denmark	12225	11747	12900	13385	2151.0	2050.8	2237.6	2308.8	4170.5	3884.1	4320.4	4461.4
Estonia	236	275	285	270	179.4	209.0	216.3	204.4	343.9	395.9	405.9	385.7
Finland	13191	12566	12627	11572	2407.3	2286.7	2292.4	2097.1	4894.8	4674.2	4660.0	4272.4
France	72550	71509	71087	69120	1089.4	1069.5	1063.1	1031.8	2400.8	2360.5	2349.6	2284.3



(continued)

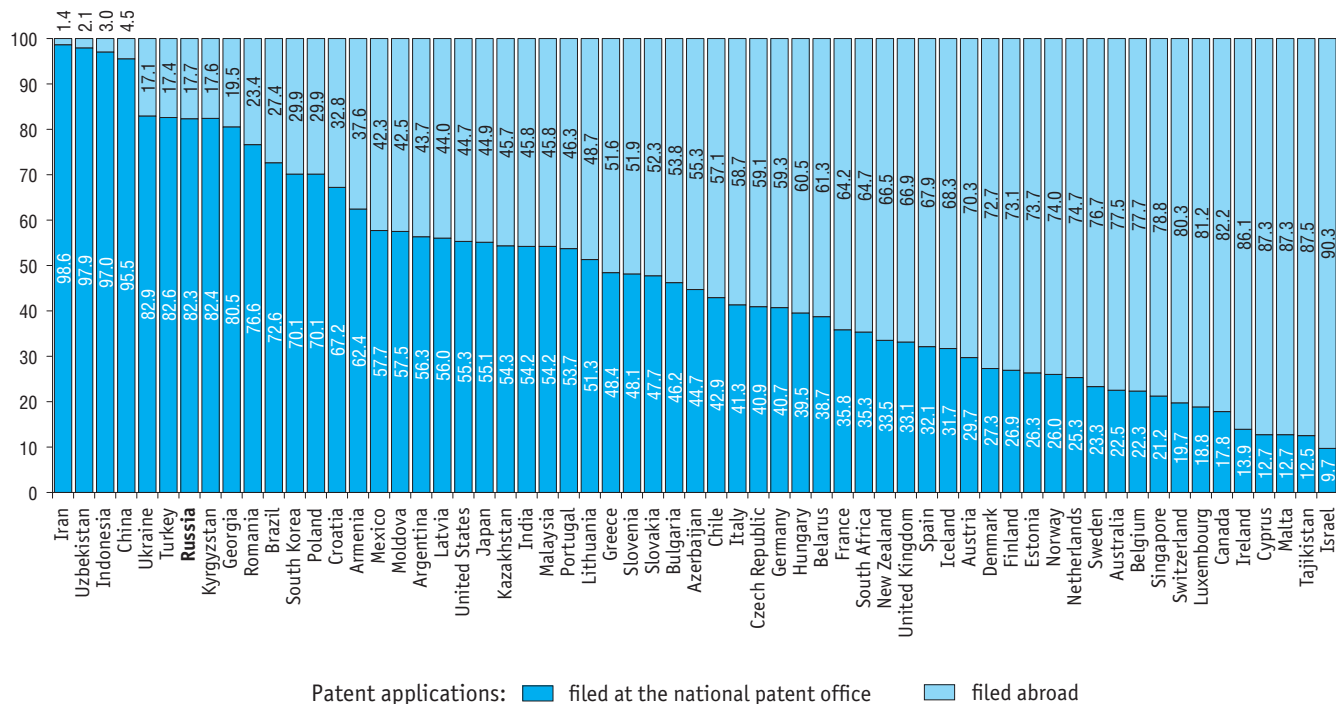
	Number of applications				Number of applications per 1,000,000 population				Number of applications per 1,000,000 labour force			
	2015	2016	2017	2018	2015	2016	2017	2018	2015	2016	2017	2018
Germany	175420	177175	176405	180086	2147.5	2151.5	2134.2	2171.6	4105.1	4103.0	4065.2	4147.3
Greece	1152	1229	1233	1137	106.5	114.1	114.6	106.0	234.7	250.5	251.7	233.6
Hungary	1496	1538	1263	1340	152.0	156.7	129.0	137.2	324.1	328.3	267.9	285.4
Iceland	276	258	332	281	834.3	769.1	966.8	794.7	1359.4	1239.0	1576.9	1298.9
Ireland	5098	5231	5217	6334	1084.2	1100.0	1085.2	1305.0	2240.0	2262.2	2237.2	2700.5
Israel	14488	15109	15515	15482	1728.9	1768.0	1780.6	1742.7	3737.0	3819.4	3854.6	3774.9
Italy	21675	31187	31393	32286	356.9	514.4	518.6	534.3	855.2	1218.9	1220.1	1260.3
Japan	457949	456550	460771	460369	3601.9	3595.0	3634.2	3638.4	6900.5	6828.6	6846.0	6862.3
Latvia	288	256	168	175	145.6	130.6	86.5	90.8	284.7	253.8	167.2	177.1
Lithuania	275	219	214	230	94.7	76.4	75.7	82.5	187.0	147.8	145.7	158.8
Luxembourg	2790	3466	3465	3199	4898.1	5955.2	5810.5	5263.9	9867.4	12265.9	11889.6	10767.6
Mexico	2509	2405	2532	2695	20.6	20.3	19.3	20.1	46.4	43.8	45.5	47.6
Netherlands	38102	39083	37642	36539	2249.2	2294.9	2197.3	2120.5	4217.2	4317.7	4131.4	3988.5
New Zealand	3287	3063	3183	3039	715.2	652.6	664.0	622.0	1307.9	1174.3	1180.5	1106.1
Norway	5713	5915	5955	6511	1101.1	1130.0	1128.5	1225.2	2068.4	2135.6	2155.5	2340.9
Poland	7010	6143	6131	6757	184.5	161.8	161.4	177.9	382.3	333.9	332.0	368.4
Portugal	1624	1682	1508	1643	156.8	162.9	146.4	159.8	311.2	323.1	287.1	314.5
Slovakia	495	457	441	560	91.3	84.1	81.1	102.8	180.7	165.4	159.7	203.6
Slovenia	462	511	373	738	223.9	247.5	180.5	357.0	457.4	512.3	362.8	724.8
South Korea	238185	233801	226614	232020	4668.9	4562.4	4403.2	4493.4	8669.8	8418.4	8062.3	8200.0
Spain	10866	10816	10808	10292	234.0	232.7	232.0	220.3	471.3	469.9	471.5	450.1
Sweden	24397	23485	23429	25310	2489.7	2366.7	2329.5	2485.5	4704.9	4474.2	4392.2	4688.2

(continued)

	Number of applications				Number of applications per 1,000,000 population				Number of applications per 1,000,000 labour force			
	2015	2016	2017	2018	2015	2016	2017	2018	2015	2016	2017	2018
Switzerland	45966	47121	44575	46659	5549.8	5627.5	5274.0	5478.6	9548.9	9637.1	9061.2	9432.3
Turkey	7296	8381	11156	9360	92.9	105.0	137.6	113.7	244.8	271.6	348.7	287.3
United Kingdom	53366	52902	53825	56216	819.4	806.5	814.8	845.5	1596.8	1569.6	1587.6	1648.1
United States	530658	522065	525467	515180	1654.5	1615.9	1616.1	1574.7	3302.7	3210.2	3197.3	3123.3
<b>EU countries which are not OECD members</b>												
Bulgaria	512	427	425	459	71.3	59.9	60.1	65.3	153.6	130.8	126.6	138.2
Croatia	250	255	280	201	59.5	61.1	67.9	49.2	131.6	138.7	152.9	111.2
Cyprus	351	335	400	432	302.3	286.3	339.1	363.2	580.8	555.5	654.6	702.2
Malta	483	497	512	394	1085.3	1091.5	1094.0	814.8	2334.7	2328.2	2325.9	1737.0
Romania	1235	1255	1452	1501	62.3	63.7	74.1	77.1	135.8	140.6	159.8	167.5
<b>Other countries</b>												
Argentina	889	1143	766	755	20.6	26.2	17.4	17.0	45.8	57.9	38.2	37.3
Brazil	6570	7216	7505	6859	32.1	35.0	36.1	32.7	64.6	70.3	71.9	65.1
China	1010524	1257425	1306080	1460244	737.0	912.1	942.1	1048.5	1286.7	1599.1	1658.7	1857.9
Georgia	124	117	93	128	33.3	31.4	24.9	34.3	60.3	57.6	46.0	63.3
India	23990	25853	28009	30036	18.3	19.5	20.9	22.2	49.0	52.0	55.4	58.6
Indonesia	1178	1154	2320	1451	4.6	4.4	8.8	5.4	9.4	9.1	17.9	11.0
Iran	...	15081	15478	12074	...	189.5	191.9	147.6	...	562.8	572.5	443.7
Malaysia	2347	1964	2148	2060	77.5	64.0	69.1	65.3	160.9	132.1	141.7	133.1
Singapore	6185	6734	6951	7415	1117.4	1200.9	1238.5	1315.0	1856.3	1996.2	2060.5	2195.1
South Africa	2077	2018	2189	1861	37.5	35.9	38.4	32.2	97.0	92.7	97.5	81.8

Source: WIPO and World Bank database, November 2019.

## 8.21. PERCENTAGE DISTRIBUTION OF PATENT APPLICATIONS BY APPLICANT AND PATENT OFFICE: 2018\*



\* Or the nearest year for which data are available.

Source: WIPO database, November 2019.

## 8.22. NUMBER OF TRIADIC PATENT FAMILIES\*

	2000	2005	2010	2012	2013	2014	2015	2016	2017
<b>Russia</b>	<b>85</b>	<b>91</b>	<b>88</b>	<b>94</b>	<b>76</b>	<b>111</b>	<b>97</b>	<b>96</b>	<b>98</b>
<b>OECD countries</b>									
Australia	516	479	308	337	308	321	296	302	308
Austria	347	409	389	378	380	398	371	374	380
Belgium	456	543	465	429	432	390	369	379	385
Canada	613	718	553	527	620	590	540	536	546
Chile	2	6	14	10	12	8	11	11	11
Czech Republic	10	25	15	36	32	44	42	43	44
Denmark	290	389	301	284	263	307	287	289	293
Estonia	1	3	3	4	9	6	4	4	4
Finland	433	391	228	290	271	312	282	278	274
France	2925	3048	2460	2440	2423	2482	2306	2314	2315
Germany	7639	7141	5058	4592	4912	4633	4434	4489	4531
Greece	11	24	5	22	20	23	18	18	19
Hungary	42	58	38	31	20	35	35	35	36
Iceland	13	7	3	2	2	1	2	2	2
Ireland	51	98	64	75	94	105	104	106	108
Israel	386	502	351	401	438	447	461	476	480
Italy	832	965	682	725	773	815	787	816	818
Japan	18263	18932	19295	18651	17647	17594	17340	17493	17591
Latvia	5	10	1	2	3	1	4	2	0
Lithuania	1	1	...	...	...	...	...	...	...
Luxembourg	22	21	19	21	15	20	17	20	19
Mexico	9	19	16	16	19	26	27	26	26
Netherlands	1264	1762	825	1039	1139	1283	1218	1238	1219
New Zealand	72	73	44	104	71	100	87	84	84
Norway	138	141	115	102	103	111	96	97	98

(continued)

	2000	2005	2010	2012	2013	2014	2015	2016	2017
Poland	9	18	62	69	59	54	74	73	77
Portugal	5	16	17	23	21	32	30	35	35
Slovakia	2	2	7	8	9	7	8	9	9
Slovenia	9	22	16	10	14	13	9	10	10
South Korea	909	2746	2460	2495	2549	2400	2314	2447	2428
Spain	196	293	238	232	230	254	255	262	263
Sweden	792	969	642	661	588	674	647	648	668
Switzerland	1004	1064	1058	1143	1116	1173	1123	1153	1155
Turkey	5	16	33	31	42	28	43	50	52
United Kingdom	2361	2164	1658	1703	1824	1667	1598	1614	1612
United States	15626	17374	12743	13737	14798	13587	13280	12274	12021
<b>EU countries which are not OECD members</b>									
Bulgaria	1	3	...	...	...	...	...	...	...
Croatia	6	4	...	...	...	...	...	...	...
Cyprus	0	2	...	...	...	...	...	...	...
Malta	3	2	...	...	...	...	...	...	...
Romania	0	7	6	14	13	9	12	10	13
<b>Other countries</b>									
Argentina	8	16	8	8	6	9	10	10	10
Brazil	29	24	0	...	...	...	...	...	...
China	87	523	1425	1952	2189	2824	3167	3820	4215
India	48	91	12	...	...	...	...	...	...
Singapore	82	170	109	107	130	148	111	128	129
South Africa	52	49	30	33	29	25	23	23	23

\* Aggregate amount of patent applications filed simultaneously to the European patent office (EPO), the United States Patent and Trademark Office (USPTO), and the Japanese Patent Office (JPO).

Source: WIPO database, November 2019.

## TECHNICAL NOTES

**Advanced manufacturing technology** is defined as computer-controlled or microelectronics-based process or equipment used in the design, manufacture or handling of a product.

**Applied research** encompasses original activities aimed at acquisition of new knowledge for the purpose of solving specific practical problems. Applied research determines possible ways to use basic research results and new methods to solve previously defined problems.

**Basic research** means experimental or theoretical research aimed at acquiring new knowledge without any particular practical application. Hypotheses, theories, methods, etc. are obtained as a result of the basic research. It may conclude with recommendations on conducting applied research in order to identify the ways to implement the obtained scientific results, by scientific publications, etc.

**Competitive R&D funding (programme funding)** means funds received by an organisation that won the competition in accordance with the decision of a special commission that summarised the competition results for scientific, technical programmes, innovation and other R&D-related projects, based on the best R&D project implementation conditions presented by this organisation in comparison to other participants.

**Country's Scientific Specialisation Index (in a specific field of science)** is calculated as a ratio of a number of publications in a specific field of science to the total number of publications of the country's authors in scientific journals indexed in Web of Science Core Collection or Scopus, as well as to this country's share in the world total number

of indexed publications. If the index value of a country is above 1.0, the field of science is considered to be this country's scientific specialisation.

**Development** are regular activities, based on knowledge received from realisation of research and practical experience, and aimed at the production of new products/processes or the improvement of existing products/processes.

**Doctoral studies** are a form of a highly-qualified personnel training programme undergone by persons with a Candidate of Sciences degree. Persons with a PhD degree are accepted for doctoral studies. The doctoral thesis is written by doctoral students in higher education institutions, additional professional (vocational) education institutions and in research institutes. Doctoral students prepare their doctoral thesis for a doctor's degree in the chosen scientific field of study in accordance with the Academic Degrees Nomenclature, approved by the Order of the Ministry of Science and Higher Education of the Russian Federation.

**Engineering** means engineering and consulting services performed under a contract regulating preparation and maintenance of the production and sales processes or maintenance of construction and operation of industrial, infrastructure and other facilities.

**Enterprises engaged in technological innovation** are enterprises (organisations, institutions) that develop and implement new or significantly improved goods and services, production processes or services delivery (provision) methods, as well as those that perform other types of innovative activities.

**Federal budget appropriations on civil S&T** are the federal budget funds allocated for basic and applied research to be applied in civil S&T. In accordance with a new budget appropriations classification introduced on January 01, 2005, Subsection 0601 'Basic Research' and Subsection 0602 'Advanced Technologies and Priority S&T Areas Development' listed in Section 06 'Basic Research and Scientific and Technological Progress Promotion' of the Federal Budget refer to basic and applied research, respectively.

**Grants** are cash and other assets provided irrevocably and free of charge by individuals and legal entities, including foreign citizens and foreign legal entities, as well as international organisations entitled to offer grants in the Russian Federation in accordance with the procedures established by the Government of the Russian Federation, to implement specific S&T programmes and projects, conduct specific scientific research under the conditions laid down by grantors (Federal Law no. 127-FL of August 26, 1996 'On Science and State Scientific and Technical Policy' (as amended)).

**Gross domestic expenditure on R&D** is the actual expenditure on research and development in the country (including R&D funded from abroad but excluding payments made abroad) in monetary form. The value of these activities is determined based on statistical reporting on the expenditure on organisations' in-house R&D activities within the reporting year, regardless of the funding source.

Gross domestic expenditure on R&D includes:

- current expenditure – expenditure on salaries, consolidated social security payments, acquisition or manufacture of special-purpose equipment (including at the expense of the production cost

of the tasks performed), other material expenditures (the cost of raw materials, material supplies, components, semi-finished products, fuel, energy, industrial works and services, etc. acquired from third parties) and other current expenditure;

- capital expenditure – expenditure on land acquisition, buildings acquisition or construction, machinery and tools acquisition included into fixed assets, etc.

Gross domestic expenditure on R&D is expressed both at current and constant prices calculated using the gross domestic product deflator.

**Industrial design** is a new duly registered engineering solution for a manufactured or artisan product that determines its external appearance and combines technical, functional and aesthetic properties.

**Innovation activity** describes the degree of enterprises' involvement in general or specific innovative activity over a specific period. The degree of an enterprise's involvement in innovation is usually evaluated as a ratio of the number of enterprises engaged in technological, marketing and organisational innovation to the total number of surveyed enterprises in a country, industry, sector, region, etc. over a specific period.

**Innovation expenditure** is the actual expenditure in monetary form, connected with the implementation of different types of innovative activity performed within an organisation (industry, region, or country). Innovation expenditure includes current expenditure and capital expenditure. The statistics studies expenditure on technological, marketing, and organisational innovation.

**Innovative activity** is a type of activity related to transformation of ideas (usually, R&D results or other S&T achievements) into tech-

nologically new or significantly improved goods or services introduced into the market; or technology new or significantly improved production processes or services delivery (provision) methods, that have been used in real life. Innovation activities involve a combination of scientific, technological, organisational, financial, and commercial actions that result in new innovations.

**Innovative goods and services** are goods and services, either new or those that underwent various technological changes within the last three years. According to the degree of novelty, there are two types of innovative goods, works, and services – those newly introduced (or those that have undergone substantial technological changes) and those significantly improved.

**Invention** is a technical and/or engineering solution in any sphere pertaining to a product (namely, a device, material, strain of micro-organism, plant and animal cell culture) or to a method (a process of manipulating material objects with the help of material means). An invention must be new, innovative, and applicable for industrial use.

**Know-how** are sensitive non-proprietary technological knowledge and processes, practical experience, including methods, techniques and skills necessary for the design, calculation, construction and production of any goods, R&D or other works; compositions and recipes of materials, substances, alloys and others; treatment methods and therapies; mining and quarrying methods; specifications, formulas and recipes; documentation, organisational charts, experience in design, marketing, management, economics and finance, and other information not available to the general public.

**Licence** is a permit by which the owner (licenser), subject to certain conditions and a fixed remuneration, gives an interested party (licensee) the exclusive right for an industrial property item or a know-how or the rights to use the item of the contract as agreed in a special contract (agreement). Patent licence entitles the owner to use the patent, lists the scope of assigned rights, the territory and the period of its use, as well as a payment form.

**Marketing innovation** means implemented marketing methods, either new or significantly improved, that involve substantial changes in the design and packaging of goods and services; usage of new goods and services sales strategies and new methods of launching and promoting them on the target market; development of new price strategies. Marketing innovations are aimed at complete satisfaction of the target customers' needs and expansion of target audience, as well as at the development of new markets to increase sales.

**Organisational innovation** means implemented new business practices, management of workplace and external relations. Organisational innovations are aimed at enterprises' increased in performance efficiency as a result of cutting administrative and transaction costs, optimisation of workplace (working hours) and, hence, achieving a better labour productivity, access to the assets that are not on the market, and a delivery costs reduction.

R&D fixed assets (capital) include:

- buildings and structures;
- machinery and equipment, including pilot plant devices, scientific instruments, automation equipment and computer hardware, etc.;
- transport vehicles;



- tools, furniture, and other fixed assets on the balance sheet of scientific organisations and their pilot and experimental facilities used in the course of their main activity.

**Patent** is the exclusive intellectual property right to an invention of a technical product or process. It establishes priority, authorship, and exclusive right of use for the patent duration.

**Postgraduate studies** is the main form of academic personnel training in research institutes, higher education institutions and additional professional (vocational) education institutions. Only individuals having a higher education attainment (specialist's degree or master's degree) are eligible to apply to postgraduate programmes of academic personnel training. In accordance with Federal Law no. 273-FL of December 29, 2012 'On the Education in the Russian Federation', since January 1, 2014, the fields of education that postgraduates can enrol in are listed in Order of the Ministry of Science and Higher Education of the Russian Federation no. 1061 of September 12, 2013 'On the Approval of the Lists of Professions and Fields of Education in Higher Education.'

**Publication activity indicators** are calculated on the basis of the Web of Science Core Collection (SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI) and Scopus databases, and in terms of citation indicators – using the InCites resources of Clarivate Analytics (based on Web of Science materials) and SciVal of Elsevier (based on Scopus materials). Unless indicated otherwise, the term 'publication' means three types of documents, namely 'articles', 'reviews' and 'conference papers' ('proceedings'). A publication belongs to a country if it is listed in the affiliated address of the author or one of the co-authors and has been recognised by Web of Science and Scopus. If one or more

co-authors give additional affiliation in a different country, such publication is considered to be written in international cooperation. All the values of the publication activity indicators presented in this collection reflect the state of the databases as of November 25, 2019.

**R&D personnel** are all individuals whose creative activity performed on a regular basis is aimed at increasing the total amount of scientific knowledge and finding new application areas for this knowledge, and they are involved in the provision of direct services associated with research and development.

R&D personnel can be divided into the following categories:

- researchers – employees professionally involved in research and development and directly engaged in the creation of new knowledge, products, processes, methods, and systems, as well as in the management of said activities. Generally, researchers have diplomas of higher education;
- technicians – employees participating in research and development and performing technical operating functions (operation, exploitation and maintenance of scientific instruments, lab equipment, computers, as well as preparation of materials, designs and blueprints, conduction of experiments, tests and assays, etc.), supervised, as a rule, by fellow researchers. Generally, technicians have secondary vocational education and/or the necessary vocational (professional) knowledge and experience;
- supporting staff – employees performing supporting work associated with research and development: employees of economic planning department, financial subdivisions, patent services, S&T information subdivisions, S&T libraries; workers who

assemble, debug, tune, maintain and repair scientific instruments and devices; workers in pilot and experimental facilities; lab assistants without higher education or secondary vocational education;

- others include staff engaged in maintenance, as well as those performing general functions connected with the overall activity of the organisation (accountants, HR personnel, clerical workers, logistic support staff, typists, etc.).

**Research and development (R&D)** is creative activity performed on a regular basis in order to increase the total amount of scientific knowledge, inter alia the knowledge concerning humanity, nature, and society, as well as to find new application areas for this knowledge.

#### **Sectors of R&D performance:**

- **government sector** involves departments' and agencies' organisations involved in government of the state and satisfaction of the needs of the society, in general; non-profit organisations, fully or partially, financed and controlled by the government;
- **business enterprise sector** involves organisations and enterprises, which main activity is associated with commercial production of goods and services, including organisations of public ownership; private non-profit organisations providing services to said organisations;
- **higher education sector** involves higher education institutions, irrespective of their source of funds and legal status, as well as scientific research institutes, experimental facilities, teaching hospitals under their control or affiliated therewith;

- **private non-profit sector** involves private non-commercial organisations that do not seek profit (professional communities, voluntary associations, etc.) and private organisations.

**Selection achievements** are the results of intellectual activity in the field of creating biologically new objects with certain properties, having a duly registered exclusive right of an individual or a legal entity. Selection achievements, i.e. plant varieties and animal breeds, constitute a special type of patent and legal protection items. In Russia, only plant varieties and animal breeds registered in the State Register of Protected Selection Achievements could be regarded as protected items of intellectual property, if these results of intellectual activity meet the requirements established by the Civil Code of the Russian Federation for such selection achievements.

**Sources of R&D funds** are the primary sources of funds for R&D, which amount is determined following the direct money transfer from the client organisation to the executing organisation.

Generally, the R&D funds of the reporting organisation are subdivided into own funds of organisations and the funds that have been received from other organisations and institutions, irrespective of their affiliation with various sectors of activity.

The following sources are included in the sources of funds:

- budget funds (including federal budget funds, regional budget funds and municipal budget funds of the Russian Federation);
- general university funds;
- funds from foundations for S&T and innovation;
- funds from abroad;
- government sector organisations' funds;
- business enterprise sector units' funds;

- higher education sector institutions' funds;
- private non-profit sector organisations' funds;
- own funds of organisations.

**Tax expenditure**, as defined by '2015 Tax Policy Guidelines and the 2016-2017 Budget Plan' approved on July 1, 2016 by the Government of the Russian Federation, are revenues' shortfalls in budgets of the Russian budgetary system caused by applicable tax incentives and other instruments (preferences) set by the fiscal law of the Russian Federation.

**Technological innovation** is the final result of innovative activity presented in the form of new or significantly improved goods and services introduced into the market or new or significantly improved production processes or services delivery (provision) methods, that has been used in real life. Innovation is considered implemented if it is launched into the market or used in production process.

**Technology balance of payments** is the total sum of the money transfers on intangible transactions connected with technology imports and exports.

**Trade in technology with foreign countries** encompasses all commercial transactions regarding import and export of technology and technological services, including deals between joint ventures and foreign organisations registered in Russia, their branches (representative offices), and their foreign parent companies.

**Trademark** is an original graphic image, a combination of figures, letters, or words, etc., intended to distinguish the goods and services of some manufacturers from similar goods and services of other manufacturers.

**Utility model** is a technical solution pertaining to equipment. Utility models must be new and applicable for industrial use.

## SCIENCE AND TECHNOLOGY INDICATORS IN THE RUSSIAN FEDERATION

Data Book

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