Ministry of Digital Development, Communications and Mass Media of the Russian Federation

Federal State Statistics Service

HIGHER SCHOOL OF ECONOMICS
NATIONAL RESEARCH UNIVERSITY

2019

Digital Economy Indicators in the Russian Federation

Data Book

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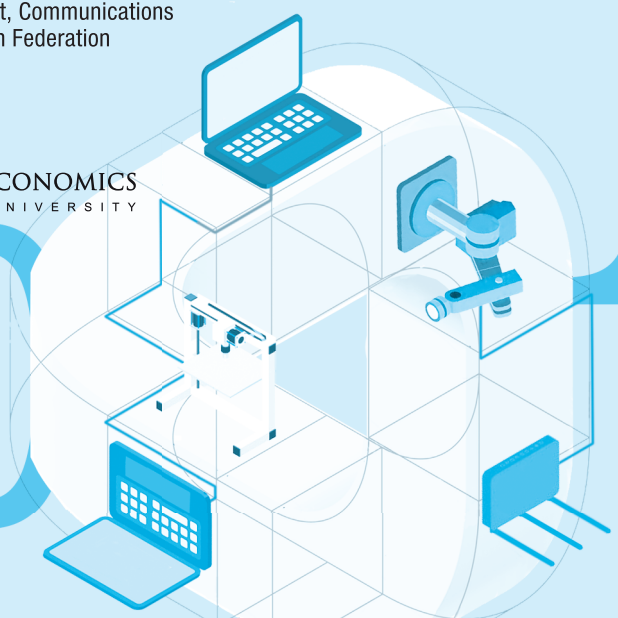

Digital Economy Indicators in the Russian Federation

Data Book

Moscow 2019

Editorial Board: Leonid Gokhberg, Yaroslav Kuzminov, and Elena Sabelnikova

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With contributions by Denis Martynov

Digital Economy Indicators in the Russian Federation : Data Book / G. Abdrakhmanova, A. Demyanova, S. Fridlyanova et al.; National Research University Higher School of Economics. – Moscow : HSE, 2019.

This data book is another publication in the series describing various aspects of the digital economy development in the Russian Federation. It's position in international ratings was researched with the help of the most recent statistical data, including indicators describing research and development in the field of ICT, digital economy personnel, telecommunications, activities of ICT sectors, content and mass media sectors. The publication presents the statistical data on the demand on the digital technologies in the business enterprise sector and social sphere, and their use by the population, including for the purposes of interaction with state authorities when receiving state services in digital form. Indicators of digital economy development in Russian regions are provided in a separate section. A review of technological trends in the digital economy was prepared with the use of the iFORA Big Data Analysis System developed by the Institute for Statistical Studies and Economics of Knowledge at the National Research University Higher School of Economics (HSE ISSEK).

The data book contains information provided by the Federal State Statistics Service (Rosstat), Ministry of Digital Development, Communications and Mass Media of the Russian Federation, Ministry of Science and Higher Education of the Russian Federation, Ministry of Culture of the Russian Federation, Central Bank of the Russian Federation (the Bank of Russia), European Statistical Office (Eurostat), Organisation for Economic Co-operation and Development (OECD), International Telecommunication Union (ITU), UN Department of Economic and Social Affairs, World Economic Forum, other Russian and international organisations, results of own methodological and analytical studies of the HSE Institute for Statistical Studies and Economics of Knowledge.

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Symbols used in tables are:

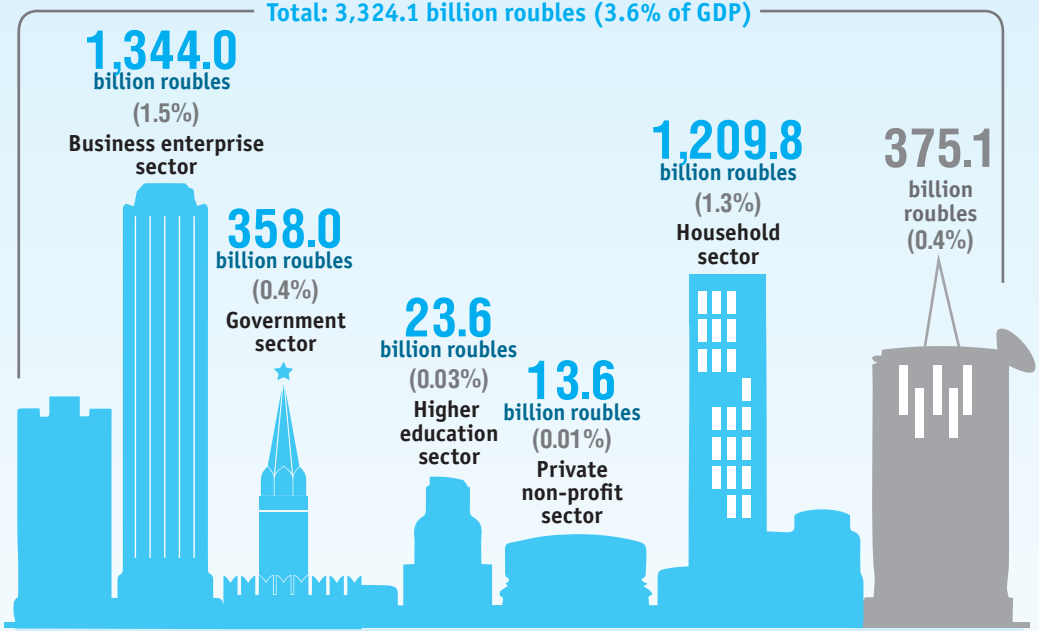
… data not available and not included in the totals,

– data not applicable,

0.0 insignificant value.

In some tables, details may not add up to the total because of rounding.

GROSS DOMESTIC EXPENDITURE ON DIGITAL ECONOMY DEVELOPMENT*



* HSE ISSEK estimates based on 2017 data.

MAIN DIGITAL ECONOMY DEVELOPMENT INDICATORS

	2010	2013	2014	2015	2016	2017	2018
Gross domestic expenditure on R&D in 'Information and telecommunication systems' priority S&T area as a percentage of the gross domestic expenditure on R&D	7.3	8.0	8.3	8.2	8.3	8.0	…
ICT-related publications by Russian authors in scientific journals indexed in Scopus:							
total	3 108	3 678	5 390	6 798	8 199	11 120	11 727
as a percentage of the world total number of ICT-related publications	0.87	1.08	1.54	1.87	2.12	2.74	2.72
ICT-related patent applications filed by Russian residents							
total	1696	2211	2267	2346	1945	2234	…
as a percentage of the world total ICT-related patent applications	0.37	0.41	0.39	0.39	0.32	0.34	…
ICT sector's gross value added as a percentage of GDP*	…	2.7	2.8	2.7	2.8	2.7	2.6
Innovative goods and services as a percentage of total sales in the ICT sector	5.4	5.1	5.1	5.7	6.4	6.6	…
Fixed broadband subscriptions per 100 inhabitants*	…	16.5	17.0	18.3	18.6	21.0	21.6
Wireless broadband subscriptions per 100 inhabitants*	…	59.9	65.2	69.1	72.4	81.3	86.8
Households with Internet access as a percentage of all households	48.4	67.2	69.9	72.1	74.8	76.3	76.6
including broadband access	…	56.5	64.1	66.8	70.7	72.6	73.2
Individuals who have ever used the Internet as a percentage of individuals aged 15–74**	49.3	71.0	74.1	77.7	80.8	83.7	87.3
Individuals who have used the Internet daily or almost every day as a percentage of individuals aged 15–74	26.0	48.0	51.6	55.1	57.7	60.6	68.8

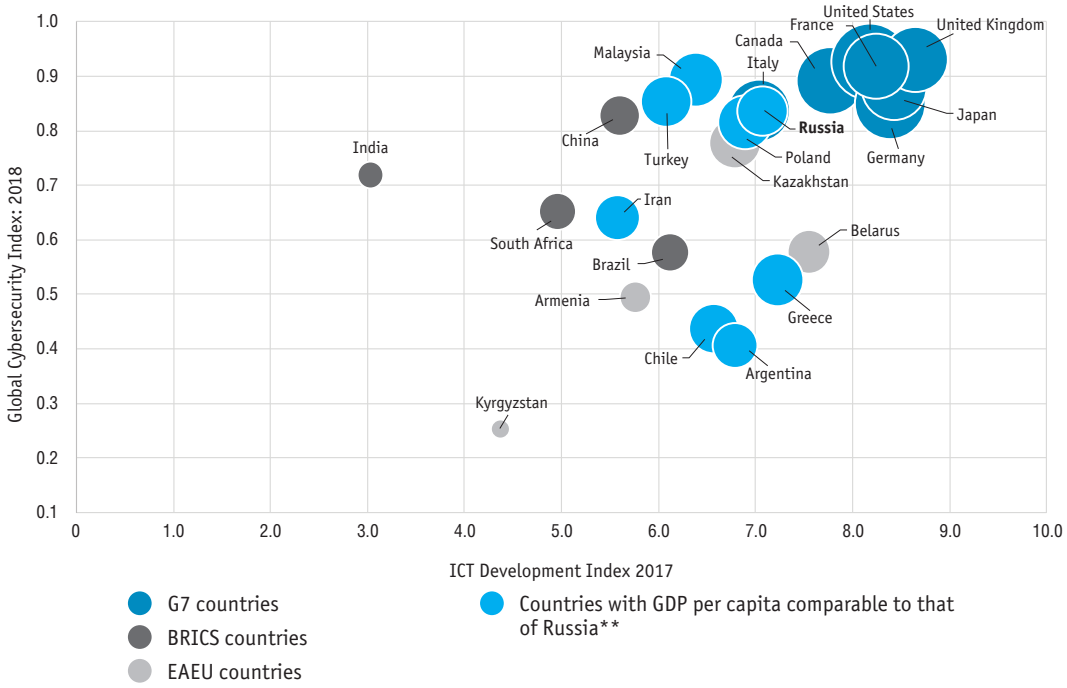
(continued)

	2010	2013	2014	2015	2016	2017	2018
Individuals who have used the Internet within the last 12 months to receive public services in digital form as a percentage of individuals aged 15–74 who have received public services within the last 12 months	…	30.8	35.2	39.6	51.3	64.3	74.8
Individuals who have used the Internet within the last 12 months to order goods and/or services as a percentage of individuals aged 15–74	…	15.3	17.8	19.6	23.1	29.1	34.7
Individuals who have encountered computer viruses that led to loss of information or took time to remove as a percentage of Internet users aged 15–74	…	44.5	37.7	17.1	13.3	11.4	8.9
Enterprises (as a percentage of the total number thereof) that use:							
broadband access	63.8	80.8	81.4	78.9	80.5	81.6	…
cloud computing services	…	11.0	13.8	18.4	20.5	22.6	…
electronic data interchange between internal and external IT systems	…	24.1	53.1	59.2	61.6	62.2	…
Social organisations (as a percentage of the total number thereof) that use:							
broadband access	49.2	75.8	79.2	79.3	81.5	83.5	…
cloud computing services	…	12.0	14.1	20.0	21.8	24.4	…
electronic data interchange between internal and external IT systems	…	…	49.8	57.6	61.0	62.6	…

* The 2018 data are preliminary.
** Here and below: the 2010 data for Internet use refer to individuals aged 16–74, 2013–2016 data refer to individuals aged 15–72.

Russia in International Rankings

1.1. ICT DEVELOPMENT INDEX BY COUNTRY*

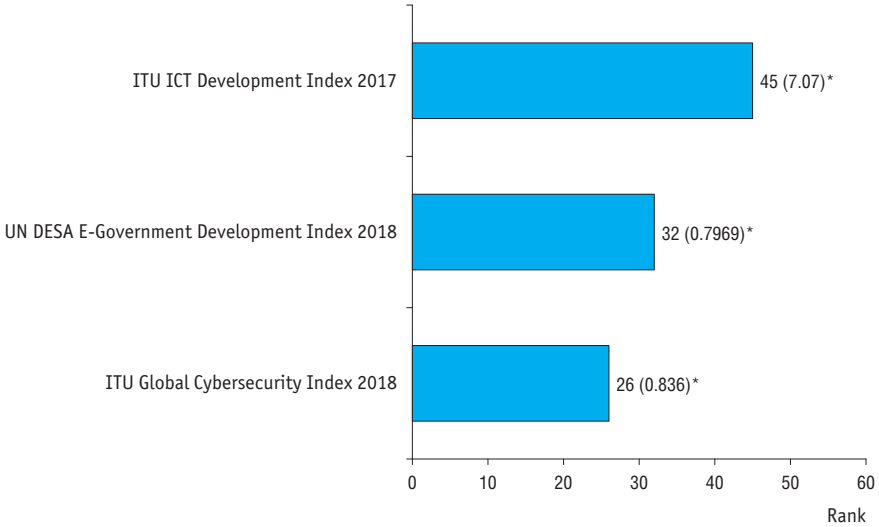


* Circle size is proportional to the country's GDP per capita (USD PPP), 2017.

** In 2017 GDP per capita of Russia was 25.5 thousand USD PPP. Countries with GDP per capita comparable to that of Russia has the value of this indicator of 19.1 to 31.9 thousand USD PPP.

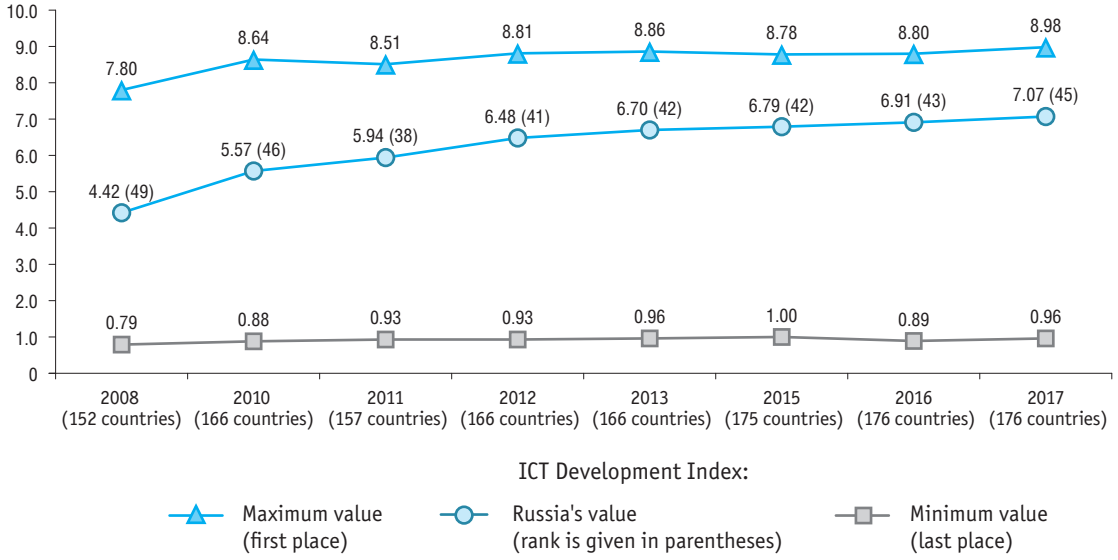
Sources: ITU; The World Bank.

1.2. RUSSIA IN INTERNATIONAL DIGITAL ECONOMY DEVELOPMENT RANKINGS



* Index values are given in parenthesis.

1.3. ICT DEVELOPMENT INDEX



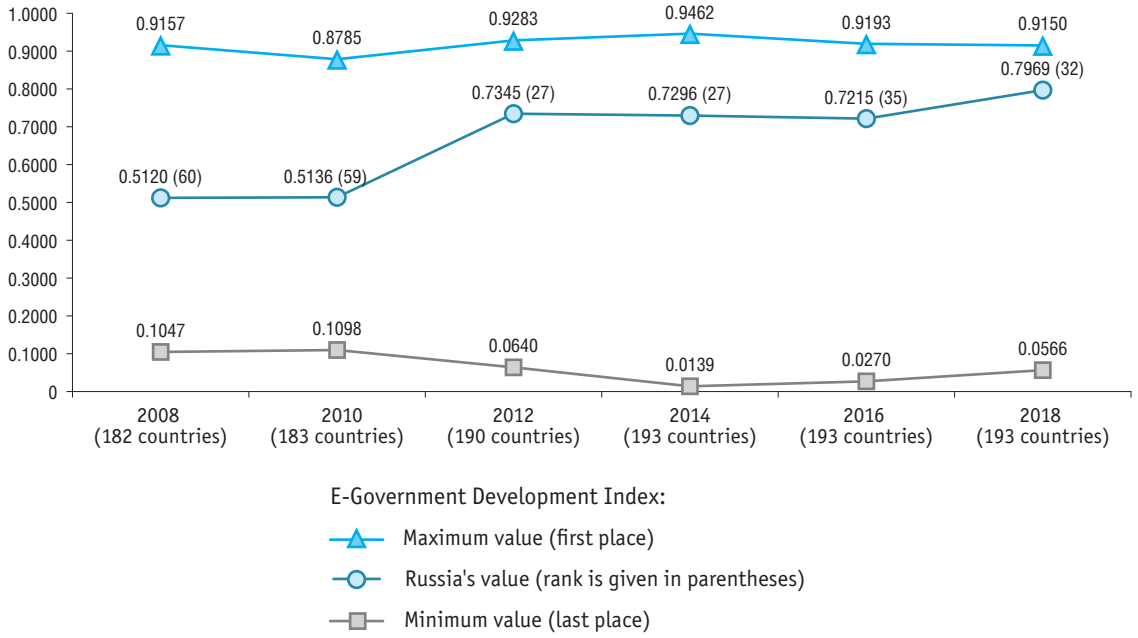
Source (here and in table 1.4): ITU.

1.4. ICT DEVELOPMENT INDEX BY COUNTRY: 2017*

	ICT Development Index (IDI)		IDI sub-indices					
			Access		Use		Skills	
	Rank (change in the ranking since 2016)	Value	Rank (change in the ranking since 2016)	Value	Rank (change in the ranking since 2016)	Value	Rank (change in the ranking since 2016)	Value
Iceland	1 (+1)	8.98	2 (0)	9.38	5 (0)	8.70	9 (+11)	8.75
South Korea	2 (-1)	8.85	7 (0)	8.85	4 (0)	8.71	2 (+1)	9.15
Switzerland	3 (+1)	8.74	8 (0)	8.85	2 (+1)	8.88	31 (0)	8.21
Denmark	4 (-1)	8.71	14 (0)	8.39	1 (0)	8.94	6 (0)	8.87
United Kingdom	5 (0)	8.65	4 (0)	9.15	7 (+1)	8.38	33 (-4)	8.17
Hong Kong (China)	6 (0)	8.61	3 (0)	9.22	10 (+4)	8.21	32 (+1)	8.19
Netherlands	7 (+3)	8.49	10 (0)	8.65	9 (0)	8.28	14 (-2)	8.59
Norway	8 (-1)	8.47	27 (-1)	8.00	3 (-1)	8.82	11 (-2)	8.71
Luxembourg	9 (0)	8.47	1 (0)	9.54	8 (-1)	8.30	74 (-3)	6.65
Japan	10 (+1)	8.43	9 (0)	8.80	11 (-1)	8.15	30 (+5)	8.22
Czech Republic	43 (-4)	7.16	55 (0)	7.14	39 (-4)	6.62	28 (-1)	8.27
Portugal	44 (0)	7.13	31 (+3)	7.91	50 (+4)	6.15	53 (-6)	7.50
Russia	**45 (-2)**	**7.07**	**50 (+4)**	**7.23**	**51 (-4)**	**6.13**	**13 (+1)**	**8.62**
Slovakia	46 (+1)	7.06	51 (-1)	7.22	36 (+4)	6.67	50 (-5)	7.54
Italy	47 (-1)	7.04	47 (+1)	7.33	42 (+1)	6.35	43 (-2)	7.86

* Full list of countries included in the rankings is given in the ITU's Measuring the Information Society 2017 report.

1.5. E-GOVERNMENT DEVELOPMENT INDEX



Source (here and in table 1.6): UN DESA.

1.6. E-GOVERNMENT DEVELOPMENT INDEX BY COUNTRY: 2018*

	E-Government Development Index (EGDI)		EGDI components					
			Online Service Index		Telecommunication Infrastructure Index		Human Capital Index	
	Rank (change in the ranking since 2016)	Value	Rank (change in the ranking since 2016)	Value	Rank (change in the ranking since 2016)	Value	Rank (change in the ranking since 2016)	Value
Denmark	1 (+8)	0.9150	1 (+27)	1.0000	12 (-7)	0.7978	5 (-2)	0.9472
Australia	2 (0)	0.9053	7 (-5)	0.9722	22 (-10)	0.7436	1 (0)	1.0000
South Korea	3 (0)	0.9010	4 (+1)	0.9792	3 (-1)	0.8496	20 (-2)	0.8743
United Kingdom	4 (-3)	0.8999	4 (-3)	0.9792	10 (-3)	0.8004	10 (-4)	0.9200
Sweden	5 (+1)	0.8882	14 (+1)	0.9444	15 (-7)	0.7835	7 (+1)	0.9366
Finland	6 (-1)	0.8815	8 (-3)	0.9653	24 (-11)	0.7284	4 (0)	0.9509
Singapore	7 (-3)	0.8812	2 (+1)	0.9861	9 (-6)	0.8019	27 (+7)	0.8557
New Zealand	8 (0)	0.8806	9 (-4)	0.9514	21 (+1)	0.7455	6 (-1)	0.9450
France	9 (+1)	0.8790	4 (+1)	0.9792	11 (+4)	0.7979	25 (+5)	0.8598
Japan	10 (+1)	0.8783	9 (+6)	0.9514	6 (-2)	0.8406	32 (+4)	0.8428
Malta	30 (0)	0.8011	36 (-10)	0.8403	18 (+6)	0.7657	53 (+18)	0.7973
Israel	31 (-11)	0.7998	39 (-21)	0.8264	28 (+7)	0.7095	24 (+2)	0.8635
Russia	**32 (+3)**	**0.7969**	**25 (+12)**	**0.9167**	**45 (-7)**	**0.6219**	**28 (+9)**	**0.8522**
Poland	33 (+3)	0.7926	17 (+28)	0.9306	55 (-11)	0.5805	22 (0)	0.8668
Uruguay	34 (0)	0.7858	27 (+1)	0.8889	32 (+4)	0.6967	65 (-12)	0.7719

* Full list of countries included in the rankings is given in UN DESA's report 'United Nations E-government Survey 2018. Gearing e-government to support transformation towards sustainable and resilient societies.'

1.7. LOCAL ONLINE SERVICE INDEX: 2018

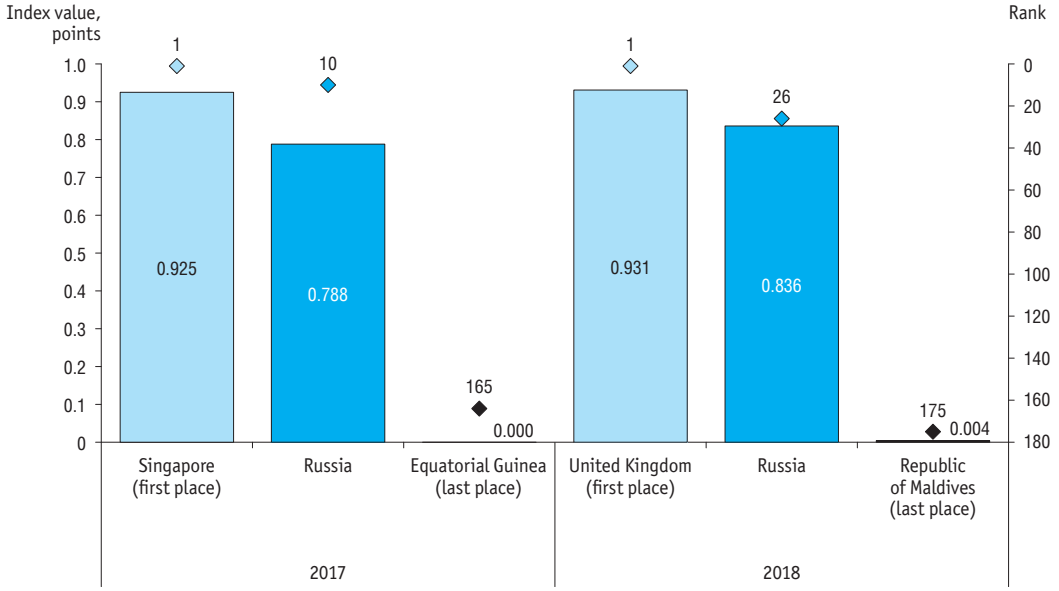
City	Country	Local Online Service Index (LOSI)		Values by criteria groups			
		City rank	Value (out of 60)	Technology (out of 12)	Content Provision (out of 26)	Services Provision (out of 13)	Participation and Engagement (out of 9)
Moscow	**Russia**	**1**	**55**	**10**	**26**	**11**	**9**
Cape Town	South Africa	2	53	10	26	11	7
Tallinn	Estonia	2	53	11	26	12	5
London	United Kingdom	4	51	10	25	11	6
Paris	France	4	51	11	24	8	9
Sydney	Australia	6	50	11	21	12	7
Amsterdam	Netherlands	7	49	9	25	10	6
Seoul	South Korea	7	49	11	25	6	8
Rome	Italy	9	48	11	25	8	5
Warsaw	Poland	9	48	11	25	7	6
Helsinki	Finland	11	47	10	24	7	7
Istanbul	Turkey	11	47	6	24	12	6
Shanghai	China	11	47	10	24	5	9
Madrid	Spain	14	46	10	22	8	7
New York	United States	14	46	10	21	10	6
Dubai	United Arab Emirates	16	44	10	21	10	4
Prague	Czech Republic	17	43	10	23	4	7
Addis Ababa	Ethiopia	18	42	12	21	4	6
Tokyo	Japan	19	41	12	24	3	3
Toronto	Canada	19	41	9	22	8	3
Buenos Aires	Argentina	21	40	8	22	5	6
Berlin	Germany	22	39	11	21	2	6

(continued)

City	Country	Local Online Service Index (LOSI)		Values by criteria groups			
		City rank	Value (out of 60)	Technology (out of 12)	Content Provision (out of 26)	Services Provision (out of 13)	Participation and Engagement (out of 9)
Jakarta	Indonesia	23	37	9	17	5	7
Mumbai	India	24	36	12	19	5	1
Almaty	Kazakhstan	25	35	11	19	3	3
Kuala Lumpur	Malaysia	25	35	11	19	4	2
Athens	Greece	27	33	8	18	7	1
Cairo	Egypt	27	33	10	18	5	1
Nairobi	Kenya	27	33	5	15	10	4
Riyadh	Saudi Arabia	30	31	9	15	3	5
Bogota	Columbia	31	30	7	17	3	4
Mexico City	Mexico	32	29	7	20	1	2
Colombo	Sri Lanka	33	28	8	13	5	3
Bangkok	Thailand	34	24	5	11	5	4
Port Moresby	Papua New Guinea	34	24	9	12	0	4
Accra	Ghana	36	23	10	12	0	2
Abidjan	Côte-d'Ivoire (Ivory Coast)	37	19	10	9	0	1
Luanda	Angola	38	17	8	9	0	1
Santo Domingo	Dominican Republic	38	17	5	11	0	2
Karachi	Pakistan	40	16	5	11	0	1

Source: UN DESA.

1.8. GLOBAL CYBERSECURITY INDEX



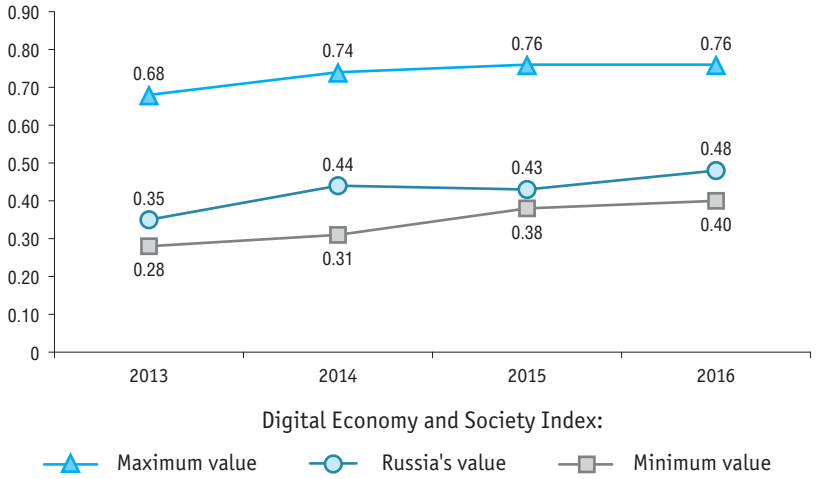
Source: ITU.

1.9. GLOBAL CYBERSECURITY INDEX BY COUNTRY: 2018*

	Global Cybersecurity Index (GCI)		GCI pillars				
	Rank (change in the ranking since 2017)	Score	Legal	Technical	Organizational	Capacity Building	Cooperation
United Kingdom	1 (+11)	0.931	0.200	0.191	0.200	0.189	0.151
United States	2 (0)	0.926	0.200	0.184	0.200	0.191	0.151
France	3 (+5)	0.918	0.200	0.193	0.200	0.186	0.139
Lithuania	4 (+53)	0.908	0.200	0.168	0.200	0.185	0.155
Estonia	5 (0)	0.905	0.200	0.195	0.186	0.170	0.153
Singapore	6 (-5)	0.898	0.200	0.186	0.192	0.195	0.125
Spain	7 (+47)	0.896	0.200	0.180	0.200	0.168	0.148
Malaysia	8 (-5)	0.893	0.179	0.196	0.200	0.198	0.120
Norway	9 (+2)	0.892	0.191	0.196	0.177	0.185	0.143
Canada	9 (0)	0.892	0.195	0.189	0.200	0.172	0.137
Australia	10 (-3)	0.890	0.200	0.174	0.200	0.176	0.139
Italy	25 (+6)	0.837	…	…	…	…	…
Russia	**26 (-16)**	**0.836**	**0.197**	**0.162**	**0.177**	**0.166**	**0.135**
China	27 (+5)	0.828	…	…	…	…	…

* Full list of countries included in the rankings is given in ITU's Global Cybersecurity Index 2018 report.

1.10. INTERNATIONAL DIGITAL ECONOMY AND SOCIETY INDEX*



* International Digital Economy and Society Index (I-DESI) was calculated by the European Commission Directorate General for Communications Networks, Content and Technology (DG CNECT) for non-EU countries as per Digital Economy and Society Index (DESI) methodology.

Source (here and in table 1.11): DG CNECT.

1.11. INTERNATIONAL DIGITAL ECONOMY AND SOCIETY INDEX BY COUNTRY: 2018

Country	International Digital Economy and Society Index (I-DESI)	I-DESI dimensions				
		Connectivity	Digital skills	Citizen Use of Internet	Business Integration	Digital Public Services
Denmark	0.76	0.77	0.80	0.79	0.71	0.71
South Korea	0.75	0.80	0.76	0.74	0.64	0.83
Finland	0.74	0.72	0.73	0.78	0.67	0.83
Netherlands	0.74	0.75	0.69	0.76	0.75	0.76
United Kingdom	0.73	0.74	0.65	0.72	0.68	0.90
Iceland	0.73	0.72	0.80	0.76	0.76	0.54
Norway	0.73	0.76	0.69	0.85	0.66	0.73
Sweden	0.72	0.75	0.69	0.78	0.65	0.73
Switzerland	0.71	0.79	0.65	0.78	0.80	0.48
Luxembourg	0.70	0.65	0.67	0.79	0.77	0.64
Australia	0.68	0.57	0.81	0.58	0.57	0.89
Japan	0.68	0.73	0.70	0.74	0.53	0.75
Canada	0.67	0.60	0.67	0.66	0.65	0.82
United States	0.67	0.71	0.56	0.71	0.62	0.79
Estonia	0.66	0.62	0.66	0.70	0.53	0.85
New Zealand	0.66	0.55	0.79	0.58	0.56	0.82
Germany	0.64	0.64	0.62	0.66	0.59	0.69
Belgium	0.63	0.68	0.60	0.62	0.61	0.61

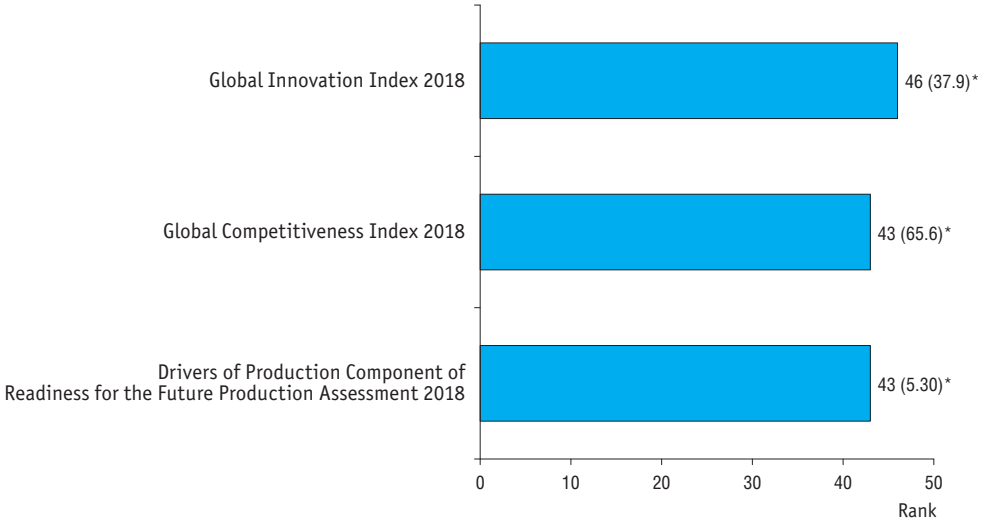
(continued)

Country	International Digital Economy and Society Index (I-DESI)	I-DESI dimensions				
		Connectivity	Digital skills	Citizen Use of Internet	Business Integration	Digital Public Services
Ireland	0.63	0.63	0.77	0.56	0.51	0.66
Spain	0.63	0.64	0.62	0.58	0.55	0.82
Austria	0.62	0.63	0.59	0.60	0.59	0.72
France	0.62	0.59	0.62	0.59	0.53	0.82
Malta	0.58	0.64	0.48	0.57	0.57	0.66
Hungary	0.56	0.60	0.62	0.55	0.51	0.46
Lithuania	0.56	0.61	0.53	0.58	0.46	0.63
Israel	0.56	0.54	0.57	0.59	0.45	0.65
Czech Republic	0.54	0.67	0.58	0.58	0.39	0.43
Slovakia	0.53	0.57	0.65	0.59	0.40	0.38
Slovenia	0.53	0.60	0.44	0.53	0.43	0.67
Italy	0.51	0.51	0.50	0.42	0.47	0.68
Latvia	0.51	0.65	0.47	0.58	0.32	0.56
Croatia	0.50	0.54	0.45	0.49	0.46	0.56
Serbia	0.50	0.52	0.44	0.50	0.44	0.61
Poland	0.49	0.53	0.53	0.51	0.33	0.57
Portugal	0.49	0.60	0.43	0.47	0.39	0.55
Bulgaria	0.48	0.61	0.47	0.42	0.36	0.45

(continued)

Country	International Digital Economy and Society Index (I-DESI)	I-DESI dimensions				
		Connectivity	Digital skills	Citizen Use of Internet	Business Integration	Digital Public Services
Cyprus	0.48	0.54	0.45	0.54	0.39	0.49
Greece	0.48	0.50	0.48	0.46	0.45	0.48
Russia	**0.48**	**0.39**	**0.64**	**0.49**	**0.30**	**0.57**
Chile	0.45	0.48	0.43	0.33	0.41	0.61
China	0.45	0.46	0.41	0.45	0.41	0.59
Romania	0.44	0.61	0.43	0.48	0.27	0.39
Mexico	0.43	0.45	0.42	0.30	0.34	0.67
Turkey	0.42	0.43	0.53	0.36	0.28	0.43
Brazil	0.40	0.40	0.39	0.34	0.28	0.62

1.12. RUSSIA IN INTERNATIONAL DIGITAL ECONOMY DEVELOPMENT RANKINGS



* Index values are given in parenthesis.

Source: World Economic Forum (for Global Competitiveness Index and Drivers of Production Index); Cornell University Consortium, INSEAD Business School, and World Intellectual Property Organisation (for Global Innovation Index).

1.13. ICT INDICATORS WITHIN THE GLOBAL INNOVATION INDEX: 2018*

	Russia		Leading country: Switzerland	
	Rank in the respective indicator	Value	Rank in the respective indicator	Value
Global Innovation Index	**46**	**37.9**	**1**	**68.4**
Subindex 2. Human capital & research	22	48.4	5	64.0
Block 2.2. Tertiary education	19	49.1	16	54.8
2.2.2. Graduates in science & engineering, %	15	29.0	32	24.4
Subindex 3. Infrastructure	63	45.2	8	65.3
Block 3.1. Information & communication technologies, ICTs	37	70.3	30	73.8
3.1.1. ICT access	45	72.3	7	88.5
3.1.2. ICT use	46	61.3	2	88.8
3.1.3. Government's online service	37	73.2	64	60.1
3.1.4. E-participation	32	74.6	70	57.6
Subindex 5. Business sophistication	33	39.9	4	62.6
Block 5.3. Knowledge absorption	35	38.1	9	53.3
5.3.3. ICT services imports, % total trade	28	1.8	5	3.7
Subindex 6. Knowledge & technology outputs	47	28.9	1	74.9
Block 6.2. Knowledge impact	80	32.5	4	57.9
6.2.3. Computer software spending, % GDP	48	0.3	3	0.8

* 126 countries participated in the rankings. The full list of countries included in the rankings is given in Cornell University, INSEAD, and WIPO analytical report 'The Global Innovation Index 2018. Energising the World with Innovation.'

(continued)

	Russia		Leading country: Switzerland	
	Rank in the respective indicator	Value	Rank in the respective indicator	Value
Block 6.3. Knowledge diffusion	51	21.5	3	76.9
6.3.3. ICT services exports, % total trade	72	1.3	11	14.1
Subindex 7. Creative outputs	72	26.9	1	59.4
Block 7.1. Intangible assets	71	39.0	8	62.0
7.1.3. ICTs & business model creation	94	52.7	1	86.2
77.1.4. ICTs & organisational model creation	47	58.6	9	76.9
Block 7.3. Online creativity	44	16.2	4	58.4
7.3.1. Generic top-level domains (TLDs)/ th pop 15–69	61	3.3	13	56.9
7.3.2. Country-code TLDs/ th pop 15–69	33	14.6	1	100.0
7.3.3. Wikipedia edits/ mn pop 15–69	49	19.7	27	47.4
7.3.4. Mobile app creation/ bn USD PPPs GDP	24	33.7	13	42.0

1.14. ICT INDICATORS WITHIN THE GLOBAL COMPETITIVENESS INDEX: 2017–2018*

	Russia		Leading country: United States	
	Rank in the respective indicator	Value	Rank in the respective indicator	Value
Global Competitiveness Index	**43**	**65.6**	**1**	**85.6**
Subindex 1. Institutions	72	52.7	13	74.6
1.12. E-Participation Index	23	0.92	5	0.96
Subindex 3. ICT adoption	25	72.1	27	71.2
3.01. Mobile cellular telephone subscriptions /100 pop.	11	157.9	61	122.0
3.02. Mobile broadband subscriptions /100 pop.	51	80.8	9	132.0
3.03. Fixed broadband Internet subscriptions /100 pop.	46	21.4	19	33.9
3.04. Fibre Internet subscriptions /100 pop.	12	13.5	40	3.7
3.05. Internet users % pop.	49	73.1	40	76.9
Subindex 6. Skills	50	68.5	3	86.3
6.05. Digital skills among population	37	4.8	2	5.8

* 140 countries participated in the rankings. The full list of countries included in the rankings is given in World Economic Forum's 'Global Competitiveness Report 2018.'

1.15. ICT INDICATORS WITHIN DRIVERS OF PRODUCTION COMPONENT OF READINESS FOR THE FUTURE PRODUCTION ASSESSMENT: 2018*

	Russian Federation		Leading Country: United States	
	Rank in the respective indicator	Score	Rank in the respective indicator	Score
Drivers of Production Index	**43**	**5.3**	**1**	**8.2**
Subindex 2. Driver: Technology & Innovation Index	39	4.7	1	8.5
Technology platform	39	6.8	2	8.7
2.01. Mobile-cellular telephone subscriptions /100 pop.	8	163.3	42	127.2
2.02. LTE mobile network coverage % pop.	70	59.0	8	99.7
2.03. Internet users % pop.	34	76.4	35	76.2
2.06. Impact of ICTs on new services and products 1–7 (best)	82	4.2	8	5.8
2.07. Cybersecurity commitment 0–1 (best)	11	0.8	2	0.9

* 137 countries participated in the rankings. The full list of countries included in the rankings is given in World Economic Forum's 'Readiness for the Future of Production Report 2018.'

R&D in ICT-related Fields

2.1. GROSS DOMESTIC EXPENDITURE ON R&D IN 'INFORMATION AND TELECOMMUNICATION SYSTEMS' PRIORITY S&T AREA*

	2010	2011	2012	2013	2014	2015	2016	2017
Gross domestic expenditure on R&D in 'Information and telecommunication systems' priority S&T area:								
at current prices, *million roubles*	38128.8	46609.9	61966.0	60031.7	70631.5	74555.8	77932.0	81390.7
as a percentage of gross domestic expenditure on R&D in priority S&T areas	12.9	12.9	13.1	12.2	12.3	11.9	11.6	11.3
as a percentage of gross domestic expenditure on R&D	7.3	7.6	8.9	8.0	8.3	8.2	8.3	8.0

* *Sources:* here and below in this section, the HSE ISSEK estimates based on Rosstat data (2.3–2.4); Scopus database and SciVal analytical tool (2.1, 2.5–2.10); WIPO database (2.2, 2.11–2.16). Data are shown as at April 4, 2019.

2.2. GROSS DOMESTIC EXPENDITURE ON R&D IN 'INFORMATION AND TELECOMMUNICATION SYSTEMS' PRIORITY S&T AREA BY SOURCE OF FUNDS

	2010	2011	2012	2013	2014	2015	2016	2017
	At current prices, *million roubles*							
Total	**38128.8**	**46609.9**	**61966.0**	**60031.7**	**70631.5**	**74555.8**	**77932.0**	**81390.7**
funds of budgets of all levels	23997.4	29260.4	41205.7	40571.9	45867.5	48060.8	48115.8	49973.9
of which federal budget appropriations	23729.0	28242.3	38927.3	39155.2	45184.0	47107.1	47650.4	49284.2
own funds	…	…	…	…	6540.9	7500.1	12622.9	12701.6
government sector institutions' funds	…	…	…	…	5911.3	7398.4	7463.3	7232.5
business enterprise sector institutions' funds	…	…	…	…	10838.5	9310.3	7913.7	9554.5
other	…	…	…	…	1473.3	2286.2	1816.3	1928.2
	Percentage							
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
funds of budgets of all levels	62.9	62.8	66.5	67.6	64.9	64.5	61.7	61.4
of which federal budget appropriations	62.2	60.6	62.8	65.2	64.0	63.2	61.1	60.6
own funds	…	…	…	…	9.3	10.1	16.2	15.6
government sector institutions' funds	…	…	…	…	8.4	9.9	9.6	8.9
business enterprise sector institutions' funds	…	…	…	…	15.3	12.5	10.2	11.7
other	…	…	…	…	2.1	3.1	2.3	2.4

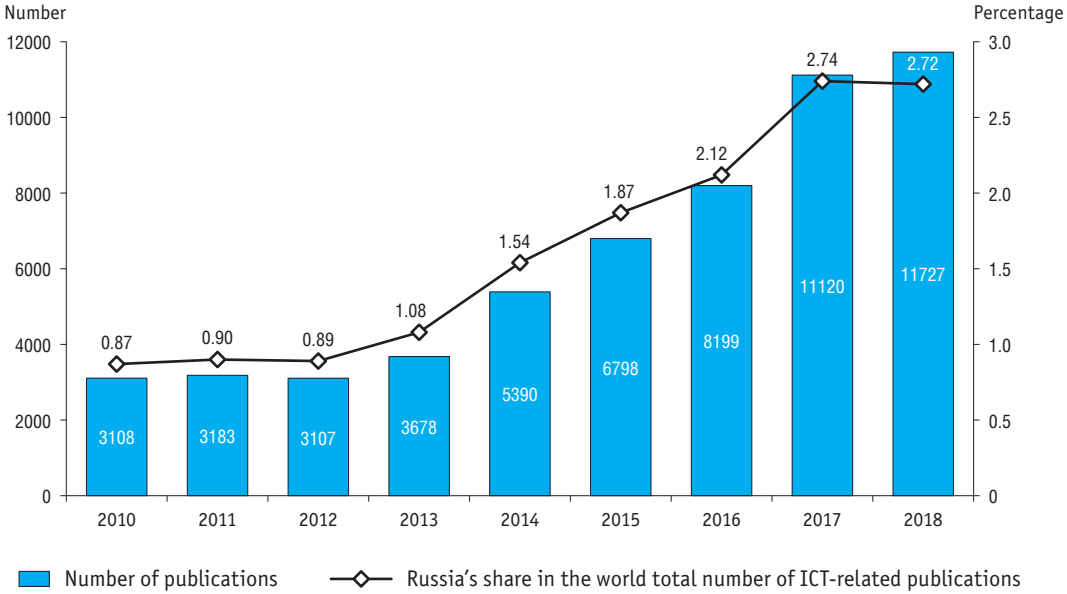
2.3. ICT-RELATED PUBLICATIONS BY RUSSIAN AUTHORS IN SCIENTIFIC JOURNALS INDEXED IN SCOPUS BY RESEARCH FIELD*

	2010	2011	2012	2013	2014	2015	2016	2017	2018
ICT-related publications – total	**3108**	**3183**	**3107**	**3678**	**5390**	**6798**	**8199**	**11120**	**11727**
Of which:									
Human–computer interaction	55	80	90	194	147	152	253	443	260
Computational mechanics	174	189	146	218	221	517	272	410	254
Information systems	364	385	286	355	456	679	1 018	1 330	1 463
Artificial intelligence	92	91	122	162	192	204	603	668	742
Computer graphics and computer-aided design	96	215	82	97	92	136	102	93	102
Computer vision and pattern recognition	199	295	189	221	289	359	469	539	443
Hardware and architecture	88	89	109	56	148	153	214	1 106	1 917
Computer networks and communications	703	711	627	639	1 149	1 572	1 824	3 288	3 377
Control and systems engineering	687	657	629	803	1 002	1 795	1 594	1 965	2 069
Health informatics	12	13	35	28	32	45	49	53	249
Library and information sciences	33	25	36	20	42	73	58	57	69
Signal processing	155	115	103	110	233	314	745	947	719
Applied computer research	842	770	771	725	1 604	1 890	2 144	3 208	3 286
Computers in Earth sciences	14	25	13	15	64	140	192	252	196
Software	291	276	411	391	582	683	730	1 212	1 162
Computer science, theory and methods	459	443	432	528	680	870	1 070	1 478	1 136
General computer science	346	444	476	644	908	1 448	2 132	2 574	2 752
Computer science (miscellaneous)	84	24	30	51	33	46	97	129	678

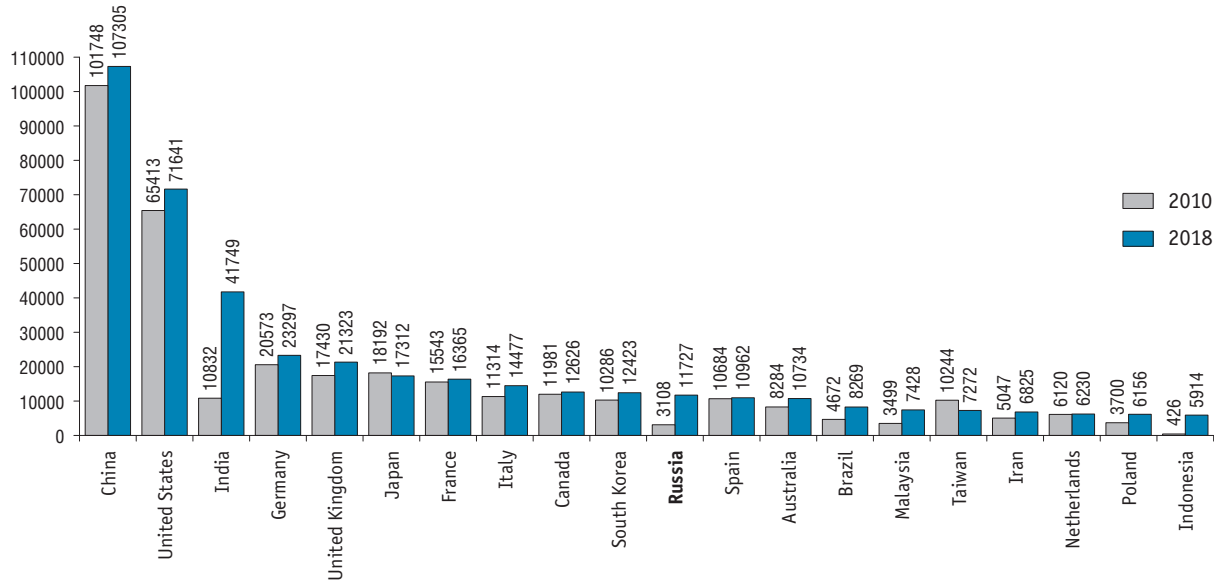
* The sum of values in a column may exceed the total indicator value as one publication may refer to two or more research areas.

Here and below, the term 'publication' refers to three types of documents: articles, conference papers, and reviews. These publications may appear in Scopus-indexed scientific journals, books, book series, conference proceedings, trade publications.

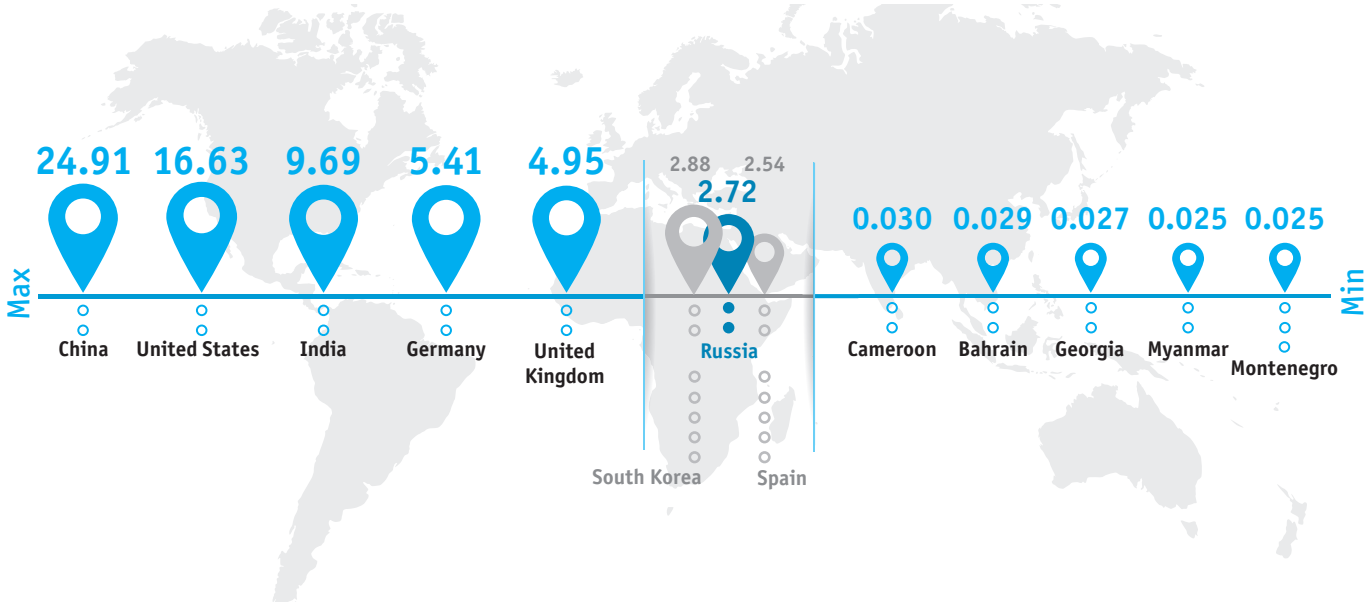
2.4. ICT-RELATED PUBLICATIONS BY RUSSIAN AUTHORS IN SCIENTIFIC JOURNALS INDEXED IN SCOPUS



2.5. NUMBER OF ICT-RELATED PUBLICATIONS IN SCIENTIFIC JOURNALS INDEXED IN SCOPUS BY COUNTRY

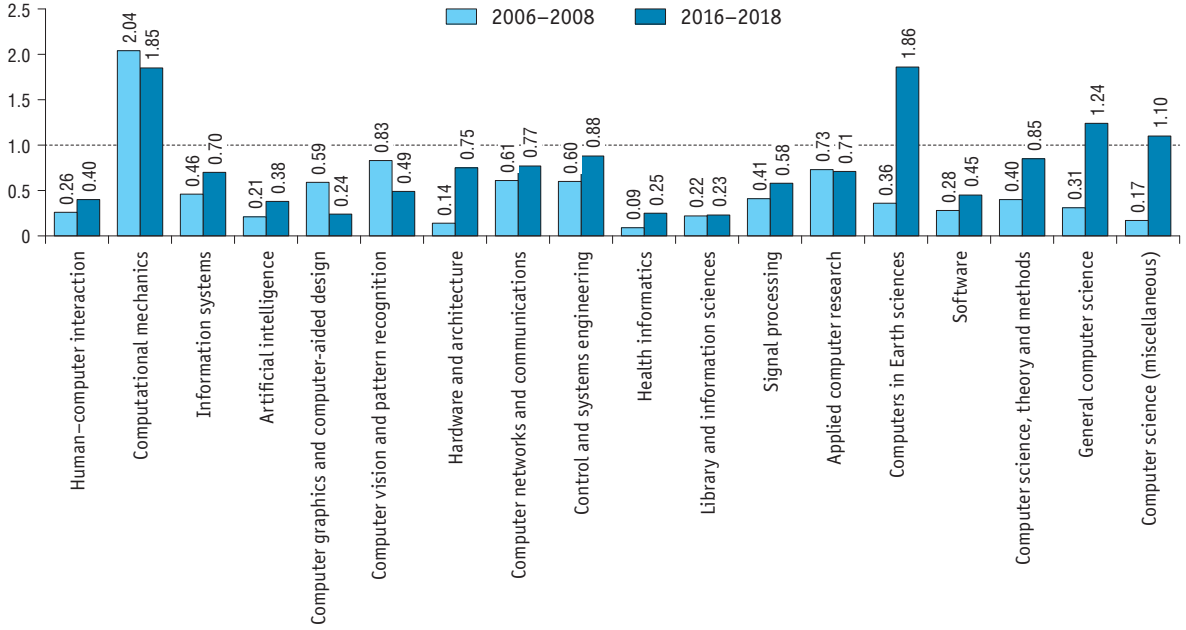


2.6. COUNTRIES' SHARES IN THE WORLD TOTAL NUMBER OF ICT-RELATED PUBLICATIONS IN SCIENTIFIC JOURNALS INDEXED IN SCOPUS: 2018*



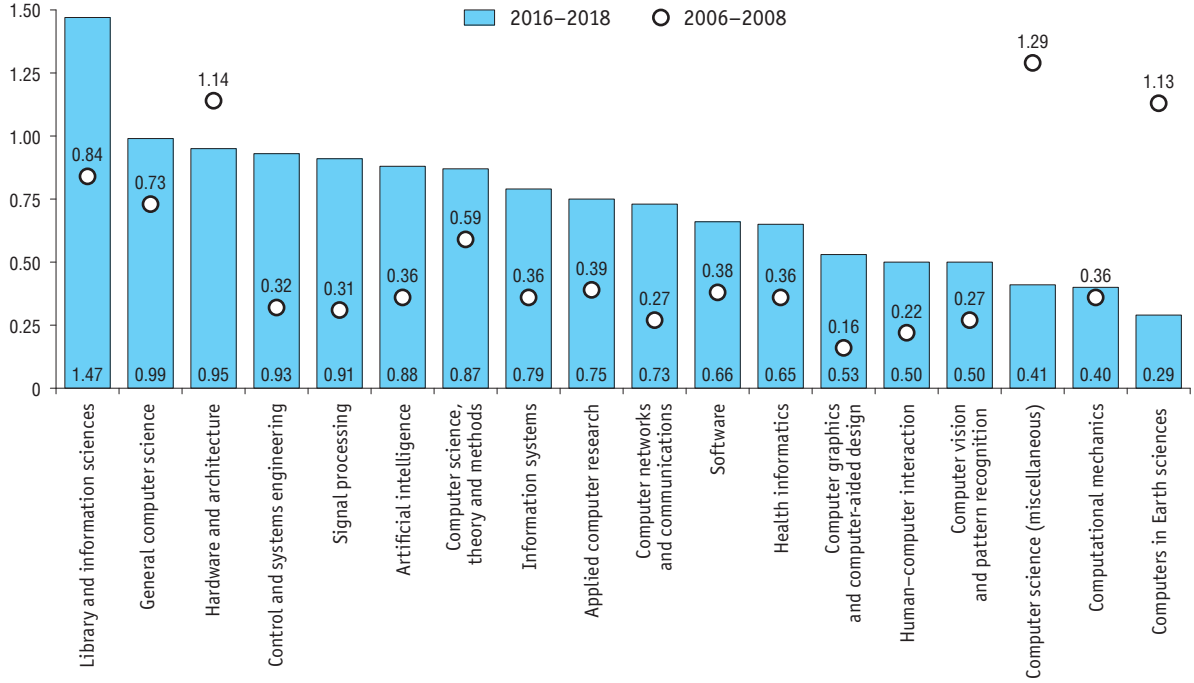
* Only countries with 100 or more Scopus-indexed ICT-related publications in 2018 are shown.

2.7. RUSSIA'S SCIENTIFIC SPECIALISATION INDICES FOR ICT-RELATED PUBLICATIONS IN SCIENTIFIC JOURNALS INDEXED IN SCOPUS BY RESEARCH FIELD*



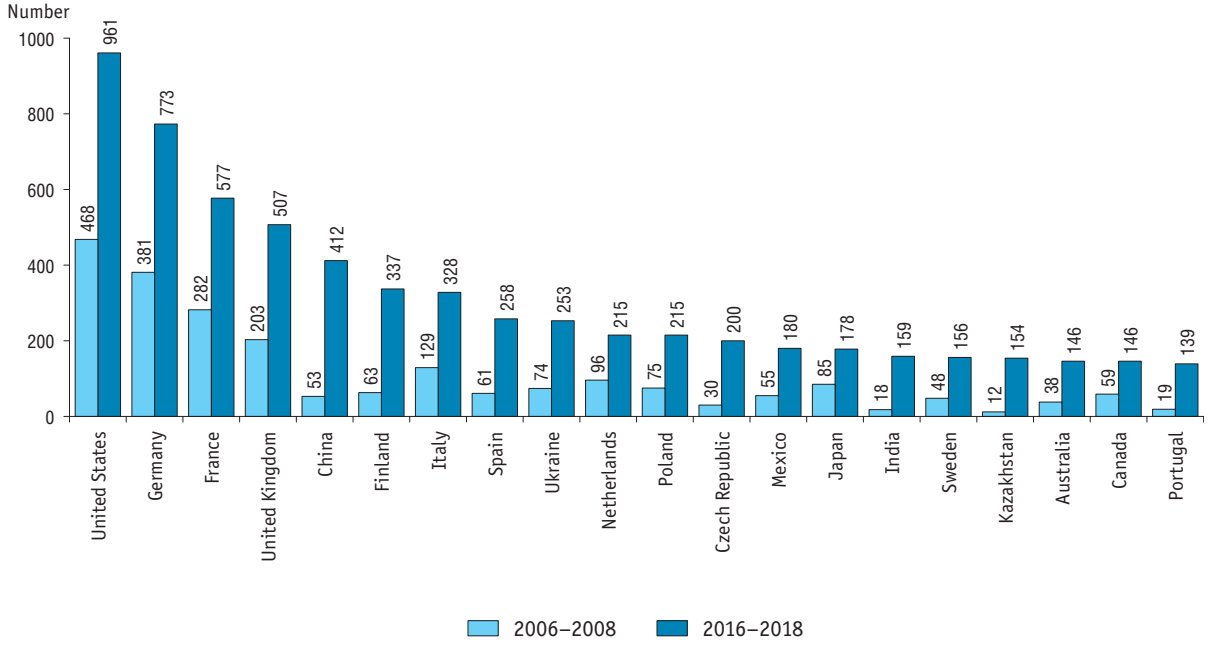
* ICT-related research fields are considered as areas of Russia's scientific specialisation where the values of scientific specialisation index is over 1.0.

2.8. FIELD-WEIGHTED CITATION IMPACT OF ICT-RELATED PUBLICATIONS BY RUSSIAN AUTHORS IN SCIENTIFIC JOURNALS INDEXED IN SCOPUS BY RESEARCH FIELD*

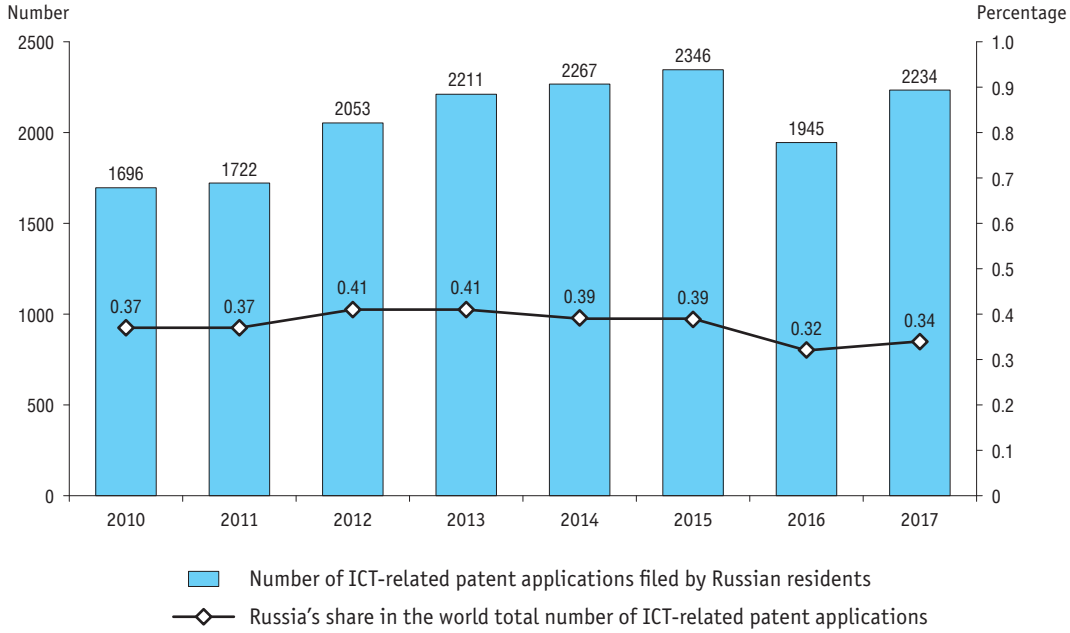


* Based on data of Scopus SciVal web-based analitics solution.

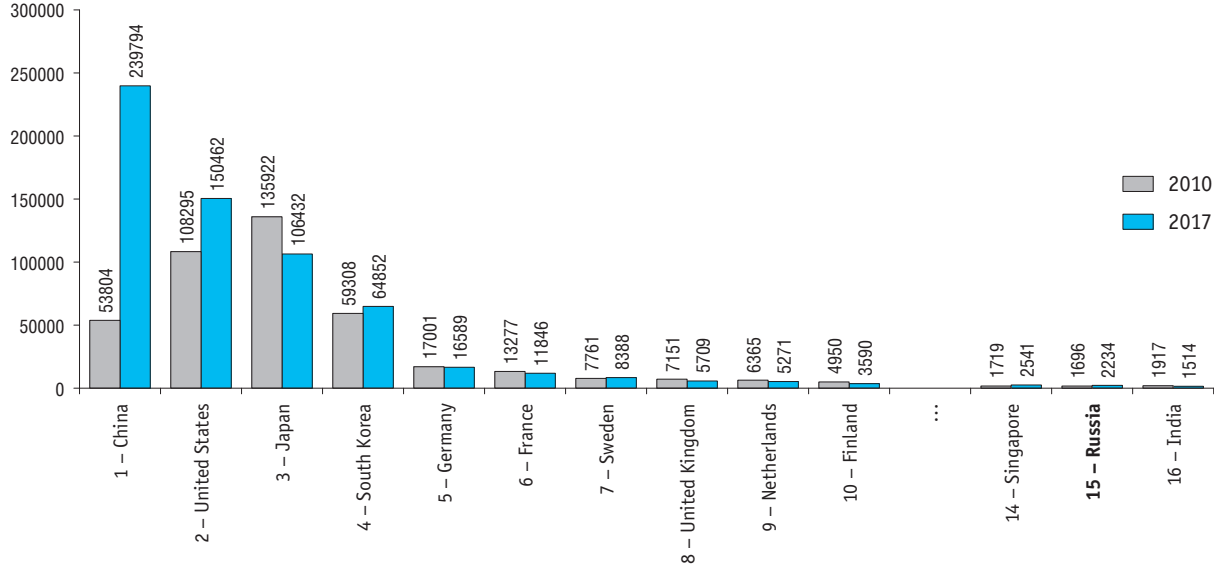
2.9. ICT-RELATED PUBLICATIONS BY RUSSIAN AUTHORS WITH INTERNATIONAL COLLABORATION IN SCIENTIFIC JOURNALS INDEXED IN SCOPUS BY PARTNER COUNTRY



2.10. ICT-RELATED PATENT ACTIVITY OF RUSSIAN RESIDENTS



2.11. ICT-RELATED PATENT APPLICATIONS BY COUNTRY OF ORIGIN

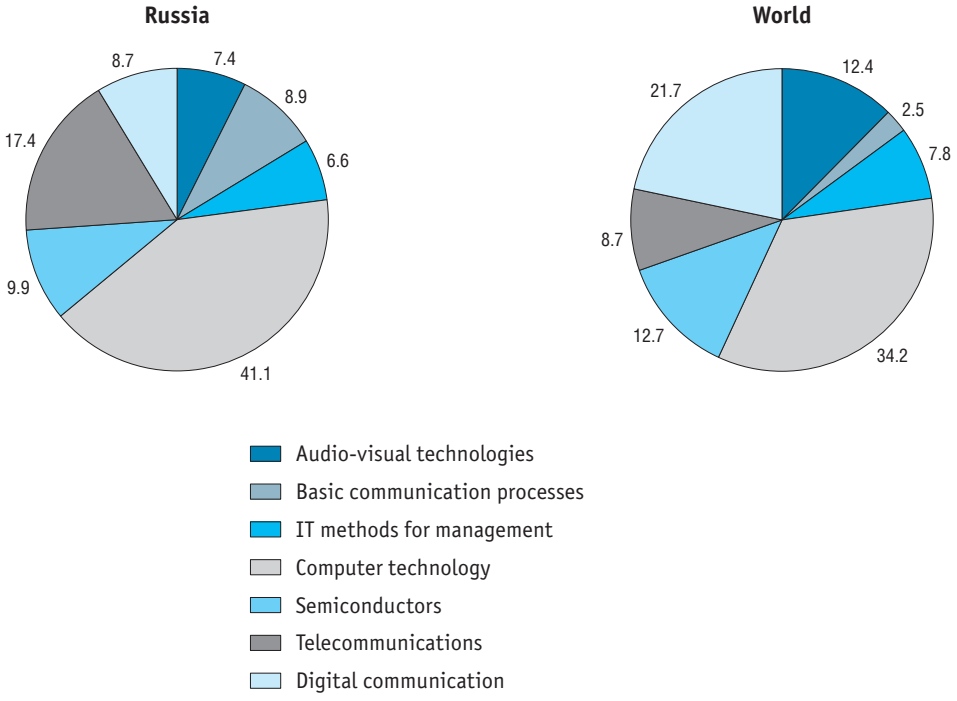


2.12. ICT-RELATED PATENT ACTIVITY OF RUSSIAN RESIDENTS BY TECHNOLOGICAL AREA

	2010	2011	2012	2013	2014	2015	2016	2017
ICT-related patent applications by Russian residents – total	**1696**	**1722**	**2053**	**2211**	**2267**	**2346**	**1945**	**2234**
Of which:								
resident (filed in Russia)	1312	1261	1461	1385	1541	1634	1413	1742
abroad	384	461	592	826	726	712	532	492
by technological area*:								
Audio-visual technologies	246	198	177	215	192	211	152	165
Basic communication processes	220	257	260	227	257	268	214	199
IT methods for management	84	78	111	196	146	143	115	148
Computer technology	474	535	672	704	821	874	682	918
Semiconductors	218	225	304	237	323	224	220	221
Telecommunications	350	321	372	409	324	426	372	389
Digital communication	104	108	157	223	204	200	190	194

* Full list of ICT-related fields is based on OECD taxonomy (T. Inaba, M. Squicciarini (2017) ICT: A New Taxonomy Based on the International Patent Classification / OECD Science, Technology, and Industry Working Papers, 2017/01. Paris: OECD Publishing) and WIPO technology classification (U. Schmoch (2008) Concept of a Technology Classification for Country Comparisons: Final Report to the World Intellectual Property Organisation. Karlsruhe: Fraunhofer Institute for Systems and Innovation Research).

2.13. PERCENTAGE DISTRIBUTION OF ICT-RELATED PATENT APPLICATIONS BY TECHNOLOGICAL AREA: 2017



2.14. ICT-RELATED ADVANCED MANUFACTURING TECHNOLOGIES BY TYPE: 2017

	Total	Of which		Technologies developed with the use of patents
		new to Russia	radically new	
Total advanced manufacturing technologies – total	**1402**	**1212**	**190**	**485**
Of which ICT-related by type:				
Computer-aided design and engineering consulting services	347	293	54	135
Single-function robots designed for object lifting and moving	11	6	5	5
Advanced robots capable of spot and arc welding	3	2	1	–
Multi-purpose robots, capable of assembly, machining, finishing, and other tasks	44	38	6	23
Automated warehousing and picking systems	18	15	3	6
Autonomous vehicles	16	12	4	8
Enterprise master data governance solutions	21	20	1	1
Enterprise networking solutions	67	58	9	13
Computerised remote control of manufacturing equipment	22	21	1	4
Electronic data interchange	38	35	3	9
Communications systems leveraging wavelength-division multiplexing	5	3	2	2
Wireless communication networks	27	24	3	5
Computer-aided integrated manufacturing	24	22	2	1
Supervised control and data collection/storage systems	33	31	2	16
Artificial intelligence technologies and/or advanced systems	13	12	1	6

2.15. ICT-RELATED ADVANCED MANUFACTURING TECHNOLOGY DEPLOYMENT BY TYPE: 2017

	Total	Of which acquired		Technologies developed with the use of patents
		in Russia	rest of the world	
Total advanced manufacturing technologies – total	**240054**	**131440**	**69141**	**9127**
Of which ICT-related by type:				
Computer-aided design and engineering consulting services	32048	18559	5085	1232
Single-function robots designed for object lifting and moving	2398	591	1389	119
Advanced robots capable of spot and arc welding	977	350	481	34
Multi-purpose robots, capable of assembly, machining, finishing, and other tasks	1489	439	462	242
Automated warehousing and picking systems	1359	559	664	77
Autonomous vehicles	1125	496	452	46
Enterprise master data governance solutions	8715	5885	1763	184
Enterprise networking solutions	27611	20712	4740	1104
Computerised remote control of manufacturing equipment	15699	9951	5018	469
Electronic data exchange	12588	9738	2042	307
Communications systems leveraging wavelength-division multiplexing	1793	1008	732	32
Wireless communication networks	4165	2801	1156	75
Computer-aided integrated manufacturing	1373	822	444	33
Supervised control and data collection/storage systems	3126	2209	597	76
Artificial intelligence technologies and/or advanced systems	194	64	27	22

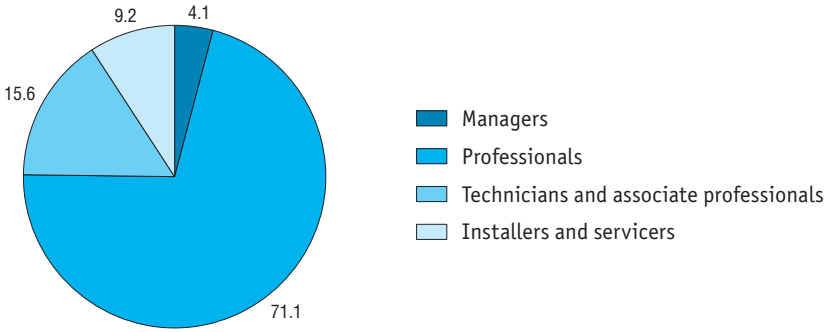
Personnel

3.1. ICT SPECIALISTS: 2018

	Thousand persons	As a percentage of total	As a percentage of the total labour force
Total	**1617.4**	**100**	**2.24**
Managers			
ICT service managers	66.1	4.1	0.09
Professionals			
ICT professionals	904.1	55.9	1.25
Software and multimedia developers and analysts	654.4	40.5	0.90
Database and network professionals	249.7	15.4	0.35
Other groups that are primarily involved in the production of ICT goods and services	245.9	15.2	0.34
Electronics engineers	128.8	8.0	0.18
Telecommunications engineers	76.3	4.7	0.10
ICT sales professionals	13.0	0.8	0.02
Graphic and multimedia designers	21.5	1.3	0.03
Information technology trainers	6.3	0.4	0.01
Technicians and associate professionals			
ICT technicians	195.1	12.1	0.27
ICT operations and user support technicians	126.6	7.9	0.18
Telecommunications and broadcasting technicians	68.5	4.2	0.09
Electronics engineering technicians	57.2	3.5	0.08
Installers and services			
Electronics and telecommunications technology installers and servicers	149.0	9.2	0.21

Sources (here and below in this section): for Russia, HSE ISSEK estimates based on Rosstat data; for countries other than Russia, OECD, Eurostat.

3.2. PERCENTAGE DISTRIBUTION OF ICT SPECIALISTS BY QUALIFICATION: 2018

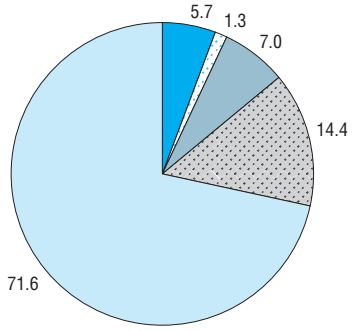


3.3. PERCENTAGE DISTIBUTION OF ICT SPECIALISTS BY QUALIFICATION AND FIELD OF ACTIVITY: 2018

(as a percentage of employment in each field of activity)

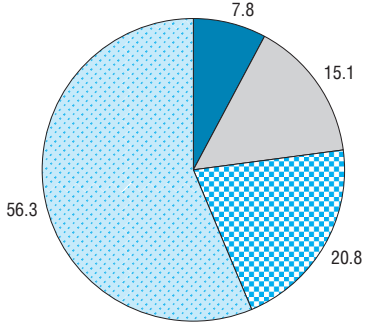
Professionals

Software and multimedia developers and analysts



- Systems analysts
- Web and multimedia developers
- Software and multimedia developers and analysts not elsewhere classified
- Multimedia developers
- Software developers

Database specialists and system administrators

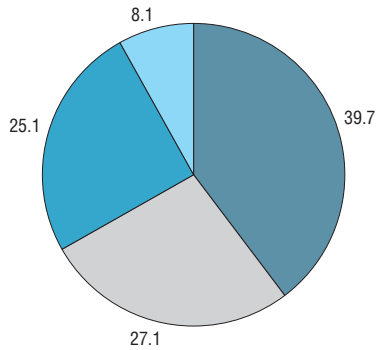


- Database designers and administrators
- Database specialists and system administrators not elsewhere classified
- Computer network professionals
- System administrators

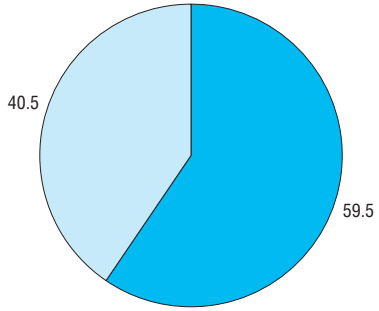
(continued)

Technicians and associate professionals

ICT operations and user support technicians

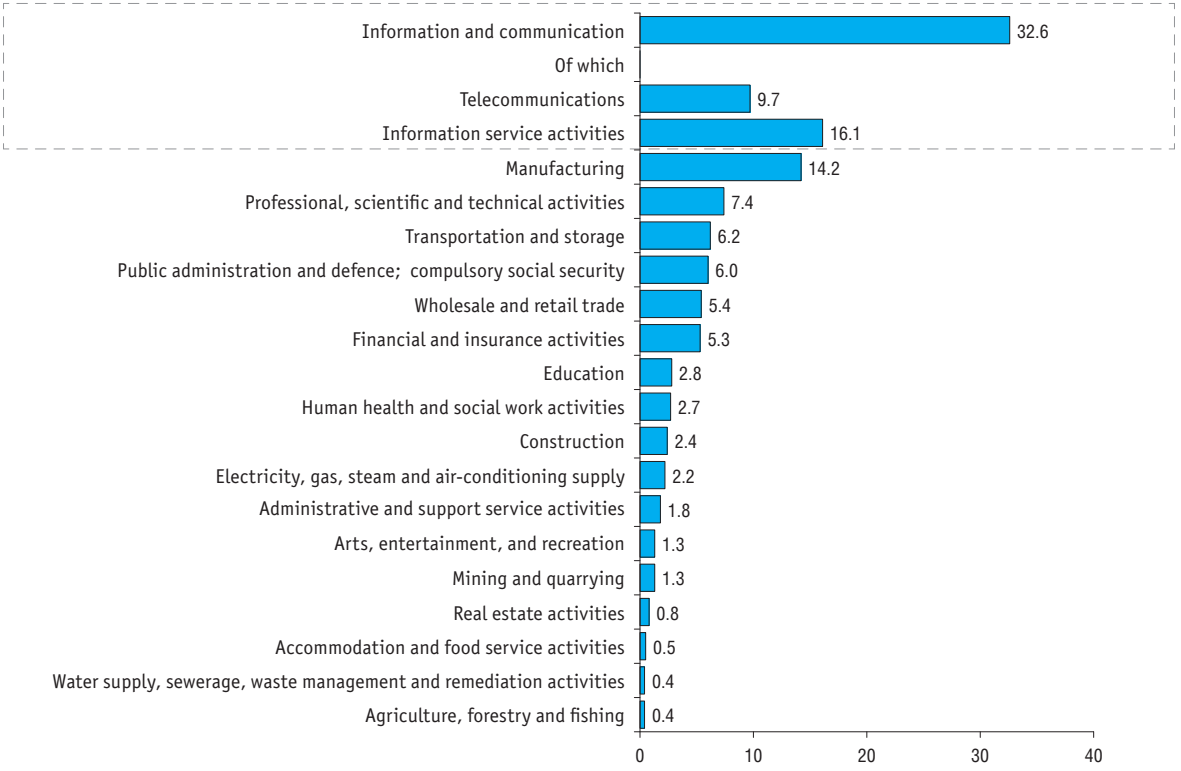


Telecommunications and broadcasting technicians



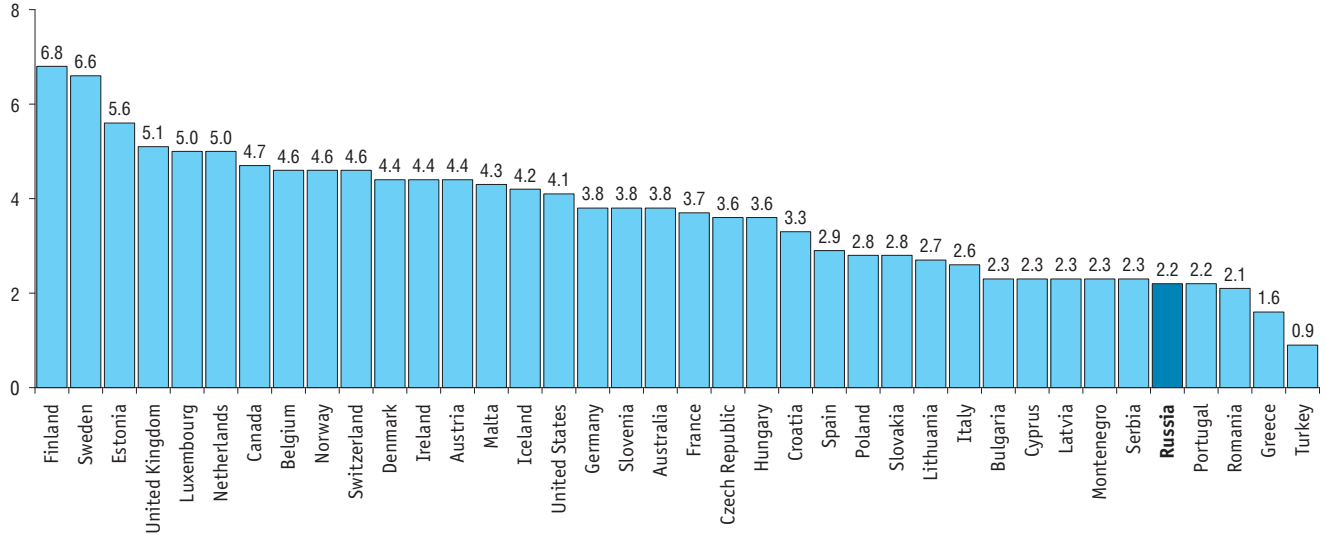
3.4. ICT SPECIALISTS BY TYPE OF ECONOMIC ACTIVITY: 2018

(as a percentage of all ICT specialists)



3.5. ICT SPECIALISTS BY COUNTRY: 2018*

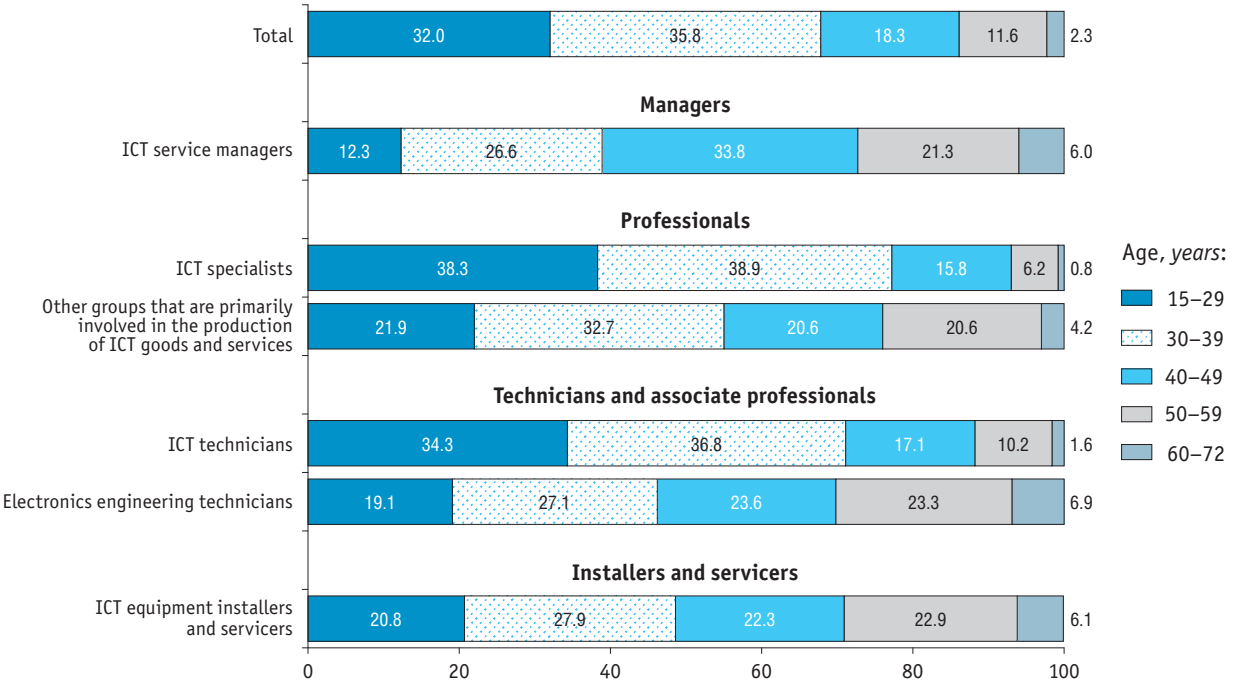
(as a percentage of all employment)



* Or nearest years for which data are available.

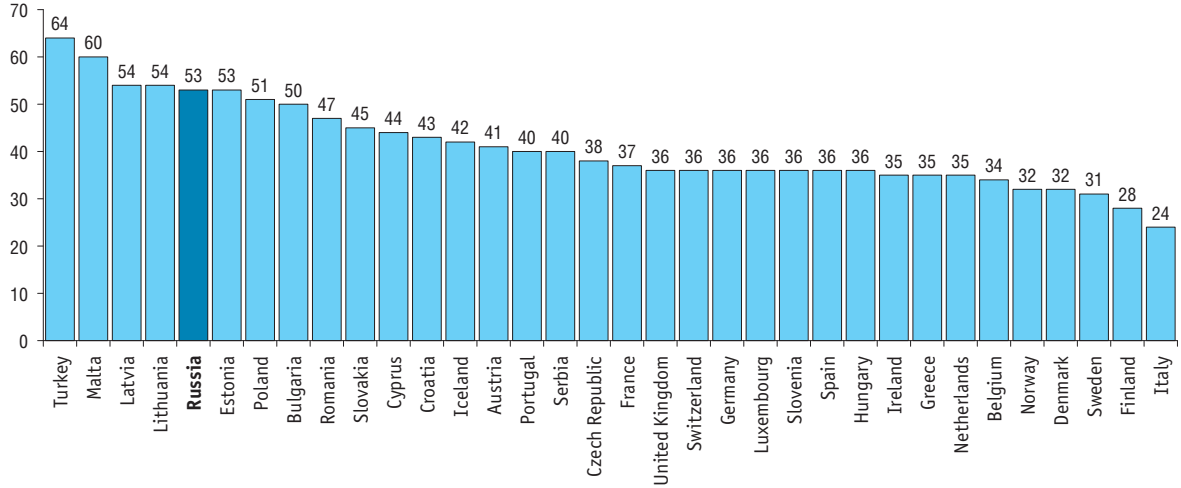
3.6. ICT SPECIALISTS BY AGE: 2018

(as a percentage of ICT specialists employed in the respective ICT-related field)



3.7. ICT SPECIALISTS UNDER 35 BY COUNTRY: 2018*

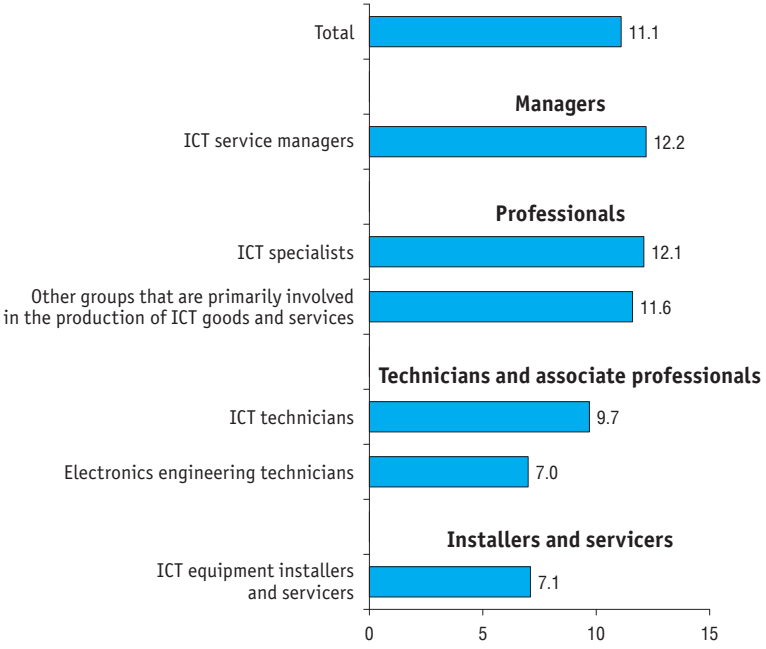
(as a percentage of all ICT specialists)



* Or nearest years for which data are available.

3.8. ICT SPECIALISTS WHO UPGRADED THEIR QUALIFICATION OR RECEIVED PROFESSIONAL TRAINING IN 2018

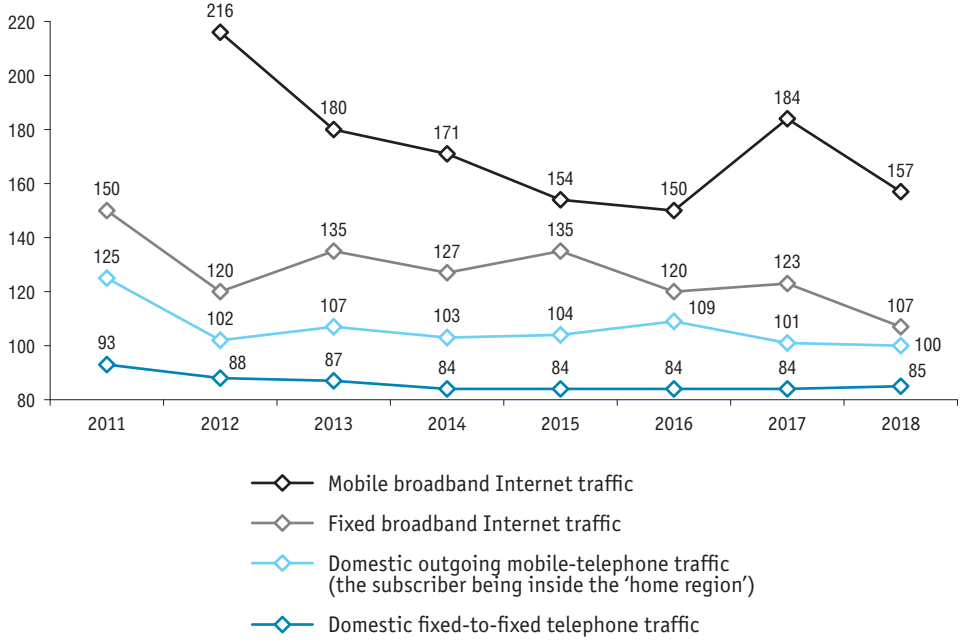
(as a percentage of ICT specialists employed in the respective ICT-related field)



Telecommunications

4.1. TRENDS IN TELECOMMUNICATION SERVICES BY TYPE*

(as a percentage of the previous year)



* Here and below in this section: 2018 data are preliminary.

Sources: (here and below in this section) for Russia, HSE ISSEK estimates based on data provided by the Ministry of Digital Development, Communications and Mass Media of the Russian Federation (4.1–4.7, 4.10, 4.12, 4.14–4.16) and Rosstat (4.8, 4.13, 4.17); for countries other than Russia, OECD and ITU.

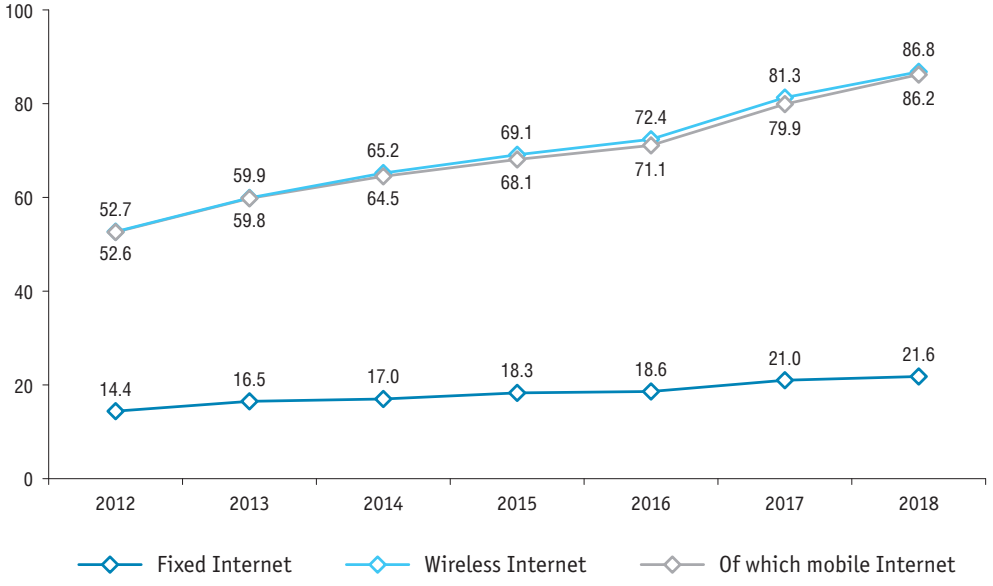
4.2. INTERNET SUBSCRIPTIONS

(thousand units; at the end of the year)

	2012	2013	2014	2015	2016	2017	2018
Fixed Internet							
Total	21111	24115	25044	26944	27493	31084	31884
Of which:							
broadband	20704	23745	24825	26756	27293	30877	31704
by technology:							
xDSL	7854	7654	7002	6315	5701	5426	4904
FTTH/FTTB (FTTx)	11063	14078	16014	18407	19433	22995	24537
cable modem	372	331	318	487	452	442	408
other	1415	1682	1491	1547	1707	2014	1855
Wireless Internet							
Total	91384	102098	107059	111937	118250	124890	132355
Of which:							
mobile	91217	101919	105828	109926	115813	122828	131359
of which broadband	75442	85908	92795	99793	104391	117406	126557
satellite	27	18	30	82	49	67	66
of which broadband	23	16	17	23	30	41	37
terrestrial fixed wireless	140	161	113	107	203	186	233
of which broadband	122	146	108	103	199	180	230
terrestrial mobile wireless	…	…	1088	1822	2185	1809	697
of which broadband	…	…	983	1387	1708	1741	643

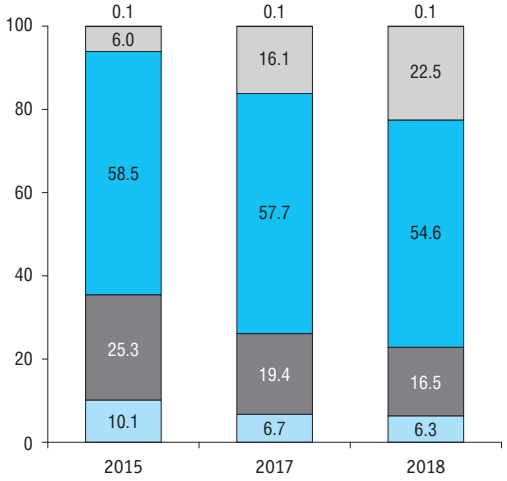
4.3. BROADBAND SUBSCRIPTIONS

(per 100 inhabitants; at the end of the year)



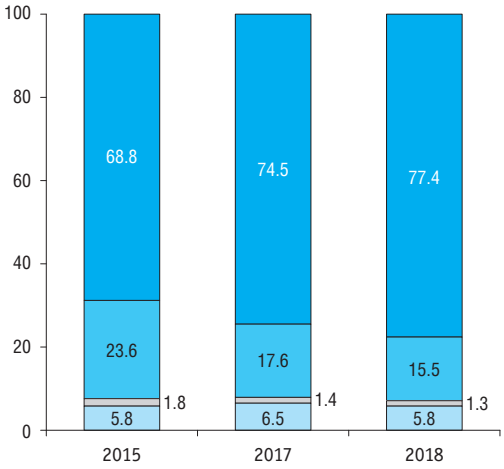
4.4. FIXED BROADBAND SUBSCRIPTIONS BY SPEED ACCESS AND TECHNOLOGY

(as a percentage of all fixed broadband subscriptions; at the end of the year)



By speed access:

- over 1 Gbit/s
- 100 Mbit/s to 1 Gbit/s
- 10 to 100 Mbit/s
- 2 to 10 Mbit/s
- 256 kbit/s to 2 Mbit/s

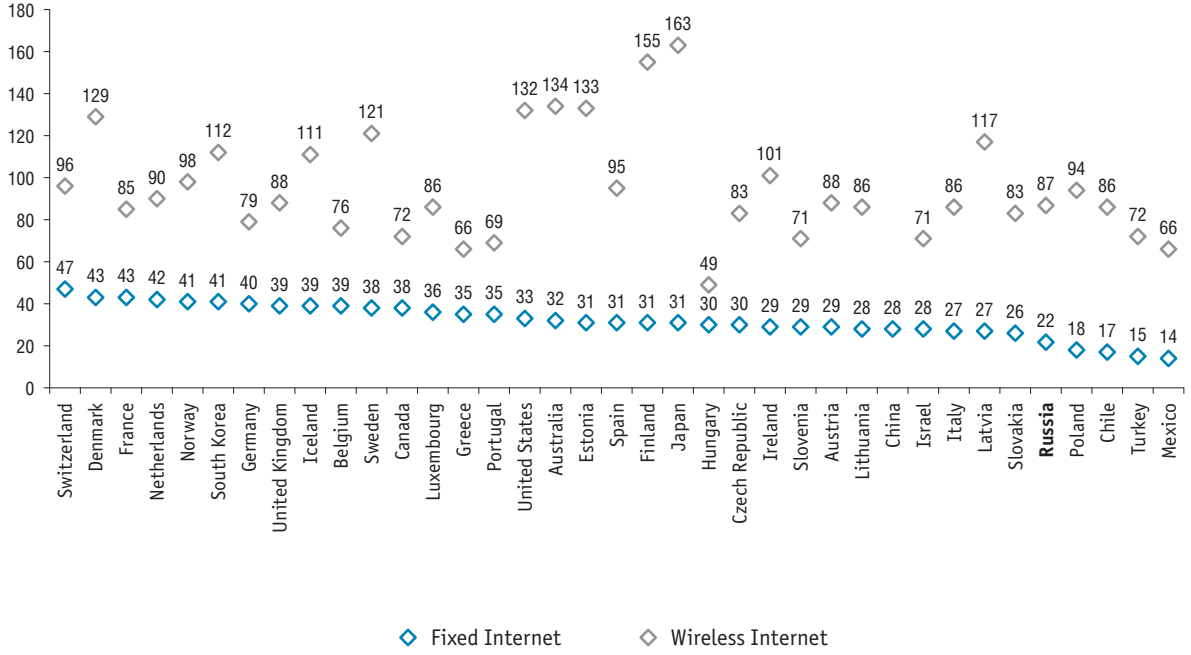


By technology:

- FTTH/ FTTB (FTTx)
- xDSL
- cable modem
- other

4.5. BROADBAND SUBSCRIPTIONS BY COUNTRY: 2018*

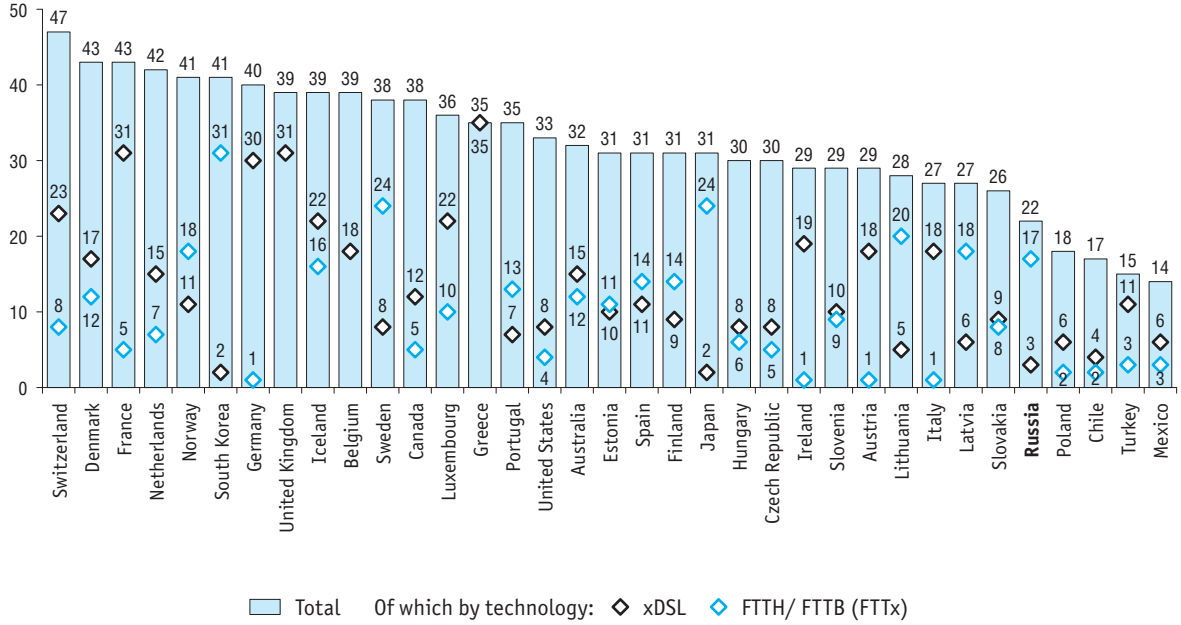
(per 100 population)



* Or nearest years for which data are available.

4.6. FIXED BROADBAND SUBSCRIPTIONS BY TECHNOLOGY AND COUNTRY: 2018*

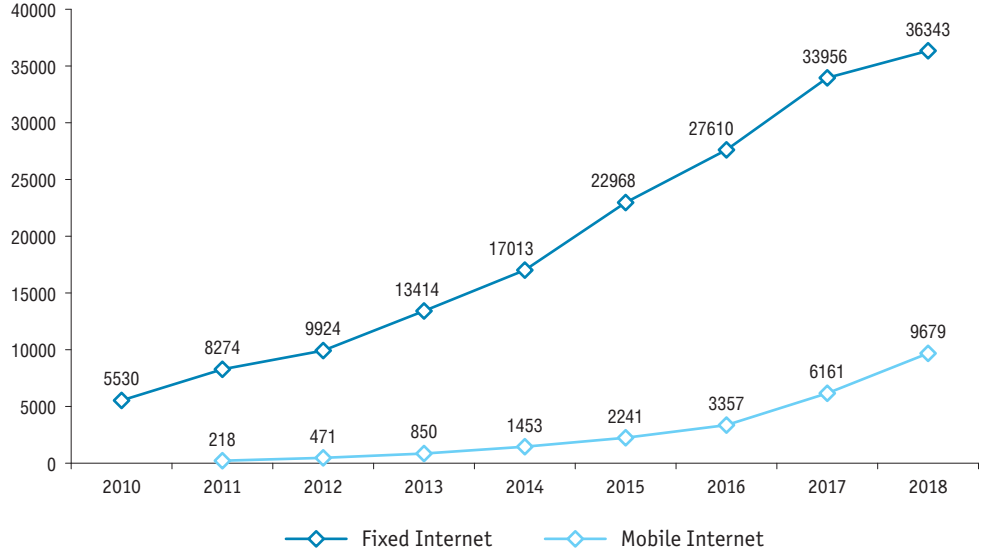
(per 100 inhabitants)



* Or nearest years for which data are available.

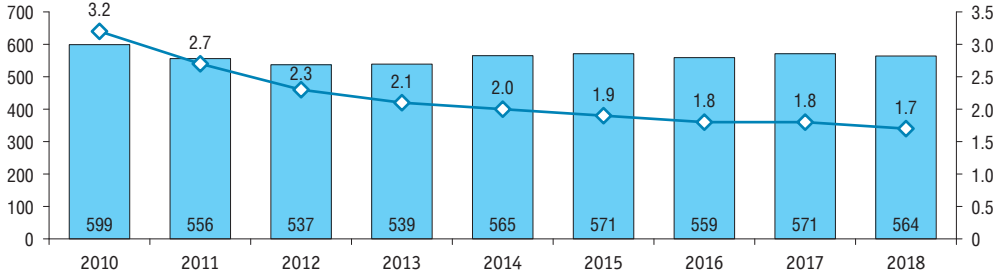
4.7. INTERNET TRAFFIC

(Petabytes)

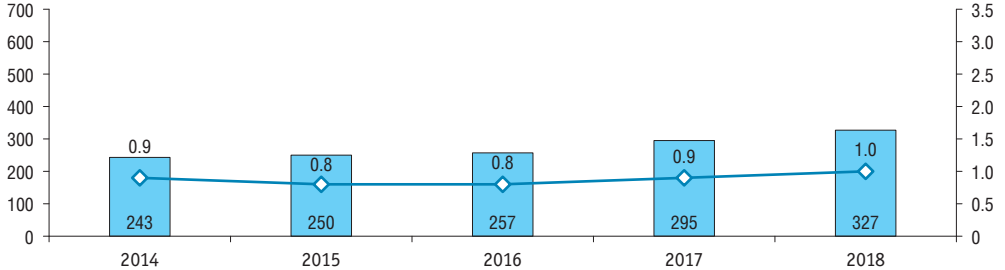


4.8. INTERNET SUBSCRIPTION FEES

Fixed Internet



Mobile Internet

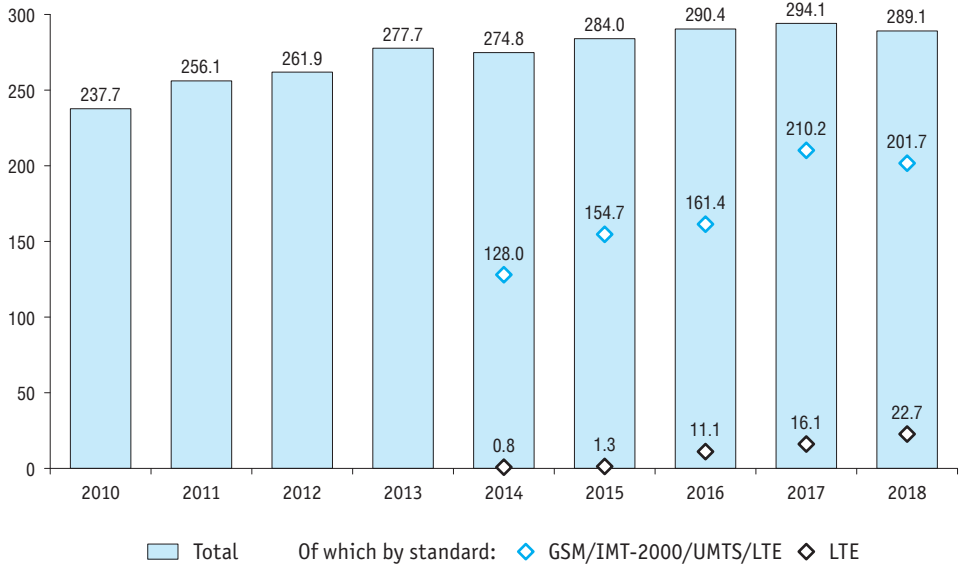


Roubles per month, *December*

As a percentage of average per capita income

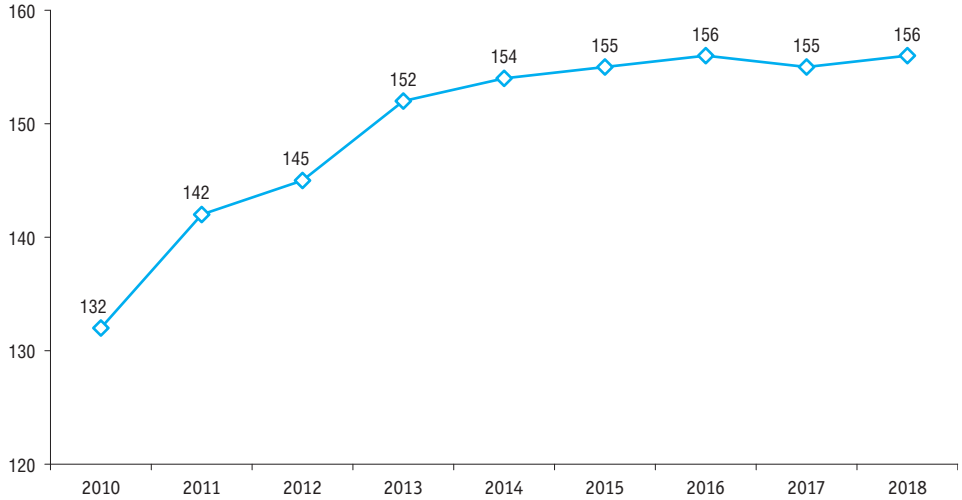
4.9. MOBILE CELLULAR SUBSCRIPTION DEVICES

(million units; at the end of the year)



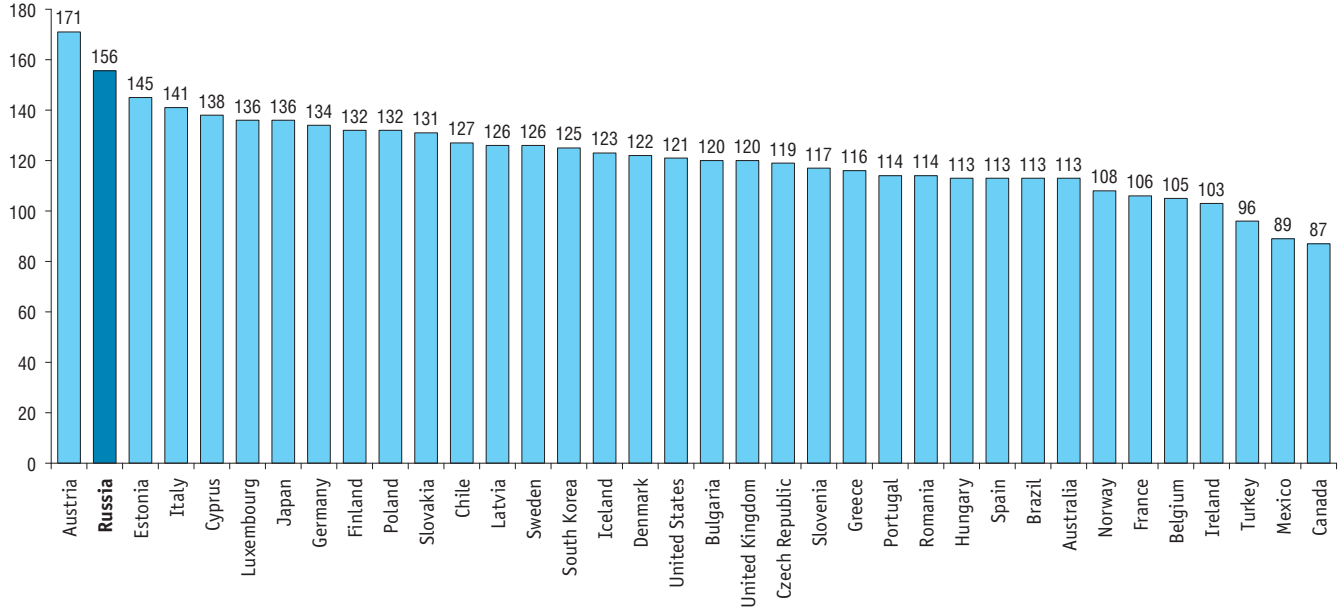
4.10. ACTIVE MOBILE CELLULAR TELEPHONE SUBSCRIPTIONS

(per 100 inhabitants; at the end of the year)



4.11. ACTIVE MOBILE CELLULAR TELEPHONE SUBSCRIPTIONS BY COUNTRY: 2018*

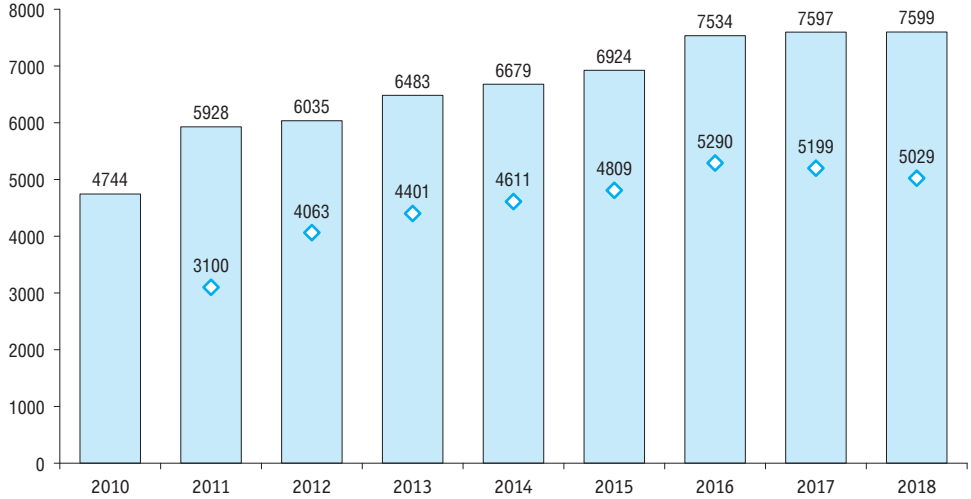
(per 100 inhabitants; at the end of the year)



* Or nearest year for which data are available.

4.12. MOBILE CELLULAR TELEPHONE NETWORK TRAFFIC

(million hours)

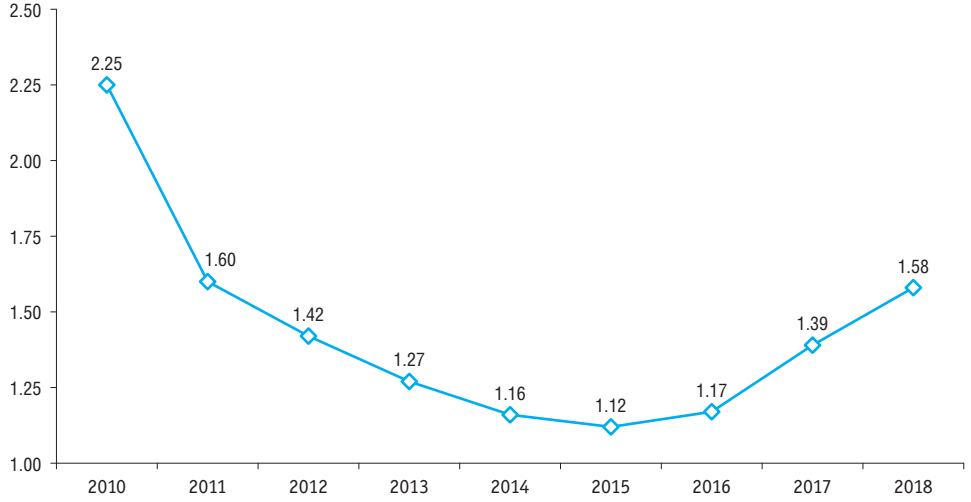


Outgoing payable calls (inside the Russian Federation) within the mobile cellular network (the subscriber being inside the 'home region'):

total ◇ with mobile cellular network's subscribers inside the 'home region'

4.13. MOBILE CELLULAR TELEPHONE PRICES

(roubles per minute of local call; December)



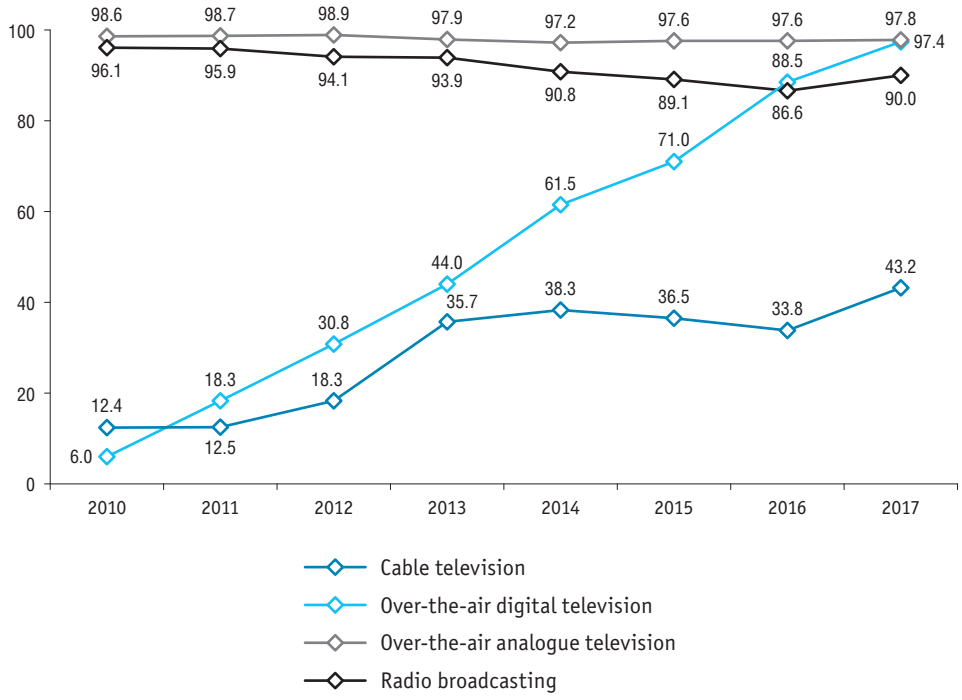
4.14. SATELLITE, TELEVISION AND RADIO COMMUNICATIONS EQUIPMENT

(units; at the end of the year)

	2010	2012	2013	2014	2015	2016	2017
Satellite communication and broadcasting transponders and transmitters used by public operators within Russian National Telecommunications Network	11048	27377	23615	25922	28756	27390	31482
Including:							
used for fixed satellite services	10999	27315	23563	25855	28680	27292	31309
central (regional) ground stations used for mobile satellite services	19	22	10	11	13	22	22
main (regional) ground transmitters used in direct television and radio broadcast systems	30	40	41	48	51	76	151
Domestic satellites used by public operators within Russian National Telecommunications Network	15	14	12	13	16	16	16
Television transmitters							
analogue	16896	17469	17768	17877	18197	18036	18304
digital	142	1 202	1 698	3 045	4 392	5698	6864
Radio transmitters							
long- and medium-wave	313	312	180	132	114	91	86
short-wave	156	129	95	76	147	49	54

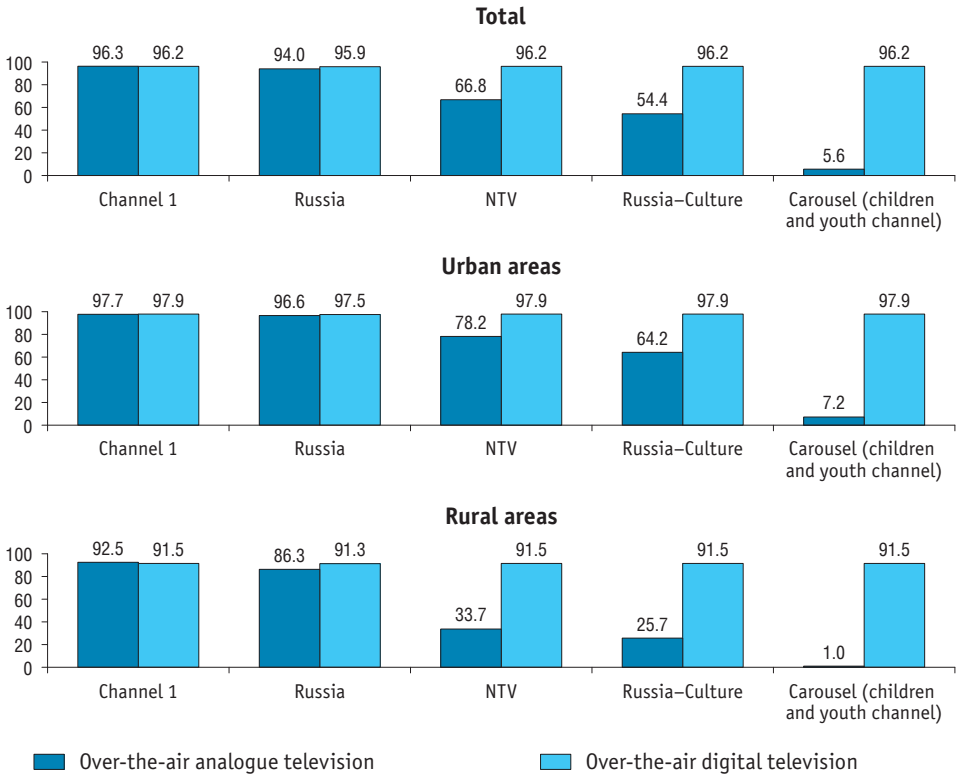
4.15. RADIO AND TELEVISION COVERAGE

(as a percentage of all inhabitants; at the end of the year)



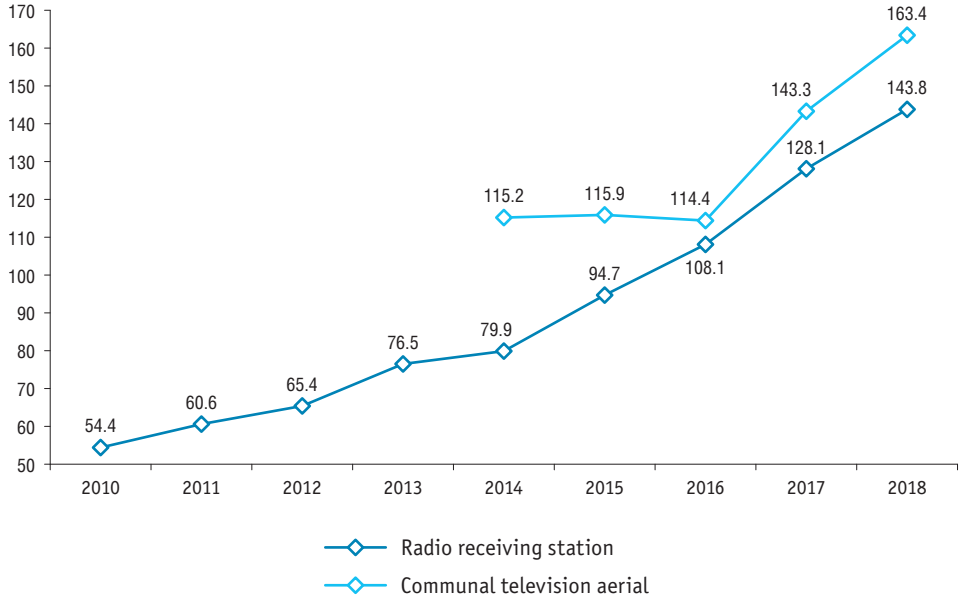
4.16. RUSSIAN FREE TELEVISION CHANNELS COVERAGE: 2017

(as a percentage of all inhabitants; at the end of the year)



4.17. RADIO AND TELEVISION SUBSCRIPTION FEES

(roubles; December)



ICT Sector

5.1. MAIN ICT SECTOR INDICATORS*

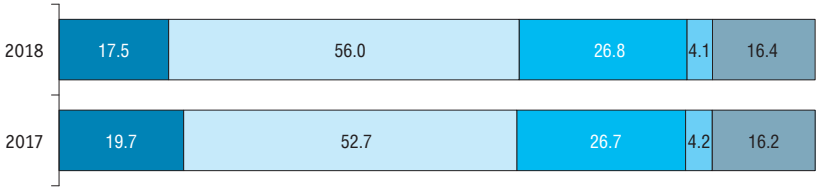
	Total		As a percentage of Russia's total for the corresponding indicator	
	2017	2018	2017	2018
Number of enterprises, *thousand units; at the beginning of the year*	119.5	120.8	2.5	2.6
Number of employees, *thousand persons*	1219.6	1183.4	1.7	1.6
Gross value added, *billion roubles*	2273.9	2443.0	2.7	2.6
Fixed capital investment, *billion roubles*	475.0	598.3	3.0	3.4

* Here and below in this section, the 2018 data are a preliminary estimate of the main ICT sector indicators.

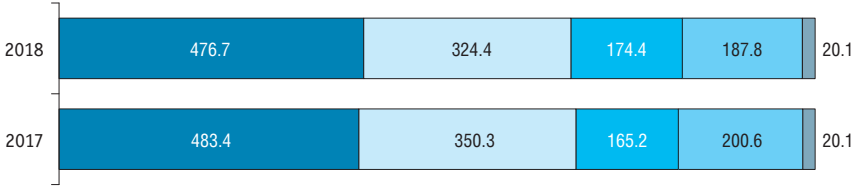
Source (here and below in this section): for Russia, HSE ISSEK estimates based on data provided by Rosstat (5.1–5.4, 5.6–5.15, 5.19, 5.20, 5.22, 5.25, 5.26, 5.28) and Bank of Russia (5.19, 5.21, 5.22, 5.25, 5.27, 5.28); field surveys conducted by HSE ISSEK jointly with Statistics of Russia (a non-profit analytical centre) under a HSE Basic Research Programme project 'Monitoring of Business Tendencies and Economic Uncertainty in Russia: 2017' (5.16–5.18); for countries other than Russia, OECD (5.5, 5.6) and UNCTAD (5.23, 5.24).

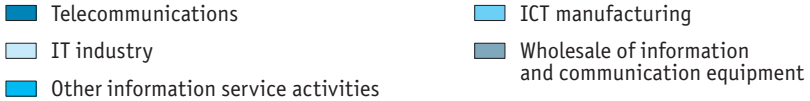
5.2. MAIN ICT SECTOR INDICATORS BY TYPE OF ECONOMIC ACTIVITY

Number of enterprises, *thousand units; at the beginning of the year*



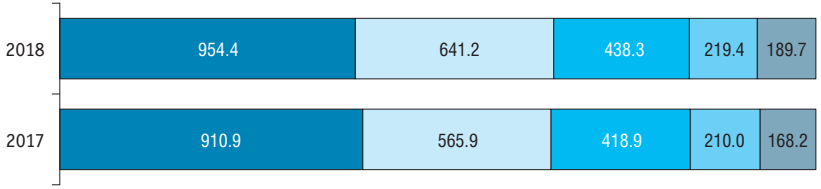
Number of employees, *thousand persons*



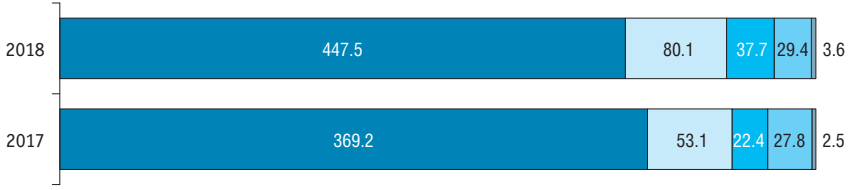


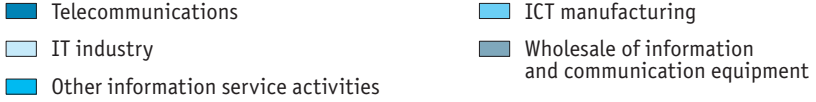
(окончание)

Gross value added, *billion roubles*



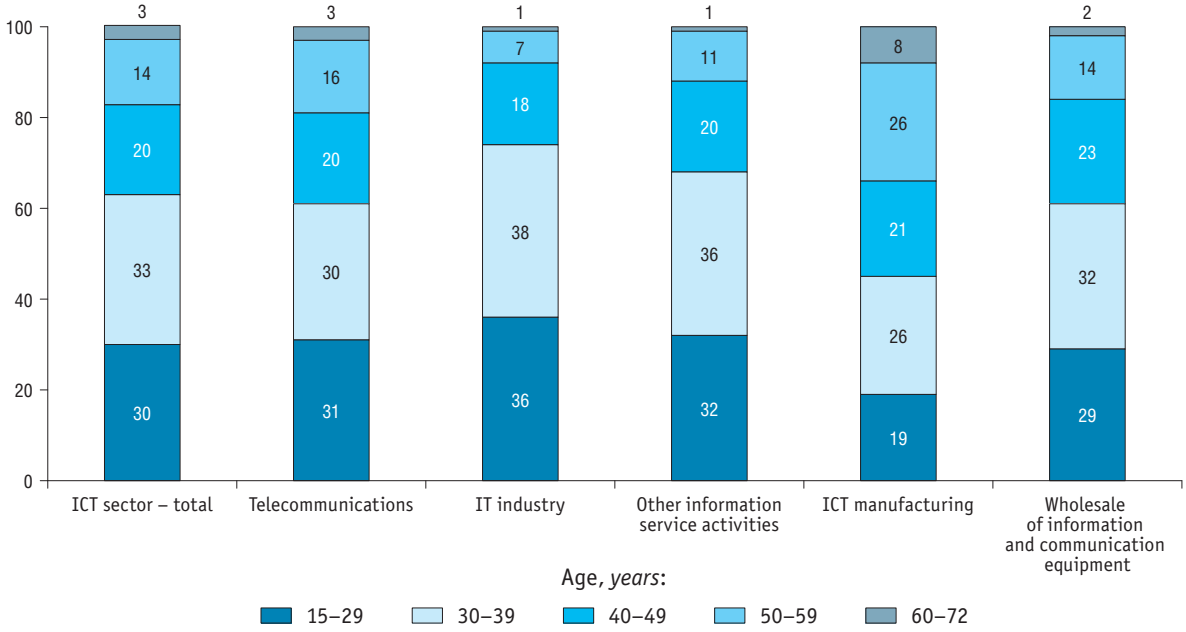
Fixed capital investment, *billion roubles*





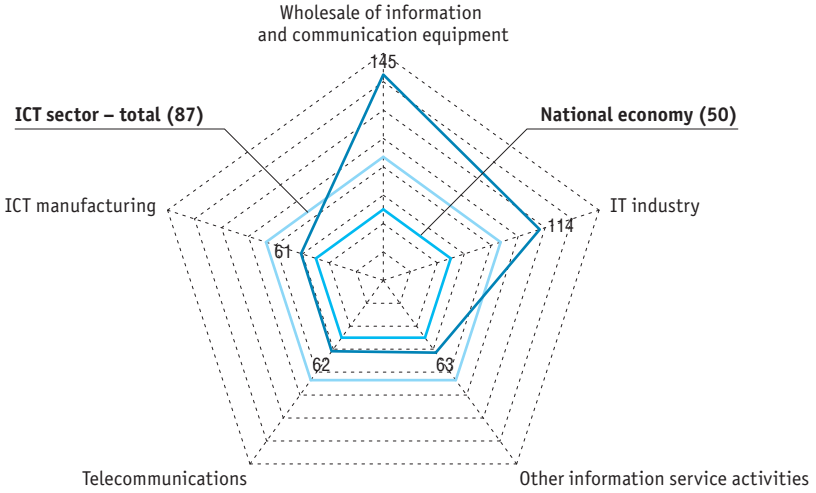
5.3. PERCENTAGE DISTRIBUTION OF ICT SECTOR EMPLOYMENT BY AGE AND TYPE OF ECONOMIC ACTIVITY: 2018

(as a percentage of the total ICT sector employment)



5.4. ICT SECTOR AVERAGE MONTHLY SALARIES BY TYPE OF ECONOMIC ACTIVITY: 2018*

(thousand roubles)

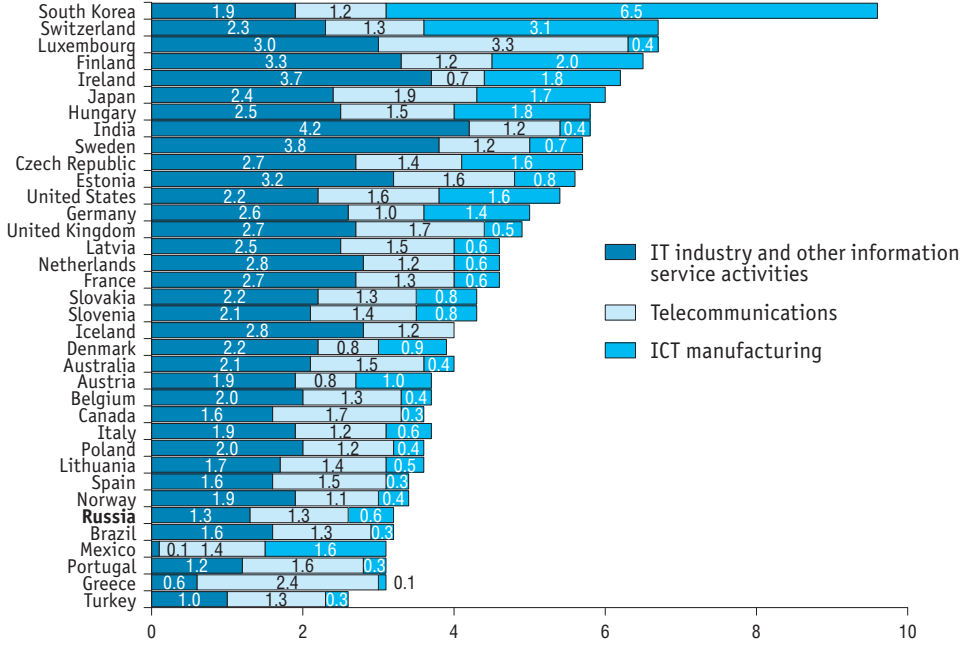


* Excluding data on small businesses.

5.5. ICT SECTOR AS A PERCENTAGE OF THE BUSINESS ENTERPRISE SECTOR EMPLOYMENT AND GROSS VALUE ADDED BY COUNTRY: 2018*

* Or nearest years for which data are available. The above data cover the following types of economic activity as per the Russian Classification of Economic Activity (OKVED2): 26, 61, 62, and 63.

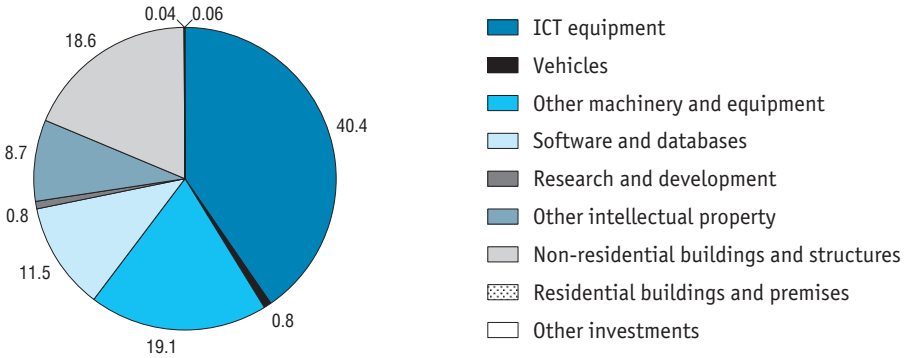
5.6. ICT SECTOR AS A PERCENTAGE OF THE BUSINESS ENTERPRISE SECTOR GROSS VALUE ADDED BY TYPE OF ECONOMIC ACTIVITY AND COUNTRY: 2018*



* Or nearest years for which data are available. The above data cover the following types of economic activity as per OKVED2: IT industry and other information service activities (Codes 62 and 63); Telecommunications (61); and ICT manufacturing (26).

5.7. ICT SECTOR ENTERPRISES' FIXED CAPITAL INVESTMENT BY TYPE: 2018*

(as a percentage of the total ICT sector fixed capital investment)



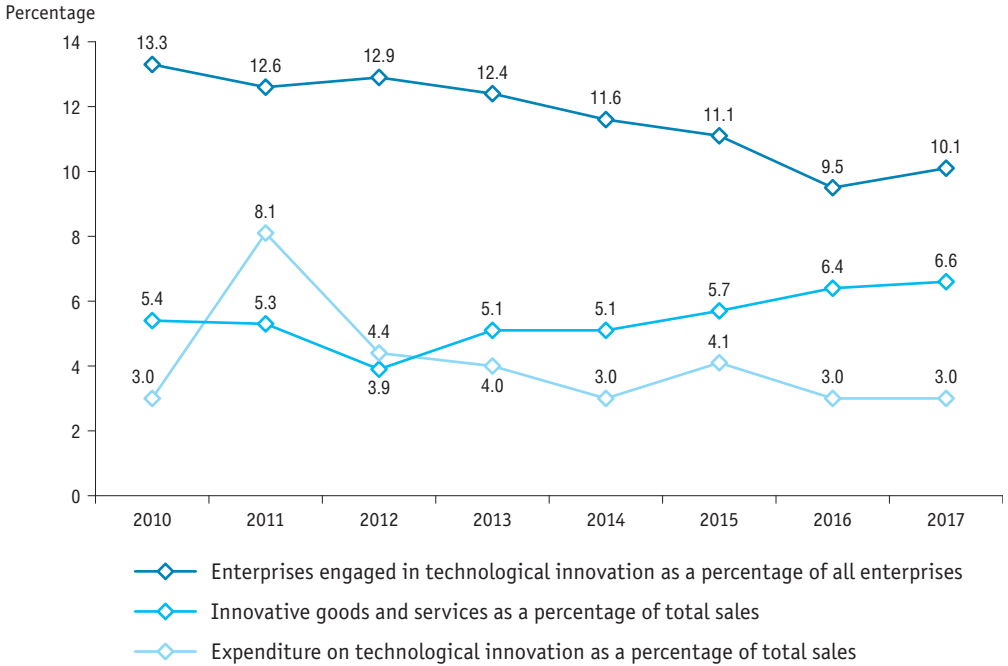
* Excluding data on small businesses.

5.8. PERCENTAGE DISTRIBUTION OF ICT SECTOR ENTERPRISES' AUTHORISED CAPITAL BY TYPE OF SHAREHOLDER (FOUNDER): 2017*

(as a percentage of the total ICT sector authorised capital; at the end of the year)

* Excluding data on small businesses.

5.9. MAIN ICT SECTOR INDICATORS OF INNOVATIVE ACTIVITY



* Aggregate ICT sector's data covering the following types of economic activity: for 2017 – OKVED2 codes 26.1, 26.20, 26.30, 26.40, 26.80, 58.2, 61, 62, 62.09, 63.11, and 63.12; prior to 2017 – OKVED (Rev. 1.1) codes 30, 32, 64, and 72.

5.10. INNOVATION ACTIVITY OF ICT SECTOR ENTERPRISES BY TYPE OF ECONOMIC ACTIVITY: 2017

(percentage)

	Innovation activity of enterprises	Enterprises engaged in selected types of innovation as a percentage of all enterprises		
		technological	marketing	organisational
ICT sector – total	**12.0**	**10.1**	**2.6**	**2.6**
IT industry	6.4	5.7	0.5	1.5
Other information service activities	7.7	7.1	0.6	0.6
Telecommunications	15.1	11.4	4.7	3.0
ICT manufacturing	37.1	35.8	6.6	9.6

5.11. ENTERPRISES ENGAGED IN SELECTED TYPES OF INNOVATIVE ACTIVITY AS A PERCENTAGE OF ALL ICT SECTOR ENTERPRISES ENGAGED IN TECHNOLOGICAL INNOVATION BY TYPE OF ECONOMIC ACTIVITY: 2017

	Research and development	Design	Purchase of ICT-related machinery and equipment	Purchase of new technology	of which acquisition of patent rights and licences	Purchase of software	Engineering	ICT-related training of staff	Market research	Other innovative activities
ICT sector – total	**26.9**	**5.5**	**50.7**	**5.2**	**3.3**	**37.1**	**17.9**	**23.8**	**3.1**	**21.4**
IT industry	31.1	5.0	35.3	7.6	2.5	49.6	5.9	18.5	3.4	18.5
Other information service activities	12.0	–	28.0	4.0	4.0	60.0	–	12.0	–	20.0
Telecommunications	10.2	5.8	55.8	1.9	1.5	26.7	25.7	25.7	1.9	31.1
ICT manufacturing	57.4	6.5	63.0	9.3	7.4	38.0	20.4	28.7	5.6	6.5

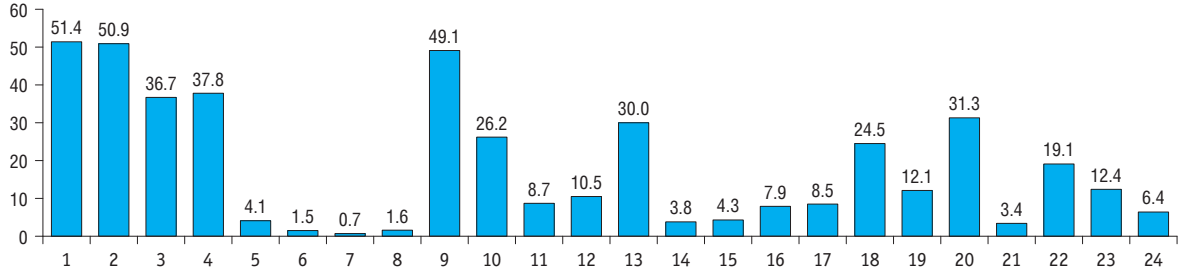
5.12. INNOVATION EXPENDITURE AND OUTPUT OF ICT SECTOR ENTERPRISES BY TYPE OF ECONOMIC ACTIVITY: 2017

	Expenditure on technological innovation		Sales of innovative goods and services	
	million roubles	as a percentage of total sales	million roubles	as a percentage of total sales
ICT sector – total	**83662.3**	**3.0**	**181148.2**	**6.6**
IT industry	18692.6	4.0	33967.6	7.2
Other information service activities	542.9	0.3	3133.6	1.7
Telecommunications	35378.6	2.1	74036.2	4.4
ICT manufacturing	29048.1	7.0	70010.8	16.9

5.13. PERCENTAGE DISTRIBUTION OF ICT SECTOR ENTERPRISES' EXPENDITURE ON TECHNOLOGICAL INNOVATION BY TYPE OF INNOVATIVE AND ECONOMIC ACTIVITY: 2017

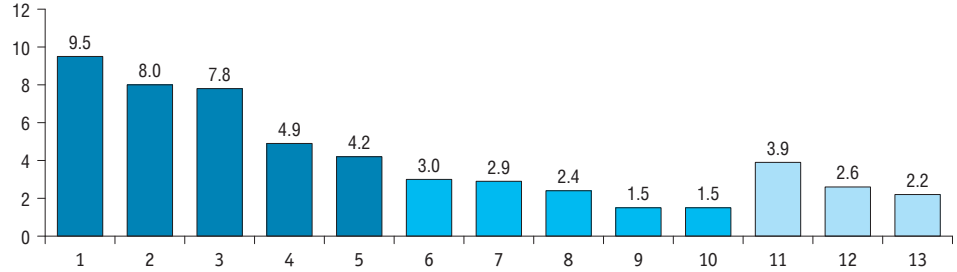
	Research and development	Design	Purchase of ICT-related machinery and equipment	Purchase of new technology	of which acquisition of patent rights and licences	Purchase of software	Engineering	ICT-related training of staff	Market research	Other innovative activities
ICT sector – total	**31.7**	**2.5**	**21.5**	**2.3**	**1.3**	**6.2**	**6.6**	**0.2**	**5.0**	**24.0**
IT industry	39.3	10.7	21.4	0.9	0.0	6.7	0.1	0.4	0.04	20.4
Other information service activities	74.3	–	15.5	0.1	0.1	4.3	–	0.8	–	5.0
Telecommunications	13.0	0.1	28.0	0.1	0.02	8.4	12.7	0.2	11.6	25.9
ICT manufacturing	48.8	0.2	13.7	5.9	3.8	3.2	3.5	0.1	0.2	24.4

5.14. ENTERPRISES INDICATING THE FOLLOWING INNOVATION OUTCOMES AS SIGNIFICANT TO THEIR MANUFACTURING AND ECONOMIC DEVELOPMENT AS A PERCENTAGE OF THE TOTAL NUMBER OF ICT SECTOR ENTERPRISES: 2017



1 – Expansion of goods and services range
2 – Retaining traditional sales markets
3 – Market expansion:
4 – in Russia
5 – in CIS countries
6 – in EU countries plus Albania, Bosnia and Herzegovina, Iceland, Kosovo, Liechtenstein, Macedonia, Norway, Serbia, Turkey, Montenegro, and Switzerland
7 – in the United States and Canada
8 – in other countries
9 – Goods and services quality improvement
10 – Obsolete product replacement
11 – Higher employment
12 – Higher manufacturing flexibility
13 – Production capacity increase
14 – Lower salary costs
15 – Lower inventory and/or material costs
16 – Better energy efficiency in production processes (lower energy consumption or energy losses)
17 – Better working environment and occupational health and safety
18 – More rapid customer and supplier interaction
19 – Higher motivation to innovate
20 – Improvements in internal and external communications
21 – Lower environmental footprint
22 – Compliance with advanced technical standards, rules, and regulations and with sanitation, veterinary and phytosanitary requirements
23 – Launching goods and services to new consumer groups
24 – Launching goods and services to new geographical markets

5.15. ENTERPRISES REPORTING THE FOLLOWING MAIN FACTORS HAMPERING THEIR TECHNOLOGICAL INNOVATION AS A PERCENTAGE OF THE TOTAL NUMBER OF ICT SECTOR ENTERPRISES: 2017



Economic factors:
- 1 – high innovation costs
- 2 – high economic risks
- 3 – shortage of intramural funds within the enterprise
- 4 – lack of financial support from the government
- 5 – low demand for new goods and services

Internal factors:
- 6 – shortage of qualified personnel
- 7 – low innovation potential of organisations
- 8 – lack of information about new technologies
- 9 – lack of information about sales markets
- 10 – underdeveloped co-operation ties

Other factors:
- 11 – uncertainty regarding economic benefits of harnessing the organisation's intellectual property
- 12 – deficiencies in legislation regulating and promoting innovations
- 13 – underdeveloped innovation infrastructure (intermediary, information, law, banking, and other services)

5.16. BUSINESS ACTIVITY OF ENTERPRISES PROVIDING IT SERVICES*

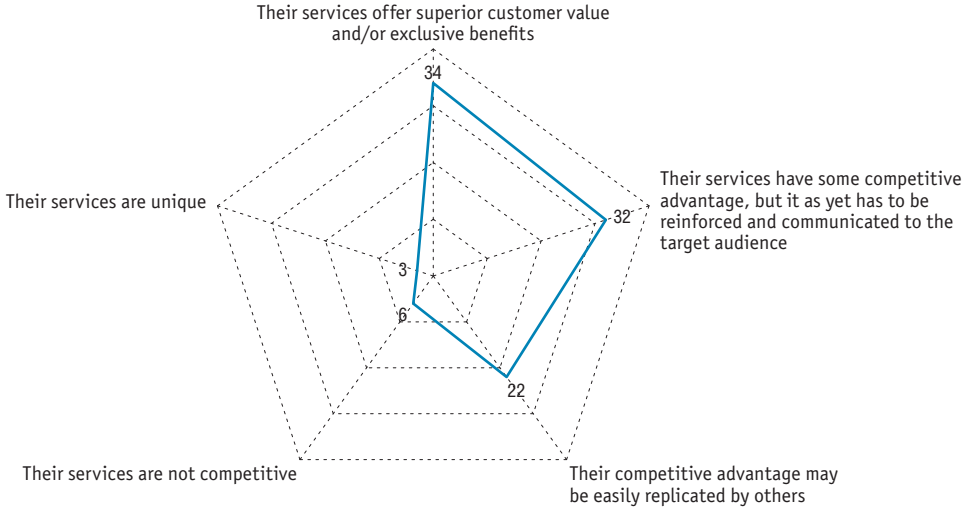
*(statistical balances**, percentage)*

	Levels***			Trends					
				During the year			Prospects for the next year		
	2016	2017	2018	2016	2017	2018	2017	2018	2019
Demand for the enterprises' services	-32	-29	-28	-10	-3	-5	+7	+11	+12
Number of contracts (customers)	-32	-33	-34	-14	-4	-3	+9	+12	+13
Cost of services	-29	-24	-23	-9	-1	-2	+6	+10	+9
Prices (fees) for the services	-12	-11	-10	+2	+3	+3	+12	+11	+10
Number of employees	-16	-15	-14	-5	-2	-1	+6	+11	+11
Competitive strength	+1	+3	+3	+4	+9	+9	+15	+16	+16
Investments	-32	-35	-32	-8	-6	-6	-6	+1	+2
Financial status	-21	-19	-16	-8	-3	+2	+4	+9	+12

* Enterprises developing computer software and providing user support and other related services (OKVED2 code 62) and engaged in IT-related activities (code 63).
** Statistical balance is the difference between the number of respondents evaluating an indicator as being 'up' from the preceding period or being currently 'above normal' and those evaluating an indicator as being 'down' from the preceding period or being currently 'below normal', expressed as a percentage.
*** Levels deemed acceptable, regular, or sufficient under the circumstances prevailing during the surveyed period.

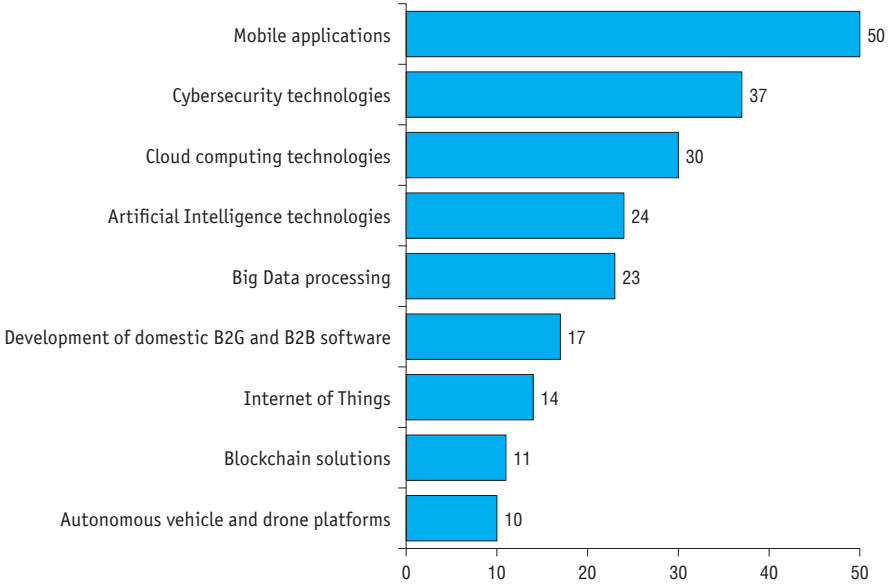
5.17. ASSESSMENT OF ENTERPRISES PROVIDING IT SERVICES OF THEIR COMPETITIVE ADVANTAGE: 2018

(as a percentage of all surveyed enterprises)



5.18. DIGITAL TECHNOLOGIES DEVELOPED BY ENTERPRISES PROVIDING IT SERVICES: 2018

(as a percentage of all surveyed enterprises)

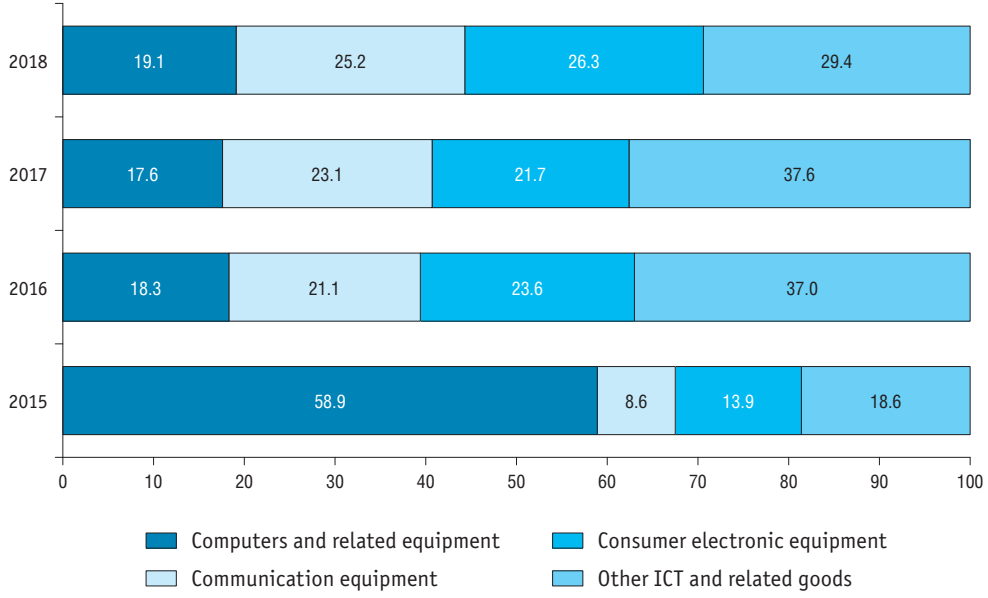


5.19. EXPORTS OF ICT GOODS AND SERVICES

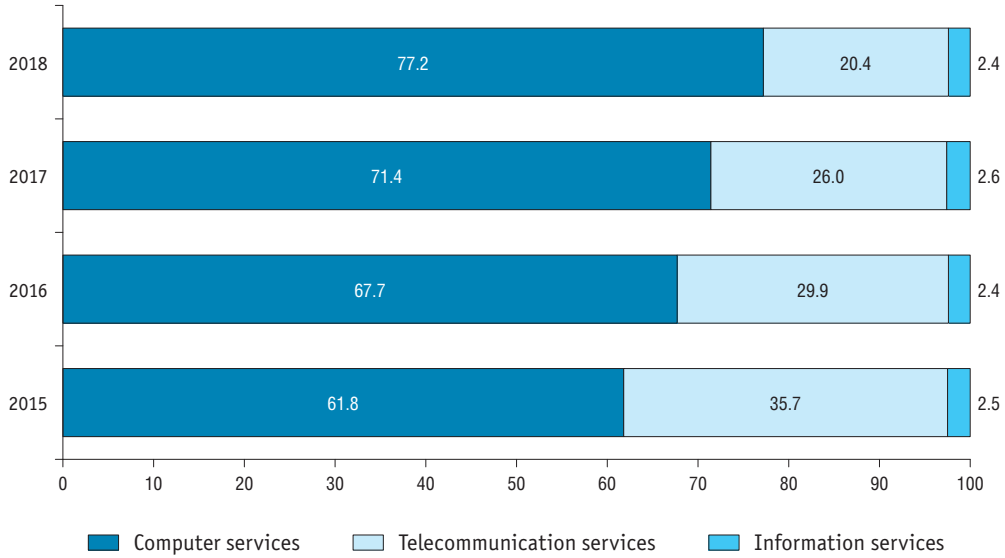
(million USD)

	2010	2015	2016	2017	2018
ICT goods – total	**1034**	**2767**	**1558**	**2070**	**2105**
Computers and related equipment	146	1630	284	365	403
Of which computers	99	445	218	283	312
Communication equipment	119	238	329	478	531
Of which telephone and telegraph equipment	83	184	279	428	486
Consumer electronic equipment	303	385	368	450	552
Of which TV receivers	260	248	256	321	404
Other ICT and related goods	466	514	577	777	619
ICT services – total	**2624**	**3972**	**3936**	**4789**	**5261**
Computer services	1273	2455	2664	3417	4061
Telecommunication services	1265	1418	1179	1247	1072
Information services	86	99	93	125	128

5.20. PERCENTAGE DISTRIBUTION OF EXPORTS OF ICT GOODS

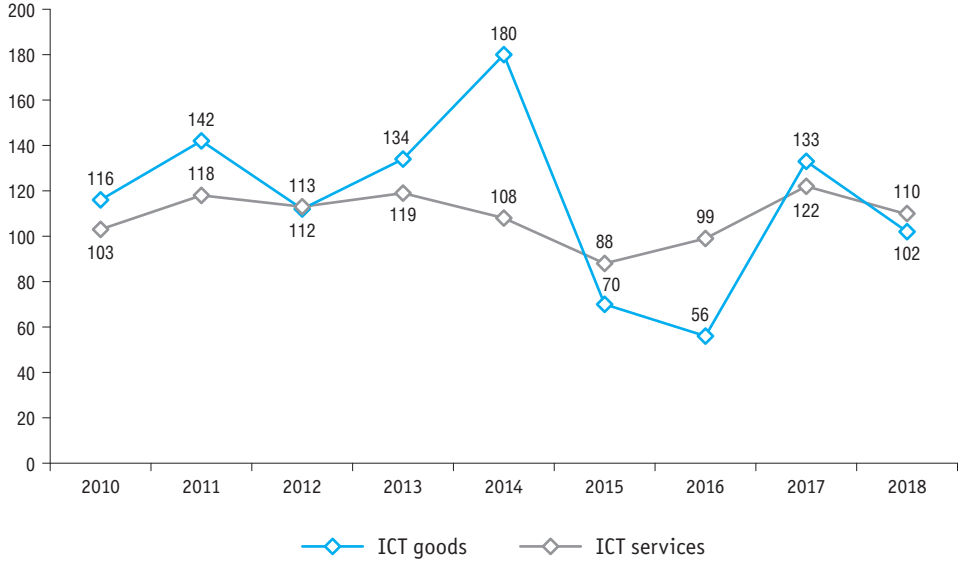


5.21. PERCENTAGE DISTRIBUTION OF EXPORTS OF ICT SERVICES



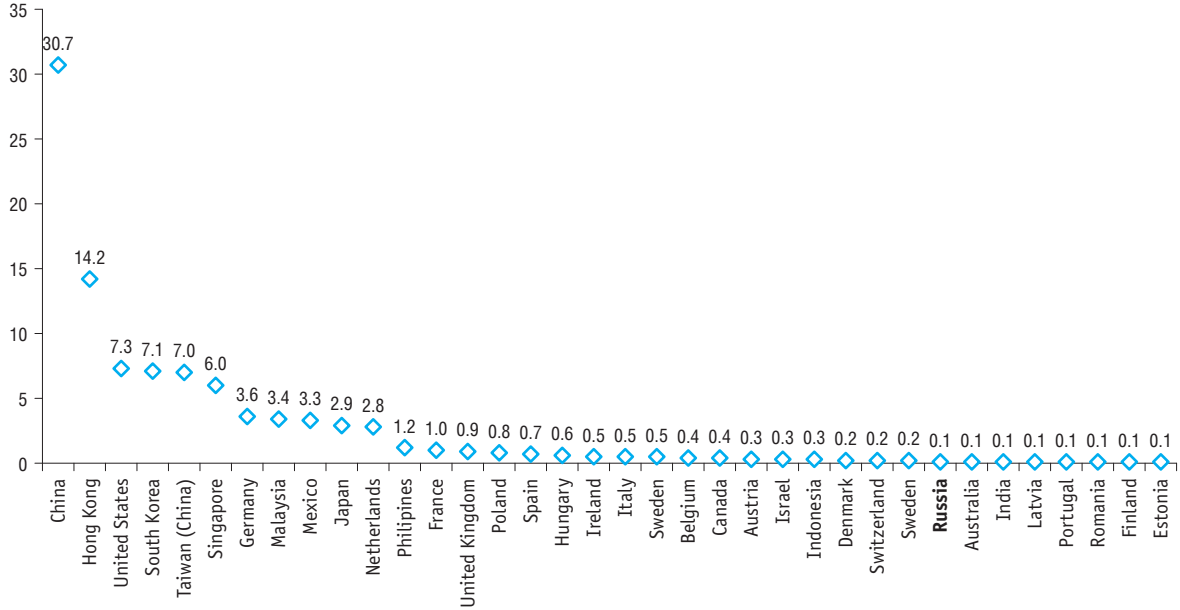
5.22. TRENDS IN EXPORTS OF ICT GOODS AND SERVICES

(as a percentage of the previous year)



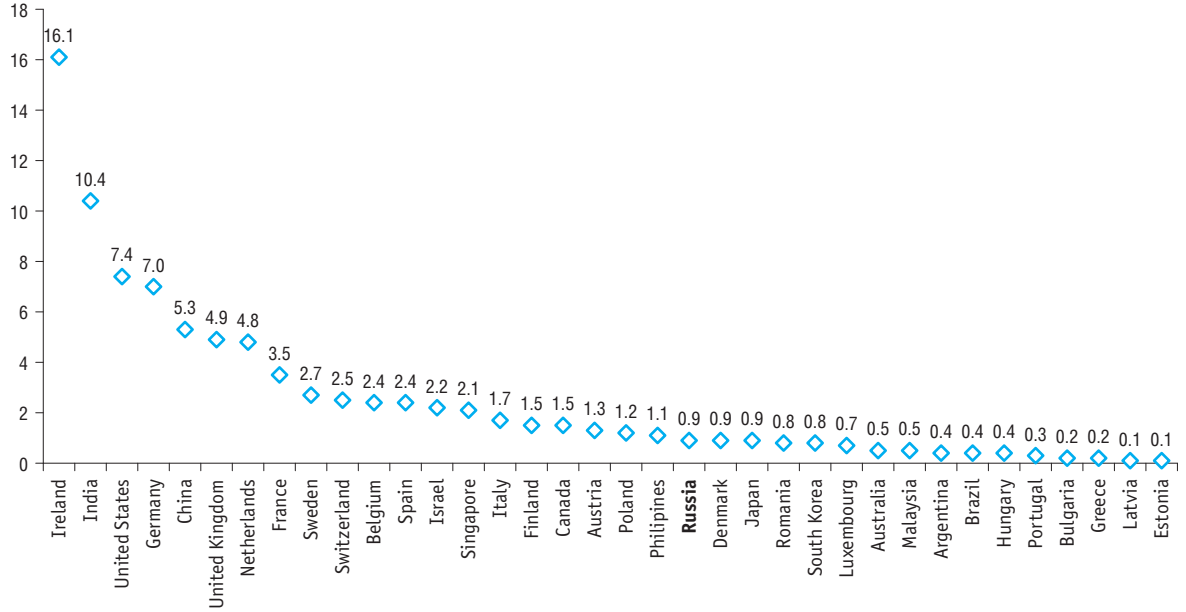
5.23. EXPORTS OF ICT GOODS BY COUNTRY: 2017

(as a percentage of global exports of ICT goods)



5.24. EXPORTS OF ICT SERVICES BY COUNTRY: 2017

(as a percentage of global exports of ICT services)

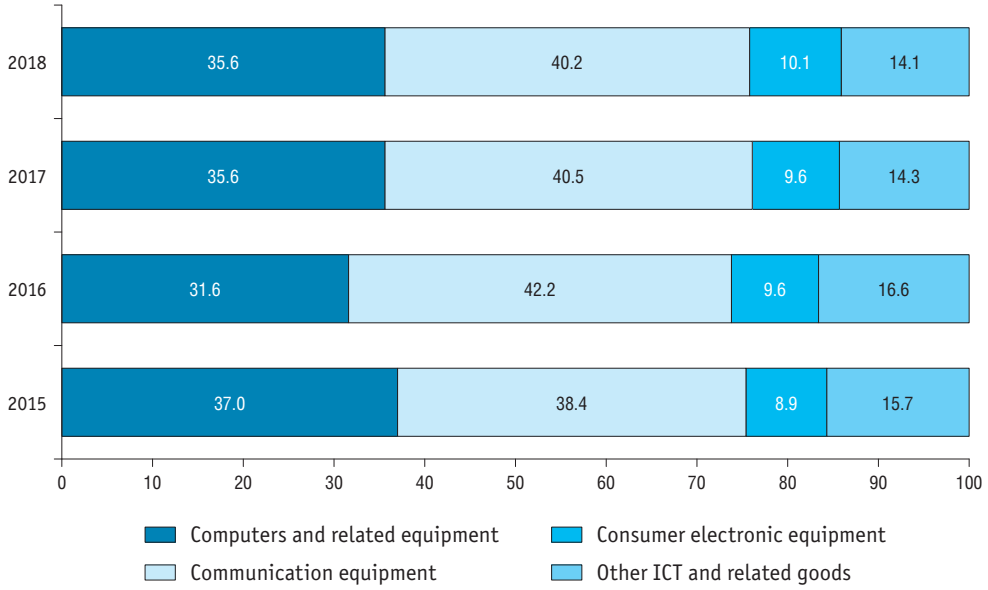


5.25. IMPORTS OF ICT GOODS AND SERVICES

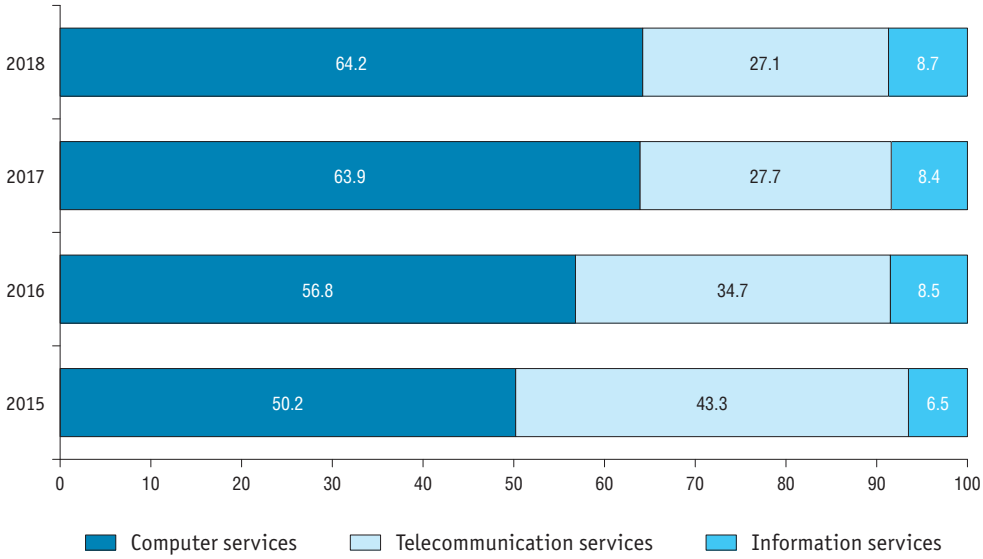
(million USD)

	2010	2015	2016	2017	2018
ICT goods – total	**19520**	**16482**	**16006**	**20844**	**23599**
Computers and related equipment	6660	6101	5065	7425	8404
Of which computers	4817	4035	3824	5099	5947
Communication equipment	6681	6328	6749	8434	9476
Of which telephone and telegraph equipment	6607	6293	6715	8394	9433
Consumer electronic equipment	3283	1471	1543	1997	2385
Of which TV receivers	742	316	273	366	440
Other ICT and related goods	2896	2582	2649	2988	3334
ICT services – total	**3955**	**5521**	**5395**	**5315**	**5488**
Computer services	1644	2772	3063	3399	3521
Telecommunication services	2065	2388	1873	1470	1486
Information services	246	361	459	446	481

5.26. PERCENTAGE DISTRIBUTION OF IMPORTS OF ICT GOODS

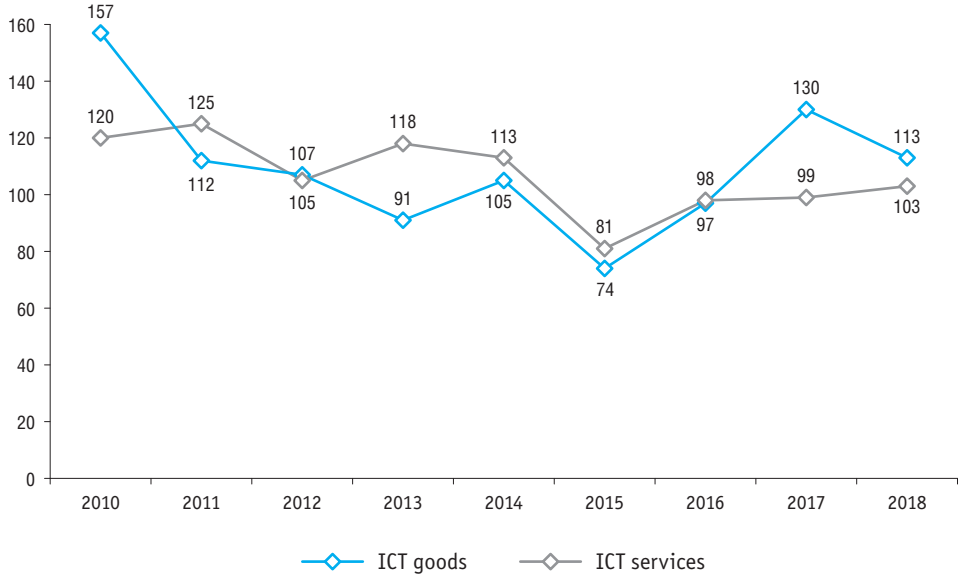


5.27. PERCENTAGE DISTRIBUTION OF IMPORTS OF ICT SERVICES



5.28. TRENDS IN IMPORTS OF ICT GOODS AND SERVICES

(as a percentage of the previous year)



Content and Media Sector

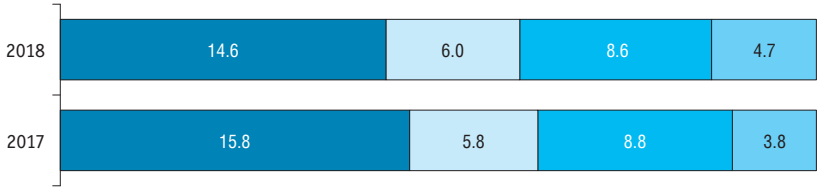
6.1. MAIN CONTENT AND MEDIA SECTOR INDICATORS

	Total		As a percentage of Russia's total in the corresponding indicator	
	2017	2018	2017	2018
Number of enterprises, *thousand units; at the beginning of the year*	34.2	33.9	0.7	0.7
Number of employees, *thousand persons*	365.7	394.7	0.5	0.5
Gross value added, *billion roubles*	289.3	293.2	0.3	0.3
Fixed capital investment, *billion roubles*	36.3	45.3	0.2	0.3

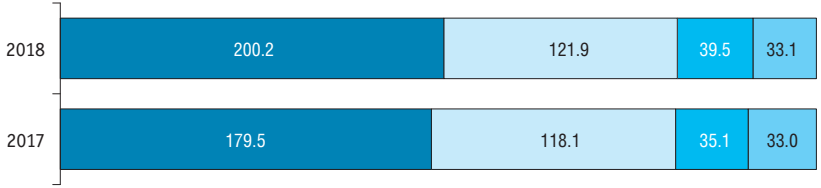
Sources: (here and below in this section): for Russia, HSE ISSEK estimates based on Rosstat data; for other countries, OECD.

6.2. MAIN CONTENT AND MEDIA SECTOR INDICATORS BY TYPE OF ECONOMIC ACTIVITY

Number of enterprises, *thousand units; at the beginning of the year*



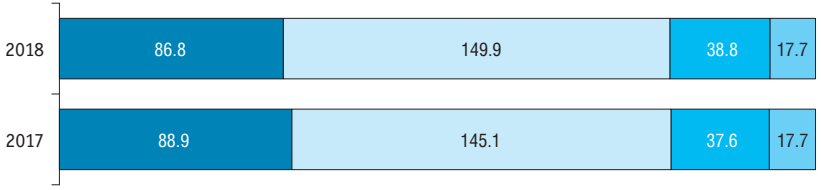
Number of employees, *thousand persons*



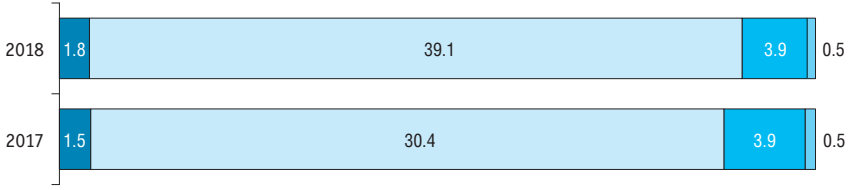
- Publishing of books, periodicals and other publishing activities
- Radio and TV programming and broadcasting activities
- Motion picture, video and television programme activities
- Other services

(continued)

Gross value added, *billion roubles*



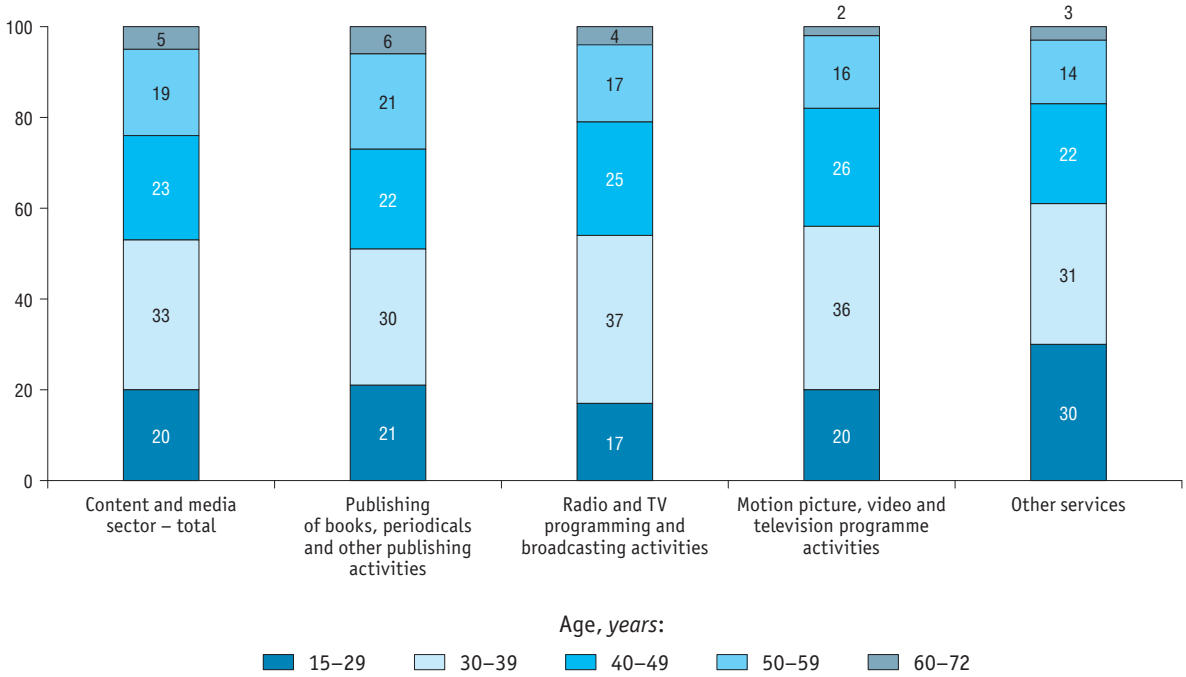
Fixed capital investment, *billion roubles*



- Publishing of books, periodicals and other publishing activities
- Radio and TV programming and broadcasting activities
- Motion picture, video and television programme activities
- Other services

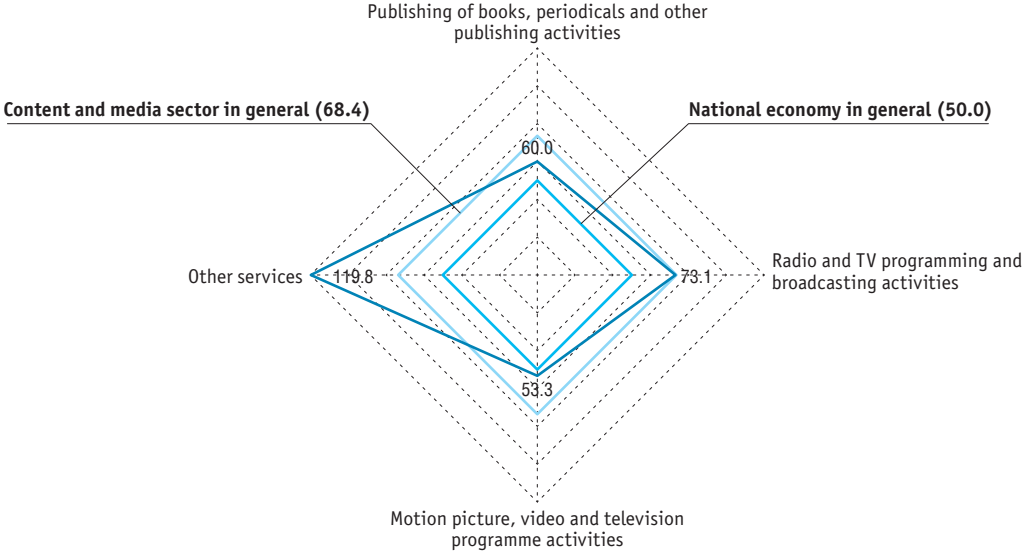
6.3. CONTENT AND MEDIA SECTOR EMPLOYMENT BY AGE AND TYPE OF ECONOMIC ACTIVITY: 2018

(as a percentage of the total content and media sector employment)



6.4. CONTENT AND MEDIA SECTOR AVERAGE MONTHLY SALARY BY TYPE OF ECONOMIC ACTIVITY: 2018*

(thousand roubles)



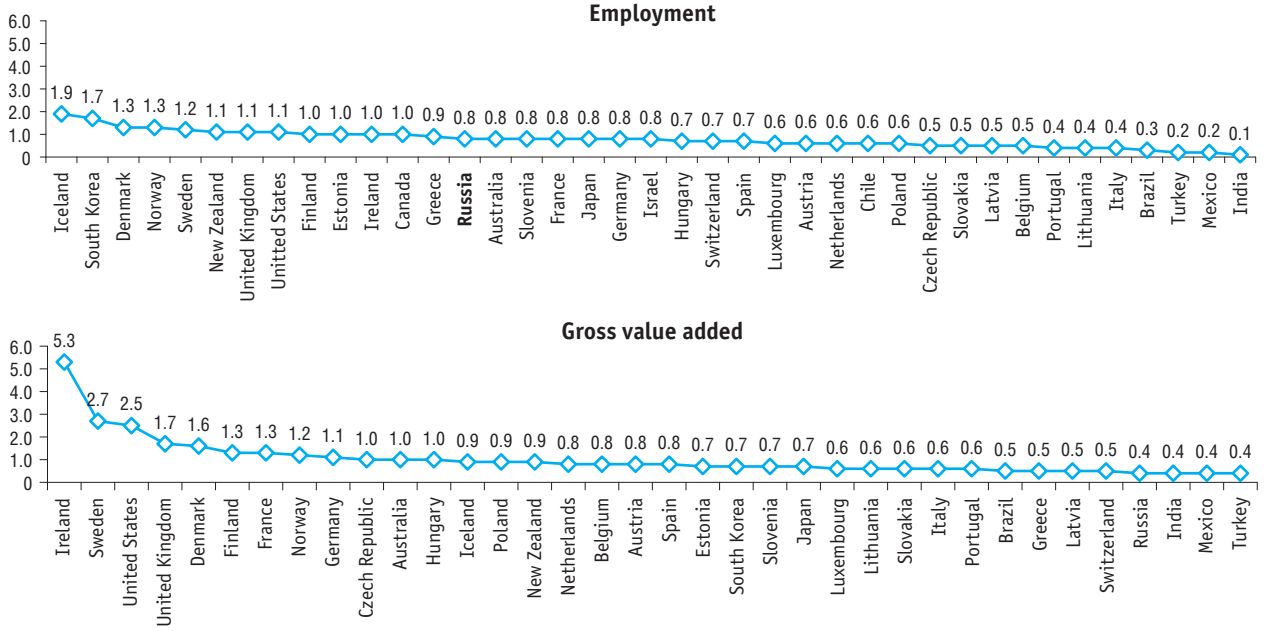
* Excluding data on small businesses.

6.5. CONTENT AND MEDIA SECTOR ENTERPRISES' AUTHORISED CAPITAL BY TYPE OF SHAREHOLDER (FOUNDER): 2017*

(as a percentage of the total content and media sector authorised capital; at the end of the year)

* Excluding data on small businesses.

6.6. CONTENT AND MEDIA SECTOR AS A PERCENTAGE OF THE BUSINESS ENTERPRISE SECTOR EMPLOYMENT AND GROSS VALUE ADDED BY COUNTRY: 2018*

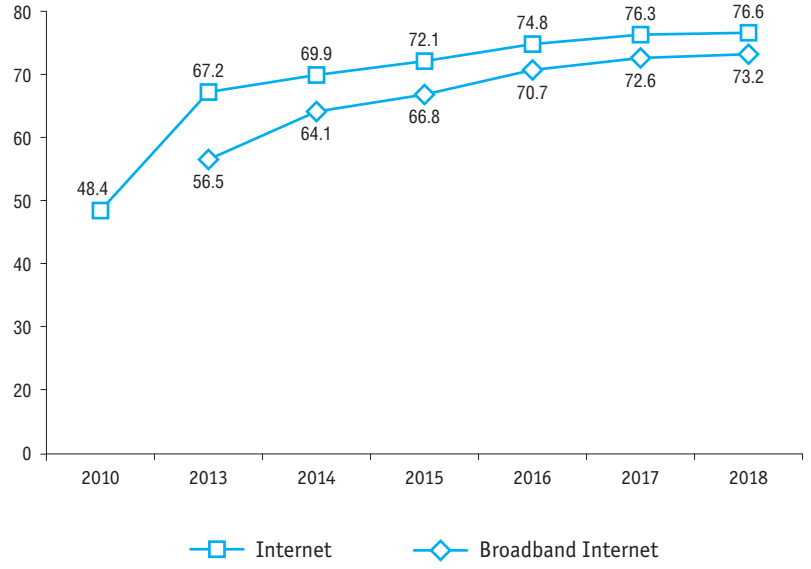


* Or nearest years for which data are available. The above data cover the following economic activity types as per the Russian Classification of Economic Activity (OKVED2): 58, 59, and 60.

Population in the Digital World

7.1. HOUSEHOLDS WITH INTERNET ACCESS

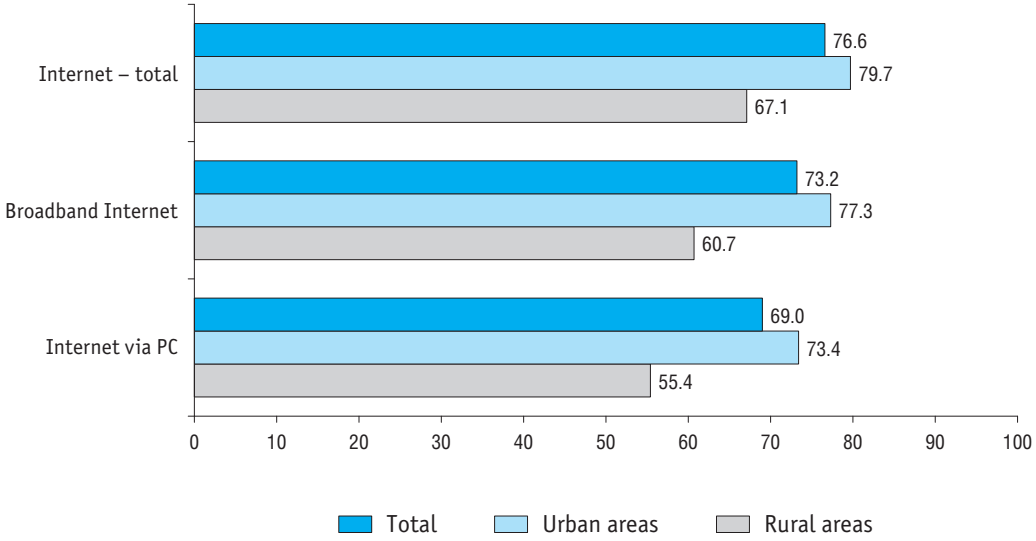
(as a percentage of all households)



Sources (here and below in this section): for Russia, Rosstat; for countries other than Russia, OECD, ITU, and Eurostat.

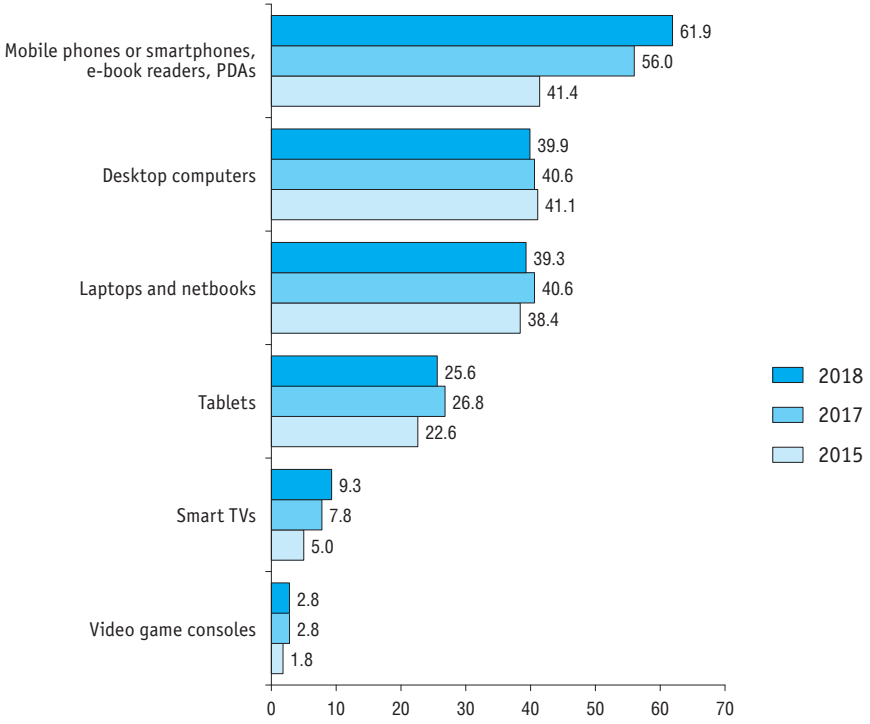
7.2. HOUSEHOLDS WITH INTERNET ACCESS IN URBAN AND RURAL AREAS: 2018

(as a percentage of all households)



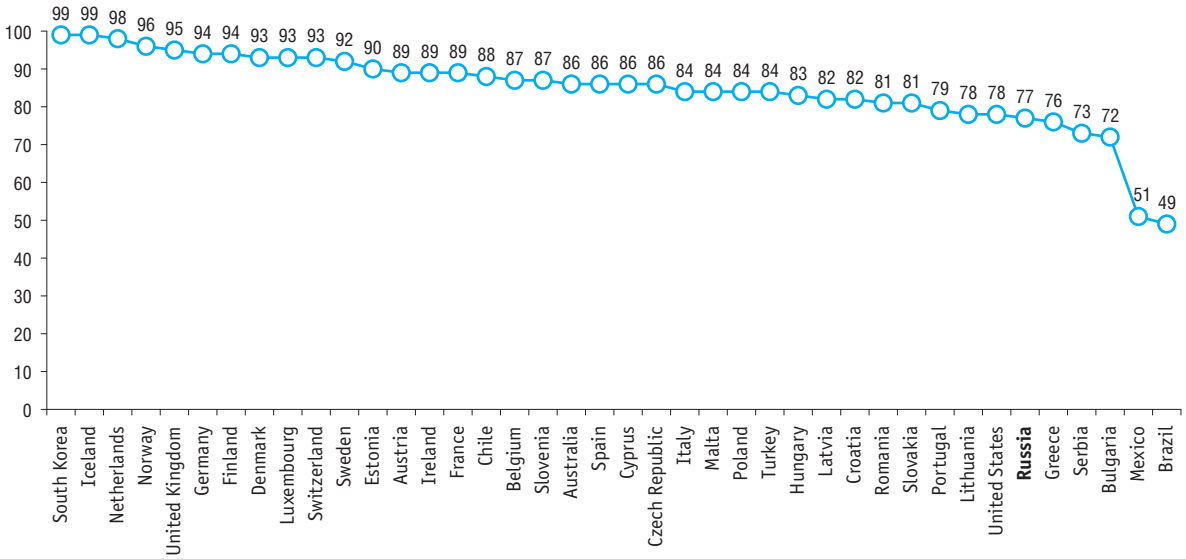
7.3. HOUSEHOLDS WITH INTERNET ACCESS BY DEVICE

(as a percentage of all households)



7.4. HOUSEHOLDS WITH INTERNET ACCESS BY COUNTRY: 2018*

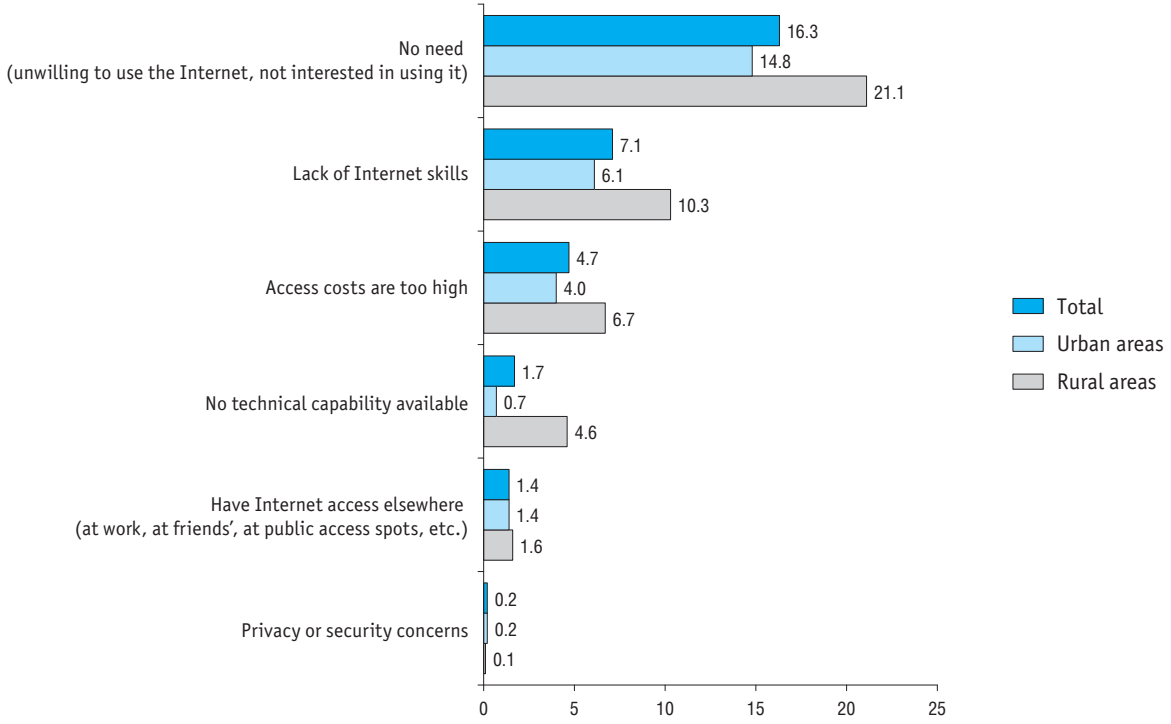
(as a percentage of all households)



* Or nearest years for which data are available.

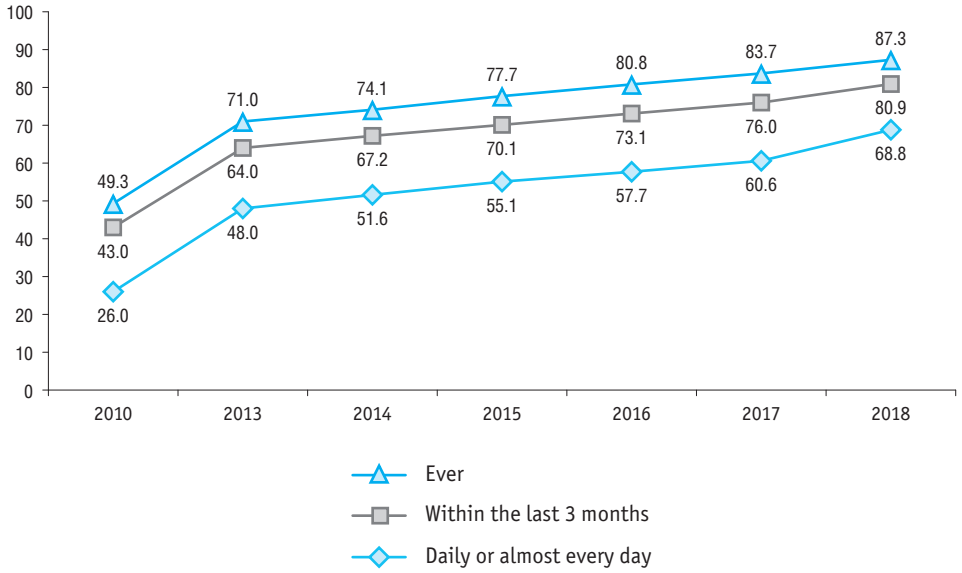
7.5. FACTORS HAMPERING HOUSEHOLDS' USE OF INTERNET IN URBAN AND RURAL AREAS: 2018

(as a percentage of all households)



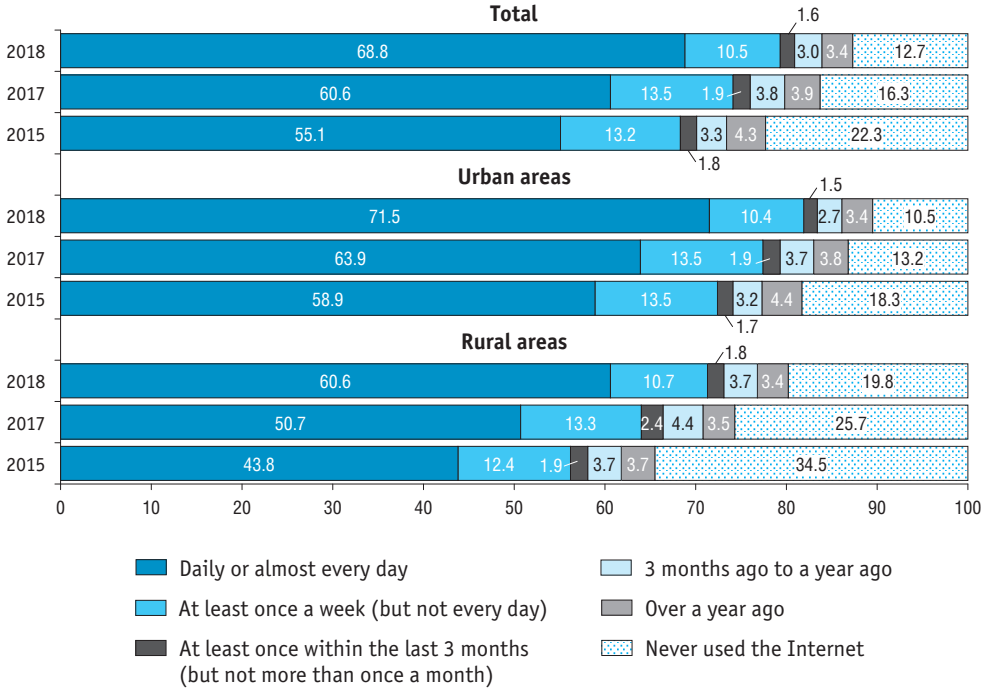
7.6. INTERNET USERS

(as a percentage of individuals aged 15–74)



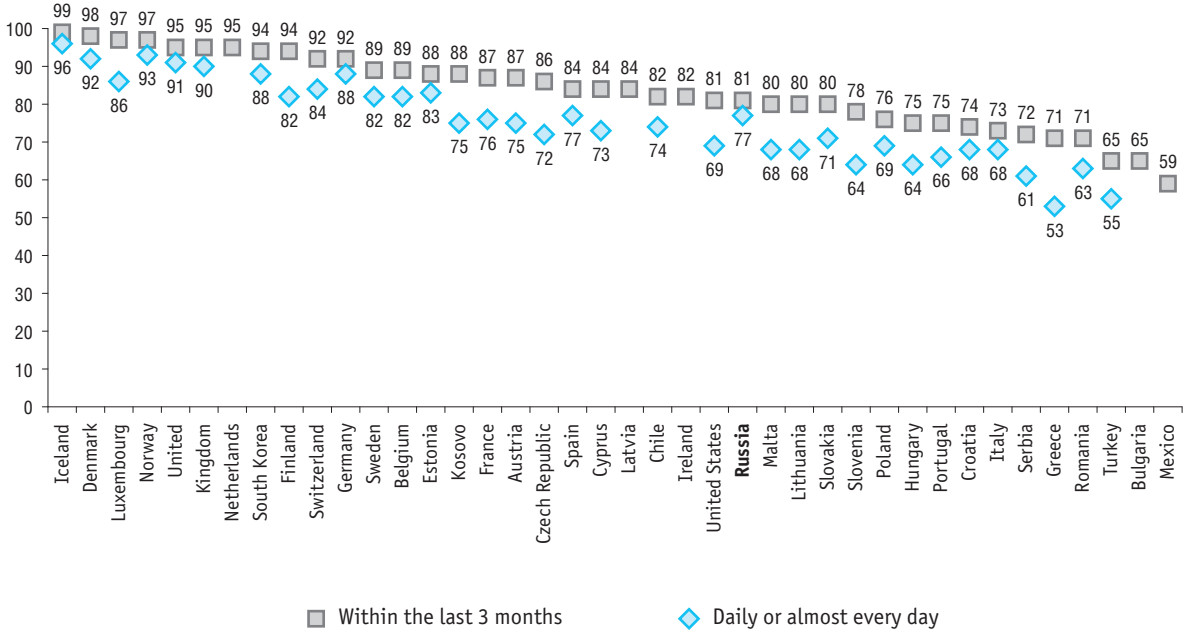
7.7. INTERNET USERS IN URBAN AND RURAL AREAS

(as a percentage of individuals aged 15–74)



7.8. INTERNET USERS BY COUNTRY: 2018*

*(as a percentage of individuals aged 15–74**)*

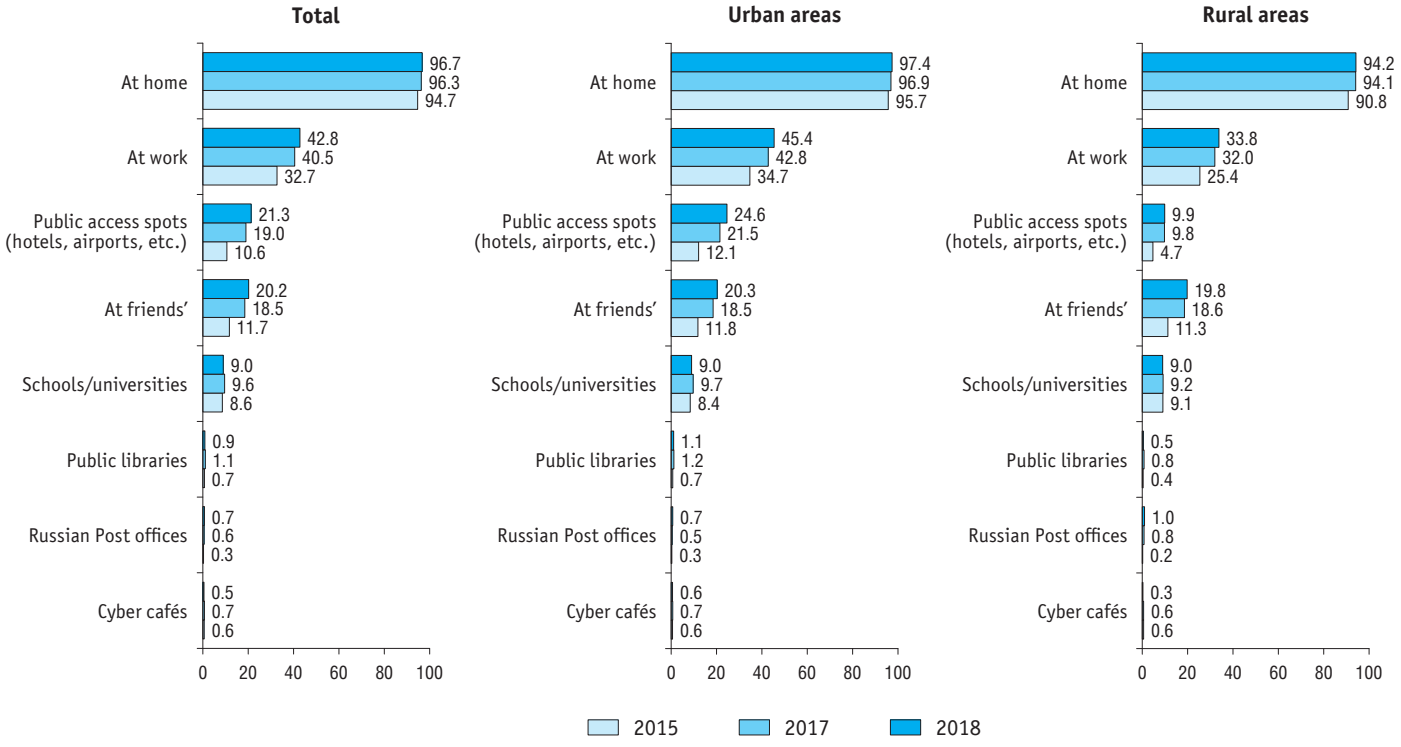


* Or nearest years for which data are available.

** For countries other than Russia: aged 16–74.

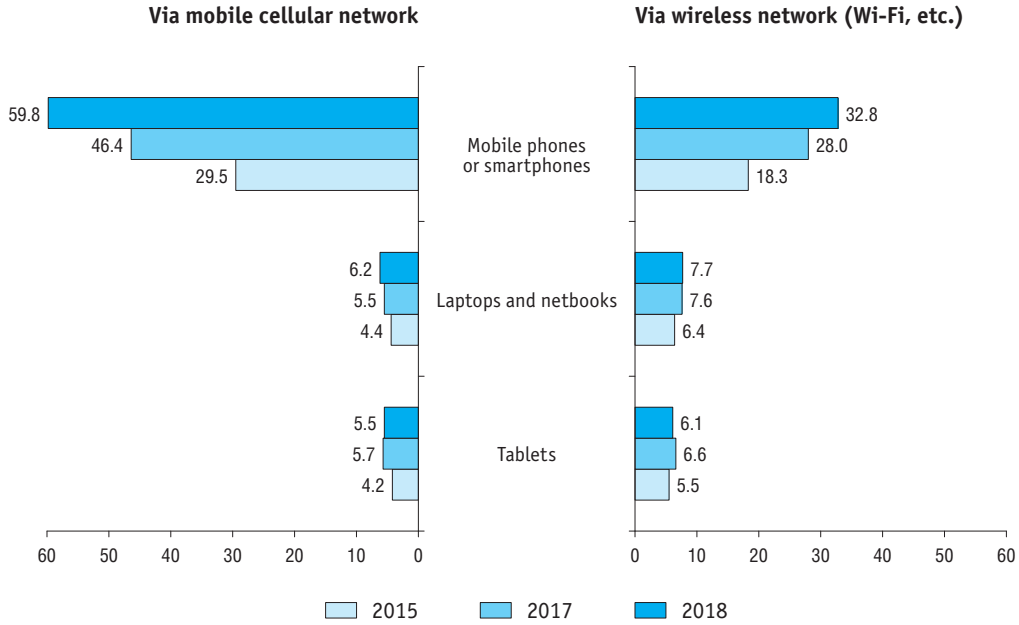
7.9. PLACES OF INDIVIDUALS' USE OF INTERNET IN URBAN AND RURAL AREAS

(as a percentage of individuals aged 15–74 who have used the Internet within the last 3 months)



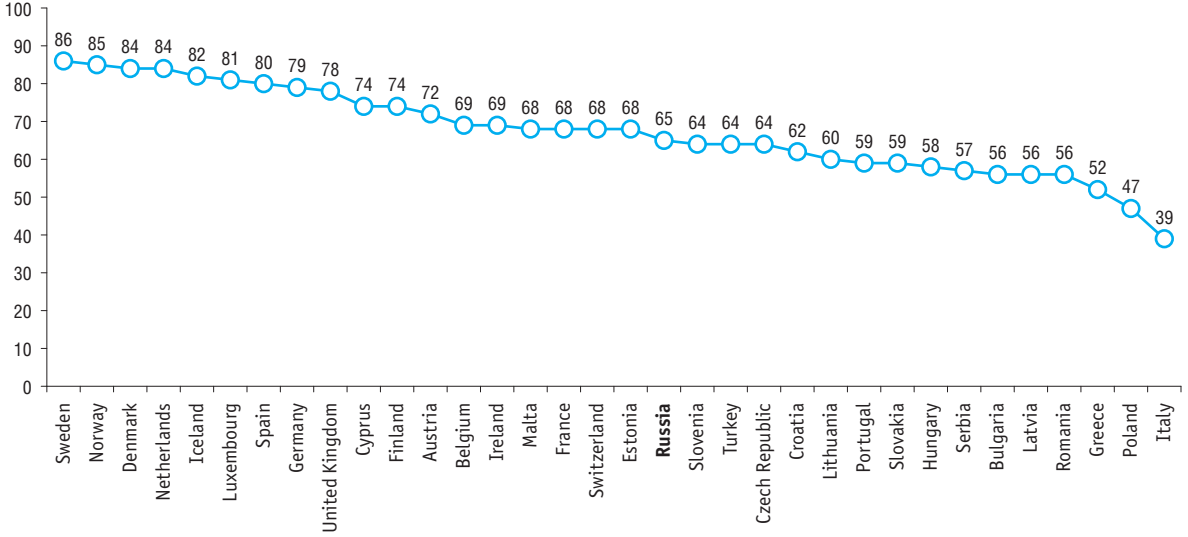
7.10. INDIVIDUALS' USE OF MOBILE DEVICES TO ACCESS THE INTERNET ON THE MOVE OR AT WORK

(as a percentage of individuals aged 15–74)



7.11. INDIVIDUALS' USE OF MOBILE PHONES OR SMARTPHONES TO ACCESS THE INTERNET ON THE MOVE OR AT WORK BY COUNTRY: 2018

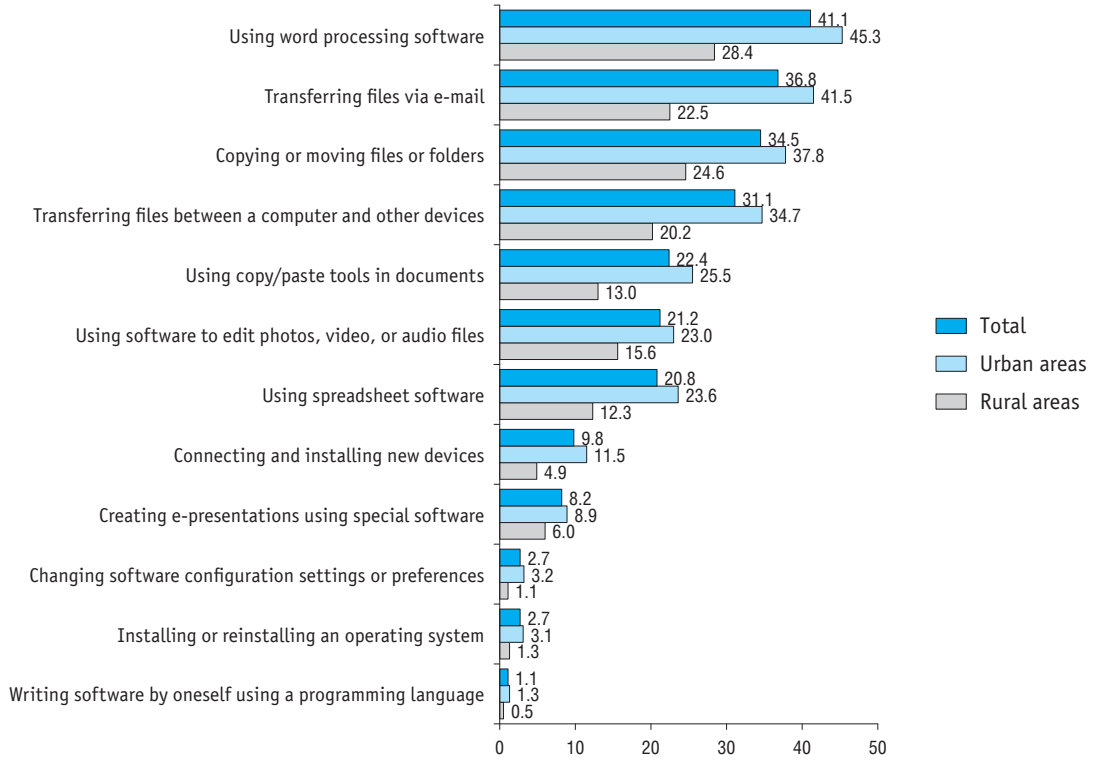
(as a percentage of individuals aged 15–74)*



* For countries other than Russia: aged 16–74.

7.12. DIGITAL SKILLS: 2018

(as a percentage of individuals aged 15 and over)



7.13. DIGITAL SKILLS BY AGE: 2018

(as a percentage of individuals in each age group)

	Total (aged 15 and over)	Of which within the following age groups, *years*						
		15–24	25–34	35–44	45–54	55–64	65–74	75 and over
Using word processing software	41.1	69.0	54.0	50.3	43.1	28.0	12.3	2.4
Transferring files via e-mail	36.8	51.3	52.7	47.7	39.5	24.7	9.6	1.6
Copying or moving files or folders	34.5	59.7	48.1	43.4	35.5	20.5	7.4	1.4
Transferring files between a computer and other devices	31.1	53.0	47.1	39.3	29.3	17.2	6.3	0.9
Using copy/paste tools in documents	22.4	39.8	31.8	28.5	22.7	12.5	3.8	0.7
Using software to edit photos, video, or audio files	21.2	43.2	33.6	25.0	17.2	9.8	3.5	0.6
Using spreadsheet software	20.8	41.3	28.3	25.8	21.2	11.3	2.5	0.4
Connecting and installing new devices	9.8	18.1	16.3	12.0	8.4	4.4	1.3	0.4
Creating e-presentations using special software	8.2	27.3	10.1	7.8	6.0	2.7	0.6	0.2
Changing software configuration settings or preferences	2.7	5.0	5.2	3.1	2.1	0.9	0.2	0.03
Installing or reinstalling an operating system	2.7	4.7	5.2	3.1	2.1	0.8	0.3	0.1
Writing software by oneself using a programming language	1.1	2.4	2.1	1.2	0.7	0.3	0.1	0.02

7.14. DIGITAL SKILLS BY COUNTRY: 2018*

*(as a percentage of individuals aged 15 and over**)*

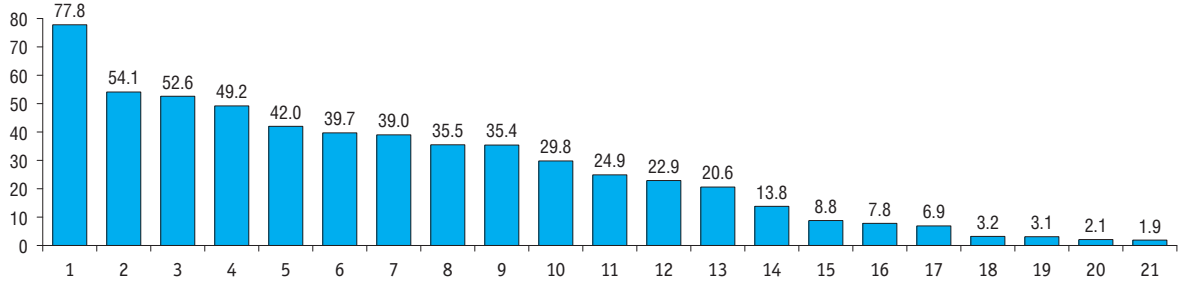
	Transferring files between a computer and other devices	Using spreadsheet software	Using software to edit photos, video, or audio files	Changing software configuration settings or preferences		Transferring files between a computer and other devices	Using spreadsheet software	Using software to edit photos, video, or audio files	Changing software configuration settings or preferences
Russia	**31**	**21**	**21**	**3**	Latvia	66	31	15	17
Austria	63	46	49	37	Lithuania	57	41	41	26
Belgium	56	45	32	19	Luxembourg	74	69	56	45
Bulgaria	44	16	10	9	Malta	49	40	34	24
Croatia	42	32	18	33	Netherlands	67	57	48	39
Cyprus	49	24	30	30	Norway	57	57	48	36
Czech Republic	66	44	27	27	Poland	49	28	31	32
Denmark	60	56	47	38	Portugal	47	38	37	16
Estonia	54	43	36	38	Romania	62	14	14	10
Finland	67	51	54	54	Serbia	38	24	18	26
France	60	40	33	23	Slovakia	62	42	27	19
Germany	64	40	46	42	Slovenia	53	45	32	18
Greece	50	39	16	17	Spain	54	36	37	24
Hungary	52	35	27	28	Sweden	53	51	47	40
Iceland	73	71	45	57	Switzerland	61	61	48	24
Ireland	38	34	24	31	Turkey	37	30	22	20
Italy	43	31	25	17	United Kingdom	58	49	50	43

* Or nearest years for which data are available.

** For countries other than Russia: aged 16–74.

7.15. INDIVIDUALS' INTERNET ACTIVITIES: 2018

(as a percentage of individuals aged 15–74 who have used the Internet within the last 3 months)



1 – participation in social media
2 – searching for information about goods and services
3 – making online telephone/video calls (e.g., via Skype, etc.)
4 – downloading movies, images, music; viewing videos; listening to music/radio
5 – sending/receiving e-mails
6 – acquiring information and knowledge on general topics via Wikipedia, other online encyclopedias, etc.
7 – financial transactions
8 – searching for health-related information or healthcare services
9 – uploading personal files (books, articles, photos, videos, software, etc.) to publicly accessible websites, social media, or cloud storage
10 – playing/downloading video or computer games
11 – buying/selling goods or services (including via online auction platforms)
12 – reading/downloading online newspapers, magazines, or e-books
13 – communicating via instant messenging services
14 – searching for information about cultural sites or events, etc.
15 – searching for information about education, courses, trainings, etc.
16 – searching for a job
17 – downloading software (excluding computer games)
18 – participating in polls or surveys on social or political issues
19 – e-learning
20 – participating in professional networks or forums
21 – posting one's opinions on social and poilitical issues on websites

7.16. INDIVIDUALS' INTERNET ACTIVITIES BY COUNTRY: 2018*

*(as a percentage of individuals aged 15–74 who have used the Internet within the last 3 months**)*

	Related to communications			Related to accessing digital content	
	Participating in social media	Making online telephone/ video calls	Sending/receiving e-mails	Playing/downloading video or computer games	Reading/downloading online newspapers, magazines, or e-books
Russia	**78**	**53**	**42**	**30**	**23**
Austria	61	45	89	21	71
Belgium	82	44	90	43	64
Bulgaria	79	83	62	22	74
Croatia	72	69	79	28	91
Cyprus	82	74	64	35	80
Czech Republic	64	49	93	29	91
Denmark	81	69	96	43	86
Estonia	69	49	91	27	90
Finland	71	46	94	40	90
France	48	35	88	33	61
Germany	57	57	92	38	74
Greece	73	61	75	31	87
Hungary	86	60	91	40	85
Iceland	92	56	96	28	95
Ireland	73	46	84	31	65
Italy	63	47	77	27	56
Japan	89	53	84	…	61
Latvia	74	62	84	26	84

* Or nearest years for which data are available.

** For countries other than Russia: aged 16–74.

(continued)

	Related to communications			Related to accessing digital content	
	Participating in social media	Making online telephone/ video calls	Sending/receiving e-mails	Playing/downloading video or computer games	Reading/downloading online newspapers, magazines, or e-books
Lithuania	73	74	76	28	93
Luxembourg	66	49	87	32	88
Malta	85	59	82	38	83
Netherlands	69	61	97	47	80
Norway	84	57	96	32	93
Poland	64	44	78	23	79
Portugal	79	46	84	39	80
Romania	86	51	59	33	69
Serbia	70	67	53	28	75
Slovakia	74	51	84	26	77
Slovenia	61	50	88	26	77
South Korea	72	50	57	…	94
Spain	67	38	80	34	77
Sweden	76	58	94	34	88
Switzerland	56	46	94	:	79
Turkey	84	69	45	35	68
United Kingdom	74	51	92	35	72
United States	76	48	91	…	…

(continued)

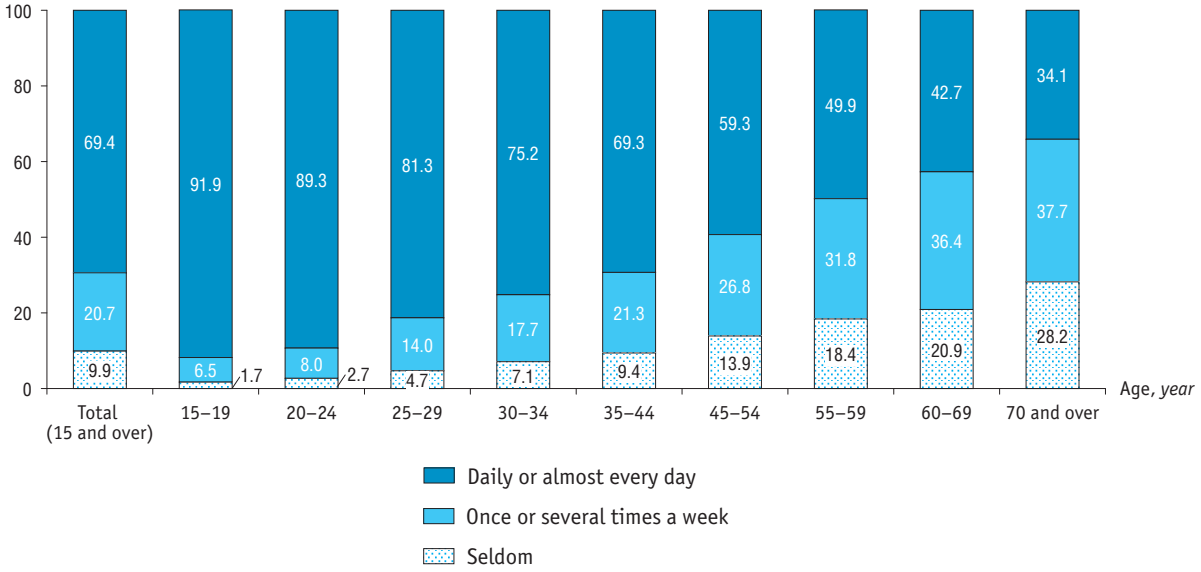
	Other activities			
	Searching for health-related information or healthcare services	Uploading personal files to publicly accessible websites, social media, or cloud storage	Financial transactions	Looking for a job or sending a job application
Russia	**36**	**35**	**39**	**8**
Austria	59	26	67	13
Belgium	52	25	78	17
Bulgaria	38	46	11	10
Croatia	68	37	54	19
Cyprus	67	67	39	17
Czech Republic	64	42	72	6
Denmark	68	52	92	24
Estonia	67	43	90	23
Finland	74	30	94	31
France	52	30	72	19
Germany	69	34	64	20
Greece	65	46	38	22
Hungary	74	54	54	18
Iceland	63	70	95	22
Ireland	57	49	70	14
Italy	47	31	46	19
Japan	…	…	16	…
Latvia	44	39	79	20

(continued)

	Other activities			
	Searching for health-related information or healthcare services	Uploading personal files to publicly accessible websites, social media, or cloud storage	Financial transactions	Looking for a job or sending a job application
Lithuania	68	48	76	16
Luxembourg	55	49	70	19
Malta	72	62	62	26
Netherlands	76	54	94	26
Norway	68	39	96	26
Poland	61	29	57	15
Portugal	60	60	52	20
Romania	43	45	10	13
Serbia	55	45	20	20
Slovakia	61	33	62	20
Slovenia	61	36	53	17
South Korea	51	53	66	15
Spain	64	42	57	23
Sweden	68	50	91	29
Switzerland	68	30	70	28
Turkey	69	61	40	10
United Kingdom	61	55	78	25
United States	47	17	68	22

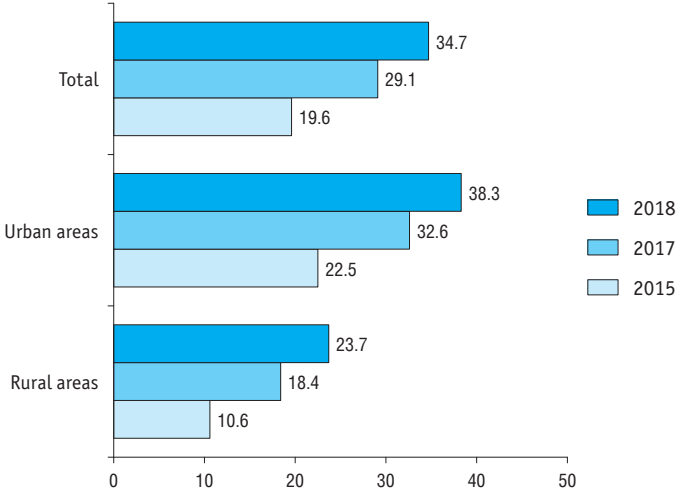
7.17. INTERNET USERS WHO SOCIALISE ONLINE BY AGE: 2018

(as a percentage of individuals in each age group who socialise online)



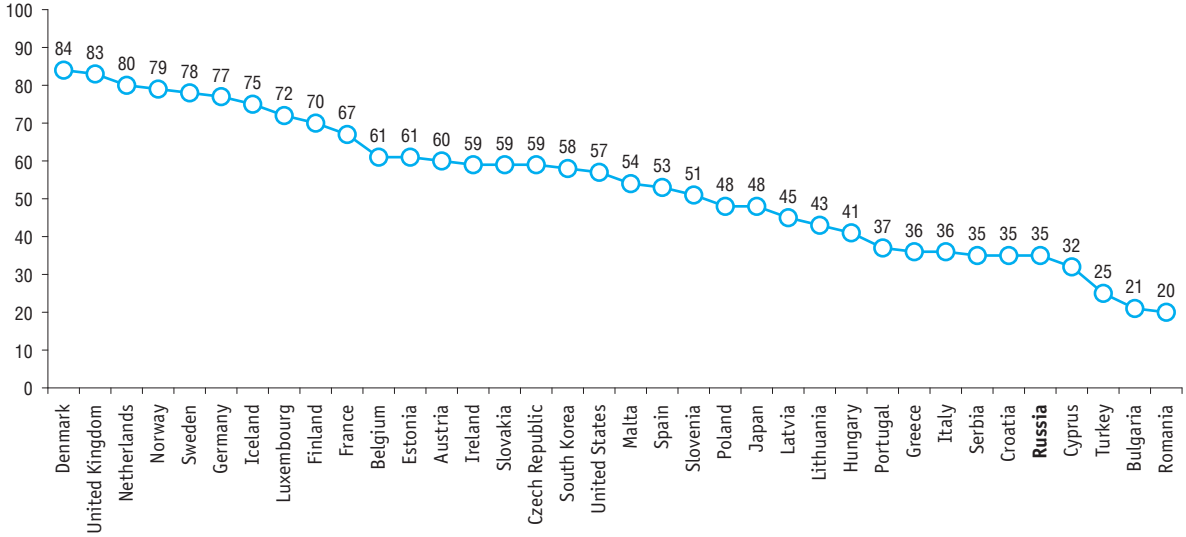
7.18. INDIVIDUALS' INTERNET ACTIVITIES RELATED TO ORDERING GOODS OR SERVICES ONLINE IN URBAN AND RURAL AREAS

(as a percentage of individuals aged 15–74)



7.19. INDIVIDUALS' INTERNET ACTIVITIES RELATED TO ORDERING GOODS OR SERVICES ONLINE BY COUNTRY: 2018*

*(as a percentage of individuals aged 15–74**)*

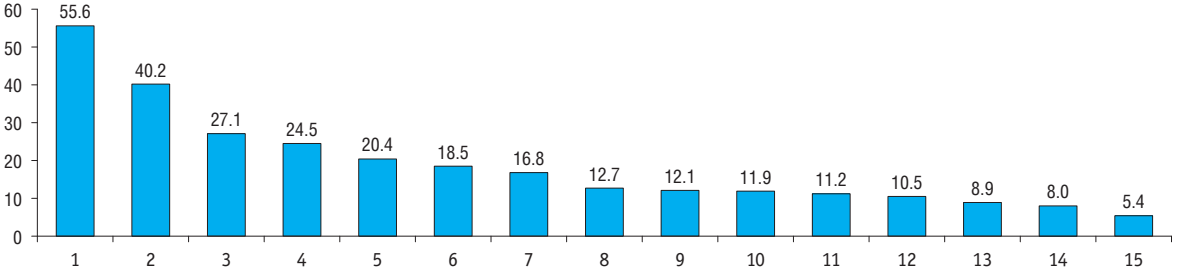


* Or nearest years for which data are available.

** For countries other than Russia: aged 16–74.

7.20. INDIVIDUALS' INTERNET ACTIVITIES RELATED TO ORDERING GOODS OR SERVICES ONLINE BY TYPE: 2018

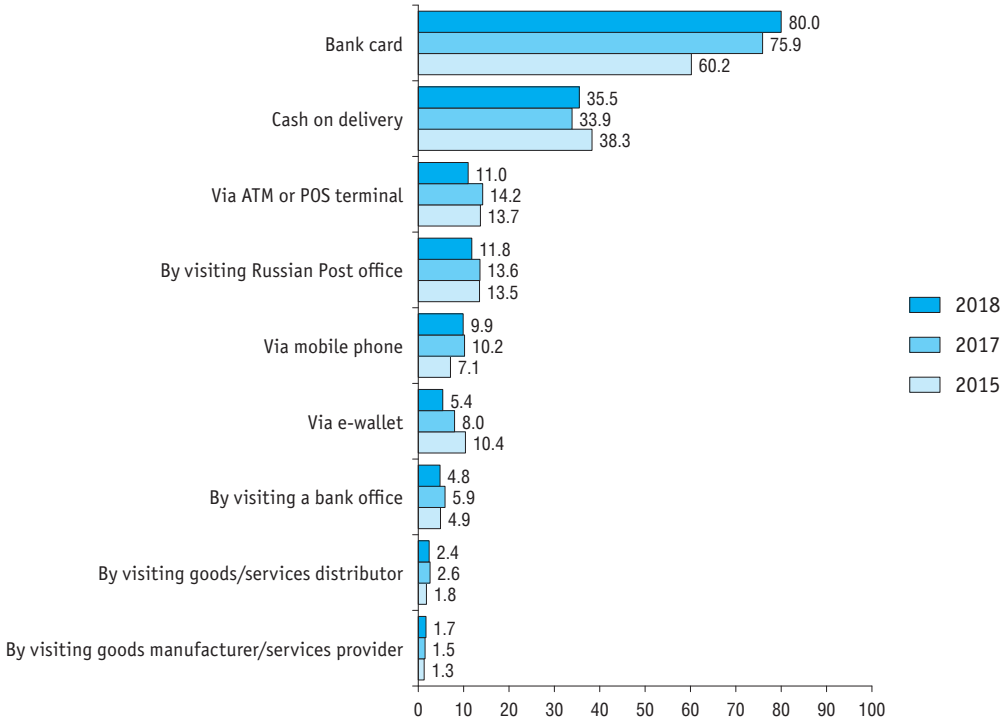
(as a percentage of individuals aged 15–74 who order goods or services online)



1 – clothing, footwear, and sporting goods
2 – financial services
3 – household items
4 – telecommunication services
5 – tickets to entertainment events
6 – travel services
7 – consumer electronics
8 – medicine
9 – computer equipment
10 – food and groceries
11 – books, magazines, and newspapers (including e-books, e-magazines, and online newspapers)
12 – movies and music
13 – creative arts & crafts and hobby items
14 – computer games and their updates
15 – software (including updates)

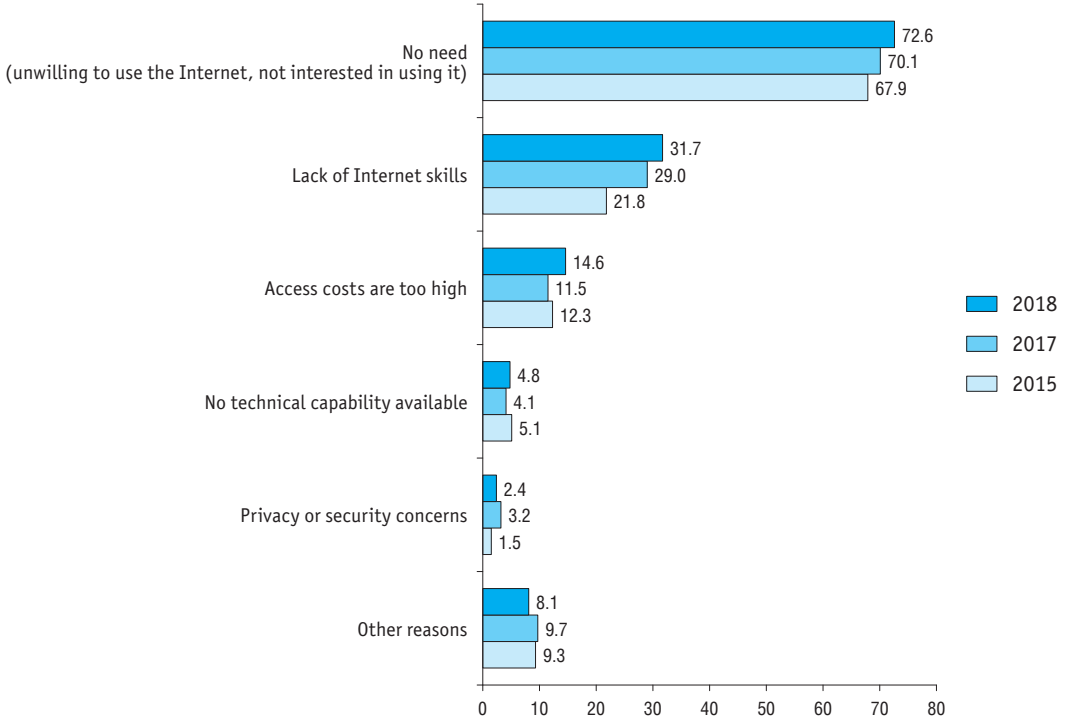
7.21. INDIVIDUALS' PAYMENT METHODS FOR ORDERED GOODS AND SERVICES ONLINE

(as a percentage of individuals aged 15–74 who order goods or services online)



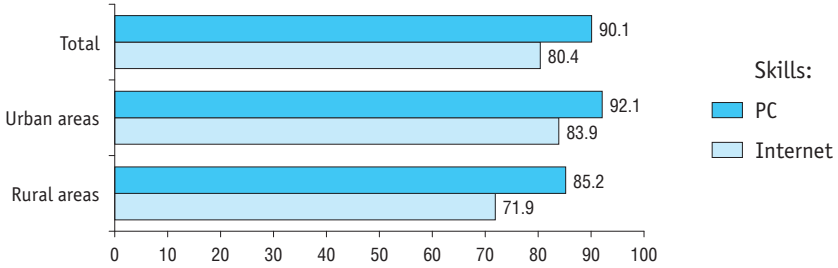
7.22. FACTORS HAMPERING HOUSEHOLDS' USE OF INTERNET

(as a percentage of individuals aged 15–74 who have not used the Internet or used it over 12 months ago)



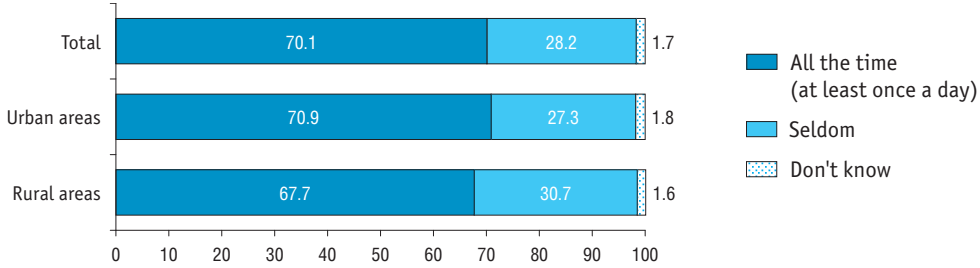
7.23. CHILDREN'S INTERNET ACTIVITIES AND USE OF COMPUTERS: 2018

(as a percentage of children under 15 who attend public schools)



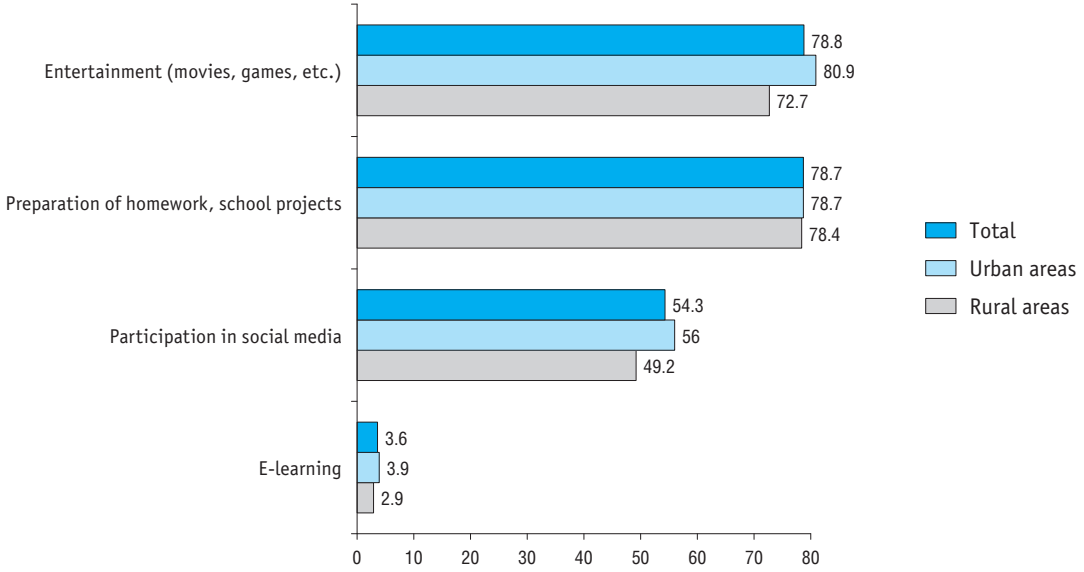
7.24. CHILDREN'S USE OF INTERNET: 2018

(as a percentage of children under 15 who attend public schools with Internet access)



7.25. CHILDREN'S INTERNET ACTIVITIES IN URBAN AND RURAL AREAS: 2018

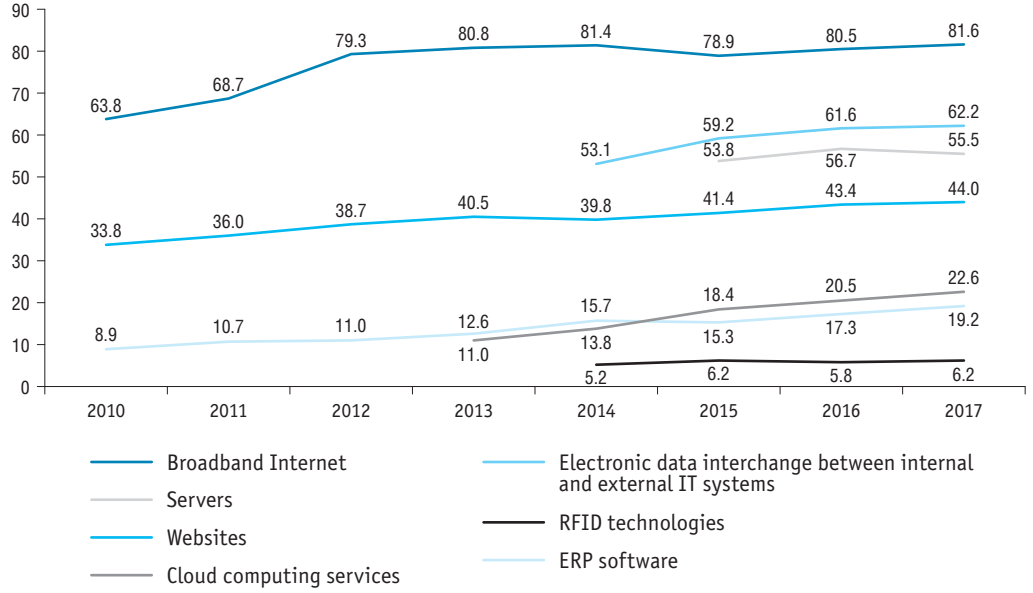
(as a percentage of children under 15 who attend public schools and use the Internet)



Business Digitalisation

8.1. ENTERPRISES' USE OF ICT

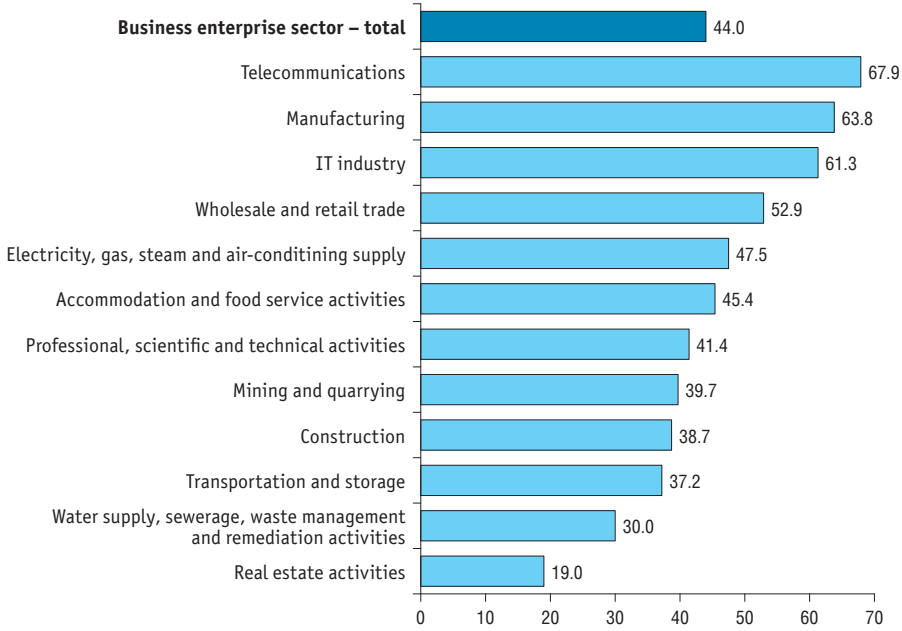
(as a percentage of all business enterprise sector units)



Sources: (here and below in this section): for Russia, HSE ISSEK estimates based on Rosstat data; for countries other than Russia, OECD and Eurostat.

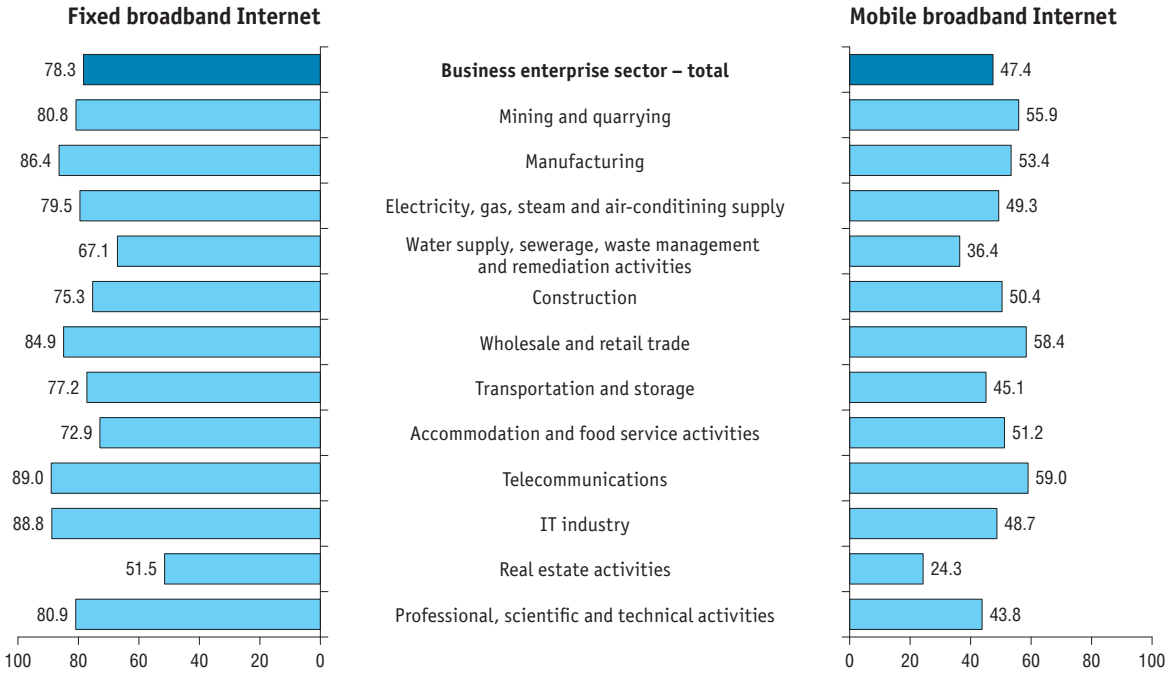
8.2. ENTERPRISES WITH A WEBSITE BY TYPE OF ECONOMIC ACTIVITY: 2017

(as a percentage of all business enterprise sector units)



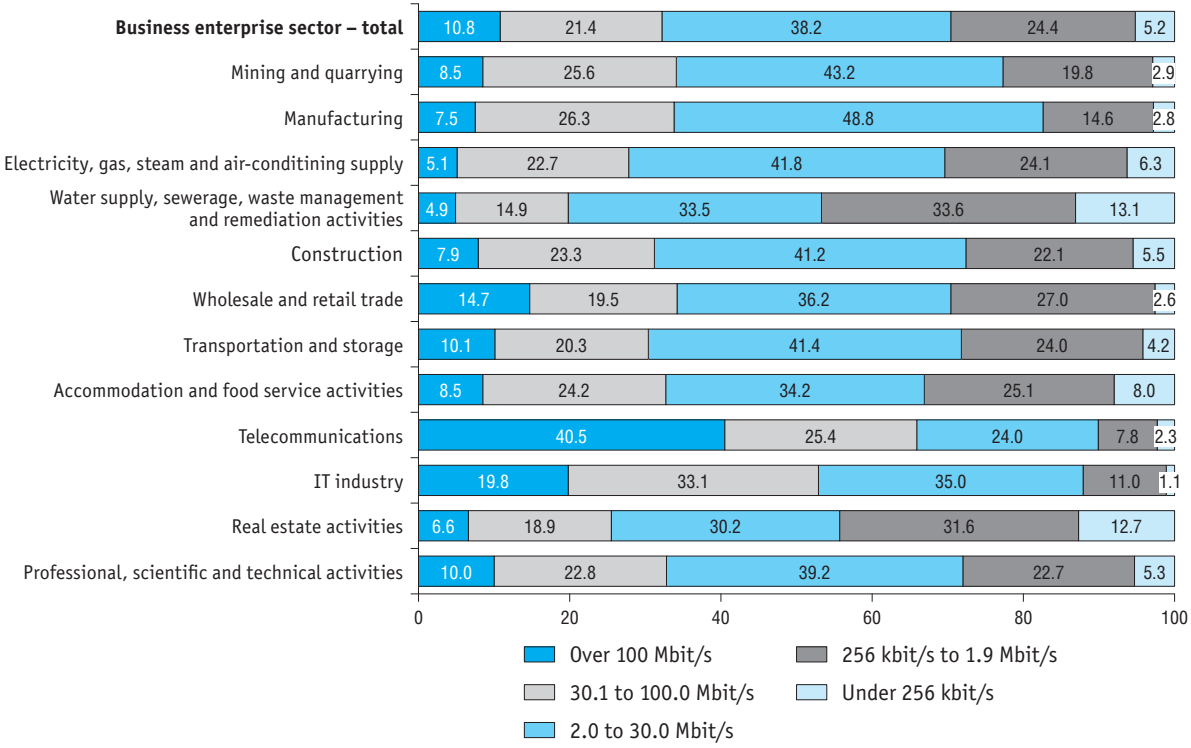
8.3. ENTERPRISES' USE OF FIXED OR MOBILE BROADBAND INTERNET BY TYPE OF ECONOMIC ACTIVITY: 2017

(as a percentage of all business enterprise sector units)



8.4. PERCENTAGE DISTRIBUTION OF ENTERPRISES BY TOP ACCESS SPEED AND TYPE OF ECONOMIC ACTIVITY: 2017

(as a percentage of business enterprise sector units using the Internet)



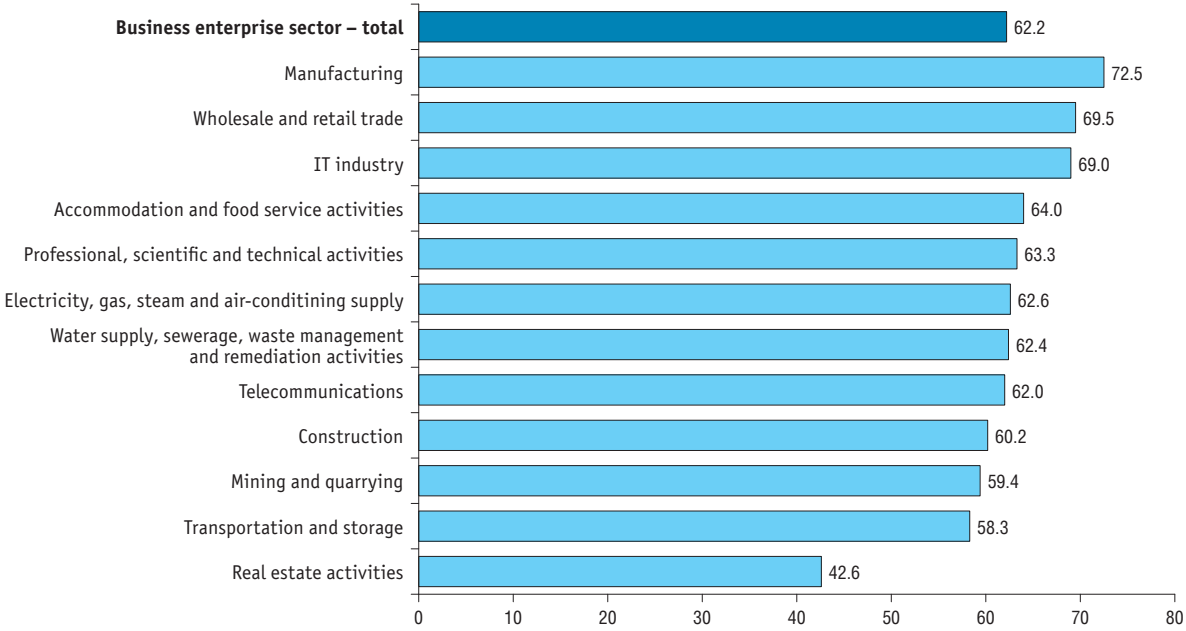
8.5. ENTERPRISES' USE OF CLOUD COMPUTING SERVICES BY TYPE OF ECONOMIC ACTIVITY: 2017

(as a percentage of all business enterprise sector units)

	Total	By type of use			
		accessing software provided by cloud computing service provider	uploading own software	database and file storage	e-mails
Business enterprise sector – total	**22.6**	**11.4**	**5.0**	**11.8**	**16.3**
Telecommunications	38.7	23.2	17.4	21.8	21.7
IT industry	34.8	17.4	10.3	21.3	25.4
Wholesale and retail trade	27.0	14.6	8.1	16.3	18.0
Manufacturing	25.7	13.1	4.1	13.3	19.7
Accommodation and food service activities	23.0	11.8	4.9	11.1	18.2
Professional, scientific and technical activities	22.1	10.2	3.7	10.4	16.4
Construction	22.0	9.0	3.4	10.5	16.7
Water supply, sewerage, waste management and remediation activities	21.3	10.0	2.8	8.9	18.2
Transportation and storage	19.5	9.1	5.4	9.6	14.2
Mining and quarrying	17.4	7.8	3.5	9.3	10.6
Electricity, gas, steam and air-conditioning supply	16.3	7.6	2.6	7.4	11.0
Real estate activities	15.4	7.5	2.1	6.5	12.1

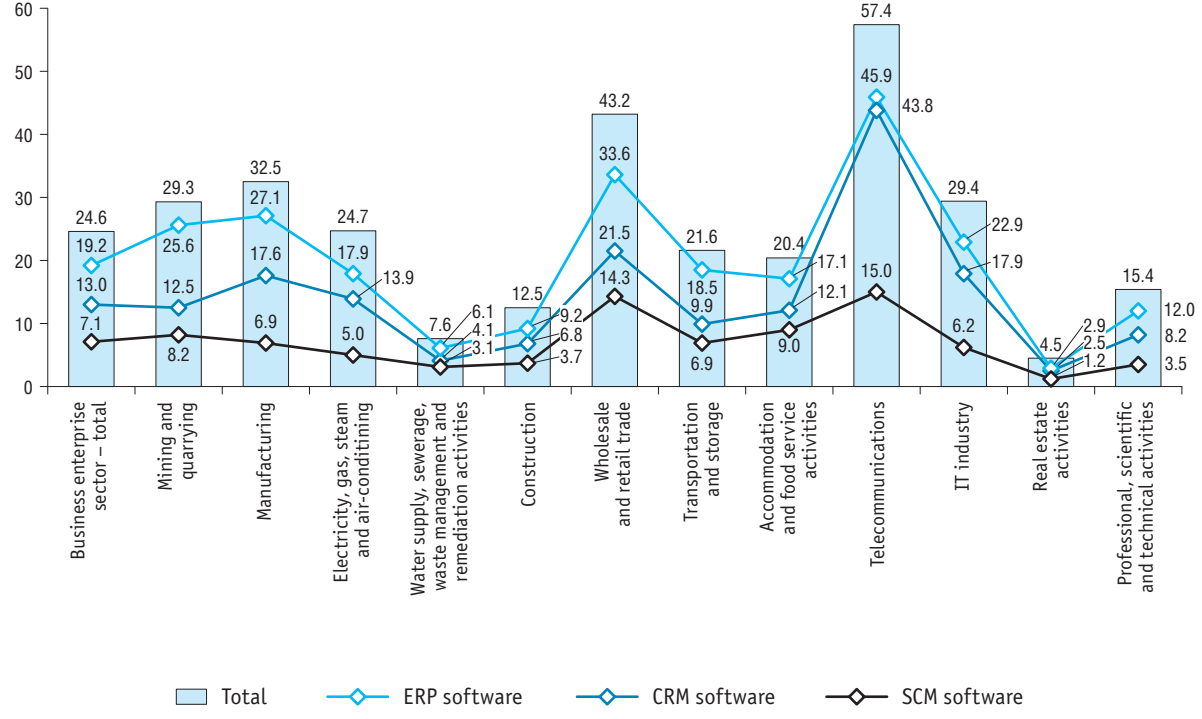
8.6. ENTERPRISES' USE OF ELECTRONIC DATA INTERCHANGE BETWEEN INTERNAL AND EXTERNAL IT SYSTEMS BY TYPE OF ECONOMIC ACTIVITY: 2017

(as a percentage of all business enterprise sector units)



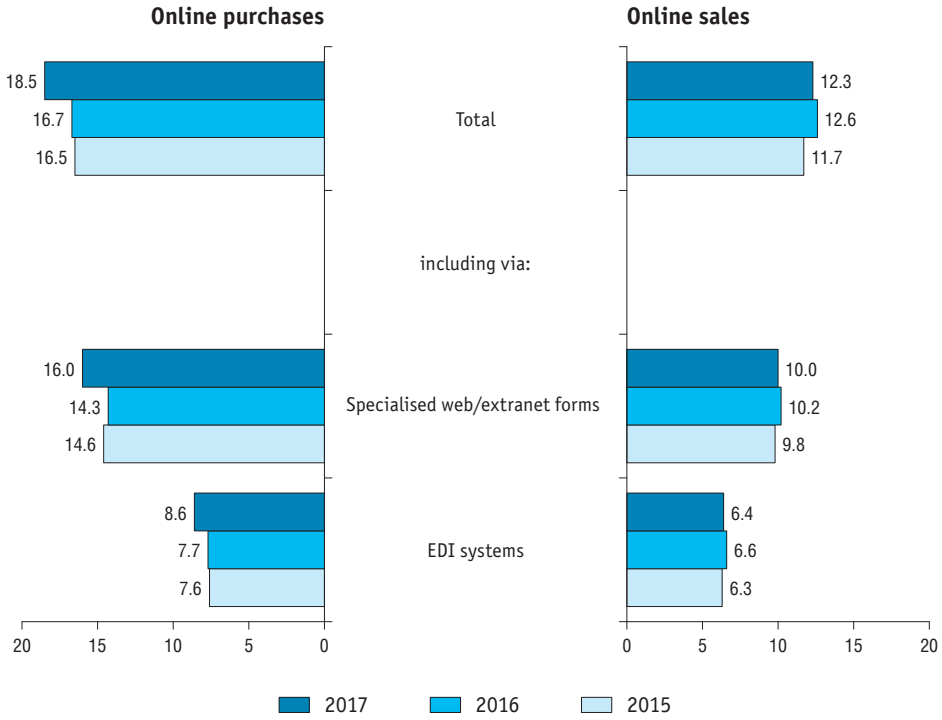
8.7. ENTERPRISES' USE OF CRM, ERP, SCM SOFTWARE BY TYPE OF ECONOMIC ACTIVITY: 2017

(as a percentage of all business enterprise sector units)



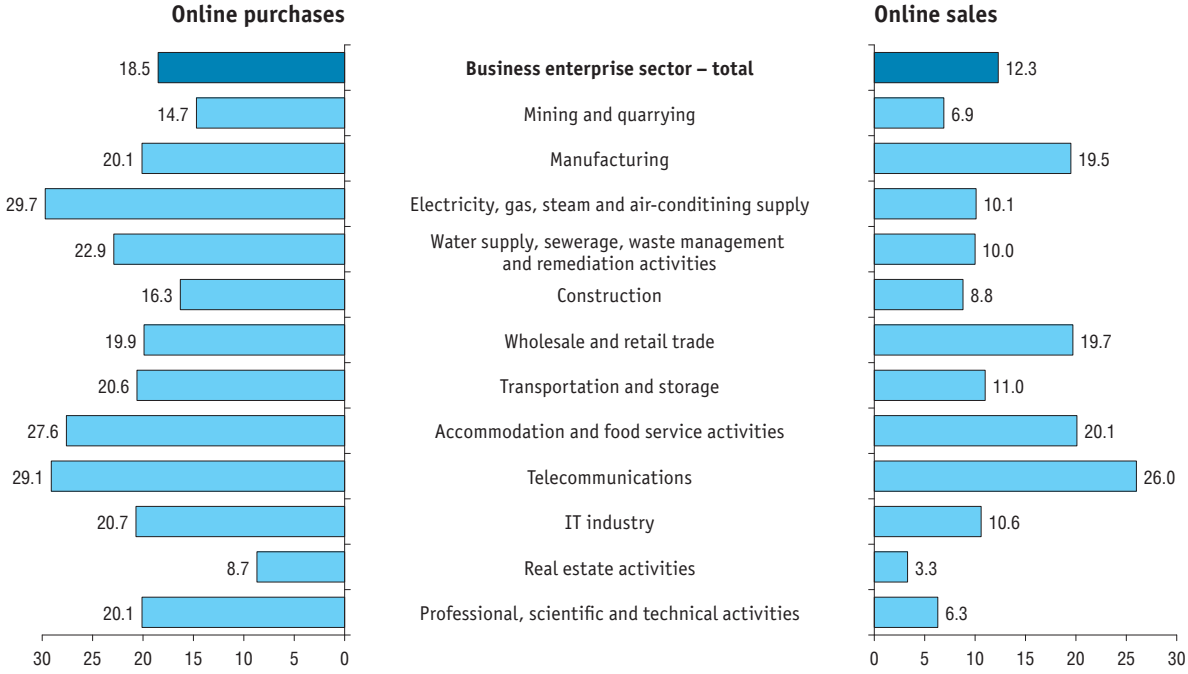
8.8. ENTERPRISES' ONLINE PURCHASES AND SALES BY TYPE OF TRANSACTION TECHNOLOGY

(as a percentage of all business enterprise sector units)



8.9. ENTERPRISES' ONLINE PURCHASES AND SALES BY TYPE OF ECONOMIC ACTIVITY: 2017

(as a percentage of all business enterprise sector units)



8.10. ENTERPRISES' USE OF SPECIALISED SOFTWARE BY TYPE OF ECONOMIC ACTIVITY: 2017

(as a percentage of all business enterprise sector units)

	Electronic document management systems	Electronic payment transactions	Computer-aided management systems	Legal reference systems	Procurement and sales management systems	Access to databases through global information networks
Business enterprise sector – total	**62.3**	**53.7**	**52.7**	**50.4**	**41.0**	**27.5**
Mining and quarrying	63.6	55.6	58.7	63.2	34.9	24.0
Manufacturing	67.7	69.3	66.4	68.1	52.0	28.9
Electricity, gas, steam and air-conditioning supply	74.1	63.3	62.6	66.0	47.4	31.4
Water supply, sewerage, waste management and remediation activities	59.5	52.3	44.3	39.7	35.4	24.9
Construction	60.1	57.1	51.7	55.1	28.7	22.4
Wholesale and retail trade	65.0	52.4	53.7	49.7	59.6	33.7
Transportation and storage	67.8	55.3	61.4	58.7	39.9	26.1
Accommodation and food service activities	60.4	58.0	50.9	47.1	49.0	34.1
Telecommunications	72.7	64.0	72.1	70.9	56.1	44.0
IT industry	74.8	54.8	62.3	60.0	39.7	33.5
Real estate activities	42.0	35.7	32.8	25.2	14.5	15.3
Professional, scientific and technical activities	64.3	56.1	52.0	54.3	30.6	24.4

(continued)

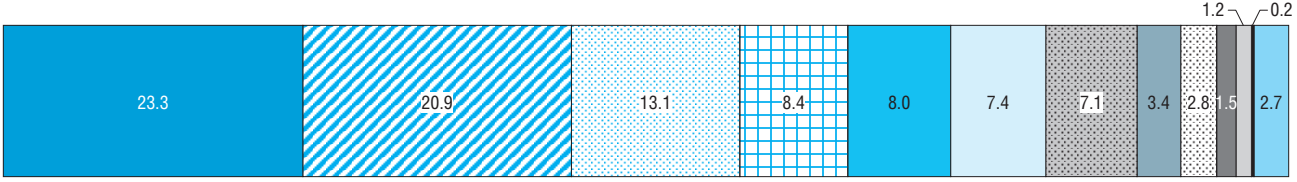
	Plant automation and/or process/unit automation	Computer-aided design	E-learning software	Editorial and publishing software	Research software
Business enterprise sector – total	**20.1**	**17.0**	**15.4**	**6.0**	**3.6**
Mining and quarrying	38.1	29.9	29.4	5.8	4.4
Manufacturing	45.0	35.0	16.8	7.2	6.5
Electricity, gas, steam and air-conditioning supply	29.1	28.5	25.2	4.1	1.6
Water supply, sewerage, waste management and remediation activities	12.7	10.0	8.4	3.2	2.2
Construction	17.4	35.8	10.4	4.6	2.6
Wholesale and retail trade	17.5	14.7	18.5	5.8	2.5
Transportation and storage	32.3	13.9	27.9	5.1	1.9
Accommodation and food service activities	15.8	8.3	12.0	3.3	1.5
Telecommunications	50.2	37.8	40.6	12.9	2.1
IT industry	18.7	14.0	15.8	6.1	3.8
Real estate activities	4.9	4.7	4.3	1.8	0.8
Professional, scientific and technical activities	13.7	19.4	11.0	6.1	10.6

8.11. ENTERPRISES' EXPENDITURE ON SPECIALISED SOFTWARE BY TYPE OF ECONOMIC ACTIVITY: 2017

(million roubles)

	Total	including Russian software
Business enterprise sector – total	**185641**	**40495**
Mining and quarrying	5716	1127
Manufacturing	23921	8473
Electricity, gas, steam and air-conditioning supply	14844	9434
Water supply, sewerage, waste management and remediation activities	937	480
Construction	3178	1389
Wholesale and retail trade	13823	2996
Transportation and storage	16046	3397
Accommodation and food service activities	419	96
Telecommunications	48675	2889
IT industry	8329	3226
Real estate activities	20840	609
Professional, scientific and technical activities	22833	5294

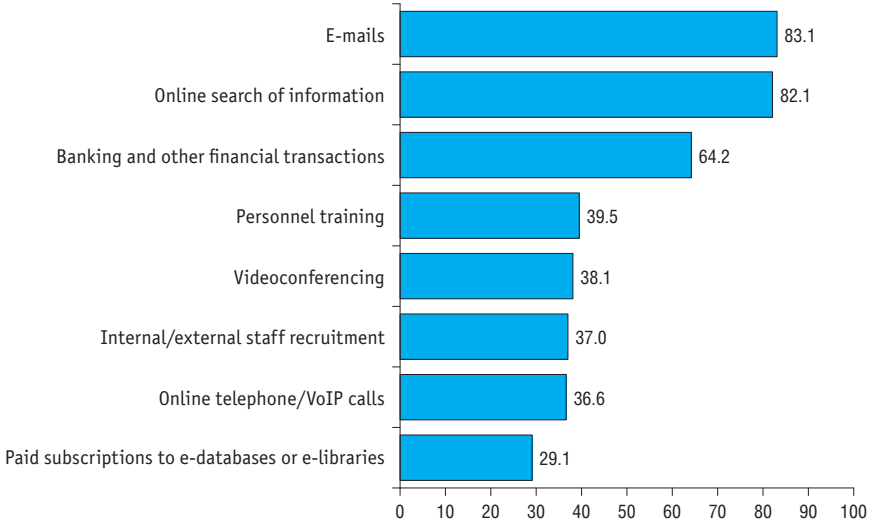
8.12. PERCENTAFE DISTRIBUTION OF ENTERPRISES' EXPENDITURE ON PURCHASE OF RUSSIAN SOFTWARE BY TYPE OF ECONOMIC ACTIVITY: 2017



- Electricity, gas, steam and air-conditining supply
- Manufacturing
- Professional, scientific and technical activities
- Transportation and storage
- IT industry
- Wholesale and retail trade
- Telecommuncations
- Construction
- Mining and quarrying
- Real estate activities
- Water supply, sewerage, waste management and remediation activities
- Accommodation and food service activities
- Other

8.13. ENTERPRISES' USE OF INTERNET: 2017

(as a percentage of all business enterprise sector units)



8.14. ENTERPRISES' USE OF INTERNET BY TYPE OF ECONOMIC ACTIVITY: 2017

(as a percentage of all business enterprise sector units)

	E-mails	Online search of information	Banking and other financial transactions	Personnel training
Business enterprise sector – total	**83.1**	**82.1**	**64.2**	**39.5**
Mining and quarrying	84.6	85.3	63.3	43.8
Manufacturing	92.0	92.0	78.4	45.9
Electricity, gas, steam and air-conditioning supply	87.1	88.7	68.9	48.1
Water supply, sewerage, waste management and remediation activities	79.6	79.7	64.0	29.4
Construction	83.5	84.0	67.5	33.2
Wholesale and retail trade	90.1	84.9	65.8	49.0
Transportation and storage	80.2	81.5	57.5	42.6
Accommodation and food service activities	81.9	81.9	65.8	36.1
Telecommunications	90.0	92.7	68.1	69.5
IT industry	91.9	93.4	63.3	56.7
Real estate activities	59.2	57.8	48.2	15.9
Professional, scientific and technical activities	86.7	87.6	67.3	37.7

(continued)

	Videoconferencing	Internal/external staff recruitment	Online telephone/VoIP calls	Paid subscriptions to e-databases or e-libraries
Business enterprise sector – total	**38.1**	**37.0**	**36.6**	**29.1**
Mining and quarrying	46.3	39.9	43.9	36.1
Manufacturing	46.7	50.6	48.5	41.2
Electricity, gas, steam and air-conditioning supply	42.9	33.3	33.7	33.9
Water supply, sewerage, waste management and remediation activities	16.9	17.2	13.0	20.1
Construction	29.1	35.5	30.2	29.9
Wholesale and retail trade	52.9	55.9	57.7	35.2
Transportation and storage	34.7	33.4	31.2	25.0
Accommodation and food service activities	28.0	33.3	22.7	28.9
Telecommunications	66.7	63.5	61.4	50.6
IT industry	64.5	48.6	56.1	34.9
Real estate activities	10.2	11.2	8.9	11.4
Professional, scientific and technical activities	36.9	28.4	29.5	31.4

8.15. ENTERPRISES' ONLINE INTERACTION WITH SUPPLIERS BY TYPE OF ECONOMIC ACTIVITY: 2017

(as a percentage of all business enterprise sector units)

	Inquiring about goods or services	Informing about enterprise's demand for goods or services	Paying for goods or services	Ordering goods or services	Purchasing electronic products
Business enterprise sector – total	**62.1**	**45.0**	**43.0**	**37.7**	**30.9**
Mining and quarrying	69.0	47.1	41.4	33.7	36.8
Manufacturing	81.2	59.2	54.1	41.9	39.3
Electricity, gas, steam and air-conditioning supply	70.5	57.0	45.6	50.8	40.1
Water supply, sewerage, waste management and remediation activities	56.5	39.7	44.8	34.3	23.9
Construction	66.1	43.1	45.9	30.1	28.3
Wholesale and retail trade	69.3	54.4	49.3	48.0	37.3
Transportation and storage	63.0	44.4	38.4	36.7	28.9
Accommodation and food service activities	63.0	50.3	44.8	42.7	25.5
Telecommunications	74.1	59.7	52.0	57.4	49.7
IT industry	75.2	50.6	39.1	40.3	41.2
Real estate activities	32.8	18.8	28.0	14.6	13.1
Professional, scientific and technical activities	60.1	42.2	40.3	37.3	31.1

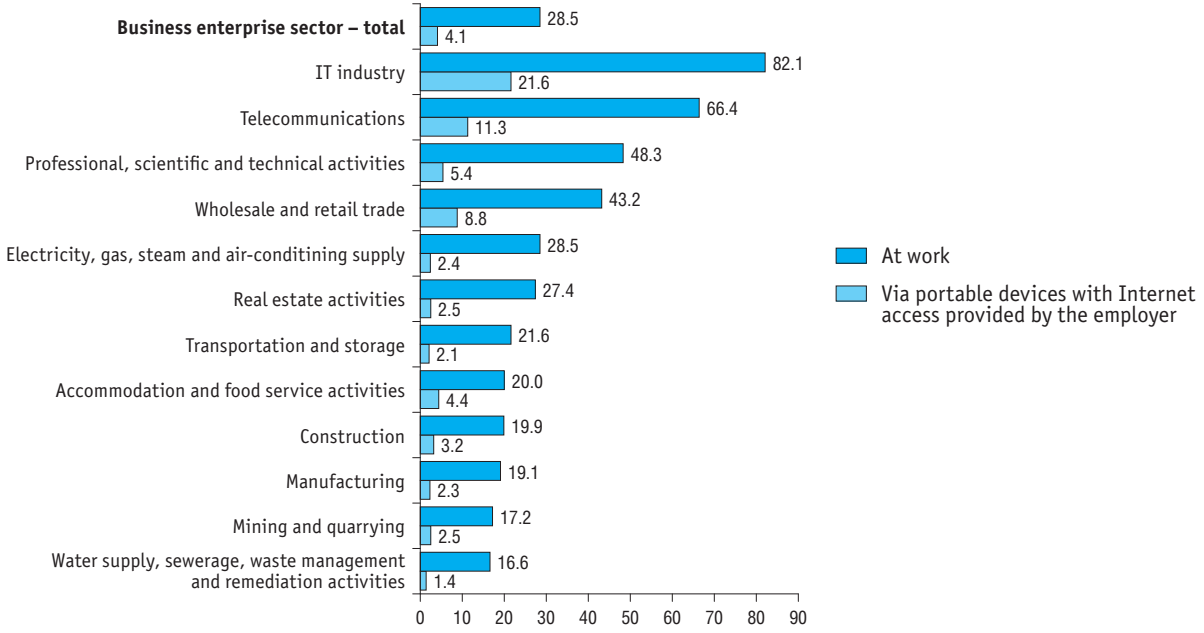
8.16. ENTERPRISES' ONLINE INTERACTION WITH CONSUMERS BY TYPE OF ECONOMIC ACTIVITY: 2017

(as a percentage of all business enterprise sector units)

	Informing about the enterprise and its goods or services	Electronic payment transactions	Receiving orders for goods or services	Aftersale support	Selling electronic products
Business enterprise sector – total	**49.9**	**30.8**	**26.0**	**8.2**	**6.7**
Mining and quarrying	42.9	26.5	18.9	4.3	2.8
Manufacturing	69.9	41.9	41.0	11.6	6.3
Electricity, gas, steam and air-conditioning supply	57.2	32.5	18.1	5.2	3.8
Water supply, sewerage, waste management and remediation activities	43.8	30.4	15.2	2.8	1.9
Construction	45.3	29.4	22.2	4.7	3.9
Wholesale and retail trade	62.4	43.8	40.9	12.9	9.5
Transportation and storage	44.5	25.7	22.4	6.2	5.7
Accommodation and food service activities	52.4	29.7	25.5	5.8	5.0
Telecommunications	65.5	43.2	44.8	33.3	27.4
IT industry	54.7	23.4	23.3	23.0	19.6
Real estate activities	23.5	15.3	6.9	1.7	1.6
Professional, scientific and technical activities	42.6	21.4	16.6	5.3	5.4

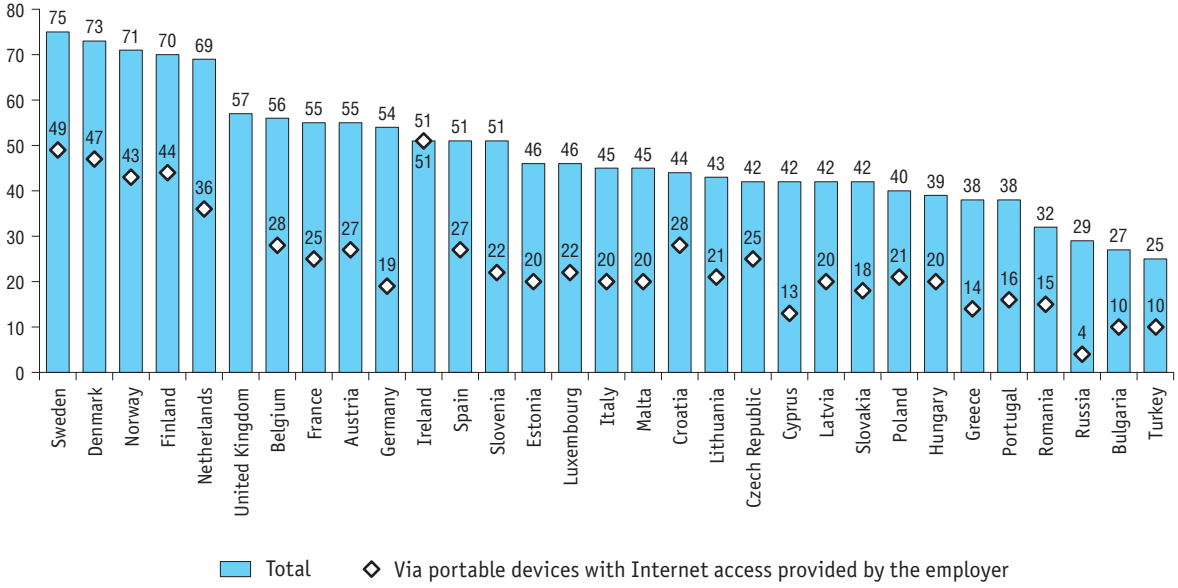
8.17. EMPLOYEES' USE OF INTERNET BY ENTERPRISES' TYPE OF ECONOMIC ACTIVITY: 2017

(as a percentage of all business enterprise sector employees)



8.18. EMPLOYEES' USE OF INTERNET BY COUNTRY: 2017*

(as a percentage of all business enterprise sector employees)



* Or nearest years for which data are available.

8.19. ENTERPRISES' ICT PENETRATION BY TYPE OF ECONOMIC ACTIVITY: 2017

(enterprises that use ICT as a percentage of all business enterprise sector units)

	Business Digitalisation Index*	Broadband Internet	Cloud computing services	RFID technologies	ERP software	Online sales via specialised web/ extranet forms or EDI systems
Business enterprise sector – total	**28.4**	**81.6**	**22.6**	**6.2**	**19.2**	**12.3**
Mining and quarrying	29.1	85.5	17.4	10.2	25.6	6.9
Manufacturing	34.9	91.6	25.7	10.7	27.1	19.5
Electricity, gas, steam and air-conditioning supply	27.0	84.0	16.3	6.8	17.9	10.1
Water supply, sewerage, waste management and remediation activities	22.4	71.2	21.3	3.5	6.1	10.0
Construction	25.4	81.8	22.0	5.3	9.2	8.8
Wholesale and retail trade	35.7	90.2	27.0	7.8	33.6	19.7
Transportation and storage	27.4	81.1	19.5	7.1	18.5	11.0
Accommodation and food service activities	29.4	78.9	23.0	7.8	17.1	20.1
Telecommunications	42.5	91.5	38.7	10.4	45.9	26.0
IT industry	34.7	93.9	34.8	8.6	22.9	10.6
Real estate activities	15.6	54.4	15.4	1.8	2.9	3.3
Professional, scientific and technical activities	25.7	85.1	22.1	4.6	12.0	6.3

91.0–100 76.0–90.9 61.0–75.9 45.0–60.9 31.0–44.9 20.0–30.9 1.0–19.9

* Here and in table 8.20: Business Digitalisation Index reflects enterprises' use of broadband Internet, cloud computing services, RFID technologies, and ERP software, and enterprises' online trade.

8.20. ENTERPRISES' ICT PENETRATION BY COUNTRY: 2017*

(enterprises that use ICT as a percentage of all business enterprise sector units)

	Business Digitalisation Index	Broadband Internet	Cloud computing services	RFID technologies	ERP software	Online sales via specialised web/ extranet forms or EDI systems
Russia	**28**	**82**	**23**	**6**	**19**	**12**
Austria	39	98	21	19	40	17
Belgium	47	98	40	21	54	24
Brazil	…	97	…	…	27	21
Bulgaria	29	89	8	18	23	7
Croatia	37	95	31	14	26	18
Cyprus	36	96	22	14	35	12
Czech Republic	36	98	22	8	28	24
Denmark	46	100	51	9	40	29
Estonia	35	95	23	12	28	16
Finland	50	100	66	23	39	21
France	36	99	17	11	38	17
Germany	38	95	16	16	38	24
Greece	30	85	11	7	37	11
Hungary	28	91	16	7	14	13
Ireland	40	96	36	11	28	30
Italy	35	96	22	13	37	8

91–100 76–90 61–75 46–60 31–45 20–30 5–19 No data available

* Or nearest years for which data are available.

(continued)

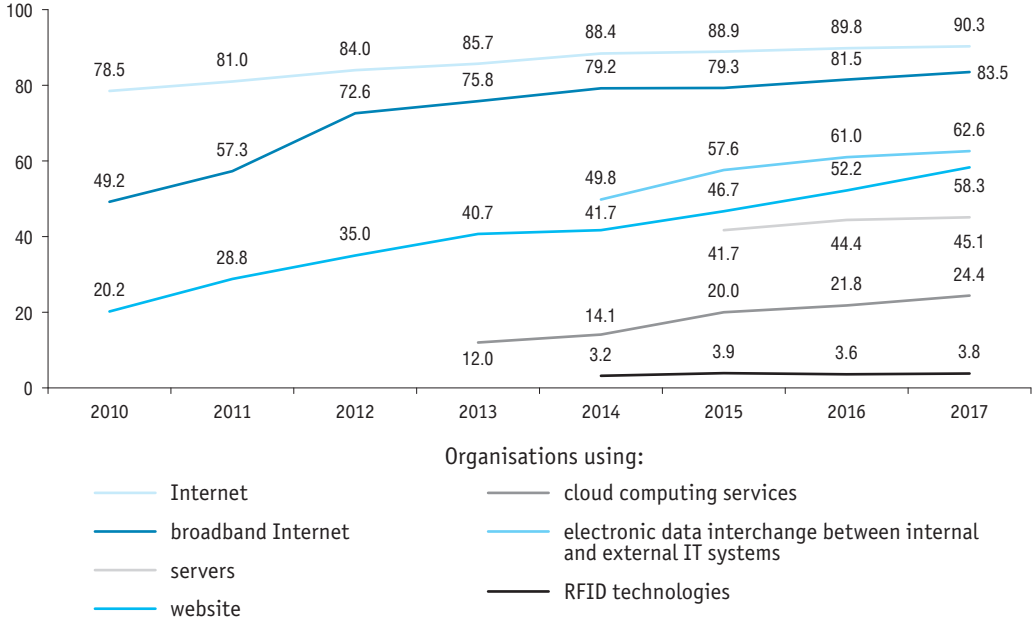
	Business Digitalisation Index*	Broadband Internet	Cloud computing services	RFID technologies	ERP software	Online sales via specialised web/ extranet forms or EDI systems
Japan	46	95	47	18	...	24
Latvia	31	99	12	9	25	11
Lithuania	40	100	23	10	47	22
Luxembourg	37	97	19	18	41	8
Malta	37	95	28	17	30	17
Netherlands	43	100	35	18	48	16
Norway	42	94	48	10	30	29
Poland	30	95	10	9	26	10
Portugal	38	98	23	11	40	18
Romania	25	82	11	7	17	8
Slovakia	36	95	22	18	31	15
Slovenia	37	99	22	15	30	18
South Korea	45	99	...	42	28	11
Spain	41	98	24	15	46	20
Sweden	43	97	48	12	31	29
Turkey	33	95	10	...	14	11
United Kingdom	35	95	35	8	19	20

91–100 76–90 61–75 46–60 31–45 20–30 5–19 No data available

Digitalisation of Social Sphere

9.1. DIGITALISATION OF SOCIAL SPHERE ORGANISATIONS*

(as a percentage of all social sphere organisations)

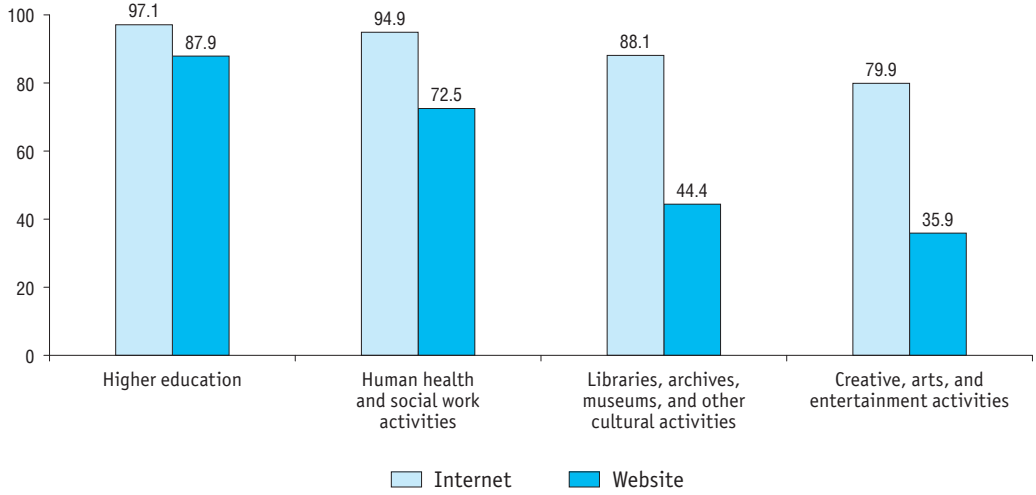


* Includes organisations operating in the following spheres: higher education (OKVED2 code 85.22); human health and social work activities (section Q); creative, arts and entertainment activities (code 90); libraries, archives, museums, and other cultural activities (code 91).

Sources (here and below in this section): HSE ISSEK estimates based on data provided by Rosstat (9.2–9.10), Ministry of Science and Higher Education of the Russian Federation (9.11), Ministry of Culture of the Russian Federation (9.12–9.15).

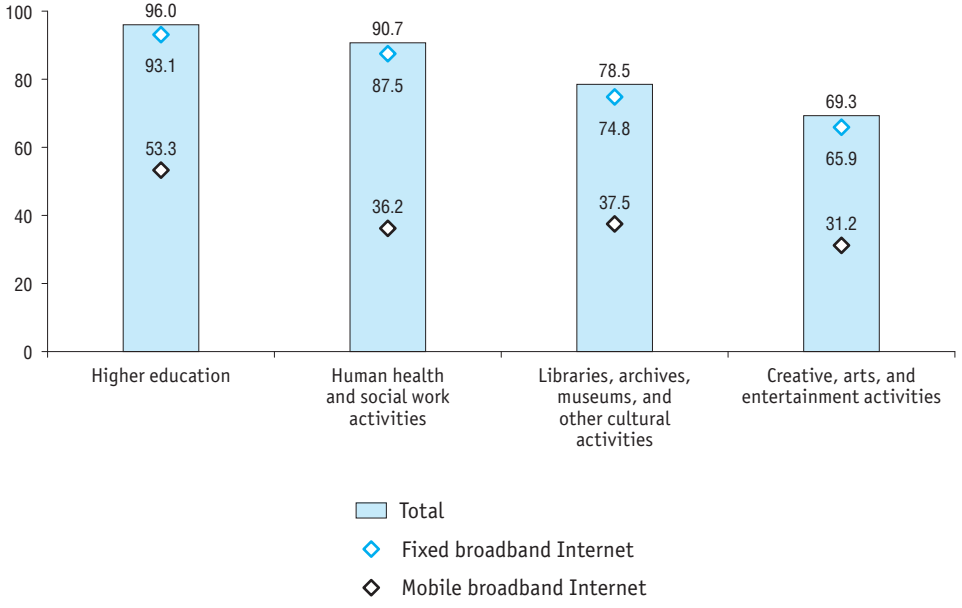
9.2. SOCIAL SPHERE ORGANISATIONS' USE OF INTERNET BY TYPE OF ECONOMIC ACTIVITY: 2017

(as a percentage of all social sphere organisations)



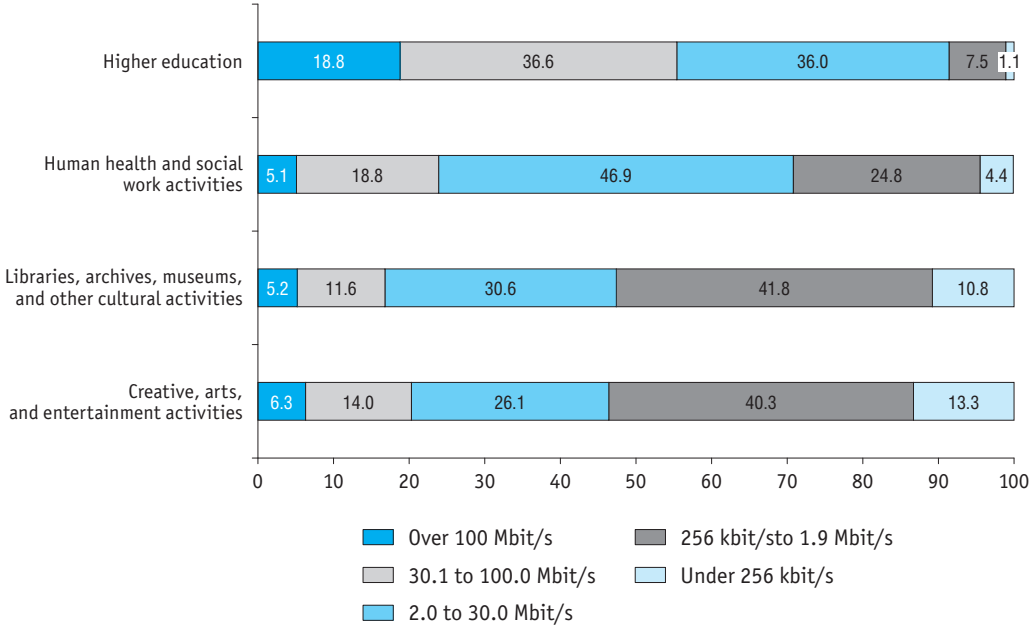
9.3. SOCIAL SPHERE ORGANISATIONS' USE OF BROADBAND INTERNET BY TYPE OF ECONOMIC ACTIVITY: 2017

(as a percentage of all social sphere organisations)



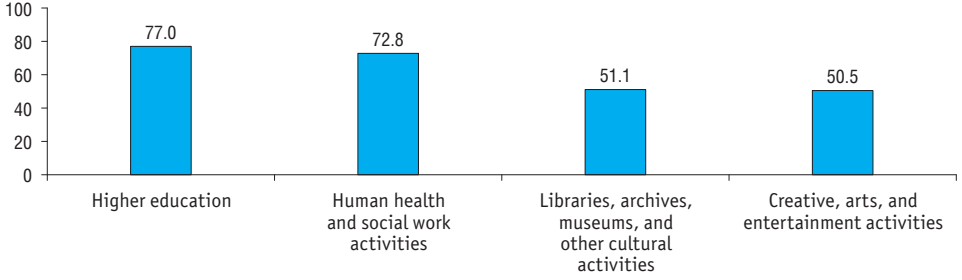
9.4. SOCIAL SPHERE ORGANISATIONS BY TOP ACCESS SPEED AND TYPE OF ECONOMIC ACTIVITY: 2017

(as a percentage of social sphere organisations using the Internet)



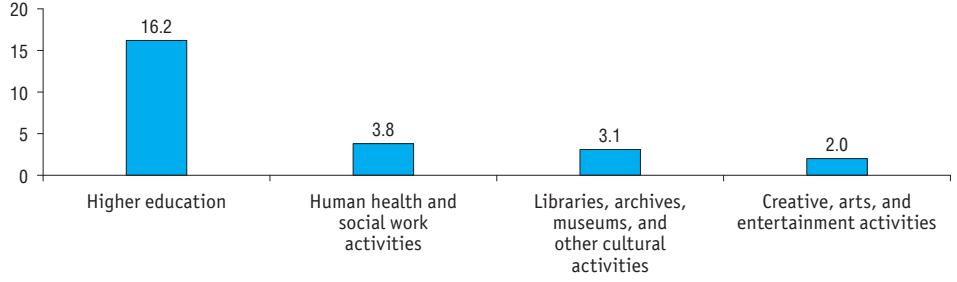
9.5. SOCIAL SPHERE ORGANISATIONS' USE OF ELECTRONIC DATA INTERCHANGE BETWEEN INTERNAL AND EXTERNAL IT SYSTEMS BY TYPE OF ECONOMIC ACTIVITY: 2017

(as a percentage of all social sphere organisations)



9.6. SOCIAL SPHERE ORGANISATIONS' USE OF RFID TECHNOLOGIES BY TYPE OF ECONOMIC ACTIVITY: 2017

(as a percentage of all social sphere organisations)



9.7. SOCIAL SPHERE ORGANISATIONS' USE OF CLOUD COMPUTING SERVICES BY TYPE OF ECONOMIC ACTIVITY: 2017

(as a percentage of all social sphere organisations)

	Total	By type of use			
		e-mails	database and file storage	accessing software provided by cloud computing service provider	uploading own software
Higher education	43.8	33.6	28.0	24.8	7.5
Human health and social work activities	29.5	22.2	12.1	14.6	2.9
Libraries, archives, museums, and other cultural activities	18.2	14.7	7.7	6.5	2.1
Creative, arts, and entertainment activities	16.1	13.0	6.4	5.8	1.7

9.8. SOCIAL SPHERE ORGANISATIONS' USE OF SPECIALISED SOFTWARE BY ECONOMIC ACTIVITY TYPE: 2017

(as a percentage of all social sphere organisations)

	Electronic document management systems	Legal reference systems	Computer-aided management systems	E-learning software	Electronic payment transactions	Access to databases through global information networks	Editorial and publishing software
Higher education	77.6	84.1	80.1	78.6	76.8	46.8	35.1
Human health and social work activities	75.7	61.0	61.9	11.4	69.5	33.4	3.1
Libraries, archives, museums, and other cultural activities	55.6	34.5	34.3	6.8	34.6	27.9	4.8
Creative, arts, and entertainment activities	53.2	24.5	35.3	5.6	35.5	23.4	2.9

9.9. SOCIAL SPHERE ORGANISATIONS' USE OF INTERNET BY TYPE OF ECONOMIC ACTIVITY: 2017

(as a percentage of all social sphere organisations)

	Higher education	Human health and social work activities	Libraries, archives, museums, and other cultural activities	Creative, arts, and entertainment activities
E-mails	96.0	93.6	85.2	75.5
Online search of information	96.2	93.5	85.9	77.3
Banking and other financial transactions	85.1	76.5	37.2	39.0
Personnel training	70.3	55.7	29.7	21.9
Videoconferencing	83.3	52.0	16.3	8.8
Internal/external staff recruitment	48.6	33.0	10.1	8.7
Online telephone/VoIP calls	53.9	23.3	8.4	6.3
Paid subscriptions to e-databases or e-libraries	78.7	29.3	13.9	9.8

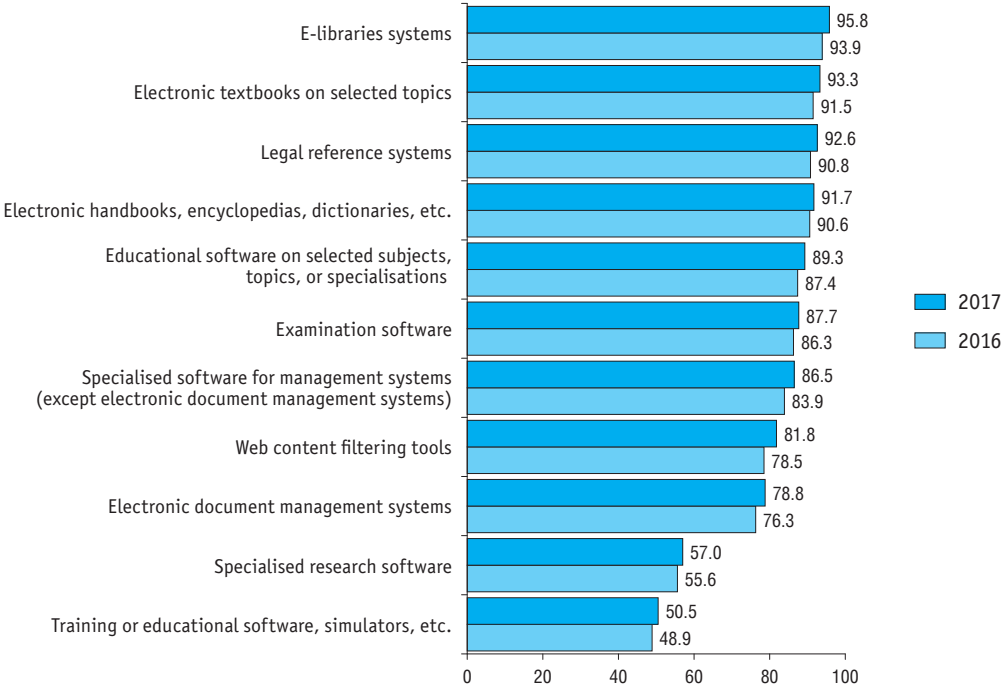
9.10. DIGITALISATION OF HOSPITALS

(as a percentage of all hospitals)

	2010	2012	2013	2014	2015	2016	2017
Internet	86.8	95.4	96.2	96.4	96.9	97.4	96.9
including broadband	56.2	87.5	90.5	91.4	92.1	94.0	95.3
E-mails	81.8	94.3	95.2	91.7	92.5	96.2	96.4
Website	20.7	59.3	69.3	68.3	74.1	80.7	85.1
Electronic data interchange between internal and external IT systems	…	30.8	33.7	62.4	71.8	75.2	76.6
Mobile Internet devices provided by the employer	…	10.8	20.0	25.2	30.7	32.0	31.0
RFID technologies	…	…	…	4.1	4.7	4.9	5.1
Cloud computing services	…	…	18.0	20.7	29.1	30.9	35.2

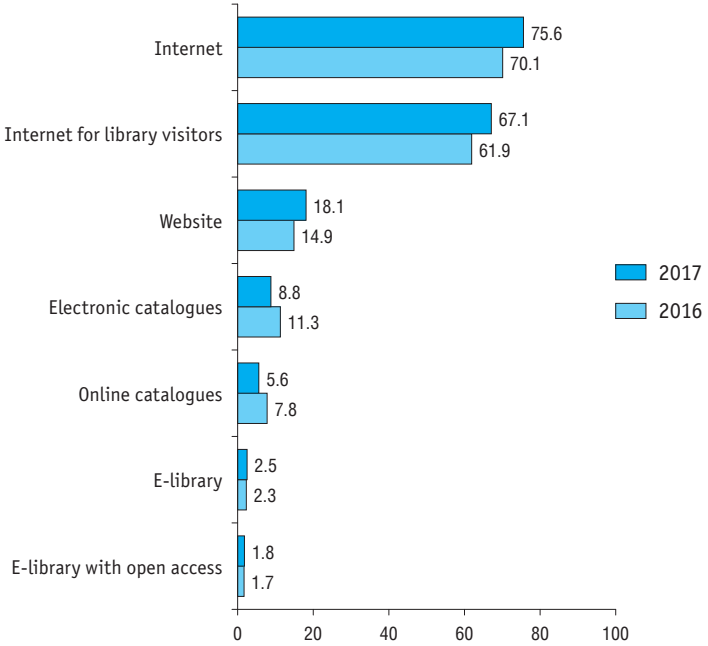
9.11. HIGHER EDUCATION INSTITUTIONS' USE OF SPECIALISED SOFTWARE

(as a percentage of all higher education institutions; at the end of the year)



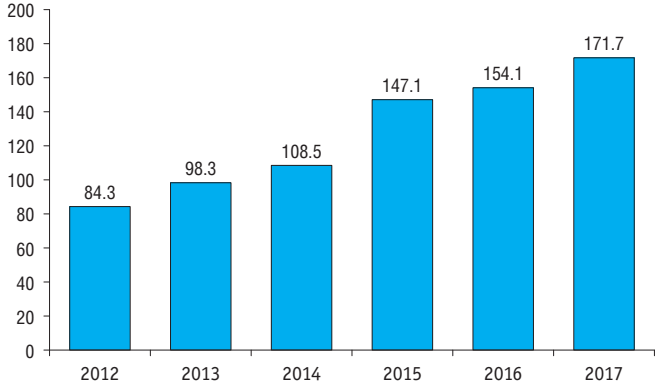
9.12. DIGITALISATION OF LIBRARIES

(as a percentage of all libraries)

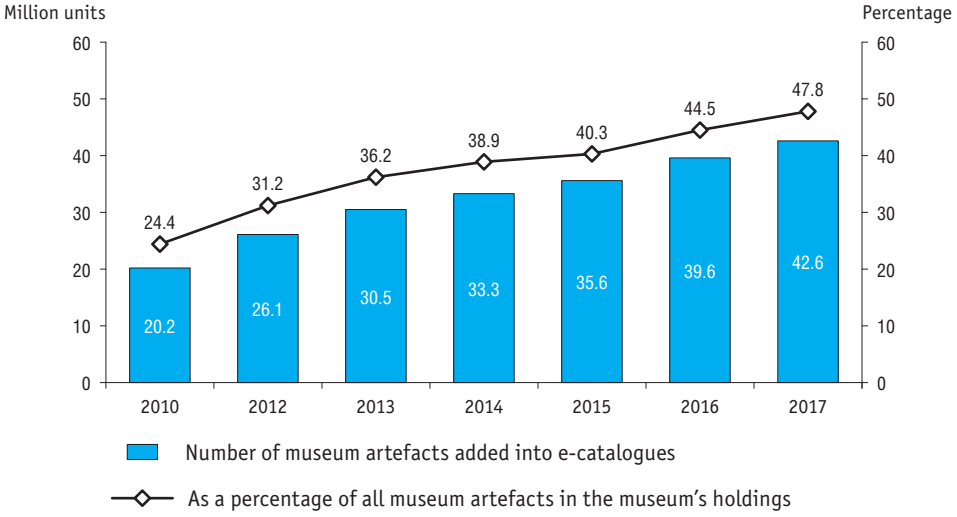


9.13. ONLINE E-LIBRARY CATALOGUES

(million records)

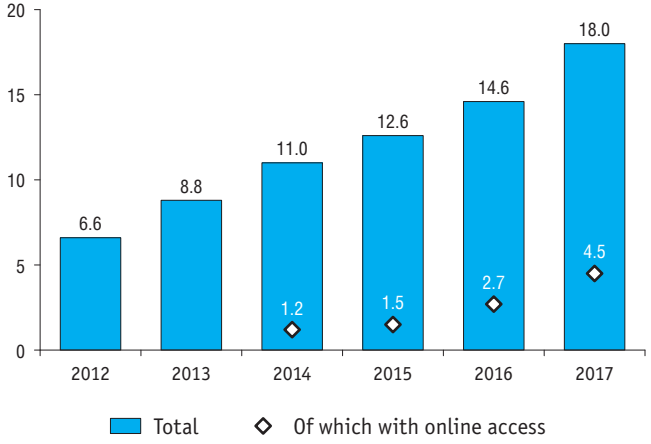


9.14. DIGITALISATION OF MUSEUM CATALOGUES AND HOLDINGS



9.15. MUSEUM ARTEFACTS ADDED INTO E-CATALOGUES AND HAVING DIGITAL IMAGES

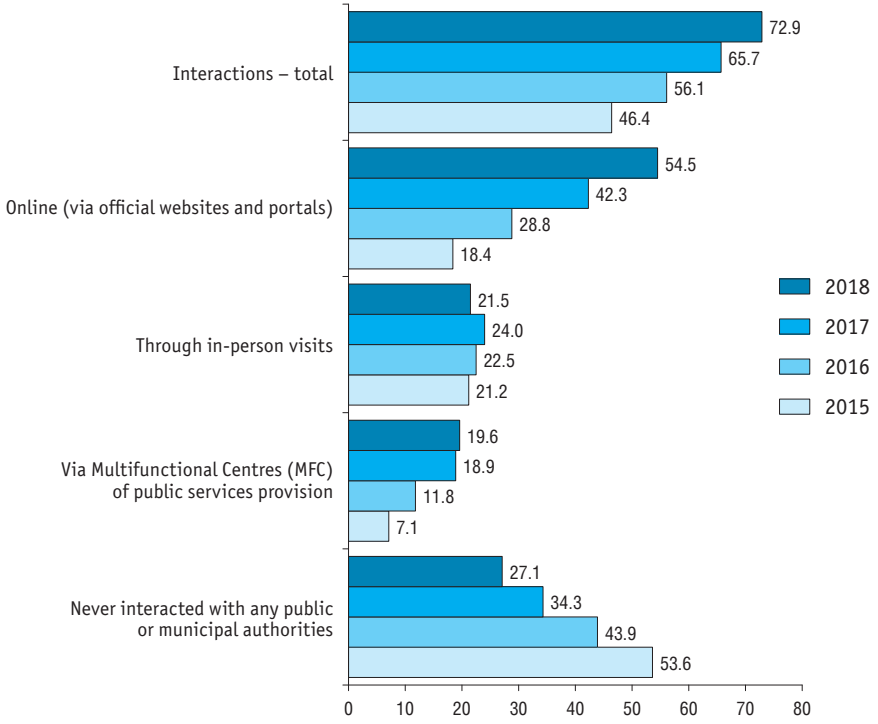
(as a percentage of all museum artefacts in the museum's holdings)



E-Government

10.1. INDIVIDUALS' ONLINE INTERACTION WITH PUBLIC AND MUNICIPAL AUTHORITIES

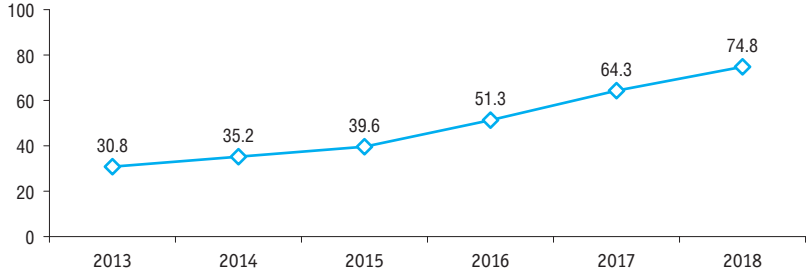
(as a percentage of individuals aged 15–72)



Sources: (here and below in this section): for Russia, Rosstat (10.2–10.7, 10.9–10.11) and HSE ISSEK estimates based on Rosstat data (10.8, 10.12–10.16); for countries other than Russia, Eurostat.

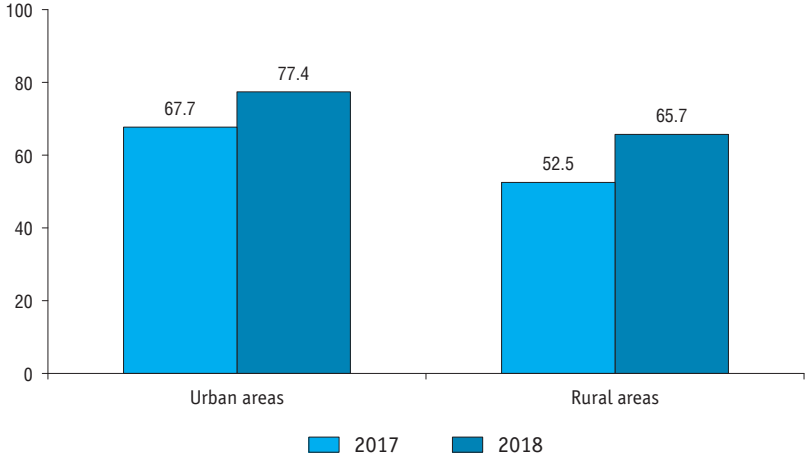
10.2. PUBLIC AND MUNICIPAL SERVICES RECEIVED BY INDIVIDUALS IN DIGITAL FORM

(as a percentage of individuals aged 15–72 who have received public and municipal services)



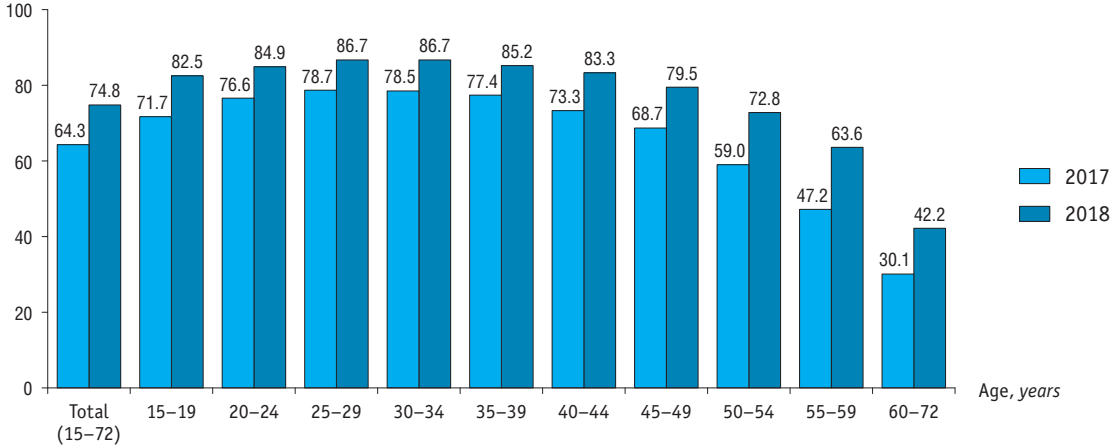
10.3. PUBLIC AND MUNICIPAL SERVICES RECEIVED BY INDIVIDUALS IN DIGITAL FORM IN URBAN AND RURAL AREAS

(as a percentage of individuals aged 15–72 who have received public and municipal services)



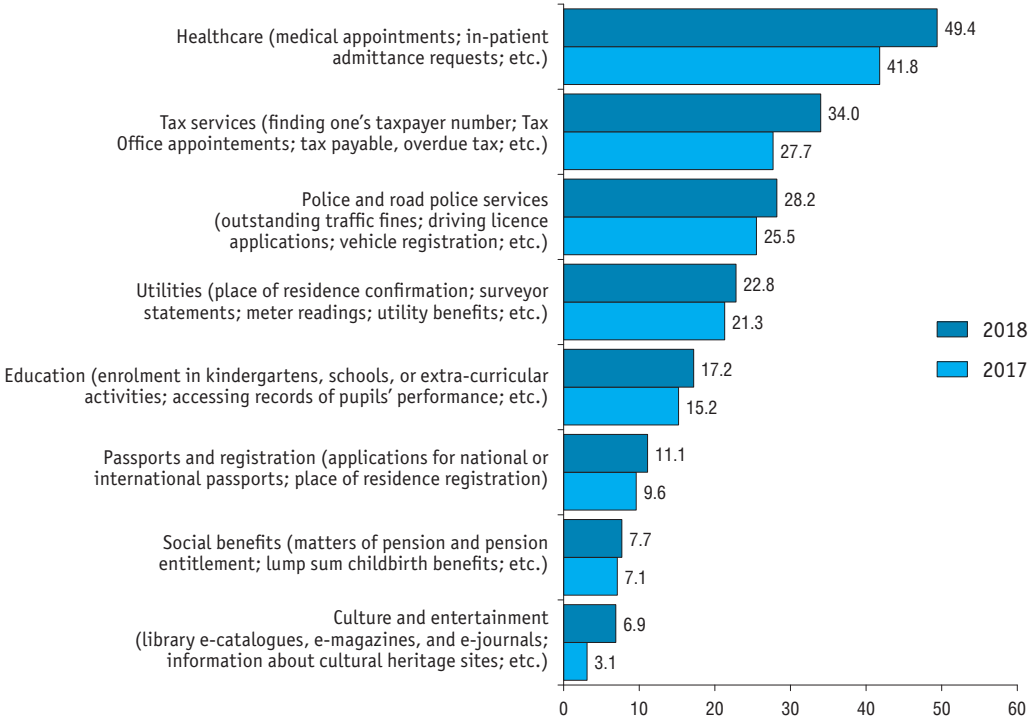
10.4. PUBLIC AND MUNICIPAL SERVICES RECEIVED BY INDIVIDUALS IN DIGITAL FORM BY AGE

(as a percentage of individuals in each age group who have received public and municipal services)



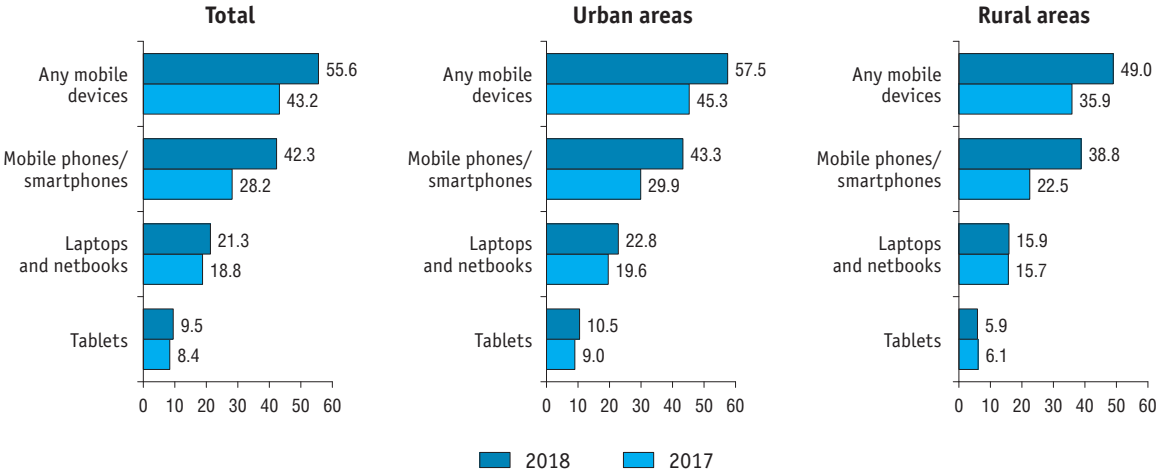
10.5. PUBLIC AND MUNICIPAL SERVICES MOST FREQUENTLY SOUGHT BY INDIVIDUALS IN DIGITAL FORM

(as a percentage of individuals aged 15–72 who have received public and municipal services)



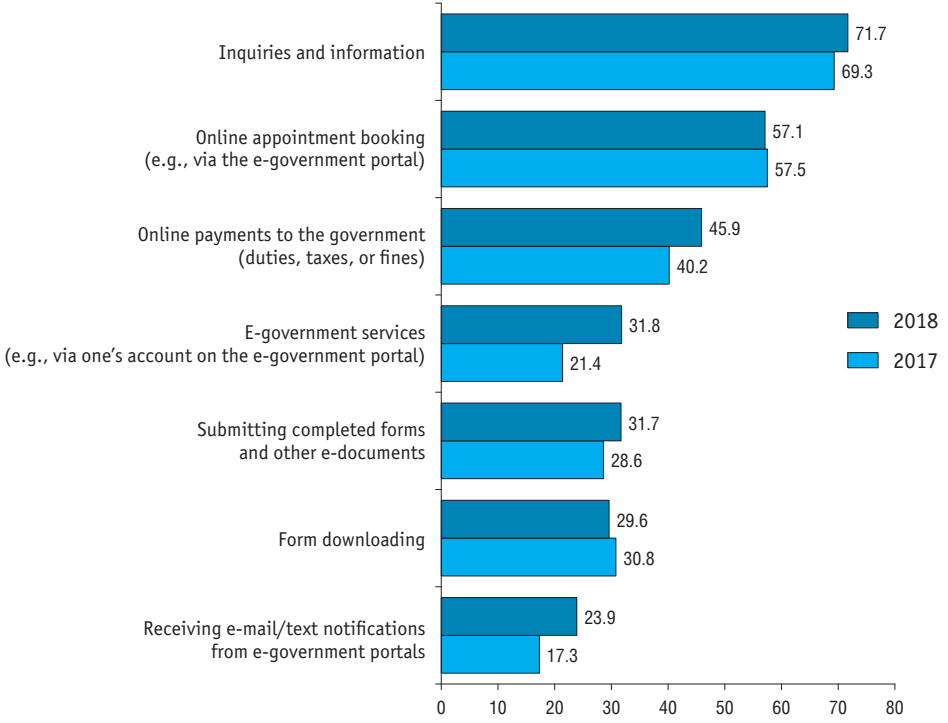
10.6. INDIVIDUALS' USE OF MOBILE DEVICES TO ACCESS OFFICIAL PUBLIC AND MUNICIPAL WEBSITES AND PORTALS IN URBAN AND RURAL AREAS

(as a percentage of individuals aged 15–72 who have received public and municipal services)



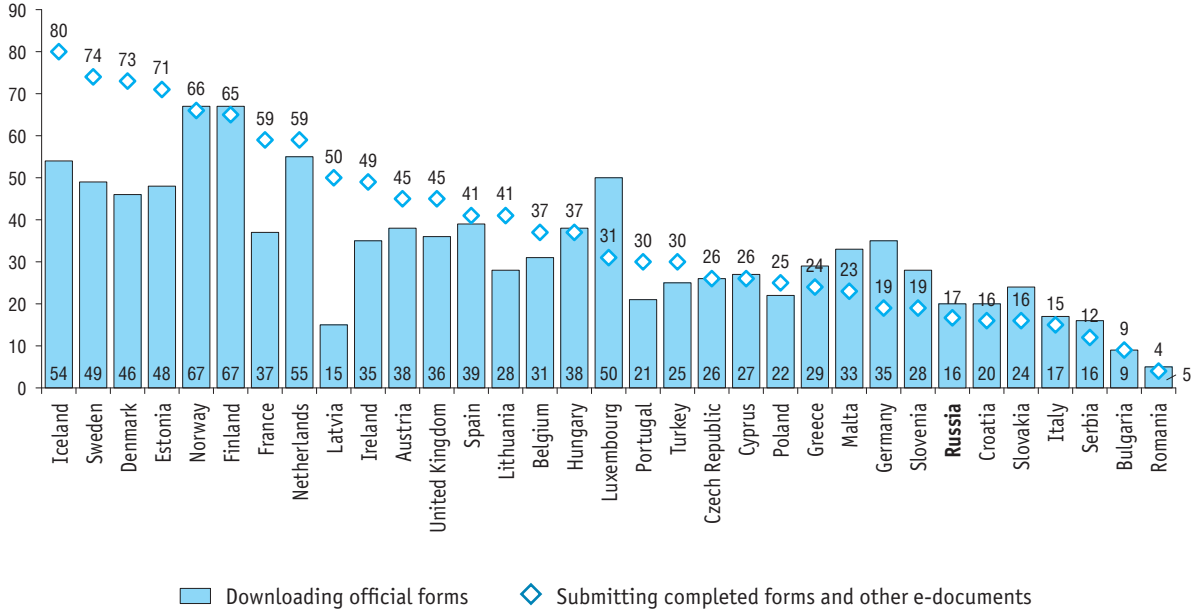
10.7. REASONS FOR INDIVIDUALS' ONLINE INTERACTION WITH PUBLIC AND MUNICIPAL AUTHORITIES

(as a percentage of individuals aged 15–72 who have received public and municipal services)



10.8. INDIVIDUALS' USE OF PUBLIC WEBSITES TO DOWNLOAD/SUBMIT OFFICIAL FORMS BY COUNTRY: 2018

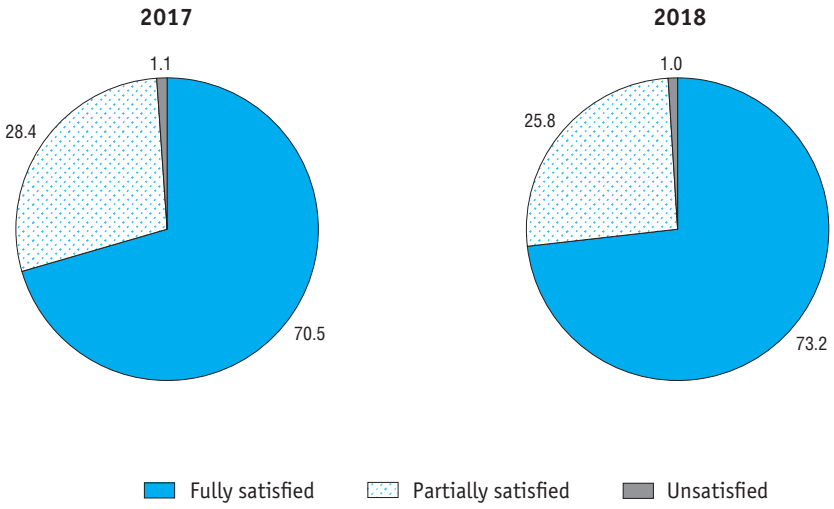
(as a percentage of individuals aged 15–72)*



* For countries other than Russia: aged 16–74.

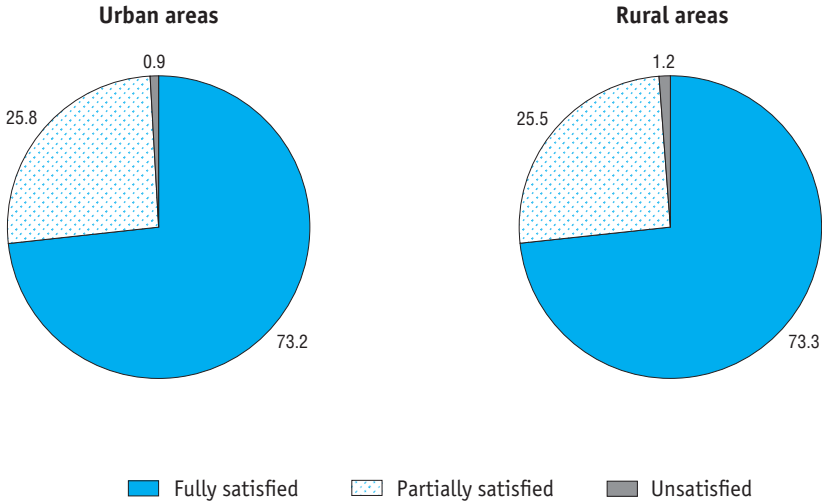
10.9. PUBLIC OPINION ON QUALITY OF PUBLIC AND MUNICIPAL SERVICES RECEIVED IN DIGITAL FORM

(as a percentage of individuals aged 15–72 who have used the Internet to receive public and municipal services)



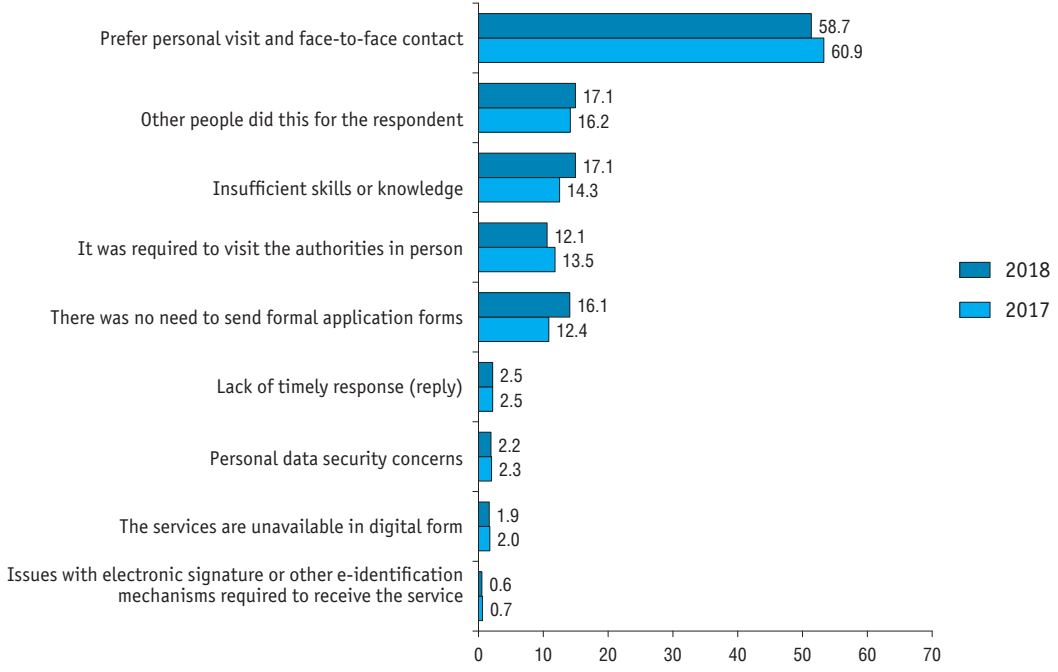
10.10. PUBLIC OPINION ON QUALITY OF PUBLIC AND MUNICIPAL SERVICES RECEIVED IN DIGITAL FORM IN URBAN AND RURAL AREAS: 2018

(as a percentage of individuals aged 15–72 who have used the Internet to receive public and municipal services)



10.11. INDIVIDUALS' REASONS TO REFRAIN FROM RECEIVING PUBLIC AND MUNICIPAL SERVICES IN DIGITAL FORM

(as a percentage of individuals aged 15–72 who have not used the Internet to receive public and municipal services)



10.12. ENTERPRISES' ONLINE INTERACTION WITH PUBLIC AND MUNICIPAL AUTHORITIES

(as a percentage of all business enterprise sector units)

	2010	2012	2013	2014	2015	2016	2017
Submitting completed forms online	66.6	69.3	70.2	71.2	69.4	69.4	67.8
Downloading official forms (such as statistical or tax return forms)	68.8	70.4	71.1	70.6	69.5	69.6	67.6
Obtaining information from websites or apps	51.2	54.9	56.0	57.4	57.7	58.8	58.0
Using public and municipal services in digital form (completely paperless)	…	31.5	34.3	34.3	36.3	38.3	39.7
E-procurement	24.5	22.4	24.9	25.9	28.7	26.9	26.2

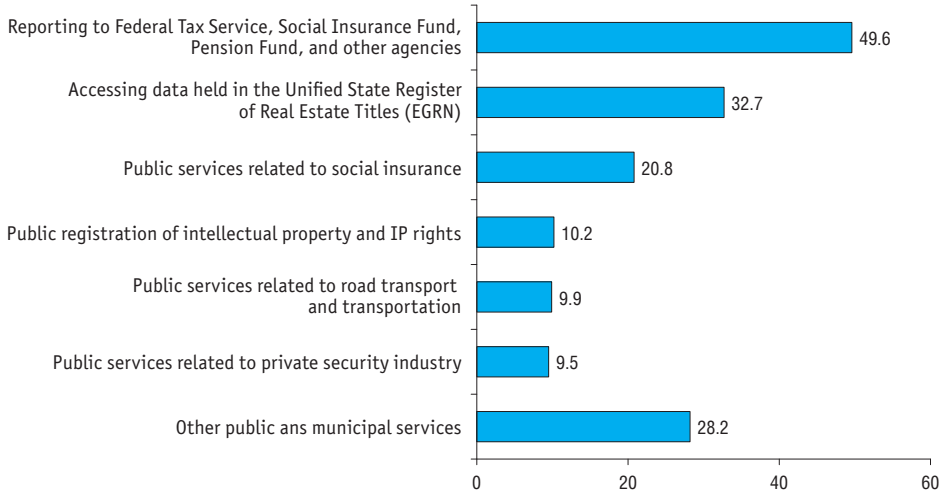
10.13. ENTERPRISES' ONLINE INTERACTION WITH PUBLIC AND MUNICIAL AUTHORITIES BY TYPE OF ECONOMIC ACTIVITY: 2017

(as a percentage of all business enterprise sector units)

	Downloading official forms (such as statistical or tax return forms)	Submitting completed forms online	Obtaining information from websites or apps	Using public and municipal services completely in digital form	E-procurement
Business enterprise sector – total	**67.6**	**67.8**	**58.0**	**39.7**	**26.2**
Mining and quarrying	68.8	69.3	59.3	41.6	14.5
Manufacturing	81.3	81.7	68.0	48.2	25.6
Electricity, gas, steam and air-conditioning supply	75.9	75.5	69.3	46.3	38.8
Water supply, sewerage, waste management and remediation activities	72.4	71.8	59.4	42.4	44.4
Construction	70.0	70.8	56.6	43.7	30.0
Wholesale and retail trade	65.1	65.4	57.8	36.9	16.5
Transportation and storage	66.8	66.1	56.7	36.2	25.6
Accommodation and food service activities	69.5	69.6	58.1	40.3	34.9
Telecommunications	70.9	71.8	65.9	46.9	45.4
IT industry	72.1	71.4	65.3	42.7	32.6
Real estate activities	49.1	50.1	39.6	27.9	15.2
Professional, scientific and technical activities	74.7	74.8	63.1	45.2	39.5

10.14. REASONS FOR ENTERPRISES' ONLINE INTERACTION WITH PUBLIC AND MUNICIPAL AUTHORITIES: 2017

(as a percentage of all business enterprise sector units)



10.15. REASONS FOR ENTERPRISES' ONLINE INTERACTION WITH PUBLIC AND MUNICIPAL AUTHORITIES BY TYPE OF ECONOMIC ACTIVITY: 2017

(as a percentage of all business enterprise sector units)

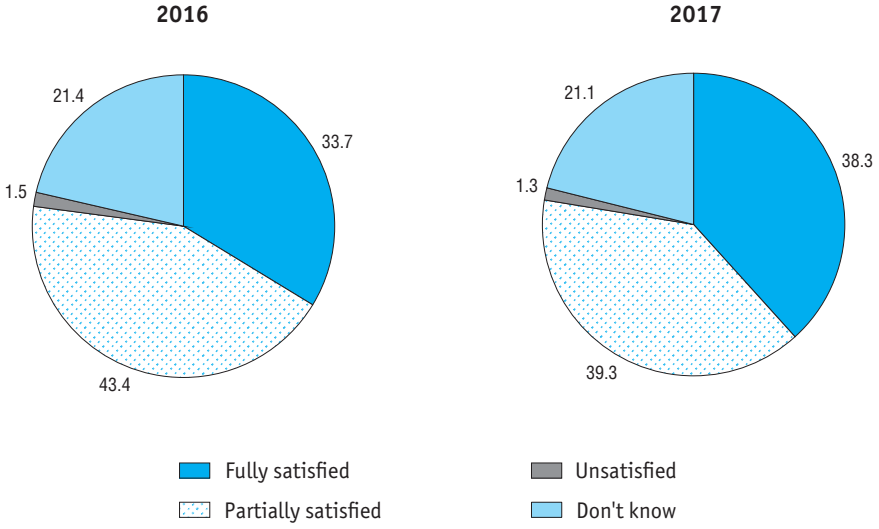
	Reporting to Federal Tax Service, Social Insurance Fund, Pension Fund, and other agencies	Accessing data held in the Unified State Register of Real Estate Titles (EGRN)	Public services related to social insurance
Business enterprise sector – total	**49.6**	**32.7**	**20.8**
Mining and quarrying	51.5	34.2	23.4
Manufacturing	60.0	39.8	29.2
Electricity, gas, steam and air-conditioning supply	57.6	42.7	28.2
Water supply, sewerage, waste management and remediation activities	54.7	28.1	25.0
Construction	51.2	34.6	23.8
Wholesale and retail trade	48.6	37.9	17.4
Transportation and storage	47.3	28.5	20.5
Accommodation and food service activities	43.3	24.8	19.7
Telecommunications	46.4	35.7	24.5
IT industry	47.3	25.1	20.3
Real estate activities	36.1	24.2	13.3
Professional, scientific and technical activities	55.2	32.6	23.7

(continued)

	State registration of intellectual property and IP rights	Public services related to road transport and transportation	Public services related to private security industry	Other public and municipal services
Business enterprise sector – total	**10.2**	**9.9**	**9.5**	**28.2**
Mining and quarrying	9.3	14.4	8.7	28.0
Manufacturing	12.7	16.9	11.4	31.0
Electricity, gas, steam and air conditioning supply	9.0	12.9	11.4	35.0
Water supply, sewerage, waste management and remediation activities	6.2	10.1	9.1	30.6
Construction	8.2	14.3	10.5	27.4
Wholesale and retail trade	15.6	9.8	10.0	30.6
Transportation and storage	5.7	15.2	8.5	26.8
Accommodation and food service activities	6.6	8.2	9.2	24.6
Telecommunications	14.7	16.6	12.5	28.4
IT industry	11.3	6.4	8.8	29.7
Real estate activities	3.6	3.5	5.5	17.9
Professional, scientific and technical activities	10.9	7.4	10.1	31.1

10.16. ASSESSMENT OF ENTERPRISES ON THE QUALITY OF PUBLIC AND MUNICIPAL SERVICES RECEIVED IN DIGITAL FORM

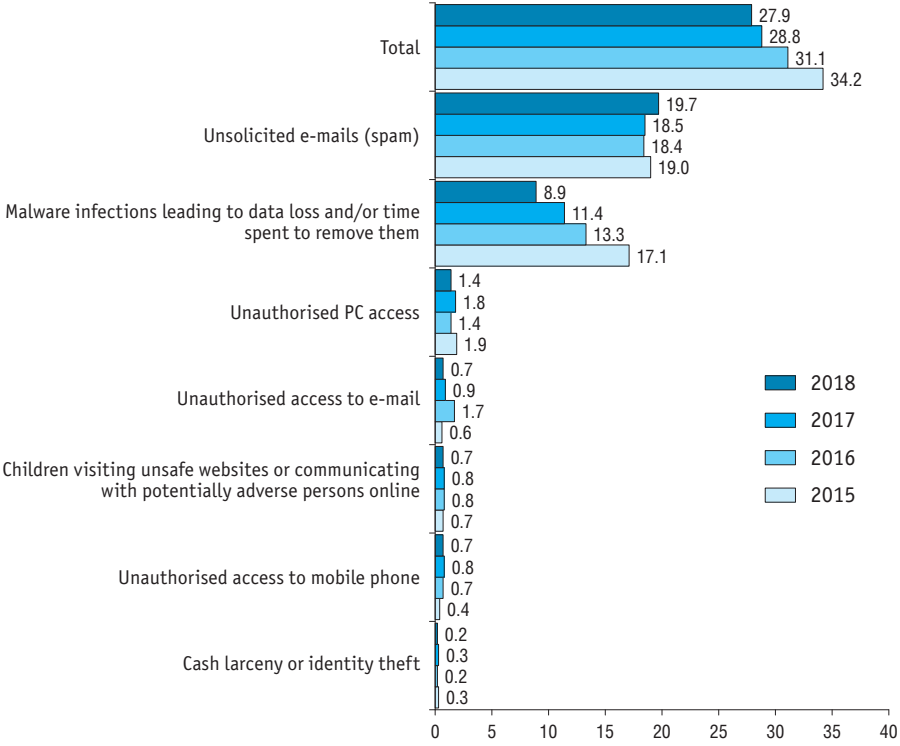
(as a percentage of business enterprise sector units that assessed online services quality)



Cybersecurity

11.1. INDIVIDUALS EXPERIENCING CYBERSECURITY ISSUES

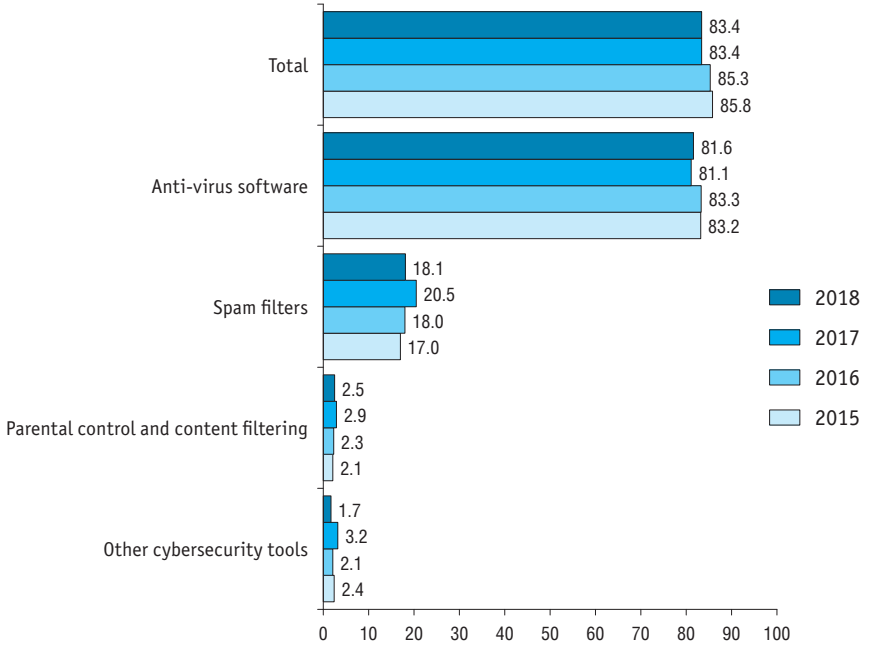
(as a percentage of individuals aged 15–74 who have used the Internet within the last 12 months)



Sources: (here and below in this section): for Russia, Rosstat (11.2, 11.3) and HSE ISSEK estimates based on Rosstat data (11.4, 11.5); for countries other than Russia, Eurostat.

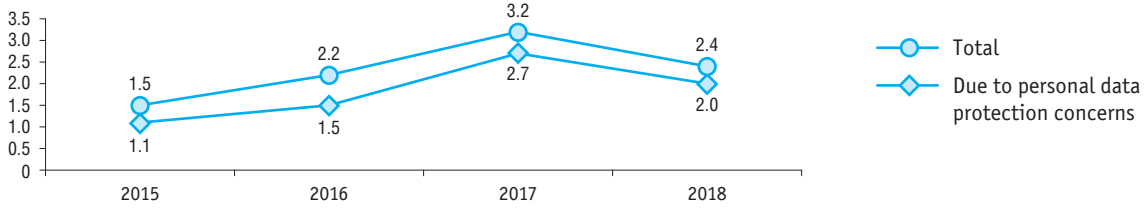
11.2. INDIVIDUALS' USE OF CYBERSECURITY TOOLS

(as a percentage of individuals aged 15–74 who have used the Internet within the last 12 months)



11.3. INDIVIDUALS REFUSING TO USE THE INTERNET DUE TO SECURITY CONCERNS

(as a percentage of individuals aged 15–74 who have not used the Internet within the last 12 months)



11.4. ENTERPRISES' USE OF CYBERSECURITY TOOLS

(as a percentage of business enterprise sector units that have used the Internet)

	2010	2012	2013	2014	2015	2016	2017
Automatically updated anti-virus software	…	84.0	87.4	87.4	86.2	87.6	87.8
Electronic signature tools	78.7	82.7	84.5	83.5	83.3	85.3	83.7
Firewalls (software and hardware)	…	51.6	56.4	58.0	63.3	64.0	64.8
User authentication tools	…	52.1	57.3	57.1	64.7	64.4	64.6
Strong password authentication protocols	…	45.0	47.7	46.4	57.6	59.1	61.4
Spam filters	…	42.8	47.4	52.5	55.0	57.5	59.3
Data encryption for confidentiality facilities	46.6	47.6	47.7	47.1	49.5	50.7	51.3
Intrusion detection systems	…	34.9	37.7	38.7	42.1	43.7	45.0
Automated IT security control and analysis software	…	26.3	27.5	30.6	33.7	33.8	34.9
Off-site data backups	…	27.0	28.0	26.7	31.9	31.2	30.7
Biometric user identification and authentication tools	…	6.7	5.0	5.4	6.6	5.2	5.7

11.5. ENTERPRISES' USE OF CYBERSECURITY TOOLS BY TYPE OF ECONOMIC ACTIVITY: 2017

(as a percentage of business enterprise sector units that use the Internet)

	Automatically updated anti-virus software	Electronic signature tools	Firewalls (software and hardware)	User authentication tools	Strong password authentication protocols
Business enterprise sector – total	**87.8**	**83.7**	**64.8**	**64.6**	**61.4**
Mining and quarrying	92.8	79.4	77.0	68.6	70.9
Manufacturing	90.4	89.6	73.3	72.6	62.8
Electricity, gas, steam and air-conditioning supply	94.5	89.9	73.1	72.0	66.4
Water supply, sewerage, waste management and remediation activities	79.2	90.4	40.5	62.4	39.4
Construction	86.0	83.4	60.4	65.9	53.0
Wholesale and retail trade	89.9	74.8	74.3	57.2	70.2
Transportation and storage	97.4	88.7	74.5	70.2	70.3
Accommodation and food service activities	82.9	84.9	55.4	65.9	52.2
Telecommunications	96.1	80.4	86.2	73.5	84.2
IT industry	92.2	85.0	79.8	78.9	76.7
Real estate activities	72.0	86.7	36.4	59.8	42.0
Professional, scientific and technical activities	86.2	87.1	60.1	66.6	55.8

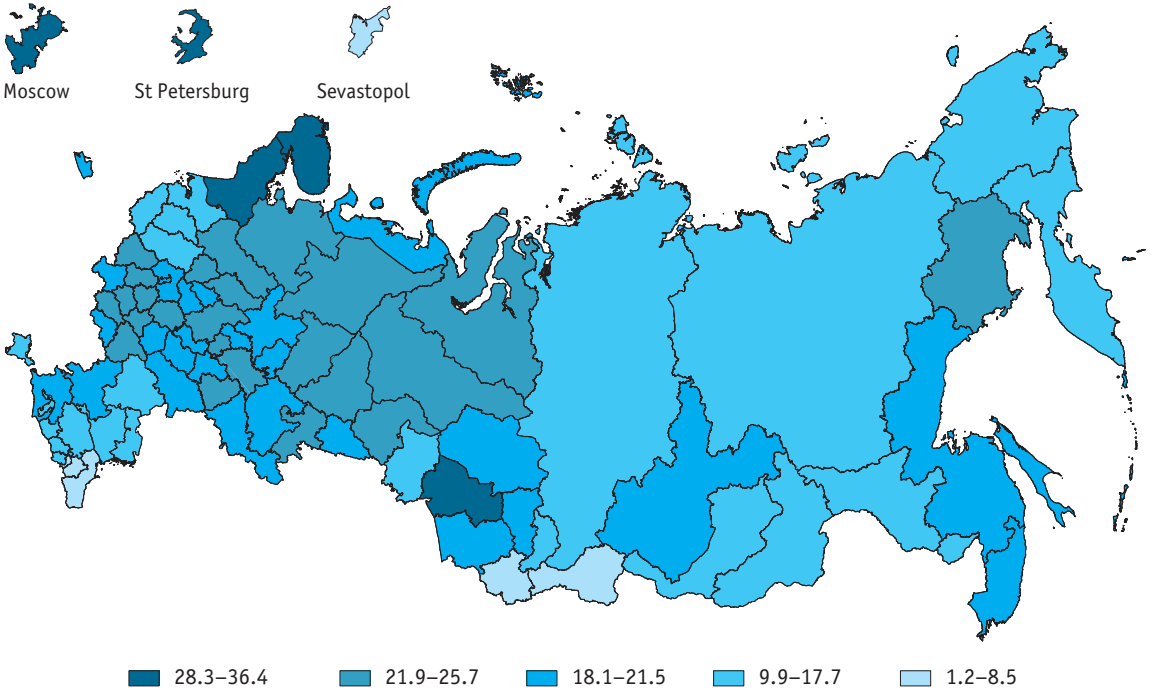
(continued)

	Spam filters	Data encryption for confidentiality facilities	Intrusion detection systems	Automated IT security control and analysis software	Off-site data backups	Biometric user identification and authentication tools
Business enterprise sector – total	**59.3**	**51.3**	**45.0**	**34.9**	**30.7**	**5.7**
Mining and quarrying	69.4	54.6	51.0	40.5	32.6	7.5
Manufacturing	64.7	57.2	48.0	35.7	32.7	5.8
Electricity, gas, steam and air-conditioning supply	63.0	59.3	46.6	34.8	27.2	3.5
Water supply, sewerage, waste management and remediation activities	32.5	34.8	24.2	23.3	22.0	2.7
Construction	53.4	44.5	41.8	34.3	29.0	3.9
Wholesale and retail trade	74.2	57.0	55.5	39.1	35.0	9.1
Transportation and storage	63.4	56.2	51.3	40.2	32.0	4.7
Accommodation and food service activities	50.5	41.4	40.8	33.8	37.3	11.0
Telecommunications	78.8	75.4	61.9	62.1	43.1	5.7
IT industry	71.3	73.1	60.8	50.4	39.7	5.8
Real estate activities	33.0	32.3	24.4	21.7	21.4	2.3
Professional, scientific and technical activities	52.9	48.9	39.2	31.5	27.6	3.7

Main Digital Economy Indicators of Russian Regions

12.1. FIXED BROADBAND SUBSCRIPTIONS IN RUSSIAN REGIONS: 2018

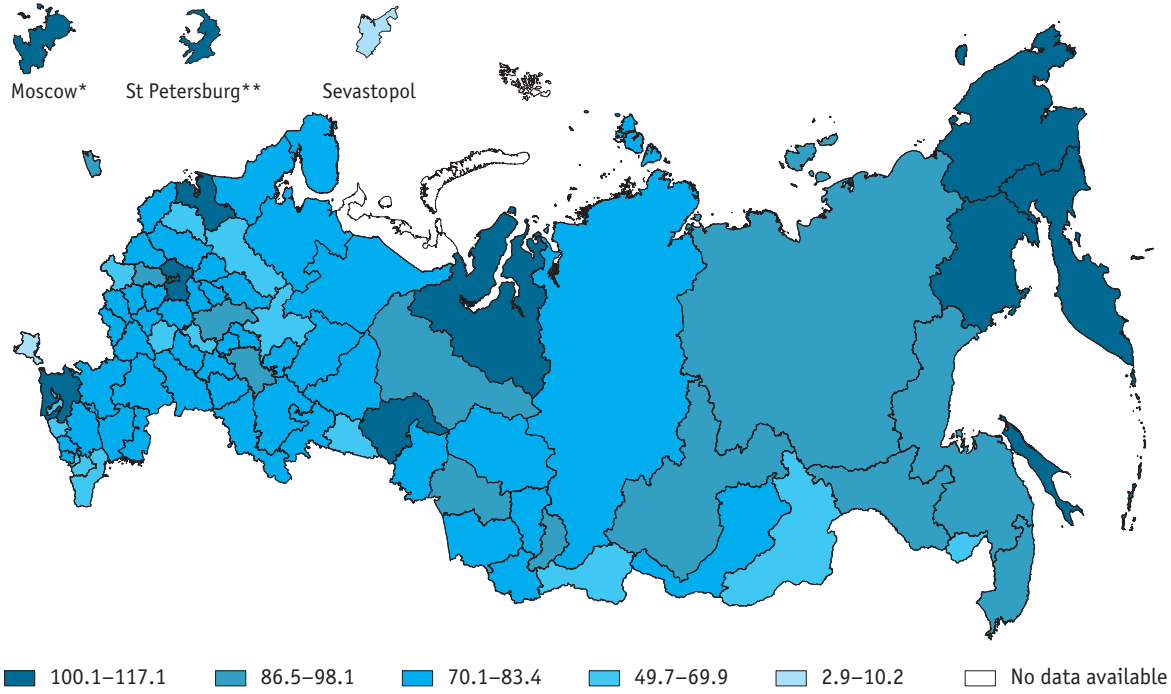
(per 100 inhabitants; units)



Sources: (here and below in this section): HSE ISSEK estimates based on data provided by Rosstat and the Ministry of Digital Development, Communications, and Mass Media of the Russian Federation.

12.2. MOBILE BROADBAND SUBSCRIPTIONS IN RUSSIAN REGIONS: 2018

(per 100 inhabitants; units)



* Aggregated data for Moscow and Moscow Region.
** Aggregated data for St Petersburg and Leningrad Region.

12.3. TELECOMMUNICATIONS INFRASTRUCTURE AND USE OF INTERNET BY HOUSEHOLDS AND INDIVIDUALS IN RUSSIAN REGIONS: 2018

	Broadband subscriptions per 100 inhabitants *(units)*		Households with broadband access as a percentage of all households	Individuals using the Internet:		
	Fixed	Mobile		as a percentage of all individuals aged 15–74	to order goods/services as a percentage of all individuals aged 15–74	to receive public and municipal services in digital form as a percentage of all individuals aged 15–72 who have received public and municipal services
Russia	**21.6**	**86.2**	**73.2**	**87.3**	**34.7**	**74.8**
Central Federal District	**26.0**	**97.4**	**74.9**	**88.9**	**40.1**	**80.0**
Belgorod Region	19.4	77.6	68.9	79.6	38.0	78.7
Bryansk Region	19.9	69.9	64.3	84.9	26.8	76.2
Ivanovo Region	18.3	74.2	63.7	82.7	30.1	70.3
Kaluga Region	25.6	86.5	70.3	84.5	22.7	83.3
Kostroma Region	21.9	73.9	67.6	81.5	34.2	62.1
Kursk Region	22.9	77.5	76.8	85.8	33.9	70.9
Lipetsk Region	22.5	73.3	73.2	89.3	22.5	75.8
Moscow Region	20.4	117.1*	78.3	95.0	46.8	87.0
Orel Region	23.8	78.0	65.7	76.4	24.9	63.0
Ryazan Region	23.9	77.1	65.2	81.9	25.7	88.6
Smolensk Region	22.4	82.2	71.8	83.7	33.0	82.0
Tambov Region	18.6	67.9	74.5	81.6	29.1	73.4
Tula Region	23.7	83.4	81.1	89.0	41.5	78.4
Tver Region	14.5	78.9	65.0	81.5	24.8	38.7
Vladimir Region	20.7	72.6	66.1	78.5	29.1	64.3

(continued)

	Broadband subscriptions per 100 inhabitants *(units)*		Households with broadband access as a percentage of all households	Individuals using the Internet:		
	Fixed	Mobile		as a percentage of all individuals aged 15–74	to order goods/services as a percentage of all individuals aged 15–74	to receive public and municipal services in digital form as a percentage of all individuals aged 15–72 who have received public and municipal services
Voronezh Region	24.7	74.9	73.7	85.9	35.6	74.1
Yaroslavl Region	23.5	78.5	63.3	80.3	31.3	78.8
Moscow	35.9	117.1*	82.0	94.0	50.1	82.5
North-Western Federal District	**23.5**	**93.1**	**76.5**	**88.0**	**37.8**	**67.8**
Republic of Karelia	31.7	70.1	74.6	85.3	39.9	61.8
Komi Republic	23.9	82.1	77.3	86.6	37.7	59.0
Arkhangelsk Region	22.8	76.6	69.7	85.1	31.9	78.7
including:						
Nenets Autonomous Region	18.2	…	56.0	80.7	48.7	66.4
Arkhangelsk Region excluding the Autonomous Region	23.0	76.6	70.1	85.3	31.2	79.2
Kaliningrad Region	20.8	92.7	70.5	85.2	34.4	67.2
Leningrad Region	11.5	108.2**	73.2	89.1	37.6	62.9
Murmansk Region	28.7	82.3	82.4	90.3	56.1	62.3
Novgorod Region	17.5	69.6	63.4	81.5	34.3	66.3
Pskov Region	16.7	72.2	65.0	81.6	30.7	53.4
Vologda Region	22.6	69.5	69.3	81.3	28.2	80.7
St Petersburg	28.3	108.2**	84.7	91.9	40.1	69.9

(continued)

	Broadband subscriptions per 100 inhabitants *(units)*		Households with broadband access as a percentage of all households	Individuals using the Internet:		
	Fixed	Mobile		as a percentage of all individuals aged 15–74	to order goods/services as a percentage of all individuals aged 15–74	to receive public and municipal services in digital form as a percentage of all individuals aged 15–72 who have received public and municipal services
Southern Federal District	**17.7**	**77.5**	**73.3**	**89.1**	**31.5**	**77.8**
Republic of Adygea	10.1	53.0	76.2	82.6	14.7	75.5
Republic of Crimea	10.4	10.9	81.4	88.5	20.9	41.7
Republic of Kalmykia	13.8	70.2	62.1	84.5	22.7	65.7
Astrakhan Region	15.9	74.9	80.8	90.2	42.5	79.3
Krasnodar Region	20.2	108.2	63.0	92.8	30.6	84.4
Rostov Region	21.1	80.1	78.1	88.3	36.8	78.4
Volgograd Region	16.5	74.2	76.0	84.3	29.3	77.2
Sevastopol	6.6	2.9	79.2	89.6	48.9	72.6
North Caucasian Federal District	**8.6**	**67.9**	**65.4**	**86.9**	**22.2**	**71.4**
Chechen Republic	4.3	65.2	50.2	91.6	39.7	79.5
Republic of Dagestan	2.5	57.3	58.8	84.3	9.7	65.8
Republic of Ingushetia	1.2	52.5	78.1	89.4	23.1	76.4
Kabardino-Balkarian Republic	9.9	71.3	66.7	87.5	21.7	72.0
Karachay-Cherkess Republic	10.3	63.5	69.0	82.5	25.1	74.6
Republic of North Ossetia–Alania	15.8	77.2	83.6	96.4	30.5	56.2
Stavropol Region	16.3	81.0	68.6	85.4	24.7	75.6

(continued)

	Broadband subscriptions per 100 inhabitants *(units)*		Households with broadband access as a percentage of all households	Individuals using the Internet:		
	Fixed	Mobile		as a percentage of all individuals aged 15–74	to order goods/services as a percentage of all individuals aged 15–74	to receive public and municipal services in digital form as a percentage of all individuals aged 15–72 who have received public and municipal services
Volga Federal District	**21.9**	**81.1**	**73.1**	**86.1**	**33.4**	**77.3**
Republic of Bashkortostan	21.5	76.1	77.9	90.7	26.0	84.8
Chuvash Republic	24.0	78.7	62.3	80.2	43.8	73.0
Mari El Republic	18.4	77.4	65.9	75.1	25.2	52.6
Republic of Mordovia	18.5	64.7	65.2	79.2	23.9	79.2
Republic of Tatarstan	25.7	92.2	80.2	93.4	40.1	86.1
Udmurt Republic	20.5	75.9	69.1	80.8	33.5	72.0
Kirov Region	21.0	69.7	64.0	78.0	31.2	64.7
Nizhny Novgorod Region	23.6	98.1	72.4	84.4	49.0	74.7
Orenburg Region	18.2	81.6	74.9	88.3	28.4	81.1
Penza Region	19.7	73.3	71.4	84.1	27.6	73.3
Perm Region	21.9	78.9	67.4	80.2	26.3	53.8
Samara Region	21.9	81.2	79.8	91.8	40.1	79.8
Saratov Region	21.5	76.5	72.4	87.2	33.1	86.9
Ulyanovsk Region	20.8	73.4	70.4	79.0	10.9	72.5
Ural Federal District	**24.6**	**85.4**	**75.4**	**86.8**	**41.5**	**65.6**
Chelyabinsk Region	25.5	81.5	74.2	84.1	33.0	64.9
Kurgan Region	20.4	67.4	64.1	80.8	32.1	64.7
Sverdlovsk Region	24.5	78.3	72.5	84.9	34.5	51.6

(continued)

	Broadband subscriptions per 100 inhabitants *(units)*		Households with broadband access as a percentage of all households	Individuals using the Internet:		
	Fixed	Mobile		as a percentage of all individuals aged 15–74	to order goods/services as a percentage of all individuals aged 15–74	to receive public and municipal services in digital form as a percentage of all individuals aged 15–72 who have received public and municipal services
Tyumen Region	24.9	101.2	84.1	93.0	59.9	81.3
including:						
Khanty-Mansi Autonomous Region – Yugra	25.1	96.5	88.9	96.8	66.1	81.6
Yamal-Nenets Autonomous Region	23.1	113.5	96.3	98.6	80.1	95.3
Tyumen Region excluding the autonomous regions	25.4	102.0	74.4	86.6	45.3	74.5
Siberian Federal District	**20.3**	**82.9**	**69.5**	**84.0**	**29.6**	**70.2**
Republic of Khakassia	12.3	86.7	54.5	81.2	13.6	80.0
Altai Republic	8.5	79.0	84.4	87.1	49.1	61.3
Republic of Tuva	4.9	49.7	87.4	88.8	30.1	86.4
Altai Region	18.3	79.1	69.4	84.6	27.8	68.0
Irkutsk Region	20.5	93.1	69.9	81.2	30.1	56.9
Kemerovo Region	18.4	77.7	66.4	82.6	25.3	61.0
Krasnoyarsk Region	15.0	82.2	66.8	86.7	33.7	77.5
Novosibirsk Region	36.4	87.8	74.5	85.1	31.2	72.8
Omsk Region	16.5	81.3	74.0	82.1	30.5	70.6
Tomsk Region	19.6	83.0	63.7	84.8	31.0	82.4

(continued)

	Broadband subscriptions per 100 inhabitants *(units)*		Households with broadband access as a percentage of all households	Individuals using the Internet:		
	Fixed	Mobile		as a percentage of all individuals aged 15–74	to order goods/services as a percentage of all individuals aged 15–74	to receive public and municipal services in digital form as a percentage of all individuals aged 15–72 who have received public and municipal services
Far Eastern Federal District	**17.5**	**86.7**	**71.2**	**85.9**	**29.2**	**65.9**
Republic of Buryatia	14.5	71.9	68.6	88.6	27.9	76.1
Republic of Sakha (Yakutia)	15.8	91.6	62.0	91.6	38.0	65.2
Amur Region	16.7	88.4	71.5	82.3	18.3	77.9
Chukotka Autonomous Region	11.7	100.1	59.1	97.8	27.3	38.6
Jewish Autonomous Region	16.0	64.1	65.6	75.3	15.2	51.8
Kamchatka Region	17.7	102.5	78.5	88.9	49.8	71.2
Khabarovsk Region	21.1	91.7	79.7	90.6	26.7	56.9
Magadan Region	23.6	100.5	75.8	88.6	28.8	43.7
Primorsky Region	18.1	94.4	73.9	83.9	31.7	68.4
Sakhalin Region	19.2	102.1	71.8	87.4	35.2	76.0
Trans-Baikal Region	15.6	63.7	62.3	78.0	22.5	49.0

* Aggregated data for Moscow and Moscow Region.
** Aggregated data for St Petersburg and Leningrad Region.

12.4. RUSSIAN REGIONS' BUSINESS DIGITALISATION INDICES: 2017

	Business Digitalisation Index	Of which the following Index values				
		Enterprises (as a percentage of all business enterprise sector units) using				Enterprises with online sales via specialised web/extranet forms or EDI systems as a percentage of all business enterprise sector units
		broadband Internet	cloud computing services	RFID technologies	ERP software	
Central Federal District	**29**	**87.4**	**25.8**	**5.3**	**15.4**	**10.6**
Belgorod Region	29	87.5	26.8	5.6	12.9	12.8
Bryansk Region	26	87.4	19.4	3.5	9.0	9.3
Ivanovo Region	27	86.7	24.7	4.2	10.8	9.1
Kaluga Region	28	87.5	21.9	4.0	16.0	9.2
Kostroma Region	23	78.0	12.5	4.3	10.8	8.8
Kursk Region	26	78.8	26.5	4.8	12.4	8.1
Lipetsk Region	28	91.9	23.9	4.5	10.4	11.4
Moscow Region	30	86.4	24.7	5.9	22.3	13.0
Orel Region	25	85.1	21.3	3.2	8.7	8.1
Ryazan Region	27	85.6	24.3	4.2	12.8	8.4
Smolensk Region	24	86.5	16.0	3.4	6.7	7.4
Tambov Region	30	94.6	37.1	2.7	9.7	7.9
Tula Region	27	82.4	22.5	5.3	15.1	9.9
Tver Region	23	78.4	17.9	3.5	8.1	8.3
Vladimir Region	27	87.8	25.4	3.9	13.6	6.9
Voronezh Region	29	88.4	26.8	4.5	12.4	12.4
Yaroslavl Region	29	89.1	27.3	5.4	14.5	10.9
Moscow	35	94.9	35.7	8.5	21.5	12.4
North-Western Federal District	**28**	**88.6**	**23.8**	**5.2**	**13.2**	**9.9**
Republic of Karelia	26	88.5	17.4	4.4	10.5	7.6
Komi Republic	26	88.1	20.5	3.9	9.6	6.0

(continued)

	Business Digitalisation Index	Of which the following Index values				
		Enterprises (as a percentage of all business enterprise sector units) using				Enterprises with online sales via specialised web/extranet forms or EDI systems as a percentage of all business enterprise sector units
		broadband Internet	cloud computing services	RFID technologies	ERP software	
Arkhangelsk Region	25	83.2	22.0	3.6	10.2	6.5
including:						
Nenets Autonomous Region	26	88.7	21.5	2.7	8.2	7.8
Arkhangelsk Region excluding the Autonomous Region	25	82.7	22.0	3.7	10.4	6.4
Kaliningrad Region	28	88.1	24.5	4.9	10.8	9.3
Leningrad Region	30	92.5	25.0	5.5	14.1	11.0
Murmansk Region	26	86.7	21.0	4.1	11.5	7.7
Novgorod Region	27	85.0	25.4	3.9	15.3	7.3
Pskov Region	26	85.4	21.3	4.7	9.1	9.0
Vologda Region	26	85.6	21.8	3.6	11.5	9.1
St Petersburg	33	93.5	29.0	8.1	19.0	15.6
Southern Federal District	**25**	**80.8**	**21.9**	**4.7**	**10.3**	**9.0**
Republic of Adygea	28	89.0	27.1	5.1	11.0	10.2
Republic of Crimea	28	93.6	29.0	3.7	6.2	8.4
Republic of Kalmykia	21	76.1	12.7	3.2	8.4	6.2
Krasnodar Region	27	85.1	21.7	5.8	12.7	9.9
Astrakhan Region	27	85.2	26.0	5.1	10.9	9.3
Rostov Region	24	78.2	20.8	4.1	10.5	8.8
Volgograd Region	23	71.3	20.3	4.1	8.8	8.8
Sevastopol	19	64.3	19.0	5.1	3.2	4.6

(continued)

	Business Digitalisation Index	Of which the following Index values				
		Enterprises (as a percentage of all business enterprise sector units) using				Enterprises with online sales via specialised web/extranet forms or EDI systems as a percentage of all business enterprise sector units
		broadband Internet	cloud computing services	RFID technologies	ERP software	
North Caucasian Federal District	**24**	**80.3**	**22.2**	**3.5**	**5.8**	**8.1**
Chechen Republic	23	85.5	19.4	2.6	2.4	3.4
Republic of Dagestan	18	63.5	17.1	1.6	2.0	3.7
Republic of Ingushetia	33	92.7	30.2	2.5	7.3	33.8
Kabardino-Balkarian Republic	24	81.1	24.0	3.1	5.3	5.2
Karachay-Cherkess Republic	26	85.5	25.0	4.9	8.2	8.4
Republic of North Ossetia–Alania	23	75.0	21.7	3.5	6.6	7.7
Stavropol Region	29	91.2	26.3	5.5	10.3	13.0
Volga Federal District	**26**	**83.5**	**20.5**	**4.8**	**12.6**	**9.3**
Chuvash Republic	27	87.7	21.8	5.1	8.6	10.6
Republic of Bashkortostan	29	88.5	22.1	4.3	19.5	12.2
Mari El Republic	24	79.3	19.3	3.3	9.1	8.0
Republic of Mordovia	22	79.6	14.4	3.4	7.8	6.7
Republic of Tatarstan	30	89.4	30.4	6.3	13.4	12.1
Udmurt Republic	23	80.1	17.1	3.7	8.9	7.6
Kirov Region	23	85.5	12.1	3.2	6.8	7.3
Nizhny Novgorod Region	30	93.3	24.7	5.6	13.0	13.1
Orenburg Region	28	92.9	21.3	5.0	11.9	9.6
Penza Region	26	84.1	22.8	4.1	9.1	9.2
Perm Region	27	84.5	23.1	4.6	13.4	9.7
Samara Region	23	71.1	17.4	5.1	13.1	6.4
Saratov Region	23	72.3	18.6	4.6	10.5	7.0
Ulyanovsk Region	23	83.5	5.8	5.3	15.3	5.8

(continued)

	Business Digitalisation Index	Of which the following Index values				
		Enterprises (as a percentage of all business enterprise sector units) using				Enterprises with online sales via specialised web/extranet forms or EDI systems as a percentage of all business enterprise sector units
		broadband Internet	cloud computing services	RFID technologies	ERP software	
Ural Federal District	**28**	**82.9**	**24.1**	**6.0**	**14.5**	**10.9**
Chelyabinsk Region	28	85.4	23.4	5.1	13.7	11.3
Kurgan Region	21	69.6	18.1	2.7	8.1	7.1
Sverdlovsk Region	30	86.9	26.9	7.0	15.8	12.4
Tyumen Region	28	82.4	23.9	6.6	15.9	10.7
including:						
Khanty-Mansi Autonomous Region – Yugra	28	85.5	24.0	5.8	15.7	11.5
Yamal-Nenets Autonomous Region	26	82.9	20.9	5.3	14.4	7.0
Tyumen Region excluding the autonomous regions	28	78.6	25.6	8.4	17.0	12.1
Siberian Federal District	**25**	**77.8**	**22.1**	**4.9**	**9.9**	**8.1**
Altai Republic	24	86.2	12.6	4.5	7.8	8.8
Republic of Khakassia	25	78.9	23.2	4.4	9.1	7.8
Republic of Tuva	21	73.0	16.6	3.1	4.5	6.0
Altai Region	24	78.7	21.8	4.5	8.0	9.3
Irkutsk Region	26	79.2	27.4	5.9	11.6	7.5
Kemerovo Region	26	81.2	22.1	6.4	13.6	7.8
Krasnoyarsk Region	25	82.3	22.0	4.5	9.2	8.2
Novosibirsk Region	23	70.3	21.2	4.4	9.0	10.1
Omsk Region	24	79.4	20.5	4.3	8.4	6.0
Tomsk Region	23	71.5	21.7	5.5	11.5	6.8

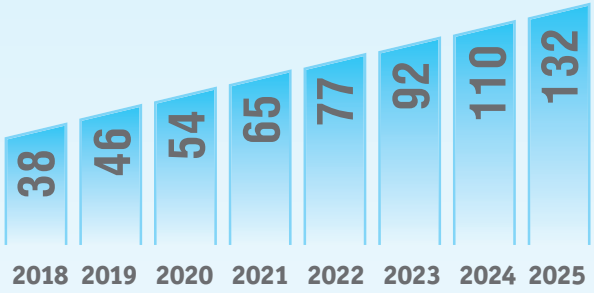
(continued)

	Business Digitalisation Index	Of which the following Index values				
		Enterprises (as a percentage of all business enterprise sector units) using				Enterprises with online sales via specialised web/extranet forms or EDI systems as a percentage of all business enterprise sector units
		broadband Internet	cloud computing services	RFID technologies	ERP software	
Far Eastern Federal District	**24**	**78.6**	**21.8**	**4.2**	**7.7**	**7.6**
Republic of Buryatia	20	62.6	21.3	3.5	6.1	6.7
Republic of Sakha (Yakutia)	22	68.5	23.8	3.2	5.5	9.3
Amur Region	23	76.1	20.8	4.4	8.1	7.5
Chukotka Autonomous Region	22	76.4	14.8	6.0	5.4	8.2
Jewish Autonomous Region	22	78.3	14.4	3.8	7.1	7.3
Kamchatka Region	24	83.9	20.8	3.9	7.5	1.5
Khabarovsk Region	27	87.6	24.5	5.6	9.5	9.7
Magadan Region	23	80.3	17.0	2.7	8.1	6.6
Primorsky Region	25	85.1	22.2	4.1	8.1	6.7
Sakhalin Region	27	87.9	19.2	5.6	10.6	9.1
Trans-Baikal Region	25	82.6	24.4	4.2	7.8	8.1

13. Digital Technology

13.1. BIG DATA

Global Big Data market
(billion USD)



396 exabytes — **global IP traffic per month by 2022** (2017: 122 EB/month)

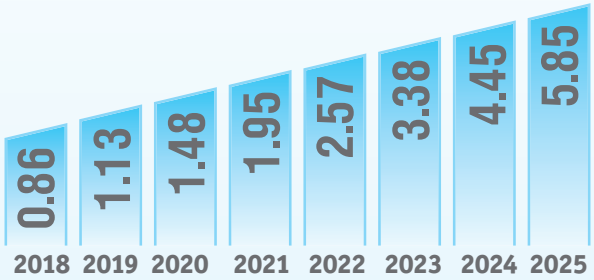
31.7 billion USD — **global Big Data as a Service (BDaaS) market by 2024 (BDaaS)** (2018: 8.9 billion USD)

175 zettabytes — **global data by 2025** (2018: 33 ZB)

Drivers

- Data transmission speed and storage capacity increase
- Lower data storage costs
- More affordable cloud data processing services
- Big Data educational programmes; more data scientists
- Growth of open data, including unstructured open data
- Internet-of-Things proliferation

Global quantum computing market
(billion USD)



944 million USD — global quantum data encryption market by 2022 (2017: 285.7 million USD)

20 per cent — of companies will have a budget for quantum technologies by 2023 (2018: under 1%)

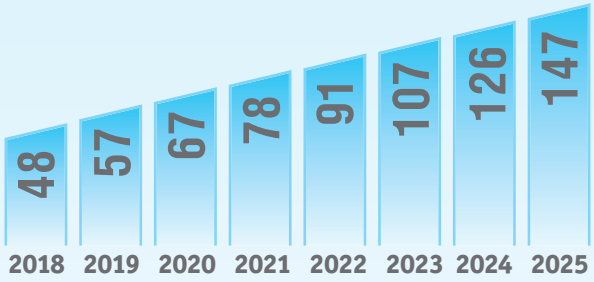
30 per cent — quantum computing market CAGR in 2017–2025

Drivers

- Semiconductor miniaturisation and performance growth
- Growth of quantum technology R&D
- Growth of unstructured data
- Quantum technology research centres and educational programmes
- Hunt for new encryption methods as cyberattacks soar
- Increasing demand for fast and safe data transmission systems

13.3. ROBOTICS COMPONENTS AND SENSORICS

Global robotics market
(billion USD)



201.3 billion USD — expenditure on robotics and drone systems by 2022 (2018: 95.9 billion USD)

19.6 per cent — robotics and drone systems expenditure CAGR in 2017–2022

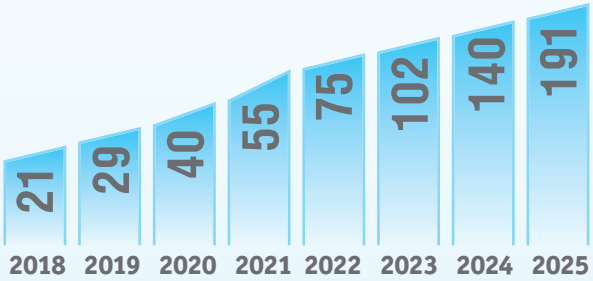
30 per cent — China's share in the global robotics market by 2022

Драйверы

- New requirements for agile manufacturing
- Development of self-charging sensors and image recognition technology
- Increasing demand for industrial robots as companies overhaul their process and upgrade their equipment
- Fuel cell capacity increase
- Increasing demand for domestic robots as humanity ages
- Demand for robots capable of operating in hazardous environments

13.4. NEUROTECHNOLOGIES AND ARTIFICIAL INTELLIGENCE

Global AI market
(billion USD)



18.6 billion USD — **global Deep Learning market by 2023** (2018: 3.18 billion USD)

53 per cent — **AI-based chatbot market CAGR in 2018–2024**

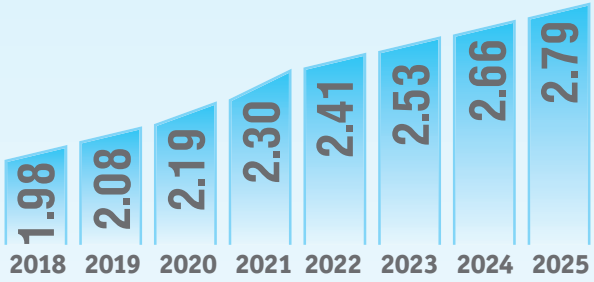
36.6 per cent — **AI market CAGR in 2018–2025**

Drivers

- Race to accelerate business processes while reducing costs
- Growth of unstructured data and need for their analysis
- Development of OpenAI, etc.
- Development of AI legal framework
- Growth of investment into neural technology and AI by businesses
- More accurate detection of consumers' emotional response to products and services

13.5. ADVANCED MANUFACTURING TECHNOLOGIES

Global computer engineering market
(trillion USD)



2/3 of companies will be using digital twins of their manufacturing plants by 2022

299 billion USD global smart manufacturing market by 2023 (2017: 153.25 billion USD)

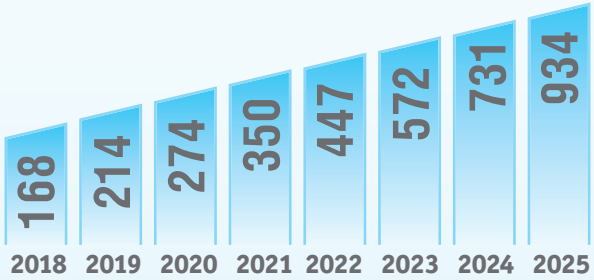
27 per cent Reduction of additive technologies' energy consumption by 2050

Drivers

- More affordable 3D printers
- Higher computing performance
- Democratisation of digital engineering technologies
- High cost of specialised manufacturing equipment used for small-batch production
- Need to reduce time to market
- Growth of customised product demand

13.6. INDUSTRIAL INTERNET

Global Industrial Internet market
(billion USD)



22 billion — IoT devices by 2025

11.1 trillion USD — global annual economic profit generated by Industrial Internet by 2025

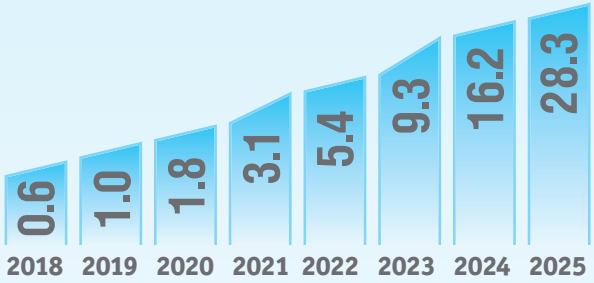
2 billion — IoT devices using LPWAN connectivity by 2025

Drivers

- Lower cost of Industrial Internet sensors
- Launch of Industrial Internet standardisation
- 5G deployment
- Need for better autonomous vehicle safety
- Growth of connected devices count
- Development of low-power wide-area network (LPWAN) technology

13.7. DISTRIBUTED LEDGER SYSTEMS (BLOCKCHAIN)

Global blockchain market
(billion USD)



250 billion USD — market capitalisation of Top 100 cryptocurrencies in May 2019

74 per cent — blockchain market CAGR in 2018–2025

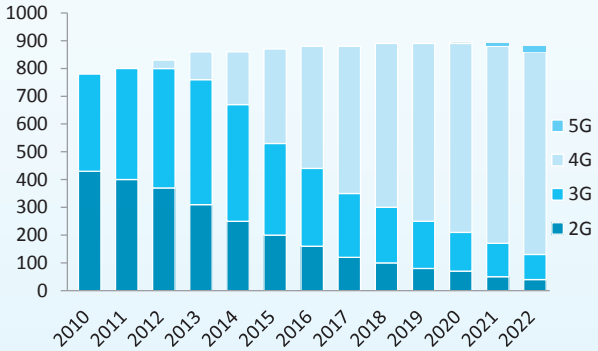
10 billion USD — daily volume of bitcoin transactions in 2019

Drivers

- Need for environment of trust among digital transaction parties
- Deployment of biometric identification technologies
- Demand for new tools of Big Data storage and processing
- Development of blockchain-based marketplaces
- Growth of online payments
- Need for greater transparency of financial transactions

13.8. WIRELESS COMMUNICATION TECHNOLOGIES

Global wireless communication market
(billion USD)



90 per cent — LPWAN technology CAGR in 2016–2022

2.6 billion — 5G subscriptions by 2025

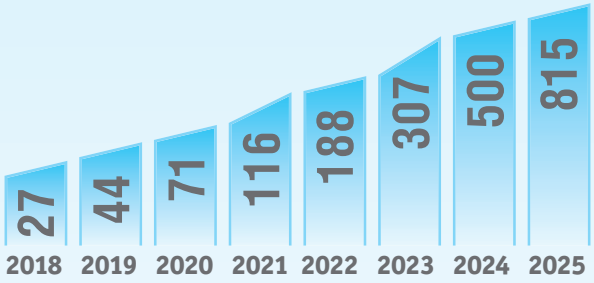
50 billion USD — global economic profit generated by 5G by 2030

Drivers

- Growth of data and need for faster data transmission
- Proliferation of autonomous vehicles
- Proliferation of IoT, including Industrial Internet
- User demand for new types of content (e.g., VR stream)
- Growth of e-commerce
- Greater network throughput in order to accommodate traffic growth

13.9. VIRTUAL AND AUGMENTED REALITY TECHNOLOGIES

Global VR/AR market
(billion USD)



11.8 Billion USD — consumer expenditure on VR/AR content and software by 2021

68.9 million — VR/AR helmet sales by 2021

1.9 billion — users benefitting from AR technology on their mobile devices by 2022 (2016: 342.8 million people)

Drivers

- Growth of demand for VR/AR display systems and software
- Growth of display performance and resolution; integration of navigation sensors into smartphones
- Higher requirements to content delivery (data transmission speed, visualisation quality, etc.)
- Development of global multimedia content
- Greater business demand for UX/UI design solutions
- Search for new ways to improve education quality; need for immersive learning

Active subscriptions to telecommunications services are subscribers who used telecommunications services at least once within the last three months or paid the subscription fee at least once during the same period.

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

Spam filters are specialised software or software function intended for filtering and hiding unwanted advertisements when visiting Internet sites, receiving e-mail, and using messaging programmes.

Anti-virus software is specialised software designed to detect computer viruses and malware, to restore any files infected (modified) by such malware and to prevent infection (modification) of files or operating system by malicious content.

Artificial Intelligence (AI) is a hardware and software system mimicking human intelligence processes through the creation and application of algorithms built into a dynamic computing environment, including analysing Big Data, adjusting to new inputs, learning from experience and making independent decisions.

Augmented Reality technologies are visualisation technologies based on adding information or visual effects to the physical world by superimposing graphics or audio content thereon in order to enhance user experience and interaction capabilities.

Average monthly salary is determined by dividing the payroll fund by the year's average headcount and further dividing it by 12. The payroll fund comprises monetary and non-monetary compensations and benefits for the time worked and for time off, including bonuses, one-off incentives, and regular meals and lodging allowances.

Bandwidth is the maximum rate of data transfer across a given path, measured in bits per second (bit/s).

Big Data are methods used to collect, process and store structured and unstructured information assets whose huge volume and high variation of data (including real-time variation) require the use of specialised technical architectures and analytical methods.

Blockchain technologies are algorithms and protocols of decentralised storage and processing of transactions structured as a sequence of interlinked blocks, which prevents unauthorised subsequent modification of such transactions.

Broadband access includes xDSL-technologies, cable TV connection, leased line connection, fiber optic connection, satellite connection, extended fixed wired and wireless access (WiMax connection, etc.), high-speed cellular network, and other types of access with the promised top access speed of 256 kbit/s and higher.

Business enterprise sector includes enterprises of manufacturing; electricity, gas, steam and air conditioning supply; water supply, sewerage, waste management and remediation activities; construction; wholesale and retail activities; transportation and storage; accommodation and food service activities; information and communication; real estate activities; professional, scientific and technical activities. Indicators of ICT use in the business enterprise sector are formulated in accordance with OKVED2 codes, sections B, C, D, E, F, G, H, I, J, L, N, codes 69, 70, 71, 72, 73, 74, and 95.

Cloud computing services is distributed data processing technologies, where computer resources and capacities are provided to users as Internet services.

Content and Media sector is a set of enterprises engaged in activities related to production, publication and/or distribution of content (information, culture and entertainment products). By Order no. 515 issued by the Ministry of Digital Development, Communications and Mass Media of Russian Federation on December 7, 2015, the following types of economic activities are included into the Content and Media sector as per the Russian Classification of Economic Activity (OKVED2):

- Publishing of books, periodicals and other types of publishing activities (OKVED2 code: 58.1);
- Motion pictures, video and television programme production activities (59.1);
- Sound recording and music publishing activities (59.2);
- Radio broadcasting (60.1).
- TV broadcasting (60.2);
- News agency activities (63.91);
- Other information-related activities (63.99).

CRM (Customer Relationship Management) software is a system is a system that helps manage the company's interactions with customers. It is used to collect and process information on different aspects of customers' activity: availability of / demand for goods and services, sales cycles, prices, etc.

Data interchange between internal and external IT systems is data exchange that enables sending and receiving messages (such as payment documents, tax returns, orders, etc.) in a pre-agreed or standard format (EDIFAST, EANCOM, ANSI X12; XML-based, such as ebXML, RosettaNet, UBL, papiNET; agreed proprietary standards, etc.) and their automatic processing.

ICT specialists are professionals, technicians and other specialists referred to as such in the Russian Classification of Occupations. They include:

- Managers – Information and Communications Technology Services Managers (RCO code: 133);
- Professionals – Software and Applications Developers and Analysts (code 251); Database and Network Professionals (252); other ICT professionals (Electronics Engineers (2152); Telecommunications engineers (2153); Graphics and Multimedia Designers (2166); Information Technology Trainers (2356), and ICT Sales Professionals (2434);
- Technicians – ICT Operations and User Support Technicians (code: 351); Telecommunications and Broadcasting technicians (352), and Electronics Engineering Technicians (3114);
- Mechanics and servicers – Electronics and Telecommunications Installers and Repairers (742).

Drivers of Production Component is a measure of countries' readiness to facilitate future production through implementing new technologies. The index is calculated based on data on the country's level of technology and innovation, human capital, institutional structure, and participation in global trade and investment. The 2018 rankings are published in The Readiness for the Future Production Report 2018 at http://www3.weforum.org/docs/FOP_Readiness_Report_2018.pdf.

E-Government Development Index (EGDI) measures the readiness and capacity of national institutions to use ICTs to deliver public services. It's calculated by the United Nations Department of Economic

and Social Affairs (UN DESA) within the United Nations E-Government Survey – the only global report that assesses the e-government development status of all 193 United Nations Member States. EGDI is a composite index based on the weighted average of three normalized indices: Online Service Index, Telecommunication Infrastructure Index, and Human Capital Index. The 2018 rankings are published in The Readiness for the Future Production Report 2018 at http://www3.weforum.org/docs/FOP_Readiness_Report_2018.pdf.

E-government services is provision of public or municipal services using ICT, including through the official Government Services Portal or regional public and municipal services portals.

E-libraries in higher educational institutions are databases containing textbooks, courseware, and other literature used in education.

E-procurement by enterprises is procurement of goods or services through orders placed via special online forms (whether posted on the company's website or in the extranet) using electronic data interchange (EDI) systems. This procurement does not include orders placed via telephone, fax, or e-mail.

ERP (Enterprise Resource Planning) software is a system that consists of one or several software applications that integrate the enterprise units' information and business processes (workflow). Typically, an ERP system integrates planning, procurement, sales, marketing, customer interface, finance, human resources, etc.

E-sales by enterprises are sales of goods, works or services through orders placed via special online forms (whether posted on the company's website or in the extranet) using electronic data interchange (EDI) systems. These sales do not include orders placed via telephone, fax, or e-mail.

Exports (imports) of ICT goods are ICT goods exports (imports) are grouped according to the Foreign Economic Activity Commodity Nomenclature (FEACN) in line with the OECD classification of ICT goods which is based on the Harmonised Commodity Description and Coding System (HS2007). They include the following groups of goods:

- Computers and related equipment (FEACN codes: 844331, 844332, 847050, 8471, 847290, 847330, 847350, 852351, 852842, 852852, 852862);
  - including computers (8471);
- Communication equipment (8517, 852550, 852560, 853110);
  - including telephone and telegraph equipment (8517);
- Consumer electronic equipment (8518, 8519, 8521, 8522, 852580, 8527, 852849, 852859, 852869, 852871, 852872, 852873);
  - including TVs (852871, 852872, 852873);
- Other ICT and related goods (852321, 852352, 852359, 852380, 8529, 8534, 8540, 8541, 8542, 901320).

Exports (imports) of telecommunications services, computer services and information services lists are compiled by the Bank of Russia. According to the Manual on Statistics of International Trade in Services 2010 (MSITS2010), telecommunications services include the broadcast or transmission of sound, images, data, or other information by telephone, telex, telegram, radio and television cable transmission, radio and television satellite, electronic mail, facsimile, etc., including business network services, teleconferencing and support services; **computer services** include services related to hardware, software and data processing; **information services** are broken down into news agency services and database services, such

as database conception, data storage, and the dissemination of data and databases (both online and on magnetic, optical or printed media) and web search portals, also include direct non-bulk subscriptions to newspapers and periodicals, whether by mail, electronic transmission or otherwise, as well other information services.

Field-Weighted Citation Impact Index (FWCI) is the ratio between the total citations actually received by a given set of publications, and the total Scopus-indexed citations that would be expected based on the average of the subject field, period, and publication type. If the index value is over 1.0, the citation impact of such set of publications exceeds the global average.

Fixed capital investment is the expenditure on property construction or rebuilding (including expansions and overhauls) which increase its original value, acquisition of plant, equipment, and vehicles which are recognised as investments in non-current assets, intellectual property or cultivated biological resources.

Fixed (wired) broadband subscriptions are active broadband subscriptions for any wired technology, for which the access speed mentioned in the subscription agreement is 256 kbit/s or above.

Fixed (wired) Internet subscriptions are Internet subscriptions with any fixed (wired) Internet access, including dial-up, regardless of bandwidth.

Global Competitiveness Index aims to measure the drivers of the 'total factor productivity' (TFP), a part of economic growth that cannot be explained by the growth in the factors of production. Using TFP, we may determine how smartly these factors are used and what is the main determinant of the long-term economic growth. The index is an annual yardstick for policy-makers that helps them look beyond short-term and reactionary measures and instead assess their progress against the full set of factors that determine productivity. The 2018 rankings are published in The Global Competitiveness Report 2018 at http://www3.weforum.org/docs/GCR2018/05FullReport/TheGlobalCompetitivenessReport2018.pdf.

Global Cybersecurity Index (GCI) is a composite index combining 25 indicators into one benchmark to monitor and compare the level of the cybersecurity commitment of countries with regard to the five pillars of the Global Cybersecurity Agenda (GCA) of the International Telecommunication Union (ITU). These pillars form the five sub-indices of GCI. The 2018 rankings are published in Global Cybersecurity Index 2018 at https://www.itu.int/dms_pub/itu-d/opb/str/D-STR-GCI.01–2018-PDF-E.pdf.

Global Innovation Index (GII) is calculated based on 81 indicators that correspond to key factors of innovative development. GII allows countries to assess the relative performance of their national innovation system. The index is an initiative of Cornell University, INSEAD Business School, and the World Intellectual Property Organisation (WIPO). The 2018 rankings are published in Global Innovation Index 2018 at https://www.globalinnovationindex.org/userfiles/file/reportpdf/gii_2018-report-new.pdf.

Gross domestic expenditure on digital economy development means total enterprises' domestic expenditure on performance of works and provision of services concerning development, dissemination, and use of digital technologies and related goods and services, and total household expenditure on use of digital technologies and related goods and services.

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 value added is determined by taking the value of goods and services produced/rendered and subtracting from it any intermediate consumption within industries and sectors of the economy. Value of goods and services produced/rendered is the aggregate value of goods and services produced/rendered by the nation's residents within the reporting period. Intermediate consumption is the total value of goods and services consumed or transformed in the production process within the reporting period. Fixed capital is not part of intermediate consumption.

ICT Development Index (IDI) is a composite index that combines 11 indicators into one benchmark measure that can be used to monitor and compare developments in ICTs between countries and over time. This index is used to monitor and compare the 'digital gap' between developed and emerging economies. The index is an ITU initiative. The 2017 rankings are published in Measuring the Information Society Report 2017 at https://www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2017/MISR2017_Volume1.pdf.

Publication activity in ICT-related research fields include indicators calculated based on Scopus-indexed publications; citation performance is assessed by Elsevier's SciVal tool. Unless otherwise stated, 'publications' include any of these three types: articles, reviews, and proceeding/conference papers. A publication is considered to originate from a country if such country is stated in the author's or a co-author's work address and is recognised by Scopus. If the sole author has stated addresses in two or more countries, such publication is considered to have been created by international co-authorship. Similarly, if one or more co-authors state affiliations associated with two or more countries, such publication is also considered to have been created by international co-authorship. Scopus ICT topics include: Human–Computer Interaction, Computational Mechanics, Information Systems, Artificial Intelligence, Computer Graphics and Computer-Aided Design, Computer Vision and Pattern Recognition, Hardware and Architecture, Computer Networks and Communications, Control and Systems Engineering, Health Informatics, Library and Information Sciences, Signal Processing, Applied Computer Research, Computers in Earth Sciences, Software, Computer Science, Theory and Methods, General Computer Science, and Computer Science (miscellaneous). All respective data in this Data Book were retrieved from the database on 29 March 2019.

ICT sector involves economic activities related to production of goods and provision of services intended for processing of information (or enabling such processing) and communication via electronic devices, including transmission and display of information. Pursuant Order no. 515 of December 7, 2015 issued by the Ministry of Digital Development, Communications and Mass Media of the Russian Federation, the following types of economic activities are assigned to the ICT sector (according to OKVED2):

- Manufacture of electronic components and boards (OKVED2 code: 26.1);
- Manufacture of computers and peripheral equipment (26.20);
- Manufacture of communication equipment (26.30);
- Manufacture of consumer electronics (26.40);
- Manufacture of magnetic and optical media (26.80);
- Wholesale of computers, computer peripheral equipment and software (46.51);

- Wholesale of electronic and telecommunications equipment and parts (46.52);
- Software publishing (58.2);
- Wired telecommunications activities (61.10);
- Satellite telecommunications activities (61.30);
- Other telecommunications activities (61.90);
- Computer programming activities (62.01).
- Computer consultancy activities (62.02);
- Computer facilities management activities (62.03);
- Other information technology and computer service activities (62.09);
- Data processing, hosting and related activities (63.11);
- Web portals (63.12);
- Repair of computers and periphery equipment (95.11);
- Repair of communication equipment (95.12).

Industrial Internet of Things is data networks in the industrial sector which link various sensor-equipped devices that are able to communicate with one another without human involvement.

Industrial robots are automatically controlled, reprogrammable multipurpose manipulators programmable in three or more axes and comprising sensors and artificial intelligence. Industrial robots control their own actions, monitor the environment and adapt to changes in it.

Information and communication technologies (ICT) are microelectronics technologies used to assemble, store, process, search, transmit, and represent data, texts, images, and sounds.

Innovation expenditure is the actual expenditure on various innovative activities performed within an enterprise (an industry, a region, or a country) in monetary form. In statistical reporting, innovation expenditure includes current expenditure and capital expenditure. The reporting further breaks down this expenditure into technological, organisational, and marketing innovations.

Innovative activities are transformation of ideas (usually resulted in R&D output or other S&T achievements) into technologically new or significantly improved goods or services, introduced on the market, or new or significantly improved production processes or services delivery methods, used in real life. Innovative activities include a broad range of scientific, technological, organisational, financial and commercial activities whose combination leads to innovation.

Innovation activity describes the degree of enterprises' involvement in general or specific innovative activity over a specific period. The degree of enterprises' involvement in innovation is usually evaluated as a ratio between the number of enterprises engaged in technological, organisational or marketing innovation and the total number of enterprises observed in a country, an industry, a sector, a region, etc. over a reporting period. **Technological innovation** are innovative activities resulted in the form of new or significantly improved goods and services, introduced on the market, or new or significantly improved production processes or services delivery (provision) methods, used in practice. An innovation is considered to have been implemented if it has been deployed in an industry or introduced in a market. **Organisational innovation** includes implemented new business practices, workplace organisation methods and external relations management methods. Organisational innovations drive enterprises' efficiency by cutting administrative and transaction costs, improving workplace organisation (worktime optimisation) and thereby boosting productivity, opening access to assets as yet unavailable in the market, and

achieving cost saving regarding delivery and supply. **Marketing innovation** includes implemented new or significantly improved marketing methods that represent substantial changes in the design and packaging of goods or services, new sales strategies, methods of goods and services' presentation, launch and promotion in the target markets, or new pricing strategies. Marketing innovations are undertaken in order to meet the customers' needs more fully, to increase the enterprise's customer base and to expand into new markets so as to increase sales.

Innovation activity of enterprises is determined as the ratio between the number of enterprises carrying out all types of innovation simultaneously (technological, marketing and organisational innovation) or selected types of innovation (their combination) and the total number of enterprises surveyed over a certain period.

International Digital Economy and Society Index (I-DESI) measures the digital economy performance of EU28 Member States and the EU as a whole in comparison with 17 non-EU countries, using a similar methodology to the EU DESI index. I-DESI combines 24 indicators and uses a weighting system to rank each country based on its digital performance with the aim to benchmarking the development of the digital economy and society. The index is calculated by the European Commission Directorate General for Communications Networks, Content, and Technology. The ranking is available at https://op.europa.eu/en/publication-detail/-/publication/2feb6564-f9a7–11e7-b8f5–01aa75ed71a1/language-en

Internet is a worldwide (global) network of independent computer networks connected with each other to exchange data via standard open protocols.

Internet subscriptions are individuals or legal entities having entered into a services provision contract/contracts on the use of data transmission network at the end of the reporting period.

Internet use for downloading official forms includes data usage to obtain blank forms for their subsequent completion and submission to relevant public authorities. Such forms can be found on public authorities' websites, sent via e-mail or other data transmission methods.

Internet use for submitting completed forms online includes completing forms directly on public authorities' websites or sending completed forms via e-mail or other data transmission methods.

Internet use for e-procurement includes networks usage to submit auction bids, enter into supply or services contracts with the federal or municipal governments.

IT industry is a set of enterprises providing services mainly intended for (or contributing to) electronic data collection, processing, storage, and presentation. By Order no. 502 of December 30, 2014 issued by the Ministry of Telecom and Mass Communications of the Russian Federation, the following types of economic activities are included into IT industry as per OKVED2:

- Computer programming activities (OKVED2 code: 62.01);
- Computer consultancy activities (62.02);
- Computer facilities management activities (62.03);
- Data processing, hosting and related services (63.11).

Local Online Service Index (LOSI) is an integral index calculated by UN DESA as part of the global E-Government Development Index in order to assess e-government intensity on municipal level. This ranking was first made 2018 and covers 40 cities in various countries. The index includes 60 indicators grouped in 4 groups. Technology indica-

tors comprise 12 metrics measuring the city website's convenience; another 26 indicators (Content provision) measure the relevancy of information presented therein; Service provision indicators (13) measure the provision of basic services via the city's website, and the remaining 9 indicators make up the Participation and Engagement group measuring municipal engagement initiatives channelled via that website. Every indicator is either 1 (meeting the criteria) or 0 (not meeting the criteria). Thus, the range of LOSI values is 0 to 60.

Mobile wireless broadband subscriptions are active mobile wireless subscriptions with advertised top access speed of 256 kbit/s and higher.

Mobile Internet subscriptions are active mobile cellular subscriptions with Internet access services.

Mobile phone is a telephone with an installed SIM-card.

Museum artefacts added into e-catalogues are museum artefacts whose details are added to museums' e-catalogues.

Neurotechnology is the assembly of methods and instruments, including artificial intelligence, that enable a direct connection of technical components with the nervous system. These technical components are electrodes, computers, or intelligent prostheses.

Number of employees is determined based on random labour force surveys conducted by Rosstat. Employees are those aged between 15 and 72 who performed any paid work (at least one hour per week) related to production of goods or provision of services (including self-employed persons). Employees also include those who were off but retained their job during the survey week.

Parental control filtering tools are a set of rules and measures to prevent the negative impact of Internet and computers on the person under care (usually a minor).

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.

Invention is a technical and/or engineering solution pertaining to a product (a device, a material, a germ strain, plant or animal cell culture) or to a method (a process of manipulating material objects through material means). Any invention must possess novelty and ingenuity and must be industrially applicable.

Quantum technology is a quickly emerging field in physics and engineering. By explicitly controlling effects such as quantum entanglement, quantum superposition and quantum tunnelling, novel applications related to quantum computing, cryptography, metrology, sensors etc. can be created. In particular, this technology is likely to transform mass data transmission and processing.

Radio and TV coverage is determined as the ratio between the population able to receive radio and TV programmes and the total population of the respective Russian region.

Country's research specialisation index (by research field) compares the percentage of publications in a specific research field in the total number of scientific publications by the authors of that country in scientific journals indexed in Web of Science or Scopus to its share in the world total number of indexed publications. If the index value of a country is above 1.0, the research field is considered to be the country's specialisation.

RFID technologies are automatic identification and data capture technologies which enable reading or recording data stored in RFID tags by means of radio signals.

SCM (Supply Chain Management) software is a system that ensures an automatic connection with suppliers/customers' ordering systems.

Sensorics is the technology and activity related to creation, manufacture, and use of sensors that collect and transmit information about the environment through data networks.

Servers are industrially manufactured or assembled server equipment (except personal computers and PC-based network servers). Servers include standard servers, servers based on reduced instruction set computer (RISC) architecture (IBM Power, Oracle T series), supercomputers, special hardware and software suites (HP Superdome, Oracle Exadata).

Social sphere includes education, healthcare, and cultural institutions. Data on ICT usage in the social sphere are broken down into higher education institutions, healthcare organisations, libraries, archives, museums, other arts and culture institutions, and entertainment businesses, as per Section Q of OKVED2, codes 85.22, 90, and 91.

Technological trend is a development in a subject area which emerged completely or partly in the past and is very likely to persist in the future. This Data Book includes information about technological trends related to end-to-end digital technologies stated as priority areas in the national Digital Economy Programme (approved by Directive 1632-r of the Government of Russia of July 28, 2017).

Virtual Reality technologies are technologies of computer-aided 3D modelling of images or spaces whereby humans can interact with a synthesised (virtual) reality and receive sensory feedback therefrom.

Website is an Internet site which has a specific address and an owner, and comprises web pages. For statistical purposes, an enterprise is considered to have a website if it has at least one web page displaying regularly updated information (at least once every six months).

Web content filtering tools include hardware devices with integrated software that restrict access to Internet resources which are harmful for pupils' education and character development.

Wireless data technologies are methods of data transmission over standard radio interface without any fixed lines.

Wireless subscriptions mean active subscriptions with mobile, satellite, fixed, terrestrial fixed wireless, and terrestrial mobile wireless Internet access.

MAJOR HSE ISSEK PUBLICATIONS ON INFORMATION SOCIETY AND DIGITAL ECONOMY STATISTICS

2001–2005

Gaslikova I. R., Gokhberg L. M. Information Technology in Russia. Moscow, 2001. (in Russian)

The Use of Information Networks in the Russian Economy: Data Book. Moscow: State University – Higher School of Economics, 2004. (in Russian)

Information and Communication Technologies in the Russian Economy: Data Book. Moscow: State University – Higher School of Economics, 2005. (in Russian)

Information Technology in Russia. 2001.

Internet Usage in the Russian Economy: Data Book. Moscow: State University – Higher School of Economics, 2004.

Gokhberg L., Shuvalova O. Russian Public Opinion of the Knowledge Economy: Science, Innovation, Information Technology and Education as Drivers of Economic Growth and Quality of Life. The British Council, 2004.

Indicators for the Information Society in the Baltic Region 2005. Action Line 6. Copenhagen, 2005.

2006–2010

Information and Communication Technology in the Russian Economy: Data Book. 2006. (in Russian)

Information Society Statistics in the Russian Federation: Harmonization with International Standards / ed. by L. Gokhberg and P. Bøegh-Nielsen. 2007. (in Russian)

Information and Communication Technology in the Russian Economy: Data Book. 2007. (in Russian)

Information Society Indicators in the Russian Federation: Data Book. Moscow: State University – Higher School of Economics, 2009. (in Russian)

Science and Technology. Innovation. Information Society: Pocket Data Book. Moscow: State University – Higher School of Economics, 2009. (in Russian)

Information Society Indicators in the Russian Federation: Data Book. Moscow: State University – Higher School of Economics, 2010. (in Russian)

Science and Technology. Innovation. Information Society: Pocket Data Book. Moscow: State University – Higher School of Economics, 2010. (in Russian)

Business Climate in the sphere of IT services: Information and Analytical Data. 2010. (in Russian)

Information Society Statistics in the Russian Federation: Harmonization with International Standards / ed. by L. Gokhberg and P. Bøegh-Nielsen. 2007.

Information and Communication Technology in the Russian Economy: Data Book. 2007.

Science and Technology. Innovation. Information Society: Pocket Data Book. 2009.

Science and Technology. Innovation. Information Society: Pocket Data Book. 2010.

2011–2015

Information Society Indicators in the Russian Federation: Data Book. Moscow: National Research University – Higher School of Economics (HSE), 2011. (in Russian)

Science and Technology. Innovation. Information Society: Pocket Data Book. Moscow: National Research University – Higher School of Economics (HSE), 2011. (in Russian)

Russian Innovation Index / ed. by. L. Gokhberg. Moscow: National Research University – Higher School of Economics (HSE), 2011. (in Russian)

Business Climate in the sphere of IT services in the 1st half of 2011: Information and Analytical data. 2011. (in Russian)

Abdrakhmanova G., Kovaleva G. The Use of Information and Communication Technologies in the System of Vocational Education // Monitoring of Education Markets and Organizations: Newsletter. 2012. No. 1 (55). (in Russian)

Information Society Indicators in the Russian Federation: Data Book. Moscow: National Research University – Higher School of Economics (HSE), 2012. (in Russian)

Information Society: Development Trends: Analytical overview. Moscow: National Research University – Higher School of Economics (HSE), 2012. (in Russian)

Science and Technology. Innovation. Information Society: Pocket Data Book. Moscow: National Research University – Higher School of Economics (HSE), 2012.

Knowledge Economy in Statistical Terms: Science, Technology, Innovation, Education, Information Society: A Dictionary / ed. by L. Gokhberg. Moscow: Economics, 2012. (in Russian)

Long-term Priorities of Applied Science in Russia / ed. by L. Gokhberg. Moscow: National Research University – Higher School of Economics (HSE), 2013. (in Russian)

Information Society Indicators in the Russian Federation: Data Book. Moscow: National Research University – Higher School of Economics (HSE), 2013. (in Russian)

Internet Usage by Individuals: A Quick Outlook. No. 1 (2013). (in Russian)

Internet Usage by Enterprises: A Quick Outlook. No. 2 (2013). (in Russian)

Electronic Public Services: The Demand on the Part of Individuals and Enterprises: A Quick Outlook. No. 3 (2013). (in Russian)

Science and Technology. Innovation. Information Society: Pocket Data Book. 2013. Moscow: State University – Higher School of Economics, 2013. (in Russian)

Russian S&T Foresight 2030. Information and Communications Technology / ed. by L. Gokhberg, I. Agamirzyan. Moscow: Russian Ministry of Education and Science, Higher School of Economics, 2014. (in Russian)

Information Society Indicators in the Russian Federation: Data Book. Moscow: National Research University – Higher School of Economics (HSE), 2014. (in Russian)

Information Society: Trends in the Regions of the Russian Federation: Data Book. Moscow: National Research University – Higher School of Economics (HSE), 2014. (in Russian)

Science and Technology. Innovation. Information Society: Pocket Data Book. Moscow: National Research University – Higher School of Economics (HSE), 2014. (in Russian)

Information Society Indicators in the Russian Federation: Data Book. Moscow: National Research University – Higher School of Economics (HSE), 2014. (in Russian)

Science and Technology. Innovation. Information Society: Pocket Data Book. Moscow: National Research University – Higher School of Economics (HSE), 2015. (in Russian)

Information Society Indicators in the Russian Federation: Data Book. Moscow: National Research University – Higher School of Economics (HSE), 2015. (in Russian)

Information Society: Trends in the Regions of the Russian Federation. Issue 2: Data Book. Moscow: National Research University – Higher School of Economics (HSE), 2015. (in Russian)

Information Society: Demand for Information and Communication Technologies by the Russian Population: Analytical Report / ed. by L. Gokhberg, E. Zanozina. Moscow: National Research University – Higher School of Economics (HSE), 2015. (in Russian)

Business Climate in small enterprises of the sphere of IT services: Information and Analytical Data. 2015. (in Russian)

The Internet and its Role and Place in the Lives of Russian People: The News Bulletin. No. 1. 2015. (in Russian)

Information Structure and Telecommunications Structure: The Main Condition of Information Society and Digital Economy Development: The News Bulletin. No. 2. 2015. (in Russian)

Science and Technology. Innovation. Information Society: Pocket Data Book. 2011.

Information Society Outlook / L. Gokhberg and C. Leonard (eds.). 2012.

Science and Technology. Innovation. Information Society: Pocket Data Book. 2012.

Information Society Indicators in the Russian Federation: Data Book. 2013.

Science and Technology. Innovation. Information Society: Pocket Data Book. 2013.

Information Society Indicators in the Russian Federation: Data Book. 2014.

Information Society: Trends in Regions of the Russian Federation: Data Book. 2014.

Science and Technology. Innovation. Information Society: Pocket Data Book. 2014.

2016–2019

Information Society Indicators in the Russian Federation: Data Book. Moscow: National Research University – Higher School of Economics (HSE), 2016. (in Russian)

Science and Technology. Innovation. Information Society: Pocket Data Book. Moscow: National Research University – Higher School of Economics (HSE), 2016. (in Russian)

Methodological recommendations concerning the studies in the field of structure and volume of Internet economy in Russia. 2016. (in Russian)

Abdrakhmanova G. I. Gender and the Russian ICT Sector Development // ITU News. 2016, issue 4. Pp. 27–29

Business Climate in the Enterprises of the Sphere of IT Services: Information and Analytical Data. 2016. (in Russian)

Telecommunications: The Growth of Modern Communication Services: The News Bulletin. No. 1 (6). 2016. (in Russian)

Russia in ICT Development Ratings: The News Bulletin. No. 2 (7). 2016. (in Russian)

Gender Factor in Digital Economy: The News Bulletin. No. 3 (8). 2016. (in Russian)

Internet Economy in Russia: The News Bulletin. No. 4 (9). 2016. (in Russian)

Russia in E-government Development Ratings: The News Bulletin. No. 5 (10). 2016. (in Russian)

Internet Economy in Russia: The 2015 Results: The News Bulletin. No. 5. 2016. (in Russian)

IT Industry Development: A Quick Outlook / Science, Technology & Innovation Series. No. 27. 09 November 2016. (in Russian)

Russia in ICT Development Ratings 2016: A Quick Outlook / Science, Technology & Innovation Series. No. 30. 30 November 2016. (in Russian)

Data Protection in Smart Systems // Global Technology Trends. Information & Communications Technology Series. No. 1. 2016. (in Russian)

Industrial Internet of Things: A Paradigm Shift in the Industry // Global Technology Trends. Information & Communications Technology Series. No. 10. 2016. (in Russian)

Digital Economy Indicators 2017: Data Book

Innovative Development Ranking of Russian Regions. Issue 5. 2017. (in Russian)

A Model for Statistical Monitoring of the Development of the Russian Segment of Internet. 2017. (in Russian)

Plaksin S. M., Abdrakhmanova G. I., and Kovaleva G. I. Approaches to Defining and Measuring Russia's Internet Economy // Foresight. 2017. Vol. 11. No. 1. Pp. 55–65. (in Russian)

E-commerce in Russia: A Quick Outlook / Science, Technology & Innovation Series. No. 55. 09 June 2017. (in Russian)

Digital Skills among the Public // Digital Economy: A Quick Outlook. 05 July 2017. (in Russian)

Russia's IT Industry // Digital Economy: A Quick Outlook. 28 September 2017. (in Russian)

Population's Demand for Digital Technology // Digital Economy: A Quick Outlook. 11 October 2017. (in Russian)

An Outlook on Mass-scale Open Online Higher Education Courses // Digital Economy: A Quick Outlook. 09 November 2017. (in Russian)

Tomorrow's Applications of Silicon Photonics // Global Technology Trends. Information & Communications Technology Series. No. 1. 2017. (in Russian)

Digital Media: New Creation and Usage Models // Global Technology Trends. Information & Communications Technology Series. No. 4. 2017. (in Russian)

Digital Economy Indicators 2018: Data Book. (in Russian)

Digital Economy 2018: Pocket Data Book. (in Russian)

Trends of the Internet's Development in Russia. Coordination Centre for the National Internet Domain. National Research University – Higher School of Economics (HSE), 2018. (in Russian)

Technological Future of the Russian Economy: A paper presented at the 19th International Research Conference for Contemporary Issues of Economic and Social Development held in Moscow 10–13 April 2018. (in Russian)

A Cutting-edge Model of Government Statistics in a Digital Age: A paper presented at the 19th International Research Conference for Contemporary Issues of Economic and Social Development held in Moscow 10–13 April 2018. (in Russian)

Digital Competence of Russian Scientists // Digital Economy: A Quick Outlook. 01 March 2018. (in Russian)

Women's ICT Professional and ICT User Skills // Digital Economy: A Quick Outlook. 26 April 2018. (in Russian)

Digital Talent // Digital Economy: A Quick Outlook. 07 June 2018. (in Russian)

Digitisation's Contribution towards the Growth of Russia's Economy // Digital Economy: A Quick Outlook. 04 July 2018. (in Russian)

Digitisation of Business Processes // Digital Economy: A Quick Outlook. 22 August 2018. (in Russian)

The Russian ICT Sector // Digital Economy: A Quick Outlook. 14 November 2018. (in Russian)

Integrating General Public into the Digital Space // Digital Economy: A Quick Outlook. 06 December 2018. (in Russian)

Digital Economy: Global Trends and Russian Business Practice. 2018 (in Russian)

Trends of the Internet Development amidst the Nascent Digital Economy. Coordination Centre for the National Internet Domain. National Research University – Higher School of Economics (HSE), 2019. (in Russian)

Digital Economy: Pocket Data Book. 2019. (in Russian)

What is Digital Economy? Trends, Competence, and Measurement: A paper presented at the 20th International Research Conference for Contemporary Issues of Economic and Social Development held in Moscow 9–12 April 2019. (in Russian)

Business Digitisation Index // Digital Economy: A Quick Outlook. 27 February 2019. (in Russian)

Digital Activity of Manufacturing Enterprises 2018 // Digital Economy: A Quick Outlook. 06 March 2019. (in Russian)

The Need for End-to-End Digital Technology: Cloud Services // Digital Economy: A Quick Outlook. 18 April 2019. (in Russian)

Digital Activity of the Retail Sector 2018 // Digital Economy: A Quick Outlook. 24 April 2019. (in Russian)

Abdrakhmanova G. Gender and the Russian ICT Sector's Development // ITU News Magazine. 2016. No. 4. Pp. 27–29.

Abdrakhmanova G., Kovaleva G., Bulchenko N. The Information Industry: Measuring Russia by International Standards // National Research University Higher School of Economics. Basic Research Program Working Paper Series: Science, Technology and Innovation. WP BRP 56/STI/2016.

Abdrakhmanova G., Kovaleva G., Plaksin S. Approaches to Defining and Measuring Russia's Internet Economy // National Research University Higher School of Economics Basic Research Program Working Paper. Science, Technology and Innovation Series. WP BRP 61/STI/ 2016.

Science and Technology. Innovation. Information Society: Pocket Data Book. 2016.

Science and Technology. Innovation. Information Society: Pocket Data Book. 2017.

Ena O., Abdrakhmanova G. ICT through the prism of critical technologies // Foresight. 2017. Vol. 19. No. 2. Pp. 121–138.

Abdrakhmanova G., Gokhberg L., Sokolov A. Indicators of Information and Communication Technology, in: Encyclopaedia of Information Science and Technology, Fourth Edition. Hershey: IGI Global, 2018.

Digital Economy: Pocket Data Book. 2019.

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