



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



FEDERAL STATE
STATISTICS SERVICE



HSE
UNIVERSITY



HSE Institute for Statistical
Studies and Economics
of Knowledge



2022

DIGITAL ECONOMY

POCKET DATA BOOK



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POCKET DATA BOOK

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D56

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This pocket data book contains the most recent statistical data representing the level and dynamics of the digital economy development in the Russian Federation. International comparisons are provided for a number of indicators.

The data book includes information of the Russian Federal State Statistics Service (Rosstat), Ministry of Digital Development, Communications and Mass Media of the Russian Federation, Federal Customs Service of Russia, Russian Central Bank (Bank of Russia), European Statistical Office (Eurostat), Organisation for Economic Cooperation and Development (OECD), International Telecommunication Union (ITU), United Nations Conference on Trade and Development (UNCTAD), UN Department of Economic and Social Affairs, World Intellectual Property Organisation (WIPO), Scopus database, and 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:

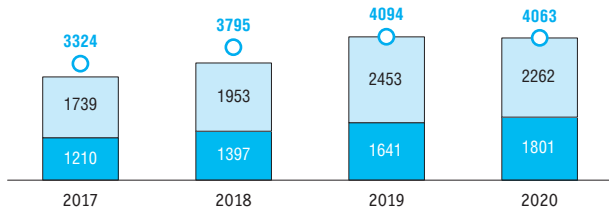
- ... data not available and not included in the totals,
- data not applicable,
- 0.0 insignificant value.

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



GROSS DOMESTIC EXPENDITURE ON DIGITAL ECONOMY DEVELOPMENT

1.1. Expenditure on digital economy development (billion roubles)

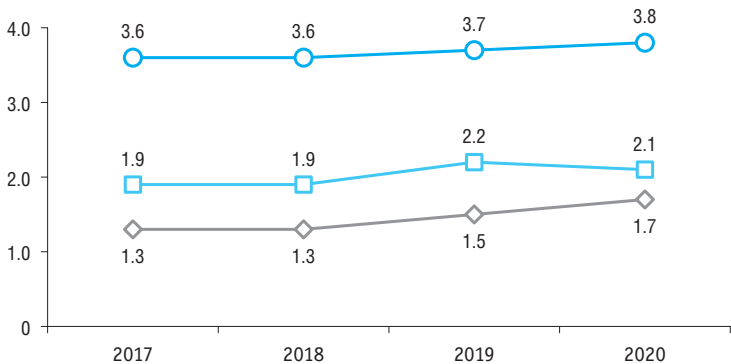


- Gross domestic expenditure on digital economy development
- Enterprises' domestic expenditure on development, dissemination, and use of digital technologies and related goods and services*
- Household expenditure on use of digital technologies and related goods and services*

* Here and in figure 1.2, the 2017–2018 data are given excluding expenditure on digital content. Enterprises' domestic expenditure on development, dissemination, and use of digital technologies and related goods and services is used to calculate indicator 'Gross domestic expenditure on digital economy development from all sources of funds as a percentage of the country's GDP' (session protocol no. 557pr of September 27, 2019 of the Digital Economy Subcommittee under the Government Commission on the Digital Development, Use of Information Technologies for Improving Quality of Life and Business Environment).

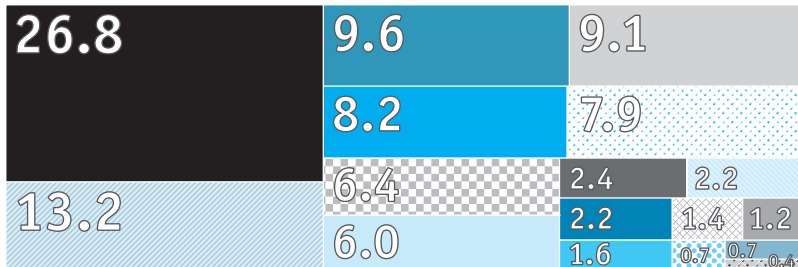
Source: here and below in this section, HSE ISSEK estimates based on Rosstat data.

1.2. Gross domestic expenditure on digital economy development as a percentage of GDP



- Gross domestic expenditure on digital economy development
- Enterprises' domestic expenditure on development, dissemination, and use of digital technologies and related goods and services

1.3. Percentage distribution of enterprises' domestic expenditure on development, dissemination, and use of digital technologies and related goods and services by type of economic activity: 2020



Information and communication

Financial and insurance activities

Education

Professional, scientific and technical activity

Manufacturing

Transportation and storage

Public administration and defence; compulsory social security

Wholesale and retail trade

Real estate activities

Human health and social work activities

Electricity, gas, steam and air-conditioning supply

Construction

Mining and quarrying

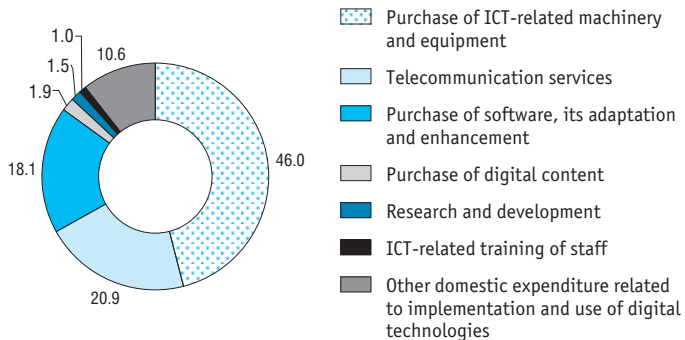
Administrative and support service activities

Arts, entertainment, and recreation

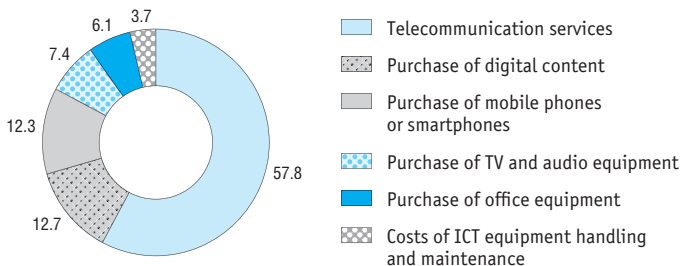
Agriculture, forestry and fishing

Other

1.4. Percentage distribution of enterprises' domestic expenditure on development, dissemination, and use of digital technologies and related goods and services by type: 2020



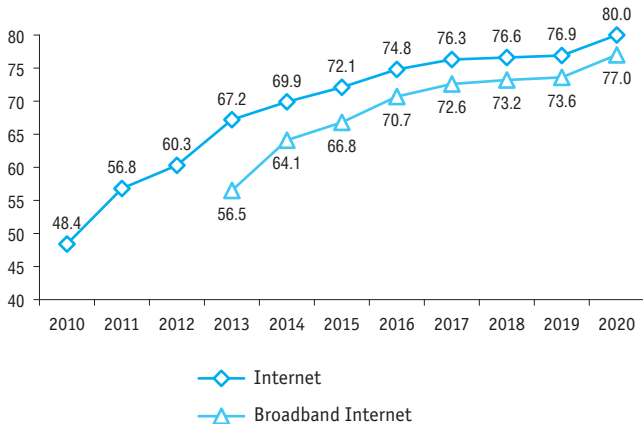
1.5. Percentage distribution of household expenditure on use of digital technologies and related goods and services by type





POPULATION IN THE DIGITAL WORLD

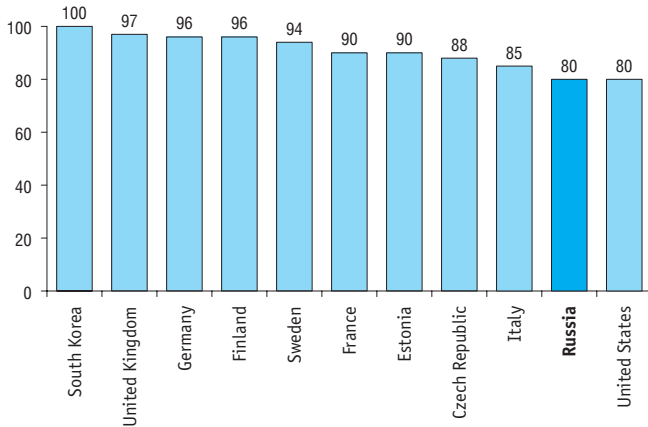
2.1. Households with Internet access (as a percentage of all households)



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

2.2. Households with Internet access by country: 2020*

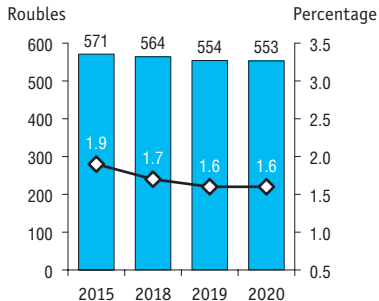
(as a percentage of all households)



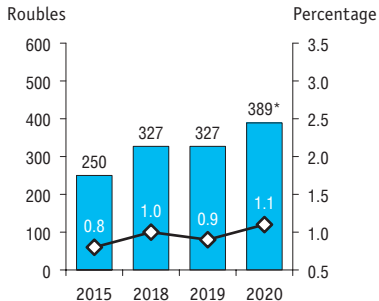
* Or nearest years for which data are available.

2.3. Ratio of Internet access tariffs for individuals to average per capita income

Fixed Internet subscriptions



Mobile Internet subscriptions



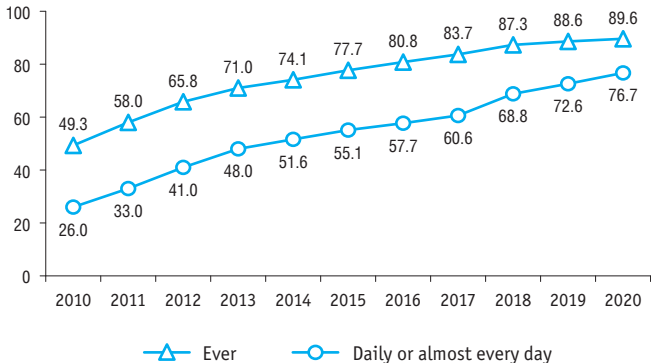
■ Subscription fee, December, roubles

◆ As a percentage of average per capita income

* Due to changes in the Rosstat methodology, the 2020 data are provided for the service 'Subscription fee for a mobile cellular network services package', which includes mobile Internet, minutes of phone calls, SMS messages.

2.4. Internet users

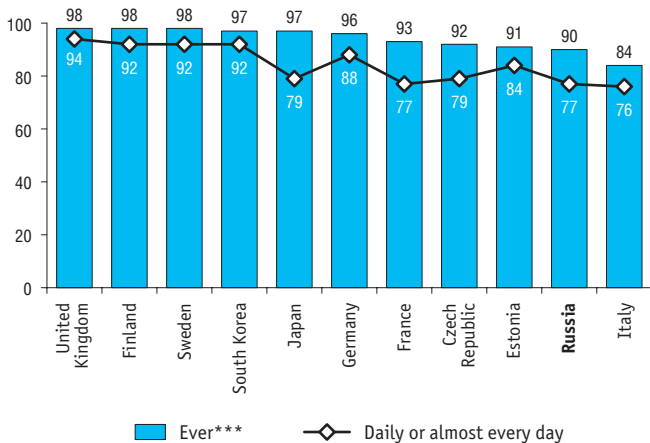
(as a percentage of all individuals aged 15–74*)



* Here and below in this section, the data for individuals' use of Internet refer to 2010, for 2011, by 16–74 years age group, for 2012, 18–74 years, for 2013–2016, 15–72 years.

2.5. Internet users by country: 2020*

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



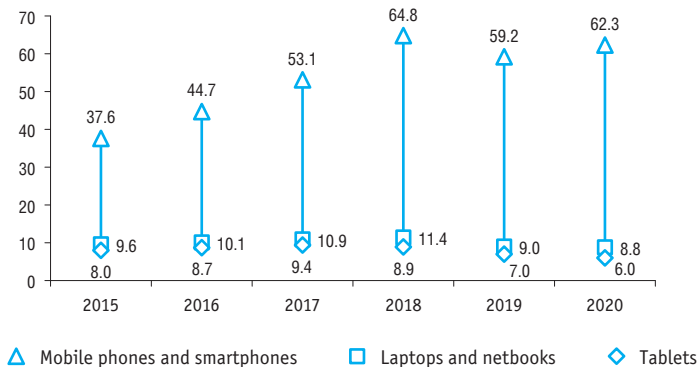
* Or nearest years for which data are available.

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

*** For South Korea and Japan, during the last 12 months.

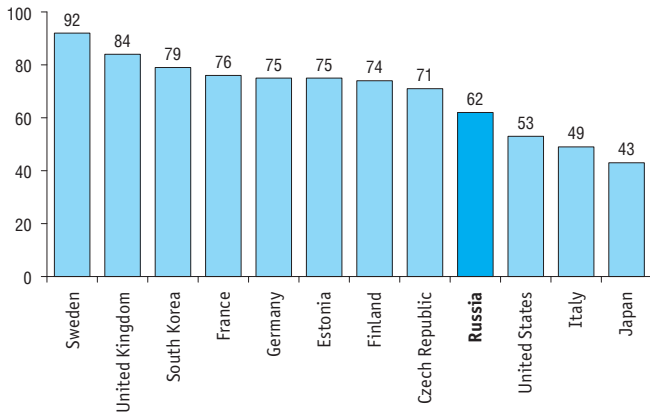
2.6. Individuals' use of mobile devices to access the Internet on the move or at work

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



2.7. Individuals' use of mobile phones or smartphones to access the Internet on the move or at work by country: 2020*

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



* Or nearest years for which data are available. For South Korea, United States, Japan, use of any mobile devices.

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

2.8. Digital skills

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

	2015	2018	2019	2020
Transferring files via e-mail	...	36.8	39.7	42.2
Using word processing software	38.8	41.1	40.4	40.4
Copying or moving files or folders	...	34.5	36.3	37.5
Using copy/paste tools in documents	...	22.4	24.9	27.7
Transferring files between a computer and other devices	27.6	31.1	31.0	27.3
Using spreadsheet software	21.7	20.8	22.0	22.9
Using software to edit photos, video, or audio files	21.3	21.2	21.9	20.9
Connecting and installing new devices	8.4	9.8	15.3	14.2
Creating e-presentations using special software	7.7	8.2	9.0	9.3
Searching, downloading, installing of software, and changing software configuration settings	5.8	5.5
Installing or reinstalling an operating system	2.8	2.8	2.9	2.5
Writing software by oneself using a programming language	1.0	1.1	1.2	0.7

2.9. Digital skills by country: 2020*

(as a percentage of all 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
Russia	27	23	21
Czech Republic	61	23	35
Estonia	57	30	38
Finland	66	34	55
France	60	27	32
Germany	66	33	48
Sweden	53	29	39
United Kingdom	56	39	49

* Or nearest years for which data are available.

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

2.10. Individuals' Internet activities related to communications by country: 2020*

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

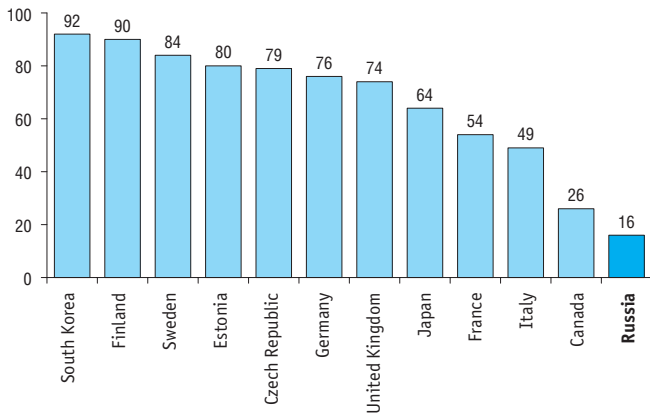
	Making online telephone/video calls	Participating in social media
Russia	65	64
Canada	50	73
Czech Republic	52	59
Estonia	63	65
Finland	78	75
France	48	42
Germany	65	54
Italy	65	48
Japan	58	66
South Korea	61	66
Sweden	73	73
United Kingdom	52	76
United States	44	63

* Or nearest years for which data are available.

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

2.11. Individuals' Internet activities related to reading or downloading online newspapers / magazines / e-books by country: 2020*

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

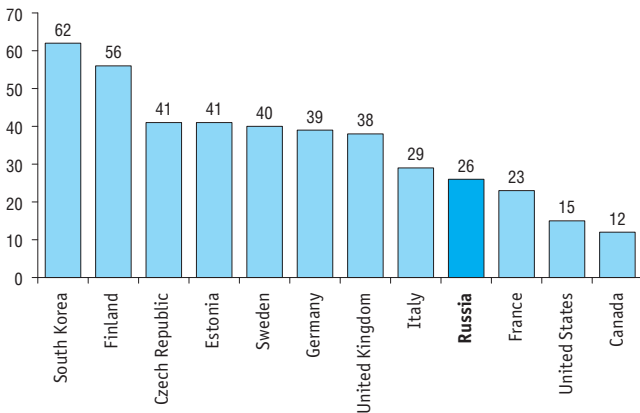


* Or nearest years for which data are available.

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

2.12. Individuals' Internet activities related to uploading personal files to publicly accessible sources by country: 2020*

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

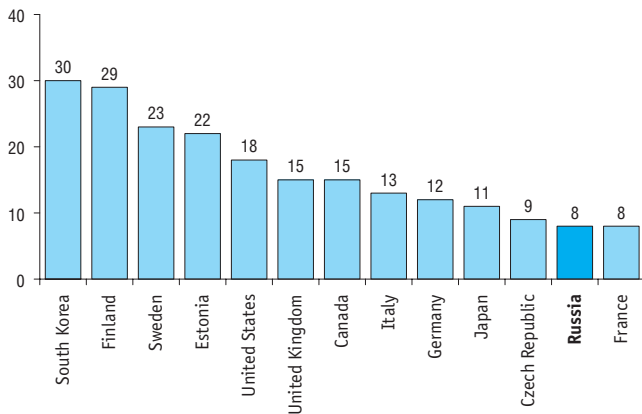


* Or nearest years for which data are available.

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

2.13. Individuals' Internet activities related to e-learning by country: 2020*

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

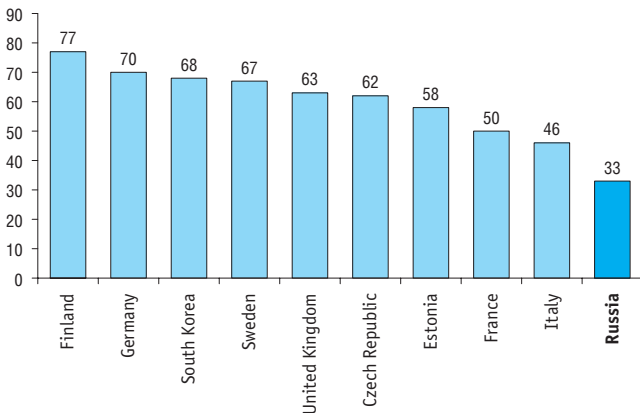


* Or nearest years for which data are available.

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

2.14. Individuals' Internet activities related to searching for information related to health and healthcare services: 2020*

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

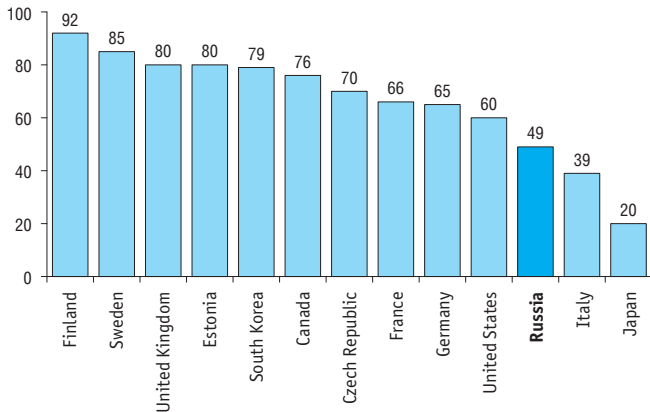


* Or nearest years for which data are available.

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

2.15. Individuals' Internet activities related to financial transactions by country: 2020*

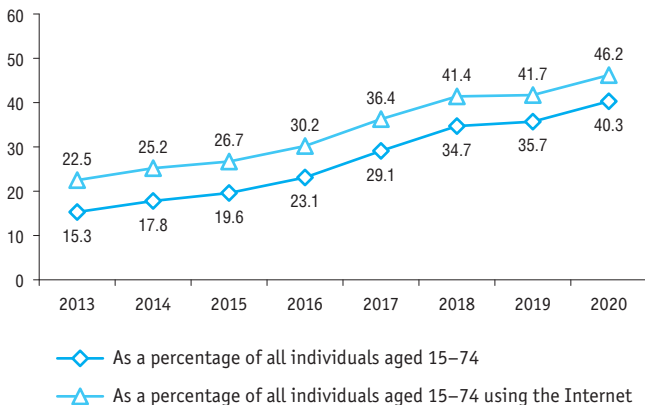
(as a percentage of all individuals aged 15–74 years**)



* Or nearest years for which data are available.

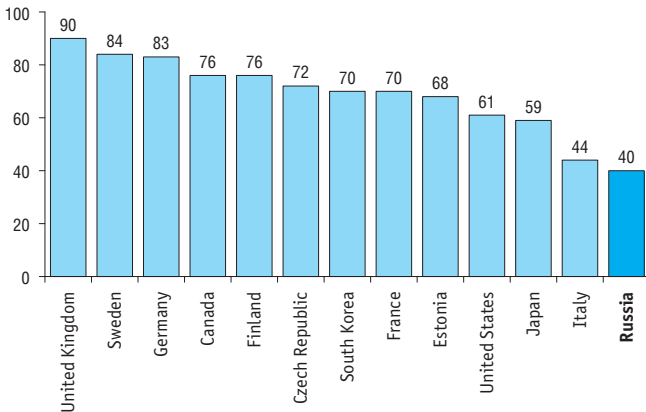
** For countries other than Russia, aged 16–74.

2.16. Individuals' Internet activities related to ordering goods or services



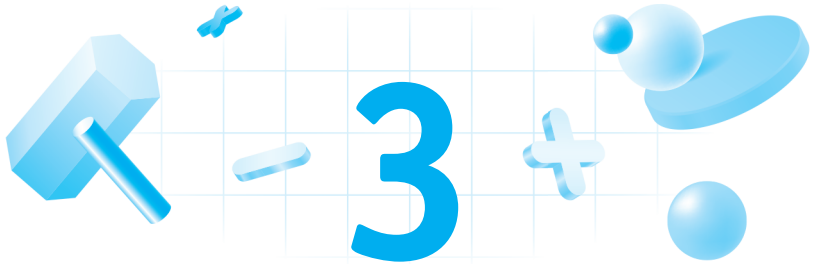
2.17. Individuals' Internet activities related to ordering goods or services by country: 2020*

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



* Or nearest years for which data are available.

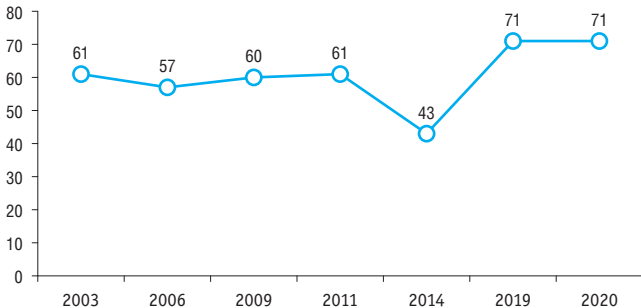
** For countries other than Russia, aged 16–74.



PUBLIC ATTITUDES TOWARDS DIGITAL TECHNOLOGIES

3.1. Career attractiveness of software developer, IT specialist*

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



* The share of respondents who 'would be happy' over their child's choice (a son or a daughter) with a career of software developer, IT specialist.

Source: here and below in figures 3.1–3.3, for 2020, the results of a representative survey of the adult Russian population aged 18–65 conducted by HSE ISEK within the Russian Longitudinal Monitoring Survey (RLMS–HSE) with the support of the HSE Basic Research Programme (carried out in September 2020 – January 2021 with participation of 7,467 respondents); for 2003, 2006, 2009, 2011, 2014, and 2019, results of representative surveys of the adult Russian population aged 18–65 conducted by HSE ISEK within the Russian Monitoring Survey of Innovative Behaviour of the Population.

3.2. Interest towards using digital innovations: 2015 vs 2020

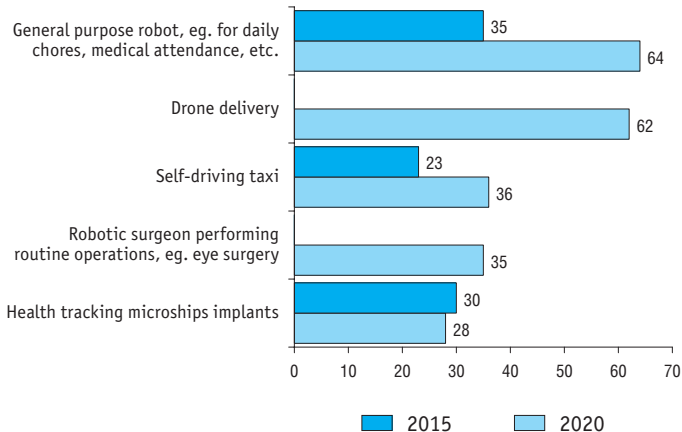
(as a percentage of all respondents aged 18–65)

	2015		2020
	Would like to have used it	Ready to pay for the good/service	Have used it
Smart home devices	45	anyway if I have spare money	5 34
Online doctor consultations*	45	anyway if I have spare money	7 27
Carsharing	32	anyway if I have spare money	5 23

* For 2015, 'Remote consultation with a doctor using specialised equipment instead of in-person visit in a clinic'.

3.3. Interest towards using smart technologies*

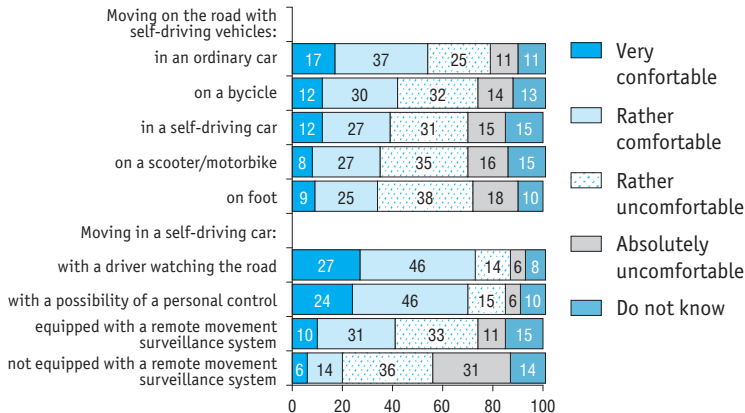
(as a percentage of all respondents aged 18–65)



* The share of respondents who would love to have used these technologies if they had such an opportunity.

3.4. Public attitudes towards self-driving vehicles appearing on the roads: 2020

(as a percentage of all respondents using the Internet aged 14 and over)

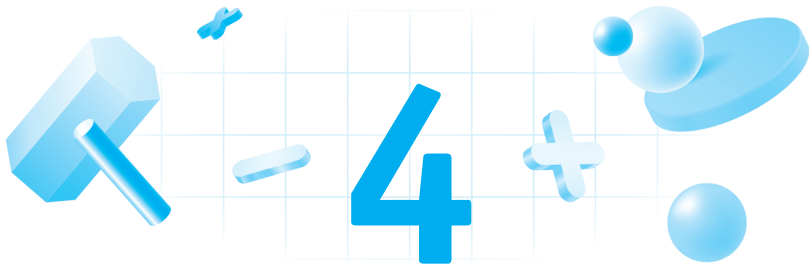


Source: here and below in figures 3.4–3.5, results of an online poll of regular Internet users aged 14 and over conducted by HSE ISSEK within the framework of the Basic Research Program subsidised from institutional R&D funding. The online poll was conducted in November 2020, with 3,000 respondents participating.

3.5. Public opinion on the possibility of drone delivery: 2020

(as a percentage of all respondents using the Internet aged 14 and over)

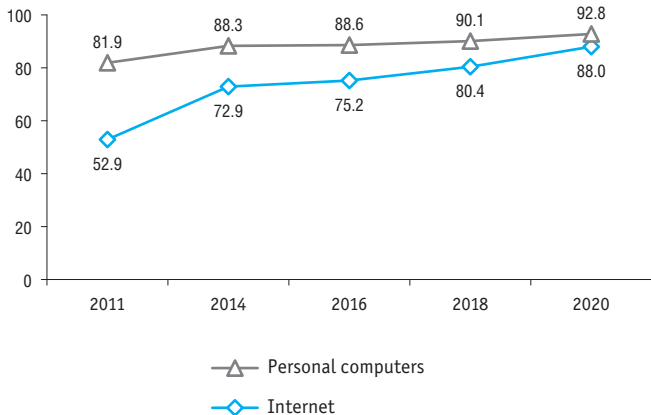




CHILDREN AND THE INTERNET

4.1. Children's use of personal computers and Internet

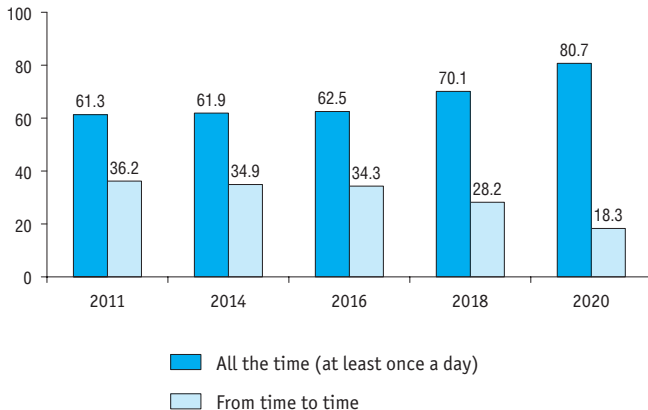
(as a percentage of children under 15 who study at general education institutions)



Source: here and below in this section, Rosstat.

4.2. Children's use of Internet

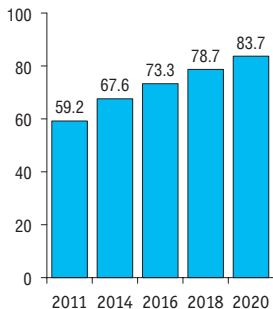
(as a percentage of children under 15 who study at general education institutions and use the Internet)



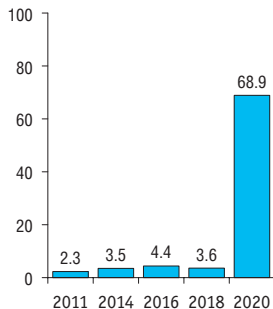
4.3. Children's Internet activities

(as a percentage of children under 15 who study at general education institutions and use the Internet)

Homework, school projects preparation

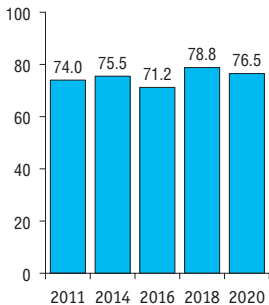


Distance learning

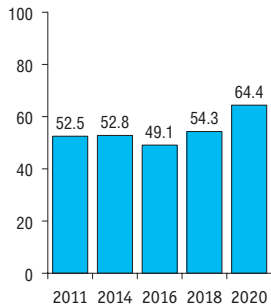


(continued)

**Entertainment
(watching films, playing games, etc.)**

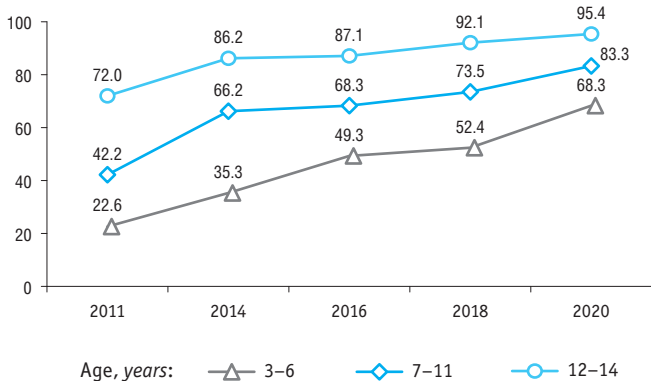


Participation in social media



4.4. Children's Internet activities by age

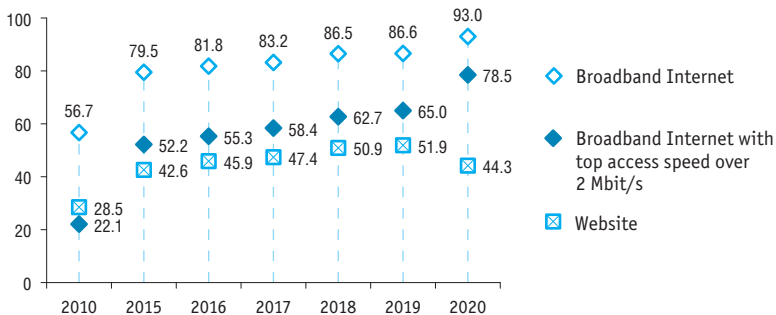
(as a percentage of children in the corresponding age group who study at general education institutions)





DIGITALISATION OF SECTORS

5.1. Enterprises' use of Internet (as a percentage of all enterprises)



Source: here and below in this section, for Russia, Rosstat; for countries other than Russia, Eurostat.

5.2. Enterprises' with fixed broadband Internet access by type of economic activity: 2020

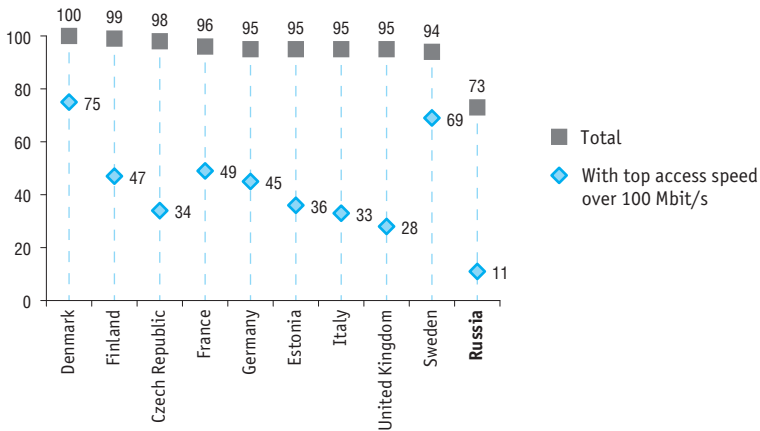
(as a percentage of all enterprises)

	Total	By top access speed		
		256 kbit/s– 1.9 Mbit/s	2.0–100.0 Mbit/s	Over 100 Mbit/s
Total	73.0	10.4	51.3	11.3
Agriculture, forestry and fishing	57.8	9.3	43.2	5.3
Mining and quarrying	59.9	6.4	43.1	10.4
Manufacturing	71.9	5.9	54.9	11.3
Electricity, gas, steam and air conditioning supply	76.1	10.5	56.5	9.1
Water supply, sewerage, waste management, and remediation activities	64.9	12.6	45.8	6.5
Construction	52.6	5.1	39.0	8.4
Wholesale and retail trade	79.5	16.1	47.2	16.3
Transportation and storage	69.5	8.8	49.3	11.4
Accommodation and food service activities	66.1	10.8	38.7	16.6

(continued)

	Total	By top access speed		
		256 kbit/s– 1.9 Mbit/s	2.0–100.0 Mbit/s	Over 100 Mbit/s
Information and communication	79.0	6.6	49.9	22.5
IT industry	81.2	4.4	53.3	23.5
Financial and insurance activities	79.6	3.2	57.3	19.3
Real estate activities	57.2	8.3	40.9	8.2
Professional, scientific and technical activities	63.6	7.9	44.9	10.8
Higher education	88.4	2.8	54.9	30.7
Human health and social work activities	82.5	7.9	67.5	7.1
Arts, entertainment and recreation	67.0	12.8	47.6	6.6
Public administration and defence; compulsory social security	74.6	12.3	54.8	7.3

5.3. Enterprises' with fixed broadband Internet access by country: 2020 (as a percentage of all enterprises)



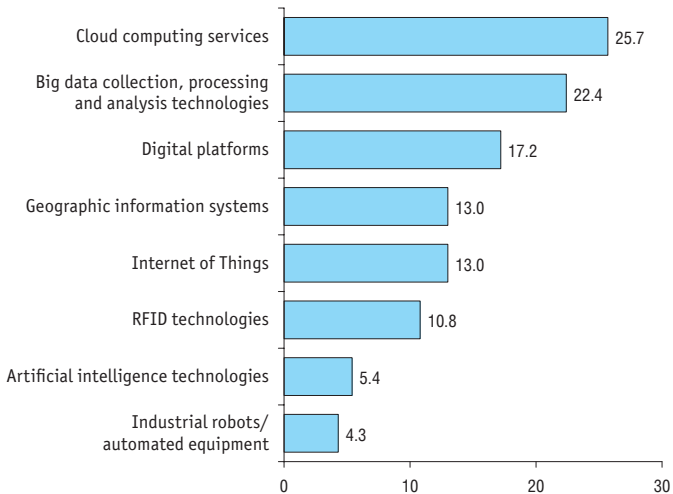
5.4. Enterprises' use of Internet by purpose: 2020

(as a percentage of all enterprises)



5.5. Enterprises' use of digital technologies: 2020

(as a percentage of all enterprises)



5.6. Enterprises' use of digital technologies by type of economic activity: 2020

(as a percentage of all enterprises)

	Cloud computing services	Big data collection, processing and analysis technologies	Digital platforms	Geographic information systems
Total	25.7	22.4	17.2	13.0
Agriculture, forestry and fishing	17.8	17.2	10.2	14.1
Mining and quarrying	19.0	21.8	13.2	18.8
Manufacturing	27.1	26.5	16.0	12.9
Electricity, gas, steam and air conditioning supply	19.4	23.7	16.6	19.9
Water supply, sewerage, waste management, and remediation activities	19.4	20.8	11.9	15.6
Construction	16.0	16.3	8.9	8.6
Wholesale and retail trade	38.3	25.9	30.3	13.8
Transportation and storage	20.1	21.0	14.8	15.8
Accommodation and food service activities	27.5	28.8	15.7	8.1

(continued)

	Cloud computing services	Big data collection, processing and analysis technologies	Digital platforms	Geographic information systems
Information and communication	31.9	29.1	22.6	15.2
IT industry	34.6	29.5	24.2	12.5
Financial and insurance activities	41.0	44.4	36.3	26.0
Real estate activities	16.7	15.9	9.1	8.7
Professional, scientific and technical activities	21.1	18.6	11.4	10.1
Higher education	45.9	27.7	35.6	19.5
Human health and social work activities	32.6	27.2	18.3	15.8
Arts, entertainment and recreation	19.5	17.0	9.7	7.6
Public administration and defence; compulsory social security	19.9	17.4	11.8	12.0

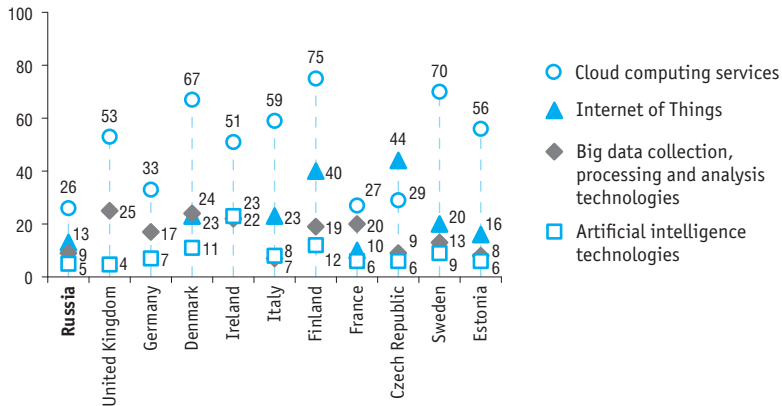
(continued)

	Internet of Things	RFID technologies	Artificial intelligence technologies	Industrial robots/ automated equipment
Total	13.0	10.8	5.4	4.3
Agriculture, forestry and fishing	11.6	8.1	2.2	4.1
Mining and quarrying	14.6	14.0	2.5	4.2
Manufacturing	15.8	16.5	3.6	17.2
Electricity, gas, steam and air conditioning supply	15.9	13.8	3.3	2.0
Water supply, sewerage, waste management, and remediation activities	12.3	7.9	2.5	2.3
Construction	8.6	6.3	1.3	1.5
Wholesale and retail trade	24.4	22.3	13.0	12.0
Transportation and storage	13.6	12.1	3.7	3.4
Accommodation and food service activities	21.4	13.1	9.7	4.4

(continued)

	Internet of Things	RFID technologies	Artificial intelligence technologies	Industrial robots/ automated equipment
Information and communication	14.6	13.6	7.8	1.4
IT industry	12.8	12.0	8.1	1.5
Financial and insurance activities	10.8	11.8	22.8	0.8
Real estate activities	8.5	6.2	1.8	1.4
Professional, scientific and technical activities	8.2	6.4	2.1	1.4
Higher education	17.1	26.2	8.4	4.6
Human health and social work activities	13.8	8.5	2.6	1.3
Arts, entertainment and recreation	8.1	5.7	1.8	0.8
Public administration and defence; compulsory social security	7.7	5.1	1.7	0.9

5.7. Enterprises' use of digital technologies by country: 2020 (as a percentage of all enterprises)



5.8. Enterprises' use of specialised software by type of economic activity: 2020

(as a percentage of all enterprises)

	Electronic document management systems	Electronic payment transactions	Access to databases through global information networks	Education and training programmes
Total	53.8	41.8	22.1	15.3
Agriculture, forestry and fishing	40.1	31.6	12.8	6.3
Mining and quarrying	44.1	34.2	9.5	16.7
Manufacturing	50.7	42.4	12.0	11.7
Electricity, gas, steam and air conditioning supply	55.2	41.8	15.7	21.6
Water supply, sewerage, waste management, and remediation activities	44.3	35.9	13.4	8.0
Construction	35.2	29.0	8.6	6.8
Wholesale and retail trade	43.3	36.5	15.7	12.8
Transportation and storage	45.7	33.0	11.7	18.5
Accommodation and food service activities	43.5	37.4	13.0	6.7

(continued)

	Electronic document management systems	Electronic payment transactions	Access to databases through global information networks	Education and training programmes
Information and communication	54.4	37.3	14.1	13.9
IT industry	58.7	33.8	13.7	17.0
Financial sector	41.9	36.4	16.5	21.6
Real estate activities	40.2	31.9	10.1	5.4
Professional, scientific and technical activities	45.3	35.5	11.7	9.1
Higher education	60.4	59.2	28.4	53.7
Human health and social work activities	61.0	52.1	19.6	11.6
Arts, entertainment and recreation	41.0	26.7	14.8	6.7
Public administration and defence; compulsory social security	55.5	38.1	17.4	8.5

5.9. Enterprises' use of cybersecurity tools by type of economic activity: 2020

(as a percentage of all enterprises)

	Electronic signature tools	Automatically updated antivirus software	Firewalls (software and hardware)
Total	68.6	63.6	44.7
Agriculture, forestry and fishing	58.0	48.7	27.2
Mining and quarrying	58.4	60.7	49.1
Manufacturing	71.0	69.0	54.2
Electricity, gas, steam and air conditioning supply	74.1	69.4	50.3
Water supply, sewerage, waste management, and remediation activities	68.3	51.1	27.9
Construction	48.2	45.0	30.1
Wholesale and retail trade	64.7	72.2	60.1
Transportation and storage	64.7	65.0	48.4
Accommodation and food service activities	61.7	58.0	37.0

(continued)

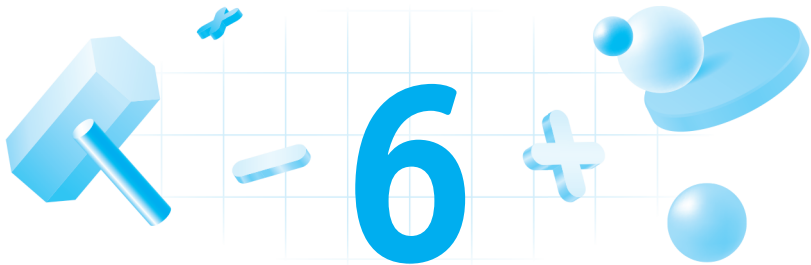
	Electronic signature tools	Automatically updated antivirus software	Firewalls (software and hardware)
Information and communication	72.5	71.0	53.3
IT industry	74.3	75.1	65.2
Financial and insurance activities	73.3	76.5	68.8
Real estate activities	58.4	45.9	27.8
Professional, scientific and technical activities	63.7	56.6	37.5
Higher education	79.0	80.9	71.3
Human health and social work activities	82.8	74.8	54.8
Arts, entertainment and recreation	66.7	49.8	23.9
Public administration and defence; compulsory social security	78.3	65.9	39.0

(continued)

	Spam filters	Data encryption for confidentiality facilities	Intrusion detection systems	Automated IT security control and analysis software
Total	40.4	38.5	32.0	27.2
Agriculture, forestry and fishing	23.7	22.0	18.5	16.5
Mining and quarrying	44.5	36.0	32.6	25.4
Manufacturing	49.4	41.1	38.1	28.8
Electricity, gas, steam and air conditioning supply	45.2	41.7	35.5	28.9
Water supply, sewerage, waste management, and remediation activities	24.3	25.3	18.9	16.6
Construction	29.2	23.1	22.9	18.2
Wholesale and retail trade	60.5	47.5	49.1	40.8
Transportation and storage	42.2	37.8	34.2	26.8
Accommodation and food service activities	39.0	30.8	29.2	27.5

(continued)

	Spam filters	Data encryption for confidentiality facilities	Intrusion detection systems	Automated IT security control and analysis software
Information and communication	50.3	47.3	43.0	38.1
IT industry	59.6	59.2	52.7	46.9
Financial and insurance activities	63.6	65.9	55.5	53.2
Real estate activities	26.0	24.5	19.9	16.5
Professional, scientific and technical activities	35.4	31.4	26.2	22.3
Higher education	63.3	59.3	47.8	36.3
Human health and social work activities	40.3	53.1	33.5	26.6
Arts, entertainment and recreation	22.5	22.3	14.4	13.2
Public administration and defence; compulsory social security	30.8	37.6	24.0	21.9



E-GOVERNMENT

6.1. E-Government Development Index by country: 2020*

	E-Government Development Index		Of which subindices values:		
	Rank	Value	Online Services Index**	Telecommunications Infrastructure Index**	Human Capital Index**
Denmark	1	0.9758	0.9706 (3)	0.9979 (2)	0.9588 (2)
South Korea	2	0.9560	1.0000 (1)	0.9684 (4)	0.8997 (23)
Estonia	3	0.9473	0.9941 (2)	0.9212 (11)	0.9266 (13)
Finland	4	0.9452	0.9706 (3)	0.9101 (15)	0.9549 (3)
Australia	5	0.9432	0.9471 (7)	0.8825 (21)	1.0000 (1)
...
Chile	34	0.8259	0.8529 (24)	0.7606 (51)	0.8643 (36)
Portugal	35	0.8255	0.8353 (35)	0.7948 (43)	0.8463 (45)
Russia	36	0.8244	0.8176 (39)	0.7723 (49)	0.8833 (31)
Italy	37	0.8231	0.8294 (36)	0.7932 (44)	0.8466 (44)
Bahrain	38	0.8213	0.7882 (45)	0.8319 (30)	0.8439 (46)

* 193 Member States were ranked.

** The country's subindex rank is provided in parenthesis.

Source: the United Nations Department of Economic and Social Affairs (UN DESA).

6.2. Individuals' online interaction with public authorities by country: 2020

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

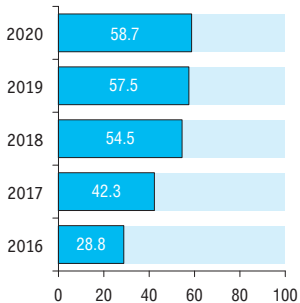
	Obtaining information from websites or apps	Downloading official forms	Submitting completed forms online
Russia	43	27	20
Czech Republic	53	29	28
Estonia	67	75	44
Finland	85	74	75
France	48	64	40
Germany	65	26	40
Italy	22	17	24
Sweden	79	74	53
United Kingdom	46	39	27

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

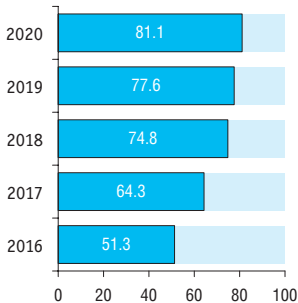
Source: here and below in this section, for Russia, Rosstat; for countries other than Russia, Eurostat

6.3. Public and municipal services received by individuals in digital form

As a percentage of all individuals aged 15–72

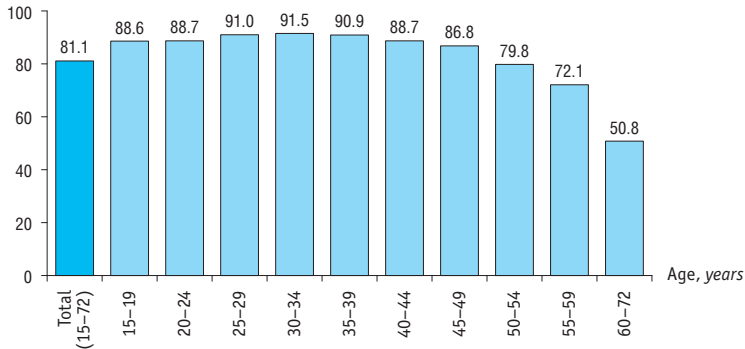


As a percentage of all individuals aged 15–72 who have received public and municipal services within the last 12 months



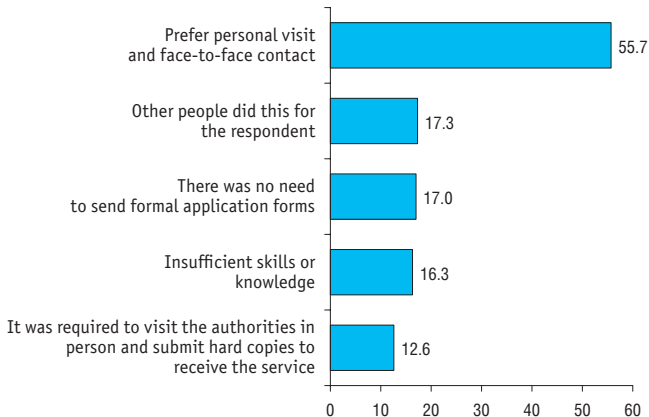
6.4. Public and municipal services received by individuals in digital form by age: 2020

(as a percentage of all individuals in each age group who have received public and municipal services within the last 12 months)



6.5. Individuals' reasons to refrain from receiving public and municipal services in digital form: 2020

(as a percentage of all individuals aged 15–72 who have not used the Internet to receive public and municipal services within the last 12 months)



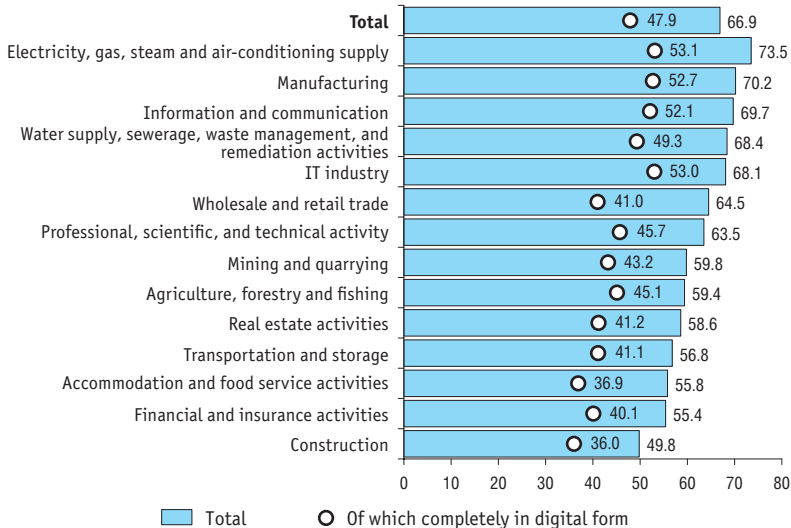
6.6. Enterprises' online interaction with public authorities: 2020

(as a percentage of all enterprises)

	Submitting completed forms online	Downloading official forms	Obtaining information from websites or apps	E-procurement
Total	65.7	64.6	60.0	36.0
Agriculture, forestry and fishing	58.6	58.0	48.3	23.5
Mining and quarrying	58.1	57.8	51.8	13.4
Manufacturing	71.2	70.3	62.7	24.6
Electricity, gas, steam and air conditioning supply	72.8	72.4	66.8	42.5
Water supply, sewerage, waste management, and remediation activities	68.5	68.0	59.0	40.7
Construction	48.0	46.8	40.7	21.2
Wholesale and retail trade	62.2	62.2	57.4	15.0
Transportation and storage	58.1	57.1	50.4	24.8
Accommodation and food service activities	54.1	52.8	42.9	25.8
Information and communication	68.1	69.0	63.6	38.2
IT industry	67.0	69.3	63.4	33.4
Financial and insurance activities	62.6	53.0	51.1	17.6
Real estate activities	57.5	55.9	49.5	22.2
Professional, scientific and technical activities	62.8	61.7	55.8	31.9

6.7. Public services received by enterprises in digital form: 2020

(as a percentage of all enterprises)





PERSONNEL

7.1. Employed in ICT task-intensive occupations by group of activities

	Thousand persons		As a percentage of total	
	2019	2020	2019	2020
Employed in ICT task-intensive occupations – total	8626.7	9148.9	100	100
Of which:				
ICT professionals – total	1665.5	1764.6	19.3	19.3
Managers				
ICT service managers	64.1	63.5	0.7	0.7
Professionals				
Software and multimedia developers and analysts	674.5	761.5	7.8	8.3
Database and network professionals	311.8	332.4	3.6	3.6
Electronics engineers	161.4	159.4	1.9	1.7
Telecommunications engineers	88.5	92.2	1.0	1.0
ICT sales professionals	11.5	15.9	0.1	0.2
Graphic and multimedia designers	27.1	36.0	0.3	0.4
Information technology trainers	7.0	10.8	0.1	0.1

(continued)

	Thousand persons		As a percentage of total	
	2019	2020	2019	2020
Technicians and associate professionals				
ICT operations and user support technicians	94.4	78.9	1.1	0.9
Telecommunications and broadcasting technicians	65.0	66.2	0.8	0.7
Electronics engineering technicians	50.2	43.1	0.6	0.5
Installers and servicers				
Electronics and telecommunications technology installers and servicers	110.0	104.7	1.3	1.1
Other ICT task-intensive occupations – total	6961.2	7384.3	80.7	80.7
Managers				
Business services and administration managers	839.7	826.6	9.7	9.0
Sales, marketing and development managers	193.5	199.5	2.2	2.2
Professional services managers	387.3	377.7	4.5	4.1

(continued)

	Thousand persons		As a percentage of total	
	2019	2020	2019	2020
Professionals				
Physical and earth science professionals	118.4	109.9	1.4	1.2
Architects, planners, surveyors and designers	448.2	471.0	5.2	5.1
University and higher education teachers	244.9	206.6	2.8	2.3
Finance professionals	2217.0	2293.2	25.7	25.1
Administration experts	1112.0	1236.2	12.9	13.5
Sales, goods and services marketing, and PR experts	1185.7	1456.3	13.7	15.9
Electrical engineers	214.5	207.2	2.5	2.3

Sources: here and below in this section, for Russia, HSE ISSEK estimates based on the data of the Rosstat, Ministry of Education of the Russian Federation, Ministry of Science and Higher Education of the Russian Federation; for countries other than Russia, Eurostat and OECD.

7.2. Employed in ICT task-intensive occupations by type of economic activity: 2020

(as a percentage of total employment)

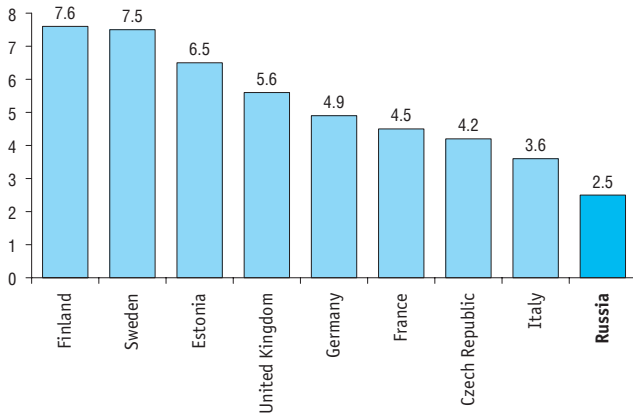
	ICT specialists	Other ICT task-intensive occupations
Total	2.5	10.5
Agriculture, forestry and fishing	0.2	2.4
Mining and quarrying	2.0	4.8
Manufacturing	2.7	6.2
Electricity, gas, steam and air conditioning supply	2.6	9.4
Water supply, sewerage, waste management, and remediation activities	1.1	5.6
Construction	1.0	6.4
Wholesale and retail trade	1.1	13.1
Transportation and storage	1.1	4.7
Accommodation and food service activities	0.5	5.8
Information and communication	42.2	11.5
Of which:		
Telecommunications	32.5	14.8
IT industry	71.8	8.5

(continued)

	ICT specialists	Other ICT task-intensive occupations
Financial and insurance activities	6.2	46.7
Real estate activities	1.1	11.4
Professional, scientific, and technical activities	6.6	31.7
Public administration and defence, compulsory social security	1.8	22.8
Education	0.6	8.9
Human health and social work activities	0.8	5.6
Arts, entertainment, and recreation	1.5	5.8

7.3. ICT specialists by country: 2020*

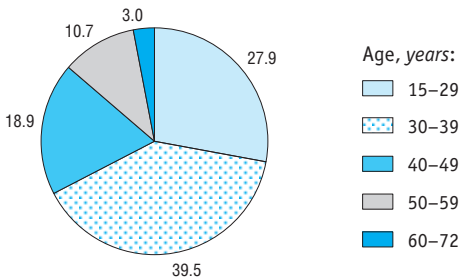
(as a percentage of total employment)



* Or nearest years for which data are available.

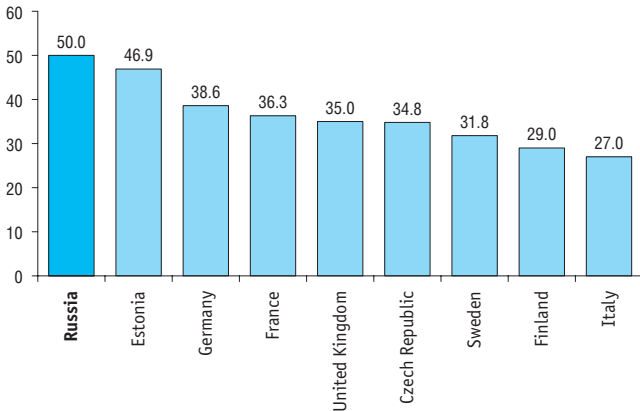
7.4. ICT specialists by age: 2020

(as a percentage of all ICT specialists)



7.5. ICT specialists under 35 by country: 2020*

(as a percentage of all ICT specialists)



* Or nearest years for which data are available.

7.6. Education and training in the field of digital technologies and production of related goods and services: secondary vocational education programmes

(thousand persons)

Key general groups of professions and qualifications	Programmes for skilled workers and employees		Programmes for mid-level specialists	
	Enrolment, at the beginning of the 2020/2021 academic year	Graduates, 2020	Enrolment, at the beginning of the 2020/2021 academic year	Graduates, 2020
Total	28.1	9.6	322.2	51.8
Computer science and engineering	19.1	6.7	216.4	32.5
Information security	–	–	18.2	2.5
Electronics and communications engineering	5.6	1.7	37.6	7.4
Photonics, instrumentation engineering, optical and biomedical engineering	–	–	2.3	0.6
Mechanical engineering	3.4	1.3	23.4	4.3
Applied geology, mining and quarrying, oil and gas engineering, geodesy	–	–	3.8	0.7
Systems engineering management	–	–	18.1	3.2
Screen arts	–	–	2.3	0.6

7.7. Education and training in the field of digital technologies and production of related goods and services: bachelor's, specialist's, and master's degree programmes (thousand persons)

Key general groups of professions and qualifications	Enrolment, at the beginning of the 2020/2021 academic year	Graduates, 2020
Total	443.8	75.6
Engineering mathematics	33.8	6.4
Computer and information science	19.4	3.4
Computer science and engineering	195.3	30.3
Information security	36.7	4.6
Electronics and communications engineering	64.1	12.5
Photonics, instrumentation engineering, optical and biomedical engineering	18.6	4.4
Nuclear engineering and technology	1.0	0.2
Mechanical engineering	35.5	6.6
Engineering physics	0.2	0.0
Arms and weapons systems	2.1	0.3
Nanotechnologies and nanomaterials	4.2	0.8
Economics and management	18.7	4.0
Mass media and library and information science	4.6	0.5
Cultural studies and socio-cultural projects	3.9	0.8
Screen arts	5.6	0.9

**7.8. Education and training in the field of digital technologies and
production of related goods and services:
postgraduate and apprenticeship programmes**
(persons)

Key general groups of professions and qualifications	Enrolment, at the end of 2020	Graduates, 2020
Total	11288	1391
Computer and information sciences	331	35
Computer science and engineering	7216	841
Information security	500	45
Electronics and communications engineering	1817	274
Photonics, instrumentation engineering, optical and biomedical engineering	978	131
Arms and weapons systems	59	1
Nanotechnologies and nanomaterials	29	8
Mass media and library and information science	343	52
Screen arts	15	4

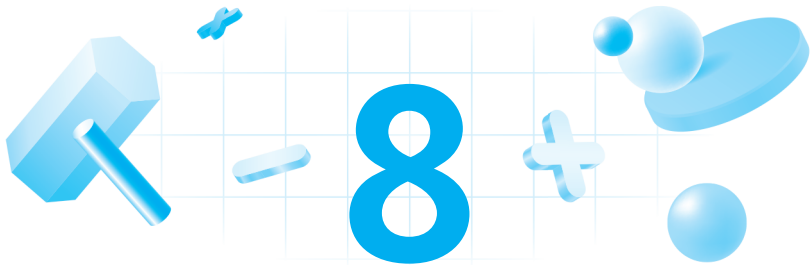
7.9. Secondary vocational education graduates – programmes for mid-level specialists and higher education graduates in 'Information and Communications Technologies' scientific areas by country: 2020*

	Secondary vocational education – programmes for mid-level specialists (ISCED level 5)		Higher education – bachelor's, specialist's, and master's programmes (ISCED level 6 and 7)		Higher education – postgraduate programmes (ISCED level 8)	
	Thousand persons	As a percentage of the total number of graduates	Thousand persons	As a percentage of the total number of graduates	Thousand persons	As a percentage of the total number of graduates
Russia	35.8	6.5	42.2	5.0	0.9	6.6
Canada	8.5	4.3	6.7	2.5	0.3	3.4
Czech Republic	–	–	3.7	5.0	0.1	3.1
Estonia	–	–	0.6	6.5	0.0	11.9
Finland	–	–	3.9	7.0	0.1	7.8
France	6.3	2.9	20.8	3.7	0.7	5.2
Germany	–	–	26.6	5.0	0.9	3.1

(continued)

	Secondary vocational education – programmes for mid-level specialists (ISCED level 5)		Higher education – bachelor's, specialist's, and master's programmes (ISCED level 6 and 7)		Higher education – postgraduate programmes (ISCED level 8)	
	Thousand persons	As a percentage of the total number of graduates	Thousand persons	As a percentage of the total number of graduates	Thousand persons	As a percentage of the total number of graduates
Italy	0.4	10.2	4.5	1.2	0.2	2.4
South Korea	8.3	5.0	19.3	4.5	0.5	3.4
Sweden	1.0	11.5	2.0	3.2	0.2	5.3
United Kingdom	6.3	5.4	25.3	3.8	1.2	4.1
United States	36.3	3.6	132.9	4.5	2.0	2.7

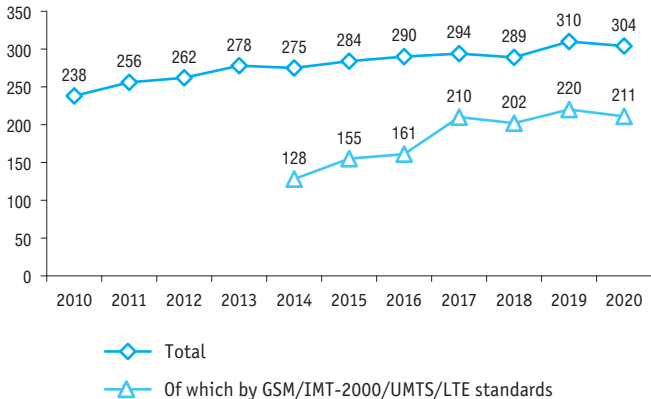
* For countries other than Russia, the data refers to 2018.



INFRASTRUCTURE

8.1. Mobile cellular telephone subscriptions

(million units; at the end of the year)



Source: here and in 8.2–8.5, 8.7, for Russia, the Ministry of Digital Development, Communications and Mass Media of the Russian Federation; for countries other than Russia, ITU and OECD.

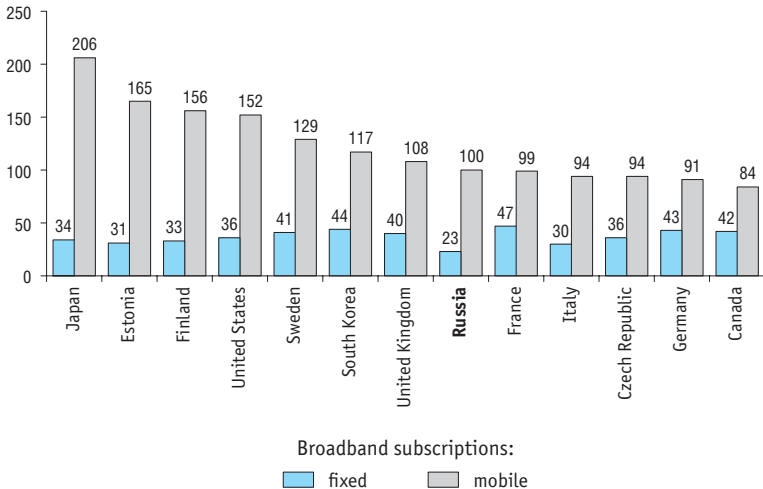
8.2. Internet subscriptions

(thousand units; at the end of the year)

	Total			Of which broadband		
	2018	2019	2020	2018	2019	2020
Internet subscriptions:						
fixed	31968	32739	33792	31789	32524	33582
mobile	131359	145633	149622	126557	141463	145626
satellite	66	88	66	44	68	45
terrestrial fixed wireless	233	269	271	230	266	267
terrestrial mobile wireless	697	669	678	643	600	623

8.3. Broadband subscriptions by country: 2020*

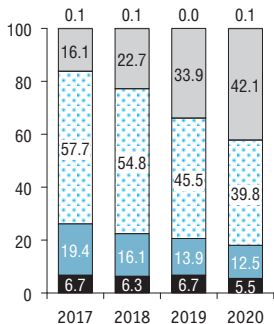
(per 100 individuals; at the end of the year)



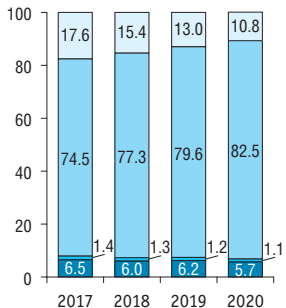
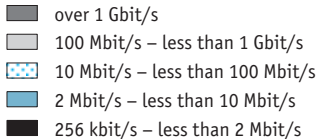
* Or nearest years for which data are available.

8.4. Fixed broadband subscriptions

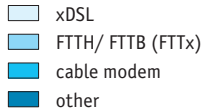
(as a percentage of all fixed broadband subscriptions; at the end of the year)



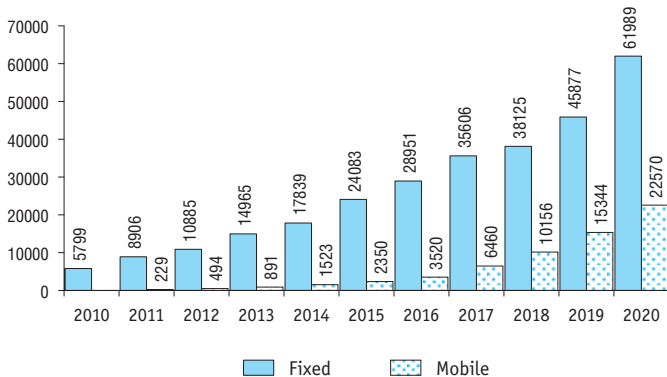
By access speed:



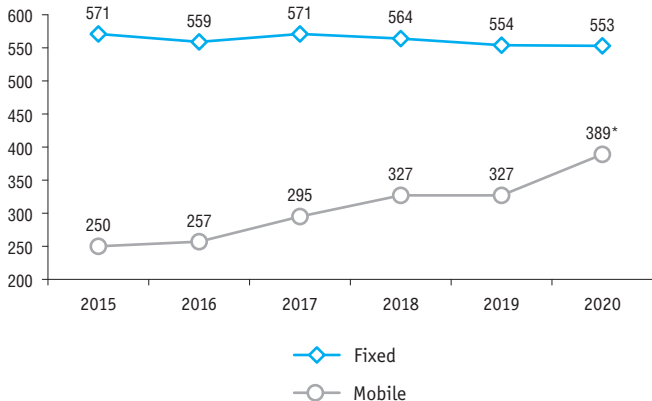
By technology:



8.5. Internet traffic (Petabytes)



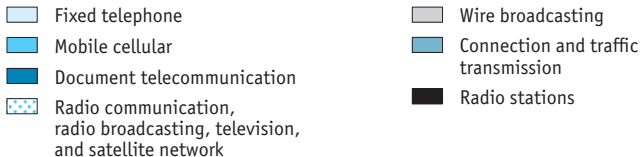
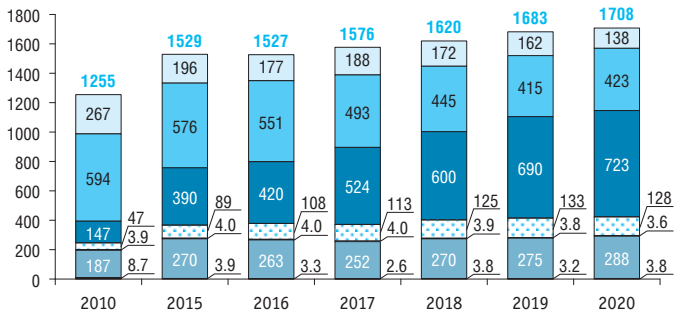
8.6. Internet access subscription fee (roubles per month; December)



* Due to changes in the Rosstat methodology, the data are provided for the service 'Subscription fee for a mobile cellular network services package', which includes mobile Internet, minutes of phone calls, SMS messages.

Source: Rosstat.

8.7. Revenue from telecommunication services

(billion roubles)



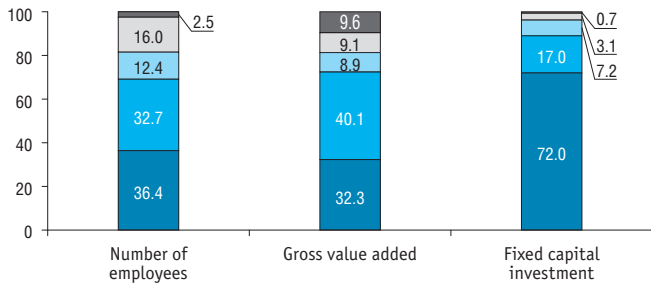
ICT SECTOR

9.1. Main ICT sector indicators

	2015	2016	2017	2018	2019	2020
Number of employees						
thousand persons	...	1245	1220	1191	1174	1240
as a percentage of total employment	...	1.7	1.7	1.6	1.6	1.8
Gross value added						
billion roubles	2097	2175	2376	2552	2803	2985
as a percentage of GDP	2.8	2.8	2.9	2.7	2.9	3.1
Fixed capital investment						
billion roubles	428	461	474	604	741	835
as a percentage of total investment	3.1	3.1	3.0	3.4	3.8	4.1

Source: here and in 9.2–9.7, 9.10, for Russia, HSE ISSEK estimates based on Rosstat data; for countries other than Russia, OECD and UNCTAD.

9.2. Percentage distribution of ICT sector by type of economic activity: 2020



Telecommunications

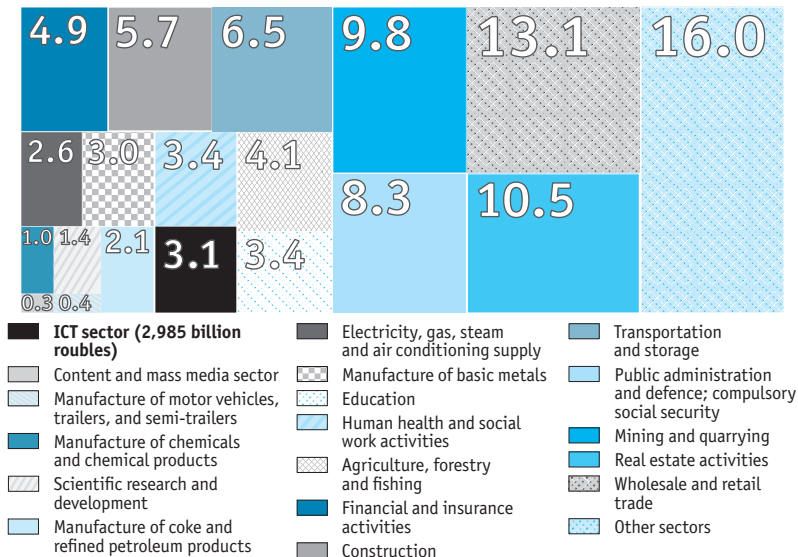
IT industry

Other information services activities

ICT manufacturing

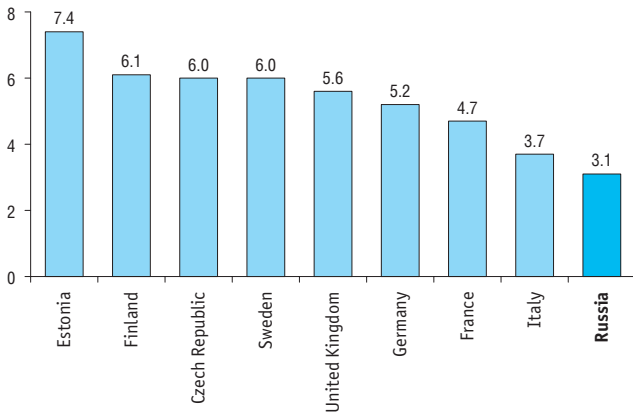
Wholesale of information and communication equipment

9.3. ICT sector's input into the national economy development: 2020 (as a percentage of GDP)



9.4. ICT sector's share in the business enterprise sector gross value added by country: 2020*

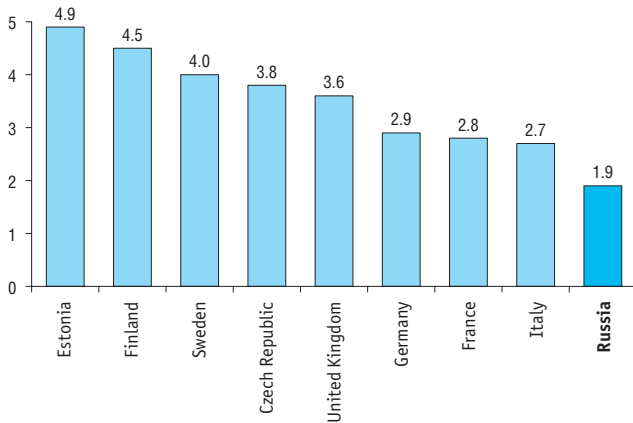
(percentage)



* Or nearest years for which data are available. Here and below in 9.5, ICT sector data are given by types of economic activity with the Russian Classification of Economic Activity (OKVED2) codes: 26, 61, 62, and 63.

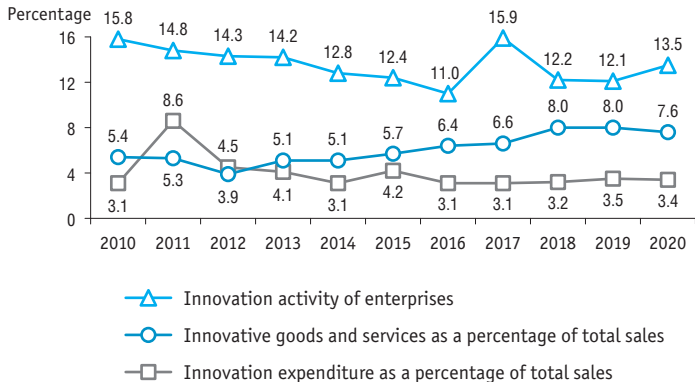
9.5. ICT sector's share in the business enterprise sector employment by country: 2020*

(percentage)



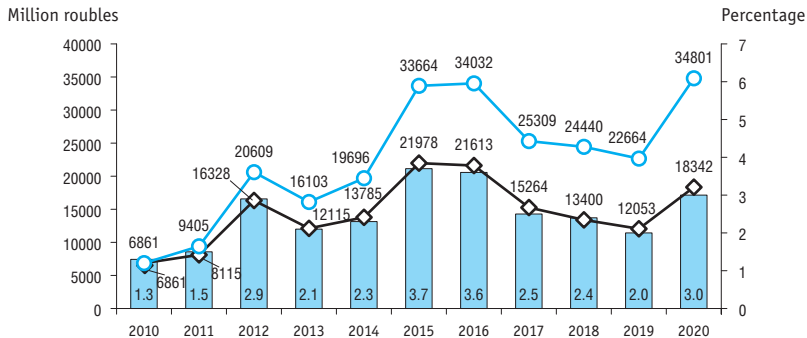
* Or nearest years for which data are available.

9.6. Main ICT sector indicators of innovation activity*



* ICT sector data are given by types of economic activity with the Russian Classification of Economic Activity codes: until 2017 – OKVED Rev. 1.1: 30, 32, 64, and 72; after 2017 – OKVED2: 26.1–26.4, 26.8, 58.2, 61, 62, 63.11, and 63.12.

9.7. R&D in the ICT sector



ICT sector's share in the gross domestic expenditure on R&D

Gross domestic expenditure on R&D in ICT sector
(at current prices), *million roubles*

Gross domestic expenditure on R&D in ICT sector
(at constant 2010 prices), *million roubles*

9.8. R&D output in ICT-related fields of S&T

	2011	2016	2017	2018	2019	2020
ICT-related publications by Russian authors indexed in Scopus						
number	3239	8730	11438	13227	17092	18416
as a percentage of the world total of ICT-related publications	0.91	2.12	2.63	2.73	3.00	3.44
ICT-related patent applications* filed by Russian residents						
number	1722	1960	2270	2065	2692	2405
as a percentage of the world total of ICT-related patent applications	0.38	0.32	0.34	0.30	0.35	0.29

* Data for the following technological areas: audio-visual technology, telecommunications, digital communication, basic communication processes, computer technology, IT methods for management, semi-conductors.

Sources: Scopus and WIPO, as of November 29, 2021.

9.9. Exports and imports of ICT goods and services: 2020

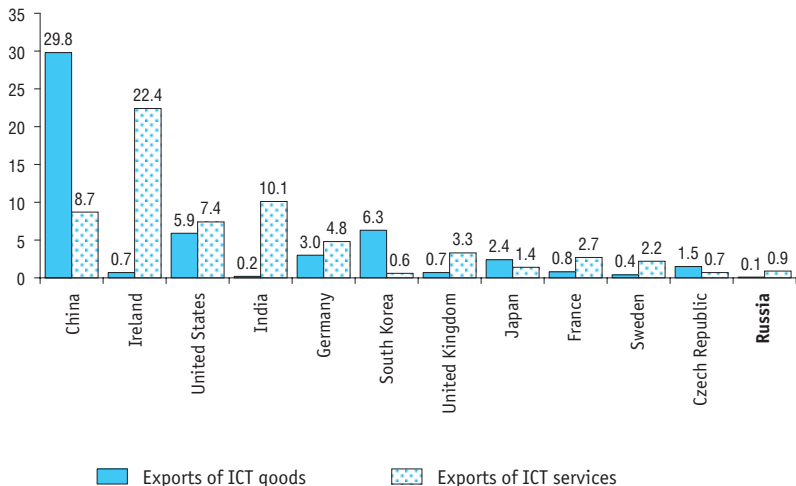
(million USD)

	Exports	Imports
ICT goods – total	1829	24225
Computers and related equipment	283	8758
Communication equipment	414	9399
Consumer electronic equipment	467	2712
Other ICT and related goods	665	3356
ICT services – total	5936	5901
Computer services	5093	4503
Telecommunication services	723	887
Information services	120	511

Sources: HSE ISSEK estimates based on Rosstat, Federal Customs Service of Russia, and Bank of Russia data.

9.10. Exports of ICT goods and services by country: 2020

(as a percentage of global exports of ICT goods and services)



Technical Notes

Artificial Intelligence is a network of technological solutions that can imitate cognitive functions of a human brain (including self-learning, problem solving using search algorithms) and receive upon the performance of specific tasks results minimally comparable to the results of the human intellectual activity.

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 Kbps and higher.

Cloud computing services are distributed data processing technologies that provide computer resources and powers to users by way of Internet services.

Digital platform is an information system within which a significant number of independent participants form a new business model that enables cutting down transaction costs and accelerating the communication between participants.

Digital economy means activities directed at creation, dissemination, and use of digital technologies and related goods and services.

Digital skills are competences of the population required to use personal computers, the Internet, and other types of ICT.

Education and training in the field of digital technologies and production of related goods and services mean systematic and organised education and graduation of skilled per-

sonnel with special knowledge and expertise in the field of digital technologies and related goods and services.

Pursuant to Order of the Ministry of Science and Higher Education no. 1199 of October 29, 2013, the following ***professions and qualifications of the secondary vocational education programmes are attributed to the field of digital technologies and production of related goods and services:***

Key general groups of professions and qualifications	Professions/Qualifications
Programmes for skilled workers employees	
Computer science and engineering	All qualifications
Electronics and communications engineering	Radio-electronic equipment installer Radio technician Communication equipment installer Communication equipment operator Electronic equipment maintenance engineer Electronic equipment assembler Vacuum electronic equipment assembler
Mechanical engineering	Control and instrumentation maintenance engineer Control and instrumentation technician

Key general groups of professions and qualifications	Professions/Qualifications
Programmes for mid-level specialists	
Computer science and engineering	All qualifications
Information security	All qualifications
Electronics and communications engineering	All qualifications
Photonics, instrumentation engineering, optical and biomedical engineering	Aircraft instruments
	Radio-electronic devices
	Optical and optoelectronic instruments and systems
	Biomedical instruments and systems
	Medical equipment assembly, maintenance and repair
Mechanical engineering	Industrial process automation (by industry sector)
	Additive technologies
	Mechatronics and mobile robotics (by industry sector)
	Operation and maintenance of industrial robots

(continued)

Key general groups of professions and qualifications	Professions/Qualifications
Applied geology, mining and quarrying, oil and gas engineering, geodesy	Information systems for urban planning
Systems engineering management	All qualifications
Screen arts	All qualifications

Pursuant to Order of the Ministry of Science and Higher Education no. 1061 of September 12, 2013, the following ***professions and qualifications of bachelor's, specialist's and master's degree programmes are attributed to the field of digital technologies and production of related goods and services:***

Key general groups of professions and qualifications	Professions/Qualifications
Engineering mathematics	Applied mathematics and computer science Applied mathematics
Computer and information sciences	All qualifications
Computer science and engineering	All qualifications*
Information security	All qualifications*

(continued)

Key general groups of professions and qualifications	Professions/Qualifications
Electronics and communications engineering	All qualifications*
Photonics, instrumentation engineering, optical and biomedical engineering	All qualifications
Nuclear engineering and technology	Electronics and automation of physical installations*
Mechanical engineering	Engineering mechanics Industrial process automation (by industry sector) Mechatronics and mobile robotics
Engineering physics	All qualifications Professions: aircraft gun armament; artillery and missile armament; design, production, and testing of ship armaments and information management systems
Arms and weapons systems	All qualifications
Nanotechnologies and nanomaterials	All qualifications
Economics and management	Business informatics

(continued)

Key general groups of professions and qualifications	Professions/Qualifications
Mass media and library and information science	Television Media communications
Cultural studies and socio-cultural projects	All qualifications Professions: Stage and event management
Screen arts	All qualifications

* Including data of a federal statistics monitoring of professions from the List of Higher Education Professions and Qualifications, approved by Order of Russian Ministry of Science and Higher Education no. 1060 of September 12, 2013.

Pursuant to Order of the Ministry of Science and Higher Education no. 1061 of September 12, 2013, the following ***professions and qualifications of postgraduate programmes for academic personnel and apprenticeship programmes are attributed to the field of digital technologies and production of related goods and services:***

Key general groups of professions and qualifications	Professions/Qualifications
Postgraduate programmes for academic personnel	
Computer and information sciences	All qualifications
Computer science and engineering	All qualifications

(continued)

Key general groups of professions and qualifications	Professions/Qualifications
Information security	All qualifications
Electronics and communications engineering	All qualifications
Photonics, instrumentation engineering, optical and biomedical engineering	All qualifications
Arms and weapons systems	All qualifications
Nanotechnologies and nanomaterials	All qualifications
Mass media and library and information science	All qualifications
Programmes for mid-career professionals	
Screen arts	All qualifications

Employed in ICT task-intensive occupations are the employed who are highly likely to be professionally engaged in performance of tasks with the help of ICT (from simple surfing of the Internet, use of spreadsheets to programming). This category includes ICT specialists, managers and professionals in finance, economics, management, sales, marketing, development, social services; physicist and chemists, architects, design engineers, surveyors, and designers;

and faculty staff of higher education institutions. The list of occupations is provided by the OECD experts: <https://doi.org/10.1787/9789264311992-en>. **ICT specialists** include workers that can develop, use, and maintain ICT, for whom ICT-related activities occupy the majority of their professional activity. According to Russian Classifier of Occupations, this category includes the following occupations:

- managers – ICT service/unit managers (RCO code – 133);
- professionals – software and multimedia developers and analysts (RCO code – 251), database specialists and system administrators (252), other ICT task-intensive occupations (electronics engineers (2152), telecommunication engineers (2153), graphics and multimedia designers (2166), information technology trainers (2356), ICT sales professionals (2434));
- technicians – ICT operations and user support technicians (RCO code – 351), telecommunications and broadcasting technicians (352); electrical engineers (3114);
- installers and servicers – ICT equipment installers and servicers (RCO code – 742).

Exports (imports) of ICT goods are listed based on Foreign Economic Activity Commodity Nomenclature (FEACN) for in accordance with OECD ICT goods classification developed on the base of 2007 Harmonized Commodity Description and Coding System, HS and includes the following groups of goods:

- Computers and related equipment (FEACN codes – 844331, 844332, 847050, 8471, 847290, 847330, 847350, 852351, 852842, 852852, 852862);

- Communication equipment (8517, 852550, 852560, 853110);
- Consumer electronic equipment (8518, 8519, 8521, 8522, 852580, 8527, 852849, 852859, 852869, 852871, 852872, 852873, 990450);
- Other ICT and related goods (852321, 852329, 852341, 852352, 852359, 852380, 8529, 8534, 8540, 8541, 8542, 9013).

Exports (imports) of ICT services lists are made by the Bank of Russia. According to the Manual on Statistics of International Trade in Services 2010 (MSITS 2010), **telecommunications services** covers 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., and includes business network services, teleconferencing and support services; **computer services** consist of hardware- and software-related services and data-processing services; **information services** is divided into news agency services and database services, such as database conception, data storage, and the dissemination of data and databases (both online and through 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 other means; other information services.

E-Government Development Index (EGDI) is based on a comprehensive UN survey of the online presence of 193 United Nations Member States, which assesses national websites and how e-government policies and strategies are applied in general and in specific sectors for delivery of essential services (for details see: <https://publicadministration.un.org/egovkb/>)

en-us/About/Methodology). It is calculated by three subindex indicators: Online Service Index, Telecommunication Infrastructure Index, and Human Capital Component. The 2020 data were published in the 'United Nations E-Government Survey 2020. Digital Government in the Decade of Action for Sustainable Development' (available at: [https://publicadministration.un.org/egovkb/Portals/egovkb/Documents/un/2020-Survey/2020%20UN%20E-Government%20Survey%20\(Full%20Report\).pdf](https://publicadministration.un.org/egovkb/Portals/egovkb/Documents/un/2020-Survey/2020%20UN%20E-Government%20Survey%20(Full%20Report).pdf)).

Fixed (wired) broadband subscriptions are active broadband subscriptions for any wired technology, for which the access speed mentioned in the subscription agreement is 256 kbps and over.

Fixed (wired) Internet subscriptions are Internet subscriptions for any wired technology, including dial-up access at any speed.

Geographic information system is an information system operating spacial data.

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 the use of digital technologies and related goods and services. Enterprises' domestic expenditure on development, dissemination, and use of digital technologies and related goods and services, including domestic expenditure on research and development in the field of digital technologies are **domestic expenditure on digital economy development from all sources of funds. Household expenditure on use of digital technologies and ICT-related goods and services** is an actual expenditure spent

by household members on purchase, use, and maintenance of the equipment related to digital technologies and telecommunication services fees. Calculation methodology of domestic expenditure on the development of digital economy has been approved by the Digital Economy Subcommittee under the Government Commission on Digital Development, Use of Information Technologies for Improving Quality of Life and Business Environment (session protocol no. 557pr of September 27, 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 of the Russian Ministry of Digital Development Communications and Mass Media no. 515 of December 7, 2015, the following types of economic activities are assigned to the ICT sector (according to OKVED2): 26.1, 26.2, 26.3, 26.4, 26.8, 46.5, 58.2, 61, 62, 63.11, 63.12, 95.1.

ICT-related patent applications are calculated on the data of the World Intellectual Property Organisation (WIPO). ICT includes the following areas: audio-visual technology, telecommunications, digital communication, basic communication processes, computer technology, IT methods for management, semiconductors. List of ICT-related areas is compiled on the basis of OECD taxonomy (Inaba T., Squicciarini M. (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 Classification of Technological Areas (Schmoch U. (2008) Concept of a Technology Classification for Country Comparisons: Final

Report to the World Intellectual Property Organization. Karlsruhe: Fraunhofer Institute for Systems and Innovation Research).

Industrial robots/ automated equipment are automated production systems equipped with 2(3)-axes manipulators capable of comprehending the environment, control actions and adapt to changes; can be used both for production processing (welding, cutting, coating, etc.) and for secondary operations (assembly, sorting, transportation, packaging, etc.).

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

Innovation activity of enterprises is a ratio of innovation-active enterprises to the total number of enterprises surveyed in the reporting year. The indicator's methodology is approved by the Order of Rosstat no. 818 of December 27, 2019. Changes in 2017 data are due to recalculation of the indicator according to this methodology.

Innovation expenditure is the actual expenditure in monetary form, connected with the implementation of one, several, or all types of innovative activities (research and development, acquisition of machinery and equipment, engineering, etc.) performed within an organisation. Innovation expenditure includes current expenditure and capital expenditure.

Innovative activities are research, financial, or commercial activities related to transformation of ideas (usually, R&D results or other S&T achievements) into technologically new or improved products or services that are significantly different from those produced before and intended to be introduced on the market; into technologically new or improved business

processes that are significantly different from the corresponding business processes that have been used before.

Innovative goods and services are goods and services, either new or those that underwent different technological changes over the last three years (including the reporting period).

International comparisons of graduates in secondary vocational education – mid-career professional programmes and higher education programmes in ‘Information and Communications Technologies’ area are provided in accordance with the levels of education comprised by the International Standard Classification of Education (ISCED 2011) and fields of education and training (ISCED-O 2013) (published in 2014 by the UNESCO Institute for Statistics: P.O. Box 6128, Succursale Centre-Ville Montreal, Quebec H3C 3J7 Canada). For Russia, the provided data concern secondary vocational education occupations within key general groups of professions and qualifications of secondary vocational education, approved by Order of the Russian Ministry of Science and Higher Education no. 1199 dated October 29, 2013; higher education professions and qualifications within key general groups of professions and qualifications of higher education, approved by Order of the Russian Ministry of Science and Higher Education no. 1061 dated September 12, 2013 with the help of Russian Joint Academic Coding System OK 009-2016 (approved and signed into law by Order of Federal Technical Regulation and Metrology Agency no. 2007-st of December 08, 2016), containing ISCED-F 2013 comparisons. Equivalence of scientific areas in the field of ICT in ISCED-F 2013 and the Russian classification of professions and qualifications in the field of ICT are as follows:

ISCED-F 2013 scientific area	Russian equivalent – key general groups / groups from the list of professions and qualifications of secondary vocational education and list of professions and qualifications of higher education
06 Information and Communication Technologies (ICTs) 0611 Computer use 0612 Database and network design and administration 0613 Software and applications development and analysis	Computer and information sciences (code 02.00.00) Computer engineering (code 09.00.00) Information security (code 10.00.00) Business informatics (codes 38.03.05 and 38.04.05) Information Systems Designed for City Planning (code 21.02.06) Additive technologies (code 15.02.09)

Internet is a global (worldwide) multitude of independent computer networks connected to one another to exchange information via standard open protocols.

Internet of Things are devices and systems connected within a single network that collect and exchange data and have remote Internet control with the help of software on any types of computers, smartphones, or via interfaces.

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

Mobile Internet subscriptions are active mobile telephone network subscriptions with Internet access services.

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

Patent is a document of title granted for an invention that certifies inventor's priority, inventorship, and right of exclusive use of this invention during the patent's term of validity. **Invention** is a technical solution in any field pertaining to a product (namely, a device, material, microorganism strain, plant and animal cell culture) or a method (the process of manipulating material objects with the help of material means). An invention must be new, innovative, and applicable for industrial use.

Publication activity indicators is calculated based on Scopus database. Unless stated otherwise, 'publications' include the following types of documents: article, conference papers, review, book, or book chapter. Scopus has the following ICT-related subject categories: Artificial Intelligence' Computational Mechanics; Computational Theory and Mathematics; Computer Graphics and Computer-Aided Design; Computer Networks and Communications; Computer Science (miscellaneous); Computer Science Applications; Computer Vision and Pattern Recognition; Computers in Earth Sciences; Hardware and Architecture; Health Informatics; Health Information Management; Human-Computer Interaction; Information Systems and Management; Library and Information Sciences; Signal Processing; Software; Theoretical Computer Science.

Public and municipal services in digital form mean public and municipal services rendered using information and communications technologies, including via national and (or) local portals of public and municipal services.

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

Top access speed means the network's bandwidth; established as maximum possible number of bits transmitted per time unit (bit/s).

Website is a spot on the World Wide Web that has a domain name, an owner and a collection of webpages. In a statistical survey, an enterprise is considered as having a website, if it has at least one own page with published and regularly updated (at least once in six months) information.

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

Digital Economy: 2022

Pocket Data Book

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