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

Federal State
Statistics Service

HIGHER SCHOOL OF ECONOMICS
NATIONAL RESEARCH UNIVERSITY

DIGITAL ECONOMY

Pocket Data Book

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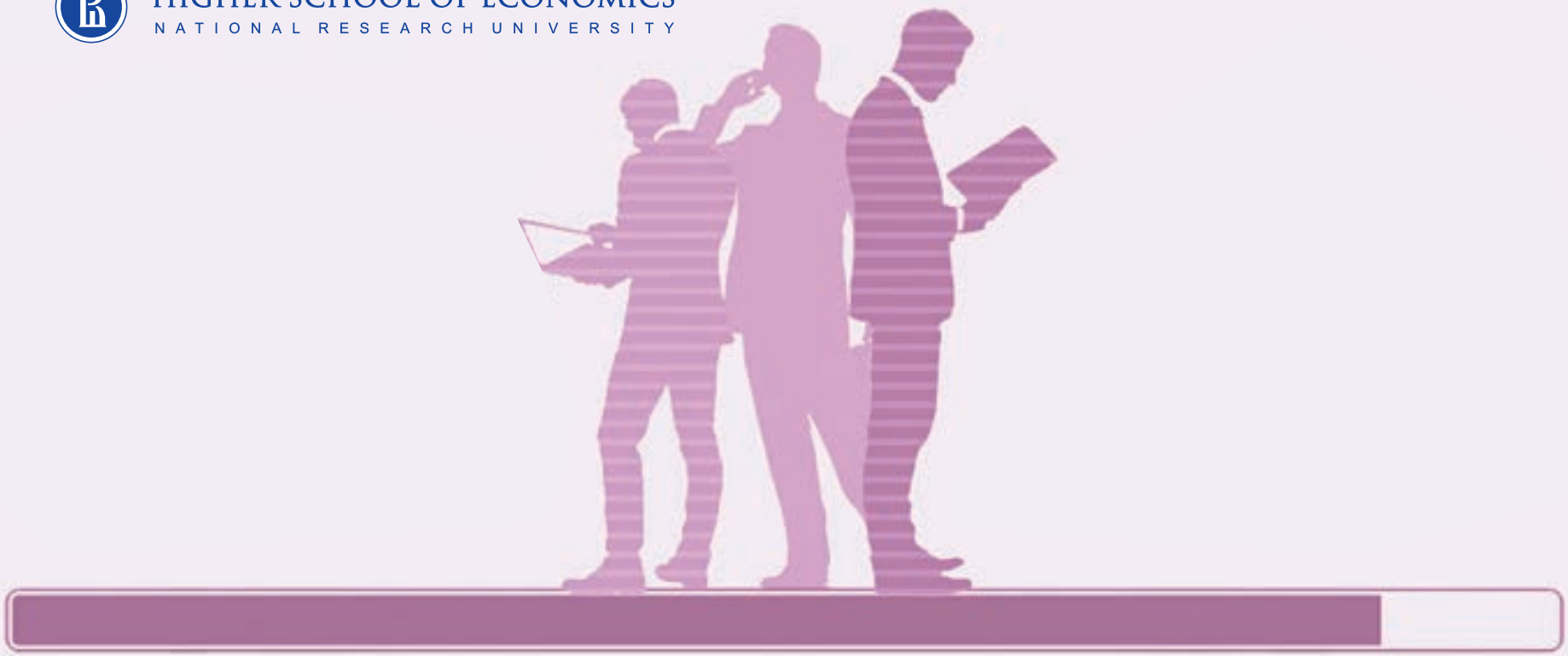

DIGITAL ECONOMY

Pocket Data Book

Moscow 2020

УДК 338:004(038.41)(470+571)
ББК 65.051
D56

Editorial Board: Leonid Gokhberg, Evgeniy Kislyakov, Yaroslav Kuzminov, and Marina Sabelnikova
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With contributions by Maria Kovrigina

Digital Economy : Pocket Data Book / G. Abdrakhmanova, A. Demyanova, S. Fridlyanova et al.; D56 L. Gokhberg (ed.); National Research University Higher School of Economics. Moscow : HSE, 2020. – 112 p. – 150 copies. – ISBN 978-5-7598-2158-8 (pbk).

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 Ministry of Digital Development, Communications and Mass Media of the Russian Federation, Russian Federal State Statistics Service (Rosstat), Russian Central Bank (Bank of Russia), Organisation for Economic Co-operation and Development (OECD), European Statistical Office (Eurostat), International Telecommunication Union (ITU), United Nations Conference on Trade and Development (UNCTAD), World Intellectual Property Organisation (WIPO), and results of own methodological and analytical studies of the HSE Institute for Statistical Studies and Economics of Knowledge.

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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.

1. Gross Domestic Expenditure on Digital Economy Development

1.1. Gross domestic expenditure on digital economy development

2018 to 2017 = **103.5%**

2017

3324 billion roubles

3.6 % of GDP

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

1210 billion roubles

1.3 % of GDP

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

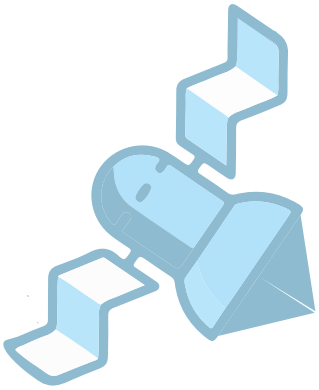
1739 billion roubles

1.9 % of GDP

Enterprises and household expenditure on purchase of digital content

375 billion roubles

0.4 % of GDP



2018

3795 billion roubles

3.7 % of GDP

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

1397 billion roubles

1.4 % of GDP

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

1953 billion roubles

1.9 % of GDP

Enterprises and household expenditure on purchase of digital content

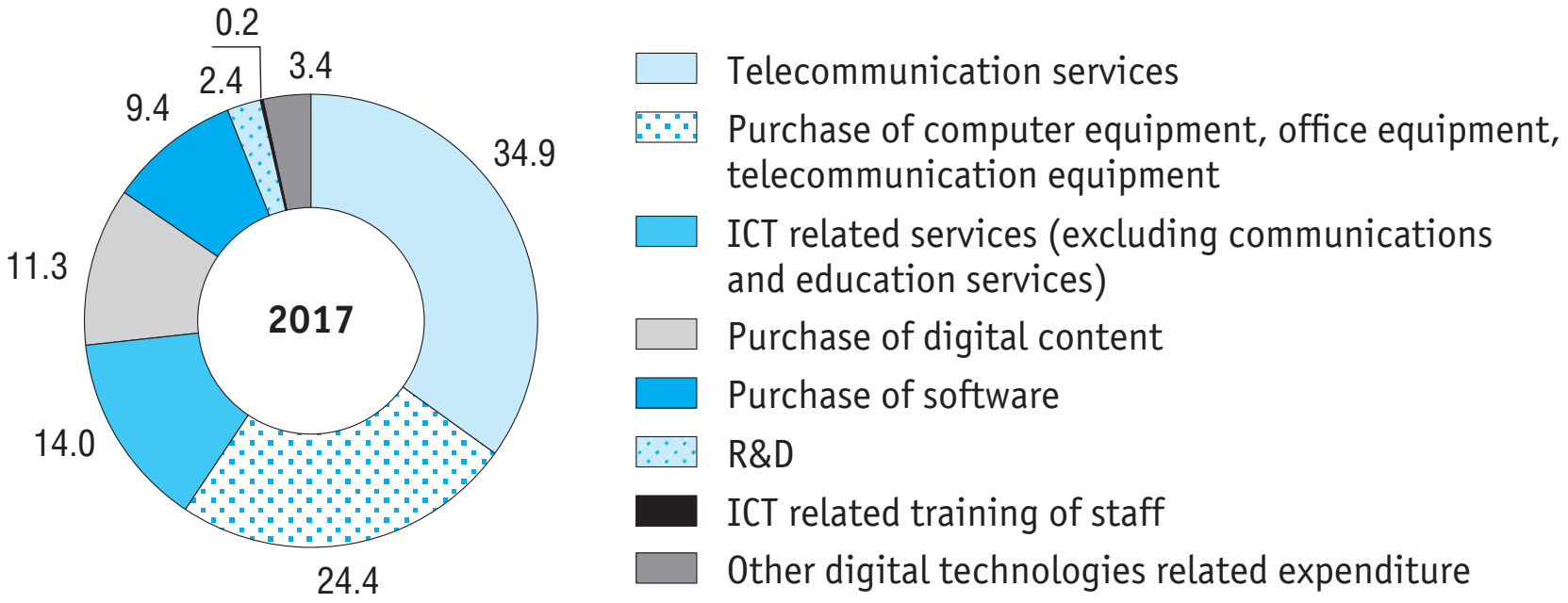
445 billion roubles

0.4 % of GDP

* Enterprises domestic expenditure on development, dissemination and use of digital technologies and related goods and services is domestic expenditure on development of digital economy (session protocol no. 557pr of September 27, 2019 of the Government Comission's Digital Economy Subcommittee on the Use of Information Technologies for Improving Quality of Life and Business Environment).

Source (here and below in the section): estimated by HSE Institute for Statistical Studies and Economics of Knowledge on the basis of Rosstat data.

1.2. Percentage distribution of gross domestic expenditure on digital economy development by type of costs



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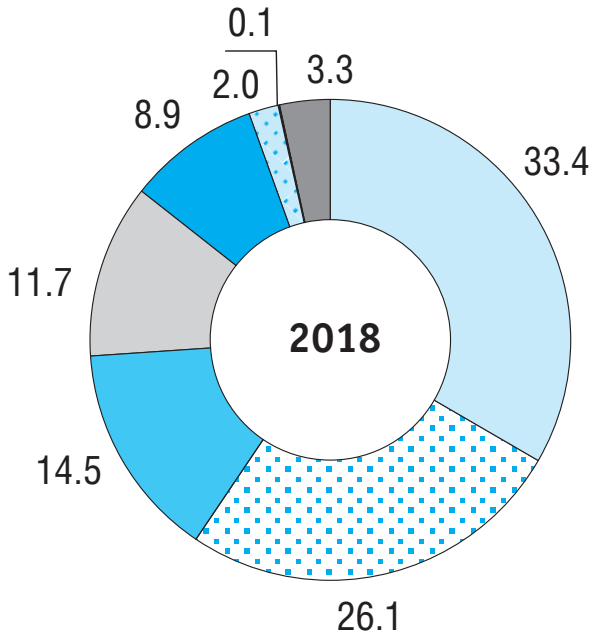
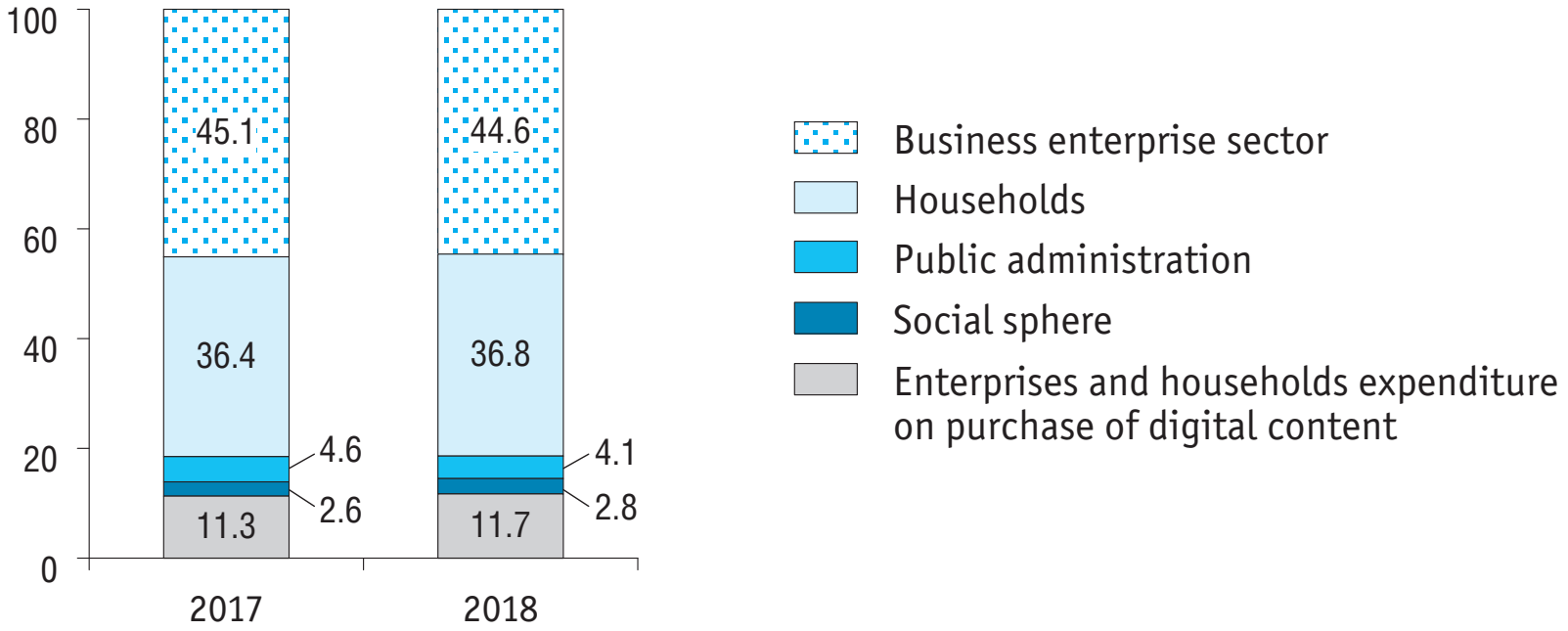


- Telecommunication services
- Purchase of computer equipment, office equipment, telecommunication equipment
- ICT related services (excluding communications and education services)
- Purchase of digital content
- Purchase of software
- R&D
- ICT related training of staff
- Other digital technologies related expenditure

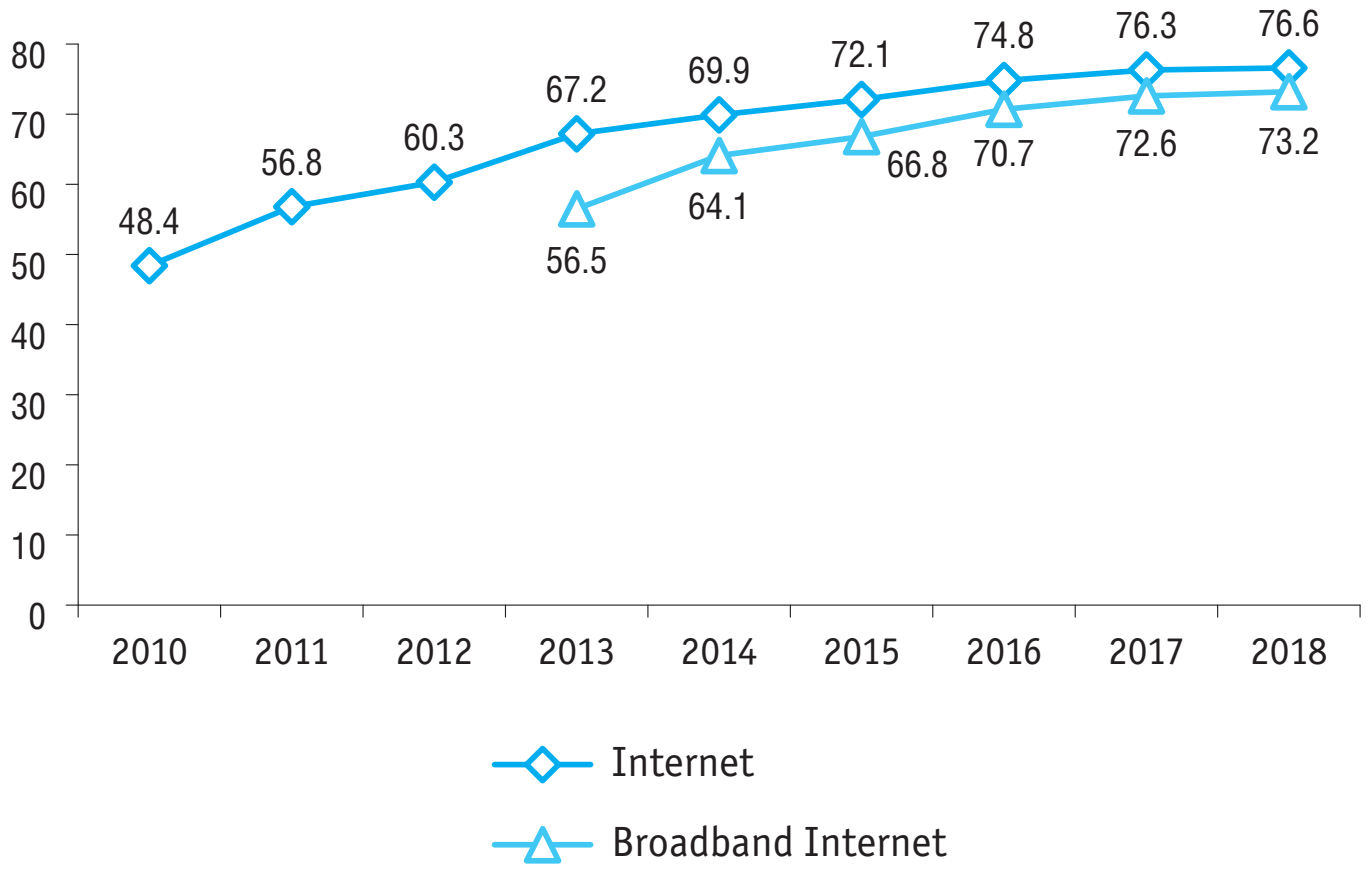
1.3. Percentage distribution of gross domestic expenditure on digital economy development by sector of economy



Population in the Digital World

2.1. Households with Internet access

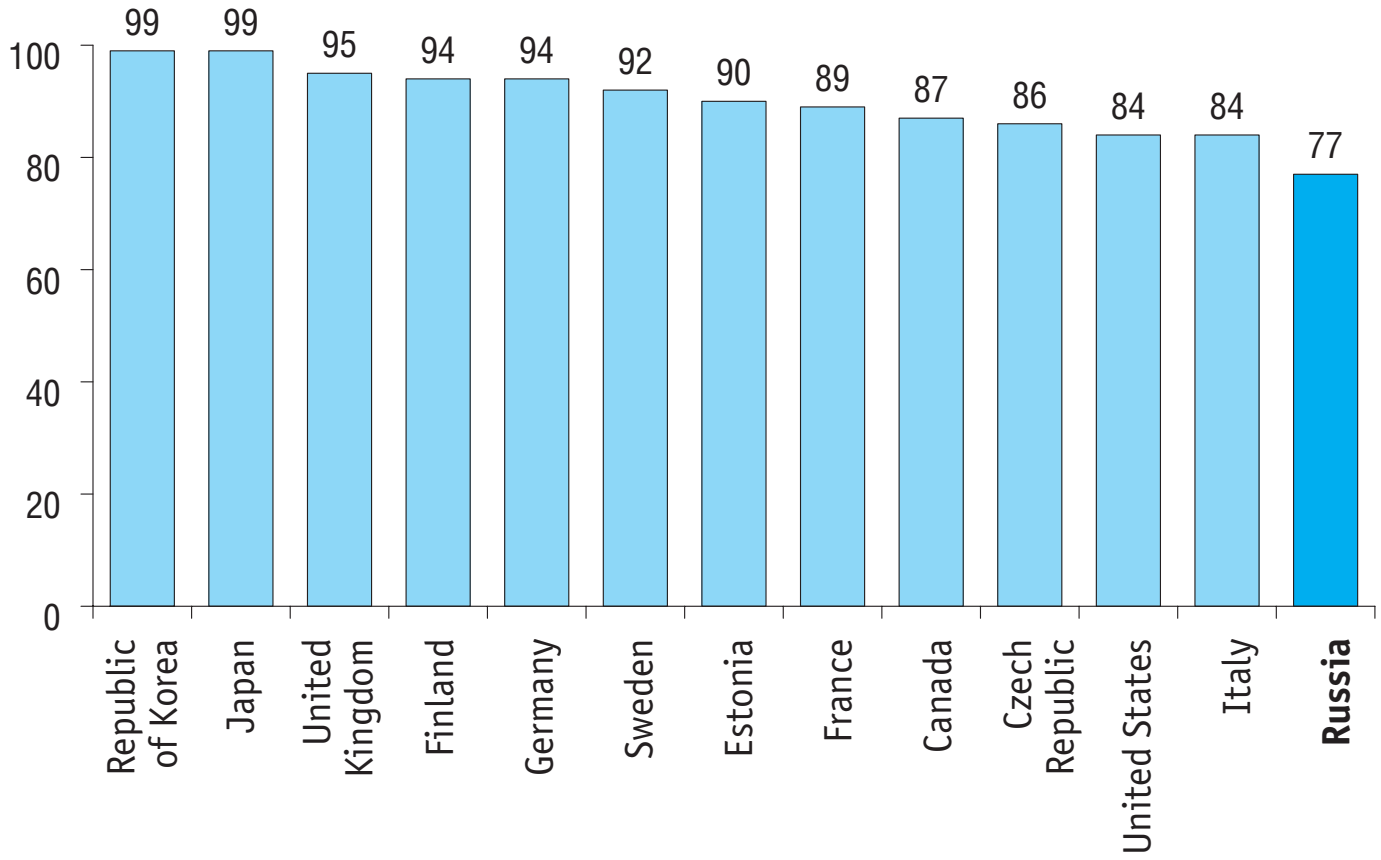
(as a percentage of all households)



Sources (here and below in the section): Russia – estimated by HSE Institute for Statistical Studies and Economics of Knowledge on the basis of Rosstat data; EU countries – Eurostat; countries other than Russia – OECD, ITU.

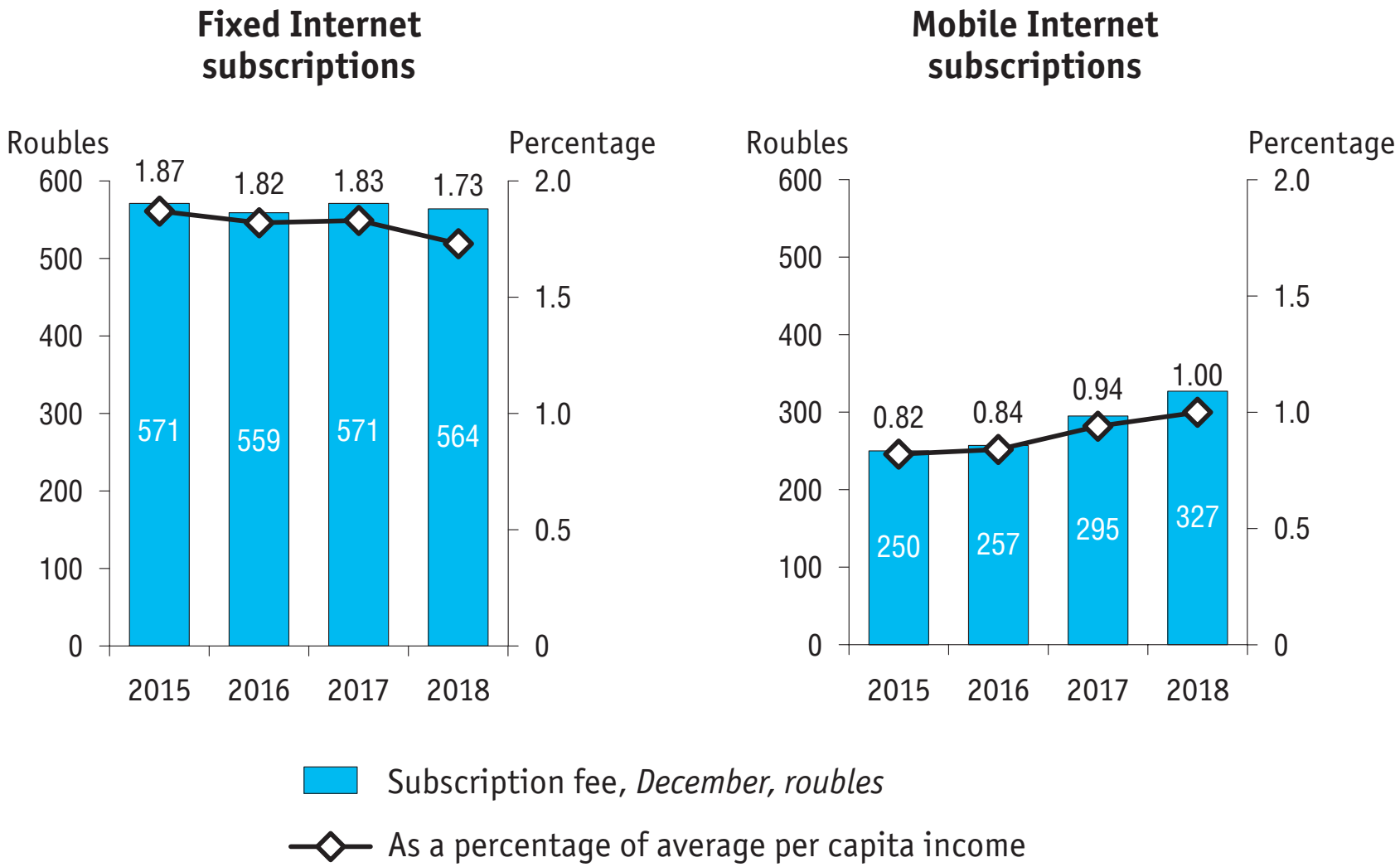
2.2. Households with Internet access by country: 2018*

(as a percentage of all households)



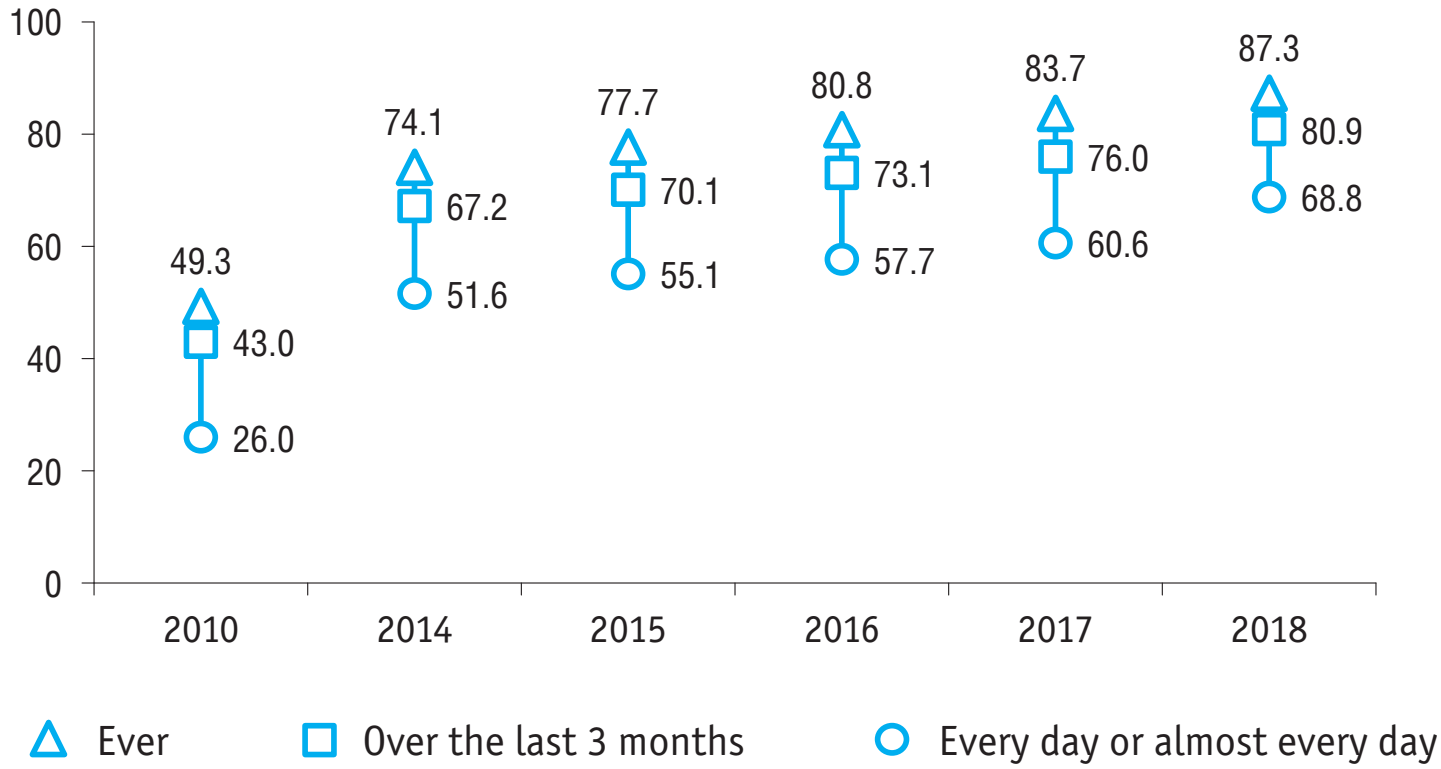
* Or nearest years for which data is available.

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



2.4. Internet users

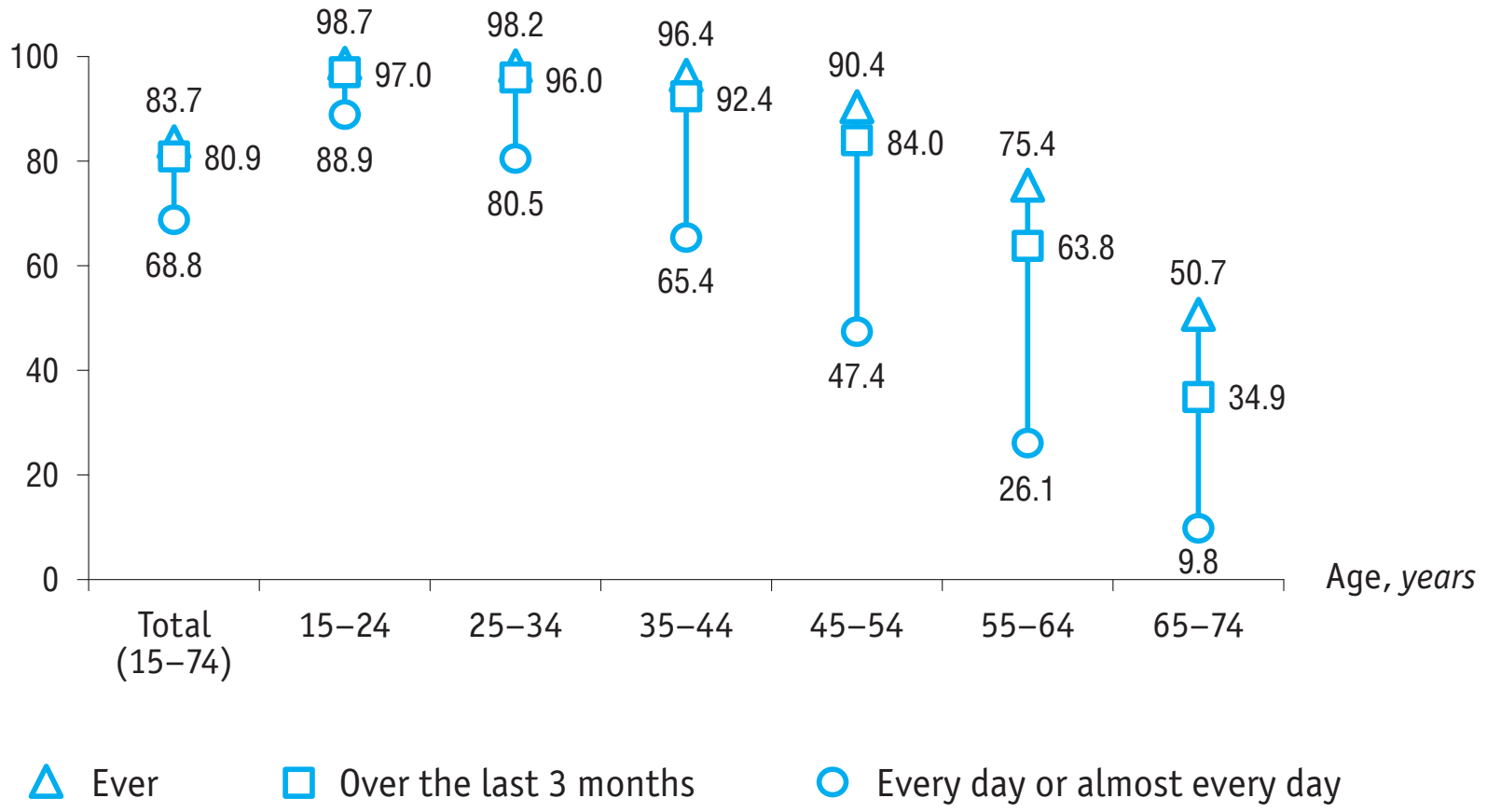
(as a percentage of all individuals aged 15–74)*



* *Here and below in the section*: 2010 data is given for individuals aged 16–74, 2013–2016 data for individuals aged 15–72.

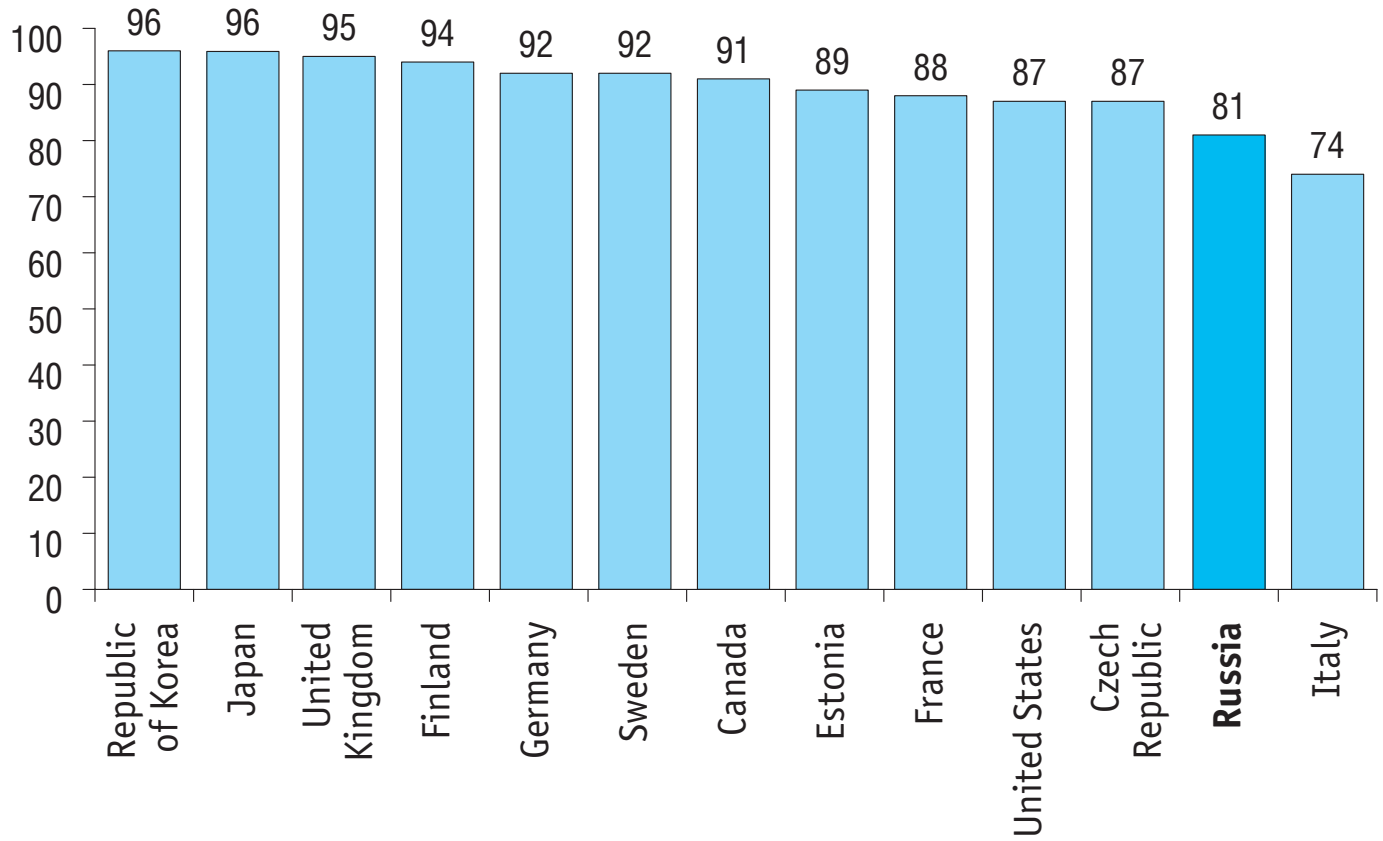
2.5. Internet users by age: 2018

(as a percentage of the population in each age group)



2.6. Internet users over the last three months by country: 2018*

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

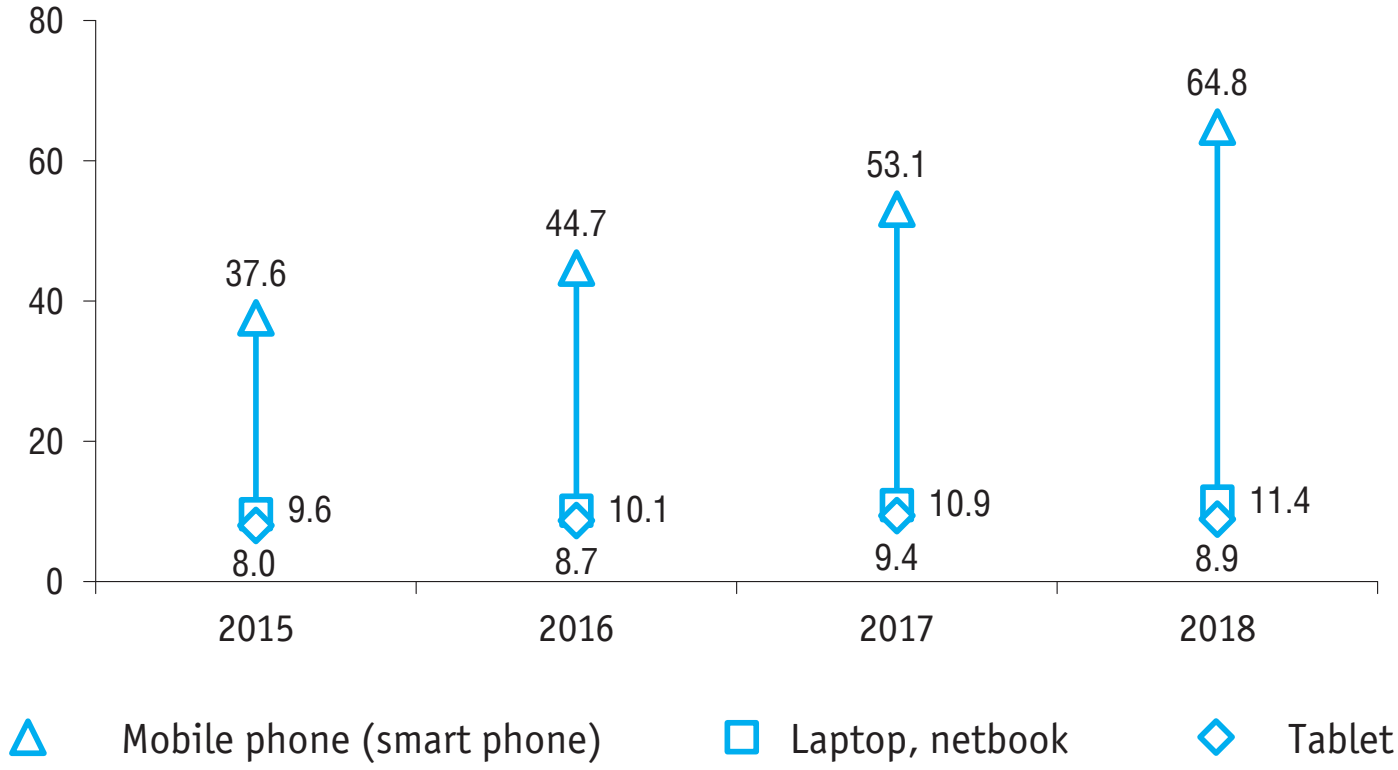


* Or nearest years for which data is available.

** *Here and below in the section*: countries other than Russia – aged 16–74.

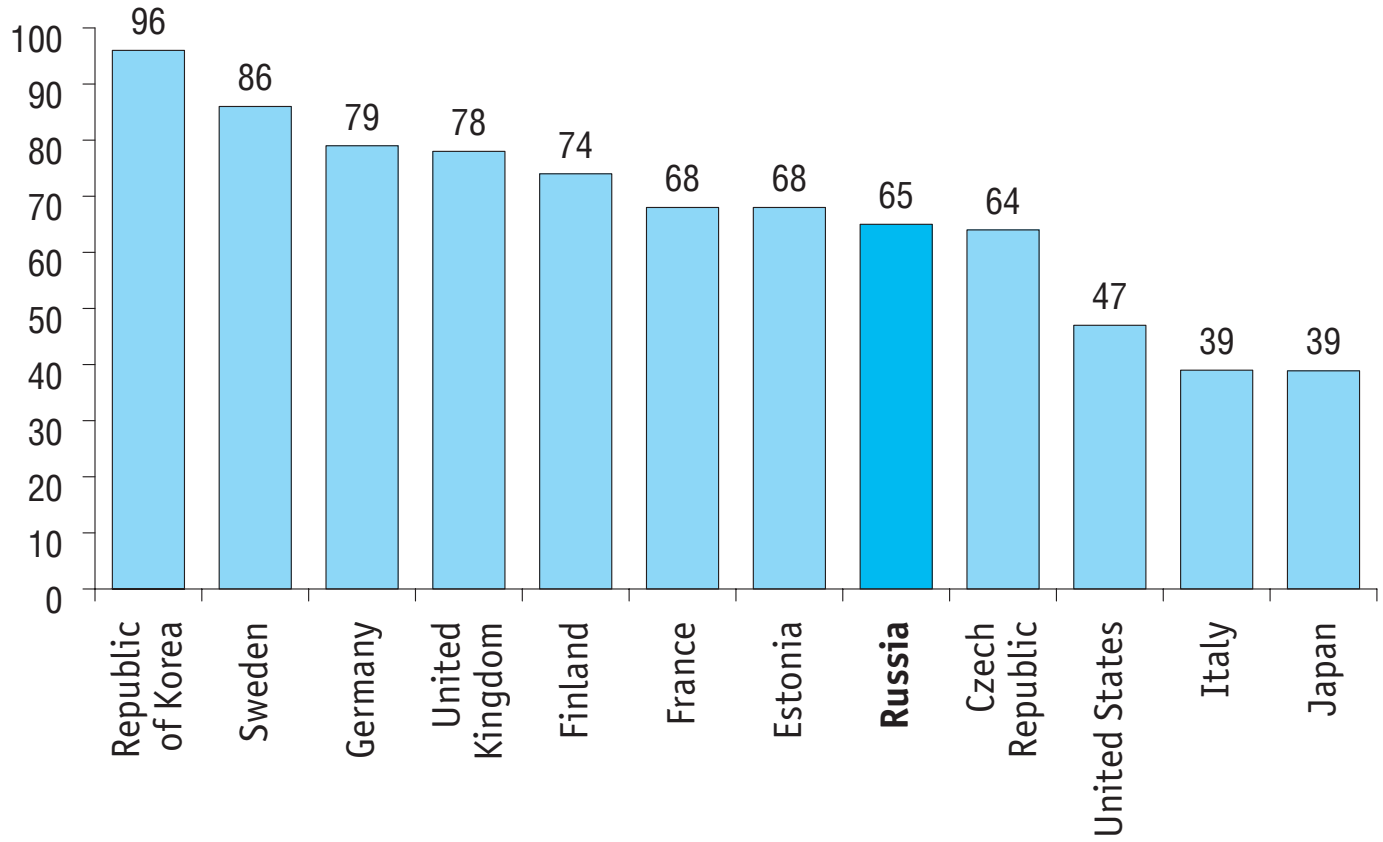
2.7. Individuals' use of mobile devices to access the Internet on the move or at work

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



2.8. Invididuals' use of mobile devices to access the Internet on the move or at work by country: 2018*

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



* Or nearest years for which data is available.

2.9. Digital skills

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

	2015	2016	2017	2018
Working with a text editor	38.8	41.5	41.7	41.1
Transferring files via e-mails	…	…	…	36.8
Copying or moving files or folders	…	…	…	34.5
Transferring files between computer and other devices	27.6	29.0	27.4	31.1
Using copy-paste tools in documents	…	…	…	22.4
Using software to edit photos, video or audio files	21.3	21.4	20.6	21.2
Using spreadsheet software	21.7	22.9	22.7	20.8
Connecting and installing new devices	8.4	8.9	9.7	9.8
Creating e-presentations using special programmes	7.6	8.5	9.1	8.2
Changing software configuration settings or preferences	3.3	2.8	3.4	2.7
Installing or reinstalling an operating system	2.8	2.7	3.0	2.7
Writing software by oneself using programming language	1.0	1.0	1.2	1.1

2.10. Digital skills by country: 2018*

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

	Transferring files between computer and other devices	Using spreadsheet software	Using software to edit photos, video or audio files
Russia	**31**	**21**	**21**
Czech Republic	66	44	27
Estonia	54	43	36
Finland	67	51	54
France	60	40	33
Germany	64	40	46
Sweden	53	51	47
United Kingdom	58	49	50

* Or nearest years for which data is available.

2.11. Individuals' Internet activities related to communications by country: 2018*

(as a percentage of Internet users aged 15–74)

	Participating on social media	Making telephone or video calls online	Sending / receiving e-mails
Russia	**78**	**53**	**42**
Czech Republic	64	49	93
Estonia	69	49	91
Finland	71	46	94
France	48	35	88
Germany	57	57	92
Italy	63	47	77
Japan	89	53	84
Republic of Korea	72	50	57
Sweden	76	58	94
United Kingdom	74	51	92
United States	76	48	91

* Or nearest years for which data is available.

2.12. Individuals' Internet activities related to accessing digital content by country: 2018*

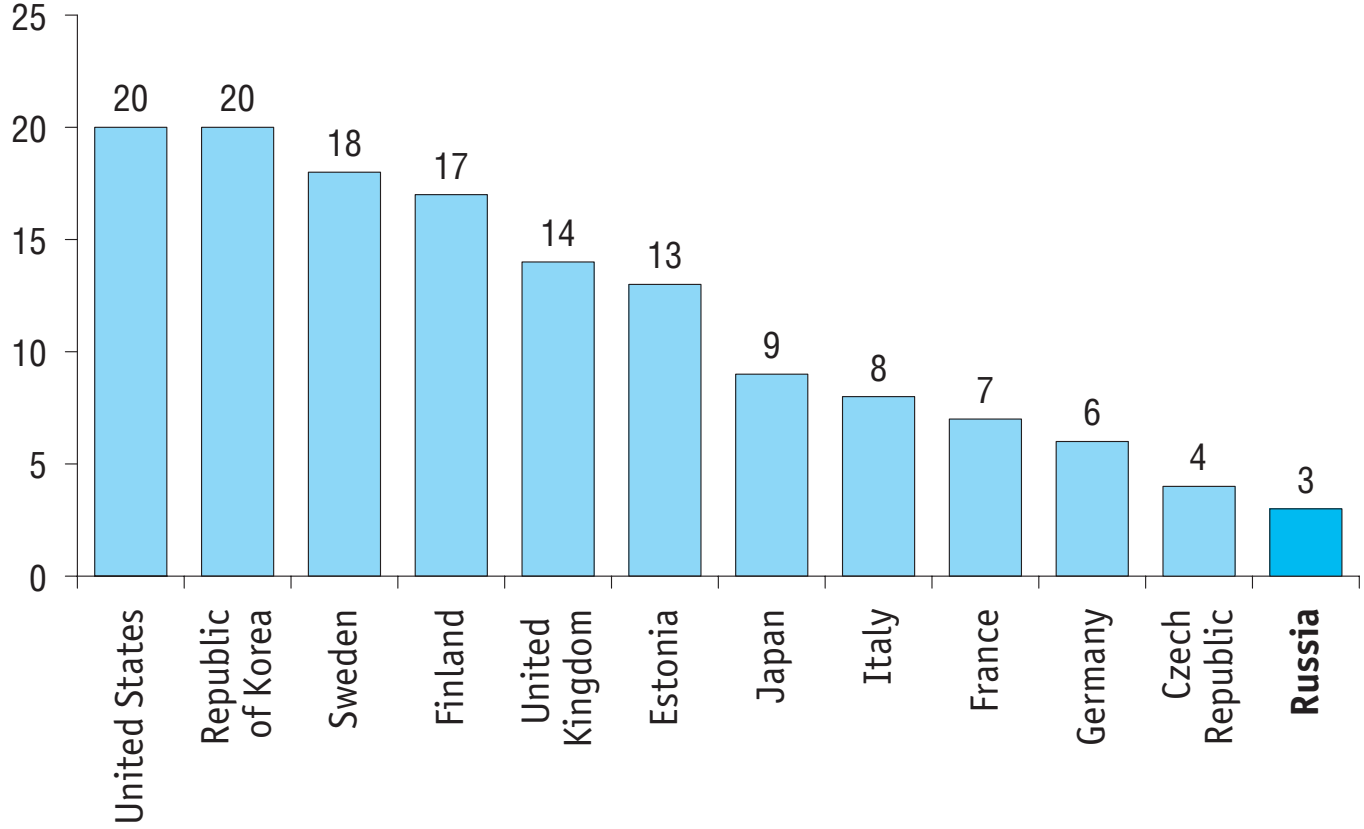
(as a percentage of Internet users aged 15–74)

	Playing or downloading video or computer / mobile games	Reading or downloading online newspapers / magazines / e-books
Russia	**30**	**23**
Czech Republic	29	91
Estonia	27	90
Finland	40	90
France	33	61
Germany	38	74
Italy	27	56
Japan	…	61
Republic of Korea	…	94
Sweden	34	88
United Kingdom	35	72

* Or nearest years for which data is available.

2.13. Individuals' Internet activities related to e-learning by country: 2018*

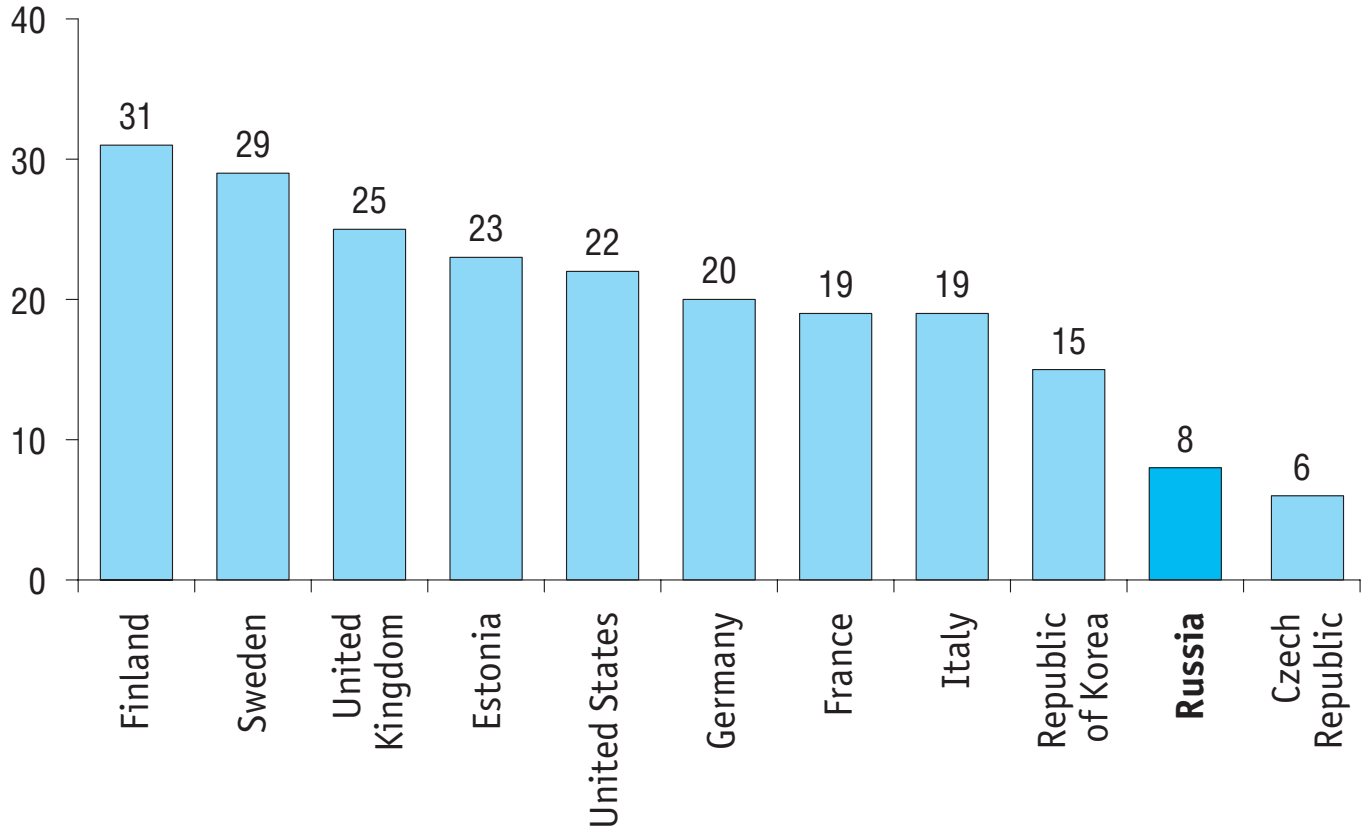
(as a percentage of Internet users aged 15–74)



* Or nearest years for which data is available.

2.14. Individuals' Internet activities related to looking for a job or sending a job application by country: 2018*

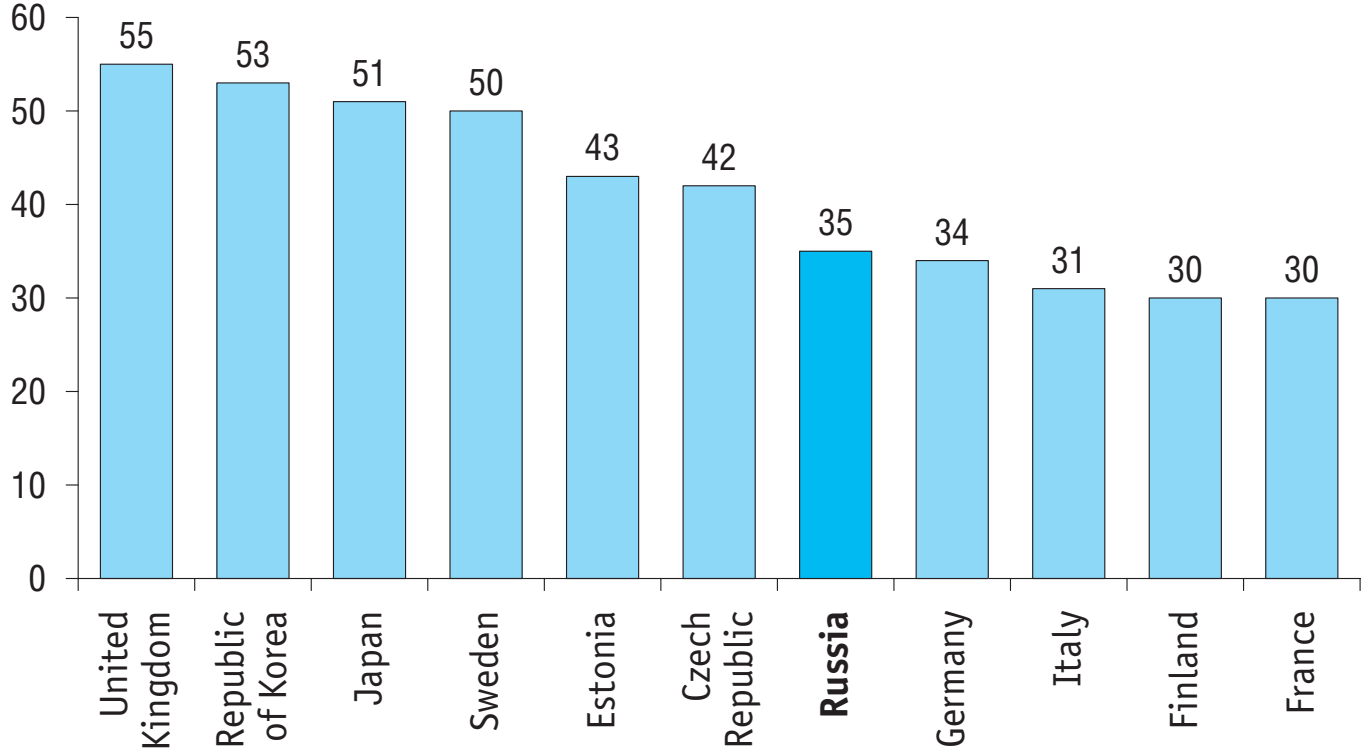
(as a percentage of Internet users aged 15–74)



* Or nearest years for which data is available.

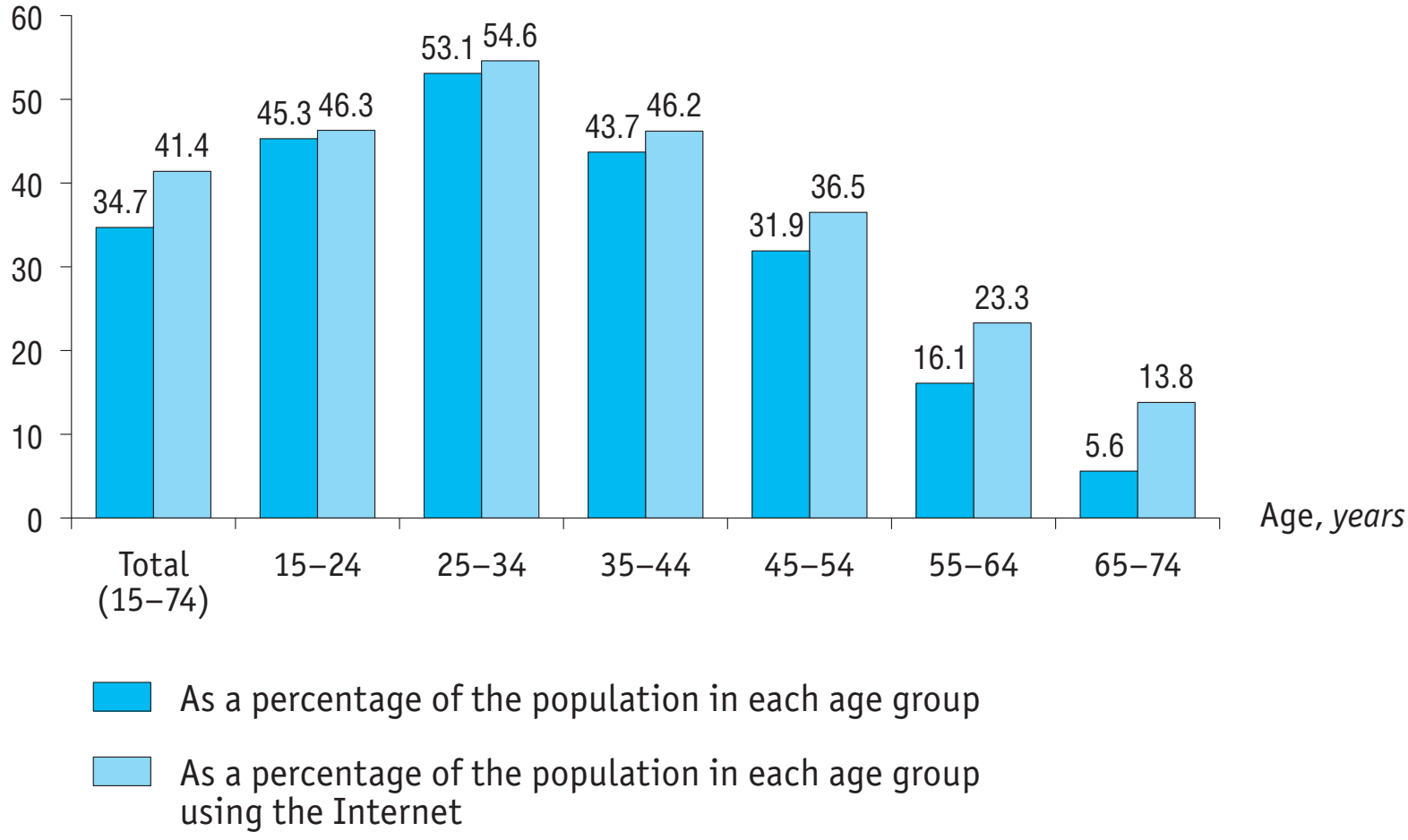
2.15. Individuals' Internet activities related to uploading self-created content to websites by country: 2018*

(as a percentage of Internet users aged 15–74)



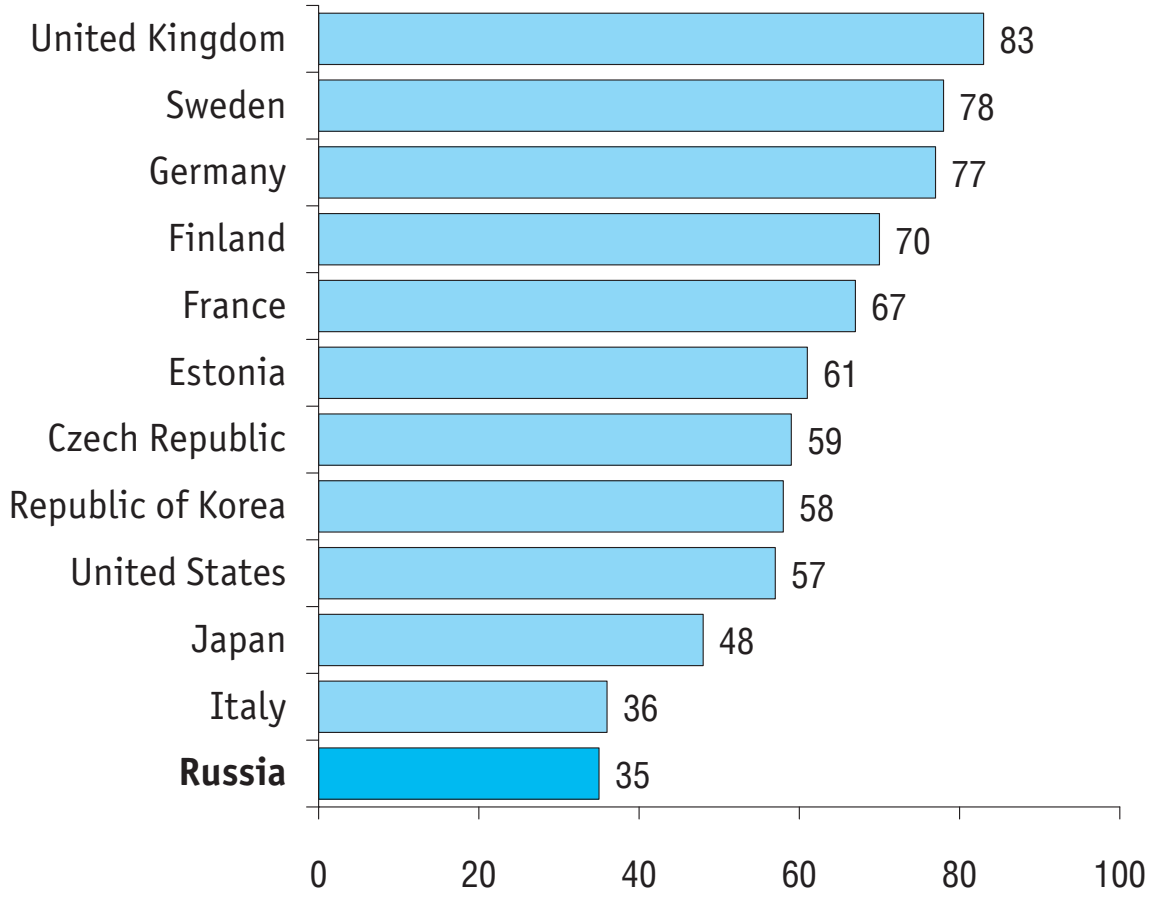
* Or nearest years for which data is available.

2.16. Individuals' Internet activities related to ordering goods or services by age: 2018



2.17. Individuals' Internet activities related to ordering goods or services by country: 2018*

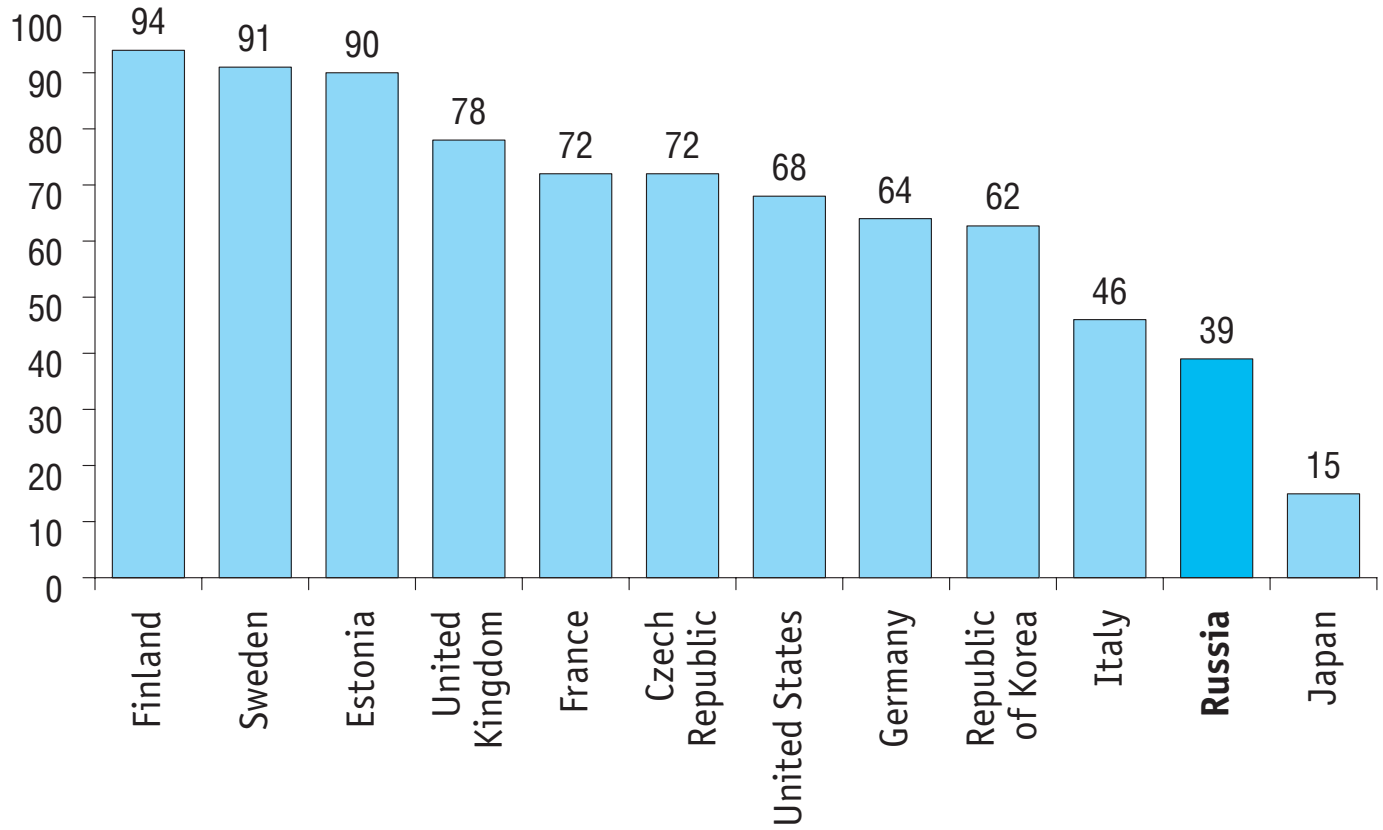
(as a percentage of all individuals aged 15–74)



* Or nearest years for which data is available.

2.18. Individuals' Internet activities related to financial transactions by country: 2018*

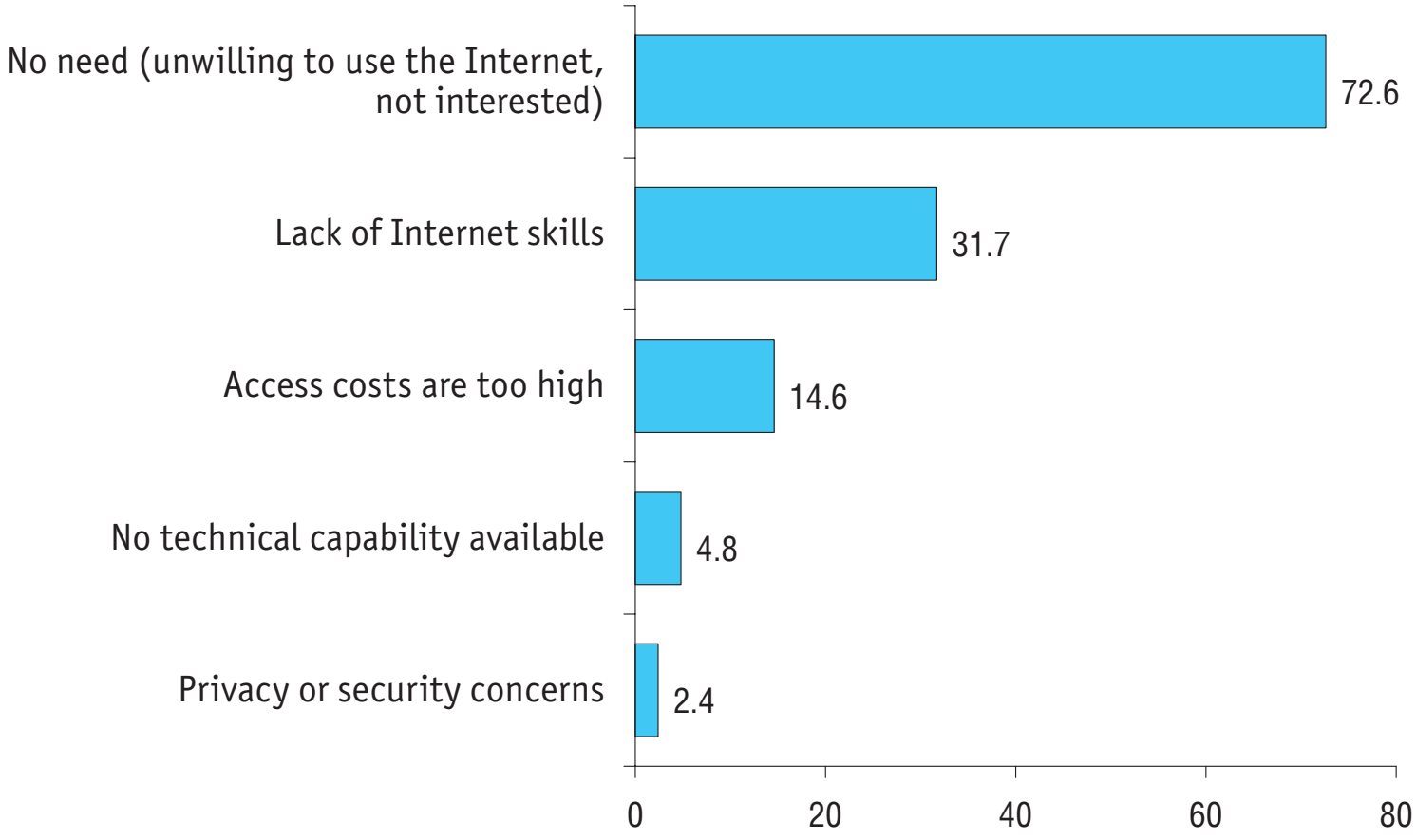
(as a percentage of Internet users aged 15–74)



* Or nearest years for which data is available.

2.19. Reasons why individuals refrain from using the Internet: 2018

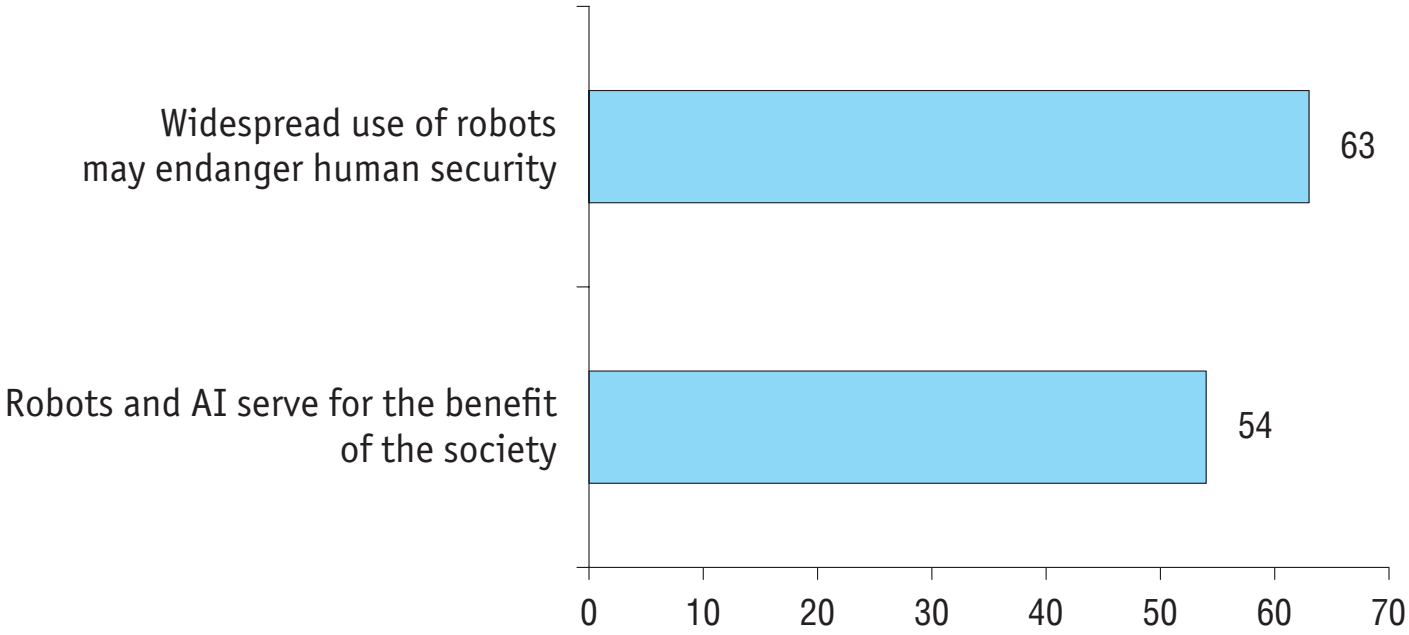
(as a percentage of individuals aged 15–74, who have not used the Internet over the last 12 months or never used it)



Public Attitudes towards Robots

3.1. Public perception of robots: 2019*

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

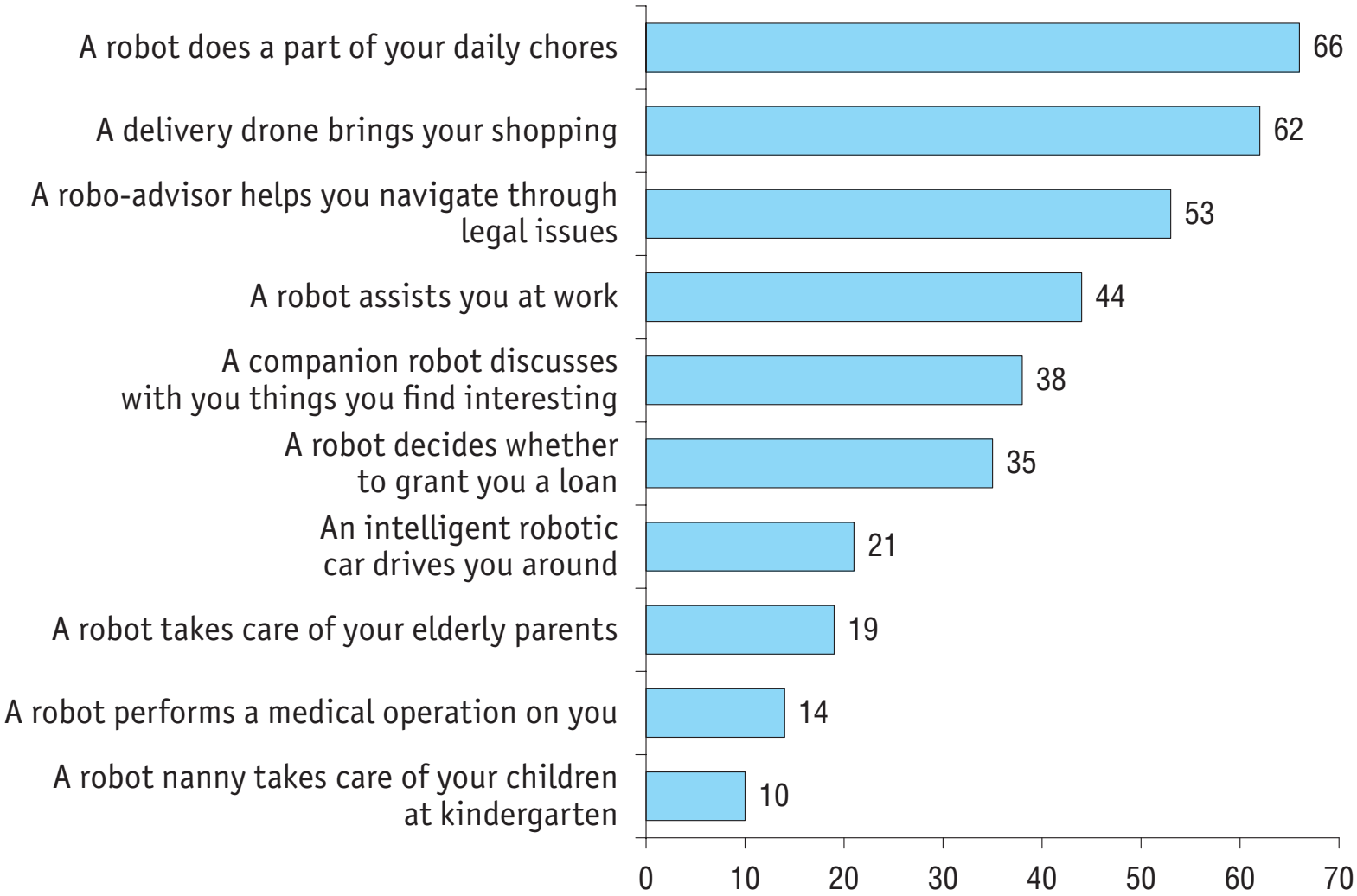


* The number of individuals who totally agree or tend to agree with each of the statements.

Source: here and below in the section – the data of a representative survey of individuals aged 18–65, conducted by the HSE Institute for Statistical Studies and Economics of Knowledge (ISSEK) within the framework of the Basic Research Programme of the National Research University Higher School of Economics. The survey was carried out in December 2018 – January 2019. The number of respondents – 7584.

3.2. Public attitude towards interaction with robots: 2019*

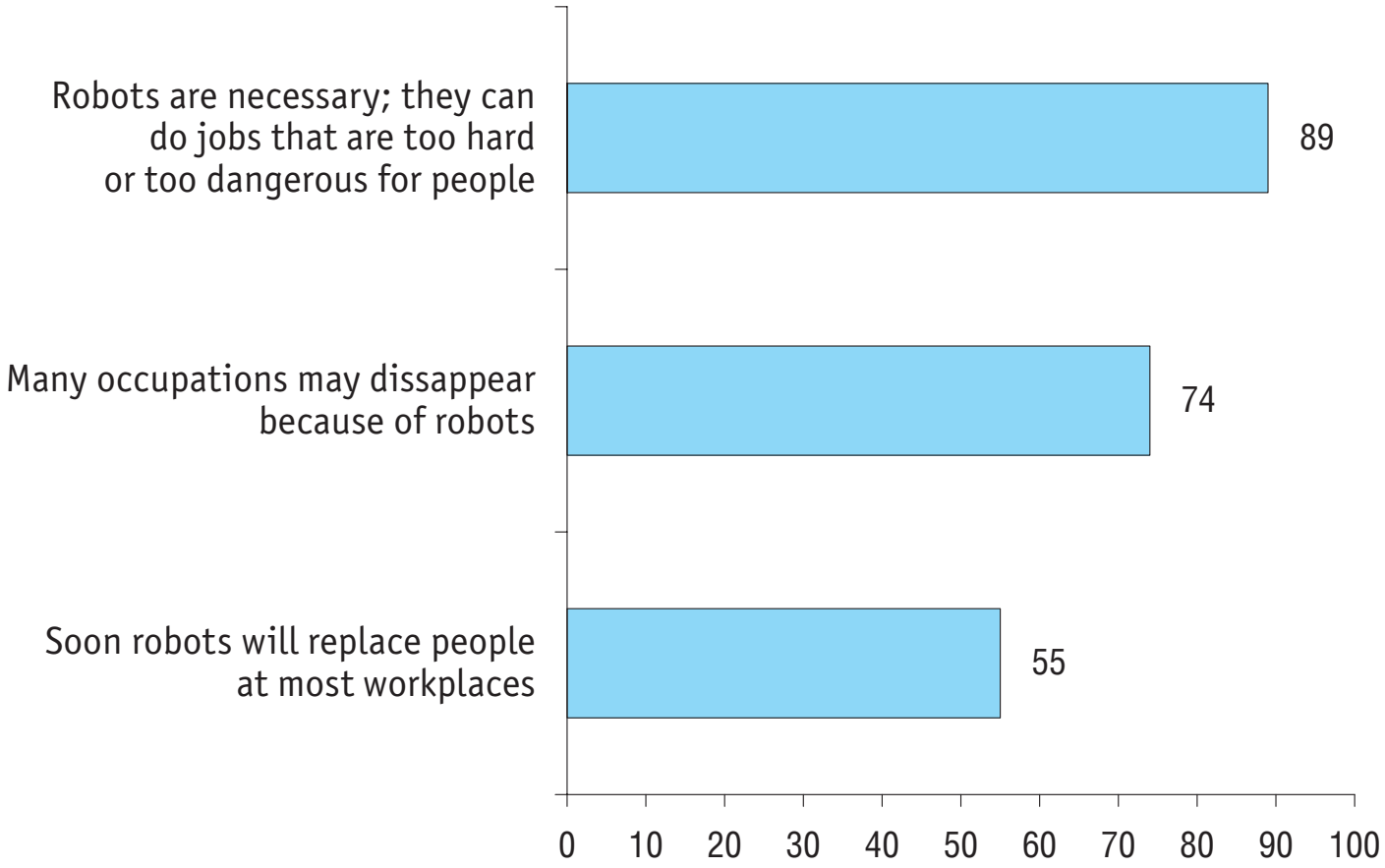
(as a percentage of all individuals aged 18–65)



* Number of individuals who feel totally comfortable or rather comfortable with each of the situations.

3.3. Perceived impact of robots on labour market: 2019*

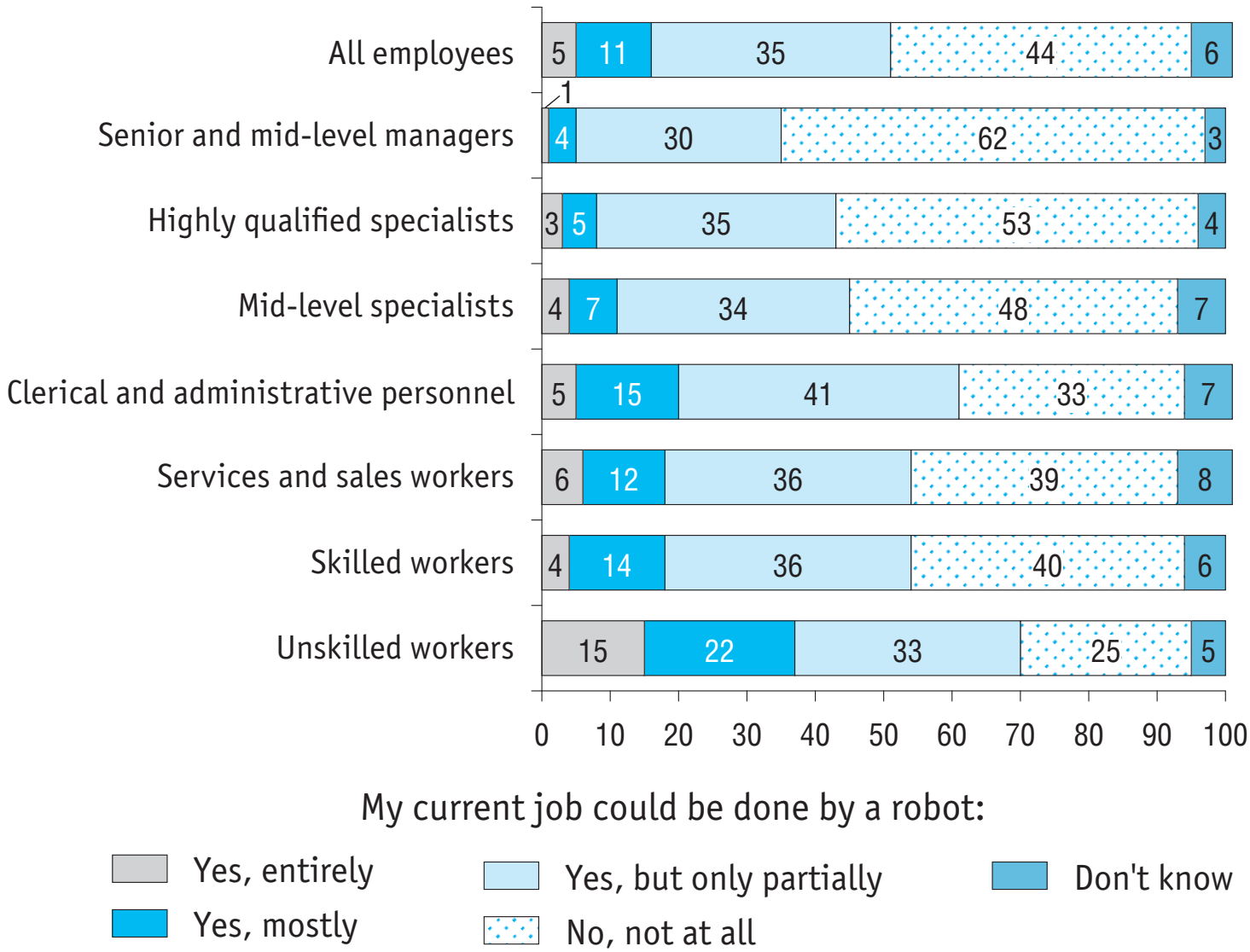
(as a percentage of all individuals aged 18–65)



* The number of individuals who totally agree or tend to agree with each of the statements.

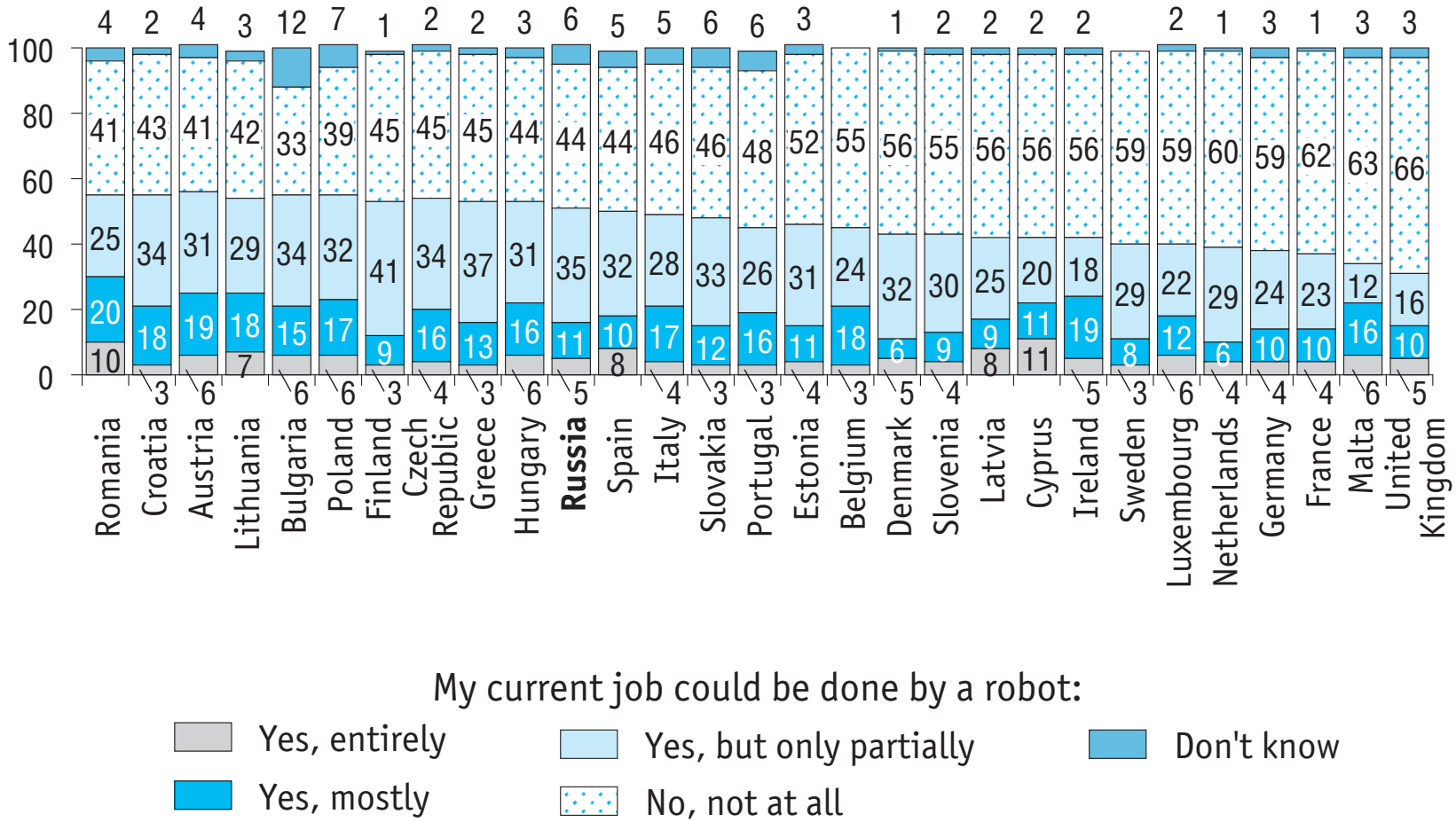
3.4. Public opinion on the possibility of robots replacing humans at the workplace: 2019

(as a percentage of employed population aged 18–65)



3.5. Public opinion on the possibility of robots replacing humans at the workplace by country: 2019*

(as a percentage of employed population aged 18–65)

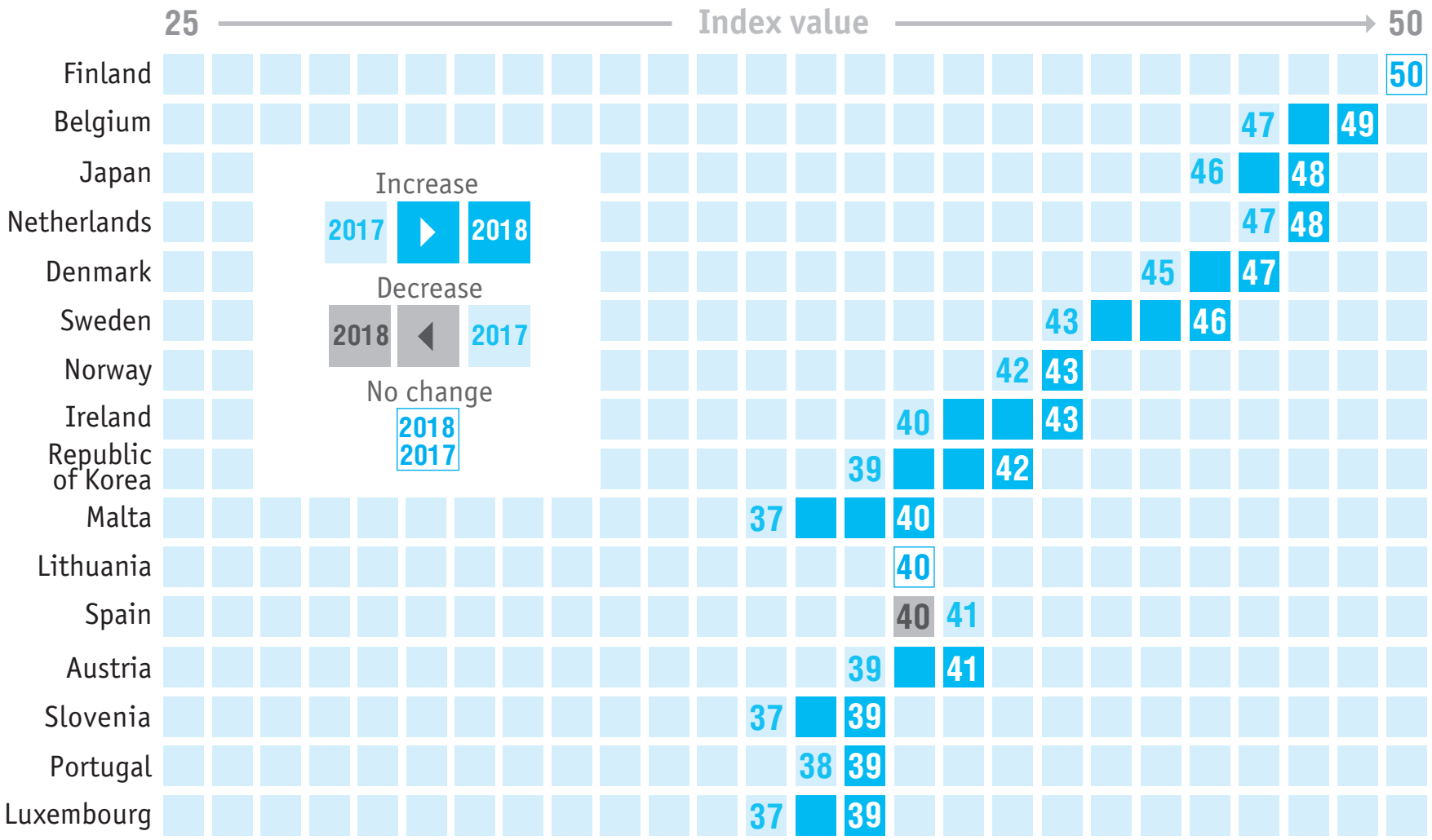


* For countries other than Russia – 2017 data is presented as a percentage of the total number of employed individuals aged 15 and over.

Source: countries other than Russia – European Commission (2017) Special Eurobarometer 460.

Business Digitalisation

4.1. Business Digitalisation Index



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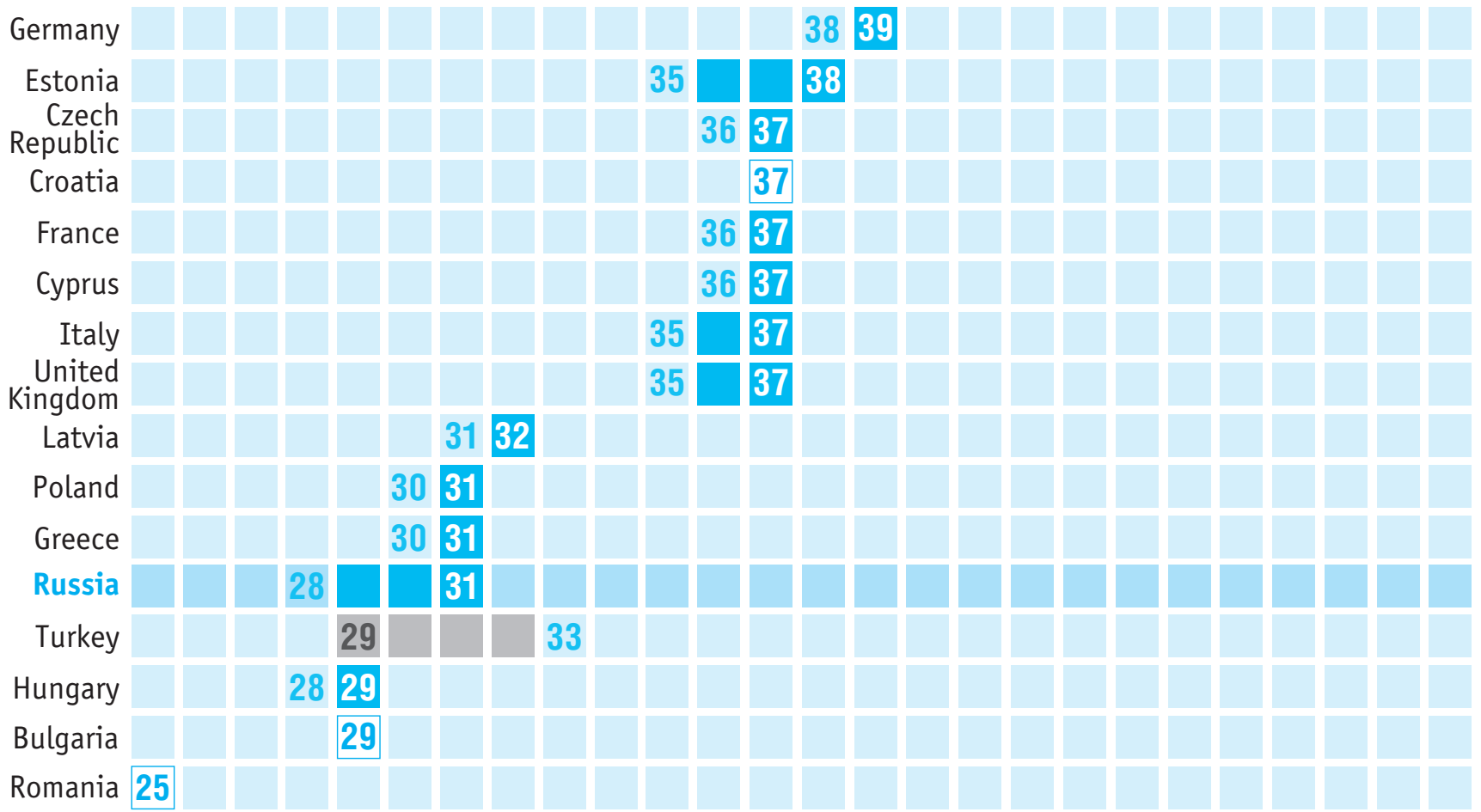
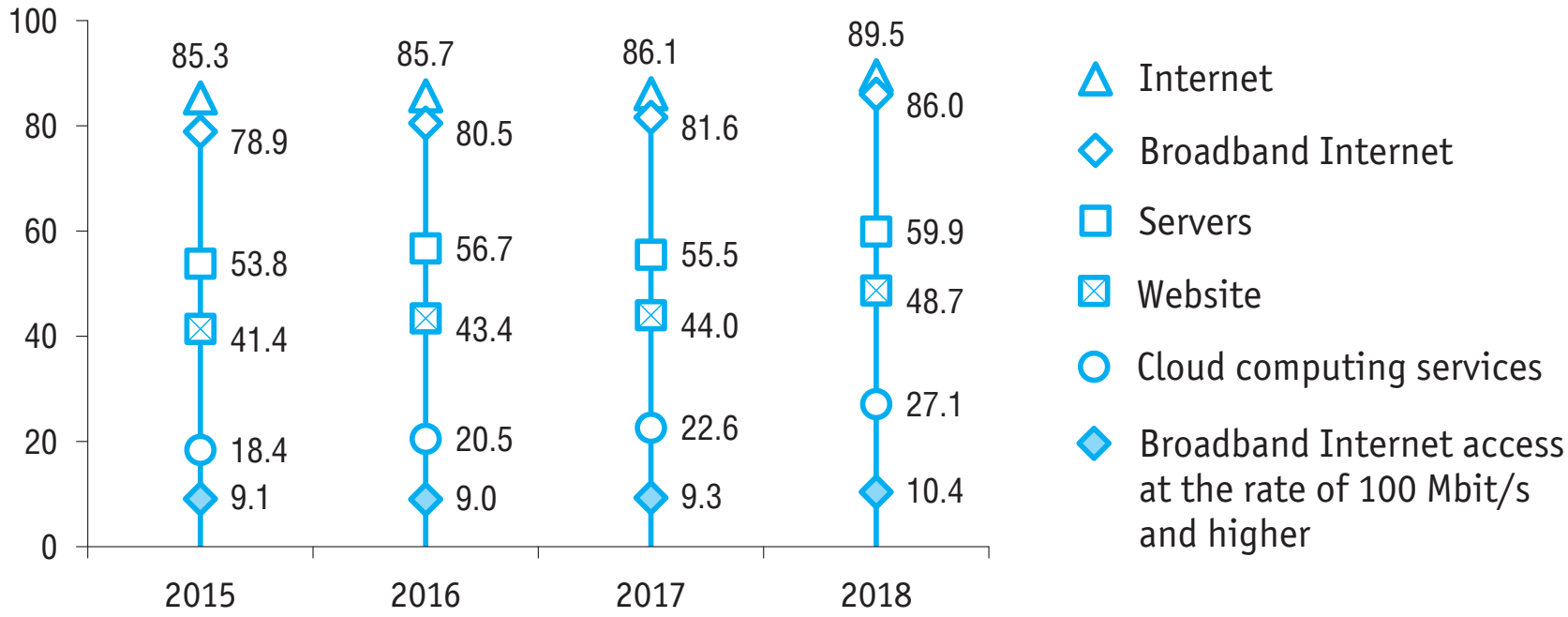


Source: estimated by HSE Institute for Statistical Studies and Economics of Knowledge.

4.2. Enterprises' use of ICT*

(as a percentage of all business enterprise sector units)



* *Here and below in the section*: business enterprise units are given by types of economic activity with the Russian Classification of Economic Activity codes (OKVED): 2015–2016 – OKVED Rev. 1.1: C, D, E, F, G, H, I, K; 2017–2018 – OKVED2: B, C, D, E, F, G, H, I, J, L, N, 69, 70, 71, 72, 73, 74, 95.

Sources (here and below in the section): Russia – estimated by HSE Institute for Statistical Studies and Economics of Knowledge on the basis of Rosstat data; EU countries – Eurostat; countries other than Russia – OECD.

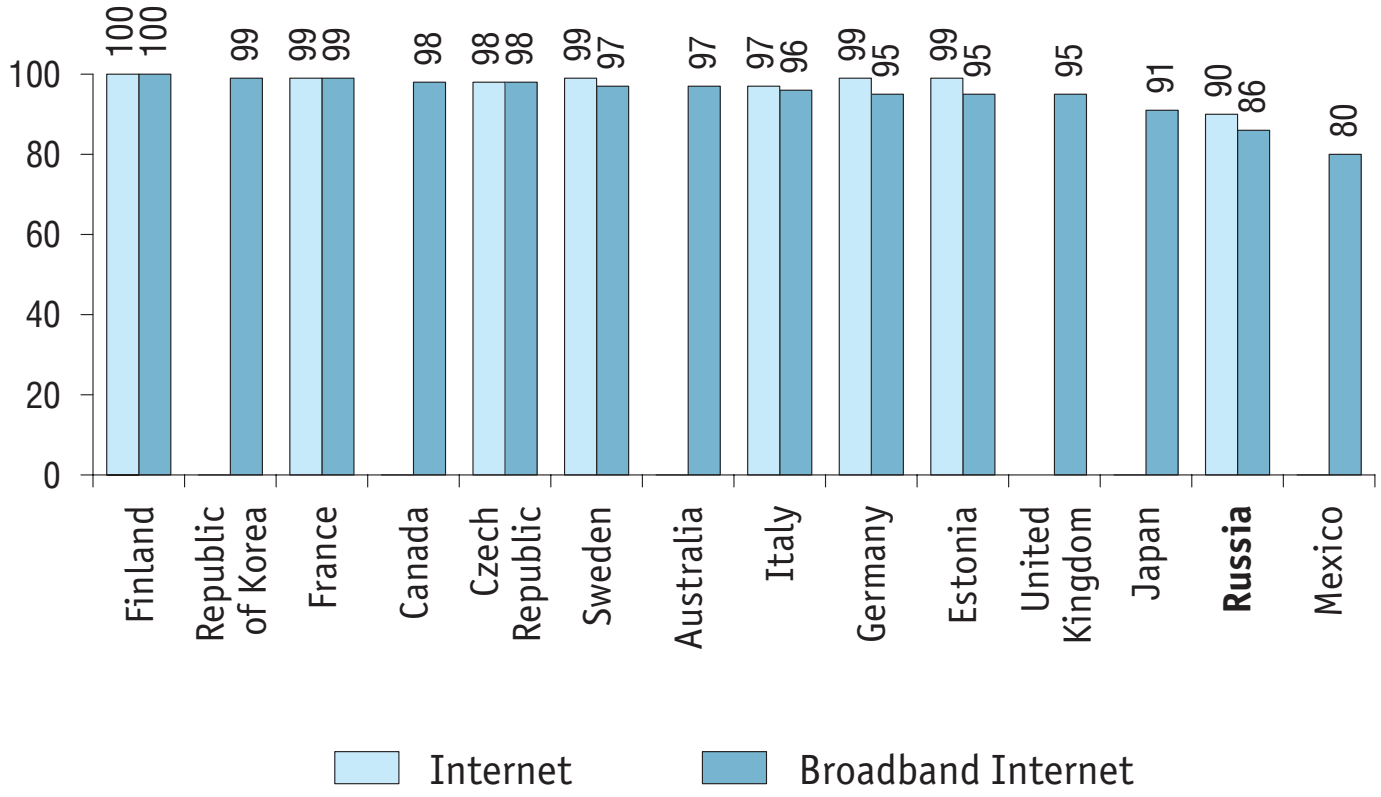
4.3. Enterprises with broadband access: 2018

(as a percentage of all business enterprise sector units)

	Total	By top speed access			By connection types	
		256 Kbp/s – 1.9 Mbp/s	2.0–100.0 Mbp/s	Over 100 Mbp/s	Fixed	Mobile
Business enterprise sector	**86.0**	**20.6**	**55.0**	**10.4**	**82.1**	**51.9**
Mining and quarrying	83.9	17.1	58.5	8.3	79.0	56.6
Manufacturing	90.3	13.6	69.3	7.4	84.6	54.6
Electricity, gas, steam and air conditioning supply	84.8	19.1	60.6	5.0	79.8	50.3
Water supply; sewerage; waste management and remediation activities	76.3	27.8	44.4	4.1	71.4	41.3
Construction	79.5	17.7	54.8	7.0	72.9	50.6
Wholesale and retail trade	91.3	25.5	52.1	13.8	86.1	59.7
Transportation and storage	80.3	18.3	53.4	8.5	76.0	47.4
Accommodation and food service activities	79.3	20.6	51.1	7.6	73.2	52.4
Telecommunications	89.7	7.6	44.1	38.0	86.9	54.5
Information technology industry	93.8	8.6	63.8	21.4	88.6	48.6
Real estate activities	77.3	21.6	49.0	6.7	72.6	37.2
Professional, scientific and technical activities	85.1	19.1	56.1	9.9	80.2	45.9

4.4. Enterprises with Internet access by country: 2018*

(as a percentage of all business enterprise sector units)

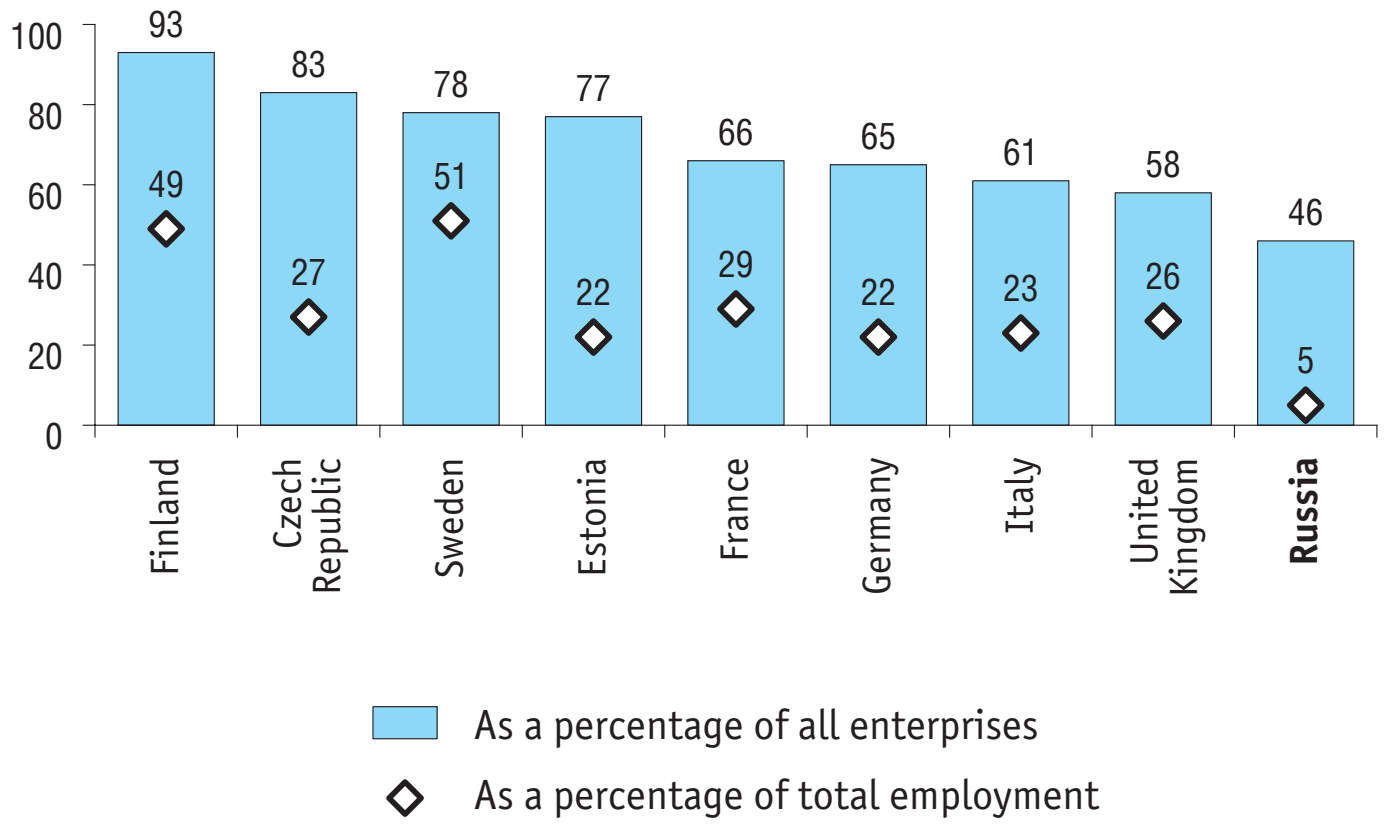


* Or nearest years for which data is available.

4.5. Provision of portable devices to personnel by business enterprise sector units for mobile Internet connection: 2018

	As a percentage of all enterprises	As a percentage of total employment
Business enterprise sector	**45.5**	**4.6**
Mining and quarrying	49.3	2.9
Manufacturing	50.2	2.6
Electricity, gas, steam and air conditioning supply	47.2	2.5
Water supply; sewerage; waste management and remediation activities	33.2	1.8
Construction	43.7	3.8
Wholesale and retail trade	56.2	9.7
Transportation and storage	42.1	2.9
Accommodation and food service activities	44.5	3.2
Telecommunications	53.3	15.8
Information technology industry	55.4	21.7
Real estate activities	26.5	3.2
Professional, scientific and technical activities	36.9	5.4

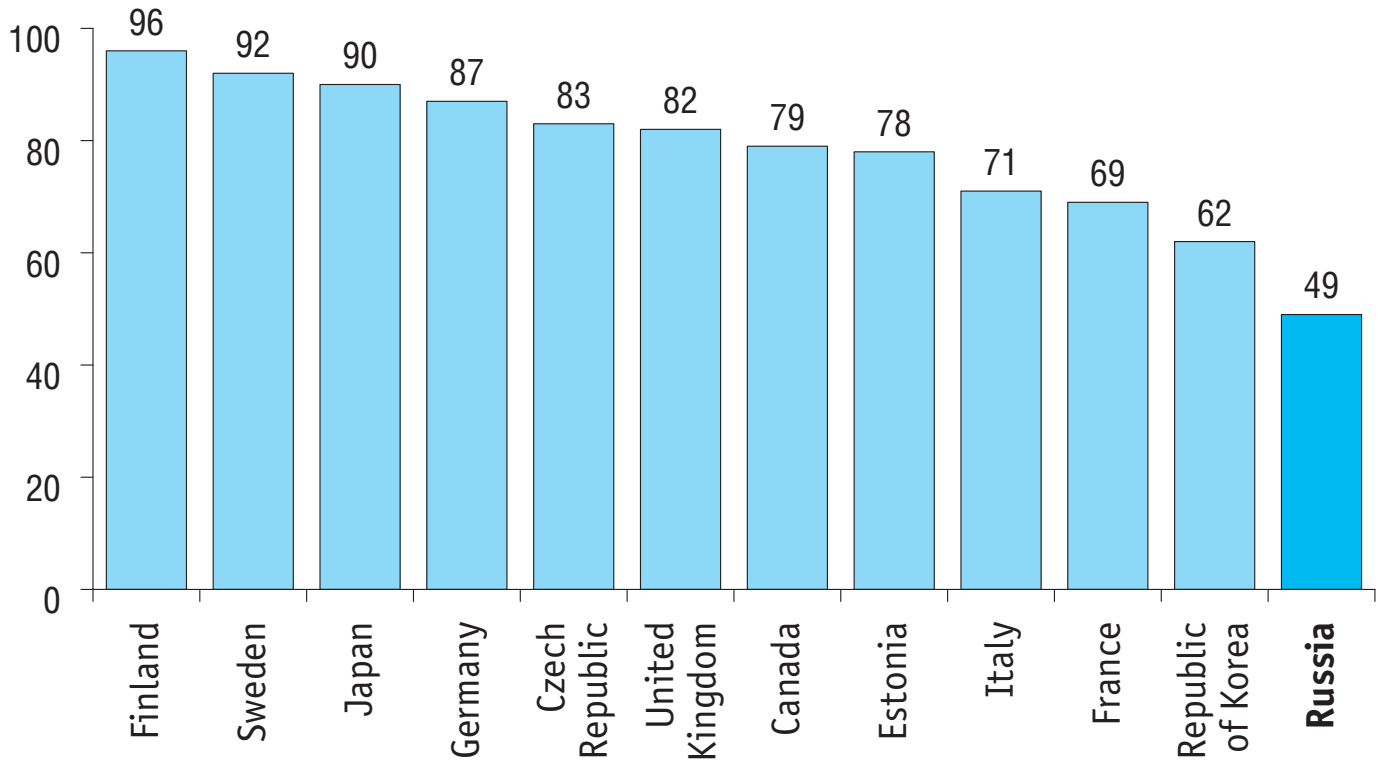
4.6. Provision of portable devices to personnel by business enterprise sector units for mobile Internet connection by country: 2018*



* Or nearest years for which data is available.

4.7. Enterprises with a website by country: 2018*

(as a percentage of all business enterprise sector units)



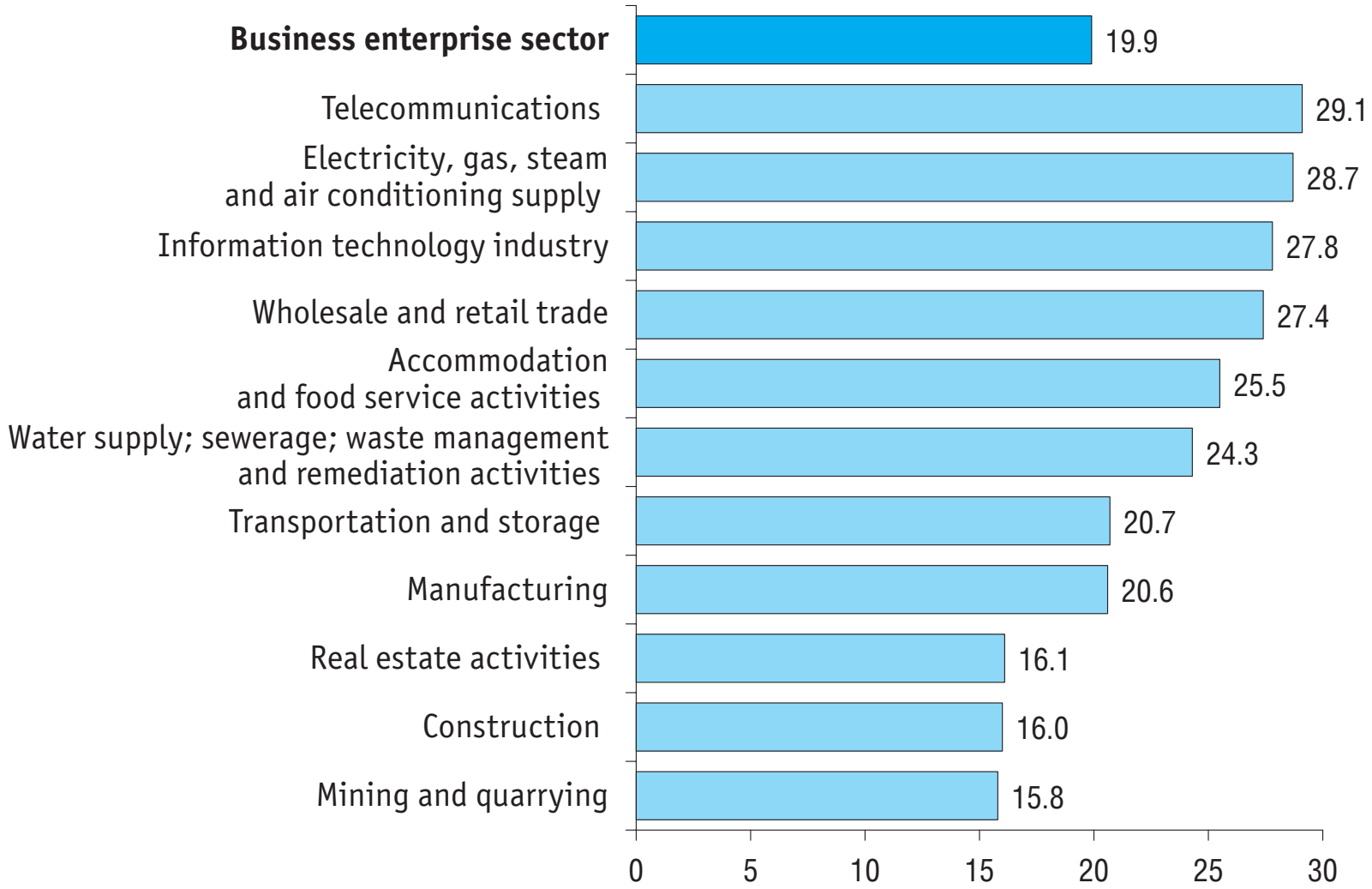
* Or nearest years for which data is available.

4.8. Enterprises' use of the Internet by purpose: 2018

(as a percentage of all business enterprise sector units)

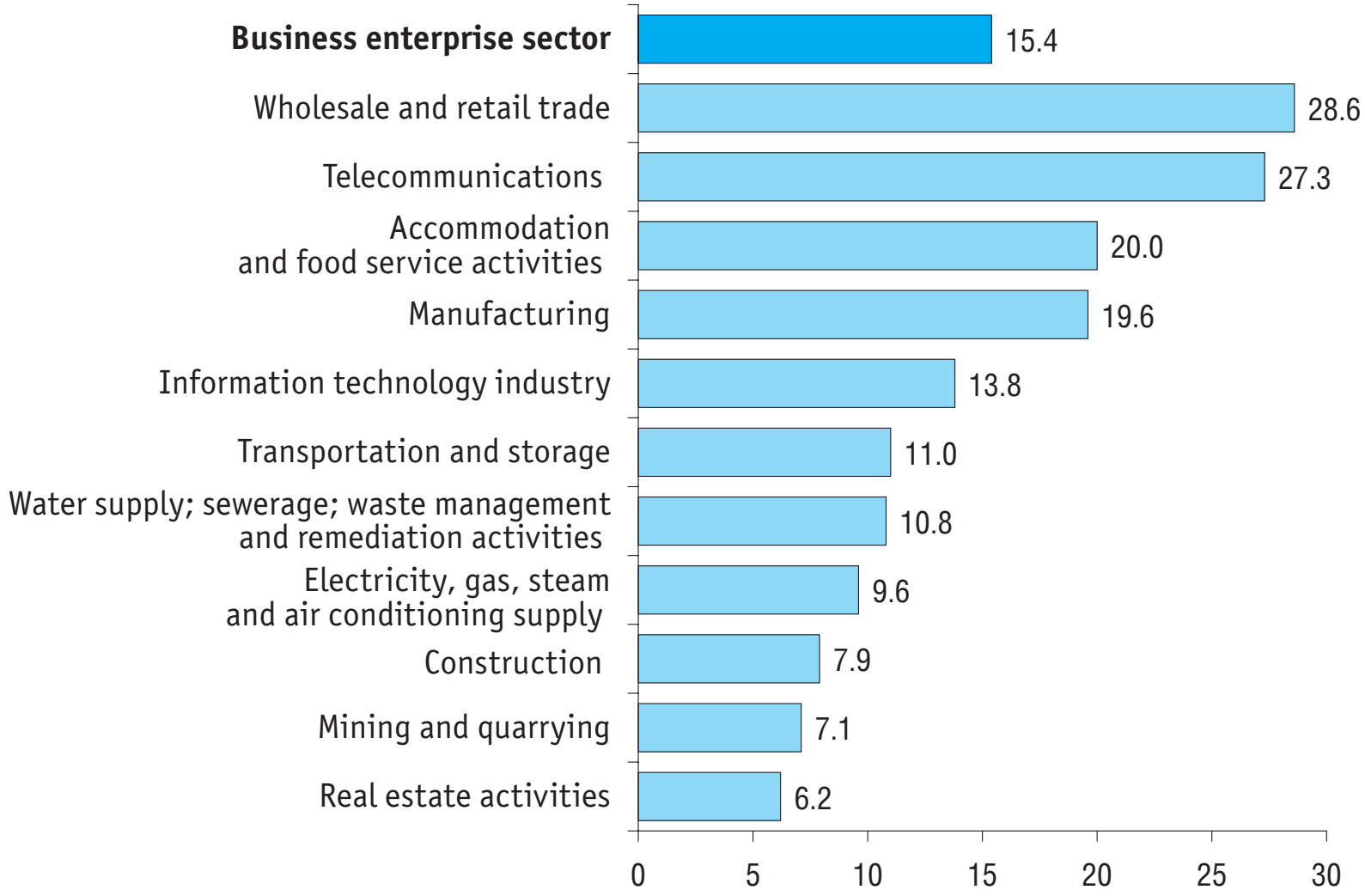
4.9. Enterprises' Internet activities related to purchasing goods or services: 2018

(as a percentage of all business enterprise sector units)



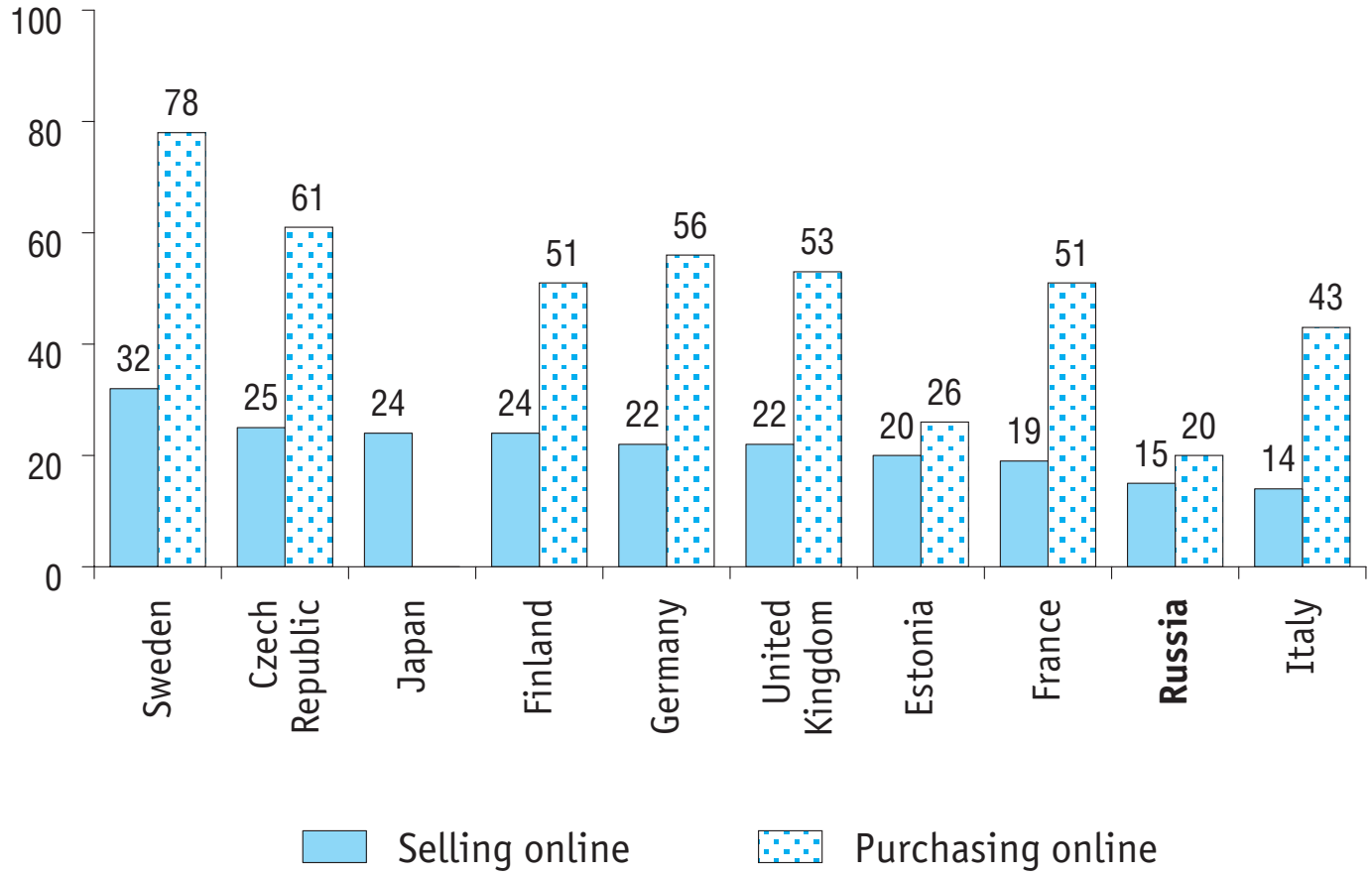
4.10. Enterprises' Internet activities related to selling goods or services: 2018

(as a percentage of all business enterprise sector units)



4.11. Enterprises' Internet activities related to purchasing and selling goods or services by country: 2018*

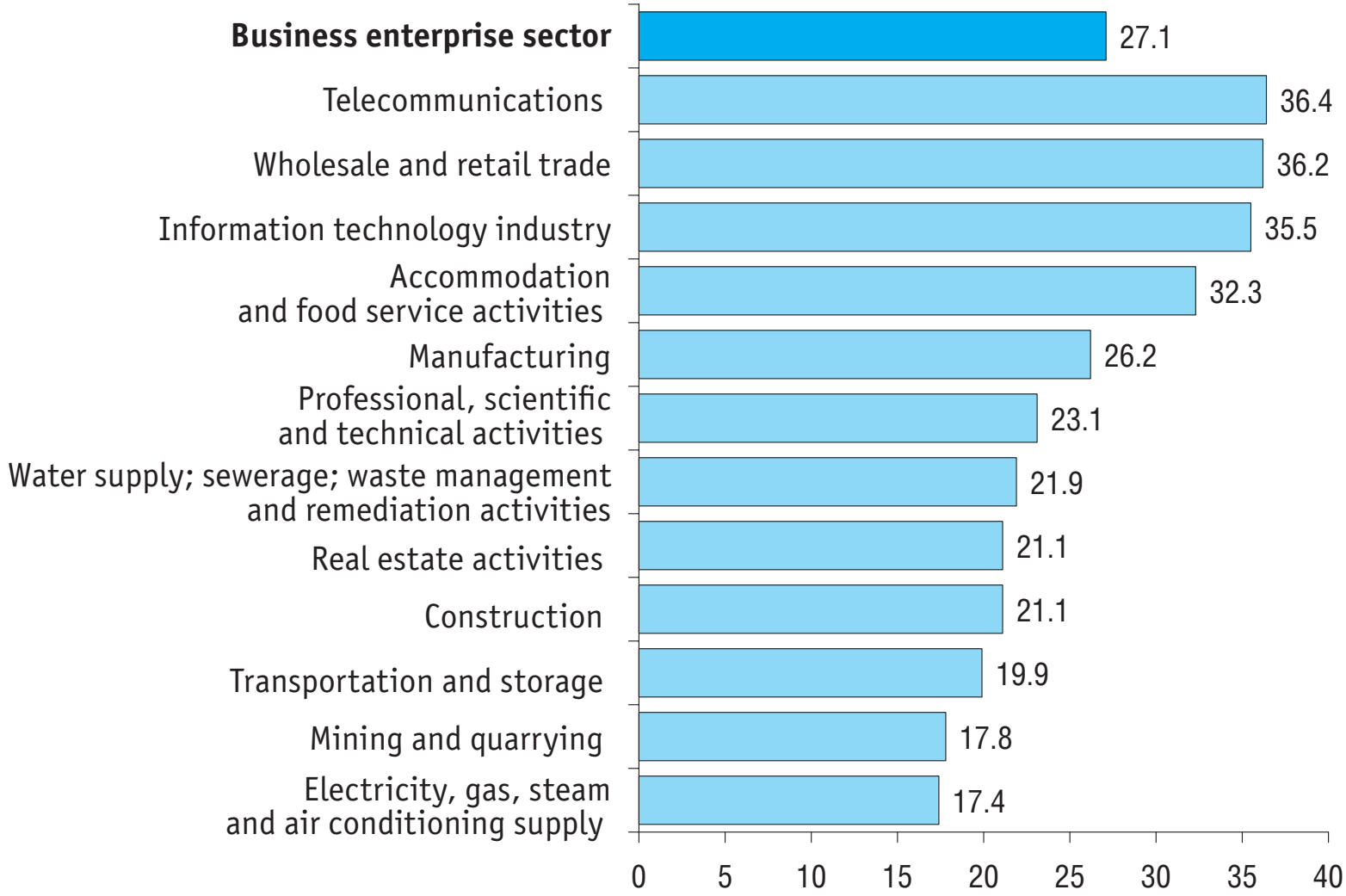
(as a percentage of all business enterprise sector units)



* Or nearest years for which data is available.

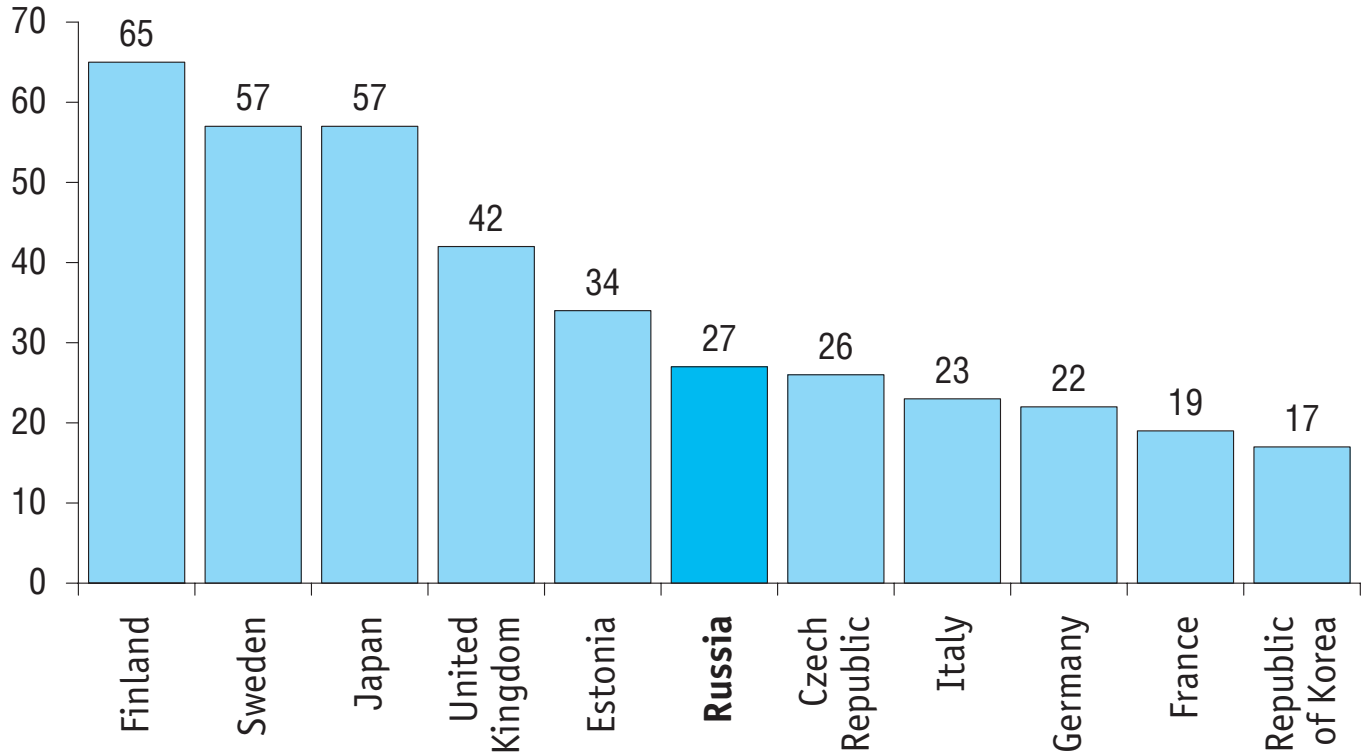
4.12. Enterprises' use of cloud computing services: 2018

(as a percentage of all business enterprise sector units)



4.13. Enterprises' use of cloud computing services by country: 2018*

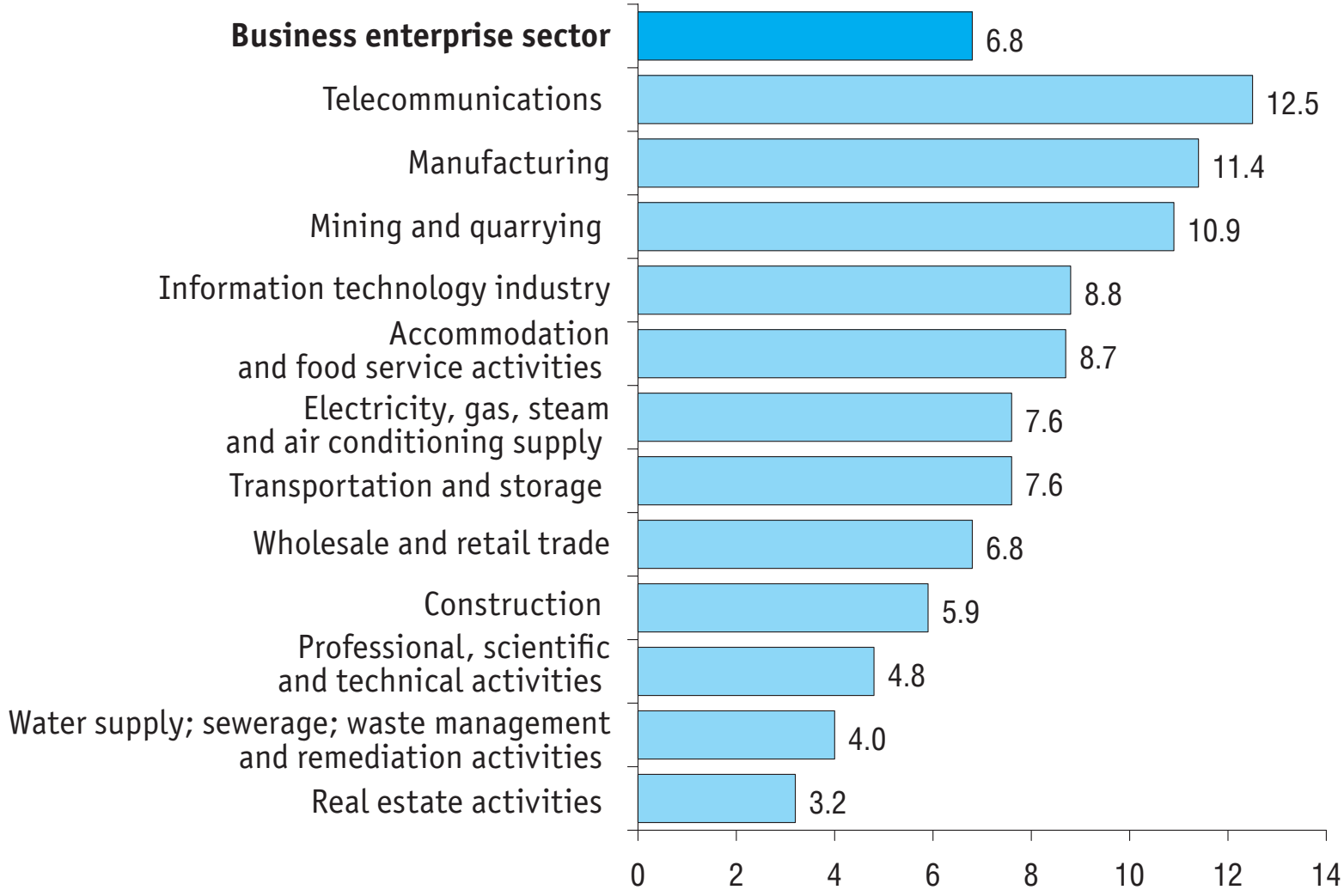
(as a percentage of all business enterprise sector units)



* Or nearest years for which data is available.

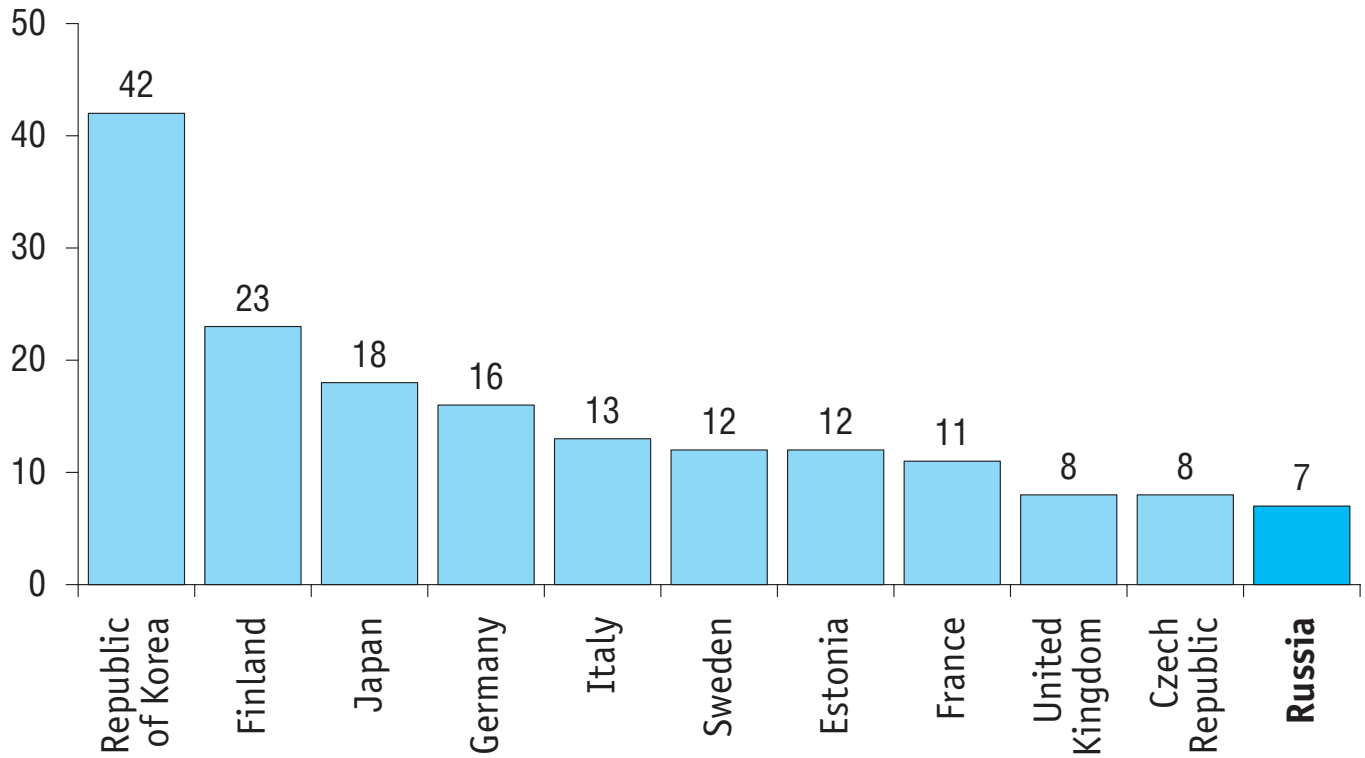
4.14. Enterprises' use of RFID technologies: 2018

(as a percentage of all business enterprise sector units)



4.15. Enterprises' use of RFID technologies by country: 2018*

(as a percentage of all business enterprise sector units)



* Or nearest years for which data is available.

4.16. Enterprises' use of specialised software to carry out business activities: 2018

(as a percentage of all business enterprise sector units)

	Electronic payment transactions	Computer-aided management systems	Access databases through global information networks
Business enterprise sector	**57.7**	**57.3**	**31.1**
Mining and quarrying	53.1	55.3	22.5
Manufacturing	66.6	64.0	27.7
Electricity, gas, steam and air conditioning supply	60.6	61.8	30.4
Water supply; sewerage; waste management and remediation activities	53.3	45.9	26.4
Construction	53.7	49.9	22.4
Wholesale and retail trade	61.4	63.5	41.6
Transportation and storage	54.0	60.7	25.9
Accommodation and food service activities	55.6	50.0	31.8
Telecommunications	57.7	64.6	38.6
Information technology industry	51.0	59.6	35.0
Real estate activities	51.8	46.0	22.2
Professional, scientific and technical activities	54.3	50.2	23.4

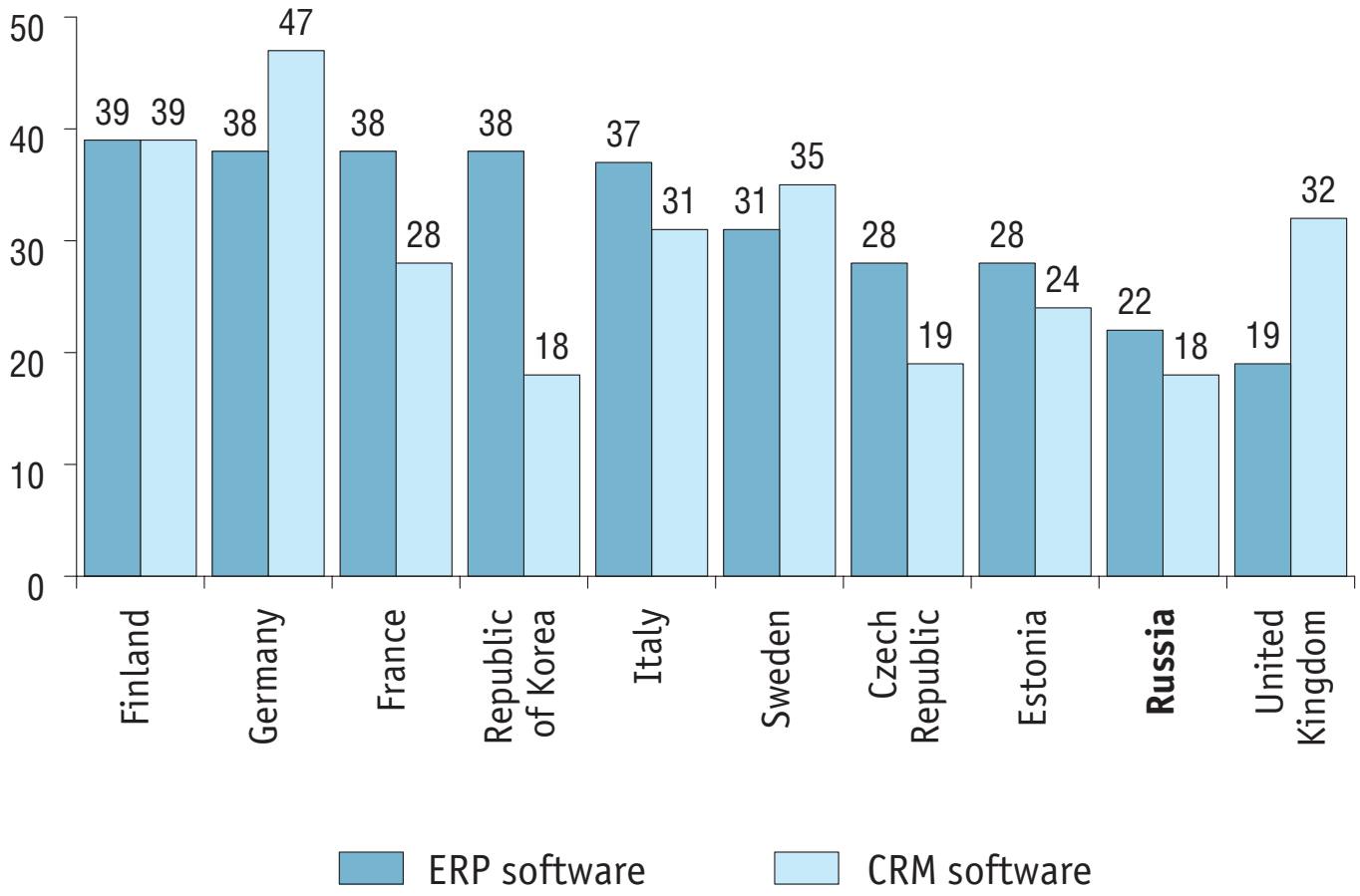
4.17. Enterprises' use of ERP, CRM, SCM software: 2018

(as a percentage of all business enterprise sector units)

	ERP software	CRM software	SCM software
Business enterprise sector	**21.6**	**17.6**	**10.1**
Mining and quarrying	23.0	10.4	7.3
Manufacturing	27.6	17.3	6.7
Electricity, gas, steam and air conditioning supply	19.8	13.4	4.9
Water supply; sewerage; waste management and remediation activities	6.7	5.1	3.4
Construction	10.1	6.4	3.1
Wholesale and retail trade	34.5	32.4	22.7
Transportation and storage	18.5	10.3	6.1
Accommodation and food service activities	17.4	12.3	8.2
Telecommunications	41.4	40.7	11.9
Information technology industry	23.5	19.9	6.0
Real estate activities	7.1	5.4	1.8
Professional, scientific and technical activities	12.1	8.8	3.3

4.18. Enterprises' use of ERP and CRM software by country: 2018*

(as a percentage of all business enterprise sector units)



* Or nearest years for which data is available.

4.19. Enterprises' use of information security tools: 2018

(as a percentage of all business enterprise sector units)

	Automatically updated anti-virus software	Electronic digital signatures	Firewalls (software or hardware)
Business enterprise sector	**79.2**	**74.6**	**60.9**
Mining and quarrying	79.5	66.8	65.4
Manufacturing	82.8	82.5	67.1
Electricity, gas, steam and air conditioning supply	84.0	77.6	67.4
Water supply; sewerage; waste management and remediation activities	67.5	76.5	35.9
Construction	70.2	69.2	49.4
Wholesale and retail trade	84.0	71.1	71.5
Transportation and storage	81.8	75.1	63.4
Accommodation and food service activities	70.2	71.5	49.0
Telecommunications	88.7	71.7	75.4
Information technology industry	87.9	80.9	75.1
Real estate activities	65.5	74.5	41.1
Professional, scientific and technical activities	75.4	77.0	53.0

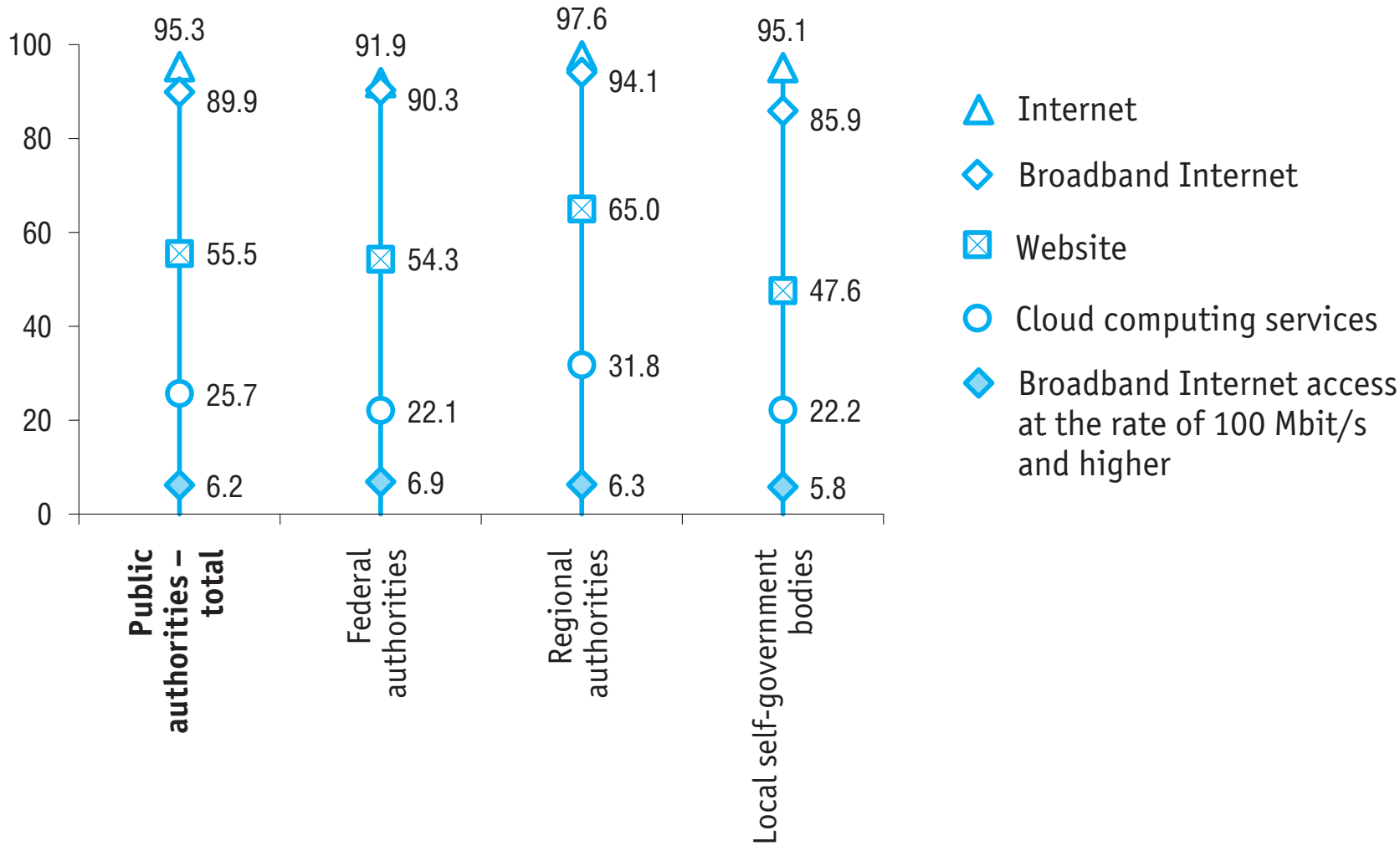
(continued)

	Spam-filters	Data encryption for confidentiality facilities	Intrusion detection system	Automated IT security control and analysis software
Business enterprise sector	**55.9**	**47.1**	**42.6**	**34.5**
Mining and quarrying	60.1	44.7	42.9	34.0
Manufacturing	59.3	50.3	44.8	32.8
Electricity, gas, steam and air conditioning supply	57.5	52.2	41.3	32.8
Water supply; sewerage; waste management and remediation activities	30.1	29.5	22.2	21.5
Construction	43.5	36.2	35.0	27.8
Wholesale and retail trade	70.3	55.8	53.0	43.7
Transportation and storage	54.1	47.6	44.6	35.3
Accommodation and food service activities	44.8	34.8	34.2	29.0
Telecommunications	69.1	60.9	58.0	56.6
Information technology industry	68.1	66.3	57.1	45.8
Real estate activities	37.0	33.3	27.3	22.9
Professional, scientific and technical activities	48.3	41.7	35.4	27.6

E-Government

5.1. Public authorities' use of ICT: 2018

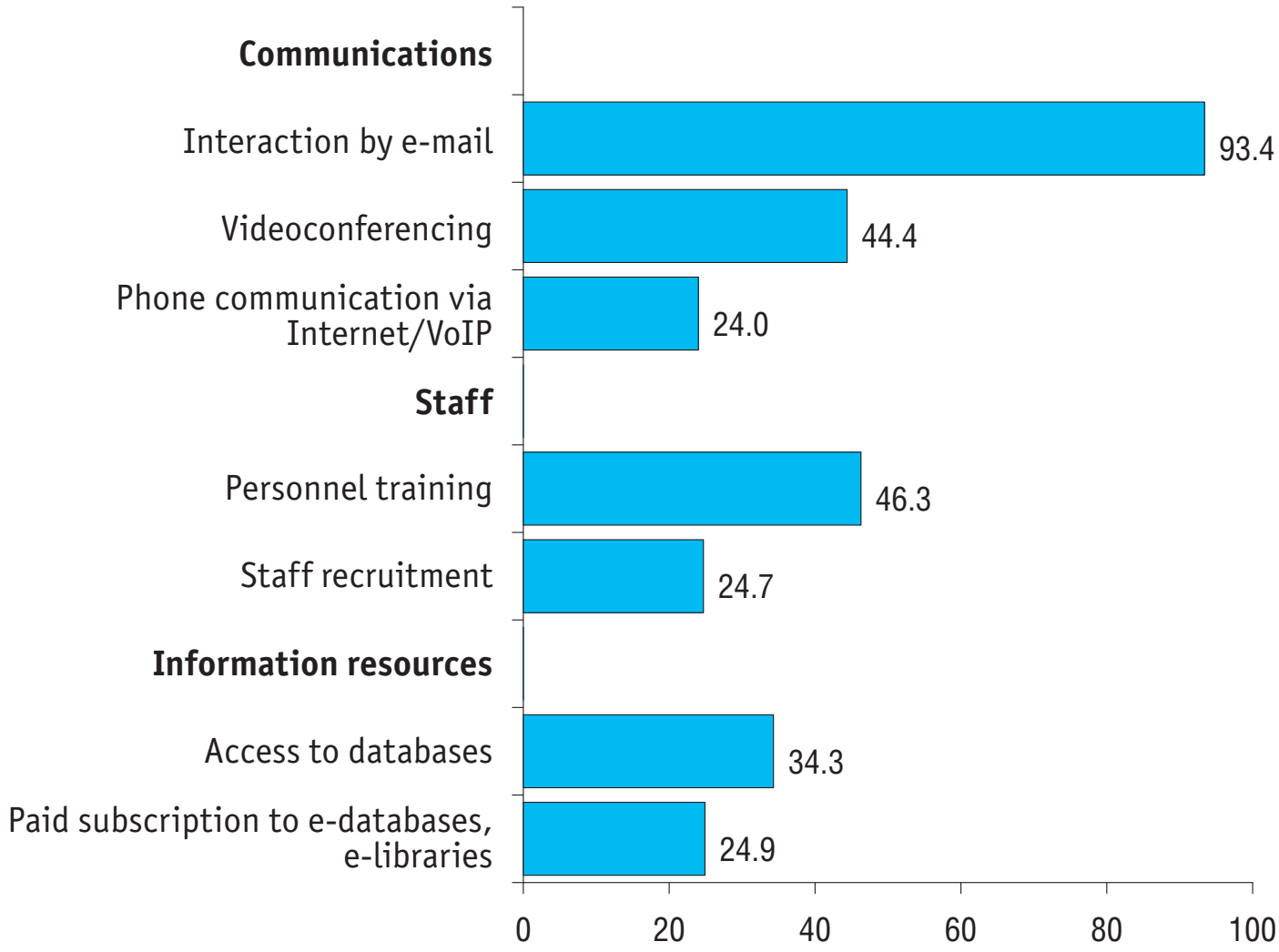
(as a percentage of all public authorities and local self-governmet bodies)



Sources (here and below in the section): Russia – estimated by HSE Institute for Statistical Studies and Economics of Knowledge on the basis of Rosstat data; EU countries – Eurostat; countries other than Russia – OECD.

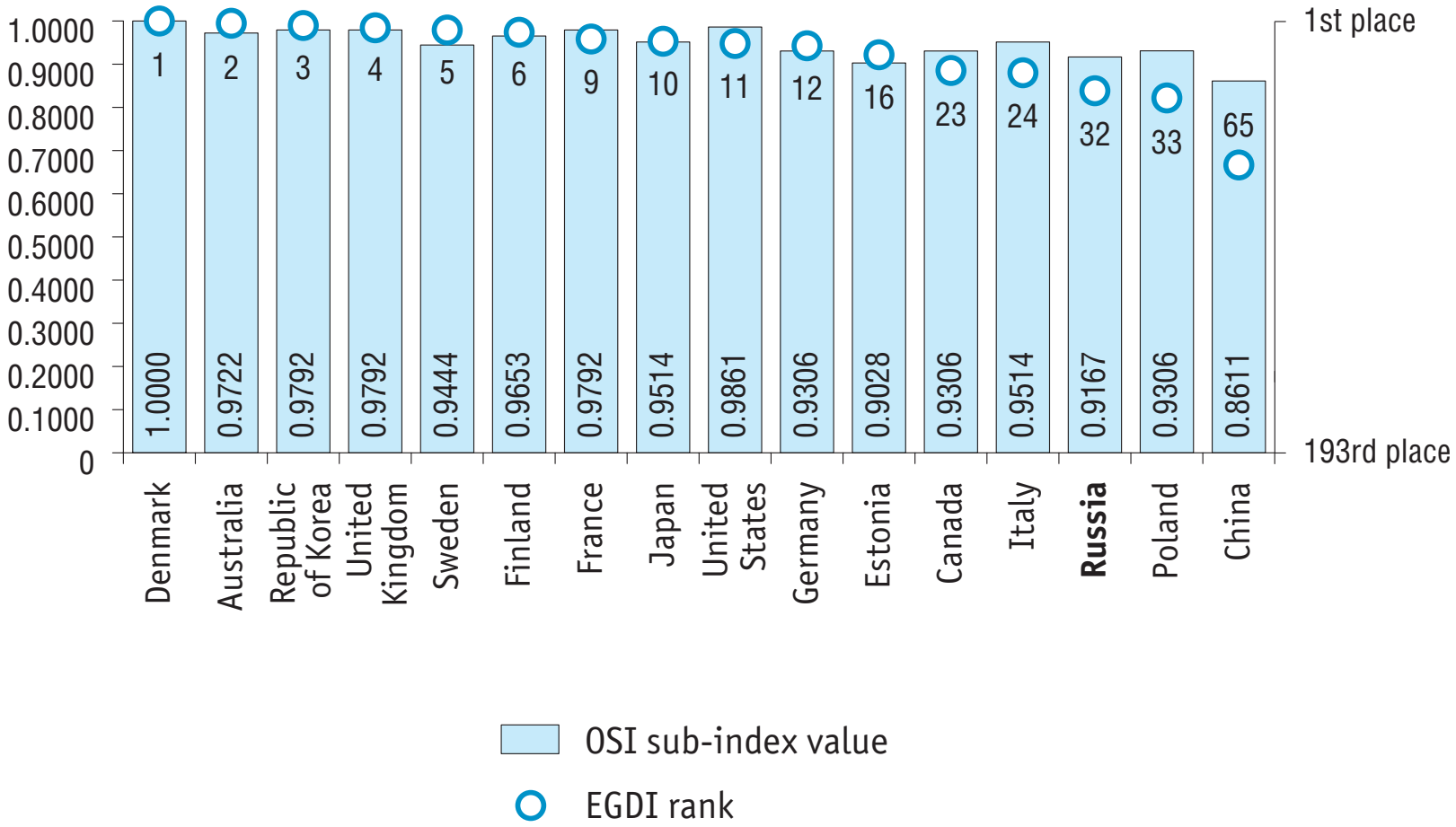
5.2. Public authorities' use of the Internet by purpose: 2018

(as a percentage of all public authorities and local self-governmet bodies)



5.3. Online Service Index (OSI) by country: 2018*

(sub-index of the E-Government Development Index, EGDI)



* Online Service Index values were calculated for all 193 Member States of the United Nations.

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

5.4. Individuals' online interaction with public authorities: 2018

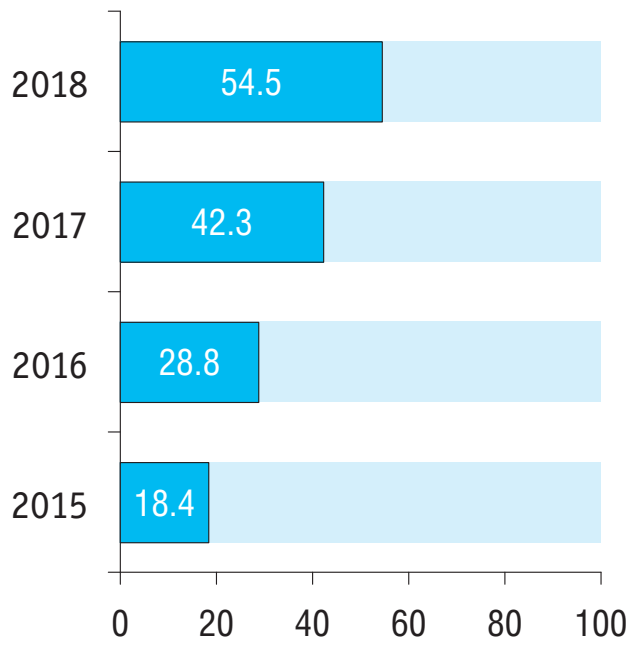
(as a percentage of all individuals aged 15–72)*

	Total	Of which		
		Obtaining information from websites or apps	Downloading official forms	Submitting completed forms online
Russia	**42**	**39**	**16**	**17**
Czech Republic	53	50	26	26
Estonia	79	69	48	71
Finland	83	78	67	65
France	71	46	37	59
Germany	57	56	35	19
Italy	24	20	17	15
Sweden	83	75	49	74
United Kingdom	59	47	36	45

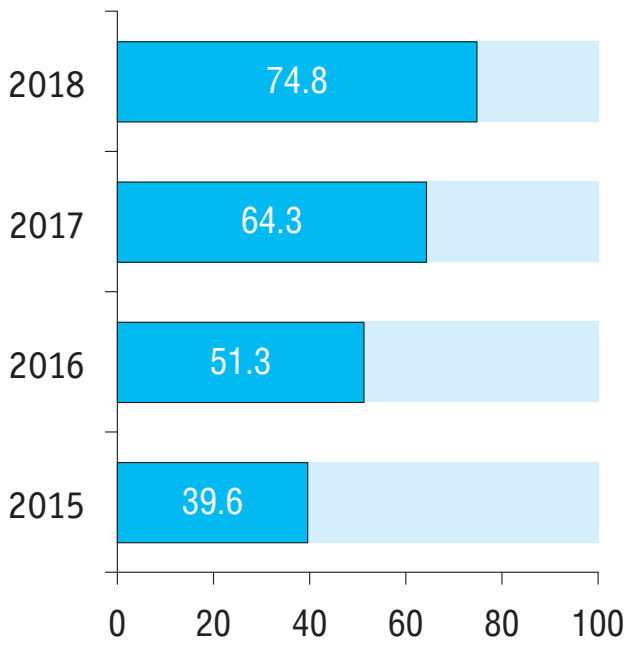
* Countries other than Russia – aged 16–74.

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

As a percentage of all individuals aged 15–72

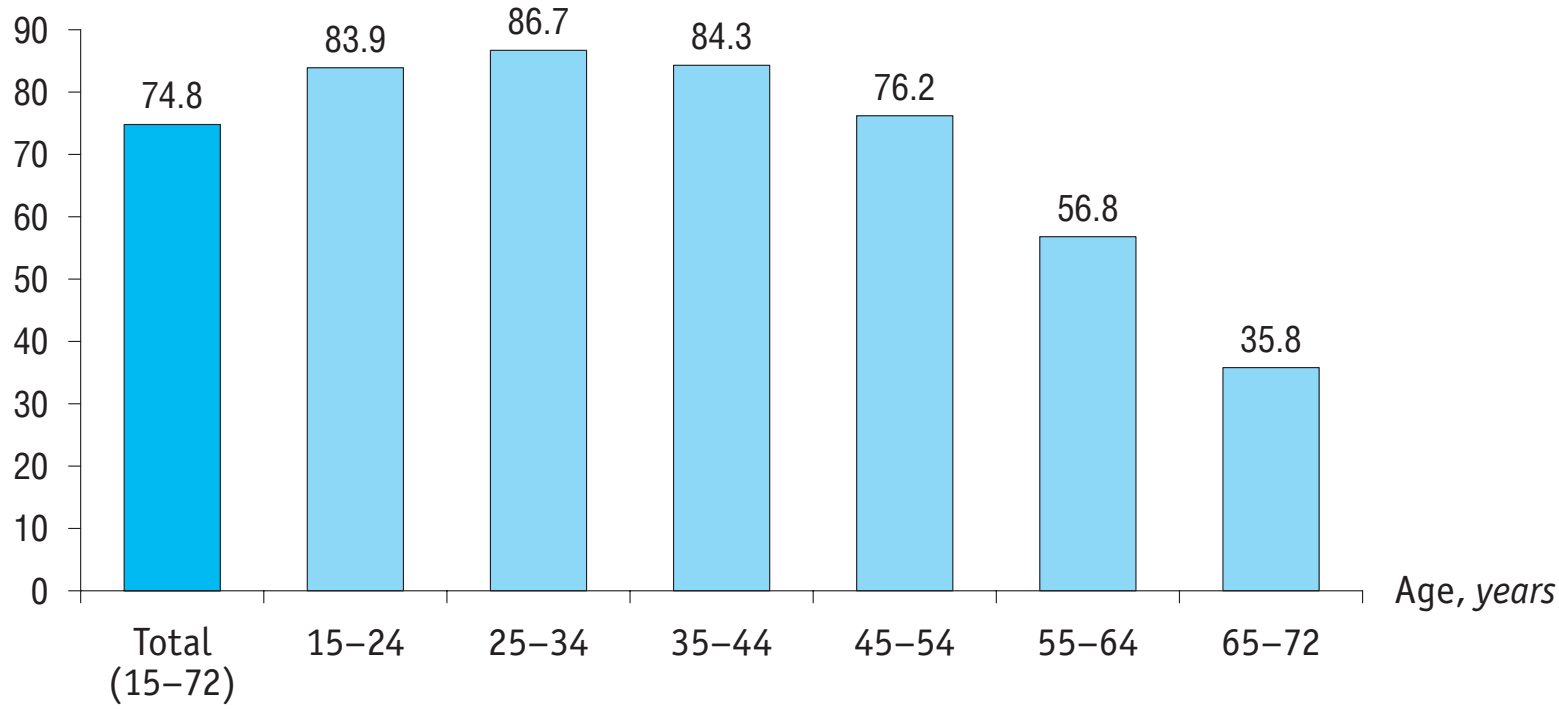


As a percentage of all individuals aged 15–72 who have received public and municipal services over the last 12 months



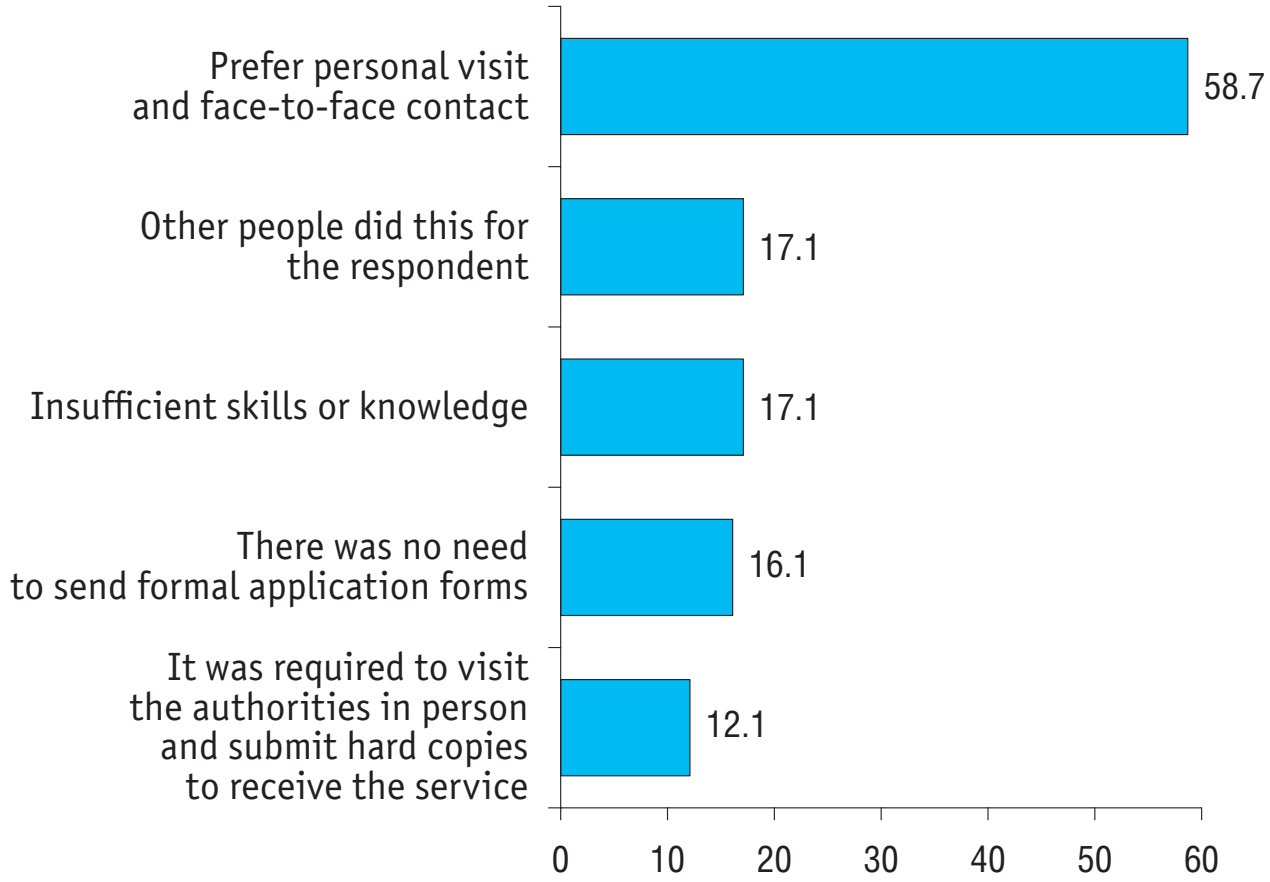
5.6. Public and municipal services received by individuals in digital form by age group: 2018

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



5.7. Reasons why individuals refrain from receiving public and municipal services in digital form: 2018

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



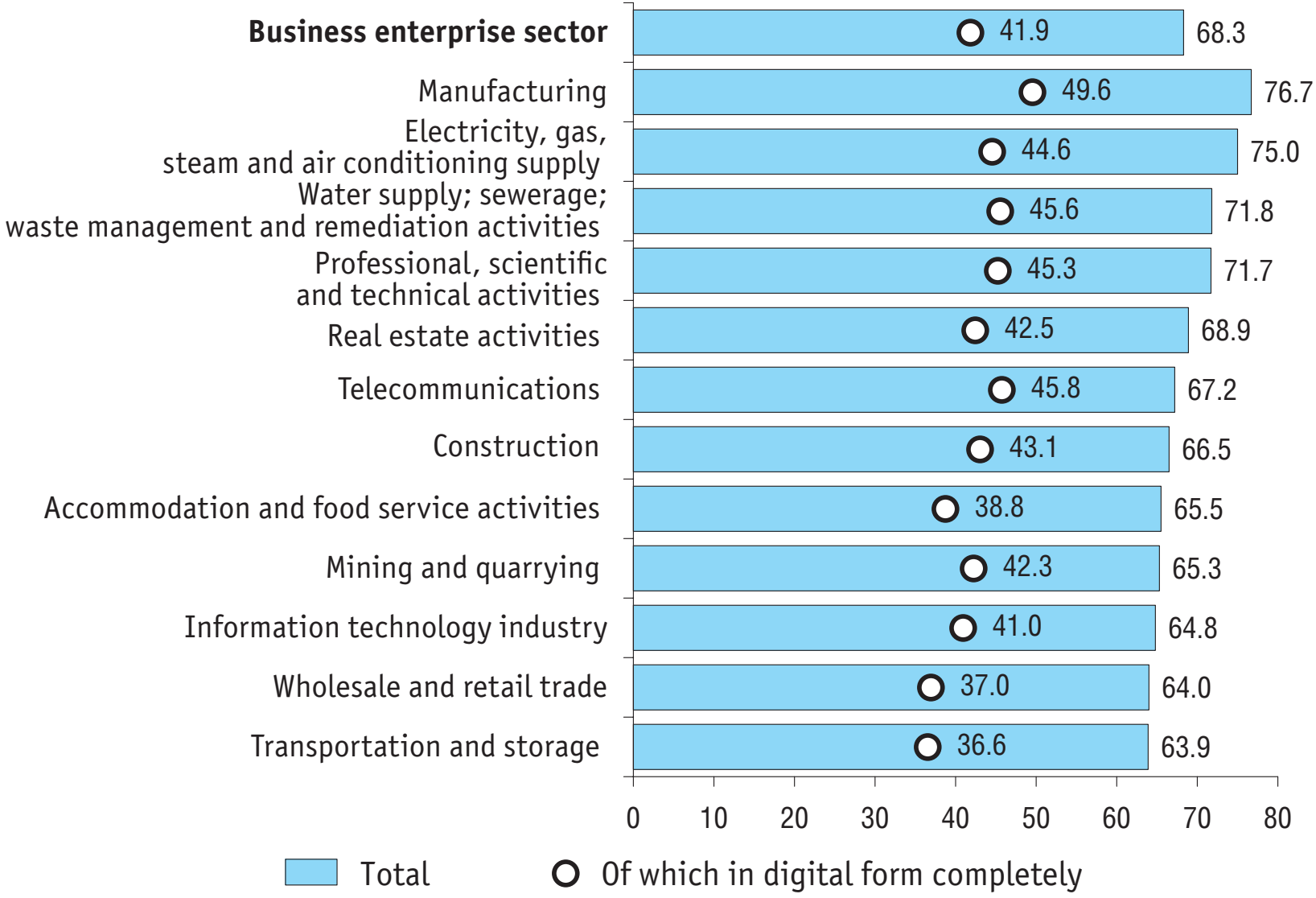
5.8. Enterprises' online interaction with public authorities by country: 2018

(as a percentage of all business enterprise sector units)

	Submitting completed forms online	Downloading/ printing official forms	Obtaining information from websites or apps	E-procurement
Business enterprise sector	**69.4**	**68.9**	**60.2**	**26.0**
Mining and quarrying	67.2	66.0	57.7	13.1
Manufacturing	80.6	79.3	66.5	24.7
Electricity, gas, steam and air conditioning supply	71.1	72.0	67.8	35.5
Water supply; sewerage; waste management and remediation activities	74.3	74.1	61.5	44.6
Construction	67.1	66.7	54.8	28.1
Wholesale and retail trade	64.6	63.8	57.5	14.5
Transportation and storage	64.5	65.4	55.7	24.1
Accommodation and food service activities	66.8	65.7	56.3	32.8
Telecommunications	68.9	69.3	63.0	40.3
Information technology industry	70.1	71.2	65.4	26.4
Real estate activities	69.3	68.5	58.3	28.4
Professional, scientific and technical activities	73.5	73.2	62.8	34.3

5.9. Public and municipal services received by enterprises in digital form: 2018

(as a percentage of all business enterprise sector units)



Personnel

6.1. Employed in ICT task-intensive occupations: 2018

	Thousand headcount	As a percentage of the total
Total	**8045.4**	**100.0**
Including:		
ICT professionals – total	1779.0	22.1
Senior managers, ICT units heads	66.1	0.8
Electrotechnical engineers	464.0	5.8
Software and multimedia developers and analysts	654.6	8.1
Database specialists and network analysts	249.7	3.1
ICT operations and user support technicians	126.7	1.6
Communications technicians and radiobroadcasting specialists	68.6	0.9
Installation personnel and maintenance technicians for electronic and telecommunication equipment	149.3	1.9

(continued)

	Thousand headcount	As a percentage of the total
Other professions – total	6266.4	77.9
Financial and business managers, senior administrators	745.5	9.3
Heads of sales, marketing, development units	254.5	3.2
Heads of units in social services sector	352.7	4.4
Physicists, chemists and similar professionals	96.9	1.2
Architects, project developers, topographical surveyors, designers	393.5	4.9
Professors and lecturers in universities and other higher education institutions	271.6	3.4
Finansists	2474.7	30.8
Administrators	1145.6	14.2
Sales managers, marketing experts, PR managers	531.3	6.6

Sources (here and below in the section): Russia – estimated by HSE Institute for Statistical Studies and Economics of Knowledge on the basis of Rosstat data; EU countries – Eurostat; countries other than Russia – OECD.

6.2. Employed in ICT task-intensive occupations by types of economic activity: 2018

(as a percentage of total employment)

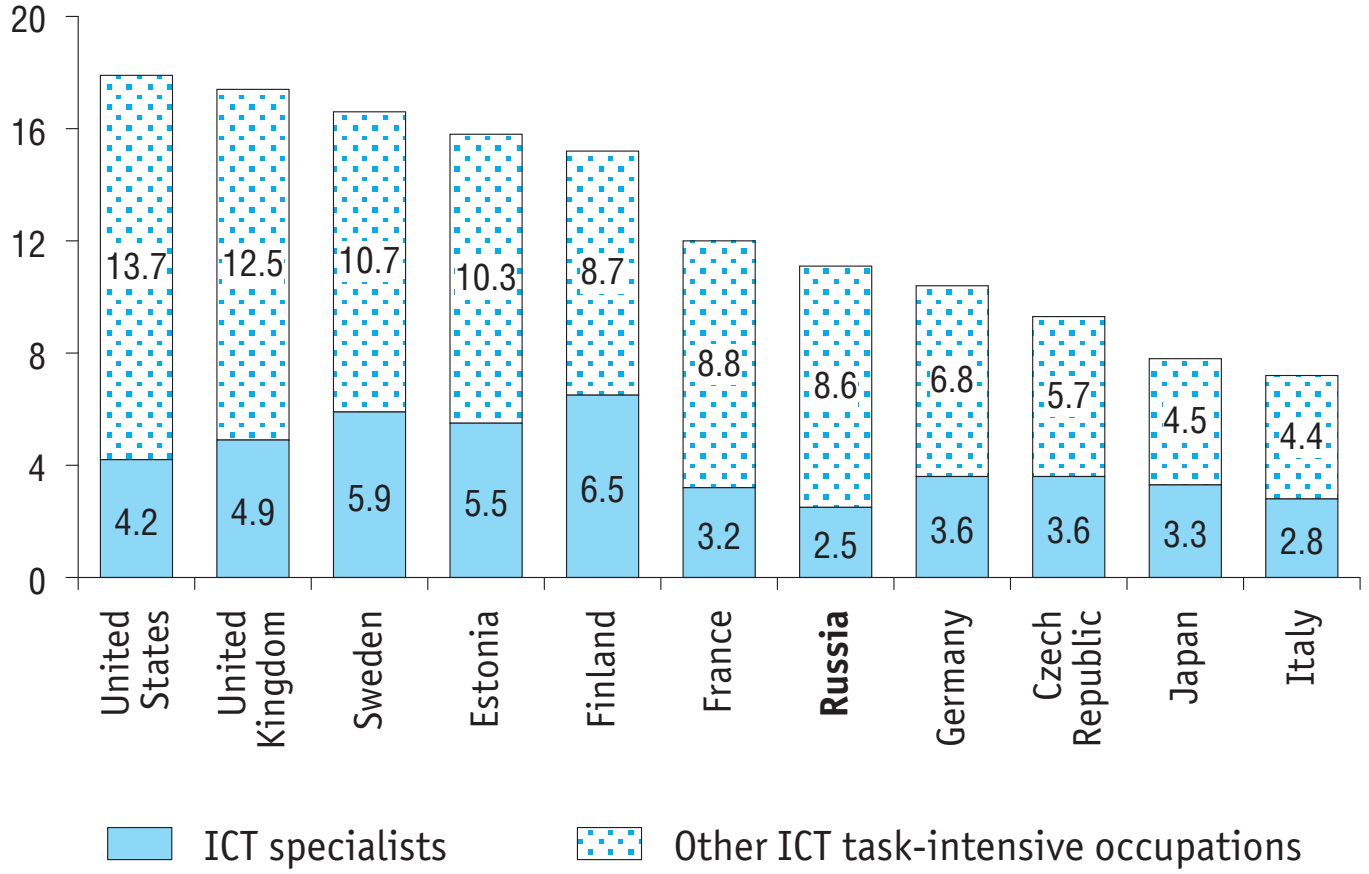
	ICT specialists	Other professions
Total	**2.5**	**8.6**
Agriculture, forestry and fishing	0.3	2.3
Mining and quarrying	1.8	4.0
Manufacturing	2.6	4.9
Electricity, gas, steam and air conditioning supply	7.4	4.4
Water supply; sewerage; waste management and remediation activities	1.7	5.4
Construction	1.0	5.7
Wholesale and retail trade	0.8	8.9
Transportation and storage	1.7	3.5
Accommodation and food service activities	0.4	4.7
Information and communication	40.4	10.3

(continued)

	ICT specialists	Other professions
Financial and insurance activities	5.3	36.9
Real estate activities	1.6	9.7
Professional, scientific and technical activities	5.1	30.5
Public administration and defence; compulsory social security	1.9	21.5
Education	0.6	8.9
Human health and social work activities	0.8	4.8
Arts, entertainment and recreation	1.6	4.8

6.3. Employed in ICT task-intensive occupations by country: 2018*

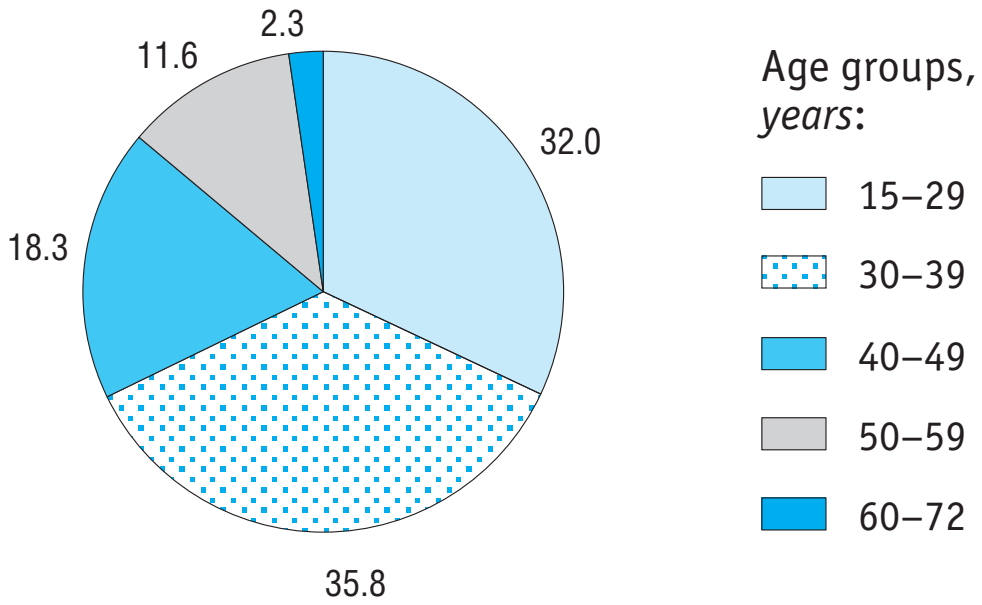
(as a percentage of total employment)



* Or nearest years for which data is available.

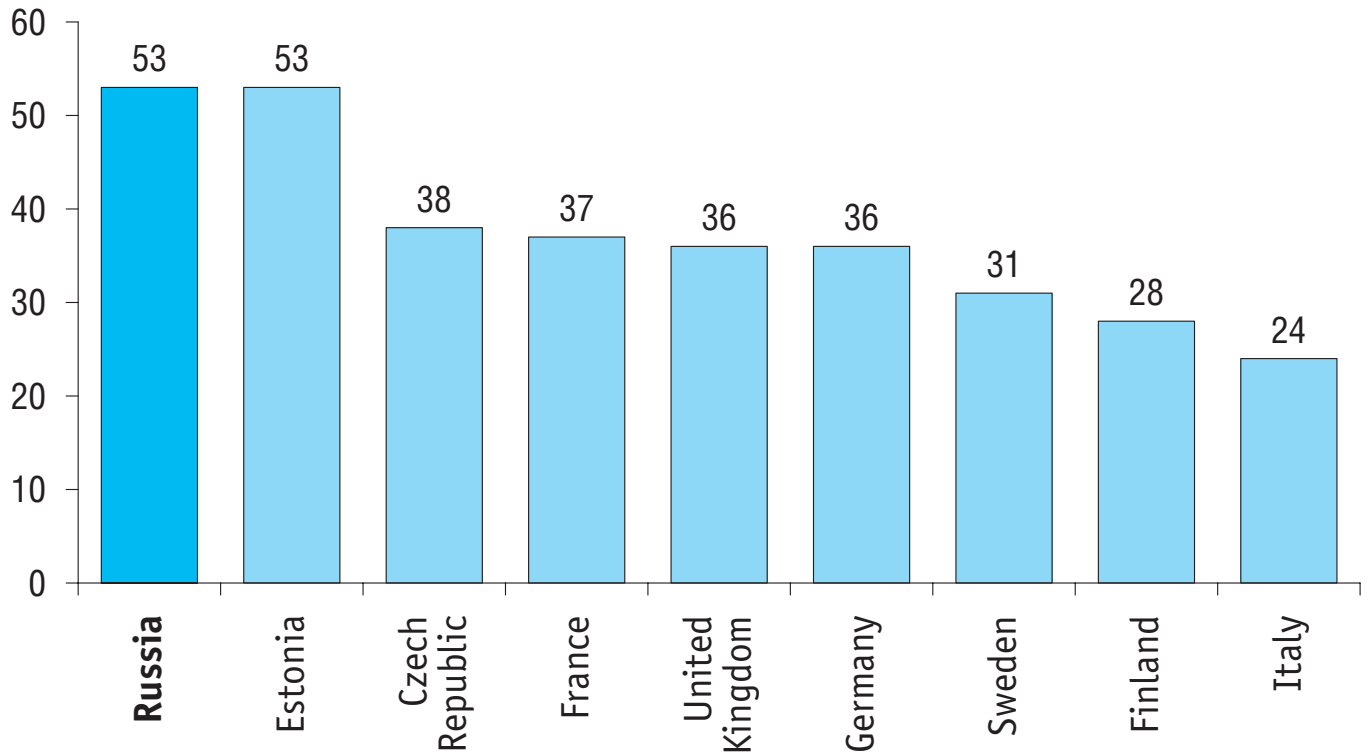
6.4. ICT specialists by age: 2018

(as a percentage of total ICT specialists)



6.5. ICT specialists under 35 by country: 2018*

(as a percentage of total ICT specialists)



* Or nearest years for which data is available.

6.6. Secondary vocational education in the field of digital technologies and production of related goods and services

(thousand headcount)

Key general groups of professions and qualifications	Programmes for skilled workers, junior technicians and employees		Programmes for mid-career professionals	
	Enrolment, at the start of the 2018/2019 academic year	Graduates, 2018	Enrolment, at the start of the 2018/2019 academic year	Graduates, 2018
Computer engineering	18.4	6.8	169.5	29.5
Information security	–	–	12.7	1.7
Electronics and communications engineering	5.8	1.7	35.3	6.8
Photonics, instrumentation engineering, optical and biomedical engineering	–	–	2.5	0.5
Mechanical engineering	4.1	1.4	20.0	3.9
Applied geology, mining and quarrying, oil and gas engineering, geodesy	–	–	3.4	0.7
Systems engineering management	–	–	15.7	2.9
Screen arts	–	–	2.1	0.4

6.7. Higher education in the field of digital technologies and production of related goods and services: bachelor, specialist and master programmes

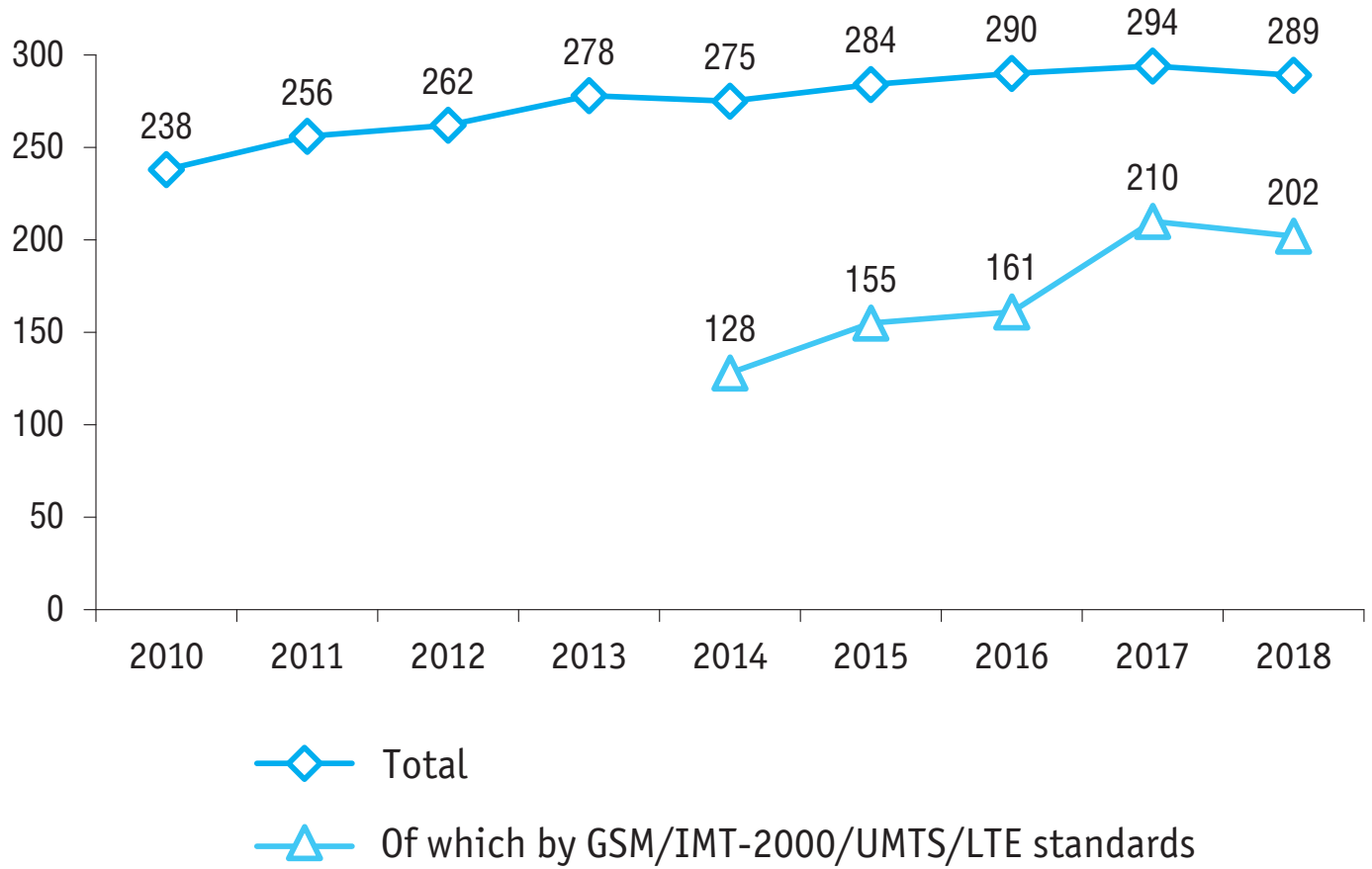
(thousand headcount)

Key general groups of professions and qualifications	Enrolment, at the start of the 2018/2019 academic year	Graduates, in 2018
Engineering mathematics	31.0	6.2
Computer and information sciences	17.5	3.2
Computer engineering	163.3	31.1
Information security	29.3	4.3
Electronics and communications engineering	62.1	12.1
Photonics, instrumentation engineering, optical and biomedical engineering	19.7	4.4
Mechanical engineering	33.7	5.9
Nanotechnologies and nanomaterials	4.0	0.7
Economics and management	19.0	5.2
Mass media and library and information science	2.9	0.2
Cultural studies and socio-cultural projects	3.9	0.8
Screen arts	5.9	0.9

Infrastructure

7.1. Mobile cellular telephone subscriptions

(million units; at year-end)



Sources (here and below in the section): Russia – the Ministry of Digital Development, Communications and Mass Media of the Russian Federation; countries other than Russia – ITU.

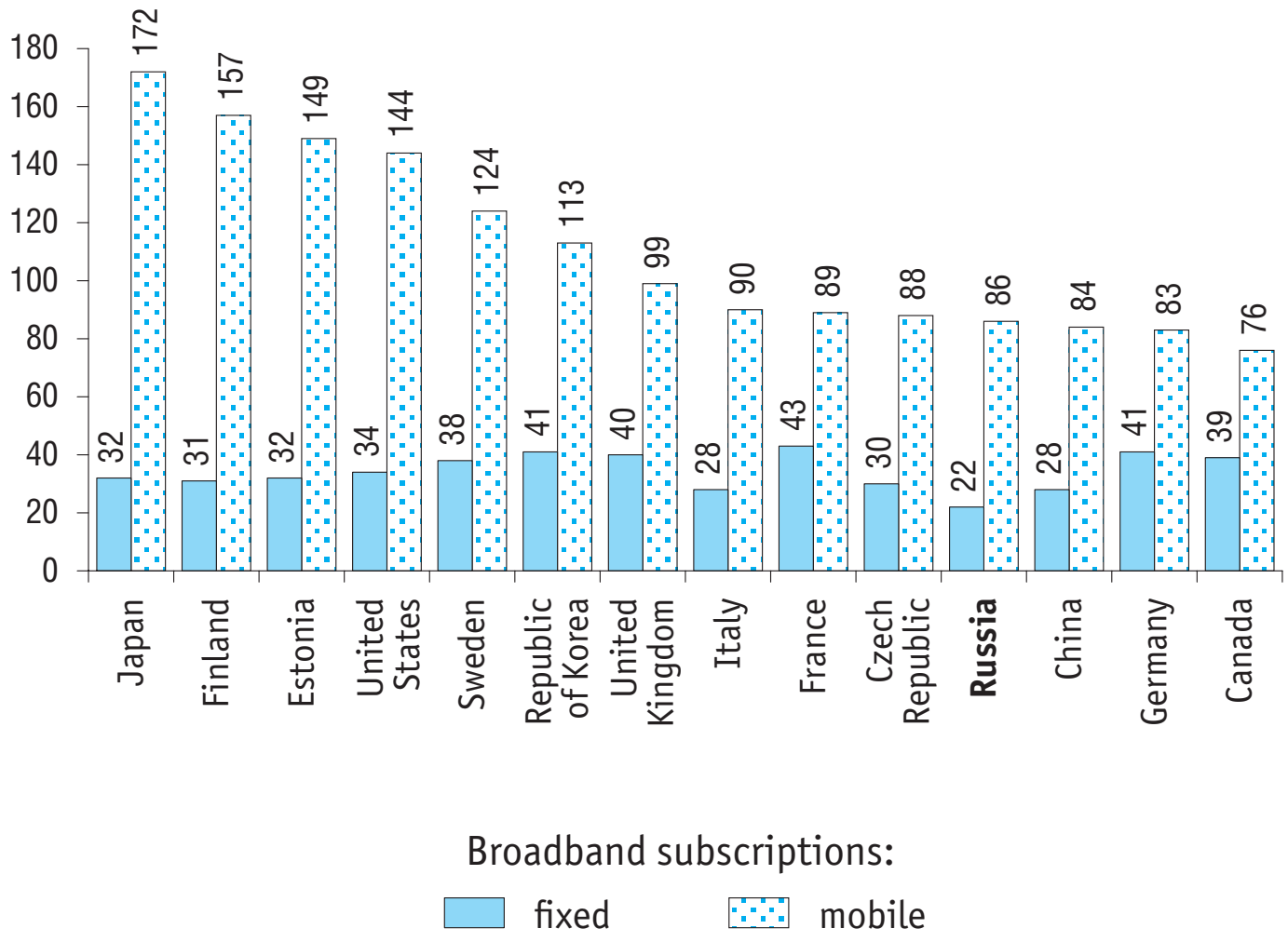
7.2. Internet subscriptions

(thousand units; at year-end)

	Total			Of which broadband		
	2016	2017	2018	2016	2017	2018
Internet subscriptions:						
fixed	27493	31084	31968	27293	30877	31789
mobile	115813	122828	131359	104391	117406	126557
satellite	49	67	66	30	46	44
terrestrial fixed wireless	203	186	233	199	180	230
terrestrial mobile wireless	2185	1809	697	1708	1741	643

7.3. Broadband subscriptions by country: 2018*

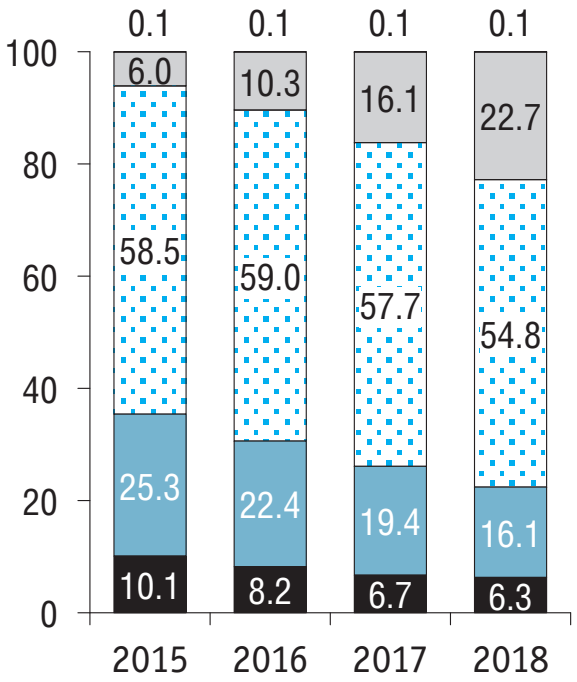
(per 100 inhabitants; at year-end)



* Or nearest years for which data is available.

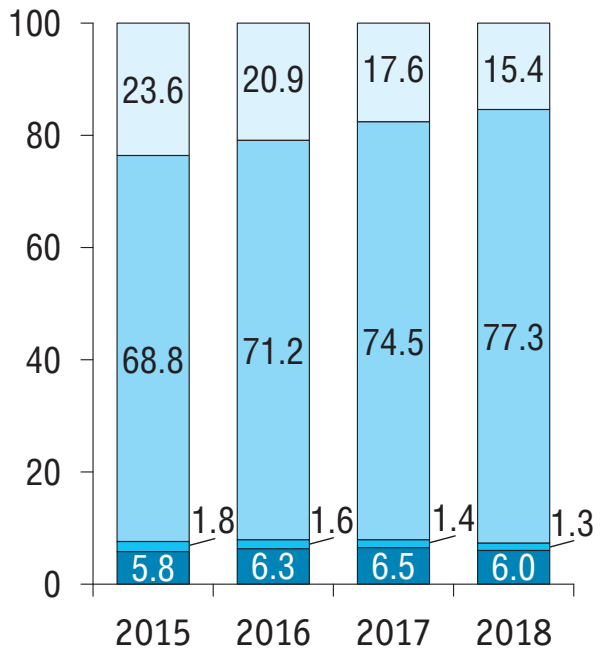
7.4. Fixed broadband subscriptions

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



By speed of access:

- over 1 Gbp/s
- 100 Mbp/s – less than 1 Gbp/s
- 10 Mbp/s – less than 100 Mbp/s
- 2 Mbp/s – less than 10 Mbp/s
- 256 Kbp/s – less than 2 Mbp/s

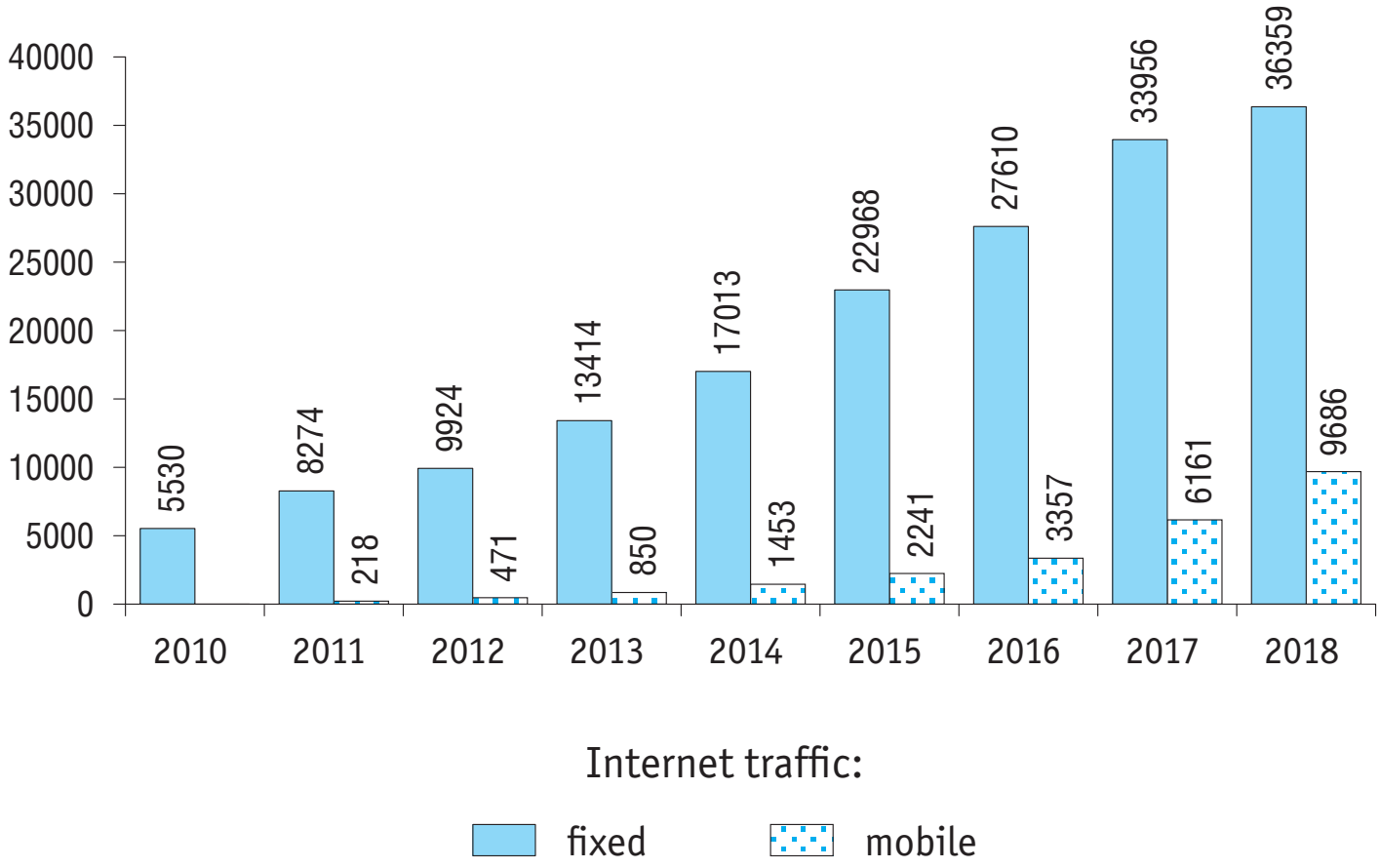


By types of connection:

- xDSL
- FTTH/ FTTB (FTTx)
- cable modem
- by other cable types of connection

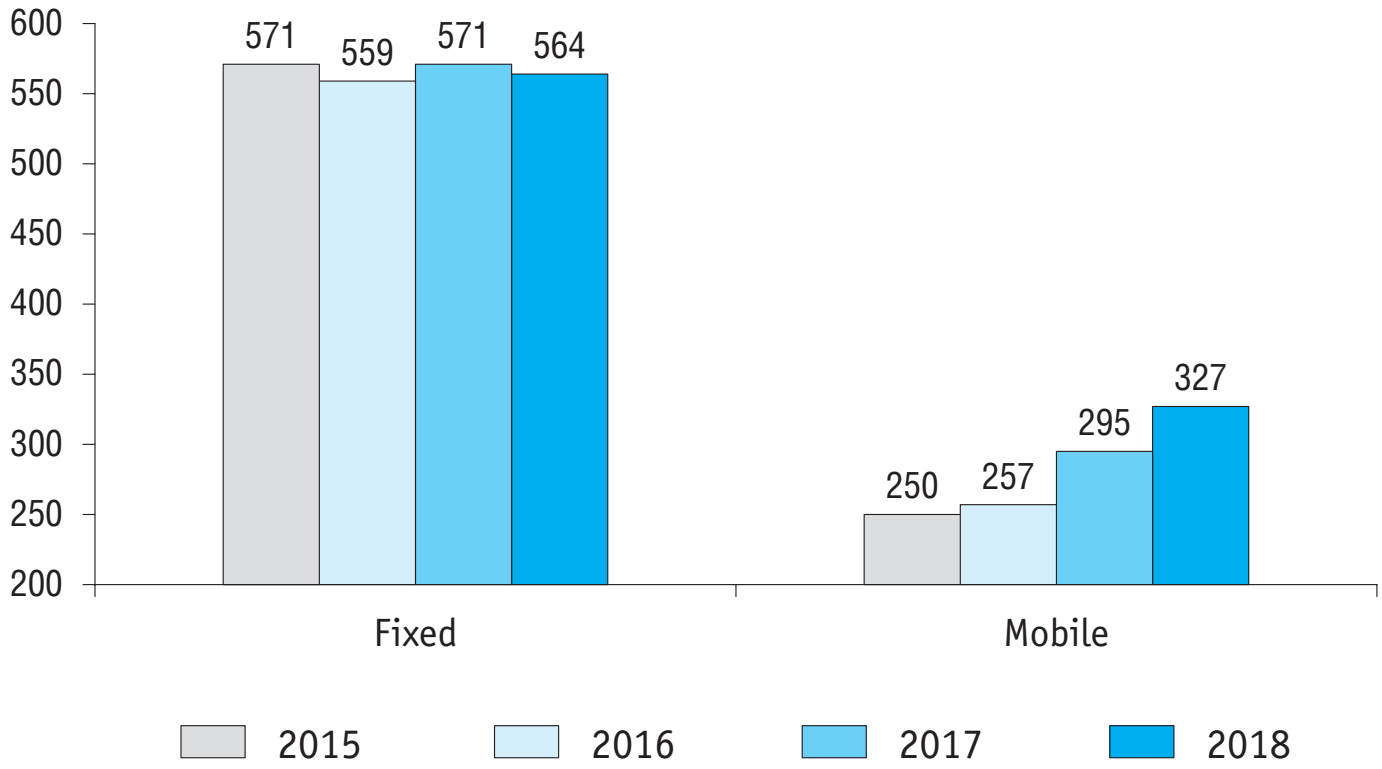
7.5. Internet traffic

(Pbyte/s)



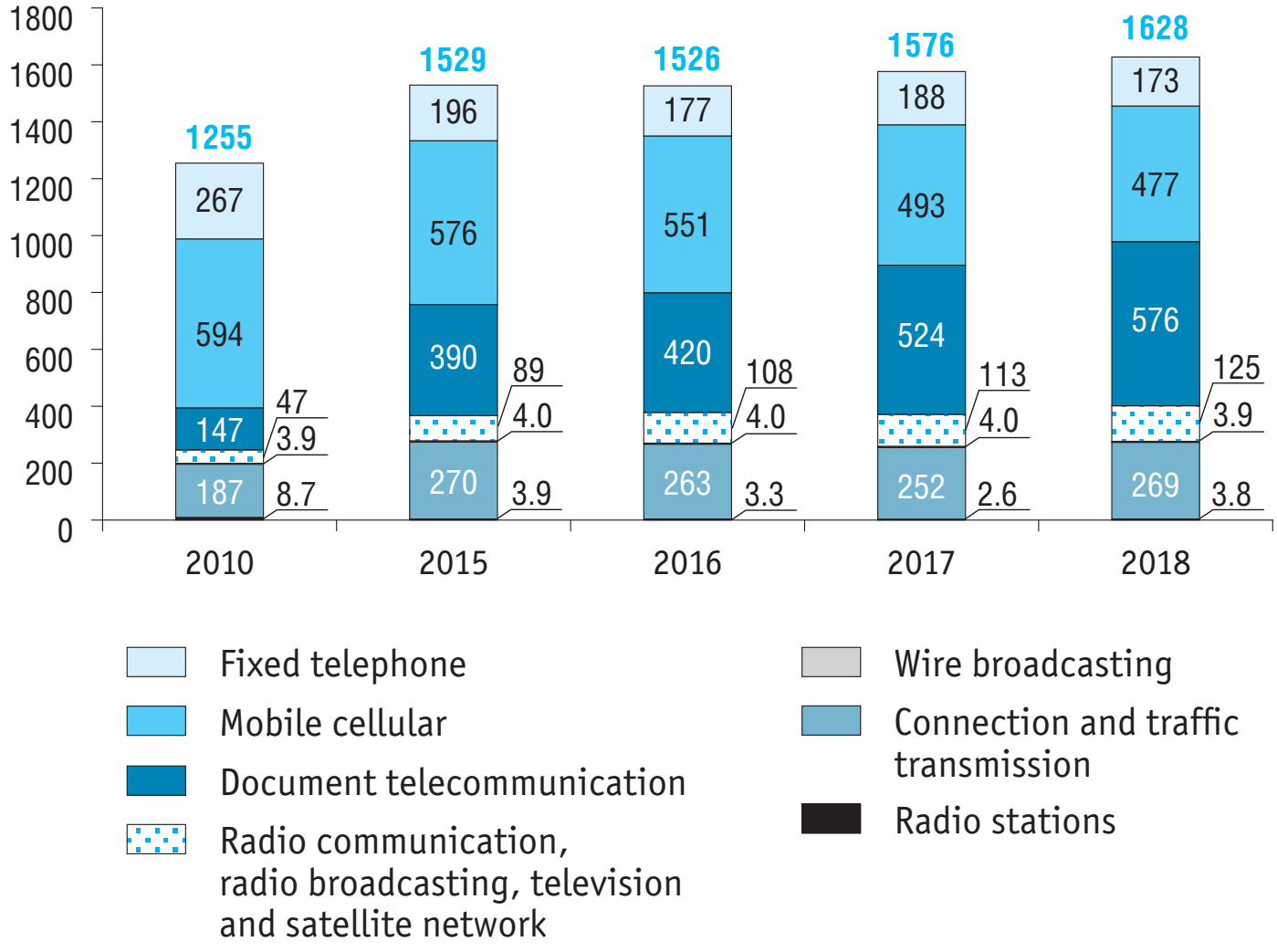
7.6. Internet access subscription fee

(roubles per month; December)



7.7. Revenue from all telecommunication services

(billion roubles)



ICT Sector

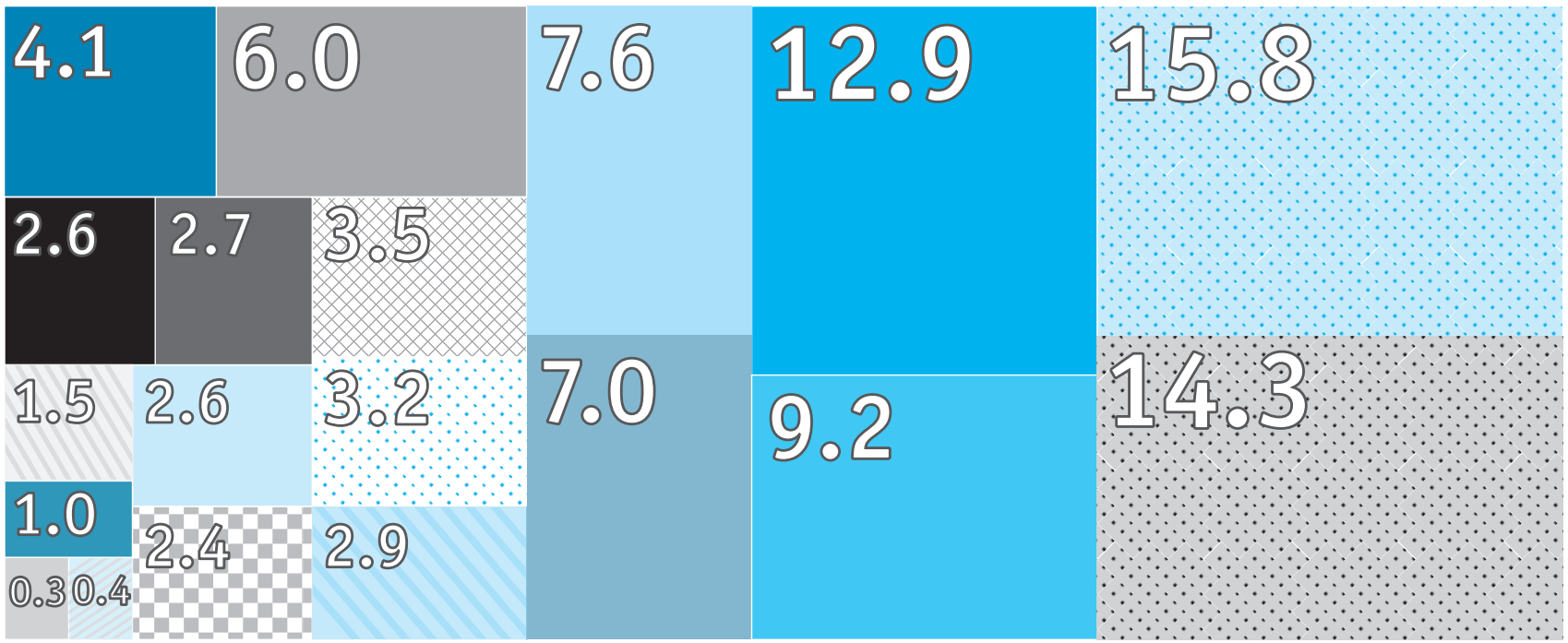
8.1. Main indicators for the ICT sector

	2015	2016	2017	2018
Number of employees				
Thousand persons	1220	1245	1220	1183
As a percentage of total employment	1.7	1.7	1.7	1.6
Gross value added				
Billion roubles	2030	2132	2274	2443
As a percentage of GDP	2.7	2.8	2.7	2.6
Fixed capital investment				
Billion roubles	…	…	475	598
As a percentage of total investment	…	…	3.0	3.4

Sources (here and below in 8.2–8.7, 8.10): Russia – estimated by HSE Institute for Statistical Studies and Economics of Knowledge on the basis of Rosstat data; countries other than Russia – OECD, UNCTAD.

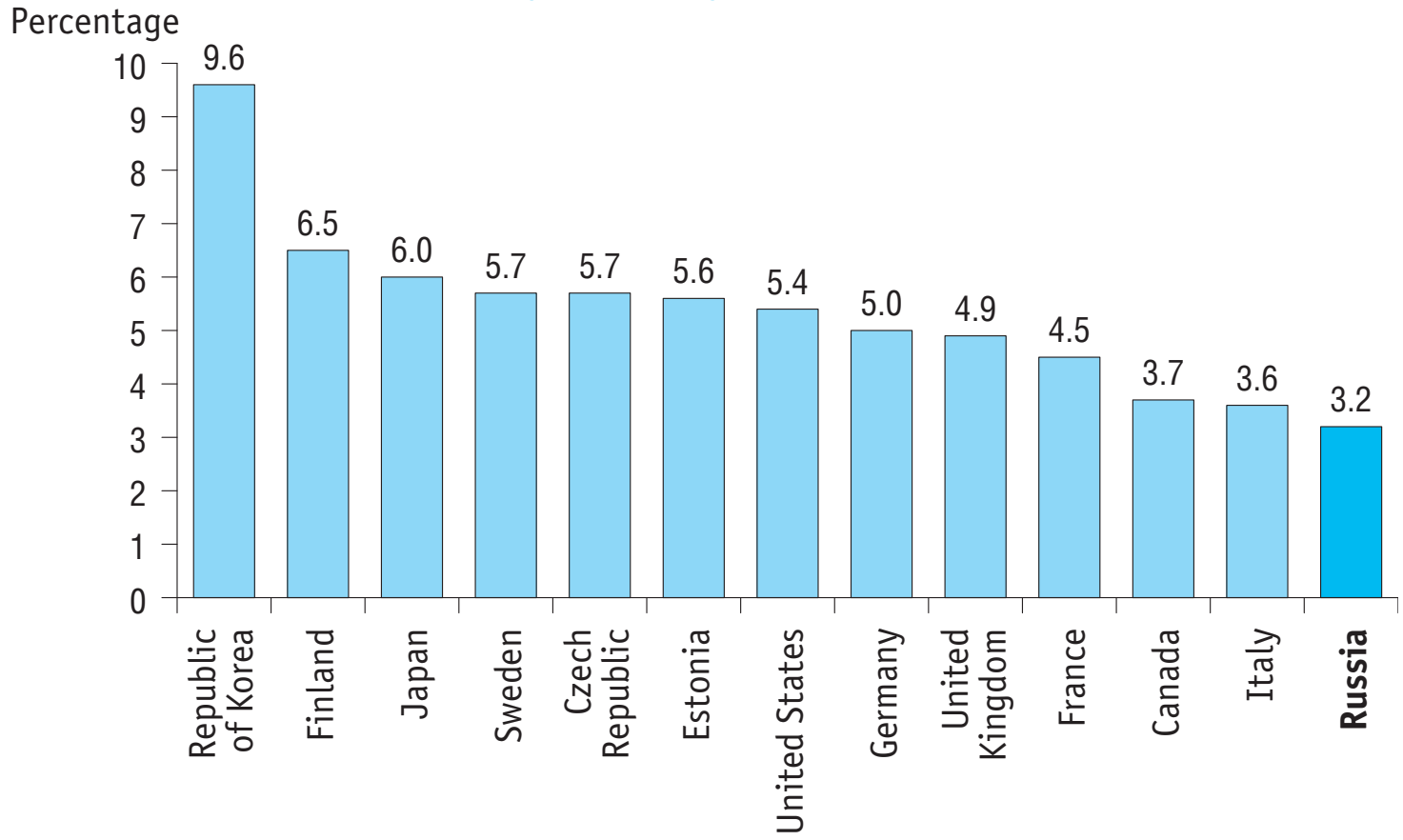
8.2. ICT sector input into the economy development: 2018

(as a percentage of GDP)



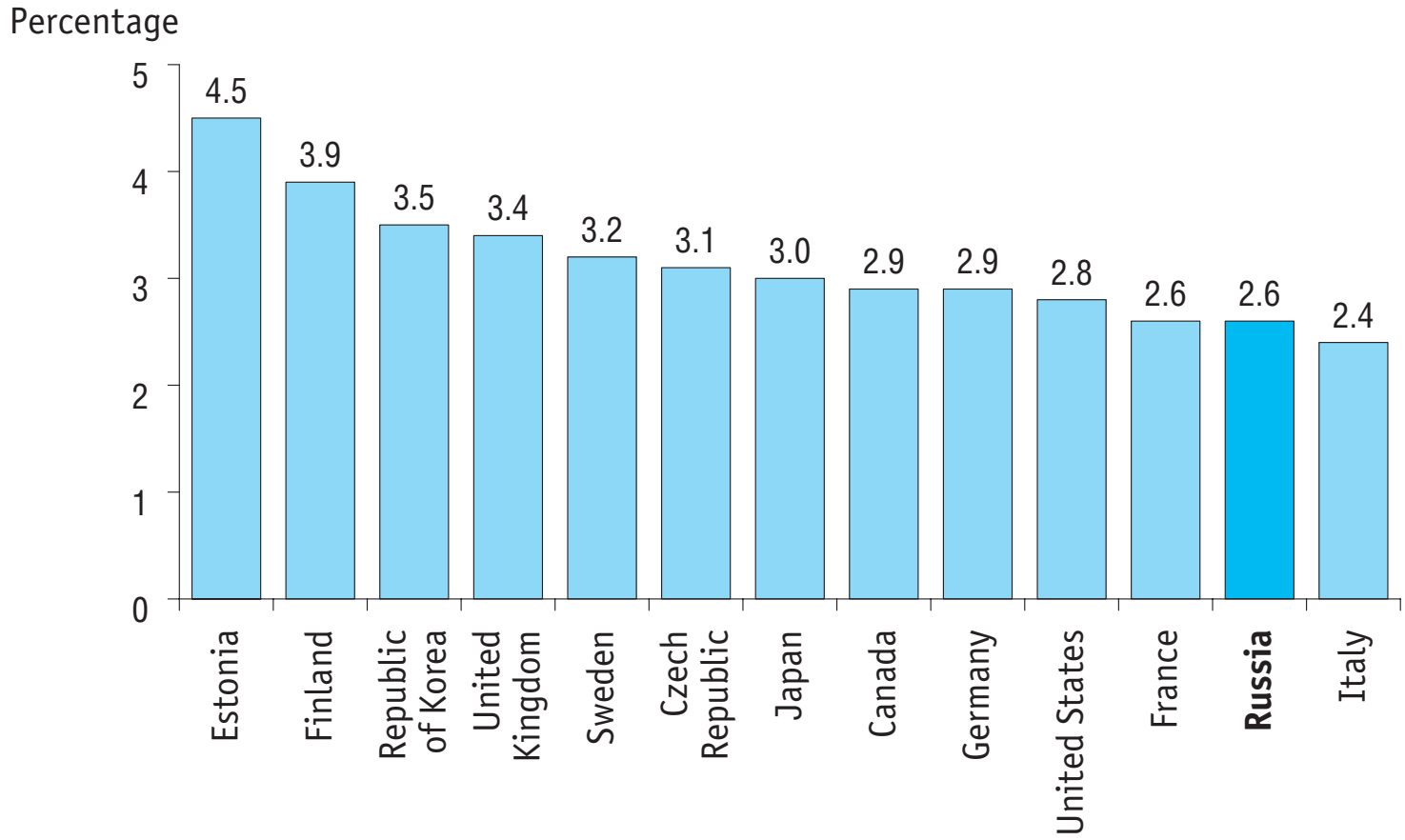
- **ICT Sector (2443 billion roubles)**
- Content and mass media sector
- Manufacture of motor vehicles, trailers and semi-trailers
- Manufacture of chemicals and chemical products
- Scientific research and development
- Manufacture of coke and refined petroleum products
- Manufacture of basic metals
- Education
- Electricity, gas, steam and air conditioning supply
- Human health and social work activities
- Financial and insurance activities
- Agriculture
- Construction
- Transportation and storage
- Public administration
- Real estate activities
- Mining and quarrying
- Wholesale and retail trade
- Other sectors

8.3. ICT sector share in the business enterprise sector gross value added by country: 2018*



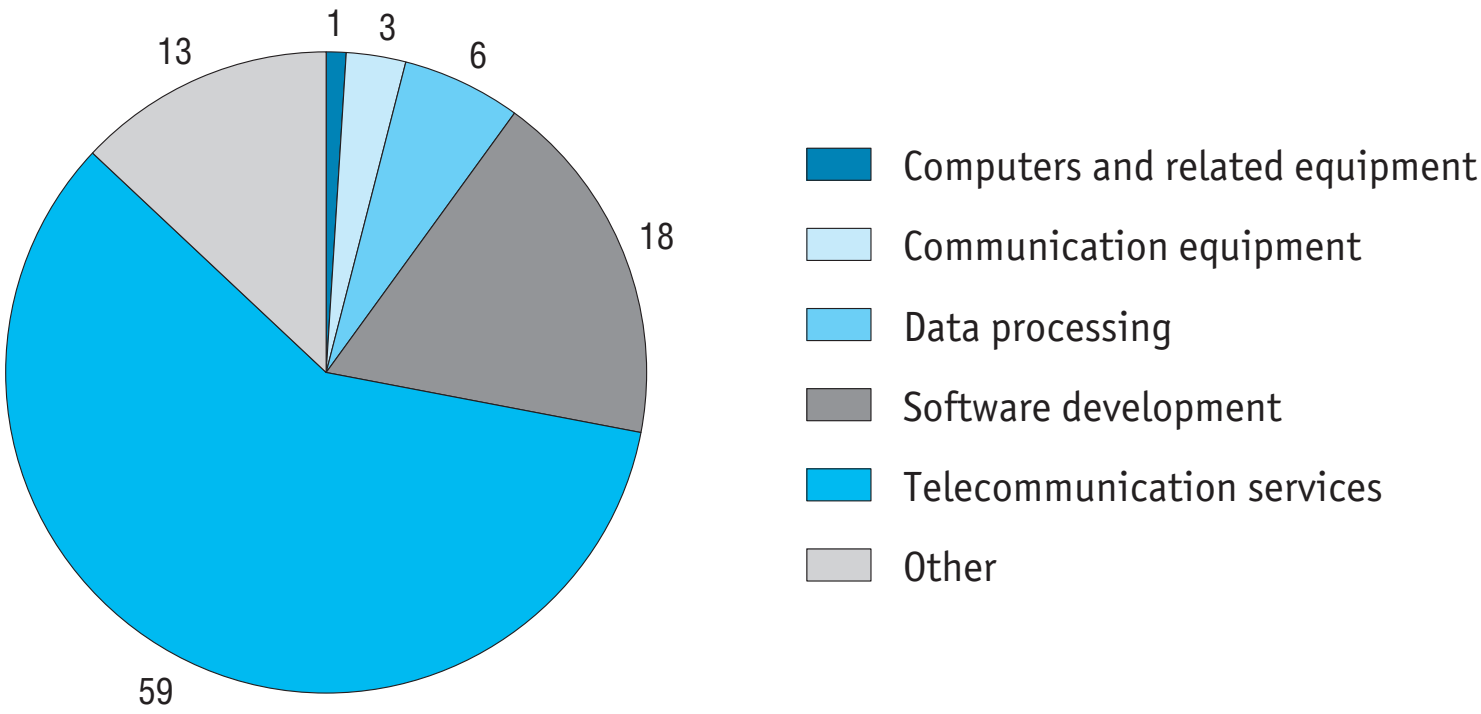
* Or nearest years for which data is available. Here and below in 8.4: ICT sector data are given by types of economic activity with the Russian Classification of Economic Activity codes OKVED2: 26, 61, 62, 63.

8.4. ICT sector share in the business enterprise sector employment by country: 2018*

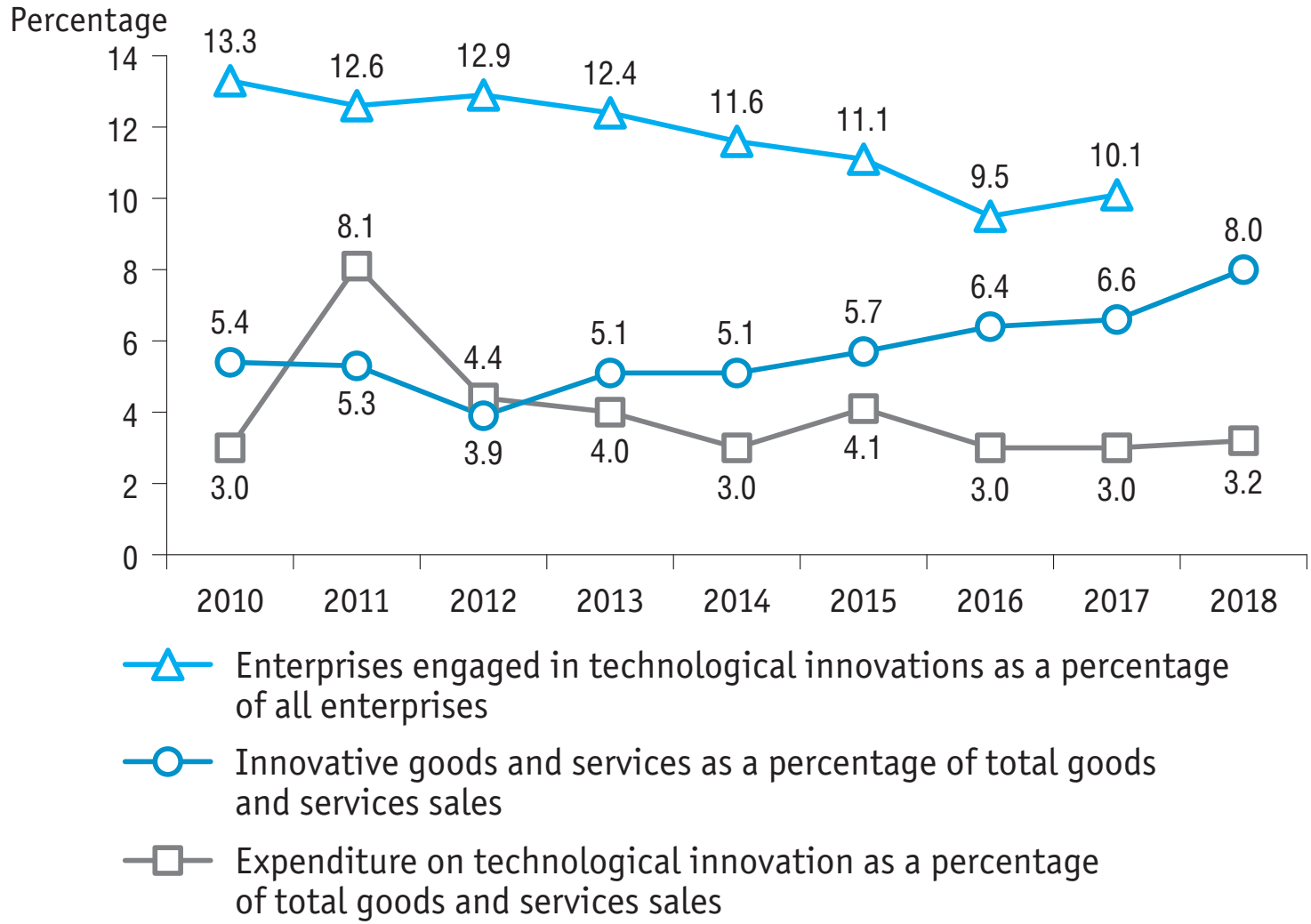


* Or nearest years for which data is available.

8.5. Percentage distribution of goods and services in the ICT sector: 2018

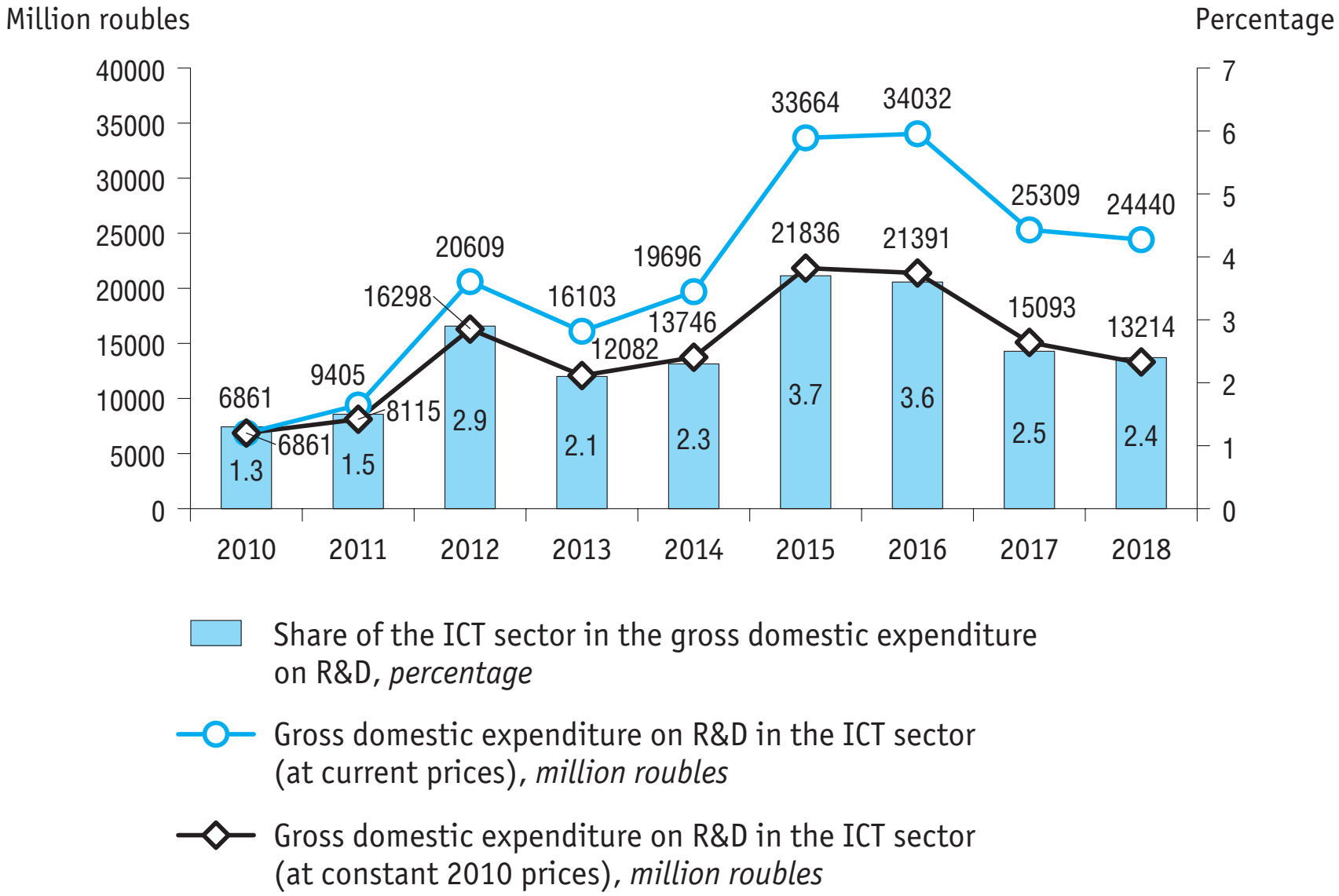


8.6. Main innovation indicators for the ICT sector*



* Here, ICT sector data are given by types of economic activities with the Russian Classification of Economic Activity codes 2010–2016 OKVED Rev.1.1: 30, 32, 64, 72; 2017, 2018 – OKVED2: 26.1–26.4, 26.8, 58.2, 61, 62, 63.11, 63.12.

8.7. R&D in the ICT sector



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

	2015	2016	2017	2018
Publications by Russian authors indexed in Scopus				
Number	6824	8213	11204	12334
As a percentage of world total number of publications	1.87	2.12	2.74	2.75
Patent applications filed by Russian residents				
Number	2353	1949	2195	…
As a percentage of world total patent applications	0.40	0.32	0.33	…

Sources: Scopus, WIPO, as of August 14, 2019.

8.9. Exports and imports of ICT goods and services: 2018

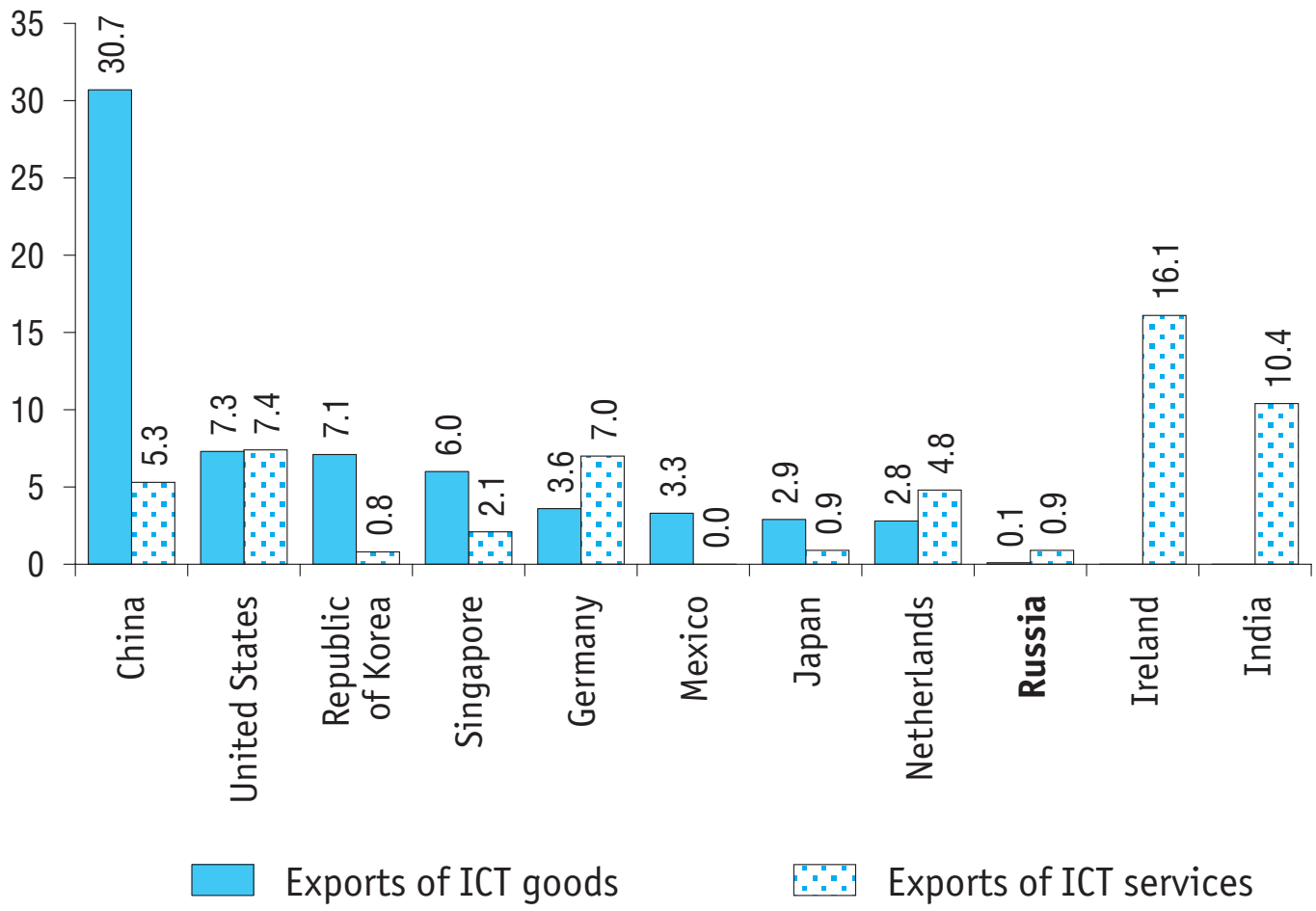
(million USD)

	Exports	Imports
ICT goods – total	**2105**	**23599**
Computers and related equipment	403	8404
Communication equipment	531	9476
Consumer electronic equipment	552	2385
Other ICT and related goods	619	3334
ICT services – total	**5261**	**5488**
Computer services	4061	3521
Telecommunication services	1072	1486
Information services	128	481

Sources: estimated by HSE Institute for Statistical Studies and Economics of Knowledge on the basis of Rosstat data and Bank of Russia data.

8.10. Exports of ICT goods and services by country: 2017

(as a percentage of total world exports)



Technical Notes

Bibliometric indicators are calculated on the basis of Scopus data. Unless stated otherwise, the term "publication" means the following types of documents: article, review or conference proceeding. A publication belongs to a country if it is listed in the affiliated address of an author or one of the co-authors and has been indexed by Scopus. Estimates are given as of August 14, 2019.

Business Digitalisation Index measures how quickly business enterprise sector units adapt to digital transformation based on several indicators: broadband internet access, use of cloud computing services, RFID technologies, ERP systems, and participation in e-commerce.

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

Digital technologies are technologies for gathering, storing, processing, searching, transferring and presenting data in digital form.

Domestic expenditure on digital economy development means enterprises' domestic expenditure on development, dissemination and use of digital technologies, including domestic expenditure on research and development in the field of digital technologies.

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 personnel 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 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, junior technicians and employees	
Computer engineering	All qualifications
Electronics and communications engineering	Radio-electronic equipment installer Radio technician Radio operator Radio and cellular equipment installer Communication equipment installer Communication equipment operator Semiconductor manufacturing operator Electron-ionic processes operator Electronic equipment maintenance engineer Electronic equipment assembler Vacuum electronic equipment assembler

(continued)

Key general groups of professions and qualifications	Professions/Qualifications
Mechanical engineering	Electron beam welder Control and instrumentation maintenance engineer Control and instrumentation technician
Screen arts	Projectionist
Programmes for mid-career professionals	
Computer engineering	All qualifications
Information security	All qualifications
Electronics and communications engineering	All qualifications
Photonics, instrumentation engineering, optical and biomedical engineering	Aircraft instruments Acoustic devices and systems Radio-electronic devices Optical and optoelectronic instruments and systems Biomedical instruments and systems Medical equipment assembly, maintenance and repair

(continued)

Key general groups of professions and qualifications	Professions/Qualifications
Mechanical engineering	Industrial process automation (by industry sector) Additive technologies Mechatronics and mobile robotics (by industry sector) Operation and maintenance of industrial robots
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 higher education (bachelor, specialist and master programmes) are attributed to the field of digital technologies and production of related goods and services:

Key general groups of professions and qualifications	Qualifications
Engineering mathematics	Applied mathematics and computer science Applied mathematics
Computer and information sciences	All qualifications
Computer engineering	All qualifications
Information security	All qualifications
Electronics and communications engineering	All qualifications
Photonics, instrumentation engineering, optical and biomedical engineering	All qualifications
Mechanical engineering	Engineering mechanics Industrial process automation Mechatronics and robotics

(continued)

Key general groups of professions and qualifications	Qualifications
Nanotechnologies and nanomaterials	All qualifications
Economics and management	Business informatics
Mass media and library and information science	Television. Media communications
Cultural studies and socio-cultural projects	Stage and event management
Screen arts	All qualifications

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). The 2018 data were published in the United Nations E-Government Survey 2018 'Gearing E-Government to support transformation towards sustainable and resilient societies' (available at: https://publicadministration.un.org/egovkb/en-us/ Reports/UN-E-Government-Survey-2018).

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.

ICT sector involves activities of enteprises engaged in ICT production and provision of services.

By Order of Ministry of Digital Development Communications and Mass Media of the Russian Federation 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.

Innovative goods and services are goods and services, either new or those that underwent different technological changes over the last three years. There are two types of innovative goods and services by degree of novelty – newly introduced and hence new (or those that underwent substantial technological changes and hence are technologically new) and those significantly improved.

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.

Online purchase or sale of goods and services by enterprises means on demand purchase or sale of goods and services through orders submitted and received via special pro-formas on a website or extranet with the help of automated exchange system between enterprises (EDI-systems). Purchases and sales made over the phone, fax or e-mail are not taken into account.

Online Service Index (OSI) is a sub-index of the E-Government Development Index (EGDI).

OSI is calculated by the United Nations Department of Economic and Social Development based on web-monitoring of government web portal sites, e-services and e-participation portals, as well as websites of national ministries for education, labor, social services, healthcare, finance and environment (for details see: https://publicadministration.un.org/egovkb/en-us/About/Methodology). The 2018 data were published in the United Nations E-Government Survey 2018.

Patent for an invention 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.

Public and municipal services in digital form means services rendered through data exchange and technological interaction, including via Public Services Portal of the Russian Federation and (or) regional public and municipal services portals.

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

Digital Economy

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For notes