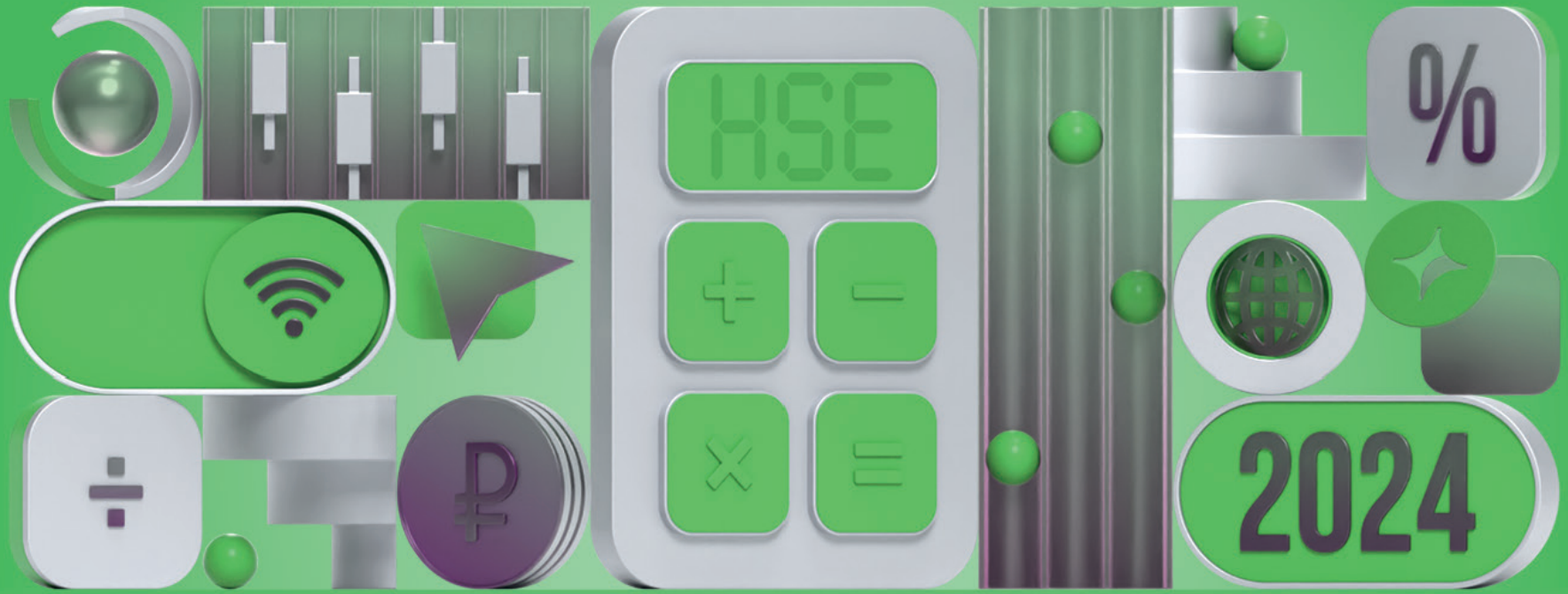
Ministry of Digital Development, Communications and Mass Media of the Russian Federation

FEDERAL STATE STATISTICS SERVICE

HSE UNIVERSITY



DIGITAL ECONOMY

POCKET DATA BOOK

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

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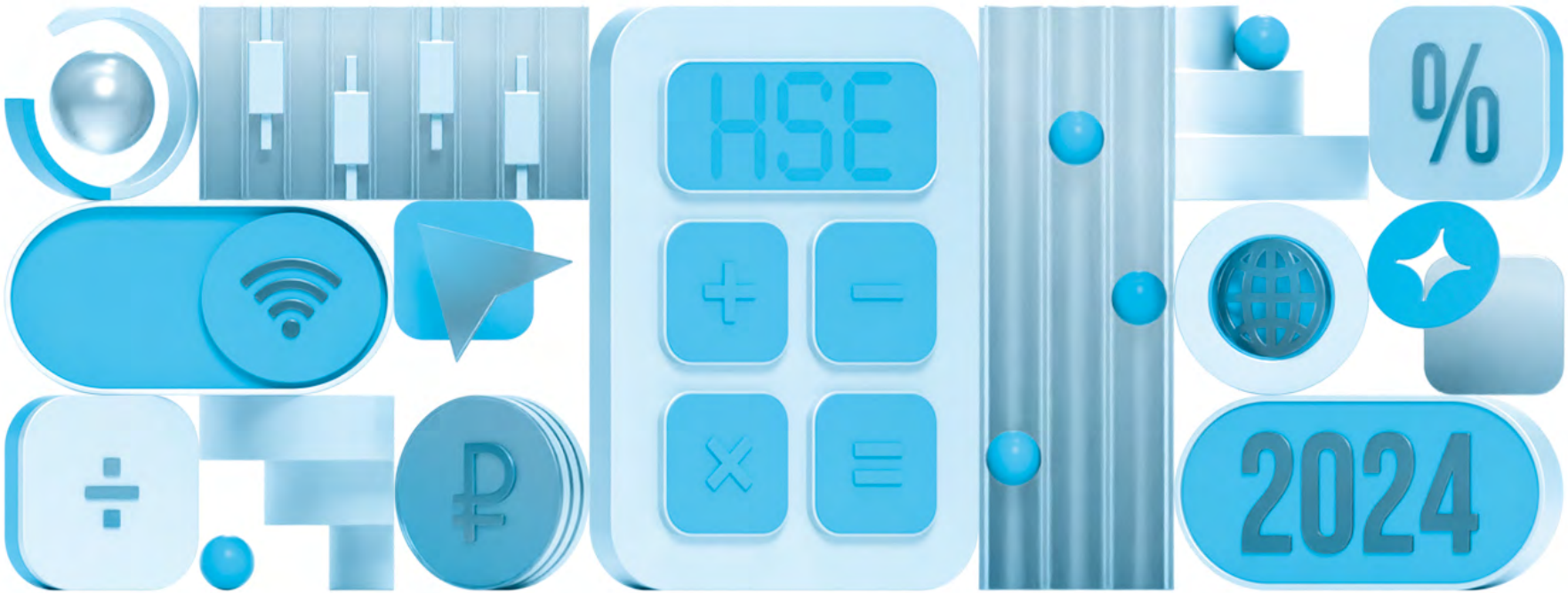

DIGITAL ECONOMY

POCKET DATA BOOK

MOSCOW 2024

УДК 338:004(083.41)(470+571)
ББК 65.051
D56

Authors: Vasily Abashkin, Gulnara Abdrakhmanova, Olga Demidkina, Anna Demyanova, Maxim Filatov, Svetlana Fridlyanova, Leonid Gokhberg, Galina Kovaleva, Liliya Kuzina, Irina Kuznetsova, Anastasia Nesterenko, Ekaterina Nikitskaya, Olga Ozerova, Svyatoslav Pokrovsky, Valentina Polyakova, Evgeny Popov, Tatyana Ratay, Pavel Rudnik, Zinaida Ryzhikova, Nikolay Schugal, Roman Shcherbakov, Ekaterina Streltsova, Konstantin Vishnevsky, and Ivan Yudin

Digital Economy: 2024 : Pocket Data Book [Electronic Resource] / V. Abashkin, G. Abdrakhmanova, O. Demidkina et al.; National Research University Higher School of Economics. – Electronic text data (3.7 MB). – Moscow : ISSEK HSE, 2024. – 122 p. – ISBN 978-5-7598-3102-0.

D56

This pocket data book contains the main indicators about gross domestic expenditure on the digital economy development, engagement of individuals and enterprises in digitalisation processes, personnel potential, infrastructure use of digital technologies by households, individuals, and enterprises, personnel, infrastructure, and ICT sector enterprises activity.

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, Russian Central Bank (Bank of Russia), European Statistical Office (Eurostat), Organisation for Economic Co-operation 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 Organization (WIPO), and results of methodological and analytical stud-ies of the HSE Institute for Statistical Studies and Economics of Knowledge.

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

УДК 338:004(083.41)(470+571)
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The publication was prepared within the framework of the Basic Research Programme of the National Research University Higher School of Economics (HSE).

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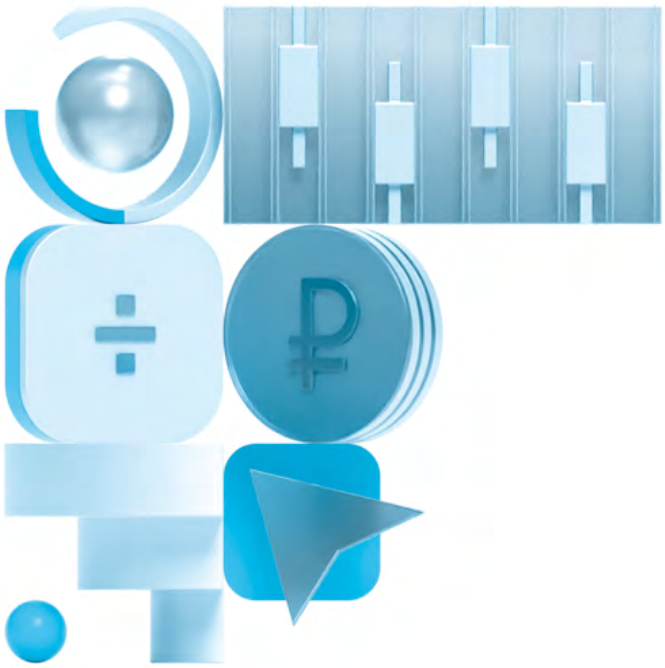
Contents

Symbols used in tables are:

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

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



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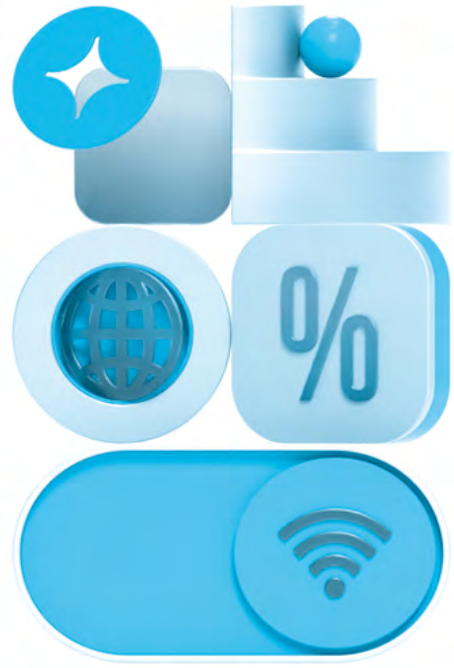
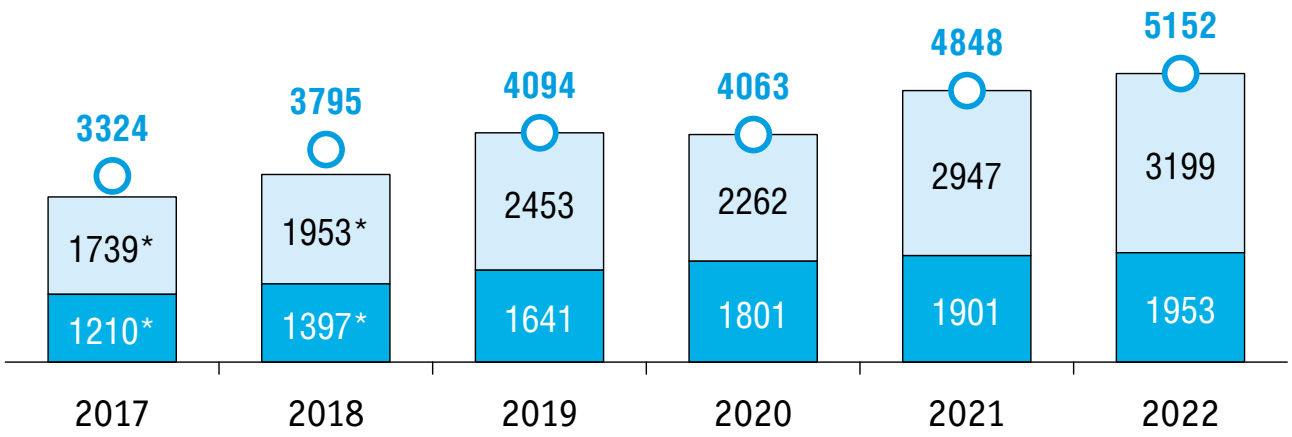


GROSS DOMESTIC EXPENDITURE ON DIGITAL ECONOMY DEVELOPMENT

1.1. Expenditure on digital economy development

(billion roubles)



Gross domestic expenditure on digital economy development

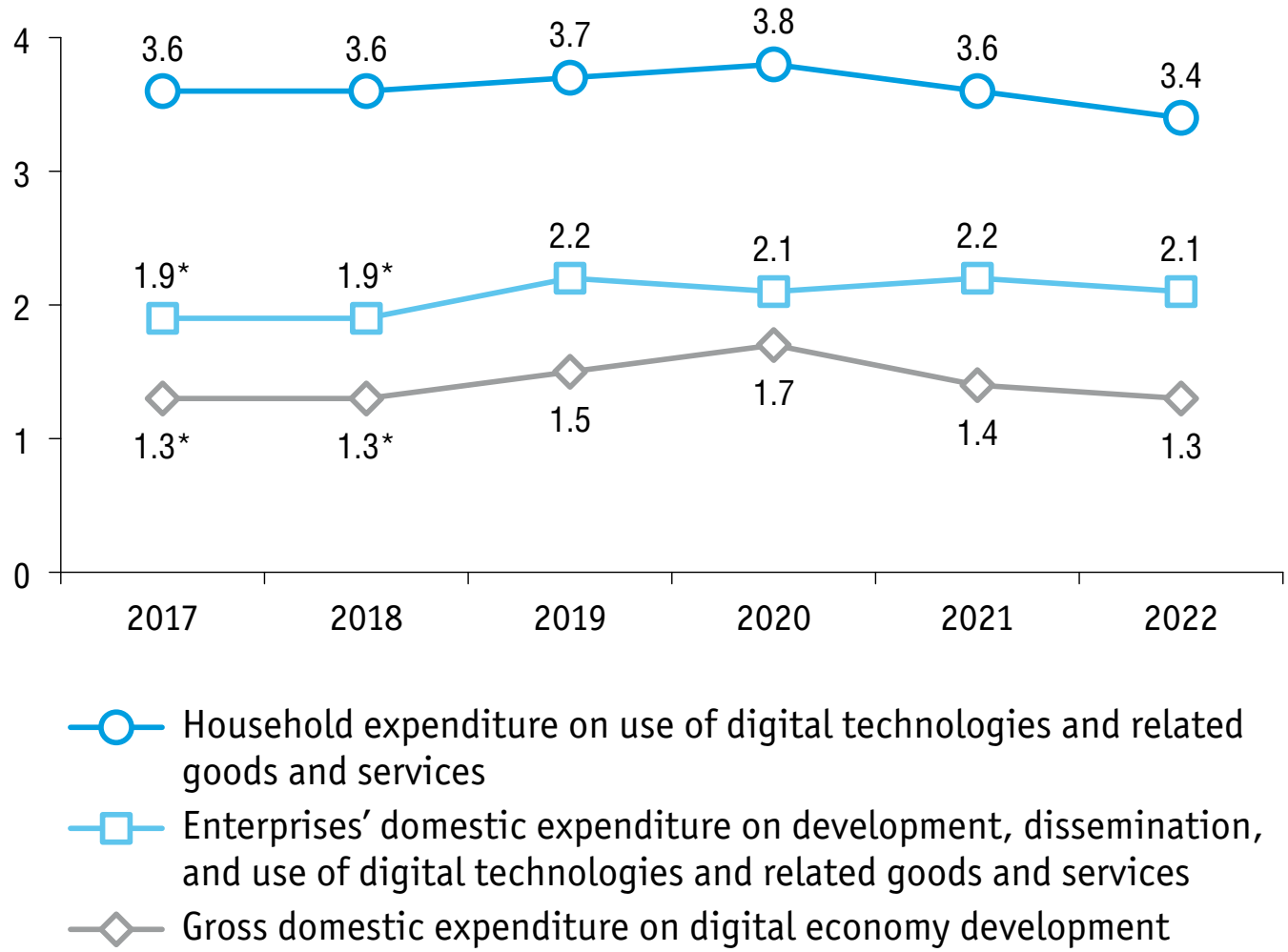
Household expenditure on use of digital technologies and related goods and services

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

* Excluding the expenditure on digital content.

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



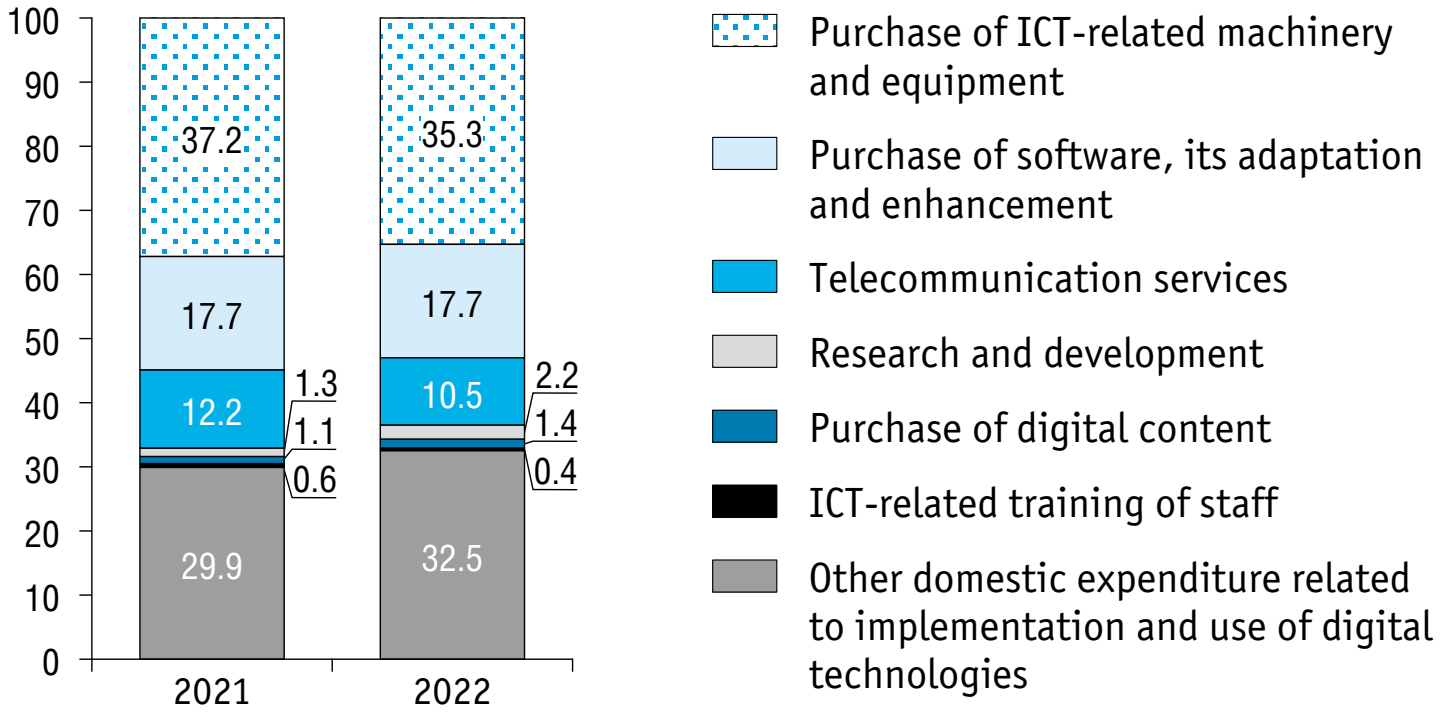
* Excluding the expenditure on digital content.

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

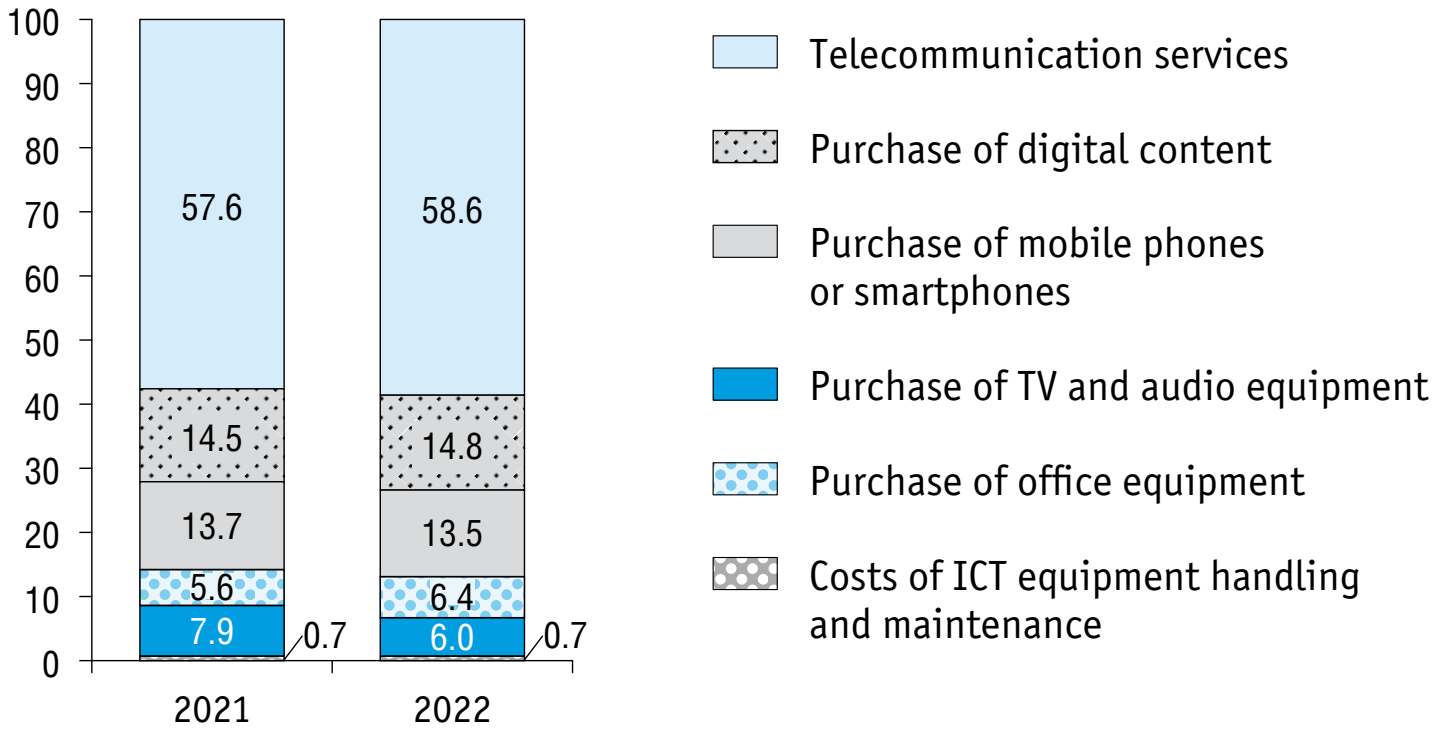
	2021	2022
Agriculture, forestry and fishing	0.4	0.3
Mining and quarrying	1.9	1.7
Manufacturing	8.7	12.5
Electricity, gas, steam and air-conditioning supply	1.8	1.7
Water supply, sewerage, waste management and remediation activities	0.3	0.2
Construction	2.8	1.7
Wholesale and retail trade; repair of motor vehicles and motorcycles	9.2	7.1
Transportation and storage	5.1	3.9
Accommodation and food service activities	0.5	0.5

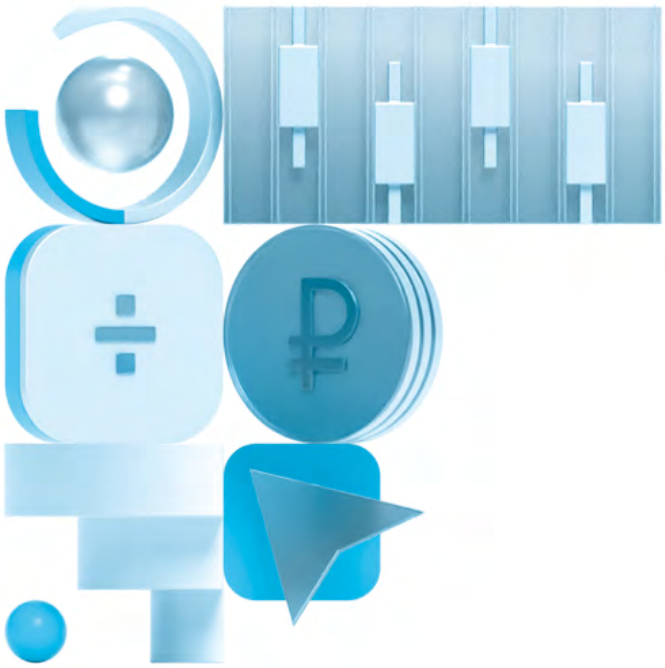
	2021	2022
Information and communication	29.4	29.5
IT industry	12.7	15.0
Financial and insurance activities	12.9	15.6
Real estate activities	2.7	1.9
Professional, scientific and technical activities	10.3	10.8
Education	4.1	5.2
Human health and social work activities	2.6	1.9
Arts, entertainment and recreation	2.0	1.3
Public administration and defence; compulsory social security	4.2	3.4

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



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





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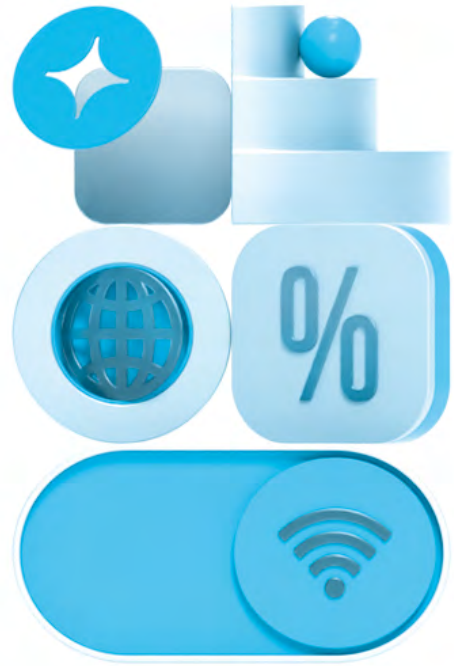
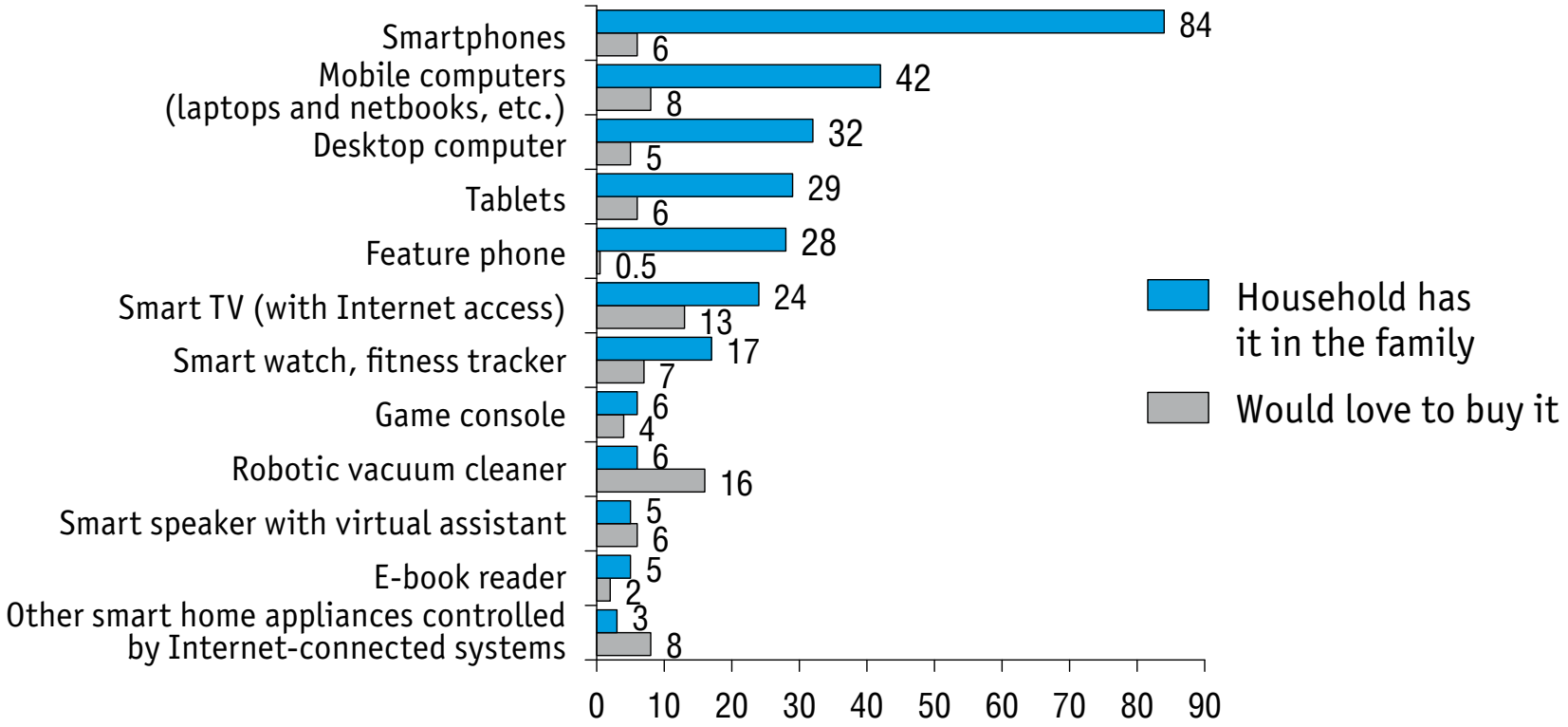


POPULATION IN THE DIGITAL WORLD

2.1. Households with digital devices: 2022*

(as a percentage of respondents aged 14 and over)

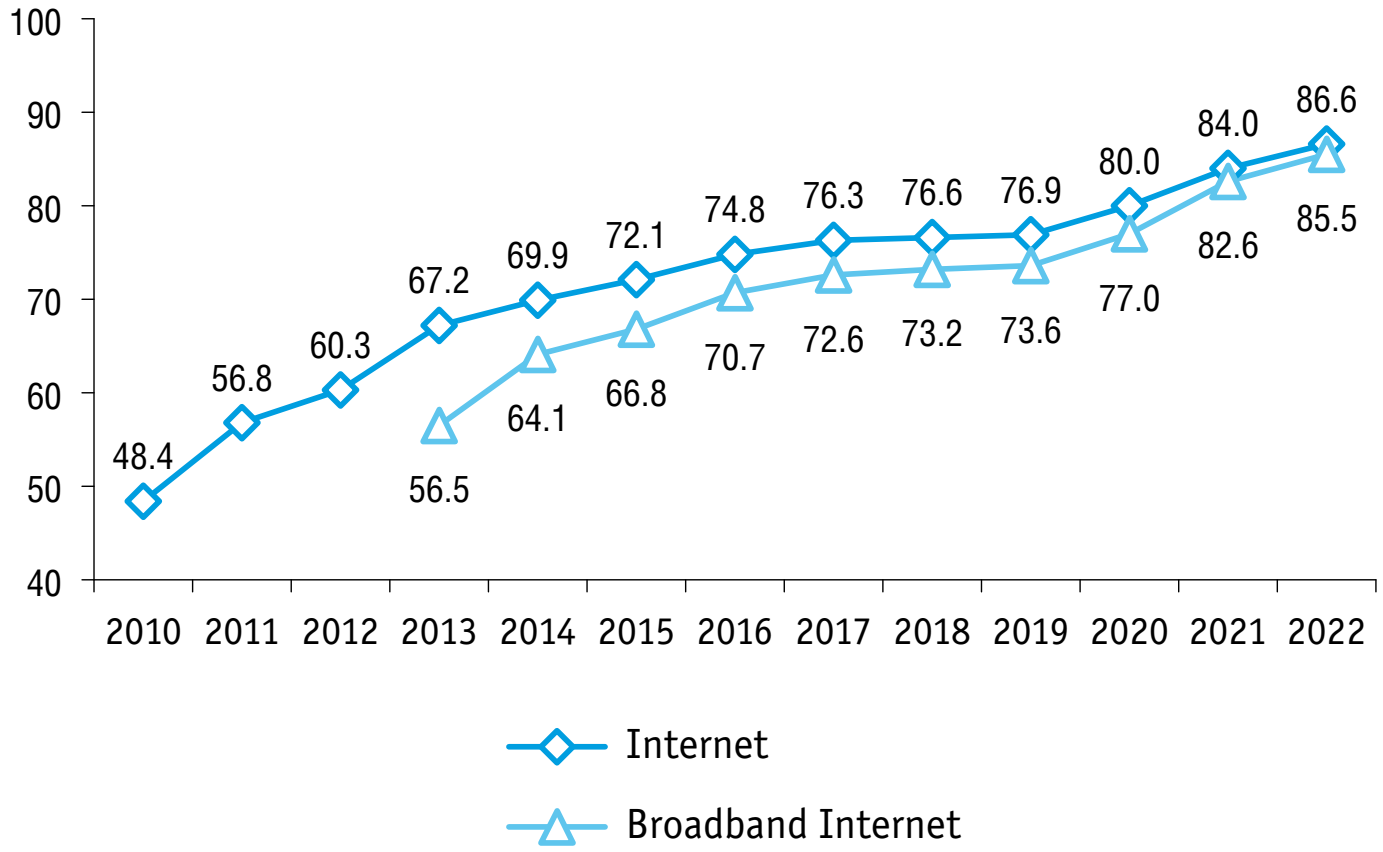


* The percentage of respondents who reported that there is a least one such device in good working order in their family (household).

Sources: here and below in this section, results of a representative survey of the adult Russian population aged 14 years and over conducted by HSE ISSEK within Digital Transformation Monitoring of the Economy and Society (carried out in August 4 – September 7, 2022 with of 10,021 participants) (2.1, 2.18–2.19); Rosstat (2.2–2.6, 2.14–2.17); HSE ISSEK estimates based on Rosstat data (2.7–2.13).

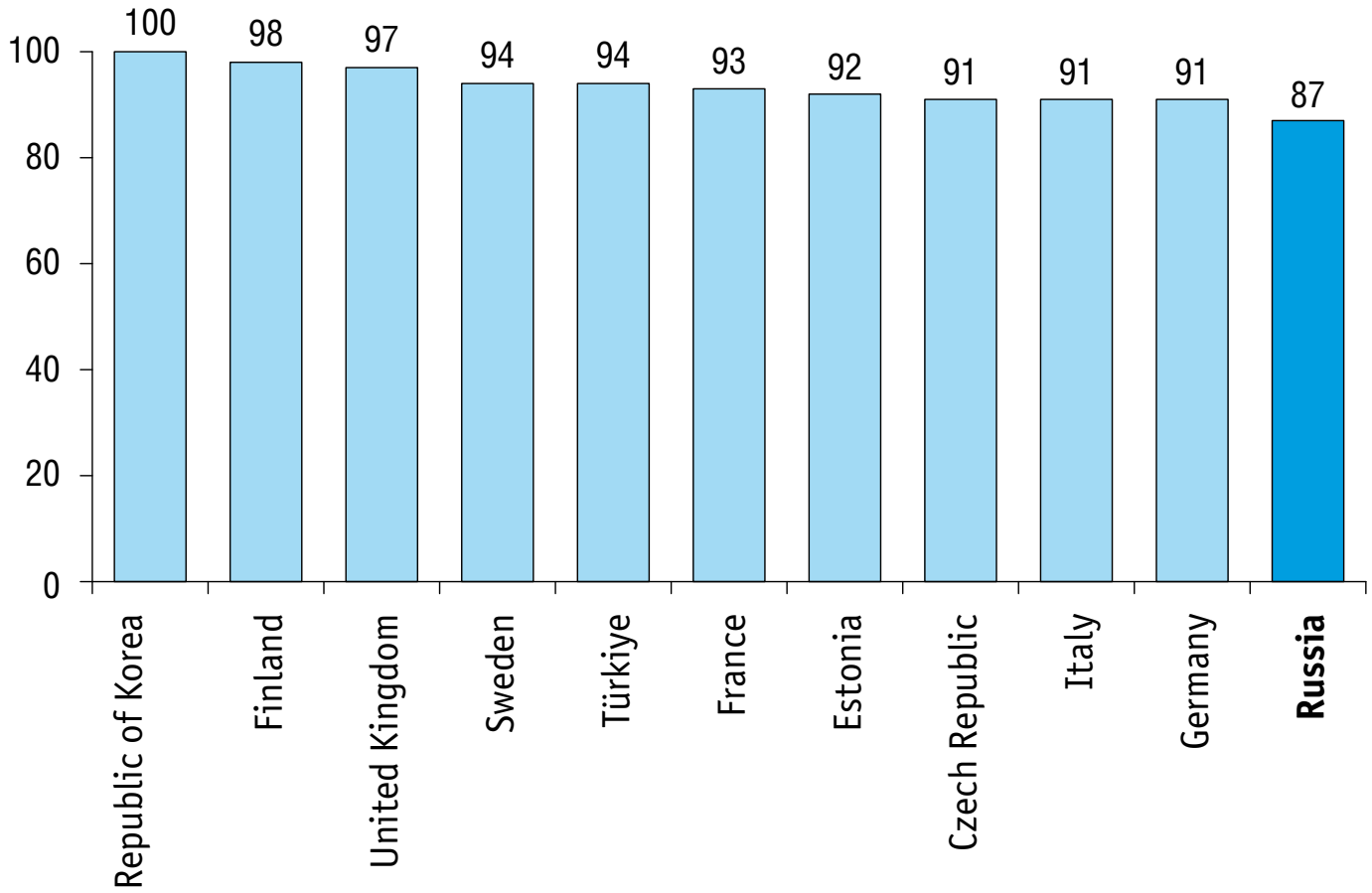
2.2. Households with Internet access

(as a percentage of all households)



2.3. Households with Internet access by country: 2022*

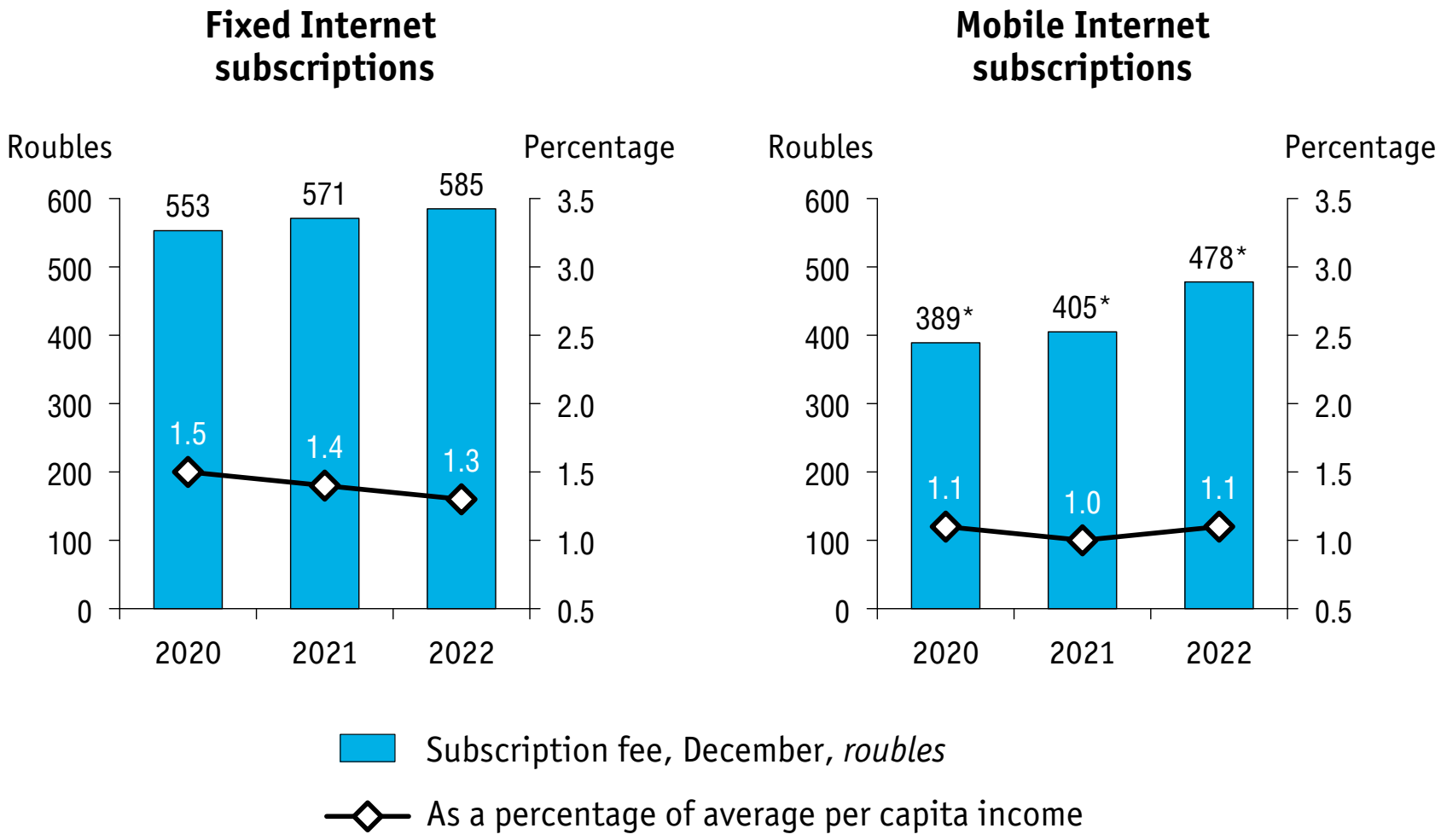
(as a percentage of all households)



* Or nearest years for which data are available.

Sources: here and below (2.6, 2.8–2.13, 2.15, 2.17–2.18): for countries other than Russia, Eurostat, OECD, and ITU.

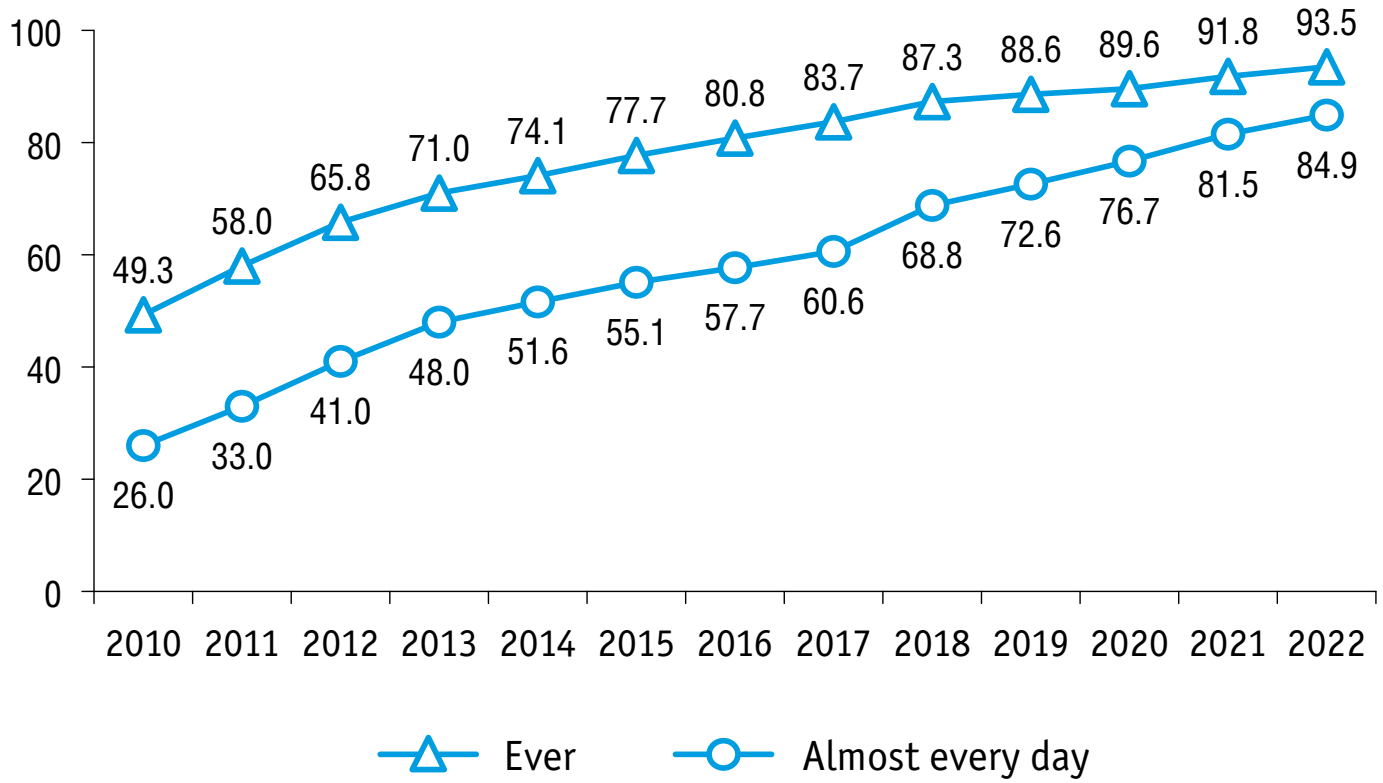
2.4. Ratio of Internet access tariffs for individuals to average per capita income



* 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.

2.5. Internet users

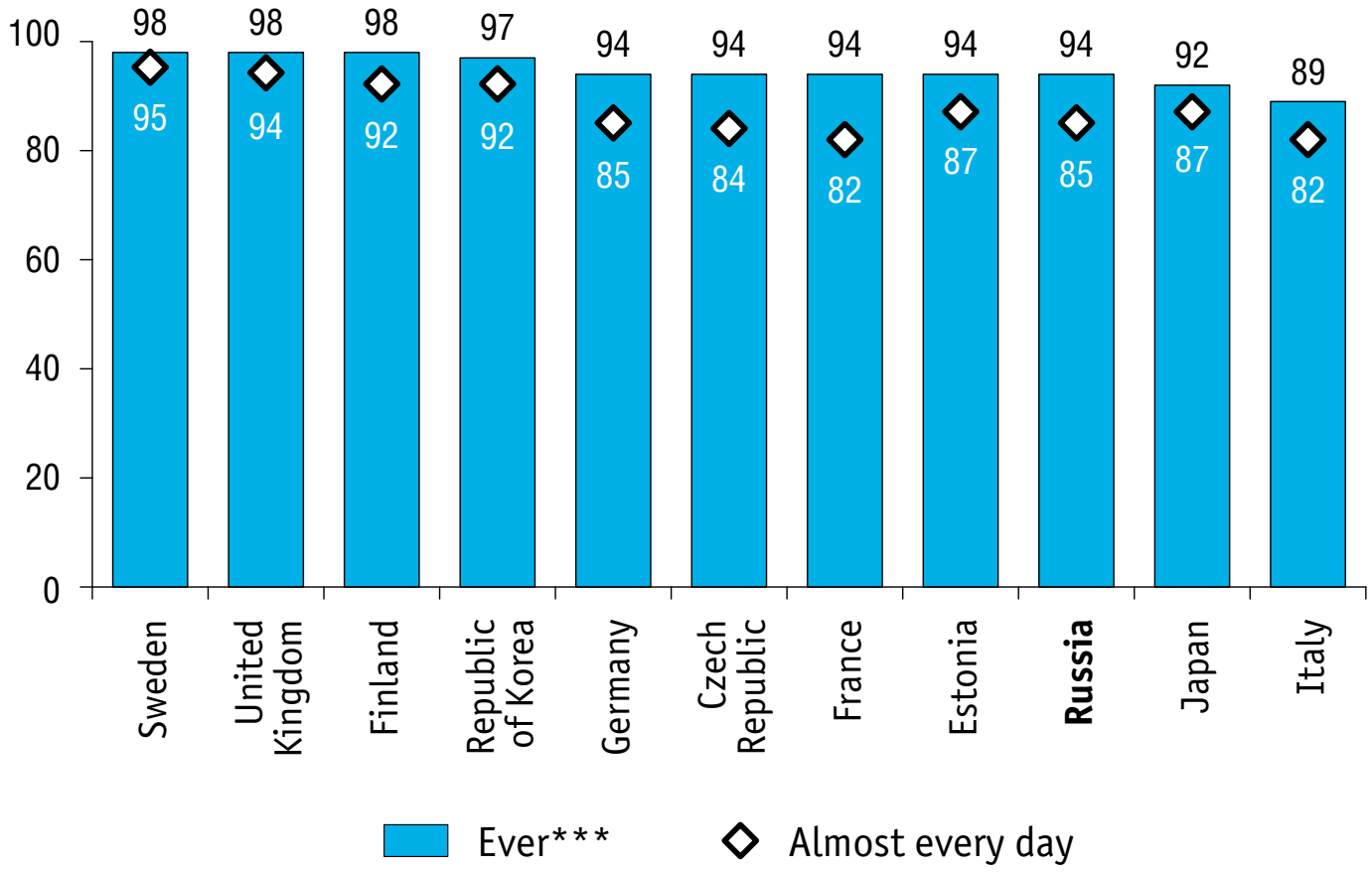
(as a percentage of individuals aged 15–74)*



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

2.6. Internet users by country: 2022*

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



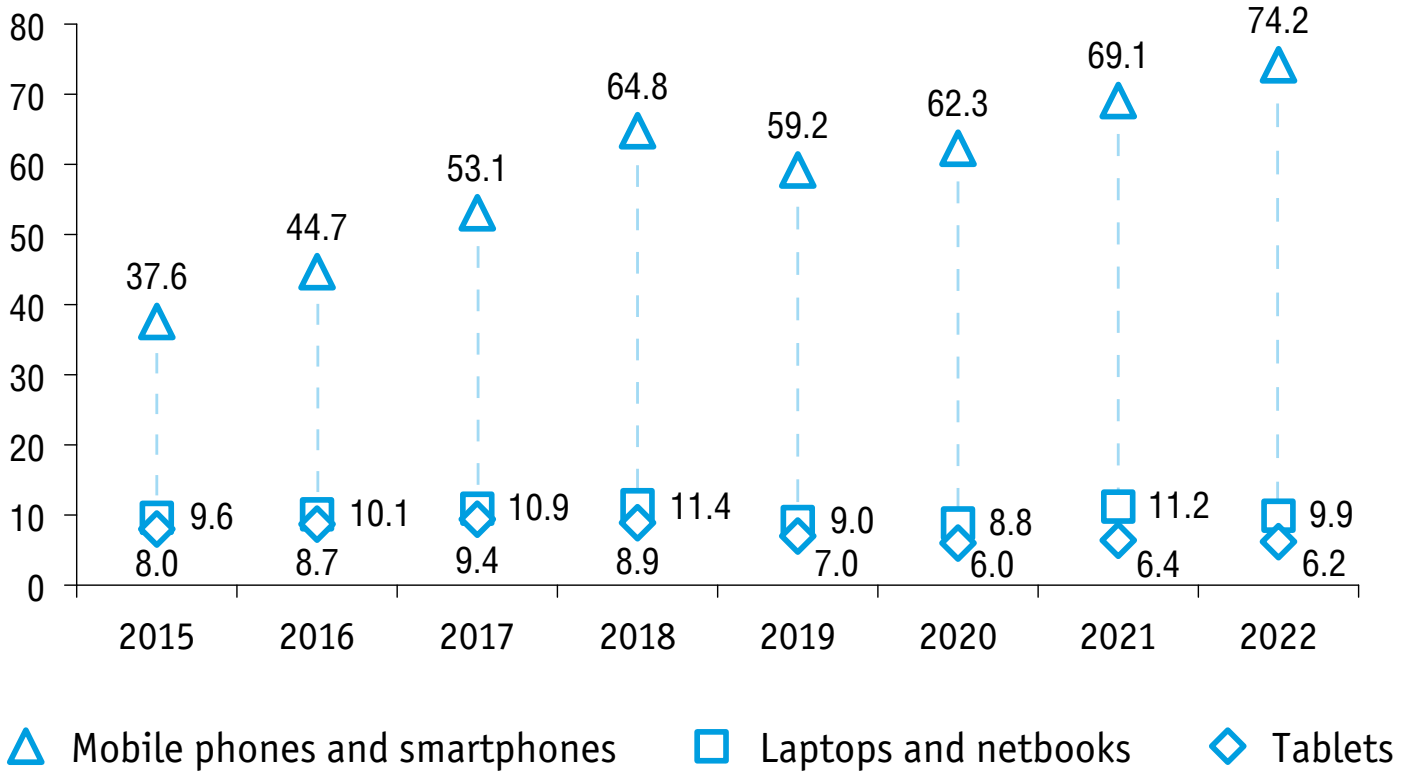
* Or nearest years for which data are available.

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

*** For the Japan, Republic of Korea, and United Kingdom, within the last 12 months.

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

(as a percentage of individuals aged 15–74)



2.8. Individuals' Internet activities related to communications by country: 2022*

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

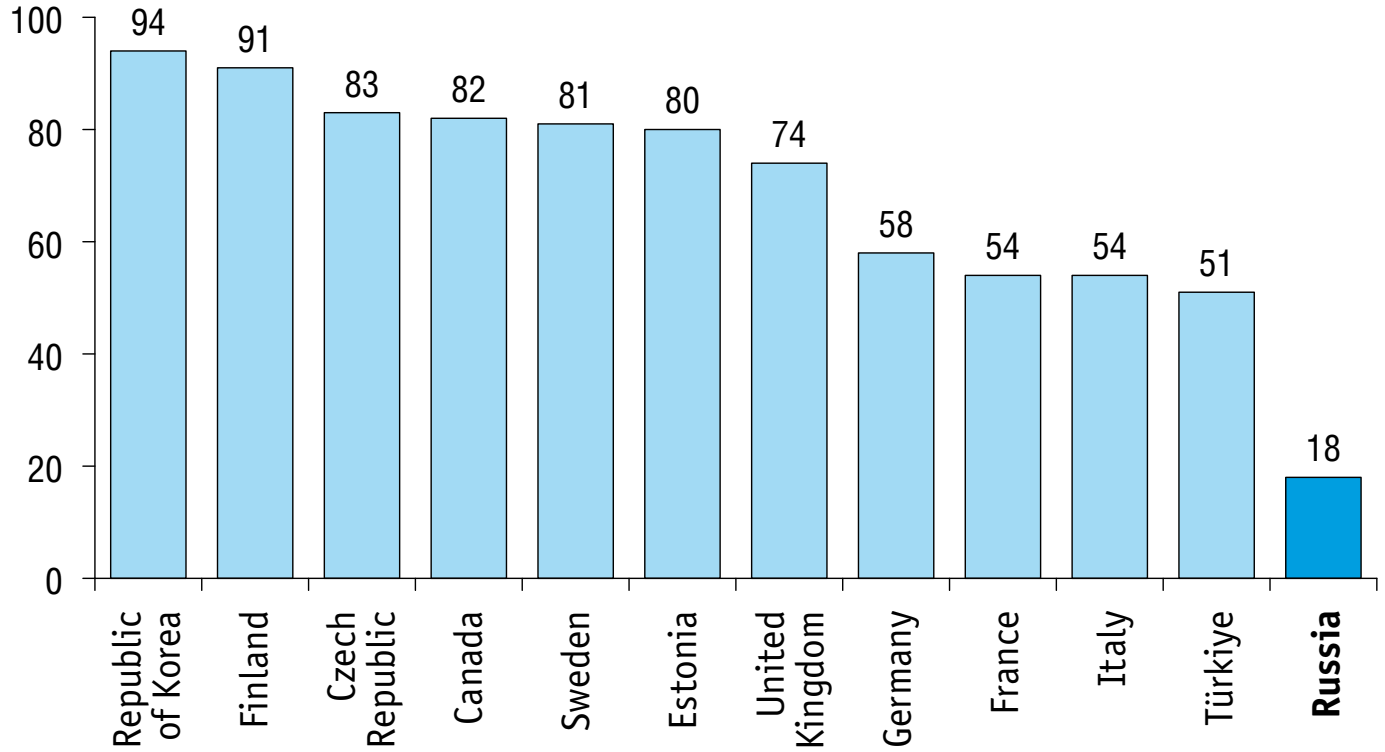
	Making online telephone/video calls	Participating in social media
Russia	**79**	**67**
Canada	68	75
Czech Republic	61	64
Estonia	61	66
Finland	74	76
France	62	44
Germany	59	48
Italy	67	53
Republic of Korea	67	69
Sweden	75	71
Türkiye	76	71
United Kingdom	52	76
United States	56	64

* Or nearest years for which data are available.

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

2.9. Individuals' Internet activities related to reading or downloading online newspapers / magazines / e-books by country: 2022*

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

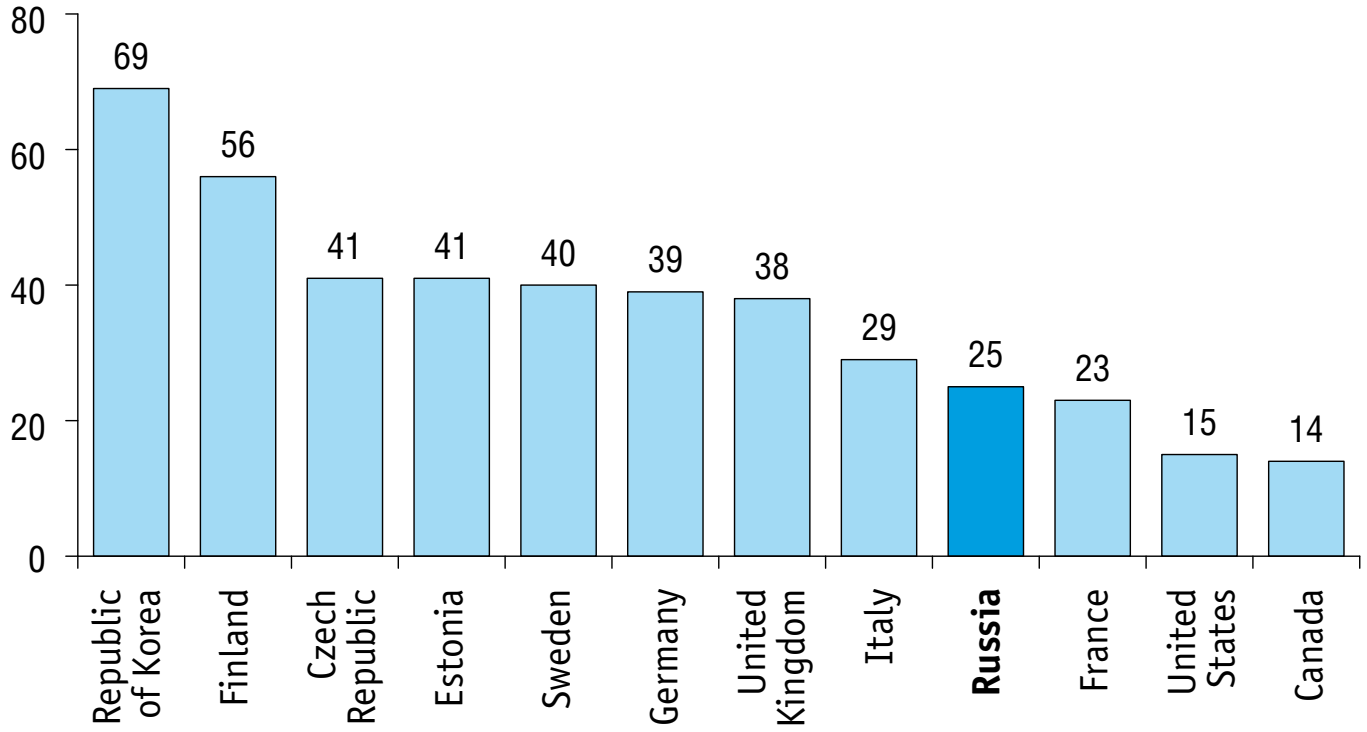


* Or nearest years for which data are available.

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

2.10. Individuals' Internet activities related to uploading personal files to publicly accessible sources by country: 2022*

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

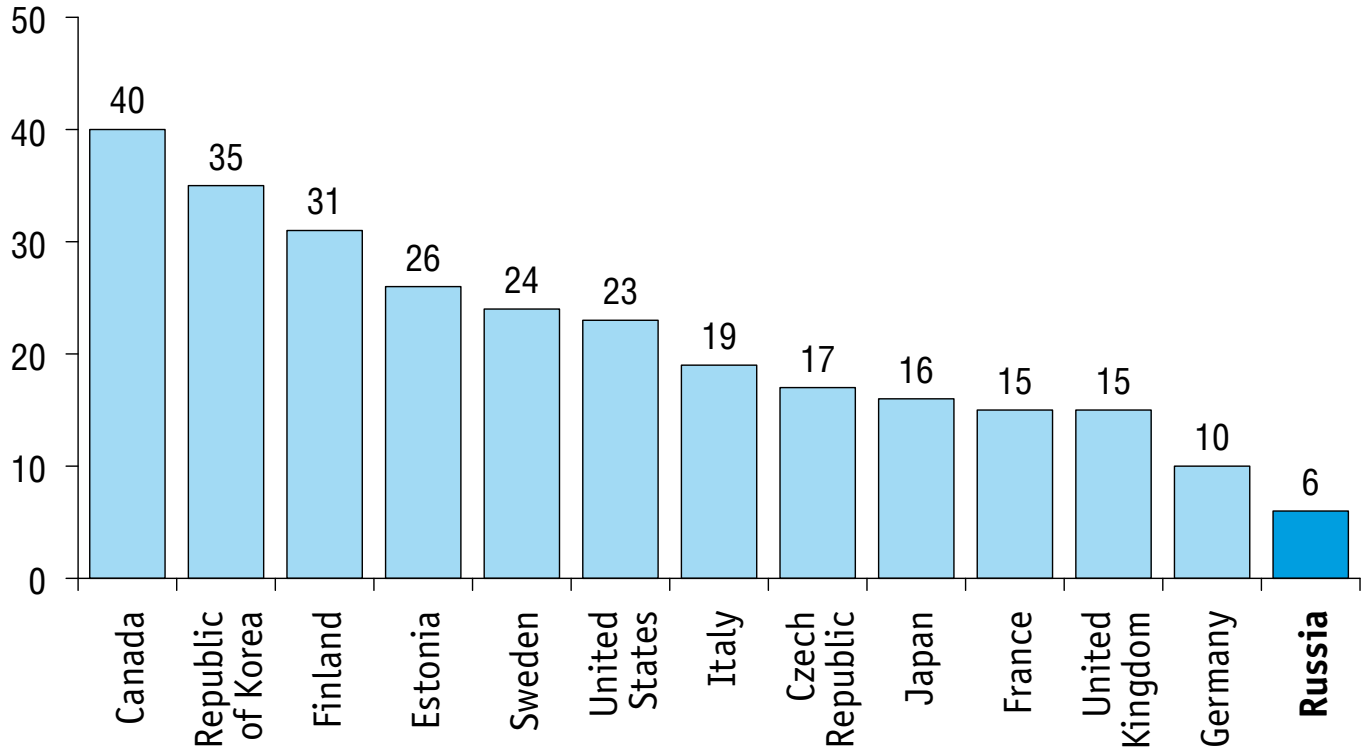


* Or nearest years for which data are available.

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

2.11. Individuals' Internet activities related to e-learning by country: 2022*

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

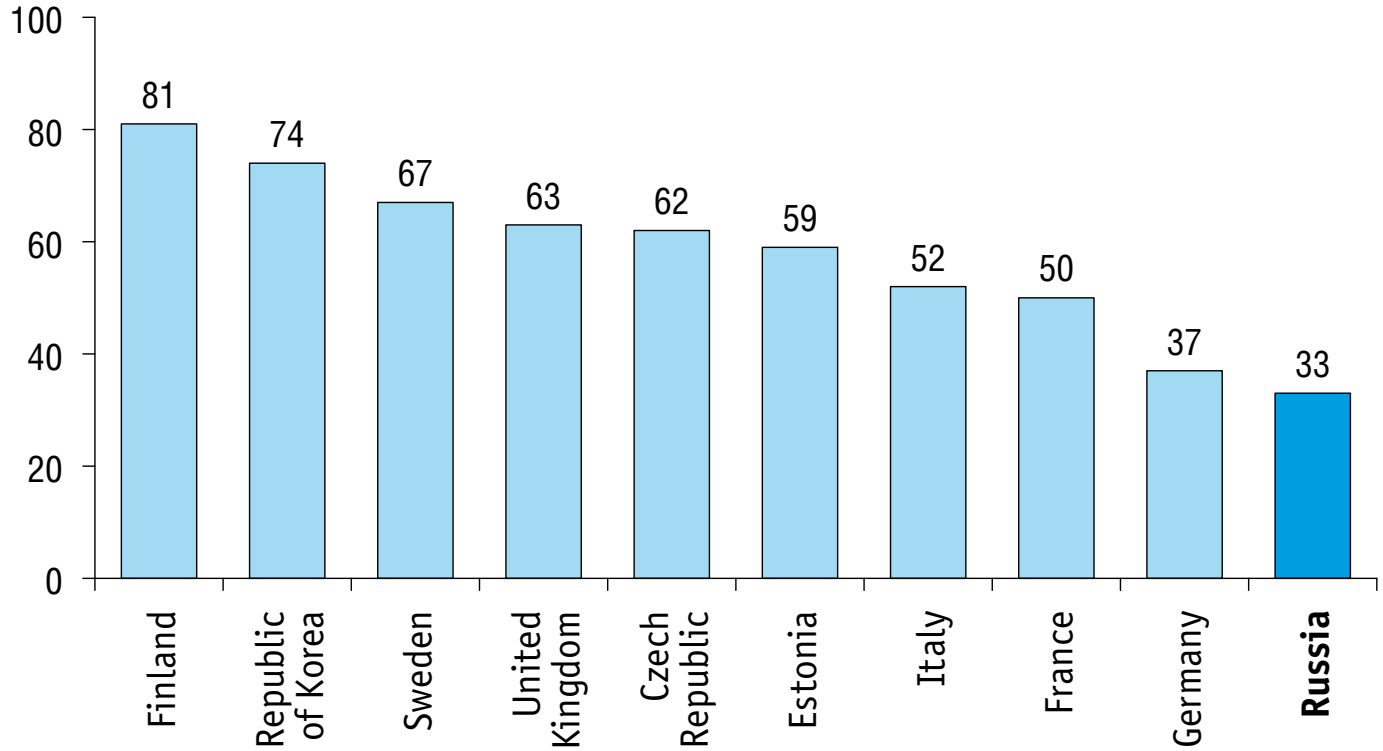


* Or nearest years for which data are available.

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

2.12. Individuals' Internet activities related to searching for information related to health and healthcare services: 2022*

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

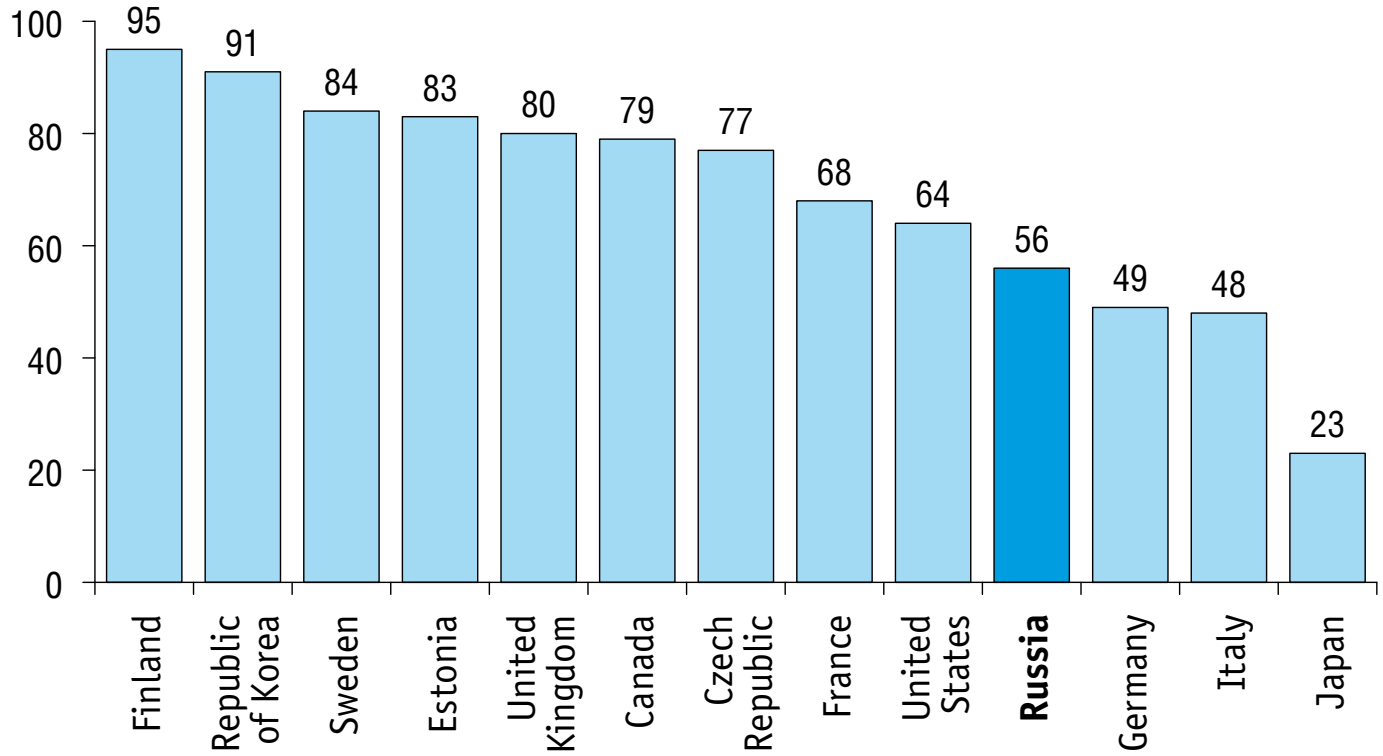


* Or nearest years for which data are available.

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

2.13. Individuals' Internet activities related to financial transactions by country: 2022*

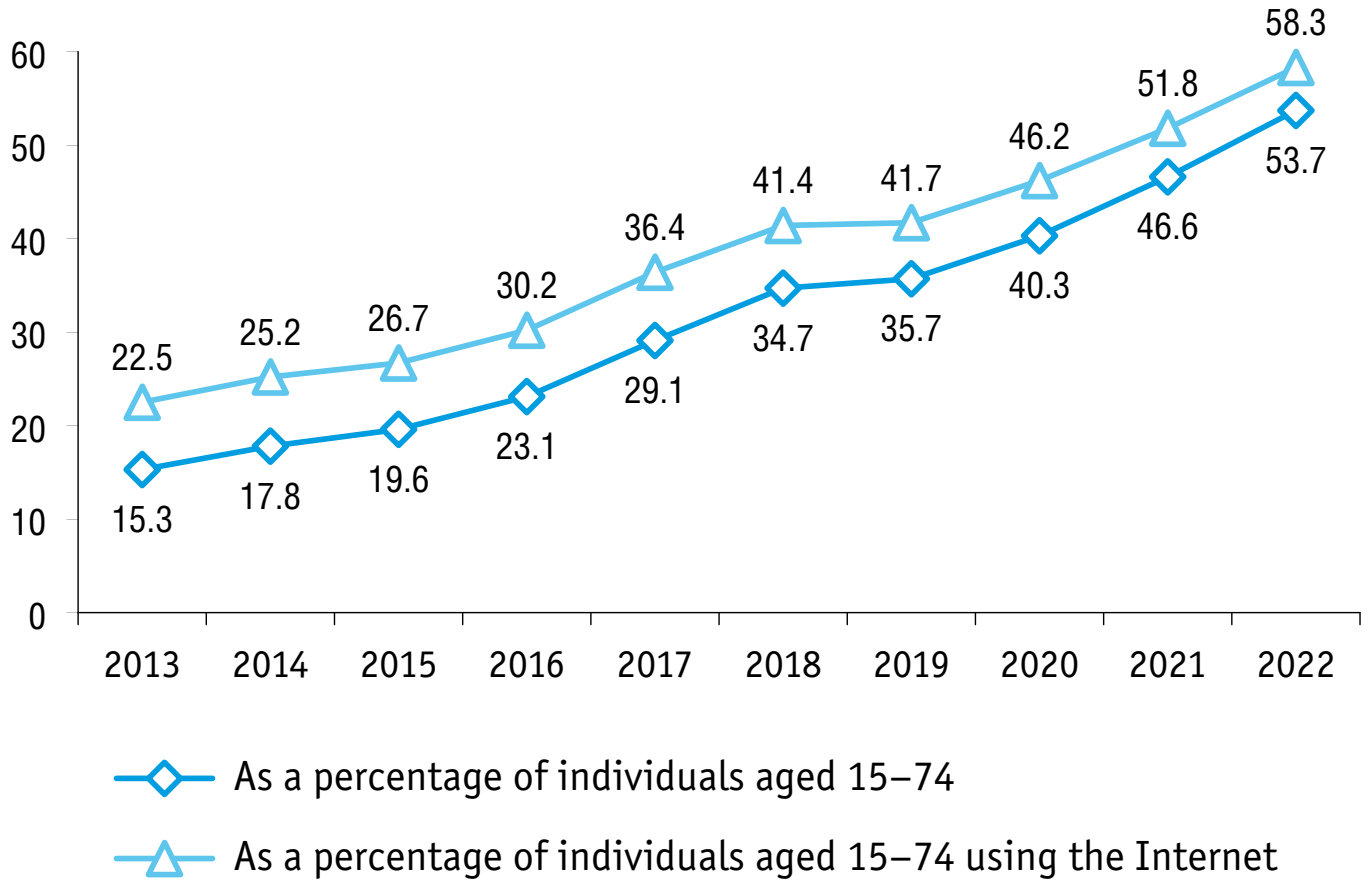
*(as a percentage of individuals aged 15–74**)*



* Or nearest years for which data are available.

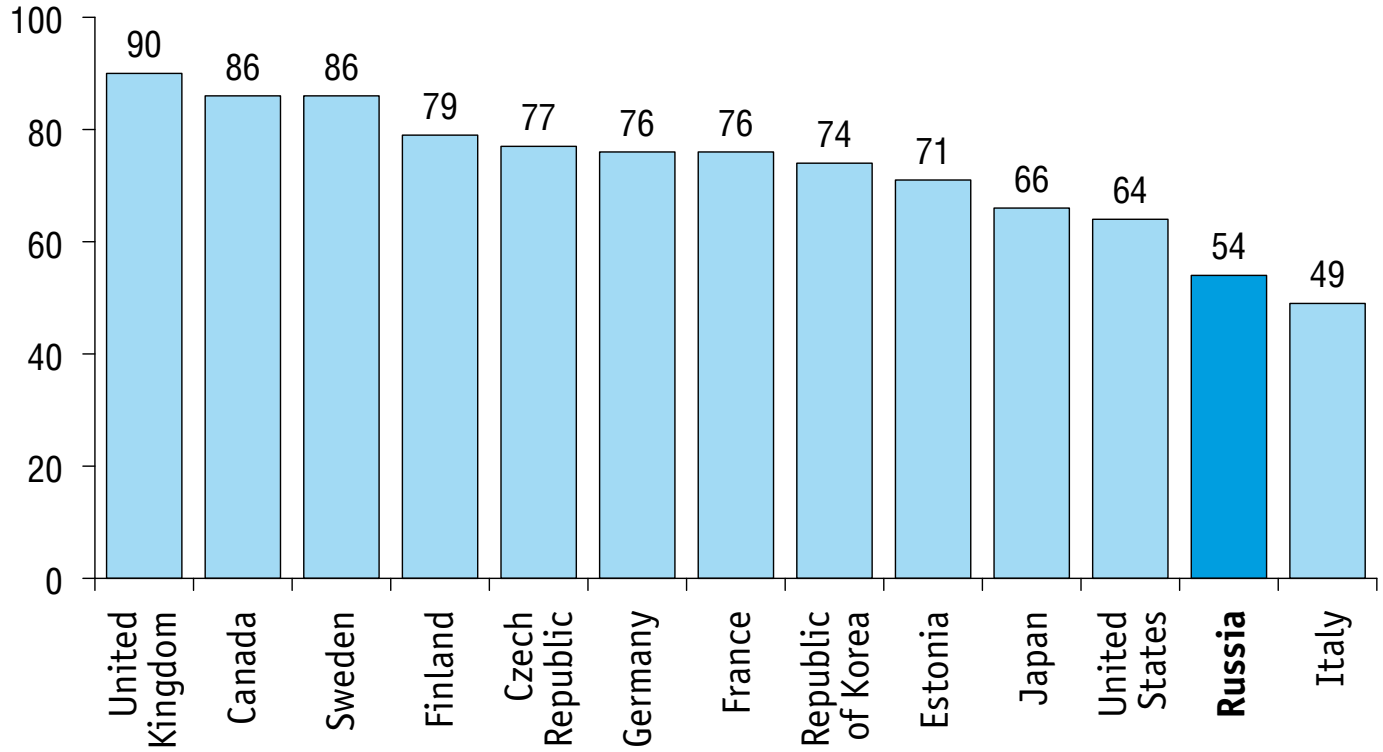
** For countries other than Russia, aged 16–74.

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



2.15. Individuals' Internet activities related to ordering goods or services by country: 2022*

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



* Or nearest years for which data are available.

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

2.16. Individuals' digital skills

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

	2019	2020	2021	2022
Transferring files via e-mail*	39.7	42.2	62.2	64.8
Using word processing software	40.4	40.4	38.4	42.3
Copying or moving files or folders	36.3	37.5	36.3	39.8
Using copy/paste tools in documents	24.9	27.7	27.7	29.3
Using spreadsheet software	22.0	22.9	21.4	25.8
Using software to edit photos, video, or audio files	21.9	20.9	21.4	23.4
Transferring files between a computer and other devices	31.0	27.3	26.1	22.7
Connecting and installing new devices	15.3	14.2	14.2	15.1
Creating passwords to protect devices, applications, and accounts	–	–	11.1	13.4
Creating e-presentations using special software	9.0	9.3	10.1	12.4
Verifying the accuracy of information found on the Internet	–	–	–	12.3
Changing account access settings	–	–	6.7	9.0

* For 2021 and 2022, due to changes in Rosstat methodology, the data refer to sending messages via e-mail, messengers, SMS with attached files.

2.17. Individuals' digital skills by country: 2022*

*(as a percentage of the total population aged 15 and over**)*

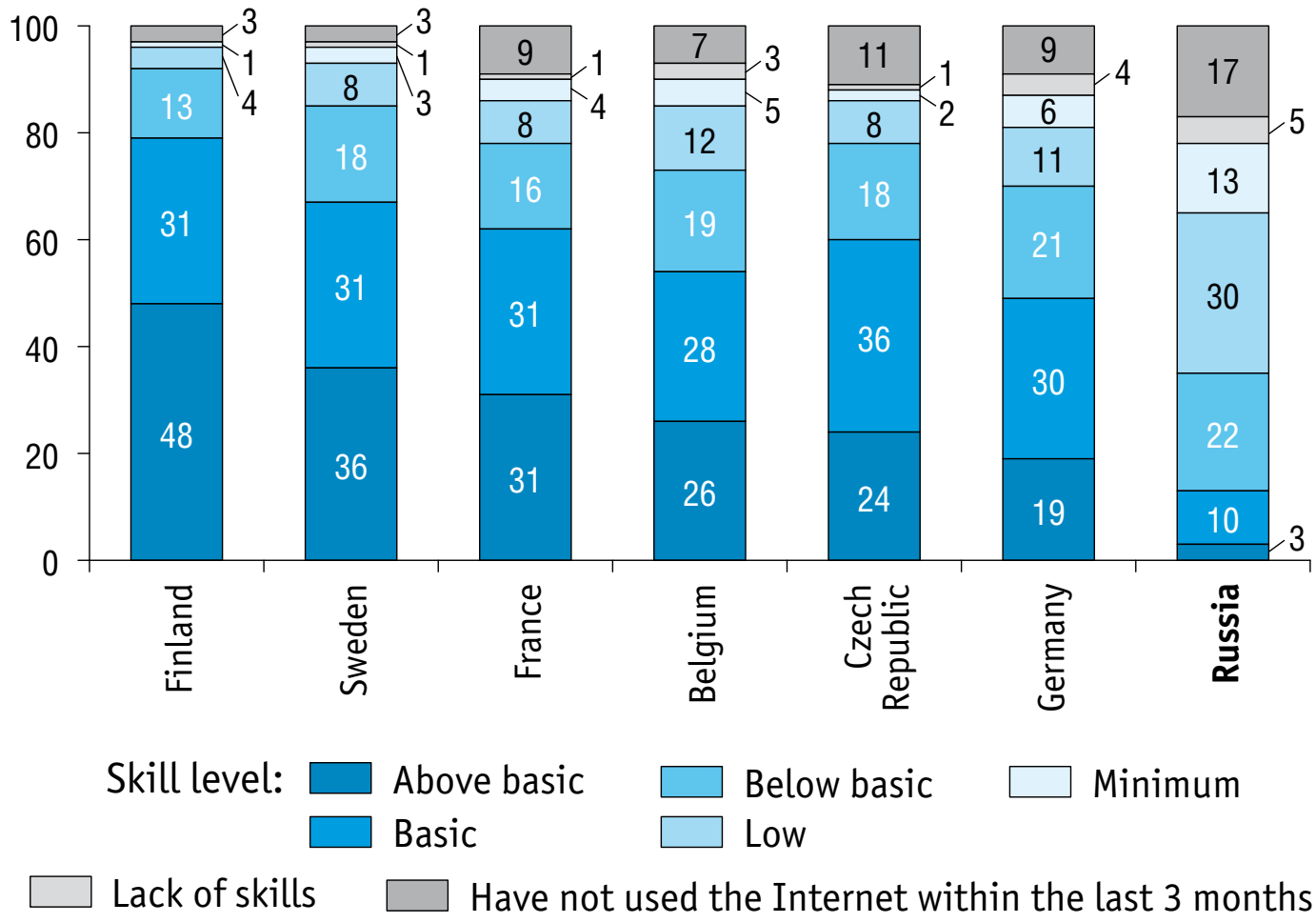
	Transferring files between a computer and other devices	Using spreadsheet software	Using software to edit photos, video, or audio files
Russia	**23**	**26**	**23**
Belgium	50	44	27
Czech Republic	57	40	28
Estonia	55	42	34
Finland	71	51	54
France	69	44	41
Germany	53	34	31
Sweden	62	45	34

* Or nearest years for which data are available.

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

2.18. Digital competence by country: 2022*

*(as a percentage of all individuals aged 14 and over**)*

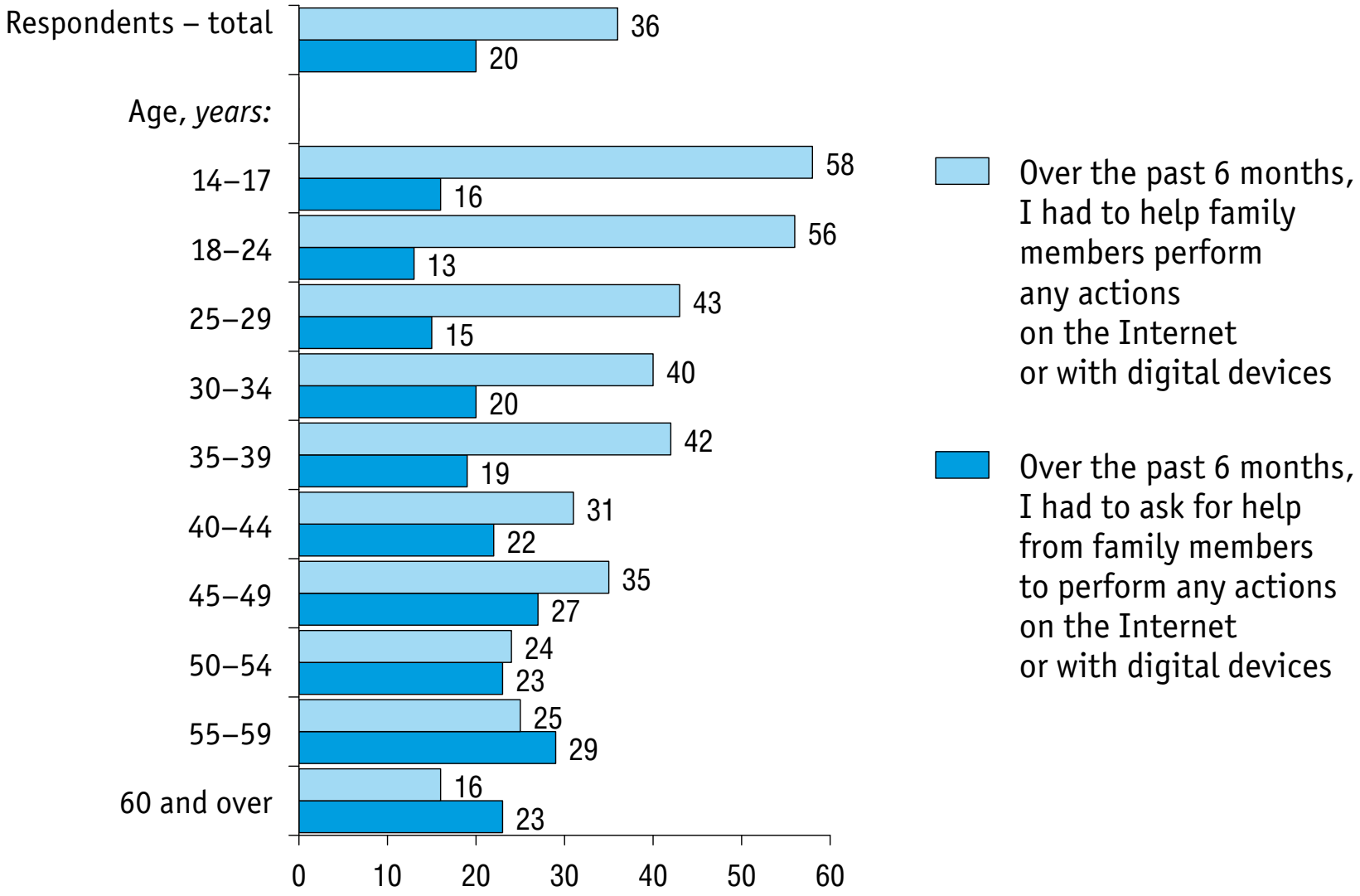


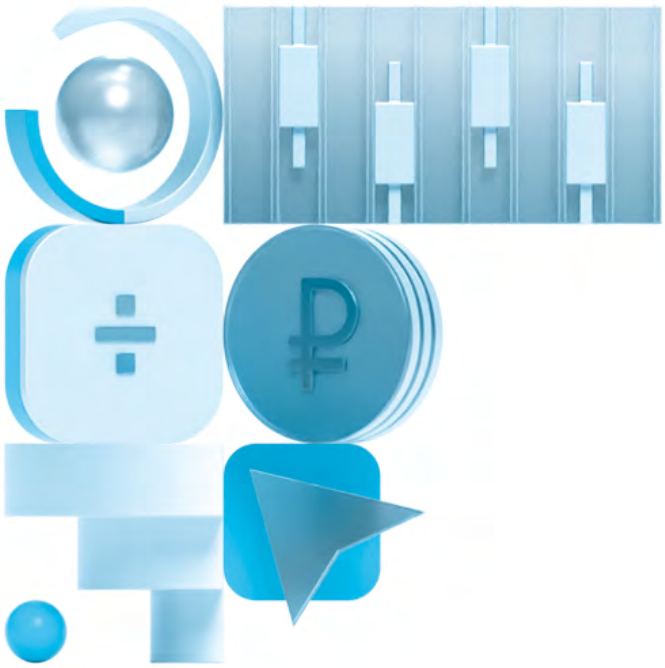
* Or nearest years for which data are available.

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

2.19. Digital assistance in households: 2022

(as a percentage of respondents aged 14 years and over who live in households of two or more people)





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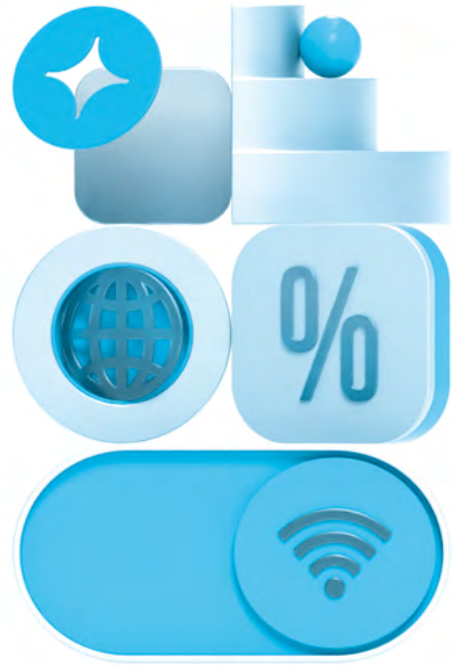
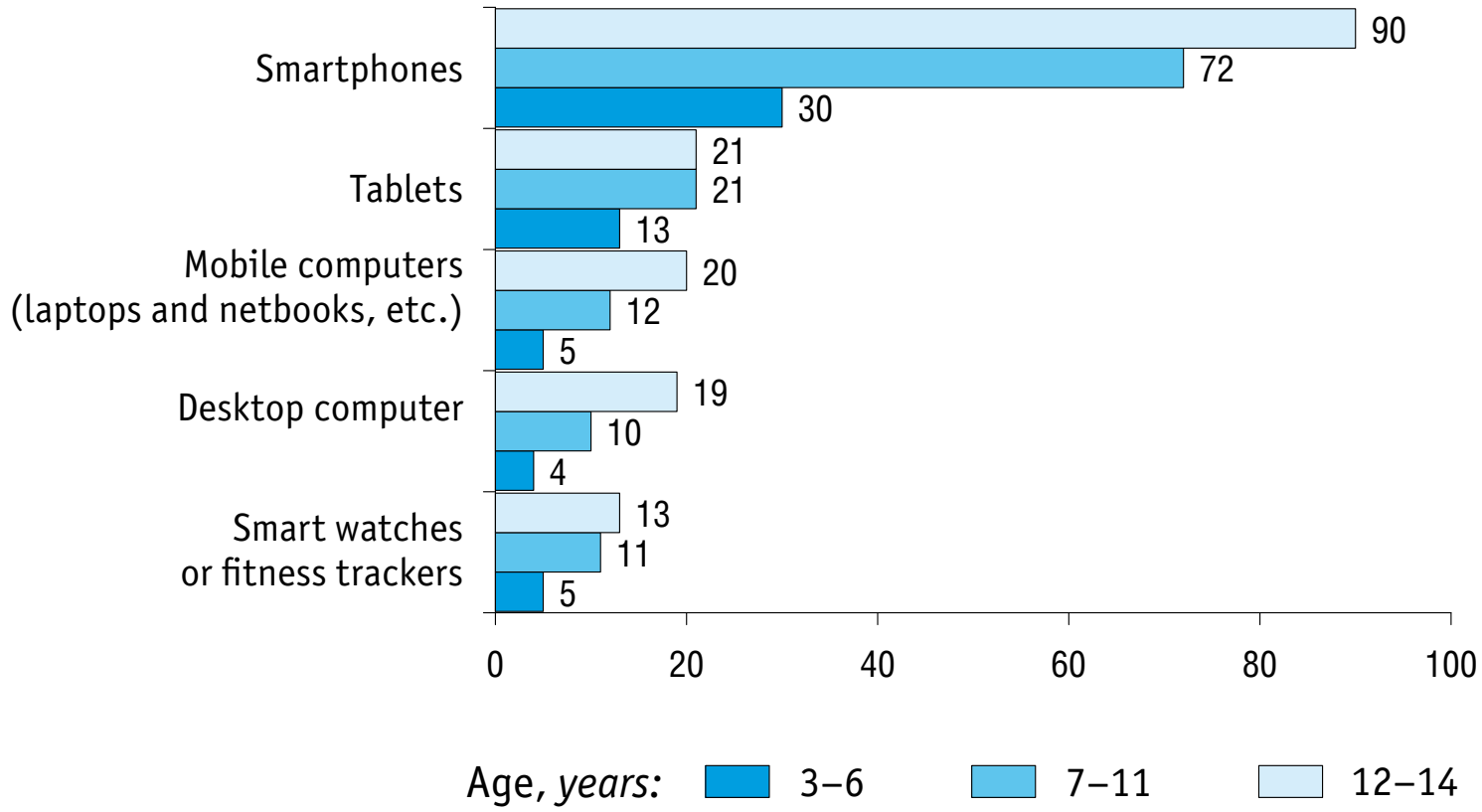


CHILDREN AND THE INTERNET

3.1. Children's use of digital devices: 2022

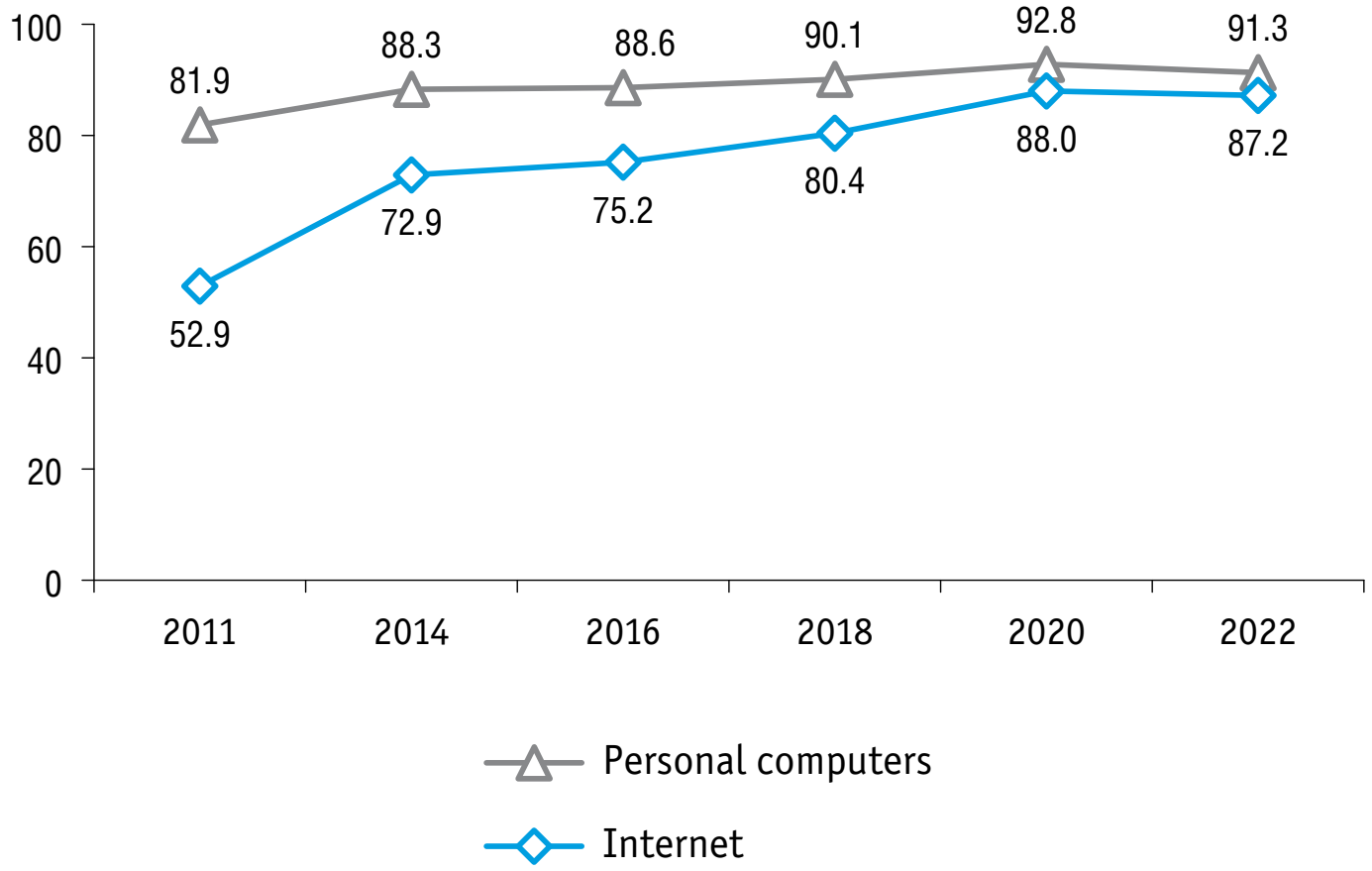
(as a percentage of all children in the corresponding age group within surveyed families)



Sources: here and below in this section, the results of a representative survey of the adult Russian population aged 14 years and over conducted by HSE ISSEK within Digital Transformation Monitoring of the Economy and Society (carried out in August 4 – September 7, 2022 with of 10,021 participants) (3.1, 3.6); Rosstat (3.2–3.5).

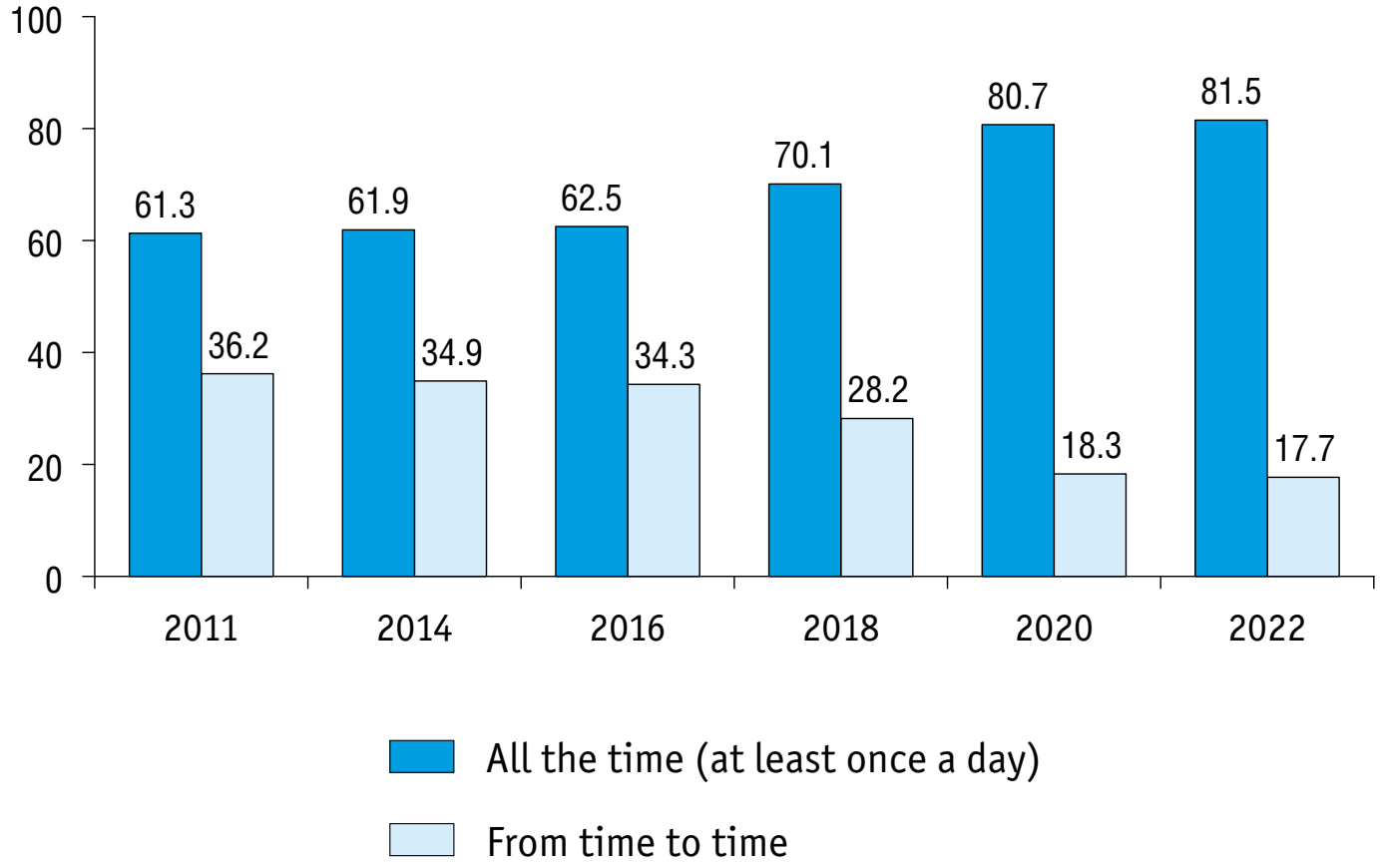
3.2. Children's use of personal computers and the Internet

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



3.3. Children's use of the Internet

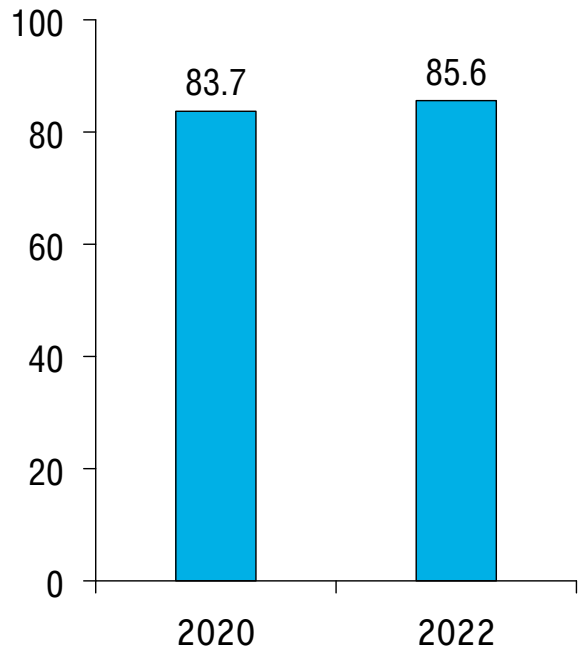
(as a percentage of children under 15 who study in general education institutions and use the Internet)



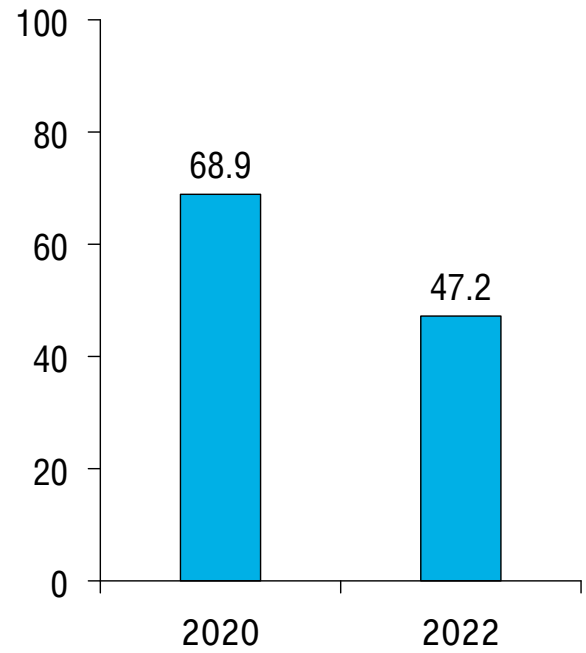
3.4. Children's Internet activities

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

Homework, school projects preparation

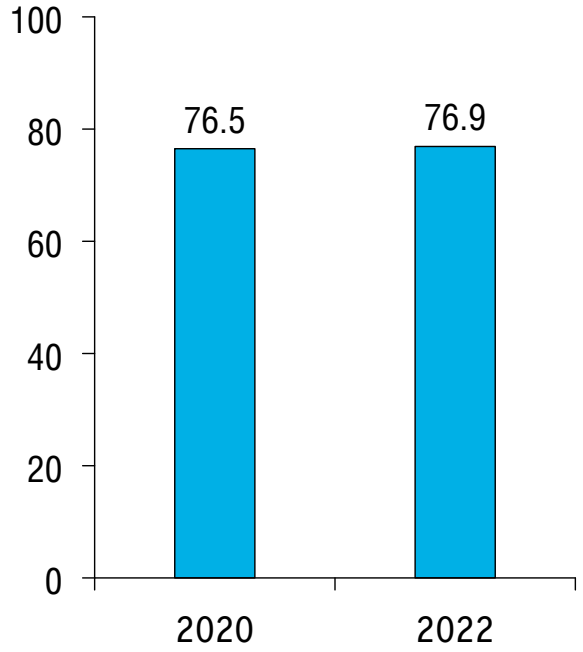


Distance learning

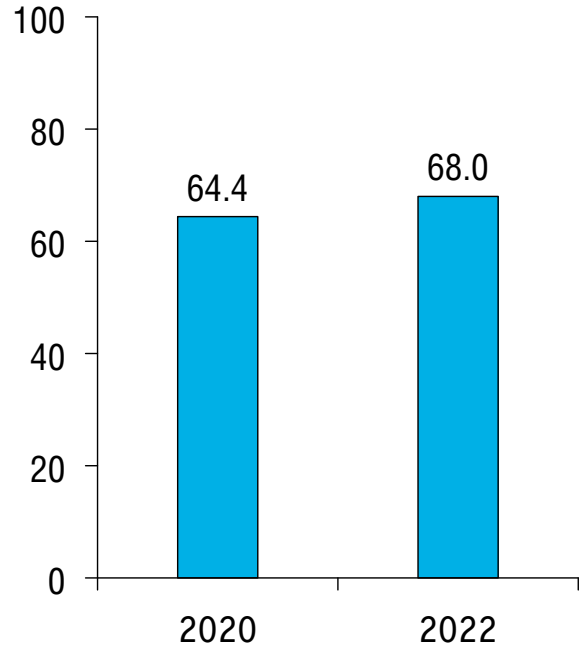


(continued)

Entertainment (watching films, playing games, etc.)

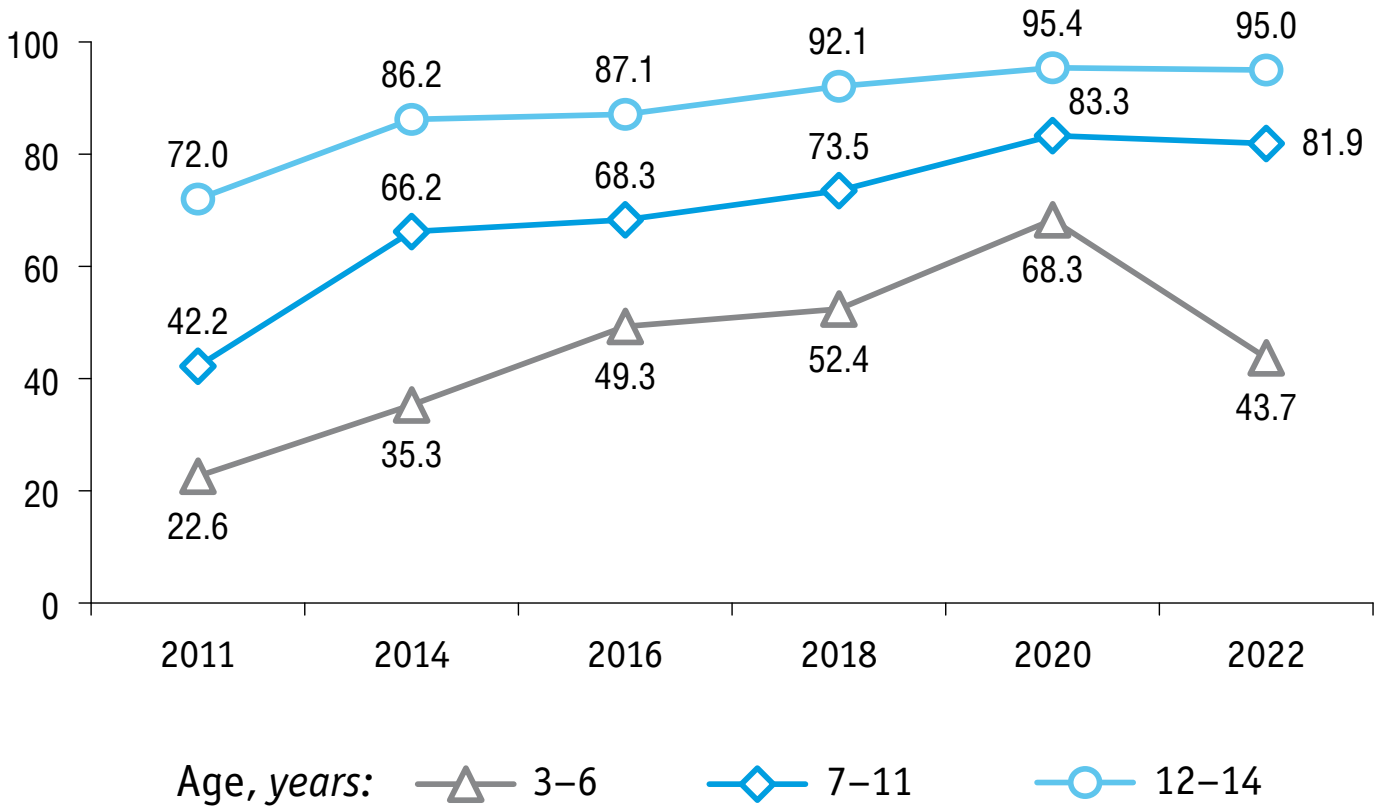


Participation in social media



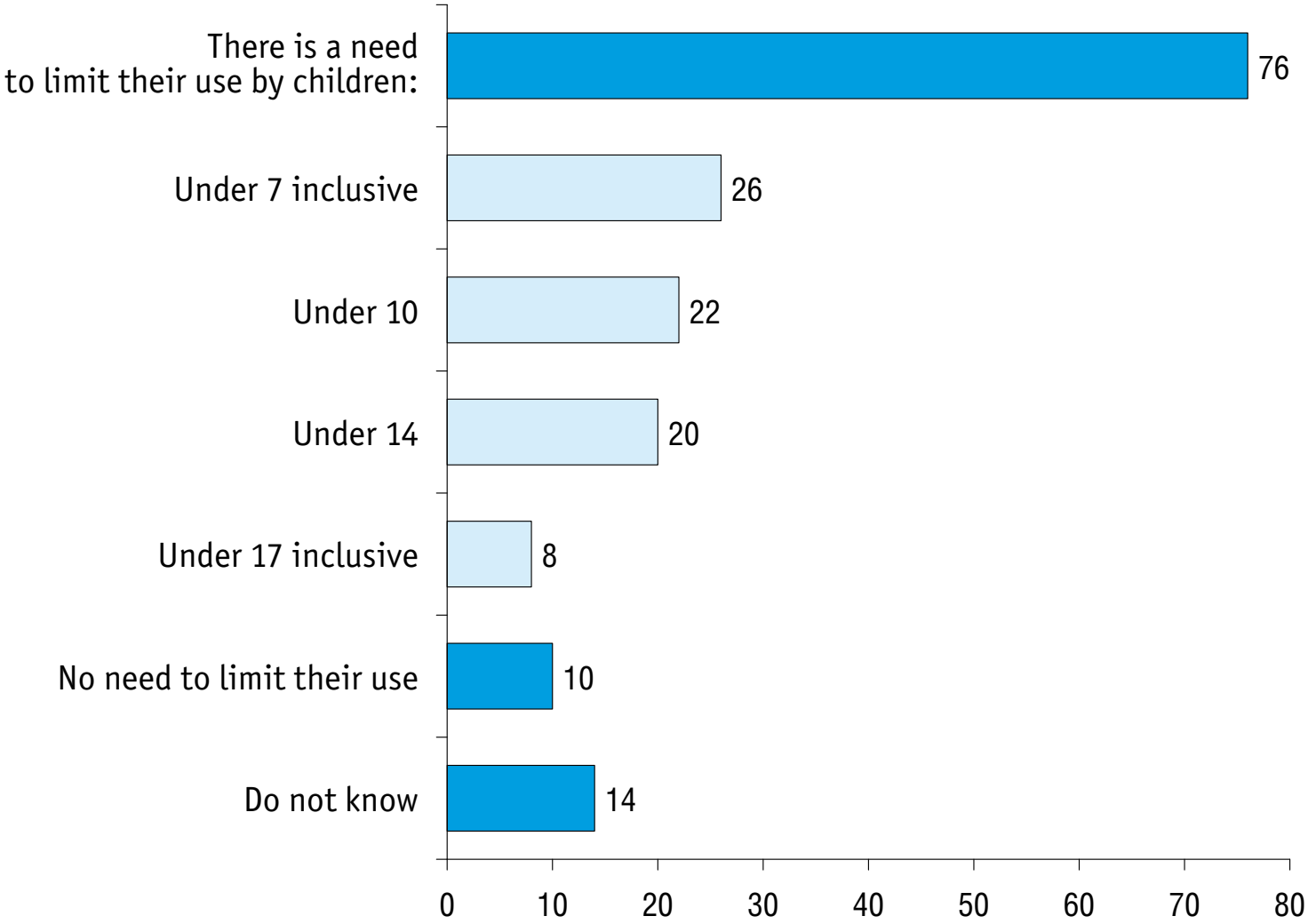
3.5. Children's Internet activities by age

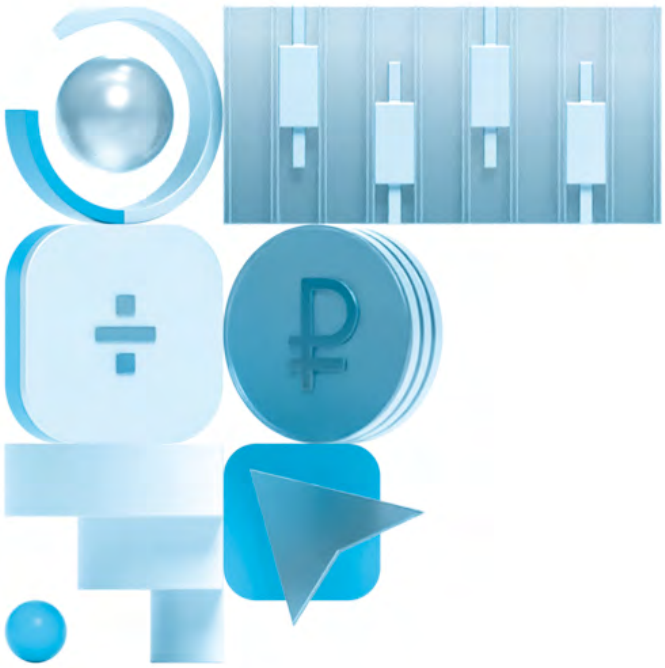
(as a percentage of children in the corresponding age group who study in general education institutions)



3.6. Internet users' attitude towards the need to limit the time of children's use of digital devices and the Internet: 2022

(as a percentage of respondents aged 18 and over who have used the Internet within the last 3 months)





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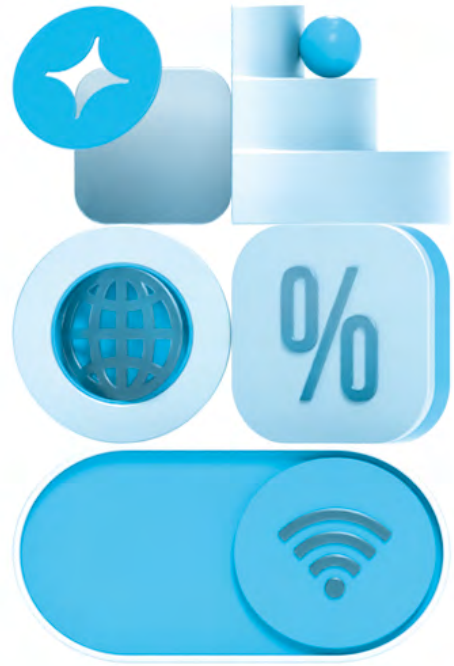
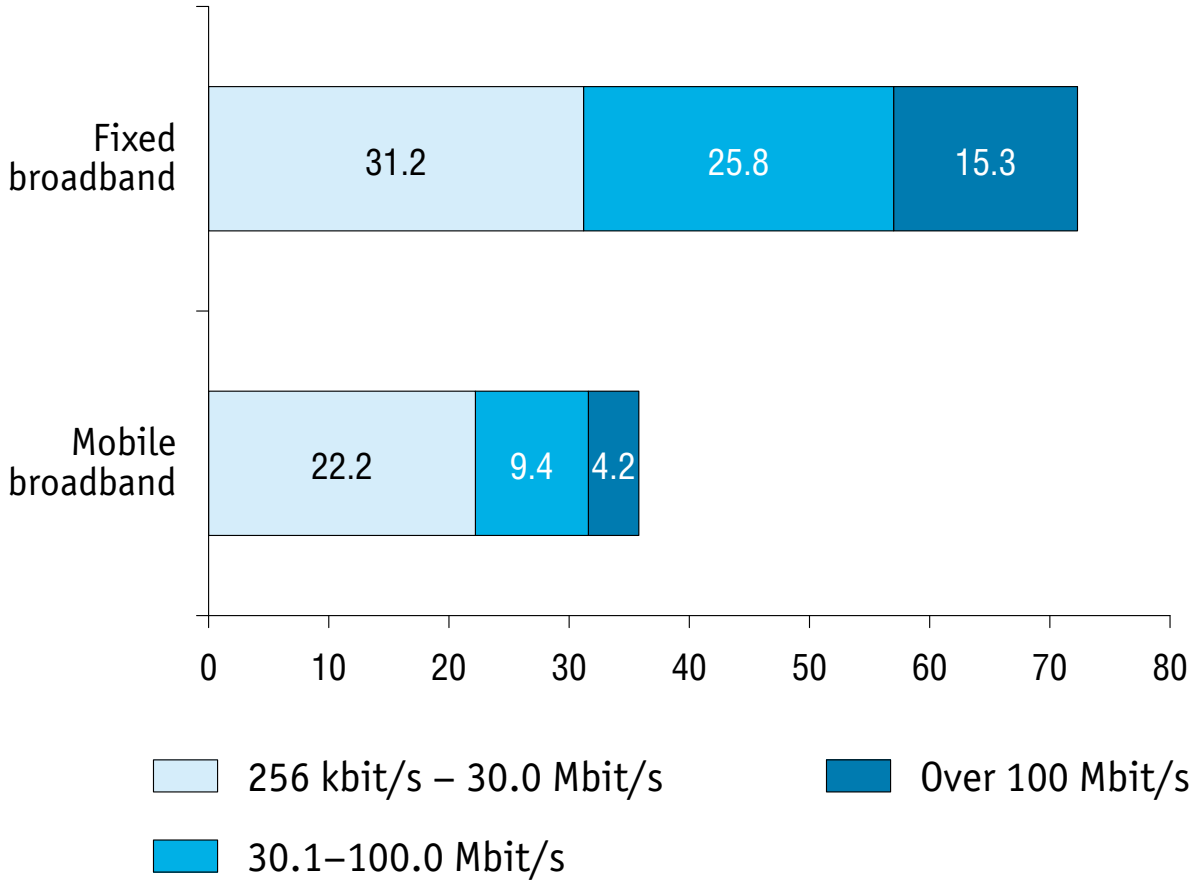


DIGITALISATION OF SECTORS

4.1. Enterprises' use of broadband Internet by type of access and top access speed: 2022

(as a percentage of all enterprises)



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

4.2. Enterprises' use of fixed broadband Internet by top access speed and type of economic activity

(as a percentage of all enterprises)

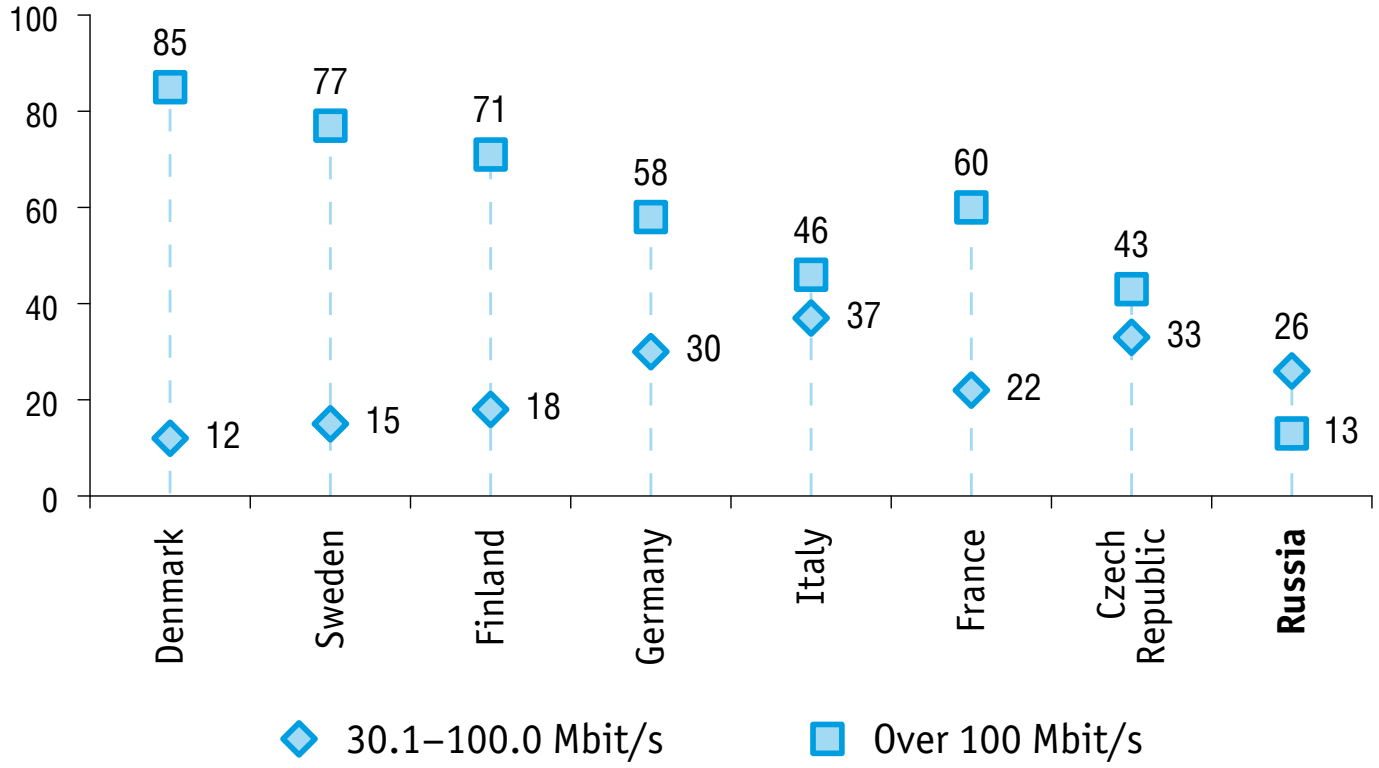
	256 kbit/s – 1.9 Mbit/s		2.0–100.0 Mbit/s		Over 100 Mbit/s	
	2021	2022	2021	2022	2021	2022
Total	**35.4**	**31.2**	**26.2**	**25.8**	**12.3**	**15.3**
Agriculture, forestry and fishing	36.3	32.6	22.8	24.1	6.8	7.3
Mining and quarrying	27.0	23.6	27.0	29.9	11.7	12.1
Manufacturing	27.8	24.6	37.3	38.2	14.2	16.9
Electricity, gas, steam and air-conditioning supply	37.7	35.3	30.8	32.5	8.8	11.2
Water supply, sewerage, waste management and remediation activities	38.4	36.4	23.8	24.5	7.2	8.8
Construction	23.0	19.2	24.8	24.4	10.6	12.9
Wholesale and retail trade; repair of motor vehicles and motorcycles	33.9	28.4	29.9	23.4	16.6	28.7
Transportation and storage	31.9	29.7	23.8	25.7	13.5	11.9
Accommodation and food service activities	34.2	34.1	16.1	15.8	17.5	16.6

(continued)

	256 kbit/s – 1.9 Mbit/s		2.0–100.0 Mbit/s		Over 100 Mbit/s	
	2021	2022	2021	2022	2021	2022
Information and communication	27.2	24.0	27.2	26.7	24.9	26.7
IT industry	23.8	20.8	29.8	27.3	26.9	29.9
Financial and insurance activities	38.6	25.4	19.0	25.7	21.1	25.9
Real estate activities	27.5	25.7	21.2	21.1	8.7	9.9
Professional, scientific and technical activities	28.6	25.0	24.4	24.2	12.5	13.6
Higher education	19.3	12.7	35.2	33.9	32.5	33.9
Human health and social work activities	40.3	35.4	33.4	33.8	7.8	8.8
Arts, entertainment and recreation	42.4	38.4	18.9	20.1	6.8	7.3
Public administration and defence; compulsory social security	44.7	41.0	26.1	26.7	8.0	8.8

4.3. Fixed broadband Internet in business enterprise sector by top access speed and country: 2022

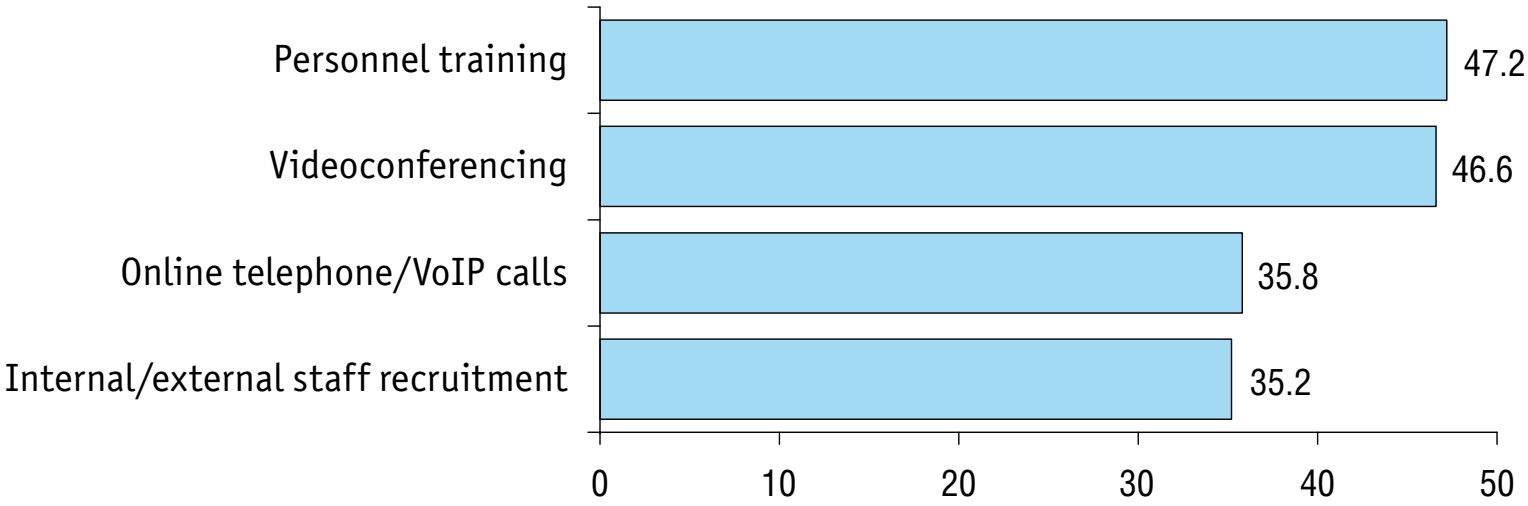
(as a percentage of all enterprises)



Sources: here and in 4.7, for countries other than Russia, Eurostat and OECD.

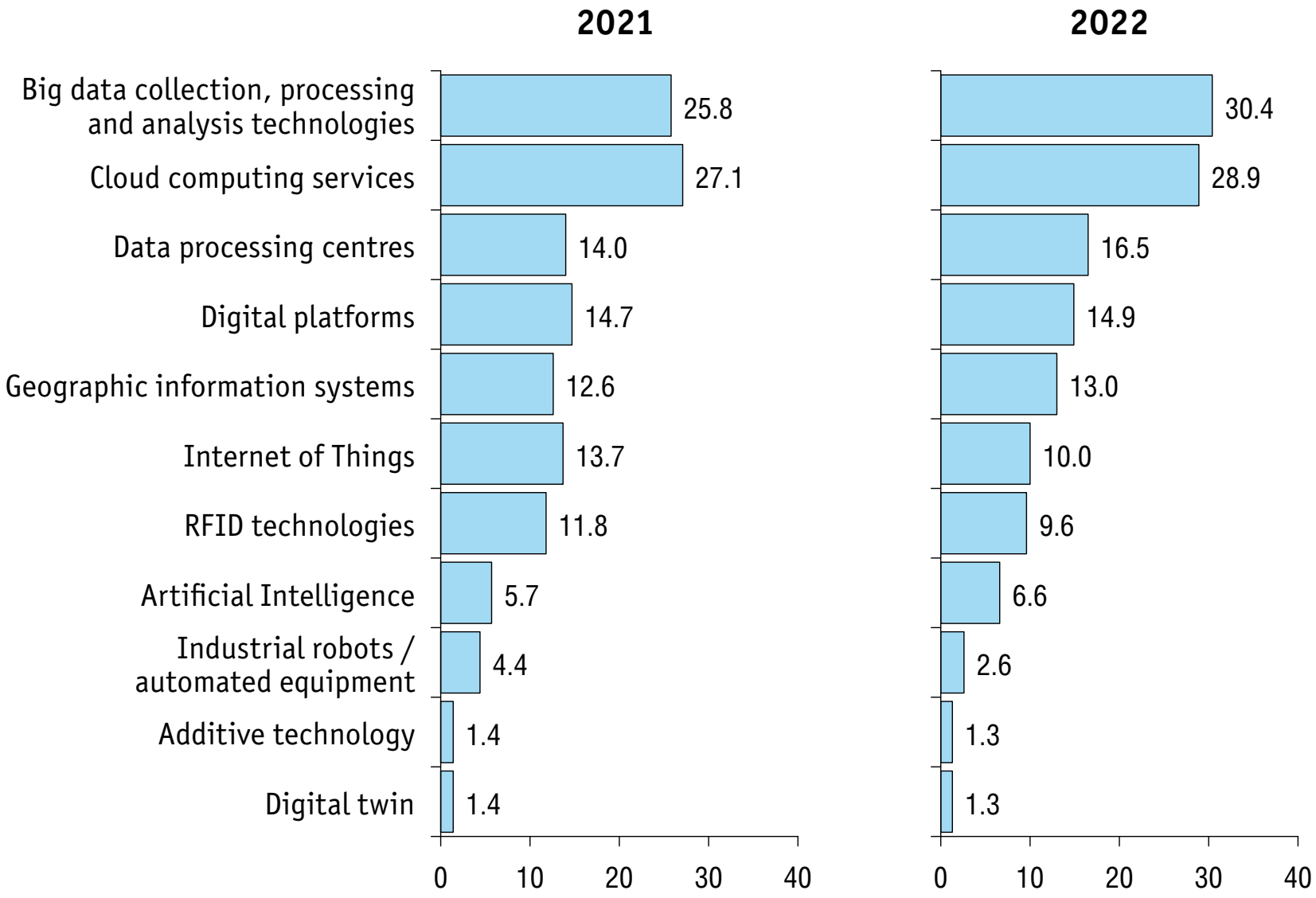
4.4. Enterprises' Internet activities: 2022

(as a percentage of all enterprises)



4.5. Enterprises' use of digital technologies

(as a percentage of all enterprises)



4.6. Enterprises' use of digital technologies by top access speed and type of economic activity: 2022

(as a percentage of all enterprises)

	Big data collection, processing and analysis technologies	Cloud computing services	Data processing centres
Total	**30.4**	**28.9**	**16.5**
Agriculture, forestry and fishing	23.7	25.5	12.8
Mining and quarrying	25.6	20.0	13.9
Manufacturing	32.9	30.7	17.9
Electricity, gas, steam and air-conditioning supply	25.2	23.5	13.7
Water supply, sewerage, waste management and remediation activities	26.1	27.0	14.2
Construction	20.2	20.5	10.9
Wholesale and retail trade; repair of motor vehicles and motorcycles	57.1	40.7	31.0
Transportation and storage	28.9	23.1	15.7
Accommodation and food service activities	31.9	29.9	17.4

(continued)

	Big data collection, processing and analysis technologies	Cloud computing services	Data processing centres
Information and communication	41.3	34.5	22.4
IT industry	45.4	35.9	24.6
Financial and insurance activities	47.7	33.8	25.9
Real estate activities	18.1	19.6	9.8
Professional, scientific and technical activities	20.6	23.6	11.2
Higher education	33.7	46.7	18.3
Human health and social work activities	30.6	36.3	16.6
Arts, entertainment and recreation	16.7	25.1	9.1
Public administration and defence; compulsory social security	17.1	23.6	9.3

(continued)

	Digital platforms	Geographic information systems	Internet of Things
Total	**14.9**	**13.0**	**10.0**
Agriculture, forestry and fishing	9.1	15.6	11.9
Mining and quarrying	10.6	16.9	13.9
Manufacturing	14.3	11.5	15.6
Electricity, gas, steam and air-conditioning supply	13.4	17.6	16.5
Water supply, sewerage, waste management and remediation activities	9.3	14.3	12.9
Construction	8.8	8.8	9.2
Wholesale and retail trade; repair of motor vehicles and motorcycles	28.2	22.4	13.8
Transportation and storage	14.1	15.8	11.2
Accommodation and food service activities	12.3	6.9	12.7

(continued)

	Digital platforms	Geographic information systems	Internet of Things
Information and communication	21.3	13.5	13.0
IT industry	22.6	10.9	11.7
Financial and insurance activities	26.9	20.4	8.8
Real estate activities	7.2	6.5	7.0
Professional, scientific and technical activities	9.4	8.1	6.7
Higher education	32.3	19.0	16.2
Human health and social work activities	16.1	13.0	11.4
Arts, entertainment and recreation	7.4	5.9	7.0
Public administration and defence; compulsory social security	8.9	10.0	5.4

(continued)

	RFID technologies	Artificial Intelligence	Industrial robots/automated equipment
Total	**9.6**	**6.6**	**2.6**
Agriculture, forestry and fishing	9.4	4.7	4.8
Mining and quarrying	16.0	3.4	3.6
Manufacturing	19.1	5.5	19.0
Electricity, gas, steam and air-conditioning supply	14.1	4.8	1.6
Water supply, sewerage, waste management and remediation activities	8.7	5.6	2.4
Construction	8.4	3.4	1.7
Wholesale and retail trade; repair of motor vehicles and motorcycles	12.2	15.4	2.8
Transportation and storage	14.7	5.1	1.7
Accommodation and food service activities	11.3	3.9	4.2

(continued)

	RFID technologies	Artificial Intelligence	Industrial robots/automated equipment
Information and communication	14.1	10.1	1.6
IT industry	12.8	8.6	1.5
Financial and insurance activities	12.2	7.7	0.6
Real estate activities	6.7	3.8	0.9
Professional, scientific and technical activities	6.4	3.9	1.1
Higher education	30.0	10.2	4.8
Human health and social work activities	8.3	5.5	1.2
Arts, entertainment and recreation	5.6	4.1	0.6
Public administration and defence; compulsory social security	4.6	3.6	0.6

(continued)

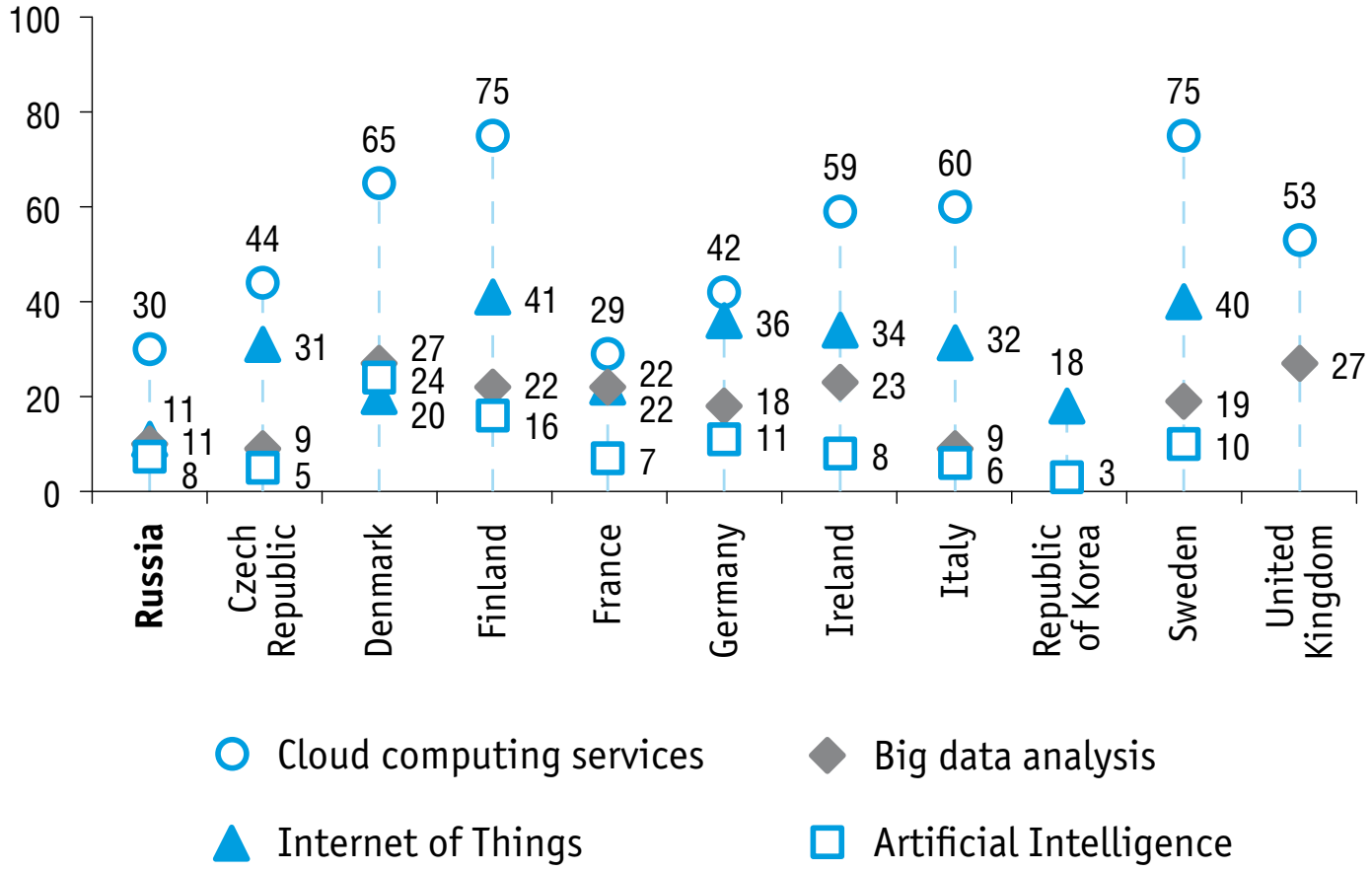
	Additive technology	Digital twin
Total	**1.3**	**1.3**
Agriculture, forestry and fishing	0.8	1.0
Mining and quarrying	1.0	2.1
Manufacturing	5.6	3.5
Electricity, gas, steam and air-conditioning supply	0.7	2.1
Water supply, sewerage, waste management and remediation activities	0.8	1.3
Construction	0.7	1.8
Wholesale and retail trade; repair of motor vehicles and motorcycles	1.1	1.1
Transportation and storage	1.1	1.2
Accommodation and food service activities	0.7	0.8

(continued)

	Additive technology	Digital twin
Information and communication	1.4	1.7
IT industry	1.5	2.1
Financial and insurance activities	0.5	0.6
Professional, scientific and technical activities	1.9	1.7
Higher education	19.3	6.2
Human health and social work activities	0.8	0.9
Arts, entertainment and recreation	0.9	0.8
Public administration and defence; compulsory social security	0.6	0.8

4.7. Use of digital technologies in business enterprise sector by country: 2022*

(as a percentage of all enterprises)



* Or nearest years for which data are available.

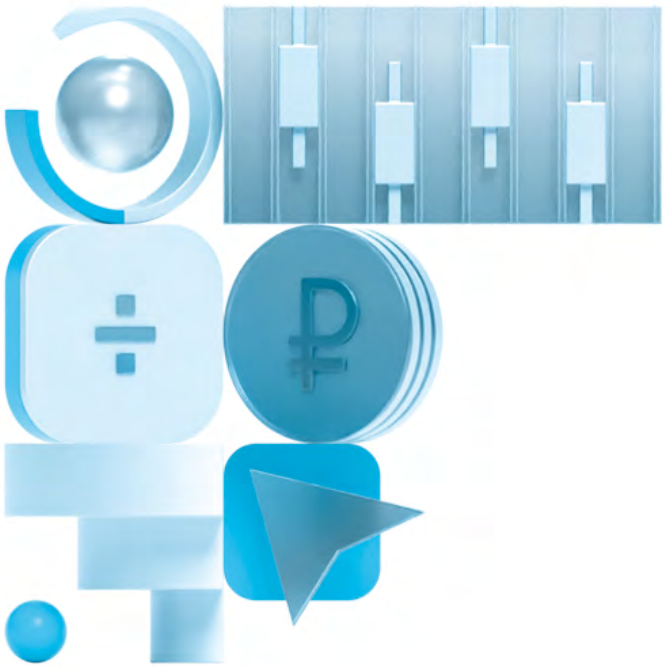
4.8. Enterprises' use of specialised software by type of economic activity: 2022

(as a percentage of all enterprises)

	Electronic document management systems	Electronic payment transactions	Access to databases through global information networks	E-learning software
Total	**56.9**	**47.0**	**28.4**	**26.1**
Agriculture, forestry and fishing	52.0	44.8	26.2	21.4
Mining and quarrying	52.7	44.5	23.4	29.9
Manufacturing	62.7	56.1	29.5	28.1
Electricity, gas, steam and air-conditioning supply	67.0	54.3	27.7	36.9
Water supply, sewerage, waste management and remediation activities	55.9	48.2	28.2	24.3
Construction	44.1	39.8	22.3	19.3
Wholesale and retail trade; repair of motor vehicles and motorcycles	64.2	55.6	40.6	34.7
Transportation and storage	55.5	42.3	24.2	31.7

(continued)

	Electronic document management systems	Electronic payment transactions	Access to databases through global information networks	E-learning software
Accommodation and food service activities	47.0	44.6	27.8	18.1
Information and communication	62.3	48.3	27.4	27.7
IT industry	63.3	45.3	27.7	29.8
Financial and insurance activities	61.3	48.0	38.2	43.0
Real estate activities	44.7	39.7	19.7	15.1
Professional, scientific and technical activities	48.8	42.0	21.3	21.1
Higher education	65.9	62.3	38.8	63.3
Human health and social work activities	63.3	58.5	29.3	26.3
Arts, entertainment and recreation	46.2	34.7	24.8	18.9
Public administration and defence; compulsory social security	60.0	44.8	24.9	20.2



5

E-GOVERNMENT

5.1. E-Government Development Index by country: 2022*

	E-Government Development Index		Of which subindices values:		
	Rank	Value	Online Services Index**	Telecommuni-cations Infrastructure Index**	Human Capital Index**
Denmark	1	0.9717	0.9797 (4)	0.9795 (2)	0.9559 (8)
Finland	2	0.9533	0.9833 (2)	0.9127 (14)	0.9640 (5)
Republic of Korea	3	0.9529	0.9826 (3)	0.9674 (4)	0.9087 (23)
New Zealand	4	0.9432	0.9579 (6)	0.8896 (20)	0.9823 (2)
Iceland	5	0.9410	0.8867 (16)	0.9705 (3)	0.9657 (3)
Sweden	5	0.9410	0.9002 (13)	0.9580 (6)	0.9649 (4)
…	…	…	…	…	…
Serbia	40	0.8237	0.8514 (26)	0.7865 (55)	0.8332 (58)
Argentina	41	0.8198	0.8089 (38)	0.7332 (69)	0.9173 (20)
Russia	**42**	**0.8162**	**0.7368 (61)**	**0.8053 (46)**	**0.9065 (26)**
China	43	0.8119	0.8876 (15)	0.8050 (47)	0.7429 (98)
Croatia	44	0.8106	0.8108 (36)	0.7711 (59)	0.8500 (52)

* 193 Member States were ranked.

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

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

5.2. Individuals' online interaction with public authorities by country: 2022*

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

	Obtaining information from the websites of government agencies	Submitting completed forms online	Downloading official forms
Russia	**52**	**44**	**33**
Czech Republic	58	52	31
Estonia	69	76	47
Finland	86	74	73
France	51	71	48
Germany	46	27	35
Italy	26	23	27
Sweden	85	80	55
United Kingdom	46	39	27

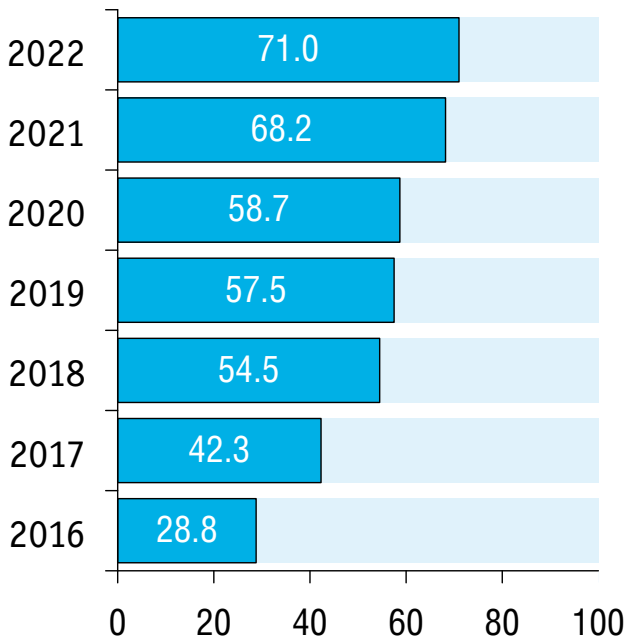
* Or nearest years for which data are available.

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

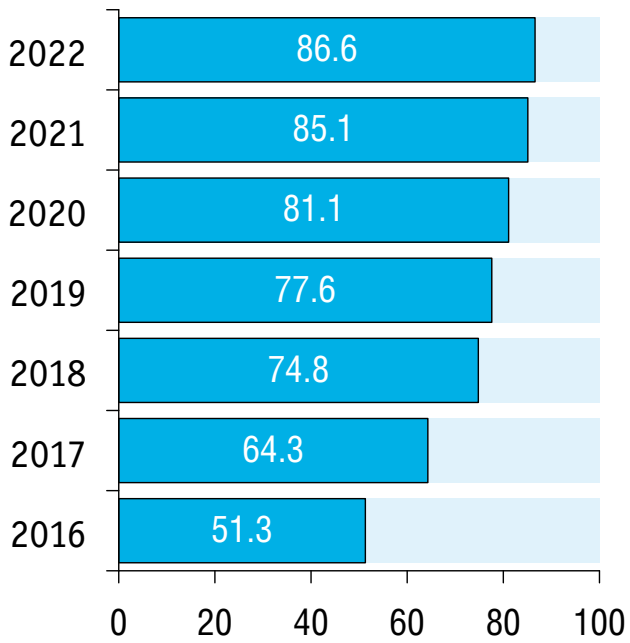
Sources: here and below in this section, for Russia, Rosstat; for countries other than Russia, Eurostat.

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

As a percentage of all individuals aged 15–72

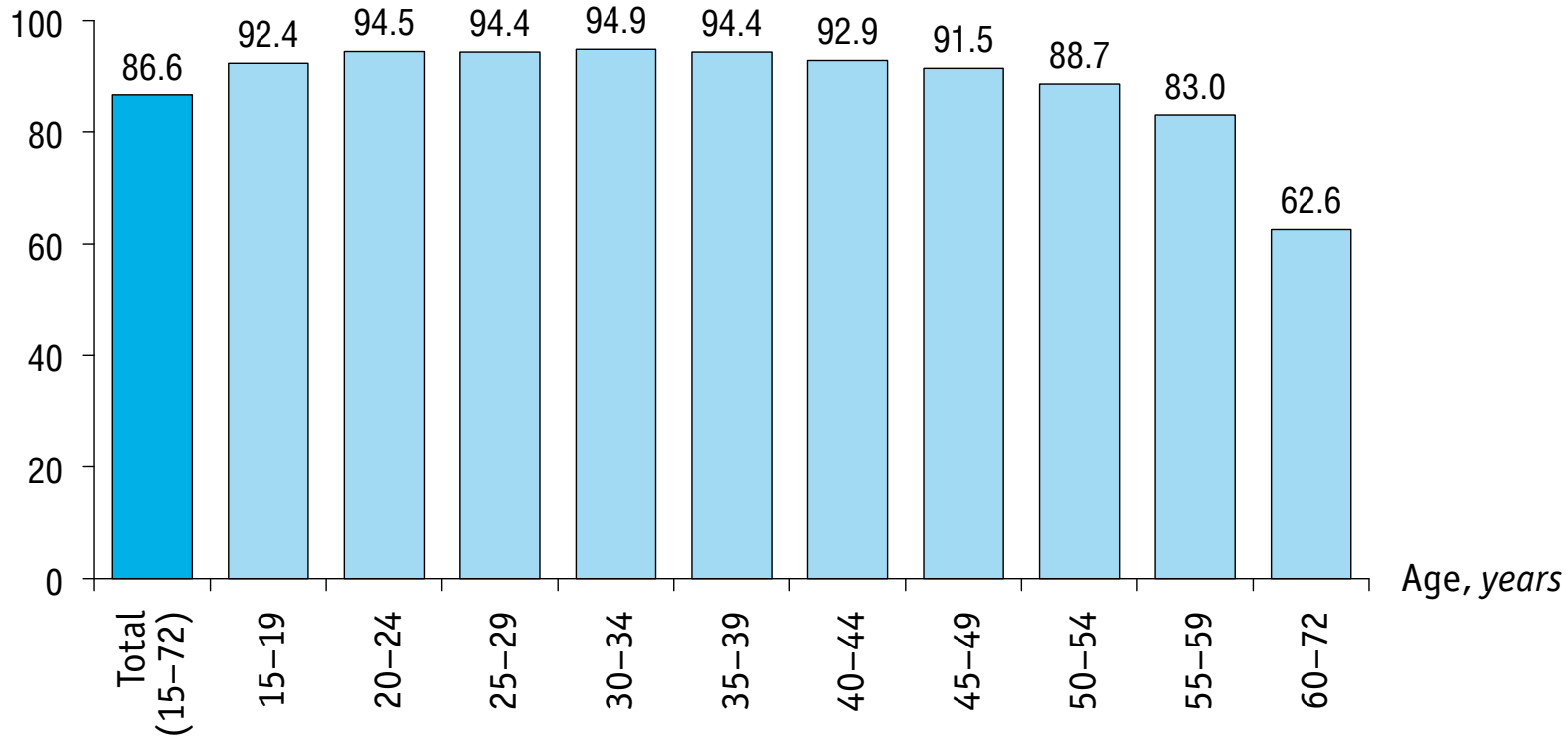


As a percentage of individuals aged 15–72 years who have received public and municipal services within the last 12 months



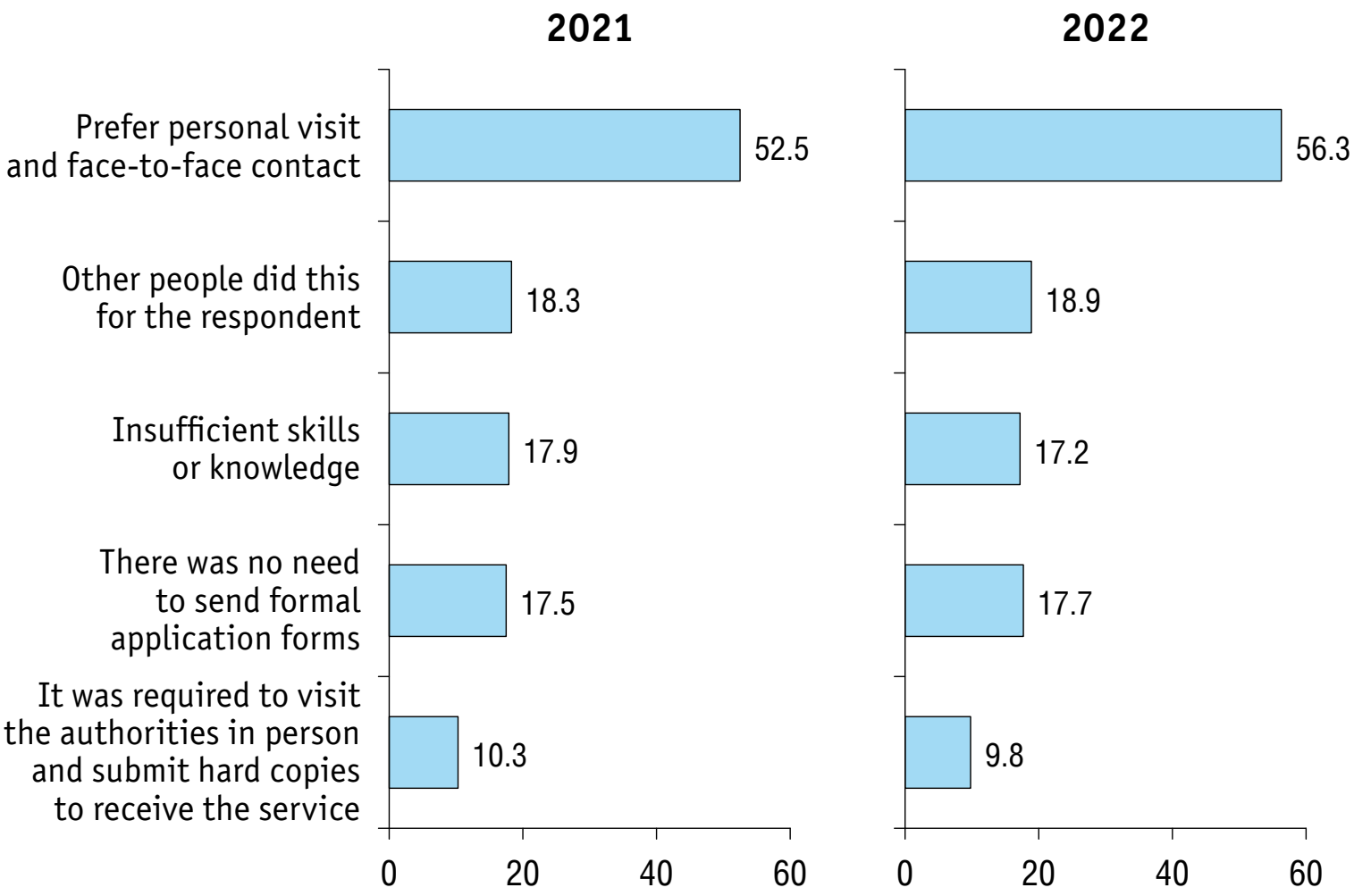
5.4. Public and municipal services received by individuals in digital form by age: 2022

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



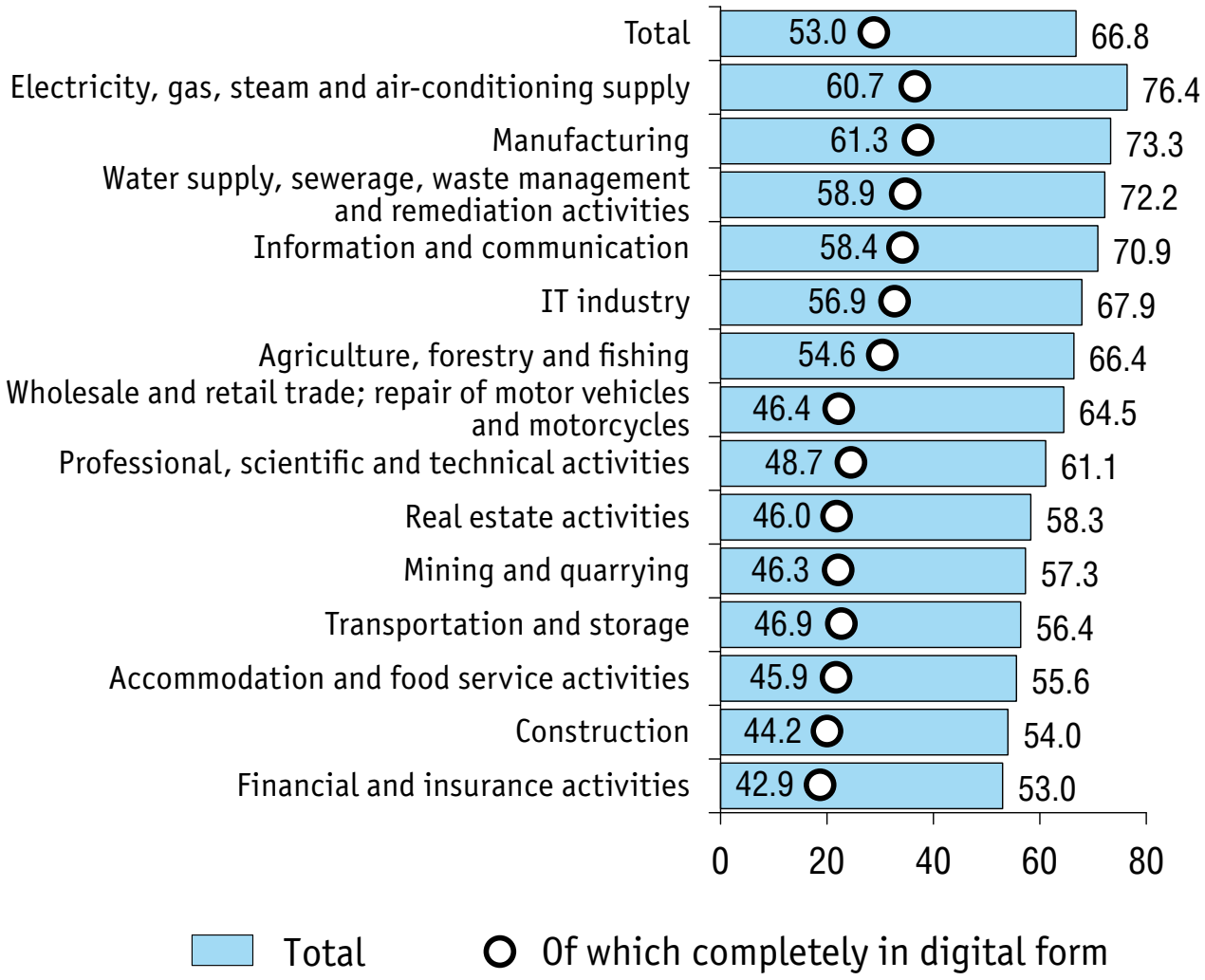
5.5. Individuals' reasons to refrain from receiving public and municipal services in digital form

(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)



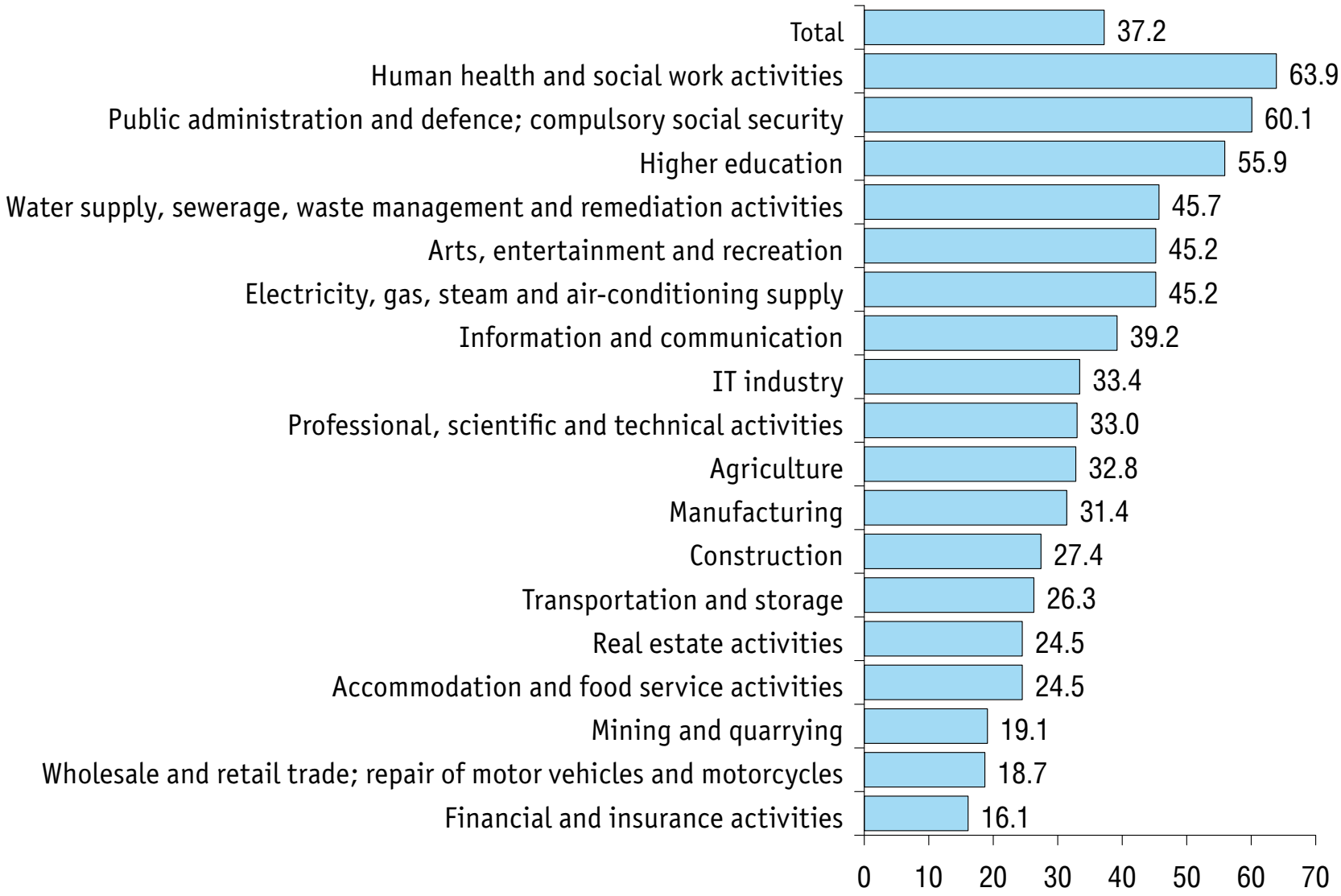
5.6. Enterprises' online interaction with public authorities: 2022

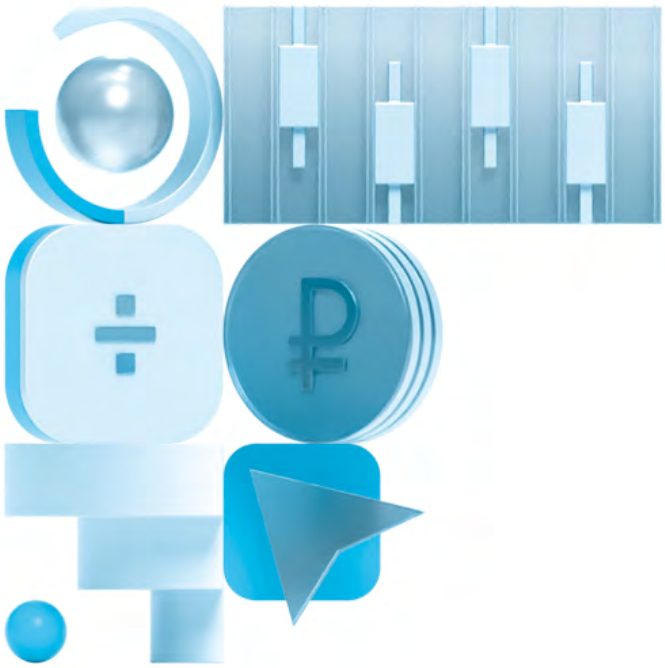
(as a percentage of all enterprises)



5.7. Enterprises' participation in e-procurement: 2022

(as a percentage of all enterprises)





6

PERSONNEL

6.1. Employed in ICT task-intensive occupations

	Thousand persons				As a percentage of total			
	2019	2020	2021	2022	2019	2020	2021	2022
Total	**8626.7**	**9148.9**	**9013.3**	**8643.1**	**100**	**100**	**100**	**100**
Of whom:								
ICT professionals – total	**1665.5**	**1764.6**	**1756.4**	**1931.7**	**19.3**	**19.3**	**19.5**	**22.2**
Managers								
ICT services managers	64.1	63.5	58.2	35.0	0.7	0.7	0.6	0.4
Professionals								
Software and multimedia developers and analysts	674.5	761.5	800.7	761.1	7.8	8.3	8.9	8.8
Database and network professionals	311.8	332.4	330.2	410.2	3.6	3.6	3.7	4.7
Electronics engineers	161.4	159.4	145.8	149.6	1.9	1.7	1.6	1.7
Telecommunications engineers	88.5	92.2	84.0	90.1	1.0	1.0	0.9	1.0
ICT sales professionals	11.5	15.9	13.8	17.1	0.1	0.2	0.2	0.2

(continued)

	Thousand persons				As a percentage of total			
	2019	2020	2021	2022	2019	2020	2021	2022
Graphic and multimedia designers	27.1	36.0	36.2	44.5	0.3	0.4	0.4	0.5
Information technology trainers	7.0	10.8	10.8	10.0	0.1	0.1	0.1	0.1
Technicians and associate professionals								
ICT operations and user support technicians	94.4	78.9	72.9	109.3	1.1	0.9	0.8	1.3
Telecommunications and broadcasting technicians	65.0	66.2	63.5	78.4	0.8	0.7	0.7	0.9
Electronics engineering technicians	50.2	43.1	33.6	68.4	0.6	0.5	0.4	0.8
Installers and services								
Electronics and telecommunications technology installers and servicers	110.0	104.7	106.7	157.9	1.3	1.1	1.2	1.8

(continued)

	Thousand persons				As a percentage of total			
	2019	2020	2021	2022	2019	2020	2021	2022
Other ICT task-intensive occupations – total	**6961.2**	**7384.3**	**7256.9**	**6711.4**	**80.7**	**80.7**	**80.5**	**77.8**
Managers								
Business services and administration managers	839.7	826.6	786.5	562.5	9.7	9.0	8.7	6.5
Sales, marketing and development managers	193.5	199.5	187.3	131.2	2.2	2.2	2.1	1.5
Professional services managers	387.3	377.7	382.2	266.6	4.5	4.1	4.2	3.1
Professionals								
Physical and earth science professionals	118.4	109.9	115.2	112.3	1.4	1.2	1.3	1.3
Architects, planners, surveyors, and designers	448.2	471.0	515.7	471.8	5.2	5.1	5.7	5.6

(continued)

	Thousand persons				As a percentage of total			
	2019	2020	2021	2022	2019	2020	2021	2022
University and higher education teachers	244.9	206.6	206.4	205.9	2.8	2.3	2.3	2.4
Finance professionals	2217.0	2293.2	2151.8	2567.0	25.7	25.1	23.9	29.7
Administration experts	1112.0	1236.2	1198.1	1147.8	12.9	13.5	13.3	13.3
Sales, goods and services marketing, and PR experts	1185.7	1456.3	1510.9	885.0	13.7	15.9	16.8	10.2
Electrical engineers	214.5	207.2	202.7	361.4	2.5	2.3	2.2	4.2

Source: here and below in 6.2–6.7, HSE ISSEK estimates based on Rosstat data.

6.2. Employed in ICT task-intensive occupations by type of economic activity: 2022

(as a percentage of total employment)

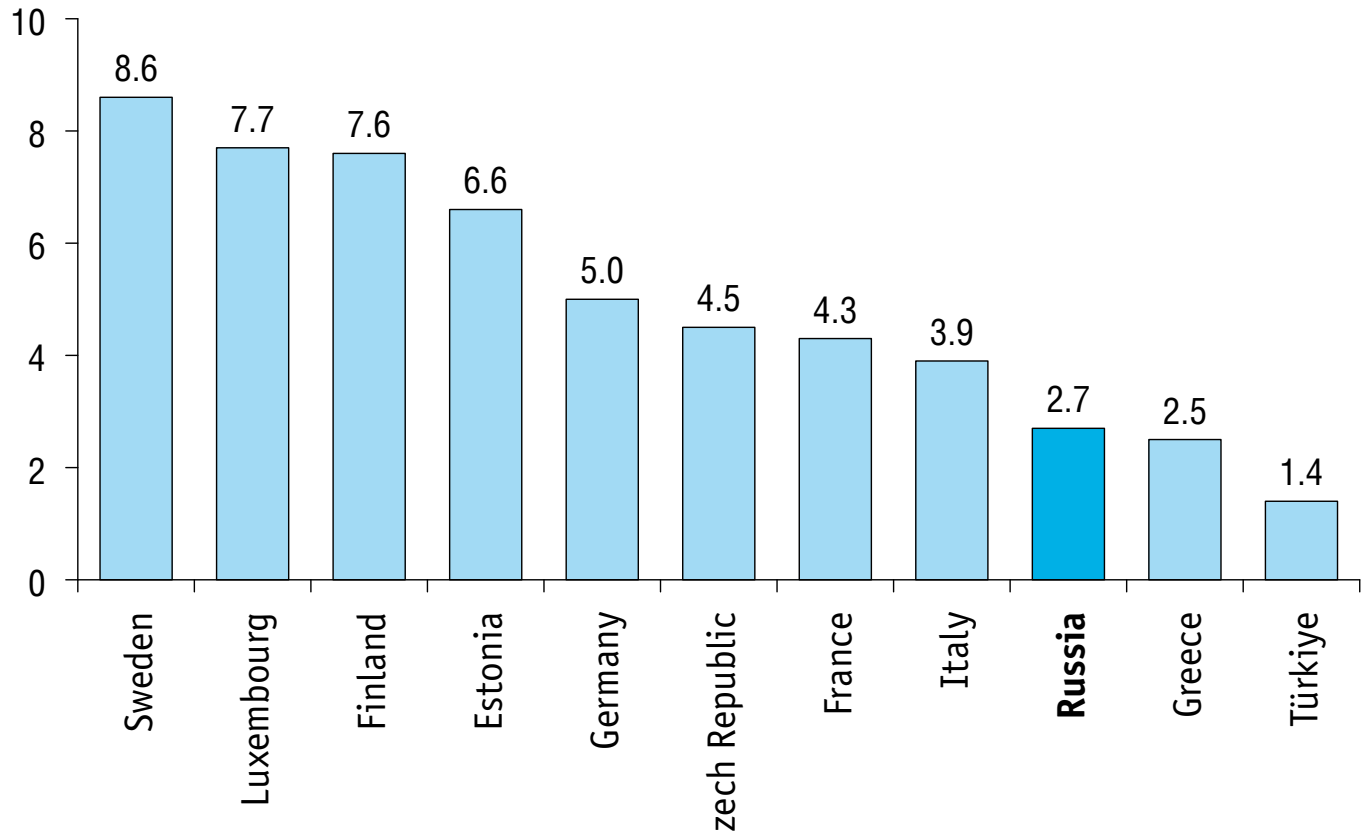
	ICT professionals	Other ICT task-intensive occupations
Total	**2.7**	**9.3**
Agriculture, forestry and fishing	0.2	3.4
Mining and quarrying	1.9	5.0
Manufacturing	2.8	6.6
Electricity, gas, steam and air-conditioning supply	2.8	11.5
Water supply, sewerage, waste management and remediation activities	0.9	6.7
Construction	1.1	6.5
Wholesale and retail trade; repair of motor vehicles and motorcycles	1.2	9.5
Transportation and storage	1.2	4.6
Accommodation and food service activities	1.0	4.9
Information and communication	47.0	9.0
Telecommunications	39.2	11.0
IT industry	77.6	6.4

(continued)

	ICT professionals	Other ICT task-intensive occupations
Financial and insurance activities	5.8	33.8
Real estate activities	1.2	11.3
Professional, scientific and technical activities	6.4	31.4
Public administration and defence; compulsory social security	2.1	21.4
Education	0.7	7.9
Human health and social work activities	1.0	4.3
Arts, entertainment and recreation	1.5	5.5

6.3. ICT professionals by country: 2022*

(as a percentage of the total employment)

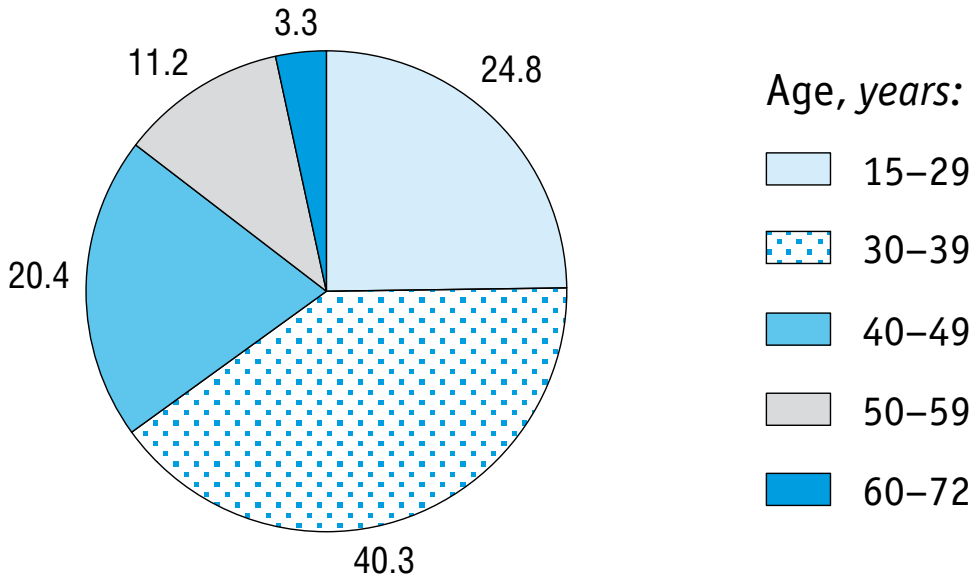


* Or nearest years for which data are available.

Sources: here and below in 4.7, for countries other than Russia, Eurostat.

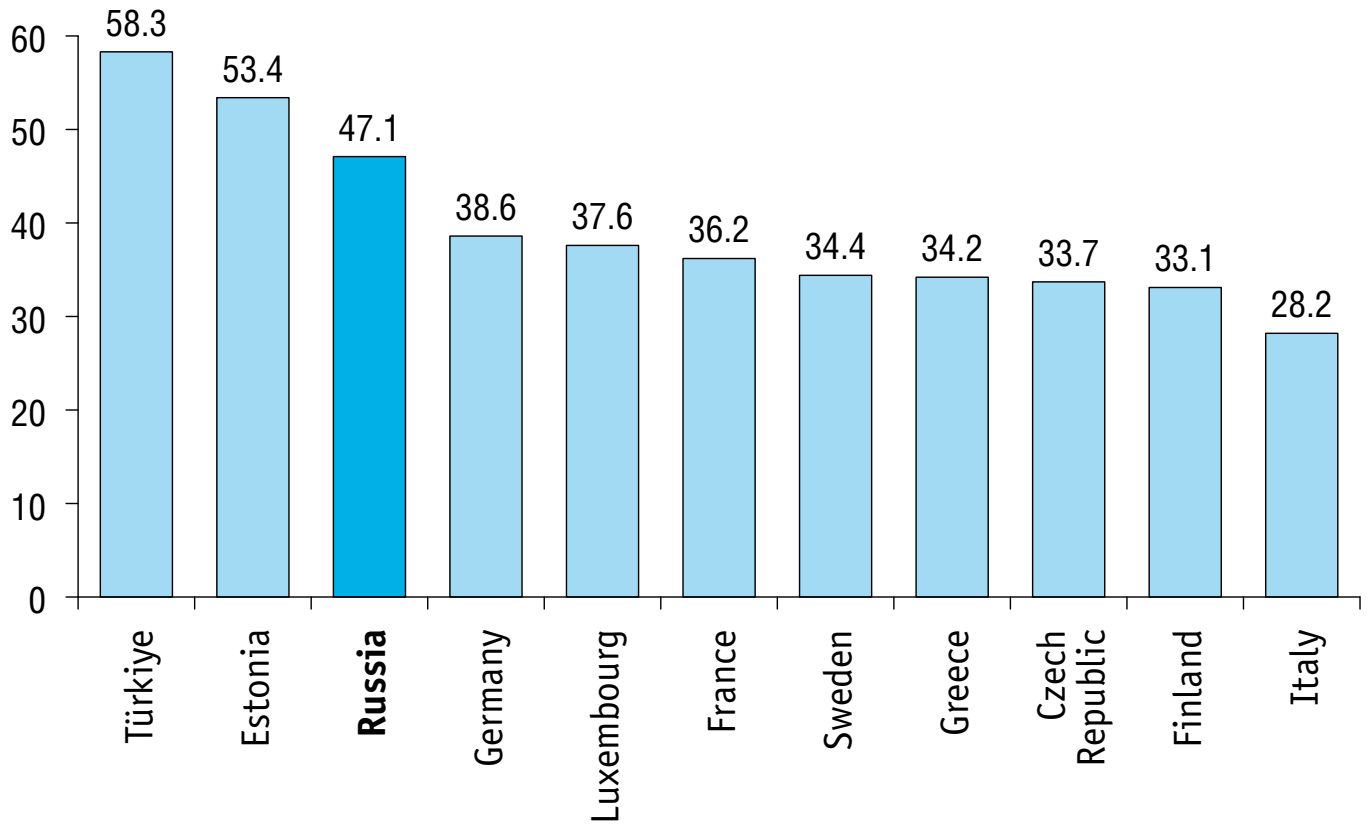
6.4. ICT professionals by age: 2022

(as a percentage of all ICT professionals)



6.5. ICT professionals under 35 by country: 2022*

(as a percentage of all ICT professionals)



* Or nearest years for which data are available.

6.6. Platform employment by individuals' socio-demographic feature: 2022

	Thousand persons	As a percentage of total	Employed through platforms as a percentage total employment
Total	**3502**	**100**	**4.9**
By gender:			
males	1870	53.4	5.1
females	1631	46.6	4.7
By locality:			
urban areas	3018	86.2	5.4
rural areas	484	13.8	3.0
By age, years:			
15–29	708	20.2	6.6
30–39	1315	37.6	6.1
40–49	886	25.3	4.6
50–59	465	13.3	3.1
60 and over	127	3.6	2.4
By level of education:			
higher	1689	48.2	6.7
secondary vocational*	1235	35.3	3.8
secondary general	484	13.8	4.3
basic general	91	2.6	3.2
no basic general education	2	0.1	1.9

* Including primary vocational education.

6.7. Remote employment by individuals' socio-demographic feature: 2022

	Thousand persons	As a percentage of total	Employed remotely as a percentage of the total employment
Total	**1917**	**100**	**2.7**
By gender:			
males	782	40.8	2.1
females	1135	59.2	3.2
By locality:			
urban areas	1654	86.3	3.0
rural areas	263	13.7	1.6
By age, *years:*			
15–29	339	17.7	3.2
30–39	671	35.0	3.1
40–49	505	26.4	2.6
50–59	301	15.7	2.0
60 and over	100	5.2	1.9
By level of education:			
higher	1428	74.5	5.7
secondary vocational*	391	20.4	2.2
secondary general	84	4.4	0.7
basic general	11	0.6	0.4
no basic general education	1	0.1	1.0

* Including primary vocational education.

6.8. Education and training in IT and related ICT task-intensive fields: secondary vocational education

(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 2022/2023 academic year	Graduates, 2022	Enrolment at the beginning of the 2022/2023 academic year	Graduates, 2022
Total	**43.2**	**12.9**	**387.0**	**63.7**
Computer science and engineering	22.9	7.3	266.6	41.3
Information security	–	–	25.5	3.6
Electronics and communications engineering	5.0	1.9	30.6	7.1
Photonics, instrumentation engineering, optical and biomedical engineering	–	–	3.1	0.7

(continued)

Key general groups of professions and qualifications	Programmes for skilled workers and employees		Programmes for mid-level specialists	
	Enrolment at the beginning of the 2022/2023 academic year	Graduates, 2022	Enrolment at the beginning of the 2022/2023 academic year	Graduates, 2022
Mechanical engineering	15.3	3.7	34.1	6.1
Applied geology, mining and quarrying, oil and gas engineering, geodesy	–	–	4.6	0.8
Engineering systems management	–	–	19.1	3.6
Screen arts	–	–	3.5	0.6

Sources: here and below in 6.9–6.11, HSE ISSEK estimates based on the data of the Ministry of Education of the Russian Federation, Ministry of Science and Higher Education of the Russian Federation.

6.9. Education and training in IT and related ICT task-intensive fields: bachelor's, specialist's, and master's programmes

(thousand persons)

Key general groups of professions and qualifications	Enrolment at the beginning of the 2022/2023 academic year	Graduates, 2022
Total	**1065.4**	**209.9**
Engineering mathematics	49.8	8.9
Computer and information science	21.9	3.4
Physics and astronomy	22.6	5.1
Earth Sciences	1.8	0.4
Biological sciences	1.2	0.2
Computer science and engineering	242.1	35.3
Information security	44.2	5.6
Electronics and communications engineering	66.5	11.9
Photonics, instrumentation engineering, optical and biomedical engineering	18.7	3.9
Electrical and thermal power engineering	84.0	17.5
Nuclear power engineering and technology	7.0	1.3
Mechanical engineering	109.6	20.4

(continued)

Key general groups of professions and qualifications	Enrolment at the beginning of the 2022/2023 academic year	Graduates, 2022
Weapons and armaments systems	2.2	0.3
Aircraft and aerospace engineering	24.6	4.1
Flight navigation and aircraft and aerospace equipment operation	0.1	0.0
Shipbuilding and water-borne transportation engineering and technology	6.0	1.1
Systems engineering management	46.1	9.7
Nanotechnologies and nanomaterials	2.1	0.4
Basic medicine	1.1	0.1
Economics and management	304.1	78.8
Linguistics and literary studies	3.9	0.7
Screen arts	5.5	0.9

6.10. Education and training in IT and related ICT task-intensive fields: postgraduate and apprenticeship programmes

(persons)

Key general groups of professions and qualifications	Graduates, 2022
Total	**4264**
Engineering mathematics	356
Computer and information science	40
Physics and astronomy	705
Computer science and engineering	920
Information security	59
Electronics and communications engineering	242
Photonics, instrumentation engineering, optical and biomedical engineering	126
Nuclear power engineering and technology	31
Mechanical engineering	314
Engineering physics and technology	5
Weapons and armaments systems	13

(continued)

Key general groups of professions and qualifications	Graduates, 2022
Aircraft and aerospace engineering	133
Engineering systems management	128
Nanotechnologies and nanomaterials	6
Economics and management	1133
Mass media, library and information science	47
Screen arts	6

6.11. Secondary vocational education graduates – programmes for mid-level specialists and higher education graduates in 'Information and Communications Technologies' scientific area by country: 2022*

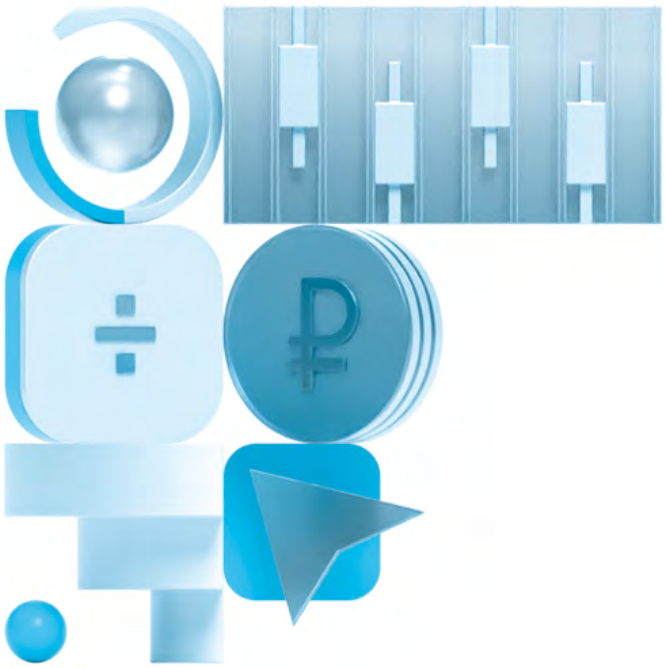
	Secondary vocational education – programmes for mid-level specialists (ISCED level 5)		Higher education – bachelor's, specialist's, master's programmes (ISCED level 6 and 7)		Higher education – postgraduate programmes (ISCED level 8)	
	Thousand persons	As a percentage of total	Thousand persons	As a percentage of total	Thousand persons	As a percentage of total
Russia	**46.4**	**7.6**	**48.1**	**5.9**	**1.0**	**7.3**
Canada	14.3	6.6	12.6	4.4	0.3	3.8
Czech Republic	–	–	3.6	5.3	0	2.6
Estonia	–	–	0.7	8.4	0	7.7
Finland	–	–	4.6	7.5	0.1	6.4
France	5.7	2.5	24.3	4	0.6	5.3
Germany	–	–	28.4	5	0.9	3.3

(continued)

	Secondary vocational education – programmes for mid-level specialists (ISCED level 5)		Higher education – bachelor's, specialist's, master's programmes (ISCED level 6 and 7)		Higher education – postgraduate programmes (ISCED level 8)	
	Thousand persons	As a percentage of total	Thousand persons	As a percentage of total	Thousand persons	As a percentage of total
Italy	0.7	13.5	5.5	1.3	0.1	1.8
Republic of Korea	8.1	5	20	4.6	0.5	3.3
Sweden	1.3	11.2	2.6	3.7	0.1	3.8
United Kingdom	6.4	5.6	29.4	4.2	1.1	4
United States	36.2	3.6	156.6	5.2	2.4	3.3

* For countries other than Russia, the data refer to 2020.

Source: for countries other than Russia, OECD.



7

INFRASTRUCTURE

7.1. Internet subscriptions

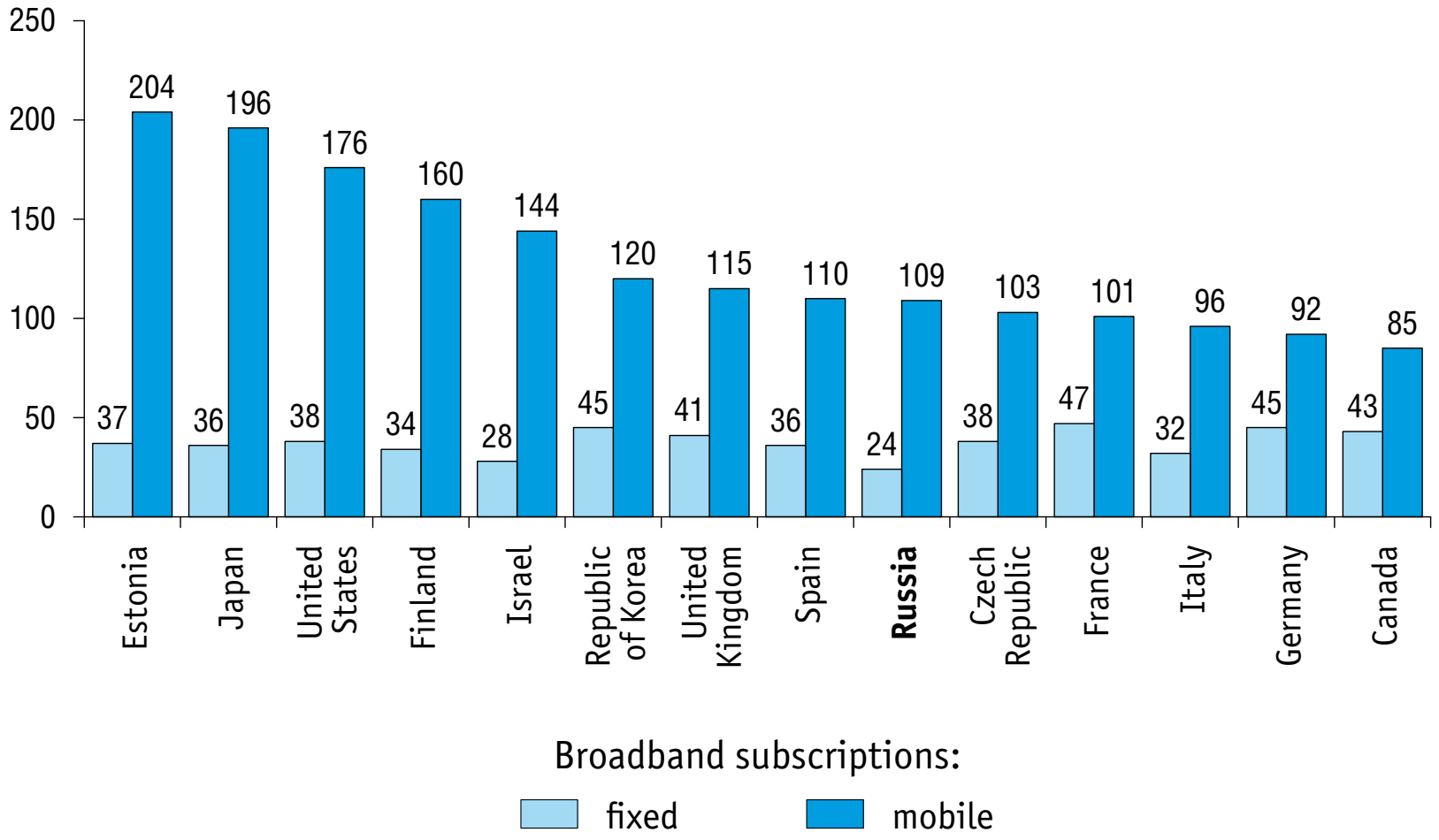
(thousand units; at the end of the year)

	Total				Of which broadband			
	2015	2020	2021	2022	2015	2020	2021	2022
Internet subscriptions:								
fixed	26944	33792	34504	35649	26756	33582	34411	35540
mobile	109926	149622	160745	164260	99793	145626	156487	159916
satellite	82	65	99	92	23	45	64	77
terrestrial fixed wireless	107	271	272	248	103	267	270	246
terrestrial mobile wireless	1822	678	627	611	1387	623	581	561

Sources: here and below in this section, the Ministry of Digital Development, Communications and Mass Media of the Russian Federation (7.1–7.5, 7.7), Rosstat (7.6).

7.2. Broadband subscriptions by country: 2022

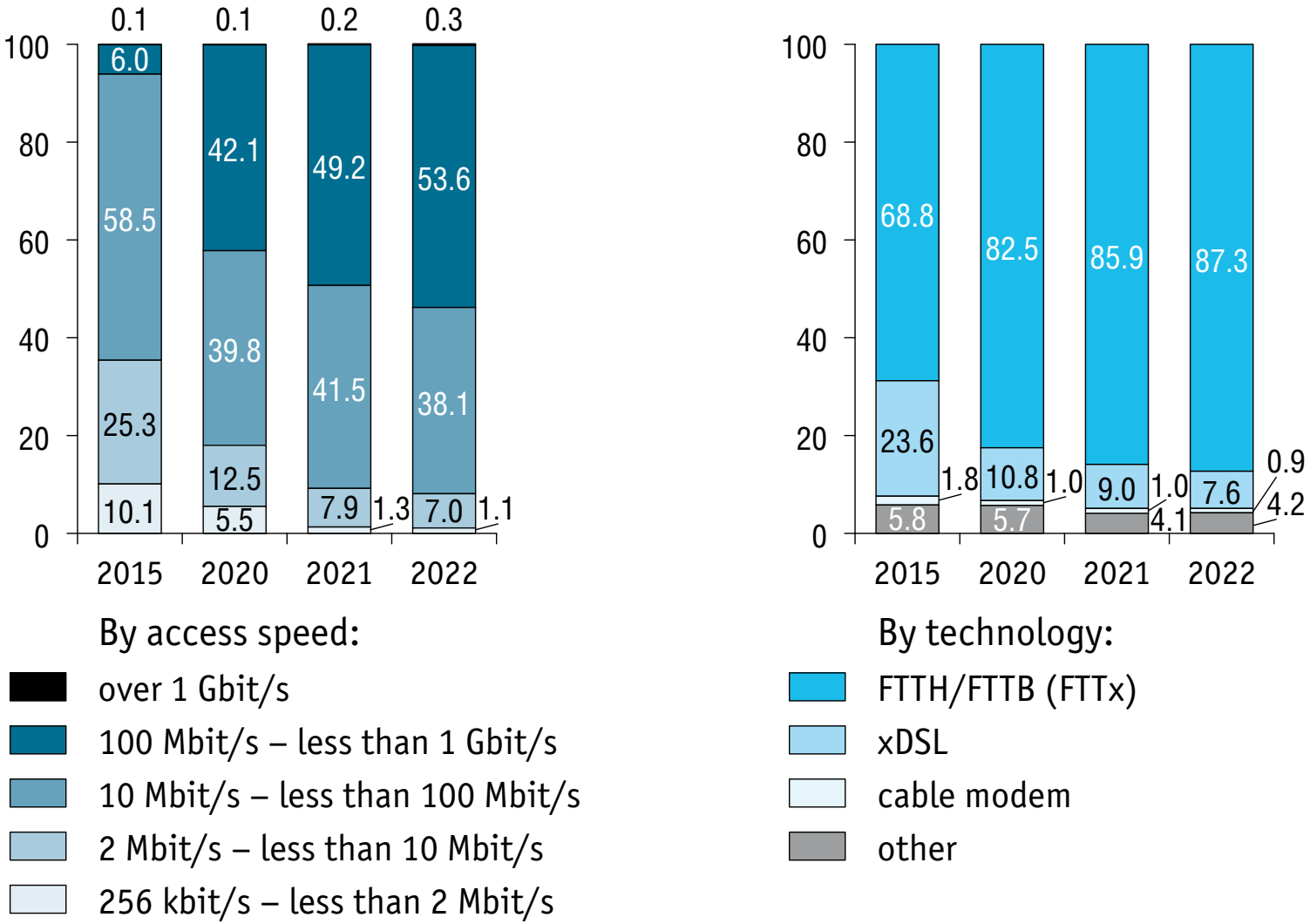
(units per 100 inhabitants)



Source: for countries other than Russia, OECD.

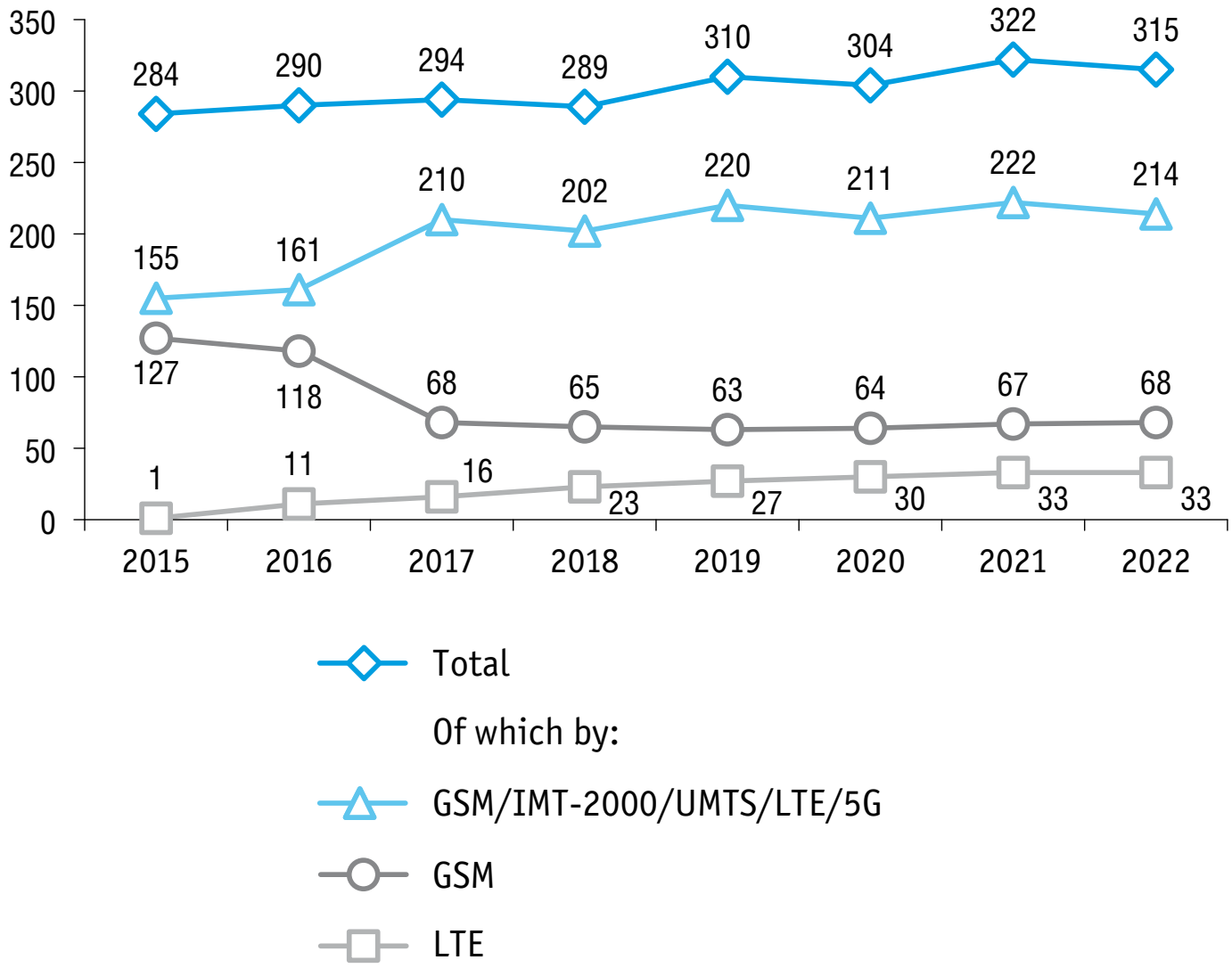
7.3. Fixed broadband subscriptions

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



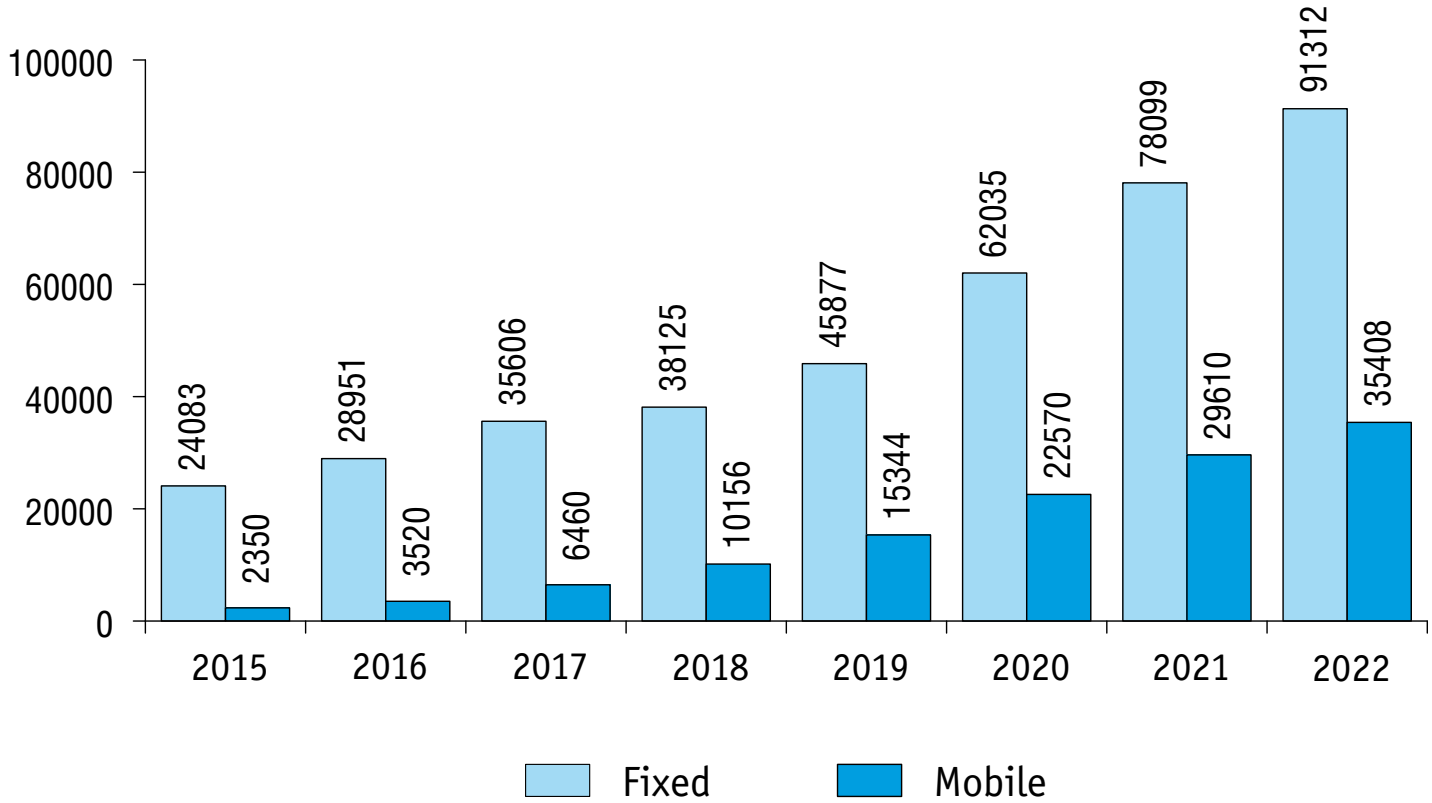
7.4. Mobile cellular telephone subscriptions

(million units; at the end of the year)



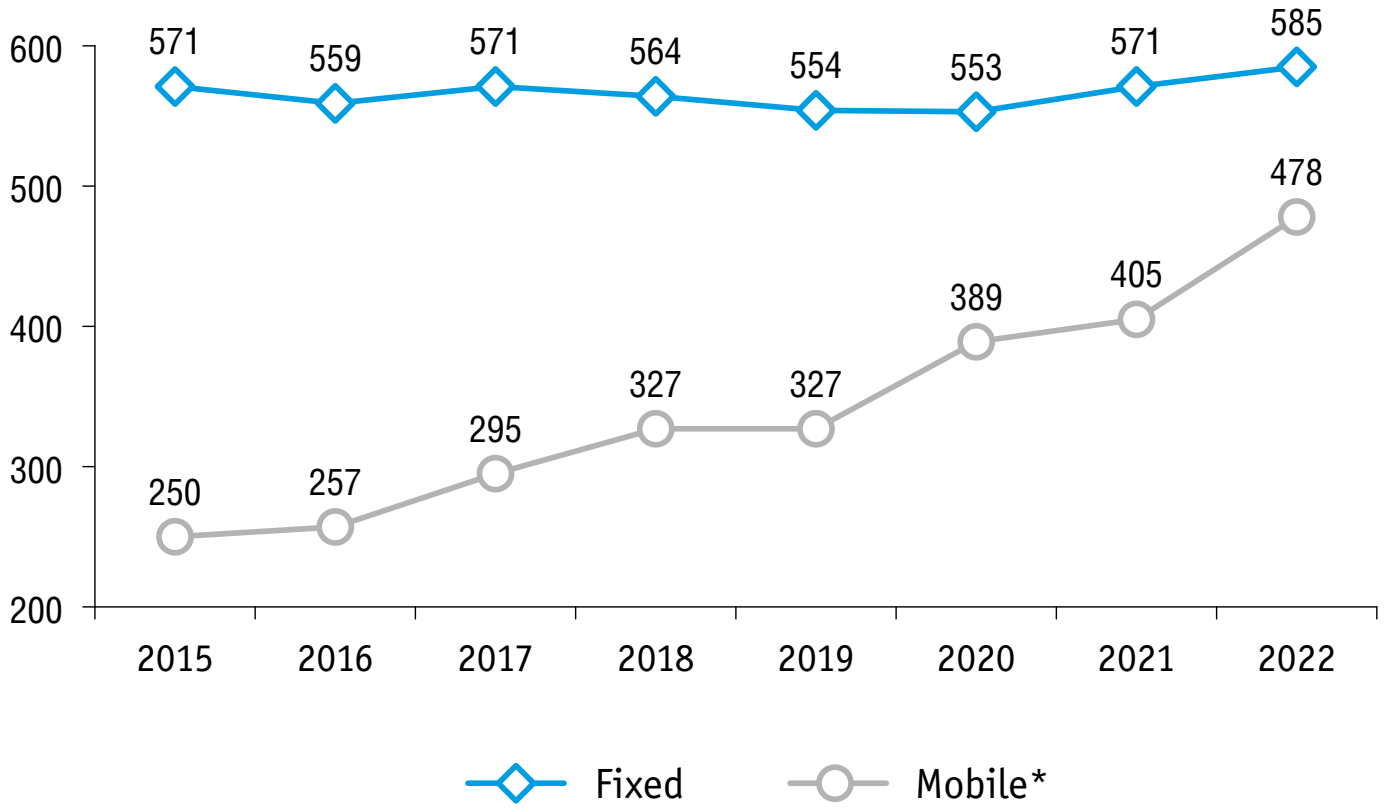
7.5. Internet traffic

(petabytes)



7.6. Internet access subscription fee

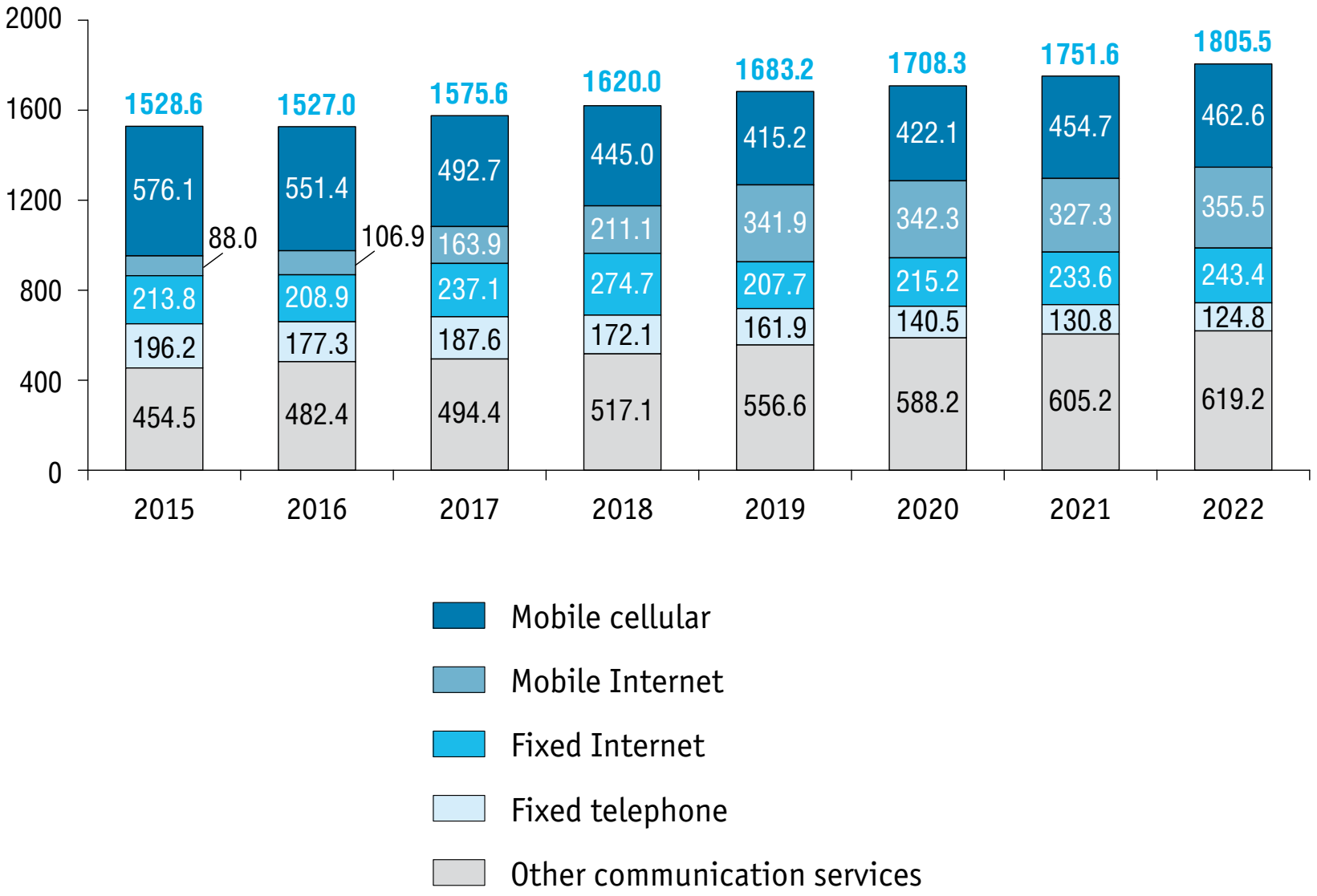
(roubles per month; December)

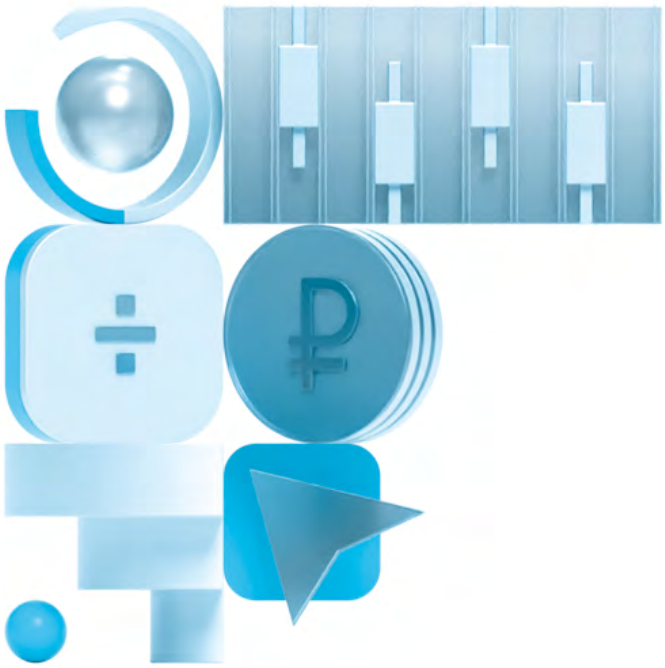


* For 2020, due to changes in the Rosstat methodology, the data are provided for the service 'Subscription fee for a cellular communication services package', which includes mobile Internet, minutes of phone calls, SMS messages.

7.7. Revenue from telecommunication services

(billion roubles)





8

ICT SECTOR

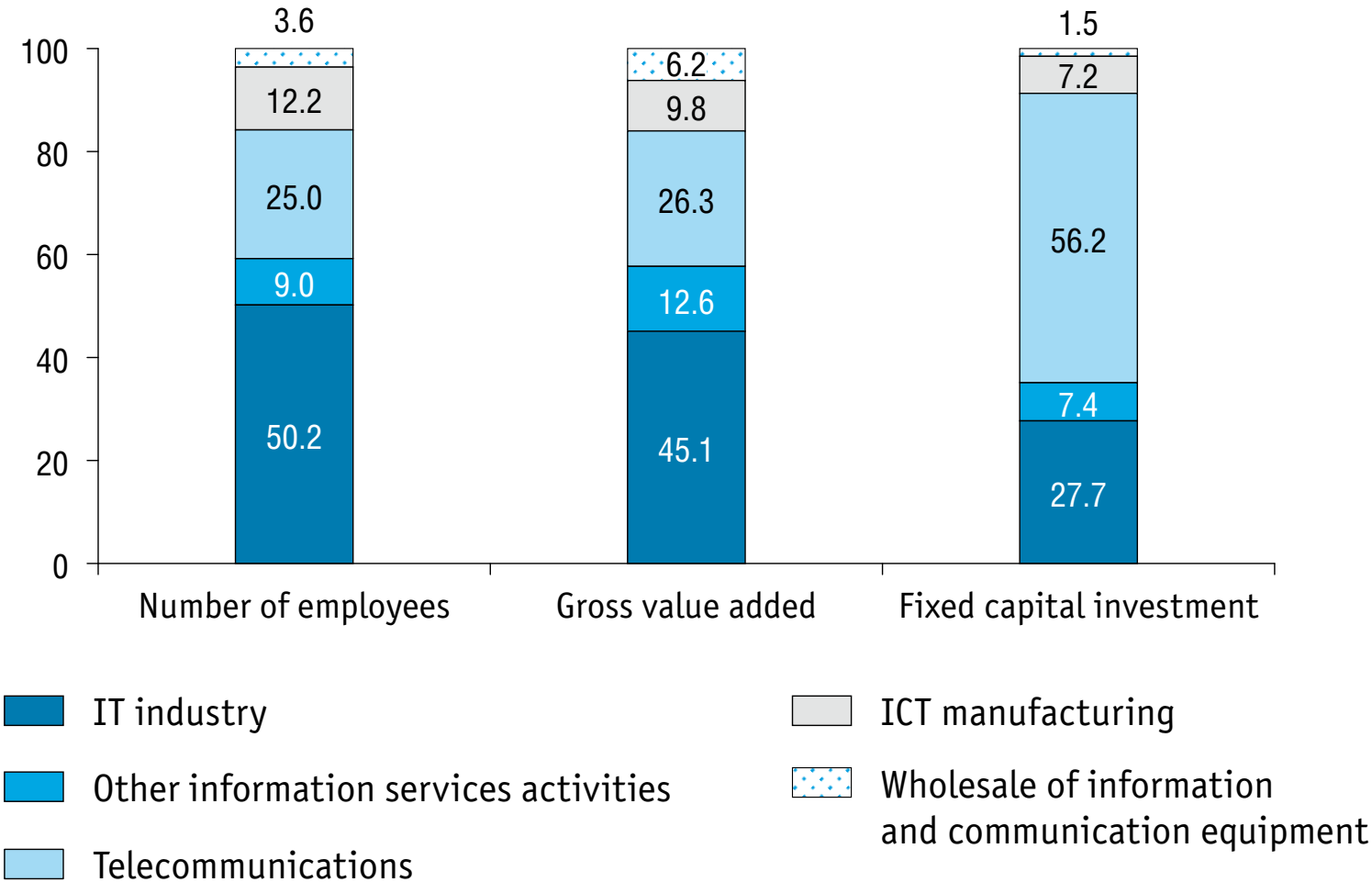
8.1. Main ICT sector indicators

	2019	2020	2021	2022
Number of employees:				
thousand persons	1203	1240	1285	1357
as a percentage of total employment	2.7	2.9	3.0	3.2
Gross value added:				
billion roubles	2860	3284	3729	4215*
as a percentage of GDP	2.9	3.4	3.1	3.0*
Fixed capital investment:				
billion roubles	741	832	938	1043*
as a percentage of total investment	3.8	4.1	4.0	3.7*

* Preliminary data.

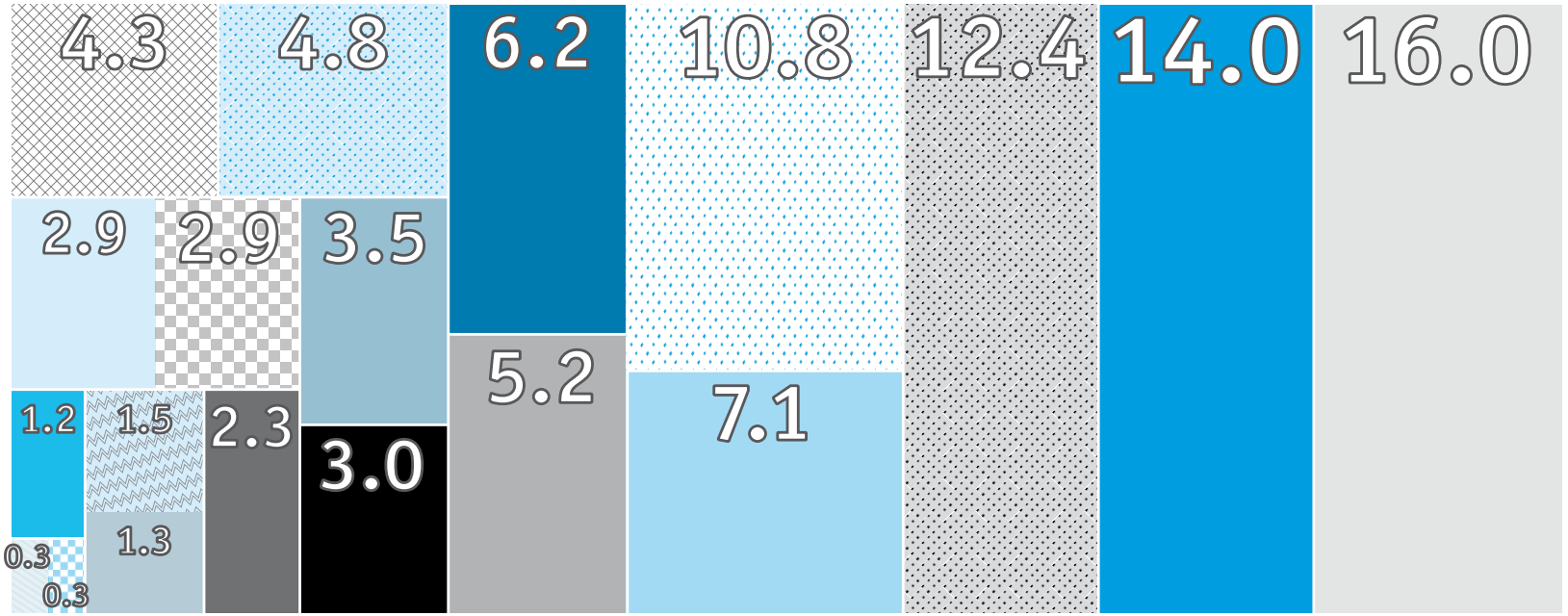
Source: here and below in 8.2–8.7, HSE ISSEK estimates based on Rosstat data.

8.2. Percentage distribution of ICT sector by type of economic activity: 2022



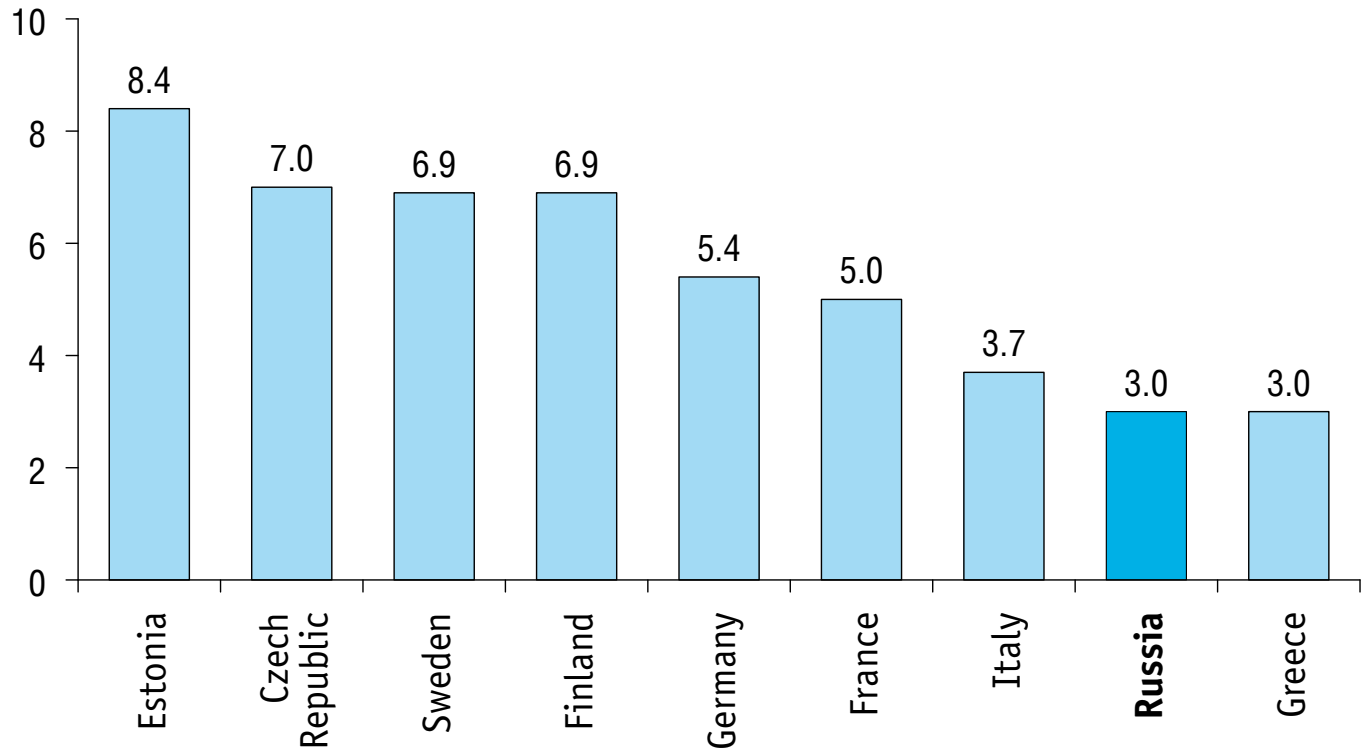
8.3. ICT sector's input into the national economy development: 2022

(as a percentage of GDP)



- **ICT sector (4,215 billion roubles)**
- Agriculture, forestry and fishing
- Education
- Scientific research and development
- Manufacture of motor vehicles, trailers, and semi-trailers
- Content and media sector
- Manufacture of chemicals and chemical products
- Manufacture of coke and refined petroleum products
- Manufacture of basic metals
- Electricity, gas, steam and air-conditioning supply
- Financial and insurance activities
- Human health and social work activities
- Transportation and storage
- Construction
- Real estate activities
- Public administration and defence; compulsory social security
- Wholesale and retail trade
- Mining and quarrying
- Other sectors

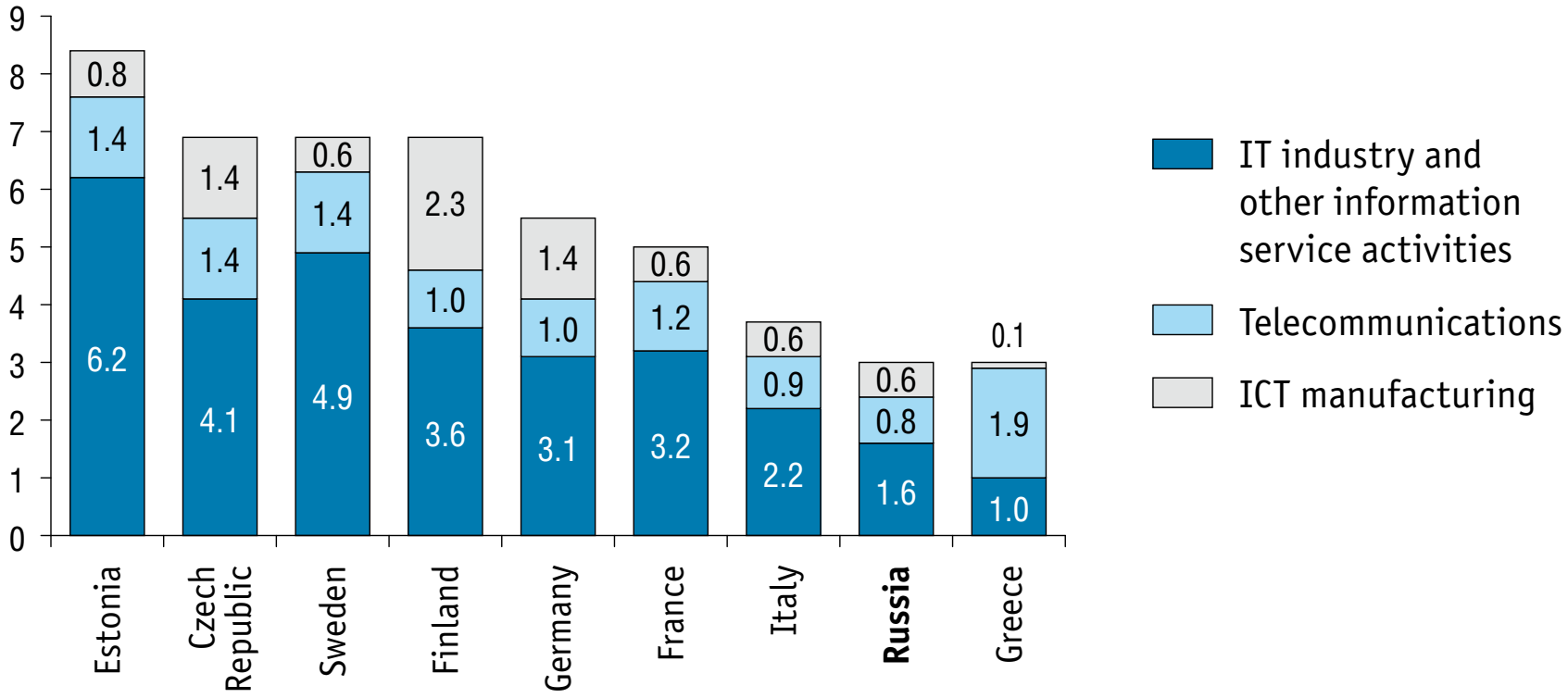
8.4. ICT sector's share in the gross value added by country: 2022*



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

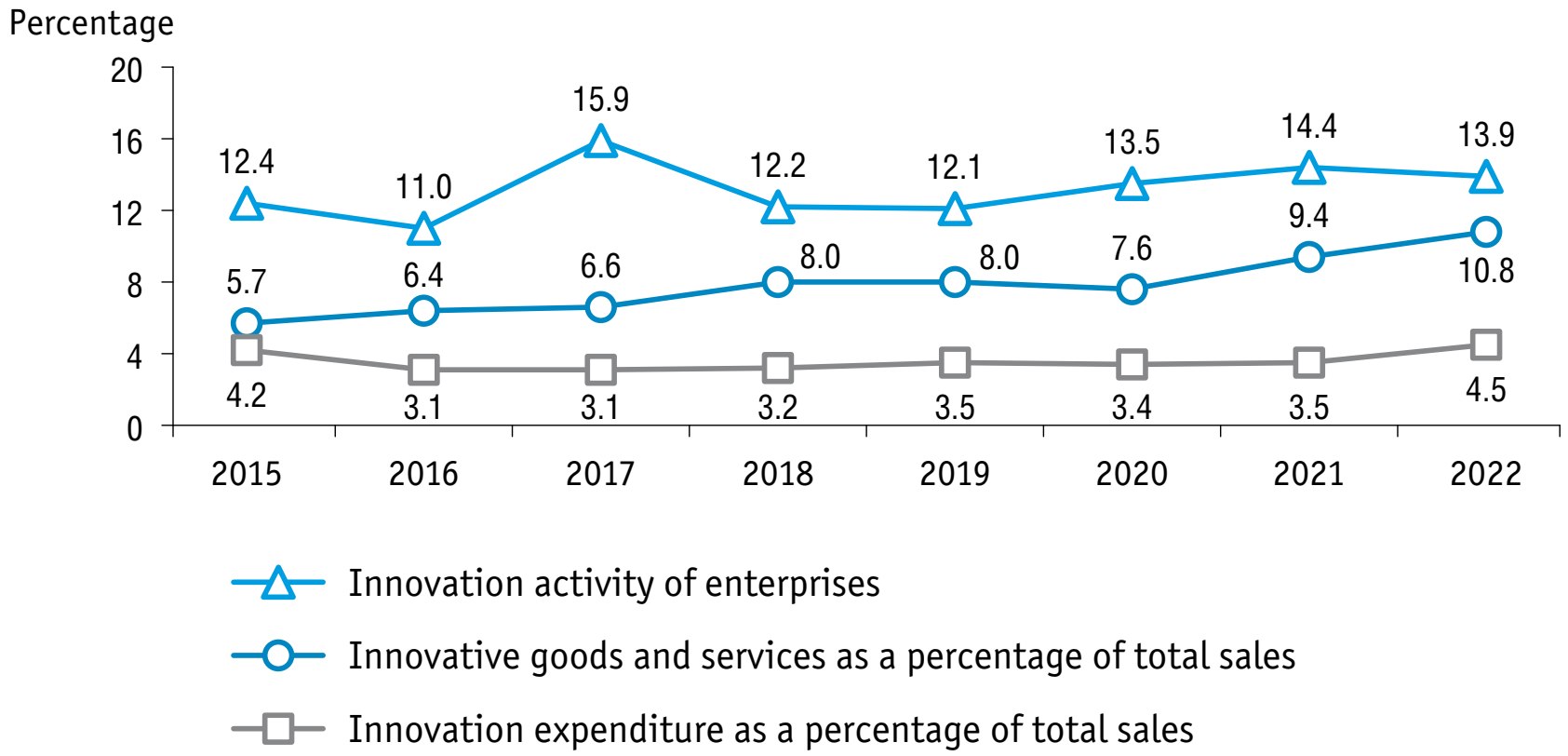
Sources: here and in 8.5, for countries other than Russia, Eurostat.

8.5. ICT sector as a percentage of gross value added by type of economic activity and country: 2022*



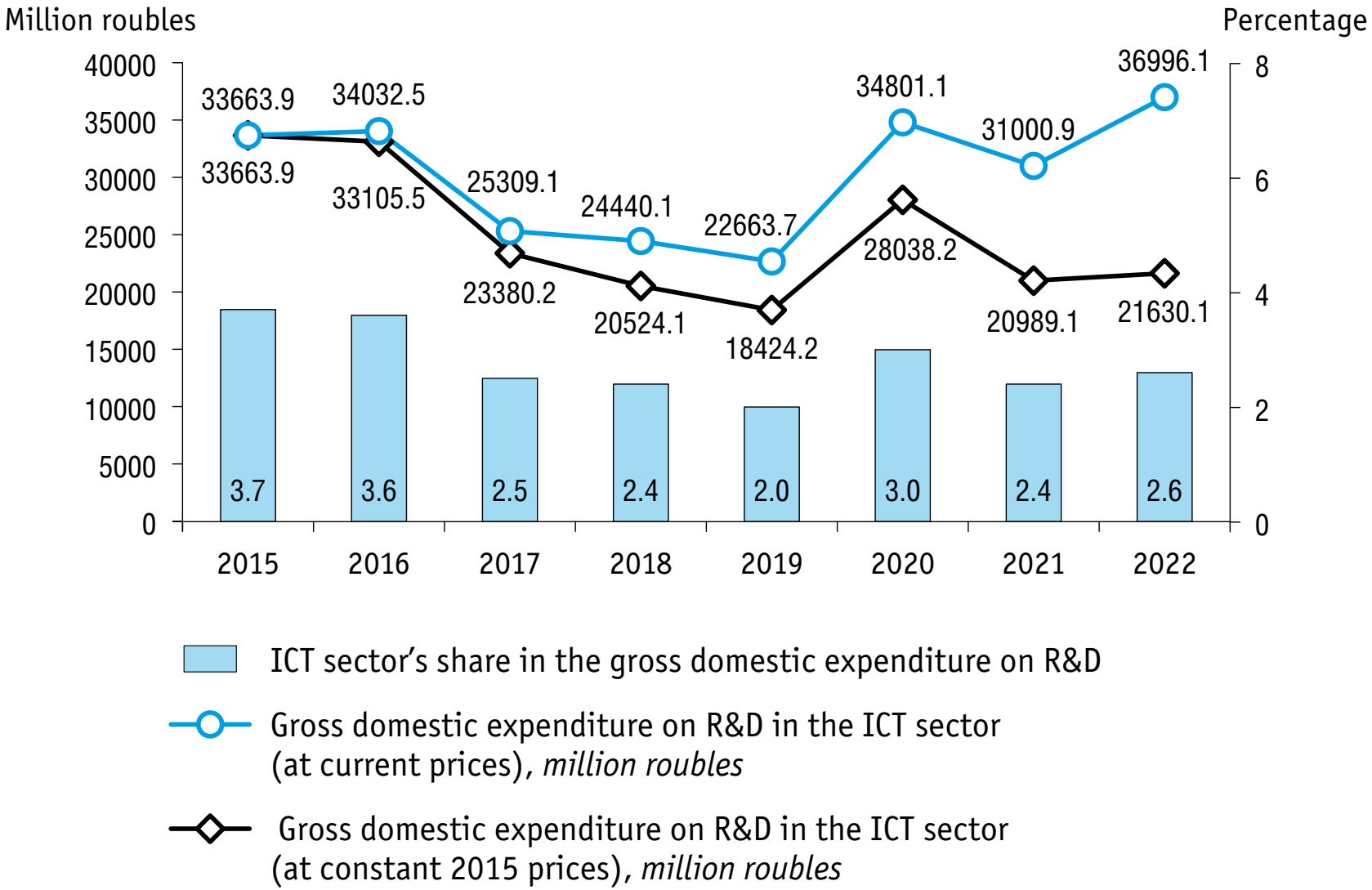
* Or nearest years for which data are available. For the purposes of international comparison in the IT industry and other information service activities, the data covers only enterprises with the following OKVED2 codes of economic activities: 26 (ICT manufacturing), 61 (Telecommunications), 62, and 63.

8.6. Main ICT sector indicators of innovation activity*



* Combined data on enterprises in the following OKVED2 codes of activities: 26.1–26.4, 26.8, 58.2, 61, 62, 63.11, 63.12; until 2017, according to OKVED (ed. 1.1): 30, 32, 64, 72.

8.7. R&D in the ICT sector



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

	2015	2016	2017	2018	2019	2020	2021	2022
ICT-related publications by Russian authors indexed in Scopus:								
number	6909	8755	11511	13388	17293	18695	18221	16423
as a percentage of the world total of ICT-related publications	1.80	2.10	2.60	2.70	2.95	3.35	3.00	2.47
ICT-related patent applications* filed by Russian residents:								
number	2334	1978	2270	2062	2706	2489	2161	…
as a percentage of the world total of ICT-related patent applications	0.39	0.33	0.35	0.30	0.35	0.30	0.24	…

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

Sources: HSE ISSEK estimates from June 23, 2023 to July 19, 2023 according to the World Intellectual Property Organization (WIPO) and publications indexed in the Scopus database.

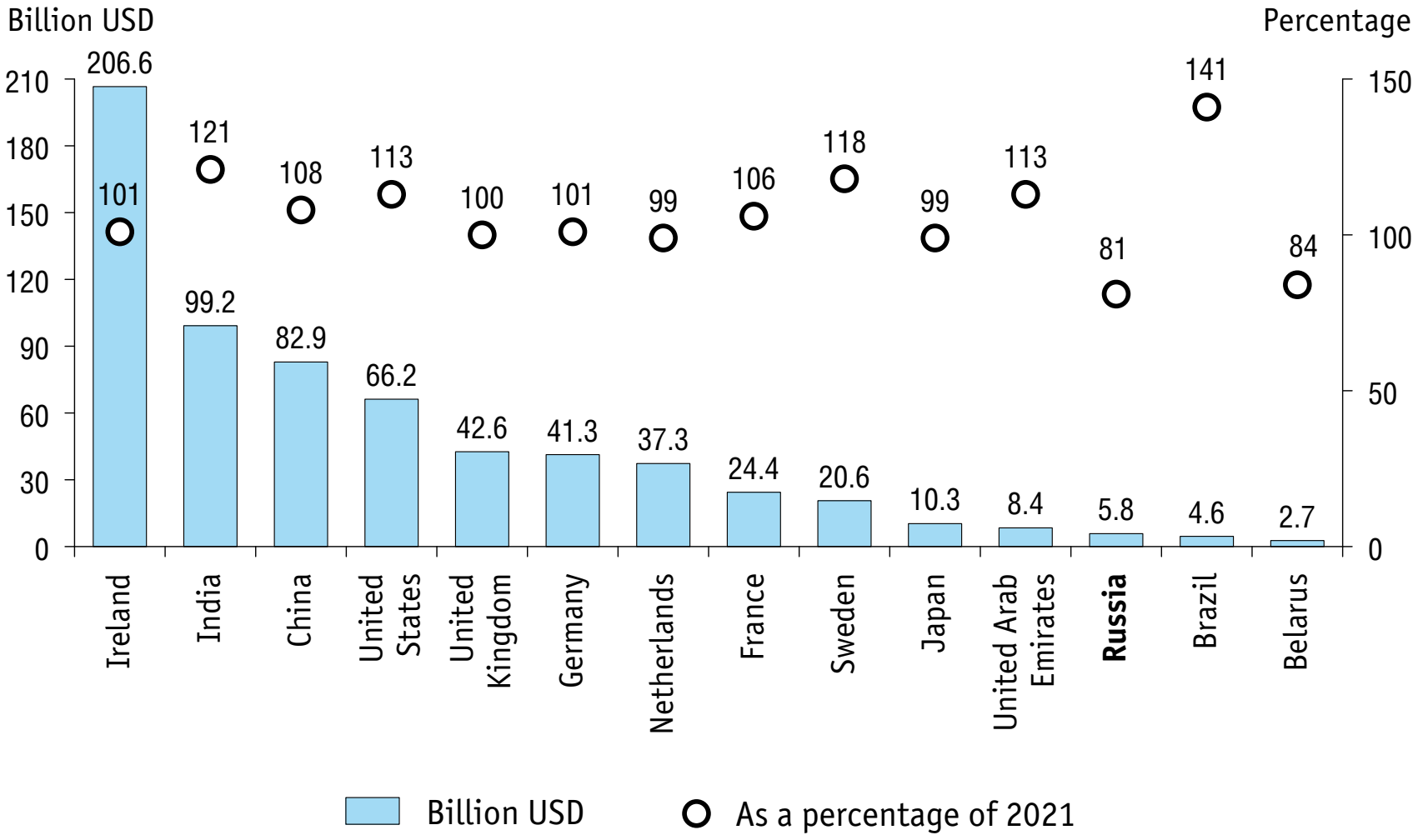
8.9. Exports and imports of ICT services

(million USD)

	Exports			Imports		
	2020	2021	2022	2020	2021	2022
ICT services – total	**5936**	**7232**	**5831**	**5982**	**6653**	**4423**
Computer services	5093	6354	5111	4503	5162	3358
Telecommunications services	723	735	626	968	984	827
Information services	120	143	94	511	507	238

Source: The Bank of Russia.

8.10. Exports of ICT services by country: 2022



Sources: Russia, the Bank of Russia; for countries other than Russia, UNCTAD.

Technical Notes

Internet (broadband) subscriptions are individuals and legal entities having entered into a services provision contract/contracts on the use of data transmission network according to tariffs under a mobile/fixed (including broadband) Internet access plan at the end of the reporting period.

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. Enterprises' domestic expenditure on development, dissemination, and use of digital technologies and related goods and services, including domestic expenditure on R&D in the field of digital technologies, **is domestic expenditure on the development of digital economy from all sources of funds. Household expenditure on the use of digital technologies and related goods and services** is the actual expenditure of household members on the purchase, operation, and repair of equipment related to digital technologies or payment for telecommunications services. The methodology for calculating gross domestic expenditure on digital economy development was approved by the Digital Economy Subcommittee under the Government Commission on the Digital Development, Use of Information Technologies for Improving Quality of Life and Business Environment (session protocol no. 557pr of September 27, 2019).

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).

Geographic information system (GIS) is an information system operating spacial data.

Public and municipal services in digital form mean public and municipal services rendered through data exchange and technological interaction, including via unified and (or) regional public and municipal services portals. Public and municipal services are considered to be rendered in digital form if the applicant uses the ESIA, the Unified Identification and Authentication System, when receiving the service used on the Unified Public and Municipal Services Portal and (or) regional portals of public and municipal services.

Employed in ICT task-intensive occupations are the employed who are highly likely to be professionally engaged in performance of ICT-assisted tasks (from simple surfing of the Internet, use of spreadsheets to programming). This category includes ICT professionals, managers and professionals in finance, economics, management, sales, marketing, development, social services; physicist and chemists, architects, design engineers, surveyors, and designers; (continued) 113and faculty staff of higher education institutions. The list of occupations is provided by the OECD experts: https://doi.org/10.1787/9789264311992-en.

ICT professionals are employees who are able to develop, operate and maintain ICT, for whom ICT-related activities are the main part of their professional activity. In accordance with the Russian Classification of Occupations (RCO), 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).

Innovation expenditure is the actual expenditure in monetary form, connected with the implementation of different 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. The stage of the innovation process does not matter, whether at the final stage, when the equipment is already commissioned and mastered in operation, i.e. production is organised and goods (works or services) are produced, or at the initial or intermediate stage, for example, when new equipment is still being installed or is only ready for operation, but has not been put into work, tested and used in the production of goods (works or services).

E-Government Development Index (EGDI) measures the readiness and capacity of national institutions to use ICTs to deliver public services. The developer of the index is The United Nations Department of Economic and Social Affairs (UN DESA). It is based on three sub-indexes: Online Service, Telecommunication Infrastructure, and Human Capital. In 2020, the index was calculated for 193 countries. The results are published in the analytical report 'E-Government Survey 2022. The Future of Digital Government': https://publicadministration.un.org/egovkb/en-us/Reports/UN-E-Government-Survey-2022.

Innovative activity includes all developmental (R&D), financial or commercial activity related to creation of technologically new or significantly improved goods or services that have been introduced on the market and differ significantly from the previously produced goods and services; or technologically new or significantly improved business processes that differ significantly from the previously used business processes.

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

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

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

Artificial Intelligence (AI) is a hardware and software system that mimics human intelligence processes (including self-education and solution search without pre-programmed algorithms) and obtains results from performing specific tasks at least comparable to results of human intelligence.

Top access speed of data transmission via Internet is bandwidth; the maximum rate of data transfer across a given path is measured in bits per second (bit/s).

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

Patent is a title of protection granted for an invention that certifies inventor's priority, inventorship, and the right of exclusive use of this invention during patent's term of validity. 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), including to the use of the product or a method for a specific purpose. An invention must be new, innovative, and applicable for industrial use.

Education and training in IT and related ICT task-intensive fields mean systematic and organised education and graduation of skilled personnel with special knowledge and expertise in IT and related ICT task-intensive fields. **The list of professions, qualifications, and fields of education in IT and ICT task-intensive fields** is formed on the basis of the lists of professions and qualifications of secondary vocational education approved by Order of the Ministry of Science and Higher Education of the Russian Federation no. 1199 of October 29, 2013, and the lists of qualifications and fields of education in higher education approved by Order of the Ministry of Science and Higher Education of the Russian Federation no. 1061 of September 12, 2013, taking into account:

- the list of ICT related fields of education and vocational training developed by the UNESCO Institute of Statistics ("The Guide to Measuring Information and Communication Technologies (ICT) in Education", published by the UNESCO Institute of Statistics in 2011). In terms of the International Standard Classification of Education and Vocational Training 2013 (ISCED-F 2013), published by the UNESCO Institute of Statistics in 2014, these include the following fields of education and vocational training:

06 Information and communication technologies (ICT)

061 Information and communication technologies (ICT)

0611 Computer use

0612 Database and network design and administration

0613 Software and applications development and analysis

07 Engineering, manufacturing and construction industries
071 Engineering and engineering trades
0714 Electronics and automation

02 Arts and humanities
021 Arts
0211 Audio-visual techniques and media production

Compliance of the Russian classification of professions, qualifications, and areas of education in ICT with ISCED-F 2013 is determined using the Russian Classifier of Occupations (RCO, RC 009-2016), approved by Order of the Federal Agency for Technical Regulation and Metrology no. 2007-st of December 8, 2016, where professions, qualifications, and areas of education are attributed to certain areas of education and vocational training in ISCED-F 2013;

- requirements of Federal State Educational Standards (FSES) for professional competencies and areas of professional activity related to information and communication technologies.

International comparisons of secondary vocational education graduates – programmes for mid-level specialists and higher education graduates in 'Information and Communications Technologies' scientific 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-F 2013). 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 (ICT) 061 Information and communication technologies (ICT) 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) Additive technologies (code 15.02.09) Information systems designed for city planning (code 21.02.06)

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

119on 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).

Publication activity indicators are calculated for publications (scientific journals, monographs, collections of publications, conference proceedings) indexed in the Scopus database. Unless stated otherwise, 'publications' include the following types of documents: article, conference papers, review, book, or book chapter. 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).

Industrial robots / automated lines are automated production systems equipped with manipulators with three or more degrees of mobility, capable of perceiving the environment, controlling their actions and adapting to changes; can be used both for industrial processing (welding, cutting, painting, etc.) and for performing auxiliary operations (assembly, sorting, transportation, packaging, etc.).

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. In the structure of the ICT sector, the following types of economic activity are included: IT industry (OKVED2 codes – 62.01, 62.02, 62.03, 63.11), other information service activities (58.2, 62.09, 63.12, 95.1), telecommunications (61), ICT manufacturing (26.1, 26.2, 26.3, 26.4, 26.8) and ICT wholesale (46.5). The composition of the ICT sector is determined in accordance with the order of the Ministry of Digital Development Communications and Mass Media of the Russian Federation dated December 7, 2015 no. 515.

Innovation activity of enterprises is determined as the ratio of the number 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. Any changes in 2017 data are due to the recalculation indicators according to the specified method.

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.

Individuals' digital skills are the competencies of people in the field of using personal computers, the Internet, and other types of ICT.

Broadband access includes fixed broadband access: 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; mobile broadband access: mobile telephone network that advertise top access speed of 256 kbit/s and higher.

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 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 (MSITS 2010), **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.

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

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