



# 2019

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## Russian software industry

**16-th Annual Survey**

**With support from  
APKIT Association**

**RUSOFT Association  
2019**





**Dear colleagues,**

*We bring to your notice the results of the annual (by this time the 16th!) survey of the software development export industry in Russia which as ever has been conducted by RUSSOFT Association. In February-April 2019, we surveyed 175 market players (it is a record throughout the entire period of survey!). Additionally, we studied various sources of information and received expert assessments from dozens of directors of software developer companies.*

*Last year was marked by a significant growth of sales of Russian software industry on the Russian IT market, particularly of software development services. An important factor which had an impact on the growth of domestic market was a real digital transformation process deeply felt by Russian economy.*

*A deepening in the geopolitical conflict between Russia and the USA results in reduction of the share of the US and the EU markets in the total volume of foreign sales of Russian software and of software development services, at the same time the confidence in the future promotes a large rise of companies which aim at coming in these markets over the next two years.*

*Foreign sales of Russia have slightly increased on emerging markets, particularly in African countries. In the developing world Russia proved capable of providing alternative solutions in the security sphere, de facto offering these countries access to the “Digital sovereignty”.*

*The volume of foreign sales of software and of software development services of Russian companies grew by 10% and reached \$9.7 billion. The cumulative volume of sales in Russia and abroad in ruble terms increased by 19% almost up to 1 trillion, and in dollar terms increased by 10.6% up to \$15.8 billion.*

*Service companies hold positions on the list of the 100 top service companies in the world (according to IAOP). Russian software vendors continued to strengthen their position in “Gartner magic quadrants”, and the success of our companies in the information security sphere should be particularly noted.*

*I would like to take this opportunity to thank ToyOpinion for their long-standing efficient support of the study in gathering initial information. Thanks to our partner Associations who successfully and all by themselves provided collection of questionnaires in their regions: in Tomsk it is City IT (via SibEDGE), in Novosibirsk – SibAcademSoft, in Rostov region – InTechDon (via Inostudio Solutions), in Perm – Foresight. I would like also to thank HeadHunter for helping to gather information about situation on the Russian labor market.*

*And as it always has been, I wish to give kind words of gratitude to our chief analyst Dmitry Zhelvitsky for his enormous work on gathering information, for preparing the report, and for forming ratings of leading companies and universities.*

*We are very grateful to the Association of Computer and Information Technology Companies (AP KIT) and to our sponsors for long-standing support in carrying out the study.*

*I would also like to thank everyone who took part in the survey and provided information about their companies.*

*Best regards,*

*Valentin Makarov*

*President of RUSSOFT Association.*

A handwritten signature in blue ink, appearing to be 'V. Makarov', written in a cursive style.



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# CHAPTER 1

## Russian software companies at the world IT market

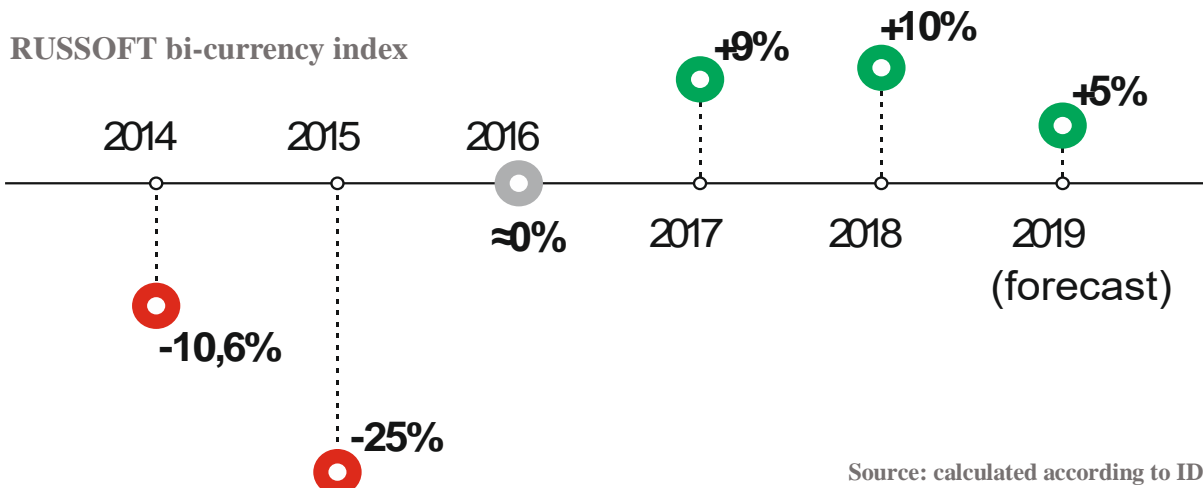
## 1.1. Russian ICT market

Following stabilization of the Russian IT market in 2016, when the 2-year period of market reduction was over and even some signs of growth were appearing, in 2017 a quite meaningful rise began. Predictably, it continued in 2018. According to IDC, the increment in dollar terms amounted to 9.5% (on conversion to rubles — +18.7%).

One of the most important conclusions about IT equipment retail sale (first and utmost, consumer devices) is a considerable increase in the average cost of purchased gadgets. It is primarily observable at smart phone market. At that the number of such sold devices is also perfectly good — not less than 30 million pieces.

For fear of getting mixed up in different growth indicators (in dollars and in rubles) RUSSOFT offers to go by its own bi-currency index. Whereas information in dollars is more interesting for foreign companies and in rubles — for domestic companies, this index reflects the way the situation at IT market is changed for Russian users of products of some or other manufacturers (in this context the users are geared more to what they get from the IT industry than what get the solution suppliers).

According to the RUSSOFT bi-currency index the Russian market in 2018 increased by 10%. It is more than in 2017 (+9%) and more than was predicted (+7.5%).



### Russian IT market in 2013-2019

		2013	2014	2015	2016	2017	2018	2019 forecast*
Opinion of foreign companies	in dollars (growth/drop per year)	\$33 billion (-1%)	\$28 billion (-16%)	\$17.8 billion (-39%)	≈\$17 billion (-3-4%)	\$21.8 billion (+17%)	\$24 billion (+9.5%)	\$25.2 billion (4.8%)
	in rubles (growth/drop per year)	₽1.05 trillion (+3.9%)	₽1.063 trillion (+1.2%)	₽1.08 trillion (+1.6%)	₽1.137 trillion (+5.3%)	₽1.27 trillion (+2%)	₽1.51 trillion (+18.7%)	₽1.66 trillion (+10%)
	Change in rubles adjusted for inflation	-2.4%	-9.1%	-9%	≈0%	≈0%	+13.8%	+4.8%

Source: calculated according to IDC

\* — presumably, by year-end 2019 an official rate of inflation will be 5%, an average rate of the dollar - 66 P.

The whole point of the RUSSOFT index calculation is as follows. The market is divided into imported and domestic solutions, and the growth in a respective currency is determined for each segment. Afterwards, the weight of each segment is accounted for. The share of Russian companies during the year increased just slightly, so we may ignore its change in our calculations.

For Russian companies the size of the IT market is of importance, but they mostly measure revenues in rubles. So the market capacity in ruble terms is more important for them.

### 1.1.1. Basic figures of Russian ICT market

#### Basic figures characterizing the Russian ICT market in 2018

Indicator	Absolute value by year-end 2018	Drop (-)/Growth (+) by year-end 2018	Drop (-)/Growth (+) by year-end 2017	Source
IT services market	<b>\$5.7 billion</b>	<b>-0.2%</b>	+20.7%	IDC
Russian ICT market (hardware, services, software at domestic market)	<b>\$10.1 billion</b> <b>(₽636 billion)</b>	<b>+6.2%</b> <b>(+15%)</b>	+17% (+3%)	1C
Russian ICT market (w/o telecom)	<b>\$16.3 billion</b> <b>(₽1026 billion)</b>	<b>0% (+5%)</b>	+16.4% (+10%)	Gartner
Russian ICT market (incl. mobile equipment)	<b>\$24 billion</b> <b>(₽1507 billion)</b>	<b>+9.5%</b> <b>(+18%)</b>	+17% (+4%)	IDC
Russian ICT market	<b>\$13.8 billion</b> <b>(₽866 billion)</b>	<b>+2.8%</b> <b>(+11%)</b>	+19% (+4%)	Ministry of Economic Development and Trade
Cumulative turnover of 100 major Russian IT companies	<b>\$20.4 billion</b> <b>(₽1287 billion)</b>	<b>+3.7%</b> <b>(+11.2%)</b>	+13% in dollars (-1.9% in rubles)	CNews100 Rating
Cumulative turnover of 100 major Russian IT companies	<b>\$23.44 billion</b> <b>(₽1447 billion)</b>	<b>+0.8% (+9%)</b>	+29% in dollars (+12.2% in rubles)	TAdviser100 Rating
Russian telecom market	<b>₽1.7 trillion</b> <b>(\$27 billion)</b>	<b>+3.4% in rubles (-4.1%)</b>	+1.3% in rubles (+16% in dollars)	TMT Consulting

### 1.1.2. Some information about situation at the Russian IT market

Data provided by individual companies reflect the situation as a whole only in some measure because, as a rule, they present the results of the past year to general public only if that year was successful for the companies. Nevertheless, the largest companies are faced with restriction in form of the size of market, therefore, if a wide range of such companies enjoy good growth, it is reasonable to expect that the same growth may be observed across the whole market.

It is worthy of note that a number of large western companies have ceased to disclose the results of activities at the Russian market as is usually the case of a small growth or downturn in sales. It is another sign that the imports substitution in IT area still occurs by a narrow margin.

#### Results of 2018 of some Russian and foreign companies having a significant share in its segment at the Russian IT market

Name	Profile	Growth/drop of turnover in 2018	Growth/drop of turnover in 2017
Rostelecom	Telecommunications, system integration	+5% (₽320.2 billion)	+3% up to ₽305.3 billion (cloud business volume — +26% up to ₽23 billion)
ER-Telecom Holding (TM Dom.ru, Dom.ru Business)	National operator of information and communication services	+18% (₽39.7 billion)	-
KROK	System integration	+34.5% (₽30.3 billion)	+20.9% up to ₽2254 billion
Technoserv	System integration	-27.3% (₽36.9 billion)	-
Softline	Distribution and software development, Internet	+19% (\$1.36 billion), +32% (₽94.82 billion)	+25% in rubles
Krok cloud services (a part of Krok Group)	Cloud provider, IaaS, SaaS	+30% (₽1.351 billion)	-
SC Lanit	IT holding with different areas of activity including system integration	+19.8% (₽164.241 billion)	-
Mail.Ru Group	Internet company	+32.5% (₽66.1 billion)	34.40%
Yandex	Internet company	+36% (₽127.7 billion)	+24%
<b>Sales of foreign companies in Russia</b>			
SAP CIS	ERP, BI systems and other business solutions	+0.9% (€472,5 million), +13% (₽35 billion)	+26% in rubles, in EUR growth about by 1/3
Asbis	IT distributor	+53% (\$369 million)	-

Huawei	One of the world largest manufacturers of telecommunication equipment and consumer devices	The company does not disclose a volume of its sales in Russia but informs that due to “active growth of business in Russia” it has increased the office areas in the country in or around three-fold. However Huawei’s Russian business is not only sales but R&D as well.
Zyxel	Manufacture of Internet connectivity equipment	+34% (total sales growth in post-Soviet states)
Eset	Software developer in information security area	+14% (currency in which the growth has been calculated is not indicated, but as it acts worldwide, in all likelihood it is in dollars)

### 1.1.3. Structure of Russian IT market

#### Structure of Russian IT market by year-end 2018

	absolute value	share (a year before)	change
IT equipment	\$15,1 billion	63% (60%)	+15%
IT services	\$5.7 billion	24% (26%)	-0.2%
Software	\$3,07 billion	13% (14%)	+2.2%
Total:	\$24 billion	100%	+9.5%

Source: calculated according to IDC

The Russian IT market was considered to be immature due to a too high share of sold hardware. Partially it still remains, if we employ an adequate maturity measure, but after long years of slow increase of the share of IT services and of software in 2014-2015 a sharp spike in IT services took place — their share increased from 20% to 25%. In 2016 it was much about the same and in year-end 2017 the indicator increased by another percentage point — to 26%. This change was primarily caused by a significant rise in foreign equipment prices with a very scarce amount of Russian counterparts that resulted in downturn in sales. However, the factor of devaluation of ruble in 2017 already could not impact upon increase of the share of IT services as that year a significant ruble strengthening happened.

In 2018, IDC determined a big increase in sales in Russia of particularly IT hardware (in dollar terms — by 15%), on the other hand IT services and software remained almost unchanged. Therefore, a certain swing-back to the structure that was there before 2014 took place, though the share of IT services remains higher than in 2014 (24%, then it was 20%). A similar thing took place with rise in prices of hardware import in local currency due to devaluation of ruble roughly by 8% against the dollar.

Gfk obtained slightly different data: the distributive market of IT equipment reduced by 6% in pieces but increased by 3% in rubles. However, it is somewhat different indicator, as hardware may be supplied bypassing distributive channels, for example, in implementation of ambitious infrastructure projects (such as World Football Championship in Russia).

Gfk revealed that IT equipment sales were outstripping in B2B segment. According to Gfk, in Europe sales in B2B are also a premier source of IT market growth, although such construction of infrastructure facilities was hardly in evidence.

If we look at the situation from the standpoint of Russian users and Russian vendors, it is supposed that the cumulative percentage of IT services and software in the volume of IT market of Russia could be not 37-40%, as in the last 2 years, but over 45%.

#### 1.1.4. Information on segments of Russian IT market

##### Individual segments of Russian IT market

Indicator	2018	Drop (-)/Growth (+) by year-end 2018	Source
<b>Hardware</b>			
Monitors	3.3 million pcs (\$536 million)	+17% (+16%)	ITResearch
External data storage systems on Q IV 2018 results	\$409 million	+14%	IDC
Supply of printing devices to Russian market	2.58 million pcs (\$630 million)	+9% (+6.5%)	IDC
Notebook retail market (excluding B2B)	2.9 million pcs (¥ 97 billion)	+9% (+21%)	M Video-Eldorado Group
Drone sales in Russia	160 thousand pcs (¥1.9 billion)	+70% (+53%)	M Video-Eldorado Group
UPS	-	+0.3% in pcs, -1.2% in \$	ITResearch
Wearable devices	some 2.5 million pcs (¥17.2 billion)	+200% (+130%)	Incorporated company Evrosset/Svyaznoy
PC	\$2.2 billion	+31.4%	IDC
Desktop	\$1 billion	+2.1%	IDC
Mobile phones	\$7.74 billion	+16.5%	IDC
Peripheral devices	\$630 million	+6.5%	IDC
Servers	\$875 million	+32.8%	
<b>Software</b>			
IS market (preliminary estimate)	-	+10%	Positive Technologies
Sales of video games	\$736 million	+9%	Superdata
Retail handheld and computer game market	2.2 million copies (¥4.5 billion)	+5% (+13%)	M Video-Eldorado Group
<b>Services</b>			
Commissioned commercial rack units at 20 major DPC providers	26.7 thousand	+19%	CNews Analytics
Russian business SaaS market	\$0.92 million (¥5.8 billion)	+20% (+30%)	J'son & Partners Consulting
Russian IaaS/PaaS market	\$140 million (¥8.8 billion)	+12% (+21%)	J'son & Partners Consulting
<b>Future markets</b>			
Earnings of Russian telecom carriers in H1 2018 from IoT projects	¥5.9 billion	-	

Indicator	2018	Drop (-)/Growth (+) by year-end 2018	Source
Russian IoT market considering connections by various wireless technologies on results of H1 2018	₽45.5 billion	-	TMT Consulting
Biometric technology market 2015-2018	-	Annual average growth over a period 35.74%	J'son & Partners Consulting
Volume of market of Smart City technology solutions	₽81 billion	+8%	iKS-Consulting
Volume of IoT market (preliminary estimate by year-end 2018 and next years' forecast)	\$3.67 billion (₽25.6 billion)	From 2018 to 2022 18% annually (CAGR)	IDC
Industrial robots introduced in Russia	860 (cost — ₽2.5 billion)	+21%	NAURR
Russian computer vision market	\$127 million (₽8 billion)	-	TAdviser and Computer Vision Systems

In 2018 almost all segments of Russian IT market have grown. At that a growth rate for the most part is double-digit. Only UPS sales have reduced by 1.2% in dollar terms although in units there is a barely perceptible growth (+0.3%). Concerning desktops the growth is very modest (+2.1%) but it is a fading segment at the whole world market.

Tellingly, in Russia it nevertheless increased though by token amount. At the same time, relative to all personal computers (primarily notebooks) we note quite a nice sales gain in dollar terms — +31.4%. Noteworthy is that this segment already cannot show high growth rate due to increase in a number of PC users. Nevertheless, the IDC analysts recorded an increase in sales almost by one third.

It is conceivable that a somehow irrationally high hardware sales growth is associated with the imports substitution process. The truth is that the inevitability of imports substitution which manifested itself by the hard-line attitude of the government trying to force state corporations into imports substitution in IT area — stimulated these corporations to purchase import hardware without delay to make it feasible to work with familiar import equipment and software and not to be involved in introduction of less than fully job-proved domestic hardware and software.

### 1.1.5. Russian software market

According to IDC, the software market in 2018 increased by 2.2% up to \$3.07 billion. In ruble terms the situation looks better — growth by 10.4%. Even if we take into account the official inflation rate, the market increased almost by 6%.

The Russian software market reached the maximum size in 2013 and amounted to \$5 billion. In next two years it decreased more than twice — to \$2.3 billion. In 2016 the free fall came to a stop — software market contracted by 4% more to \$2.2 billion. In 2017 a quite comfortable growth was recorded — up to \$3 billion. However, IDC showed the growth by 19% (if one compares 3 billion and 2.2 billion, the difference is 36%). By all accounts, 2016 data was improved by the IDC analysts upwards (therefore, no contraction of software market took place). According to RUSSOFT estimates, sales at domestic market of Russian software companies turn to be traditionally much greater than the whole market capacity. Values of growth/drop are also much better. By year-end 2018, sales of Russian software companies amounted to \$6.1 billion with 11% growth (in rubles the increase was by 20%). Such growth cannot be deemed to be very high for such fast-moving industry as software development, yet it is anything but symbolic.



It is easy to explain higher growth rates of Russian companies at domestic market by imports substitution process. Still, the income of Russian software developers from activities in Russia turned out to be twice the amount of the software market itself that seemingly is impossible because no less than \$2 billion accrue to foreign software suppliers. If sales of foreign companies and Russian developers are summed then the Russian software market should make out not roughly \$3 billion but no less than \$8 billion.

Such great difference can be adequately explained by different procedures and approaches. First, IDC assigns to software market only a part of sales of software companies. First and foremost, sales of different services for software deployment and infrastructure support as well as custom software development services are taken into account in assessment of IT service market (\$5.7 billion). If this income of Russian software companies is excluded and focus on “sales, deployment and support of own software products” is increased, then RUSSOFT obtains some \$2.7 billion. Besides this indicator includes a double count as while developing software on the platform of certain vendor the payment to this vendor is accounted for twice — in income of the final solution developer and in income of the platform developer. Yet this double count hardly exceeds \$0.5 billion (in all likelihood far less) Therefore, software market anyway should be over \$4 billion and more likely — over \$5 billion, even if only sales of own software products are accounted for. If we consider custom development and implementation services, it will give us \$8-9.3 billion.

It comes that IDC after all underestimates Russian software market. Let's bear in mind that the methodology of calculations may differ. However, in this case criticism is inept because the different methodology assumes another indicator. Therefore, the difference between indicators is in the nature of things. The same goes for estimates of cumulative turnover of companies of software industry, software export and total IT market of Russia (not only software market). As to the IT market, estimates may differ and do differ by a factor of 1.5-2. That is not to say that somebody definitely falls into error. In particular, smart phones can be classed both with IT market (because in terms of functionality they serve for web-connected wearable computers) and with telecom equipment market. Just for these reasons an estimate of IT market may differ by billions of dollars.

### Basic features of Russian software market in 2015-2018

	2015	2016	2017	2018	Comment
Market volume	\$2.3 billion	\$2.2 billion	\$3 billion	\$3.07 billion	IDC version
(change in a year)	(-43.1%)	(-4%)	(+19%*)	(+2.2%)	
	\$5.5-6.4 billion	\$6-7 billion	\$7.3-8.5 billion	\$8-9.3 billion	RUSSOFT version (together with custom software, SaaS and services for introduction)
	(-30-32%)	(+11-12%)	(+20-22%)	(+10-11%)	
Change in rubles with account for official inflation rate	-19%	+16-17%	+3.5%	+5.5%	RUSSOFT version

\* — it is likely that this IDC growth is received after correction of 2016 data



### 1.1.6. Forecast for the Russian IT market in next years

Most experts and analysts are unison in opinions that in 2019 the growth of the IT market of Russia will continue but it will be not very high (modest). IDC expects an increase by 4.8% in dollar terms. Due to anticipated slight devaluation of national currency the growth in rubles should be a little bit higher. A small increment of the whole IT market, according to the IDC forecast, is contingent on the slowdown in the growth of hardware sales (+3% instead of +15% by year-end 2018). At the same time, IT services will rise by 8.2% and software — almost by 12%.

Naturally, totally new and relatively new segments are far from saturation and the IT-market of economically developed countries and even of China will grow at a far quicker rate.

The results of first quarters attest to the fact that these trends at Russian IT market in 2018 will prevail all 2019 through, but the growth rate of the entire market in all appearances will slightly go down.

Some surveys show that the growth potential of the whole IT market and of its individual segments (most notably those nowhere near saturation stage) is very high.

According to polling of 100 heads of Russian and foreign companies of different industries, which are active within Russia, taken in early 2019 by DT Global Business Consulting GmbH, the digital transformation in Russia is well under way. For the large majority of companies it became if not priority then at least a vitally important objective because the potential of digital environment includes great competitive advantages. Only 7% of companies in Russia do not work actively to this end. At the same time 80% of respondents plan during this year to increase investments in digital transformation within their companies and 19% from them contemplate boosting expenditures.

According to information of Softline presented in November 2018, IT infrastructure of two thirds of companies in Russian regions are prepared for implementation of digital transformation.

The projects related to transformation of business processes and business models are already underway in companies of 41% of Softline customers, moreover a number of optimization and innovative initiatives are roughly the same. The heads and IT directors of regional companies consider the shortage of required competences (in 47% of cases) and underfunding (56%) to be roadblocks on the way to increase in activity of digital transformation projects.

According to SearchInform, the growth potential of Russian DLP market is high — as of March 2019 it has been mastered roughly by 10%. At the same time even more companies are worried about provision of information security.

In the perception of J'son & Partners Consulting, by year-end 2018 the Russian IaaS/PaaS market was just 0.2% of the global market with the share of Russia in global economy of 1.5-1.8%. At the same time, the growth rate of Russian market in ruble terms in 2018 (21%) does not exceed that of global market in dollar terms.

Experts of Xelent data center expect that server sales in Russian DPCs by year-end 2019 will increase at least twice as much, at the same time the number of physical servers in data centers will increase during the year only by 20-25%. This is due to the fact that servers will be generally purchased to replace equipment with expiring lifecycle.

According to results of the survey conducted by the analytical center TAdviser jointly with Computer Vision Systems, the volume of computer vision (CV) market in Russia will come up to P38 billion in 2023. It will increase as compared with 2018 by a factor of 4.8.

Even higher growth rates are anticipated at the Russian market of industrial VR/AR-solutions. According to survey of TAdviser and CROC VR (CROC business unit specializing in use of immersion technologies in industry), if it follows the optimistic scenario, by 2022 it will amount to P18.7 billion. In 4 years this market may increase by a factor of 11.7 at the annual average growth rate of 85%.

According to report of the National Association of Robotics market Actors (NAURR) presented in April 2019, 860 industrial robots were installed in Russia in 2018, that is by 21% more than in 2017. The growth is seemingly high, but in comparison with some other countries the process of robotic application in industry is too slow in coming. As a comparison, in China over the same period there were introduced 133,200 industry robots (population and GDP in this country are by one order more, but robots were installed by two orders greater), in Japan — 52,400. In Russia the ratio of the number of robots per 10,000 workers was 4 robots. In Europe this indicator is 106, in America — 91, in Asia — 75.

Investments in equipment, software, services and communications which was involved in development of solutions for IoT over the period from 2018 to 2022 inclusively, will grow on average by 18% annually (CAGR). This forecast was made by the IDC Russia analysts. According to estimates, in the end of 2022 expenditures on solutions for IoT by end users in Russia will reach \$7.61 billion

Russian communications providers expect that income from projects in the IoT sphere in the next years will grow at a rate of 18-25% annually (according to poll of the newspaper Commersant in 2018).

### 1.1.7. Use of Internet technologies

Putting some kind of growth slowdown to the side one may state that there was no crisis for Russian Internet industry in 2014-2015. Generally, this slowdown stemmed in some measure from the fact that a number of Internet users as far back as 2013 approached saturation threshold and in no way could recover momentum.

#### Use of Internet technologies in Russia

Indicator	Time	Absolute value	Indicator change	Penetration indicator	Source
Internet users	end of 2017	87 million people	-	-	Mail.Ru Group
Runet audience	in 2017	90 million people	-	73% of population	RAEC
E-commerce	2018	₽2 trillion	-	-	RAEC
Infrastructure and communications market	2018	₽1.8 trillion	-	-	RAEC
Digital content market	2018	₽75 billion	-	-	RAEC
Volume of marketing and advertising segment in Internet	2018	₽250 billion	+11.6%	-	RAEC
Online commerce	2018	₽1.66 trillion	+59%	-	RAEC
Share of etail in the whole Russian retail	2018	5.3%	-	-	Ministry of Industry and Trade
Total number of users of Unified State Services portal (EPGU)	2018	86 million people	+32%	-	www.gosuslugi.ru
Number of electronic application forms for receiving government services at www.gosuslugi.ru	2018	60 million	+55%	-	www.gosuslugi.ru
Total receipts of legal video service market	2018	₽24.86 billion	+56%	-	J'son & Partners Consulting

In 2016-2017, the high growth rate of some indicators of use of Internet technologies in Russia recovered. It can be said that by year-end 2018 the growth rate has increased. Anyhow, it concerns E-commerce. By year-end 2019, it is anticipated that this market will grow by 31% more up to ₺2.17 trillion (APKIT estimate which is most probably based on RAEC data).

The growth of E-commerce in Russia by year-end 2018 calculated by RAEC is challenged by INFOLine-Analytics which assumes that the indicator of E-commerce volume in 2017 was underestimated. For this reason the growth cannot be as much as almost 60% and in reality can be twice as low. Nevertheless, even this version assumes very high growth rates — almost 30%.

### 1.1.8. Telecommunication market

#### Volume of Russian telecommunication market in 2018

	Absolute value	Growth/drop in 2018	Growth/drop in 2017	TMT Consulting
Russian telecommunication market	₺1.77 trillion (\$28.1 billion)	+3.4% in rubles (-4.2% in dollars)	+1.3% in rubles (+16% in dollars)	TMT Consulting
Mobile communication services	₺969 billion	+5%	+1.5%	TMT Consulting

The Russian telecommunication market in the recent years scarcely grew in rubles and significantly decreased in dollar but by year-end 2017 added 1.3% and 16% respectively. Increment in dollar terms was related to strengthening of the Russian national currency against the dollar, and in ruble terms — to the start of tariff revision upwards (in previous years, tariffs were cut more often). In 2018 the growth in rubles continued (primarily at the expense of receipts of mobile communications providers) but due to devaluation of Russian national currency the growth in dollars reduced again.

The TMT Consulting analysts relate the increase in receipts from mobile communications services by 5% to the departure of communications providers from price competition, to the abolishment of unlimited mobile tariffs and to the increase in offered basic and additional services. Besides, came into play a significant growth observed in the corporate customer segment, above all due to the increase in income from mass text messaging, M2M (machine to machine) and other additional services.

According to Cisco, by 2022 the number of mobile communication users in Russia will be as many as 124 million people or 87% of the whole nation (in 2017 there were 121 million people) and the annual average increment of mobile traffic in Russia will come up to 43% and by a factor of 2.2 will exceed the rate of increment of fixed IP traffic (19.9%). The mobile data transmission traffic in Russia will reach 43.9 EB and thus by a factor of more than 6 will exceed the 2017 indicator (7.3 EB).

According to results of the information and analytical agency Content Review survey, as for December 2018, Russia took the 8<sup>th</sup> place in the latest rating of countries with the cheapest mobile web. Therefore, Russia retained its position compared to the rating published in June. From May to December the price of 1 GB of mobile web traffic in Russia reduced by 15% and amounted to ₺55.5. The worldwide indicator over the same period reduced from ₺280.5 to ₺269.3.

### Individual segments of Russian telecommunication market

Indicator	Time	Absolute value	Change	Source
Mobile subscriber number	end of 2018	254 million people	-3.3% per year	TMT Consulting
Smart phone sales	2018	\$7.56 billion (over 30 million pcs)	+18%	IDC
Smart phone sales	2018	₽469 billion (over 30 million pcs)	+17% (+3%)	Incorporated company Evroset/Svyaznoy
Quarterly average earnings of Russian mobile operators	2018	₽324	+5.3%	TMT Consulting
Broadband Internet access services	2018	₽187 billion	+3.2%	TMT Consulting
Broadband Internet access customer network	end of 2018	34.9 million clients	+1.8%	TMT Consulting
Fixed line subscriber number	end of 2018	26.3 million clients	-7.4%	TMT Consulting
Earnings from fixed line	2018	₽119 billion	-8.4%	TMT Consulting
Russian smart phone owners	2018	122.9 million pcs	-	J'son & Partners Consulting

## 1.2. Russia and Russian cities in world IT ratings

No serious displacement of Russia in the World ratings in 2018-2019 has happened. The continuing rise in “Doing Business” can be noted. It can be considered as the most important among all ratings. The drop by 16 points in Global Cybersecurity Index (GCI) hardly reflects real changes. Anyway Russia remains at a sufficiently high place — 26<sup>th</sup>.

At the same time, any alteration of Russian positions in world ratings has little to do with real changes. Long-term observations allow for defining the following consistent pattern: the higher is the Russian place the less is the influence of subjective expert opinions upon ranking of countries in any rating. Thus, a drop or an improvement of the country's rating primarily reflects the way Russia is presented abroad. It is an important factor, however, it does not pay to pass judgment on the real situation on the basis of positions in ratings.

To a large extent these positions are affected by information coming from Russia. In many cases the well-targeted work with compilers (sometimes they are invited to get themselves familiar with situation at the local level) produces positive result. But here again the resulting improvement in rating now and then not so much reflects a serious improvement in the real circumstances as obtaining by analysts of additional important information. Russia is making progress upon different directions but in almost all cases it is smooth and steady.

## Change of Russian positions in ratings of competitiveness, innovativeness and use of ICT

#	Name of rating	Year/place of Russia in ratings (↑ or ↓ relative to previous version)				
		2015	2016	2017	2018	2019
<b>Competitive edge and business environment</b>						
1.	Doing Business	62 (↑)	51	40	35	31
2.	The Global Competitiveness Index	53 (↑)	45	43	38	43
3.	The IMD World Competitiveness Yearbook	45 (↑)	44	46	45	45
4.	The best developers (ranked by average score across all HackerRank Challenges)	-	-	2	-	-
5.	Human Capital Index	26 (↑)	28	16	-	-
6.	Open Data Barometer			26	13	-
<b>Innovations and use of ICT</b>						
7.	Bloomberg Innovation Index	14 (↑)	12	26	25	27
8.	Global Innovation Index	48 (↑)	43	45	46	45
9.	ICT Development Index	45	43	—	45	-
10.	E-Government Development Index	—	35 (↓8)	—	32	—
11.	Global Cybersecurity Index (GCI)			10 (↑2)	-	26 (↓16)

### 1.2.1. Competitive edge and business environment

Russia has the best developers (ranked by average score across all HackerRank Challenges) — they keep the 2<sup>nd</sup> place just after China.

According to the survey of HackerRank well-known by online platform of programming challenges of the same name, Russia is the world's second in programmer training. China, which is the first, has just an incidental advantage. Chinese developers have good reputation for mathematical qualification in the sphere of functional programming and data structure, and Russians — in algorithmics though their mathematical qualifications are also very high.

The USA and India which are considered to be leaders at the world market of software development services (including custom development) take the 28<sup>th</sup> and the 31<sup>st</sup> place, but judging by the HackerRank rating, they achieve leadership mainly thanks to a number of developers and to business models which cannot be followed by other countries.

Results of this rating are very important for presentation of the Russian software industry abroad.

#### Doing business — 31<sup>st</sup> place (↑4)

As judged by the progress in the Doing business rating, business environment in Russia was consistently improving throughout recent years. However, it reflects the situation only in Moscow and (in the last three years) in St. Petersburg. With that, the leap forward in the last 6-7 years was made more than likely due to the fact that the rating compilers have earlier had an obscure view of actual state of thing.

As before, the statement that in the sphere of “Trading across borders” Russia takes only the 99<sup>th</sup> place still raises a doubt. Clearly, the bureaucracy gets at closer cooperation and export marketing activities, but still these processes are going on pretty much actively. From all appearances, Russia is inferior to 3-4 dozens of developed countries in this line, but hardly is located at the end of Top-100.



### Change in Doing business by individual indicators, place in rating

#	Indicator	2015	2016	2017	2018	2019
	<b>Total Doing business rating</b>	<b>62</b>	<b>51</b>	<b>40</b>	<b>35</b>	<b>31</b>
1.	Starting a business	34	41	26	28	32
2.	Dealing with construction permits	156	119	115	115	48
3.	Getting electricity	143	29	30	10	12
4.	Property registration	12	8	9	12	12
5.	Getting credits	61	42	44	29	22
6.	Protecting minority investors	100	66	53	51	57
7.	Paying taxes	49	47	45	52	53
8.	Trading across borders	155	170	140	100	99
9.	Enforcing contracts	14	5	12	18	18
10.	Resolving insolvency	65	51	51	54	55

The same goes for Dealing with construction permits. By this indicator Russia is among the countries with not very active construction activities. The same progress rate of commissioning (of new business centers, residence buildings) is in a few countries. So the question arises: if getting construction permits is so difficult, why are facilities built so actively? Perhaps, in this indicator Russia is far from being among leaders (though one must strive forward) but hardly is located beyond Top-100.

It is not implausible that in the next years in “Trading across borders” and “Dealing with construction permits” there will be the same progress as in “Getting electricity” where Russia has raised from the 143<sup>rd</sup> place to the 10<sup>th</sup> in as little as 3 years by 2018. Therefore, inclusion in Top-20 by 2020 (that target was set up some years ago by the President of Russia) already does not seem to be an uphill battle. At the same time, in this line Russia slightly dropped in 2019 — to the 12<sup>th</sup> place.

### The Global Competitiveness — 43<sup>rd</sup> place (↓5)

The Global Competitiveness Index, a global survey and an accompanying rating of countries of the world by the economic competitiveness indicator is annually performed since 2004 by the World Economic Forum. The survey is based on the combination of publicly-available statistic data and results of global pool of company executives. The population of variables by two-thirds consists of results of global pool of company executives, and by one-third of statistics and results of research regularly conducted by international organizations.

According to The Global Competitiveness Report, in 2019 Russia dropped by 5 positions — to the 2017 level. The methodology of rating preparation in 2019 was changed: new parameters were incorporated while some old parameters were excluded. So it is difficult to compare with the previous year and understand the reason of decline. One may note an improvement in such parameters as Innovation potential, Financial market maturity and Institutional environment. At the same time, the compilers decided that problems with Macroeconomic situation and Infrastructure still remained. If in estimation of stability Russia dropped down only by 2 points (although no express conditions to do it are visible), then in assessment of infrastructure the drop is much greater — from the 35<sup>th</sup> place to the 51<sup>st</sup>.

In 2017, the greatest loss Russia suffered was in Macroeconomic situation, where it has lost 51 positions in 1 year. Apparently, here came into play the statements in foreign media that the Russian economy was ripped to shreds. And besides, while the new rating version was getting ready the situation showed a great improvement. In 2018, the authors of the rating took it into account — in “Macroeconomic situation” Russia has raised from the 91<sup>st</sup> to the 53<sup>rd</sup> place.

## Changes in The Global Competitiveness by individual indicators, place in rating

#	Indicator	2015	2016	2017	2018	2019
1.	Global Competitiveness Index	53	45	43	38	43
2.	Institutional environment	97	100	88	83	72
3.	Infrastructure	39	35	35	35	51
4.	Macroeconomic situation	31	40	91	53	55
5.	Health and basic education	56	56	62	54	-
	Health	-	-	-	-	100
	Skills	-	-	-	-	50
	Goods market	-	-	-	-	83
6.	Higher and vocational education	39	38	32	32	-
7.	Efficiency of goods and services market	99	92	87	80	-
8.	Labor market efficiency	45	50	49	60	67
9.	Financial market maturity	110	95	108	107	86
10.	Level of technological development	59	60	62	57	-
	Dynamics of business development					51
11.	Size of domestic market	7	6	6	6	6
12.	Companies' competitiveness	86	80	72	71	-
	ICT introduction	-	-	-	-	25
	Institutions	-	-	-	-	72
13.	Innovations	65	68	56	49	36

Researchers note wholly true that the financial sector of Russia is plagued by reduction of capital inflow related to earnings from mining operations, accessibility of credits and venture capital is cooling down. However, this loss can hardly be thought to be so considerable for placing Russia so low in that indicator. In 2019 there was a certain ascending motion, but nevertheless Russia's place is still unreasonably low.

### Human Capital Index 2017 — 16<sup>th</sup> place (↑12)

According to the latest Human Capital Report prepared by World Economic Forum (WEF), Russia raised to the 16<sup>th</sup> place among 130 countries by Human Capital Index.

#### Change of Russian position in Human Capital Index in last years

2013	2015	2016	2017
51	26	28	16

Countries are ranked by 46 indicators in two groups. Ranking takes into account employment (breakdown by skill level, share of unemployed, accessibility of skilled employees, expectancy of life) and education (shares of population having secondary and higher education).

In spite of noticeable progress the rating compilers think that the Russian education system essentially has not changed. As before, the country maintains high positions due to the very high level of primary, secondary and higher education (in this field Russia is located somewhere among leaders — at the 4<sup>th</sup> place). However, additional efforts are needed to prepare population for the 4<sup>th</sup> industrial revolution. In Know-How the place of Russia is not very high — it takes the 42<sup>nd</sup> place.

The problem is recognized also by Russian businessmen. The basic fundamental education is at a good level, but skills required in practical activities are not properly trained in education institutions.

In terms of people having higher education, the USA, China and India have comparable figures (66-77 million, in RF — 29 million) — however, the number of graduates from technical universities is greater precisely in China and India (4.6 million and 2.6 million people). In Russia they are 561 thousand, and in the USA — 568 thousand.

### **Country attractiveness for experts in IT sphere (Boston Consulting Group and The Network)**

Russia took 25<sup>th</sup> place among 180 countries in attractiveness for experts in IT area. More than 40% of Russian IT professionals are looking to work abroad. At the same time, IT-experts from Kazakhstan, Belarus and other countries do not mind working in Russia. The survey was performed from March to May 2019. In the aggregate, there were interrogated over 26 thousand people including more than 1.6 thousand Russians.

#### **1.2.2. Innovativeness and ICT application**

### **E-Government Survey 2018: E-Government Development Index (EGDI) — 32<sup>nd</sup> place (↑3)**

E-Government Development Index is updated every other year by the UN Department of Economic and Social Affairs. After uprising from the 59<sup>th</sup> place in 2010 by 32 points to 2012, in 2014 nothing has changed for Russia. It held a sufficiently high 27<sup>th</sup> place.

#### **Change in E-Government Development Index by individual indicators, place in rating**

2012	2014	2016	2018
27	27	35	32

In 2016, a small decrease took place — to the 35<sup>th</sup> place, but the level of development is nevertheless recognized as high. The worst estimates are given to the Russian telecommunication infrastructure. Perhaps, it is explained by the huge scale and a big number of inhabited localities at a distance of hundreds and thousands km from the nearest metropolitan cities.

In 2018 Russia returned closer to positions achieved in 2014. An especially significant rise concerns E-Participation Index (EPI) — from the 32<sup>nd</sup> to the 23<sup>rd</sup> place.

Compilers offer prospects of a new version of this rating in 2020.

### **ICT Development Index 2017 — 45 (↓2)**

The ICT Development Index is a composite indicator characterizing achievements of countries across the world from the standpoint of development of information communication technologies (ICT). It is calculated according to the methodology of the International Telecommunication Union, the specialized UN division which specifies world standards in the ICT area. The index was developed in 2007 on the basis of 11 indicators which the International Telecommunication Union employs in estimates of ICT development in 190 countries.

In calculation of the index the ICT analysts do not take into account the geographical features of the countries as well as the density and the pattern of distribution of population, whereas these factors significantly impede ICT development in countries with parameters akin to that of Russia.



In the last version in spite of two position-down motion Russia increased its indicator from 6.91 to 7.07 (on a 10-point scale).

#### Changes in ICT Development Index by individual indicators, place in rating

Indicator	2015	2016	2017
<b>ICT Development Index</b>	<b>45</b>	<b>43</b>	<b>45</b>
ICT access	48	49	50
ICT use	44	47	51
ICT skills	19	14	13

It means that the analysts see a certain development but in other countries which take higher places it is going on much faster. At the same time, in ICT Development Index in Russia it is not all that bad. In this segment it takes a sufficiently high 13th place, having moved during last year by one place higher.

#### **Bloomberg 2018 Innovation Index — 27<sup>th</sup> place (↓2)**

Bloomberg Innovation Index is annually prepared by Bloomberg. In the rating of 50 innovative countries Russian positions remain generally unchanged in the last three years after rapid decline from the 12<sup>th</sup> to the 26<sup>th</sup> place. It may be noted that the authors found out a lower patent activity and a lower post-secondary education efficiency.

#### Changes in Bloomberg Innovation Index by individual indicators, place in rating

#	Indicator	2015 (↑ or ↓ relative to previous year)	2016	2017	2018	2019
	<b><i>Bloomberg Innovation Index</i></b>	<b>14 (↑4)</b>	<b>12</b>	<b>26</b>	<b>25</b>	<b>27</b>
1.	R&D Intensity (% of public spending on R&D)	31 (↑2)	31	31	32	33
2.	Manufacturing Value-Added (% of GDP)	37 (↑20)	27	48	33	37
3.	Productivity (GDP per working hour)	15 (↑32)	18	42	44	51
4.	High-tech Density (% of public high-tech companies out of total number of public companies)	15 (↓8)	8	24	22	25
5.	Postsecondary Education Efficiency (share of professionals)	2 (↑2)	3	3	5	10
6.	Researcher Concentration (number of researchers per 1 million habitants)	26 (↓1)	27	27	28	24
7.	Patent Activity	6 (↑3)	15	16	16	30

#### **Global Innovation Index – 45<sup>th</sup> place (↓1)**

Aside from Bloomberg, the Global Innovation Index rating is prepared by the Cornell University jointly with the INSEAD business school and the World Intellectual Property Organization. In 2014 Russia rose by 13 positions in this rating and took 49<sup>th</sup> place (given that in 2012 it dropped from the 51<sup>st</sup> to the 62<sup>nd</sup> place). In the last three years Russian positions in the rating have not changed significantly.

## Changes in Global Innovation Index by individual indicators, place in rating

#	Indicator	2015 (↑ or ↓ relative to previous year)	2016	2017	2018
	<b>Global Innovation Index</b>	<b>48 (↑1)</b>	<b>43</b>	<b>45</b>	<b>46</b>
1.	Innovation resources	52 (↑4)	44	43	43
2.	Innovation results	49 (↓4)	47	51	56
3.	Innovation efficiency	60 (↓11)	69	75	77

Researchers in 2017 noted the following strong points of Russia:

- Females employed with advanced degrees (2<sup>nd</sup> place among 127 countries)
- Domestic market scale (6)
- Utility models by origin (8)
- Trade, competition and market scale (12)
- Graduates in science & engineering (13)
- Pupil/teacher ratio, secondary (14)
- Knowledge-intensive employment (15)
- PCT patents by origin (15)
- IP payments (16)
- Tertiary education (17)
- Knowledge creation (22)
- Citable documents H index (22)

Russia has weak positions in the following indicators:

- Political stability and safety (112)
- Knowledge absorption (111)
- GDP per capita (110)
- GDP/unit of energy use (108)
- Innovation linkages (105)
- Rule of law (104)
- Regulatory quality (102)
- Political environment (100)
- Logistics performance (96)
- Investments (95)
- Regulatory environment (94)
- ISO 14001 environmental certificates (94)
- FDI net outflows (94)
- Venture capital deals (90)
- Global entertainment & media markets (48)

### Use of state services (**Boston Consulting Group** survey)

According to results of the survey of Boston Consulting Group (BCG) published in spring 2019, Russia was the world third-biggest in growth rate of using electronic state services and made the Top 10 in the intensity of using thereof. On average the world growth rate is at 15% but in Russia it is much higher — about 42%. Russia also makes the Top 10 in the highest intensity of electronic state service application. About 47% of Russians use them at least weekly. Electronic state services accessible to Russian population are quite diversified — on average every Russian uses 9.1 different types of these services. In this indicator such countries as the Netherlands and Sweden lag behind Russia — 8.2 and 8.8 respectively.

## Use of Artificial Intellect (AI) opportunities in business (Business Leaders in the Age of AI, Microsoft)

According to the survey of Business Leaders in the Age of AI, Microsoft (results were presented in April 2019), 30% of Russian top managers actively introduce artificial intellect: the worldwide indicator is 22.3%, for example in France it is only 10%. In opinion of the authors, Russian managers turned to be more practical in issues of using AI in business compared to their foreign colleagues. Among basic priorities of AI usage there were named: setting correct goals (32%), development of business ideas (26%), identification of new market opportunities (25%) and decision-making (23%). Russian managers were second in positive attitude towards AI: 73% of directors think that this technology will positively impact upon management behavior. They also demonstrated significantly higher preparedness for training and developing new skills in AI area. 90% of them were willing to be supported by professionals in order to work with this technology more actively; in the world this indicator is 67.3%.

### 1.2.3. Ratings of cities

#### Innovation Cities Global Index 2018

##### Change in position of Russian cities in Innovation Cities Global Index, place in rating

City	2015 (↑ or ↓ relative to previous year)	2016-2017	2018
Barnaul	—	446	467
Vladivostok	367 (↑14)	415	439
Volgograd	365 (↑13)	432	436
Yekaterinburg	220 (↓7)	358	402
Izhevsk	400 (↓6)	454	466
Kazan	223 (↓1)	339	375
Kaliningrad	303 (↑11)	397	426
Krasnoyarsk	280 (↑23)	412	443
Moscow	45 (↑18)	43	48
Nizhny Novgorod	273 (↑9)	388	421
Novosibirsk	244 (↑9)	394	416
Omsk	362 (↑9)	421	441
Orenburg	406 (↑1)	448	473
Perm	340 (↑14)	419	440
Rostov-on-Don	289 (↑28)	392	425
Samara	282 (↓16)	434	427
St. Petersburg	48 (↑33)	75	93
Saratov	341 (↑14)	437	456
Togliatti	407 (↑1)	455	474
Tomsk	339 (↑4)	444	462
<b>Total cities in rating:</b>	<b>442</b>	<b>500</b>	<b>500</b>

In 2018 the number of rating participants in Innovation Cities Index an included 500 cities worldwide. The rating makes possible to determine a potential of participants in the field of creation, implementation and translation of innovative ideas. The cities are evaluated by 162 special indicators including evolution of market relations, investments in technological progress, business environment, level of development of science, education, health care, culture as well as urban sports, financial and information communication infrastructure. 2015 was a year of rise of Russian cities, whereas 2017 was for all cities, but Moscow unfortunate one: the cities literally broke down in the rating having lost from 27 to 152 positions. In 2018 the decrease concerned all Russian cities including the capital.

No causes of such decrease of almost all Russian cities are visible, as economic problems should not affect creation, introduction and translation of innovative ideas. Changes in Russia in 2 years influenced innovativeness both positively and negatively as the same economic recession more often than not made companies and government agencies more innovative.

### **E-Government Rating (UN)**

In this rating compiled in 2018, Russia takes 32nd place (in previous version in 2016 it took 35th place). Herewith one should take into account that the authors have increased the number of cities under consideration to 40 world metropolitan cities. Each city was assessed in accordance with the Local online service index — that indicator for the first time was presented within the framework of the pilot project. Each city's result is influenced by contents and opportunities of city portals, the quality of rendered electronic services. Among all these metropolitan cities Moscow was first in line.

### **The smartest cities of the world according to version of ICF ([Intelligent Community Forum](#))**

The rating defines only 7 smartest cities of the world. In 2017, the 15th edition of the rating was published and Moscow was included for the first time. In 2018 and 2019 edition Moscow is already absent. In the last version Moscow can be found among semifinalists.

## **1.3. Achievements of individual Russian companies in the world IT ratings**

The large Russian software exporters actively participate in various ratings created by the globally authoritative analyst teams. However, their presence in these ratings is still insignificant. The main reason is the requirement of the rating shapers to disclose the turnover and profit data. A lot of Russian companies for a variety of reasons refrain from disclosing it.

In 2018-2019 regarding the change of positions of Russian companies in different world ratings it is hard to draw any firm conclusions about decline or improvement.

### **The Best of The Global Outsourcing**

The International Association of Outsourcing Professionals (IAOP) for 12 consecutive years has been compiling the rating of 100 TOP world's outsourcing companies. Since 2016 to be included in this rating, the companies are judged on five criteria: size & growth, customer references, awards & certifications, programs for innovation, corporate social responsibility. It should be taken into account that the Association is interested in attraction of new members that may impact on the rating of companies which are not the IAOP members. In and of itself no rating with sequential numbers has been prepared since 2015, but each company is given a status of leader or rising star depending on compliance with 5 criteria. In 2019, the name of the rating was changed for The Best of The Global Outsourcing 100 (in the previous name The Global Outsourcing 100 the year of survey was indicated). The company status again is not indicated.

Russia's representation in IAOP in recent years has changed insignificantly while before for a dozen of years it gradually improved the position. In opinion of experts, good representation in this rating testifies that the highest technical level of Russian engineers has been added by understanding of market requirements and by skill in doing business of Russian companies. Sometimes individual companies leave Top 100 as well as the number of leaders in certain nominations. However, they are replaced by others. So the total number remains almost unchanged.

Three years ago ICL Services became a newcomer of world ratings. For several years before this it already was regarded as a basic Russian claimant upon Top-100 world service companies and it lived up to expectations. In 2013 the company withdrew from Fujitsu Group and started working in Russia rebranded as ICL Services. The company is located in Kazan, the capital of Tatarstan, where the groundwork has been laid for establishment and development of IT companies. MAYKOR which offers IT services only 4 years ago for the first time was included in a similar rating basically due to its vigorous activity in Russia and IAOP.

In new version 2019, as compared with the previous one, the representation of Russian companies increased thanks to a newcomer — SimbirSoft from Ulyanovsk. In addition, First Line Software came back and Artezio was excluded (this company is a frequenter of the rating but it is not able to get a toehold in Top-100 every year).

### Russian companies in The Best of The Global Outsourcing (The Global Outsourcing 100) in 2015-2019

#	Name of Russian company	2015 (status/ points out of max. 4)	2016 (status/ points out of max. 5)	2017 (status/ points out of max. 5)	2018 (status/ points out of max. 5)	2019 (inclusion in rating)
1	Artezio	Start-up	—	—	Start-up (2)	
2	Auriga	Start-up 1	Start-up 4	Start-up 3	Start-up 3	+
3	Luxoft	Leader 1	Leader 3	Leader 4	Leader 5	+
4	MAYKOR	Leader 3	Leader 4	Leader 4	Leader 4	+
5	First Line Software	—	—	Start-up 2	—	+
6	ICL Services	—	Leader 3	Leader 4	Leader 4	+
7	MERA	Leader 0.5	—	Leader 2	Leader 2	+
8	SimbirSoft	-	-	-	-	+

Apart from Russia, neighboring Ukraine and Belarus are also represented in the global IAOP rating (in various years there have been such companies as the EPAM Systems, IBA Group, Intetics, Itransition, Oxagile, TEAM International, Miratech, SaM Softjour, SoftServe). All three countries are close to each other in terms of culture and economy in spite of the existing conflict between Ukraine and Russia. So it is quite reasonable to talk about a so-called “Russophone community” of IT- service companies. Strong points of companies from three countries are roughly the same. Primarily they have high quality of education in the area of physical and mathematical sciences, strong creativity and experience in managing complex project.

### Inc. 5000 Europe 2019

The annual rating of growth companies Inc. 5000 Europe 2019 includes five thousand companies of different industries. 7 Russian companies were classed with Software (in some cases they present different online services or are holdings supplying also hardware besides software).

Place in rating	Name	Growth	Turnover
90	Aitarget	2777.31%	€30.9 million
256	Skaner	1647.83%	€5.8 million
505	Laboratoriya VS	1176.96%	€8.1 million
1174	Inforion	730.82%	€5.0 million
1404	Geliosoft Limited Liability Company	652.74%	€3.4 million
1776	Quality Technologies LLC	557.63%	€2.9 million
1970	Xored	519.87%	€3.3 million

### Magic Quadrants of Gartner

The Gartner Group analytical agency ratings are one of the most prestigious ratings of software companies (software product vendors). Year over year this agency publishes so-called Magic Quadrants of Gartner, which include products and companies that are among the leaders in certain software segments.

### Russian companies in Magic Quadrants of Gartner

Gartner Magic Quadrant	2015	2016	2017	2018
Endpoint Protection Platforms	Kaspersky Lab (leader)	Kaspersky Lab (leader)	Kaspersky Lab (leader)	Kaspersky Lab (leader)
Enterprise Data Loss Prevention	—	InfoWatch (niche player)	InfoWatch (niche player)	More recent information not available
	—	Zecurion (niche player)	Zecurion (niche player)	
	—	—	SearchInform (niche player)	
Threat Intelligence	Kaspersky Lab Group IB	Kaspersky Lab Group IB	Information on research not available	More recent information not available
Business Intelligence and Analytics Platforms	PROGNOZ (niche player)	—	—	-
Advanced Analytics Platforms	PROGNOZ (niche player)	PROGNOZ (niche player)	-	-
Web Application Firewalls	Positive Technologies (visionary)	Positive Technologies (visionary)	Positive Technologies (visionary)	Positive Technologies (leader)
Application Security Testing	-	-	-	Positive Technologies (leader)
Application Testing Services	-	-	-	Positive Technologies (leader)
Data Center Backup and Recovery Software/Solutions	Veeam (visionary) Acronis (niche player)	Veeam (leader) —	Veeam (leader) <sup>7</sup> -	New version not available -



Gartner Magic Quadrant	2015	2016	2017	2018
Contact Center Infrastructure, Worldwide	NAUMEN (NODA)	NAUMEN (NODA)	NAUMEN (NODA)	New version not available
Disaster Recovery as a Service	Acronis (pretender)	Acronis (pretender)	Acronis (niche player)	Public information on leaders only
Enterprise File Synchronization and Sharing	Acronis (niche player)	—	Information on research not available	More recent information not available
Enterprise Backup Software and Integrated Appliances	Acronis (niche player)	—	Information on research not available	More recent information not available
	Veeam (visionary)	Veeam (leader)	Veeam (leader)	
Integrated Revenue and Customer Management for CSPs (solutions with functions: billing, customer service, tariff classification, charge generation, cost calculation, partner relationship management, policy management)			Peter-Service (leader)	-
Critical Capabilities for Application Security Testing	-	-	-	Positive Technologies
Sales Force Automation	-	-	-	bpm'online Terrasoft (leader)

The *leaders* take a significant market share and impact greatly upon the market, and to a large extent determine its development. The visionaries understand market trends but do not have sufficient facilities to affect the market.

The *niche players* focus on small segments or the other way round are “defocused” and do not boast by functions or potentialities.

The *pretenders* have a significant market share or take up a large segment, but it is not they who govern the market environment by their steps.

In 2019, in Sales Force Automation again was included CRM system bpm'online of the Russian company Terrasoft.

In the end of 2017 in Magic Quadrant for Integrated Revenue and Customer Management for the first time was included Peter-Service, St. Petersburg.

In 2018, Positive Technologies found itself to have the upper hand in two ratings: Application Security Testing and Application Testing Services.

Several years ago Diasoft became the first and the only Russian banking software developer included in Gartner Magic Quadrant for International Retail Core Banking Systems. Information on subsequent inclusion is not available (no open access to this Gartner Quadrant).

Endpoint Protection Platforms — Kaspersky Lab steadily makes the top three for the third year in a row.

Threat Intelligence — this software segment is presented by two Russian companies: Kaspersky Lab and Group IB falling under the leading global players within the segment.

Enterprise Data Loss Prevention— InfoWatch and Zecurion were added by SearchInform, and all three companies in 2017 turned to be in the zone of niche players, in so doing InfoWatch somehow moved up towards leaders.

Disaster Recovery as a Service — Acronis for three years was all downhill in this segment and in 2017 lost the pretender status and became a niche player.



## CHAPTER 2

Volume and structure  
of sales of Russian  
software companies at  
domestic market and  
abroad

## 2.1. Basic indicators of Russian software industry

According to RUSOFT estimations, in Russia there are no less than 3.6 thousand stable companies which pursue professional activities in the area of software development (exclusive of start-ups which do not have regular revenue). Annually, the number of software companies is growing by some 2-3% (in some years, the increment amounts to 4%). In opinion of RUSOFT Association, “a software company” is understood to be a commercial company the core business of which is software development. It should conduct regular sales, be managed by one legal entity and be targeted at market under its own name.

The RUSOFT’s estimate of the number of the Russian software companies is based on the availability of the own contact base which is annually checked and added, as well as on data about operating enterprises taken from federal and regional structures (trade associations and government authorities). This database of RUSOFT contains information on some 2 thousand companies. The complex database seeding allows to judge of a number of companies outside of our database. In addition, we are privy to information from regions where fully functional communities of software developers have been formed. Any methods of calculation talk about the fact that in Russia there are between 3.6 thousand and 4 thousand sustainable software development companies.

In the estimation of RUSOFT, at least 2.1 thousand Russian software companies conduct international business. According to banker books submitted to the Central Bank of Russia (CBR), monetary resources for provided “software services” (explained below in Section 2.3.) in 2018 were received from abroad by 9 thousand companies. However, the difference between 2 thousand and 9 thousand exporting companies as well as the total number of software companies come from the fact that one and the same company as per understanding of RUSOFT may sell its services and solutions through several associated legal entities. Besides, the income from “software services” may be gained by the companies which are not counted as being software because for them software development is not a core business.

### Number of Russian software companies

Number of Russian stable software companies	no less than 3600
Number of companies with export receipts	no less than 2100

## 2.2. Volume of sales of Russian software development industry

The cumulative turnover of the Russian software companies has grown by year-end 2018 by 19.5% and amounted to P997 billion. According to calculations made under the previous RUSOFT survey, the growth was expected to be higher — 25%, that would allow already in 2018 to pass one trillion threshold. That forecast was based on information of respondent companies on anticipated volume of revenues and of export during the current year.

### Basic figures characterizing the Russian software industry in 2013-2019 (growth/decline compared to similar indicator in the previous year)

	2013*	2014	2015	2016	2017	2018	2019 (forecast)
Cumulative turnover of Russian software companies, \$	over \$11 billion	\$12 billion (+5%)	\$10.34 billion (-10%)	\$12 billion (+16%)	\$14.3 billion (+19%)	\$15.82 billion (+10.6%)	\$18.6 billion (+17,6%)

	2013*	2014	2015	2016	2017	2018	2019 (forecast)
Volume of foreign sales, \$ billion	\$5.4 billion (+17%)	\$6 billion (+11%)	\$6.7 billion (+12%)	\$7.6 billion (+13%)	\$8.8 billion (+16%)	\$9.68 billion (+10%)	\$11.12 billion (+15%)
Share of foreign sales in cumulative turnover	49%	50%	65%	63%	62%	61%	60%
Volume of sales in domestic market, \$ billion	\$5.6 billion	\$6 billion (+7%)	\$3.64 billion (-39%)	\$4.4 billion (+21%)	\$5.5 billion (+25%)	\$6.14 billion (+12%)	\$7.48 billion (+21.8%)
Volume of sales in domestic market, rubles billion	₽178 billion	₽240 billion (+35%)	₽220 billion (-8%)	₽294 billion (+34%)	₽321 billion (+9%)	₽387 billion (+20.5%)	₽486 billion (+25.6%)
Cumulative turnover of Russian software companies, ₽ billion	₽363 billion	₽456 billion (+25,5%)	₽630 billion (+40%)	₽802 billion (+27%)	₽834 billion (+4%)	₽997 billion (+19.5%)	₽1.21 trillion (+21.3%)**

\* - before 2013 RUSOFT did not determine an amount of cumulative turnover so no information of turnover growth as compared to 2012 is available.

\*\* — it is anticipated that the annual average dollar rate by year-end 2019 will be 65 rubles.

In dollars, the growth of cumulative turnover also turned out to be much less — 10.6% instead of predicted 18%. The same holds for foreign sales which have been increased by 10%, though calculations showed growth by 19%.

### 2.3. Future prospects of changes in basic indicators of software industry

In earlier years expectations of the software development companies concerning volume of their foreign sales and income, as a rule, allowed for making sufficiently close assessments. Small companies overestimated indicators (were too optimistic) and large — underestimated them (exercised caution). All told, their errors were cancelled out.

This prediction method failed only twice. In 2015 instead of predicted turnover growth in dollar terms there was a fall almost by 11%. Cumulative turnover in dollar terms dropped due to contraction of domestic market and to sharp devaluation of Russian national currency. For the companies gaining a great part of revenues from activities outside Russia such changes are rather positive than negative. For this reason although aggregate foreign sales were a bit low in terms of growth rate after 2013 but increased by year-end 2015 to quite good 12%. Something similar happened in 2009 when due to the world financial crisis forecasting trends of sales volume turned out to be much more difficult.

In both cases when a real value of cumulative turnover greatly differed from predicted one, it resulted from certain economic tremors unforeseeable by respondent companies.

In 2018, there also were changes in geopolitics and world market but it is difficult to rank them among shocks or crises. Nevertheless, the growth of cumulative turnover and consolidated revenue from foreign sales turned to be much lower than anticipated.

The ruble came down against the dollar roughly by 8%, at the same time sales of Russian software development companies at domestic market increased by 12% in dollar terms. In rubles the increment is even better — +20.5%. One could not expect to find a much greater growth in current conditions— it was almost impossible. Devaluation takes a toll just on sales at domestic market.

Thus, there is no cause to consider devaluation as a main reason for slowing down the growth rate of cumulative turnover of the Russian software companies. Though a certain negative impact of ruble weakness against dollar could have taken place as in 2017, the growth of sales at domestic market was slightly higher (+23%).

Slow down in the growth rate of cumulative turnover of software development industry was to a great extent determined by foreign sales. Decrease in growth rates of sales (from 16% to 10%) can be primarily explained by effect of sanctions and of negative attitude toward Russia and to everything Russian at western markets. It came through imposition of sanctions (down to explicit ban on working with Russian software companies) and prevailing negative coverage in western media (for more on publications which can affect Russian software export see Section 1.4).

Both anti-Russian sanctions and the negative image in media emerged as factors affecting foreign sales as far back as in 2014-2015. However, in all appearances this influence seriously manifested itself only in 2018. Before, top managers of Russian companies complained about unfavorable media coverage in the West but along with this said that a lot of things still were clicking. Decrease in growth rates up to 10% against a decline in the ruble demonstrates that external negative factors really began having a serious impact on IT export from Russia at mature markets.

Losses at western markets are partially compensated by sales growth in Asia, Middle East (to a lesser degree, in Africa and South America). However, this compensation cannot be thought as adequate yet. As before, mature markets bring Russian developers up to 80-85% of all foreign sales (in more detail see Chapter 5).

An illustrative example is a case of Kaspersky (previously Kaspersky Lab). Only in the US in two last years it lost over \$40 million of annual sales. Courtesy of the growth at other markets (the company has offices and partners in 135 countries) it managed to increase consolidated revenues by year-end 2018. However, the increment was just 4%. It is fair to assume that without keeping out from western markets it would have been no less than 10%.

At the same time, it is conceivable that the attitude toward the Russian software companies will change in the years ahead both in Europe and the US. One cannot quickly give up software development services and off-the-shelf program products because replacing them is not always possible. With all existing bans, the solutions of Kaspersky are still used by American government structures.

A positive impact on activities of the Russian software companies may provide information that software for two crashed airplanes Boeing 737 Max was developed by Indian programmers. This news appeared in the broadsheet Bloomberg in late 2018. It may result in growth in orders for the Russian software development companies which previously also have fulfilled bulk orders of Boeing.

It can be expected with very great probability that revenues of Russian software companies in dollar terms will be growing in the next 2-3 years on average by 10-20% per year.

The only factor which may bring a significant growth of volume to foreign sales may become the launch of platformic solutions of the Russian companies to the Global market, primarily, in segments of the new Technological Paradigm of world economy (artificial intellect, cyber physical systems, industrial Internet, robotics, virtual and augmented reality). But this growth will to a great extent depend on governmental support to creation and to introduction by Russian IT industry of a new security infrastructure that is absolutely necessary for establishment and growth of markets of the new Technological Paradigm.

The increment of 10-20% of cumulative turnover has existed in all recent years except the 2-year crisis period (before 2013 RUSOFT calculated just the volume of foreign sales). Such growth rates are limited on two sides.

On the one side, such limiter is a growing demand for software at world market (both software products and custom development). It ensures the growth of cumulative turnover at least by 10%. Moreover, the salaries of developers are growing from year to year.

Therefore, even with stationary demand the revenues of custom software suppliers will go on rising. For Russian companies this limitation is overcome in case of domestic market contraction but only partially and for a short period. Processes of digital transformation of economy and imports substitution anyway generate heavy pressure on market and support sales in Russia. Contraction of domestic market primarily makes a dent in foreign software companies.

On the other hand, another growth limiter is human resources. What is meant here is not only engineers directly involved in software development but also marketing experts with knowledge of situation in foreign markets, sales managers and competent senior officers with leadership skills. Due to the inability to greatly increase these resources, cumulative turnover does not grow more than by 20% per year. It may be assumed that first of all in short supply are leaders who are able to establish a new company or to assume authority for development of one or another activity area of a middle company or a large company. Marketing experts and sales managers are important primarily for the product companies, which in recent years grow slower than the service companies. The service model is directly rely on the number of developers, but it also requires managers with leadership skills.

For foreign sales the shortage of human resources is of even higher value growth limiter. Without approaching the global market with platformic solutions their growth by more than 15% is hardly probable. In recent years it was 16% and even 17% but only due to a few very large (by Russian standards) companies which were established long ago and already became global (not always they identify themselves as Russian). If these leaders are taken off the list, the growth of volume of foreign sales will be no more than 10%.

The work in other countries requires rarer skills and knowledge. For example, a good command of foreign languages is essential, without mentioning understanding of different cultures, world engineering and market trends. Among IT graduates the number of engineers with good command of any foreign language are 15-20% at best.

Recruiting developers and managers for activities at domestic market is a lot easier. So the growth of sales herein may exceed 20% in dollar terms even at the stable ruble's rate against the dollar if fortunes in the market look up.

Due to tight resources (both human and financial) many companies have to decide between activities in domestic market and abroad. If the maximum growth is provided by sales in Russia, they can either fully (at least for a while) elect not to promote solutions abroad, or significantly reduce the export share. We can observe the latest reorientation to the Russian market while analyzing results of 2017-2018. It has overtaken no less than 10% of the Russian software companies. As a rule, those companies with share of exports no more than 10-15% and who limit themselves to export to countries from CIS totally gave up working beyond Russia.

Barriers to purchase of Russian software in the USA and EU and the negative coverage in western media during 2018 started materially and negatively affect the growth rates of foreign sales of Russian developers who continue to gain a main export income at markets in Europe and North America. Therefore, even more important is the rapid reorientation of companies to other foreign markets. RUSSOFT suggested heightening their interests in these markets as far back as 10 years ago, at the same time we urged not to leave western markets. However, engaging in activities in the US and Europe becomes more difficult year after year (for more on geographic markets in Chapter 5).

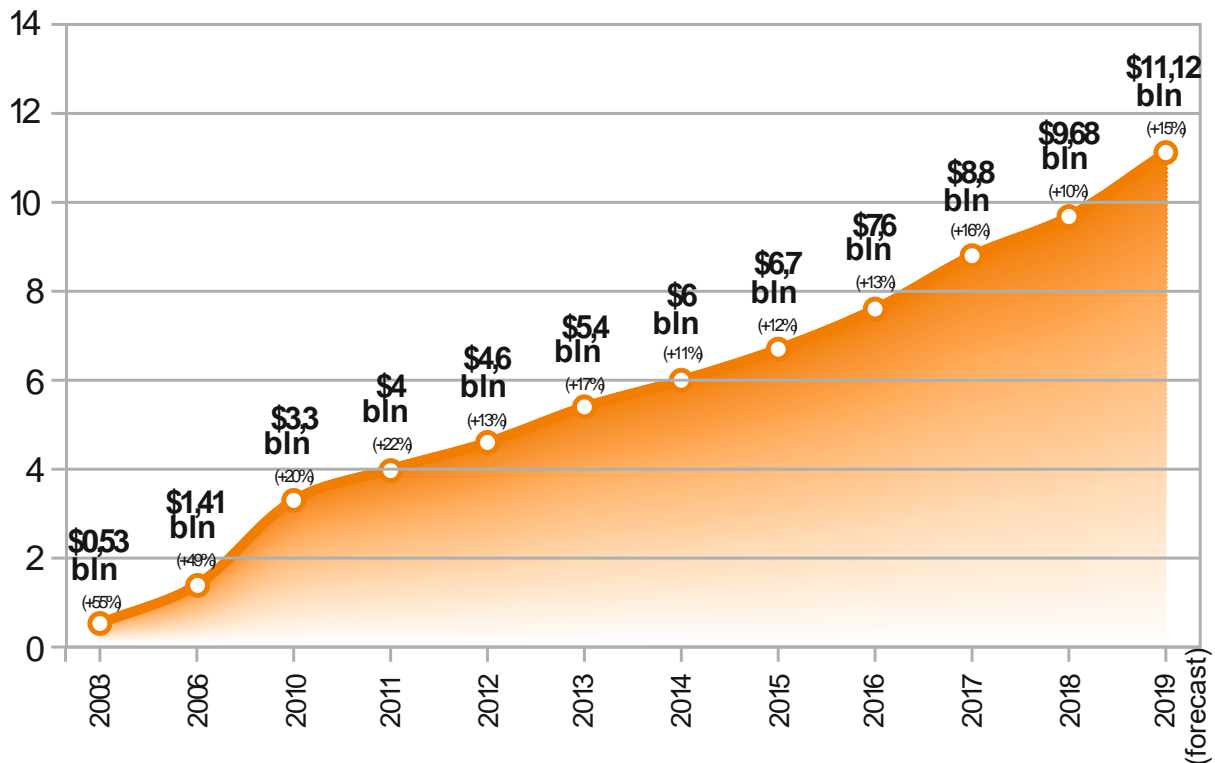
Commitment to the imports substitution in IT area (or better said to "Digital Sovereignty") is underway not only in Russia but also in many countries outside the western world. At that, the imports substitution may occur as replacing import from one country by import from another country. With due account for critically different IT development levels in developed and developing countries, in most countries of the Third World precisely this imports phase-out is more probable than substitution of American solutions by local ones. Such commitment to "Digital Sovereignty" in many developing countries may be and has to be used by Russian companies.

Different public structures (primarily, Russian Export Center) have already began assisting promotion of domestic software developers to relatively new markets.

## 2.4. Foreign sales and export earnings

Cumulative foreign sales of software companies in 2018 run at \$10 billion as we predicted a year ago. In all appearances, in spite of positive forecast, this level will hardly be reached by year-end 2019. First, turnovers of a few large companies will not be included in our calculations because they will not be classed as Russian ones anymore (forecast for 2018 was made including information from these companies). Second, an increment of volume of foreign sales in 2019 calculated on basis of expectations of respondent companies most probably will be traditionally overestimated (in very deed it will be less than 15%).

### Volume of foreign sales in 2003-2019 (annual increment)



Foreign sales of software companies may be thought as their export, but they should not be confused with export earnings from sales of software and development services. Each of these notions has an appropriate quantitative dimension. There are three different indicators of activities of the software companies abroad:

- volume of foreign sales,
- volume of “software service” export,
- volume of export earnings.

They can be significantly distinct from each other.

For instance, there are data published by the Central Bank of Russia (CBR) on the software service export. Its volume by year-end 2018 was \$4.06 billion that is 42% of the volume of foreign sales calculated by us. However, such big difference which often puzzles and is open to debate has a logical clue.

#### **CBR letter ruling**

*Statistics of cross-border trade of the “software services” is prepared on the basis of international methodology described in “Guide on statistics of international service trade, 2010”, UN. The software services include operations related to development and introduction of software: development, creation, delivery and presentation of documentation for custom software; purchase of ready-made software supplied by electronic means; acquisition of licenses for software with no chance for reproduction and distribution.*



*Besides, this category of services includes activities related to data processing, creation, recovery, hosting, storing databases and working herewith; services for development, designing and web- pages hosting on server; services for installation, repair and software and hardware servicing; providing consulting services related to software and computer operation as well as training under consulting. Basic information sources of formation of cross-border service trade statistics of the Russian Federation are data in accounts and records of credit institutions approved by the Bank of Russia.*

“Foreign sales of a software company” and “Export of software services” are two different indicators which must not be equated. First, the software companies gain income not only from software services, but also from sales of embedded software integrated in different devices and in software packages, from ads in applications developed hereby. Second, companies transfer to Russia the revenues from international sales of their software not only for provision of “software services” but also as payments for use of intellectual property, remittance of funds to physical persons or as investments. Third, a considerable part of the proceeds remains beyond Russia.

A part of cash is left in other countries by legal entities established by Russian companies in accordance with the global practices (to be closer to the customer in order to mitigate its risks of dealing with foreign companies). This is even more understandable under the current geopolitical environment. This money may be allocated for marketing, for own foreign R&D centers and for offices expenses, as well as it remained on the owners accounts.

#### Comparison of volume of exported software services (statistics of Central Bank of Russia) and volume of foreign sales of software companies (as per calculation by RUSOFT)

		2011	2012	2013	2014	2015	2016	2017	2018
Foreign sale of Russian software companies (as per calculation by RUSOFT)	Absolute value, billion \$	4	4.6	5.4	6	6.7	7.6	8.8	9.7
	Annual change	+22%	+13%	+17%	+11%	+12%	+13%	+16%	+10%
Export of software services (according to CBR)	Absolute value, billion \$	1.666	1.995	2.508	2.651	2.455	2.664	3.417	4.06
	Annual change	+30.9%	+19.7%	+25.7%	+5.7%	-7.4%	+7.7%	+28.3%	+18.8%
Share of exported “software services” (by CBR) in foreign sales of software companies (by RUSOFT)		42%	43%	46%	44%	37%	35%	39%	42%

Therefore, export of software services accounts only for a part of foreign sales of software companies. By year-end 2018 these two indicators differ by \$5.6 billion. How these 5-odd billion are distributed we may picture just highly approximately because methods of definition of these two indicators are widely different. RUSOFT collects accurate data on major companies and it extrapolates on the rest on the basis of a selective survey. Central Bank uses stop-watch reading based on reports of banks about sources of hard currency of its clients.

## 2.5. Sales at domestic market

Out of the total volume of sales at domestic market of \$6.1 billion about \$2 billion accrue to the service companies the main income thereof is gained by custom engineering, and a little over \$4 billion — to software product developers. Once is known what share of revenue of companies accrues directly to custom solutions (75% of service and 14% of product companies), one can estimate a volume of orders for software development which Russian companies secured in Russia. It is \$2.1 billion.

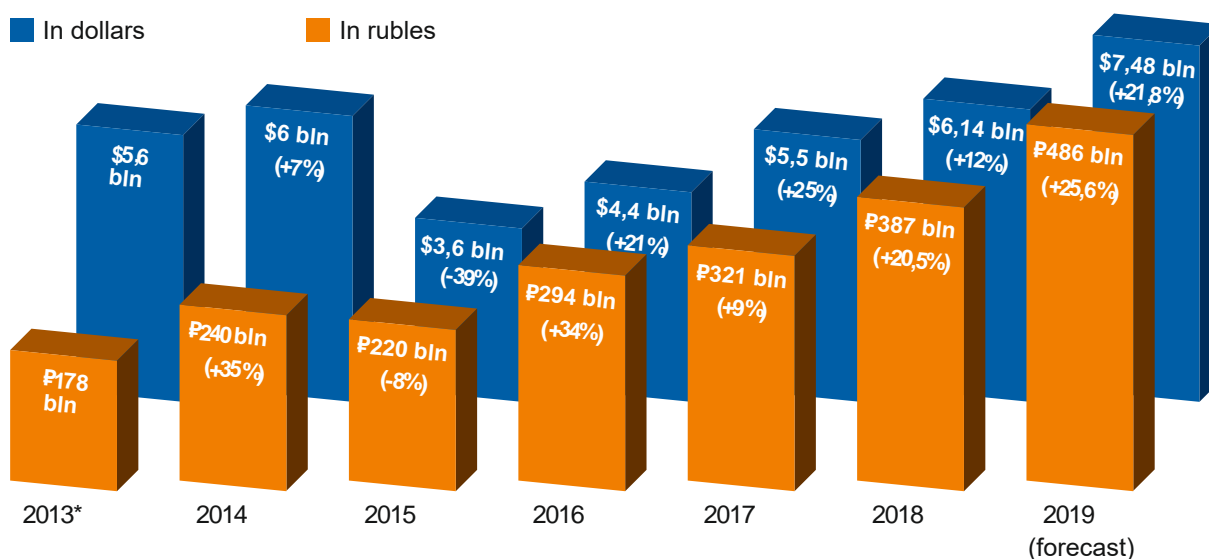
Similar calculations may be performed as to domestic software products sold in Russia. The service companies also develop them, but they make up no more than 6% of cumulative turnover. The primary source of income of the product companies (software vendors) is domestic market sales — 63%. As a result, sales of domestic software products inside Russia make up \$2.7 billion.

Altogether, the total volume of sales of custom software and sales of software products by year-end 2018 was as much as roughly \$4.8 billion. The difference between this value and aggregate sales of service companies and of software vendors (\$6.1 billion) is due to the sales of embedded software in hardware and in software packages, the revenue from different IT services including SaaS, and other sources of revenue earned.

The increment of revenue of the domestic software vendors at domestic market was 8.4% in dollars (in rubles — 17%). A similar value should be obtained as regards sold software products (without other income streams). According to IDC, Russian software market has increased only by 2.2% up to \$3.07 billion. Stemming from the difference in growth rates it may be concluded that the process of imports substitution is still underway quite actively though a lot of large government entities in every possible way are trying not to change anything and not to forgo foreign software (in more detail in Section 3.4.).

At the same time, at domestic market Russian companies sell software products up to \$2.7 billion (with its size of \$3.07 billion according to IDC version). It does not mean at all that Russian developers already occupy 88% of Russian market. Anyway foreign companies sold software products in Russia to no less than \$2 billion in 2018. Most probably, the volume of Russian software vendors income should be at least \$4-4.5 billion, even if not taking into account the services for custom software development (IDC classifies them as IT services and assigns to the appropriate segment of IT market). However, IDC data can also be quite accurate provided that this research company strictly follows the developed methodology. There may be different opinions of what can and what cannot be classed with software market depending on terms of reference (in more detail in Section 1.1.5.).

### Volume of sales of Russian software companies at domestic market in 2013-2019



\* - until 2013 RUSOFT did not determine an amount of cumulative turnover so no information of turnover growth as compared to 2012 is available.

\*\* — presumably, the annual average dollar rate in 2019 will be P65.



All sales at domestic market (product and service companies) have increased by 12% in dollars (in rubles — by 20.5%). At the same time, revenue of activities abroad has increased by 10%. Hence, comparing these growth rates one can assume that there are indications of reorientation of companies from foreign markets to domestic market. If we analyze information by way of dividing the companies into categories by business models and size, such reorientation becomes obvious at quite a large scale although not for everyone.

First of all, service companies began to place greater focus on domestic market. If their cumulative foreign sales increased by 9% then sales at domestic market increased by 20.6% (all similar comparisons are in dollars). At that, such relationship is typical for any sized service companies. Whereas some 5-10 years ago some classical custom software developers had been working at the US and EU markets and had no sales in Russia at all (and sometimes were skittish about chances of finding a good Russian customer), then in the last couple of years almost all of them went belly up. The largest of them without fail take on projects in Russia gaining less than 10% of aggregate revenue.

Perhaps, the growth in demand for custom engineering is related to preparation for FIFA World Cup in Russia in summer of 2018. Most works could have been implemented in 2017, but payments were effected in 2018. Still, the impact of preparation for this championship could be not so great because extension of scope of artificial intellect, introduction of industrial IoT, creation of public information networks, development of the Smart City — all this required development of unique solutions. Besides, according to observations of IC experts, a number of companies have grown who try to develop its own system even if similar ready-made solutions are available.

The digital transformation stimulating demand for unique systems is on fast-forward. It was a conclusion reached by DT Global Business Consulting GmbH which in early 2019 interviewed 100 top managers of Russian and international companies working in Russia in different branches of economy. According to poll, only 7% companies do not invest heavily in the area of digital transformation of business. At the same time 80% of respondents planned in 2019 to increase investment in digital transformation within their companies, and 19% of them intended to boost expenditures.

The matter with the software vendors (product companies) is quite otherwise. They increased foreign sales by 11% and sales at domestic market by 8.4%. Hence, it is expected that they have reoriented themselves from domestic to foreign markets. It is particularly true for the largest software vendors who have already built their business at global market and who increased sales basically abroad. If Russian market is growing by 15-30% but ensures 2-4% of turnover they will hardly reorient to domestic market even if the share of sales in Russia has increased.

If we look at product companies with turnover from \$5 million to \$20 million we see that their cumulative foreign sales have increased by 8% and that at domestic market — by 17%. It is possible, indeed, that now it is easier for them to sell their products in Russia. By Russian business standards they are sufficiently large and noted even by major Russian corporate buyers.

At the same time, product companies with turnover less than \$5 million faster increase trade at offshore market. Their sales have increased by 10% and the revenue from activities at domestic market — by 8%. However, the difference is not so great to speak about any apparent reorientation.

Nevertheless, it stands to reason that in 2018 the software development companies crossed over to domestic market to an adequate degree. For that matter a prominent part was played by the companies which did not gain income from foreign sales more than by 10-15%. Many of them reduced export revenue to zero (in 2017 25% of respondent companies did not have any export revenues, and in 2018 this value increased up to 36%).

## 2.6. Head office location

Dependence of turnover changes and foreign sales on the head office location of respondent companies in 2015-2018

Head office location	Moscow				St. Petersburg				Other cities			
	2015	2016	2017	2018	2015	2016	2017	2018	2015	2016	2017	2018
Overall revenue change in USD	+11%	+17%	+22%	+6%	+9%	+20%	+11%	+8%	-8%	+12%	+59%	+18%
3-year average (overall turnover change)	+13.9%				+12.1%				+20.2%			
Change of volume of foreign sales in USD	+24%	+19%	+16%	+10%	+23%	+20%	+13%	+9%	+9%	+7%	+27%	+10%
3-year average (change of volume of foreign sales)	+17.2%				+16.4%				+13.2%			

Software developing companies from Moscow and St. Petersburg almost always showed better figures of the total sales and exports than the regional businesses. The primary reason is that most large and medium software companies of Russia concentrate in the two Russian capitals. They have been growing due to their size, although the head office locations are also of importance. The brand awareness of two Russian capitals is a factor as well as a closer interlinking with other countries. First of all, it is referred to flight connection (though from St. Petersburg it is also easy to get to the capital of the neighboring EU country by high-speed train or by car). As a matter of fact, these factors are no longer critical as almost all major Russian cities enjoy quite comfortable flight connection with foreign countries.

In 2016 due to revival of Russian economy the strengths of both capitals were slightly reduced but still were in place, while in 2017 the economic turn came into being — the respondent companies located beyond Moscow and St. Petersburg were growing much faster (they increased turnover by 59%, and foreign sales — by 29%).

In 2018 the turnover growth rates of companies with head offices outside two Russian capitals also were higher. It is worth noting that the growth rates of foreign sales in no way depended on location (inside-the-margin-of-error difference).

## 2.7. Share of foreign sales in the turnover of companies

The results of 2012 for the first time showed the violation of the rule that the higher share of exports of companies resulted in the higher turnover growth. Maybe, it is a consequence of implementation of several large projects in Russia during that year (in 2012, the total turnover of companies grew more than their exports). Judging by the results of 2014-2015, this rule again turns to be fair. During the crisis years 2014-2015 it was even more obvious that companies with a high export share were much more resistant to the crisis than companies more oriented towards the domestic market.

As per the results of 2015, the companies offering a share of foreign sales in excess of 50%, reduced their turnover generally by 21% in USD, that have not been observed throughout the years of surveying.

In 2016 the active work in foreign markets did not give much precedence due to recovery of the growth of domestic market for Russian companies, nevertheless the precedence was in place.

In 2017, the situation at domestic software market was still improving, but companies with the share of foreign sales in turnover over 50% still were growing faster than companies with great part of revenues provided by sales in Russia.

By year-end 2018, no obvious dependence of growth rates on a share of foreign sales was found out and this occurred despite the fact that sales at domestic market got a little bit higher. It means that companies which are more focused on foreign markets always are able to resonate with the growth of domestic market. If the situation in external markets becomes more favorable compared to that in domestic market, those companies which sole key market is Russia will not be able to react effortlessly to this change.

Random fluctuations of optimal ratio of export income and sales in the domestic market are quite possible however the evaluation over the past few years shows that if the software development companies intend to provide the stable turnover growth, the export share in their consolidated revenues must be at least 50%.

### Income growth of companies offering a different share of foreign sales

Export share	less than 10%	less than 50%	over 50%	over 75%
Growth of income in 2011	+11%	+17%	+34%	+36%
Growth of income in 2012	+28.5%	+22.1%	+20.6%	+24.5%
Growth of income in 2013	+5%	+7%	+24%	+25%
Growth of income in 2014	+4%	+1%	+25%	+26%
Income growth /reduction in 2015	-34%	-21%	+22%	+25%
Growth of income in 2016	+14%	+15.5%	+18%	+18%
Growth of income in 2017	+16%	+17%	+21%	+23%
Growth of income in 2018	+11%	+9%	+10%	+11%
8-year average	+6%	+8%	+23.5%	+25%

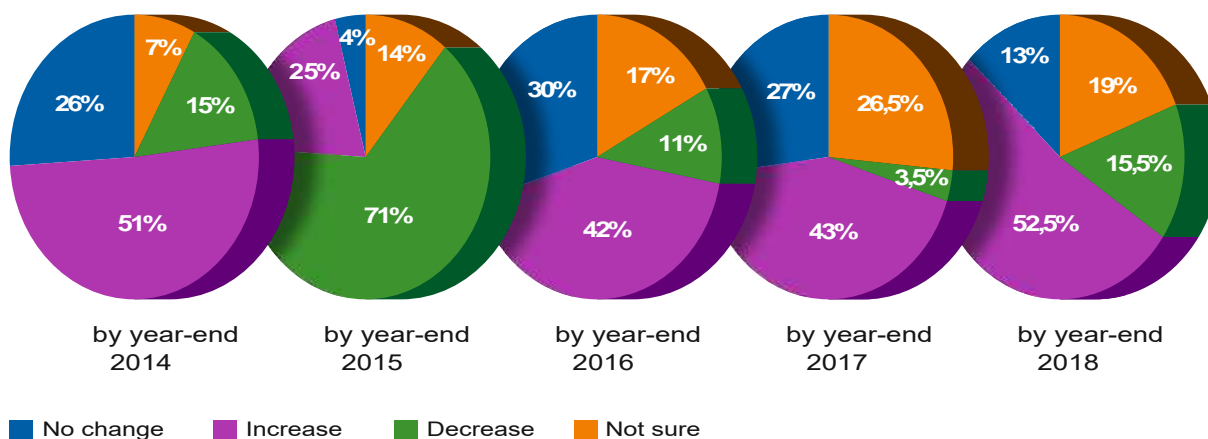
## 2.8 Turnover change nature

If in 2015 71% of respondent companies reduced their turnover in dollar terms, in 2016 they were only 11%, being illustrative of the fundamental change of situation across the industry. In 2017 the share of companies with reduced revenues by year-end decreased to a just symbolic value — 3.5%. In other words the software industry is spare of companies with reducing revenues in dollar terms, but by and large it is due to an increase in the annual average exchange-value of ruble. At the same time a third of respondent companies has high growth rates: they increased turnover more than by 10%.

In 2018 the number of companies with decreasing turnover in dollar terms again went up. At the same time the number of growing businesses also went up — 35% of companies showed the growth over 10%.

Obviously, in 2018 the value of turnover change varied wildly — from 50% reduction to 100-150% growth. This scatter may be quantitatively measured by calculation of an average deviation of growth/drop from the change of consolidated revenues of all respondent companies (hereinafter to be referred to as “average deviation”). The higher this indicator, the less stable is situation at the world and at the Russian market for Russian software developers. Generally the highest level is observed during economic crises. For example by year-end 2014 the average deviation was 6.4%, and by year-end 2015 increased sharply up to 20.4%. In 2016 it again decreased to 5% and remained at this level in 2017.

### Share of respondent companies with different annual turnover changes in dollar terms

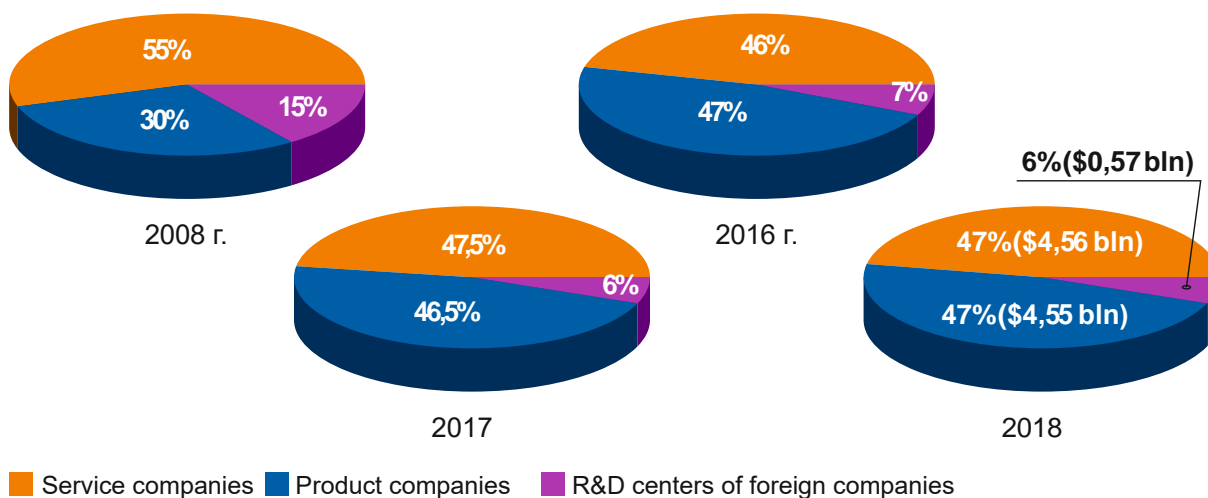


There is no evidence for believing that 2018 was a kind of exceptionally recession year. If not some signs of crisis (it is hard to speak in serious vein about crisis when we have the growth of some 10%) then at least the world market turbulence can be observed. Conditions for Russian companies have changed (it is more challenging works in 2018 specifically). For another thing, the world market itself undergoes serious changes due to appearance of the New Technological Paradigm and the associated increased popularity of brand-new technological trends.

### 2.9. Distribution of foreign sales vs. business model

The definition of branch structure in terms of business model becomes more and more irrelevant as the differences between product and service companies are getting fuzzy. In 2019 49% of the respondent product companies mentioned custom development as a segment of their activities. The same indicator took place last year. At the same time classical outsourcing companies which reject any possibility of developing their own software have software modules or units utilizable in different designs (in other words, the same replicated solutions).

#### Distribution of consolidated foreign sales among companies with different business models by year-end 2016-2018 (absolute value)



In addition, the composition of income is a guide to the priorities of a company. In 2019 6.3% of companies indicated the composition of income by which it would be impossible to determine their unique or prevailing business model; 24.4% did not deal with custom development at all (that means they were unequivocally product companies); 36.3% indicated the zero revenues from sales of their own software products (unequivocally service companies).

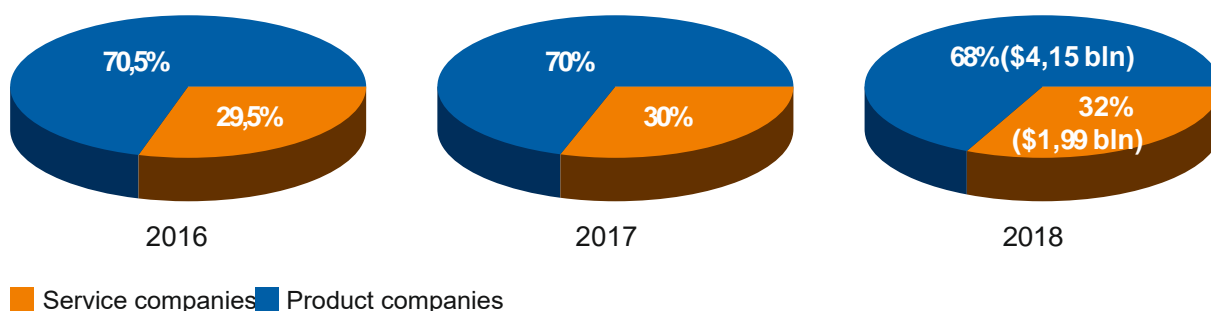
The remaining 33% of respondents used both models side by side. In calculations, they are classed with product or service companies depending on what income is primary. There is no bright-line test to classify companies however one may draw a conclusion on tendencies towards using one or another model.

Before 2016, there was a definitive tendency implying reduction of share of foreign sales of software development services in the entire volume of foreign sales of Russian software development companies (including software development services provided by R&D Centers of foreign companies). In comparison with 2008 the proportion of companies specializing in custom development have reduced from 55% to 46%, and that of R&D centers of foreign corporations — from 15% to 7%. The companies with the product business model are taking center stage. By year-end 2016-2018 the service companies ultimately were growing faster. In 2018 their growth rates of sales at domestic market were particularly high, but in terms of cumulative turnover the product companies even increased their share.

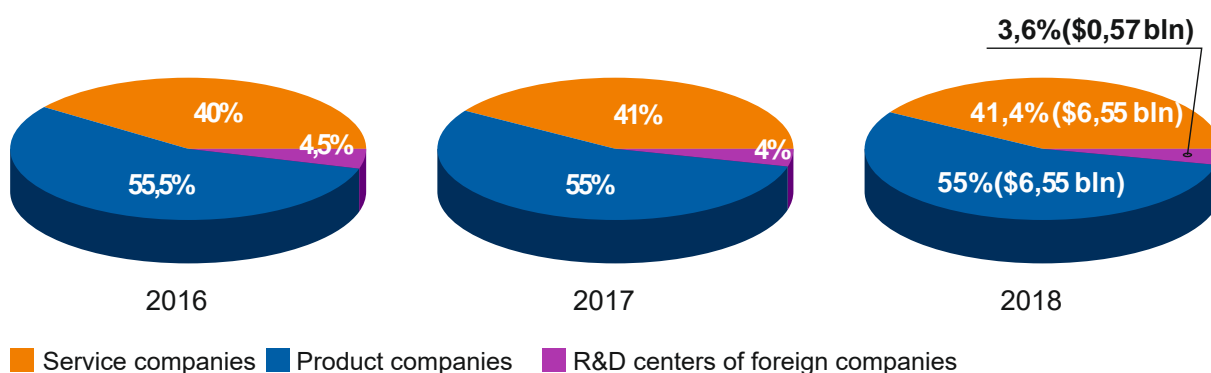
One may reasonably believe that a quicker growth of foreign sales of companies which gain primary income from custom development was purely temporal and related to the significant ruble's decline against the dollar after 2014. This assumption is confirmed to a degree by 2018 results (although the annual average dollar-ruble exchange rate decreased by 8%). The decline of national currency considerably increased the competitiveness of Russian custom development at the world market. For more on prospects of each business model see below in respective sections.

The factors which impact upon the R&D centers of foreign companies and upon Russian service companies in some degrees coincide. At the growing for 10-15 years labor cost of software developers many foreign corporations appeared to be not prepared to enlarge their Russian segments of business. In addition, their activities were affected by deterioration in relations between Russia and the USA (many R&D centers with reduced staff belonged just to the US companies). At the same time, the activities of R&D centers were also affected by decisions of some Western corporations which had a hard time doing and as a result undertook staffing cuts throughout the world including Russia.

#### Distribution of consolidated sales at domestic market among companies with different business models by year-end 2016-2018 (absolute value)



#### Distribution of cumulative turnover among companies with different business models by year-end 2016-2018 (absolute value)





## 2.10. Service companies

### Basic indicators of service companies by year-end 2018

	in dollars	in rubles	in rubles inflation adjusted	forecast for 2019, \$
Turnover	\$6.55 billion	₽ 413 billion	-	\$7.9 billion
Turnover increase	+12%	+21%	+16%	+21%
Volume of foreign sales	\$4.56 billion	-	-	\$5.3 billion
Foreign sales increase	+9%	-	-	+16%
Domestic market sales	\$1.99 billion	₽125.4 billion		\$2.6 billion
Growth of domestic market sales	+20.6%	+30.3%	+24.9%	+32.2%

The bulk of the increment in foreign currency from the software development services during previous years has been provided by major companies. Their growth rates are much higher than those of middle and small companies.

Large service companies may receive more beneficial orders and, consequently, pay better salaries to their employees than small businesses. This has been a reason for a flow of professionals to major companies from small ones.

Major companies feature one more advantage: an existing chain of sales offices and development centers throughout the world. As a result, they may compensate for the problems of anti-Russian propaganda and anti-Russian sanctions as well as expand their staff through the establishment of remote development centers in Russian various towns and abroad or through the acquisition of foreign and Russian companies.

In 2017 the situation underwent a 180-degree turn — the increment of foreign sales of companies with turnover less than \$5 million averaged out 24% (in dollar terms) and that of companies with a greater turnover much less — 8% and 14%.

Nevertheless, the turnover increase in 2017 as before turned to be greater among large companies. This suggests that they began to focus more on the domestic market of custom engineering which in all appearances significantly increased in 2017.

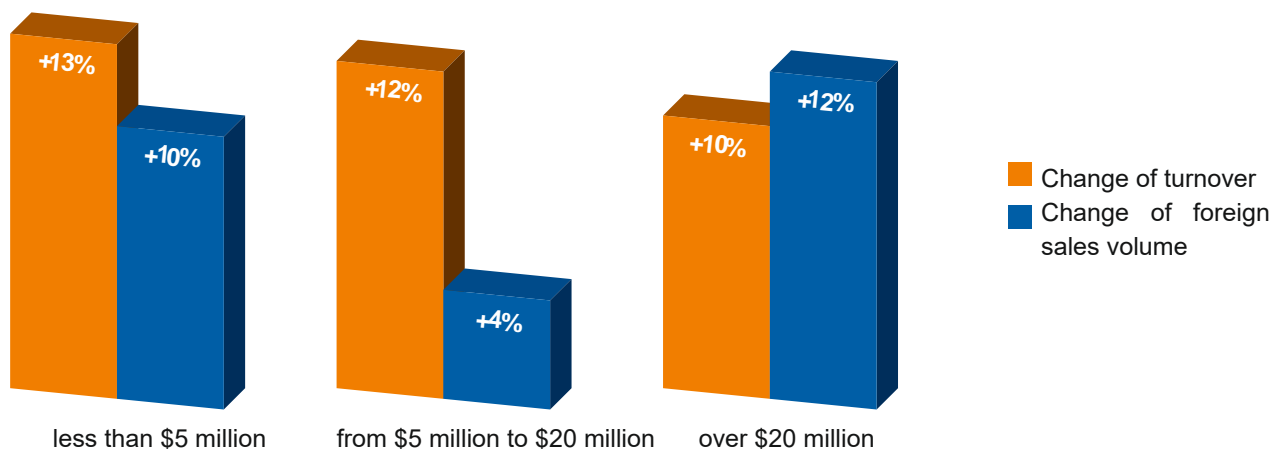
In 2018, the growth rates of the service companies of unequal size became more even. As a result, it is difficult to assert what turnover opens up more possibilities for revenue increase. Cumulative turnover of companies with revenues less than \$5 million has increased a little more than that of larger ones, but the difference turned to be too insignificant to draw any conclusions.

Only the companies with revenues of \$5-20 million need attention having growth rates of foreign sales well below than that of the rest. A sample of these companies is not big but last year they showed the same gap and not coincidentally. Their growth rates of foreign sales are markedly lower than of more large and less large companies. It is fair to assume that precisely these companies prefer to increase turnover at home. Owing to active work in Russia the growth of their cumulative turnover is similar to that of others. Hence, in the context of scanty resources they are forced to select Russian market as a priority.

Small service companies became more distinctive and active in the recent 2-3 years. By all tokens they managed to find foreign customers even with the restricted marketing budget and under anti-Russian sanctions. They cannot compete in large-scale projects with large companies which have thousands of employees. At the same time, in foreign countries there are other customers (with low budget) which are of no concern of the largest outsourcing companies. On the other hand, the high-profile customers in Europe and the US to a greater extent face a risk of imposition of anti-Russian sanctions than small companies (for example, start-ups which are conventional customers of Russian service companies).

A novelty was the introduction of not very large regional service companies to Moscow labor market, though previously they could not adequately jockey for manpower even in hometown.

#### Change of turnover and foreign sales by year-end 2018 depending on company size



Custom development still is much-in-demand in Russia and abroad. It is changing and more than likely will change down the line. There will emerge more efficient ways of software development and the specialization profile of the service companies will strike into subject. For example, in summer of 2019 Lanit established a new company Lanit Expertise which aims in 3 years to win some 10% of Russian outsourcing market in the area of software testing services.

It cannot be ruled out that the demand for custom engineering will be stimulated through Russian product companies. Until now, they do not take the role of serious customers of the service companies, but some examples of closer cooperation already exist. For example in June 2017 the service company Mera endorsed an agreement with Kaspersky Lab for development and testing of mobile device software.

Presumably, Russian service companies underestimate markets of developing countries. By all means the value of labor power there is lower than in Russia, and it would be difficult to succeed in the local marketplaces with the classical model of custom development. But if one uses a tried-and-tested expertise and ready-made modules and packages, if it works in cooperation with other companies (with platform developers, system integrators) then the window of opportunity herein becomes quite feasible.

One of the largest Russian service companies which for long years had been working only for western customers considered a possibility of working in Iran. At long last it elected not to bid for a tender because it did not know how to work with Iranian government agencies and had trouble understanding the decision-making procedure in that Eastern country. Incidentally, the estimated cost of the project was fine with the company. Another service company (Auriga) won a tender in Dubai and currently is developing a new and a very prospective market.

In many developing countries there are important needs in national-grade information systems. Russian developers may have required competences at a competitive price level. In 2016-2017, 5-10% of the service companies indicated their presence at markets beyond North America and EU. In the Middle East countries in 2017 they made up 12% and a year earlier 9%. In 2018 already 25% of the service companies had presence at “new markets” (even just implementing individual projects) and at the Middle East market — 14%. Reorientation of service companies to the “new markets” becomes more and more apparent.

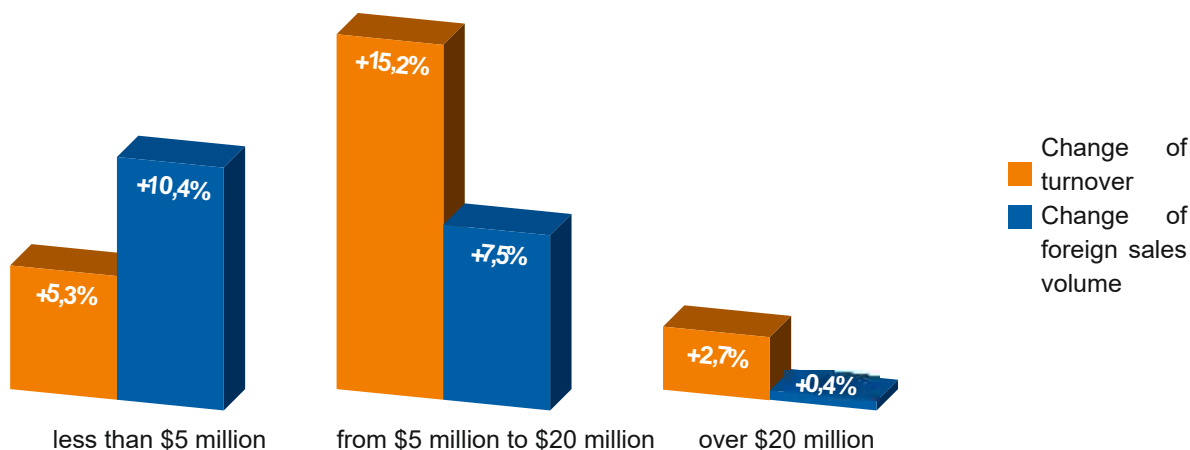
## 2.11. Software products and ready-to-use solutions

### Product companies by year-end 2018

	in dollars	in rubles	in inflation-adjusted rubles	forecast for 2019
Turnover	\$8.7 billion	₽550 billion		\$10.1 billion
Turnover growth / reduction	+10%	+18.7%	+13.8%	+16%
Foreign sales	\$4.55 billion	-	-	\$5.2 billion
Foreign sales growth	+11%	-	-	+15%
Domestic market sales	\$4.15 billion	₽261 billion	-	\$4.86 billion
Domestic market sales growth / reduction	+8.4%	+17%	+12.2%	+17%

Given that product companies should expand their sales easier (as they depend on availability of the vacant professionals in the labor market to a lower extent) their growth rates in the last three years appeared to be less than those of service companies whose sales are almost proportionately governed by the staff expansions. At the same time product companies also rely heavily on the number of trained professionals which shortage hinders the development. However, not only technical experts are in question but primarily sales managers, marketing experts with knowledge of global market and engineering trends and competent ambitious senior officers with leadership skills.

### Change of turnover and foreign sales by year-end 2018 depending on company size



### Forecast of software product sales

If we rely on the expectations of respondent companies (as well as on the experts' estimates regarding the prospects of major companies) then foreign sales of software vendors in 2019 should increase by 15% in dollars. At domestic market the growth of sales is predicted at the level of 17% (in rubles it will amount approximately to 13.5%, as the annual average dollar rate increased roughly up to 65 rubles).

The major Russian product companies which have previously worked exclusively within the post-Soviet borders strive for coming to far-abroad markets. The odds are that they will make a go, however this assumption was made already 10 years ago but there have not been any successful achievements yet. One of the leaders of Russian market in its segment planned an aggressive international expansion but later its top managers decided that the export business line was not good for them.



There are a few other smaller companies that hold promises of promoting their solutions which have been successfully approved in the Russian market, in foreign countries. This promotion is, in particular, supported by their inclusion in so-called Gartner Magic Quadrants (Gartner Magic Quadrants, see Chapter 1).

The relatively small companies start moving on in fast growing markets of developing countries (e.g., Brazil, China, India and even Vietnam). It is hard just to list the specialization profiles which allow for blossoming out in these markets. More often than not their achievements are untraceable because for promotion they do not need any publicity in Russia.

## 2.12. Software development centers of foreign corporations in Russia

### Volume of services provided to parent companies

Volume by year-end 2018, \$	Change by year-end 2018, %	Volume by year-end 2018, P	Change by year-end 2018, P	Forecast for 2019, \$
\$0.57 billion	+4%	Р36 billion	+12%	\$0.6 billion (+5%)

The prevailing geopolitical situation and global problems of some western corporations (primarily, American) has resulted in a situation where a number of these corporations reduced their Russian R&D centers or closed them at all. Alcatel-Lucent, Motorola, HP, Google, Intel have followed suit. In 2017, they were joined by Oracle which completely closed its development center in St. Petersburg that, in particular, by 1/3 provided development of the programming language Java. Prior to adoption of anti-Russian sanctions nothing foreboded this course of events because the Oracle management expressed satisfaction with activities of St. Petersburg staff. By all appearances, the closure of the development center in St. Petersburg was fueled by the political position of the company management or by pressure of the US government entity.

The problems of global companies which implemented retrenchment all over the world also came into play. Once again a message about plans of such retrenchment came in spring of 2019 from Intel which as before is a leader at the world processor market but its leadership is not so flawless than 10 years ago. This company launched the large-scale restructuring and cost minimization followed by reduction of staff but no precise amount of dismissed persons is reported.

The information background in foreign mass media often misrepresents the risks of operations in Russia. For that reason, top managers of the foreign corporations (if they have not elected to reduce the investments in Russian business units) are not at least bent on an expansion of the same. At the same time, Russia has taken a number of measures complicating the operations of foreign corporations' development centers. In particular, foreign R&D centers have responded adversely to of adoption of the RF Law on personal data protection.

One may talk of rather massive exodus of internationally acclaimed IT companies from Russia but their place is taken by large German and Asiatic companies as well as by young and dynamically developing Western companies many of which were established by Russian-born businessmen.

According to the recruiting companies, the activity on the Russian labor market of international corporations not only lessened but even boosted. According to HeadHunter, in H1 2018 in Russia at hh.ru there were published by 21% more job offers of foreign companies in Russia with specialization in software development than for the same period last year. In January-June 2019, the increment to H1 last year was 30%. Due to the closed nature of R&D centers of foreign companies, we are forced to judge about investments in these companies, primarily, by information of recruiting agencies.

It is not implausible that the volume of services provided to foreign parent companies which amounted in 2018 to \$0.6 billion is underestimated. By year-end 2019, this indicator will be much higher thanks to the fact that a number of large Russian companies have declined Russian jurisdiction and currently cannot be considered as Russian. Their sales have become fully foreign, but development activities most likely will continue in Russia. It may happen that they will expand their operations thanks to new powerful owners.

Foreign companies that have their own R&D centers in Russia: Alcatel-Lucent, Allied Testing, AVIcode, Cadence, Design Systems, Chrysler, Cisco Systems, Columbus IT, Dell, Deutsche Bank, Digia, Edisoft, EGAR Technology, EMC, EMS, Ericsson, Hewlett-Packard, Huawei, IBM, Intel, InterSystems, Jensen Technologies, LG Softlab, Motorola, NEC, NetCracker, Nival Interactive, Microsoft, Netwrix, Nokia, Nokia Siemens, Quest Software, RD-Software, Samsung Research Center, SAP, Scala CIS, SmartPhoneLabs, Tagrem Studio, Teleca, T-Systems.

### 2.13. RUSSOFT rating of major software companies of Russia

In 2019, RUSSOFT has prepared the fifth version of annually updated RUSSOFT rating of Russian software development companies. Essentially it is a list of the major software companies divided into categories (divisions) depending on size and growth rate (including predicted indicators during 2 years to come). No similar complete rating list of Russian software developers has ever been made.

Our objective was rather not ranking the companies by size but covering all Russian largest software companies. Perhaps, we do not have yet information of some companies worth looking at to be included in our rating list. However, it is arguable that there are only a very few such companies, and they have the turnover no more than \$50 million.

Nevertheless, we compiled our own rating list with a primary focus on a company size. For fear of disclosing confidential information and avoiding rigorous ranking, all the companies were grouped and posted in alphabetic order without giving information about their turnover.

For each group, a sufficiently wide range of consolidated revenues was defined; however, the companies were grouped out not only by existing volumes but also with consideration for their development trends.

#### Top division (Division A)

«1C»

Kaspersky

Luxoft

Veeam

The Top division consists of companies which already have capitalization in billions of dollars. We have included Luxoft into this division as it is historically a Russian company, it made IPO under the Russian flag, and has changed the jurisdiction of its head office five years ago under the pressures of heavy geopolitical consideration. In 2019, the transaction was completed on sale of Luxoft by the US DXC company.

So in the next RUSSOFT rating it will go to another category in compliance with the turnover of its Russian office where some 2.5 thousand people are working. The same holds for Parallels and TRANSAS which sales were reported in 2018 (there have not been any official information about deal consummation till August 2019 yet).

Most likely, 1C company could have had a billion USD turnover if one takes into account the income not only from sale of own solutions but earnings from distributorship as well. However, the economic crisis (primarily, the ruble exchange rate fall) had an extremely unfavorable impact on its turnover in dollar terms as the company's main income is drawn in Russia.

Kaspersky (previously KasperskyLab has enhanced its standing among leaders, but so far is not growing so rapidly as several years ago). It's possible that new solutions focused on security of Internet of Things and a more active work beyond the USA and EU will give the opportunity to speed up and reach a 1B turnover.

By year-end 2016, Veeam, as expected, moved into the Top Division. At the global market it portrays itself as an international company, however, the founding members were of Russian descent, and the basic development center is located in St. Petersburg.

### Division B

ABBY
Acronis
CBOSS
Center of financial technologies
Cognitive Technologies
DataArt
EPAM Systems (Russia)
JetBrains
Nexign (Peter-Service)
Parallels
SKB Kontur
TRANSAS

The Division B also includes sufficiently large companies with the turnover from \$100 million to \$500 million. Particularly, the Russian office of EPAM Systems which controls work of development centers in Moscow, St. Petersburg, Saratov and several other cities. This category in 2018 was added by DataArt with the US corporate headquarters and the main development center in St. Petersburg, and another well-known St. Petersburg company JetBrains with the corporate headquarters in the Czech Republic.

A newcomer in Division C was Playrix with Vologda roots. It became known after inclusion in the world rating AppAnnie at the 32<sup>nd</sup> place. Some experts valued its turnover roughly at \$200 million, and capitalization at more than \$1 billion. However, there is no precise information of the company's turnover. Since it has R&D centers in several Russian cities and considering its appearance in AppAnnie which takes into account volumes of mobile application sales, it is fair to assume that Playrix's turnover is at least \$50 million, though it may well be that it has already exceeded \$100 million.

### Division C

BSS
Diasoft
Dr. Web
Forsite
Infotecs
GDC Services (ICL-Services)
Kronshtadt
Mera
Playrix
Positive Technologies
RTSoft

In Division D (turnover from \$20 million up to \$50 million) was included a newcomer — Geoscan Group. There also some other would-be members, particularly, RC Module, Satellite Innovation and Contek Soft. Perhaps, they already have a turnover required for being included in the rating, but no affirmation has been presented yet.

Cumulative turnover of 73 companies listed in the rating of major software companies is no less than \$8 billion.

### Дивизион D

Arcadia	Compass Plus	InfoWatch	Soft Expert
Artezio	CryptoPro	Integra-S	SpeechPRO
ASCON	Devexperts	Kodeks	Paragon
Ashmanov and Partners	Digital Design	Lanit-Tercom	SPIRIT
Atom Security	Elecard	Naumen	R-Style Softlab
Auriga	First Line Software	NIC SPb ETU	RDTex
B2B-Center	iiko	Omnicom	Reksoft
BARS Group	Galaktika	Parus	Return on Intelligence
Bercut	Garant	PROMT	VIST GROUP
BFT	Geoscan Group	SCANEX	Zecurion
BIS	Group-IB	Security code	
CDC	Infokompas	SIGMA	

Perhaps, it would be as well to include in the rating Waves Platform and Aitarget, but the point is whether they really are software companies. Waves Platform is a developer of blockchain platform Vostok which within the second round was valued at more than \$1 billion. However, the company presents itself as an online service provider.

Aitarget has been included in the rating of high-tech companies Inc. 5000 Europe 2019 with €30.9 million turnover. It has developed a system for automation of targeted advertising campaigns in social networks Facebook and Instagram, but the income is derived from rendered services. Therefore, it may be also classed with dot com companies.

# CHAPTER 3

## Primary Trends in the Russian Software Development Industry

### 3.1. General analysis

In 2018 the Russian software industry not only ultimately got out of crisis (evidenced by few indicators described in Chapter 2) but began to grow ever-more-rapidly than before 2014. In the big picture if we compare with other segments of economy the crisis associated with events in Ukraine for software developers was conditional. Only the dollar equivalents of epy total volume of turnover and of sales at the domestic market were reduced and only at year-end 2015. There were some serious problems for several companies which generally operate in the Russian market alone. Nevertheless, on the average returns in rubles all the same were growing even in 2015, the same as the RUSSOFT bi-currency index which accounts for sales in rubles and dollars (that index in 2018 was 1.14 which corresponds to the 14% growth). The staff of software companies considers as crisis a squeeze on income in dollar terms but in ruble terms the income kept on growing throughout recent years. In other sectors an average salary measured in rubles, if anything, was frozen.

A negative impact of Ukrainian crisis upon Russian software development industry in 2017 still took place, but in a number of critical ways it can be said that by the beginning of 2018 it basically became history. Growth rates of sales in rubles not only recovered but moved to a new level — from 10-13% to 15-18%.

The industry overcoming the crisis is reflected not only by economic indicators but also by a number of indirect indicators. In particular, answers of respondents to the question about the main areas of activity not only provide the relevant information about companies' goals but also serve as an indirect indicator of a perception of crisis (or growth). If a company mentions a smaller number of areas of activity than previously, more often than not this means that it has had to scrap plans to complete certain tasks. This may be due to uncertainty on the market arising from changing conditions, or to the lack of resources for adequate development. Naturally in a down economy companies try to concentrate on solving just one task (or if possible, another one or two, but no more).

Accordingly, with a drastic decrease in the number of areas of activity mentioned by a significant number of respondents we can speak of deterioration of business environment or a present crisis. Judging by the change in the average number of areas of activity mentioned by respondents, the worst times for the industry were when the survey was held in 2014 and 2015. In 2016, this figure grew, if only slightly, although it did not reach the level of 2012-2013. This indirectly shows that the crisis was beginning to be overcome. In 2017-2018 the number of main areas of activity per company first reached the level of 2013 and then exceeded it. In the 2019 survey this indicator slightly reduced however remained at a level much higher than in 2014-2015.

#### Number of main areas of activity and trends per company surveyed

year of survey	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
directions	-	-	1.9	2.06	1.84	1.6	1.82	2.07	2.14	2.08
trends	3.19	2.73	2.96	3.23	3.42	2.28	2.58	-	-	-

Answers to the questions about main objectives of companies, about business environment and factors influencing activities of software companies first and utmost provide a means of assessing sentiments and changes of mood of top managers. It is possible to judge about real situation by mood of respondents but it must be done carefully using evidence from other sources.

After the decrease in the share of respondent companies in 2015 which believed in the prospects of a growth of sales in Russia when the prospect of a serious contraction of the domestic market was obvious, this share increased in the subsequent two years. Especially as in 2016 the growth of the domestic market was not only expected but real.

In the 2018 survey the share of companies which believed in the prospects of work in Russia was almost at all-time highs. The previous record was achieved in 2013 and in 2019 this record was cut.

In 2018 the opportunities for increasing foreign sales were mentioned by a greater number of respondents than a year earlier. However, the share of those who positively assessed the prospects of work at the domestic market has been grown much more. In 2019 thanks to the improved situation at the internal market and to problems at western markets the number of companies focused on more active work abroad were smaller than in the last two years. Nevertheless, 61% — is not so bad. At the same time the share of companies which mentioned “Work for export/expansion of the marketing network abroad” as a priority even slightly increased — from 28% to 31%.

In 2019 87% of respondents mentioned the growth of business (regardless of whether in Russia or abroad) as a priority task of their development. In 2016-2018 surveys they were 75%, 77% and 80% respectively.

It is worth pointing out that a certain explosion of interest of respondents in the area “Certification of software development processes” which was observed in 2017-2018, in 2019 concluded. In 2016 no company named it as a priority, in 2017 5% of companies did, and in 2018 — 3%. In 2019 again no one company named certification it as a priority task. In all appearances, with the existing growth of the domestic market when a software company does not need a certificate of compliance with international standards, companies again lost interest in collecting foreign certificates. The companies (mainly, service) which generally work abroad have all necessary certificates anyway, so while answering our questions they do not consider this issue as a priority.

After the drop in the 2015 survey of the number of companies aspiring to create software development centers in other regions (up to 4%) in the next two years it climbed back to 15%, which shows the recovery of the market and a deficit of software engineers.

In 2018 that indicator kept footing within 10-15%. Only over the period of crisis in 2009 and 2015 it was below 10%. In 2019 anew there were a few companies which planned to establish or expand networks of development centers in other cities though this year by no means is a recession year. At the same time companies plan increasing the staffing level at year-end by 16%. By all tokens a hope of increasing the staff is related with cities where companies already have production sites. Such headcount growth industry-wide is unfeasible due to the objective scantiness of resources. Through an additional labor supply it is possible to reinforce staffing by 6-8% at most.

#### Main areas of companies' development, %\*

Year of survey/area	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
More active work on the domestic market	66	68	77	73	81	73	63	65	68	79	84
Growth of online sales	22	31	28	29	36	27	30	32	39	33	33
Work for export/ expansion of the marketing network abroad	-	-	47	52	59	56	50	57	66	69	61
Certification of software development processes	8	13	12	13	10	5	7	8	16	18	16
Establishment of regional development centers	7	12	13	15	15	15	4	10	15	12	9
Other	-	-	8	8	5	8	6	10	3	4	5

\* — respondents could choose more than one area



### Priority areas of companies' development

	2015	2016	2017	2018	2019
More active work on the domestic market	45%	36%	31%	52%	56%
Growth of online sales	17%	14%	11%	5%	4%
Work for export/expansion of the marketing network abroad	30%	41%	36%	28%	31%
Certification of software development processes	1%	0%	5%	3%	0%
Establishment of regional development centers	2%	2%	2%	0%	1%
Other	5%	8%	1%	1%	1%

In the 2016 survey almost all the areas in 'Other' reflected quite an optimistic mood. However, three respondents mentioned tasks which did not focus on development – carrying out present tasks, survival, and keeping afloat on the market. Afterwards no one mentioned survival as the main priority of their activity.

In 2019 respondent companies three times mentioned as 'Others' development or market launch of own software products and also singly the following tasks: 'Accelerate and enhance the quality of recruitment', 'Attraction of investments', 'Establishment of a project office', 'Increase in earnings'.

Companies with turnover below \$5million more often see the prospects of work at the domestic market than abroad. Larger companies in 2018 preferred foreign markets of all others but in 2019 even they reoriented to a greater extent to the domestic market.

### Main areas of development for companies with different turnover

	turnover <\$5 million	turnover >\$5 million
More active work on the domestic market	84%	82%
Growth of online sales	34%	29%
Work for export/expansion of the marketing network abroad	58%	71%
Certification of software development processes	16%	16%
Establishment of regional development centers	6%	21%

### Main areas of companies' development with different H.Q. location

	Moscow	St. Petersburg	Siberia	Ural*	Other cities
More active work on the domestic market	89%	77%	78%	89%	89%
Growth of online sales	19%	29%	41%	67%	32%
Work for export/expansion of the marketing network abroad	44%	68%	78%	11%	66%
Certification of software development processes	8%	15%	14%	44%	21%
Establishment of regional development centers	3%	12%	5%	22%	14%

\* — Ural is represented just by 6 companies, so it's difficult to draw any conclusions hereon

Siberian companies are more focused on work for export contrary to Ural companies. Though truth be told there were a very few Ural companies surveyed to draw firm conclusions. For example, Yekaterinburg is the 4<sup>th</sup> most populous city in Russia while according to the Central Bank of Russia the Sverdlovsk region takes the 15<sup>th</sup> place in export of computer services. It falls short of such lowly populated areas as Vologda and Tula regions.



### 3.2. Quality management system certification

In 2011-2016 the replies to the question about the presence of a quality management certificate have not made it possible to make any logical conclusions. If there were changes in the results of these answers they were probably coincidental. So after 2016 this question was temporarily removed from the questionnaire. The 2018 survey allowed for assuming its return as after the end of the crisis period 3-5% of surveyed companies called ‘Certification of software development processes’ as a priority area of activity (this was not mentioned at all in the 2016 survey). However in 2019 when companies more often indicated their intention to enter the foreign markets no one mentioned it as a priority.

At the same time 16% consider ‘Certification of software development processes’ as one of the objectives in 2019; only 26% of respondent companies think of the state support for quality management certification to international standards as totally unimportant. They can be added by 17% which could not assess its importance. Thus for 57% of companies surveyed the state support for quality management certification to international standards is important to some extent. It is highly important for 15% (almost the same number set this task for 2019). However an average point of such measure as the state support of certification is steadily the lowest among all main measures of state support. At year-end 2019 it was 1.28 on a scale from one to five (between ‘low importance’ and ‘moderate importance’ but closer to low).

#### Evaluation of importance of state support for quality management certification to international standards, % of surveyed companies



For service companies the importance of state support of certification is obviously higher than for product companies (the average point was 1.38 and 1.17 respectively). Besides 18% of service companies mentioned “Certification of software development processes” as one of main tasks for 2019 and among product companies they were 14%.

It is fair to assume that the importance of certification is higher for companies which work or plan to work at foreign markets. The 2019 survey shows that it is not quite so.

If we look at companies which are already present at just one foreign market, for 49% of them the significance of this measure of support is zero (or it was difficult for them to assess it). For all companies surveyed it is 43%. For companies, which did not work abroad in 2018 but plan to enter to even one foreign market in 2019-2020 this indicator is 44%. At the same time the average point of importance of state support of certification is anyway slightly higher than among all companies — 1.33 versus 1.28.

Presumably the problems related to certification to international standards require consideration not by a general survey but through the focus group discussion with participation of experts.

According to experts interviewed in 2017, the issue of establishing a quality management system in software development companies in Russia lost its urgency approximately in the middle of the 2000s because by that time practically all companies have had their own quality management systems. For those service companies which participate in international tenders with formal requirements for CMMI certificates this problem was resolved by the regulatory certification. All product companies and small service providers content themselves with ISO or implement their own quality management systems based on ISO and CMMI but without requiring the expensive procedure of certification and confirmation.

In 2007, the first authorized (and later certified) CMMI Expert appeared in Russia and in 2009 the first Russian-speaking Lead Appraiser (which still remains the only one) was certified. This only led to a short-term and small increase in the number of certified companies as the share of the Russian experts' services cost in the total assessment and certification cost is not great enough to have a serious bearing on the certification cost.

A general idea of a share of companies which have been certified to ISO and CMMI may be obtained from 2016 data.

### Share of companies certified to international standards

	2009	2010	2011	2012	2013	2014	2015	2016
Not certified	65%	61%	69%	64%	74%	71%	61%	61%
ISO	31%	31%	29%	35%	24%	24%	33%	30%
CMM*	0%	7%	3%	3%	1%	-	-	0%
CMMI	4%	7%	2%	6%	6%	5%	4%	4%

\* — CMM was not included in the 2014 questionnaire as it was recognized to be obsolete and completely replaced by CMMI

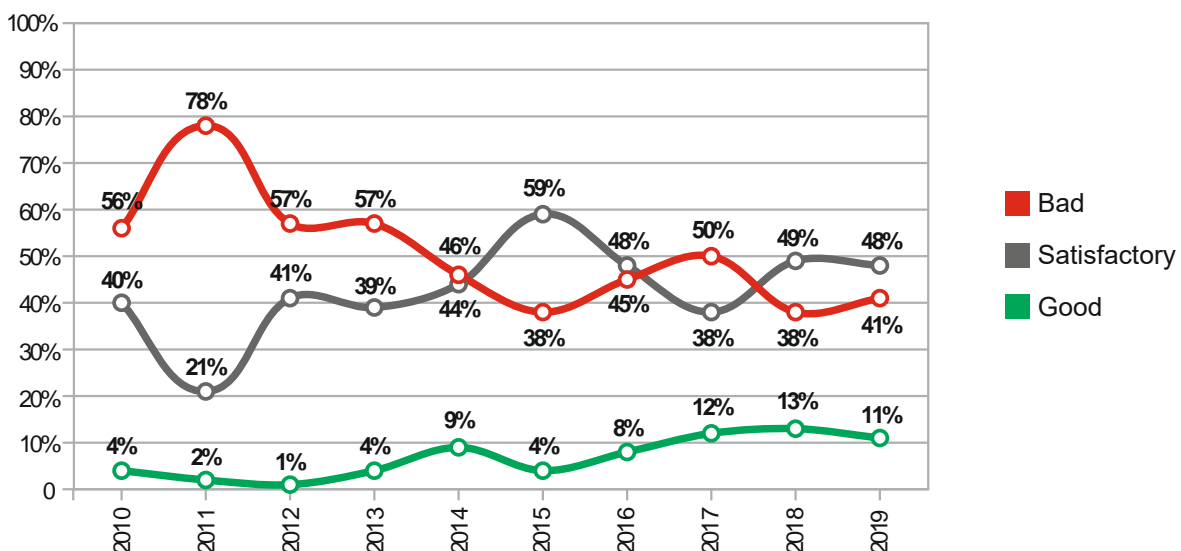
In 2014 for the first time we included the question about the use of SCRUM or other kind of Agile Programming but initially we could not obtain any reliable results. It is likely that employees of the call-center and many respondents misunderstood the question. The problem was solved in the following year. In 2015 and 2016 the share of companies using SCRUM or its equivalent were identical – 13%.

In 2016 software vendors mentioned the presence of any kind of certificate almost as frequently as service companies (36% and 40% respectively).

As the problem of having certificates becomes less pressing, in recent years respondents have become less concerned about whether there is state support of certification (although this support is almost zero). In 2010-2013 more respondent companies showed dissatisfaction with the lack of this support. From 2014, the problem of certification became less significant in the face of serious changes in the external environment. Most respondent companies are not even aware that in competing countries the state is interested in the quality management system certification of domestic companies.

Assessment of state support for quality management certification to international standards in 2019 hardly changed compared to 2018. Noteworthy is that 48% of respondent companies refused to assess this support at all, they apparently had no information about it.

### Evaluation of state support for international certification



In 2016 a State program was launched to compensate some of the expenses of Russian manufacturers for production certification on foreign markets (RF government decree № 1388, the Russian Export Center was nominated as an agent of the government for providing subsidies ). In 2017 the financing of 0.76 billion rubles was allocated for this program. This decree approved the list of codes of goods of foreign economic activity of the Eurasian economic union (Armenia, Belarus, Kazakhstan, Kirgizia, Russia). According to these codes, compensation is provided for a part of expenses on certification and on localization of products.

The Russian Ministry of Economic Development is at present formulating proposals to expand the list of production codes (request attached) manufactured with the following technologies: technologies reducing losses from socially significant diseases; nano-, bio-, information and cognitive technologies, biomedical and veterinarian technologies (Presidential decree № 899).

The realization of this program has not yet had an effect on the Russian software industry. The share of unsatisfactory evaluations of state support of quality management system certification increased in 2015-2017 from 38% to 50%. This growth did not so much take place because support has dropped, but because of the increasing demand for it. The 2018 survey showed that this indicator decreased to the 2015 level. At the same time 55% (a year before — 61%) of respondent companies could not assess state support of certification at all. Evidently they know nothing about it and are not sure that they need it.

Supposedly the situation will change in the years to come. The RF Government has prepared a financial feasibility study of a level of federal budget appropriation in 2019-2021 for implementation of national project (program) called ‘International cooperation and export’ to grant a subsidy to the stock company Russian Export Center (REC) for recovery of expenses on organization of certification and adaption of services to requirements of external markets.

### 3.3. Investment promotion

Findings of the annual RUSOFT survey show that in 2018 Russian software companies attracted more investments than a year earlier. Their volume of investment returned to the 2016 level.

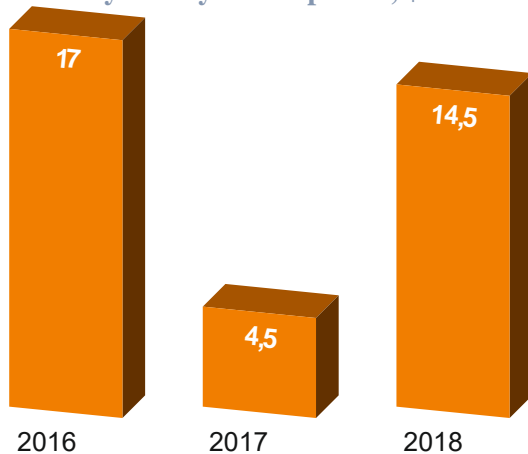
Previously the annual survey only made it possible to reveal a number of companies which got external financing in the last year and planned to attract investments within 2 next years. Changes in the questionnaire prepared for the 2017 survey not only made it possible to determine attraction of investment or plans to attract investment among companies but also the size of external financing (both existing and expected).

**Share of companies which in 2018 attracted external investments with distribution by the value of external funding and forecast for 2019-2020.**

	<b>In 2018 (actual)</b>	<b>In 2019 (forecast)</b>	<b>In 2020 (forecast)</b>
Did not attract any and do not plan to	79%	77%	74%
Less than \$1 million	9%	9%	8%
From \$1 million to \$5 million	1%	4%	8%
From \$5 million to \$10 million	0%	0%	1%
Over \$10 million	0%	0%	0%
Could not give an evaluation	8%	8%	8%

As a consequence for the first time we managed to give an estimate of the volume of investments attracted by Russian software companies. Initially the accuracy was expected to be very low but nevertheless the appropriate calculations allowed for getting a general idea about a scope of investors’ activity and changes of external financing from year to year (both for the whole industry and for specific categories of companies).

### Approximate volume of investment attracted by surveyed companies, \$ million



If we extrapolate data of companies surveyed to the entire sector which, supposedly, includes at least 3500 companies then in 2016 the volume of external financing amounted to \$420 million, and at year-end 2017 it reduced to \$120 million.

Most probably the reduction of the volume of investments was not so big but it stands to reason that it was in place. At year-end 2018 this indicator raised to \$325 million. Taking into account the low accuracy this amount does not differ much from \$420 million obtained in 2017.

The survey covers a few beneficiaries (10-15 companies). Therefore it is possible to use it for extrapolation to the whole sector but with due allowance for great influence of random factors.

In addition in the survey the obtained investments are mentioned primarily by small companies. Even a small number of large transactions which can outweigh all other investments, far from always are exposed to general knowledge. All too often it is a subject on which information is lacking.

The volume of corporate venture investments was determined by the TAdviser analytical agency under its study 'Corporate venture in Russian IT industry 2016-2018'. It concerns direct investments of large companies and purchase of IT startups. Thus, the study did not cover investments in all software companies as they could attract external financing not only from corporations and by no means from all of them could be considered as startups.

According to TAdviser in 2016-2018 the total volume of corporate venture investments and financing of IT startups in Russia exceeded \$570 million. Since results of the study were presented in November 2018 full-year calculations are preliminary.

In terms of announced investment the transactions of Sistema JSF Group (17 transactions) and Sberbank (10 transactions) lead by a significant margin. In terms of volume of transactions the Mail.ru shines due to a big number of expensive purchases.

TAdviser analysts noted that the government had already started assisting state corporations and private holdings in acceleration and purchase of startups, a next step would be creation of motivating tools. At the same time, private groups of companies like Lanit, 1C and Softline work with startups not less actively and sometimes more actively than state corporations.

According to the study 'Venture Barometer 2018' performed in partnership with RVC, investment activity in 2018 increased contrary to forecasts: more than half of respondents (53%) confirmed that volumes of their investments as a whole (without breakdown into domestic and foreign projects) increased. The survey included 88 investors among which dominated representatives of private funds (48%), business angels (17%) and public funds (14%). The study showed that the process of new fund launching markedly accelerated: in 2018 they emerged under control of 30% of respondents. It is an important indicator of maturity of IT industry because the second and subsequent funds can be opened only if the first has healthy signs of return on investment. In 2019 74% and 71% of respondents stated respectively about planned extension of volume of investments and about the number of projects.

Despite complicated political relations the expectations for western companies as investors in Russian funds have appreciably grown (from 3% to 15%). And for the first time the third place in this rating is taken by institutional investors from Asiatic and Arab countries (32%). The western structures come second in the list of potential strategic investors for Russian startups (49%).

Interest in foreign projects has heightened. The number of countries/regions to be considered for making investments in have grown in 2018 among 37% of respondents; in 2019 the growth of this indicator is predicted by 45%.

There were no exits of the majority of funds (59%) in 2018. The players at venture market have been cured of illusions but do not intend to realign investment strategies.

For years investors persistently put Fintech and Artificial intelligence/Machine Learning in the foreground in the list of most attractive areas for investment, though the investment boom in these segments is hardly in evidence.

The same stability is observed for least popular investment patterns. Within a year their list remains unchanged — e-commerce, AdTech and Blockchain.

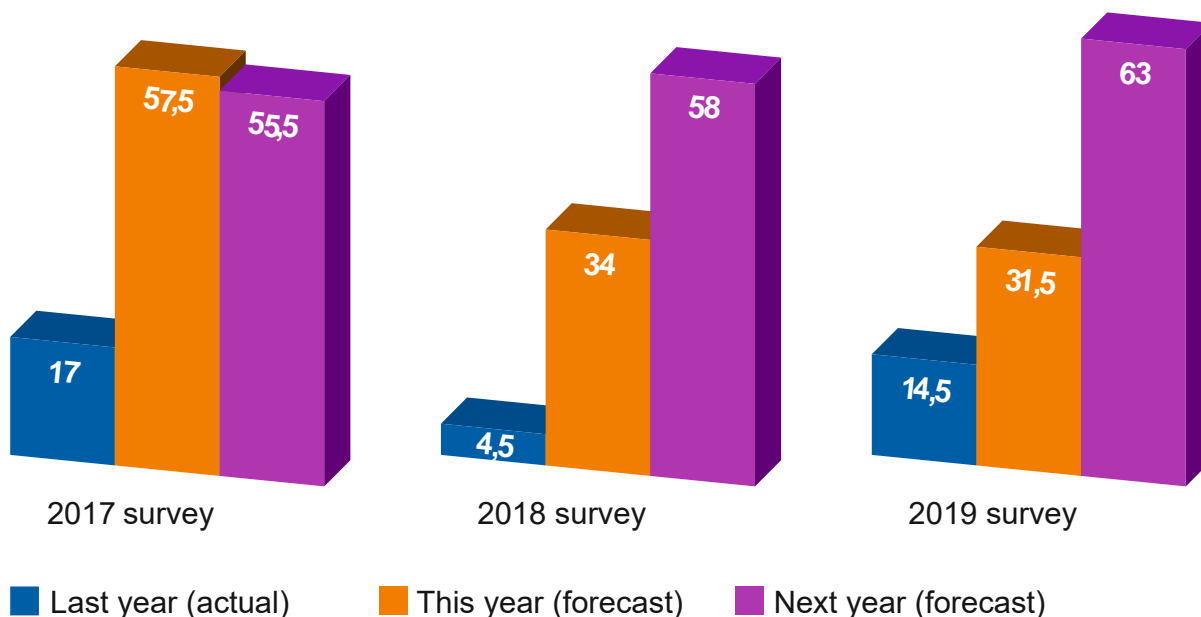
Most respondents do not receive assistance of the state but acknowledge that all the same it is needed to market in form of construction of the infrastructure required for market development (58%), for encouragement of “exits” and for development of innovation procurement culture (52%), and also for reduction in taxes for participants of investment process (40%). Players pin specific expectations on state corporations: the answer ‘growth of state corporations’ activity’ was among Top 4 incentives which can revitalize Russian venture market.

### 3.3.1. Demand for external financing

Findings of the annual survey show that the demand of software companies for external financing turns to be much greater than the actual amount of funds attracted which software developers allocate to business development. If we compare actual values with expectations of top managers we’ll meet that companies need at least twice as much. For example, companies surveyed in 2018 planned to attract \$34 million of investments, for all intents and purposes they got about \$15 million. In 2017 the difference was even greater — \$57.5 million and \$4.5 million respectively.

At the same time the survey reflects only plans for the near future — 2 years, while the demand could be much greater. Plans are prepared with due allowance for possibilities while the demand may exist even with the understanding that for the time being there is not the faintest chance to attract investments on favorable terms.

Approximate volume of investment attracted by surveyed companies, \$ million



In previous years the survey showed that companies, which reckoned on external financing, were at least twice as many as beneficiaries. For example, if 14% of respondent companies expected at year-end 2017 to receive external financing, de facto there were 6% which got it.



Therefore, there is overwhelming evidence that the assumption that the demand for external financing far outweighs the amount of actual investments is right. There is more data confirming such a wide gap.

The fact that a shortage of investments is one of the most serious problems industry-wide is confirmed also by other sources. For example, the survey conducted in early 2017 as a part of the study initiated by the SAP corporation: ‘Prospects of Russian IT developments on the global market’ showed that for 52% of software companies the growth of foreign sales is held back by an insufficient marketing budget and for 33% — by insufficient funds for developing solutions which could be competitive on foreign markets.

In-depth interviews with 31 experts conducted as part of the study made it possible to conclude that above all there is a lack of ‘long-term funds’ — investments for 3-5 years. It is not difficult to attract investments and take out a loan for a project which will provide almost guaranteed profit within a year. But in the hi-tech sphere it is rare when profit can be guaranteed. So venture capital is required.

In the last three years it became apparent that the assessment of prospects of attraction of investments by companies is more realistic than before. If in terms of amounts they significantly overestimate the window of opportunity, then in actual raising of funds from external sources the figures are roughly the same as predictions. For example, in 2017 11% of surveyed companies reckoned on investments in 2018 and 12% of companies surveyed in early 2018. The share of actual beneficiaries fully conforms to forecast — 11%.

#### Share of companies which attracted or plan to attract investments

Year of survey	Last year	This year	Next year
2011	9%	16%	18%
2012	9%	24%	26%
2013	12%	25%	25%
2014	7%	18%	27%
2015	7%	22%	24%
2016	10%	19%	23%
2017	11%	14%	11%
2018	6%	12%	10%
2019	11%	13%	16%

In the context of an almost 4-fold disinvestment in 2017 revealed in the survey of software companies, it is worth noting that among respondents the share of undecided significantly increased — from 8% to 17%. Perhaps, the number of companies has increased which do not want disclose information about attracted investments. In 2019, again only 8% of surveyed companies could not answer the question about attracted investments. Hence, it is fair to assume that disinvestment in 2017 more than likely was in place but not as big as calculated because a part of companies surveyed did not disclose appropriate information.

It is still necessary to examine in depth the demand for investments (what are projects and tasks for requiring money, what companies need investments and in what amounts, what are resources of development inoperative due to a shortage of funds). At the same time, even without any accurate computation of this demand we may state with considerable confidence that in Russia capital exists to meet all kinds of demands for external financing, naturally, if they are substantiated by a need of real business development.

Thus there are big unsatisfied demand for investments as well as considerable untapped capital owned by private persons, big and small businesses. Both facts look mutually exclusive but only if we do not understand the reason why existing investors cannot cover all existing demands for external financing.

### 3.3.2. Investment attraction by categories of companies

The following categories of companies manage to attract investments in 2018 much more often: those established less than 10 years ago; those with the share of export below 50%; those who work at “new markets” (Asia, Middle East, Africa, South and Central America) or plan to enter hereon in the next 2 years; those who increased export revenue in a year more than by 10%. A location of headquarters doesn't make a big difference when it comes to metropolitan cities (for example, Moscow, St. Petersburg, Novosibirsk or Yekaterinburg). In all appearances it is much more difficult to receive external financing in small cities. A business model (product or service) did not impact on a percentage of companies which attracted investments.

At year-end 2017 the situation was largely different. Investments more often were attracted by software developers with turnover below \$5 million and by those with a share of foreign sales over 50%. These companies usually were established less than 10 years ago and located in Siberia or Moscow. Similar conclusions were drawn in analysis of results of 2016.

Indicators of growth of turnover and of foreign sales among regional companies until 2017 were steadily lower than in two biggest Russian cities. In all appearances, relatively low growth rates were largely related to the shortage of investments in the previous 10 years. It looks like the situation starts changing.

#### Share of companies that attracted or plan to attract investments, by categories

Year of survey	last year	this year	next year
<b>Business model</b>			
Software developers	11%	16%	15%
Service companies	10%	10%	17%
<b>Company size</b>			
Turnover less than \$5 million	8%	11%	11%
Turnover more than \$5 million.	12%	14%	18%
Turnover from \$5 million to \$20 million	12%	15%	15%
Turnover more than \$20 million	0%	0%	0%
<b>Share of foreign sales</b>			
More than 50%	5%	8%	10%
Less than 50%	13%	15%	18%
<b>Age of company</b>			
Older than 10 years	9%	13%	14%
Younger than 10 years	14%	14%	20%
<b>H.Q. location</b>			
Moscow	11%	17%	11%
St. Petersburg	9%	12%	18%
Siberia	11%	14%	16%
Urals*	33%	22%	22%
Other cities	7%	9%	18%
All regions	11%	12%	18%
<b>Presence on markets</b>			
Have not worked far abroad	11%	14%	17%
Worked or plan to work on new markets	16%	20%	22%
Work or plan to works on western markets	12%	16%	21%
<b>Growth rate in 2018</b>			
Turnover increased more than by 10%	14%	12%	22%
Export increased more than by 10%	17%	20%	27%

\* — it makes no sense to draw firm conclusion because only 9 Ural companies were surveyed



Following results of 2015-2018 Moscow is not the leader among cities where companies got external financing, though other surveys show that the greatest part of venture investments is distributed in the capital. And even on the basis of the annual RUSSOFT survey that conclusion is obvious because in the current survey participate only 3-4% of all Moscow companies while for Siberia this indicator is over 10%. Hence, in extrapolation the conversion rate of the volume of investments for Moscow will be at least twice as big as for Siberia. There is a good chance that Moscow companies required outside financing to a lesser extent as they can get access to much more numerous resources of money in the financial capital of Russia.

In Moscow some software companies can attract more funds than all Siberian software developers can get together. For example, only in creation of 'My Office' suite of the Moscow company New Cloud Technologies in recent years there were invested more than P3 billion of private investments (over \$50 million).

According to findings of research 'Market review. Direct and venture investments in Russia', prepared by Russian Association of Venture Investment (RAVI), in 2017 to Central Federal District (CFD, primarily, Moscow) accrue 70% of all Russian venture investments, to Northwest Federal District (NWFD, St. Petersburg) — 14%, to Siberian Federal District (SFD) — 7%. In terms of venture investments in the field of software development the breakaway of Moscow from the rest of Russia, presumably, will be not so big but the fact that it is significant can be stated with certainty.

Both RUSSOFT and Russian Venture Capital Association data tell that investors have recently begun looking for opportunities to invest outside of Moscow. According to 'Market review. Direct and venture investments in Russia' the share of CFD reduced from 87% in 2015 to 70% in 2017, and that of NWFD increased over the same period from 11% to 14%. Even a greater progress is demonstrated by Siberia (SFD) — from less than 1% to 7%.

News from the venture market of 2018-2019 (Section 3.3.3. Major events of the venture market) show that government tries to stimulate the investment activity in Russia (just like it used to do in 2008-2009) by using its structures — development institutions and state corporations.

Upon that the press coverage was growing. Along with state corporations a higher investment activity in high-tech sector began to demonstrate also large Russian private companies. Some news bespeaks potential foreign financing (for example, Chinese companies and Chinese investment funds).

The purchase of Russian software companies by Russian state corporations and major foreign companies is another trend that should not go unnoticed in the context of situation on venture market. In 2018-2019 foreigners bought very large (by Russian standards) enterprises — TRANSAS, Parallels and Luxoft. Previously there were no such transactions.

The purchase of the control shares of software companies by corporations can adequately ensure an investment hike in development of these companies. However not all of them will remain Russian if absorbed by foreign corporations. It is entirely possible that key engineers and stable groups of developers possessing competences and expertise will be lost for Russia. On top of that companies themselves can fully melt into the corporation which has bought them and become one of business units hereof. In this case in Russia will be left only a part of development, while entire intellectual property created by Russian developers will find itself elsewhere. In any case the international practice of BRICS countries (like China and India) proves that in order to keep talents and to accumulate IP and competences in the innovative sectors the state should use stimulus as well as impose restrictions regarding foreign investors. For example, the share of foreign investor in the innovative startup should not be over 49% (surely not 20% as it is stipulated in the draft of a Law prepared in the State Duma).

### 3.3.3. Major events of the venture market

#### 2018

1. The end of March 2018: 'RT - Business Development LLC' that belongs to government corporation 'Rostec' together with the investment fund 'NDF' have bought out a share (37.5%) in a Russian startup 'NtechLab' – face recognition algorithm developer. The characteristic property of the algorithm is the ability to recognize human emotions, gender and age.

NtechLab plans to spend the attracted investments on the further development of the technology and on its promotion in the inner and foreign markets. This is a strategic portfolio investment with a long-term interest in the project. The deal is absolutely corresponding to the Rostec strategy, which is to enter the fast-growing public markets. The entering into the project would allow Rostec to include NtechLab's solutions into the company's work on technological setup transformations and data economy development. The analysis of the global market by Rostec's experts showed that the potential of company's capitalization within 5 years can be estimated at the trading band of \$1 billion.

2. The beginning of July 2018: China announced the creation of the investment fund for information technologies. This fund became an answer for the similar project by Japanese telecom giant 'SoftBank' called Vision Fund with total volume of almost \$100 billion. As Financial Times (FT) says, the initiative called China New Era Technology Fund was created by the Chinese government conglomerate China Merchants Group together with London investment group Centricus and with other unnamed Chinese companies. The fund's volume is ¥100 billion (about \$15 billion to the current rate, 2.07.18). ¥40 billion of total volume will come from the Chinese side.

3. April 2018: it was announced that VTB bank is buying out 40% of the Russian major system integrator company 'Technoserv'.

4. March 2018: building its digital ecosystem, Sberbank announced the buying of the majority share in the 'Dialog' company. 'Dialog' is a developer of the corporate messenger 'dialogue enterprise'. The 'Dialog' team plans to spend the attracted investments into the further development of its technical solution and in the utilizing the cybersecurity features of the messenger.

5. November 2018: it was revealed that Parallels was sold to the Canadian company Corel Corporation.

6. Late November: the news broke about plans of construction of the 8 Tbit/s cable line for traffic between Europe and Asia. The line will run from the Finnish border to China and Mongolia. The cost of project offered by Rostelecom is estimated at ₺13.1 billion out of which ₺10.1 billion should be invested by private entities.

#### 2019

1. April 2019: the US fund WCM Investment exits from Yandex. Before that three other US funds on the contrary bought shares of Yandex. In February, American investment funds Wellington Management Group and Harding Loevner purchased 4.5% and 4.7% of Yandex shares respectively.

2. January 2019: IBS agreed to sell Luxoft to the US DXC Technology for \$2 billion.

3. June 2019: Huawei became the only owner of the Russian company Vocord which since 1999 dealing with development and integration of personal identification systems based on face recognition technologies.

4. July 2019: Rostech informed on launching the investment fund Industry 4.0, which will make financial contributions to startups in the field of industrial technologies, robotics, artificial intellect, 'digital twins' and new materials. By the end of 2019 the total capital of the fund shall amount to 3 billion.

5. June 2019: Fort Ross Ventures and Megafon signed an agreement for strategic partnership and cooperation in the field of innovations, technological exchange and mutual search of highly attractive investment projects. Under that agreement Fort Ross Ventures will provide Megafon with exclusive own expertise and information about promising potential investments and own portfolio companies.

6. February 2019: EPAM Systems informed on establishment of the investment fund Global Opportunity Philly Fund (GO Philly Fund) which will contribute to engineering companies which work on blockchain and cryptocurrency solutions.
7. February 2019: it got about that 'Sochi Digital Valley' would receive up to \$250 million of private investments. It is an accelerator that already selects the first IT projects for financing. It is supposed to place special emphasis on domestic software developers and ideas relevant to artificial intelligence and to Internet of Things.
8. April 2019: MTS, Russian telecom and digital service provider, informed TAdviser about launching of the own corporate venture fund for development and support of promising technological startups. The decision has already been approved by MTS Board of directors. The fund will function on the basis of corporate accelerator MTS StartUp Hub.
9. The beginning of September 2019: RR (Russian Railways) announced launching of the startup accelerator. The program will be implemented jointly with Internet Initiatives Development Fund (IIDF).
10. June 2019: it got about that a RR subsidiary and a Rostec daughter established a mutual development center for designing devices of wireless network LPWAN XNB and technologies in the area of IoT for transport. The next step will be the opening of the venture fund to support issue-related projects with investment budget of \$100 million.
11. September 2019: it got about that Russia needs \$54 billion for development of VR/AR technologies. If successful, Russian companies can take 15% of the relevant global market and set industry benchmarks. Respective calculations have been made within preparation of the roadmap. The document has been prepared by Far East Federal University under the federal project Digital Technologies of the national program 'Digital Economy'.

In 2017-2018 Russian companies started to use ICO (Initial Coin Offering) to attract investments although such operations were out of the legal framework. According to the information announced at the 'Crypto-conference' in the autumn of 2017 at Skolkovo, Russian ICO market has exceeded the volume of venture investments twice and amounts to \$263 million.

At the end of 2017, real economy blockchain, 'Universa' has gathered more than \$28 million from 26000 investors in China, Europe and Russia during its Token Sale. The developers of this high-speed blockchain plan to spend the funds received on the further protocol development and on its promotion in the global market.

'Universa' is a next-generation protocol and blockchain-platform. It's a set of protocols and data that form a system of smart contracts with decentralized notarial cloud inside that verifies every transaction. The author of the project is Alexander Borodich, Russian venture investor and one of the first professionals in the blockchain industry and innovations.

According to cointelegraph.com, \$24 million have already been collected (by May 2018) for a Russian project called World Wi-Fi – worldwide decentralized free internet access network. The money will be invested in World Wi-Fi all over European countries, Asia, America and Australia. During the next two years they plan to connect more than 20 million of Wi-Fi routers to the blockchain platform and reach \$1B by revenue.

BitClave startup that created decentralized searching system BitClave Active Search Ecosystem (BASE) managed to collect \$16 million during its ICO pre-sale that took place from September 15 to October 15 in 2017. Company based in Silicon Valley but authors of the project are from Russia. Alexander Bessonov, the founder and CEO, is a former security director in LG Electronics.

### 3.3.4. Foreign investments of Russian companies and funds

In the recent years the activity of Russian investors abroad was declining if we analyze information about public transactions and procurements. It may well be that in reality there is no decline at all with account for investments swept under the carpet. Due to aggravation of relations with the USA western countries began to be watchful of Russian investors. They even were accused in industrial espionage. For that reason it is desirable to keep a low profile.

Before an economic and political crisis was triggered in 2014, the investments of Russians, Russian companies and funds into high-tech sector of other countries were constantly growing. According to J'son & Partners Consulting, in H1 2014 the amount of investment in foreign projects with involvement of Russian investors increased both quantitatively and materially. At the same time, the share of syndicated credits changed in a minor way: quantitatively it increased from 28% to 35%, in monetary terms decreased from 53% to 48%. Compared to H1 2013, the number of transactions with participation of Russian capital increased from 18 to 23.

At year-end 2014 investments of Russian investors into foreign projects (exclusive of syndicated credits) in monetary terms decreased by 1.4% amounting to \$92.2 million. At the same time, the number of transactions kept growing (increasing in comparison with 2013 by 7.5%).

In 2015 the growth of foreign investments was shown again. According to J'son & Partners Consulting, the number of transactions with participation of Russian foundations and business angels increased by 34.2%, and in monetary terms the growth was 21.7% (98 transactions with integrated value of \$1.27 billion). Over the same period there were seven exits of Russian investors from foreign projects versus nine exits a year before.

In 2016, according to the survey of Russian venture industry 'MoneyTree: Venture Market Navigator' the volume of transactions of Russian investors with foreign assets reduced compared to 2015: from \$277 million down to \$114 million. Similar to venture transactions within the Russian territory with a comparable number of transactions (50 in 2016 versus 51 transactions in 2015), the main reason of investment volume reduction was the decrement of the average transaction size from \$5.8 million to \$2.6 million

Russian investors can pursue different purposes when investing abroad (establishment of their remote development centers, access to new significant clients in the markets concerned, receipt of profit from subsequent resale as well as getting an opportunity to exert influence upon decision-making process as the company's shareholders).

Foreign investments allow particular individuals or companies to enjoy their profit. However, they are also important from the viewpoint of Russian economy integration into the world economy. Acquisition of large shares in successful foreign companies is a way to adopt executive experience as well as to find opportunities for cooperation between these enterprises and the Russian IT companies and to provide Russian companies' entrance into new markets. In certain cases, the Russians obtain ready-to-use technologies that may be elaborated and used in their own business in Russia. In this regard, in the spring 2014 the US FBI warned high-tech companies and research institutes in Boston and its neighborhood about ulterior motives of Russian venture investors showing interest in the US startups. The true motive of Russian investors' interest to American solutions, in opinion of FBI representatives, is in gaining access to new promising technologies and stealing them.

Besides, the money earned from purchase and sale of shares may return to the Russian IT sector. Judging by the successful transactions this process is already in progress.

First, it should be mentioned that after the Facebook's IPO, the Russian shareholders of this company (Mail.ru Group, Alisher Usmanov, Yury Milner, Mikhail Frokin, and others) became the owners of shares worth total of several billion dollars.

In late 2013 the group of funds DST of Yuri Milner and Alisher Usmanov began actively unloading stock in foreign Internet projects: Facebook, Groupon and Zynga. For the sold shares they gained about \$300 million.

In early 2014, the Russian venture fund Life.Sreda made the first exit as a consequence of sale of the US mobile bank Simple to the Spanish bank group BBVA for \$117 million. According to this fund, by that transaction it earned 180% per annum out of investments.

In the spring of 2018, the venture fund Grishin Robotics carried out the first investment exit — it sold the share in Ring, the developer of smart devices for house security (door lock, camera etc.). In March 2016 the share was purchased for \$61.2 million. The buyer was Amazon.



A number of investment funds that had started their activities in Russia reoriented to foreign venture markets as Russian market did not provide a required flow of entries and exits. Especially difficult in Russia is to ensure exits. Over the last years some companies, such as Almaz Capital, almost completely winded down operations at Russian market. Such funds in Russia do not report about foreign activities. And indeed, it is difficult to call their investments as Russians.

Judging by conclusions of analysts of PwC and CB Insights, the growth at the world venture market is in place the same as it is at the Russian market. In the beginning of January 2019 they published the report whereby in 2018 the highest level of venture financing over the last 18 years was observed after the dot-com bubble. In 2018 \$207 billion was invested within 14, 247 transactions worldwide that is by 21% more than in 2017. The total volume of financing in the US in a year increased by 30%, amounting to \$99.5 billion over 5536 transactions. In the span of a year approximately 382 financing funds (including 184 in the USA) made up over \$100 million while in 2017 they were just 266.

In the USA in 2018, 53 new companies reached a mark of attracted venture capital of \$1 billion and more, while in 2017 they were only 29. Investments mainly were received by companies in the area of artificial intelligence, digital healthcare and financial technologies, notably financing related to artificial intelligence increased by 72% up to \$9.3 billion.

In Asia in 2018 investments into venture capital increased by 42% and the volume of committed deals increased by 11%. Asia beat the records in all areas: the share of financing funds with a size of \$100 million and more increased by 35% (up to 162), and the share of new companies with investments over \$1 billion increased by 60% (40 companies were opened).

According to the annual European report PitchBook, the volume of venture investments in Europe got to be unprecedented. In 2018 within 3384 transactions there was invested collectively \$23.3 billion that is by 4.2% more than a year earlier. But the total amount of transactions reduced by 25.9%. Supposedly, investors were more interested in investing more money into companies at a later development stage than in providing smaller pieces of investment to young startups.

In Q II 2018 China for the first time overran North America in volume of venture capital abetted by a record fundraising to the amount of \$14 billion by the company Ant Financial Services Group specializing in development of financial technologies.

According to Strategic Cyber Ventures, in 2018 companies in the segment of information security attracted worldwide \$5.3 billion of venture capital that by 20% exceeds last year value equal to \$44 billion.

### Some examples of Russian investments in foreign high-tech companies in the last 2 years

#### 2018

1. June 2018: Luxoft, software developer, informed about the purchase of Smashing Ideas from the world largest publishing company Penguin Random House which had control over the creative agency since 2011. The financial data and other terms of agreement are kept under the radar.
2. July 2018: Baring Vostok, investor of Yandex and 1C, purchased the share in Belarus developer Itransition. The developer plans to spend funds received on development of services and expansion of development centers, particularly in St. Petersburg and Ryazan.
3. September 2018: Luxoft paid \$11.5 million for the purchase of the digital design agency Smashing Ideas. The buyer was the US publishing company Penguin Random House.
4. August 2018: Luxoft announced the purchase of Objective Software for undeclared price.

5. August 2018: Acronis absorbed T-Soft, its long-standing partner involved in software development and testing and distribution of Acronis products in Bulgaria.
6. November 2018: EPAM will pay \$55.5 million for the US company Continuum specializing in food design. The transaction was the biggest in EPAM history.

## 2019

1. July 2019: Sberbank venture fund under control of Fort Ross Ventures invested into the US robotic startup Fetch Robotics, becoming a lead investor in round for \$46 million. Funds will be spent on international expansion and further development. At the moment the company has attracted altogether \$94 million from such investors as Softbank Capital, Shasta Ventures, Sway Ventures and others — they also participated in the new round.
2. August 2019: ABBYY became an owner of TimelinePI which develops solutions for holistic analysis of business processes. It plans using exploratory studies of TimelinePI to improve the capacity of own products for business intelligence. The company founders will move to ABBYY.

### 3.4. Import substitution

The process of import substitution in the software area has been going over all recent 15-20 years (perhaps, it began even earlier). At the government level it has been discussed over 10 years. At the same time the constant increase in the share of Russian solutions on the domestic market has gone its way regardless of how actively discussion took place at different levels. Initially the main factor that propelled import substitution in Russia was the creation and improvement of Russian solutions. A typical path was shown by the company “1C” which began by developing accounting systems but then created an ERP system initially for small and medium companies and then for large ones. So it captured new segments of the corporate software market squeezing out foreign competitors.

As a result, on the ERP systems market Russian developers also dominate (if their share is calculated not in cash terms, but in the number of projects, established solutions or jobs covered by the system).

In 2014 two more significant factors arose which accelerated the process of imports substitution somewhat: anti-Russian sanctions and the drastic drop of the national currency. The disclosures of Snowden and WikiLeaks also played a role in recognizing the need for import substitution from the point of information security and technological sovereignty.

In the autumn of 2016 the publication CRN/RE asked a number of Russian companies to evaluate how much clients save if they prefer their solutions to foreign equivalents. RAIDIX saved 40-50%, SKALA-R of the IBS saved 30-40%, for SPIRIT the total cost of ownership was 10 times lower, with use of DBMS PostgreSQL in comparison to Oracle, expenses on technical support were 12 times lower, and expenses on licenses were the same, or even 20 times lower.

According to the AXELOT, economic reasons played a pivotal role in the transition to Russian software in 70% cases of import substitution. Even companies which previously used Oracle and SAP on principle are now seriously examining the possibility of moving to 1C.

In recent years the process of import substitution was uneven. The latest slowdown was registered at year-end 2017. In 2018 the acceleration occurred evidenced first and foremost by comparison of growth of sales of Russian software companies at the domestic market and of increase in the volume of Russian software market. Besides, the measure of changes in active transition to Russian solution was the amount of relevant news in media.

If we compare the growth rates of market and sales of Russian companies at the domestic market, then in 2016 the difference was immense — 30 percentage points (sales of domestic companies were growing much faster). In 2017 that difference reduced to 5 percentage points and in 2018 it increased roughly up to 10 percentage points.

At the same time, in 2017-2018 service companies with prevailing earnings from custom software development have better growth indicators than product companies. Previously they were not classed with those involved in the import substitution process because their foreign competitors did very little to render similar services in Russia. However this conclusion is no longer true: recently custom development is becoming an alternative to procurement of off-the-shelf solutions. For instance, instead of purchasing modules of ERP systems enterprises may generate their own unique control systems with the involvement of external developers.

Noteworthy that IDC in their reports began mentioning import substitution as a trend that will have a significant impact on Russian IT market in the next future.

The results of the IDC's annual survey 'Russia Enterprise Application Software Market 2018–2022 Forecast and 2017 Vendor Shares' confirm that all the collected data witness the slowing down the process of import substitution. By 2017 the volume of Russian ERP market reached \$819.27 million, showing the calendar year rise of 29.6%. It's important to note that ERP takes more than a quarter of the Russian software market, which IDC values in \$3.2 billion. The German 'SAP' and Russian '1C' have been holding leadership in this sector: Russian organizations spend 80% of their enterprise management software budget on products and services from them. It's significant that SAP's earnings in 2017 showed growth for 33.2% in dollars and 16% in rubles when '1C' sales grew a little slower – for 30% and 13.2% respectively.

According to the sales data of these two companies we can even think that in 2017 the ERP sector showed the reverse process to import substitution. But this assumption is not really correct. If we consider the shares of Russian and foreign vendors in monetary terms, we can see the foreign developers have strengthened their positions. If we consider the same shares in jobs and sold licenses we see the benefits of the Russian companies: their solutions are usually less expensive than foreign ones. '1C' thinks of itself as a rightful leader according to the number of licenses sold in the Russian market with a market share higher than 80%.

#### Comparison of indicators of growth of Russian software market and sales of Russian software companies hereon (in dollar terms)

	2017	2018
Russian software market (IDC data)	+19%	+2.2%
Sales of Russian software companies at the domestic market	+25%	+12%
...product companies	+24%	+8.4%
...service companies	+27%	+21%



# CHAPTER 4

## The business environment in Russia

## 4.1. Results of general analysis

Average note given by respondents to the business environment (calculated on the basis of estimates of respondent companies):

Year of survey	2011	2012	2013	2014	2015	2016	2017	2018	2019
Average point	2.58	2.73	2.73	2.83	2.85	2.82	2.86	2.86	2.86

Once the Digital Economy program was adopted — the estimates of the business environment by market players should have been improved as might be expected. However, it did not happen. Everything suggests that business people no longer respond to announcement of a new State program and wait for results of their implementation. In previous years the mere fact that the State paid attention to the software industry took a favorable view of community.

Although the average note to the business environment is generally stable, in some cases its variations in some parameters and in different categories of companies was quite significant. However the worsening in some parameters and categories of companies was balanced out by improvements in other ones, and on the average the assessment of the business environment in Russia by the IT community remained surprisingly identical for three years in a row.

The role of accidental factors in determining this assessment is still important, and the external economic and political conditions influence the way that respondents perceive the business environment.

For this reason it is important to understand that the average note (and also changes to it) primarily reflects the opinion of respondents on the existing business environment, and not on the environment itself or the way the environment has changed, although there is a certain connection between these subjects.

On the basis of many years of observations, one may conclude that following the worsening foreign economic and political situation, respondents assess conditions for business as being worse (that do not depend on external factors at all). Evidently a general negative mood of respondents has an effect. In the event of a crisis, companies expect major support from the State, and if even nothing changes in this support, their responses show a more critical attitude to government action even if the apparent degradation is hardly in evidence.

Nevertheless, the changes of the average assessment of the business environment, as a rule, have a logical clue. If in 2017 the improved estimate of the business environment, primarily, reflected the improved situation in national economy and the emerging growth of domestic market, in 2018 this improvement resulted in aggravation of the staffing problem (the most crucial for software industry).

Stemming from results of the 2019 survey one may note a considerable growth of “State support of international and marketing activity” (from 2.64 to 2.73). The reasons of it really existed because different State structures (both at the federal level and at the level of sub-federal entities) began to more actively participate in promotion of Russian software companies abroad by arranging and financing business missions (or other marketing events), and also signing intergovernmental agreements which intend to extend the cooperation in the IT area.

For this reason the estimate of the RUSSOFT members (51 companies out of 160 surveyed) is much higher than of all companies surveyed (2.92 versus 2.73). It attests to the fact that through the Association the companies get access to a much broader flow of information on measures aimed at international marketing which are carried out by the State. In addition, the Association itself plays a role of a co-organizer of marketing events carried out with support from the government. The average note in assessment of the State support of international and marketing activity as a whole by the RUSSOFT members is also higher — 2.92 against 2.82 of companies which are not members of the Association.

#### Average assessment of conditions of activity in Russia on a five-point system based on the results of a survey of software exporters

	survey 2015	survey 2016	survey 2017	survey 2018	survey 2019
State support in the IT sphere	3.09↓	3.06↓	3.16↑	3.17↑	3.07↓
Protection of rights of intellectual property	3.08↓	3.13↑	3.14↑	3.17↑	3.12↓
Provision of personnel and the education system	2.73↑	2.75↑	2.83↑	2.67↓	2.74↑
Tax system	2.88↑	2.91↑	2.95↑	2.91↓	2.84↓
Bureaucratic and administrative barriers	2.69=	2.71↑	2.67↓	2.7↑	2.64↓
Presence of modern infrastructure	3.24↑	3.16↓	3.13↓	3.10↓	3.13↑
Financial support of small business and startups	2.85↑	2.8↓	2.85↑	2.82↓	2.84↑
State support of international and marketing activity	2.58↑	2.45↓	2.51↑	2.64↑	2.73↑
State support of certification for compliance with international standards	2.66↑	2.64↓	2.62↓	2.74↑	2.69↓
Financing of R&D	2.68↓	2.64↓	2.70↑	2.73↑	2.78↑

The dependence of the assessment of business conditions on company turnover in 2017 was insignificant and varied from 2.75 points (for companies with a turnover above \$100 million) to 2.92 (for companies with a turnover from \$1 million to \$5 million). Evidently, after a certain worsening of business conditions for small companies (which was in many ways connected with the economic crisis) a change in the trend has taken place. Various data shows that small companies have started to grow in Russia, not just in the software industry but in other industries as well.

In 2018-2019 large companies again began to evaluate the business environment in Russia obviously better than small enterprises, but the lowest note was given by companies with turnover between \$5 million and \$20 million. In the prior years, these companies also were the most critical of existing conditions for doing business. That is why it makes sense to see into the matter in some detail. At the moment we can only take wild guesses. For example, one possible explanation is that they have become sufficiently large to attract attention of bureaucracy but still do not know how to overcome administrative barriers or do not have sufficient resources to do it.

Changes of the average note of assessment of conditions for doing business by companies with different headquarters location often look like random fluctuations. For example, Ural region traditionally is represented in our survey by a very small sample. For this reason the amplitude of fluctuations turns to be much greater than of other regions and both capitals. Nonetheless, it is possible to trace some common factors. Traditionally, the lowest assessment of conditions for doing business was seen among St. Petersburg companies. It stands to reason that it is not a mere coincidence.

## Assessment of existing conditions for doing business in Russia depending on company turnover

	less than \$1 million**	from \$1 million to \$5 million***	from \$5 million to \$20 million****	over \$20 million	from \$20 million to \$100 million	over \$100 million
2010 survey	2.72	2.72	2.67	2.77	-	-
2011 survey	2.56	2.54	2.68	2.66	-	-
2012 survey	2.76	2.65	2.87	2.92	-	-
2013 survey	2.72	2.73	2.71	-	2.73	2.93
2014 survey*	2.82 (2.8)	2.85 (2.84)	2.86 (2.85)	-	2.91 (2.88)	2.81 (2.78)
2015 survey	3.01	2.84	2.85	-	2.68	2.9
2016 survey	2.78	2.86	2.83	2.9	2.89	3
2017 survey	2.82	2.92	2.81	2.85	2.78	2.75
2018 survey	2.79	2.79	2.67	2.95	3.00	2.84
2019 survey	2.87	2.86	2.78	2.98	2.88	3.40

\* - in brackets taking into account the assessment of financing of R&D, which was introduced in 2014

\*\* - before 2016 – below \$0.5 million

\*\*\* - before 2015 - from \$0.5 million to \$4 million

\*\*\*\* - before 2015 - from \$4 million to \$20 million

A significant decrease in the average note was observed in the assessment of doing business among Moscow companies. Since the number of respondents in the capital of Russia is quite big, we also can assume that such change is not a fluke albeit difficult to rationalize yet. A decrease in the average point does not mean that conditions themselves have changed. The perception might have changed if companies lose momentum.

Better estimates are seen among companies beyond two Russian capitals. Their growth rates are also higher than those of companies from Moscow and St. Petersburg. Respondents in some big cities confirm that their conditions for doing business have ameliorated, small companies start to enter foreign markets more actively. However they still cannot give reasons for the observed growing activity. For one thing, it cannot be explained by a more successful work of local authorities which (as a rule) is assessed not so high compared to activities of the federal government. Perhaps, in regions most companies pass over the stage when growth rates are highest while on the average Moscow and St. Petersburg companies are older and have passed this stage earlier.

## Assessment of conditions existing in Russia depending on company location

	Moscow	St. Petersburg	Siberia	Ural	Other cities
2011 survey	2.61	2.65	2.42	2,45	2,57
2012 survey	2.74	2.76	2.81	2.72	2.65
2013 survey	2.7	2.76	2.86	2.9	2.65
2014 survey*	2.92 (2.89)	2.7 (2.69)	2.96 (2.93)	2.91 (2.91)	2.84 (2.83)
2015 survey	2.86	2.82	2.83	3.02	2.84
2016 survey	2.82	2.72	2.93	3.07	2.87
2017 survey	2.95	2.85	2.76	2.79	2.85
2018 survey	2.93	2.61	2.82	2.83	2.7
2019 survey	2.77	2.77	2.86	3.29	2.88

\* - in brackets taking into account the assessment of financing of R&D, which was introduced in 2014

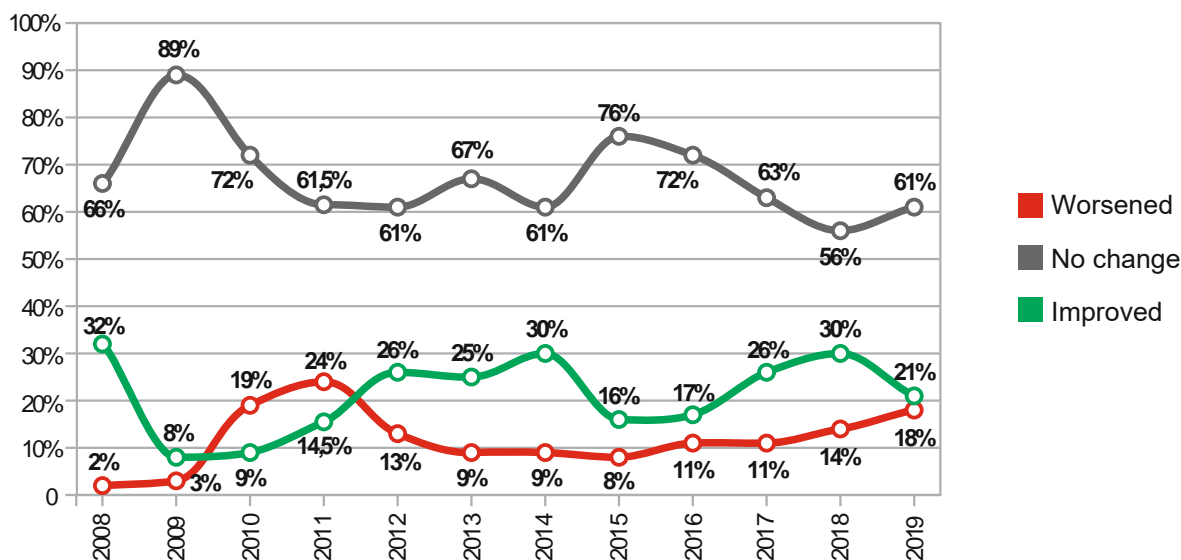
## 4.2. State support in the IT sphere

The results of the survey do not so much reflect the assessment of real State support but the change in attitude to it from respondents. So the more critical attitude to this support in 2014 and 2015 may be explained by the crisis periods, by increased demands towards how State bodies treat the industry. The market expectations in the crisis years to receive more elaborated, thorough and significant State support were not fully met. As a result, the average assessment of State support worsened. The share of companies surveyed who saw improvements in the State's attitude to IT dropped from 30% to 17% and the share of companies that believe that there is less support increased. The number of critical respondents still increased insignificantly – from 9% to 11% and the vast majority assess the change quite objectively (76% of respondents in 2015 did not see changes in state support, and 72% did the same in 2016). In 2017, the situation for the software industry in general improved, and positive changes in State support were noted by 26% of companies surveyed (more than a year previously). Respondents noted an important improvement in the extension of incentives on social payments to insurance and pension funds. This decision was taken in December 2016. Another positive change noted was the establishment of the Russian Export Center. A number of companies only began to feel a real effect from this work several months after the survey was held, but the fact that this center began to devote attention to the IT sector was assessed positively then and there by companies. The positive assessment of State support from regional companies also evidently reflects improvements at the regional level.

The 2018 survey was carried out on the back of increased focus of the Government on information technologies (particularly, on software development). This accounts for an increase from 26% to 30% of the share of respondents who think that State support in the IT area has improved in the last 2 years. At the same time from 11% to 14% has increased the share of companies which state a decline. As for State support it is difficult to define significant changes which have obviously influenced the software development industry. In this context the plainly increased attention of the State to the IT sphere made some respondents inspired and others irritated due to absence of any good results. The irritation is caused by the fact that there are too many discussions and plans which fulfillment is postponed or carried out contrary to all expectations of software developers.

In 2019, the percentage of critical appraisals has again increased — from 14% to 18%, and positive changes were mentioned by a smaller number of respondents — just 21% instead of 30% a year earlier. 15% of respondent companies were undecided concerning the State support in the IT sphere that is less than in 2018 (20%). However this difference is not very big to draw any firm conclusions (the share of undecided also not very well characterizes the attitude of industry toward the role of government agencies).

### Assessment of how state support in the IT sphere has changed over the last 2 years



A drop of the average note is typical for almost all lines which can be directly connected with measures of State support. The estimates changed for the worse for the following lines: “Protection of rights of intellectual property”, “Tax system”, “Bureaucratic and administrative barrier” and “State support of certification for compliance with international standards”. In all cases the reduction of the average note is rather small but not so small to consider this fluctuation random. At the same time the opinions of respondents have considerably improved for “State support of international and marketing activity” (from 2.64 to 2.73) that can be related to the real intensification of activities of different government entities which organize business missions and other marketing events. The assessment of “Financing of R&D” has also got better in spite of serious difficulties with paperwork and with requirements to reporting. The government also impacts on such parameters as “Presence of modern infrastructure” and “Provision of personnel and the education system” but in a year it is difficult to change anything therein. At the same time, as is shown by many years of observations, any alterations of these parameters are primarily influenced by rent rates for office space and by the situation on labor market. Generally, a more frequent criticism of State support can be squared with the presidential elections in spring of 2018 and with a long induction period of new persons in the revised government related thereto.

The adoption in summer of 2017 of the Federal program “Digital Economy of the Russian Federation” should be conceived by companies broadly positively. However, by the time of survey in spring of 2019 the program never got round to implementation. Long discussions and the situation of uncertainty also could have an effect on assessment of state support in the IT sphere.

#### **“Digital Economy of the Russian Federation”**

*In autumn of 2018, in the governmental work plan until 2024 the “Digital Economy” was stated as a program to promote solution of a number of topical issues for Russia. By means of the program it is expected to increase the income of citizens, decrease poverty by half, speed up technological development and propel the country into five largest world economies. Also the Digital Economy was included in the list of key programs aimed at acceleration in development of Russia and increase almost by a factor of 7 a number of organizations involved in technological innovations — from 7.3% of their total number in 2016 up to 50% by 2024. In addition, the Digital Economy became a key program to provide expeditious introduction of digital technologies in economy and social sector. It is also appears on the list of key programs required for propelling Russia into five largest world economies and ensuring economic growth rates above the world standards subject to preserving macroeconomic stability including inflation at a 4% rate.*

*By the end of 2024, 120 thousand people will complete the curriculum of higher education programs in the IT sphere and 10 million people will be trained in online E-literacy programs. Together with IT companies the government plans in 2020 to open 5 centers of accelerated training of specialists, and one year on — already 15, by year-end 2023 — 150. The grant support is envisaged of hundreds of most outstanding educational institutions and tens of thousands of students in specialties related to digital economy: first and foremost — “Mathematics”, “Informatics” and “Technology”.*

*The budget of the Federal program Digital Economy was determined after two-fold reduction of the initial value in February 2019. It is expected to spend on this program by and large P1634 billion with the following distribution of resources:*

- 1. Statutory regulation of digital environment P1.7 billion;*
- 2. Information infrastructure P772.4 billion;*
- 3. Personnel for digital economy P143.1 billion;*
- 4. Information security P30.2 billion;*
- 5. Digital technologies P45.8 billion;*
- 6. Digital public administration P235.7 billion*



*It is expected to allocate to Russian software developers around ₺15 billion as a financial support within implementation of the Digital Economy program. A large portion of these resources is planned to attract from non-budgetary sources.*

*It is planned to increase the monetary share of Russian software purchased and/or rented by state corporations and publicly owned companies from 45% in 2019 up to 55% in 2021 and then up to 70% in 2024.*

*Over the period 2019-2021, in the state budget is envisaged ₺403 billion on program implementation and specifically on creation of information infrastructure ₺152 billion and digital public administration — ₺101 billion. By the end of 2021 Digital Economy sets the following targets: invite in projects for development and commercialization of products and services on the basis of “cross-cutting” digital technologies at least ₺120 billion, and for 1350 commercially driven scientific and technical projects in the field of “cross-cutting” digital technologies — gain the grant support.*

*A Digital Economy project officer was appointed Maxim Akimov, Deputy Chairman of the RF Government. A direct supervisor of the project is Konstantin Noskov, minister of digital development, communications and mass-media, and an administrator— Evgeny Kislyakov, deputy minister of digital development, communications and mass-media.*

*Following the results of H1 2019, the federal budget expenditure execution on the national Digital Economy program amounted only to 8.3% (according to the RF Accounts Chamber). It is a very low indicator. Among all 13 national programs it takes the last 13<sup>th</sup> place.*

For the digitalization of economy, new management structures are being established in the country by the State. In June 2018, by order of the Russian President the presidential administration of IT application and development of electronic democracy was rearranged. The administration will provide the presidential activities on formation of national policy therein and present the appropriate proposals.

In Spring 2018, a decision was made to establish the Expert Council on development of Digital economy at the Council of Federation (upper house of the Russian Parliament). Apart from representatives of committees of the Federation Council and federation entities the Council includes senior officials of relevant agencies as well as experts and representatives of IT business associations.

In the end of December of 2018 the Ministry of Digital Development, Communications and Mass Media prepared a draft of a renewed development strategy for information technologies in Russia over the period of 2019-2025 and in the long-term until 2030. It was made pursuant to the instruction of the Deputy Chairman of the Government Mr. Maxim Akimov to update the 2014-2020 strategy.

According to the prepared draft strategy, the Russian IT industry has a potential of global competitiveness and must become one of the key growth areas for Russian economy by 2036. The implementation of the strategy also has to reduce dependence of national economy of the commodities export through increase in export of IT products, also to improve the level of education and labor efficiency due to accelerated introduction of IT into key areas of economy and to improvement of general investment environment in Russia.

The draft strategy is discussed by professional communities (it has not been completed during preparation of this chapter). As a rule these documents do not provoke rejection by business since general guidelines are described reasonably well, but a lot of things may be damaged at next stages — when the support measures are worked out in detail and performed. Thus, the mere fact of preparation of a new development strategy of IT industry cannot impact upon estimates of government policy which affect the interests of software companies.



According to the Ministry of Communications, Mass media and Digital transformation, among the stated government priorities the following merits are mentioned:

1. Activities on creation of a unified digital space and integrated information systems.
2. Bilateral tracks (including within the former CIS) on the principles of mutuality and of the development of ICT export.
3. State funding of “Smart city” projects, technical infrastructure and provision of cyber security thereof.
4. Support of IT export. Due to sanction pressure the configuration of target market geography has changed. Thus the ministry is ready to assist companies in sales of their products and services in countries where they wish and able to sell. A wide range of countries, primarily, in the Middle East and South-East Asia are up for cooperation with Russia.

#### 4.2.1. Support of IT export

The situation on the Russian market and on some foreign markets has changed fundamentally since the beginning of 2014. Threats or even real restrictions have appeared for business and along with them new opportunities, which will often be difficult or impossible to make use of without State support. Russian software companies are already having problems on foreign markets (not only in countries with which Russian has tense relations).

Software exports must turn to new markets and give more attention to promotion in Asia, in the Middle East, Latin America and in Africa. For access to these new markets the State support is very important.

In the last few years some governmental agencies at federal and regional level demonstrated willingness to assist promotion of solutions and services of Russian IT companies at foreign markets. Besides, some State corporations suggest using their numerous foreign offices all over the world. At the federal level assistance is given by the Ministry of Communications and the Ministry of Industry and Trade to which in 2018 the Russian Trade Representation offices abroad were transferred from the Ministry of Economic Development. Several years ago the Russian Export Center (REC) started working with IT companies. At the regional level the vigorous support can be given by the Moscow Export Center (MEC) under the authority of the Department of entrepreneurship and innovation development of the Moscow City Administration.

The Russian Export Center (REC) was established in 2015 on the basis of VEB bank and EXIAR Assuaring agency. Initially, instruments of the REC were directed towards supporting goods export and were practically inapplicable for companies exporting virtual products which do not cross customs borders. Additionally, these companies do not have property (tangible assets) necessary for getting export loans. In 2016, with the creation of an IT department at the REC, the situation began to change and in 2017 real support appeared in the form of financing business missions and of supporting participation of Russian companies' stands in exhibitions abroad as well as of offering other incentive mechanisms including cheaper credits.

Such preparedness of different governmental agencies can help a faster growth of Russian IT export. However, in order to achieve the maximum it is advisable not to duplicate functions and to integrate in a single source the available information on foreign markets and on measures to support Russian companies to enter hereon. Some promotion channels can function in parallel but not all. It is important to rule out competition when different agencies are trying to draw the same foreign customers to their side that a few software companies have already come across.

#### **Information about incentives of governmental agencies aimed at support of IT export**

1. In October 2018, the committee on digital economy of RUIE (Russian Union of Industrialists and Entrepreneurs) at the meeting with participation of representatives of the Ministry of Economic Development and Trade, the Ministry of Communications and concerned Committees and Commissions of RUIE discussed and approved a package of

measures that would promote the advanced growth of Russian market of services of data centers and cloud services as well as the increase of their export potential and consolidation of positions on the global market.

2. As a result of mutual discussions, the Ministry of Economic Development and Trade and REC, specified that one of the barriers for development of export of services was the necessity to localize their services to requirements of external markets (primarily, it applies to IT companies and companies in the creative industry sector). In view of this, the Ministry of Economic Development developed rules for granting subsidies from federal budget to Russian organizations which are intended to compensate a part of expenses on adaptation of services and (or) results of intellectual activity to requirements of external markets. In February 2019 the ministry reported about readiness of these rules which, in particular, envisage the compensation of expenses on development of design, usability, development and localization of documentation (development of a technical manual).

According to the federal project “Export of services”, annual service sales will achieve \$100 billion by 2024. Among other things, an export income from “telecommunications, computer and information services” will amount to \$10.8 billion. By year-end 2018, this value is almost half that — \$5.26 billion (data of CBR). A more that two-fold growth is also envisaged for revenues from payment for use of intellectual property (in 2018 — \$0.876 billion).

3. In June 2019, SAP CIS, REC and School of export of the Russian Export Center signed the Memorandum of understanding. The parties will maintain long-term cooperation focused on development and on implementation of export potential of Russian companies of non-energy sector. SAP CIS и REC plan cooperation in several areas. Mutual efforts will be aimed at the increase of the level of financial awareness and technical readiness of Russian developers as well as the search for new opportunities and business partners on global market by means of the business network SAP Ariba, e-commerce trading platform, which combines more than 2 million companies from 186 countries.

4. In June 2019, within the framework of St. Petersburg International Economic Forum, the Moscow Export Center presented a few new programs of export support. They are “export calculator”, country analytics, selection of buyers, providing price accounts at Europages. Along with the already implemented support measures, these programs should allow metropolitan entrepreneurs to break new ground in export activities.

#### 4.2.2. State support at regional level

In 2018, for the first time we included in our survey a question which allows respondents to assess the support of the industry by local authorities. The answers made possible to compare attitude toward federal and regional government entities as well as to make a first version (prototype) of the relevant regional rating.

Both in 2018 and in 2019 in terms of State support federal authorities were assessed by respondents higher than regional ones. At the same time, the attitude on State support at federal level became more critical and at regional — less critical (it would be premature to speak about better or worse attitude when the average point is below 3 points out of 5). 23% respondents were undecided in relation to support by regional authorities and to that of federal authorities — 15%. This difference is also not in favor of regional governments as the representatives of companies give no estimates mostly when they know nothing about given support. However, a year earlier the estimate was higher — 42% and 20% respectively.

It is quite logical that support at federal level is assessed higher because at regional level there are very few opportunities to impact upon software industry. If we look at measures which were recognized as most important according to findings of the annual survey, the absolute first leader (see last section of this chapter) was the “Granting social tax incentives”. Privileges to these payments are established at federal level. They are so important that many companies think that “we don’t need anything more so long as officials don’t interfere”.

Some regions also grant local tax privileges but such steps are a hard sell for representatives of software industry.

Second and third place in importance are traditionally taken by such measures of support as “Removal of bureaucratic and administrative barriers” and “Presence of modern infrastructure”. Their efficiency to a great extent depends also on decisions at federal level. Regulated bureaucratic processes are determined by Russian law which is updated by the RF State Duma. Local parliaments are able to influence these procedures but their capabilities are very restricted.

Of paramount importance for development of software industry is the quality and the quantity of trained IT-professionals in the field of software development. However leading universities which train such developers for the most part are directly subordinated to federal authorities. The availability of good universities in some cities can provide development of local software industry even if local authorities totally ignore it.

If we analyze the infrastructure (office space, airports, roads, telecommunication channels availability), we will see that it is largely developed by funding from federal budget or under federal target programs. For example, 12 state technology parks were built in 2007-2014 within the relevant federal program, and almost a half of expenses on construction were covered by subsidies from federal budget. It is quite the same when we look at the airport construction.

#### Assessment of state support depending on company location (2019 survey)\*

City (region)	Number of respondents	Assessment of support of regional authorities		Assessment of change of state support in IT sphere in last 2 years (at federal level)	
		average point	undecided	average point	undecided
1. Perm	8	3.67	25%	3.25	0%
2. Orel	10	3.30	0%	3.80	0%
3. Moscow	36	2.88 (2.94)	31% (61%)	3.10	14%
4. St. Petersburg	34	2.87 (2.71)	29% (44%)	2.79	15%
5. Tomsk	14	2.80 (3.17)	29% (25%)	2.82	21%
6. Moscow region	3	2.67	0%	3.67	0%
7. Rostov-on-Don (Rostov region)	13	2.64 (2.00)	15% (50%)	2.91	15%
8. Novosibirsk	17	2.58 (2.86)	29% (57%)	2.71	18%
All respondent companies	175	2.94 (2.87)	23% (42%)	3.07 (3.17)	15% (20%)

\* — in brackets the value obtained in 2018 survey (not available for all federation entities)

At the same time, the comparison of attitude on State support at federal and regional levels has to be made with certain assumptions and guesses. The fact is that our questionnaire has two questions concerning State support. One (with a certain change in definition) has been asked for many years. In 2018 survey it was asked as follows: “How in your opinion did the State support in the IT sphere change in the last 2 years (2016-2017) at federal level?” The options were: “worsened”, “no change”, “improved” and “difficult to say”.

The second question about the State support has assumed an assessment of the level of support: “Please assess activities of local authorities aimed at supporting the IT industry in your region”. Respondents could choose between the following options: “bad”, “satisfactory”, “good” and “difficult to say”.

In this context, the following assumption was made as a comparison: in analysis of answers to the question on change of support at the federal level the answer “improved” corresponds to “good” in the question about support at regional level (correspondingly, “no change” = “satisfactory”, “worsened” = “bad”).

Basically, if there is no change for the better at the federal level, it’s absolutely impossible to give “good” to State support. That’s why the assumption is quite justified, specifically if the difference between compared indicators is very big.

The average note to each subject of Federation can be thought of only as a reason for further investigation of situation. Worsening or improving of indicators for each city (region) does not look as based on real changes in policy aimed at supporting the industry in regions. Thus, for example, the average point of Moscow significantly reduced in 2019 but also with a considerable decrease in the share of undecided respondents. In other words, it may be assumed that one indicator has changed at the expense of the others. At the same time, changes take place at a time when MEC has intensified work with IT companies (anyway it showed readiness to take specific measures to promote their exports).

A high average point of Perm and Orel as well as a low score of Moscow region are probably related to a small sample (for Moscow region it is too small to draw even conservative preliminary conclusions).

It is expected to present a more sophisticated analysis of situation in regions by different parameters in the “Rating of cities” produced by the RUSSOFT Association.

#### 4.2.3. Attitude toward State support in the IT sphere by different categories of companies

An assessment of changes of State support to IT-industry traditionally depends on the size of the company: the greater the turnover, the more often companies show a higher assessment of state activity. This being said, the lowest average point of assessment of State support steadily remains among companies with turnover \$1-5 million.

Such setback in this category also occurred in previous years, hence, in all appearances it is not casual. Companies with such turnover become perceptible for governmental agencies (for example, tax offices), they count upon State support, but still are not able to lobby government authorities. Large software companies are better protected against arbitrary behavior on the part of local officials as they shrink from losing an important regional tax payer and employer.

Following the results of 2019, the dependence of the average note of assessment to local authorities on the size of a company does not look so evident as in previous years. Companies with turnover < \$1 million even slightly better assess the State support than companies with turnover \$5-20 million. But in any case this indicator was higher among companies with turnover above \$5 million. This being said, it is not as if small companies felt a greater support because the average point dropped for all groups subdivided by turnover. A certain leveling-off has happened due to the fact that large and middle companies changed attitude to support to a greater degree.

#### Assessment of State support in the last 2 years by companies of different size (results of 2019 survey)

Turnover	< \$1 million	\$1-5 million	\$5-20 million	> \$20 million
Worsening, % of respondent companies with relevant turnover	18%	9%	19%	25%
Average note (2018 indicator)	3.09 (3.18)	2.98 (3.04)	3.05 (3.29)	3.11 (3.33)

### Assessment of State support in the last 2 years for different categories of companies

	2017 survey	2018 survey	2019 survey
All respondent companies	3.16	3.17	3.04
<b>Business model</b>			
Software developers	3.19	3.07	3.02
Service companies	3.15	3.22	3.05
<b>Size of companies</b>			
Turnover < \$5 million	3.13	3.11	3.03
Turnover > \$5 million	3.29	3.30	3.07
<b>Foreign sales share</b>			
> 50%	3.23	3.16	3.09
< 50%	3.14	3.17	3.02

Division of respondent companies into groups showed that the scatter of average notes got thinner. In 2017, indicators of different categories of companies stayed within a quite wide range — from 3.13 to 3.29. In 2018 this range turned out to be even greater — from 3.07 to 3.30 and in 2019 — the smallest not only in the 3 last years but also in all previous years (from 3.02 to 3.09). It is fair to assume that this leveling was due to the fact that some companies, even satisfied with State support, started to be more critical.

#### 4.3. Assessment of the taxation system

Since 2012, the attitude of respondents to the Russian taxation system has improved significantly. The share of companies dissatisfied with the taxation system dropped from 50-66% to 26-31%. Software development companies assess the taxation system better because of the amendments to the Federal Law 212. Thanks to these amendments passed in 2010, it was established that the rate of insurance payments for software development companies accredited at the Ministry for Communications and Media remains at the level of 14% (as was the case in 2008-2009 only for software exporters).

In 2016, thanks to the activity of companies and associations representing the software industry, and thank to the support of the Russian president, it was possible to overcome the wish of a number of officials to deprive software developers of privileges for payments to social and pension funds.

In particular, RUSOFT presented calculations to the government which showed that abolishing incentives on insurance payments would not cause the increase of payments to budgets, but rather the decrease. At the same time, a blow would be given to a critically important sphere for the entire economy. As a result of lobbying this decision the president decided to extend privileges for another five years – until 2023.

In 2015-2018 the results of surveys did not show any evident change in attitude toward the taxation system on the part of respondent companies. In 2019 a small increase in the share of the grade “bad” (from 26.5% to 31%) may be noted. The average note in this case reduced from 2.91 to 2.84. Perhaps, it was a consequence of the increase of the VAT rate from 18% to 20% since January 1, 2019. Also the pursuit of regional authorities and social funds to raise their own budget revenue (or cut expenses) may come into play that often causes bureaucratic red tape in granting allowable deduction and repaying funds spent by companies (for example, on paid maternity leave of their employees).

In addition, the multi-year research shows that the assessment of the taxation system largely depends on the current media coverage which in 2018 and in the first months of 2019 was anything but categorically positive or negative. On the one hand, granting additional tax privileges was being discussed, on the other hand, sanction barriers were in progress.

The Skolkovo Foundation developed in 2018 amendments to the Tax Code in order to release Russian IT exporters from VAT, which were spent for equipping programmers’ workplaces. On top of that, the Ministry of Economic Development prepared proposals of



changes to legislation which assume the profit tax relief to companies cooperating with education institutions. Managers of software companies have been expecting such measures from the State for a long time. In December 2018, a draft law was published concerning changes in application of VAT in some transactions, particularly, in electronic and IT services. It envisages deduction of input VAT in export of electronic and IT services and in implementation of IP as well as a VAT exemption in performance of IT services (including SaaS). Earlier the draft law was approved by the Ministry of Finance.

According to the indications of the Russian President to the Government in late 2018, it is anticipated that there will be used a deduction against income from qualifying the intellectual property (Patent Box). In February 2019, the Ministry of Economic Development prepared a document whereby the profit tax for export of telecommunications, computer and information services will be collected at a zero rate.

### Assessment of the taxation system

	Bad	Satisfactory	Good
2008 survey	45%	54%	1%
2009 survey	37%	52%	11%
2010 survey	50%	42%	8%
2011 survey	66%	30%	4%
2012 survey	49,5%	42%	9,5%
2013 survey	36%	55%	9%
2014 survey	30%	53%	17%
2015 survey	26%	59%	15%
2016 survey	26%	57%	17%
2017 survey	26,5%	52%	21,5%
2018 survey	26,5%	56%	17,5%
2019 survey	31%	52%	17%

All above mentioned incentives and proposals should be perceived by software companies positively or at least neutrally. At the same time, some media frightened that due to amendments to the Tax Code enacted in 2019 IT companies could be deprived of privileges for payments to social and pension funds. Fears turned to be unfounded but similar information could have impacted on the attitude of software companies toward the taxation system.

All previous years companies with turnover below \$5 million, as a rule, were more critical to the taxation system than larger companies.

Such difference also is observed in results of the 2019 survey though it did not happen in 2018. Maybe it was a consequence of a much higher average point of companies with a share of export over 50% (compared to companies more focused on Russian market). It is large companies which have a high share of export. The initiative of tax remissions manifested in 2018-2019 is primarily focused on export encouragement.

### Attitude toward the taxation system of different categories of companies in 2019, average point

All respondent companies	2.84
<b>Business model</b>	
Software developers	2.79
Service companies	2.91
<b>Size of companies</b>	
Turnover < \$5 million	2.83
Turnover > \$5 million	2.97
<b>Foreign sales share</b>	
> 50%	3.21
< 50%	2.74
<b>Company's age</b>	
Older than 10 years	2.81
Younger than 10 years	2.96

Young companies traditionally assess the taxation system better (an exception to it was the 2018 survey, when there was no big differences of views between companies older and younger than 10 years). Among them are many startups with different tax privileges.

An average point is higher among service companies for which existing tax privileges are of paramount importance. The gap between estimates of the taxation system by companies depending on location of headquarters is narrowing. It can be determined by the sum of deviations from average point. Formally, in 2019 it has grown but only owing to data presented by companies from Ural region. As the sample of Ural companies is too small their indicator can be excluded, and without it an average deviation will be not 0.63 but 0.3.

Moscow based companies now much more critically feel about the taxation system (comparing with findings of 2018 survey).

They have the lowest average note of this indicator since 2014. Basically, in no way it depends on company location (except Ural region, which has too small sample to draw any conclusions). St. Petersburg has a symbolic growth (from 2.86 to 2.87). Here in the summer of 2018 the local law “On tax privileges” was adopted which envisaged a reduced profit tax rate for organizations investing in creation or update of data centers as well as companies engaged in software export.

#### Average assessments of the taxation system depending on company location

	survey 2014	survey 2015	survey 2016	survey 2017	survey 2018	survey 2019
Moscow	2.95	3.03	2.91	3.00	3.00	2.74
St. Petersburg	2.74	2.74	2.93	2.90	2.86	2.87
Siberia	3	2.72	3.2	2.83	2.91	2.91
Ural	2.67	3.33	2.67	2.90	2.67	3.29
Other regions	2.88	2.88	2.88	3.07	2.90	2.84
Sum of deviations from average point	0.61	0.97	0.66	0.39	0.39	0.63

A profit tax rate for them is reduced up to 12.5% in 2018-2020. In the next years it will be 13.5%. Companies which have invested in creation and in update of data centers at least P500 million will be able to take advantage of the privilege, as well as companies involved in software export. In this case a share of export has to be at least 70% of sales result, and 90% of total revenue has to accrue to activity “Software development, consulting and other supporting services”. This loosening could not have a serious impact on assessment of State support by St. Petersburg companies, however a certain positive influence could take place.

#### 4.4. Presence of modern infrastructure

As a result of many years of observations, it was realized that the most significant factors in an assessment of infrastructure are as follows: the growth or decrease of rental rates and other expenses ensuring the functioning of offices, and also the effect of publications in the media on public opinion. These two factors can significantly influence the number of companies dissatisfied with infrastructure in just a year, although in reality the infrastructure itself cannot change to the same degree in such a short time.

The significance of rental rate is confirmed by the results of 2018 survey. Companies which reported of increased rental rates give a note of 3.02 to the infrastructure. If there was not any increase or the respondent was undecided, the average note turned to be much higher — 3.13.

Rental rates in 2018 have increased by a quite acceptable and anticipated value. On the average, they have increased by 6.2% that is slightly above the officially declared rate of inflation. At the same time, a number of companies reported to have moved to a more comfortable office and that is the only reason why they pay for rent much more. The growth of rental rates is higher among companies the turnover of which has increased by more than by 10% (compared to those with lower, zero or negative growth rates).

Generally, the changes in rental rates could not impact on assessment of the infrastructure. For many years it is satisfactory. In the recent years new technology parks have not been opened in a mass scale. The progress of infrastructure development is so slow that respondents may fail to notice it.



Hence, the fact that assessment remains the same as in 2018 is quite logical. A certain improvement is mentioned but within random fluctuations which is typical in the recent years.

Significant changes emerged in the last decade that was reflected in assessment of our respondents. Enormous investments in telecommunications infrastructure were made both by the State and by private companies. For example, the coverage zone of the 3G network has already reached its maximum possible size, and in almost all regions cellular network of the next generation, 4G (LTE) has been launched.

By its speed of data transfer in LTE networks and by its coverage of the territory of the country, Russia is ahead of the USA. Additionally, the bandwidth of main communications channels is increased, the problem of “digital inequality” is solved which affects settlements that are small and remote from Moscow. Over the last decade new modern airports and roads have been built in various cities, a high-speed railway has been built between Moscow, Petersburg and Helsinki, and also between Moscow and Nizhny Novgorod with a planned extension to Kazan (an according project is in the process of realization). In recent years, large-scale updating of electricity transmission equipment has been taking place, which is confirmed by foreign experts and by heads of foreign companies which have provided solutions for the industry. By its percentage of new equipment in the electrical power industry, Russia is already one of the world leaders.

Opening of 12 technology parks built in ten Russian regions under the federal program which remained in force from 2007 to 2014 was also assessed positively.

#### Assessment of infrastructure existing in Russia

	Bad	Satisfactory	Good
2008 survey	52%	42%	6%
2009 survey	20%	60%	21%
2010 survey	15%	59%	26%
2011 survey	40%	37%	22%
2012 survey	11,5%	60,5%	28%
2013 survey	25%	52%	23%
2014 survey	16%	52%	32%
2015 survey	10%	56%	34%
2016 survey	21%	42%	37%
2017 survey	19%	48%	33%
2018 survey	21,5%	47%	31,5%
2019 survey	18%	51%	31%

Assessments of modern infrastructure now are not strongly dependent on location of headquarters of surveyed companies (if we exclude Ural region with a very small sample). It implies that the quality of infrastructure facilities and the cost of relevant rendered services have flattened out.

It may be noted that among Moscow companies in 2019 the average point of assessment of infrastructure condition has reduced. In prior years it was steadily higher. It is an occasion to investigate the reasons of potential problems in Moscow. However, the changes of the average point do not automatically mean that such problems exist.

#### Assessment of existing infrastructure in Russia depending on company location

	survey 2014	survey 2015	survey 2016	survey 2017	survey 2018	survey 2019
Moscow	3.29	3.35	3.19	3.32	3.34	3.10
St. Petersburg	2.88	3.23	2.9	3.23	3.00	3.19
Siberia	3.53	3	3.1	2.88	3.10	3.10
Ural	2.83	3.33	3.33	2.7	3.17	3.50
Other cities/regions	3.14	3.25	3.29	3.16	2.87	3.08

## Assessment of existing infrastructure in Russia depending on company turnover

	survey 2014	survey 2015	survey 2016	survey 2017	survey 2018	survey 2019
< \$1 million*	3.39	3.29	3.1	3.06	3.27	3.28
from \$1 million to \$5 million**	3.14	3.24	3.27	3.18	2.93	3.07
from \$5 million to \$20 million	3.1	3.3	3	3.33	2.83	2.91
from \$20 million to \$100 million	3	3	3.22	2.83	3.25	3
over \$100 million	3	3.5	4	-	3.25	4

\* - before 2016 – less than \$0.5 million

\*\* - before 2016 - from \$0.5 million to \$5 million

The evident dependence of assessments of infrastructure on company size is not seen. It may be noted that middle companies have the lowest average note (two categories — \$1-5 million and \$5-20 million). As a rule smaller companies have low requirements to infrastructure as they do not have serious clients which could demand that their suppliers observe international standards of doing business. Larger companies take advantage of economies of scale (i.e. getting a discount from service providers). However, results of surveys in different years (for example, 2017) do not meet such explanation. Nevertheless, it has a right to exist.

### 4.4.1. Office space

In 2014-2016 the rental rates were steadily growing by 4-6% per year. In 2017 the increment increased but by year-end 2018 again returned to the level around 6%. At that, all recent years a share of companies reporting on increased rental rates was growing. In all appearances, landlords try to change rental conditions not every year.

### Share of companies with different change in rental rates in 2015-2018

Change in rental rates	2015	2016	2017	2018
No change	68%	63%	61%	49%
Increased	28%	36%	38%	49%
... increased by over 10%	16%	19%	20%	14%
Dropped	3%	1%	1%	2%

After the crisis in 2014-2016 a mass scale rent enhancement occurred first in Moscow and a bit late in regions (a year or two apart). By year-end 2018 the rate of price increases among companies in Moscow, St. Petersburg and other Russian cities has flattened out.

An increase in rental rates is higher for small service companies (turnover below \$5 million), young (established less than 10 years ago) and more geared towards foreign markets. A rent for service companies all recent years is going up in price because with the existing growth of turnover they depend more than product companies on staff size requiring office space. Another obvious consistent pattern: rental rates have more increased among growing companies. In 2018 the turnover of companies which mentioned the growth of cost of renting by 10% and more increased on the average by 20%. Alternatively, if the increment is below 10%, then turnover has increased far less — by 8%.

The difference of growth of rental rates for companies subdivided into categories can be significant not only due to the growth rate of consolidated turnover among formed groups but also because representatives of these groups prefer offices in business centers of specific class, while their rent rose in price in 2018 in an uneven manner (for example, offices in business center of one class increased by 9%, and of another one — by 20%).

## Growth of rental rate in different categories of companies in 2015-2018

	by year-end 2015	by year-end 2016	by year-end 2017	by year-end 2018
All respondent companies	5.4%	4%*	8.6%	6.2%
<b>Business model</b>				
Software developers	1.7%	3%	5.8%	2.73%
Service companies	5.8%	4%*	10.6%	7.53%
<b>Size of companies</b>				
Turnover < \$5 million	2.2%	4%	3.4%	9.0%
Turnover > \$5 million	5.8%	4%*	10.1%	4.7%
<b>Foreign sales share</b>				
> 50%	6.4%	5%*	10.6%	4.2%
< 50%	1.6%	3%	6.1%	8.3%
<b>Company's age</b>				
Older than 10 years	5.5%	4%*	8.7%	5.2%
Younger than 10 years	3%	5%*	8.6%	10.9%
<b>Headquarters location</b>				
Moscow	6%	6%*	4.7%	5.6%
St. Petersburg	3.4%	4%	7.8%	6.3%
All regions	2.2%	3%*	13.4%	6.4%

\* - without the two largest companies surveyed, for which rental increased by 20% and 24%

The growth of rental rates was influenced not only by the economic upturn in the country with an increase of tenants' payment behavior but also by the fact that in the recent years (some may even say, the last year) the number of newly opened business-centers reduced. It is an appropriate response to crisis which took place with a certain time lag.

As a rule the construction of commercial real estate needs some years. For this reason, putting office space in operation in 2014-2015 just after upper turning point was continuing even if was postponed by developers. However, real estate companies began rejecting new scheduled projects. As a result, the share of vacant spaces reduced, while rates began to grow (primarily, in business centers of class B).

According to Colliers International, in spite of the evident deficit of offices of class A the kick-off of new projects in St. Petersburg in 2018 was almost at zero. In 2019 the situation would hardly change: it is expected that no more than 70 thousand m<sup>2</sup> will be launched while large blocks from 5 thousand m<sup>2</sup> will remain in scarce supply as before. An alternative choice for many companies is the purchase of offices of custom design.

Another alternative to office rental in business centers is construction of an IT village. For instance, the governor of Kaliningrad region stated that a land plot of 10.6 ha on the coast of the Baltic Sea had been allotted for construction of such village. Implementation of the project is planned for 2019. However, similar incentives will hardly be implemented on a mass scale. It may happen that software developers will not go to Kaliningrad region, on the other hand this region has just a few own software companies. Youngsters mostly prefer living in big cities.

According to data of the international consulting company Knight Frank, the main trends of Moscow real estate market in 2018 were a historically low supply of new office space since 2009 and the same historically low level of availability of space since 2014 (in class A – 12.7%, in class B – 9%), as well as the growth of rental rates by 11.2% in the segment of offices of class A and by 3% in class B. The analysts of Knight Frank predict that in 2019 the proposal at office market will go on reducing and rental rates – growing.

By preliminary results of 2018 the total supply of high quality office real estate in the capital was 16.4 million m<sup>2</sup>. Compared to 2017 the volume of available space has grown by 1.1%. In class A the increment of space was 2.6%, in class B – 0.4%.

In 2019, the Knight Frank experts predict reduction of the share of vacant space up to 9.6% due to persistent demand in segment and a low delivery of new space. In offices of class B the share of vacant space in a year reduced by 1.6 percentage points and following preliminary results of 2018 it amounted to 9% that corresponds to 1.2 million m<sup>2</sup>. In 2019 a potential vacancy in class B may drop to 7.7%.

A weighted average selling rental rate in offices of class A in 2018 increased by 11.2% and comprised ₺25 thousand per sq. m. per year (triple net). According to forecast of Knight Frank, in 2019, a rental rate will raise to 26.700 rubles per sq. m/year (triple-net). Following preliminary results of 2018 the weighted average selling rental rate in offices of class B was 14,500 rubles per sq. m/year (triple net). Since the turn of the year the rate has increased by 3%.

Following preliminary results of 2018 companies which presented the sector of telecommunications/media/technologies (TMT) used to be leaders in volume of transactions with offices. Their share in the total volume of transactions was 20%.

Following preliminary results 2018 the total volume of investments in the commercial real estate of Moscow region will amount to ₺170 billion that is by 19% lower than indicators in 2017. The reduction of investment in Moscow real estate is associated with a certain shift of interests of investors towards regional real estate projects.

By year-end 2018 the total volume of investments in commercial real estate in Russian regions was ₺80 billion, that is more than twice higher than last year values. Such situation is explained by an increase of investments projects in real estate in St. Petersburg.

According to Maris (Part of the CBRE Affiliate Network), following the results of H1 2019 the gross rentable space of office centers of class A and B in St. Petersburg is 3,101 million m<sup>2</sup>. An average level of vacancy at office real estate market has changed little, if at all relative to final value in 2018 (+0.2 %). As of the end of June of 2019, about 177 thousand m<sup>2</sup> or 5.7% of total scope of proposal is free.

Requested rental rates in office centers of class A have not changed, in business centers of class B they are characterized by insignificant positive dynamics (+2.0%).

According to Knight Frank St Petersburg, by year-end 2018 the total commissioning in St. Petersburg was 280 thousand m<sup>2</sup> of office space —a maximum value in the last 5 years. The volume of net absorption was 109 thousand m<sup>2</sup>.

The level of vacant space in business centers of class A and B in 2018 kept on reducing and reached the mark of 4.7%. Available property offering reduced in one-and-a-half times in comparison with year-end 2017.

The structure of the industry-specific tenants changed towards decrease of IT companies share in rent deals and towards activation of other tenants. On average, an increase in item-by-item rental rates for space of class A and B was below 1.5%.

In 2019 the tendency of reducing the high quality vacant proposals at market, specifically offices of class A, will continue. 16 office centers with a total rentable space of 117 thousand m<sup>2</sup> from among those intended for rent and claimed for commissioning in 2019 are at the stage of construction and restoration.

It is noteworthy that in 2016-2017, analysts of realtor companies began to call IT companies (primarily software companies) the engine of the real-estate market on an equal level with oil and gas companies (they even have a more pronounced influence). This is another sign of the growing significance of the software development industry.

Due to ruble appreciation in 2017 the rental rates in dollar terms have increased even more that took a toll. However, since August 2018 the value of ruble began to drop again. As a result, rental rates in dollars again started to reduce.

#### 4.4.2. Technology parks

In 2016, the Russian board of standards passed changes to the national standard “Technology parks. Requirements” which came into force in March 2017 and specified requirements for technology parks, their infrastructure and for the list of services provided by the managing company of a technology park, and also privileges provided. According to assessments of the Association of clusters and technology parks, introducing requirements and recommendations of a standard will lead to an increase in the effectiveness of State support to technology parks at federal and regional levels.

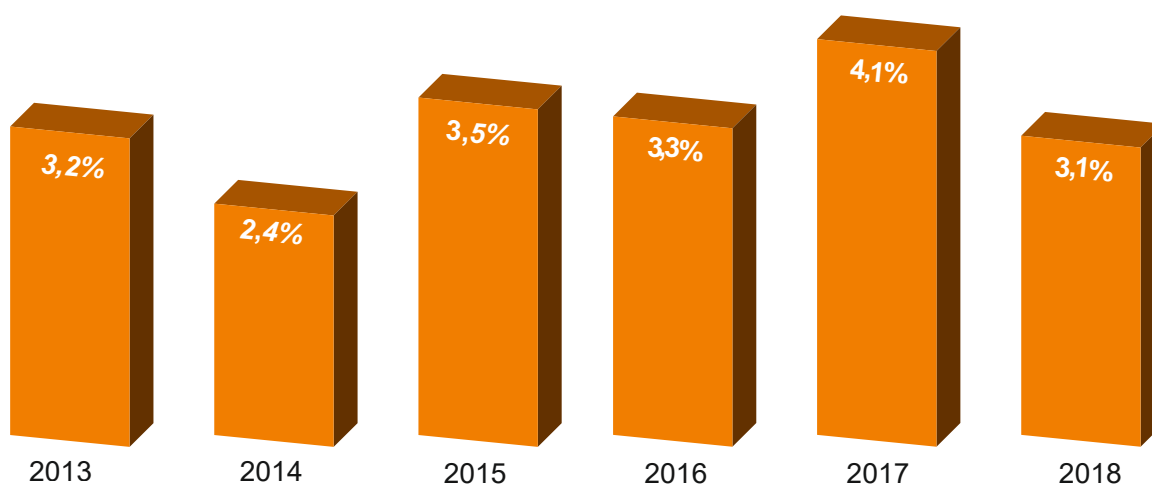
In 2016 there were over 200 organizations which had certain features of technology parks (around 500 have this name) in Russia, of which 107 technology parks met the requirements of the national standard “Technology parks. Requirements” to the fullest degree. Of these 107 technology parks, 44 are developed by private owners, and the others are financed in full or partially by the State in accordance with a number of State programs (data of the Association of clusters and technology parks of Russia). In 2017-2018 no large-scale commissioning of new technology parks has been seen.

#### 4.4.3. Telecommunications

Since 2013, findings of surveys show that companies spent around 3% of budget on telecommunications services. Significant fluctuations year in, year out are caused primarily by a number of large companies surveyed. The greater is their number, the lower is the indicator. In addition, it bears mentioning the rate of growth of spending on other items (first of all, on salary and to a lesser degree on office rental) as well as tariff adjustments of telecommunication companies.

The larger the company, the lower the share of telecommunication services in general expenses. This rule extends to all years and in all surveyed cities without exception.

#### Share of expenditure on telecommunication services in total cost scale of respondent companies



We may assume that until 2017 a gradual reduction of the percentage of these expenses took place. Revenue of companies and their budgets in dollar terms over the last 2 years either increased or dropped to a lesser degree than dollar prices for telecommunications services. A tendency to reduce the share of expenses on telecommunications stems from the fact that in Russia as in all parts of the world technologies are being introduced which will make it possible to reduce expenses on communications. We observe the universal transition to IP telephony, which is becoming an alternative not only to traditional wire telephony, but wireless, the more so since 4G networks have covered almost all major cities of Russia with the high concentration of software companies.



### Share of expenditure on telecommunication services accounted for different categories of companies in 2018.

All respondent companies	3,1%
<b>Business model</b>	
Software developers	3,3%
Service companies	3,0%
<b>Size of companies</b>	
Turnover < \$5 million	4,0%
Turnover > \$5 million	2,6%
<b>Foreign sales share</b>	
> 50%	2,3%
< 50%	3,8%
<b>Headquarters location</b>	
Moscow	2,5%
St. Petersburg	3,2%
Other cities	3,2%

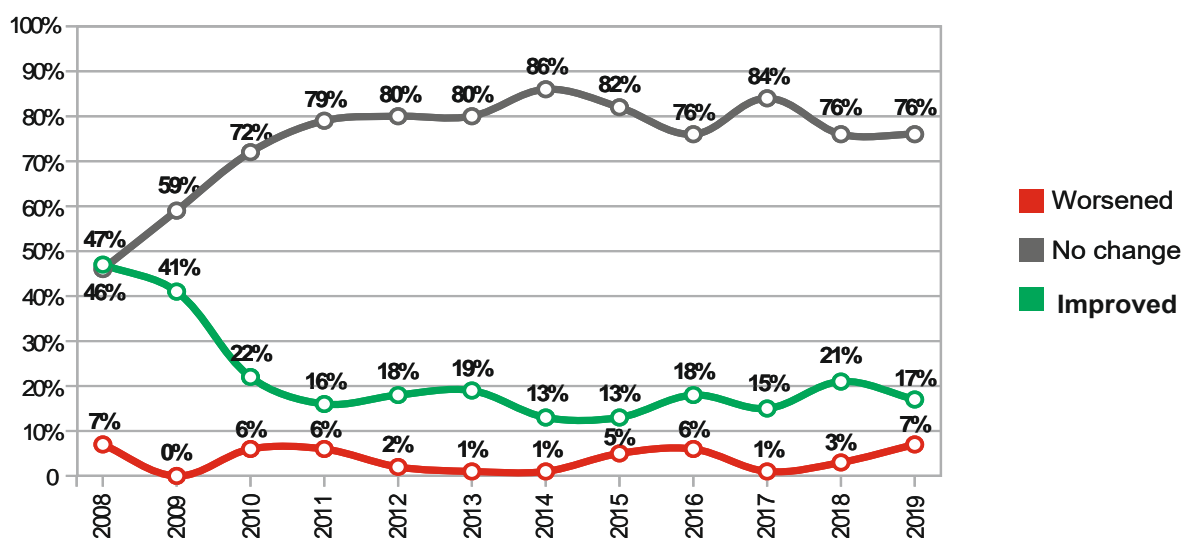
In 2017 the situation changed to evolving rise in tariffs of communications providers but that event was temporal.

All types of communications including video conferencing are now accessible even to small young companies almost Russia-wide wherever the industrial software development exists or may exist due to skills availability. Some 5-7 years ago there were problems but only for a specific category of companies.

## 4.5. Situation in the sphere of protecting intellectual property rights

In recent years the share of respondents who do not see changes over the past 2 years in the sphere of protecting intellectual property rights has remained stable at a level of 80%. Indeed, some significant changes in the sphere took place in the active battle against piracy more than 10 years ago. Although the 2019 survey demonstrated that the number of companies which saw an improvement has slightly grown, but this change is within random fluctuations observed in the recent years.

### Assessment of changes over the last 2 years in the sphere of protection of rights of intellectual property



The situation in the sphere of protecting IP rights warrants further in-depth investigation. An annual RUSOFT survey offers too limited information. As a first step, it is a good idea to determine how wide is the range of companies in need of better protection of IP rights and how serious are their problems herewith. Far from every company has anything that requires extra protection. Any relatively successful company has its own IP but not always there is somebody who infringes on rights.



The main problems of software companies as regards to IP protection are as follows:

1. Illegal use of a developed source code (as a rule, theft is performed by current or former employees who copy this code and handover to other companies).
2. Sales of pirate software copies.
3. Unauthorized patenting of another's pioneering work (frequently practiced by "patent trolls" in order to demand for license fees later on).
4. Illegal use of a name (using a very similar name in order to create confusion), brand, logo, website URL.

The extent of code theft from Russian companies is difficult to assess because, as a rule, these cases do not become known to public. Presumably, about the first in Russia court action related to illegal use of code was reported by media in June 2019 when a Russian programmer Anton Mamichev won a case of copyright against Amazon Technologies Inc. and Veeam Software. The St. Petersburg court passed a verdict that these companies should pay to the developer P23 million because they removed from the code the copyright symbol in violation of the license agreement in force.

Sales of pirate copies are no longer such serious problem as some 10 years ago. In 2017, according to information of BSA, a percentage of illegal software used on Russian PCs was 62%, in other words, remained at the same level as in all prior years. Thereafter no new information about measurements of this indicator was published in media (the same holds for BSA website). Probably, the share of illegal software is formally big but in all appearances is below 38%. However, more often than not it is used by persons who, come what may, will never be legal buyers since do not have wherewithal.

According to the on-commercial partnership of software products producers (NP PPP) the number of criminal cases involving violation of authors' rights on software have been decreasing. The number of crimes under article 146 of the Russian criminal code (violation of authors' and mixed rights) committed towards participants of NP PPP in 2013 was 1772, in 2014 — 1211 and in 2015 — 1070. Law-enforcement bodies increasingly apply fines as a punishment, the sums of which are constantly growing.

The management of the Federal institution of industrial property (FIIP) believes that the widespread opinion that Russian legislation is incapable of protecting authors' rights in the field of high technology at a modern level is mistaken. The legislative base fully corresponds to international requirements in this sphere, although there are problems of applying it in practice. According to the FIIP, in recent years the stable growth in the number of submitted and approved application for registration of authors' rights has been observed, and for every 100 programs there are 10 databases and one topology. The peak of submitted applications took place in 2014 (over 1600), after which a small drop was recorded, which can probably be explained by a worsening of the general economic situation in the country.

Only such large companies as Kaspersky (former name — Kaspersky Lab) and ABBY have reported about attacks of patent trolls abroad. In the USA they managed to fight back against claims of patent trolls, but nevertheless their court costs were big (in the US court system one has often spend more than one million dollars toward this goal). Other cases of similar attacks on other Russian companies are unknown.

More than likely, for most Russian software companies the problem of protecting IP rights does not exist at all or is not crucial. In the annual survey of software companies carried out by RUSSOFT, in the last few years respondents were given a free hand to offer the measures of state support they need most of all. Among all proposals protecting IP rights was never mentioned yet.

It is revealing that in 2018 one third of respondents was undecided in regard of changes in protection of IP rights (33%), and in 2019 — 24%. It may be assumed that most companies presented by respondents have no problems with protection of intellectual property due to the absence of substantial subject matter.

## Assessment of changes over the last 2 years (2016-2017) in the sphere of protection of rights of intellectual property by different categories of companies

	2017 survey		2018 survey		2019 survey	
	average point	undecided	average point	undecided	average point	undecided
All respondent companies	3.14	28%	3.17	33%	3.11	24%
<b>Business model</b>						
Software developers	3.11	27%	3.04	34%	3.09	23%
Service companies	3.16	28%	3.26	35%	3.12	25%
<b>Size of companies</b>						
Turnover < \$5 million	3.16	30%	3.18	29%	3.11	22%
Turnover > \$5 million	3.04	21%	3.06	45%	3.12	32%
<b>Foreign sales share</b>						
> 50%	3.12	34%	3.14	38%	3.17	28%
< 50%	3.14	25%	3.17	29%	3.09	23%

In 2019, for the first time the assessment of changes in protection of IP rights by companies, more focused on domestic market, was lower than that of companies which have more than 50% revenue from export. The difference was quite significant. It is difficult to discover the cause of it on the basis of surveys. The worsening of situation was seen primarily by small software vendors (and also by service companies which have own replicable solutions), having a small or zero share of export.

In summer 2016, the Russian government determined a procedure for subsidizing foreign patenting of Russian companies. Prime Minister Dmitry Medvedev signed a decree determining the procedure for providing subsidies to support patenting of Russian companies abroad. Subsidies will be offered to Russian organizations which provide services to national manufacturers and exporters on foreign patenting of inventions and useful models abroad. Subsidies should help many Russian developers, who would like to patent their inventions but do not have sufficient funds.

Practical measures to apply this regulation are entrusted to the Russian Export Center. The provision of these subsidies in 2016-2017 did not prove very effective because of the complex procedure of application and reporting, and also the low sum of subsidies compared to the cost of patenting in the USA. So at present these regulations are being elaborated, to raise the sum of subsidies and simplify the procedure of receiving them.

### 4.6. State support of international marketing activity

Actions of different governmental institutions (ministries, Russian Export Center, Moscow Export Center) aimed at promotion of Russian IT companies abroad were intensified in the recent years. Arrangement of business missions, signing of intergovernmental agreements in the IT sphere, subsidies to exporters, support of visiting of Russian enterprises of foreign events (exhibitions, conferences) — all of these are growing from year to year, though often concurrence and forethought is lacking in holding and supporting foreign marketing events of interest. These actions still cover not a very broad spectrum of software companies (more times than not they are short of necessary information) but this spectrum is broadening.

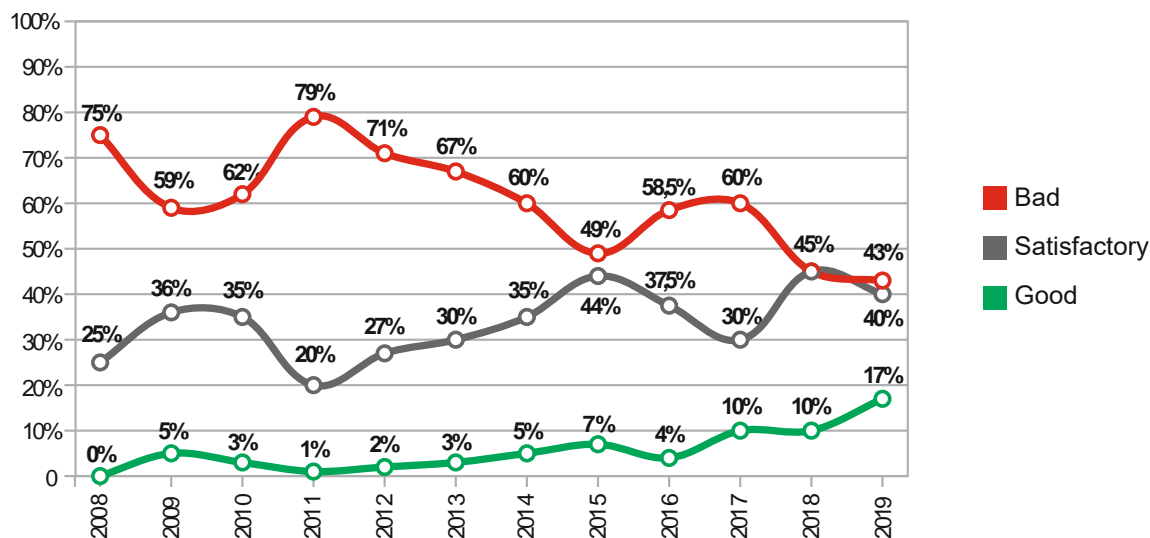
For this reason an increase of the share of companies surveyed which gave the grade “good” to the State support of international marketing activity is no mere chance. If in 2008 this share was zero, by year-end 2019 it hit record high — 17% (of all assessing companies).

In this case the proportion of undecided companies reduced materially. If in 2017 they run at 50%, then in 2018 already 39%, and in 2019 — 34%. Therefore, in two years the number of companies which knew nothing about existing State support of international marketing activity were significantly reduced.

The situation began to change in 2016-2017. First the IT department was opened at the REC, which established ties with software exporters (including potential ones). Then financing of foreign marketing events in the form of collective expositions at foreign exhibitions and of business missions took place. A survey was regularly conducted among companies about the exhibitions and conferences that they found most interesting, and the Associations of IT business were invited to these events to organize the participation of Russian companies. In 2017 an agreement of cooperation was signed between REC and RUSOFT, under which RUSOFT organized business programs for participants of delegations of IT companies in business missions and in a number of exhibitions.

In the last 2 years with the financial and organizational assistance of REC and with participation of RUSOFT there were organized business missions of Russian IT companies to Indonesia, India, and program of marketing actions at exhibitions such as GITEX (Gulf Information Technology Exhibition) in Dubai, AfricaCom in Capetown (South Africa), Consumer Electronics Show in Las Vegas, Mobile World Congress in Barcelona. Unfortunately, after change of REC top managers the involvement of IT associations in organization of foreign marketing came to a full stop and likewise the support of IT business missions.

#### Assessment of state support of international marketing activity



The RUSOFT Association prepared the “Vision of software industry” where all problems of industry and possible solutions thereof have been collected. There is a chance that this document will be given serious thought by authorities both at federal and regional level.

In particular, this Vision states that an effect of the state support to the software export cannot be treated only from a point of view of receipt of tax payments, of foreign currency inflow and of increase in employment. An increase in export of software allows for diversifying the Russian economy and for reducing dependence on raw materials price fluctuations. Software exporters obtain competences and knowledge abroad which they use working at Russian market. Herewith to Russia are carried over not only technological competences but also methods of efficient workflow management (especially, the interaction between customer and contractor).

The greater is the number of Russian top-level developers with proven experience of participation in global competition, the better are chances to generate competitive solutions in any field of the world economy. But if professionals leave Russia on mass scale (as physical persons or with companies which change jurisdiction) it will be a blow to the entire national economy.

Existing world technological trends also operate to the advantage of Russian developers. Software development in future-oriented segments of the new Techno-economic paradigm requires a high level of physics and mathematical training, and that level in Russia remains unchanged, despite all problems of Russian higher education institutions.

#### Assessment of state support of international marketing activity of different categories of companies

	2017 survey		2018 survey		2019 survey	
	average point	percentage of undecided	average point	percentage of undecided	average point	percentage of undecided
All respondent companies	2.51	50%	2.64	39%	2.74	34%
<b>Business model</b>						
Software developers	2.63	47%	2.68	46%	2.72	38%
Service companies	2.40	53%	2.58	30%	2.75	31%
<b>Size of companies</b>						
Turnover < \$5 million	2.54	54%	2.64	39%	2.82	41%
Turnover > \$5 million	2.42	34%	2.62	28%	2.56	13%
<b>Foreign sales share</b>						
> 50%	2.43	40%	2.43	22%	2.96	35%
< 50%	2.57	55%	2.77	45%	2.66	34%

If we compare assessments of different categories of companies we'll see that large companies are informed about current State support of international marketing activity more than smaller companies but are more critical hereto.

#### 4.7. Financing of R&D

In 2014, for the first time since the survey was held, respondents were asked to assess the level of State financing of R&D in the IT sphere. The new question was included in the study as the topic of finding sources of financing R&D became especially important, primarily thanks to the activity of the Skolkovo Foundation. It suddenly turned out that the State was capable of allocating funds to R&D not only among universities, establishments of the Russian Academy of Sciences, State enterprises and a narrow circle of businesses close to the bureaucracy, but also among a wide range of commercial companies. Several years ago, this phenomenon simply did not exist (the only exception was the Fund for Promotion of the Development of Small Forms of Enterprises in Scientific and Technical Sphere the so-called Bortnik Fund).

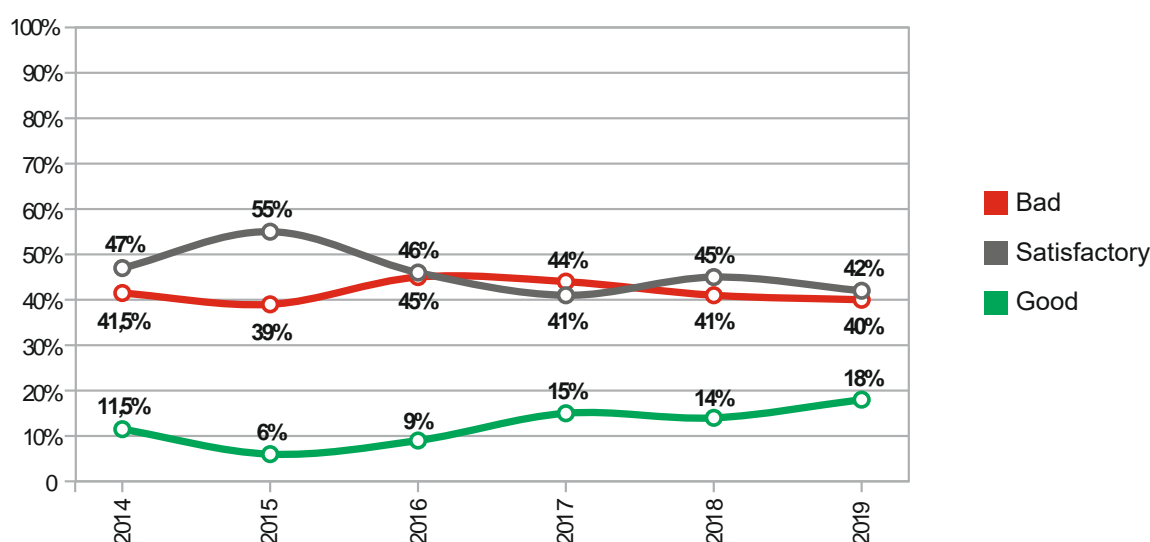
It cannot be said that this financing was sufficient, but it was noticeable. Around 60% of respondents in the 2014-2015 surveys assessed the level and quality of existing financing of R&D from the state as "satisfactory" and "good". However, the average assessment of quality of support from the State in this sphere (2.68 in 2014 and 2.7 a year previously) still differed from the assessment of other measures of State support for the worse.

In 2016, the level of respondents dissatisfied with financing of R&D increased from 39% to 45%, which was probably linked to the crisis which led to a drop in this financing, and in 2017 it decreased to 41%. From 9 to 15% increased the share of companies which assessed financing of R&D as “good”. However, it must be taken into account that this 15% share includes companies which answered this question, excluding 45% of respondents which had difficulties assessing State financing of R&D.

In 2018 despite information on reduction of State financing of R&D, the average point of its assessment slightly increased — from 2.70 to 2.73. At the same time, the proportion of undecided diminished — from 45% to 42%. Though truth be told, this change is insignificant.

The 2019 survey showed the highest proportion of grades “good” of this indicator (18%) over the years when this question was included in the questionnaire. Another positive change — the reduction of undecided came up to 34%. The average point of this measure of State support still does not correspond to the grade 3 or “satisfactory” (it was 2.78), but currently we see more problematic lines.

### Assessment of state financing of R&D



### Assessment of state financing of R&D among different categories of companies surveyed, average point

	2016 survey	2017 survey	2018 survey	2019 survey
All respondent companies	2.64	2.70	2.73	2.78
<b>Business model</b>				
Software developers	2.59	2.67	2.74	2.79
Service companies	2.71	2.71	2.66	2.77
<b>Size of companies</b>				
Turnover < \$5 million	2.69	2.76	2.70	2.81
Turnover > \$5 million	2.62	2.47	2.86	2.68
<b>Foreign sales share</b>				
> 50%	2.61	2.56	2.69	2.87
< 50%	2.66	2.76	2.71	2.75
<b>Company's age</b>				
Older than 10 years	2.62	2.6	2.84	2.72
Younger than 10 years	2.69	2.8	2.63	2.88
<b>Headquarters location</b>				
Moscow	2.73	2.79	2.78	2.47
St. Petersburg	2.44	2.57	2.25	2.63
All other cities	2.69	2.72	2.81	2.93



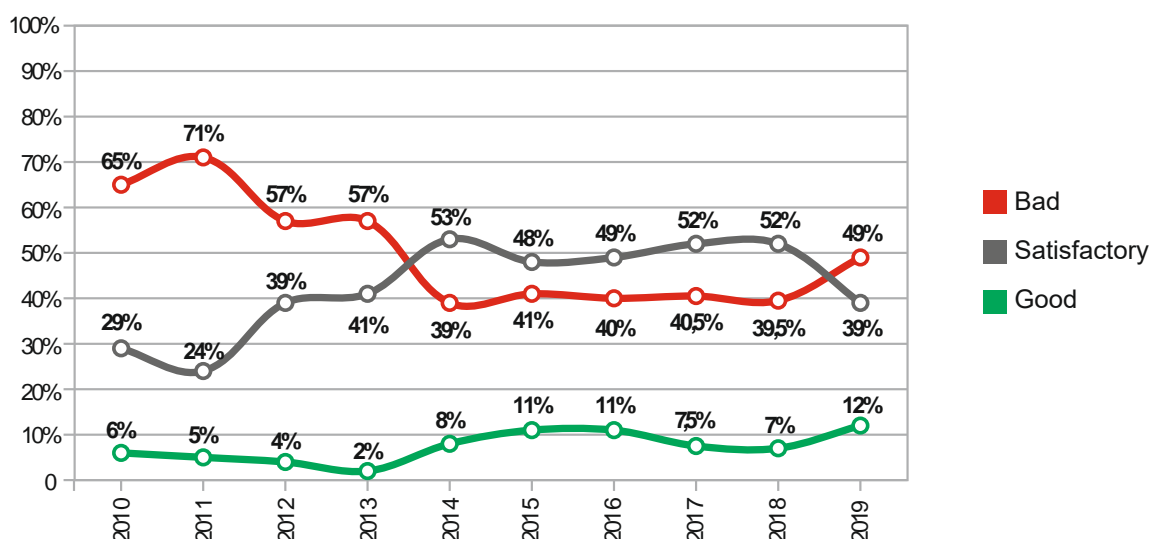
If we compare the assessments of different categories of companies, it is difficult to say which of them is more satisfied with State financing of R&D, as all have an average point much lower than 3. It is also difficult to reveal any conclusive trends in respect of individual groups of companies. The progressively growing from 2014 satisfaction of regional companies with this indicator is seen. It is not implausible that it becomes easier for them to get State financing of R&D.

#### 4.8. Bureaucratic and administrative barriers

In 2014, a considerable improvement was noticed in respondents' assessments on how the problem of bureaucratic and administrative barriers is solved. Above all, the share of respondents dropped drastically who believe that this problem is solved badly – from 57% to 39%. Surveys of 2015-2016 showed that the share of these assessments has barely changed – for three years in a row, around 40% of respondents were unhappy about how the problem of bureaucracy is solved.

If we look at the results of the survey for the past 5-7 years, we can safely assume that this improvement of assessments is unlikely to be a coincidence. Without sufficiently effective work by officials, it would be simply impossible to get mass accreditation of IT companies at the Ministry for Communications and Mass Media, the allocation of grants from the Skolkovo Fund, and receiving the status of resident at State technology parks.

##### Assessment of the influence of bureaucratic and administrative barriers on companies' activity



In 2018, no significant changes were revealed with a very symbolical increase of the average point and the reduction of undecided from 22% to 19%.

The 2019 survey showed that the problem of bureaucratic and administrative barriers should be given a more serious consideration. The proportion of “bad” grades increased sharply — from 39.5% to 49%. At the same time, the percentage of companies which were undecided as of how this problem was solved significantly reduced — from 19% to 7%. Although the share of “good” grades increased, the situation in all likelihood took a turn to the worse. Probably, this worsening involved specific categories of companies most of all.

In this regard it is worth paying attention to a specifically low average point of this indicator among Moscow companies. Also companies which are more focused on the Russian market had given worse notes. The reasons should be figured out because data of survey only gives grounds for assumptions. One of the reasons may be the craving of authorities for improving budget figures of revenues and specific types of expenses. It may concern not only regional budgets but pension and insurance funds too. In this eventuality managers usually give a command to subordinates and set goals which are often achieved by simplest and not exactly legal ways.



Officials can obstruct granting pertaining privileges, reimbursement of companies' expenses on maternity leave of employees by requiring a great amount of official documents in paper form and attempting to receive surtaxes. There are known cases when payment for performed contracts tied up with government entities was delayed. Perhaps, such cases are not isolated.

**Assessment of the influence of bureaucratic and administrative barriers on different categories of respondent companies (findings of 2019 survey), average point**

All respondent companies	2,63
<b>Business model</b>	
Software developers	2,54
Service companies	2,69
<b>Size of companies</b>	
Turnover < \$5 million	2,65
Turnover > \$5 million	2,54
<b>Foreign sales share</b>	
> 50%	2,83
< 50%	2,55
<b>Company's age</b>	
Older than 10 years	2,60
Younger than 10 years	2,66
<b>Headquarters location</b>	
Moscow	2,38
St. Petersburg	2,67
Siberia	2,69
Ural	3,14
Other regions	2,63

In addition, the average point may be negatively affected by the increase in the number of companies which have attempted to receive State support. For this reason, for the first time they have had to deal with officials and complex procedures which are unclear for business. Without support programs, these companies may have had no reason for a critical attitude to the work of State structures.

A number of experts note that the attempts of the State to mitigate restrictions in the currency regulation system still present a cosmetic measure which will do almost nothing to solve overly-regulated problem. Therefore, there are still many barriers which impede foreign economic activity of businesses.

#### 4.9. Financial support of startups

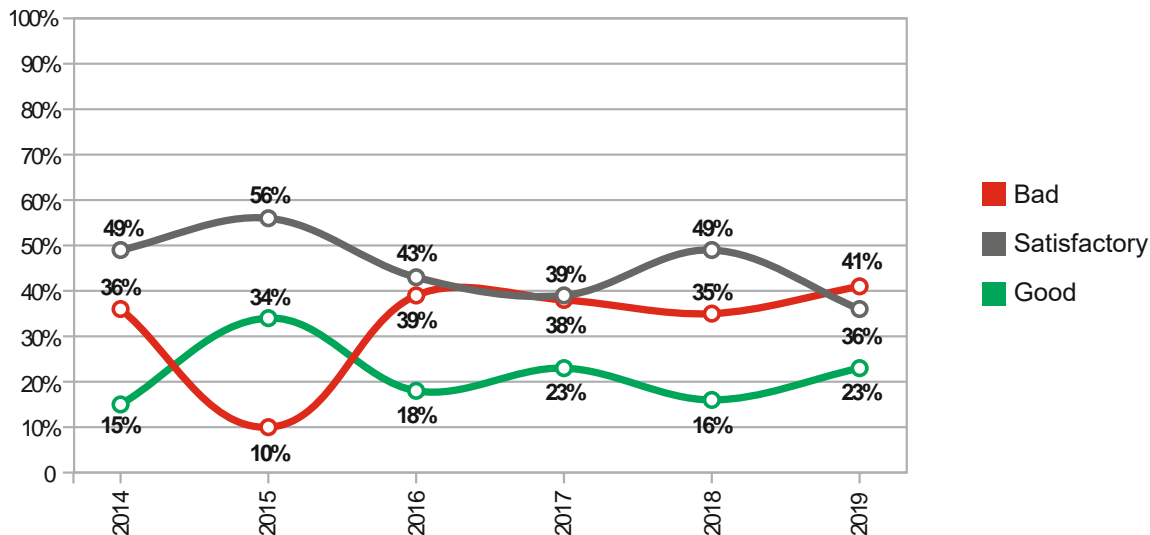
The significant reduction of the venture market in 2015 was reflected in assessment of respondents on financial support of startups in 2016: the share of dissatisfactory assessment grew drastically – from 10% to 39%.

The 2017 survey reflected small improvements. The entire venture market in 2016 continued to shrink, but the rates of its reduction were less than in the previous year. At the same time, investments in the software industry increased. This situation led to a very large share of surveyed companies (44%) having difficulty in how startups are financially supported.

In 2018 the number of undecided sharply decreased (up to 32%), and the proportion of “satisfactory” increased at the expense of the reduction of “bad” and “good” grades. At that the average point slightly reduced — from 2.85 to 2.82, as the reduction of “good” grades was more significant. These findings look appropriate: there were no grounds for improvement of assessment over the year since the last survey.

In 2019, there was little change in the total assessment of financial support of startups: the average point increased from 2.82 to 2.84. The same is the case of undecided companies (in 2019 — 31%, a year earlier they were 32%). However the number of both “bad” and “good” grades increased. This suggests that situation for some companies improved and for others changed for the worse.

## Assessment of financial support of startups



The average point of assessment increased among companies which sell more abroad than at domestic market. Besides this indicator increased among regional companies, and among developers from Moscow and St. Petersburg it went down.

## Assessment of financial support of startups for different categories of surveyed companies, average point

	2017 survey	2018 survey	2019 survey
All respondent companies	2.85	2.82	2.84
<b>Business model</b>			
Software developers	2.89	2.83	2.85
Service companies	2.81	2.77	2.83
<b>Size of companies</b>			
Turnover < \$5 million	3.00	2.79	2.82
Turnover > \$5 million	2.81	2.93	2.88
<b>Foreign sales share</b>			
> 50%	2.94	2.78	3.19
< 50%	2.80	2.82	2.70
<b>Company's age</b>			
Older than 10 years	2.80	2.78	2.80
Younger than 10 years	2.89	2.85	2.89
<b>Headquarters location</b>			
Moscow	2.94	3.00	2.67
St. Petersburg	2.86	2.80	2.61
Siberia	2.88	2.85	2.88
Ural	2.78	3.00	3.43
Other regions	2.78	2.61	2.93

*The situation is presented in further detail in the results of the study "Startup barometer 2019". The survey under this study showed that corporations began to participate more actively in support of new high-tech companies. The large business held a course for development of corporate accelerators aimed at search and verification of new solutions validity based on corporation infrastructure and clientele.*

*The 2018 survey showed that 71% of startups were established on private-venture funding and are not financed by investors. In 2019 they were 63%.*

*The second place unexpectedly was taken by grant-based companies — 16% of startups compared to 2% in 2018. A source of financing for launching of 9% of projects was non-core investors (or extended family and friends), while business angels yielded ground: in 2019 this option is at the end of the list.*

*77% of startups have no external investors. Entrepreneurs somehow manage to develop their business at their own expense and with appropriate support measures of other players, but stemming from obtained answers these resources are insufficient for product augmentation (because founders are still concentrated thereon), hiring of sought-after employees, new market research, mobilization of any other required resources.*

*To the question about support of State development institutions 39% of founders answered that they did not feel any benefit from options listed. One-third of respondents noted the activity of the Fund for Promotion of the Development of Small Forms of Enterprises in Scientific and Technical Sphere (Bortnik Fund), and one-fourth noted the activity of IIDF. The activity of Skolkovo contributes to the success of business of 22% of founders.*

*Entrepreneurs think that accelerators assist to develop startups most of all: 50% of founders chose option “assist” and 15% — “assist very much” — it is the biggest share of positive assessment among all players in the marketplace. At present, startups expect and receive assistance from corporations least of all: 29% say that corporations “assist in no way”, and 45% that «help very little”. Relative to development institutions and business incubators this indicator is still not uniquely defined, whereas in contrast the answers about support of venture funds and business angels still are positive-going.*

*In this case almost 80% of respondents take into account the cooperation with corporations. Businessmen become acquainted with representatives of large companies at industry events (27%) and contact through networking (25%). 15% of founders for this purpose participate in competitions and corporate accelerators.*

*Startups are launched by people of ripe age — between 26 and 35 years — this answer received most votes. Contrary to a stereotype that mainly youngsters are interested in getting startup moving, in reality entrepreneurs at the age of 18-25 years among respondents are fewest. These figures have not changed in comparison with 2018 data, rather confirmed the fact that an average age of the founder is between 30 and 40 years.*

*A number of entrepreneurs, who before launching the current startup already have had their own business, reduced compared to the indicator of 2018 (from 30% to 24%), but increased a number of those who made a switchover to startup industry from large companies. 23% of respondents earlier were employed in middle and small companies. Former employees of corporations among startupperes are 27% —this answer is the most popular and a number of experienced business owners shifted to the second place. An option of migration from corporations to startupperes as a new trend considers revising next year.*

*Women who established startups among respondents were just 12%.*

Taking into account the increasing international competition for personnel as well as simple procedures of re-domiciliation of high-tech companies in the IT sphere, such situation with startup support rings alarm bells.

According to Crunchbase, a company tracking and analyzing data about collected venture resources in different countries, in Q II 2018 China received 47% of world venture capital while the USA and Canada could win 35% of resources. For the first time China outcompeted North America in venture capital volume abetted by an unprecedented fund raising to the amount of \$14 billion by Ant Financial Services Group, specializing in development of financial technologies.

In the summer of 2018, British authorities declared a creation of a new visa which would be issued to startup founders. As expected, the issuance will begin in 2019. In the UK already exists a similar IT visa (a relevant program envisages issuance of 2 thousand visas per year) but its owners can be only technical university graduates. Right now the list of applicants will be increased by entrepreneurs who are ready to launch technology projects in Great Britain.

#### 4.10. Influence of external factors on doing business in Russia

Thanks to the additional question that was introduced in 2015, it became possible to find out how such external factors as the economic crisis in Russia, western sanctions against Russia and responsive anti-sanctions, and the devaluation of the ruble in relation to the dollar and Euro influence companies.

In the survey respondents had to choose an option from -3 (very negative influence) to +3 (very positive influence). Zero indicated no influence at all.

In 2015 it was found that external factors did not have any influence or had a negative influence, on the vast majority of companies surveyed.

The 2016 survey showed that the negative influence of external factors has increased. The average point on three factors which also existed a year ago reached -0.44 (on four factors – 0.42). The influence of the economic crisis became more noticeable (if in 2015 the average assessment of its influence was -0.5, in 2016 it was -0.95, and the influence of western sanctions was less significant (-0.4 and -0.27 respectively).

The significance of devaluation remained at a level of almost zero (-0.09 instead of -0.1), but this is only the average indicator for all surveyed companies. For some companies focused more on foreign markets, its influence was very positive, but for others for which the majority of revenue comes from the domestic market, it was negative. As it is mainly large companies that have a large share of export, we may assume that the positive influence of devaluation for the entire IT industry outweighs the negative one.

In 2017 the situation changed and new formulations of external factors were included in the questionnaire. From the questionnaire of the previous year, the factor “Western sanctions against Russia” was retained. Although its formulation changed somewhat (“responsive sanctions: were excluded), the comparison can still be made. If in 2016 the influence of this factor was assessed at -0.27 (i.e. negative but insignificant), in 2017 the significance of sanctions was higher (-0.66). For 22% of surveyed companies they are a serious problem.

About the same number of respondents (19%) noted a negative or very negative influence of the anti-Russian mood of western media.

Since the question wording in 2018 remains unchanged, we may compare an integrated index of influence of external factors in 2 years. In 2018 it run at -0.21 (negative influence but very small), and a year earlier it was -0.25. An improvement of integrated index was primarily provided by a significant decline of negative influence of western sanctions on business, at the same time the importance of negative attitude toward Russia in western media increased.

In 2019 the total influence of external factors essentially remained unchanged (an integral estimation run at -0.22). In all appearances, the negative influence of western sanctions grew stronger. At the same time, respondents assessed “Stimulation of software export” better than a year earlier. This improvement was expected.

The proportion of companies which felt “Negative attitude to Russia in western media” increased but the importance itself of influence of the factor on the average reduced. As a result, the integral estimation increased from -0.68 to -0.62 (for companies with export share over 50% — from -1.42 to -0.97).

## Assessment of influence of external factors, share of surveyed companies

	Bans on using foreign software with equivalent on register of Russian software	Western sanctions against Russia	Stimulation of software export (in particular the work of the REC – Russian export center)	Negative attitude to Russia in western media
Very negative	3%	5%	0%	2%
Negative	6%	19%	1%	16%
Negative, but insignificant influence	10%	26%	3%	27%
No impact	55%	38%	77%	53%
Positive, but insignificant influence	14%	11%	13%	1%
Positive	10%	3%	3%	1%
Very positive	2%	0%	3%	0%
Difficult to say	12%	9%	18%	13%
Average point (year earlier)	0.09 (0.16)	-0.63 (-0.48)	0.26 (0.16)	-0.62 (-0.68)

For all the heated debates and discussions of preferences for Russian companies as part of import substitution, the factor of “Ban on use of foreign software with an equivalent in the register of Russian software” only had a positive and very positive influence for 12% of surveyed companies (2017 survey). This is not very many. Especially, as a comparable number called this factor negative and very negative – 8%.

In 2018, the assessment of import substitution became a bit more — 16%. In 2019 – in increased to 26%, however, there are little less than that of companies (19%), which see in bans a negative influence on their business (predominantly, it comes to service companies and, generally, companies with more than 50% of revenue from export). Regardless of the fact that the number of companies which derived benefits from import substitution measures, increased one-and-a half times approximately, the integral assessment of this factor decreased from 0.16 to 0.09. In other words, the influence of this factor for the entire industry on an average is almost zero.

The import substitution process is underway, but largely thanks to other factors: requirements of a regulator on information security and on technology independence, as well as the price increase of imported software compared to Russian equivalents since the devaluation of the ruble.

We should note significant deviations in the assessment of the effect of the law prohibiting State structures to purchase imported software, between product and service companies, and also between companies focused on the Russian market and primary exporters. Product companies and companies focused on the Russian market highly assess this law and the creation of the Register of Russian software, while service companies and companies primarily focused on export believe this measure has a negative effect.



### Assessment of influence of external factors, share of surveyed companies (average point)

	Bans on using foreign software with equivalent on register of Russian software	Western sanctions against Russia	Stimulation of software export (in particular the work of the REC – Russian export center)	Negative attitude to Russia in western media	Average point for all 4 factors
All respondent companies	0.09	-0.63	0.26	-0.62	-0.22
<b>Size of company</b>					
Companies with turnover above \$5 million	0.13	-0.91	0.22	-0.91	-0.37
Companies with turnover below \$5 million	0.08	-0.54	0.28	-0.55	-0.18
<b>Business model</b>					
Software developers	0.18	-0.32	0.27	-0.40	-0.07
Service companies	0.01	-0.89	0.26	-0.82	-0.36
<b>Foreign sales share</b>					
Companies with foreign sales share < 50%	0.17	-0.47	0.24	-0.50	-0.14
Companies with foreign sales share > 50%	-0.14	-1.08	0.34	-0.97	-0.46

In some cases working abroad becomes impossible due to the company's affiliation with the Russian jurisdiction. For example, WayRay changed it for the Swiss one because it depends on components which can be purchased exclusively in the US. Besides, it faced a problem at German market: a representative of the potential partner flatly stated that "his company will never buy Russian technologies". Far from everyone is on warpath in western countries, but such issue is in place.

Preconditions for reduction of sanction activity on the US part are not yet in sight. In September 2018, the US Department of Commerce prepared sanctions against 12 Russian companies moreover four of them are under an accusation of aiding Russian cyber criminals. The fault of the rest is delivery of equipment to the Russian Navy or support of A&D industry.

In Europe in the short term a certain improvement of conditions for Russian companies is possible. In April 2019, the European Commission reached an official verdict on absence of malware and cyberspying functions in Kaspersky products. However, a year before the European Parliament recommended prohibiting the usage of this company's software throughout the EU. In fact, the ban has taken effect while the decision of the European Commission may not impact on its revocation.

The most negative influence of all the external factors (according to 2017-2019 surveys) is felt by large companies, developers of custom software and companies which are more focused on foreign markets than on the Russian market. Sanctions and the negative attitude towards Russia and Russian companies from western media affects them to a much greater degree than to small product companies mainly working in Russia.



## 4.11. Importance of measures of State support

In order to understand better how the IT business chooses priorities that should be possessed by State structures which are responsible for the development of the high technology sector of the economy, in the 2015 survey a question was added to the survey about the importance of certain measures of State support for software companies.

The results of the survey confirmed the hypothesis that for the vast majority of software developers, “Provision of tax privileges” (including privileges on social tax payments) had the crucial importance. Other measures of support have much lower assessments. The Russian Export Center (REC) which supports export of different industries, notes a certain passivity of software companies, whose position is characterized by the following words: “The privileges have been kept. Thanks! We don’t need anything more”. According to representatives of the REC, companies of other industries are more demanding of the State support and more active.

In 2018 it could be noted a rise of the average point of the assessment of measures of State support absolutely on all fronts. However, the 2019 survey again demonstrated its reduction. Just an importance of removal of bureaucratic and administrative barriers is assessed at the last year level. This measure steadily keeps the second place in the rating of important State support measures. Also a relative high significance has the presence of modern infrastructure.

Noteworthy is that the importance of “Stimulating export of software” reduced as respondent companies saw improvement in the area of State support of international marketing activity and a more positive influence of such external factor as “Stimulating export of software” (particularly, the work of the REC — Russian Export Center). On the one hand, the importance of this measure could decrease due to reorientation towards the Russian market (due to this fact other measures of support could become less important). On the other hand, companies can less appreciate what they already have if they have received the appropriate support from the State.

### Significance of main measures of state support (2019 survey)

	No significance (0 points)	Low significance (1)	Medium significance (2)	High significance (3)	Difficult to say
Provision of tax privileges (including privileges on insurance payments)	8%	8%	15%	66%	3%
Support of international marketing activity	23%	17%	20%	23%	16%
Stimulating export of software	21%	15%	21%	28%	14%
Financing of R&D	21%	18%	20%	28%	13%
Support of certification of quality control under international standards	26%	22%	19%	15%	17%
Development of necessary infrastructure for business	10%	9%	32%	40%	9%
Removal of bureaucratic and administrative barriers	5%	11%	26%	51%	6%

### Change of significance of main measures of state support in 2016-2019, average point

Year of survey	2016	2017	2018	2019
Provision of tax privileges (including privileges on insurance payments)	2,3	2,4	2,64	2,43
Support of international marketing activity	1,5	1,34	1,82	1,52
Stimulating export of software	1,9	1,68	1,94	1,64
Financing of R&D	1,7	1,44	1,86	1,62
Support of certification of quality control under international standards	1,1	1,05	1,49	1,28
Development of necessary infrastructure for business	1,8	1,88	2,32	2,11
Removal of bureaucratic and administrative barriers	2,1	1,98	2,31	2,31

In comparing average assessments of different categories, we may note that providing privileges on social insurance payments (and also certain other measures of support), is much more important for companies focused more on foreign markets than on the domestic market.

### Significance of main measures of state support for different categories of companies in 2019 (average point)

	Provision of tax privileges (including privileges on insurance payments)	Support of international marketing activity	Stimulating export of software	Financing of R&D	Support of certification of quality control under international standards	Development of necessary infrastructure for business	Removal of bureaucratic and administrative barriers
All respondent companies	2.4 (2,7)	1.5 (1.8)	1.6 (1.7)	1.6 (1.6)	1.3 (1.3)	2.1 (2.4)	2.3 (2.4)
<b>Size of companies</b>							
Companies with turnover > \$5 million (2018 survey)	2.3 (2.7)	1.6 (1.8)	1.9 (1.7)	1.5 (1.6)	1.5 (1.3)	2.0 (2.4)	2.4 (2.4)
Companies with turnover < \$5 million (2018 survey)	2.5 (2.6)	1.5 (1.8)	1.6 (2.0)	1.6 (1.9)	1.2 (1.5)	2.1 (2.3)	2.3 (2.3)
<b>Business model</b>							
Software developers (2018 survey)	2.4 (2.6)	1.3 (1.7)	1.6 (1.9)	1.7 (2.0)	1.2 (1.7)	2.0 (2.3)	2.4 (2.4)
Service companies (2018 survey)	2.5 (2.6)	1.7 (1.9)	1.6 (2.0)	1.6 (1.7)	1.4 (1.4)	2.2 (2.3)	2.3 (2.3)
<b>Foreign sales share</b>							
Companies with foreign sales share < 50% (2018 survey)	2.4 (2.6)	1.5 (1.7)	1.5 (1.8)	1.7 (1.9)	1.3 (1.5)	2.1 (2.3)	2.3 (2.3)
Companies with foreign sales share > 50% (2018 survey)	2.6 (2.9)	1.7 (2.1)	1.9 (2.3)	1.4 (1.8)	1.4 (1.4)	2.1 (2.4)	2.2 (2.3)

For software product companies, in comparison with service companies, the significance of measures of state support in 2018 was higher for “Financing of R&D”, “Support of certification of quality control under international standards” and “Support of international marketing activity”, while service companies more needed “Development of necessary infrastructure for business”. In 2019 the “Support of certification of quality control under international standards” and “Support of international marketing activity” became more significant for service companies.

#### 4.12. Structure of expenditure of Russian software companies

Since 2016 the questionnaire was added with a new question about significance of certain items of expenditure in the budget of software companies.

The analysis of findings over the last three years shows that it is possible to define just an approximate composition of costs: telecommunications services account for about 3%; marketing, in all likelihood, 4-5%; rental of office space — 7-9%, R&D — 5-6% (the leap up to 11% in 2016 is probably caused by random factors).

#### Structure of expenditure of companies surveyed following the results of 2015-2017, % of all expenses

		Telecommunications services	Marketing	Office space rental	R&D
by year-end 2015	All respondent companies	1.7%	2.2%	4.7%	5.6%
	Without data of the largest company surveyed, with a large business outside Russia	3.5%	3.8%	7.6%	6.1%
by year-end 2016	All respondent companies	3.3%	3.7%	8.3%	11%
	Without data of the largest company surveyed, with a large business outside Russia	3.6%	6.6%	9.2%	11%
by year-end 2017	All respondent companies	4.1%	2.9%	8.4%	2.8%
	Without data of the largest company surveyed, with a large business outside Russia	3.0%	5.2%	6.6%	6.0%

In 2019, the question about composition of costs was supplemented by the most important for software companies item of expense — “Salary”. As a result, it turns out that the salary budget amounts to around 66% of the entire budget. In this case, for service companies it exceeds 70%, and for product companies it is consistently lower — about 57%. In the cities where the level of salaries is higher the corresponding share of expenses is also higher.

By year-end 2016, 49% of companies spent on R&D. In comparison with 2015, the percentage of companies spending on R&D at least 10% of all expenses has increased from 26% to 35%. By year-end 2017, expenses on R&D were reported by 39% of respondents. 14% of respondent companies spent on R&D more than 10% of their annual budget.

By year-end 2018, the composition of costs did not undergo radical changes (also around 40% of companies spent a part of budget on research and development), but a smaller number of companies — 5% — spent over 10% for these purposes.

### Structure of expenditure of companies surveyed by year-end 2018, % of all expenses

	Salary	Telecommunications services	Marketing	Office space rental	R&D
All respondent companies	66.1	3.1	5.4	6.9	4.6
<b>Business model</b>					
Software developers	57.3	3.3	8.4	6.0	5.3
Service companies	70.1	3.0	4.0	7.3	4.3
<b>Size of companies</b>					
Turnover < \$5 million	64.5	4.0	6.6	7.9	3.9
Turnover > \$5 million	66.9	2.6	4.7	6.4	4.9
<b>Foreign sales share</b>					
> 50%	69.2	2.3	5.9	6.6	4.8
< 50%	63.2	3.8	4.8	7.3	4.4
<b>Headquarters location</b>					
Moscow	76.0	2.5	1.7	5.8	1.5
St. Petersburg	68.1	3.2	2.7	8.2	4.9
Other cities	64.0	3.2	7.4	6.2	4.9

By year-end 2016, the proportion of companies which disclose data about marketing expenses reduced from 68% to 66%. The share of companies spending at least 10% of budget on marketing was 45%.

By year-end 2017, expenses on marketing were mentioned by 66% of respondent companies (31% spent above 10% of budget), and by year-end 2018— 64% (only 19% of respondents spent at least one tenth of their budget for these purposes).

## CHAPTER 5

# Geographical Coverage and Vertical Markets of Russian Software Development Companies

## 5.1. Russian market and global presence

Problems related to anti-Russian sanctions and to the anti-Russian propaganda in at Western markets a favorable at the Russian market (growth of market itself and squeezing foreign developers out due to the imports substitution policy) in 2018 have resulted in a small but still obvious reorientation of software development companies towards domestic market.

It looks small in monetary terms as sales at domestic market have increased by 12% (in USD), and abroad — by 10%, and this is not a far cry. As a consequence, the share of foreign sales in cumulative turnover of Russian software companies has increased just by one percentage point — from 60% in 2017 to 61% in 2018.

The reorientation towards domestic market is on full display if we look at the share of companies without any export revenues. By year-end 2017 there were 24.8% such companies among respondents, by year-end 2018 there were roughly half as much — 35.6%. At the same time, a great part of companies covered by survey in the last two years (1/4 of respondents in 2019) showed the decrease in export share (and specifically, up to 0%). As a rule, those are small companies to which activities abroad in 2017 provided up to 10-15% of revenues. However major custom engineering companies also pumped up sales in Russia.

Software vendors increased foreign sales a little more than at home (by 11% and 8.4% respectively in dollar terms), but just these companies gave up export revenues much more intensively. If in 2017 21.1% of them had no such revenue, in 2018 they were 45.2%.

The case of the service companies is almost just the other way round. They increased sales at domestic market by 20.6% in dollar terms, and foreign sales — only by 9%. In this context the percentage of companies with no export revenues remained almost unchanged (increased from 27.2% to 27.6%).

The reason is that a greater increment of sales of software vendors at foreign markets is ensured by a few very large companies, as well as by some not very big but growing companies. Service companies hardly cried off foreign activities but increased sales in Russia much more actively. Admittedly, this reorientation concerns custom engineering companies of all stripes.

From the point of view of the change of sales share at domestic market in cumulative turnover of Russian software companies since 2013 (before 2013 RUSOFT calculated only consolidated export), since 2016 it rises steadily by 1-2 percentage points. However before 2016 there occurred a sharp decrease in the share of domestic market from 50% up to 35%. Therefore, in the last three years, assumeably, the previous ratio has been recovering (in all likelihood, the process will continue also in 2019).

Market failure in 2015 is primarily caused by a sharp drop in the currency rate. Herewith the domestic software market did not increase even in ruble terms. As a result, the volume of sales of Russian software companies reduced in rubles by 8%, and in dollars — by 39%. On the other hand, the weakening of national currency promoted export activities (above all, custom software development).

Since 2016 currency fluctuations and real-time situation at Russian software market ceased to be main factors influencing the share of sales at domestic market in cumulative turnover of software companies. This indicator is steadily growing with both further weakening of national currency and the absence of obvious growth of domestic software market. Even in 2017 it is not as if ruble strengthening and expansion of Russian market has significantly impacted upon an increase in share of sales in Russia in total turnover. The growth by just one percentage point is too little to consider it as the main factor compared to the rise in exchange rate of ruble against the dollar (roughly by 15%).

After 2016 geopolitics started exerting the strongest influence over relationship of sales at domestic and foreign markets. For this reason it was much more difficult to increase export in the US and EU. The process of imports substitution at Russian software market got into high gear.



### Share of sales in Russia in the total turnover and the yearly average exchange rate of dollar in 2013-2019

	2013	2014	2015	2016	2017	2018	2019 (forecast)
Share of sales	51%	50%	35%	37%	38%	39%	40%
Dollar rate, ₺	30.9	38	60.7	67	58,3	63	65

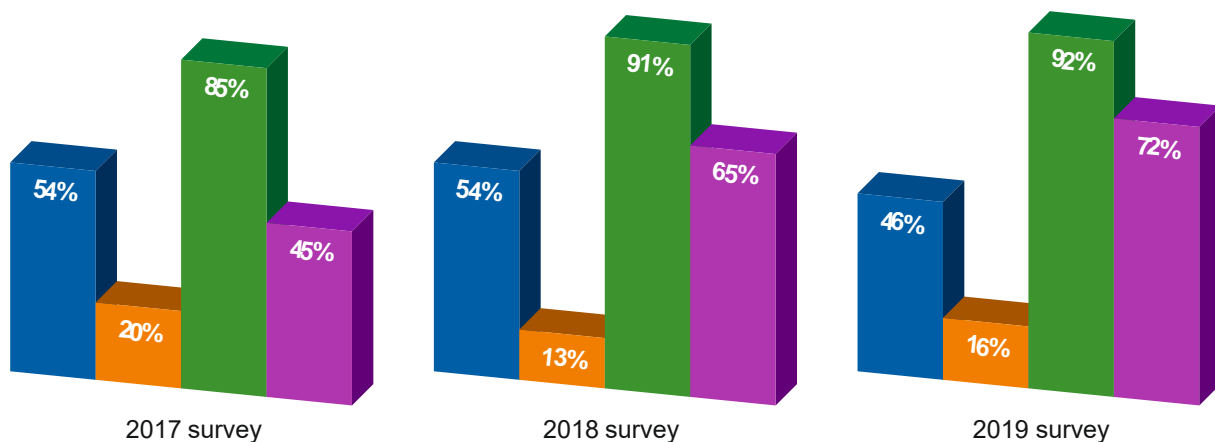
Given that up to 20% of companies have clearly reoriented towards domestic market by reducing the export share (half the time up to 0%), much more companies began planning to enter new foreign markets in the next 2 years. In 2018 survey on average respondents mentioned 1.32 macro-regions where they intended to work for the first time in current and in the next year. In 2019 survey this value increased to 1.66. All in all, similar plans have 41% of respondent companies.

Therefore, one may talk of a planned mass expansion of software development companies at foreign markets. However it does not mean at all that this expansion is bound to happen. Similar plans were also mentioned in 2018 survey, but in reality companies more often left foreign markets than entered new markets. Respondent companies informed that they were present in 2017 at 3.12 markets on average, and in 2018 — at 2.98.

One may judge about the attitude towards working at Russian or foreign markets by the tasks which companies set themselves. The share of respondent companies which attach importance to the option “Working for export/expanding the marketing network abroad” in 2016-2018 was growing (first from 50% to 57%, and then to 66% and 69%). 2019 survey showed that this indicator reduced to 61%. The share of respondents who mentioned the option “Working for export/expanding the marketing network abroad” as a priority have reduced already in 2018— from 36% to 28%. In 2019 it has slightly increased (up to 31%), but still remained at a low level.

The importance of Russian market, with the best will to sell abroad, is growing from year to year: a top-priority of “More active work on the domestic market” was indicated in 2019 by 56% of respondent companies, in 2018— by 52%, and in 2017— by 31%.

### Attitude to work on domestic and foreign market of companies with the export share less than 25%



- Working for export/expanding the marketing network abroad as one of the tasks
- Working for export/expanding the marketing network abroad as priority
- More active work on the domestic market as one of the tasks
- More active work on the domestic market as priority

Of particular note is the attitude towards foreign markets of companies with export share up to 25%. It indicates that the principal income is gained by activities in Russia and CIS countries. This category includes at least 60% of all respondent companies (following the results of 2019 survey— 64%). The respondent companies for which foreign sales account for not more than 25% of revenue give a high rating to Russian market, to judge by their “important” and “priority” tasks. Year after year they increasingly name “More active work on the domestic market”, and “Working for export/expanding the marketing network abroad” less often. At the same time, 47% of these companies informed that in 2019-2020 they would plan to enter even one new foreign market.

Additional information about pursuance of foreign markets is given by findings of the study “Prospects of Russian IT developers on the global market” which was conducted by RUSSOFT in 2017 on the initiative of the SAP corporation. It was directed towards a deeper study of prospects and aspirations of Russian software companies to promote their solutions and services on corporate markets abroad.

**The results of this survey made it possible to make the following conclusions:**

1. Around 10-15% of Russian software vendors are not yet prepared for international expansion. They either create solutions for the Russian market, or work abroad with a narrow circle of clients, which they do not intend to expand. Accordingly, 85%-90% of companies see their expansion abroad as a possible strategy of development in the future. At present, not more than 60% of Russian software companies work on foreign markets, around half of which do not develop their own products, but provide services to develop custom software.
2. 74% of respondents are in the process of creating software for export, and 65% not only indicated the existence of such developments, but also gave brief descriptions of them.
3. 12% of companies whose sales were previously limited to Russia and countries of the post-Soviet sphere, plan to enter foreign markets for the first time in 2017, and 14% - in 2018.
4. Forecasts of leading world analytical centers show that high-tech solutions will be in particular demand in coming years on the world market, which requires developers' high level training in physics and mathematics, and this is the main advantage of Russian engineers. The results of this survey confirm that Russian software developing companies specialize above all in searching for solutions in the most prospective segments of the world Software (“big data”, artificial intelligence, computer vision, machine learning etc.). In many cases they are oriented towards the global market from the very beginning. Only in 60% of cases, export oriented developments coincide with developments for the Russian market, and in 40% of cases companies create software that is originally oriented towards the foreign market.

Therefore, the pursuance of expansion on foreign markets is typical for a wide range of Russian software companies but if resources are limited they have to choose between real opportunities of increasing sales at domestic market and the opportunities to enter new and frequently little-understood foreign markets. More often they opt for working at Russian market. Not very wide range of companies has resources yet for entering new far abroad markets without compromising activities at domestic market. Herewith this range in recent years is narrowing.

## **5.2. Distribution of sales by macro-regions of the world market**

For year-end 2015, for the first time we received data on sales of Russian software companies in different macro-regions of the world. In previous years the significance of individual regions of the global market was only assessed by the number of respondent companies which indicated their presence in a certain macro-region.

Sales in global macro-regions are calculated by the importance of their markets indicated by respondent companies. As to large companies which have not participated in survey, as a rule we may judge their geographical priorities by the degree of activity at one or another market. Some of them disclose information about structure of sales with distribution by countries or macro-regions which include several countries.

This method has a large margin of error. However there is no other (better) methodology. Nevertheless it makes sense to define just an approximate distribution of sales in geographical terms.

The available data on these sales in the last 4 years (2015-2018) allow us to estimate the dynamics of sale at each market with due diligence and, if information from other sources exists, to confirm our estimates. Fluctuations are too big and not always look logical. Nevertheless, the data for several years provide an opportunity to define framework for each market. For some markets the scatter was not very great and changes (growth or drop) are broadly confirmed by other sources. One of these sources is CBR (Central Bank of Russia) having statistics of flow of export revenues from “Software services”. Though these services account for less than a half of foreign sales of Russian software companies (see Section 2.4), the discrepancy following the results of 2017 turned to be either insignificant or explicable.

#### Distribution of foreign sales of Russian software companies by countries and by macro-regions in comparison with CBR data on revenue sources from exported “Software services” (2017)

<b>RUSSOFT calculations</b>		<b>CBR data</b>
Belarus	3.0%	Republic of Belarus 1.0%
Ukraine	4.0%	N/A
Other CIS countries	8.2%	Republic of Kazakhstan 2.4%
USA or Canada	28.0%	United States of America 32.3%
Germany and German-speaking countries	14.6%	Federal Republic of Germany; Swiss Confederation 7.7%+5.8%=13.5%
Scandinavia и Finland	5.4%	Kingdom of Sweden 1.5%
Other countries of Western Europe	14.1%	Cyprus, Ireland, United Kingdom of Great Britain and Northern Ireland, Kingdom of the Netherlands, Grand Duchy of Luxembourg 6.3%+7.2%+6.9%+2.8%+1.0%=24.2%
Central and Eastern Europe	5.1%	Czech Republic, Slovak Republic 2.1%+1.4%=3.5%
Southeast Asia	8.7%	Republic of Singapore, Hong Kong Special Administrative Region 1.3%+1.7%=3%
South and Central America	2.9%	N/A
Africa	1.7%	N/A
Australia	2.5%	N/A
Middle East	1.9%	N/A

A discrepancy exists for Belarus and Ukraine (if N/A is less than 1%). It is explained by a specific feature of RUSSOFT calculation methodology which reflects the fact that in the neighboring countries many companies are at work but does not take into account small volumes of sales. In addition, revenues from sales in CIS countries more often than not may be accounted for not as “Software services”. In all appearances, the export revenues from Belarus and Ukraine are less than 4% and 3%, but greater than that of CBR estimation (i.e. over 1%). If we look at other years, then RUSSOFT calculations show some 2%.

For Germany and German-speaking countries the difference is actually calculated in a tenth of one percent if data for Austria are taken into account. A difference of data for the USA is very small.

If we take «Other countries of Western Europe», CBR shows a much bigger share of sales (only for 5 states out of almost 20). However Cyprus, Ireland and Luxembourg are small countries which cannot buy much software from Russia.

At the same time, they are known as tax havens. In other words, from these countries sales are performed throughout Europe via subsidiaries of Russian software companies. In the UK and the Netherlands Russian software exporters also frequently establish offices for working across the whole European Union.

Therefore, RUSSOFT calculations allow for showing the quite realistic picture of distribution of foreign sales by various geographical markets. CBR statistics gives an option of assuming that some data have to be adjusted. Results of calculations made in different years give the opportunity to identify random fluctuations. The accuracy also improves in aggregating the indicators — for instance, by merging all markets of western countries, countries of post-Soviet area and all markets new for Russian companies. Both RUSSOFT and CBR demonstrate that the markets conventional for Russian software companies (EU, US, former Soviet republics) still provide at least 80-85% of foreign sales (revenues from these sales to Russia).

#### Distribution of foreign sales of Russian software companies by macro-regions of the Global market, % of cumulative turnover (calculation by assessment of significance of specific markets)

	2016	2017	2018
Russia	37%	49.5%	55.3%
Belarus	1.9%	1.0%	0.8%
Ukraine	2.5%	1.2%	1.3%
Other CIS countries	52%	2.9%	3.3%
USA or Canada	17.7%	17.1%	13.0%
Germany and German-speaking countries	9.2%	8.4%	8.1%
Scandinavia и Finland	3.4%	1.5%	1.7%
Other countries of Western Europe	8.9%	8.5%	6.4%
Central and Eastern Europe	3.2%	1.5%	1.7%
Southeast Asia	5.5%	4.0%	4.0%
South and Central America	1.8%	1.5%	1.6%
Africa	1.1%	0.5%	0.6%
Australia	1.6%	0.9%	0.9%
Middle East	1.2%	1.3%	1.4%

As of changes per year in distribution of foreign sales by markets, it stands to mention the decrease in the share of the USA (with Canada) and of Western Europe with the increase of the Russian value. In this case the export of services of R&D centers of international corporations is not accounted for. And for that matter the computational error is higher than in calculations of the above mentioned share of foreign sales and sales at domestic market. In other macro-regions the changes are within reasonable errors. In recent years Russian software companies are definitely faced with greater difficulties in the EU as a whole and in the North America.

If we consider the geographical distribution of sales made by companies with turnover up to \$20 million separately, we may also identify reorientation towards Russian market but due to reduction of the share of not only American and Canadian but of other markets as well. The shrinkage of the share of North America is not so high as that of companies with turnover over \$20 million, which most likely suffer for exacerbation of political relations.

On the average, in 2017-2018 the respondent Russian software companies were present at as many as 4 geographical markets (4.05 in 2017 and 3.92 in 2018). Previously the indicator was lower: in 2016 — 3.42, and in 2015 — 3.6.

The average number of key foreign markets also increased in 2017 and decreased in 2018 (2015 — 1.5; 2016 — 1.98; 2017 — 2.33; 2018 — 1.65). This indicates that companies through reorientation towards Russian market are trying to stick to their presence at foreign markets, at the same time, bringing down activities therein.

### Distribution of sales of small and middle Russian software companies (turnover up to \$20 million) by macro-regions on the global market

	Share of sales in cumulative turnover		
	2016	2017	2018
Russia	60.4%	64.1%	67.2%
Belarus	2.0%	1.7%	0.9%
Ukraine	1.9%	1.5%	1.0%
Other CIS countries	4.6%	3.3%	4.0%
USA or Canada	10.9%	11.3%	8.6%
Germany and German-speaking countries	4.2%	3.3%	4.6%
Scandinavia and Finland	3.3%	2.0%	2.4%
Other countries of Western Europe	5.4%	5.6%	4.5%
Central and Eastern Europe	2.1%	1.7%	2.1%
Southeast Asia	2.3%	1.6%	1.4%
South and Central America	0.5%	0.7%	0.5%
Africa	0.6%	0.6%	0.5%
Australia	1.0%	1.5%	1.0%
Middle East	0.9%	1.1%	1.4%

For the first time in all 16 years of RUSOFT study the respondents indicated as key markets all 14 markets into which we divided the global market on the geographical, linguistic and cultural grounds. One year previously, 3 macro-regions were not mentioned as being key ones by any respondent. This change is a sign that Russian developers are increasingly interested in markets which were not previously traditional for them.

In 2018 also all macro-regions were mentioned as being key markets by even one respondent.

8 respondent companies (5.2%) mentioned presence at all 14 markets. It means that they have become or aim at becoming global. Noteworthy is that among them there are custom software developers which previously ignored countries where salaries were lower than in Russia (before they oriented exclusively towards European and American customers).

Historically, traditional markets for Russian developers are Europe and North America, and also the market of Russia and of post-Soviet countries. Entrance into markets of economically developed countries took place thanks to numerous former compatriots who moved in mass during the perestroika years to countries with higher standards of living. Large-scale migration to these countries from the post-Soviet region took place especially in the 1990s.

The countries of the post-Soviet area (former USSR republics) are often considered by Russian developers to be the domestic market, as this market was well-known to them and clients and customers know Russian language pretty well.

Therefore, traditional markets are “Western world” and “Russia and former Soviet Union”. “Western world” is represented in the table of distribution of sales by macro-regions as follows: “USA or Canada”, “Germany and German-speaking countries”, “Scandinavia and Finland”, “Other countries of Western Europe”, “Australia” and “Central and Eastern Europe”, which currently are becoming closer to Western world (the more so since all they are members of the EU).

“Russia and former Soviet Union” apart from Russia has separate categories (Belarus and Ukraine), all others belong to “Other CIS countries”. Perhaps, Belarus appears worthy of this segregation unlike Ukraine. RUSOFT survey shows that the volume of sales of Russian software developers at Ukrainian market is about the same as in Belarus. However CBR data assert that in the post-Soviet the biggest export of “Software services” is provided to Kazakhstan (2.4% of all export of these services by year-end 2017), while Ukraine has not even 1%. The fact that Kazakhstan comes to the fore among all republics of the former Soviet Union is confirmed by lots of news about active actions of Russian software developers at Kazakhstan market.



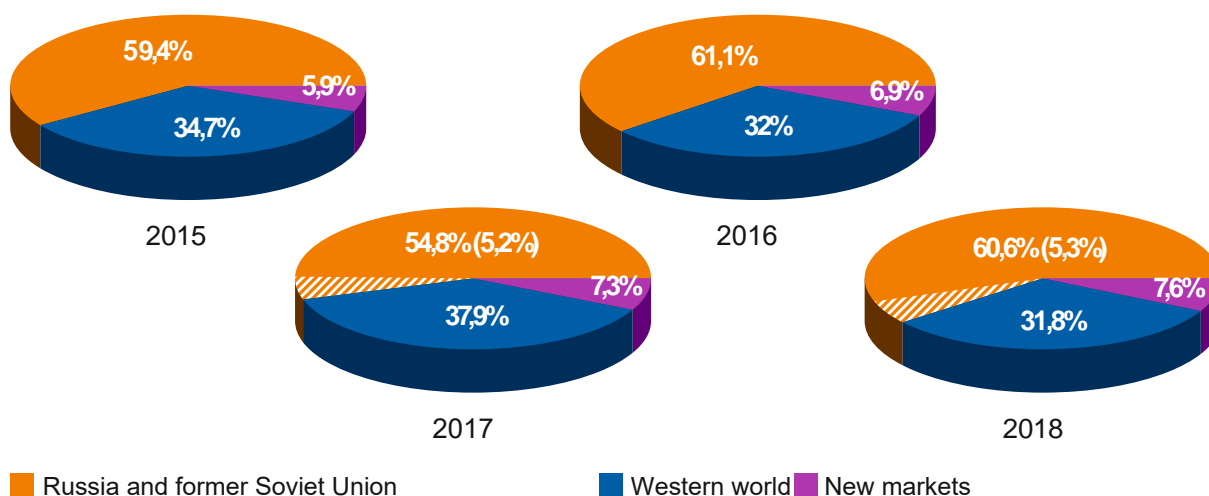
At the same time, it may be assumed that due to complicated Russian-Ukrainian relations Russian software companies work at Ukrainian market through their European offices (allegedly, suppliers are European companies). Nevertheless, the share of Ukraine consistently declines. If it continues, it will be misleading to categorize Ukraine as a separate geographical market.

“New markets” are subdivided into the following macro-regions: “Southeast Asia”, “Africa”, “South and Central America” and “Middle East”.

Market clustering permits to improve accuracy. Thus, it’s safe to say that throughout recent years the share of “Russia and other CIS countries” and “New markets” grows and that of “Western world” continues to decline. The growth of the “Western world” in 2017 is arguably an episode caused by devaluation effect.

Such changes are confirmed by information about a significant increase in sales at domestic market and in a number of news about activity at “New markets”.

### Distribution of sales of Russian software companies by market groups



If we look only at the distribution of foreign sales we may conclude that conventional markets by year-end 2018 account for 83%, and “New markets” — around 17%, although their share at the global IT market is 30-40%.

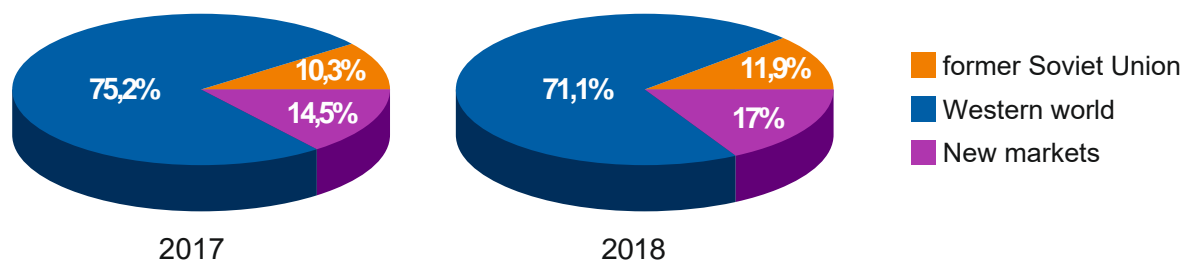
“Post-Soviet area” provides almost 12% of sales of Russian IT companies. It exceeds the share of CIS in export of “Software services” (according to CBR), which is 5.9% (\$228 million), but CIS includes only 9 states out of 15 former Soviet republics. On top of that, export of “Software services” and “Foreign sales of Russian software companies” are different indicators, although there is a link between them. One has also to take into account that solutions and services in the post-Soviet area may be supplied by Russian companies through their European offices. In other words, the difference does not look too wide.

According to CBR, by year-end 2018 the share of CIS in the total export of “Software services”, has increased to 5.9% compared to 5.5% in 2017. According to RUSSOFT, the share of sales in total foreign sales of software companies in the post-Soviet area has also increased — from 10.3% up to 11.9%. However, in previous years the share of CIS was reducing: in 2013 it was 7.8%, in 2014 — 7.2%, in 2015 — 6.9%, in 2016 — 6.1%, in 2017— 5.5%. RUSSOFT did not calculate this indicator for the post-Soviet area before 2017, however, presumably, it was reducing too.

From 2007, the percentage of respondent companies working on the American market began to decrease. This mainly concerned small companies (although large companies also reduced their activity in the USA somewhat). In 2013-2014, interest in the American market was revived, but in 2015 because of geopolitical risks this interest dropped once more. In the last 2 years about 40% of respondents mentioned their presence in American market, however, sales herein are still reducing.



### Distribution of foreign sales of Russian software companies by market groups



Software developers who have secured a foothold in the US market try not to leave it. For new companies it becomes increasingly difficult to enter herein. Nevertheless, the share of companies which plan to make first appearance at American market this and next year (relative to the year of survey) since 2016 is steadily growing and has increased in 4 years from 8% up to 13%. A high demand for American market among companies which have not entered yet comes from the fact that this market is the largest in the world and once a footprint in the USA is made it will be much easier to enter other foreign markets.

The growth of number of companies willing to make first appearance beyond Russia has respect to all foreign markets. Even the indicator of Ukraine is sufficiently high — 7% versus 2% in 2016.

### Presence of Russian companies on world markets, % of respondent companies

	2007	2013	2014	2015	2016	2017	2018
Russia	55	93	94	92	87	93	94
USA and Canada	55	41	48	36	37	42	39
Ukraine	17	39	30	32	25	23	20
Other countries of Western Europe	35	34	37	32	30	35	31
Other CIS countries	39	31	45	40	42	40	45
Belarus	32	33	27	33	28	29	26
Germany (German-speaking countries)	25	22	24	27	19	31	29
Scandinavia (with Finland)	28	17	17	18	16	20	21
Southeast Asia	19	8	12	15	13	16	17
Central and Eastern Europe	-	-	-	-	16	20	21
Australia, Africa, South America	25	14	12	-	-	-	-
South and Central America	-	-	-	8	8	14	10
Africa	-	-	-	9	7	10	8
Australia	-	-	-	8	10	16	12
Middle East	-	8	6	9	11	16	19

At the same time, plans largely have not been borne out yet: in spite of intentions to enter foreign markets more actively Russian developers increase sales at home ahead of schedule while the shares of macro-regions in geographic distribution of foreign sales are generally reducing or scarcely changing.

Almost all macro-regions are less often considered by respondents as key markets by year-end 2018. Only Russia's indicator has increased, that of Scandinavia and Finland stays the same. Reduction of the indicator of Ukraine is especially high — from 15% to 2%.

### Plans to enter markets for the first time this year and next year vs year of survey (% of all respondent companies)

	2016 survey	2017 survey	2018 survey	2019 survey
Russia	2%	3%	5%	3%
USA and Canada	8%	9%	12%	13%
Ukraine	2%	3%	7%	7%
Other countries of Western Europe	13%	14%	13%	17%
Other CIS countries	6%	5%	11%	12%
Belarus	6%	8%	9%	11%
Germany (German-speaking countries)	12%	12%	16%	19%
Scandinavia (with Finland)	5%	7%	13%	13%
Southeast Asia	12%	8%	11%	17%
Central and Eastern Europe	-	9%	11%	17%
South and Central America	6%	5%	6%	9%
Africa	2%	2%	4%	10%
Australia	4%	5%	11%	9%
Middle East	7%	10%	8%	12%

### Key markets, % of respondent companies

	2007	2010	2011	2012	2013	2014	2015	2016	2017	2018
Russia	42	86	79	24	69	62	78	80	78	81
USA and Canada	43	15	30	14	10	18	21	25	26	24
Other countries of Western Europe	12	12	17	13	15	14	11	13	18	12
Ukraine	6	10	9	22	8	5	7	9	15	2
Other CIS countries	12	6	11	24	7	8	10	18	26	8
Belarus	24	12	8	20	6	6	9	11	18	5
Germany and German-speaking countries	11	12	14	18	8	7	6	8	16	10
Central and Eastern Europe	-	-	-	-	-	-	-	6	7	5
Scandinavia and Finland	13	6	8	8	8	7	4	5	5	5
Southeast Asia	6	3	7	6	1	4	3	6	7	5
Australia, Africa, South America	9	1	4	3	3	6	-	-	-	0
South and Central America	-	-	-	-	-	-	1	1	5	1
Africa	-	-	-	-	-	-	0	2	1	1
Australia	-	-	-	-	-	-	0	3	4	4
Middle East	-	-	-	3	1	3	0	3	7	3

### 5.3. The emergence of “problem markets” caused by increasing political tension

In terms of sales, the US market remains in confident second place (after Russia) throughout all the years of our surveying. As we know, for major Russian exporters the shares of sales in the USA in their total turnover is often measured in tens of percent, and sometimes reaches 50% and even 80%. Service companies are leaders in activities at developed markets (US and EU), almost two-fold exceeding that of software vendors by the share of companies of its segment working therein. Nevertheless, for the leading software vendors the US market also ensures very significant amounts of export revenues. For example, Kaspersky Lab, the major Russian developer of information security solutions, annually earned up to \$200 million on the US market but in the recent years this value decreased (according to the US media) down to about \$150 million.

In the last three years, certain political risks have arisen on traditional markets for Russian developers. This concerns countries of the EU, USA, Canada and Ukraine, where a campaign is being conducted in the media to generate an adverse image of Russia.

Government structures are prohibited to purchase Russian software in any form. Commercial companies are recommended not to acquire Russian software or to engage Russian companies to develop software in case this is used to the benefit of the Ministry of Defense.

In case of any violation penalties follow in judicial procedures. In autumn 2015 the USA Department of Justice obligated two American companies to pay a multimillion dollar fines for engaging programmers from the Russian Federation to create source codes for U.S. defense systems.

In Ukraine, where the government tries to present the situation in relations with Russia as a State of war, former President Pyotr Poroshenko signed an addendum to the decree prohibiting government purchases from Russia, applying the ban to several dozen more Russian companies.

However in 2015 a significant reduction of presence of Russian companies is observed only at the US/Canada markets. A certain exit from the market of Ukraine is observed in 2014, but to judge by a number of critical ways, in 2017 this process comes to a stop. Approximately one third of respondent companies keep on working in Ukraine (both supplying their solutions and employing local developers).

Problems with Ukraine are related not only to the political atmosphere. Its IT market is plummeting. As a result, IT market of Belarus with population a fourth of Ukrainian is no less attractive for Russian IT companies.

Nevertheless, there have emerged landmark exits of Russian companies from Ukrainian market. For example, Infowatch, which is actively trying to cultivate new geographical markets, closed more or less a year ago its sales office in Ukraine. It does not mean that sales stopped at all, but the importance of Ukrainian market obviously became for Infowatch not so great.

In spring of 2017, the US Government perceived in products of Kaspersky as a threat for the national critical infrastructure on the grounds that former Russian military men worked in the company and that the Russian officials have access to any information within the territory of their country, including Kaspersky office. The open letter of the head of the company Evgeny Kaspersky gave elucidations on this point but it didn't work. In the heart of summer the US Administration stroke Kaspersky Lab from two lists of suppliers of products under government contracts for reasons of “security of government and network”, in August of 2017 the attempts were commenced to force the Russian company also from nonpublic sector. CIA decided that the solutions of the Russian company jeopardized the US national security even if used in the private sector.

Attacks with very severe charges against Russian IT companies took place also in European media, and they concerned not only Kaspersky Lab (see Section 1.4) but other companies as well, which work in the sphere of information security (for example, Infowatch).

The tendency for Russian companies to be increasingly forced out of the markets of Western countries (primarily the USA) has a negative effect on their sales on these markets (growth could possibly be greater than it is now). At the same time, there are so far no grounds to expect a breakthrough and change in attitude towards Russia and towards Russian software companies.

However, demands for completely squeezing Russian companies out of the US public sector have not been fulfilled yet. Public American companies as of August 2019 cannot find a worthy alternative to Kaspersky safeguarding software. The attempts to find out suitable counterparts have been undertaken for almost two years — since September 2017 when the present president of the United States Donald Trump ordered to remove Kaspersky software from the US government bodies. US experts found out Kaspersky software at least in two American defense networks and also at more than ten army contractors working for the government. From this perspective, the public sector is no different – at least eight US government networks are protected from viruses and from other forms of malware by Russian-made software.

Squeezing Russian custom engineering developers out of American market also may become a difficult task to carry out when it is necessary to retain budget and quality of software. In the end of June 2019 it got about that the software for crashed aircrafts Boeing 737 Max was developed by Indian programmers commissioned by the American company. It was reported by the authoritative in the West agency Bloomberg and was regarded as a good reason to engage more qualified Russian developers.

Hence, not only Russian side is plagued by political tension but also American. Mutual dependence in the IT sphere has turned to be sufficiently high. Attempts to push Russian companies out of western markets will hardly stop for this reason but they might be less intensive from time to time.

#### 5.4. New markets

“New markets” (Southeast Asia, Africa, South and Central America and Middle East) by year-end 2018 provided 17% of all foreign sales. The indicator has been growing in two last years, however slowly. By year-end 2017, these markets brought 14.5%, but the growth up to 17% was primarily fuelled by the fact that sales in Russia were increasing more quickly at the expense of markets of the “Western world”. Thus we should emphasize not so much an increase in the share of “New markets” (the growth is revealed though by a negligible margin) as a decrease in the share of “Western world”. If we look at the entire cumulative turnover of Russian software companies (with sales at home), then “New markets” by year-end 2018 would account for 7.6% of turnover, a year ago – for 7.3%.

At the same time, the interest to “New markers” is growing. In 2017, respondent companies mentioned their presence on average in 0.29 macro-regions belonging to “New markets”, and in 2018 — already in 0.48.

Putting aside the whole post-Soviet area with Russia (they account for 2% of the world IT market, where domestic companies cannot but dominate), it appears that all remaining sales in 2018 are distributed as follows: “Western world” accounts for 80.7%, and “New markets” — 19.3%.

Such relationship does not correspond to the geographical structure of the world market. According to Gartner и IDC, the USA and the EU account for roughly 60% of world IT expenditures (including telecom services). This inconsistency masks a huge potential for increase in foreign sales at developing markets. In the long view “New markets” may account for even more than 40%. As they are fast-growing one may have a greater share thereon than on stable Western markets.

The decreasing appeal of a number of traditional markets pushes companies to look more actively for opportunities of sales in Southeast Asia, Latin America, Middle East and even in Africa. According to the mass media, a number of companies are opening offices and realizing projects in countries which Russian software developers showed almost no interest in just 5-10 years ago (see the selection of news reports below). Russian developers of software products have taken an interest in the markets of Latin American countries, Vietnam, Mongolia, the Philippines, Zimbabwe, Indonesia, Nigeria, South Africa, India, China, Nepal, the United Arab Emirates, Iran and of many other countries.

About 5 years ago, RUSSOFT advised Russian companies to consider the prospects of new markets, which while smaller than the American and European markets, were sufficiently large and growing fast. A gradual turn towards “New markets” is already in motion. Currently it can be only gradual because the entry into these markets requires deep insight into local specifics and difficult fence-mending. Generally, sales come into play within 3-4 years after the start of promotion.

RUSSOFT assists the penetration of Russian companies into new markets. In 2015, jointly with Russian Venture company it arranged road shows in different countries and conducted webinars where managers shared experience in working at under-investigated markets. In 2016-2017, REC (Russian Export Center) became active. It relies on RUSSOFT and other associations of IT business or independently assists promotion of solutions and services of Russian IT companies, primarily, at markets of developing countries. Moscow Export Center went into action in Moscow; the national program of development of non-natural resource exports and service export has been developed.

By joint efforts within last years it has already been possible to change the attitude of Russian IT companies towards new markets. It is quite possible that in several years a new name will have to be found for these markets, as it will be difficult to call them new and non-traditional any longer. If in 2015-2016 (in the period between the end and start of the next annual study of RUSSOFT) there were 11 of these news' reports, in 2016-2017 there were already 26. So a breakthrough in this area is quite possible in the years to come.

This is especially likely given that the sanctions policy of the USA authorities undermines trust in American solutions and platforms in many countries, as their leaders fear that American sanctions may be applied to any country without any special reason. For example, in summer 2017 it was learned that Apple was deleting applications of Iranian developers from the App Store in connection with the US sanctions against Iran. Previously Apple had asked Iranian IT companies to remove all paid options from applications. The developers obeyed but this proved insufficient. Thus, Iranian owners of iPhones were deprived of the possibility to download necessary applications which local companies had developed for them.

The attack on the Chinese company Huawei would be fraught with a similar effect. Since May 20, 2019, Google stopped cooperation with Huawei that means disconnection of support of OS Android, but kept on supporting current smart phones Huawei up to 19 August 2019. Previously, Google was called to do it by the US Congressmen. This is to say that the utilization of any American engineering solution may face hurdles of any country at any time due to some political differences with the USA.

## 5.5. Geography of preference of service and product companies

Software vendors, compared to developers of custom software, are traditionally orientated to a great degree towards the Russian market and markets of former USSR countries. Not all of them have the required marketing budget to work far abroad.

At the same time, the product companies increasingly map out their presence at “New markets”. Service companies were initially oriented exclusively towards the developed markets of the USA and Europe, as in Russia and in neighboring countries there were no solvent clients, neither they saw any prospects at “New markets” where the average salary of programmers is lower than in Russian cities.



### Attitude of Russian product and service companies to work abroad (% of respondent companies)

	Service	Product
Work or plan to work in 2019-2020 at all markets	5.9	17.1
Do not work or plan to work far abroad	25.9	38.6
Worked at new markets in 2018	24.7	28.6
Interested in "New markets" (already work or plan to enter in 2019-2020)	40.0	42.9
Do not plan to work abroad in 2019-2020	17.6	27.1
Did not work far abroad in 2018	32.9	60.0
Interested in markets of western countries (already work or plan to enter in 2019-2020)	74.1	48.6

### Presence of Russian product and service companies on world markets, % of respondent companies

	2015		2016		2017		2018	
	Product	Service	Product	Service	Product	Service	Product	Service
Russia	93	94	86	89	97	94	90	93
USA and Canada	22	43	24	43	29	32	23	53
Ukraine	39	29	44	16	39	9	31.5	10.5
Other countries of Western Europe	28	34	26	32	27	41	20	40
Other CIS countries	54	34	66	31	61	26	51.5	35
Belarus	52	23	48	18	45	15	41.5	12
Germany and German-speaking countries	22	30	16	21	26	35	24	33
Scandinavia (with Finland)	9	24	12	19	18	21	18.5	22
Southeast Asia	15	14	18	12	23	13	18.5	15
Central and Eastern Europe	-	-	22	14	18	22	21.5	20
South and Central America	7	8	10	7	18	9	14	7
Africa	11	7	12	4	15	8	13	5
Australia	0	13	10	9	17	15	14	10.5
Middle East	7	10	12	9	23	10	24	14

However, the situation has gradually changed. Having gained serious experience of working for foreign customers, custom engineering developers began to participate in large-scale projects of digital transformation at domestic market and CIS countries. In 2018-2019, they expressed interest in markets in Africa, Middle East and Asia. For example, only by 2% of the service companies in 2017 mentioned plans to enter African markets and in 2019 they were already 7%.

If the State lends assistance to IT companies in foreign marketing, the export of Russian software vendors could be greatly increased. This is especially sensitive for developing markets where a quite loyal attitude towards Russia exists but information about Russian software companies is lacking. However, at markets of Western Europe and the USA there are also opportunities for increasing export of Russian software.



### Plans to enter new markets this and next year versus the year of survey (percentage of respondent companies)

	2017 survey		2018 survey		2019 survey	
	Product	Service	Product	Service	Product	Service
Russia	0	3	5	6	5	2
USA and Canada	10	7	8	15	11	14
Ukraine	0	5	6	8	6	8
Other countries of Western Europe	16	13	12	14	16	18
Other CIS countries	4	6	5	14	13	12
Belarus	10	7	5	13	13	9
Germany and German-speaking countries	12	12	12	19	14	24
Scandinavia (with Finland)	8	6	12	12	9	16
Southeast Asia	10	5	9	13	19	15
Central and Eastern Europe	12	7	11	12	17	18
South and Central America	8	3	6	5	9	9
Africa	4	2	5	3	13	7
Australia	8	3	8	12	6	12
Middle East	8	12	8	6	13	11

### 5.6. Geographic distribution of marketing and sales offices of Russian companies

#### Availability of sales offices (percentage of respondents indicating country or region)

	2011	2015	2016	2017
Anywhere	34%	38%	34%	36%
Russia	19%	29%	25%	22%
Abroad	27%	32%	20%	24%
Non-CIS countries	-	21%	14%	20%
Belarus	2%	7%	3%	2%
Ukraine	3%	8%	3%	4%
Other CIS countries	6%	8%	7%	5%
Other countries of Western Europe	16%	11%	7%	8%
Scandinavia and Finland	-	-	1%	2%
Germany and German-speaking countries	-	-	4%	7%
Central and Eastern Europe	3%	5%	3%	4%
USA and Canada	19%	12%	7%	12%
South East Asia	6%	5%	3%	3%
South America	3%	2%	1%	1%
Australia	-	2%	0%	2%
Middle East	3%	2%	0%	1%
Africa	-	0%	0%	1%

Inasmuch as data on presence of sale offices in different places of the world by and because of large duplicated information about significance of markets, the question about sales offices in 2019 survey was rejected.

As a rule, these offices are established and function at the most important foreign markets. Hence, their geographic distribution does not provide any additional valuable insights. That aside, it makes sense to know how many companies have sales offices abroad (and thus are bound to keep them) but over the course of one year their number is slightly modified. For this reason, an appropriate question will be included in the questionnaire not in every instance. Perhaps, we shall have to reformulate it.

According to findings of 2018 survey, in 2017 sales offices were functioning in 36% of respondent companies. 22% of them had sales offices abroad. It is expected that about 1 thousand Russian software companies have sales offices abroad.

Noteworthy, before 2013 the percentage of respondents who mentioned availability of at least one sales office with any alteration in composition of respondent companies, did not exceed 20%. Hence, to be sure, the number of offices are significantly growing.

## 5.7. Geographical distribution of software development centers

Remote centers of development are established by Russian companies to achieve two goals: either to bring developers closer to the customer and to let them handle all issues arising with them on a 24/24 and 7/7 basis, or (which happens more often) to receive access to the local human resources on the labor market.

Most often, Russian companies find necessary experts in other Russian cities. 29% of respondents mentioned presence of the functioning development center in Russia in 2018. In 2013-2016 they were steadily over 30%. However, such reduction was related not to closure of Russian development centers but only to the purposeful work of RUSSOFT with regions (as previously Moscow and St. Petersburg companies predominated among respondents). They are far more likely to have development centers in other Russian cities.

Assumably, up to 30% of the software companies (hardly over 30%) have development centers in another city of Russia.

### Presence of development centers and plans to open them in the next 2 years, % of respondent companies

	2016 survey	2017 survey	2018 survey	2019 survey
Have at least one remote development center in Russia or abroad	40%	43%	31%	32%
Plan to open a center in Russia or abroad in the next 2 years	32%	25%	31%	31%
Have a center abroad	22%	22%	16%	14%
Plan to open a center abroad in the next 2 years	22%	11%	11%	17%
Have a center outside the former USSR	11%	14%	11%	10%
Plan to open a center outside the former USSR in the next 2 years	15%	9%	10%	14%

The same goes for the presence of development centers abroad. Only sufficiently large companies can afford it and such companies are generally concentrated in Moscow and St. Petersburg. A percentage of companies with foreign development centers has decreased in the last two years only due to the fact that much more regional companies currently participated in survey. Nowadays it is around 15%.

Compared to the 2018 survey, the quantity of regional companies among respondents in 2019 has not augmented, so it is possible to make some conservative estimates. Thus, it is worth mentioning that in 2019 the percentage of companies which intent in the next 2 years (including a year of survey) to open at least one development center abroad has increased (from 11% to 17%), particularly, in non-CIS countries (from 10% to 14%).

In point of fact such plans are merely indicative of pursuance of geographic expansion, of increase of turnover and export. Other sections of this chapter explain that these plans frequently reflect an excessive spirit of optimism of respondents.

### Interest in macro-regions as a place for establishing development centers (percentage of respondents specifying a country or a region)

	Functioning in 2015 or planned to open in 2016-2017 (2016 survey)	Functioning in 2016 or planned to open in 2017-2018 (2017 survey)	Functioning in 2017 or planned to open in 2018-2019 (2018 survey)	Functioning in 2018 or planned to open in 2019-2020 (2019 survey)
Russia	40%	41%	41%	40%
Belarus	8%	8%	4%	4%
Ukraine	12%	6%	3%	4%
Other CIS countries	11%	9%	6%	7%
Other countries of Western Europe	11%	8%	8%	8%
Germany and German-speaking countries	-	2%	4%	7.5%
Scandinavia and Finland	-	1%	3%	2.5%
Central and Eastern Europe	7%	4%	8%	9%
USA and Canada	12%	5%	6%	11%
Southeast Asia	7%	2%	3%	4.5%
Africa	2%	0%	1%	0.5%
South and Central America	3%	1%	1%	1%
Middle East	1%	1%	1%	2.5%
Australia	1%	0%	3%	3%

Only 4% of respondent companies have development centers in the USA/Canada and in the countries of the EU. This is a case when development centers are required to be set up in order to be closer to the main clients. However, expenses for them are often not much different from equivalent centers in Moscow and in Petersburg. In some countries of Western Europe, the average salary of programmers before the crisis was much higher than in Russia, but the higher costs of employees were compensated for by the lower cost of leasing offices. This was the situation when the exchange rate of the dollar was less than ~ ₴40.

In 2014-2015, the average salary in Russia became much lower than in developed countries while the cost of leasing offices evened out. Nevertheless, the attractiveness of the USA and Western Europe for opening development centers was high (5-7% of respondents informed that in 2016 they had planned to open producing departments in the USA and Western Europe in the next 2 years). In many ways, this can be explained by the sanctions and by negative attitude towards Russia from Western media. It was important for companies to show clients not only a Western jurisdiction, but also the presence of a local resources in development centers in the USA and the EU. As judged by results of survey in the years following, the plans all too often turned to be unrealized.

### Presence of remote development centers (percentage of respondents specifying a country or a region)

	2011	2012	2013	2014	2015	2016	2017	2018
Russia	28	24	34	32	36	33	25	29
Belarus	7	8	11	7	6	5	2	4
Ukraine	7	10	14	9	12	4	3	2
Other CIS countries	3	6	12	4	7	5	5	4
Other countries of Western Europe	5	5	10	7	7	4	6	4
Germany and German-speaking countries	-	-	-	-	-	1	3	4
Scandinavia and Finland	-	-	-	-	-	0	2	1
Central and Eastern Europe	3	1	2	3	5	3	5	4
USA and Canada	3	4	14	9	8	3	4	4
Southeast Asia	5	1	3	3	4	1	1	2
Africa	0	0	2	1	1	0	0	0
South America	0	0	0	2	2	1	1	1
Middle East	0	1	1	0	1	0	1	0
Australia	-	-	-	-	1	0	3	1

In 2019 again the number of companies increased which plan to take on developers in the USA and countries of Western Europe. An interest in countries of “Western world” as location of own development centers was rekindled. However for the nth time it can be expected that the plans for the most part will remain unfulfilled, though the dogged desire will eventually transform into something.

In the last 3 years respondent companies steadily indicated 0.6 macro-regions where they had operating development center. In prior years the figures were higher (for example, in 2015 — 0.9), but a clear reduction can be observed only in Ukraine. At that, it was manifested just in 2016. Straight after the growing Russian-Ukrainian animosity in early 2014 Russian companies held back on leaving Ukrainian labor market.

### Plans to open remote development centers this year (next year) vs the year of survey (percentage of respondents specifying a country or region)

	2017 survey	2018 survey	2019 survey
Russia	14% (11%)	18% (17%)	15% (18%)
Belarus	3% (3%)	1% (2%)	2% (2%)
Ukraine	1% (2%)	0% (0%)	1% (1%)
Other CIS countries	3% (3%)	1% (2%)	4% (4%)
Other countries of Western Europe	0% (3%)	2% (2%)	3% (4%)
Germany and German-speaking countries	1% (1%)	0% (1%)	1% (3%)
Scandinavia и Finland	1% (0%)	1% (1%)	1% (1%)
Central and Eastern Europe	1% (2%)	2% (3%)	3% (5%)
USA and Canada	1% (3%)	1% (2%)	4% (6%)
Southeast Asia	1% (1%)	0% (2%)	2% (1%)
Africa	0% (0%)	0% (1%)	1% (1%)
South America	1% (1%)	0% (1%)	1% (1%)
Middle East	0% (1%)	0% (1%)	1% (2%)
Australia	0% (0%)	1% (1%)	2% (1%)

Altogether 32% of respondents have development centers in Russia or abroad. This value reduced in 2018 (due to the more active involvement of regional companies) and there was little change in 2019. Noteworthy, almost all companies which have foreign development centers also have such centers in Russia too.

## 5.8. Facts related to geographic expansion of Russian companies over last 2 years

The number of news reports reflecting activities of Russian software companies at foreign markets is growing year after year. This growth became significant and apparent roughly since 2013. In this context the interest is aroused primarily by markets which are not yet conventional for Russian software companies.

### 2018

1. The group of companies InfoWatch of Natalya Kasperskaya informed in early summer of 2018 about sale of controlling stake of its German subsidiary EgoSecure which deals with the development of information protection software for different devices. The buyer was a German manufacturer of office software — Matrix42. A transact was forced due to accusations against InfoWatch in German media in relations with Russian intelligence services. This publicity campaign resulted in the loss of several high-profile clients. EgoSecure was purchased by Russian InfoWatch in 2011 and in all recent years has been increasing its turnover.

2. In winter 2018, Promobot made decision to open the first office in the USA in the second half of that year. The company has been working at the US market for a while now but has no own office therein. An impetus to open the office was given by conclusion of contracts with 40 companies all over the world at the Consumer Electronics Show (CES 2018). A primary objective of the new office is the organization of 24/7 warranty and after-sales servicing of robots countrywide and the development of dealer strategy.

3. In spring of 2018 top managers of Bars Group announced their plans to enter foreign markets. At the first stage the most interest was given to the markets of Europe and Vietnam.

4. In February 2018, SearchInform informed on entry into Brazilian market. The Russian developer of information protection software opened an office in Sao Paolo. The Russian company started activities in Latin America in November 2016. In April 2017 it opened an office in Argentina.

5. In February 2018, Avanpost, the Russian developer of IT identification systems, informed about plans of entering far abroad markets. It intents upon starting activities in Middle East and then developing markets in Southeast Asia or Latin America. At new markets Avanpost will have no evident “Russian meddling efforts”: the company does not plan to use its own brand nor establish offices. In the nearby countries the company has been present for a few years already, it built its business in Belarus, Kazakhstan and the Kyrgyz Republic, but in the long run gave up on entering the Ukrainian market.

6. In March 2018 SearchInform announced creation of a market representation office in South Africa. The companies concluded a partner agreement with Condyn — South African distributor of products in the field of information security.

7. In March 2018 RAIDIX concluded a partner agreement with Indonesian supplier of IT solutions Adhimatratama. A new partner based in Djakarta put the data storage system of RAIDIX in its portfolio and presented a new software-defined solution to a wide range of potential customers including local government agencies and law-enforcement authorities.

8. In November 2018 it became known about plans of Group-IB to open the global headquarters in Singapore within the framework of international expansion. The new Group-IB headquarters in Singapore will contain business units which are already in operation in the Moscow office — a digital forensic and malware research laboratory, an information security investigation branch, a round-the-clock monitoring and incident response department and other departments. Group-IB is determined to retain the basic engineering development activities in the Moscow office. Only 15 out of more than 300 employees of Group-IB will leave for Singapore. The remaining 75 persons in the new office in accordance with the national law will be signed up at the local market.



9. In November 2018 Acronis announced the conclusion of agreement on global engineering partnership with the football club Manchester City. Under the partnership Acronis will assist the club in expanding and improving opportunities in the field of backup and data storage.

10. In December 2018 Aplana reported on completion of the project in the Vietnamese bank VPBank including in particular completion of online bank load testing. The project totaled up 11 IT systems of the bank.

11. In September 2018 Positive Technologies and the State engineering service NSC of Kazakhstan agreed upon consolidation of mutual efforts, technical and human resources in the area of detection, prevention and mitigation of cyber attacks.

12. In October 2018 the 4<sup>th</sup> meeting of ministers of communications and ICT of BRICS countries was held in South African city Durban. According to tradition, within the framework of the event there took place not only negotiations of heads of relevant agencies but also a business dialogue between companies and representatives of IT industry took place.

13. In October 2018 Russian Export Center agreed upon establishment of Russian center of digital innovations and information technologies in the free economic zone in UAE. The new organization will help Russian high-tech companies with export of their products in Middle East.

14. In November 2018 WaveAccess opened an office in Copenhagen enlarging its footprint at West European market.

15. In September 2018 Tomsk company Aurigma informed about integration of its software for designer labor automation in the control system of an American customer – a major real state agency from East Coast.

16. In October 2018 in order to attract programmers, EPAM opened an office in the resort town Malaga in Southern Spain.

## 2019

1. In February 2019 TrueConf informed about deployment of the video banking system based on proprietary solution TrueConf Server in Kuwait Commercial bank. The solution integrates 43 branches and the central office as well as enables the bank's call center to serve customers remotely across the country.

2. In March 2019 Naumen informed about entry into German market after completion of the project of introduction of Naumen Contact Center platform at the VersOffice GmbH.

3. In June 2019, 1C informed that its basic ERP system would be translated into English by the autumn of this year to enable foreigners to develop own versions thereupon. Besides, in the international version (1C: ERP) the options related to the need for compliance with the specific Russian legislation would be eliminated, functionalities would also be extended. 1C: ERP is aimed at the CIS countries (for example, Kazakhstan and Belarus), at many countries of the East and at some countries in the Western Europe (particularly, Germany and Italy), and also at countries long way from Moscow like Vietnam.

4. In March 2019 DataArt announced opening of an office in Yerevan where for the first time in history of company it combined functions of R&D center and of sales office. DataArt in Armenia will lean on promotion of Quality Assurance (QA) — software testing and quality assurance, software development and support, sustainability-focused business.

5. In July 2019 ABBYY informed that within the scope of market representation in Asia-Pacific region it opened a new office in Hong Kong. This is already the third regional office of ABBYY in Asia following those in Taiwan and in Japan.

6. In July 2019 Nexign announced partnership with Giza Systems in the region of Middle East and Africa. The objective of cooperation is to give greater freedom to both companies in presentation of flexible product solutions to telecom providers in MEA (Middle East and Africa) region.

7. In May 2019 NtechLab, an engineering partner of the State Corporation Rostech and one of the world leaders in biometric technologies, presented a facial recognition solution focused on countries of Asia, Middle East and Latin America.



8. In February 2019 the Ministry of Digital Development, Communications and Mass Media of the Russian Federation informed about plans to play a part role of coordinator in creating of an innovation hub in Vietnam. Among other things, it would support Russian IT companies in entering Vietnamese market.

9. In May 2019 Kaspersky opened an office in Rwanda aimed at business development in African continent. As a result, Russian company currently has at total 37 offices in 32 countries.

10. In April 2019 MONT announced opening of a legal body and a separate branch in Uzbekistan (Tashkent). The new MONT branch will continue working with companies which earlier interacted with the trade representative of MONT in Uzbekistan, and also will be engaged in collaborative network development and extension in the region.

11. In February 2019 the heads of some Russian members of Federation and a number of leading national engineering companies took part in the business mission in Japan. Russian experts presented in Tokyo the investment potential of Russian regions and also introduced Japanese partners to activities of Russian engineering companies.

12. In April 2019 Data MATRIX, a resident of Skolkovo cluster of biomedical technologies, signed a cooperation agreement with one of the leading contract research organizations of South Korea Seoul CRO. The document kicked off introduction of Russian high-end IT solutions for the Korean pharmaceutical industry. Within the agreement the Russian software developer and the provider of services for data processing and for clinic trial automation Data MATRIX will transfer exclusive rights to use its solutions to Seoul CRO. In parallel, Korean companies will be engaged in introduction of IT products and cloud services to the local market.

13. In June 2019 the Ministry of Digital Development, Communications and Mass Media of the Russian Federation informed about launching in Dubai of Russian Center of digital innovations and ICT. It was opened with the assistance of Russian Export Center in the so called UAE “Silicon Valley” — Dubai Internet City.

14. In June 2019 Auriga opened a new laboratory of medical equipment software testing at one of the company’s regular customers in Vilnius (Lithuania).

15. In March 2019 Eurasian development bank (EDB), Rusprom and Transkom signed a trilateral memorandum on cooperation focusing on establishment of partnership relations and on enhancing cooperation for joint implementation of the project on creation and development of integrated statecraft in the Kyrgyz Republic for public and municipal authorities.

16. In May 2019, according to the Ministry of Digital Development, Communications and Mass Media, Russia and Vietnam concluded a bilateral agreement for supply of IT solutions in the area of information security. Prime ministers of both countries — Dmitry Medvedev and Nguen Suan Fuk signed the relevant documents in Moscow.

17. In March 2019 the plans of Russia and India on establishing a joint center of navigation equipment development were announced. Russia will invest P2.5 billion in the project, as many again is planned to attract from private investors.

18. In April 2019 the Russian start-up Bitronics Lab opened a neurotechnology study circle for secondary school students in Spain. By means of educational sets produced by the Russian start-up students will study fundamentals of human physiology, robotechnics and programming. Training is conducted in Russian Educational Center Glagol in San Pedro de Alcántara.

19. In March 2019 a delegation of Russian IT companies headed by the minister of Digital Development, Communications and Mass Media of the Russian Federation Konstantin Noskov paid a formal visit to Cairo. As a result of passed talks and consultations there were reached agreements on supply to Egypt of a number of Russian IT products and package solutions and on a return visit of representatives of Egyptian companies to Russia.

20. In May 2019 a Russian manufacturer of service robots Promobot informed about signing of a contract for the supply of products to Saudi Arabia. This is the 34th country in the geographic coverage of the company’s export.

The value of the contract is \$400,000.

21. In February 2019 Devicelock informed about the growth of sales of the Russian Data Leak Prevention system Devicelock DLP in the United Arab Emirates, Saudi Arabia, Bahrain and in other countries of Arab Peninsula in 2018 by 25% versus 2017. The new technology was introduced in public institutions, banks and big companies. A number one in the total scope of introduction was the Sultanate of Oman.

22. In February 2019 Russian electronic toll collection system (RTITS), the provider of Plato, informed that it would introduce a similar system in India. At present, in India the tolls are payable “manually” at gate which is resulting in traffic jam and in loss of money. If the Russian system proves successful in one area it will be deployed countrywide.

23. In November 2019 Finland became the 14th country where you can request a ride via Yandex service. In Finland the Yandex.Taxi service is named Yango (abbreviation of Yandex Go).

24. In July 2019 Tomsk based company Neuromech which is engaged in development of neuro-controlled mechatronic devices and software, informed about opening offices in Spain and in Hong Kong aimed at promotion of solutions at European and Asian markets.

Over split 2019 a number of news about promotion of Russian companies at foreign markets has turned to be much greater than in every previous full year.

In the last two years most of news concerned marketing activities in Asia (15). Also the active promotion of our companies to countries of the West took place. Information hereon is in 10 pieces of news plus another piece of news about displacement of Russian companies from the Western market. In theory, there should be more such pieces of news, however, companies do not like negative news about themselves even if they are completely blameless.

Activities at Middle East markets are mentioned in 8 pieces of news, in South and Central America — in 3, Africa — also in 3, CIS countries — in 5.

Five pieces of news concerned the State support of high-tech products export.

In 2018-2019, most news about marketing activities of Russian vendors can be attributed to information security. There were 9 such pieces of news, in terms of macro-region distribution they are as follows: Southeast Asia — 4, Middle East — 3, South and Central America — 2, Africa — 2, non-CIS countries — 2 (in sum over 9, because in one item more than one macro-region was mentioned).

Also are active abroad Russian developers of EPR systems (including other corporate software). They initiated 7 news (Europe — 3, Asia — 3, Middle East — 3, the USA — 1, Africa — 1).

Robot producers were twice mentioned in media in relation to marketing activity of Russian companies in the US and in Middle East.

Developers of data storage and backup systems manifested themselves in 4 pieces of news (2 cases of activity in Asia and 2 in Europe).

Navigation systems were promoted only in Asia, and navigation — in Europe (one on each subject).

Custom engineering developers (service companies) also informed about marketing activities abroad. Altogether, they generated 6 news (3 concern CIS countries, 2 — Asia, and 1 — Europe, but this news is related to opening of the development center in Spanish resort, to designate it with promotion of services is not exactly correct).

## 5.9. Vertical markets

For all years of RUSSOFT surveying, no regular change in the importance of individual vertical markets for Russian software developers was revealed. The majority of the figure fluctuations are random or temporary. As a whole, it can be concluded that Russian export companies' industry priorities have not changed essentially for the decade.

The only clearly revealed regularity connected with vertical markets was a sharp reduction of their number which were mentioned during period of crisis. In 2009-2010, software developers were forced to focus their efforts on the areas in which they were most competitive or which were least affected by the world crisis. A similar reduction of this indicator was revealed in 2015-2016 survey.

In 2018 there was no such question in the questionnaire. It reappeared in the questionnaire of 2019 and allowed for revealing a sharp growth of an average number of specified vertical markets — it reached 6.8 (in 2017-2017 this indicator was 4.6). All vertical markets except Information Technology were mentioned by lots of respondent companies.

#### Frequency of mention of vertical markets in 2007-2019 (% of all respondents)

Year of survey / vertical markets	2007	2009	2011	2013	2015	2016	2017	2019
Information Technology	89	69	74	74	68	70	80	78
Banking*	35	36	23	26	34	29	20	38
Telecom	34	33	26	31	27	27	30	44
Industries	31	31	27	38	37	33	28	41
Hospitality, Travel & Transportation	24	31	28	29	31	27	28	45
Government	28	25	21	24	28	24	22	37
Power supply, Gas & Oil	18	24	17	22	29	21	18	32
Healthcare & Pharmaceuticals	23	24	23	28	28	24	26	39
Retail & Distribution	35	24	26	29	24	26	22	38
Education	36	23	21	28	24	25	22	31
Science & Research	-	-	18	26	20	20	26	31
Gambling & Entertainment	20	11	9	15	17	15	16	22
Media	-	-	13	18	18	13	14	18
Sport & Travel	-	-	10	17	11	15	16	23
Insurance	-	-	13	15	15	13	11	21
Building & Real estate	-	-	12	17	28	17	16	33
Services	-	-	27	35	26	22	28	42
Finances	-	-	25	26	21	19	19	33
Energy	-	-	17	21	24	22	21	31

\* - before 2011 Banking & Financial Services



# CHAPTER 6

## Human resources

## 6.1. Assessment of the general situation of human resources in the industry

At the end of 2018 there were at least 540 thousand engineers in Russia directly involved in the software development process. A yearly increment of such employees was 7.8%. Approximately the same growth rates (by 7-8%) were also observed in 2 previous years.

However, in order to determine the total number of developers the RUSSOFT analysts used a wider range of 6-8%. In order to avoid overestimation they focused on the lower level of that range. Moreover calculations were made only for the software industry, while as regards to software developers employed in companies of other economic sectors as well as to those in the public sector it was supposed that they accounted for roughly  $\frac{3}{4}$  of the total amount of developers, and this share for years remains more or less unchanged.

In 2015-2016 one might expect the inflow to the software industry of software developers from IT departments of different enterprises where job cuts happened in the time of crisis. In the last 2 years this switchover has hardly provided an increase in personnel of software companies. No mass layoff is observed in IT departments. Together with the so-called “insourcing” companies (daughter IT-companies of big corporations which are not software development businesses in pure terms), the IT-departments of not-IT companies rather cause problems to software industry by enticing human resources with higher salaries which more often than not are improperly high.

In recent years both large and small software companies are steadily increasing the staff by 8% and more (as a matter of fact in companies surveyed the annual increase in personnel in 2017 and 2018 was 12%). Previously large companies were growing much faster and largely at the expense of small companies. Thus we may say that the previous assessments of growth were too conservative and the total number of personnel in this sector is by several tens of thousands more than the figure of 540 thousand people which we predicted earlier.

According to the Ministry of Communications and Media, in 2017 there were around 25 million programmers in the whole world (in the USA — about 4 million, India — 3 million, China — 2 million). According to the Ministry, Russia had about 350 thousand software developers that is less than the figure calculated by RUSSOFT. However, the word ‘programmer’ may mean different types of professionals (in broad or narrow term).

According to the study performed in 2018 by the official ad agency of the London Town Council “London & Partners” on the basis of information from the community Stack Overflow and the from the business social network LinkedIn, the greatest number of software developers in Europe worked in London (358 thousand people). The top three included Paris (269 thousand) and Amsterdam (217 thousand), followed by Cologne (166 thousand). Moscow in this rating takes the 5th place with 161 thousand developers.

The Institute of Statistic Studies and Economics of Knowledge of the Higher School of Economy (NIU VSE) has determined that in Russia there are the greatest number of software engineers employed as software and applications developers (analysts) — about 655 thousand people. Taking into account that criteria for being classified as software developers can be different, this figure is not very different from the RUSSOFT estimates. Information on Russian regions gives a similar value if extrapolated to the whole country. Therefore, different sources indicate that in Russia there are around 600 thousand software developers.

Overall numbers of engineers in Russian software development companies exceed 210 thousand people. In 2019 the percentage of these employees in the staff of companies surveyed was 77%, a year earlier — 84%. Thus for the entire industry this number averages out 80%, and the overall number of developers and managers is above 260 thousand people.

According to results of the RUSSOFT survey, experts in the service companies average out 70-85% of the whole staff, and in software vendors — 55-70%.



## Overall numbers of experts in software development companies, thousand people

	the end of 2016	the end of 2017	the end of 2018
Software engineers working in Russia in all industries (including IT departments)	470-480	>500	>540
Software engineers, working in the Russian software development industry (overall), from them:	180-190	>195	>210
In the overseas development centers	48-53	>53	>58
In Russia			
total	132-137	>140	>155
in service companies (working for foreign clients)	78-84 (28-29)	82-88 (30-31)	91-97 (33-34)
in product companies	≈53	≈56	≈59
in Russian R&D centers that belong to foreign companies	>5	>6*	>6*

\* — change of the numbers is affected not by the growth, but by the correction made after receiving additional information

Out of 210 thousand engineers over 58 thousand developers work in the overseas development centers of Russian software companies.

Therefore, in Russia in software companies at least 155 thousand people are directly associated with software development. In service companies the number of developers in 2018 increased by 11% up to 91-97 thousand people, in software vendors — by 5% up to roughly 59 thousand people. Russian development centers of foreign companies, in all appearances, also have more employees, but it is impossible to calculate overall numbers because they do not present appropriate data.

The share of companies which had planned to increase the staff number in 2018 and that of those which actually did it is almost the same (53% and 54% respectively). However, the growth of staff more than by 10% showed 28% of companies surveyed and the planned figure was slightly bigger — 34%. 9% of companies had to cut the staff. Naturally, it had been anticipated by a far fewer companies.

Noteworthy, in 2018 there were more growing companies than in 2017, and at year-end 2019 their share will be even more significant if our respondents live up to the expectations.

## The change in the number of personnel, the share of companies surveyed

	at year-end 2016	at year-end 2017	forecast for 2018 (at the beginning of the year)	at year-end 2018	forecast for 2019
Increase	49%	44%	53%	54%	68%
Increase for more than 10%	23%	25%	34%	28%	39%
Reduce	13%	9%	3%	9%	1%
Without changes	31%	35%	31%	31%	20%
Hard to tell	7%	12%	13%	6%	11%

Overall numbers of software developers working in Russia by the end of 2019 will likely increase by the same 8% as in previous years, or the increase will be a little bit higher. Among companies surveyed the planned increase of personnel is 16%, but they hardly will be able to ensure altogether 11-12% because Russia has no proper conditions for a big growth (universities cannot increase so considerably the number of well-trained graduates and migration flows to and from abroad compensate one another).

In this context one has to radically revise some data on headcount of developers at year-end 2019 due to the fact that several large companies cannot be considered anymore as Russian (after sales in 2018-2019 to foreign corporations). For example, if Luxoft is recognized as the US company, then over 3 thousand employers working in Russia must be classified as belonging to R&D centers of foreign companies. Hence only due to this correction the total staff of these centers will increase at least by a factor of 1.5.

### 6.1.1. Staffing level of the entire ICT sector

The Institute of Statistic Studies and Economics of Knowledge of the Higher School of Economy calculated that in 2018 8 million Russians were employed in the workplaces where they had to intensively apply skills in the sphere of information communication technologies (11% out of all citizens who found jobs). Among them 1.8 million people are working in ICT sector. Around 655 thousand work as developers (analysts) of software and applications, 464 thousand more work as systems' administrators. 250 thousand Russians work as specialists in databases and networks, 149 thousand people deal with assembly and repair of electronic and telecommunication equipment.

Another 127 thousand people work as technicians at ICT integration and user support. Some 69 thousand are technicians in telecommunications and broadcasting by radio. Finally, 66 thousand people supervise offices and units in the ICT sphere.

### 6.1.2. Insourcing companies and IT departments

Corporations and largest Russian banks have big advantages in competition for ICT specialists at labor market. Often they offer salaries by tens of percentage points higher than export-oriented software companies. In addition, they can hire not very well trained graduates inspiring inflated salary expectations at labor market.

In 2018, the number of IT professionals at the MTS telecom service provider increased from some 2 thousand up to 3.1 thousand people. This value includes only employees in the staff of MTS itself and in its subsidiary MTS IT and does not account for personnel of NVision Group purchased by MTS in 2015. IT engineers, attracted by MTS, work on development of existing products and on launching new ones.

In February 2019, VTB bank informed on plans of recruiting IT specialists. Till the end of 2020 it is planned to hire around 2.3 thousand of them, among which 1.5 thousand — during 2019. By the end of 2020 the staff of IT engineers shall reach 5 thousand people.

In September 2019, Raiffeisenbank informed that since 2016 it increased the staff of their own IT professionals in Russia by a factor of 3 — up to 1.5 thousand people. All four business departments of the bank now have their technical directors. Recruiting is connected with the technological transformation of the bank. Since the beginning of 2019 the bank recruited additionally over 150 developers, over 70 testers, more than 60 system analysts and over 60 specialists in engineering, including technical support. A part of recruited specialists found employment in Omsk where the bank has its IT center Raiffeisen Tech Center. In the center there were established teams of end-to-end development and of IT support of software products. At the moment 300 employees are working there, by the end of the year their number will grow to 370.

In October 2018, the research center TAdviser analyzed data on numbers of employees in largest Russian IT companies and concluded that the leader in the staffing level was SIBINTEK and not Sberbank Technologies as had been assumed previously. The average number of SIBINTEK employees in 2017 was 13.9 thousand people while of Sbertech — about 9.5 thousand.

In 2016, SIBINTEK had over 11 thousand employees while Sbertech reached a maximum staffing level in 2018 (11 thousand people), upon which the leadership of Sberbank made the decision to transfer 8 thousand employees of its insourcing subsidiary directly to the bank staff.

### 6.1.3. Rotation of human resources

The indicator of staff turnover previously varied mainly within the range of 6-7% per year, but in 2016 it increased to 9.5%, and in two subsequent years it stabilized at this level.

No more than a half of companies surveyed come across dismissals (in 2016 — 59%, in 2017 — 50%, in 2018 — 58%).

The staff turnover at 9.5% is quite acceptable, but already it is not as if this indicator is low. Under current conditions when the staff is renewed every year on the average almost by 10%, companies are forced to learn how to launch projects with one line-up and complete with an entirely different team.

#### Annual indicator of staff turnover depending on company size

year	All companies surveyed	above \$100 million*	from \$20 million to \$100 million	from \$5 million to \$20 million	from \$1 million to \$5 million**	below \$1 million***
2012	6.0%	4.6%	8.3%	9.0%	8.4%	4.8%
2013	6.0%	7.7%	7.4%	7.8%	8.2%	13.1%
2014	7.7%	5%	6.5%	7.4%	6.6%	7.7%
2015	5.7%	6%	6.1%	8.1%	6.1%	6.2%
2016	9.5%	11%	6.7%	10.9%	6.2%	6.5%
2017	9.5%	9%	8.8%	16%	5.4%	6.6%
2018	9.3%	2%	13.8%	10.8%	9.7%	6.7%

\* — as a rule, several companies and in 2016 and 2018 only one and two respectively

\*\* — until 2014 inclusively 'from \$0.5 million to \$5 million'

\*\*\* — until 2014 inclusively 'below \$0.5 million'

The staff turnover differs depending on company type. For example, it was lower among small companies. Besides, small companies have to hire more university graduates while large enterprises focused to a large degree on foreign markets (share of foreign sales above 50% of income) prefer to hire developers with experience.

In the recent years these dependencies began to evolve. Since 2016 are affected by staff turnover not the smallest companies, but enterprises with turnover from \$5 million to \$20 million, and in 2018 they were joined by companies with turnover from \$20 million to \$100 million. Since 2018, new graduates are more often hired by companies which generate income from foreign sales compared to those mainly working in Russia.

The unvaried indicator is a more stable composition of developers in software vendors in comparison with service companies. Also staff turnover is steadily higher among companies which operate at the market for less than 10 years versus those which have already celebrated the 10th anniversary since foundation.

### Figures for staff turnover in companies of different categories at year-end 2018

	<b>Staff turnover</b>	<b>Share of specialists – university graduates from average number of personal</b>
All companies surveyed	9.3%	10.4%
<b>Company size</b>		
Turnover below \$ 5 million	9.2%	11.8%
Turnover above \$ 5 million	9.3%	10.0%
<b>Business model</b>		
Service	10.0%	11.2%
Product	7.4%	8.1%
<b>Share of foreign sales in turnover</b>		
Below 50%	8.8%	8.6%
Above 50%	9.6%	11.6%
<b>Age of company</b>		
Less than 10 years	13.2%	16.8%
More than 10 years	8.8%	9.7%

In almost all the years of our survey, the highest activity on the labor market is invariably recorded in St. Petersburg. In this city, the staff turnover is traditionally higher, and has the largest percentage of university graduates on staff. For 2016 and 2017 St. Petersburg ceased to be the leader in these figures, but it had more companies from which the software engineers left. At year-end 2018, in the northern capital the lowest staff turnover was recorded.

#### Activity on the labor market by surveyed companies depending on their location

	for 2017			for 2018		
	Hired university graduates	Share of companies with staff turnover	Staff turnover figure	Hired university graduates	Share of companies with staff turnover	Staff turnover figure
Moscow	6.0%	27%	9.4%	7.2%	86%	11.6%
St. Petersburg	4.1%	72%	9.4%	7.3%	85%	6.6%
Regions	10.0%	54%	8.7%	17.6%	84%	11.0%

It should be noted that the recruitment of graduates is drastically reduced in crisis period. In that way, the share of recent students in the staff on 2014 reduced to 0.8% (a year earlier it was 8.4%). In 2015, this indicator grew to 8.4% (in all appearances, due to pent-up demand) and in 2016-2017 it stabilized at the level of 6%. At year-end 2018, it is the highest on record— 10.4%.

#### 6.1.4. Inflow

Software companies have three main sources of personnel: universities, migration from foreign countries (primarily, countries of the former Soviet Union) and inflow from IT departments in enterprises from other economic sectors.

Frankly speaking, currently we have only one source — universities. If before 2016 the migration of software developers from Kazakhstan, Ukraine and Belarus in particular years provided up to 20% of the total increase of staff of Russian software companies (except employees at foreign development centers), in the last two years this figure is below 5%.

At year-end 2018, university graduates and foreign developers provided 99.5% increment of the total staff of companies surveyed (labor force migration gave only some 4%). Cross-sectoral movements of employees did not provide any significant increase in human resources. Most probably, approximately the same number of people from other sectors switches to software companies and change jobs that move in opposite direction.

In 2014-2016 we had seen the growing switchover of developers from other industries to software companies driven both by the economic recession and by large use of cloud technologies and of outsourcing services. But following all indications, the economic recession is over and almost every sector (including industrial) now demands for IT-professionals. We talk about not just IT-departments, but also about the innovation departments of enterprises of every economic sector. Digital transformation is slowly but surely finding its way into economy and increases the demand for IT competences.

HeadHunter (recruiting company) points to the rising competition for IT-professionals at the job-marketplace between industrial manufacturers, agricultural businesses, banks and telecom operators in particular. Now it's not just IT companies that entice workers from each other, but also enterprises from different economic sectors.

If we compare the staff number growth rates with the turnover growth rates, we can see that through all years of the RUSOFT research studies, the income in dollars or export sales in companies were growing faster than workforce number. It is revealing that at year-end 2018 35% of companies surveyed, which personnel has not changed or even reduced, have increased their turnover (in dollar terms). 24% of companies had the growth of returns over 10%. And the growth rate of companies, which could not enlarge the staff, increased by 2.3%.

#### 6.1.5. Rise in labor productivity

In 2017 the total number of personnel of Russian software companies increased by 7%, and the cumulative turnover in dollars — by 19%. In 2018, the difference was smaller — 7.8% and 10.6% respectively due to the ruble decline against dollar.

The growth of working efficiency is evident when measured in dollars. Formally, we have this growth, but in practice it is not provided by the fact that an average software engineer began to produce more code per hour. The indicative productivity growth is basically provided by the increase of the software development service' costs and by scaling of ready-made solutions.

At year-end 2018, one developer (of all software development companies together with foreign R&D centers) accounted for \$75 thousand of returns per year.

#### 6.1.6. Job attraction factors

A survey conducted by HeadHunter in April 2016 among 225 respondents indicated that high salaries were not the prime reason for job appeal to IT professionals. They mentioned an interesting job (86%) and a prospective and dynamically evolving segment (58%) most frequently. Salary was only mentioned by 39% of respondents. 23% appreciated a flexible work schedule, while 23% appreciated that IT professionals were in demand and protected against staff reductions.

Based on a survey conducted in May-July 2016, HeadHunter made a profile of an IT jobseeker. Those were mostly men (88%) of an age of 26-35 (54%), who had over 6 years of work experience (62%). The smallest segments were professionals of an age of 46-55 (4%) as well as inexperienced jobseekers (3%).



According to a joint study produced by Microsoft and SuperJob, the results of which were published in early summer 2017, over half of employees want to work in companies which stimulate the ‘desire to create’. They must encourage independence and initiative of employees (mentioned by 50% of respondents) and create conditions for effective interaction between departments – 46% of respondents consider this of ‘maximum benefit’.

According to the study of Rekadro ‘Motivations of IT professionals’, published in late 2018, IT specialists are interested in working for a large company less than Russians as a whole.

Similarly, significantly fewer IT specialists wish to work for government-owned companies (14% against 32% among Russians taken together) and are more interested in own business (16% versus 11% among Russians taken together). IT specialists prefer working for an international company that fully coincides with the position of Russians in general.

## 6.2. Current demand for IT professionals

There is no much sense in the quantitative assessment of the short supply of engineers in software development. If we state that the shortage of programmers is 500 thousand people, 1 million people or 2 million people, any of these figures will be right. The matter is that any potential offer of these professionals at Russian labor market, which can additionally emerge in the coming years, can be theoretically absorbed by software companies and by IT departments of enterprises of different economic sectors. With due allowance for the global manpower shortage and according to the small share of Russia on the world software market (including custom development services), the domestic software industry may grow by a factor of 2-3 and even more with a jump in export.

However instead of pipe dreams about future Russian export, in our opinion it would be more the point to focus on all opportunities of training and of attracting human resources — who, how and whom can we train or invite from other countries. The quantitative reference points will still be needed but only for the best distribution of available resources required for training. For example, at different conferences there are splits over the question — what kind of professionals are required — not so many but top-level, or developers of a good average level but very many. Perhaps, both are needed for different tasks, however, we need to determine a right ratio. In addition, it is essential not only to prepare top-level engineers but to set the stage for them to not leave Russia or to return after gaining foreign experience.

At the same time, we may assess an estimated demand for IT professionals stemming exclusively from the domestic needs of economy, determining the demand for software and development services as well as needs of different categories of companies. Taking into account that in this case we should look 5-10 years ahead, while it is difficult to predict the future even for 1-2 years in our unstable world, we do not bet on any close assessments. Without doubt, it is essential to look at completely different roadmaps in Russia in order to set correct objectives in allocating resources for staff training.

There are calculations of national demands for IT specialists but they give just preliminary overall assessments, which have to be revised and elaborated.

In October 2018, the chairman of the Russian Parliament Committee for Education and Science Vyacheslav Nikonov stated that the implementation of the Federal program ‘Digital Economy’ we in Russia had to train 500 thousand IT specialists per year while today some 50 thousand are trained on annual basis. Moreover, for the success of the program all trained IT-professionals must stay in Russia and for this purpose an appropriate environment must be created.

The working group on the development and on the implementation of the roadmap of the National Technological Initiative (NTI) jointly with BCG specified the required number of professionals for NTI projects.



The results of the study are as follows: by 2035 the recruitment needs of AutoNet market in experts will be roughly 85.5 thousand people; AeroNet — 28.3 thousand; EnergyNet — 37.7 thousand; NeuroNet — 15.3 thousand; FoodNet — 36 thousand; HealthNet — 38.6 thousand; SafeNet — 41,9 thousand; MariNet — 600 people (a low demand is related to a specific duration of product life cycle in the area of marine technology). It is anticipated that altogether by 2035 only for implementation of NTI projects — between 271 and 300 thousand people should be trained.

In the case of a total demand for 500 thousand specialists it is necessary to understand who and how calculated this figure. It looks unrealistic and has no details. With regard for human resources for NTI there is a certain primary breakdown but within a few years all these estimates will be probably radically changed. If we take the current demand — how many additional employees will be needed for software companies in the space of a year, it can be estimated more precisely than the general shortage in 10-15 years. Judging by plans announced about recruitment, on the average companies need additionally 15-20% of the existing staff of developers. They are ready to hire them almost off the reel.

Industry-wide, in 2018 the demand was 23-30 thousand people. Actually, they have hired new employees twice as little — 12-14 thousand people. Hence, the shortage on a short-term horizon for the software industry alone is 11-16 thousand people a year. The number of programmers, which are missing in the whole economy is four times larger. Still it does not mean, that the resulting staff shortage should be multiplied by 4. In all appearances, some sectors (for example, banks) can afford to hire almost as many developers as they need and sometimes even more. It may be assumed that the total annual shortage of software developers is 25-40 thousand people. In other words, the lacking developers should be attracted additionally from elsewhere. We may see how does the ratio of the amount of CVs and vacancies changes, using Index HeadHunter which reflects the change of the number of CVs per one vacancy in different job categories. The software sector may be linked with ‘IT, internet, telecom’. Although this index is reflective of situation in the whole ICT sphere with a wider spectrum of technology staff and of managers, its dynamics almost fully corresponds to results of the RUSSOFT survey where respondents assess ‘Skills availability, education and career enhancement system’.

According to HeadHunter, from August to December 2018 the growth rates in the segment ‘IT, internet, telecom’ gradually are decreasing from 24% to 15%, then remain at 15-17% until March-April 2019, and then start dropping up to the negative value (-18% in June). Afterwards the growth rates of vacancies also surge forward up to +8% in August. Generally, the number of vacancies in 2018 has increased by 15-20%.

Index HeadHunter is changing as follows. In 2018 till September it remains at 2.5-2.6 and reduces in some months down to 2.2 and 1.8. In late 2018 and in the beginning of 2019 it is stabilized at 2.7-2.8, in some months dropping to 2.5 (for the whole economy this index varies within 5-7). That means that supply at labor market for IT specialists has slightly grown versus demand.

The dynamics of the average point calculated on the basis of the annual RUSSOFT survey is much alike. The 2018 survey shows a drop of the average point down to 2.67 (for software vendors it is 2.68, for service companies — 2.64). The 2019 survey shows a slight growth up to 2.73 (hh.index has also insignificantly grown). Software developers assessed the staffing situation at the level of 2.79, service companies — 2.68.

It is difficult to reveal even obvious reasons of improved situation, the more so since the improvement is small. In the post-crisis environment, the situation of transfer of developers to software companies from other economic sectors has changed dramatically.

Not only the number of movements reduced but those sectors became serious competitors to IT companies at labor market. The same programmers are now required in industry and even agriculture where digitalization is underway getting ahead of many other sectors. Such emerged competition was revealed by HeadHunter analysts.

It may be assumed that for all that the number of university graduates trained in IT engineers have increased. It was growing also in previous years but the growth rate could notably increase in the last 2 years.

### 6.2.1. The most in-demand professions

Information on what specialists are most demanded and how this trend is changing in the recent years becomes less accessible. The results of studies of recruiting companies, if any, are not anymore published on their websites. The latest studies refer to 2014-2015.

Data of RUSOFT which were gained in survey also refer to year-end 2015. Afterwards, the relevant question was temporarily removed because we could not find any changes over several years. Information on popularity of programming languages (see Chapter 7) allows for assuming that since 2015 there have not been any profound changes.

Currently it is essential to revise the list of basic careers to be measured because using other subdivision the changes could be enormous, and some of them have been already recorded by analysts.

A joint research of Microsoft and HeadHunter (results presented in the spring of 2018) demonstrates that in Russia programming skills rank fourth in popularity among employers. In this context, in 2017 the number of vacancies mentioning programming skills exceeded the number of CVs by 17%. Leaders in the areas requiring programming skills, apart from IT sphere, were: marketing, advertising and PR (3.7%), production (3.4%).

Therewith in Russia the demand is steadily growing not simply for programmers but for specialists with skills in the most challenging areas such as artificial intelligence, Big Data, blockchain etc. In 2017, the number of vacancies mentioning knowledge of blockchain increased by 1143%, and the number of CVs — by 942%. There are also leaps among vacancies for engineers in neural networks (increase by 114%), Internet of Things (by 82%), VR/AR (by 77%).

Recently, among other vacancies there began to appear those which only a short time ago were referred to as future professions such as VR designer, deep learning engineer, data mining engineer, AI developer, IoT analyst.

Among skills which employers will look at a few years later, the most popular will be: foreign language skills, self-learning ability, transdisciplinarity and cross-functionality, technological literacy, programming skills, creativity, commercial acumen, social intellect, collaboration with team members. Therefore, in future the most successful applicants will be those who in equal measure have soft skills and hard skills.

According to information of the recruiting agency Unity, published in the autumn of 2017, Russian banks are gunning for blockchain architects and senior blockchain developers. There are only a handful of required specialists on the market, and financial institutions are ready to shell them with salaries to the amount of P200–400 thousand per month. However even such great deals do not allow to banks to fill available positions. According to HH.ru site, since the start of the year there were placed over 200 vacancies concerning blockchain.

#### Vacancies in IT sphere

Sphere	Number of vacancies
Mobile applications	2981
Information security	2862
Front end	2007
Back end	1703
QA	1244
Machine learning	901
Big data	797
VR	287
Artificial intellect	209

Source: job board Adzuna.ru

According to HeadHunter, the most in-demand professions of the next future are engineers in machine learning, data mining, Big Data. The number of vacancies mentioning them every year grows exponentially.

According to the labor market survey produced by the job board Adzuna.ru, published in the spring of 2018, the greatest demand for IT specialists was seen in mobile application development and in information security.

The steady demand also remains in place for front-end and back-end developers (approximately 2000 and 1700 vacancies respectively). But for work on artificial intelligence and on virtual reality only a relatively few professionals are needed: total 209 and 287 vacancies.

According to findings of HeadHunter, in analysis of 400 thousand vacancies of developers, the number of vacancies of front-end, web developers and data analysts over the 4-year period have increased by 140%. Today these professions account for 25% of all IT vacancies.

### 6.2.2. Potential sources of the increase in a number of software developers

As things are now with the staff shortage in software sector, it is necessary to look for different ways to increase the number of engineers who are able to participate in software development for internal needs and for export. Worse still is a demographic pitfall concerning 20-25-year people due to a drastic decline in birth rate in 90s of the last century. There are several sources of acceleration of the number of software developers. This is not about only big numbers. In some cases just a targeted strengthening of developer teams can propel the company development.

#### 1. Russian universities

The higher education system is able to considerably increase the number of trained developers if not only 20-30 universities work efficiently but twice as many at the least. Even the best universities have something to make progress. More on that in Section 6.5 of this chapter.

#### 2. Technical education system

Currently, specialized vocational schools and colleges are not viewed by employers in software industry as a staff source at all, though the need in well-trained mid-level specialists is very important. However, within the technical education system youngsters are being taught en masse but the result, if the best happened, is system administrators for small enterprisers without any complicated information systems, with rare exception. In 2018, for the first time of existence of the RUSSOFT rating of universities, it included a representative of the technical education system — Rostov-on-Don college of communications and informatics (RKSI). Though it earned only one vote, judging by active work and by achievements its inclusion in the university rating is well-deserved.

The largest world IT companies, on the contrary, have a very high share of employees with no higher education. In August 2018, the large recruiting agency Glassdoor presented the results of research where it named large companies that ceased to request the higher education upon entry into employment. Among them are Apple, IBM and Google. The head of Apple Tim Cook in March 2019 confessed that some 50% of employees of his company don't have a college degree. Moreover he feels pride in it.

According to research of My Circle, in Russia 85% professionals working in IT have university degrees: 70% — have graduated, 15% — still go to universities (incomplete higher education).

#### 3. Migration

As things currently stand, it is difficult to rely on a big inflow of developers from abroad. Nevertheless, it is essential to look for opportunities of attracting to Russia foreigners and former fellow countrymen with families. Indeed, if specialists are happy with life abroad it will be hard to convince them to shift the place of residence. But the dissatisfaction with work and life in other countries is gradually growing. Perhaps, not everybody knows about conditions of life in Russia. The most important vacancies can be filled with foreigners from economically developed countries. Such examples already exist though rather solitary. More on that in Section 6.3.

#### 4. Girls training

Previously, software development was considered to be an exclusively male profession. However, in the recent years this idea is changing not only abroad but in Russia as well. By attracting girls to software development it will be possible to partially neutralize influence of the demographic pitfall where Russia is located today.

According to the survey, initiated by Microsoft and conducted by KRC Research agency together with communication group 'Creation' during August-September of 2016 in Europe, about 40% of young ladies at the age of 11-18 realize the practical importance of technical science. In Russia, more than 60% of them consider this training to be useful later in their life. With this, the survey showed that in Europe girls begin to demonstrate the interest to natural sciences at the average age of 11, when in Russia — at 10. 9500 girls participated in that survey — from Italy, Germany, Finland, France, Great Britain, Ireland, Poland, Holland and 1500 girls and female students from Russia.

The biggest American companies already rise the number of female employees too. As [www.tadviser.ru](http://www.tadviser.ru) announced in 2017, the share of female staff in Facebook offices around the world was 35% (33% a year before). And the share of women among technical employees grew from 17% to 19%; there are 21% of women among newly employed software engineers in Facebook. Uber has 36% of women among all the employees and only 15% among technical employees (21% among top management). Adobe is attempting to reach gender balance and is planning to increase the share of women in the staff up to 50% before the end of 2018. Google has 20% of female technicians in the company.

In Russia, about 20% of women aspire to work in 'IT, Internet and Telecom' sector, according to HeadHunter data. There is no similar statistic for Russian companies, but for sure the share of female software developers is always growing and has already exceeded the average point of 10%. It might be about 40% among software testers.

Another new phenomenon is participation of girls in programming competitions at the highest level. Still in individual cases, but they have already barged through with their teams to the finals of the prestigious global championship ACM International Programming Collegiate Contest (and even won medals — for example, in the line-up of Belarus team). They are presented more in the regional semi-finals where participate teams of universities of Russia and several neighboring countries.

#### 5. Personnel upgrading (postgraduate education)

A huge potential is behind further training of developers who have degrees in professions not referring to IT. It is not necessary that they have degrees in technical professions with a good basic mathematical training. Biologists, health professionals, chemists, linguists and many others are wanted. The knowledge is needed for generation of specialized software for different sectors and purposes. A person with the appropriate professional experience knows what must know a biologist better than most. It is easier to train him/her in programming than to train a programmer in biology (though sometimes programmers have to do it). At the same time, leadership of software companies is ready to hire even mature (50-60 years) retrained engineers.

The companies themselves are engaged in further training on a basis of their training centers. However, it does not provide any significant inflow for the entire market. It would be extremely hard to achieve success on a massive scale without State aid. It will be recalled that software companies practice staff training out of profits.

No privileges are provided for training centers of commercial companies, although they, to a some measure, fulfill functions of the government.

The gap in the number of software development professionals, which are needed to the Russian Economy, is supposed to be filled by the 'Digital Economy' National program. The program foresees legal, technological and financial State support measures to the high education of IT-professionals but also to the retraining of non-IT-professionals, including people with disabilities, elderly people and people who leave traditional economic sectors. We also expect simplification of procedures for attracting former Russian citizens and foreign

professionals with required expertise into the Russian digital economy. The processes of training, upgrade qualifications and self-education within the digital economy will be going on throughout the whole citizen's life. The share of the government academic assessment of graduates' educational level proceeded with digital tools should reach 40% by 2025.

However, similar plans existed in the past too (in particular, RUSSOFT launched its project of the Academy of postgraduate IT education in 2011), but among all projects aimed at an increase in the number of software developers only the efforts of Association APKIT made possible to increase a number of state-financed openings in universities in IT professions.

### 6.3. Migration of labor resources

In 2018, no signs of fundamental change in situation with migration of software developers to and from Russia were detected. Both inflow and outflow remained at the same level.

#### 6.3.1. Outflow

Due to the growth of staff outflow in 2015, we decided to include into the questionnaire of 2016 a few questions that allow for seeing how migration flows influence the software industry. As a result, we found out that migration of the personnel was a problem for 14% of the surveyed companies. This index was almost unaffiliated with the share of foreign sales and with the business model (for software vendors it was 13%, for service companies – 14%).

The problem is more common for regional companies (16%). In Moscow and Saint-Petersburg 13% of respondents confirmed that they do have this issue. The problem was also noted by 15% of companies who have less than \$5 million in revenue and by 12% of companies with more than \$5 million in revenue. By all accounts, the workforce leaves companies with a low level of wages (they are mainly regional and small companies). However, there's not big difference appeared between companies of different categories.

#### The problem of an outflow of software developers abroad for different categories of companies, % of companies surveyed

	2016 survey	2017 survey	2018 survey	2019 survey
All companies surveyed	14%	18%	17%	17%
<b>Company size</b>				
Turnover below \$5 million	15%	19%	18%	18%
Turnover above \$5 million	12%	14%	14%	13%
<b>Location of head office</b>				
Moscow	13%	4%	2%	11%
Petersburg	13%	15%	12%	15%
Regions	16%	28%	25%	20%
<b>Share of export</b>				
Below 50%	14%	16%	12%	13%
Above 50%	14%	22%	29%	28%

The obtained results of the 2017 survey show that the group of companies which recognize the problem of an outflow of personal abroad is growing. This growth mainly took place in regional companies with a turnover below \$5 million, which receive the majority of revenue from export.



The growth in the share of companies that recognize the problem of an outflow of personal abroad does not mean that in 2016 and early 2017 (before the survey was conducted in spring) more IT-professionals left the country than in 2015 and early 2016. It is clear that in spring 2016 in Russia the number of vacancies for software developers began to grow much more swiftly than the number of according CVs. Accordingly, when employees who after hesitations had finally decided to work abroad — it became more difficult to find a replacement for them. Thus, we may assume that the outflow of developers abroad may not have increased, but the problem of emigration has begun to be felt more strongly.

In 2018 and 2019 the collected data does not allow for making any conclusions on any significant changes in the way companies size up the migration problem. We can only state that the difference between export-oriented companies and companies which mainly focus on the internal market has grown bigger. On the average, the software engineers that work in Russia are much worse at speaking foreign languages. This keeps them away even from thinking about applying abroad. Besides, the inner market recovery affects this issue. Working only in the inner market, companies are able to grow fast and retain staff due to the additional income.

It is noteworthy that even the American Russian-speaking community does not have precise data on the number of IT professionals who have moved to the USA from the post-Soviet area. There is only the assumption that in Silicon Valley alone, there are at least 50,000 of them.

There is no mass outflow of personnel abroad right ow. However, often even the loss of one key employee who is leaving the country is a problem for a specific company, particularly when this person is the most competent developer who knows foreign languages. So for 17-18% of companies in 2017-2019 migration of professionals from Russia poses a problem.

According to Eurostat, Russia takes the 8<sup>th</sup> position in the rating of citizens entering EU for an extended time frame (which is not high, considering the size of the country). In 2016, 79 thousand Russians have received their first residence permits in EU and only 14 thousand of them came for work. In 2017, Russia took the 9<sup>th</sup> position in the rating of former citizens who were granted EU citizenship with a figure of 20.8 thousand people.

### 6.3.2. Inflow of personal from abroad

Thanks to another new question which was included in the 2016 survey ‘What is the share of new employees hired in 2018 came from abroad (Ukraine, Kazakhstan and Belarus and other countries from the former Soviet Union and beyond)?’ we can calculate how many programmers came therefrom. Thus, the inflow of personnel to software companies in Russia was estimated in 2016-2017 at 400-500 people. It may well be that this figure could be slightly greater as some respondents did not have full information about hired employees in their companies.

At year-end 2018, calculations show that more software developers came to Russia from abroad — roughly 600-700. Taking into account that some coming professionals has found themselves in other sectors, the total inflow is estimated at 2-2.5 thousand people. According to companies surveyed, both in 2017 and in 2018 the total increase in staff almost corresponds to the number of hired university graduates. Therefore, all other flows (between sectors, to and from abroad) compensate each other. The divergence is just 3-4%. It means that in 2018 other sources (apart from universities) provided for software companies additionally 800-900 experts which shifted to IT companies from other sectors and from abroad (than in opposite direction).



In 2015, 20% of surveyed companies hired foreign software developers. In 2016 — 18%, in 2017 — 14%. However, in 2016-2017 the absolute quantity of IT-professionals from abroad did not change. In 2018, increased both the share of companies hiring foreign professionals (up to 21%) and the amount of these specialists.

#### How actively employees from the CIS were hired by different categories of companies

	Average percentage of new employees from the CIS (of all hired in 2018)	Percentage of companies hiring employees from the CIS in 2018
All companies surveyed	3.0%	21%
<b>Company size</b>		
Turnover below \$5 million	1.9%	20.5%
Turnover above \$5 million	3.3%	24%
<b>Location of head office</b>		
Moscow	0.1%	8%
St. Petersburg	6.3%	27%
Regions	2.4%	24%
<b>Export share</b>		
Below 50%	0.8%	19%
Above 50%	4.7%	28%

Boston Consulting Group and The Network in the joint research from March to May 2019 placed Russia at the sufficiently high 25<sup>th</sup> position among 180 countries in attractiveness for IT professionals. Altogether there were surveyed above 26 thousand people including above 1.6 thousand Russians.

38% respondents from Kazakhstan and 27% from Belarus stated their preparedness to move to Russia. Also the percentage of people wishing to work in Russia were high in Turkey, Angola, Nicaragua, Serbia, Lithuania, Peru, Estonia and Ukraine. Researchers explained the attraction of Russia for local and foreign IT professionals by large-scale digitalization process which is underway in the country and the world. It generates demand for well-qualified specialists for whom business and public sector compete.

At the same time, over 40% Russian IT professionals don't aspire to work abroad. If globally 68% IT professionals are ready to move to the other country for work on the average, in Russia this figure is 58%.

#### 6.3.3. Internal migration

According to findings of the 10<sup>th</sup> research of labor market and survey of salaries in Russia in 2019 of the recruiting agency Antal Russia, the willingness of professionals to relocate within the home country in the recent years is going down: if in 2016 40% were ready for moving to another city, in 2019 only 30% respondents agreed to move up-country.

Over the last years, the multiregional competition for workforce began to show. The main player in this field is Tatarstan (with its new technological cluster Innopolis), Kaliningrad region (with its free economic zone and distinguished preferences for business), Moscow (with the whole program on attracting IT business), Ulyanovsk region (where the Governor takes personal commitment in IT business events). The activity is manifested in creation of favorable conditions for hi-tech business and for work. Not always it is enough for any transfer of professionals in large numbers.

## 6.4. Remuneration of labor

### 6.4.1. Average salary in Russia, in the IT sphere and in the software industry

In all the years of the RUSSOFT survey the average salary in the software industry has been growing as measured in rubles. Over crisis periods (2009-2010 and 2014-2015) the growth rates slightly went down — from 10-20% to 8-10%. The increase of software developers' salaries existed always but in the midst of economic hard times they could not always offset losses due to inflation. In such times they went down in dollar terms due to depreciation of Russian currency.

At the same time, an average salary in the software sector always grew faster than countrywide. However in 2017 for the first time in 16 years of study the salary growth rate in the software industry turned to be more or less the same as in the entire Russian economy. According to the Russian Federal Statistics Office, the monthly average nominal gross payroll by year-end 2017 in Russia was ~39.167 thousand RUR that is by 6.7 % more than in 2016. According to HeadHunter, the salaries of Russian IT professionals in 2017 increased slightly less - by 6%. According to respondents within the annual RUSSOFT survey, the salary of a software developer in Russia in 2017 increased by 7.7% on the average.

Considering that different calculation methods are used in our study, the increment is compatible. In all appearances, salaries of programmers have grown a bit more (by 1-2 percentage points) than national average but for the first time the difference is so insignificant. However in other sectors even nominal incomes of workers in the last 2-3 years either did not grow at all, or declined, and real wages dropped definitely. In 2017 only a partial compensation was made for losses which software developers did not feel as such.

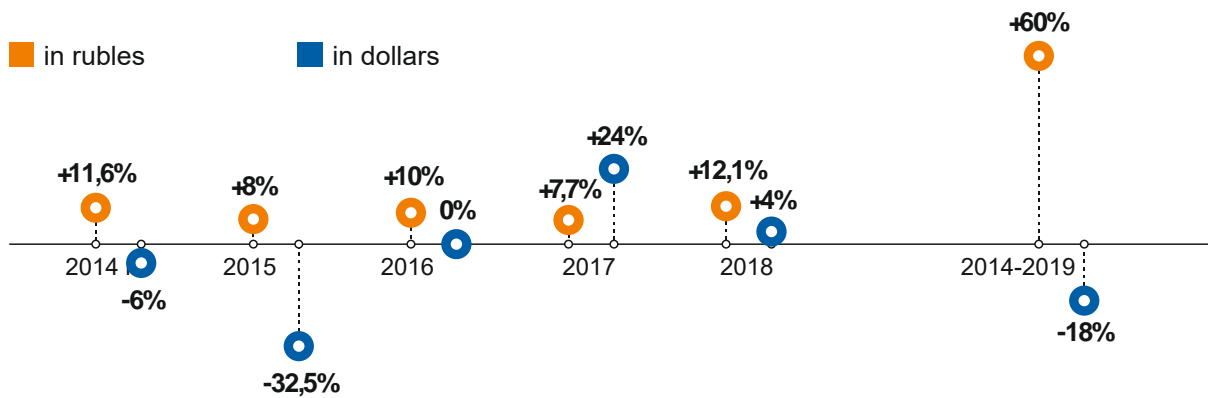
In 2018 the growth of the average salary of software developers and the increase in nominal gross payroll of workers in the entire Russian economy (Rosstat data) became altogether equivalent. According to RUSSOFT calculations, salaries of experts in the software sector increased by 12.1% over year, and in the entire economy — by 11.6% (up to ₴43.724 thousand).

The Superjob salary index in the Information Technologies segment showed a smaller growth — by 7.4%, but with acceleration in 2019 (in the first 8 months it increased by 8.9%). For the entire economy Rosstat calculated the increment only for the first half-year. It made 3.4%. Thus, it may be assumed that the faster growth of software developers' salaries was renewed. As a rule, their income increases more than in the whole IT industry. For example, the Superjob salary index for job 'Java programmer' in 2018 increased by 7.1% and within 8 months of 2019 — by 13.3%.

In respect to software developers, the Russian labor market is just a part of the world market. Consequently programmers not without reason often are geared to measuring their income in dollars. If we look at the dynamics of the average salary in dollar terms, that of Russian software developers increased in 2017 by about 24% (in no small way due to strengthening of ruble). However, in 2018 due to weakening of ruble the average salary in dollars increased only by 4%. It has not reached the pre-depression 2013 level yet (lower by 18%).

In all likelihood, the wage level in the IT sphere began growing in the first 8 months of 2019 even faster than a year earlier, and the ruble weakened by about 3-4%, as a consequence the income in dollars of software developers will increase by 5-8%. Just the same, it will come short of the 2013 level. At the same time, in other countries the salaries of programmers over these years have increased significantly (see Section 6.7).

### Change of an average salary among surveyed Russian software companies in 2014-2018



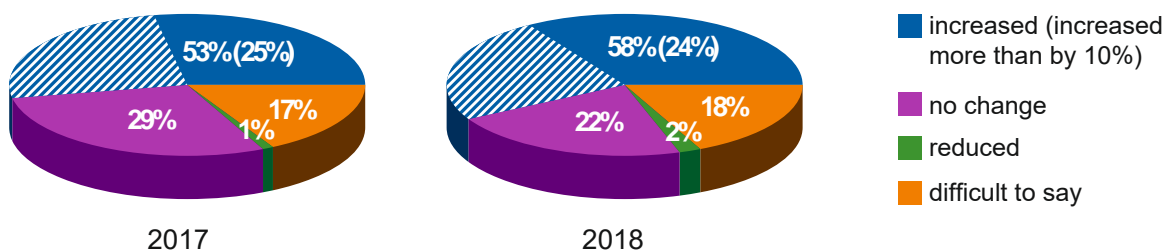
An average salary in the area of software development in Russia by the beginning of 2017 reached ₹82-84 thousand, by the beginning of 2018 it averaged ₹90 thousand. As the growth by not less than below 10% is typical for all categories of companies surveyed, it is not beyond the reach of reason to suggest that by the beginning of 2019 the average salary of experts of Russian software companies run at about ₹100 thousand or, perhaps, a very little more. In this context, both data of Superjob, plans of respondents to act in an aggressive manner at labor market and preservation of a gap to world indicators allow suggesting that following the results of the entire 2019 epy growth rate of salaries of software developers will be roughly the same as in the past year — not below 10%.

According to HeadHunter, the average salary of specialists in IT sphere in early 2019 was at least ₹88 thousand that broadly corresponds to the average salary in software companies at ₹100 thousand, as in these companies the remuneration of labor is higher than in the whole IT industry on the average.

The career portal My Circle has found out that the average salary of an IT professional in H1 2019 is ₹100 thousand across Russia. Industry-wide wages of IT professionals have increased by 10%, and dropped only among specialists in marketing. As before, the highest wages get Scala, Objective-C and Golang developers. A difference in salaries between Moscow and regions is 36%. In the capital a net salary is ₹136 thousand (growth by 13%), in St. Petersburg — ₹110 thousand (+10%), in regions on the average — ₹75 thousand (+7%).

For implementation of the national program ‘the RF Digital Economy’ the Russian Government specified a man-month value in the area ‘Development of software, consulting services and other associated services’. It amounts to ₹169 thousand including both remuneration for labor and necessary payments to insurance and pension funds.

### Change in salaries among companies surveyed in 2017-2018



In 2018, not only the salary growth rates in the software industry were higher than in the year-earlier period but the share of companies increasing remuneration and other payments to employees also increased.

According to research of Antal Russia, in the entire IT industry 47% of respondent professionals have received increased salaries. It is by 6% more than a year before.

The recruiting company Unity noted in November 2017 that on the back of the pay increase in the IT sphere the role of non-financial motivation was growing. With the existing market of candidates the companies use the whole set of motivational tools to get possession of a really competent and highly experienced employee, for example, a senior developer or a specialist in Big Data. Nevertheless, the preferred and the most important way to bring expertise is money. Highly competitive are offers envisaging flextime, possible exercise of profession during one working day of a week out of the office, extended health insurance including for family members.

#### 6.4.2. Change in average salary in different categories of companies

Over the last 4 years, we should note higher growth rates of average salary in regions than in Moscow and Petersburg, and also an increase in salaries in companies which are primarily focused on the Russian market. Developers of ready-made solutions over the last 4 years raised salaries to a lesser degree than service companies which drastically increased export. In 2016, the difference between them decreased (the growth rate was almost equal), but in 2018 it again increased.

#### Average growth of salary in ruble terms for different categories of companies surveyed

	at year-end 2015	at year-end 2016	at year-end 2017	at year-end 2018
All companies surveyed	+8%	+10%	7,7%	12,1%
<b>Location of head office</b>				
Moscow	+7%	+7%	7.9%	8.9%
St. Petersburg	+8%	+8%	4.2%	10.1%
other Russian cities	+10%	+14%	10.3%	13.7%
<b>Company size</b>				
turnover below \$5 million	+9%	+9%	9.4%	10.3%
turnover above \$5 million	+7.8%	+10%	7.5%	13.4%
<b>Export share</b>				
below 50%	+6.6%	+10%	10.4%	13.5%
above 50%	+10%	+9%	7.2%	10.7%
<b>Business model</b>				
developers of ready-made solutions	+4%	+7%	6.6%	8.6%
developers of custom software	+9%	+11%	7.8%	13.2%
<b>Company age</b>				
more than 10 years	+10%	+10%	7.3%	12.2%
less than 10 years	+8%	+9%	14.0%	11.8%

According to HeadHunter, in H1 2018 the average salaries in regions in the area 'Information technologies, internet, telecom' were growing, while in Moscow and St. Petersburg — not. The reason is that the metropolitan companies promptly responded to crisis. Accordingly, the growth of the comprehensive income in two capitals was seen earlier while regions only recently approached the stage of restoring the pre-depression level. Novosibirsk already remains just a little short of St. Petersburg in the level of salaries of IT professionals.

### Average salaries offered in January-June 2018 in major Russian cities for professionals in area 'IT, Internet, telecom'

	All	Moscow	St. Petersburg	Novosibirsk	Tomsk region	Yekaterinburg	Kazan	Rostov-on-Don
Average salary, P thousand	59.8	90.6	72.5	66	56,.	58.4	48.5	47.8
Vacancy dynamics	+45%	+34%	+26%	+31%	+30%	+42%	+31%	+38%
CV dynamics	+13%	+6%	+12%	+18%	+24%	+19%	+6%	+11%
Index hh.ru	2.6	2.8	2.7	1.8	1.7	1.7	2.5	2.4

Source: HeadHunter

#### 6.4.3. Level of salary for popular professions

##### Change of salaries in IT sphere from January 2017 till September 2019

	01.09.17	01.01.18	01.08.18	01.08.19
PHP programmer, thousand P	105	105	112	130
1C programmer, thousand P	105	107	112	135
Java programmer, thousand P	138	140	150	170
Information technologies (index)	167,37	170,46	177,17	199,35

Source: Superjob.ru

According to the information of Hays, published in autumn 2017, in Moscow a developer with more than 4-year work experience in companies with the number of personnel up to 200 people earns ~100-140 K, in companies with the number of personnel between 200 and 1000 people ~120-170 K, and in companies with the number of personnel over 1000 people his/her salary is ~120 and 180 K. A developer with less than 4-year work experience may qualify for a salary of ~70 K rubles per month.

A developer of web sites and portals earns in companies with the number of personnel between 200 and 1000 people ~120-140 K. In case of companies with the number of personnel over 1000 people the salary is ~130-150 K. A web developer with a smaller work experience may qualify for the salary from 60 K. As a rule, mobile developers are in demand only in companies with the number of personnel over 1000 people. Having work experience over 4 years they earn between 160 and 220 K, with less than 4 years ~100-160 K.

An ABAP (SAP development language) developer with the work experience over 4 years earns ~120-180 K in companies with the number of personnel between 200 and 1000 people. If the staff is more than 1000 employees, the salary increases up to ~120-220K. Without 4-year experience an ABAP developer may get from ~75 K per month.

According to the mutual study of HeadHunter and Yandex.Practicum, the highest offered salary in 2018 was among Java- and Android-developers, in both professions the median value was above P130 thousand. DevOps engineers and iOS developers trail closely behind with a median above P120 thousand. Among freshmen iOS developers may count upon the highest remuneration: a half of job advertisements promised more than P69 thousand. C++ specialists run second (P66.1 thousand), full-stack developers (P63.2 thousand) are third-biggest.



The career portal My Circle has found out that in H1 2019 the highest salaries were attributed to developers in such languages as Scala, Objective-C and Golang — ₱150 thousand. Generally, the salary in software development is ₱100 thousand (in Moscow — ₱140 thousand, in St. Petersburg — ₱120 thousand, in other regions — ₱80 thousand).

Salaries grow for developers in all programming languages, primarily, Objective-C (₱150 thousand, +25%), Swift (₱130 thousand, +24%) and Java (₱120 thousand, +20%). A little drop is observed for C++ (₱97 thousand) and Delphi (₱78 thousand).

## 6.5. Personnel training. Universities

According to the High School of Economics), young people under the age of 30 account for 39% of the total number of staff of Russian IT companies. The annual increase in this category in recent years was about 5-6%. As for software developers it is over 25 thousand new employees.

### 6.5.1. Main problems and changes in the education system

As a rule, the changes in the sphere of staff training for the Russian software industry are not fast because the education system is inherently conservative. It is possible to draw conclusions about alterations if we take the 5-year period at the very least. If this period is increased to 10 years then we may speak with considerable confidence about improvements in the education system in regards of funds. Higher education institutes (faculties of classic universities) which train specialists for software industry during these years, as a rule, have not become booming, however, have been given a free hand to develop.

In the area of software development there is no problem of unemployment if we look at labor market of all Russia and not individual cities. Therefore, any well-trained graduate if wished will find employment without any problems. Sometimes it is necessary to quit the house that is not a stone of stumbling for young people.

In depth interviews performed within the framework of research ‘Prospects of Russian IT developers on the global market’, initiated by SAP and carried out by RUSOFT in H1 2017, it was shown that representatives of software development industry (top officials of successful and future-proof companies) variously estimate the changes in quality of academic staff training. Someone mentioned an unmistakable slow backslide into a lower level based on results of tests of applicants which from year to year are going downhill a little (it can be related to the fact that due to the increasing number of companies the amount of well-trained professionals per company is going down). Other people say that gifted youngsters are not running out in Russia, anyway they appear in spite of all unsolved problems of the educational system.

All parties agree that teaching in universities absolutely isn’t tooled for training of developers ready for working at companies. The base is good as the fundamental physical and mathematical education remains at a very high level. Programming essentials are also well taught. However university students do not study industrial-applied programming which assumes team working, product managers are not prepared, soft skills are not imparted.

The Russian labor market is in short supply of professionals with business competences and with working experience at international markets —business and marketing managers, sellers, entrepreneurs and so on. Such demands allegedly should be met by graduates of numerous educational institutions which are training managers and economists of different specialties. However, their performance efficiency is even lower (and much lower) than in technical colleges. At the same time, as regards software industry, the knowledge of the area of expertise for sellers, marketing and business managers is of prime importance. Ideally, graduates should have technical and supplementary education in management (anyway, technical education must be basic).

When it comes to development products for the global market, Russian companies have to compete with the best-in-class product managers, marketing managers, specialists in development of partner networks, with sellers for which these markets are native.



The situation keeps getting worse because in these fields Russia has no Soviet school of specialized training and in Russian companies there are still a few successful people on the ground who could share an experience.

The incompleteness of knowledge in the area of industrial programming, marketing and management to a great extent is compensated by self-training, including online lectures, study placements, training courses arranged by companies, as well as lectures by representatives of business. Of all others it provides a definite percentage of graduates prepared for work in companies (5-15%) and up to a half of recent students who can be adjusted to a level acceptable by a software company over a few months or a year.

Without self-training and without participation of business in education, the efficiency of universities would be even lower (a further section of this chapter is dedicated to cooperation of universities and software companies).

The Bologna system comes under criticism for it resulted in dividing the process of upper education into bachelor degree and masters courses. The 4-year bachelor degree course may be insufficient to train an engineer who may meet requirements of business. At the same time, the coming-of-age process these days does not finish after 4 year education in university. Young people are not ready for serious tasks, they are not able to follow the rules of PM and QA, neither to keep responsibility. In western countries this late coming-of-age begins long before. That is why young starting scientists there in fact are several years older than Russian ones.

Another problem is also related to the Bologna system. As there are fewer state-financed openings in graduate school than in magistracy, a part of talented students leave to work after undergraduate education and afterwards it is practically impossible to return them to university for scientific research. However, it is difficult to assess the gravity of this issue because there is no relevant information for the whole country in different universities.

Scientific research at universities is being conducted but it is none the less closer to education than to science. Historically, fundamental and applied science has been centered in the system of the Russian Academy of Sciences or in the industry research centers. A disparity between science and education has not been eliminated yet. This is suggested to be done within the new federal program “Digital Economy” which assumes since 2018 an annual monitoring of staffing requirements in the area of development of cross-cutting technologies of digital economy. By 2025 there will be established at least five postgraduate and master schools for each direction of cross-cutting technologies on the basis of leading universities and scientific institutions.

Also under “Digital Economy” some activities are underway to introduce a mechanism of supporting the two-way exchange of professionals between research establishments and universities from one side and with businesses on the other side in the sphere of digital economy (on sabbatical basis). Some changes are also planned in the legal and regulatory framework aimed at elaborating grant support of fundamental and applied studies and development in the field of digital economy on behalf of public and private foundations.

Within the Federal program “Digital Economy” there is a chapter called “Forming research competences and technological project pipelines” which assumes to allocate in 2018-2020 appr. 50 billion RUR on implementation of research and pilot projects in the field of digital economy and for the development of strategies of company for digital transformation it is planned to spend 1.37 billion. For the training of 70 Russians abroad it is allocated ~650 million RUR and top managers of government enterprises ~180 million RUR.

All studies planned herein are divided into nine groups of cross-cutting technologies: “Neurotechnologies and Artificial Intelligence”, “VR/AR technologies”, “Robotics and sensory components”, “Wireless Communication Technologies”, “Quantum Technologies”, “Distributed Ledger System” (blockchain), “Big Data”, “Industrial Internet” and “New Production Technologies”.

It is also planned to provide financing for of the participation of Russian universities in international research and innovative projects. 50 million RUR will be focused on these purposes. Here will be implemented five appropriate projects at least.

The introduction of the unified state examination (USE) in the schools promoted the admission to the advanced universities of talented youngsters from regions. They almost had no chances with the previous system of student selection. If before USE in the best universities of Moscow and St. Petersburg on the faculty of mechanics and mathematics dominated students from Moscow and St. Petersburg, in the recent years proportions drastically changed — local school graduates form only about 30% share, and the rest 70% of students come from different parts of the country.

Connection of all Russian schools to Internet by broadband communication channels is another decision at the level of ministries (Ministry of Education and Science and Ministry of Communications and Media) which promoted greater involvement of talented young people from upcountry in education in IT professions.

Some experts noted an increase in a number of well-trained young men from regions which lack high-achieving universities or physic-mathematical schools at all. When interacting with these young people it turns out that they learned on their own, listening to lectures online, more often than not within a school setting. Therefore, a distaned learning which earlier was perceived by many with a negative mood , and connection of all Russian schools to broadband access to Internet, provided an observable effect though more likely it could have been greater.

Keeping in mind that the software industry needs a big number of decent and diligent workers, it is not necessary that all software developers should obtain a higher education. Secondary technical schools and colleges would cope with the task of training a lot of programmers at beginner level. However, they are not an adequate source of human resources for Russian software enterprises at all (respondents indicated only two colleges in the whole country which train proper professionals). At the same time, in biggest American IT companies, which are hoped-for employers for many young people, up to 30-50% employees have no university degree.

Vocational training colleges may allow young people already at age of 20 to take on a job at software companies. Indeed, if these institutions are focused on current demands of software development companies and not on the standards from twenty years ago.

The topic of training IT specialists in colleges is regularly brought by business, but no changes in the advanced education system occur. Graduates of some vocational training colleges which allegedly train professionals for IT companies and for the telecommunications industry are out of the picture at Russian labor market. Nevertheless, these unproductive colleges on a nationwide scale have a pretty good state financing.

According to the research center of Superjob.ru, in Russia is gradually changing the ratio of school leavers who after school apply to vocational education institutions and universities. According to the survey, children of just 48% parents intended in 2016 to go to university. In 2010, they were 80%. 23% of surveyed parents were going to continue the education of their children in vocational education institutions — secondary schools and colleges. Chiefly, children from poorer families are ready for going to colleges and secondary schools.

Most often school leavers who decide to go to secondary schools and colleges would like to work in the health care (18%). IT professions come second in popularity (11%). However, the desire to be trained for becoming a programmer in a secondary school and college doesn't mean that it is feasible to obtain adequate education in the selected learning institution.

### 6.5.2. Future professions

The list of IT professions in Russian universities remains almost the same for some twenty years. Additionally, educational programs are being updated very slowly though the IT sphere undergoes explosive changes. To begin with, universities provide very good knowledge of physics and mathematics — the spheres which have changed in a minor way in the ensuing 100 years.

Ultimately, knowledge of modern technological trends is gained by university students, but to a greater degree it is owing to self-training, to the participation in programmer communities and to extended education provided by commercial companies. Leading universities themselves initiate participation of industry representatives in learning process. For instance, right away several universities announced that in the academic year starting in 2017 they would introduce learning of fundamentals of blockchain and crypto currency. In particular, BTC and other aspects of innovative financial technologies will be studied by students at Moscow State University, Higher School of Economics, Moscow Institute of Steel and Alloys, Moscow Institute of Physics and Technology (MIPT) and St. Petersburg State Economical University (SPSEU). For example, at Higher School of Economics crypto currencies will be studied within the education master's program "Financial technologies and data analysis" which the university launched jointly with Sberbank.

In spring 2018, in Far East Federal University (FEFU) the First cram school of VR volunteers started up. Over 70 students and pupils will complete the curriculum of the Russia's first ever training program "VR basic operation" launched by the Volunteer Training Center (VTC) FEFU with the assistance of the virtual reality laboratory VR-Lab DV (Vladivostok).

In-house departments for training in emerging professions are being established at universities by many large and not very large Russian IT companies. See in more details in Subsection 6.5.8.

In September 2019, it got about launching training programs in artificial intelligence (AI) in 100 Russian universities. The launching of an online education project with participation of 100 universities based on the educational workshop 'Island 10-22' was announced by Dmitry Peskov, the special representative of Russia president on digital and on technological development. It is supposed that under this project, apart from launching of supplementary education programs on AI, there will be started courses intended for university top managers, scientists and teachers. Also universities will be able to introduce straightforwardly the AI technologies in educational and in scientific processes as well as in the university management sphere on the basis of big data analysis.

### 6.5.3. Number of graduates by IT professions

The existence of an obvious understaffing in software industry and in the IT sphere as a whole, points to the fact that the number of graduates in respective professions have to be significantly increased. However no information is available about details of this increase. The efforts aimed at increasing the State financed admissions for the school leavers with required core knowledge and at the financing for retraining qualified teachers, should be more solid. Even there is no exact verifiable information about the existing annual overall numbers of graduates studying IT professions in Russian universities.

According to IC, last year there were about 45 thousand graduates capable to work as software developers. RUSOFT calculations show a similar figure (50-54 thousand) if we rely upon the data of overall numbers of employees of Russian software companies. Those who have programming skills are at least twice as many.

We can get an insight if we take into account the possible differences in understanding of university teachers and of heads of companies over the competences of graduates in IT professions. It does not pay to contrast available data about graduates because the itemization of data on staff training is more important than information about the growth of offers at labor market provided by Russian universities.

It can be inferred on future graduates in IT professions by what USE examinations are selected by upper mids for admission to the university. In 2017, informatics was selected by 53 thousand schoolchildren, in 2018 — by 67 thousand (+26.4%), in 2019 — by .9 thousand (+11.8%). A grade point average in informatics over two years increased from 59.2 to 62.4, but it hardly tells us about an improvement in attainment level. USE itself does not show such level but makes possible to chop away those pupils who in the examination apparently have limited knowledge.

Experts assessing the results of the USA in 2019, take a favorable view of the improvement in ‘Specialized mathematics’ by more than 6 points — from 49.8 to 56.5. In 2018, an improvement (by 2.7 points) was also recorded. This points to the fact of the popularity of education in mathematics which is essential for training students in IT professions.

The total increase in applications for USE in 2019 by 50 thousand is also positive. The applications were filed by 779 thousand people; a growth of this indicator is related to the growth of school leavers — from 640 thousand to 678 thousand (USE is taken not only by the current year high school graduates).

Thanks to the activity of APKIT (the IT-industry umbrella Association the number of State financed places for IT professions at Russian universities has increased in recent years. At any rate, in 2016 the Ministry for Communications and Media reported an increase of 31%. As a result, in recent years the State order for IT specialists has grown by more than 70%, rising from 25,000 to over 42,500 budget places. In 2017, an increase of around 30% more is expected from the reduction of budget places on other professions which are not in demand. Accordingly, in several years the number of graduates in IT professions should double.

In all appearances, an annual growth of state-financed openings really exists. But the twofold growth raises doubts if we evaluate the largest collection of data on future graduates of universities in IT professions, conducted by the Club of professional development “IT Planet” in 2017. The survey of Russian universities took place in the first half of 2017 as part of preparation for holding the competition “IT Planet 2017”. The information gathered in this way was submitted to RUSOFT for analysis. It was found that 111 universities had trained 22,500 engineers in 2017 who study IT professions (or professions closely related to IT). Extrapolation to all Russian universities gives 67 thousand university graduates in IT professions per year.

In 2013, the Ministry of Communications and Media specified that for the stepped-up development of IT industry over several years from 2014 to 2018 it was necessary to train at least 350 thousand IT professionals. An increase in state-financed openings in IT professions is one of measures to achieve the goal. It was anticipated that the education system (including advanced training and retraining centers) would graduate by 2018 up to 150 thousand IT professionals. The lacking professionals were supposed to be attracted from abroad.

One may believe that in 4 years universities have managed to train 150 thousand new professionals, but migration flows have hardly given an option of increasing the total staffing even up to 200 thousand people.

As experience shows, from the viewpoint of advanced training and retraining of acting IT engineers, the efficiency of universities turns to be lower than in training centers of companies because the majority of university teachers are out of everyday practice of participation in commercial projects.

Nothing is known about successful implementation of university staff retraining programs (at federal and at regional levels) for the needs of IT industry. Efforts to launch them are being made but with little effect. Nevertheless, this line seems promising. It is essential to establish an appropriate public-private partnership that did not allow to have good results so far.

It is also possible to touch upon a question of staff retraining and specify how many graduates who are not able to develop software but are ready to become programmers after a not very long training within the framework of postgraduate education. Another room for thinking is staff training in secondary technical schools and in colleges.

It is of prime importance to consider prospects of using deep learning systems and artificial intelligence for software development that will allow to abandon services of lots and lots of semiskilled programmers. Hence, the concentration on the increase of the number of university students by hedge or by stile alone may result in enormous numbers of software developers who will not be commercially successful due to insufficient skills. Similar problem has already manifested itself in India.

A comprehensive research of staff training system for IT industry is required, beginning with occupational guidance for schoolchildren and ending with monitoring of graduate employability. In all appearances, the findings of research will make clear that a further reduction of a number of inefficient universities is necessary with an increase in financing of those which are of greatest service in software sector.

Over recent years a process of reduction the number of universities is underway — a number of non-governmental universities were reduced by half (partially due to institutions which actually “sold” diplomas). However, it is supposed that a large part of governmental universities are very inefficient which permits to raise an issue of their amalgamation with strong universities, of liquidation or cutbacks to funding these universities.

#### 6.5.4. Popularization of IT education

With the general drop in the number of school graduates as a consequence of the “democratic slum” caused by perestroika, the popularization of IT professions becomes particularly important. With the goal of stimulating young people to enroll in IT fields at universities, the large-scale campaign “Code Hour” has been held in Russia from 2014, in which some 50 million children from over 35,000 schools in all federal districts of the country learned about the basics of programming. This campaign encompasses 70% of Russian schoolchildren over the course of a week.

The campaign is held with the support of the Ministry of Education and Science, the Ministry of Communications and Media, and also leading companies of the Russian IT industry. It allows children and their parents to assess the importance of IT as a prospective profession.

Additionally, for the popularization of IT and for an initial training in the field of information technology, the Ministry of Communications and Media and the Moscow department of education together with the companies 1C, ABBYY, Mail.ru group and Yandex selected 50 Moscow schools in a competition to organize IT programs and IT classes. Ministry representatives believe that this experience may be applied to other Russian cities.

In summer 2017, it was decided to popularize the “digital economy” among schoolchildren. Graduates in 2020 will be able to take a test on knowledge of a number of appropriate IT-related disciplines, which will give them a few additional points to enroll at university. The project of the state program ‘Digital Economy’ contains the section “Personnel and education”, which includes the “system of attestation norms of competence for the ‘digital economy’, which gives enrolling students advantages”.

In spring 2019, 1C gave the first regional demo lesson of informatics within the All-Russian event ‘Lesson of a digit’. For this purpose it issued a learning computer game for the ‘Project management’. The event is aimed at finding future solution of the problem of staffing bottleneck for the program ‘Digital Economy’ — through popularization of informatics among schoolchildren.



On the whole, various one-off campaigns, methodological work and the example of young people who find good jobs in software companies in various cities are bearing fruit. According to survey of Levada Center in the mid-2016, 17% of parents wanted their children to be programmers. It is a second best indicator among all professions along with physicians. The survey conducted by Superjob in H1 2019 had the same effect: 17% of schoolchildren stated willingness to enroll at IT faculties.

Popularization of technological entrepreneurship is also on the front burner. Appropriate events were conducted within last 2 years. Since September 1, 2018, Russian schoolchildren could take part in a unique multidirectional Olympiad ‘Technological entrepreneurship’ aimed at detection and support of high school seniors who are interested in engineering art, research in innovation sphere and dreaming of throwing their lot with entrepreneurship in the high-tech area.

In April 2019 there was started a project for software developers, WEB-designers and project managers in the IT field — ‘Digital breakthrough’. An organizer is a non-commercial organization called ‘Russia – country of opportunities’, a co-organizer – Innovation Support Fund. The primary goal of the project is to open up new professional opportunities for the talents in the digital economy. The contest will permit participants to launch own technological businesses, get employment assistance, find like-minded people and form a project team as well as to win prize money.

#### 6.5.5. Quality evaluation of university work

For all the deficit of IT personnel (in particular of software developers), the main thing is not so much the number of young people with a diploma of high education with an appropriate profession, but the quality of training. We can only talk of a sufficient or insufficient number of graduates if they have certain knowledge and skills which are demanded by Russian companies (especially Russian software exporters) to recent students.

In connection with this, the question arises about the evaluation of universities in graduating IT professionals (programmers). If we examine Russian software developers in general, there are quite objective indicators of the high level of their educational level. If they are not the best, they are among the best. This is also shown by the victories of Russian students at various programming competitions (for more detail see subsection 6.5.10. Participation of Russian students in international programming competitions), and the work of hundreds of thousands of graduates of Russian universities abroad (at the same time they hold high positions in major world companies).

The data for testing knowledge on programming for a considerable number of programmers (not necessarily the very best) also shows that Russian programmers are among the finest in the world. The results of a study based on this test were presented in the summer of 2017 by Fossbites, which has an online platform of test exercises on programming. The conclusion is the following – Russia is in second place on the international general rating after China, with an insignificant lag (99.9 and 100 points respectively). Both leaders are ahead of Poland, which holds third place with 98 points. The lead on the USA, which holds 28<sup>th</sup> place with 78 points, is enormous, despite the fact that American companies are able to attract the best programmers from all over the world. India, which leads the world market of services for custom software development, is even lower – in 31<sup>st</sup> place with 76 points.

If in the general rating of Fossbites Russia is on the second place, it leads in terms of producing algorithms. These tasks correspond most fully to the technological trends which were determined by Gartner analysts and by other research companies. Tasks connected with algorithms are the most popular: they are chosen by around 40% of participants of Fossbites tests. They involve, among others, carrying out data sorting, dynamic programming, searching by key words etc. To solve these types of tasks, any programming language may be chosen.



Fossbites also ranked countries by other types of tasks, which are divided by programming languages or certain instruments. Russia is in 5<sup>th</sup> place in the Java category, in 4<sup>th</sup> place in Data Structure, 2<sup>nd</sup> in C++, 5<sup>th</sup> in Python, 4<sup>th</sup> in SQL, 4<sup>th</sup> in Artificial Intelligence, and 3<sup>rd</sup> in Functional Programming.

Victories in competitions, mass hiring of Russian developers overseas and the results of testing make it possible to assess the general level of Russian programmers, but not the quality of training in a specific university. This assessment exists in part, if teams from a university take part in competitions, but victories of these teams shows the high level of training at a certain department or laboratory, and not the entire mass of graduates from that university. Usually universities that nurture champions also have quite a high average level, but from the employers' standpoint, there is no guaranteed 100% link between the victories of their best representatives and the effective work of the university as a whole. Additionally, winners and prize winners of prestigious international programming competitions come from 10-20 universities, but hundreds of them need to be assessed.

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To assess the work of universities there exist different ratings (in more detail in subsection 6.5.9. Russian universities in international and Russian ratings). However, as a general rule, they just afford an opportunity of making an intercomparison between the leading universities with certain assumptions. Particularly, the RUSOFT university rating provides information on leading Russian universities as viewed by software companies which assess both the number of graduates of required specialization and the quality of training. The relevant ranking allows to make quite an accurate determination of the Top-10 (though it cannot be ruled out that a university which takes 11<sup>th</sup>-15<sup>th</sup> place is worthy of being included in Top-10). Ranking from the 15<sup>th</sup> to the 30<sup>th</sup> place is less accurate.

The research conducted in the summer of 2017 by Association RUSOFT jointly with the Club of professional development "IT Planet" showed a significant difference between regional universities' positions in the rating compiled by numbers of IT-graduates and their positions in the rating which reflects the employers' assessment of the quantity and the quality of graduates. Such comparison provides an incomplete estimation of efficiency of university activities. First, one rating demonstrates the number of all IT professionals trained in the university, the other rating – the number of well-trained specialists in the perception of software companies. Second, not all universities are included in both ratings (universities from Moscow and St Petersburg are absent).

A faulty judgment may be made in regard to a specific university. It stands to reason, however, that these mistakes can be only a few. The presence of a significant inconformity of places of one and the same university in two ratings all too often indicates that the system of funding and the university performance evaluation of the Ministry of Education and Science does not meet the actual state of things and the requirements of business.

There are many universities with a lot of graduates whom the employers from software industry do not wish to hire. In Table 'Comparison of the total number of university graduates ...' the indicator of non-conformity of places in two ratings in the ideal case shall be within the range of -10 - +10. However, effectively, the difference for the most part is well over.

Altogether both ratings include 47 universities. Ranking in the table of conformity is made only for 23 universities with best performance indicators.

### Comparison of the total number of university graduates trained in IT professions with the estimates of employers reflecting the number of well-trained professionals

	Number of graduates in IT specialties in 2017, people	Place in rating as estimated by employers (RUSOFT rating)	Place in rating by number of graduates (IT specialists)	Indicator of non-conformity of places in two ratings
1 Cherepovets State University	42	52	104	52
2 Tomsk Polytechnic University	167	12	49	37
3 Institute of Engineering Technologies and Natural Sciences NIU Belgorod State University	152	21	53	32
4 Astrakhan State Technical University	108	42	70	28
5 Samara State Technical University	93	52	77	25
6 National Research Tomsk State University	232	13	37	24
7 F.M. Dostoyevsky Omsk State University	120	42	62	20
8 Volga region State Technological University	165	34	50	16
9 Ulyanovsk State University	128	42	58	16
10 Kostroma State University	111	52	68	16
11 M.T. Kalashnikov Izhevsk State Technical University	266	15	30	15
12 Vologda State University	139	42	56	14
13 Vladivostok State University of Economics and Service	112	52	66	14
14 G.I. Nosov Magnitogorsk State Technical University	114	52	65	13
15 V.I. Lenin Ivanovo State Power University	116	52	63	11
16 Chelyabinsk State University	296	18	28	10
17 Novosibirsk State Technical University	440	10	11	1
18 Mari State University	56	98	96	-2
19 Penza State University	377	17	14	-3
20 South Ural State University (National Research University)	438	18	12	-6
21 Omsk State Technical University	328	25	19	-6
22 Southern Federal University	764	11	4	-7
23 Irkutsk State University	184	52	44	-8

International and Russian university ratings to some extent reflect the performance of a whole educational institution compared to other universities and not just the quality of IT graduates training. Intrinsicly, they are not perfect all the same they serve as an assessment of the evolution process. If previously universities were financed without a systematic approach, much depended on how the rector was able to wheedle money out of budget, the system of ratings affords an opportunity of revealing as to which universities have no grounds for additional funding.

Nevertheless, the research conducted by the Club 'IT Planet' allows for stating that the system of objective assessment is required to determine the efficiency of universities in training of IT professionals (particularly, programmers). This system should be primarily based on estimates of Russian employers.

If in overall numbers of IT-professionals Russia is behind (and perhaps not only) of three above mentioned countries, then in the training quality it is among world leaders. It is confirmed not only by appearances of Russians in difference competitions (primarily, all-time victories at the prestigious ACM International Programming Collegiate Contest), but also by testing of ordinary professionals (not those who specially prepare for the competition).

#### **6.5.6. Postgraduate education**

Software companies gain staff not only among universities IT-graduates, but also from the retraining graduates in other specializations, or among engineers from IT and from other industries. Many universities graduates who are not IT specialists can requalify quite quickly, as they have certain basic knowledge.

To solve the problem of the personal deficit in the IT industry, in 2015 the Ministry of Communications and Media together with the Ministry of Labor and Social Welfare and with regions of the Russian Federation initiated the inclusion of IT professions in regional training programs financed by the state for the requalification of freed-up specialists from other industries.

The Human Capital Development Center (group of companies Netrika) and RUSOFT in 2019 began resuscitation of the project of postgraduate education of IT specialists initiated by RUSOFT and the US Chamber of Commerce in St. Petersburg in 2011. The project is implemented on a new platform which will provide a mechanism for regular retraining of software developers and systems administrators as well as empowering with the option for university students and graduates to complete an internship at leading IT companies.

#### **6.5.7. Study at foreign universities**

In 2014, the Russian government launched the program 'Global education', which involves paying students scholarships of up to 1.38 million rubles per person. Subsequently this limit was increased to 2,763,000 (around \$40,000) because of the devaluation of the ruble. This sum may be spent on training Russian students at leading foreign universities in a number of IT professions (in particular 'computer and information sciences', 'information and computing technology' and 'information security'). The scholarship may also be spent on travel to the place of study, on medical insurance, accommodation, food, educational and scientific literature etc.

The government has determined the list of foreign universities and fields of training that come under the program. This list has been expanded in recent years. As of October 2017, it included 288 universities from 32 countries, including American universities: Harvard University, Massachusetts Institute of Technology, the Universities of California in Berkeley and Santa Cruz, Columbia University and others.

Initially this program was planned for 2014-2016, but then was extended until 2025.

The condition for a state scholarship is a decree (not lower than a bachelor's degree) and the obligation to take a job in the acquired profession at a Russian company, university, scientific or medical organization for a period of three years. Breaking the last condition means returning the sum received and paying a fine of double the amount.

By October 2017 40 people had been placed in jobs, who had received additional education abroad under the 'Global education' program, and another 17 people had completed studies and were waiting for suitable vacancies. By August 2019, 336 people were placed in jobs, from which 127 people are 'Trained engineers' (program site). A year earlier they were 117 and 52 respectively.

According to comments by young people who studied abroad, they were able to look at the situation in their own country from the outside and find out how certain problems were solved in other countries. Additionally, this study leads to the growth in the number of personal ties, which then has a positive effect on the international business of Russian companies, including software developers.

Financing of training abroad is also envisaged by the Federal program 'Digital Economy' (see Section 6.5.1.).

### 6.5.8. Involvement of business in the process of training of personnel

Software companies (both Russian and foreign) make great contributions to training highly qualified personal. In many ways, thanks to them the share of graduates who immediately or after brief additional training find work in their acquired profession of software developer is around 50%. Without business and without the self-training of young people this percentage would be close to zero.

As teaching work is still not well-paid and prestigious, universities still have teachers who do not know the industry that they train specialists for. This problem is partially solved by trainers from business (including even owners) going to universities themselves and delivering lectures to students, or giving practical studies and also preparing themes for internship and degree works. This is how students find out about the industry.

Many major and even medium-sized companies have their own training centers, where they train professionals for their own companies and for the entire industry. The largest companies established chairs or laboratories in leading universities where they purposefully prepare employees for themselves. Some representatives of the industry believe that personnel for the IT industry can be trained at private universities, which should be founded by big business.

However, at present commercial companies carry out the function of the state for training personnel at their own expense. At the same time, officials from the Ministry of Education and Science force private educational centers to undergo licensing and try to control their work. Software companies do not expect anything from this control but extra expenses and bureaucratic pressure.

In the summer of 2017, the Institute for the Development of the Internet and RUSOFT sent the Ministry of Communications and Media proposals to train personnel for the digital economy. These proposals involve introducing tax preferences for IT companies which work in education or in retraining specialists in IT. For example, when they organize joint departments with universities, a reduction in VAT rates by 6-7% was also proposed. But these proposals have yet to be accepted.

If we judge by the results of the RUSOFT survey, in 2014 the activity of software companies in universities dropped compared to the previous year. But in 2015 it began to restore itself again – 60% of surveyed companies worked with universities. This is the highest figure since 2008. In 2016 it increased further up to 70% but in all appearances the rise was caused by random factors, because in 2017 the share of companies cooperating with universities again reduced — down to 61%. In 2018, an evident and considerable expansion of interaction between companies and universities occurred. 73% of respondent companies had one or another form of cooperation. Therefore, a lot of small companies also took on cooperation.

In the 2019 survey for the first time respondents were asked to indicate, whether they had their own training center. It was found that such center was in possession of 16% of companies surveyed.

### Main forms of cooperation of companies with universities in 2008-2018

	2008	2014	2017	2018
Internship for students	42%	38%	50%	54%
Job placement for graduates	34%	24%	36%	48%
Courses for employees	24%	12%	28%	24%
Presence of own study center	N/A	N/A	N/A	16%
Others	1%	37%	14%	16%
No cooperation	42%	53%	39%	27%

### Main forms of cooperation of companies with universities depending on company turnover in 2018

	above \$100 million	from \$20 million to \$100 million	from \$5 million to \$20 million	from \$1 million to \$5 million	below \$1 million
Internship for students	100%	90%	58%	69%	28%
Job placement for graduates	100%	70%	54%	57%	28%
Courses for employees	100%	60%	42%	25%	7%
Presence of own study center	0%	30%	27%	20%	5%
Others	0%	20%	31%	20%	5%
No cooperation (previous year)	0% (0%)	0% (25%)	19% (5%)	15% (38%)	49% (56%)

Among large and medium software and IT companies (both Russian and foreign working on the Russian market) there are very few which do not cooperate with universities and this has been the case for a long time.

Other forms of cooperation (beside internship, job placement and courses for employees) mentioned by respondents over the last five years were the following:

- creation of a basic department and laboratories;
- summer internship;
- graduation practice;
- themed conferences, science festivals, career days, popularization of IT industry;
- free software (or at preferential prices);
- free training center for students;
- mentoring programs;
- stands for universities;
- preparation of educational programs;
- training courses for local university students;
- joint educational projects;
- provision of study materials;
- support of university and regional vocational-oriented projects;
- career days and vacancy fairs;
- competitions of degree works;
- programming competitions, organization of Academic Olympics;



- student projects under guidance of company employees;
- free training center for students;
- advanced training programs;
- participation in qualifications commission;
- lectureship, research work;
- joint research and development efforts;
- student center for software development;
- provision of corporate scholarships;
- sponsorship of Academic Olympics at universities, meetings, seminars;
- participation of company employees in boards of examinations;
- preparation of customers' employees;
- post-graduate IT education on the basis of job training (internship)

### 6.5.9. Russian universities in international and Russian ratings

As a rule, Russian universities are placed far outside the first hundred of the international rating lists of universities, although in some fields they can be considered to be among the world's best. One of the main reasons is the small volume of R&D carried out by higher education institutions by orders of businesses. Historically, Russian universities have never focused on this kind of research, which was dealt with by other organizations (sector research institutes and institutions at the Russian Academy of Sciences). In addition, it is of great importance to the position of higher education institutions on the rating list that they have not yet learned how to work with rating agencies, which do not have enough information on higher education in Russia.

However, in recent years universities have changed their attitude towards R&D, and the government has encouraged the emergence of universities with the status of "national research universities".

To implement measures to be included in the Top 100 world ratings, under the Federal program '5-100' it was proposed to allocate about 60 billion rubles. As a result of the first tender, a part of this money was allocated to 15 Russian universities. In 2013, each of them received about 600 million rubles (\$20 million) for those purposes. In October 2015, another tender was held, as a result of which the number of higher educational institutions competing for the status of the "national research universities" increased to 21.

The goal of the '5-100' Program is not to break Russian universities into the Top 100 on any international list by any means possible. The main thing is to improve the quality of university work by maximizing the competitive position of the group of leading Russian universities in the global market of educational services and research programs. It is quite possible that the quality can improve without any upward movement on the rating lists.

As regards some parameters, it is incorrect to compare Russian educational institutions and foreign universities at all. For example, the USA, Great Britain and other English-speaking countries have had an initial advantage that the lecturing is in English, which is actually an international language. Therefore, universities of these countries can attract foreign students more easily, who under all other equal conditions will still desire to learn English rather than Russian (the number of foreign student numbers significantly influence a university's position on the most renowned international rating lists). Some Russian universities launch their educational programs in English, though the main language must be the national and native one for the majority of citizens.

It is also difficult to attract foreign students because of the negative way that Russia is portrayed in the western mass media. Even the climate could be an important factor — many young people would prefer to live in warm California than in the severe conditions of Siberia.

So there is no reason to bewail the fact that the best Russian universities are outside the Top 100 of the international rating lists. The main thing is that progress can be seen in the quality of university work. This progress is partly reflected in the upward movement on international rating lists, and this has been observed in recent years.



Since 2013, Russia's presence in QS World University Rankings has been steadily growing and positions of those included in the top 100, 500, 800 or 1000, as a rule, improved.

As regards new versions published in 2019, now it is not as if the vast majority of Russian universities in all ratings went upward. In some ratings the best universities of Russia raised and the representatives of the next level — went down (as a rule, not by much). There are always cases when some universities were excluded from the number of the best, at the same time, more newcomers appeared. In this context it is necessary to study each case separately. Some of them could cease to exist due to amalgamation with the other university.

Generally, Russian universities improved in 2019 their positions in world ratings in comparison with the past year. For example, in one of the best known ratings — QS World University Rankings, the representation of Russia in Top-1000 increased from 24 to 25. 20 universities raised higher, 4 — kept up and only one fell by 5 positions.

### Russian universities in QS World University Rankings in 2014-2019

2019	2018	2017	2015	2014		
90 (↑)	95 (↑)	108 (=)	108	114	Lomonosov Moscow State University	1
235 (↑)	240 (↑)	258 (↓)	256	233	Saint-Petersburg State University	2
244 (↑)	250 (↑)	291 (↑)	317	328	Novosibirsk State University	3
277 (↑)	323 (↑)	377 (↑)	481-490	491-500	Tomsk State University	4
299 (↓)	291 (↑)	306 (↑)	338	322	Bauman Moscow State Technical University	5
312 (↑)	355 (↓)	350 (↑)	431-440	411-420	Moscow Institute of Physics and Technology State University	6
329 (↑)	373 (↑)	401-410 (↑)	501-550	481-490	National Research Nuclear University MEPhI (Moscow Engineering Physics Institute)	7
343 (↑)	382 (↑)	411-420 (↑)	501-550	501-550	National Research University Higher School of Economics (HSE, Moscow)	8
355 (↑)	373 (↓)	350 (↑)	397	399	Moscow State Institute of International Relations (MGIMO University)	9
373 (↑)	386 (↑)	400 (↑)	481-490	501-550	National Research Tomsk Polytechnic University	10
404=	401-410 (↑)	411-420 (↑)	471-480	481-490	Peter the Great Saint-Petersburg Polytechnic University	11
412 (↑)	491-500 (↑)	601-650 (=)	601-650	551-600	Ural Federal University named after Boris Yeltsin	12
439 (↑)	441-450 (↑)	501-550 (↑)	551-600	551-600	Kazan (Volga region) Federal University	13
446 (↑)	501-550 (↑)	601-650 (=)	601-650	471-480	Peoples' Friendship University of Russia (RUDN University)	14
476 (↑)	501-550 (↑)	601-650 (↑)	701	701+	The National University of Science and Technology «MISIS»	15
501-510 (↑)	551-600 (=)	551-600 (↑)	601-650	601-650	National Research Saratov State University	16
511-520 (↑)	601-650 (↑)	-	-	-	ITMO University	17
531-540 (↑)	551-600 (=)	551-600 (↑)	601-650	601-650	Southern Federal University	18
541-550 (↑)	601-650 (↓)	551-600 (↑)	651-700	701	Far Eastern Federal University	19
601-650 (↑)	701-750 (=)	701+(=)	701	701+	Lobachevsky State University of Nizhni Novgorod	20
701-750 (↑)	801-1000 (↑)	-	-	-	Samara National Research University (Samara University)	21

2019	2018	2017	2015	2014				
801-1000=	801-1000 (↓)	701+(=)	701	701+	Plekhanov	Russian	University of Economics	22
801-1000=	801-1000 (↓)	701+(=)	701	701+	Voronezh State University			23
801-1000=	801-1000 (↓)	701+ (↑)	-	-	Novosibirsk State Technical University			24
801-1000 (↑)	-	-	-	-	South Ural State University			25

Note: ↑ - rating up, ↓ - rating down, = - no change

Source: QS World University Rankings

For some time now the ranking of Russian universities differs greatly in another international rating — Round University Ranking (RUR). It coincides with with QS World University Rankings only in the fact that the first place among Russian universities is taken by MGU (Moscow State University.)

In 2017, the representation of universities in Round University Ranking (RUR) increased sharply — from 23 to 68. The total number of educational institutions included in the rating increased from 700 to 763 primarily because they improved their positions. Not accounting for rating expansion, Top 700 includes 43 Russian universities instead of 23 a year earlier.

In 2018, the representation of Russian universities in RUR increased to 70, primarily, due to expansion of the number of ranked universities — from 763 to 783.

The strongest positions were demonstrated by Russian universities in the area of teaching. In Section ‘RUR Teaching’ three universities join the ranks of Top-100: Lomonosov MGU (48<sup>th</sup> place), Peoples' Friendship University of Russia (65<sup>th</sup> place) and Tomsk State University (79<sup>th</sup> place).

In 2019 version, Russia’s presence increased by 5 universities — up to 75. Only one joined the ranks due to expansion of the list. There were 9 newcomers, 4 Russian universities due to some reasons dropped out from RUR (they are Southern Federal University, Siberian State Aerospace University, Saint Petersburg Mining University, Russian State Academy of Justice).

If all Russian universities in Round University Ranking are roughly divided into two halves then the best of them (35-40) typically improved their positions, and others lost positions more often. In other words, Round University Ranking compilers got a sight of some stratification. Perhaps, not without reason. QS World University Rankings compilers could miss it because they included among the best only 25 Russian universities.

### Russian universities in Round University Ranking (RUR)

Positions of Russian universities	Name	Place in RUR 2018	Place in RUR 2019
1	Lomonosov Moscow State University	153	115 (↑)
2	National Research Nuclear University MEPhI (Moscow Engineering Physics Institute)	224	157 (↑)
3	Tomsk State University	240	178 (↑)
4	Moscow Institute of Physics and Technology	256	216 (↑)
5	Novosibirsk State University	329	314 (↑)
6	Saint Petersburg State University	385	323 (↑)

Positions of Russian universities	Name	Place in RUR 2018	Place in RUR 2019
7	Tomsk Polytechnic University	481	412 (↑)
8	RUDN University	439	418 (↑)
9	ITMO University	495	445 (↑)
10	National University of Science and Technology MISiS (Moscow Institute of Steel and Alloys)	513	491 (↑)
11	Lobachevsky University	504	493 (↑)
12	Peter the Great St. Petersburg Polytechnic University	518	500 (↑)
13	Moscow Aviation Institute	515	522 (↓)
14	Bauman Moscow State Technical University	558	558=
15	Ammosov North-Eastern Federal University	-	575 (↑)
16	Pirogov Russian National Research Medical University	597	588
17	Kazan Federal University	626	602 (↑)
18	D. Mendeleev University of Chemical Technology of Russia	683	623 (↑)
19	Sechenov University	-	625 (↑)
20	Kursk State Medical University	591	628 (↓)
21	Innopolis University	615	642 (↓)
22	Ural Federal University	691	647 (↑)
23	Orel State University	688	651 (↑)
24	Saratov State University	630	661 (↓)
25	Ryazan State Medical University	681	657 (↑)
26	Gubkin Russian State University of Oil and Gas	478	670 (↓)
27	Bashkirian State Medical University	728	672 (↑)
28	The New Economic School	537	675 (↓)
29	Saint-Petersburg State Electrotechnical University ``LETT``	694	676 (↑)
30	Tver State University	-	682 (↑)
31	National Research University of Electronic Technology (MIET)	696	686 (↑)
32	Samara State Aerospace University	-	694 (↑)
33	Belgorod National Research University	722	696 (↑)
34	Altai State University	698	697 (↑)
35	Far Eastern Federal University	721	698 (↑)
36	Ufa State Aviation Technical University	680	700 (↓)
37	Siberian Federal University	741	701 (↑)
38	RANEPA, The Russian Presidential Academy of National Economy and Public Administration	669	709 (↓)
39	Novosibirsk State Technical University	718	712 (↑)
40	Mechnikov St Petersburg State Medical Academy	-	719 (↑)
41	Voronezh State University	628	720 (↓)
42	Mordovia State University	672	729 (↓)
43	Bashkir State University	-	635 (↑)
44	Tver State Technical University	673	752 (↓)
46	Immanuel Kant Baltic Federal University	707	721 (↓)
47	Kazan National Research Technical University named after A.N. Tupolev	758	722 (↑)

Positions of Russian universities	Name	Place in RUR 2018	Place in RUR 2019
48	Kazan National Research Technological University	725	725=
49	Omsk State Technical University	743	735 (↑)
50	Moscow Pedagogical State University	738	745 (↓)
51	Perm National Research Polytechnic University	753	746 (↑)
52	Tyumen State University	737	750 (↓)
53	Russian State University for the Humanities	710	751 (↓)
54	Russian New University	745	754 (↓)
55	Moscow Power Engineering Institute (National Research University)	761	759 (↑)
56	Samara University	664	760 (↓)
57	Southwest State University	759	762 (↓)
58	Northern (Arctic) Federal University (NArFU)	774	763
59	Belgorod State Technological University	-	765 (↑)
60	Tomsk State University of Control Systems and Radioelectronics (TUSUR University)	756	766 (↓)
61	Kozma Minin Nizhny Novgorod State Pedagogical University	781	768 (↑)
62	Volgograd State University	766	770 (↓)
63	Irkutsk State University	684	772 (↓)
64	Reshetnev Siberian State University of Science and Technology	-	778 (↑)
65	Perm State University	764	780 (↓)
66	Voronezh State Technical University	765	782 (↓)
67	Saint-Petersburg state University of Architecture and Construction	-	784 (↑)
68	Plekhanov Russian University of Economics	751	788 (↓)
69	Moscow State University of Design and Technology (MSUDT)	780	789 (↓)
70	Magnitogorsk State Technical University	752	790 (↓)
71	South Ural State University	747	791 (↓)
72	Don State Technical University	726	792 (↓)
73	Ulyanovsk State University	776	796 (↓)
74	Ufa State Petroleum Technological University (USPTU)	770	797 (↓)
75	Novosibirsk State University of Economics and Management	769	801+ (↓)

The Times Higher Education World Reputation Rankings — 2019 are compiled on the basis of an expert survey by representatives of the international academic community. The opinions of over 10,000 scholars from over 100 countries are taken into account in its preparation. In 2019 it included only Moscow State University (MGU) which moved from the 3<sup>rd</sup> to the 38<sup>th</sup>. A year earlier it kept company with Moscow Institute of Physics and Technology (MFTI) — 91<sup>th</sup>-100<sup>th</sup> places. In 2017, among the 100 best universities the same as in 2019 was only MGU. In recent years this rating included from 1 to 3 Russian universities. Besides MGU and MFTI it also included SPbGU (St. Petersburg State University).

In the rankings of the Times Higher Education BRICS & Emerging Economies 2019 positions went down of 37% of Russian universities, and remained unchanged of 20%. However, Russia's presence increased from 28 to 35.

## Russian universities in Times Higher Education BRICS &amp; Emerging Economies (2018-2019)

Positions of Russian universities	Place in THE rating - 2018	2019	University
1	3	5 (↓)	Lomonosov Moscow State University
2	11	12 (↓)	Moscow Institute of Physics and Technology
3	19	16 (↑)	National Research Nuclear University MEPhI
4	32	22 (↑)	Higher School of Economics
5	36	49	Tomsk State University
6	21	51 (↓)	Tomsk Polytechnic University
7	57	53 (↑)	ITMO University
8	43	62 (↓)	Novosibirsk State University
9	44	68 (↓)	Saint Petersburg State University
10	105	87 (↑)	Peter the Great St Petersburg Polytechnic University
11	60	99 (↓)	Kazan Federal University
12	99	104 (↓)	National University of Science and Technology (MISiS)
13	251–300	117 (↑)	RUDN University
14	153	177 (↓)	Bauman Moscow State Technical University
15	-	189 (↑)	Samara University
16	201–250	251–300 (↓)	Novosibirsk State Technical University
17	251–300	251–300 (=)	Lobachevsky State University of Nizhni Novgorod Russian Federation
18	251–300	251–300 (=)	National Research Saratov State University Russian Federation
19	-	201–250 (↑)	Belgorod State National Research University
20	-	251–300 (↑)	Moscow Power Engineering Institute
21	-	251–300 (↑)	St Petersburg Electrotechnical University (LETI)
22	251–300	251–300 (=)	Ural Federal University
23	301–350	301–350 (=)	Far Eastern Federal University
24	251–300	301–350 (↓)	Southern Federal University
25	-	301–350 (↑)	Moscow Aviation Institute
26	301–350	351+ (↓)	National Research University of Electronic Technology (MIET)
27	301–350	351+ (↓)	Sechenov University
28	301–350	351+ (↓)	Siberian Federal University
29	351+	351+ (=)	Perm State University
30	351+	351+ (=)	Volgograd State Technical University
31	351+	351+ (=)	Voronezh State University
32	-	351+ (↑)	Kazan National Research Technological University
33	-	351+ (↑)	MIREA — Russian Technological University
34	-	351+ (↑)	Perm National Research Polytechnic University
35	-	351+ (↑)	Pirogov Russian National Research Medical University

THE in 2017-2019 also compiles a rating in level of teaching Computer science (a parameter in many respects reflecting the level of training of professionals for software industry). From the very beginning in this rating among top-100 there were MGU and ITMO University, and MIFI was in 2018 (in 2019 it went slightly down to 101<sup>st</sup>-125<sup>th</sup> place).



### Russian universities in World University Rankings 2019 by subject: computer science

71	ITMO University
78	Lomonosov Moscow State University
101–125	Moscow Institute of Physics and Technology
201–250	National Research Nuclear University MEPhI
201–250	Saint Petersburg State University
301–400	Higher School of Economics
301–400	Peter the Great St Petersburg Polytechnic University
401–500	Bauman Moscow State Technical University
401–500	Novosibirsk State University
401–500	Novosibirsk State Technical University
401–500	Tomsk Polytechnic University
501–600	Samara University
501–600	St Petersburg Electrotechnical University (LETI)
501–600	Tomsk State University
501–600	Ural Federal University
601+	Southern Federal University

HackerRank (that has an eponymous online trial assignment platform) wondered what universities of the world train the coders best of all. The best ones are identified by presence of programming skills in the process of tackling problems. As a result of testing of 5.5 thousand students from 126 universities from around the world University Rankings Competition was drawn up with the following triumvirate: 1. ITMO University (Russia), 2. Sun Yat-sen Memorial Middle School (China), 3. Ho Chi Minh City University of Science (Vietnam). The best American university (University of California, Berkeley) took only the 4th place. Top-50 of the rating contains only one more Russian university: Spb State University achieved a high 6th place. India has a biggest presentation of universities — 22 out of 50.

Top-500 of the international rating of universities in graduate employability compiled by British organization QS Quacquarelli Symonds comprises 11 Russian universities. The best of them is MGU (101<sup>st</sup>-110<sup>th</sup>). It is followed by SPbGU (161<sup>st</sup>-170<sup>th</sup> place) and MGIMO (201<sup>st</sup>-250<sup>th</sup>). The fourth among Russians is Higher School of Economics (251<sup>st</sup>-300<sup>th</sup> place). Top-500 also includes MGT, MFTI, MIFI and MISiS, and the best regional university turns to be Novosibirsk State Technical University followed by Novosibirsk State University. The last Russian university in the rating is Russian G.V. Plekhanov Economic University.

#### Russian alternative to foreign world ratings

Russian Association of Rating Compilers presented in the end of 2017 the results of a pilot ranking of 200 universities codenamed Moscow International Rating. It consists of 13 Russian universities together with major universities from 39 countries. First places traditionally were won by such American universities as Harvard University, Massachusetts Institute of Technology, Stanford University, Yale University.

MGU took the 25<sup>th</sup> place, St. Petersburg State University—72<sup>nd</sup>, and MFTI —73<sup>rd</sup>. The second hundred included 10 other Russian universities.

The reason for preparation of the national rating is that the assessment of universities in the international ratings THE or QS is heavy-handed: the position is determined by votes of experts and by the total citation number of research papers published by the university staff. In both British ratings — THE and QS — the leaders are the US and UK universities because only papers in English are accounted for and among experts predominate English language speakers. Russian universities in these international ratings present a low profile.



In 2019, the renewed Moscow International Rating obtained an additional name — ‘The three university missions’. It became more representative — for the first time the published list includes over 1000 universities corresponding to the current standard of leading world rating agencies.

The 2019 rating consists of 1200 universities from 79 countries. Another novelty is the international expert review with participation of 16 reputable foreign experts to whom were sent preliminary ranking results. In the preparatory process there was collected objective information about more than 1700 universities of the world.

The 2019 rating showed that most of best world universities are located in European countries — 414 universities or almost 35% of the published list. The second macro-region in representation is Asia with 29% of ranked universities. North America in this parameter is only the third — 20%. Russia accounts for 6% of best world universities. As for specific countries the Top-5 is as follows: the USA (212 universities), China (111), UK (94), Russia (74) and Japan (65).

In Top-20 dominate the US universities, three first lines took Harvard University, Massachusetts Institute of Technology and University of Pennsylvania. High positions of American universities in the rating are mainly contingent on heavy financing and on a high total citation index. Thus an average budget per student in American universities from Top-100 of the rating exceeds by a factor of 1.6 the indicator of Japanese universities and by a factor of 2.3 – the UK universities. A similar statistics is in volumes of research papers: the US universities attract for R&D by the factor of 1.5 more funds than Japanese universities, and separation from British and German universities is even greater — Americans are superior to competitors from these countries by a factor of 2.0 and 4.5 respectively.

The best British universities (Cambridge and Oxford) in 2019 took 5<sup>th</sup> and 6<sup>th</sup> place in the rating respectively. In the Continent the best position is of Swiss Federal Institute of Technology Zurich. Among Asian universities the best positions are of Tokyo University (15<sup>th</sup> place) and Beijing University (16<sup>th</sup> place).

The Three University Missions rating in 2019 included 74 Russian universities. Leaders of Russian higher education institutions become a fixture in Top-100: MGU (22<sup>nd</sup> place), SPbGU (41<sup>st</sup> place) and MFTI (51<sup>st</sup> place). At one stroke six national higher education institutions were included in TOP-100 of the subrating in criteria ‘Education’: MGU, SPbGU, MFTI, NIYU MIFI, NIU VSE and NGU (Novosibirsk). Russian universities do not so well with scientific mission — in top-100 there are no universities from Russia, and the highest position is of MGU and MFTI which got in the subrating ‘Science’ 108<sup>th</sup> and 154<sup>th</sup> place respectively.

### **Russian university ratings**

Besides international rankings, there are also various Russian rankings of higher education that reflect certain strong points of the country’s universities. For example, Superjob presented rankings of Russian technical universities based on salaries of graduates employed in the IT industry. MGU, which in international rankings is considered the best university in the country, is only at the 5<sup>th</sup> place.

The ranking was made by the Superjob Research Center based on a comparison of the average income levels of the Russian university graduates in 2010—2015. The salaries of the university graduates residing outside Moscow were adjusted by regional index to the level of the Moscow labor market. The regional index is the ratio between the average salary level in a particular city and the average salary level in Moscow.

### Superjob ranking of Russian technical universities in 2016 based on salaries of graduates employed in the IT industry, thousands of rubles

	Average salary in 2016	Average salary in 2017	Average salary in 2018	Average salary in 2019
Moscow Institute of Physics and Technology (State University)	130	136	150	160
National Research Nuclear University 'MIFI'	100	110	120	125
Moscow Bauman State Technical University	96	110	130	140
St. Petersburg National Research University of Information Technologies, Mechanics and Optics	87	98	120	128
Lomonosov Moscow State University	85	95	105	130
Novosibirsk National Research State University	85	90	100	112
National Research University – Moscow Energy Institute	78	87	95	100
St. Petersburg State University of Aerospace Instrumentation Engineering	80	85	90	92
Perm State National Research University	85	83	87	95
National Research University – Moscow Institute of Electronic Engineering	80	83	93	95
National Research Technology University 'MISiS'	75	83	90	100
Moscow Aviation Institute (National Research University)	73	83	90	95
N.I. Lobachevsky Nizhny Novgorod State University (National Research University)	75	82	87	97
Ural Federal University named after the First Russian President B.N. Yeltsin	75	82	91	97
Kazan (Volga Region) Federal University	70	81	91	100
D.F. Ustinov Baltic State Technical University 'Voenmekh'	75	80	81	85
Ufa State Technical Aviation University	73	80	85	90
St. Petersburg State University	75	79	89	100
Omsk State Technical University	70	79	80	84
Moscow Institute of Electronics and Mathematics – National Research University Higher School of Economics	75	78	93	-
Novosibirsk State Technical University	75	78	87	98
Yu.A. Gagarin Saratov State Technical University	73	78	81	86
Siberian Federal University (Krasnoyarsk)	61	77	83	86
Moscow State Transport University (former MIIT)	72	76	80	85
Far Eastern Federal University	72	76	79	85
R.E. Alexeyev Nizhny Novgorod State Technical University	70	76	80	85
Tomsk National State Research University	74	75	75	82
D.I. Mendeleev University of Chemistry and Technology	72	75	75	80
Russian University of Technology (MIREA), Moscow	-	75	78	80
Peter The Great St. Petersburg Polytechnic University	71	75	85	97
Tula State University	67	74	74	-
Astrakhan State Technical University	66	74	74	80
South Ural National State Research University	72	73	-	77

	Average salary in 2016	Average salary in 2017	Average salary in 2018	Average salary in 2019
Ulyanovsk State Technical University	72	73	-	-
V.I. Lenin Ivanovo State Energy University	70	73	-	80
Izhevsk State Technical University	66	73	-	-
Ulyanovsk State University	66	73	-	-
M.I. Platov South Russian State Polytechnic University (NPI)	72	72	75	-
F.M. Dostoyevsky Omsk State University	71	72	-	80
Tyumen State University	71	72	-	78
Orenburg State University	68	72	76	80
Volgograd State Technical University	67	72	75	80
Far Eastern State University of Railroads	67	72	-	-
Irkutsk State University	71	71	-	80
Irkutsk National Technical Research University	71	71	-	78
Penza State University	68	71	-	77
Altai State Technical University	68	71	75	82
Ryazan State Radio Technical University	65	71	-	78
S.P. Korolev Samara National Research University	-	-	80	80
National Research University Higher School of Economics	-	-	93	110
National Research Tomsk Polytechnic University	-	-	-	95
Finance University at the RF Government	-	-	-	80
Russian G.V. Plekhanov Economic University	-	-	-	78

Some employers in software industry with knowledge of the matter are interested not only in what university a successor candidate has graduated from, but at what faculty or department he has been trained. An attainment level may vary wildly depending on faculties in one and the same university. In this context, the portal hh.ru compiled ratings of Moscow universities in eight professional spheres including ‘Information technologies’.

#### hh.ru rating of faculties of Moscow universities in specialty ‘IT’

Place	University	Faculty	Overall score
1	NIU HSE (Higher School of Economics)	Higher school of business informatics	8,70
2	Moscow Aviation Institute	Control systems, informatics and power sector	8,60
3	Moscow Bauman State Technical University	Informatics and control systems	8,31
4	Lomonosov Moscow State University	Computational mathematics and cybernetics	8,18
5	Moscow University of Technology (MIREA)	IT institute	7,91
6	I.M. Gubkin Russian State Oil and Gas University	Automatics and computer engineering	7,68
7	MEI (Moscow Energy Institute)	Institute of automatics and computer engineering	7,15
8	MTUSI (Moscow Technical University of Communications and Informatics)	Information technologies	7,08

Place	University	Faculty	Overall score
9	National Research Nuclear University 'MIFI'	Institute of intellectual cybernetic systems	6,84
10	Moscow Bauman State Technical University	Robotics and overall automation	6,67
11	State Management University	Institute of information systems	5,58
12	Kosygin Russian State University	Institute of mechatronics and information technologies	5,13
13	RGSU (Russian State Social University)	Information technologies	5,10
14	MIIT (Russian Transport University)	Institute of management and information technologies	4,22
15	NIU MGSU (Moscow State Civil Engineering University)	Institute of economics, management and information systems in construction and real estate	3,51
16	MFYA (Moscow Finance and Law University)	Information technologies	3,38

Since 2009, on an annual basis 'Monitoring of quality of admission to the RF universities' is conducted which allows ranking of universities by the passing grade. In 2018, in 41 universities the passing grade exceeded 80, that is by 8 more than a year before.

#### TOP-20 of universities in quality of state-financed education in 2018

	name	passing grade
1	Moscow Institute of Physics and Technology (MFTI)	96.4
2	Moscow State Institute of international Relations (MGIMO)	95.3
3	National Research University 'Higher School of Economics', (Moscow)	94.6
4	St. Petersburg State University	91.8
5	National Research University 'Higher School of Economics' (NIU HSE, St. Petersburg)	90.5
6	National Research University MIFI	90.3
7	ITMO University	90.2
8	Russian Presidential Academy of National Economy and Public Administration	89.7
9	Lomonosov Moscow State University	89.3
10	Russian G.V. Plekhanov Economic University	88.2
11	Moscow State Linguistic University	86.8
12	Novosibirsk National State Research University	86.4
13	Finance University at the RF Government	86.2
14	O.E. Kutafin Moscow State Law University	86
15	National Research University 'Higher School of Economics', Nizhniy Novgorod branch	84.7

	name	passing grade
16	N.I. Pirogov Russian National Research Medical University	84
17	I.M. Sechenov First State Moscow Medical University	83.8
18	Russian State University for Humanities	83.2
19	National Research University (MISiS)	82.8
20	I.P. Pavlov First St. Petersburg State University	82.4

RUSSOFT, as an association of software developers, makes its own rankings of universities based on a survey of CEOs of Russian software companies. It takes into account the number of mentions of universities as suppliers of employees for companies over the last 4-5 years. The respondents indicate the universities whose graduates they believe are in greatest demand.

The list has existed for several years. It is updated every year to take the most recent survey data into account, but over the course of a year it cannot show major changes, as data for several years is summed up.

As the RUSSOFT survey annually covered over 150 companies (in 2018 — 161, and in 2019 — 175), and every year the composition of participants changed by 70-80%, the summary ranking over 4-5 years reflects the opinion of over 400 employers of the Russian software industry.

#### Rankings of universities according to the assessment of employers (software companies) in 2016-2019

1	Bauman Moscow State Technical University	76
2	St. Petersburg National Research University of IT, Mechanics and Optics	75
3	Moscow State University	66
4	St. Petersburg State University	65
5	St. Petersburg State Polytechnic University	63
6	Moscow Institute of Physics and Technology	43
7	Novosibirsk State University	41
8	Tomsk State University of control systems and radio electronics	40
9-10	St. Petersburg State Electrical Engineering University	38
9-10	Tomsk Polytechnic University	38
11	Novosibirsk State Technical University	37
12	Tomsk State University	34
13	Moscow National Research Nuclear University	33
14	Southern Federal University	26
15	St. Petersburg State University of Aerospace Instrumentation Engineering	20
16	Penza State University	16
17	Higher School of Economics	14
18-20	Don State Technical University	11
18-20	Bonch-Bruевич St. Petersburg State University of Telecommunications	11
18-20	A.N. Tupolev Kazan National Research University (KAI)	11
21-22	Nizhniy Novgorod State Technical University (NGTU)	10
21-22	South Ural State University	10
23-25	Izhevsk State Technical University	8
23-25	Kazan (Volga Region) Federal University	8
23-25	Chelyabinsk State University	8
26-29	Voronezh State University	7
26-29	N.I. Lobachevsky Nizhny Novgorod State University (NNGU),	7
26-29	Moscow Technological University (MIREA, MGUPI, MITHT)	7



26-29	I.S. Turgenev Oryol State University	7
30-31	F.M. Dostoyevsky Omsk State University (OmGU)	6
30-31	Siberian State University of Telecommunications and Informatics	6
32-34	Samara State Aerospace University	5
32-34	Moscow Aviation Institute	5
32-34	Perm State national Research University	5
35-43	Belgorod State University	4
35-43	Ulyanovsk State Technical University	4
35-43	V.G. Shukhov Belgorod State Technological University	4
35-43	Ryazan State Radiotechnical University	4
35-43	I.I. Polzunov Altai State Technical University	4
35-43	Ulyanovsk State University	4
35-43	N.G. Chernyshevsky Saratov State University	4
35-43	Y.A. Gagarin Saratov State Technical University	4
35-43	Volga Region State Technological University (Yoshkar-Ola)	4

Source: Annual survey by RUSOFT

Altogether, in the recent years respondents mentioned 134 universities. Besides, there were mentioned 2 educational institutions of the vocational secondary education system (technical secondary schools, colleges).

In the last version (results of 2016-2019 surveys) there were defined Top-43 (the universities which over 4 years had 4 mentions at least).

Votes of respondents given for universities reflect not only the quality of training but also the number of graduates. For this reason some universities with a very high training level but a small number of graduates take positions far behind leaders or at all are out of Top-43. For example, St. Petersburg National Research Academic University RAS is among three best universities of the city with highest USE grades of school leavers. It is training professionals who can and do work in software industry but very small in number. That is why it has been mentioned only twice over two years in the RUSOFT rating.

The RUSOFT university rating (the same as other ratings) allows for concluding about performance of a specific university on certain assumptions. In the first instants, it is essential to account for activity of polling in specific cities. For example, we did not have a chance yet by the annual survey to cover a big number of companies in Yekaterinburg and Nizhniy Novgorod. In view of this, there must be more universities of these cities in our rating. In Voronezh there are a lot of R&D centers of foreign companies but they seldom or never have participated in surveys. For this reason Voronezh universities also are underestimated.

Nonetheless, there can be shifts in the rating by 10-15 positions but only among those out of Top-15, which positions in the RUSOFT university rating are fully reflective of quality and quantity of trained professionals. At the same time, positions of top-15 can be corrected by 1-2 at the very outside.

Among all national universities two leaders are noticeable: University ITMO and Bauman Moscow State Technical University. In the recent years they have been taking turns in winning the first place. At the same time a difference between them is tiny. For this reason on the basis of survey there is no point in discoursing upon which one is better.

Three universities are following them with almost identical indicators: MGU, SPbGU and St. Petersburg State Polytechnic University. Therefore, Top-5 comprises three St. Petersburg and two Moscow universities. Further is a group of 8 universities with relatively similar ratings. Among them there is one university from St. Petersburg, two from Moscow, Novosibirsk and three from Tomsk.

In 2018, for the first time in the RUSOFT rating existence, it includes a representative of the vocational secondary education system – the Rostov-on-Don Communications and Informatics College. Though it received just one vote yet but judging by active work and available accomplishments it justly has found its way to the university rating.



In 2019, one more college was mentioned — N.E. Zhukovsky Omsk Aviation College. Similar references hardly attest the beginning of changes in the vocational secondary education system. More than likely these are only individual cases, nonetheless it is important that they exist and thus there is a positive experience that can be adopted.

### 6.5.10. Participation of Russians in international programming competitions

It is difficult to compare Russian and foreign universities, as historically they have had different goals. Nevertheless, higher education institutions in Russia take the highest positions in some specific rankings. For example, the St. Petersburg National Research University of Information Technologies, Mechanics and Optics (SPNRU ITMO) is the best in the world by results in the ACM International Collegiate Programming Contest throughout the entire period that the contest has existed.

SPNRU ITMO is a seven-time world champion. No other team has won so many times over the entire 40-year history of this competition (Russian companies have only been taking part in it since 1995).

Several other Russian universities are in the top 20 in the organizers' ratings of this contest. Teams from St. Petersburg State University have been world champion four times, teams from Moscow State University – twice and a team from Saratov State University won this title once.

Some more Russian universities also regularly take high places in this main contest of programmers. Over the last 8 years, there have usually been at least 3-4 Russian teams among the 12 prize-winners of the contest. A total of 14 Russian universities have been prizewinners of the ACM ICPC world championship.

In the ACM-ICPC 2018 final took part 140 teams which won in regional semifinals.

Among 31 best teams (a very high level) were 10 Russian universities. Apart from 4 Russian prizewinners given in Table below they are St. Petersburg State University, Higher School of Economics, Moscow Aviation Institute, Novosibirsk State University, Perm State University and Saratov State University.

In 2019, a Russian university again was a winner and again it was MGU. Among prizewinners there are two more universities from Russia — VSE and MFTI. Among 40 best there are more Russian universities: a repeat winner SPNRU ITMO (its team fell little short of an award-winning place), as well as Saratov State University and Ural Federal University which took 21<sup>st</sup>-40<sup>th</sup> place.

These competitions in many respects reflect the quality of programmer training. Judging by their results, programmer training in Russia is the best in the world, although in the last decade, Chinese universities achieved similar great progress. Among leaders and prize-winners, there have been teams from Poland, Belarus, and Ukraine, but these countries do not have as many strong teams as Russia and China. Individual representatives of Western Europe and the USA sometimes appear among the top teams though it should be noted that in the last two years the US universities secured a footing among prizewinners.

In 2019 among prizewinners apart from three Russian universities there have been teams from Korea, Iran, Taiwan, Hong Kong, USA, Poland and China. The only one team that had two medal winners and more was the Russian team.

Champions and prizewinners in contests do not always achieve such outstanding results in practical work for commercial and state structures. However, they can usually also meet the most complex challenges in their labor activities, which is confirmed by the fact that many Russian ACM contest champions and prizewinners have established successful software companies or work as key experts for these companies (DevExperts, JetBrains, SPb Software, Yota, Vkontakte, Telegram, Yandex, ...).

### Prize-winning places of teams of Russian universities at the ACM International Collegiate Programming Contest from 1999 to 2019\*

		1999- 2013	2014	2015	2016	2017	2018	2019
1	St. Petersburg State University of Information Technologies, Mechanics and Optics	3, 5, 3, 3, 1, 3, 3, 1, 1, 1, 1	9	1	7	1	9	
2	St. Petersburg State University	9, 1, 1, 6, 11, 3, 9, 4, 5	1		1	4		
3	Moscow State University	9, 2, 2, 9, 10, 5, 2, 10, 10, 10	2	2			1	1
4	Saratov State University	6, 7, 1, 6, 4, 7, 6						
5	Moscow Institute of Physics and Technology	3			4	5	2	10
6	Izhevsk State University	8, 9, 3						
7	Altai State Technical University	3, 8						
8	Perm State University	4, 13						
9	Petrozavodsk State University	13, 10, 5						
10	Novosibirsk State University	5						
11	Nizhny Novgorod State University	5			10			
12	Ural Federal University	13, 11			8	10	13	
13	National Research University Higher School of Economics		10					11
14	Ufa State Aviation Technical University	10						
	Total prizewinners	from 2 to 5	4	2	5	4	4	3

\* the quantity of medal places varied from 10 to 13 during this period

Source: ACM International Collegiate Programming Contest rating compiled by the RUSOFT Association

Russians also win other competitions of programming and information technology. In summer 2019, Gennady Korotkevich, a post-graduate student of St. Petersburg University ITMO became the best world programmer for the sixth time running on the strength of the annual contest Google Code Jam results. This contest is conducted on an annual basis.

In 2018, among 15 leaders were also other ITMO graduates: Evgeny Kaplun came fourth and Pavel Mavrin — thirteenth.

In August 2019, a team of schoolchildren with the guidance of coaches from leading Russian universities won four gold medals and was the best in team total at the 31 International Olympiad in Informatics IOI 2019. In individual classification Russian Ildar Gainullin demonstrated the second result in the world. Similar success was achieved in the last two years.

In June 2019, Russian schoolchildren won four medals at III European Physics Olympiad (the gold medal won Dmitry Tsarev from Moscow).

In June 2019, a team of robot technicians from ITMO University was a silver medalist in the nomination of OnStage Advanced of the youth league of RoboCup 2019. This is the largest world robototechnical contest. The medal place to the St Petersburg team was brought by robot ELSA playing flute. Also the composite team of ITMO University jointly with participants from China and Mexico won a competition of combined teams — RoboCup SuperTeam Challenge.

In November 2017, the Russian team took the first place and one third of all medals at World Robot Olympiad 2017 in Costa Rica (five gold, one silver and two bronze medals).

In the summer of 2018, Russian schoolchildren won five gold medals at the International Math Olympiad (Team Russia achieved TOP-3 of the best teams of the world).

Students' results at the world programming championship give an idea about the quality of training of students at Russian universities. However, it is more important to assess this quality by employer satisfaction.

### **Main conclusions on personnel training for the IT industry:**

1. Financing of Russian universities over the last 10-15 years has improved, which has allowed them to stop declining and to begin to develop.
2. In a number of universities the teaching staff is getting younger, but this is not sufficient and only slows down the aging process. There are many teachers in the higher education system who are far-removed from practical activity.
3. The still low salaries of teachers do not make it possible to nurture the new generation of promising and motivated teachers at universities, or attract IT professionals from business environment to teaching.
4. While there is a lack of money in the entire education system, some universities have such low work efficiency that a justification of state financing may be called into question.
5. There are many universities with a large number of graduates whom employers from the software industry do not wish to hire.
6. University teachers complain of increasing demands for preparing various reports, which take up a lot of teachers' time.
7. For all the criticism of the United State Examinations, its introduction has helped many talented young people from the regions to enroll in leading universities that train IT professionals.
8. Distant education, which many used to feel skeptical about, and the connection of all Russian schools to broadband Internet have helped young people in regions where there are no strong universities and schools of physics and mathematics to educate themselves.
9. Technical schools and colleges could cope with the task of training large numbers of programmers. But they are not (almost without exception) a source of personnel for Russian software companies.

10. The list of IT professions which are taught at Russian universities has remained unchanged for 20 years. Educational programs are also updated very slowly, although swift changes are taking place in the IT sphere.
11. The data of programming knowledge tests from Fossbites shows that Russian programmers are among the finest in the world. If in the general rating, Russian programmers share 1<sup>st</sup> and 2<sup>nd</sup> place with the Chinese, in solving tasks involving algorithms, they hold the absolute leading position in the world. These are the tasks that correspond to leading world technology trends which were determined by analysts at Garnet and at other world research companies.
12. A major contribution to training IT-engineers to meet market requirements is made by commercial companies, but they solve tasks which should have solved by the State at their own expense, without receiving preferences from the state. At the same time, officials try to control educational centers, in which they train personal for themselves.
13. A significant potential for increasing the number of IT professionals — both for further training of graduates upon pain of dismissal due to digital transformation, and for mastering IT skills by employees of other industries — is connected with involvement of training centers of IT companies in the State financed IT specialists professional development and retraining programs.
14. Russian universities, as a rule, are improving their positions in international ratings and in some special ratings they dominate.

## 6.6. Foreign language skills

The share of employees of Russian software development companies with a good knowledge of English has consistently come to around 70% in recent years. Evidently, after an increase of this figure in the first decade of the 21 century, stabilization took place. The share of German-speaking specialists at the respondent exporter companies remains 8-10%. The share of employees speaking other foreign languages is almost the same.

As the figures change insignificantly from year to year, the question about the number of employees who knew foreign languages well was not asked to respondents in 2017-2019.

### Share of employees knowing foreign languages well (of total staff numbers of respondent companies)

	2008	2009	2010	2011	2012	2013	2014	2015
English	65%	65%	68%	68%	72%	67%	75%	74%
German	10%	11%	5%	8%	8.5%	9%	8%	11.5%
Others	3%	11%	4%	8%	9.5%	11%	10%	13.5%

However, if the employees of foreign development centers are not taken into account, then the share of those speaking English will be much lower. According to the results of the 2016 survey, the share comes to 55-57%. The same applies to German and other languages (2-3% without employees of development centers of foreign companies in Russia).

As a rule, the knowledge of English (and of other languages) is sufficient for communication with foreign colleagues, and local partners can carry out localization and promotion of solutions. Among “other” languages (besides English), German was mentioned 9 times, Spanish — 6 times, and Dutch, Italian, Korean, Latvian, Lithuanian, Finnish, French and Czech were mentioned once each.

Languages of the former USSR countries and Russian national republics were also mentioned, although they are unlikely to be useful in promoting services and solutions abroad. Naturally, almost all employees in foreign development centers have an excellent knowledge of language in the countries where the centers operate. However, these countries are primarily interesting as labor markets, not as sales markets.

Despite the obvious progress in foreign language acquisition by employees of software companies, many problems remain unresolved. There are not enough English-speaking employees in small and in regional companies. The increase in the total number of these employees is provided by the largest companies located in Moscow and St. Petersburg.

This happens partly because these companies pay for their employees' foreign language training. However, this growth is mainly connected to the fact that companies from two capitals have an opportunity to attract the best developers from regions and from small companies.

The growth of the share of English-speaking employees in IT companies is not caused by improvements in the Russian state educational system. People mainly study foreign languages at their own expense or at their employers' expense, which pay for study at language courses or hire teachers to give lessons at the company.

In Russia, as a rule, skilled English teachers do not tend to work at schools and universities because of the low salary level at state educational institutions. This problem must be solved by the government.

#### Share of employees with good knowledge of foreign languages, depending on company location

	English	German	Others
Moscow	76%	14%	17%
St. Petersburg	76%	3%	2%
Siberia	72%	7%	6%
Ural	93%	0%	6%
Other cities	54%	4,5%	0,2%
Beyond Moscow and St. Petersburg	62%	4%	1,7%

Otherwise, the competitiveness of the high-technology sector of the economy will never correspond to the potential of high technological education that exists in Russia. Russia does not hold the worst positions in world ratings of English proficiency, but it is in the lower half.

For example, according to a study by the company GlobalEnglish, Russia received 3.6 points to determine the level of proficiency in business English. This was higher than Colombia (2.75), Brazil (2.95), and Turkey (2.97), but much lower than in the Philippines (7.11), India (5.57), and a number of other large countries.

On the global ranking of English language skills, the EF English Proficiency Index 2015, Russia holds 39<sup>th</sup> position from the top, lagging slightly behind Ukraine, Peru, Chile, France, and Ecuador, and ahead of Mexico and Brazil.

#### Level of knowledge of foreign languages, depending on company turnover

	below \$5 million	above \$5 million
English	50%	77%
German	4%	12%
Others	1,8%	15%

Sweden and Finland, which take the top positions in the world English knowledge ratings, should be a reference point for Russia. In many respects, the high percentage of the English-speaking population in these countries ensures the countries' integration in the world economy and their considerable achievements in the field of high technologies.

According to the superjob.ru portal, 84% of Russian jobseekers specify knowledge of English in their CVs. However, in reality among them there are far fewer programmers with a good command of this language (most likely less than 70%, because roughly the same amount of English-speaking employees work at companies which predominantly work for export).

A more detailed analysis of CVs by Superjob shows that only 15% of software developers specify a "fluent" or "conversational" level of English in their CVs, 50% declare a knowledge of the language at the level of reading technical documentation, 28% admit that they have basic skills only, and 7% do not specify their level of proficiency in English.

According to ANCHOR High Technologies, the situation with the knowledge of English is much better: 64% of all developers (included in the recruiting agency's database) have a good command of English or are fluent in English.

Considerable differences in the data of these two companies can be explained by the fact that they cover absolutely different audiences. ANCHOR is more oriented towards recruiting personnel for international companies and for Russian exporters, which implies stricter requirements for knowledge of foreign languages, while SuperJob focuses on a wider audience.

After examination in H1 2019 of salary offers of employers and of salary expectations of applicants for a job where knowledge of English is often needed, Superjob revealed the difference in income of specialists with and without a good command of foreign languages. A market salary band for engineers without requirements to knowledge of English is P 55–80 thousand. A mean income of white-collar workers at companies, where a “fluent” or “conversational” level of English is supposed, increases to P60–90 thousand.

According to Superjob, more than a third of applicants (36%) with proficiency in one or several foreign languages have dealt in employment with tests of knowledge of a foreign language. One fourth (25%) constantly use the foreign language in work, another 17% — quite often, 4 out of 10 — from time to time. It is interesting that among Russians who specify their level of knowledge of the foreign language as ‘command’ only 42% think that their language skills are sufficient for work at the company where this foreign language is working one. According to analysis of CVs by Superjob, among Russians with a good command of foreign languages at “fluent” or “conversational” level the majority know English. The second by popularity is German, the third — French followed by Spanish, Italian and Chinese.

Studying foreign languages remains a problem, although not as serious as it was 15 years ago. However, improvements in this area are vital, especially in the light of plans for the declared international expansion of Russian software companies.



# CHAPTER 7

# Technologies

## 7.1. Operating systems

When it comes to popularity of operating systems among developers — with all random fluctuations in the last 5-10 years — several obvious trends are visible. First, the frequency of mention of MS Windows reduced from 94-97% down to 84-88%. But even with steady reduction of its share it is still number one well ahead of GNU Linux family. Nevertheless, this OS family is approaching the leader although gradually. The rise of OS Android looks most striking — from 6% in 2010 up to 58% in 2019.

The share of companies involved in software development at least on just one OS of Linux family (GNU Linux family, Android and Tizen) is 73%. If closely related UNIX-like systems are added, then the share of companies which mentioned at least one operating system of this group will be 78%. As before, the percentage of MS Windows mentions is higher, but the separation from the combined UNIX and Linux family is already not so big. Given that these tendencies remain, the existing difference between two leaders will be cancelled out in the next 2-3 years.

Due to the fact that Google under the pressure of the US Government made out of its operating system Android a tool for political pressure (new smart phones of Chinese Huawei may be deprived of using and of updating this OS as well as associated services of Google), the doubts occur as to further increased popularity of Android. The drivers have emerged for a more active development of alternative OSs with fully-featured functionalities. They have already appeared in China, Russia and other countries, however, in Russia the transfer to new OS for mobile devices has been not really fast.

At the same time, such transfer will hardly affect the confrontation between Linux family and MS Windows as a potential rejection of Android will be in favor of other OSs developed on the basis of Linux.

Among operating systems which are losing ground among developers is Oracle (Sun) Solaris.

iOS and Mac OS in the last 10 years were more frequently mentioned — from 15-30% to almost 50%, but in the recent 2 years this indicator has not significantly changed.

Some previously popular operating systems are remembered by fewer than all. These are OSs for mobile communications systems — RIM Blackberry and Symbian OS, the usage of which clearly dropped in these years because of problems of companies which had developed these systems — RIM and Nokia. As their popularity indicators are close to zero, in 2016 we excluded these OS from the list of main operating systems.

At the same time, this table has not undergone radical changes. Seven out of ten OSs were there for a good reason as far back as 2008. Over 10 years the only change was that Blackberry and Symbian were replaced by OS Tizen.

It makes sense to remember bygone OSs because their history may be repeated by others. For example, signs intimate that MS Windows Mobile will embark on a course of Symbian. In January 2019, Microsoft announced the time when support of Windows 10 Mobile — the last mobile operating system of the American corporation — will come to stop. In spite of termination of support of the operating system, the phones on its base will go on functioning and the application developers will be able to produce their software updates later on. Applications from Microsoft Store still will be installed on devices. MS Windows Mobile does not lose ground among Russian developers — in some 10 last years the frequency of its mention steadily hover around 15-20%. However, the same thing took place with Symbian — the applications (subsequent to discontinuation of support by Nokia) were developed for quite some time but at the last everything went to naught.

Even in Autumn 2017 the vice president of Microsoft promised that Windows 10 Mobile would never receive any updates except security because the number of platform users was small and developers felt no concern for it. It was decided to stop any further development of Windows Phone. According to Gartner, in Q IV 2016, 99.6% of new mobile devices were equipped with OS Android or iOS.

In the OS segment for mobile systems Blackberry and Symbian were replaced by relatively new Tizen OS, the first version of which was released in 2012. This OS has a version adapted for Russia for devices which can be used in state structures and companies which aim to exclude unsanctioned access to confidential information. In the Summer 2016 the first implementation of the free operating system Tizen for the Russian processor was presented — 1892VM14Ya. The main feature of the Russian Tizen is the built-in safety profile which ensures a higher level of confidence in compliance with requirements of Russian regulators (1892VM14Ya is a new generation multicore signal chip for communications, navigation, multimedia, built-in and mobile systems, for example tablets, intelligent video cameras and telephones).

In 2017, a significant growth in the popularity of the Tizen OS could be assumed. This growth was quite possible, however, the results of 2018 survey do not allow us to confirm the hypothesis categorically as the frequency of mention of this OS has even decreased but within the range of possible random fluctuations. The 2019 survey showed a very high popularity of Tizen, suggesting that Russian developers make heavy use of this OS increasingly more.

So far we can say that the Tizen OS was not included on the register of Russian software by the decision of the ministry for communications and mass media. In this situation, we should note that another OS, Sailfish was included on the register, which was successfully promoted by the Mass Media (in particular, it makes purchases of Sailfish OS for Russian Post, which is subordinate to the ministry). Judging from the fact that in the last 2-3 years none of respondents mentioned Sailfish (respondents had a chance to name other OS not belonging to the main ones), its promotion has not yet involved the community of market players.

In Spring 2018, the State Corporation Rostelecom suggested to the Russian Government compelling Russian civil servants to use smart phones on the basis of domestic OS Sailfish. Experts demurred that in such way the mass use of OS Sailfish could be assured if even the devices with this system would have limited functionalities. On top of that, the government officials usually use their own smart phones on which they install applications required to do the job.

In the beginning of 2019 Sailfish took a Russian name Aurora. In all appearances, the promotion under a new name will be more active. The promotion has already begun: in June 2019 the minister of digital development and communications Konstantin Noskov suggested Huawei withdrawing Android in favor of Russian Aurora. Speaking with Huawei CEO Go Pin he discussed a possibility for shifting Chinese smart phones to the Russian mobile OS Aurora.

Also in June 2019 it got about that the Russian corporate messenger PostLink became the first Russian corporate software with mobile OS Aurora voice call implementation.

It may be so that another domestic OS for mobile devices will appear. In March 2019, Kaspersky announced that the company was developing a similar operating system with an advanced security feature. It will be accessible by the end of 2019 in two options — for the corporate segment including government agencies and for ordinary users.

For PC there have been developed several Linux-based Russian OS versions including ALT Linux and Astra Linux. Though it is reported that major Russian hardware builders are shifting to them, for the time being they are not separately mentioned by developers — it seems that respondents class them with GNU Linux family.

Among other operating systems (not included in Top 10) respondents mainly mentioned real-time OS — for example, QNX, VxWorks, ThreadX, MQX, Contiki, LynxOS. In 2019, there also appeared MSVS (Armed Forces Mobile System) and Linux-Elbrus, but they also were mentioned only one time. Thus, there is no occasion yet for widening the table of main OS.

Until 2016, the number of mentions of real-time OS grew from year to year, which corresponds to world trends. According to the survey of the last four years, this growth was not observed. However 3- 5% of companies consistently indicate the use of these systems.

### Top 10 used operating systems

Name of OS / Year of survey	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
1 MS Windows	97	94	93	96	94	88	92	87	93	84	89	88
2 GNU Linux family	64	54	54	59	60	65	51	59	60	57	59	72
3 Android	-	-	6	4	37	33	43	36	43	39	53	58
4 iOS	-	-	-	-	28	24	34	29	35	36	49	49
5 Mac OS	26	9	15	19	32	31	33	32	33	37	48	48
6 Open/Free/NetBSD	25	7	9	9	13	10	14	13	11	11	19	22
7 MS Windows Mobile	41	17	16	15	23	17	15	23	19	20	14	18
8 Oracle (Sun) Solaris	26	16	15	19	19	14	15	11	16	7	13	13
9 MS Windows Phone	-	-	-	-	19	19	22	23	21	15	12	13
10 Tizen	-	-	-	-	-	-	-	-	4	7	5	8

Looking ahead, the list of most popular OS will, probably, be added with the national operating system for IoT. It became known about plans to develop this system in the Autumn of 2017 from the document prepared by the working group headed by Sberbank within the plan of actions on cyber security for 2017–2024 under the program Digital Economy. Presumably, it will outperform foreign counterparts in key parameters such as processing speed, security and fault tolerance. It can be employed in all types of cyberphysical systems. Still the development thereof will be completed only by the end of 2021.

Results of our survey show that companies which gain over 50% of their income from export, are usually large, and so they have many areas of activity and many diverse clients. Accordingly, they use more programming tools and operating systems than companies which are primarily focused on the Russian market. Differences between these two groups of companies in the last two surveys were not seen only in the popularity of MS Windows. In 2019 the difference displayed itself (the popularity of Windows among developers, more oriented towards Russian market was reduced), but it is still premature to draw firm conclusion on basis of just one survey.

Compared to companies from other cities, in St. Petersburg until 2016 the percentage of companies using operating systems for mobile devices was significantly higher. In 2018, the leadership of St. Petersburg companies in use of these OSs was total except iOS, which was the most popular in regions. In 2019 any more active use of OS for mobile devices by St. Petersburg companies was not revealed. As before, they are leaders by use of GNU Linux family: at least 70% of respondent St. Petersburg companies in the last 4 years consistently mention GNU Linux family among used operating systems.

Regional companies most often mention a great many OSs. However, these companies present cities with different number of inhabitants. Their indicators can be related to the increased activity of software companies beyond two Russian capitals.

### Main operating systems used by companies with a different share of export in total turnover

	MS Windows	Mac OS	GNU Linux family	Open/Free/NetBSD	Oracle Solaris	iOS	Android	MS Win Mobile	MS Win Phone	Tizen
Export < 50%	86%	39%	66%	18%	9%	42%	52%	13%	10%	6%
Export > 50%	93%	75%	90%	35%	23%	73%	78%	30%	20%	13%

Among all Russian users (not only developers), the definitive leadership of OS Windows is a thing of the past. As shown by information from the statistics service LiveInternet, the change of the leader took place at the end of 2015, when OS Android moved to the first place. As of December 23, 2015, the share of Windows (including desktop and mobile versions) came to 40.7% against 42% for Android.

### Main operating systems used by companies with a different headquarters location

	Moscow	St. Petersburg	Other cities
1 MS Windows	75%	91%	91%
2 GNU Linux family	72%	79%	69%
3 Android	50%	47%	66%
4 Mac OS	33%	44%	56%
5 iOS	36%	41%	58%
6 MS Windows Mobile	22%	21%	14%
7 MS Windows Phone	17%	12%	11%
8 Oracle (Sun) Solaris	22%	15%	8%
9 Open/Free/NetBSD	28%	21%	20%
10 Tizen	6%	3%	10%

## 7.2. DBMS

The frequency of mention for all DBMSs included in the table has changed up insignificantly from year to year (the same as ranking by this indicator). Random fluctuations for each DBMS were not large but were present. The constant increase in the share of the open-source object-relational DBMS PostgreSQL was the exception to the rule.

As a result in 2018 the list of top three of the most popular DBMS was changed for the first time. For years it consisted of MS SQL, MySQL and Oracle.

In 2018, it included PostgreSQL which deprived Oracle of the 3rd place. Among companies with turnover up to \$5 million PostgreSQL came to the confident third place already in 2017. In 2019, it moved to the second place so far among all respondent companies. For another thing, the last survey showed that MS SQL came to the fore unseating the perennial leader My SQL (open source database management system for e-commerce, online transaction processing, which development and support is carried out by Oracle, the corporation that purchased MySQL a few years ago).

PostgreSQL (various versions of it) is being actively introduced in Russia. Companies which receive more than 50% of revenues from export use it more often than developers which are more oriented towards Russian market. However, the popularity of PostgreSQL is growing quicker just among companies for which Russian IT market is predominant. In autumn 2016, the Russian company Postgres Professional released a new version of DBMS for major clients, Postgres Pro Enterprise. The solution is essentially with the escalating process of import phaseout. The ordinary version of PostgreSQL does not satisfy all the demands of major clients. Postgres Pro Enterprise was designed to meet these demands.

The company Postgres Professional already provides Sberbank with support services for the freely distributed PostgreSQL on the platform of x86 architecture (OS Windows, Red Hat Enterprise, Linux).

In Summer 2017, a pilot project was completed at VTB bank to introduce tools for processing big data using freeware. As a relational DMBS the “free” PostgreSQL was used. At the same time, the PostgreSQL DMBS is not a direct part of the system, and if necessary may be replaced with a different DMBS.

In Spring 2018, the developer of the Russian office package “My office” (the company called New Cloud Technologies) became a partner of the developer of Russian DBMS Postgres Pro. Through joint efforts they produced a protected office solution to be certified at FSTEC (Federal Service for Technical and Export Control) and FSB.

The popularity of SQLite, compact built-in DBMS, is still growing. If in 2010-2011 it was mentioned by 5-9% respondents, by 2019 this indicator raised to 35%.

In 2016, Mail.ru Group announced plans to enter the database market with its own DMBS with the open source code called Tarantool. It is being tested on internal products, but will subsequently be distributed (above all as a replacement for Oracle) both in Russia and abroad. This system is not mentioned yet in answers of respondents.

#### Commonly used DBMS, % of respondent companies

year of survey/ DBMS	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
1 MySQL	47	40	59	56	56	54	42	53	61	72
2 PostgreSQL	17	15	26	30	28	28	33	36	51	66
3 MS SQL	63	74	70	66	70	67	59	61	67	62
4 Oracle	49	55	51	47	45	39	36	37	40	41
5 SQLite	9	5	12	10	19	12	10	19	25	35
6 MS Access	19	9	19	17	18	19	17	18	16	23
7 Firebird	11	9	10	13	16	15	11	11	14	13
8 MongoDB	-	-	-	-	-	-	-	-	6	10
9 IBM DB2	13	14	9	10	12	12	8	8	7	9
10-11 MSDE	7	5	5	5	7	2	2	4	6	7
10-11 Sybase ASE	6	3	3	6	8	6	2	3	5	7
12-14 IBM Informix	7	5	7	7	6	4	1	3	6	6
12-14 Sybase ASA	6	6	5	6	6	3	2	2	4	6
12-14 Линтер	-	-	-	-	-	-	-	3	4	6
15-16 SAP DB	6	5	7	5	5	3	5	2	6	5
15-16 InterBase	9	7	7	10	6	6	3	3	7	5
17 Paradox	4	3	3	2	4	3	1	2	5	4
Other	13	8	7	8	10	9	5	9	14	13

The larger the company, the greater the selection of DMBS used. So among companies with a turnover of more than \$5 million, practically all systems are mentioned more often than among small companies. The only exception in 2017 was the Russian system Linter, which is the only used by companies with a turnover of less than \$5 million. At the same time, it was more interesting to companies which receive most of their revenues from export. The version of the Linter DMBS used in Japan is recognized there as one of the best DMBS for the Internet of Things.

In 2018 it was revealed that DBMS Linter became interesting also to companies with turnover > 5 million end even more that to smaller companies. In 2019, the advantage of Linter in terms of a frequency of mention by large companies has increased even more.



The lower is DBMS in the rating, the greater is its popularity among companies of different size and share of export. The larger is the company and its focus on export, the better is the indicator for almost all DBMSs. Only SQLite has a scarcely different frequency of mention (among companies with turnover <\$5 million is 35%, among companies with turnover > \$5 million — 34%).

### Main DMBS used by companies of different sizes and with a differing share of foreign sales, % of all respondent companies

DBMS	Company size		Foreign sales	
	Turnover < \$5 million	Turnover >\$5 million	< 50% of turnover	> 50% of turnover
MS SQL	59%	71%	58%	73%
MySQL	70%	76%	66%	90%
Oracle	33%	68%	37%	55%
PostgreSQL	63%	71%	60%	83%
SQLite	35%	34%	31%	48%
MS Access	19%	37%	18%	38%
Firebird	9%	26%	13%	13%
IBM DB2	2%	32%	4%	25%
Sybase ASE	2%	24%	3%	18%
MSDE	3%	18%	4%	15%
InterBase	2%	16%	4%	8%
Sybase ASA	2%	16%	4%	10%
IBM Informix	2%	18%	3%	15%
SAP DB	2%	16%	3%	13%
Paradox	2%	11%	3%	8%
Линтер	3%	13%	6%	5%
Others	17%	5%	10%	23%

For the last two years the DBMS rating does not include about 10 systems mentioned by respondents (in 2017 they were 6). MongoDB is a newcomer, it was named most times - 10 times in 2018 (6% of all respondent companies) and 16 times in 2019 (10%). On account of the increased number of mentions, this DBMS got the nod and took the 8<sup>th</sup> place straightway. Among the rest indicated as “Others” in 2018, two times were mentioned only Cassandra and Redis. Once — Realm, Raven DB, Raima, NoSQL, Intersystems Cache, OrientDB, BigQuery, Ignite, and also Zirkon developed on a basis of PostgreSQL. In 2019, Redis is mentioned already three times and the others once (these are Berkeley DB, ClickHouse, DynamoDB, Firebase, ClickHouse, Oracle TimesTen In-Memory Database, Hbase).

### 7.3. Languages and programming tools

Four programming languages (C#, C, C/C++, Java/J2EE) continue to lead in popularity among Russian developers for many years only changing their positions in relation to one another. The absence of the C language in the top four in the 2016 survey was evidently temporary and caused by random factors.

However the 2018 survey showed that the programming language C was losing fraction after all — again it dropped from Top 4. In 2019 it retained just about at the same place, and the programming language Java/J2EE for the first time got a foothold among the leaders.

### TOP 7 of programming languages used as main tools, % of respondent companies

	Year of survey/ programming language	2014 survey	2015 survey	2016 survey	2017 survey	2018 survey	2019 survey
1	Java/J2EE	17%	22%	17%	15%	14%	24%
2	C/C++	17%	26%	26%	18%	19%	17%
3-4	C#	17%	16%	20%	19%	15%	13%
3-4	PHP	9%	6%	5%	5%	12%	13%
5	.NET	9%	6%	8%	2%	8%	4%
6	C	17%	12%	8%	15%	4%	4%
7	Delphi	8%	7%	11%	4%	6%	3%

Among the main programming languages mentioned which were not included on the list of the most popular, Python (6 or 4%) and JavaScript (4 or 3%) are mentioned most often. Traditionally, 1C is once or twice mentioned as the main programming language by respondent companies (in 2019 - 3 times). In addition, Ruby and VBA won 2 votes each, one vote — Scala, Centura, the computer game environment framework Unity and the platform Oracle APEX.

A year earlier, in 2018 were twice mentioned only HTML5, Python and Swift, once — RUBY, JavaScript, 1C, FoxPro, PL/SQL, Objective-C and Kotlin. Noteworthy, Kotlin developed in Russia by JetBrains for the first time was mentioned as a main language. In 2017, Kotlin was noted by Google as either of two (together with Java) recommended programming languages for mobile systems. For this reason its appearance in the rating came as no surprise.

### Use of programming languages which are not main tools, but are applied by companies in a number of projects, % of respondent companies

		2014 survey	2015 survey	2016 survey	2017 survey	2018 survey	2019 survey
1	HTML5	-	-	29%	34%	46%	50%
2	Java	39%	44%	40%	46%	49%	47%
3	PHP	23%	18%	26%	29%	37%	47%
4	C++	30%	25%	34%	41%	40%	44%
5	C#	25%	21%	26%	32%	36%	42%
6	.Net	14%	24%	24%	22%	33%	35%
7	C	10%	16%	19%	23%	26%	30%
8	Javascript	5%	7%	4%	7%	11%	22%
9	Delphi	7%	4%	10%	14%	17%	21%
10	Python	3%	8%	5%	7%	6%	15%
11	Kotlin	-	-	-	-	4%	7%
12-13	Swift	-	-	-	3%	6%	4%
12-13	Golang (Go)	-	-	-	-	3%	4%
14-16	Ruby	4%	4%	3%	1%	4%	3%
14-16	Objective C	5%	5%	2%	2%	3%	3%
14-16	SQL	3%	4%	4%	1%	2%	3%
17	Scala	-	-	-	-	2%	2%
18-21	Perl	4%	4%	3%	3%	2%	1%
18-21	CSS3	-	-	-	-	2%	1%
18-21	Erlang	-	-	-	-	2%	1%
18-21	Assembler	-	-	-	-	1%	1%

About 30 programming languages were mentioned by respondents as not main but used tools.

Following the results of 2018 survey HTML5 raised to the second place following Java, and in 2019 moved to the first.

Thanks to 4% of respondent companies Kotlin at one stroke was found to be at the 11<sup>th</sup> place.

### Most popular development tools

Year of survey/development		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
1	MS Visual Studio	46	64	60	62	45	36	53	49	57	55	57	58
2	Eclipse	19	25	19	6	16	15	34	12	25	28	26	43
3	Intellij IDEA	10	5	3	8	9	4	14	9	21	26	26	33
4	Xcode	-	-	-	-	-	2	14	6	15	18	27	26
5	WebStorm								2	10	12	21	24
6	NetBeans	-	-	-	-	-	3	8	0	7	10	18	18
7	Other	-	-	-	-	-	-	15	24	20	16	15	21
	Not used	-	-	-	-	-	-	-	24	16	9	11	10

In the rating of development tools throughout recent 10 years an obvious leadership is still with MS Visual Studio. IntelliJ IDEA of JetBrains from St. Petersburg and free Eclipse with participation of Xcode jockey are at the second place. But following the results of 2019 survey, Eclipse has got away from all pursuers, approaching the leader. IntelliJ IDEA has steadily consolidated itself at the third place.

Among tools not included in the table of the most popular, the largest number of mentions in 2018 went to Android Studio and SubLime (3 times), as well as to PyCharm, RubyMine and PHPStorm (twice). In 2019, 4 times were mentioned Android Studio and PyCharm, and 3 times — PHP Storm, Qt Creator and Vim.



# Main conclusions

### Economic indicators

The cumulative turnover of the Russian software companies has grown at year-end 2018 by 19.5% and has amounted to P997 billion. According to calculations made under the previous RUSOFT survey, the growth was expected to be higher — 25%, that would allow already in 2018 to pass one trillion threshold.

In dollars, the growth of cumulative turnover also turned out to be much less — 10.6% instead of predicted 18%. The same holds for foreign sales which have been increased by 10%, though calculations showed growth by 19%.

In comparison with 2017 indicators, in ruble terms the acceleration was recorded from +4% to +19.5%, and in dollar terms — the slowdown from +19% to +10.6%. This big difference is due to fluctuations of the ruble's exchange rate against the dollar.

In order to understand the common trend with such exchange fluctuations, RUSOFT applies our own bi-currency index (average weighted indicator of changes in sales at domestic market in rubles, and abroad — in dollars). At year-end 2018 it was 1.14 corresponding to the 14% increment. A year earlier the index was almost identical — 1.13. Therefore, we may talk about stable growth rates of consolidated revenues.

Slowdown in the growth rate of foreign sales recorded at year-end 2018 is related to negative attitude toward Russian companies in the US and EC whereas markets thereof up to date are main foreign targets for Russian developers (over 70% of total export).

At the same time, the domestic market situation got much better. As companies have limited resources, they frequently prefer to increase sales at the gaining domestic market which on top of that is well-known and understandable rather than to try to come or secure a foothold in a still under-explored foreign market.

A significant expansion of demand for custom engineering services is on display giving a true view of the real process of digital transformation of Russian economy that requires that each enterprise should have a tailor-made solution. It is service companies that have increased sales in Russia most of all.

Findings of long-standing surveys of RUSOFT suggest that the revenues of Russian software companies in dollar terms will rise in the next 2-3 years on the average by 10-20% per year. An increment may come below 10% only in case of disasters with ruble devaluation by 40-50% and more. The same may be said about the growth of the total volume of sales more than by 20% which is possible with the same cheapening of the dollar against other currencies.

If we use the previous forecast methodology based on expectations of surveyed companies, then at year-end 2019 the cumulative turnover of Russian software companies will amount to \$18.6 billion (growth by 17.6%) or P1.21 trillion (+21.3%). Foreign sales will increase by 15% up to \$11.12 billion, and domestic sales by 25.6% up to P486 billion. The RUSOFT bi-currency index also will grow: from 1.14 to 1.19.

However, with great probability we may assume that the actual growth of all these indicators will turn to be smaller because plans to increase staff by 16% on the average cannot be fulfilled due to lack of an appropriate offer at labor market.

A big uncertainty relative to the end-of- 2019 review is also caused by the emerging new reality which requires a major revision of methods of calculating main indicators which are representative of the status of software industry. The point is that in 2018 it was announced about sales of several Russian large software companies to foreign corporations. At present, TRANSAS, Parallels and Luxoft have new foreign owners.

At year-end 2019, according to accepted standards, they cannot be considered as Russian companies any more in our research.



## Investment

Findings of the annual RUSOFT survey show that in 2018 Russian software companies attracted more investments than a year earlier. Their volume returned to the 2016 level.

The study 'Startup Barometer 2019' showed that corporations have begun to actively participate in support of new high-tech companies. Big business held a course for development of corporate accelerators aimed at search and verification of a value of new solutions based on the infrastructure and customer databases of corporations.

According to the study 'Venture Barometer 2018' performed in partnership with RVC, contrary to forecasts, the investment activity in 2018 increased: more than half of respondents (53%) confirmed that volumes of their investments increased as a whole (without breakdown into domestic and foreign projects).

If we compare actual values with expectations of top managers (RUSOFT data), we'll meet that companies need at least twice as much. At the same time, the annual survey reflects only plans for the near future - 2 years, while the demand could be much greater. Plans are prepared with due allowance for possibilities while a demand may exist even with the understanding that for the time being there is not the faintest chance to attract investments on favorable terms.

In the last three years it became apparent that the assessment of prospects of attraction of investments by companies is more realistic than before. If in terms of amounts they significantly overestimate the window of opportunity, then in actual raising of funds from external sources the figures are roughly the same as predictions.

In 2018, the following categories of companies manage to attract investments much more often: established less than 10 years ago; a share of export is below 50%; work at 'new markets' (Asia, Middle East, Africa, South and Central America) or plan to enter hereon in the next 2 years; increased export revenue in a year more than by 10%.

The location of headquarters doesn't make a big difference when it comes to metropolitan cities (for example, Moscow, St. Petersburg, Novosibirsk or Yekaterinburg). In all appearances, it is much more difficult to receive external financing in small cities. A business model (product or service) did not impact on a percentage of companies which attracted investments.

## Situation on Russian and on world market

The volume of Russian IT market in ruble terms in 2018 increased by 18.7% (and taking inflation into account - by 13.8%).

According to the RUSOFT bi-currency index, the Russian IT-market in 2018 increased by 10%. It is more than in 2017 (+9%) and more than was predicted (+7.5%).

Noteworthy, the evident growth of the Russian IT market in rubles is recorded for the first time since 2012 when a deflator is used in calculation. In 2013-2015, a contraction of IT market was observed and in 2016-2017 its volume remained stable.

Most of experts and analysts are unison in opinions that in 2019 the growth of IT market of Russia will continue and will be not very high (modest). IDC expects an increase by 4.8% in dollar terms.

The annual RUSOFT survey allows for evaluating the size of the Russian software market based on data on domestic sales of Russian software companies. Taking into account that the foreign software vendors account for sales on the Russian market to the value of at least \$2 billion (in more recent times several major foreign companies quoted figures of their sales in Russia), according to RUSOFT, the Russian software market including also software development services in 2018 increased by 10-11% reaching about \$8-9.3 billion (in rubles the increase after allowing for inflation amounted to roughly 5.5%).

According to IDC preliminary estimates, the volume of the world IT market in 2018 run at \$4 trillion having increased by 4.2%. In other words, the growth is similar to that assessed by Gartner.

However, forecasts of both companies greatly differ. If Gartner expects the growth of the IT world market in 2019, IDC at year-end 2019 forecasts the 3% decline due to economic problems related to increase of import duties and to the interest rate hike by the US Federal Reserve System, also to the slowdown in the growth of Chinese market and CAPEX cycle finishing in economy.

### Geographical reach

At year-end 2018, Russian software companies reoriented from western markets to domestic market with a slight increase of the share of ‘New markets’. Nevertheless, they plan in the next 2 years to expand presence in the USA and Europe.

Results of the 2019 survey showed a greater or at least the same number of companies which plan to return to western markets or for the first time come therein in the next two years.

The Anglophone media spelled trouble for promotion of Russian software on western markets.

Over 70% of articles for the topic ‘software’ published in foreign media over the last 2 years negatively affect sales of Russian software companies abroad. A positive image of Russian software industry is in the picture of just 13% of publications, a questionable image is in 14%.

However, the peak of negative publications seems to be already behind.

RUSOFT’s calculations in the context of its own annual survey showed that in 2018 within the cumulative turnover of Russian software companies there was significantly increased the share of sales in Russia and in countries of the Former Soviet Union — to 60.6% from 54.8% a year earlier.

A large-scale refocusing on Russian market is confirmed by other data of the annual survey. For example, it is worth paying attention to a drastic reduction of a percentage of companies surveyed without any export revenues. If at year-end 2017 they were 24.8%, in 2018 his increased roughly one-and-a-half times — up to 35.6%.

A growth of the Russian market share resulted mostly from the reduction of the share of ‘Western world’ (EC, North America, Australia) — from 37.9% to 31.8%. At the same time, a little reorientation towards conventionally new markets (South and East Asia, Africa, South and Central America, Middle East) is seen — their share increased from 7.3% to 7.6%.

The share of companies planning to return or to come to these ‘new markets’ for the first time in 2019-2020 has increased significantly. Predominantly, a debut is planned rather than the return. The share of companies planning to come in ‘new markets’ in the next 2 years has increased by a factor of 1.5-2 compared to the 2018 survey. Companies take a special interest in the African IT market.

An increase of export in the ‘near abroad’ is also promising. Over the past couple of years the Ukrainian market has contracted and become more difficult for activities of Russian companies. However, a downturn in sale in Ukraine is well compensated by the growth in Kazakhstan, Uzbekistan and other republics of the former Soviet Union where domestic markets are developing dynamically.

The professional software development is underway in no fewer than in 55 Russian cities. The presence of even a few companies which sell beyond their regions is a case in point, as well as a presence of not local and foreign R&D centers.

It can be said that the software sector exists at the regional level referring to some 10 members of Russian Federation. In some 10-15 regions or more the sector is in course of formation. In all other regions successful companies are working only in individual cases, however, they may prove a success even abroad.

### Import substitution

In recent years the process of import substitution now accelerates, now slows. The latest slowdown was registered at year-end 2017 and in 2018 the acceleration occurred which is evidenced first and foremost by comparison of growth of sales of Russian software companies at the domestic market and an increase in the volume of Russian software market. Besides, we can measure changes in active transition to Russian solutions is the amount of relevant news in media.

If we compare the growth rates of market and sales of Russian companies at the domestic market, then in 2016 the difference was immense — 30 percentage points (by that much faster were growing sales of domestic companies), in 2017 that difference reduced to 5 percentage points, and in 2018 increased roughly up to 10.

At the same time, in 2017-2018 service companies with prevailing earnings from custom software development have better growth indicators than product companies. Previously they were not classed with those involved in the import substitution process because their foreign competitors did very little to render similar services in Russia. However this conclusion is no longer true: recently custom engineering is becoming an alternative to procurement of off-the-shelf solutions, particularly due to the digital transformation.

A number of news about significant events related to import substitution also indirectly characterize the way domestic solutions are replacing foreign ones. If in 2017 there were 9 such pieces of news, in 2018 already 19, and for a fraction of 2019 — 20 pieces of news. They are connected both with launched projects and with plans of state corporations as well as with governmental decisions.

The analysis of news as well as other observations allow for drawing the conclusion that the attempts of the government to influence the IT-import substitution process lack consistency.

The annual RUSOFT survey shows that on the average an assessment of efficiency of the Russian Software Register in the recent years is not high. In 2019, an average assessment of influence of the Russian Software Register among all companies surveyed (within the range from -3 to +3) reduced from +0.16 to +0.09. At the same time, the assessment of companies, which do not operate overseas, is better — the increase in average point from +0.15 to +0.22 (anyhow lower than +0.25 in the 2017 survey), and that of companies working overseas is much worse — the drop from +0.16 to the negative value (-0.01).

### The business environment in Russia

An integral estimate of the available business environment obtained by the annual RUSOFT survey of Russian software companies is unchanged in the last three years. It amounts to 2.86 that is slightly lower (or almost similar) than the grade ‘satisfactory’ (on the five-point scale). At the same time, in individual parameters there have been recorded both reassuring improvements and red flags.

In this case stability is hardly a matter of rejoicing since the business environment isn’t even rated at ‘satisfactory’, although the progress compared to the situation in 2011 is noteworthy.

In the context of the ‘digital transformation’ declared by the state it is essential to improve conditions for software business rather than to keep level. Besides, degradation of some important parameters of business environment is deeply felt by companies.

The 2019 survey covering 175 companies engaged in software development shows a significant improvement of assessment of the following parameters: ‘State support of international and marketing activity’, ‘Provision of personnel and the education system’ and ‘Financing of R&D’ — and this when their absolute value still remains at a very low level (below ‘3’ on the five-point scale).

Concern should be arisen due to the fact that unrest of respondents grows over the tax system and over solution of the problem of bureaucratic and administrative barriers. Assessments of these indicators went down from 2.91 to 2.84 and from 2.70 to 2.64 respectively.

If previously small regional companies assessed the business environment worst of all, in the recent years companies which can be classified as middle-sized are hitting stiff headwinds. These are companies with turnover \$1-5 million. Sometimes (in particular years and in particular parameters) they are added with companies with a bigger turnover (\$5-20 million).

Over 25 years (1991-2015) on the average there were annually established 4% of software developing companies currently in operation— about 150 companies per year. In all appearances, this number of new companies is another bottleneck for development of Russian software industry. Taking into account that a company is founded by 2-3 persons, one may calculate how many new business leaders have emerged and are emerging in software industry in Russia every year. It looks like some 300-400 people.

The number of established new companies beginning from 2017 are gradually growing after recession in the previous few year.

### Human resources

At the end of 2018 in Russia there were at least 540 thousand professionals directly involved in the software development process (in software companies or in IT departments of different categories of companies). A yearly increment of such employees was 7.8%. Approximately the same growth rates (by 7-8%) were also observed over 2 previous years.

In recent years both large and small software companies have been steadily increasing the staff by 8% and more (in the companies surveyed the annual increase in personnel in 2017 and 2018 as a matter of fact was 12%). Previously large companies were growing much faster and largely at the expense of small companies. Thus we may say that the previous assessments of growth were too conservative and the total number of personnel in this sector is by several tens of thousands more than the figure of 540 thousand people which we predicted earlier.

Overall numbers of professionals in Russian software development companies exceed 210 thousand people. In 2019, the percentage of these employees in the staff of companies surveyed was 77%, a year earlier — 84%. Thus for the entire industry this number averages out 80%, and the overall numbers of personnel including managers is above 260 thousand people.

According to results of the RUSSOFT survey, experts in custom software development companies average out 70-85% of the whole staff, and in software vendors — 55-70%.

Out of 210 thousand software developers over 58 thousand work in the overseas development centers of Russian software companies.

Therefore, in Russia in software companies at least 155 thousand people are directly associated with software development. In service companies the number of developers in 2018 increased by 11% up to 91-97 thousand people, in software vendors — by 5% up to roughly 59 thousand people.

The indicator of staff turnover previously varied mainly within the range of 6-7% per year, but in 2016 it increased to 9.5% and in two subsequent years it stabilized at this level.

No more than a half of companies surveyed come across annual dismissals (in 2016 — 59%, in 2017 — 50%, in 2018 — 58%).

By year-end 2018 the total increase in staff of surveyed software companies almost corresponds to the number of hired university graduates. Therefore, all other flows of developers (between different economy sectors, to and from abroad) compensate each other.

There is no much sense in the quantitative assessment of the short supply of professionals in software development. The matter is that any potential offer of software developers at Russian labor market which can additionally emerge in the coming years will be required and engaged in software companies and in IT departments of enterprises of different economic sectors.

Instead of disputes over annual training of a million or half a million of IT professionals it would be more to the point to focus to maximum effect on all opportunities of training and attraction of human resources — who, how and whom can we train or invite from other countries. The quantitative reference points will still be needed but only for the best distribution of available resources required for training.

An average salary in the software sector always grew faster than countrywide. However in 2017 for the first time the salary growth rate in the software industry turned to be more or less the same as in the entire Russian economy. According to the Russian Federal Statistics Office, the monthly average nominal gross payroll in Russia by year-end 2017 was ~39.167 thousand RUR that is by 6.7 % more than in 2016. According to HeadHunter, the salaries of Russian IT professionals in 2017 increased slightly less - by 6%. In responding software companies within the annual RUSSOFT survey, in 2017 the salary on average increased by 7.7%. Considering that here different calculation methods are used, the increment is compatible.

In 2018, the growth of the average salary of software developers and the increase in nominal gross payroll of workers in the entire Russian economy (Rosstat data) became altogether equivalent. According to the RUSSOFT calculations, salaries of professionals in the software sector increased by 12.1% over year, and in the entire economy — by 11.6% (up to P43.724 thousand).

If we look at the dynamics of the average salary in dollar terms, that of Russian software developers increased in 2017 by about 24% (in no small way due to strengthening of the ruble). However, in 2018 due to weakening of the ruble the average salary in dollars increased only by 4%. It has not reached the pre-depression 2013 level yet (lower by 18%).

Judging from the fact that the wage level in the IT sphere began growing in the first 8 months of 2019 even faster than a year earlier, and the ruble will weaken within a year by about 3-4%, the income in dollars of software developers will increase in an entire year by 5-8%. Just the same, it will come short of the 2013 level. At the same time, in other countries the salaries of programmers over these years have increased significantly.

In 2018, an evident and considerable expansion of interaction between companies and universities is observed. 73% of respondent companies had one or another form of cooperation with universities. Therefore, a lot of small companies also took on cooperation.

In the 2019 survey for the first time respondents were asked to indicate, whether they had their own training center. It was found that such center was in possession of 16% of companies surveyed.



# Participants of the Survey



Artezio is an international private company with development centers in Eastern Europe and the USA. It specializes in providing professional services for food and Internet companies in the field of custom software development, creating and integrating corporate applications and solving complex problems of digital transformation of business processes.

Artezio is included in the list of the world leading outsourcing service providers (The Global Outsourcing 100) as well as the top best developers in several categories according to the Clutch rating agency.

**Development centers:**

- Moscow (Russia),
- St.Petersburg (Russia),
- Saratov (Russia),
- Nizhny Novgorod (Russia),
- Minsk (Belarus),
- Vitebsk (Belarus),
- Mogilev (Belarus).

The company is represented in the USA, Canada, and Poland

**Certification:**

- ✓ ISO 9001:2015,
- ✓ Microsoft Gold Certified,
- ✓ Salesforce Certified,
- ✓ Amazon Partner.

**Achievements in the industry:**

- Software 500 (2010-2018),
- TOP 5000 Europe's Fastest Growing private companies as recognized by Inc. (2018),
- TOP 100 the World's Best Outsourcing companies according to IAOP (2018),
- TOP 15 .Net developers in New York according to Clutch (2018),
- TOP 50 Web development companies in Germany according to Clutch (2018),
- TOP 20 Belarus's Best development companies,
- TOP 10 best development companies according to British agency MAN Digital,
- TOP 50 best development companies according to Explority agency.

**Services:**

- system analysis, development and enhancement of software solutions,
- consulting on the introduction of technologies and business process automation,
- IT-audit,
- software testing,
- maintenance of ready-made solutions and technical support

**The core industries:**

- Finance and Insurance,
- Healthcare,
- Software production,
- Internet and Media.

## Technology profile:

### Enterprise software:

- High-loaded SOA systems based on JEE (CDI, EJB, JPA, JSP, JSF, JMS, SOAP, REST) and related frameworks (Spring, Seam) as well as using .Net technologies (ASP.Net MVC, WPF, WCF),
- portal solutions based on Liferay Portal, Sharepoint WSS/MOSS, WebLogic Portal, WebSphere Portal,
- integration solutions based on ESB (OSB, Oracle ESB, IBM WebSphere ESB, JBoss ESB), Spring integration, MSMQ, eMule,
- reporting systems based on Jasper, BIRT, Pentaho, SQL Server Reporting Services,
- cloud solutions (Azure, Amazon),
- cloud services customization: Salesforce, Alphasoftware, Demandware, Office 365.

### Big Data technologies and solutions:

- Database analysis and BI (Pentaho, Oracle BI, using machine learning algorithms),
- NoSQL databases (Cassandra, MongoDB, Couchdb),
- search engines (Elastic search, Apache Solr, Sphinx),
- intellectual data processing (Apache lucene, Apache Mahout),
- distributed compilation (Apache Hadoop, Apache ZooKeeper, Scala),
- semantic data processing,
- intellectual interfaces (Yoda QA),
- image recognition and video analytics (CNN).

### Mobile development:

- The wholes stack of native Android, iOS D, Win8/10 development technologies,
- cross platform development (Apache Cordova, Xamarin, React.Native),
- geotracking and navigation app development,
- three-tier solution development.

### Web development:

Development of Rich Internet application (RIA) based on Java, Java/J2EE, EJB, Spring (Core, Boot, Integration), Servlets & JSP, CSS & JavaScript, Activiti BPM, Rich UI Applications: Angular, React, SOAP, REST, etc. ASP.NET, PHP, JavaScript and Python, development of interfaces based on GWT, Angular.JS, React.JS, Ext JS frameworks and Kendo UI components, mobile Web application development, Single Page Application development (SPA).

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# ARTEZIO



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<b>Services</b>	<ul style="list-style-type: none"> <li>✓ Software Product Engineering and ADM</li> <li>✓ Custom Software Development</li> <li>✓ Product Maintenance</li> <li>✓ Re-engineering and Porting</li> <li>✓ Customization and Integration</li> <li>✓ Testing and Test Automation</li> <li>✓ Technology Research and Consulting</li> <li>✓ Analytics</li> </ul>
<b>Domain Verticals</b>	<ul style="list-style-type: none"> <li>✓ High-tech, Telecom,</li> <li>✓ Computer SW, Mobile,</li> <li>✓ Enterprise, Healthcare,</li> <li>✓ Finance and Banking,</li> <li>✓ Media &amp; Entertainment,</li> <li>✓ Education,</li> <li>✓ Information security,</li> <li>✓ Government, Robotics,</li> <li>✓ Automotive, Avionics,</li> <li>✓ Logistics and more</li> </ul>
<b>Major Clients</b>	IBM, Draeger Medical, Chrysler, nVent, Lynx Software, HomeCredit, IBM, HP, Stada, etc.
<b>Technologies &amp; Platforms</b>	<ul style="list-style-type: none"> <li>✓ Embedded, system-level, and real-time systems, digital twins</li> <li>✓ Mobile and connectivity, cross-platform development, multimedia streaming, hybrid and native apps</li> <li>✓ Enterprise applications: Workflow, document, knowledge and content management, CRM systems.</li> <li>✓ Web services, high loaded distributed applications</li> <li>✓ Data science: Big Data, cloud storage, DevOps, machine learning, prediction analytics</li> <li>✓ Internet of Things, wearables, sensors, AR/VR apps</li> <li>✓ M2M solutions, apps and services for smart home, smart enterprise, e-health, connected cars and other scenarios</li> </ul>

<b>Awards</b>	<ul style="list-style-type: none"> <li>➤ In Global Outsourcing 100 (rating by IAOP) since 2008. Auriga constantly receives top marks for Customer References.</li> <li>➤ In Global Services 100 (by Global Services Media and neoIT) since 2006. The company is ranked among the “Top 10 Service Providers: Eastern Europe”.</li> <li>➤ In the Black Book of Outsourcing (by Datamonitor) c 2006. In 2011 Auriga is ranked the No. 1 Engineering Services Outsourcing (ESO) provider worldwide. In 2010 Auriga was named #15 in the prestigious “Global Top 50 Vendors” list.</li> <li>➤ Auriga is included in overall Top 20 of software R&amp;D service providers and in Top 10 among the companies serving Software industry, in a 2009 ranking of service providers in India, China, Russia, Ukraine &amp; CEE by Zinnov Management Consulting.</li> <li>➤ Microsoft Silver Partner in Software Application Development since 2010</li> </ul>
<b>Certification</b>	ISO 13485
<b>Partnerships</b>	Parasoft, Aquantia
<b>About Auriga</b>	<p>Established in 1990, Auriga (<a href="http://www.auriga.com">www.auriga.com</a>) is recognized as one of the Top-100 leading outsourcing software R&amp;D providers worldwide. Headquartered in Boston, MA with 500+ employees, seven development centers across six time zones, 13+ embedded testing R&amp;D labs and 100+ projects yearly for medical device, automobile and construction tools manufacturers, telecom and power management companies, chip manufacturers, our company offers maximum flexibility in terms of processes, communications, issue resolution while conduct project in strict compliance to quality and risk management standards (ISO 13485).</p>
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# CUSTIS®

CUSTIS has 20-years of experience providing a comprehensive service for conceptual design, development, solicitous implementation and maintenance of IT systems for major banks, retailers and government institutions.

**The company's mission** is to work on strategic development of its customers, solving critical business problems with IT-tools, and to support innovative technology projects, which are to open new opportunities for companies and industries.

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- Retail
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- Higher education
- Housing and utilities sector
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# CUSTIS®

## **CUSTIS solutions**

CUSTIS specializes in creating large-scale IT solutions that provide competitive advantages and better quality of customers' key processes. Today, the company develops corporate solutions in higher education, treasury management and capital investment.

**The Treasury Management System class solution** automates payment functions of a group's single treasury, centralizes the payment process and improves liquidity management. The automation of cash management common operations reduces the time for applications and payments alignment from a few days to a few minutes. In addition, the solution allows to strengthen the analytical activity of the Treasury, providing tools for cash flow forecasting and modelling. In 2019, the service was awarded the CNews AWARDS prize in the nomination "IT in the service of business: the best solution for liquidity management of an industrial group".

**Capital Investments Platform** helps to control large investment projects in industry and capital construction at all stages. The platform provides tools for the implementation of extended banking support, makes all processes transparent to the participants. The solution helps investment companies and large businesses to track the cost and timing of the project in real time, improve the implementation efficiency and make informed investment decisions.

**Modeus cloud platform system** supports technological transition to the personalization of higher education. The service allows universities to design a new educational space and implement a modular approach to the educational process management. Modeus distributes teachers' workload and creates thousands of academic schedules automatically.

[www.custis.ru](http://www.custis.ru)

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**First Line Software**

**Founded in:** 2009

**Size:** 700+

### **About:**

First Line Software is a premier provider of custom software development, technology enablement services and value-add consulting in big data engineering, digitalization, intellectual integration, industrial Internet and IoT, digital media and marketing, and enterprise content management as well as healthcare IT.

Headquartered in the US, First Line employs 700+ staff globally. First Line team and company culture is centered around subject matter expertise, technical excellence, consulting capabilities and proven methodologies, with a strong focus on Agile and Intellectual Integration.

The company has been recognized with multiple annual rankings and awards by the International Association of Outsourcing Professionals (IAOP), Global Services, CorporateLiveWire, Insights Success, Ventana Research and CNews.

We were the first to be awarded with the Scrum Capability Medallion by Scrum, Inc. Most recently, research firm Gartner included First Line in their first ever Market Guide for Technology Integrators (2014) and the Cool Vendor in Applications Services 2015 Report. We are active members in Object Management Group and Industrial Internet Consortium. FLS is also an Episerver Solutions Partner.

First Line ran over 1000 projects in 25 countries in 14 different industries. We have global clients across North America, Europe and Australia, including Accenture, Bonnier Group, Clinic to Cloud, Dell Software, InnerWorkings, Partners HealthCare, Odysseus Data Services, Solita, Viastore, and others.

### **Development centers:**

- ✓ St.Petersburg,
- ✓ Moscow
- ✓ Nizhny Novgorod
- ✓ Prague
- ✓ Brno
- ✓ Hague
- ✓ Boston
- ✓ Seattle
- ✓ Singapore

**Certification:** ISO 9001, Scrum.



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**Size:** 700+

**Technologies & Platforms:**

- .NET
- Databases and data processing
- ECM/BPM
- Microsoft technologies
- Mobile technologies
- JAVA SE/EE
- Messaging Queue
- C++
- Big Data / Hadoop
- QA management
- UI / UX
- CI
- Application servers
- Content management / e-commerce

**Partners:**

Bonnier Group, Dell, RW3, Pfizer, ClickSquared, Episerver, InnerWorkings, Tupperware, Solaris Development, Web2print, Geotraq, Viastore and others.

**Web site:**

[www.firstlinesoftware.com](http://www.firstlinesoftware.com)

**Contacts:**

**USA / Worldwide Sales**

16192 Coastal Highway, Lewes, DE 19958,  
+1 (877) 737 7178

**Europe**

Louis Couperusplein 2, 2514HP The Hague, The Netherlands,  
+31 (70) 512 1899  
Na Havrance 1508/14, 143 00 Praha 12, Czech Republic,  
+420 (2) 28884855

**Email:**

[sales@firstlinesoftware.com](mailto:sales@firstlinesoftware.com),  
[info@firstlinesoftware.com](mailto:info@firstlinesoftware.com)



**ICL Services** is a Russian IT service company (part of the ICL group company) operating on the domestic and international markets.

The company has more than 1800 employees working successfully with more than 80 customers from 30 countries, providing maintenance IT services 24 hours 7 days a week in Russian, English, French and German.

**ICL Services offices** are located in Kazan, Moscow, Voronezh, Vladivostok and Belgrade (Serbia).

Among the company's **customers**: Ozon, Renaissance Capital, Kelly Services, Spring Mobile Solutions, YUM! Brands and other major market players. The company is a Fujitsu key business partner.

**Certificates:** ISO 27001, ISO 9001-2015, ISO 20000

**Methodologies:** Agile (Scrum, Extreme Programming, Kanban), Essential Unified Process, PRINCE2

### **Key areas of activity:**

#### **SERVICES:**

- **Service Desk**
- **Field support in Russia and the CIS countries**  
Provides fast, high-quality and authorized service for a wide range of equipment from different manufacturers in Russia and the CIS countries.
- **Support, transformation and integration of IT infrastructure and systems**  
It is carried out in accordance with the service approach, ITIL recommendations and established SLA. Ensuring the smooth operation of systems.
- **Development, implementation and maintenance of applications**  
It includes end-user support, development work, software integration, as well as application and database migration service.
- **IT and business consulting**  
A business consulting service using tools allows you to quickly analyze a business process based on facts and objective evidence and formulate recommendations for its improvement. IT consulting, in turn, provides the customer with comprehensive professional support in the field of information technology, aimed at managing, organizing and developing the company's IT infrastructure.
- **Digital solutions (Machine learning, AI, IoT)**  
Development of solutions based on artificial intelligence, development, implementation and support of solutions of the Internet of Things class, virtual and augmented reality, robotization of business processes and monitoring the functioning of business applications.

## **SOLUTIONS:**

ICL Services solutions will improve the effectiveness of business process management of the client company as a whole. These solutions will also improve economic effect due to reduce in development time and adoption of new activities.

The company's solutions are offered to customers in the field of Finance, Energy and Engineering, Logistics and Retail.

### **ICL Services provides:**

- comprehensive service of all components of the IT infrastructure from data centers and user workstations to critical complex business applications using advanced methodologies and flexible service models;
- guaranteed availability of IT infrastructure and applications, as well as full compliance with the agreement on Service Level Agreement (SLA);
- minimization and sharing of risk of IT infrastructure management with the customer;
- transformation and upgrading IT infrastructure using efficient technologies;
- the growth of business performance through reliable and stable IT services.

## **Industry Achievements:**

- ✓ TOP-100 in The Global Outsourcing 100 rating, according to the International Association of Outsourcing Professionals (IAOP);
- ✓ Winner of the “Time for Innovation” prize in the nomination “Product of the Year” and “Technological Innovation of the Year” in the category “IT and Digital Technologies” (2018);
- ✓ TOP-3 of the SDI (Service Desk Institute) in the nomination “The best large Enterprise Managed Service Provider”;
- ✓ TOP-7 in the IT Europe competition in the category “Data, information management or Analytics solution of the year”;
- ✓ Winner of the contest “Russian Organization of High Social Efficiency” in the nomination “Creation and Development of Jobs in Non-Productive Organizations”.

## **Contacts:**

ICL Services

Head office: 42, Dorozhnaya Str., Usady, Laishevskij area, 422624

<https://icl-services.com/eng>

[pr@icl-services.com](mailto:pr@icl-services.com)

8-800-333-98-70



## Participants of the Survey

### Embedded software (equipment, devices)

Barsum	St.Petersburg	www.barsum.ru	info@barsum.ru	812 449-17-00
Getmobit	Dubna	www.getmobit.ru	emarkova@getmobit.ru	495 796-22-96
IECI	Perm	www.ieci.ru	Politov@pss.ru	912 059-02-84
RAIDIX	St.Petersburg	www.raidix.ru	request@raidix.com	812 622-16-80
Research Center «Module»	Moscow	www.module.ru	info@module.ru	495 531-30-80
Rhonda Software	Vladivostok	www.rhondasoftware.com	lc@rhondasoftware.com	4232 30-35-00
RTSoft	Moscow	www.rtsoft.ru	info@rtsoft.ru	495 967-15-05
SB-Soft	Tver	www.sb-soft.pro	rad@electro-box.com	916 656-56-88
Z-Wave.Me	Moscow	www.z-wave.me	info@z-wave.me	8(800)550-7264

### Replicated enterprise (institution) management, document flow automation, design and production process systems (ERP, CRM, ECM, EDMS, CAD, APCS and other)

ASGOR	Chelyabinsk	www.asgor.su	sale@asgor.su	351 729-88-98
Awara IT	St.Petersburg	www.awara-it.com	info@awara-it.com	812 244-04-40
BI-Consulting	Moscow	www.bi-cons.ru	info@bi-cons.ru	499 502-51-59
Contek Soft	Tomsk	www.contek.ru	vold@contek.ru	913 829-38-82
Digital Design	St.Petersburg	www.digdes.ru	Podstrelov.N@digdes.com	921 897-39-81
Docsvision	St.Petersburg	www.docsvision.com	info@docsvision.com	8 800 505-05-65
GoodLane	Tomsk	-	info@goodlane.ru	3882 33-96-60
IndorSoft	Tomsk	www.indorsoft.ru	support@indorsoft.ru	8 800 333-08-05
iSpring	Yoshkar-Ola	www.ispring.ru	press@ispring.ru	8 800 333-78-73
KAMIS	St.Petersburg	www.kamis.ru	info@kamis.ru	812 274-35-22
Monolit-Info	St.Petersburg	www.monolit.com	alex@monolit.com	812 334-95-95
Nautsilus	Moscow	www.nautsilus.ru	info@nautsilus.ru	495 939-58-72
New Athena	Moscow	www.newathena.ru	inform@newathena.ru	495 651-84-95
OblTeh	Taganrog	www.oblteh.ru	info@oblteh.ru	863 333-29-74
Oreluchet	Orel	www.oreluchet.ru	lc@oreluchet.ru	4862 44-53-23
Pro-Log	Kazan	www.pro-log.ru	market@pro-log.ru	843 524-77-72
Profit	Rostov-on-Don	www.profit-ug.ru	i.rubanova@profit-ug.ru	863 237-06-89
PROMT	St.Petersburg	www.promt.ru	julia.epiphantseva@promt.ru	812 655-03-50
SPC «KRUG»	Penza	www.krug2000.ru	krug@krug2000.ru	8412 49-97-75
Telebreeze	Tomsk	www.telebreeze.com	info@telebreeze.com	913 849-35-07
ValMaster	St.Petersburg	www.valmaster.ru	info@valmaster.ru	812 329-44-59

### Computer games

RedSpell	Orel	www.redspell.ru	hello@redspell.ru	909 230-21-51
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## Basic software development (DBCS, OS, office applications, virtualization tools, programming languages and tools)

RELEX	Voronezh	www.relex.ru	market@relex.ru	473 271-17-11
TM Automatics	Taganrog	www.tmavt.ru	office@tmavt.ru	863 256-95-90
UNIGINE	Tomsk	www.unigine.com	info@unigine.com	3822 55-34-58
Wentor Software	Barnaul	www.wentor.ru	support@wentor.ru	903 947-66-12

## Information security solutions

IIDM	Moscow	www.iidm.ru	info@iidm.ru	495 796-92-00
A-Real Consulting	Yaroslavl	https://xserver.a-real.ru	hello@a-real.ru	8 800 555-9297
AltEll	St.Petersburg	www.altell.ru	info@altell.ru	812 309-05-88
Atlansys Software	Tver	www.atlansys.ru	info@atlansys.ru	495 470-09-92
Macroscop	Perm	www.macroscop.com	info@macroscop.com	8 800 555-0043
Slavservis-Svyaz	Orel	www.slavservis.ru	sss@slavservis.ru	4862 25-52-24
Smart-Soft	Kolomna	www.smart-soft.ru	info@smart-soft.ru	495 77-55-991

## Navigation systems & Geographic information systems (GIS)

Geoscan Group	St.Petersburg	www.geoscan.aero	info@geoscan.aero	921 563-00-81
Internet-Frigate	Novocherkassk	www.job.ifrigate.ru	main@ifrigate.ru	8635 22-41-10
MosMap	Moscow	www.mosmap.ru	mosmap@mosmap.ru	495 542-01-49
OptiPlat	Novosibirsk	www.optiplat.ru	info@optiplat.ru	383 363-18-99

## Mobile applications

Asmo-Press	Moscow	www.Asmo.media	Support@asmo.media	499 990 -55-32
Balalaika Studio	Orel	www.balalaika.studio	mail@it-srvs.ru	4862 48-98-99
Hawk House Integration	Moscow	www.hawkhouse.ru	info@hawkhouse.ru	499 703-03-18
OMOBUS	Moscow	www.omobus.ru	info@ak-obs.ru	495 991-24-10
RadioToolkit	Orel	www.radiotoolkit.com	support@radiotoolkit.com	920 282-76-68
Shark Develop	Novosibirsk	www.sharkdevelop.com	support@sharkdevelop.com	983 315-86-66

## Website designing

Bitrixoid	Novosibirsk	www.b-id.ru	info@b-id.ru	383 380-52-59
OrelSiteStroy	Orel	www.orelsite.ru	office@orelsite.ru	4862 22-20-18
SibDS	Omsk	www.sibds.com	contact@sibds.com	8 800 500-03-86
Studio T	Tomsk	www.tdsgn.ru	mail@tdsgn.ru	499 346-66-40
Webpractik	Rostov-on-Don	www.webpractik.ru	info@webpractik.ru	863 303-20-38

## Custom software development

7bits	Omsk	www.7bits.it	at@7bits.it	909 535-00-73
ABISoft	St.Petersburg	www.abisoft.spb.ru	info@abisoft.spb.ru	921 936-12-80
AndSoft	St.Petersburg	www.andsoft.ru	admin@andsoft.ru	921 301-20-85
Arcadia	St.Petersburg	www.softwarecountry.ru	info@softwarecountry.ru	812 610-59-55
Arsis	Moscow	www.arsis.ru	info@arsis.ru	495 980-29-31
Artezio	Moscow	www.artezio.com	sales@artezio.com	495 981-05-31
AstroSoft	St.Petersburg	www.astrosoft.ru	Konstantin.Tsivin@astrosoft.ru	812 670-90-95
ASys Soft	Zelenograd	www.asys.ru	asys@asys.ru	499 645-53-64
Auriga	Moscow	www.auriga.com	pr@auriga.com	495 713-99-00
BACUP IT	Novosibirsk	www.rabis.biz	info@bacup.ru	383 325-07-71
BaltPoint	St.Petersburg	www.baltpoint.com	info@baltpoint.com	812 600-68-44
Bingosoft	Nizhny Novgorod	www.bingosoft.ru	post@bingosoft.ru	831 422-42-32
CodeInside	Penza	www.codeinside.ru	info@codeinside.ru	8412 63-67-36
CUSTIS	Moscow	www.custis.ru	sales@custis.ru	495 772-97-02
DaleSoft	St.Petersburg	www.dalesoft.ru	office@dalesoft.ru	921 952-44-47
Dom Programm	St.Petersburg	www.domprog.com	info@domprog.com	812 320-21-36
DUNICE	Taganrog	www.dunice.net	hello@dunice.net	495 478-18-56
DynSoft	Moscow	www.dynsoft.ru	main@dynsoft.ru	495 789-09-27
Econophysica	Tomsk	www.econophysica.ru	contactus@econophysica.com	3822 90-06-01
Effective Technologies	Nizhny Novgorod	www.effective-group.ru	info@effective-group.ru	-
ENBISYS	Tomsk	www.enbisys.com	info@enbisys.com	3822 99-00-49
Erminesoft	Novosibirsk	www.ermesoft.com	denis@.ru	(+1) 805-364-54-33
eDevelopers	St.Petersburg	www.evelopers.com	info@evelopers.com	812 324-32-11
FIRECODE	Rostov-on-Don	www.firecode.ru	info@firecode.ru	918 579-77-73
First Line Software	St.Petersburg	www.firstlinesoftware.com	irina.ribchenko@firstlinesoftware.com	906 279-00-25
FogStream	Khabarovsk	www.fogstream.ru	org@fogstream.ru	4212 20-79-81
GDC Services	Kazan	www.icl-services.com	pr@icl-services.com	8 800 333-98-70
INOSTUDIO	Taganrog	www.inostudio.com/ru	russoft@inostudio.com	8634 32-03-18
Inreco LAN	Vladimir	www.inrecolan.ru	sergey.pyatigorskiy@inrecolan.com	910 777-50-17
Instream	Moscow	www.instream.ru	zakaz@instream.ru	495 255-15-45
Itransition	St.Petersburg	www.itransition.com	info@itransition.com	495 640-89-37
KODE	Tomsk	www.kode-t.ru	ee@appkode.ru	909 542-21-69
Lanit-Tercom	St.Petersburg	www.lanit-tercom.ru	contact@lanit-tercom.com	911 982-10-21
Limon	Perm	www.it-limon.ru	info@it-limon.ru	342 229-52-38
Linkorn	Saratov	www.linkorn.ru	info@linkorn.ru	8452 37-62-19
Luxoft	Moscow	www.luxoft.com	Ozolotikh@luxoft.com	495 967-80-30
M-TE	St.Petersburg	www.m-te.ru	soft@m-te.ru	812 933-69-51
Meotyda	Taganrog		idsidorov@gmail.com	903 402-95-76
Nanosemantics Lab	Moscow	www.nanosemantics.ai	hello@nanosemantics.ai	495 995-58-72
Oggetto	Taganrog	www.oggetto.ru	paul@oggettoweb.com	989 612-70-00

Reksoft	St.Petersburg	www.reksoft.com	rfi@reksoft.ru	812 325-21-01
Rubius	Tomsk	www.rubius.com	info@rubius.com	3822 97-77-72
SeaMobile	St.Petersburg	www.mobilesol.ru	info@mobilesol.ru	812 380-38-14
Sib-Soft	Tomsk	www.sib-soft.ru	sales@sib-soft.ru	3822 90-10-32
SibEDGE	Tomsk	www.sibedge.com	contacts@sibedge.com	3822 70-18-41
SimbirSoft	Ulyanovsk	www.simbirsoft.com	info@simbirsoft.com	8422 44-66-91
Simple Soft	St.Petersburg	www.simple-soft.ru	info@prostoysoft.ru	812 987-42-24
Smart Design	St.Petersburg	www.smddev.com	info@smddev.com	812 932-71-50
SMARTIUS	Perm	www.smartius.ru	info@smartius.ru	968 062-40-05
SoftInform	Tomsk	www.softinform.to	sales@sib-soft.ru	3822 90-10-32
Stride	Kazan	https://stride.one	work@stride.one	900 320-00-60
Vprogram	St.Petersburg	www.vprogram.ru	contact@newvoice.ru	812 335-05-15
UBTec	Rostov-on-Don	www.ubtec.ru	taktarov@ubtec.ru	918 555-46-59
UNIPRO	Novosibirsk	www.unipro.ru	marketing@unipro.ru	383 373-24-63
Usetech	Moscow	www.usetech.ru	info@usetech.ru	495 660-50-48

## Others

ABS Soft	Moscow	http://pct.ru	info@abssoftware.ru	495 797-89-97
ALESTA Software & Services	Moscow	www.alesta.ru	info@alesta.ru	495 954-97-50
AM Soft	Moscow	www.amsoft.su	order@amsoft.su	499 65-56-35
ASPO	St.Petersburg	www.aspo-spb.ru	aspo@aspo-spb.ru	812 710-88-63
Budget and Financial Technologies	Moscow	www.bftcom.com	info@bftcom.com	495 784-70-00
CDNvideo	Moscow	www.cdnvideo.ru	info@cdnvideo.ru	495 782-17-32
CloudTech	St.Petersburg	-	denis.miliushchenko@gmail.com	921 998-75-08
DOC	Kaluga	www.doc.kaluga.ru	doc@kaluga.ru	910 915-70-73
E-Contenta	St.Petersburg	www.e-contenta.com	info@e-contenta.com	921 862-96-04
Expasoft	Novosibirsk	www.expasoft.com	expasoft@expasoft.ru	383 281-94-92
GPR	Moscow	www.gpr.ru	103@gpr.ru	985 262 17-20
Inside Systems	Moscow	https://inside-systems.ru	info@inside-systems.ru	499 322-00-62
Inventos	Orel	www.inventos.ru	d.bersenev@inventos.ru	909 230-21-51
Kibernetika	Nizhny Novgorod	www.kibernetika.net	info@kibernetika.net	908 164-26-46
Kosta	St.Petersburg	www.kostasoft.ru	info@kostasoft.ru	812 320-06-07
Kvadrat-A	Moscow	www.kvadrat-a.ru	info@kvadrat-a.ru	495 799-49-46
Loginom	Ryazan	www.loginom.ru	market@loginom.ru	495 222-71-17
Next Tehnika	Vladivostok	www.nexttehnika.ru	nextteh@mail.ru	4232-60-01-12
NIP-Informatica	St.Petersburg	www.nipinfor.ru	maxim.grishko@nipinfor.ru	812 321-00-55
Parallels	Moscow	www.parallels.com/ru	info@parallels.com	495 783-29-77
Proxima.TV	Orel	www.proxima.tv	ask@proxima.tv	909 230-21-51
QASQUAD	Novosibirsk	www.qasquad.com	hello@qasquad.com	913 768-67-01
Simtech	Ulyanovsk	www.simtech.ru	ceo@simtechdev.com	927 818-93-58
SMS-IT	Samara	www.sms-it.ru	info@sms-it.ru	846 205-79-00
Wimark Systems	Moscow	www.wimark.com	info@wimark.com	916 713-29-98



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St.Petersburg,199034, Russia  
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[www.russoft.org](http://www.russoft.org)