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The IT Industry in Belarus:

2017 and Beyond

THIS REPORT CONTAINS INFORMATION AS OF 30 APRIL 2017

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FOREWORD

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The digital transformation of all aspects of business is on management's agenda in companies everywhere in the world. Today, three key factors driving a company's success and future prospects are the ability to create and manage digital technology, access to technology talent, and the speed and cost of transformation. In the world of technology, where borders between countries tend to fade, it is essential to identify promising locations, find reliable partners, and make well-considered investments.

The IT industry in Belarus has grown and developed substantially in the last decade. We are convinced that the industry has great promise, and we are seeing ever increasing interest in Belarusian IT companies from other countries and our clients.

We are pleased to present **The IT industry in Belarus: 2017 and Beyond**, a report prepared by EY experts to give you an idea of the country's IT industry and its potential.

We have tried to bring together all the essential statistical and analytical information on the country and its business environment, and on the IT industry and IT companies in Belarus, as well as to forecast key industry figures for the future.

In preparing this report, we analyzed available statistics, conducted a large number of interviews with industry experts, and surveyed numerous IT companies.

We trust that you will find the information in this report useful.

If you have any questions or would like to explore the Belarusian IT industry in greater depth, EY experts will be happy to provide support and assistance.

Enjoy the journey!

EXECUTIVE SUMMARY

The Republic of Belarus is a country in Eastern Europe with a population of around 9.5 million. The capital, Minsk, with a population of some 2 million, is the 11th largest city in Europe and Belarus's economic and educational center, as well as its main technological cluster.

The IT industry plays a key role in the economy of Belarus. During the last 10 years Belarus's IT industry has distinguished itself from other sectors of the economy by steadily growing revenues, exports, workforce, and other indicators.

The information and communication technology (ICT) sector currently has a workforce of over 85,000, including some 34,000 in the IT products and services segment. Another 30,000 IT specialists are employed in sectors of the economy other than ICT according to our estimates. There are currently no official statistics on the overall number of ICT specialists in Belarus, but we conservatively estimate the number at over 115,000.

Foreign demand for the products and services of companies in Belarus's IT industry has seen strong growth in recent years. Exports of IT products and services increased by a factor of more than 30 in the period from 2005 through 2016, with the share of IT exports in the country's total exports of goods and services rising from 0.16% to 3.25%. The IT industry has emerged as the second-largest contributor to the positive balance of service exports (after the traditionally dominant transportation services). A positive external trade balance is important for Belarus's economy, and a range of measures are being taken to encourage export-oriented industries. Over 90% of the market for Belarusian IT companies is external and involves exports, but the state retains a strong influence over the industry in the form of local laws regulating the business environment.

In the IT products and services segment, these measures include the Hi-Tech Park (HTP), a special regime for IT companies that was introduced in 2006 and applies throughout the country. Resident companies enjoy important government support: they are exempted from most taxes, including value-added tax and income tax. Further, employees of the resident companies enjoy a 30% reduction in personal income tax compared with other sectors of the economy. Due to the HTP, Belarus managed to build a mature export-oriented software development industry and became a significant player on the IT services market in Europe in just 10 years. According to Gartner, Belarus is among the nine most attractive locations for Outsourcing, Shared Service & Captives in the Europe, Middle East and Africa region. Today, Belarus Hi-Tech Park is a major IT cluster with over 30,000 software engineers employed there.

Under national law, Hi-Tech Park residents can provide services involving information-system analysis and software design and development (IT consulting, audit, maintenance of national information networks, database development, and implementation and support of corporate information systems). Since 2015, Hi-Tech Park residents have also been involved in new R&D activities (micro-, opto- and nanoelectronics, mechatronics, telecommunications, radar ranging, radio navigation and wireless communication), information security, establishment of data-processing centers, etc. As a result of the IT industry's development, the range of activities needs to be broadened to meet the needs of companies developing their own products, whose form of monetization may differ from that permitted at the present time (advertising revenues, for example). On the whole, industry experts and companies have a high opinion of the Hi-Tech Park's business climate – from the point of view of taxes as well as other areas of cooperation with the state.

Hi-Tech Park residents may be categorized as follows:

- Companies specializing in IT services
- Companies specializing in developing and supporting their own products (including startups)
- Captive centers or R&D centers of foreign technology companies

At the first stage of its development the Hi-Tech Park was established as a regime for outsourced software development and IT services based on the offshore model. This line of business still prevails among residents. Five out of ten of the world's largest corporations, according to Forbes rankings, are customers of the Hi-Tech Park, and its residents supply software products and IT services to 67 countries globally. Six of the Park's residents have been selected as 2017's best outsourcing service providers – listed in the 2017 Global Outsourcing 100 – by the International Association of Outsourcing Professionals (IAOP).

Facts about IT in Belarus

BELARUS

9.5
million population in 2017

80+
countries' citizens allowed visa-free entry

37th
place out of 190 for Belarus in the World Bank Doing Business 2017

48.3%
share of services in GDP, 2016

ICT SECTOR

85,000
employed in ICT sector, 2016

5.1%
share of ICT sector in GDP, 2016

2.2%
share of ICT sector in total employment, 2016

USD 1.4b
foreign investment in ICT sector, 2015

IT PRODUCTS AND SERVICES

34,000
employed in IT products and services, 2015

USD 1b
revenue from IT products and services, 2015

25%
share of IT products and services in ICT sector revenue, 2015

15.9%
CAGR of IT products and services revenue, 2011-2015

COMPUTER SERVICES EXPORTS

USD 956.8m
Computer services exports, 2016

USD 100
computer services exports per capita, 2016

30
times increase in share of computer services in total exports, 2005-2016

28.4%
CAGR of computer services exports, 2011-2016

HI-TECH PARK

181
Hi-Tech Park resident companies, 2017

30,000+
Hi-Tech Park residents' headcount, 2017

85%
share of Hi-Tech Park residents' exports in computer services exports, 2016

30
times growth in computer services exports since Hi-Tech Park's creation, 2005-2016

HTP RESIDENTS

>30%
of Fortune 200 have worked with HTP residents

8,000+
are employed in the EPAM Systems development center in Belarus

69%
of HTP residents are engaged in IT services outsourcing

55%
of HTP residents are under foreign or joint ownership, 2017

MEASURES OF STATE SUPPORT FOR HTP RESIDENTS

0%
VAT, corporate profit tax and offshore duty

5%
withholding tax on dividends, interest and royalties

30%
reduced personal income tax for employees (9% instead of 13%)

USD 2,140
total payroll costs for an employee with USD 1,800 net monthly salary

EDUCATION

29.4%
share of people with higher education in total employment, 2014

24%
share of STEM students in higher education system

15,000
STEM graduates, 2016

1st place
Belarus in overall Google Code Jam rankings, 2003-2016

LABOR

76%
share of IT workforce with higher education, 2016

USD 2,012
average gross monthly salary of HTP residents' employees, 2016

USD 1,500
median developer's gross monthly salary, 2016

7.6%
share of women in the Hi-Tech Park workforce, 2016

Custom software was initially developed by companies to satisfy Belarus's domestic demand. The successful development of the mobile and gaming segments has provided a major impetus for Belarusian developers, and today there are many companies in Belarus successfully developing their own products, such as Game Stream (Wargaming), Apalon, Vizor, etc. Nowadays, mobile applications developed by HTP residents are used by more than 1 billion people in over 150 countries of the world. World of Tanks, a product by Wargaming, is one of the five most profitable MMO games with over 140 million registered users.

There have been several high-profile deals with Belarus-based companies over the last four years, e.g. Viber, Maps.me, MSQRD, and Juno. As a rule, successful Belarusian startups are taken over by foreign companies, but carry on with their development projects in Belarus. The startup MSQRD was a prime example of success in 2016. It caught the attention of the world's largest social network, Facebook, which later acquired it. Today, MSQRD's technologies are implemented in Facebook core products and used by billions of users.

Some major international companies have already opened captive centers or global in-house centers in Belarus, benefiting from the high qualifications, relatively low labor costs and preferential legal regime offered by the Hi-Tech Park. The best known include the captive centers of IHS Markit, Playtika, Netcracker, Viber, Yandex, Fitbit, Ciklum and SK Hynix.

The birth and dramatic growth of Belarus's IT industry has been made possible by the country's system of STEM (Science, Technology, Engineering, and Mathematics) education. Technology-related education is provided exclusively by state universities. There is broad access to higher education, as a result of which over 40% of students currently study for free. In order to satisfy their own staffing needs, private companies in the IT industry work on a contractual basis with state educational institutions, arranging for certain disciplines and special courses to be taught by company experts, establishing branch departments in IT companies, setting up labs in cooperation with educational institutions, and making employees available to teach cutting-edge IT disciplines. These activities, financed by IT companies as an investment in the education system, substantially enhance the quality of graduates. Moreover, major IT companies have their own training centers that prepare students to better meet companies' needs.

Experts in the IT industry note that educational institutions need higher budgets and more flexible educational processes in order to further prepare the IT specialists needed on the market. Overall, cooperation between the state education system and companies in the IT industry has ensured strong development of the IT industry for the last 15 years.

The average salary in the ICT sector is higher than in other sectors of the economy. The average monthly salary in Belarus as a whole in 2016 was about USD 400, while the average salary in the ICT sector was around USD 1,800. Due to its high level of compensation, the IT industry is able to attract and retain a better qualified workforce than other sectors. The migration of qualified IT specialists from other areas of the economy to IT products and services is the second contributor, after the education system, to the quantitative growth of IT companies. Higher salaries and tax benefits have significantly reduced the outflow of IT specialists to other countries (the brain drain). In fact, the

INFRASTRUCTURE

USD 15-25
rent for 1 sq. m. in A-class business centers, 2016

36th place
out of 167 for Belarus in the ICT development index, 2015

10+ million
internet user nodes

75%
of territory covered by 3G/4G networks, 2016

INTERNATIONAL RANKINGS

10
Software 500 companies with development centers in Belarus, 2016

6
HTP resident companies included in Global outsourcing 100, 2017

FORECASTS

15-20%
expected annual headcount growth rate for most HTP residents

USD 1.3-1.4b
EY estimate of HTP residents' revenue in 2020

36-40 thousand
EY estimate of HTP residents' headcount in 2020

USD 2,400
EY estimate of HTP residents' average salary in 2020

current trend is just the reverse: qualified specialists are being hired from other countries. One of the key problems faced by companies on the labor market is the stiff competition for qualified specialists and their rising cost for companies. In the current conditions, we foresee further growth in the salaries of IT specialists over the next few years, but despite this growth, the cost of services provided by Belarusian IT companies remains quite competitive compared with other companies in Eastern Europe. This is largely due to the low average level of salaries in Belarus and the considerable benefits that companies receive.

In the near term, we expect to see continued growth in the performance of Hi-Tech Park residents, including revenues, headcount and average salaries. Key growth drivers include competitive advantages under the Hi-Tech Park regime and global growth of the IT products and services segment, making it easy for Belarusian companies to find new clients and consumers abroad. Although growth rates in the industry are now slowing, rapid development could continue if the state makes the decisions needed to promote IT education and the IT industry. Draft laws that would offer additional benefits to IT companies are currently under discussion. If the initiatives are approved, the IT industry is likely to follow an "accelerated development" scenario. If the current situation persists, we estimate that Hi-Tech Park companies will have a workforce of around 36-40 thousand by 2020, and resident companies should have revenues of between USD 1.3 billion and USD 1.4 billion.

The success story of the Belarusian IT industry and the Hi-Tech Park shows how favorable conditions and talent were brought together at the right time to launch a new high-demand sector in the country. Belarusian IT companies are now creating their own success stories, and many are gaining worldwide recognition.

We believe that the IT industry in Belarus deserves greater attention from companies looking for technology partners or areas for investment.

In preparing this report, we have brought together information needed to give a complete picture of the IT industry in Belarus, and we hope that readers will find it useful.

Thank you!

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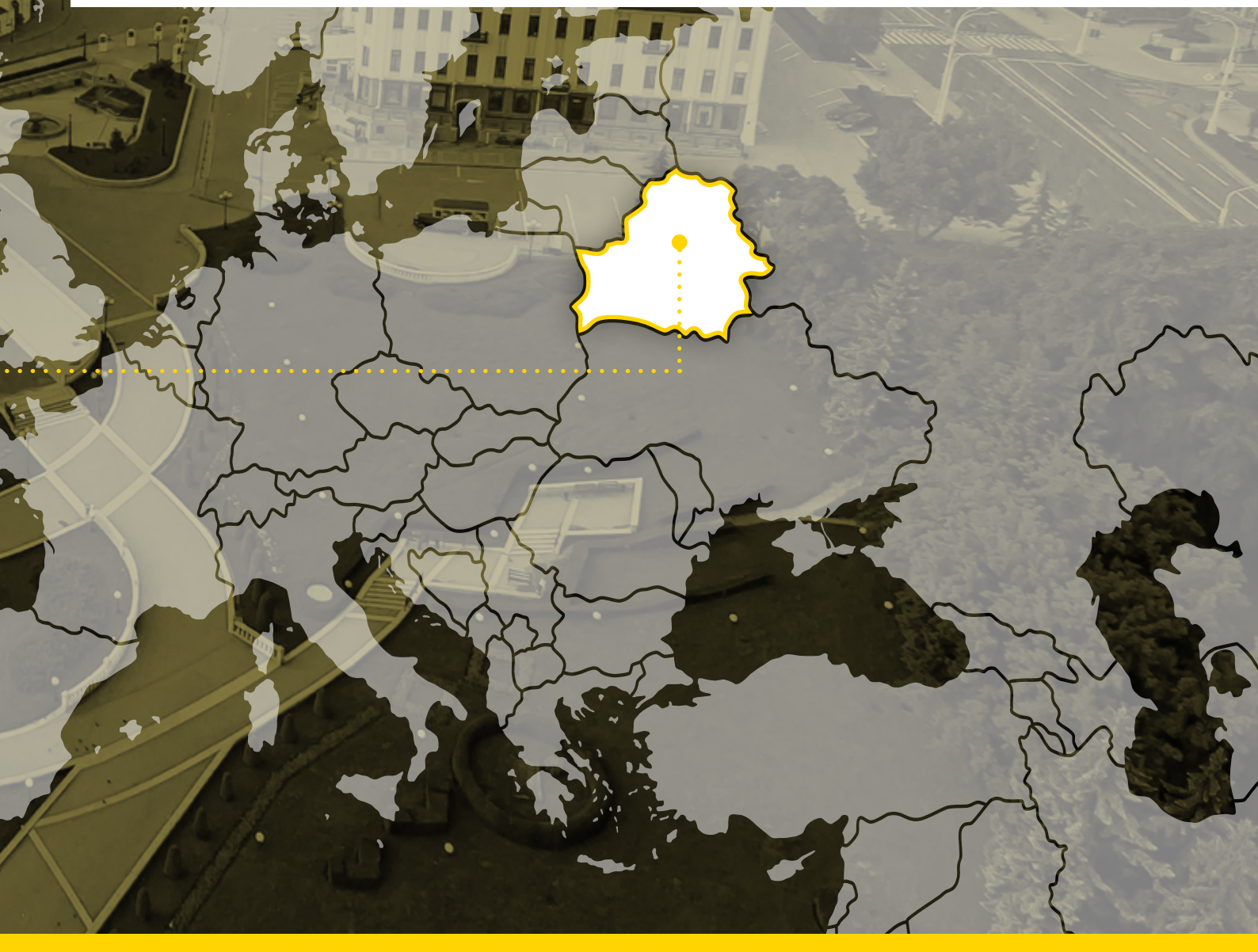
BRIEF INFORMATION ABOUT THE REPUBLIC OF BELARUS



General information

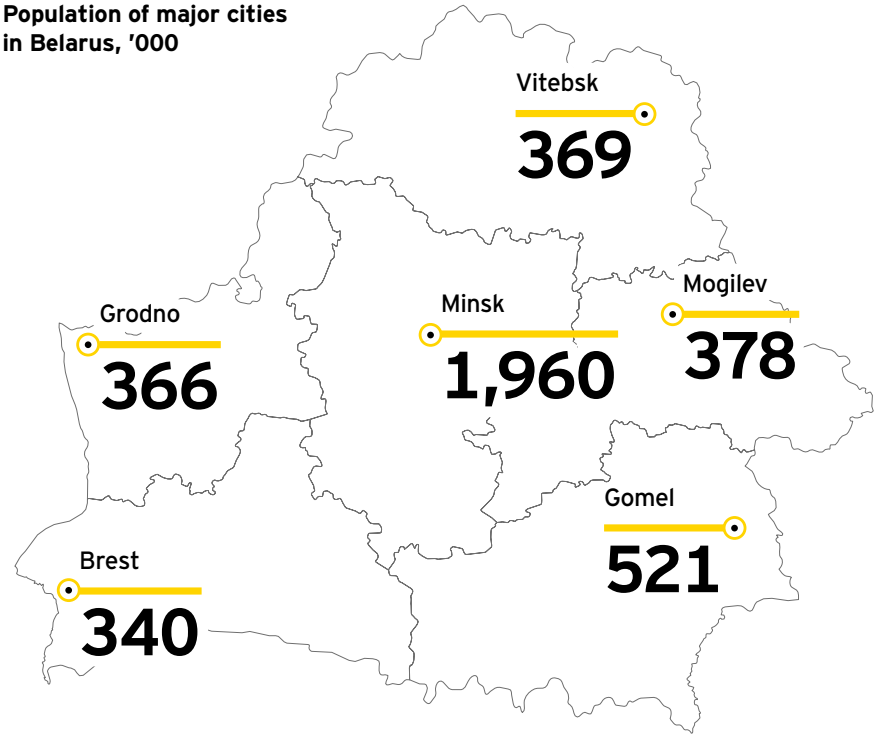
The Republic of Belarus is a country in Eastern Europe bordered by Poland, Lithuania, Latvia, Russia and Ukraine. Belarus is the 20th most populous country in Europe and 13th in terms of area.

The capital, Minsk, is the 11th largest city in Europe and Belarus's main technological cluster as well as its economic and educational center. The country's other major cities are the administrative centers Gomel, Vitebsk, Mogilev, Grodno and Brest.

Belarusian and Russian are the official languages of Belarus. Russian is the most widely used for business purposes. The most common foreign languages are English and German.

Belarus is in the FET time zone (UTC+3).

Population of major cities in Belarus, '000



Visa-free travel

Belarus introduced five-day visa-free travel for citizens of 80 countries, including EU member states, on 12 February 2017. A full list of these countries is available on the official website of the Belarusian Ministry of Foreign Affairs (http://mfa.gov.by/upload/17.01.11_list_states_eng.pdf).

Foreign nationals entering Belarus at Minsk National Airport for a period of no more than five days do not need a visa. In all other cases, visitors to Belarus must obtain a visa. Entry visas are issued by Belarus diplomatic missions and consular offices in foreign countries. As a rule, foreigners may also apply for a visa at the airport upon arrival (requires preliminary arrangements).

Flight times from Minsk to other cities

City	Flight time
London	3 hours
Moscow	1 hour, 20 minutes
Paris	3 hours
Frankfurt	2 hours, 25 minutes
New York	12 or more hours (1 connection)

Sources: [1], [2]

Population

According to the most recent available data (February 2017 [3]), Belarus has a population of 9.5 million. The population is largely urban (77.6% [4]), with around 2 million people living in Minsk and its satellite cities. The population declined over the 20 years from 1994 to 2013, taking an upward turn again in 2014. The decline in population was largely rural, and this trend continues, whereas the urban population has steadily increased, with the population of Minsk growing 17% in the last 20 years [4].

Adults and seniors are the predominant age groups, as is typical for Europe, and this trend was strengthened by a declining birth rate in the 1990s.

Belarus has a high level of literacy (99.9%), and a relatively high percentage of the population has higher education (29.4% in 2014). Education is popular and in high demand among the population.

Transport and communications

Belarus is served by a well-developed network of roads and railways that connects the regions, and the cost of transportation remains moderate. The capital is in the center of the country, meaning that all major cities are 3-5 hours away by public transport and 2-4 hours by private transport. Cell networks cover 98.2% of the country's territory and 99.8% of its population. Over 10 million subscribers have wired Internet access.

Doing Business

Belarus has demonstrated a steady improvement in the World Bank Doing Business rankings in recent years, now occupying 37th position in 2017, compared with 50th in 2016 and 63rd in 2014. This shows the country's understanding of the necessity to reduce regulative and administrative barriers.

Belarus achieved the highest result for the registering property indicator (5th place). The greatest improvements were recognized in obtaining electricity (up 50 places) and resolving insolvency (up 26). These improvements were down to direct government action in the given areas.

Belarus shows the worst results and almost no improvement in getting credit (101st place) and paying taxes (99th). These issues are often mentioned when the Belarusian economy is considered.

In addition, Belarus ranked 30th in facilitating cross-border trade for the second year in a row. This position is comparable to that of its closest former USSR neighbors Russia (40th place) and Ukraine (80th), but it highlights areas for improvement considering the positions of Poland (24th), Latvia (14th) and Lithuania (21st).

Belarus was subject to sanctions from the EU and other western countries, which were lifted in February 2016. Since then, Belarus, as one of the EU Eastern Partnership countries, has been engaging actively in EU programs aimed at SME support and regional development.

Belarus GDP structure by type of economic activity

Economic activity	2010	2016	Change, p. p.
Production sector	44.3%	38%	-6.3
Services sector	43.5%	48.3%	+4.8
Taxes and subsidies	12.2%	13.7%	+1.5

Sources: [7] – National accounts of the Republic of Belarus, Statistical Digest, 2017;
[9] – Statistical review of Belarus in 2016

Economy

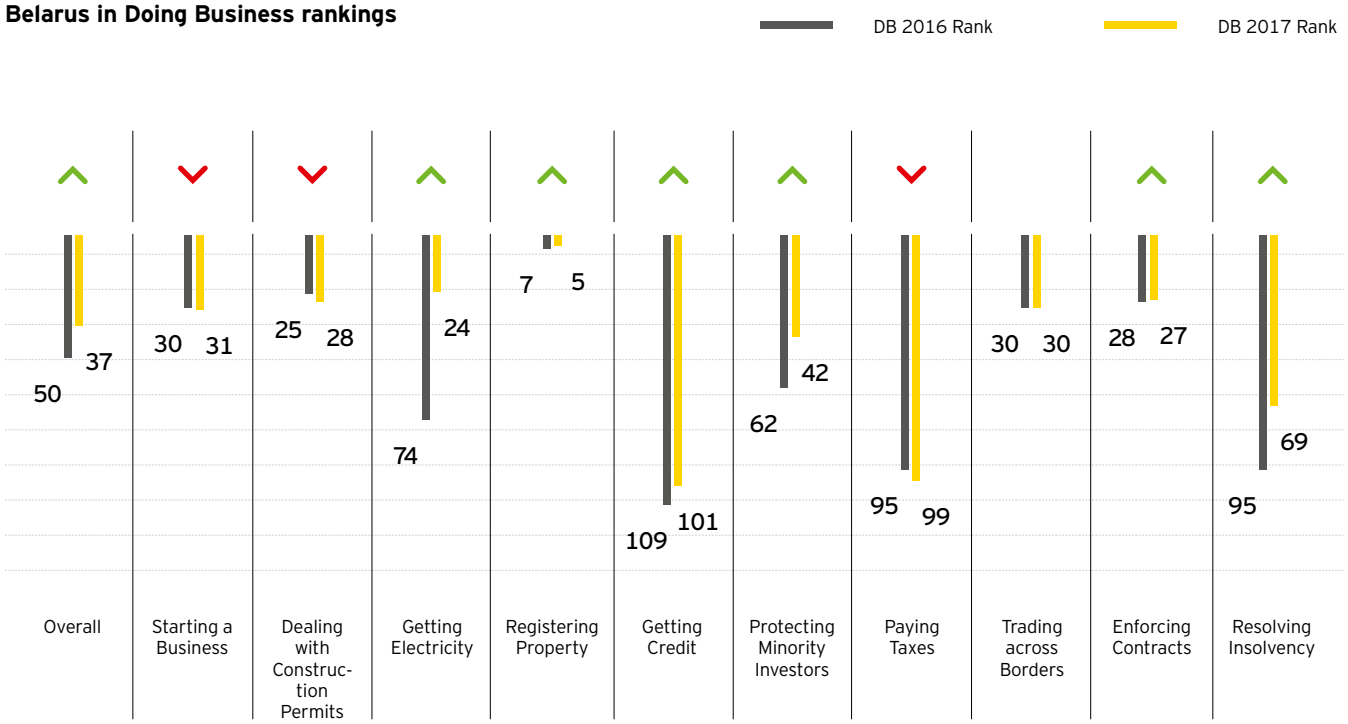
4,367,000 people were employed in the Belarus economy in February 2017. The nominal average monthly salary in February 2017 was USD 377.76. [6]

Belarus had a nominal GDP of USD 47.4 billion in 2016. According to the IMF, Belarus holds 28th place in Europe in terms of GDP (or 26th in terms of GDP PPP). GDP per capita is USD 4,991 – 37th among European countries (36th in terms of PPP). Much of Belarus's GDP is generated by large state-owned enterprises, which are predominant in the economy.

The service sector accounts for 48.3% of GDP, having grown from 43.5% to 48.3% between 2010 and 2016. The main sources of GDP in the service sector are wholesale and retail trade (22%), real estate (13%) and transportation services (12%).

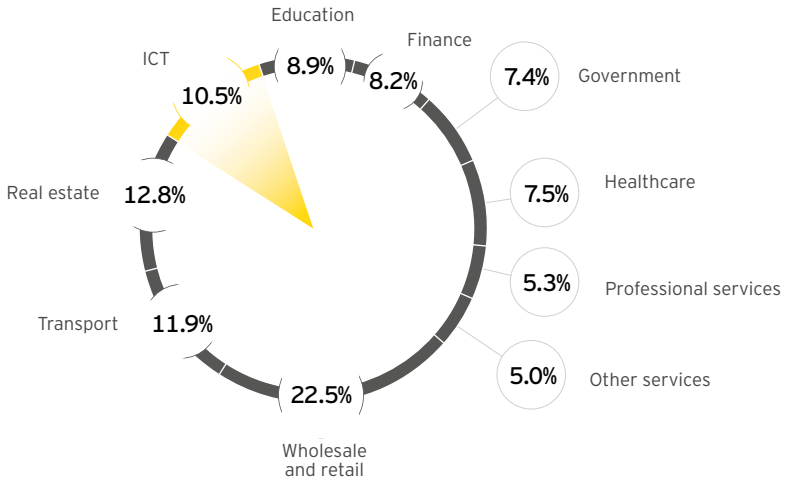
After a period of growth between 2009 and 2014, Belarus's GDP took a downturn in USD equivalent, losing nearly 38% in the three years of

Belarus in Doing Business rankings



Source: [5] – Ease of Doing Business in Belarus, 2017

Structure of service sector GDP, 2016



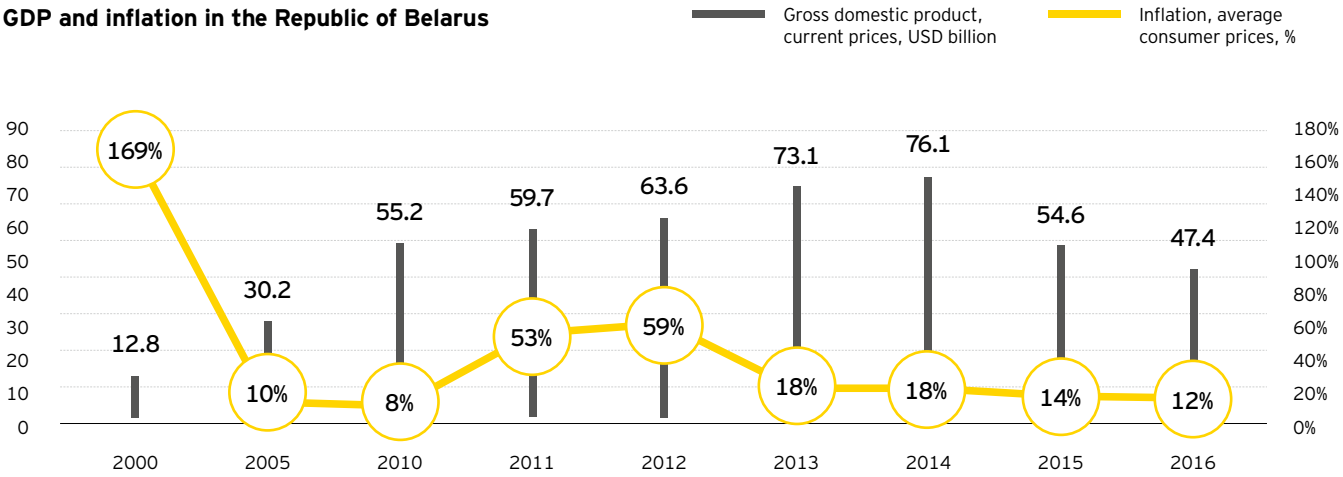
Source: [9] – Statistical review of Belarus in 2016

2014-16. In the same period, the national currency's official annual average exchange rate against the US dollar fell almost 49% from BYR 10,216 to 19,885, largely due to GDP's decline in dollar terms.

Exchange rates in Belarus were very volatile during 2009-2016.Economic performance has to be evaluated in terms of foreign currencies, since the local currency is subject to high inflation (168% in 2000 and 59% in 2012), often triggered by devaluation of the national currency. The economy's stability depends largely on the stability of exchange rates, which has a direct effect on the population's real income (due to inflation and reduced purchasing power of the national currency), on state spending (due to the increased cost of servicing the external national debt) and on the economy as a whole (due to costlier imports, a substantial portion of which consists of energy resources).

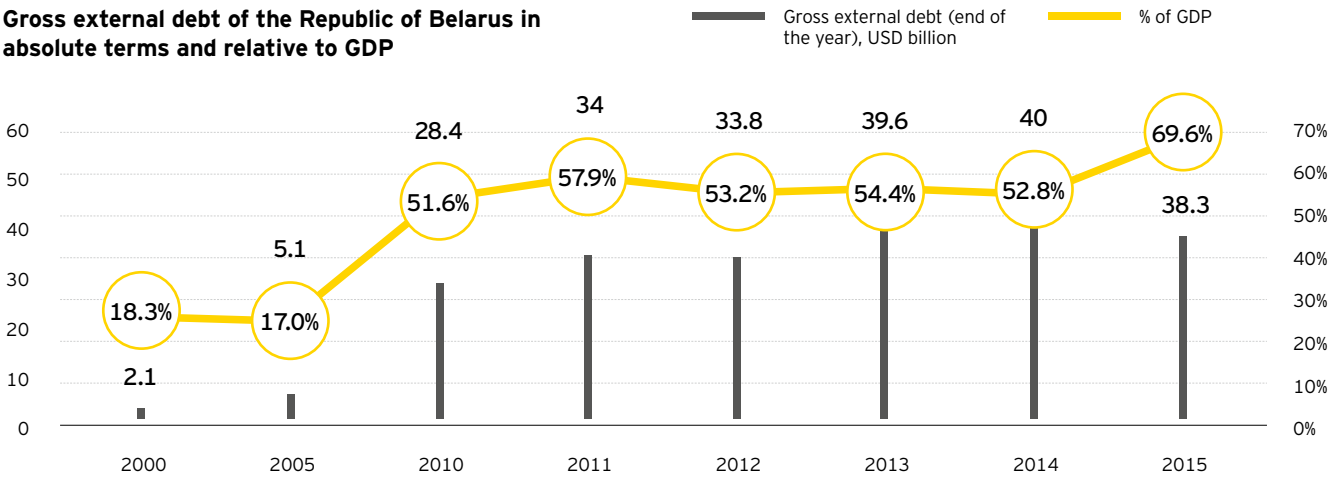
Exchange rates peaked in February 2016, followed by the current period

GDP and inflation in the Republic of Belarus



Source: [8] – International Monetary Fund World Economic Outlook, 2016; [9] – Statistical review of Belarus in 2016

Gross external debt of the Republic of Belarus in absolute terms and relative to GDP



Source: [10] – Statistical Yearbook of the Republic of Belarus, 2016

Foreign investments in the real economy by major investing countries, USD million

	2005	2010	2011	2012	2013	2014	2015
Total	1,816.2	9,085.5	18,878.6	14,329.8	14,974.3	15,084.4	11,344.2
including:							
Russian Federation	531.5	6,555.00	9,440.30	6,691.00	7,281.20	6,274.70	4,896.00
UK	83.2	280.2	4,391.70	3,617.80	3,202.10	2,809.00	2,339.30
The Netherlands	71.1	315.6	219.9	407.9	741.1	1,962.10	1,220.20
Cyprus	50.3	316.3	1,238.70	923.4	1,059.50	930.9	806.7
Austria	178.4	912.3	955.2	576	501.9	526.1	353.4
China	1.3	71.4	125.1	127.6	146.7	300.1	341.7
Poland	19.7	27.9	85.6	128.2	179.8	157.7	194.8
Lithuania	10.7	49.5	114.4	173	178.5	233.5	168.9
Latvia	129.3	52.3	119.5	129.3	177.3	193	101
Germany	149.4	70.9	176	185.2	163.4	379.7	98

Source: [10] – Statistical Yearbook of the Republic of Belarus, 2016

of stabilization. The refinancing rate of the National Bank of Belarus – the base rate used to calculate interest rates – has returned to 14%, where it was in the first half of 2011 before being raised to 45% to contain inflation.

Foreign investments

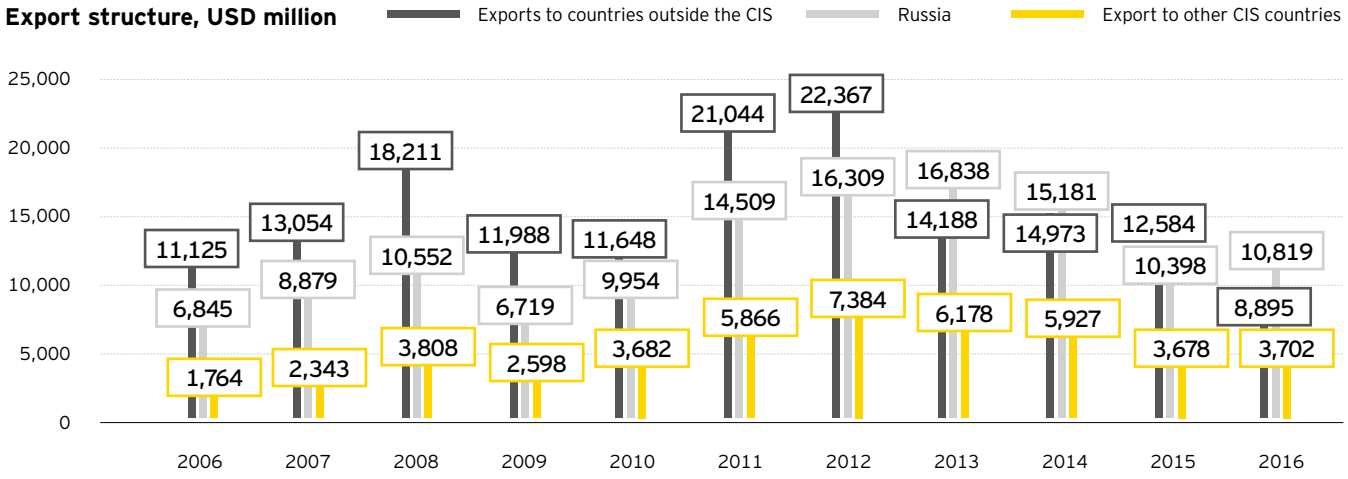
The Government of Belarus is implementing a range of measures to attract foreign investments. In addition to ministries, institutions that are active in this area include the Foreign Investment Advisory Council under the Council of Ministers and the National Agency for Investment and Privatization.

The Russian Federation accounts for the largest share of foreign investments: 43.2% in 2015. At the same time, foreign investments are highly unstable and depend on political decisions, periods of economic instability and other countries' reactions to such events. They are also affected by the economic situation in other countries such as Russia.

Foreign trade

Belarus has trade relations with over 180 countries around the world. The top 20 trading partners accounted for 90.4% of the country's exports in 2016, including 46.2% to Russia. Belarus's exports thus depend heavily not only on the world market, but also on the economic situation in these partner countries – a dependence compounded by the structure of Belarus's exports, which are traditionally dominated by petroleum products made from Russian crude oil and by mineral fertilizers. Exports of goods have declined for the last four years (2013-16) on all principal sales markets.

Export structure, USD million



Source: [11] – Foreign trade in goods and services of the Republic of Belarus, statistics of the National Bank of the Republic of Belarus

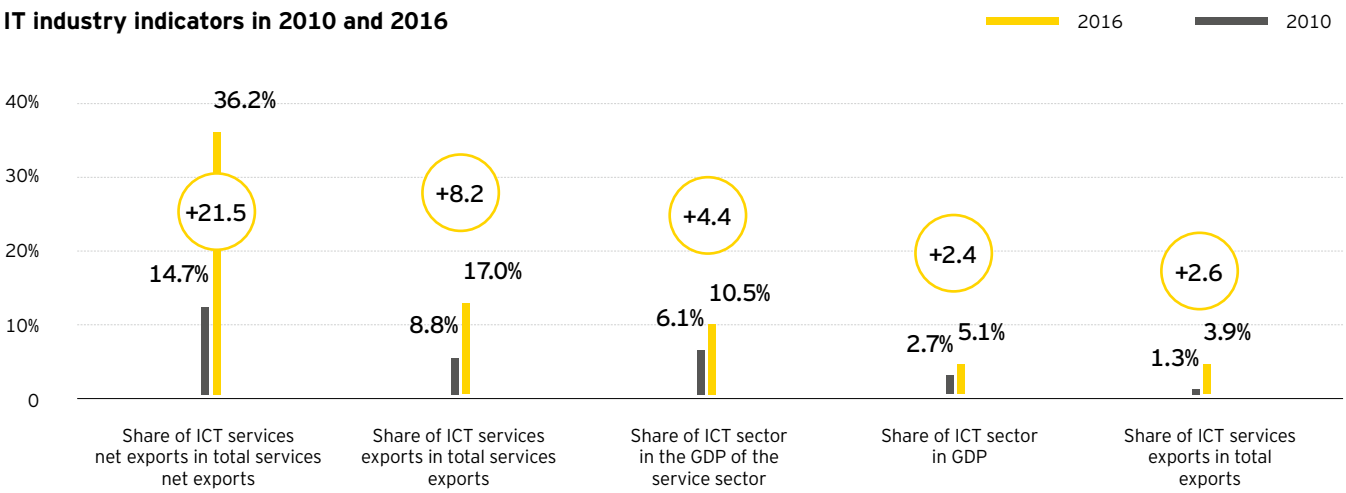
The IT industry's role in Belarus

Belarus's IT industry is conspicuous among other sectors for its steadily growing revenues, exports, workforce and other indicators. Exports of IT services more than quadrupled in 2010-16.

In the current environment, a positive external trade balance is important for Belarus's economy, and a range of measures are being taken to encourage export-oriented industries that are less affected by restraints on traditional areas of the economy (e.g. the cost of energy resources).

In this context, Belarus's IT industry is taking on strategic importance. ICT accounts for 10.5% of GDP in the service sector and 5.1% of total GDP (2016 [9]), with IT services making up 3.2% of total exports (2016 [12]).

IT industry indicators in 2010 and 2016

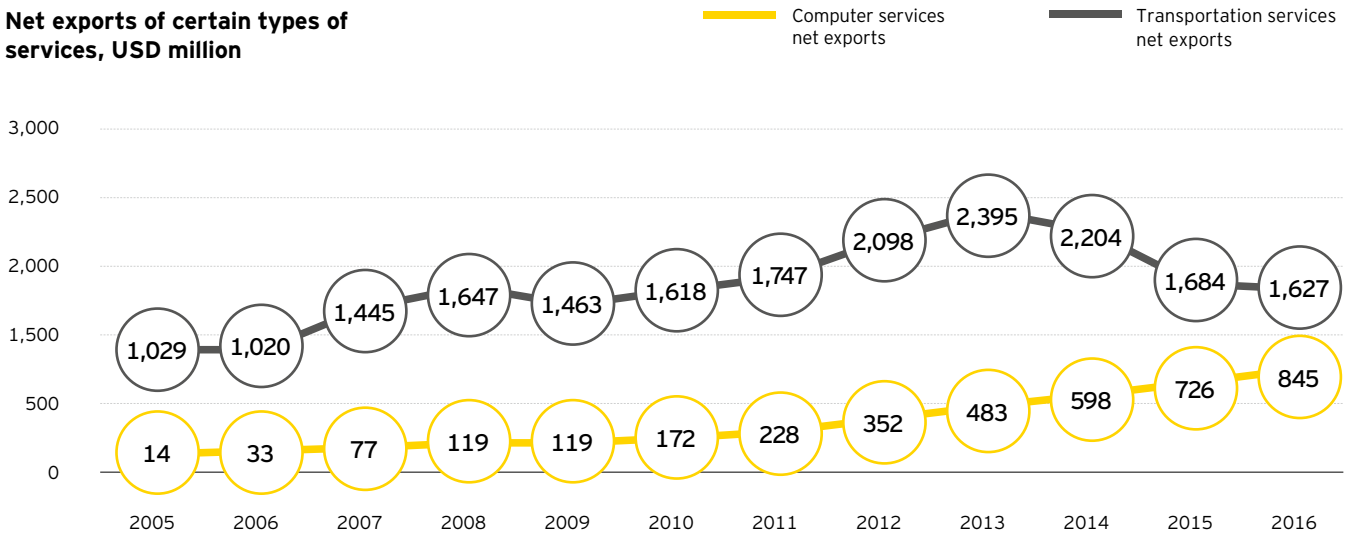


Source: [9] – Statistical review of Belarus in 2016; [13] – The National Bank of the Republic of Belarus. Balance of payments

The substantial exports of computer services contrast with a relatively low level of imports, making this industry Belarus's second-largest contributor (after transportation services) to the positive balance of service exports.

The IT industry's weight is growing as a component of all macroeconomic indicators, and this demonstrates the effectiveness of current incentives (strong tax benefits) as well as the industry's competitiveness on external markets and growth potential.

Net exports of certain types of services, USD million



Source: [13] – The National Bank of the Republic of Belarus. Payment balance

SOURCES

[1] http://www.timeanddate.com/

[2] http://www.airport.by/

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[4] Demographic Yearbook of the Republic of Belarus, 2016 – http://www.belstat.gov.by/ofitsialnaya-statistika/publications/izdania/public_compilation/index_5769/

[5] Doing Business Measuring Business Regulations, Ease of Doing Business in Belarus 2017 – http://www.doingbusiness.org/data/exploreeconomies/belarus

[6] Data on employees' accrued average salary in February 2017. http://www.belstat.gov.by/ofitsialnaya-statistika/solialnaya-sfera/trud/operativnaya-informatsiya_8/o-nachislennoi-srednei-zarabotnoi-plate-rabotnikov/o-nachislennoy-sredney-zarabotnoy-plate-rabotnikov-v-fevrale-2017-nbsp-g/

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[11] Foreign trade in goods and services of the Republic of Belarus, statistics of the National Bank of the Republic of Belarus – http://www.nbrb.by/statistics/ForeignTrade/

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[13] The National Bank of the Republic of Belarus. Balance of payments. http://www.nbrb.by/statistics/BalPay/

[14] Belarus in figures, 2016 – http://www.belstat.gov.by/ofitsialnaya-statistika/publications/izdania/public_compilation/index_4920/

[15] Average official exchange rate of the Belarusian ruble in relation to foreign currencies – http://www.nbrb.by/statistics/Rates/AvgRate/

INFORMATION ABOUT THE IT INDUSTRY

Summary

The ICT (information and communication technology) sector in Belarus does not yet account for a major share of the national economy, with some 2.2% of total employment and 5.1% of GDP. However, it stands out among other sectors for its high growth in revenue, exports, and foreign investment.

ICT sector revenues reached almost USD 4 billion in 2016. IT products and services were the main driver of this growth. In the context of a decline in traditional economic sectors, a general recession and changes in the ruble rate, exports of IT products and services from Belarus surged more than sevenfold in 2009-16, and their share in total exports of goods and services rose almost sixfold against a drop in total exports in 2012-16.

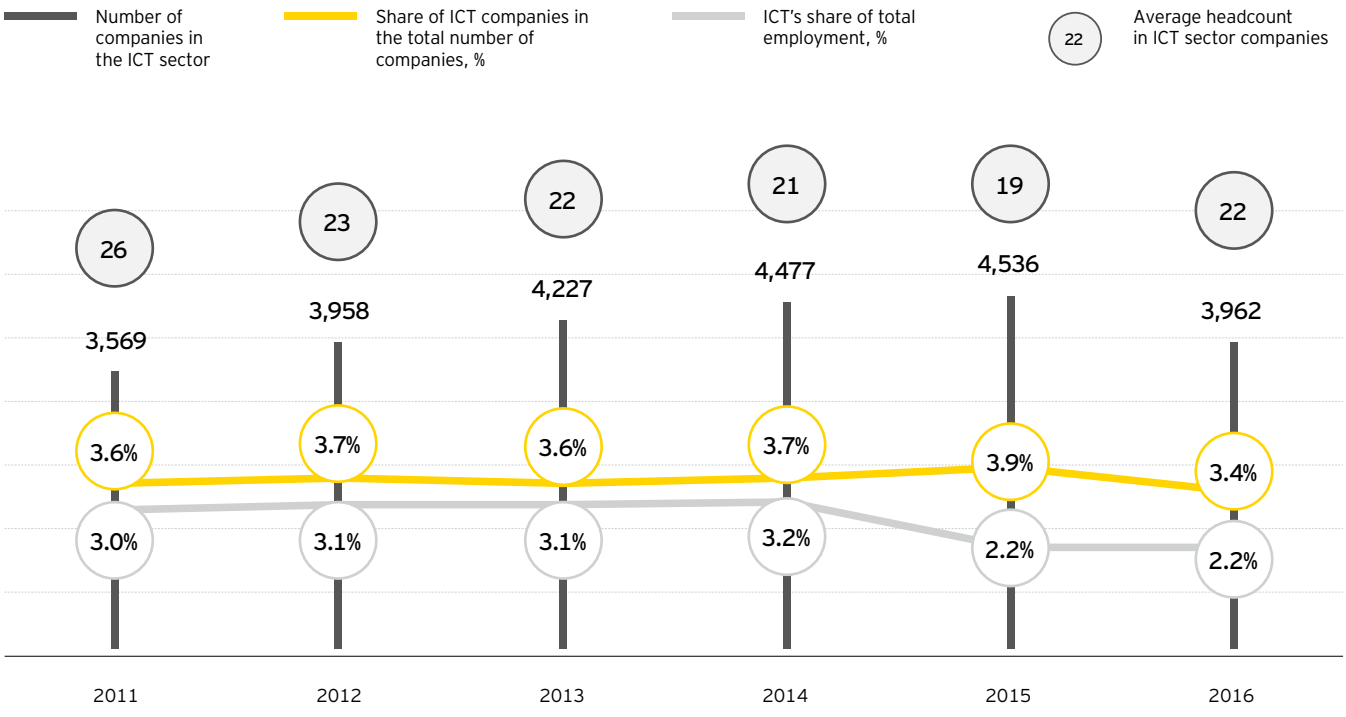
The IT product and services segment has been growing at a fast pace since 2006, when the Hi-Tech Park was established. The Hi-Tech Park provides a special regime for IT companies that was introduced in 2006 and applies throughout the country. Resident companies enjoy important government support: they are exempted from most taxes, including value-added tax and income tax, while the employees of the resident companies enjoy personal income tax reduced by 30% compared with other sectors. Thanks to the HTP, Belarus managed to build a mature export-oriented software development industry and became a significant player on the IT services market in Europe over just 10 years. Today, Belarus Hi-Tech Park is one of the largest IT clusters in Eastern Europe, with over 30,000 software engineers employed there. This favorable environment, as well as the availability of qualified IT specialists, fosters the development of IT business in Belarus.

ICT sector executives make up a quarter of the top 200 successful and influential businesspersons in Belarus. They engage in a wide range of activities: from online games to banking and medical IT products.

Advances in information technology attract foreign investors: total investments in the ICT sector soared by almost 290% to USD 1.47 billion by

The ICT sector's share of the economy

Indicator	2011	2012	2013	2014	2015	2016
Number of companies in the ICT sector	3,569	3,958	4,227	4,477	4,536	3,962
Combined headcount of ICT sector companies	92,026	92,649	91,658	92,221	87,238	85,406
Share of ICT companies in the total number of companies, %	3.6	3.7	3.6	3.7	3.9	3.4
ICT's share of total employment, %	3.0	3.1	3.1	3.2	2.2	2.2
Average headcount in ICT sector companies	26	23	22	21	19	22



Source: [1] – Information society in the Republic of Belarus, 2015 with updates received from the Belarusian Statistics Committee in May 2017

2014, from USD 505 million in 2011. The US, the Netherlands, and Russia were the main sources of foreign investments.

IT products and services make up the fastest growing and most promising segment of the ICT sector in Belarus, and we therefore made it the focus of our report. A large and regionally significant software technology and engineering cluster has been set up in Minsk, the capital, which also has a competitive labor market. This helps technology companies to implement state-of-the-art technology projects for customers from across the world.

That said, major effort is required from IT companies, the government, and the education system to sustain the impressive growth performance that the sector has demonstrated over the last 10 years.

Employment in the ICT sector

The ICT (information and communication technology) sector in Belarus comprises about 4,000 entities that employ over 85,000. According to EY estimates, the total ICT workforce in the Belarusian economy is about 115,000, including those directly involved in software production and those performing IT functions in entities in other sectors. ICT sector companies account for 3.4% of the total number of business entities and 2.2% of total employment in the economy.

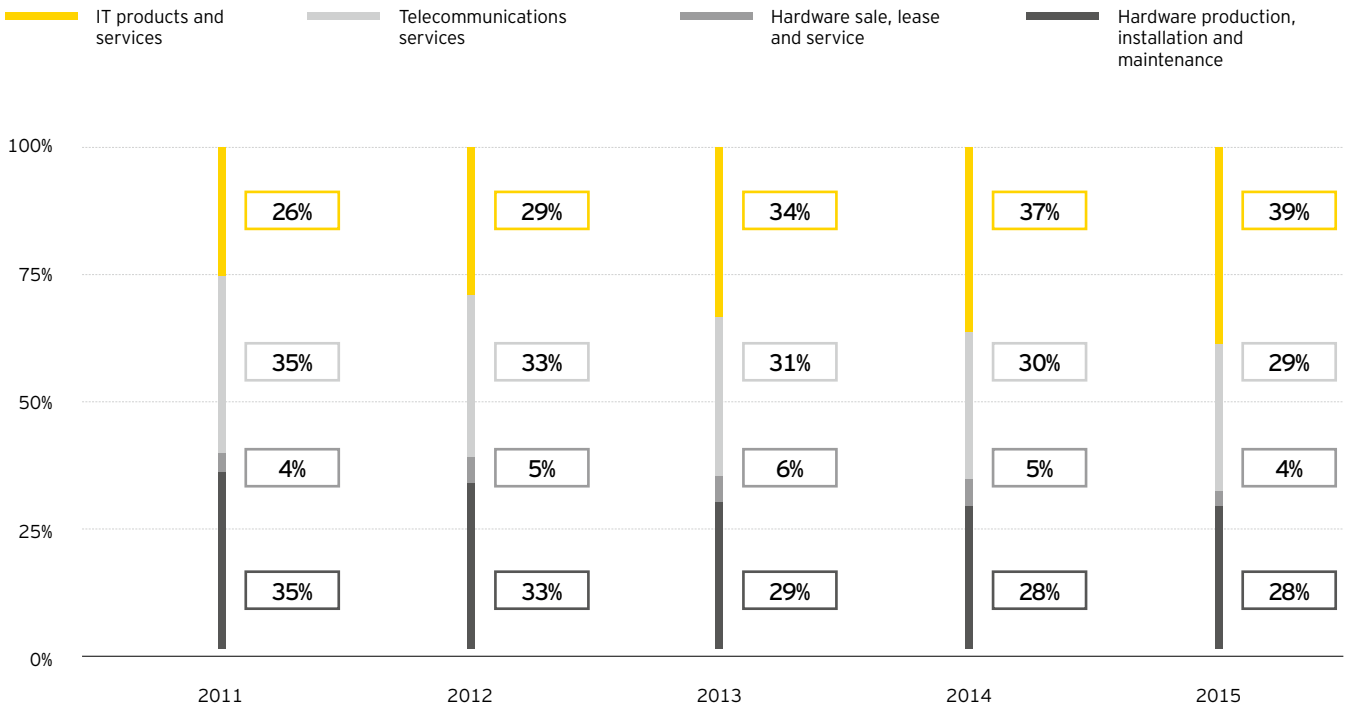
ICT companies' activities in Belarus span across various sectors of the economy and include hardware production, repair and maintenance; software development; development of automated information systems; telecommunication services; training in ICT; consulting and other ICT-related services.

The ICT workforce is mostly employed in IT products and services (37%) and telecommunications (30%) (2014, [1]). The headcount in IT products and services has been growing annually since 2011, although the overall sector headcount remains almost unchanged.

Major IT companies, such as EPAM Systems, Wargaming, IBA Group, and Itransition, make up the core of the IT products and services segment and

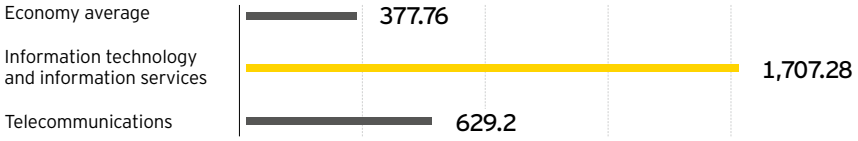
ICT headcount by segment

Segment	2011	2012	2013	2014	2015
Hardware production, installation and maintenance	32,323	30,649 ▼	26,726 ▼	25,925 ▼	24,634 ▼
Hardware sale, lease and service	3,765	4,613 ▲	5,144 ▲	4,991 ▼	2,790 ▼
Telecommunications services	32,367	30,302 ▼	28,750 ▼	27,376 ▼	25,406 ▼
IT products and services	23,571	27,085 ▲	31,038 ▲	33,929 ▲	34,408 ▲
Growth in headcount in IT products and services		+14.9%	+14.6%	+9.3%	+1.4%



Source: [1] – Information society in the Republic of Belarus, 2015 with updates received from the Belarusian Statistics Committee in May 2017

Nominal accrued average monthly salary in February 2017, USD



Sources: [2] – Data on the accrued average salary in February 2017

employ over 12,000. Hi-Tech Park residents have a total headcount of over 30,000.

The telecommunications segment is clearly dominated by Beltelecom, the largest government-owned telecommunications operator with 25,000 employees; other players include mobile phone operators Velcom (Telekom Austria Group), Life (Turkcell Group) and MTS (Mobile TeleSystems Group). Apart from them, some small Internet providers operate in the segment.

The hardware production, installation and maintenance segment comprises large public-sector companies that engage in the production of TV and radio equipment, semiconductors and integrated circuits, such as Integral with some 5,000 employees, as well as an array of small businesses that produce various technology goods and provide maintenance services.

The hardware sale, lease and service segment has no major players and consists of many small wholesale and retail companies that sell technology goods and provide related services.

The average monthly salary in the ICT sector is the highest compared with other sectors. A high level of compensation of staff helps the sector to attract and retain a qualified workforce. The rapid development of the ICT sector and tax benefits it enjoys has substantially reduced the migration of talent (the brain drain) from the sector, which is now seeing a steady inflow of qualified migrants from neighboring countries instead.

Key ICT performance indicators

The ICT sector is the fastest growing in the national economy in terms of both investment inflows and exports. A major focus on exports is the sector's hallmark.

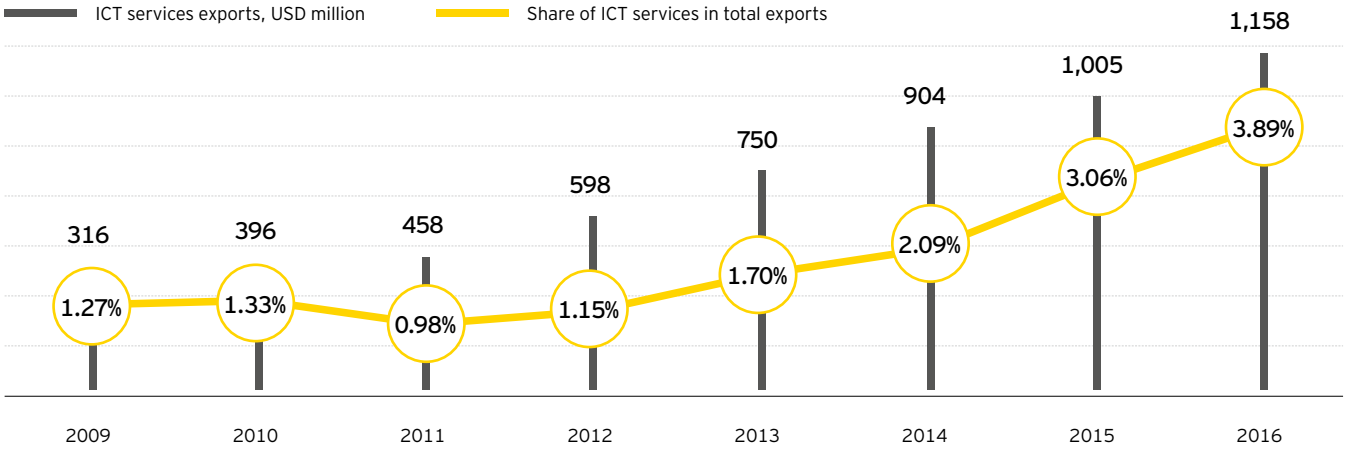
The ICT revenue structure is as follows: 41% – telecommunications companies, 25% – IT products and services, 22% – hardware production, installation and maintenance, and 12% – hardware sale, lease and service. Telecommunications services and IT products and services increased their contribution to total revenue in 2011-15 from 38% to 41% and from 14% to 25%, respectively.

ICT revenue

Indicator	2011	2012	2013	2014	2015	2016
Revenue from products (works, services) by ICT entities, USD billion	4.26	4.41	5.49	5.01	4.20	3.94
Growth rate, %	-	3.5%	24.5%	-8.7%*	-16.2%*	-6.1%*

Source: [1] – Information society in the Republic of Belarus, 2015 with updates received from Belarusian Statistics Committee in May 2017
*Decline is caused by devaluation of the national currency exchange rate to the USD, in national currency the average annual growth rate in 2013-2016 was 17%

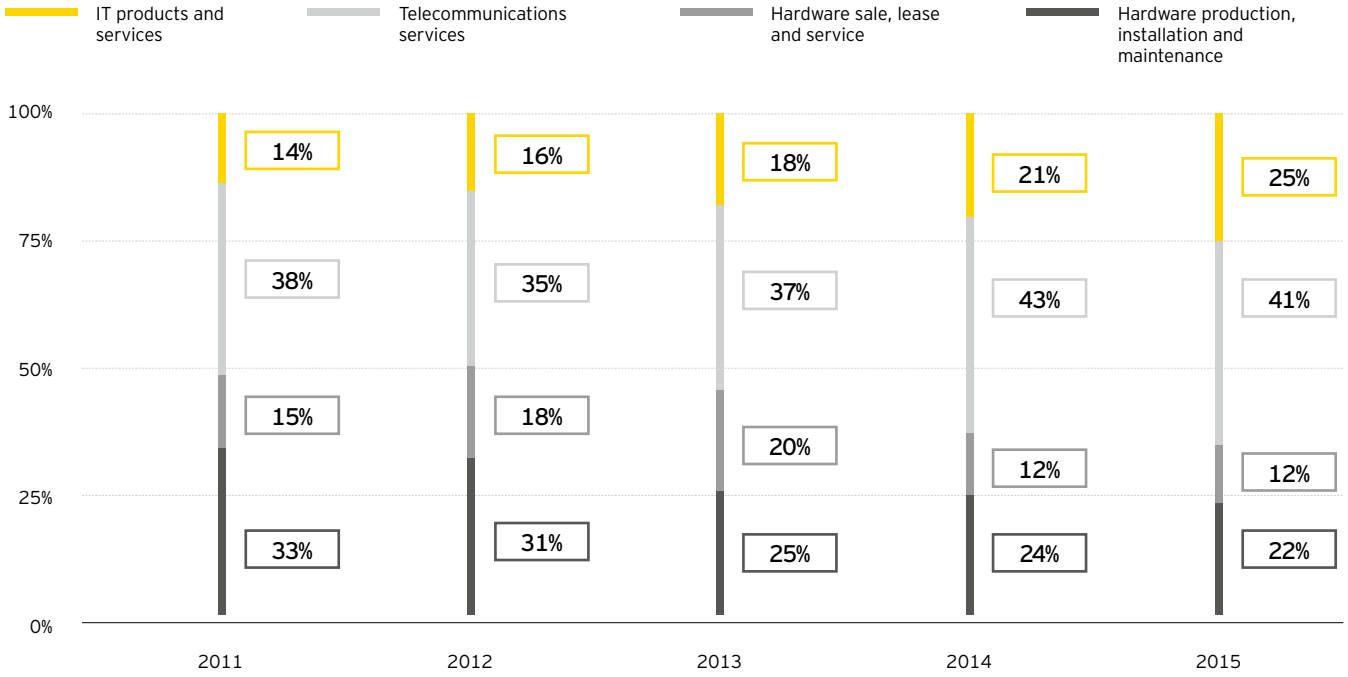
ICT exports



Source: [4] – Statistical Bulletin: Balance of Payments, International Investment Position, and Gross External Debt of the Republic of Belarus, 2009-16

ICT revenue structure, USD million

Segment	2011	2012	2013	2014	2015
Hardware production, installation and maintenance	1,416.6	1,374.7 ▼	1,360.0 ▼	1,196.2 ▼	937.03 ▼
Hardware sale, lease and service	614.8	810.6 ▲	1,105.0 ▲	622.9 ▼	485.74 ▼
Telecommunications services	1,634.9	1,535.2 ▼	2,021.8 ▲	2,153.3 ▲	1,704.9 ▼
IT products and services	592.5	686.5 ▲	999.9 ▲	1,036.0 ▲	1,069.2 ▲



Source: [1] – Information society in the Republic of Belarus, 2015 with updates received from the Belarusian Statistics Committee in May 2017

The share of ICT services in total service exports is growing, while the share of ICT goods in total goods exports has been fluctuating but has been broadly flat overall. The difference between the volume of services and that of goods in the structure of exports is widening: it was less than threefold in 2009 but increased to 6.8 times by 2014.

IT products and services is the fastest growing segment in terms of revenue and exports. Exports of computer services (WTO category) surged by a factor of 36 over 12 years to reach USD 956.8 million in 2016. Even if we disregard the initial rapid growth period, exports grew at a CAGR of 28.4% during the last five years. In 2016, computer services accounted for 3.2% of total exports and for 14% in total exports of services, and are constantly on the rise. Although

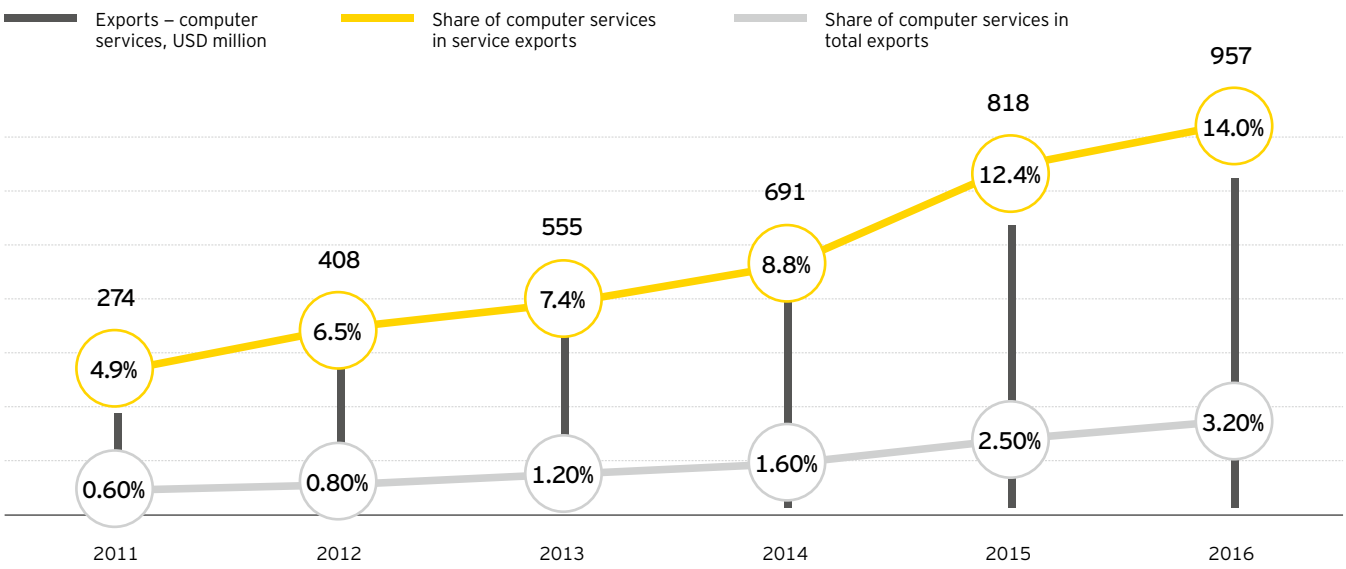
ICT exports indicators

Indicator	2009	2010	2011	2012	2013	2014	2015	2016
Exports of ICT goods, USD million	104.4	158.5 ▲	176.4 ▲	81.8 ▼	148.4 ▲	131.2 ▼	n/a*	n/a*
Share of ICT goods in total exports of goods, %	0.5	0.6 ▲	0.4 ▼	0.2 ▼	0.4 ▲	0.4 —	n/a*	n/a*
Exports of ICT services, USD million	316	396 ▲	458 ▲	598 ▲	750 ▲	904 ▲	1,005 ▲	1,158 ▲
Share of ICT services in total exports of services, %	9.0	8.8 ▼	8.2 ▼	9.4 ▲	10.0 ▲	11.5 ▲	15.1 ▲	17.0 ▲

Sources: [1] – Information society in the Republic of Belarus, 2015 with updates received from the Belarusian Statistics Committee in May 2017;
[4] – Statistical Bulletin: Balance of Payments, International Investment Position, and Gross External Debt of the Republic of Belarus, 2009-16

*There was no specific data available about exports of ICT goods as of April 2017.

Computer services exports, 2011-2016



Sources: [5] – World Trade Organization;
[4] – Statistical Bulletin: Balance of Payments, International Investment Position, and Gross External Debt of the Republic of Belarus, 2016

government-owned entities dominate the Belarusian economy, all major companies that provide IT products and services are private.

Business of Hi-Tech Park residents

The upsurge in the IT products and services segment is attributed to the establishment of the Hi-Tech Park (HTP) in 2006. The Hi-Tech Park provides a special regime for IT companies that was introduced in 2006 and applies throughout the country. Resident companies enjoy important government support: they are exempted from most taxes, including value-added tax and income tax, and the employees of the resident companies enjoy personal income tax reduced by 30% compared with other sectors. Thanks to the HTP, Belarus managed to build a mature export-oriented software development industry and became a significant player on the IT services market in Europe over just 10 years. Today, Belarus Hi-Tech Park is one of the largest IT clusters in Eastern Europe with over 30,000 software engineers employed there. This favorable environment, as well as the availability of qualified IT specialists, fosters the development of IT business in Belarus.

What makes the Hi-Tech Park unique is the winning combination of high-quality technical education, highly-skilled IT professionals, and government support for the IT industry.

Employees of HTP residents make up 28% of the total ICT workforce and 70% of those employed in the IT products and services segment (2015). HTP residents contributed 28.9% to total ICT sector revenue in 2015 and 85.7% to total exports of computer services. Therefore, the bulk of computer services that Belarus exports is generated by HTP companies.

Key activities of the Hi-Tech Park residents include information and communication technology, software development and implementation.

According to national legislation, HTP residents can provide services in information system analysis, software design and development (IT consulting, audit, networks maintenance, database development, and information systems implementation and support). Since 2015, HTP residents have also been involved in new R&D activities (micro-, opto- and nanoelectronics, mechatronics, telecommunications, radar ranging, radio navigation and wireless communication), information protection, and establishment of data processing centers, etc.

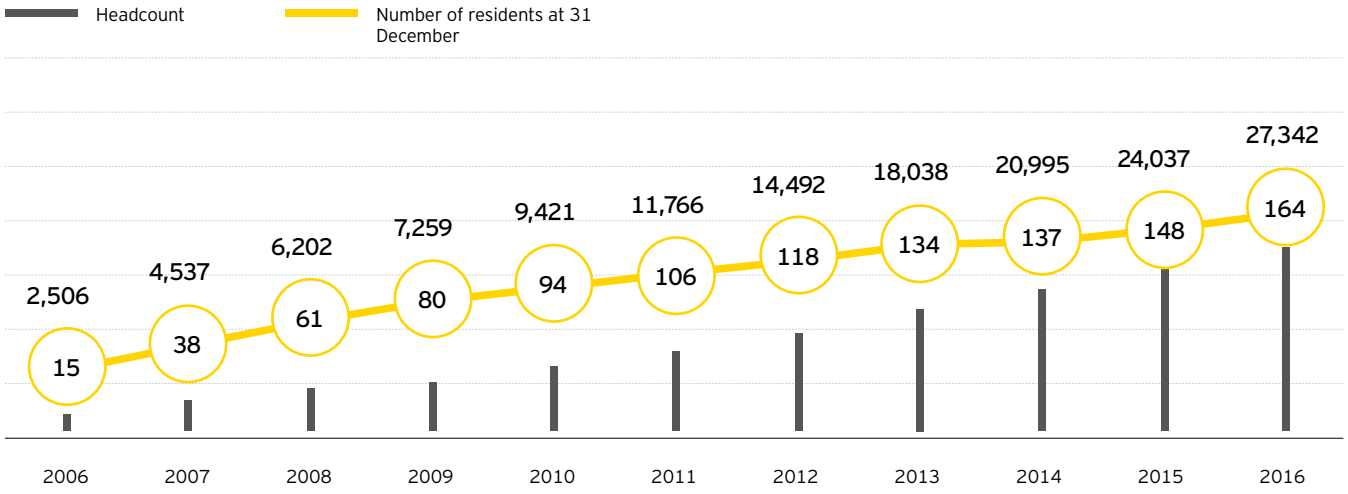
Generally speaking, HTP residents are the most export oriented and competitive companies in the IT products and services segment of Belarus.

15 companies with 2,506 employees became residents of the HTP in 2006. Currently, HTP residents include 181 companies employing more than 30,000. The HTP resident headcount has been going up steadily over the last five years by approximately 3,000 a year.

Even though domestic sales are on the rise and domestic revenue has doubled compared with 2012, reaching USD 83.8 million, the share of domestic sales in total revenue has been sliding, down to just 9.3% in 2016.

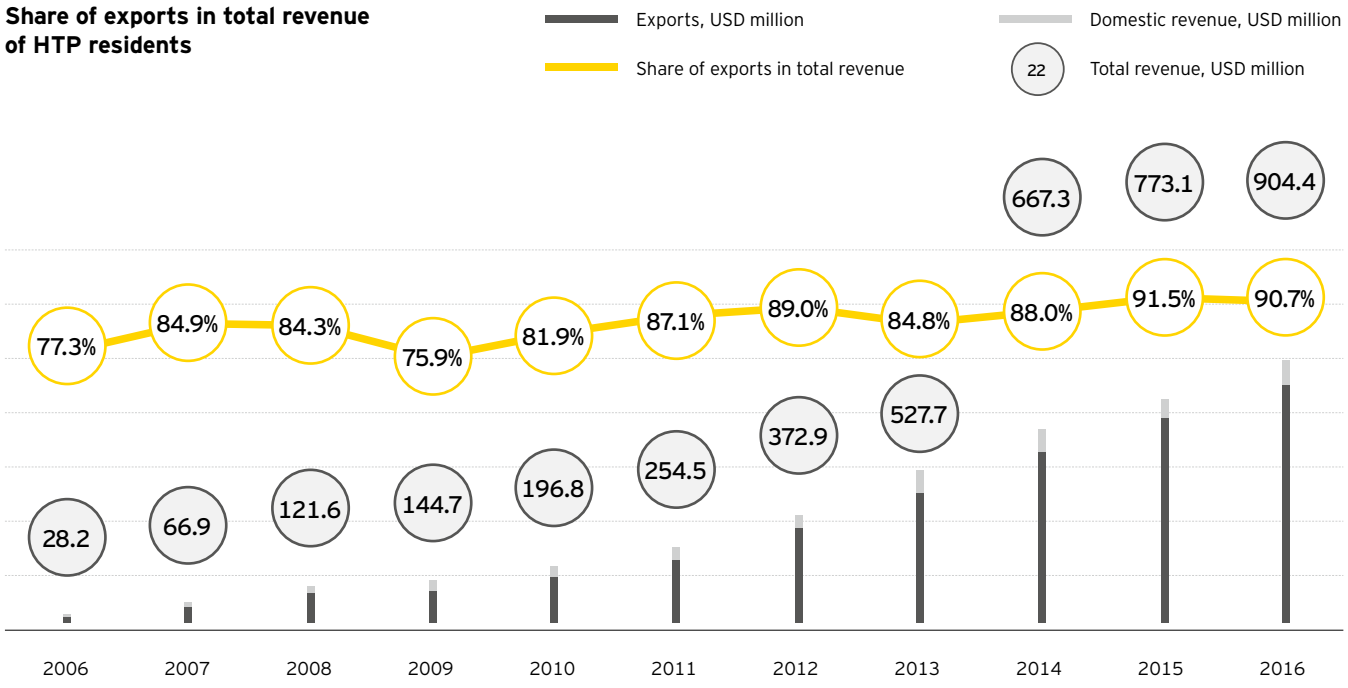
IT companies and industry experts highlight that the domestic market is a low priority in many companies' development strategy, and attribute this to the limited demand in Belarus in absolute terms, as well as to the overall economic situation in the market. Most respondents we surveyed (51%) indicated that the size of the domestic market is the least important factor for the development of IT companies, whereas more respondents believe that it has a negative (38%) rather than positive (8%) impact on the industry's development.

HTP residents growth



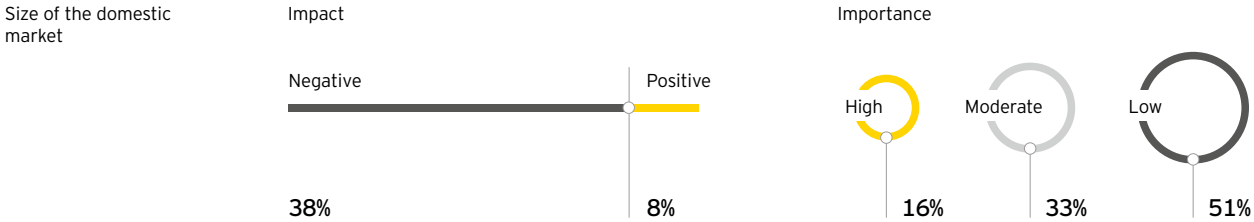
Source: [6] – Information provided by the Hi-Tech Park Administration

Share of exports in total revenue of HTP residents



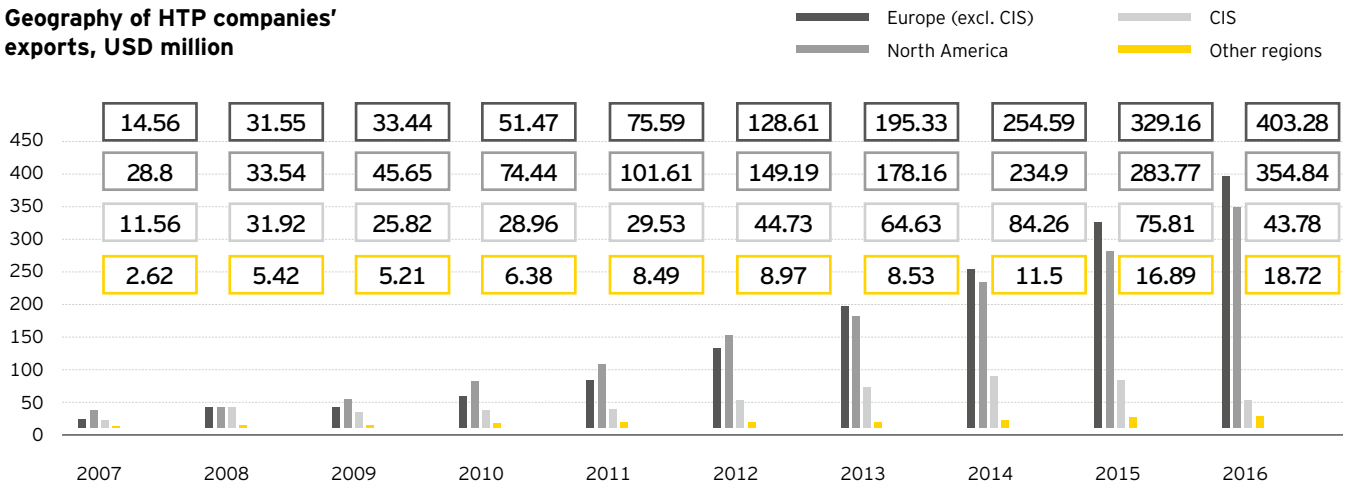
Source: [6] – Information provided by the Hi-Tech Park Administration

Importance of the domestic market for the development of HTP companies



Source: [7] – Results of EY's survey among Hi-Tech Park residents

Geography of HTP companies' exports, USD million



Source: [6] – Information provided by the Hi-Tech Park Administration

Software products that HTP residents developed in 2016 were supplied to customers in 67 countries worldwide, with 49.1% and 43.2% of exports going to Western Europe and the USA, respectively. The share of CIS countries in total exports has shrunk from 10.7% to 5.3% amid a 43% drop in exports to Russia in 2016 [4]. Notably, most ICT sector players operate through their own companies or representative offices in other countries, and therefore, exports statistics may not be fully representative of their customer geography.

Role of the Hi-Tech Park Administration

The Hi-Tech Park Administration (HTP Administration), a state Institution established in accordance with Decree No. 12 of the President of the Republic of Belarus of 22 September 2005 "On the Hi-Tech Park," directly manages the Hi-Tech Park.

The HTP Administration is subordinate to the President of the Republic of Belarus and reports to the Council of Ministers. It's a legal entity at the national level and a nonprofit state institution.

The HTP Administration's activities involve creating conditions favorable for HTP residents, promoting domestic and foreign investments in information technologies and creating a modern infrastructure. The HTP Administration also protects the interests of Hi-Tech Park residents and represents their interests in relations with national government agencies.

The HTP Administration is active in implementing national strategy and state policy affecting the development and export of information technologies. Measures to promote HTP residents on external markets include an annual roadshow, "Discover IT Belarus" as well as business forums held abroad and contacts with foreign media.

For foreign clients and IT companies seeking to do business in Belarus, HTP Administration specialists provide information, consultations and organizational assistance, advise on available forms of state support and identify HTP residents interested in collaboration.

The HTP Administration plays an important role in promoting close collaboration between the IT industry and the system of higher education, taking measures to increase the number and quality of specialists for the IT industry. It also conducts a large-scale career guidance program to popularize technical education in the schools and to encourage students in general secondary schools to pursue higher education in engineering, IT and other technology-related disciplines.

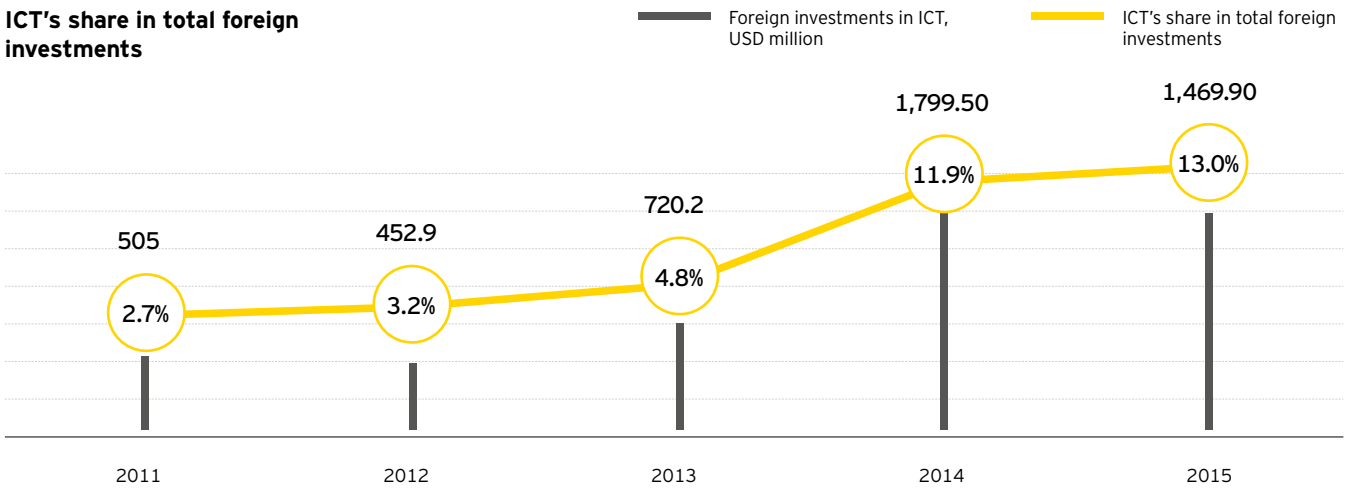
Foreign investments

The ICT sector in Belarus is less exposed to regular economic shocks than other sectors, which for this reason see unstable inflows of foreign investments. Unlike them, foreign investments in ICT were constantly on the rise in 2011-2014, reaching more than USD 1.4 billion in 2015 (the latest data available), up by a factor of 2.9 from 2011. As a result, in 2015 the ICT sector absorbed 12.96% of total foreign investments, compared with just 2.7% in 2011.

The telecommunications services segment dominates the structure of foreign investments in terms of both share (88%) and growth (by a factor of 3.86 from 2011). By comparison, investments in IT products and services increased by a factor of 2.5 over the same period and accounted for 8% of total investments in 2014. This broad difference arises because the telecommunications segment is capital intensive and foreign investments in Belarusian companies are ultimately classified as investments in fixed assets.Alternatively, investments in IT products and services are usually linked to a transfer of ownership rights and take place outside Belarus, as most IT companies carry out these transactions via their foreign entities.

Foreign direct investments in HTP companies were consistently on an upward trend, reaching USD 169.2 million in 2016. They account for a relatively small share in total foreign investments in the sector because most HTP residents use their own profit to drive organic growth rather than seek external investment. In addition, companies often become HTP residents after they receive investment and when they already have an established business model.

ICT's share in total foreign investments



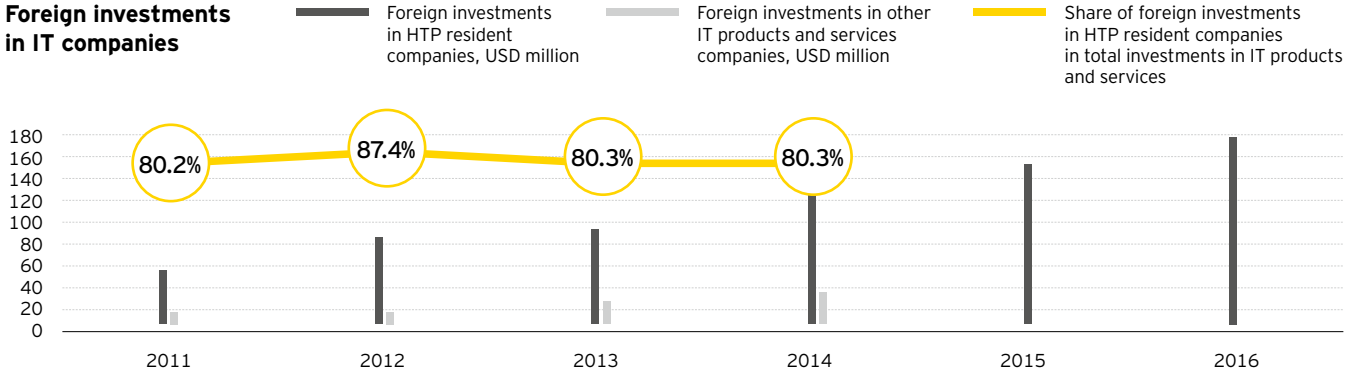
Sources: [6] – Information provided by the Hi-Tech Park Administration; [1] – Information society in the Republic of Belarus, 2015 with updates received from the Belarusian Statistics Committee in May 2017; [3] – Statistical Yearbook of the Republic of Belarus, 2016

Foreign investments in ICT, USD million

Segment	2011	2012	2013	2014
Hardware production, installment and maintenance	22.4	26.7 ▲	25.5 ▼	22.5 ▼
Hardware sale, lease and service	14.3	33.1 ▲	41.2 ▲	49.2 ▲
Telecommunications services	407.7	303.6 ▼	547.3 ▲	1,578.1 ▲
IT products and services	60.7	89.6 ▲	106.2 ▲	149.7 ▲

Source: [1] – Information Society in the Republic of Belarus, 2015 with updates received from the Belarusian Statistics Committee in May 2017

Foreign investments in IT companies



*As of April 2017 there was no data concerning the total amount of foreign investments in IT products and services for 2015-2016
Source: [6] – Information provided by the Hi-Tech Park Administration

SOURCES

[1] Information society in the Republic of Belarus, 2015 with updates received from the Belarusian Statistics Committee in May 2017 http://www.belstat.gov.by/en/ofitsialnaya-statistika/publications/statistical-publications-data-books-bulletins/public_compilation/index_4922/

[2] Belstat data on average salaries in February 2017 - http://www.belstat.gov.by/ofitsialnaya-statistika/solialnaya-sfera/trud/operativnaya-informatsiya_8/o-nachislennoi-srednei-zarabotnoi-plate-rabotnikov/o-nachislennoy-sredney-zarabotnoy-plate-rabotnikov-v-fevrale-2017-nbsp-g/

[3] Statistical Yearbook of the Republic of Belarus, 2016 - http://www.belstat.gov.by/ofitsialnaya-statistika/publications/izdania/public_compilation/index_6316/

[4] Statistical Bulletin, 2009-16 https://www.nbrb.by/engl/publications/bulletin/Bulletin_2015_4e.pdf

[5] World Trade Organization 2017. http://stat.wto.org/StatisticalProgram/WSDBStatisticalPartner.aspx?Language=E

[6] Information provided by the Hi-Tech Park Administration

[7] Results of EY's survey among Hi-Tech Park residents

EDUCATION

Summary

Thanks to the conditions and opportunities offered by the country's educational system, higher education is popular and in high demand in Belarus. People with higher education accounted for 29.4% of the workforce in 2014, up from 22.8% in 2005. There is broad access to higher education, which is free for over 40% of students.

The demand for and affordability of higher education in Belarus can be judged from the World Bank's Enrollment Index (the number of those who receive tertiary education over the total number of people graduated from school), in which Belarus placed second among 139 countries (2014).

Quantity and quality are both key considerations in an analysis of the system of higher education: the number of people entering the IT industry and their knowledge and skills.

Quantity

Belarus had 313,000 university students in 2016, with as many as 75,000, or 24%, specialized in STEM (Science, Technology, Engineering and Mathematics) disciplines [3], including some 70 IT specializations, which are the most in demand among IT companies [5]. These are the people who will develop the IT industry of the future.

If current trends persist, quantitative growth driven by higher education can be forecast based on the following assumptions:

1. The number of students enrolling in educational institutions will change in proportion to the change in the birthrate 17-18 years before the enrollment
2. The percentage of those enrolling in institutions of higher education has stabilized and will remain constant
3. Given the current trend, the percentage of university graduates specializing in STEM disciplines will increase, reaching 22% by 2025 (now at 20%)

Percentage of the workforce with higher education

Indicator	2005	2010	2014
Percentage of the workforce with higher education	22.8%	25.4% ▲	29.4% ▲

Sources: [1] – Statistical compilation Education in the Republic of Belarus 2013;
[2] – Statistical compilation Education in the Republic of Belarus 2015

Tertiary education enrollment index according the World Bank

Rank	Country Name	2014
1	SPAIN	89.07%
2	BELARUS	88.86%
3	FINLAND	88.67%
4	UNITED STATES	86.66%
5	CHILE	86.63%
6	SLOVENIA	82.93%
7	UKRAINE	82.31%
8	DENMARK	81.52%
9	NEW ZEALAND	80.88%
10	AUSTRIA	80.00%

Source: [4] – World Bank Data. gross enrolment ratio. tertiary. both sexes

Quality

STEM education is provided almost entirely by state educational institutions, and the percentage of private institutions is insignificant. As of today, Belarus has not yet completed the process of joining the European Higher Education Area. The quality of the education system depends to a large degree on the approaches taken in the state education system and educational institutions in developing and implementing up-to-date programs of study, creating the necessary conditions (labs, access to technology) and preparing academic staff. Experts in the IT industry note a need for higher budgets and more flexible educational processes in order to prepare the IT specialists needed on the market.

In order to satisfy their own staffing needs, private companies in the IT industry work on a contractual basis with state educational institutions, arranging for certain disciplines and special courses to be taught by company experts, establishing branch departments in IT companies, setting up labs in cooperation with educational institutions and making employees available to teach cutting-edge IT disciplines. These activities, financed by IT companies as an investment in the education system, substantially enhance the quality of graduates.

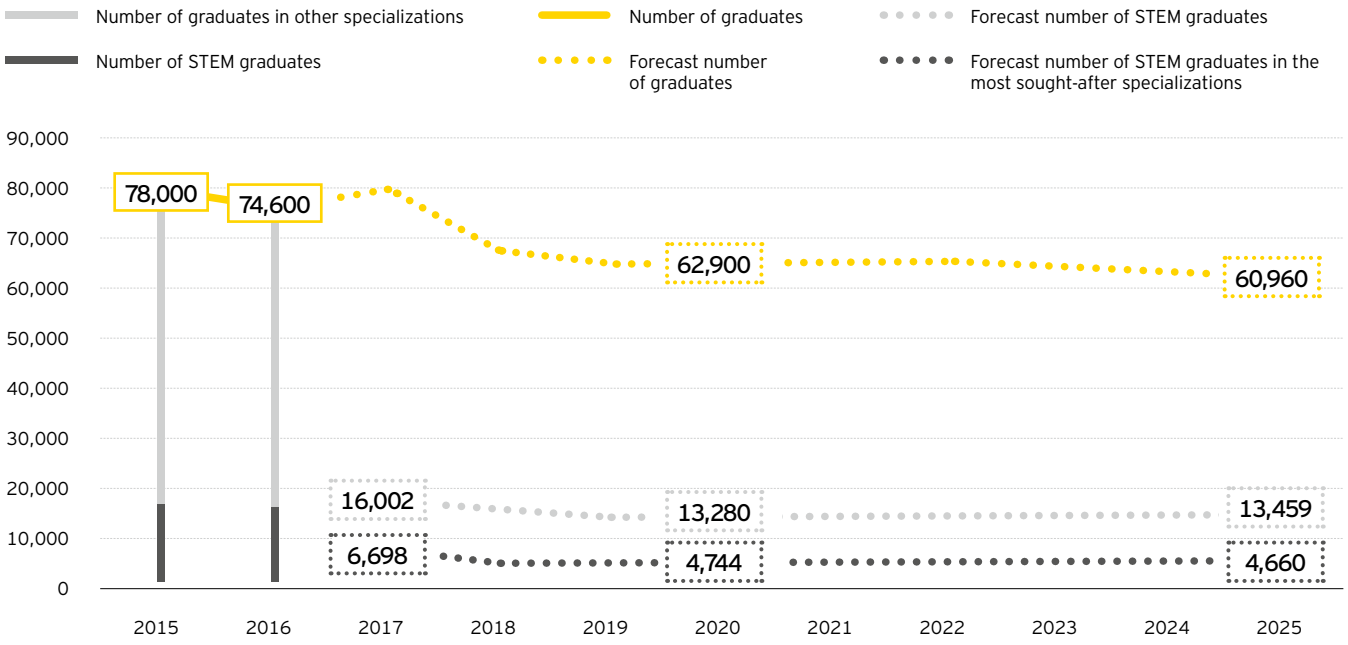
Moreover, major IT companies have their own training centers that prepare students to better meet companies' needs.

Belarus has a unique graduate placement system for state-funded students (around half of all graduates). Those graduates are required to conclude a two-year contract with the company to which they are assigned. IT companies make active use of this mechanism to recruit graduates.

Overall, cooperation between the state education system and companies in the IT industry has ensured strong development of the industry for the last 15 years.

Education system growth forecast (based on existing trends)

Indicator	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Total births 17 years prior to enrollment year	92,645	92,975	93,691	91,720	88,743	88,512	88,943	90,508	96,721	103,626	107,876
Total births 18 years prior to enrollment year	89,586	92,645	92,975	93,691	91,720	88,743	88,512	88,943	90,508	96,721	103,626
Number of students enrolled in institutions of higher education	63,100	62,700	64,161	63,729	62,029	60,926	60,995	61,681	64,354	68,863	72,697
Number of graduates	78,000	74,600	78,400	66,050	63,250	62,900	63,430	63,945	62,879	61,477	60,960
Number of STEM graduates	15,700	15,100	16,002	13,849	13,142	13,280	13,533	13,760	13,607	13,473	13,459
Number of STEM graduates in the most sought-after specializations	n/a	n/a	6,698	3,942	4,263	4,744	4,685	4,767	4,711	4,665	4,660



Source: EY analysis

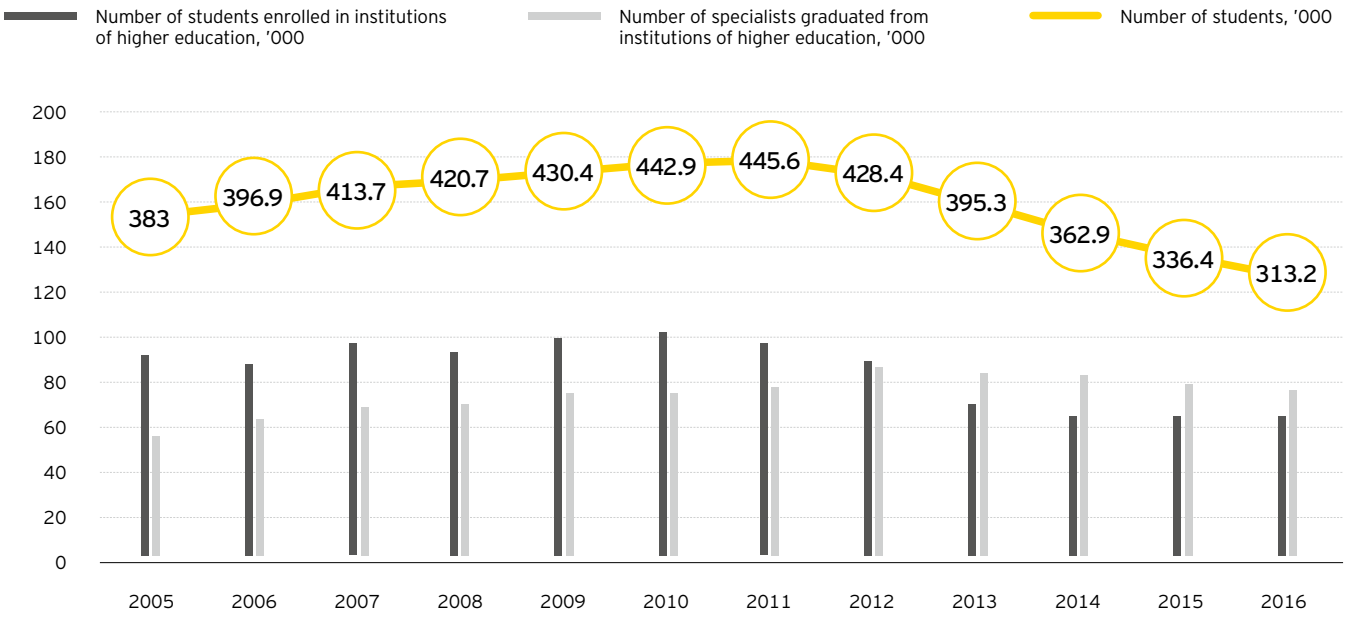
Higher education system

The higher education system in the Republic of Belarus includes 51 educational institutions with a total enrollment of 313,200 undergraduate and 11,800 master's students in 2016, or an average of 330 students per 10,000 population.

The number of students grew between 2005 and 2010, but took a downturn in 2011 due to the demographic situation in the 1990s and early 2000s (a sharp decline in the birth-rate). In 2002 the birthrate began to grow again, and the number of graduates should thus resume a positive trend in 2024.

Statistical data on institutions of higher education

Indicator	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Number of institutions of higher education	55	55	53	53	53	55	55	54	54	54	52	51
Number of students, '000	383.0	396.9	413.7	420.7	430.4	442.9	445.6	428.4	395.3	362.9	336.4	313.2
Students per 10,000 population	398	414	433	442	453	467	471	453	417	383	354	330
Number of students enrolled in institutions of higher education, '000	90.5	86.6	95.4	91.5	97.8	100.5	96.0	88.1	68.7	63.4	63.1	62.7
Number of specialists graduated from institutions of higher education, '000	53.6	61.4	66.9	68.8	74.0	73.3	75.8	84.6	82.7	81.1	78.0	74.6
Number of specialists employed in the economy per 10,000 population	122	137	148	149	159	156	162	183	181	178	173	166
Number of master's students, '000	2.0	2.4	3.3	4.0	4.3	4.8	5.0	6.1	7.6	8.9	10.2	11.8



Sources: [1] – Statistical compilation Education in the Republic of Belarus 2013;
[2] – Statistical compilation Education in the Republic of Belarus 2015;
[3] – Statistical bulletin Education in the Republic of Belarus 2016-2017

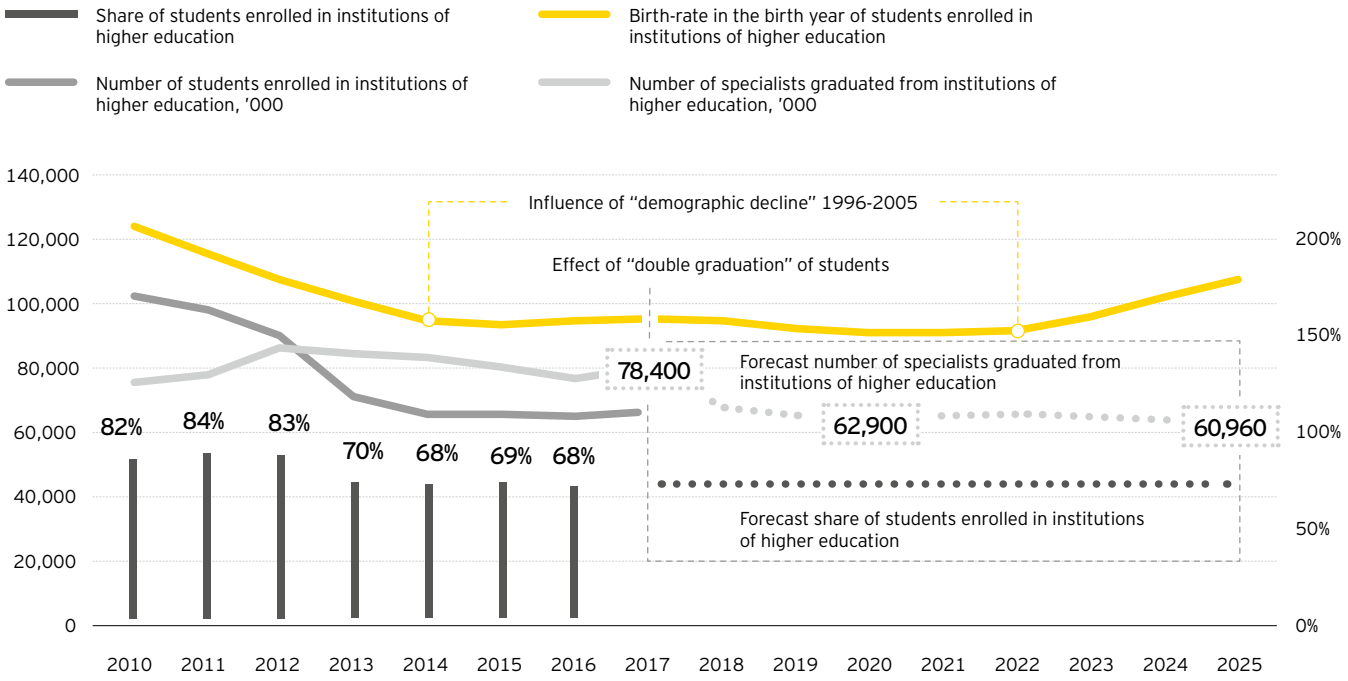
The greatest number of educational institutions (28), including the oldest and most in demand among companies in the IT industry, are located in the capital city of Minsk:

- Belarusian State University
- Belarusian State University of Informatics and Radio Electronics
- Belarusian National Technical University

Regional demand is satisfied by educational institutions in other major cities – the regional centers Brest, Vitebsk, Gomel, Grodno and Mogilev – but Gomel and Grodno are the most noted for technical disciplines.

Educational institutions owned and managed by the state (the Ministry of Education) are completely dominant in terms of the number of students, the quality of education and prestige (popularity). As a rule, private institutions concentrate on the humanities and do not have specializations in demand among IT companies.

Higher education system trends and forecast 2010-2025



Source: EY analysis

A strong state presence in higher education is typical for countries of the CIS, and this affects the rules that Belarusian educational institutions follow in terms of:

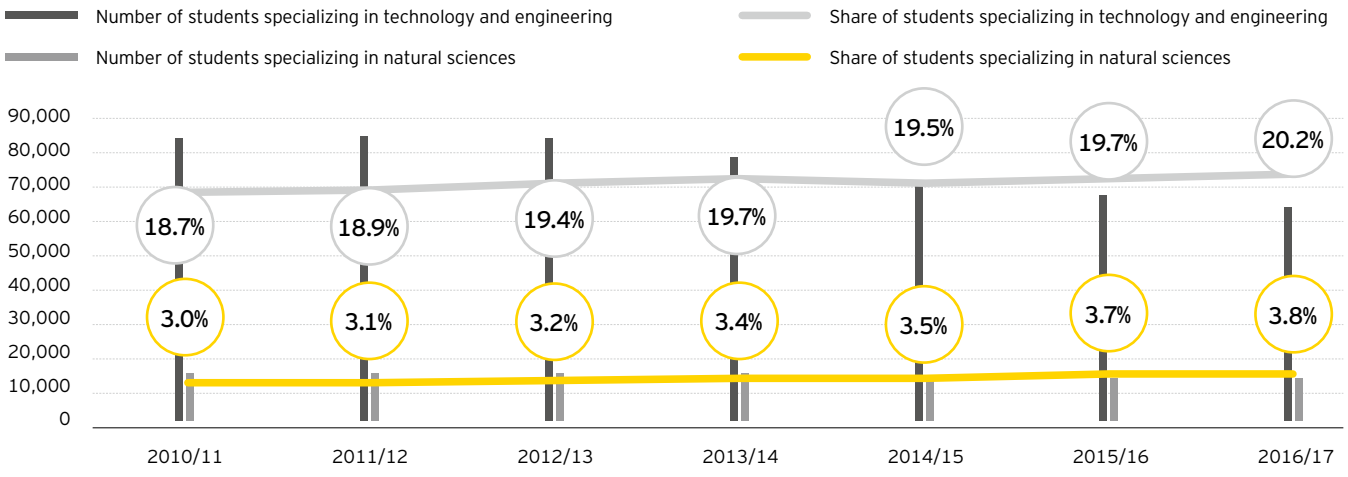
- Planning the number of places by specialization
- Affordability of education
- Graduate placement
- Designing academic programs

Belarus is currently in the process of joining the European Higher Education Area and must substantially restructure its system of higher education to meet European standards. A road map has been developed for this purpose, and the reforms mapped out are prerequisites for inclusion in the European Higher Education Area. The process is going forward, but it is still too early to say when Belarus will actually be included. [7]

STEM education

STEM education in the Republic of Belarus comprises two groups of disciplines: natural sciences and technology/engineering. In 2016/2017 a total of 75,300 students, or 24% of the student population, were specializing in these disciplines.

Number of students enrolled in universities specializing in natural sciences and technology

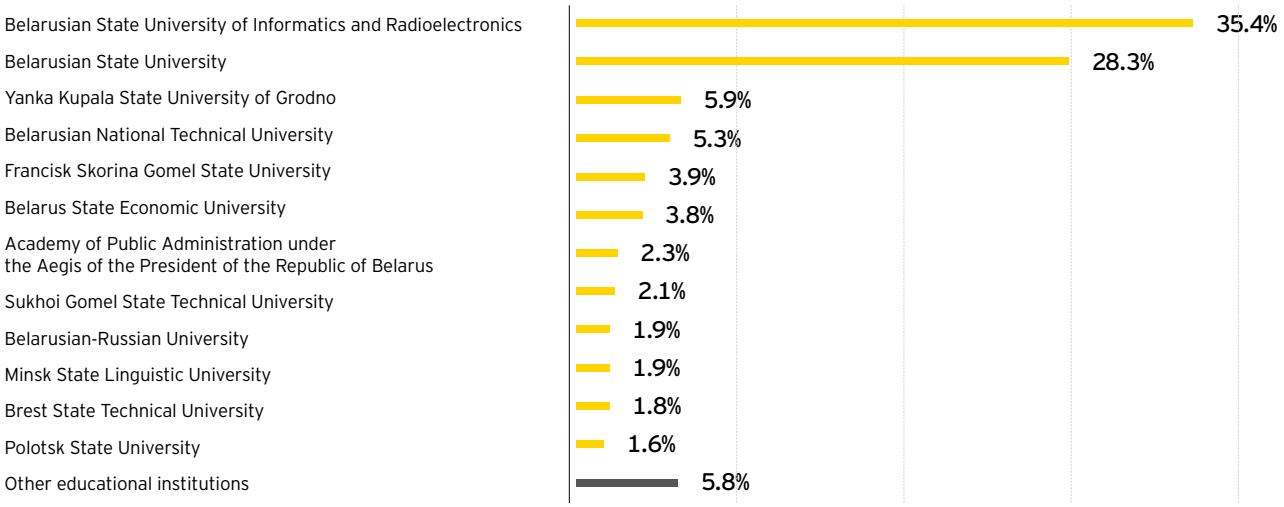


Sources: [1] – Statistical compilation Education in the Republic of Belarus 2013;
[2] – Statistical compilation Education in the Republic of Belarus 2015;
[3] – Statistical bulletin Education in the Republic of Belarus 2016-2017

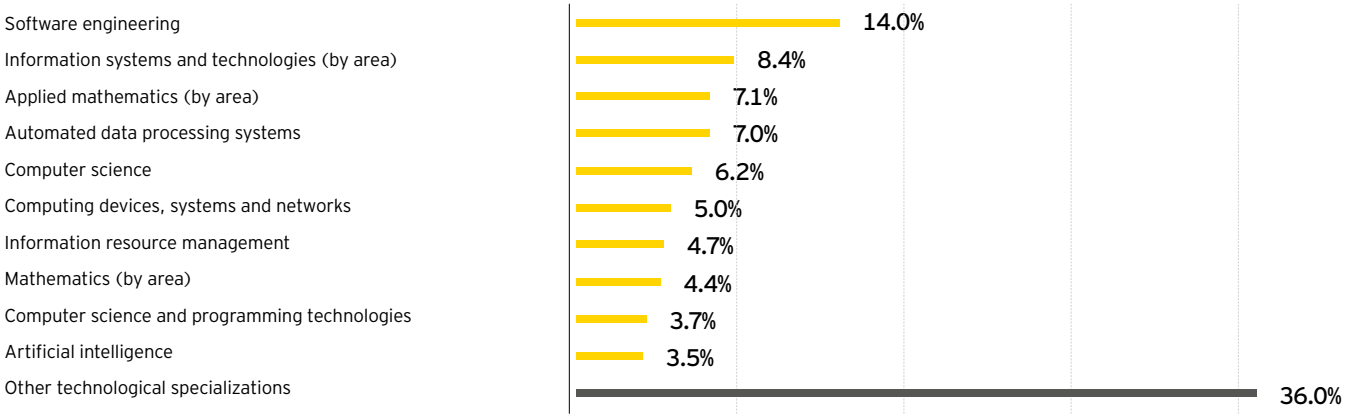
As with the total number of students and graduates, there was a positive trend from 2005 through 2010, followed by a decline lasting until 2016 due to the demographic situation. Meanwhile, the share of students receiving STEM education has grown steadily over the last 11 years (from 20.5% in 2005/2006 to 24% in 2016/2017).

Technical education has grown in popularity as demand has increased on the labor market – largely due to the development of the IT industry in Belarus. Job placement statistics show

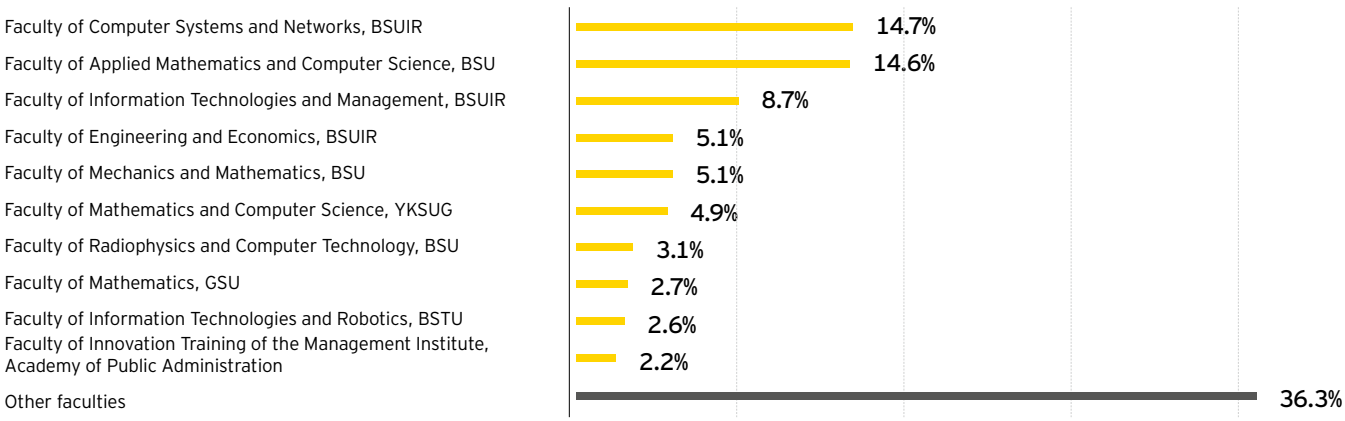
Most popular universities in terms of graduate employment in the Hi-Tech Park in 2016



Most popular specializations in terms of graduate employment in the Hi-Tech Park in 2016



Most popular faculties in terms of graduate employment in the Hi-Tech Park in 2016



Source: [9] – Information provided by the Hi-Tech Park Administration

that graduates of Belarusian State University of Informatics and Radio Electronics and Belarusian State University are the most sought-after. Together, these two leading universities supply most of the junior specialists needed by companies in the IT industry.

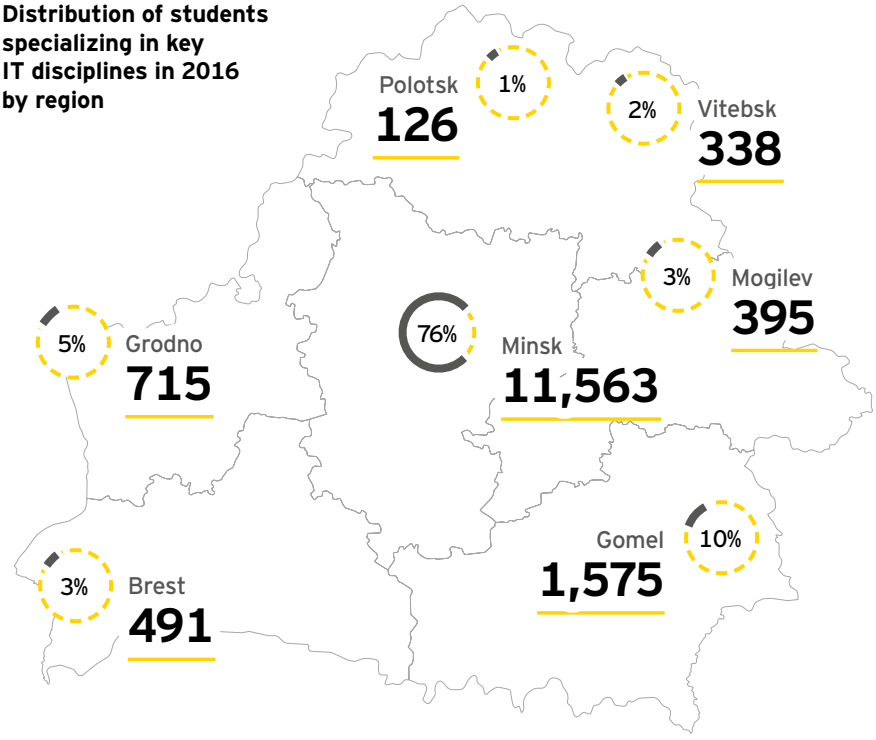
To meet the industry's current needs, educational institutions update their programs and introduce new specializations, such as information systems and technologies (in the game industry), programmable mobile systems, geo-information systems, manufacturing based on 3D technologies, and information security software for mobile systems. Educational institutions throughout the country are also introducing popular IT specializations such as software engineering, applied computer science, etc. into their curriculum.

Now that there is stable demand for graduates specializing in technological disciplines, admission scores and competition among applicants have risen substantially, making these specializations, especially in leading universities, among the most popular and sought-after in the country.

IT specialists are trained throughout the country, though institutions in Minsk still play the main role (especially Belarusian State University and Belarusian State University of Informatics and Radio Electronics). Other institutions that didn't train IT specialists just 15 years ago are now introducing new specializations to satisfy the demand among applicants and on the labor market. Major IT companies have started opening offices in other cities in order to employ graduates throughout the Republic of Belarus.

A key problem noted by many industry experts in connection with the quality of higher technical education is the disproportion in salaries between academic staff and IT specialists, leading to an outflow of experts from the educational system into the workforce.

Distribution of students specializing in key IT disciplines in 2016 by region



Source: [5] – Directory for those applying for an IT specialty, HTP, 2016

Leading institutions of higher education

The most prominent institutions preparing IT specialists are Belarusian State University and Belarusian State University of Informatics and Radio Electronics, which account for the majority of students specializing in IT disciplines (about 55%).

The faculties whose IT specialists are most in demand among Hi-Tech Park residents are the Faculty of Computer Systems and Networks and the Faculty of Information Technologies and Management at Belarusian State University of Informatics and Radio Electronics, the Faculty of Applied Mathematics and Computer Science at Belarusian State University, and the Faculty of Information Technologies and Robotics at Belarusian National Technical University.

Belarusian State University of Informatics and Radio Electronics, Faculty of Computer Systems and Networks

The Faculty of Computer Systems and Networks is one of Belarus's leading sources of IT specialists. The faculty has 7 departments, 4 of which grant degrees in computers, computer science, software engineering and electronic computing devices. The faculty also has branch departments of computers, computer science and software engineering at EPAM Systems. The faculty has 13 research laboratories, set up in cooperation with leading IT companies that are Hi-Tech Park residents and Belarusian banking institutions, as well as 5 academic and education centers. The faculty also has a professional development center (business incubator), formed in cooperation with System Technologies company, and a parallel computing laboratory [10]. The faculty employs over 220 academic staff, including 16 professors (doctors of sciences) and 94 assistant professors (candidates of sciences) [5].

Belarusian State University of Informatics and Radio Electronics, Faculty of Information Technologies and Management

The Faculty of Information Technologies and Management was founded in 1964 as the Faculty of Automation and Computing Technology. The faculty has 6 departments, 5 of which grant degrees: smart information technologies, automated systems information technologies, management systems, theory of electrical engineering, and computational methods and programs. The faculty has 4 branch departments at industrial enterprises in Belarus as well as 6 research and development laboratories, 3 of which were set up in cooperation with leading Hi-Tech Park residents. The faculty is a partner of leading foreign technology vendors such as IBM, Siemens, Philips, Intel and Motorola [11]. The faculty employs over 110 academic staff, including 20 professors (doctors of sciences) and over 35 assistant professors (candidates of sciences). [5]

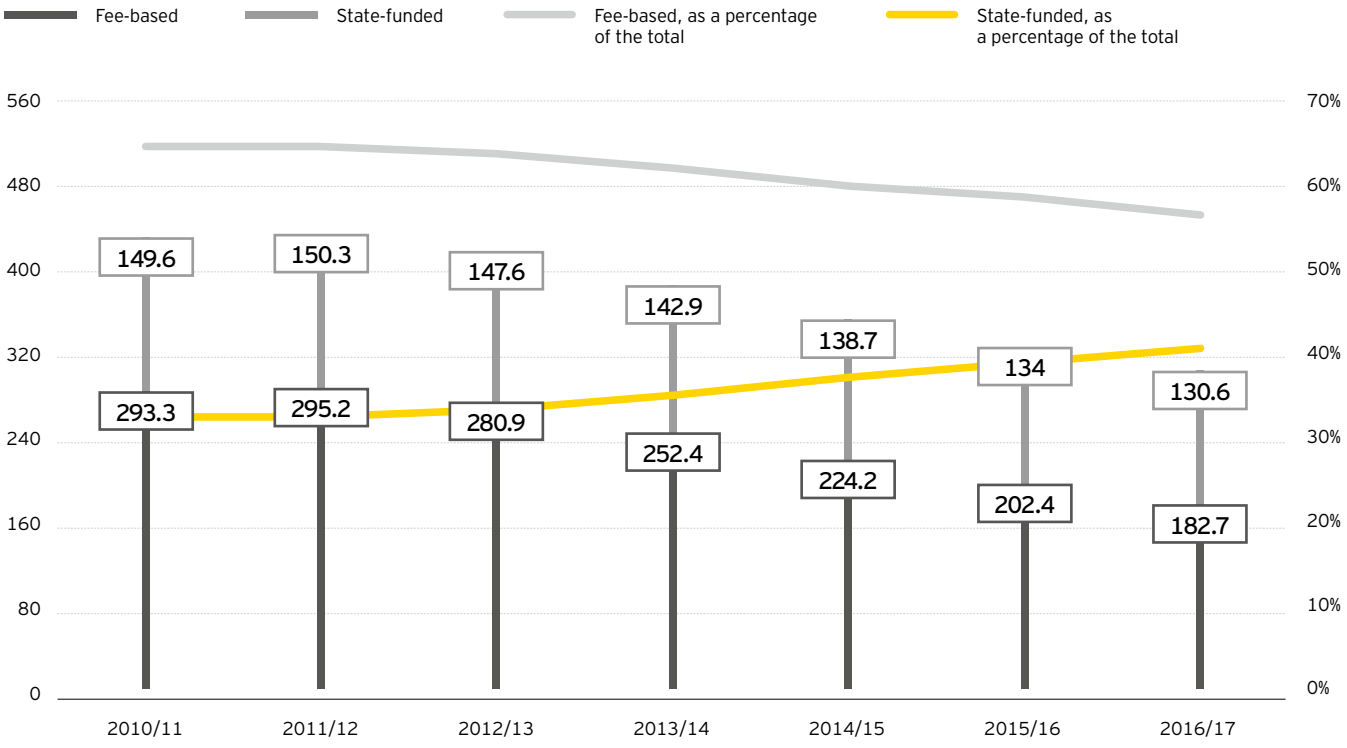
Belarusian State University, Faculty of Applied Mathematics and Computer Science

The Faculty of Applied Mathematics was founded in 1970. Graduates are qualified to engage in research, analysis, organization and management in their areas of specialization, and today make up the core human resources of many leading IT companies in the country. The faculty has cooperation agreements with over 100 Hi-Tech Park residents. The faculty has 11 departments, including further mathematics, computational mathematics, discrete mathematics and algorithmics, management information systems, computer technologies and systems, mathematical modeling and data analysis, etc. The faculty has 6 branches at Hi-Tech Park companies and the National Academy of Sciences of the Republic of Belarus. There is also an IT competence center devoted to the study of products of well-known international vendors such as SAP, Oracle, Microsoft and Cisco, and the Yandex Data Analysis School has also been set up. The faculty employs over 180 teachers, including over 30 professors (doctors of sciences) and over 100 assistant professors (candidates of sciences).

Belarusian National Technical University, Faculty of Information Technologies and Robotics

The Faculty of Information Technologies and Robotics was founded in 1983 as the Faculty of Robots and Robotic Systems. The faculty is expanding its program for students specializing in information technologies and robotics to meet today's needs. The faculty has 6 departments, 4 of which grant degrees: computers and automated systems software, automated design systems,electrical drives. and automation of industrial installations and technological complexes. A key focus is the development of information technologies in areas such as education, science and manufacturing. Research is carried out by the industrial automation research and innovation laboratory (magnetic diagnostics and processing sector). The faculty also has a computer center, including a computer graphics and publishing systems laboratory (education support sector). The faculty employs some 150 academic staff, including 7 doctors of sciences and 67 candidates of sciences [12].

Number of students by form of payment for education, '000



Source: [3] – Statistical bulletin Education in the Republic of Belarus 2016-2017

Affordability of education

The dominant role of state-funded higher education means that education is very affordable: 41.7% of students receive full state funding, and 58.3% receive partial funding (a partial state subsidy, with the rest paid by the students themselves).

The cost of education in technical disciplines averages USD 1,300 per year (4-year course of study). The full cost of education for foreign students is substantially higher.

Students have the chance to reduce their fees or switch to state funding on the basis of their academic and other achievements. In addition, commercial banks in Belarus provide educational loans to be repaid after education is completed. There is also a legally established "family capital" initiative under which a family receives USD 10,000 from the state for each child beginning with the third. This amount is indexed and may be used to pay for the child's education when he or she reaches the age of 18.

Planning the number of students

The dominance of state educational institutions allows state agencies to manage the number of students in accordance with economic plans and forecasts. The state plans the number of graduates, based on applications that the Ministry of Education receives from organizations seeking to hire graduates. This system, however, requires a long planning horizon (4 years, previously 5), as a result of which private companies – especially small ones – are rarely involved in such planning.

The state determines the number of students that will receive funding. An educational institution may redistribute state funds among specializations, on condition that a minimum number of specialists graduate in all specializations for which companies have submitted applications. Educational institutions, based on their own resources (classroom area, number of teacher hours), may then admit an additional number of students who will make a partial payment. The need for specializations is taken into account, allowing educational institutions to meet the demand of applicants. Although there is a considerably higher demand on the market for graduates specializing in software development than for graduates in many other technical areas, universities tend to be conservative and in no hurry to increase IT admissions at the expense of other areas, even though they have the ability to do this.

In the next four years, almost 20,000 students are expected to graduate with specializations in high demand among IT companies. The large number of graduates in 2017 has to do with the transition in Belarus from a 5-year to a 4-year course of university study as part of the process of harmonization with European standards. The deans of the key IT faculties believe that most students will find employment despite twice as many students graduating this year compared with the usual number. Subsequently, the graduation trend is expected to remain positive.

Plan for graduates with key IT specializations

2017	2018	2019	2020
6,698	3,942	4,263	4,744

Source: [9] – Information provided by the Hi-Tech Park Administration

Graduate placements

The practice of compulsory graduate placement applies to all state-funded students. Each such graduate receives the legal status of "young specialist". All graduates who receive a state-funded education are placed on the basis of applications from companies. They conclude two-year contracts and cannot resign or be dismissed during that period except in cases stipulated by law. This guarantees that state-funded students get their first employment and encourages students to interact with companies on their own to ensure that applications are submitted. As a result, practically all students have a job waiting when they complete their education. This practice is not mandatory for students who make partial payment, but they may also obtain "young specialist" status if they so desire.

Annual cost of higher education in key technical disciplines for Belarusian and foreign students, 2016

	Educational institution	Faculty	For Belarusian students	For foreign students
1	Belarusian State University of Informatics and Radio Electronics	Faculty of Computer Systems and Networks	USD 1,334	–
2	Belarusian State University	Faculty of Applied Mathematics and Computer Science	USD 1,157	USD 3,350
3	Belarusian State University of Informatics and Radio Electronics	Faculty of Information Technologies and Management	USD 1,227	USD 5,000
4	Belarusian State University of Informatics and Radio Electronics	Faculty of Engineering and Economics	USD 1,227	–
5	Belarusian State University	Faculty of Mechanics and Mathematics	USD 1,101	USD 2,850
		Average, top 5 technical faculties	USD 1,209	USD 3,733

Sources: [13] – BSUIR information portal;
[14] – Order of the rector of BSU;
[15] – Information portal of the Ministry of Education of the Republic of Belarus

Approximately 47% of graduates hired by IT companies received placements. This practice is popular with both graduates, who are guaranteed a job, and companies, which know that these specialists will not soon leave for other companies and are thus willing to invest in them.

Cooperation between educational institutions and technology companies

An important aspect of technical education is student access to new technologies and systems. Such access improves the quality of education and thus helps both universities and companies by reducing the cost of additional training and allowing talented students to be identified and recruited even before their graduation. For this reason, the law allows companies in the IT industry to enter into cooperation agreements with educational institutions.

The form of cooperation that is most widespread and affordable for companies makes use of employees of technology companies to teach specific subjects, special courses or labs (practical training involving the use of specific technologies).

Joint laboratories are a more advanced form of cooperation, involving a certain level of investment on the part of companies. These are classrooms equipped by a company for work with products and technologies that it actively uses and develops. As of today, technology companies have set up 52 joint laboratories in 15 educational institutions.

Another form of cooperation involves the opening of a so-called "branch department" in an IT company. In this case, some of the department's classes are held directly on the companies' premises, allowing students to obtain practical IT experience. As of today, 24 branch departments of 8 educational institutions have been opened in 11 Hi-Tech Park companies.

Belarusian educational institutions work not only with domestic IT companies, but also with international technology vendors. For example, they work with SAP as part of the SAP University Alliances Program as well as under a tripartite memorandum on cooperation (Belarusian State University of Informatics and Radio Electronics, SAP CIS, and Itransition). The Regional Academic Competence Center, formed in December 2010 (the first in Belarus), offers training courses and awards its own certificates as well as TERP10 professional certification.

Universities work with IBM as part of the IBM Academic Initiative Program, and a memorandum of understanding has been signed (IBM Eastern Europe/Asia). The IBM Technology Academic Competence Center was established on 21 April 2011. Students who complete training courses at the center receive IBM certificates as part of the IBM Academic Qualification Program. In 2012 Belarusian State University of Informatics and Radio Electronics received an IBM Faculty Award.

Cooperation between the Faculty of Computer Systems and Networks, Belarusian State University of Informatics and Radio Electronics, with big-name international IT companies

Company	Year cooperation began	Form of cooperation
SAP	2009	Participation in the SAP University Alliances Program. Tripartite memorandum on cooperation (Belarusian State University of Informatics and Radio Electronics, SAP CIS, and Itransition). The Regional Academic Competence Center was formed.
CISCO Systems	2009	The Cisco Web Academy was set up.
National Instruments	2010	Cooperation agreement with National Instruments Rus. The officially authorized National Instruments Technology Center was formed.
IBM	2010	Participation in the IBM Academic Initiative Program. Memorandum of understanding (IBM Eastern Europe/Asia). The IBM Technologies Academic Competence Center was formed.
NVidia	2012	Agreement with the Moscow branch. The CUDA Training Center was set up (reorganized as the GPU Education Center in 2016). The center's status is confirmed on an annual basis.
EMC2	2013	Participation in the EMC Academic Partnership Program.
EPAM Systems	2004	Cooperation Agreement. Joint laboratories. Training in Java, testing technologies and Linux systems programming. The company branch of the Faculty of Computer Systems and Networks offers 300-400 class hours of training annually.
Yandex	2013	Cooperation Agreement. An annual interface development school.
Microsoft	2008	Participation in the Microsoft Dream Spark Program (Microsoft Imaging).
Oracle	2013	Participation in the Oracle Academy Program.
Apple	2014	Participation in the iOS Developer University Program.

Source: [16] – Information provided by the faculty Dean's office

IT company training centers

Training centers of major IT companies – an important new element of the IT education system – train new specialists for the IT industry and provide retraining and advanced training for those already employed in the industry. In 2016, 4,394 people took training at Itransition, EPAM Systems and Hi-Tech Park training centers, and 1,391 were subsequently hired by IT companies. This number includes university students in IT disciplines who took training before entering the workforce as well as those with no prior training.

IBA's IT and Business Administration Institute focuses on specialized courses for the retraining and advanced training of IT specialists. In 2016, 325 people took authorized courses as part of partnership programs with technology companies (Microsoft, Cisco, Oracle, SAP, IBM, and 1C). In addition, 381 people took the institute's custom-designed courses in various IT-related areas.

With the participation of HTP residents, the Educational Center of the Hi-Tech Park was established to provide re-education for adults who want to start a career in the IT industry, as well as training for employees of IT companies willing to improve their knowledge and skills. 1,629 people received training there in 2016, with 340 of them getting jobs in HTP companies. iTeen Academy for kids aged 6-15 years old also operates within the Educational Center.

Number of persons who took courses at IT company training centers in 2016

Center	Area	Trained	Hired	% hired of total trained
Itransition Training Center	Software development	568	105	18.5%
Itransition Training Center	QA	840	140	16.7%
EPAM Systems Training Center	QA	583	412	70.7%
EPAM Systems Training Center	Software development	617	324	52.5%
EPAM Systems Training Center	Other areas	157	70	44.6%

Source: [17] – Information provided by the training centers of Itransition, EPAM Systems

Achievements of Belarusian students in international competitions and olympiads

Belarusian university and school students are active in international competitions and olympiads in STEM subjects.

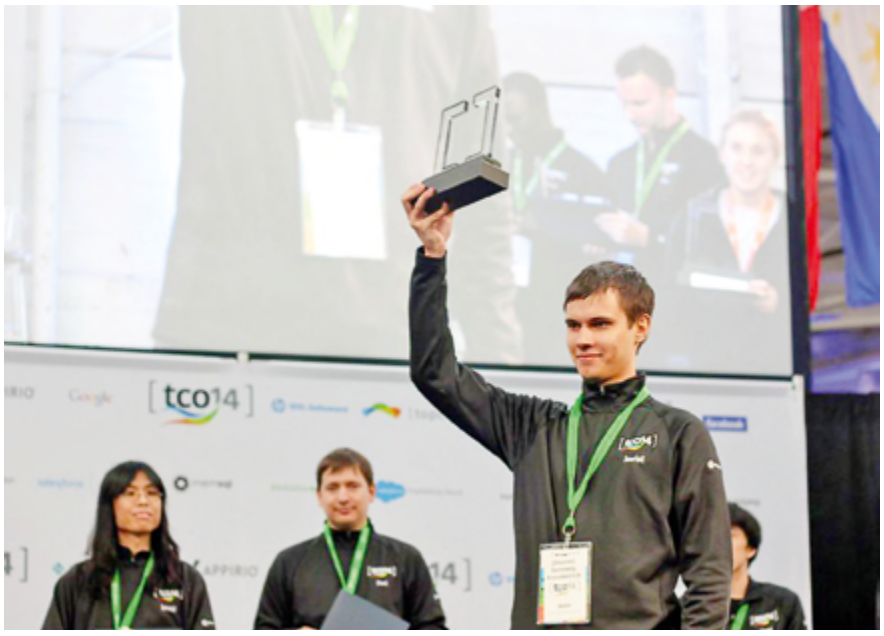
Gennady Korotkevich, an internationally recognized programming prodigy, has won six consecutive gold medals in the International Olympiad in Informatics (IOI), first place in the 2014, 2015 and 2016 Google Code Jam and first place in the 2014 and 2015 Facebook Hacker Cup.

Belarusian students have taken part in competitions such as ACM ICPC, Google Code Jam, Google Hash Code, TopCoder Open and IEEEXtreme. In 2004, the Belarusian State University team took third place and won a gold medal in the International Collegiate Programming Contest (ACM ICPC). From 2004 through 2016, a total of over 40 students achieved strong results, 29 of them taking prizes in individual or team competitions (highlighted in yellow).

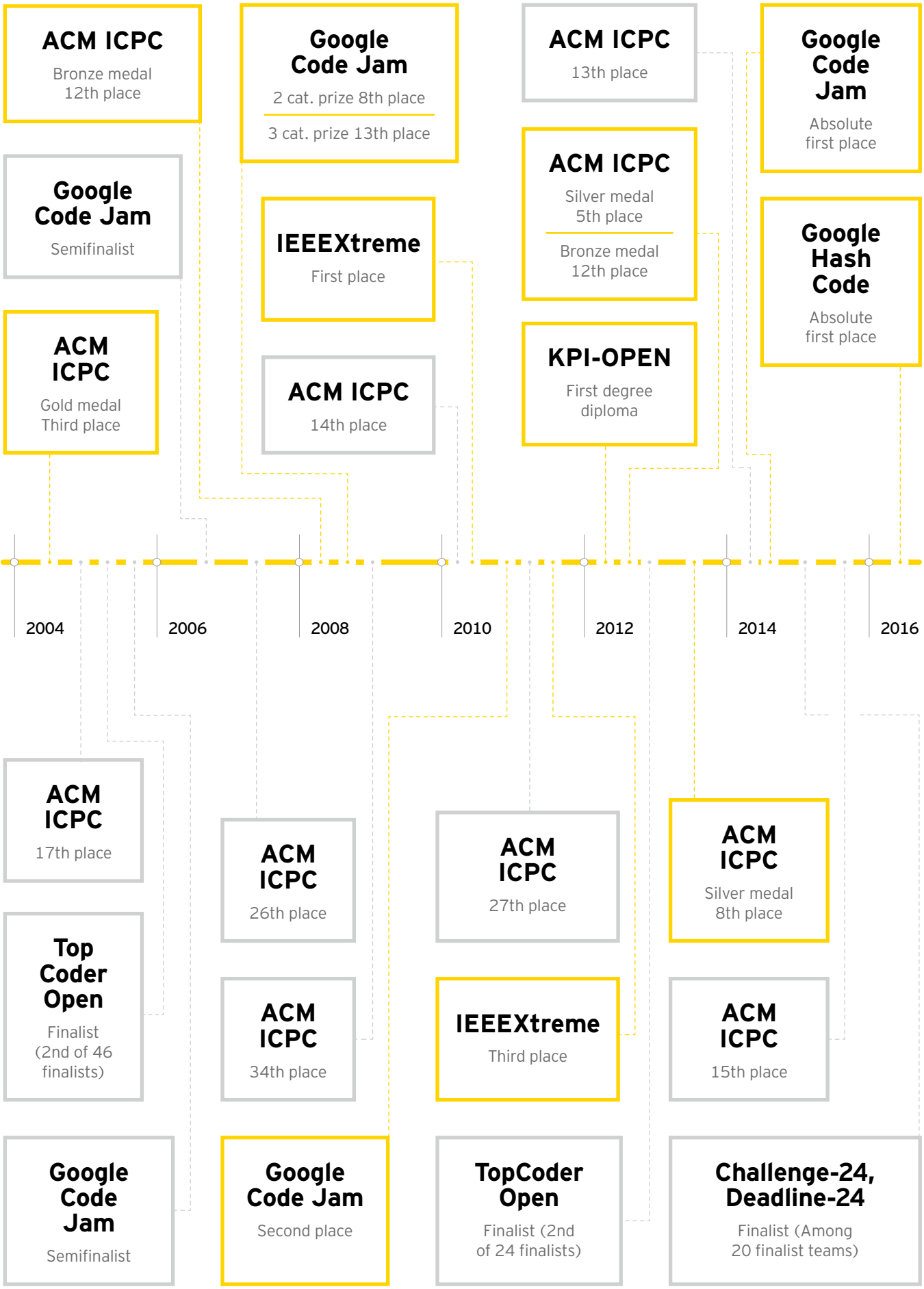
Belarusian university and school students also excel in international math competitions and conferences such as IMC, EUCYS, ICYS and ITYM. The following achievements may be singled out:

- IMC (International Mathematics Competition for University Students): team firsts in 2003 and 2005; 77 students have taken part in the olympiad since 2001, and all of them have won individual prizes: 40 gold medals (including 5 grand prizes), 27 silver and 10 bronze
- ITYM (International Tournament of Young Mathematicians): in 2016 Belarus was represented by 2 teams, both of which took prizes (gold and silver medals); in the 8 years that the tournament has been held, Belarusian students have won 9 awards

Gennady Korotkevich takes gold in the prestigious international competition Topcoder Open in the USA



Source: [19] – History of ITMO University


ACM ICPC
Bronze medal
12th place
Google Code Jam
Semifinalist
ACM ICPC
Gold medal
Third place
Google Code Jam
2 cat. prize 8th place
3 cat. prize 13th place
IEEEXtreme
First place
ACM ICPC
14th place
ACM ICPC
13th place
ACM ICPC
Silver medal
5th place
Bronze medal
12th place
KPI-OPEN
First degree
diploma
Google Code Jam
Absolute
first place
Google Hash Code
Absolute
first place
2004
2006
2008
2010
2012
2014
2016
ACM ICPC
17th place
Top Coder Open
Finalist
(2nd of 46
finalists)
Google Code Jam
Semifinalist
ACM ICPC
26th place
ACM ICPC
34th place
Google Code Jam
Second place
ACM ICPC
27th place
IEEEXtreme
Third place
TopCoder Open
Finalist (2nd
of 24 finalists)
ACM ICPC
Silver medal
8th place
ACM ICPC
15th place
Challenge-24, Deadline-24
Finalist (Among
20 finalist teams)

School education

Computer science is a prerequisite for the upper six grades in the Belarusian school curriculum. The approved course of study includes the fundamentals of information technologies and algorithmization, as well as basic technology skills (graphic and text editors, web design, computer animation, and the development environment).

The popularity and prospects of higher technical education can be judged based on the demand for technical specializations among school students. All applicants to institutions of higher education take the same state exams. The number of graduates who take the maths and physics exams (the subjects required for admission to STEM disciplines) is thus an indication of the level of interest in IT-related education and employment. In 2016 one in four school graduates chose to take both maths and physics exams.

The Hi-Tech Park Administration actively engages with school students to promote IT education. Since 2010 the first week in September has been Knowledge Week, when representatives of Hi-Tech Park residents meet with school students all over the country to tell them about work in the IT field, make recommendations on what to concentrate on when preparing for exams, what areas to specialize in, etc.

An IT Academy was established at the Hi-Tech Park Educational Center for children from 6 to 15 years of age (iTeen Academy). Courses are offered on programming, robotics, game creation, web technologies and design. The center's students have won prizes in both national and international olympiads and competitions.

In 2016, at the initiative of Hi-Tech Park residents and in cooperation with the Hi-Tech Park Administration and the Ministry of Education, a joint educational program was launched to teach Scratch programming skills to children in the second grade on a voluntary basis. Another course is designed for students of the fifth-sixth grades dedicated to game development using Scratch. In Scratch programming, code is replaced with graphic units. This allows programming to be studied at the level of program functioning, which helps to develop both logical and algorithmic thinking in children. The project is designed to teach children to understand and create computer programs and to use computers to solve a variety of problems.

Google Code Jam ranking, 2003-2016

Country	Number of first-place showings	Number of second-place showings	Number of third-place showings
BELARUS	4	1	0
CHINA	2	3	1
RUSSIA	2	1	6
POLAND	2	0	1
JAPAN	1	1	1

Source: [18] – Google Code Jam results by years

SOURCES

[1] Statistical compilation *Education in the Republic of Belarus 2013* http://www.belstat.gov.by/ofitsialnaya-statistika/publications/izdania/public_compilation/index_487/

[2] Statistical compilation *Education in the Republic of Belarus 2015* http://www.belstat.gov.by/ofitsialnaya-statistika/publications/izdania/public_compilation/index_682/

[3] Statistical bulletin *Education in the Republic of Belarus 2016-2017* http://www.belstat.gov.by/ofitsialnaya-statistika/publications/izdania/public_bulletin/index_6835/

[4] World Bank Data, gross enrolment ratio, tertiary, both sexes – http://data.worldbank.org/indicator/SE.TER.ENRR?end=2014&start=1970&view=chart

[5] Reference book for those obtaining IT education, HTP, 2016

[6] Results of EY's survey among Hi-Tech Park residents

[7] Report *Implementation of road map requirements in the draft Education Code* – http://bolognaby.org/images/uploads/2017/03/BIBC_Roadmap_Code_of_Education_2017.pdf

[8] Education and Youth Policy State Program for 2016-2020 – http://www.government.by/upload/docs/file2b2ba5ad88b5b0eb.PDF

[9] Information provided by the Hi-Tech Park Administration

[10] Interview with Alexander Martinkevich by information portal tut.by – http://42.tut.by/415519

[11] Official Information Portal FITU BSUIR – https://www.bsuir.by/ru/fitu

[12] Official information portal of FITR BNTU – http://www.bntu.by/fitr/item/fitr.html

[13] BSUIR Information portal – https://www.bsuir.by/ru/oplata-obucheniya

[14] Order of the rector of BSU – http://www.bsu.by/Cache/pdf/751133.pdf

[15] Information portal of the Ministry of Education of the Republic of Belarus – http://edu.gov.by/page-22931

[16] Information provided by BSUIR FCSN Dean's office

[17] Information provided by the training centers of Itransition, EPAM Systems

[18] Google Code Jam results by years – https://en.wikipedia.org/wiki/Google_Code_Jam

[19] History of ITMO University – http://en.ifmo.ru/en/history/History.htm

LABOR MARKET

Summary

The labor market is a cornerstone of the IT industry, having an impact on all sector activities. The Belarusian IT industry is notable for a high percentage of employees with higher education (some 76%) [1]. Its young workforce is another characteristic of the sector – 57% of Hi-Tech Park employees are under 30 years of age [2]. The IT career path usually starts before the age of 25 [1].

The information and communication technology (ICT) sector currently has a workforce of over 85,000, including some 34,000 in the IT products and services segment, with more than 30,000 working for HTP resident companies. Another 30,000 IT specialists are employed in sectors of the economy other than ICT according to our estimates. There are currently no official statistics on the overall number of ICT specialists in Belarus, but we conservatively estimate the number at over 115,000.

High urbanization of the workforce is a key feature of the labor market in Belarus, where more than 80% of working people live in cities. This trend is even more prominent in the IT industry: over 95% of IT company employees are based in three cities – Minsk, Gomel and Grodno – which are also major centers of higher education. Minsk is an important technology cluster in Eastern Europe: it has a large number of IT companies, competitive employers, highly qualified IT staff, and an effective system of education that satisfies the demand of companies for graduates.

Although the labor market is largely concentrated in Minsk, IT companies often set up their offices in regional cities to gain access to IT resources who work there for companies from other sectors. The knock-on effect of this trend is that engineering education is developing at the regional level. Drawing on regional resources is a factor that will help the IT industry to grow its workforce and develop.

The level of labor compensation prevailing on the market is responsible for the sector's high attractiveness and ability to draw and retain talent; on the other hand, the cost of labor affects the cost of IT services and companies' potential to compete in foreign markets.

The IT industry labor market features an average salary level that is much higher than in all other sectors of the economy and is constantly rising for both experienced staff and beginners. As of March 2017, the average salary in the IT industry was almost five times the average national salary. This huge gap in the level of labor compensation is one of the reasons why the IT products and services segment draws talent from other sectors. The majority of best qualified IT staff work in the IT products and services segment. The IT industry has a reputation for providing secure and well-paid jobs that are immune to economy-wide fluctuations in both the labor market and the regional economy.

The median net monthly salary is USD 1,500 for developers, USD 2,000 for project managers, and USD 700 for system administrators. For technology staff, the salary level largely depends on work experience: those with at least 5 years of experience are paid more than USD 2,000, and those with 7 years of experience are paid more than USD 3,000. The salary level also depends on technology expertise, with the highest salaries paid to specialists who work with C++ (USD 1,949 on average), Objective C / Swift (USD 1,969 on average) and Python (USD 2,002 on average).

The rapid growth in the IT industry company headcount (19% per year between 2010 and 2016 [2]) strengthens competition for experienced IT workers, because the world market potential and growth opportunities that companies see surpass their ability to recruit and train qualified staff. Yet, most companies note that the need for IT graduates is not difficult to meet. In previous years, some major IT companies were able to increase their local headcount by 1,000 and more every year.

Industry experts point to improvements in education quality and self-learning, and particularly, much better English language skills. Just five years ago, IT developers with reasonable English language skills were difficult to find, whereas now the majority of highly qualified IT staff can speak good English.

The overall tax burden and labor costs are relatively high in Belarus; however, Hi-Tech Park residents are entitled to payroll tax benefits that are among the most advantageous in the region. This gives Hi-Tech Park residents a significant competitive edge over companies from other countries in the region.

In terms of gender structure, Belarus has more women than men; however, men prevail in the working-age population. Women make up 7.6% of total Hi-Tech Park headcount, which is consistent with the gender ratio in the IT industry globally. Female talent holds untapped potential that the IT industry can draw on to further drive its growth and development.

Demographics and regional distribution

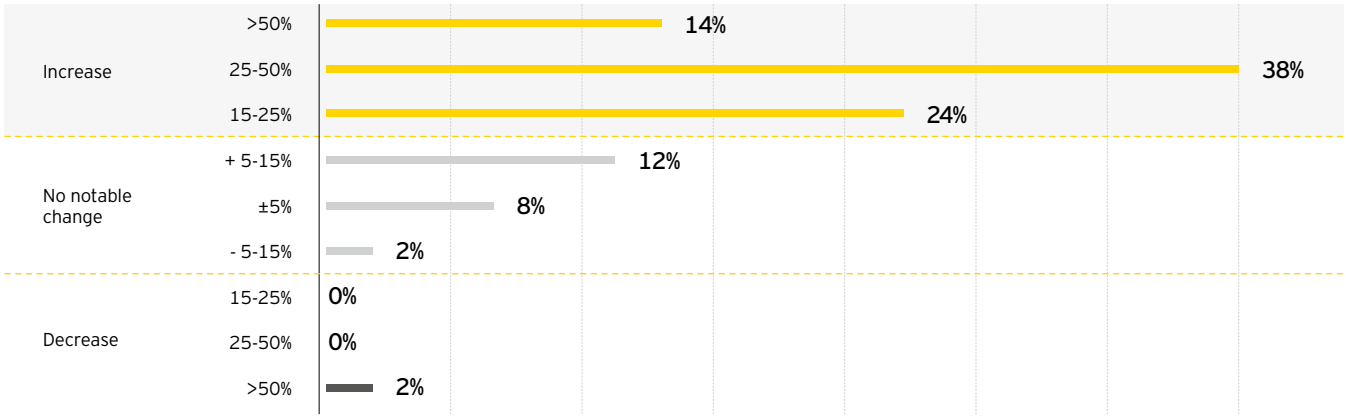
Belarus has a population of 9.5 million, with 4.37 million engaged in the economy. Belarus is a highly urbanized country: 7.4 million or 77.6% of its total population and 3.6 million or 81.1% of its working population live in cities [4].

Official unemployment statistics are based on the number of people officially registered as unemployed, and thus may not adequately report the actual number of jobless people, yet they show changes in the national unemployment rate. The unemployment rate was the lowest in 2012-14 at 0.5%, but then picked up to 1% due to the deteriorating economy.

In 2015, the combined headcount in the ICT sector was 85,000, or less than 2% of the working population, with some 34,000 in the IT products and services segment, and over 24,000, or 28%, employed by Hi-Tech Park residents [3]. Apart from that, around 30,000 IT specialists work in other sectors of the economy.

The ICT sector and HTP workforce is constantly expanding, consistent with IT company development plans. According to the EY Survey 2017, 88% of companies indicated that they are planning to boost their headcount in the next 2-3 years, and 52% intend to expand it by more than 25% [5].

How do you expect your company headcount to change by 2019?



Source: [5] Results of EY's survey among Hi-Tech Park residents

The majority of the population live in six large cities that are administrative centers of the Belarusian regions. All of them have educational institutions that train STEM specialists.

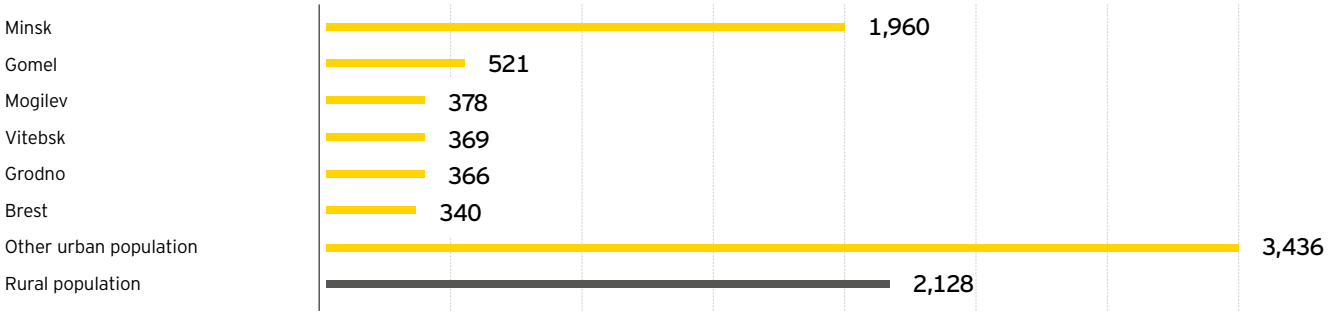
The companies responding to our questionnaire have indicated that more than 95% of their employees are based in three cities: Minsk (89%), Gomel (6%) and Grodno (2%).

The majority of Belarusian IT companies were founded in Minsk. Historically, Minsk has always been the center of higher education and the main migration destination in the country for people seeking education or employment. Regional development is one of the potential growth paths for the IT industry. Initially, IT companies set up offices in regional cities to attract IT talent who work there for other sectors into the IT industry.

However, regional universities have recently started to enroll more students for training in IT jobs and introduce new IT specializations, supplying fresh talent to the sector in the regions.

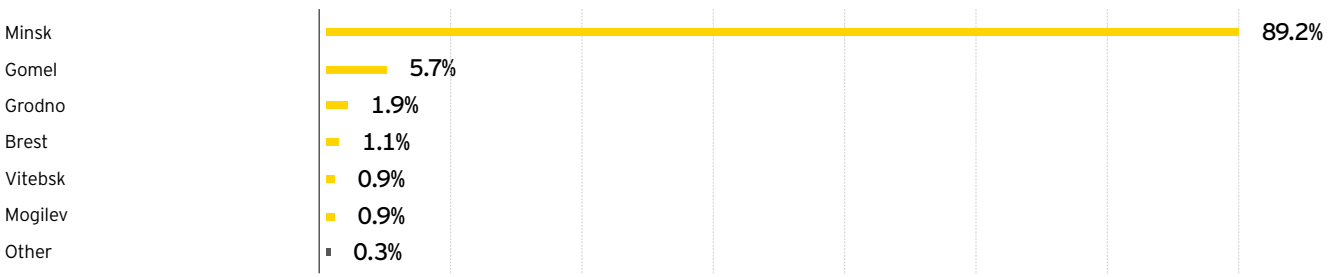
Companies believe that the state of the IT industry labor market in Belarusian regional cities and regions is an important factor whose impact on the industry has so far been fairly negative.

Distribution of population, '000



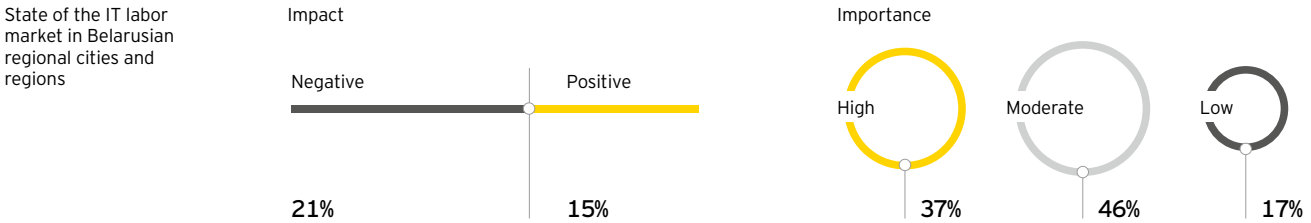
Source: [6] – Demographic Year Book of the Republic of Belarus, 2016

Distribution of HTP residents' employees among cities



Source: [5] Results of EY's survey among Hi-Tech Park residents

Assessment of factor impact



Source: [5] Results of EY's survey among Hi-Tech Park residents

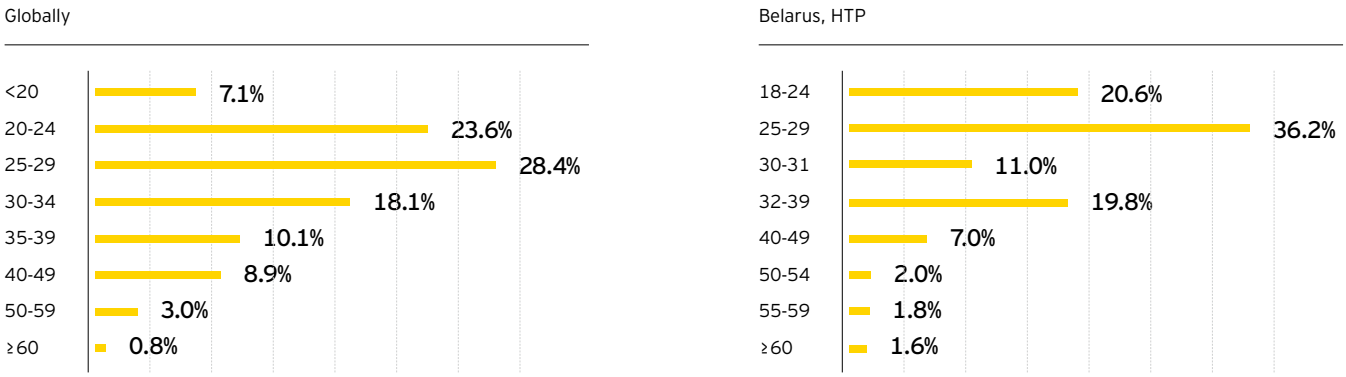
International migration has no material effect on the total workforce in the country. In 2015, 28,000 arrivals and 10,000 departures were registered, resulting in a net change of less than 0.5% of the total workforce. Migration of IT talent from Belarus has dropped considerably over the last 10 years.

On the contrary, IT companies point to a new trend – inbound migration to Belarus from other countries, mostly Russia and Ukraine. Factors that attract IT talent from neighboring countries include a large number of IT companies offering competitive employment conditions and interesting technology assignments, a stable situation in the country, as well as an affordable cost of living and convenient infrastructure.

Age structure

The Belarusian IT industry has a young workforce. When compared with the findings of the global IT workforce survey by Stack Overflow covering 56,000 developers, the Belarusian IT industry employs fewer people over 30 years old but more people aged between 25 and 29. This is due to the fact that the IT workforce is mostly replenished with university graduates who gain a new job in the sector after completing two years of mandatory post-graduation employment (refer to the "Education" section for details).

IT industry age structure



Sources: [7] – Stack Overflow Survey Results 2016

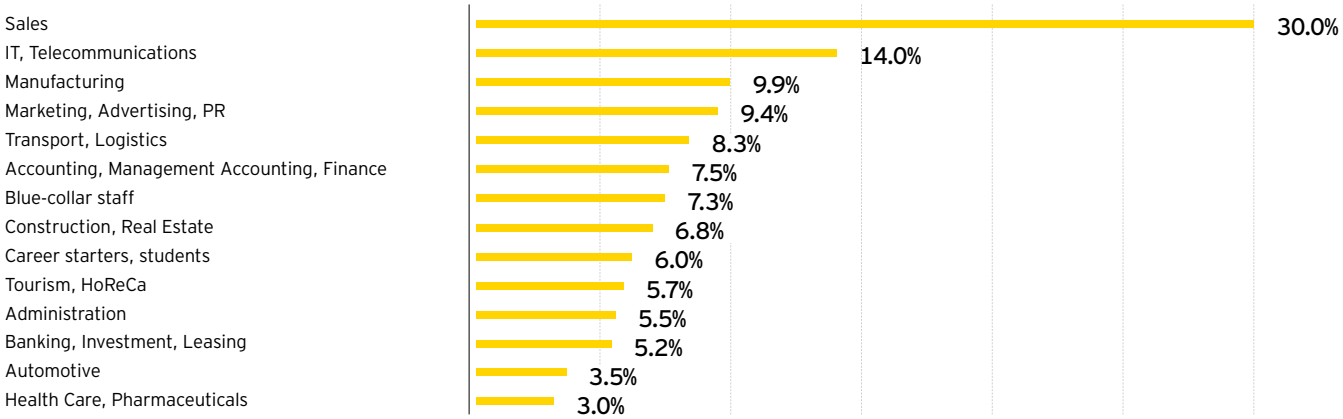
Sources: [2] – Information provided by the Hi-Tech Park Administration

Supply and demand on the IT labor market

Supply and demand on the labor market was analyzed using data on vacancies and candidates' resumes posted at jobs.tut.by, the top job search website in Belarus.

Competition for qualified IT professionals is strengthening because the need for IT industry workers is growing faster than the total workforce. In Q1 2017, demand for IT skills surged by 26% year-on-year and by 5% from Q4 2016. On average, there were 2,124 vacant IT jobs available in this period, or 14% of total vacancies posted on the website – the second-highest among all occupational areas. Demand on the IT labor market continues to rise, reaching a four-year peak.

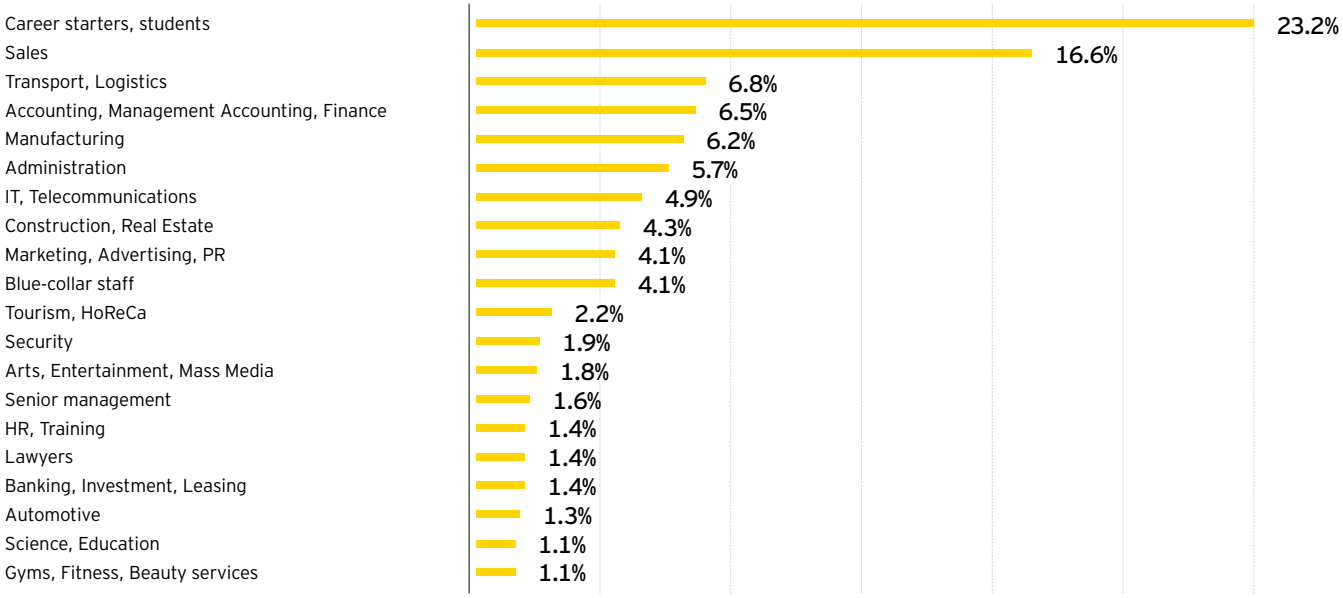
Vacancies by occupational area



Source: [8] – Labor market in IT: jobs and resumes, competition, salaries
Note: only occupational areas with more than 3% of vacancies are displayed; vacancies can relate to several occupational areas

Over 33,000 people looking for a job in IT/Telecommunications have registered on the website over the last five years, with 17,000 registered during the last 12 months. The number of job seekers was down 0.7% in Q1 2017 from the previous quarter. On average, there were 7,595 active resumes daily during this period, or 4.9% of total resumes – seventh-highest among all occupational areas. This means that IT job seekers remain active in the labor market.

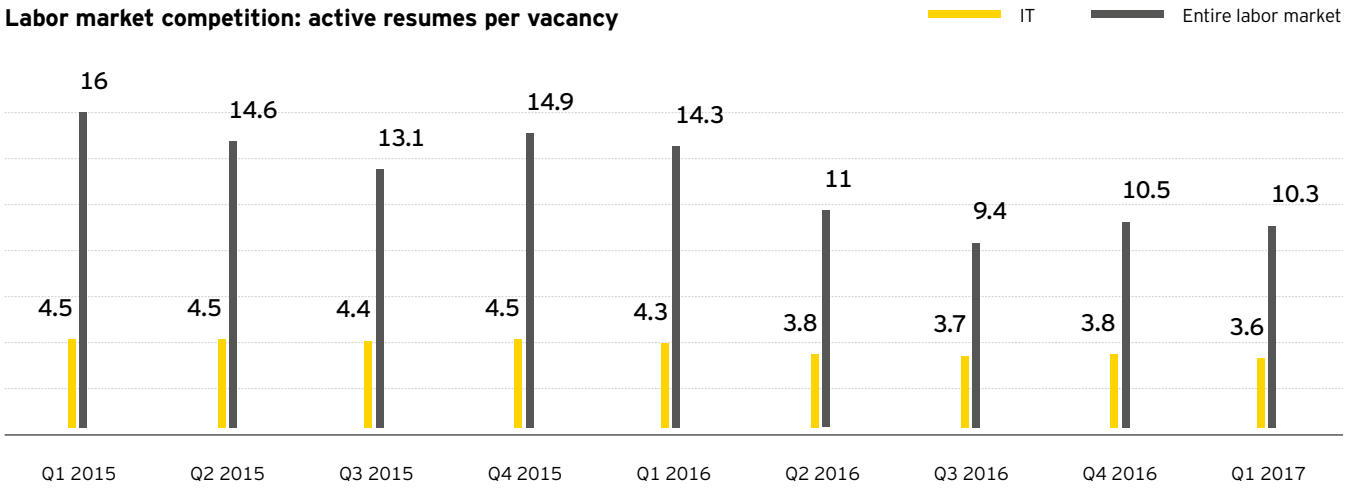
Resumes by occupational area



Source: [8] – Labor market in IT: jobs and resumes, competition, salaries
Note: only occupational areas with more than 1% of resumes are displayed

In 1Q 2017, competition for IT jobs decreased to the lowest level over the last two years: 3.6 resumes per vacancy. Changes in the number of vacancies and job seekers in the IT industry do not correlate with those in other sectors of the economy, meaning that the IT industry has specific characteristics making it largely independent of the rest of the economy. In particular, those seeking a job in the sector need special training to acquire skills in a limited range of IT specializations.

Labor market competition: active resumes per vacancy

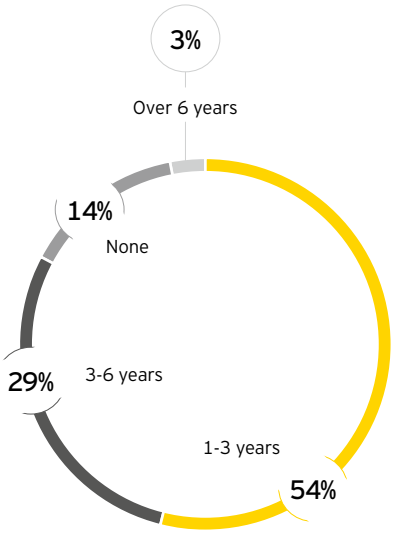


Source: [8] – Labor market in IT: jobs and resumes, competition, salaries

Assessment of factor impact

Source: [5] – Results of the EY's survey among Hi-Tech Park residents

Vacancies by required work experience



Source: [8] – Labor market in IT: jobs and resumes, competition, salaries

The number and qualification of available experienced IT specialists are, in the opinion of IT companies, the most significant labor market factors that affect the IT industry in Belarus. Many respondents point out that educational institutions in Belarus either do not provide training in certain skills or have just started doing so. For example, Belarusian State University of Informatics and Radioelectronics started training game designers only in 2015, [9] with strategic support from Wargaming, Melesta Games and the HTP Administration. However, no courses in universities are yet in place specifically for the IT industry in project management, management, marketing or business administration in Belarus.

The number of experienced IT specialists currently available on the labor market has a significant negative impact on the industry, while the number of young IT specialists currently available has a positive impact.

The shortage of IT experts with a high qualification level is proved by the fact that most vacancies require relevant work experience: 54.4% from 1 to 3 years and 28.9% from 3 to 6 years. Only 14% of total vacancies are suitable for graduates or newcomers lacking relevant experience.

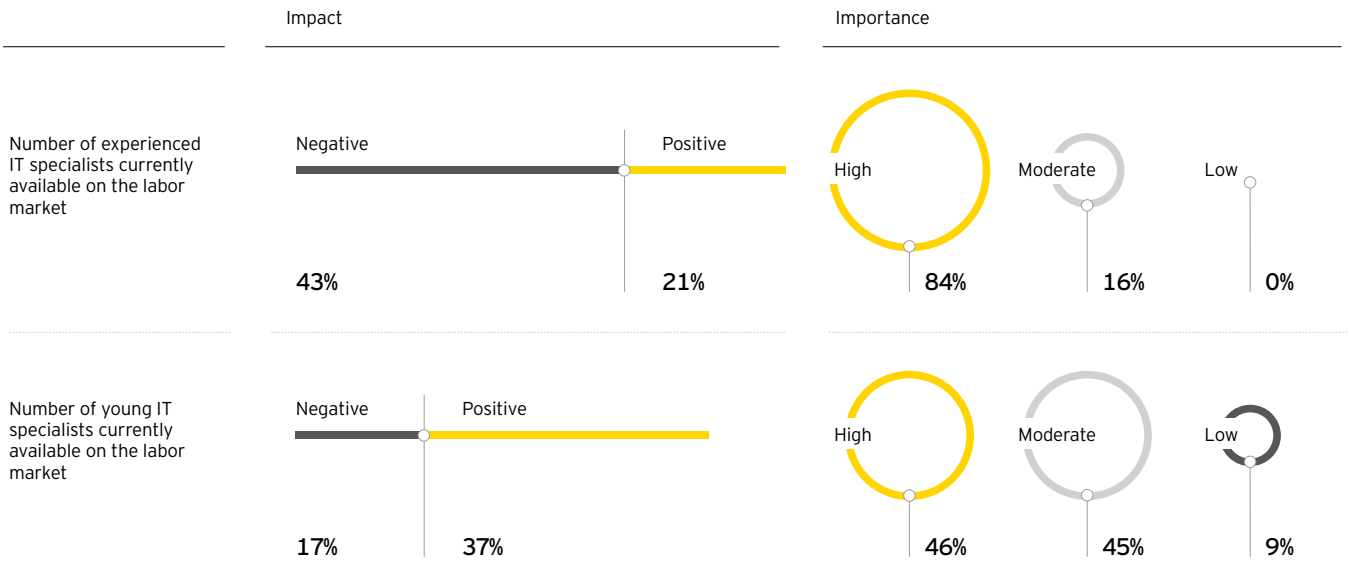
Employee turnover

The data to which EY refers throughout this section comes from the annual voluntary survey of IT industry employees carried out by the website dev.by. In 2016, 1,542 employees took part in the survey. EY neither collected nor verified the data.

Although industry experts state that their companies have low employee turnover of 10-15% a year, the survey showed that 24% changed their job during the last 12 months. The survey also found that the average continuous employment period – when an employee has worked for one employer without a break – is two years or less. This is attributed to high competition for experienced IT experts on the labor market. Usually, an IT specialist with proper qualification will easily find an attractive job offer on the market, with the main reasons for changing job being a chance to take part in an interesting technology project or acquire new skills, rather than a better salary or working conditions.

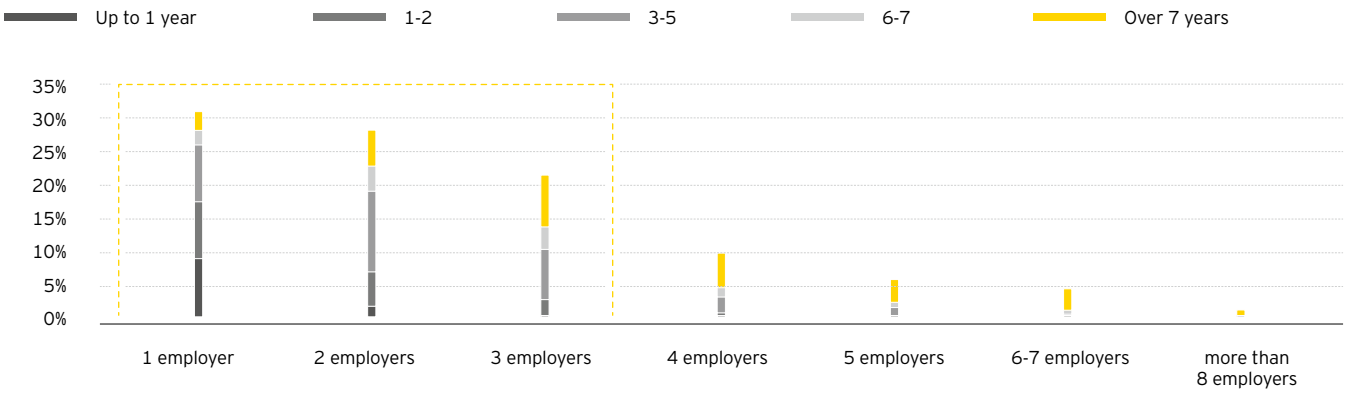
According to the dev.by survey findings, only 1-8% of the respondents were made redundant in 2009-16. This means that employees switched to another employer on their own accord rather than because they were dismissed by their current employer. Most of those who were made redundant in 2009-16 managed to find a new job due to the large market capacity.

Assessment of factor impact



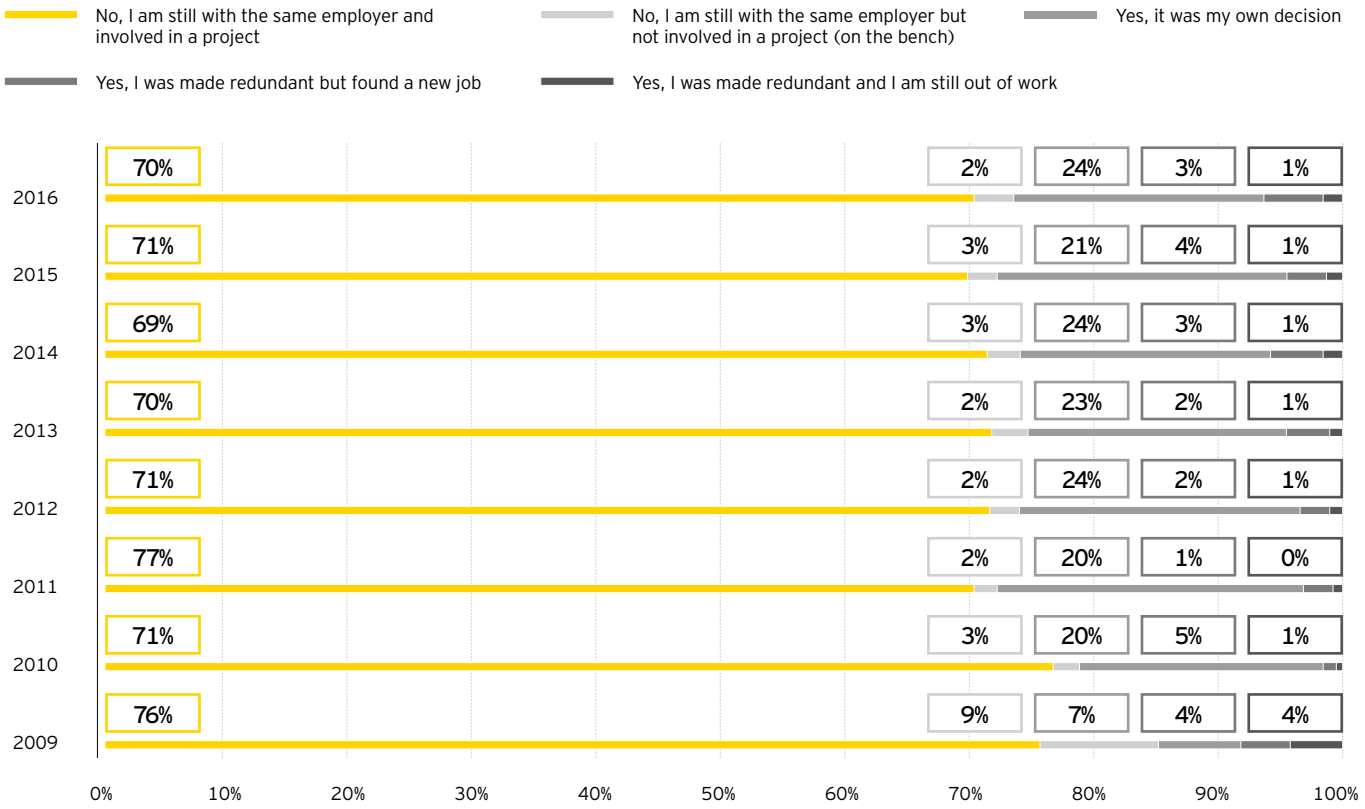
Source: [5] – Results of EY's survey among Hi-Tech Park residents

Number of employers depending on length of service, 2016



Source: [1] – dev.by IT labor market survey data

Change of employer over the last 12 months



Source: [1] – dev.by IT labor market survey data

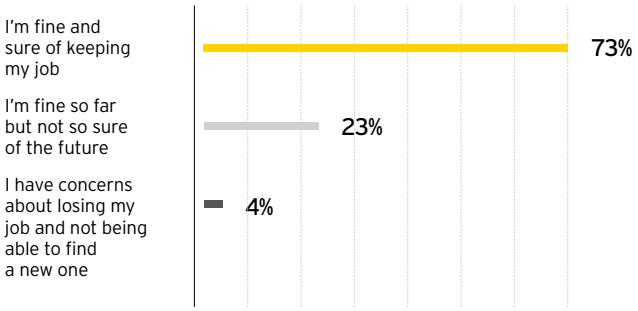
Employees themselves consider the IT labor market to be stable in terms of job security: 73% are confident that they will keep their job.

Distribution by age and length of service

According to the dev.by survey, about 12% of individuals employed in the IT industry are students. A key feature of the sector workforce is its large percentage of university graduates: some 76% of respondents [1] have higher education, whereas the average figure for the economy is 30% of the working population or even less than that.

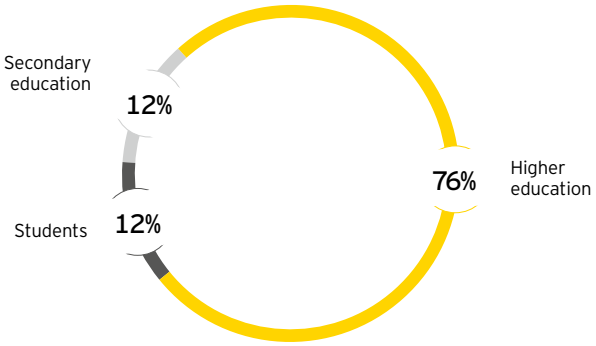
The IT industry is among the most attractive for local employment and continues to draw talent from other sectors. The workforce analysis by age and length of service suggests the

Assessment of current job security by employees, 2016



Source: [1] – dev.by IT labor market survey data

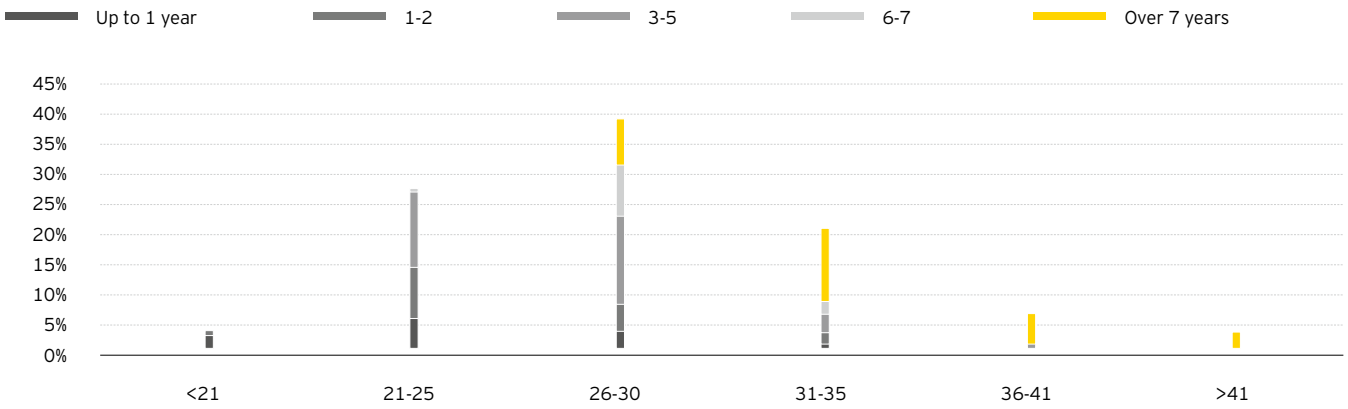
IT industry employees by education, 2016



Source: [1] – dev.by IT labor market survey data

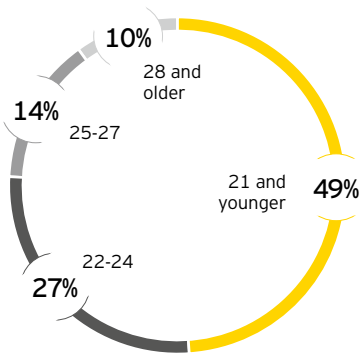
conclusion that many employees have switched to the IT industry after they graduated from university and worked in other sectors of the economy. Among the respondents aged over 30, 32% reported less than 7 years of work experience, meaning that they worked in other sectors before switching to IT. Similarly, 19.2% of the respondents aged 26-30 have less than 3 years of IT-related work experience. In total, at least 17% of the respondents have switched to the IT industry after gaining work experience in other sectors.

Respondents by work experience and age, 2016



Source: [1] – dev.by IT labor market survey data

Respondents by age of starting an IT career, 2016

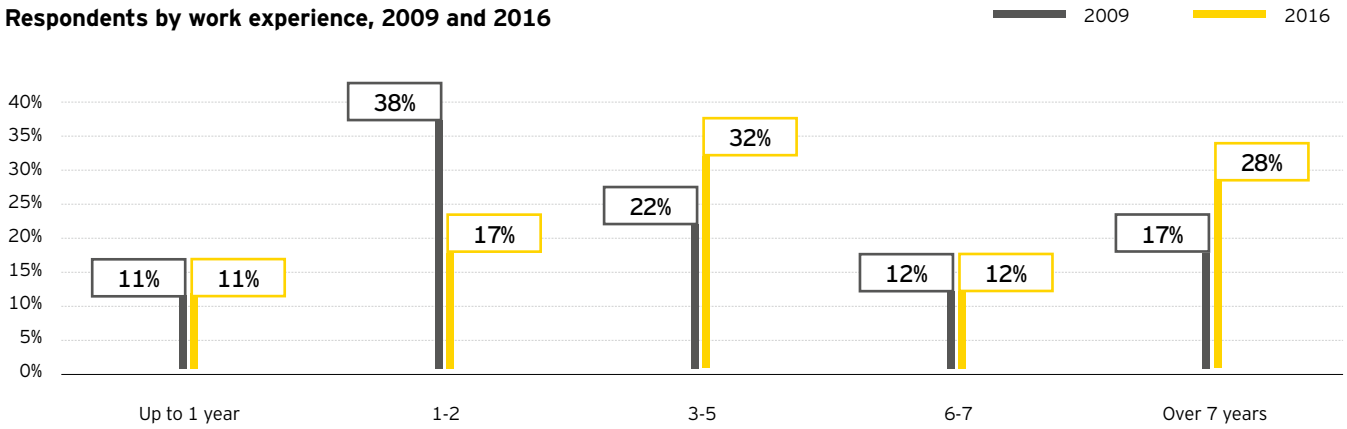


Source: [1] – dev.by IT labor market survey data

IT companies have close ties with universities, and their involvement in the teaching process helps them to attract talented students while they are still at university. The obvious conclusion regarding the age of people starting a career in IT is that the sector mainly attracts young talent. According to the survey [1], 49% of the respondents got their first job in the IT sector before they were 21, while still a student, and 27% embarked on an IT career at the age of 22-24, that is, after graduation. Some people (14%) joined the IT community at the age of 25-27. This age group mostly comprises those who completed two years of mandatory post-graduation employment and took a job in the IT industry once they gained an opportunity. Only 10% started their career in IT after 28.

The percentage of experienced IT experts is constantly on the rise. Back in 2009, 51% of the survey respondents had work experience of more than 3 years, whereas in 2016, their share increased to 72%, and the share of respondents with more than 7 years of experience picked up to 28% from 17%. This suggests that IT professionals tend to stay in the sector rather than switch out of it or even look for a job abroad.

Respondents by work experience, 2009 and 2016



Source: [1] – dev.by IT labor market survey data

Salaries in the IT industry

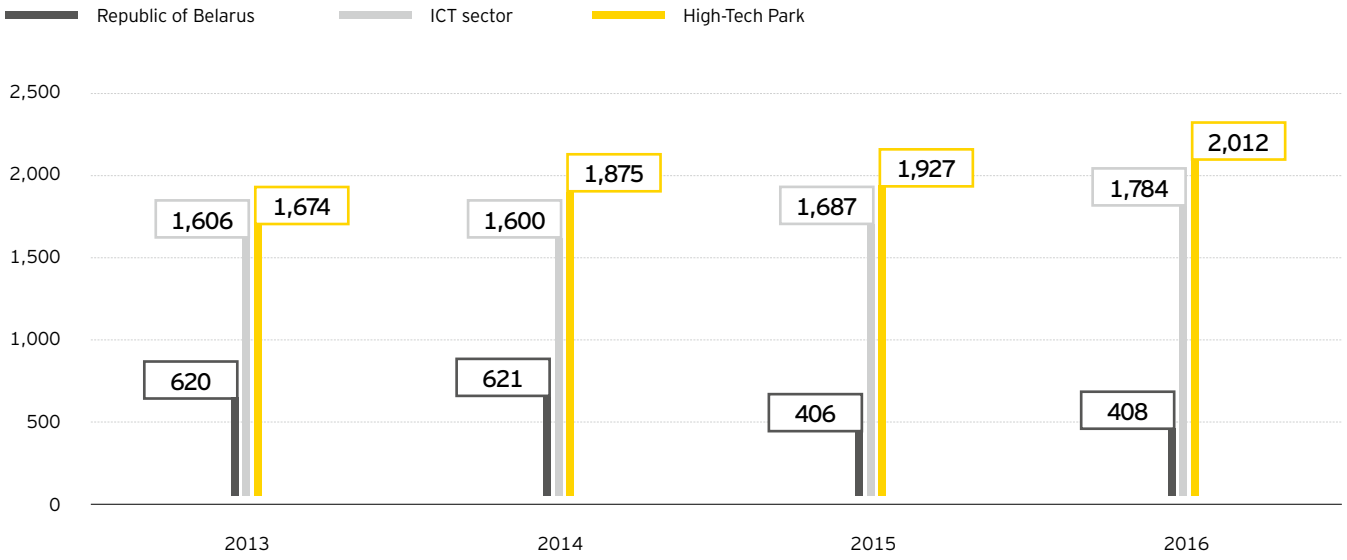
According to a Hi-Tech Park statistical report [2], salaries in the IT industry are substantially higher than the national average, and employees of Hi-Tech Park residents received an average salary that was 16% above the average for the IT industry as a whole in 2016.

Employees in senior positions – tech leads, team leads and project managers – had the highest average salary in the IT industry. The salaries of developers, systems administrators and analysts show the greatest differences between the upper and lower quartiles, with the most experienced and qualified technology specialists receiving salaries far above the average.

Software development and related activities are key, representing the core of the industry, and developers (including team leads, tech leads and project managers) were singled out among survey respondents. The salaries of technology specialists depend on their experience and technology-related skills.

The most popular programming languages are Javascript (57% of those surveyed), SQL (52%), Java (48%), .NET/C# (38%) and Python (18%). This distribution is in line with world trends: the three most popular languages – Javascript, SQL and Java – are the same.

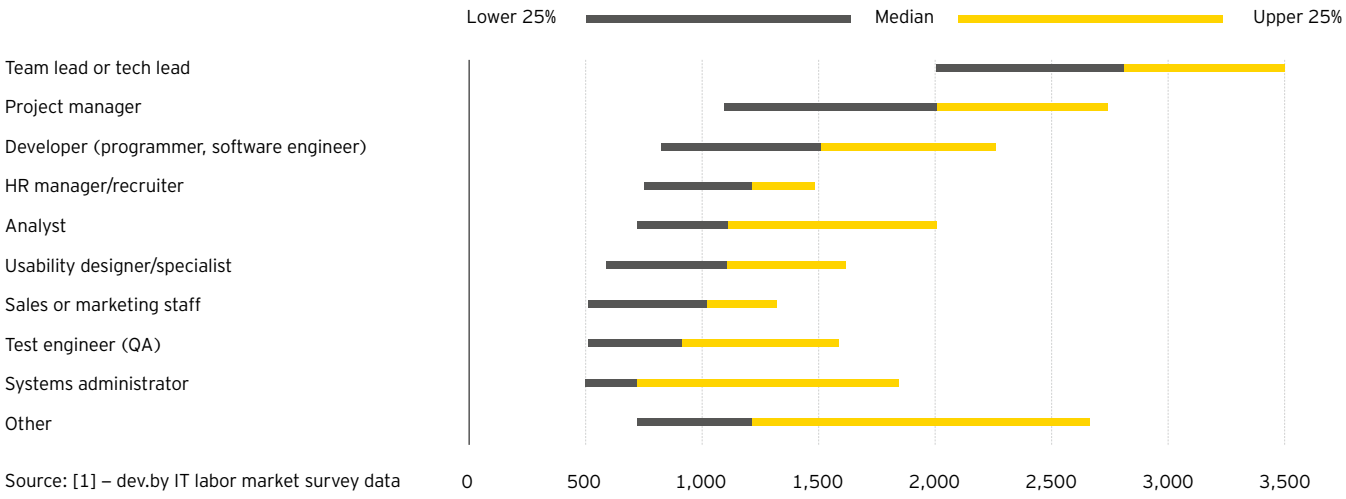
Average monthly salaries in Belarus, the IT industry and the Hi-Tech Park, USD, 2016



Source: [2] Information provided by the Hi-Tech Park Administration

Monthly salaries by position, USD, 2016

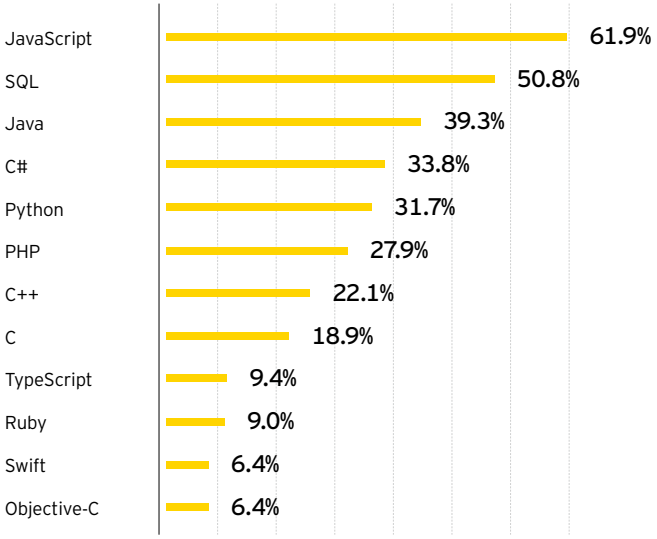
Position	Lower 25%	Median	Upper 25%
System administrator	488	700	1,825
Test engineer (QA)	500	900	1,575
Sales or marketing staff	500	1,000	1,300
Usability designer/specialist	575	1,100	1,600
Analyst	700	1,100	2,000
HR manager/recruiter	735	1,200	1,470
Developer (programmer, software engineer)	811	1,500	2,245
Project manager	1,075	2,000	2,738
Team lead or tech lead	2,000	2,800	3,500
Other	700	1,200	2,650



Source: [1] – dev.by IT labor market survey data

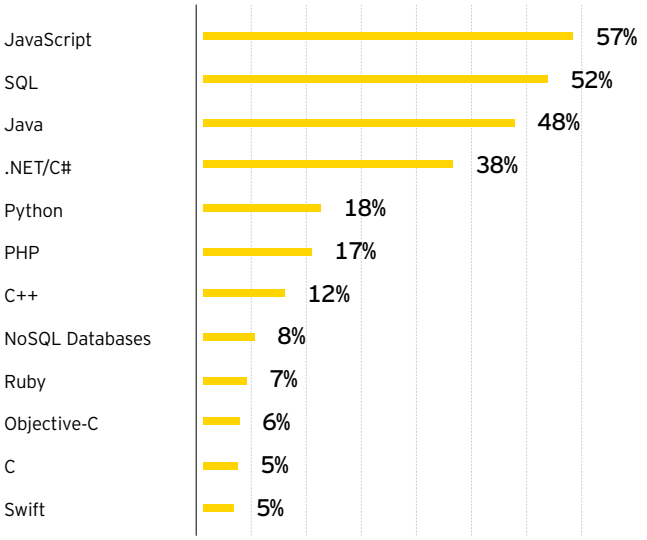
Distribution by main programming language, 2016

Globally



Source: [7] – Stack Overflow Survey Results 2016

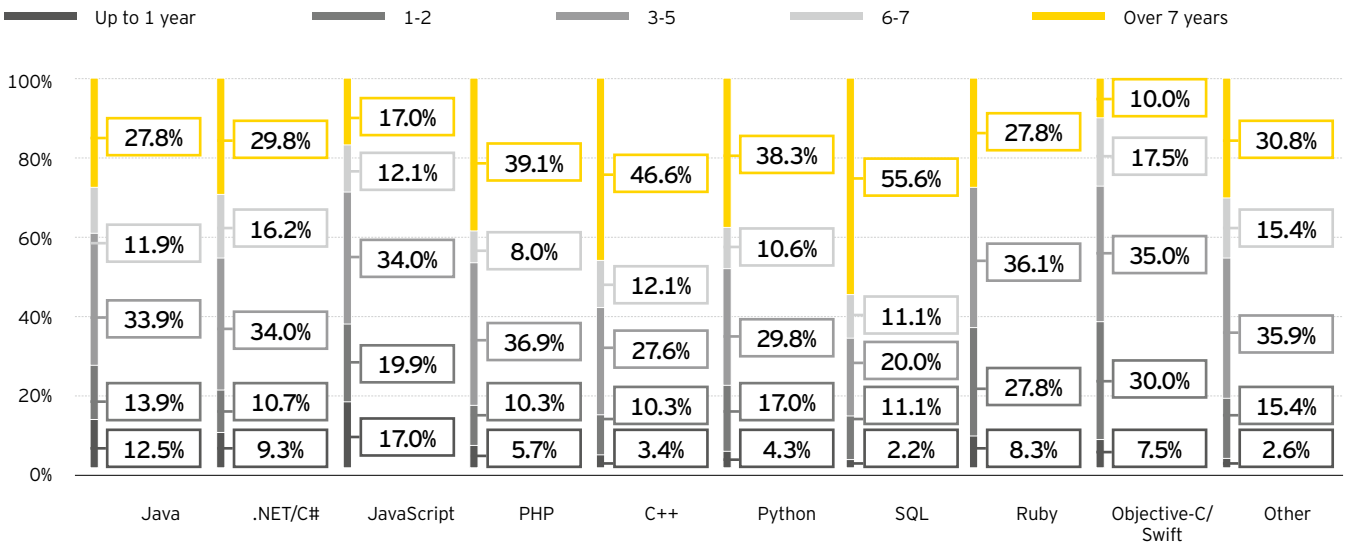
Belarus, dev.by



Source: [1] – dev.by IT labor market survey data

Preference of main programming language and work experience, 2016

Language	up to 1 year	1-2 years	3-5 years	6-7 years	over 7 years
Java	12.5%	13.9%	33.9%	11.9%	27.8%
.NET/C#	9.3%	10.7%	34.0%	16.3%	29.8%
JavaScript	17.0%	19.9%	34.0%	12.1%	17.0%
PHP	5.7%	10.3%	36.8%	8.0%	39.1%
C++	3.4%	10.3%	27.6%	12.1%	46.6%
Python	4.3%	17.0%	29.8%	10.6%	38.3%
SQL	2.2%	11.1%	20.0%	11.1%	55.6%
Ruby	8.3%	27.8%	36.1%	0.0%	27.8%
Objective-C/Swift	7.5%	30.0%	35.0%	17.5%	10.0%
Other	2.6%	15.4%	35.9%	15.4%	30.8%



Source: [1] – dev.by IT labor market survey data

Monthly salary depending on work experience and programming language, USD, 2016

Language	up to 1 year	1-2 years	3-5 years	6-7 years	over 7 years	average	median
Java	423	855	1,745	2,399	2,870	1,846	1,700
.NET/C#	505	939	1,610	2,209	2,761	1,876	1,900
JavaScript	465	798	1,564	2,388	2,862	1,545	1,250
PHP	340	1,372	1,631	2,836	2,188	1,845	1,600
C++	585	808	1,257	1,864	2,735	1,949	1,700
Python	550	890	1,900	2,130	2,702	2,002	1,900
SQL	500	1,100	1,387	2,005	2,292	1,907	1,800
Ruby	470	1,128	1,981	n/a	3,228	1,928	1,600
Objective-C/Swift	700	1,288	2,050	3,271	2,400	1,969	1,700
Other	700	778	1,896	2,178	3,008	2,079	2,000

Source: [1] – dev.by IT labor market survey data

Experienced developers are unevenly distributed in terms of programming languages. Java and Javascript, followed by .NET/C#, are preferred among junior specialists. This is because these languages are the most popular in general and also because they form part of the university programming curriculum. These languages, as well as Ruby and Objective-C, are preferred by employees with up to five years of experience. Among developers with over five years of experience, C++ and SQL are preferred.

An analysis of salary figures by programming language and work experience reveals that the average salary associated with Objective-C/Swift is higher than for other languages. Languages popular with young specialists, such as Java, Javascript and PHP, are associated with lower salaries for employees with less experience, but comparatively high salaries for employees with over five years of experience.

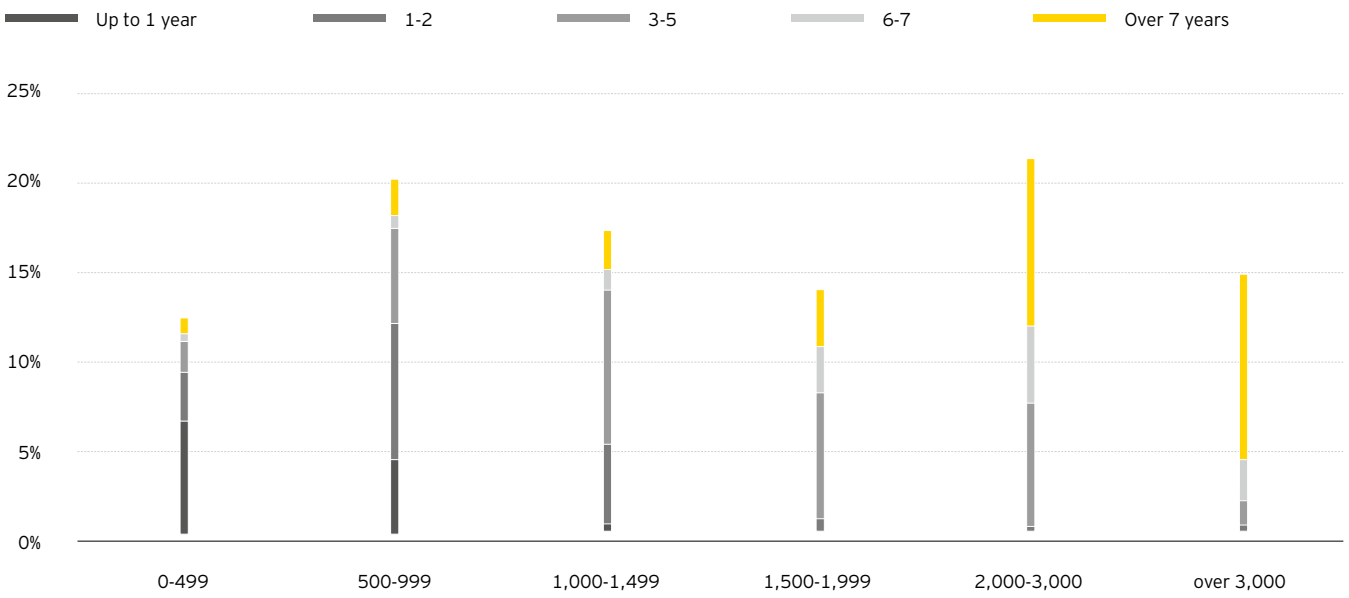
In addition to programming language, salary depends on an employee's work experience. The main groups are distinguished on the basis of experience. Salaries of up to USD 500 are generally those of students with experience of up to 1 or 2 years. Most developers at the junior-to-middle level receive salaries from USD 500 to USD 2,000. Specialists with experience of more than 7 years are beginning to account for a significant part of the group, with salaries over USD 2,000. The USD 2,000-3,000 group is the salary level at which most senior developers stop.

It is important to note that a good number of highly-paid developers are in the group earning above USD 3,000, and their maximum salaries may be several times the most common values. This explains the high average salary of USD 3,844 – well above the median of USD 3,500.

Most IT companies review salaries on a regular basis. Only 5% of dev.by respondents have seen a decrease in salary, while 54% have seen an increase. Substantial growth in salary (more than 20%) was typical for specialists with little work experience, as well as for those with long experience in IT.

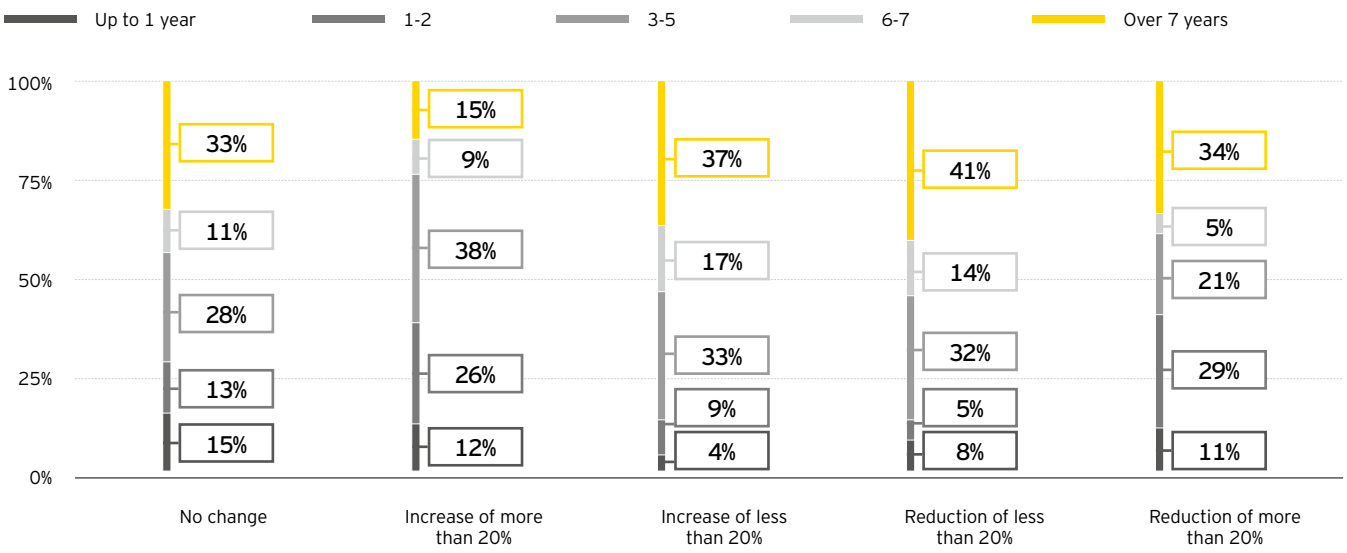
Distribution by salary and work experience, 2016

Salary. USD	Experience					Overall
	up to 1 year	1-2 years	3-5 years	6-7 years	over 7 years	
0-499	6.5%	2.7%	1.8%	0.5%	0.9%	12.3%
500-999	4.3%	7.7%	5.5%	0.8%	2.0%	20.3%
1,000-1,499	0.5%	4.6%	8.9%	1.2%	2.1%	17.3%
1,500-1,999	0.0%	0.8%	7.3%	2.6%	3.2%	13.8%
2,000-3,000	0.0%	0.4%	7.1%	4.4%	9.6%	21.5%
over 3,000	0.0%	0.3%	1.6%	2.3%	10.6%	14.8%



Source: [1] – dev.by IT labor market survey data

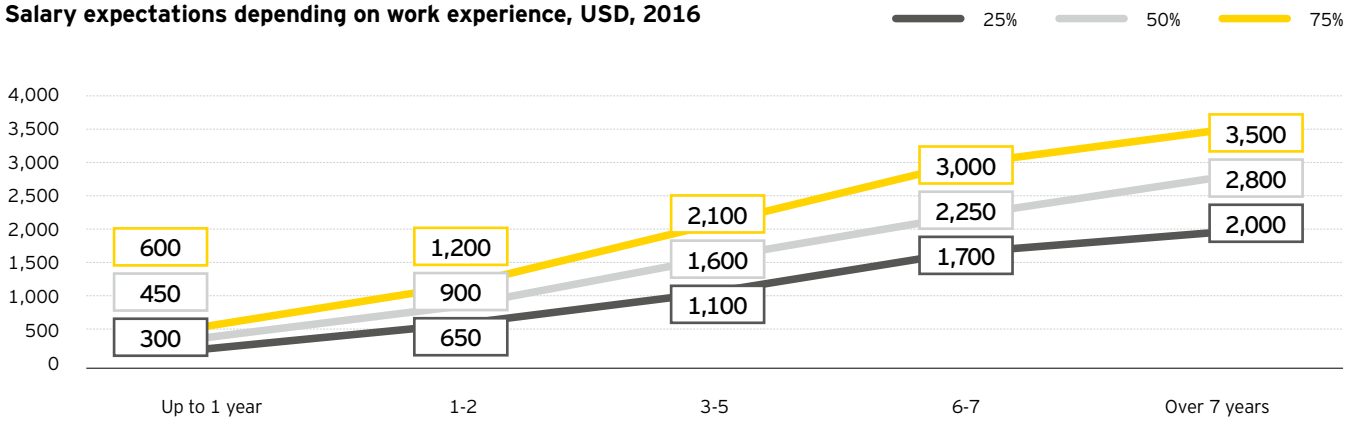
Change in salary depending on work experience, 2016



Source: [1] – dev.by IT labor market survey data

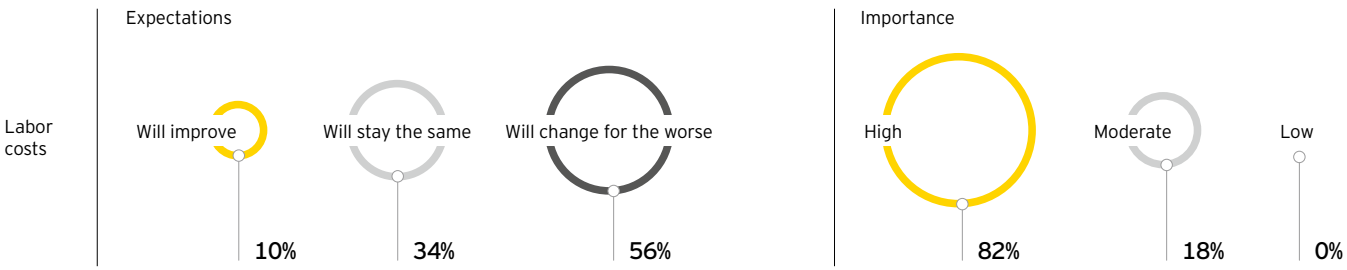
In addition to actual salary, the full picture requires an analysis of employees' salary expectations, which have a significant impact on the cost of labor for projects, as well as on the movement of employees between companies. Expectations were analyzed using information on employees' satisfaction with their salaries to identify salaries that satisfy 25%, 50% and 75% of employees in each length-of-service group. Salary expectations are generally consistent with employees' experience and actual salaries. Employees with up to 2 years of experience are satisfied with a salary of around USD 1,000, those with from 3 to 5 years of experience want at least USD 1,500, those with more than 6 years want over USD 2,000, and those with more than 7 years want at least USD 3,000.

Salary expectations depending on work experience, USD, 2016



Source: [1] – dev.by IT labor market survey data

Importance and expectations regarding the cost of labor among IT companies



Source: [5] – Results of EY's survey among Hi-Tech Park residents

In the opinion of IT companies, the cost of labor is one of the key determinants of the Belarusian IT industry's prospects for development. 56% of companies expect further growth in the salaries of IT specialists, and this may have an adverse effect on prices and thus on the competitiveness of Belarusian IT products and services.

Total labor costs

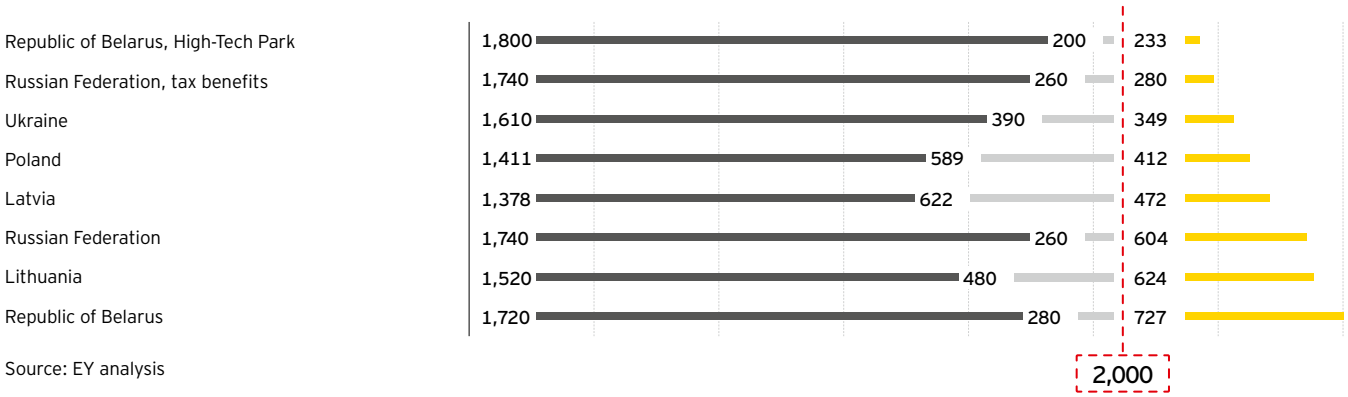
In analyzing salaries, it is important to understand an employee's real income and expenses, taking into account all related taxes and contributions paid by the employer. To this end, a comparative analysis was made of the hypothetical expenses on an employee earning USD 2,000 gross per month in Belarus and neighboring countries.

The below table shows that an employer's tax expenses are highest in Belarus (USD 727) and lowest in Ukraine (USD 349). As for the expenses of employees, the highest taxes and deductions from salary were in Latvia (USD 622) and the lowest in the Russian Federation (USD 260).

However, Belarus and Russia have introduced measures of government support to stimulate the IT industry. Under these regimes, Belarusian Hi-Tech Park residents have the lowest expenses (USD 233), and their employees pay the lowest taxes (USD 200). The measures of government support provided to Hi-Tech Park residents thus substantially enhance an employer's competitiveness in terms of sales and on the labor market.

Net income of employees and total labour costs in Belarus and neighbouring countries, USD, 2017

	Employee's net income	Taxes paid by the employee	Taxes paid by the employer
Republic of Belarus, Hi-Tech Park	1,800	200	233
Russian Federation, tax benefits	1,740	260	280
Ukraine	1,610	390	349
Poland	1,411	589	412
Latvia	1,378	622	472
Russian Federation	1,740	260	604
Lithuania	1,520	480	624
Republic of Belarus	1,720	280	727



Source: EY analysis

Labor resources by gender in the IT industry

The proportion of men to women in Belarus is approximately even up to the age of 50. In age groups over 50, men are a significantly smaller proportion of the population. Given a retirement age of 60 for men and 55 for women, the working-age population has a majority of men. The retirement age is now being gradually increased to 63 for men and 58 for women.

Number of men and women in the working-age population, 2016

Indicator	Men in the 18-60 age group	Women in the 18-55 age group
Number	2,850,523	2,605,572
Share	52%	48%

Source: [6] – Demographic Year Book of the Republic of Belarus, 2016

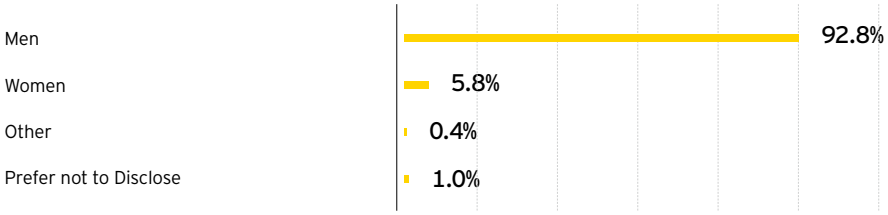
The IT industry in Belarus is marked by a comparatively high percentage of women in the workforce: 18.7% based on the findings of dev.by [1]. According to official Hi-Tech Park statistics, women account for a much smaller share of park employees: 7.6%. This is because Hi-Tech Park residents specialize in software development, an area that employs substantially more men at the present time.

Even though women occupy a higher percentage of non-technology positions (HR, marketing/sales), data on the IT industry in Belarus also shows a greater percentage of women developers (5.8%) and team leads/project managers (7.6%) than in the Stack Overflow findings for 2016 and 2017. Women also account for a significant share of QA specialists (36%) and business analysts (42%). The profession least in demand among women (consistent with the Stack Overflow findings for 2016 and 2017) is that of systems administrator/dev-ops engineer, representing only 4% of surveyed IT specialists in Belarus.

There is a disparity between the levels of salary for men and women. The greatest relative difference in median salary, 26.6%, applies to employees with a length of service of 3-5 years, and the overall disparity increases for more experienced employees. Stack Overflow findings show a similar trend. This is largely because men are more often employed as technology specialists in the Belarusian IT industry, and their salaries increase with experience, substantially exceeding the salaries of employees with the same length of service in support positions.

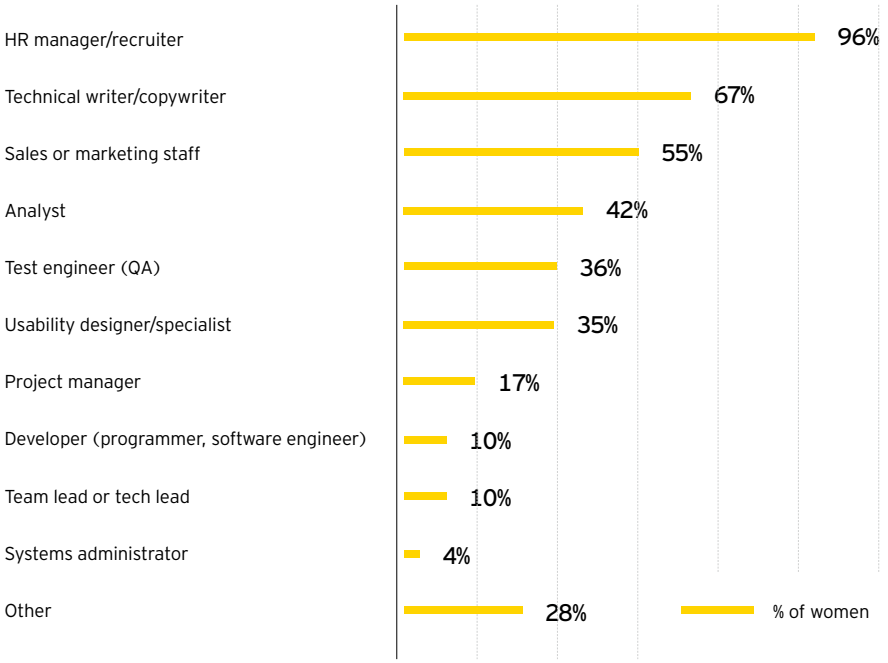
Increased involvement of women in the IT industry, especially in technology-related specializations, may become a key driver of quantitative and qualitative growth in the IT industry.

Percentage of women developers according to the Stack Overflow study, globally, 2016



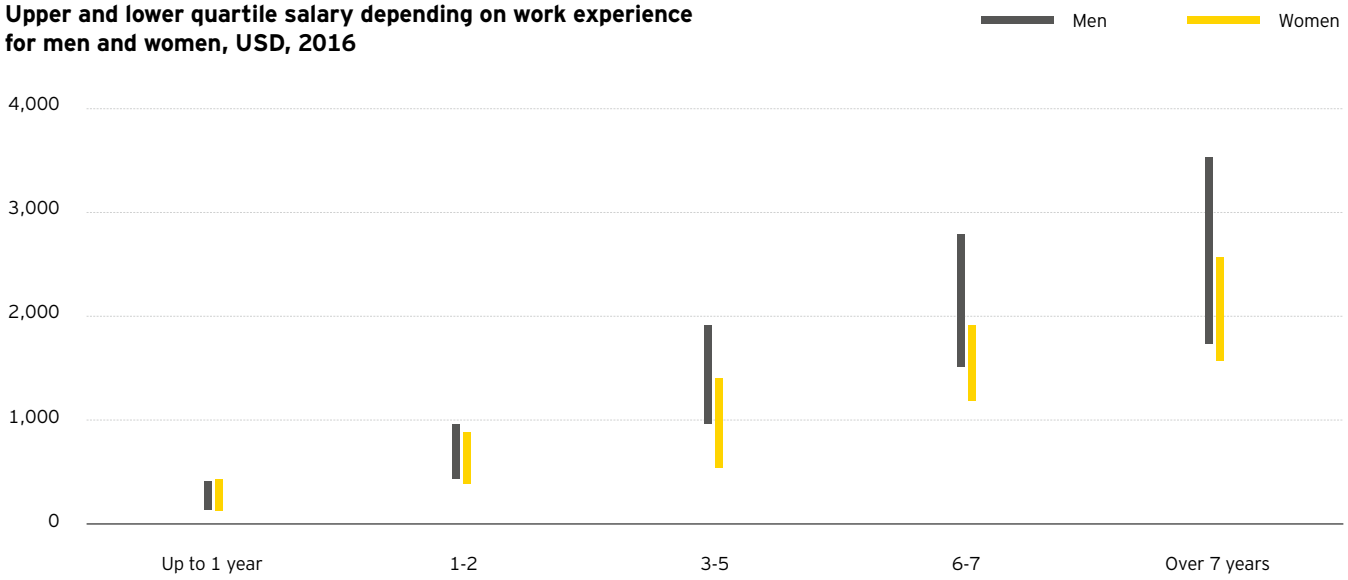
Source: [7] – Stack Overflow Survey Results 2016

Positions by gender in the Belarusian IT industry, 2016



Source: [1] – dev.by IT labor market survey data

Upper and lower quartile salary depending on work experience for men and women, USD, 2016



Source: EY analysis; [1] – dev.by IT labor market survey data

Proficiency in foreign languages

Since the majority of Hi-Tech Park residents concentrate on exports of IT services, they place a high importance on employees' proficiency in foreign languages – English in particular, since the US is their primary market. These companies give serious attention to English and invest in language training for their employees. Industry experts have noted improvements in the quality of education and self-study, including higher proficiency in English. Just five years ago, it was hard to find developers with any proficiency in English, whereas now the majority of highly-qualified technology specialists can speak English.

Although English is the language most in demand, other languages are also needed. There are companies, for example, that provide services in the German language – up to and including remote user-support services.

An analysis of the level of English among job applicants shows that, of the 17,000 IT/telecom applicants listed on the website jobs.tut.by, 36% define their English skills as sufficient for interviewing.

SOURCES

[1] Website dev.by IT in Belarus https://dev.by/

[2] Information provided by the Hi-Tech Park Administration

[3] Information society in the Republic of Belarus, 2015 with updates received from the Belarusian Statistics Committee in May 2017 http://www.belstat.gov.by/en/ofitsialnaya-statistika/publications/statistical-publications-data-books-bulletins/public_compilation/index_4922/

[4] Work and employment, 2016 - http://www.belstat.gov.by/ofitsialnaya-statistika/publications/izdania/public_compilation/index_6396/

[5] Results of EY's survey among Hi-Tech Park residents, 2017

[6] Demographic Year Book of the Republic of Belarus, 2016 - http://www.belstat.gov.by/ofitsialnaya-statistika/solialnaya-sfera/demografiya_2/metodologiya-otvetstvennye-za-informatsionnoe-s_2/index_5770/

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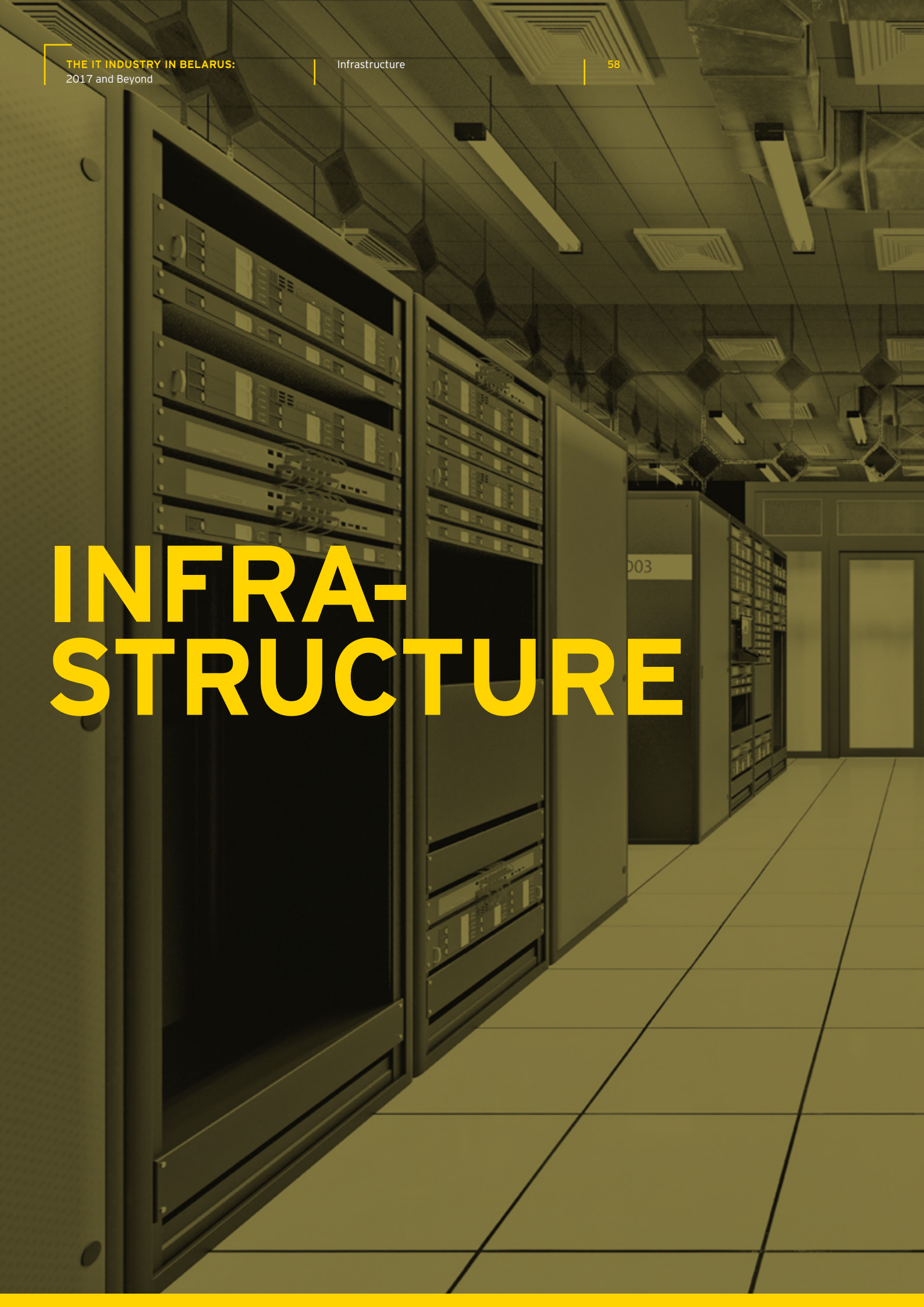


INFRA-STRUCTURE

Summary

Belarus has well-developed infrastructure for running a business. Transport, telecommunications, office premises, and utilities, etc. meet high quality standards and are relatively cheap, making overheads and infrastructure costs less burdensome for businesses. The average national monthly salary of just USD 378 (February 2017) affects the prices for many goods and services in the country.

Belarus has well-organized transportation services between its capital and other cities, and a well-developed network of roads and railways, while the cost of transportation remains moderate. The capital is in the center of the country, meaning that all major cities are 3-5 hours away by public transport or 2-4 hours by private transport.

According to Mercer's 2016 Cost of Living Survey, Minsk is one of the 10 least expensive cities among 209 surveyed and has the lowest cost of living in Europe [1]. Minsk's position in this ranking suggests that foreign companies can benefit from setting up an office (e.g., a captive center) in Belarus.

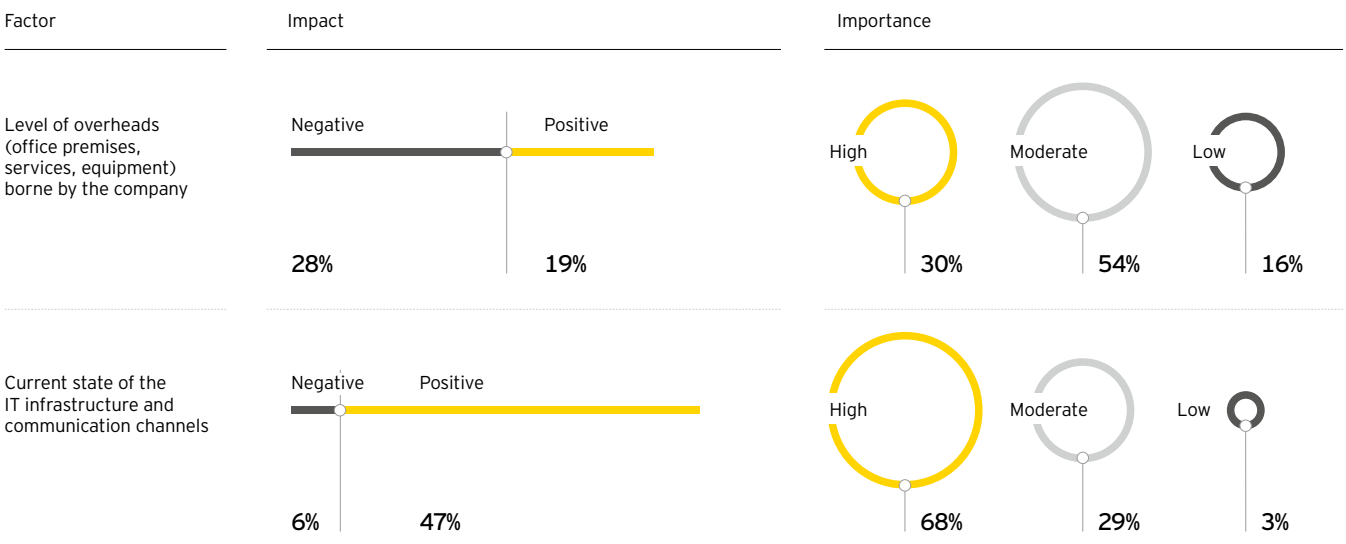
IT companies are generally positive about the current level of overheads of running a business in Belarus. Most IT companies (84%) consider low overheads, including office premises, services and other costs, among the most significant factors impacting sector development. Another important factor is the state of IT infrastructure and communication channels. Almost half (47%) of respondents believe that this factor has a positive impact on their development.

10 most and least expensive cities to live in

Top 10			Bottom 10		
#	City	Country	#	City	Country
1	Hong Kong	Hong Kong	200	Lusaka	Zambia
2	Luanda	Angola	201	Gaborone	Botswana
3	Zurich	Switzerland	201	Karachi	Pakistan
4	Singapore	Singapore	203	Tunis	Tunisia
5	Tokyo	Japan	204	Minsk	Belarus
6	Kinshasa	Democratic Republic of the Congo	205	Johannesburg	South Africa
7	Shanghai	China	206	Blantyre	Malawi
8	Geneva	Switzerland	207	Bishkek	Kyrgyzstan
9	N'Djamena	Chad	208	Cape Town	South Africa
10	Beijing	China	209	Windhoek	Namibia

Source: [1] – Mercer 2016 Cost Of Living Rankings

Assessment of factor impact



Source: [2] Results of EY's survey among Hi-Tech Park residents

Office premises and other utility expenses

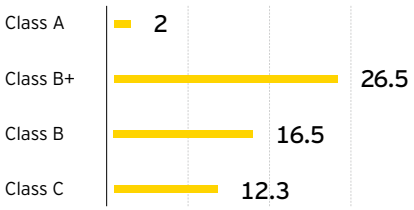
Minsk currently has over 100 business centers with total office space of some 900,000 sq. m [3]. With many new office premises being built (on average, some 100,000 sq. m a year becoming available in 2013-16) and the economy being sluggish, lease rates have plunged in 2017, leveling out at USD 15-25 per sq. m, USD 10-15 per sq. m, and USD 6-8 per sq. m for Class A, Class B, and Class C business centers, respectively. However, a lower lease rate does not mean that the quality of office space has declined. Some business centers apply variable lease rates depending on the leased area. For large deals, owners of business centers may often agree to special terms different from those reported in statistics.

Despite an ample supply of vacant office space in Minsk (just over 55,000 sq. m in 60 business centers as of 1 February 2017), there is somewhat of a shortage in the segment of large (over 1,500 sq. m) and high-quality premises, making the search for a suitable office difficult for major companies [3].

The development of startups and small companies is supported by the favorable environment that business incubators create for them. The latter support small and medium-sized businesses, in particular, by providing office space at lower lease rates.

In addition to lease payments, company overheads are impacted by the cost of utilities. The Belarus government does not provide IT companies with any utilities subsidies, however, utility costs are generally moderate.

Vacant office space, '000 sq. m, 1 February 2017



Source: [3] – Tvoya Stolitsa real estate agency

Average cost of utilities for legal entities, USD, May 2017

Utility type	Unit of measure	Cost, USD
Electricity*	1 kWh	0.15
Drinking water	1 m^3	0.86
Wastewater disposal	1 m^3	0.43

Source: [4] – Electricity tariffs for legal entities;
[5] – Water supply and wastewater disposal tariffs for legal entities

* The cost of 1 kWh for other non-industrial customers.

The ICT Development Index

The overall development level of information and communication technologies (ICT) in Belarus can be assessed by comparing it with that of other countries using the ICT Development Index (IDI) published by the UN International Telecommunication Union since 2009. The index is calculated in order to follow local ICT development over time in comparison with other economies, monitor and compare ICT performance within and across developed and emerging economies, and evaluate ICT development potential. The ICT Development Index is based on 11 ICT indicators, grouped into three clusters: access, use and skills, which are given different weights in the computation of the overall IDI.

Belarus substantially improved its IDI performance between 2010 and 2015, mainly due to improvements in the ICT access sub-index (up from 6.16 in 2010 to 7.68 in 2015) and the ICT use sub-index (from 2.46 in 2010 to 5.40 in 2015), moving up from 50th place to 36th in the ranking of 167 economies.

ICT Access (40%)	ICT Use (40%)	ICT Skills (20%)
▸ Fixed-telephone subscriptions / 100 inhabitants ▸ Mobile-cellular telephone subscriptions / 100 inhabitants ▸ International Internet bandwidth (bits/s) per user ▸ Percentage of households with a computer ▸ Percentage of households with Internet access	▸ Percentage of individuals using the Internet ▸ Fixed (wired) broadband subscriptions per 100 inhabitants ▸ Wireless broadband subscriptions per 100 inhabitants (including satellite, terrestrial fixed, and active mobile with a minimum download of 256 Kbit/s)	▸ Adult literacy rate (% of the population aged 15 and older who can read and write simple statements with understanding and do simple arithmetic calculations) ▸ Gross enrollment ratio secondary level ▸ Gross enrollment ratio tertiary level

ICT Development Index, 2015 (rank change from IDI 2010)

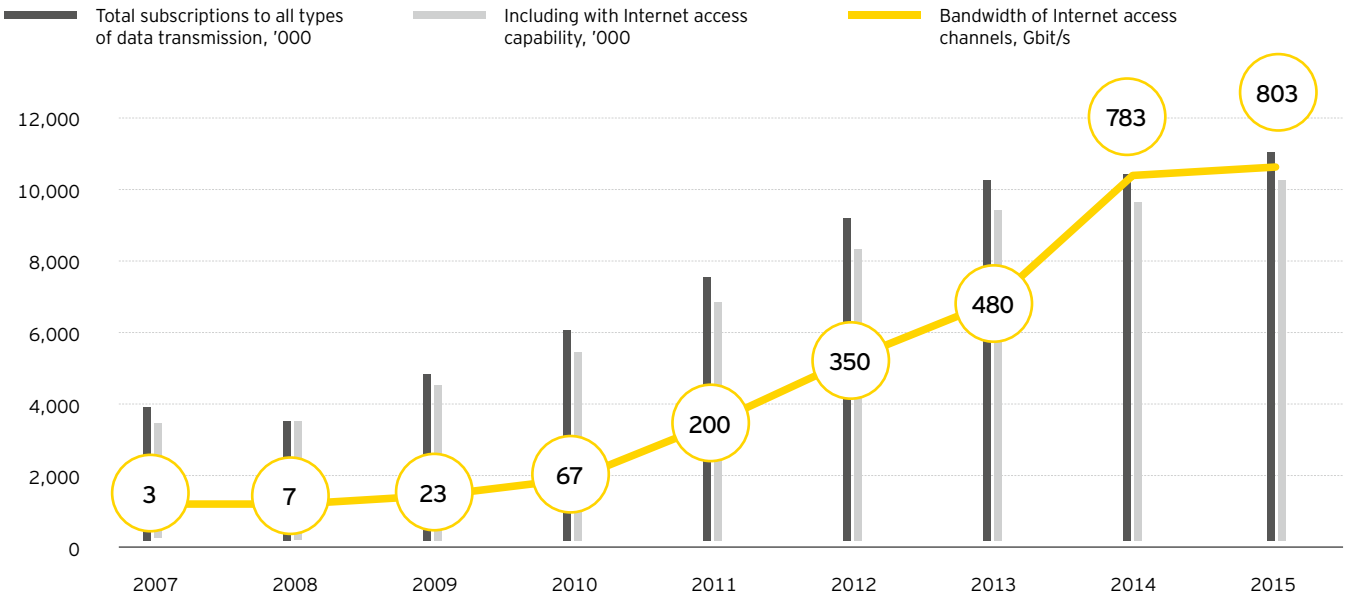
Economy	IDI		ICT Access		ICT Use		ICT Skills	
	Rank	Index	Rank	Index	Rank	Index	Rank	Index
Korea (Rep.)	1 —	8.93	9 ▲	9.00	4 ▼	8.42	2 —	9.82
Denmark	2 ▲	8.88	13 ▼	8.72	1 ▲	8.83	12 ▲	9.29
Iceland	3 —	8.86	2 —	9.37	8 ▲	8.11	10 ▲	9.35
United Kingdom	4 ▲	8.75	4 ▲	9.24	3 ▲	8.42	44 ▼	8.42
Sweden	5 ▼	8.67	10 ▼	8.90	6 ▼	8.32	24 ▼	8.91
United States	15 ▲	8.19	31 ▼	7.82	11 ▲	7.86	5 —	9.57
Estonia	20 ▲	8.05	28 ▼	7.86	14 ▲	7.66	15 ▲	9.22
Israel	35 ▼	7.19	25 ▼	7.98	42 ▼	5.57	26 ▲	8.86
Belarus	36 ▲	7.18	38 ▲	7.68	47 ▲	5.4	4 ▲	9.75
Latvia	37 ▼	7.16	49 ▼	7.23	32 ▼	6.29	30 ▼	8.76
Lithuania	40 ▼	7.08	54 ▼	7.04	34 ▲	6.1	17 ▼	9.13
Poland	44 ▼	6.91	51 ▼	7.15	41 ▼	5.62	20 ▲	9.02
Russian Federation	45 ▲	6.91	48 ▲	7.24	44 ▲	5.52	19 ▼	9.04
Ukraine	79 ▼	5.23	72 ▲	6.27	109 ▼	2.17	14 ▲	9.25

[6] – International Telecommunications Union, Measuring the Information Society Report 2015

Internet access

Access to the Internet is vital for IT companies to operate. Since the territory of Belarus is not very large, it is easier for telecommunications companies to ensure good access to data networks and make improvements to service quality and scope on an ongoing basis. Subscribers to data networks that have Internet access capability almost doubled between 2010 and 2015 (10.3 million versus 5.4 million), while the bandwidth of Internet access channels increased by 12 times (from 67 Gbit/s to 803).

Data network indicators



Source: [7] – Statistical Yearbook of the Republic of Belarus, 2016

The data and network infrastructure is undergoing continuous improvements and upgrading, resulting in much better quality of communications and a higher speed of data transmission for subscribers throughout the country.

Mobile-cellular communications

Mobile-cellular services are provided in Belarus by three private telecommunication operators. The cellular network covers 98.2% of the territory of Belarus and 99.8% of its population, with 74.5% [8] of its territory covered by 3G or 4G networks. 4G networks are available in all major cities.

Key indicators of mobile-cellular penetration

Indicator	2013	2014	2015	2016
Total mobile-cellular subscriptions, '000	11,114.4	11,401.9	11,448.3	11,439.9
Population covered by mobile-cellular services, %	99.9	99.8	99.9	99.8
Territory covered by mobile-cellular services, %	98.4	97.6	98.1	98.2
Mobile-cellular subscriptions per 1,000 inhabitants	1,174	1,203	1,205	1,204

Source: [9] – Statistical Book: Belarus by Numbers, 2017

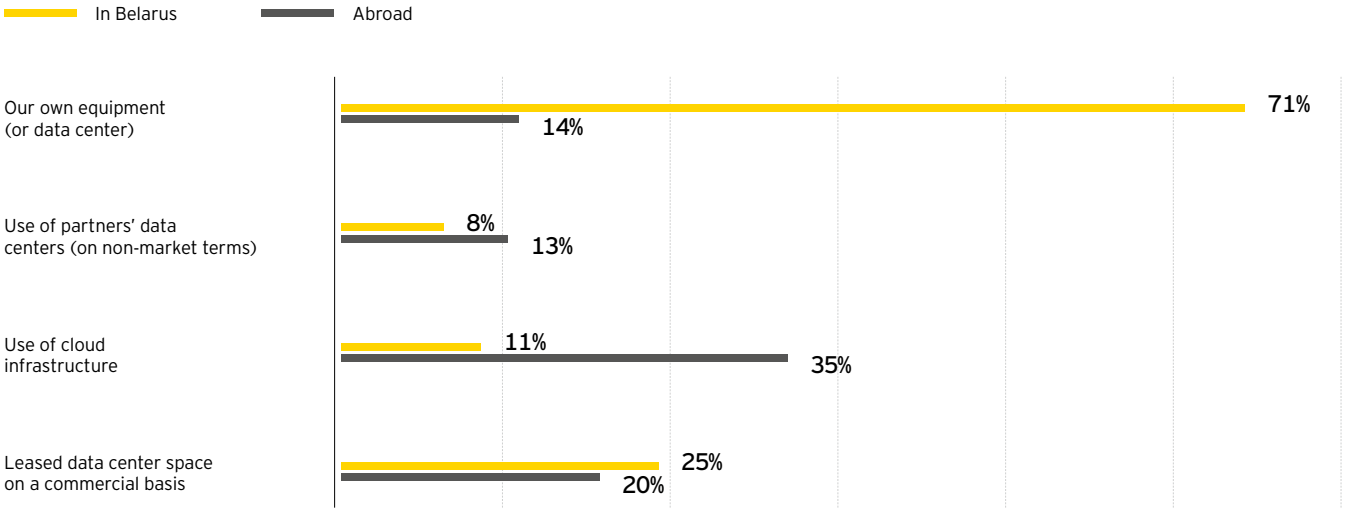
Commercial data centers

Several companies currently provide data center services on a commercial basis. Their service offering includes hosting, colocation, VPS, SaaS, PaaS, and IaaS.

All commercial data centers are located in Minsk or the Minsk region, except the server facilities of Beltelecom, the government-owned telecommunications provider, which are located in administrative centers of Belarusian regions and provide only colocation services.

June 2016 saw the launch of construction of the country's first TIER III data center – the Republican Data Center. The first module consisting of 156 racks began operation in December 2016. The data center is planned to host information systems of government bodies, as well as provide services on a commercial basis.

Please describe the location of your organization's IT infrastructure



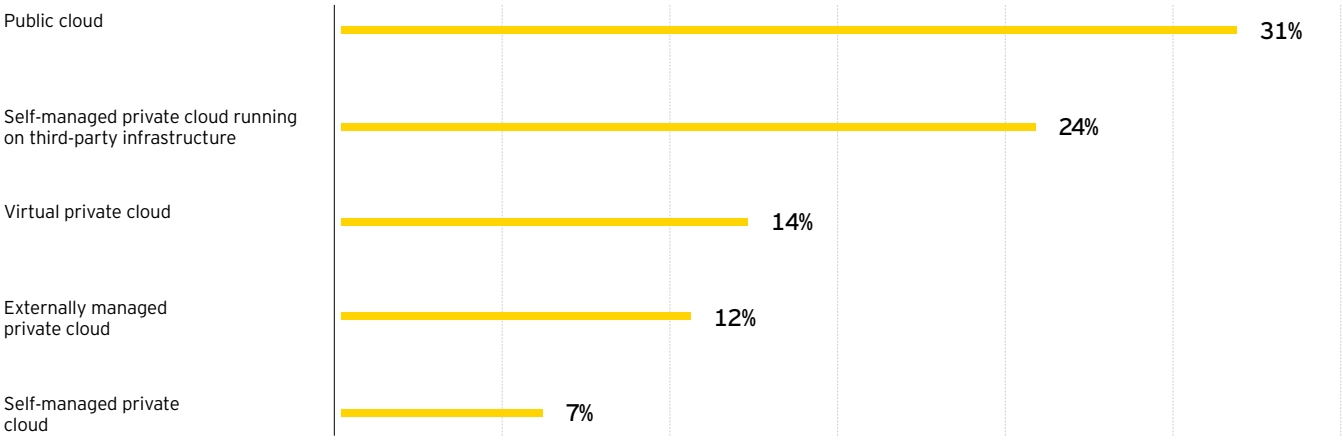
Source: [2] Results of EY's survey among Hi-Tech Park residents

Over 70% of the surveyed IT companies use their own server premises located in Belarus. Apart from that, companies build their IT infrastructure using cloud infrastructure from foreign providers (35% of respondents) or colocation (25% in Belarusian data centers and 20% in data centers abroad).

Currently, only 11% of companies use cloud infrastructure from local providers and 25% lease space with Belarusian commercial data centers; however, with new commercial data centers beginning operation, more companies are likely to locate their infrastructure in Belarus.

Many IT companies already use cloud services for their business. The use of public cloud services is the most popular solution (31% of respondents). The second most popular solution (24%) is the use of a self-managed private cloud running on third-party infrastructure. Only 7% of survey participants use their own private cloud managed by themselves. Some IT companies in Belarus use a combination of solutions to build their infrastructure.

What cloud computing technologies do you use to build your infrastructure?



Source: [2] Results of EY's survey among Hi-Tech Park residents

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[9] Statistical Book: Belarus by Numbers, 2017 - http://www.belstat.gov.by/ofitsialnaya-statistika/publications/izdania/public_compilation/index_7187/

DOING BUSINESS

Summary

The IT industry in Belarus is regulated at the state level by the President of Belarus and various state agencies.

The decision that laid the foundation for support of the IT business was the Decree "On the Hi-Tech Park," which established a system of preferences for park residents. These preferences, involving corporate tax exemptions or a substantial reduction in tax rates, do much to promote the development of IT companies.

In addition, Belarus has a simplified tax system for other companies in the IT industry that do business and meet certain criteria. The simplified tax system offers rates substantially lower than in the general system.

Belarus has created favorable conditions for investments, and investments may be made in various ways. Belarusian law guarantees that investors can freely transfer profits and other investment-related funds.

Although there is currently no basis in law for venture financing in Belarus, the practice exists.

The Republic of Belarus, along with Armenia, the Russian Federation, the Republic of Kazakhstan and the Kyrgyz Republic, is a member of the Eurasian Economic Union (EEU), which has a unified customs territory. The EEU has unified customs regulations and a unified list of customs duty rates applicable to goods imported into the customs territory of the EEU from third countries. Under the preferential regimes of doing business, customs payments and VAT benefits may be provided to Belarus companies for imports of certain goods.

The judicial system consists of the Constitutional Court of Belarus and courts of general jurisdiction. Domestic and foreign legal entities may appeal to courts of general jurisdiction to defend their lawful rights and interests. Organizations outside the judicial system have also been created to resolve disputes: permanent arbitration courts as well as ad hoc arbitration courts formed by agreement of the parties to a specific dispute.

Computer programs in Belarus are automatically protected by copyright as soon as they are created.

State support and regulation of the IT industry

A unified state IT policy is established by the **President of the Republic of Belarus**, who has broad powers to use a variety of instruments to regulate and promote the development of the IT industry. One example is Presidential Decree No. 12 of 22 September 2005 "On the Hi-Tech Park," which created a special system of preferences for IT companies that are park residents. Belarus has no separate state body that acts as a central regulator of the IT industry.

The regulation of specific issues in IT-related areas is the responsibility of various state bodies, including:

- the Ministry of Communications and Informatization of the Republic of Belarus
- the Operational and Analytical Center under the Aegis of the President of the Republic of Belarus
- the Hi-Tech Park Administration
- the State Science and Technology Committee of the Republic of Belarus

The Ministry of Communications and Informatization of the Republic of Belarus develops and implements concepts and programs for the development of telecommunications as well as state informatization programs, licenses telecommunication activities (e.g. data transmission, IP telephony and cellular mobile telecommunication services), registers websites in the national segment of the Internet, and adopts technical regulations concerning informatization, information and communication technologies and telecommunications, etc.

The Operational and Analytical Center under the Aegis of the President of the Republic of Belarus licenses activities involving technical and cryptographic information security, verifies state expert examinations of technical and cryptographic means of information security, and determines the procedure for registering domain names with the national domain extension as well as the procedure for restricting access to information resources posted in the Internet, etc.

The Hi-Tech Park Administration oversees the Hi-Tech Park regime; sends materials to the Hi-Tech Park Supervisory Board as required for decisions on registering applicants as park residents, canceling residency status and registering business projects involving new and high technologies; enters into agreements with park residents concerning the terms of their participation and monitors compliance with these terms; and analyzes residents' activities and the results of their activities to ensure that they are permitted types of activity, etc.

The State Science and Technology Committee of the Republic of Belarus regulates the development of science, technology and innovation and the protection of intellectual property rights and is responsible for the development of innovation infrastructure, for the introduction of support mechanisms for innovators, for the establishment and development of production facilities based on new and high technologies and for the attraction and use of advanced, high-efficiency foreign technologies, etc.

State support of IT companies

Measures of state support under the Hi-Tech Park regime

The Hi-Tech Park regime is a special legal regime that provides various benefits and preferences for developing software, information and communication technologies and other new and high technologies in Belarus (see table).

The preferential regime may be used by legal entities and individual entrepreneurs that are registered as Hi-Tech Park residents and are engaged in activities permitted for park residents. The current system of preferences has been approved in law until 25 December 2020, and residents and industry experts expect the tax benefits to be extended for another ten years.

The most important benefits are an exemption from corporate profit tax and a reduction in the base used to calculate contributions on compulsory state social security insurance of employees. Further, the business owners enjoy 5% dividend withholding tax and exemption from offshore duty. At the same time, residents must make quarterly payments of 1% of their revenues to the Hi-Tech Park Administration.

Measures of state support under the Hi-Tech Park regime

	Standard tax regime	Hi-Tech Park resident
Corporate profit tax	18%	Exemption
VAT on sales of goods, work, services and property rights in the Republic of Belarus	20%	Exemption
Withholding tax on dividends, royalties and interest paid to foreign organizations*	12% on dividends 10% on interest 15% on royalties	5% on dividends 5% on interest 5% on royalties
* A more favorable regime may be envisaged by double tax treaties		
Rent for state-owned real estate	Determined using the base rate	For rented real estate in the Hi-Tech Park, the base rate is reduced by 50%
Real estate tax	1% of the real estate's value	Properties in the Hi-Tech Park are exempted
Offshore duty when dividends are paid to founders/participants registered in an offshore zone	15%	Exemption
Personal income tax for employees	13%	9%
Compulsory state social insurance contributions of employees	35%, excluding the part of an employee's income in excess of five times the country's average salary	35%, excluding the part of an employee's income in excess of the country's average salary, by agreement with the employee
Mandatory sale of foreign currency	20% of hard-currency revenues	Exemption

Benefits for Infopark members

The members of Belarus's Infopark Science and Technology Association – legal entities whose core activity is the development of information technologies, including software – are exempted from VAT on proceeds from sales of information technologies and services involved in the development of such technologies.

Other preferential regimes

In addition to the Hi-Tech Park regime, Belarus has a number of other **preferential regimes,** including:

- Investment agreements with the Republic of Belarus
- Business activities in medium-sized and small towns and rural areas
- Free economic zones
- The Great Stone China-Belarus Industrial Park

1 Data of the National Agency for Investments and Privatization of the Republic of Belarus: http://www.investinbelarus.by/press/news/f2e15a9a0e36f6ea.html

Investment agreement with the Republic of Belarus

An investment agreement is a special type of contract concluded to provide additional state support for investment projects. Investment agreements are concluded between a foreign or national investor and the Republic of Belarus as represented by the Council of Ministers of the Republic of Belarus or a republican government body.

Investment agreements may be concluded only for projects in Belarus in areas (or industries) that have priority investment status. Such areas are determined by the Council of Ministers of the Republic of Belarus and include, among others, telecommunications, computer programming, consulting on computer technologies, data processing, hosting services and related activities, etc.

During the term of an investment agreement, the investor is entitled by law to a number of benefits and preferences, most of them designed to create preferential conditions for construction. As a result, it has become common in Belarus to conclude investment agreements for construction and greenfield projects. Benefits of a more general nature are also provided, e.g. exemption from customs duties and VAT on imports of equipment (as well as components and spare parts for such equipment) to be used exclusively in Belarus for the purposes of an investment project.

Investment agreements concluded by decision of the Council of Ministers of the Republic of Belarus with the permission of the President of Belarus may provide additional incentives and benefits, even if these are not expressly envisaged by law. Such incentives are provided individually on a case-by-case basis.

Statistics[1] show that around a half of all investment agreements are terminated or fall behind schedule. If an investment agreement is terminated because the investor fails to meet its contractual obligations, the investor must pay compensation for the benefits and/or preferences received as well as a penalty stipulated in the agreement.

Current information on these regimes and the preferences and benefits they offer may be found in Doing Business in Belarus, a guide prepared by EY experts.

Overview of the legal and regulatory environment

General business matters of relevance for IT companies

Any IT company doing business in Belarus must comply with the general requirements of the business laws of Belarus.

Current information on the key legal and tax aspects of business in Belarus may be found in Doing Business in Belarus, a guide prepared by EY experts.

Overview of the tax system

IT companies doing business in Belarus may use either the general tax system that applies by default to all organizations and involves payment of corporate profit tax or the simplified tax system.

Under the general tax system, a company pays 18% corporate profit tax on the difference between its revenues and costs, while under the simplified system, instead of corporate profit tax, it pays tax on its revenues at a rate of either 5% or 3%. When a company pays 5% it is also exempt from VAT on sales of goods, work, services and property rights in Belarus (see table).

The simplified tax system may be used if a company has no more than 100 employees and annual revenues of no more than BYN 1.5 million (approximately USD 800,000 in equivalent). The simplified system may not, however, be used by Hi-Tech Park residents or by a commercial organization when over 25% of its shares (participatory interest) are owned by a single organization or jointly owned by several organizations.

Overview of the tax system

Key taxes and their standard rates	General tax system	Simplified tax system
Corporate profit tax/Tax under the simplified tax system	Corporate profit tax: 18%	Tax under the simplified tax system: 5% (no VAT paid) or 3% (VAT paid)
VAT on sales of goods, work, services and property rights in the Republic of Belarus*	VAT: 20%	VAT: 20% if the 3% rate is used VAT is not paid if the 5% rate is used
* The Republic of Belarus is not regarded as the place of sale, and VAT does not apply when property rights to intellectual property are sold to foreign customers.		
VAT on goods imported into the Republic of Belarus	VAT: 20%	
Real estate tax	1% of the real estate's value	Real estate that does not exceed 1,000 square meters in area is tax-exempt. Otherwise, 1% of the real estate's value.
Withholding tax on certain types of income paid to foreign organizations**	10% on interest 12% on dividends 15% on royalties 15% on other income in a list prescribed by law	
** Lower rates or an exemption from withholding tax may apply under double tax treaties with the Republic of Belarus.		
Personal income tax	13%	
Compulsory state social insurance contributions of employees***	35%	
*** The monthly base used to calculate these contributions is limited to five times the average monthly salary in the country. 34% is paid by the employer, and 1% is withheld from the employee's salary.		

As a rule, tax returns are filed and taxes paid on a month basis: returns are to be filed no later than the 20th of the month following the reporting quarter, and tax is to be paid no later than the 22nd of the month following the reporting quarter.

Tax audits are generally performed in accordance with a plan, and their frequency depends on a company's risk group. Companies with a high level of risk may be audited once a year. Companies must not, however, be audited for a period of two years after their registration. No period of limitation applies to tax collection in Belarus, so the tax authorities may collect unpaid taxes and late payment interest regardless of how much time has passed since the due date.

Foreign trade

In working with foreign clients and customers, Belarusian IT companies must observe a number of special legal requirements that may in practice create certain complications.

Written form of an agreement

An agreement with a nonresident must be in written form; otherwise the foreign trade transaction will be invalid. **Written form** is observed when a single document is prepared and signed by the parties or when a written offer to enter into an agreement is sent and accepted by means of implicative (actual) actions to fulfill the terms of the agreement (payment, performance of work or services, etc.).

Settlement terms in an agreement

An agreement with a nonresident must indicate the **terms of settlement**, i.e. payment before or after the other party performs its obligations.

Primary accounting document

Accounting law requires that a **primary accounting document** confirm each business transaction performed, including cross-border transactions. Such primary accounting documents must indicate: the document's title and date; the name (full name) of the parties to the transaction; the content and basis of the transaction; its value in physical and money terms or in money terms; and the positions, full names and signatures of the persons responsible for the transaction's completion and/or proper documentation.

As a rule, a primary accounting document should be prepared and signed by both parties: the client and the provider. A unilateral procedure is possible if such a procedure is envisaged in a public agreement between the provider and the client. A public agreement is concluded by a commercial organization and establishes such organization's obligations, including to perform work (services) that, by the nature of its activities, it must perform for any who request them and on the same terms.

Mandatory sale of foreign currency revenues

Belarus IT companies (except for Hi-Tech Park residents) are **required to sell 20% of their foreign currency revenues** from cross-border transactions on the domestic currency market.

Time limits for cross-border transactions

The law sets binding **time limits for the completion of cross-border transactions**:

- in the case of imports, a transaction must be completed within 60 calendar days after prepayment is made, i.e. goods (protected information, exclusive rights to the results of intellectual activity) must be received or work or services performed
- in the case of exports, a transaction must be completed – i.e. money from exports must be received – within 90 calendar days (120 calendar days in the case of commission agreements) after the shipment of goods (protected information, exclusive rights to the results of intellectual activity) or the performance of work or services

Withholding tax upon import transactions

In the case of import transactions, **withholding tax** may be charged in Belarus on certain income of a nonresident. Such income includes royalties for the use of proprietary rights or the right to use proprietary rights to copyrighted works (including software) as well as licensing fees, income from intermediary and advertising services, data processing services and web hosting, and income from web portals involving websites that use search engines to create and maintain extensive databases of Internet addresses and content formatted for easy searching, etc.

Belarus IT companies are a source of such income and are considered as tax agents and thus they are obliged to calculate, withhold and pay 15% withholding tax. Double tax treaties between the Republic of Belarus and foreign states (70 such agreements have been signed as of today) may envisage benefits in the form of a reduced rate of withholding tax or exemption from such tax. To qualify for these benefits, a company must provide the Belarusian tax authorities with a tax residency certificate issued by foreign tax authorities. In practice, however, such a certificate may be difficult to obtain from a non-resident.

Cross-border specifics of Belarus IT companies

In practice, it isn't possible for a company to meet these requirements of Belarus law when working with foreign game and app stores (Google Play, App Store), social networks (Facebook) and advertising services (Google AdSense). Belarus IT companies that want to offer products to a broad range of consumers or otherwise commercialize their products must work with foreign organizations indirectly via intermediaries registered in foreign jurisdictions so that they can conclude agreements in written form, regularly prepare and sign primary accounting documents, stay within the time limits for cross-border transactions, etc.

In principle, Belarus law prohibits the activities of so-called payment agents, who receive payment for goods (work, services) sold by third parties. Such activities may be carried out only by banks, non-bank credit and financial institutions and certain state organizations. Depending on the situation, however, there are legal mechanisms for reducing such risks.

Investments in the Republic of Belarus

Under the laws of Belarus, investments are any assets or other subjects of civil rights that an investor owns or possesses on another legal basis allowing it to dispose of them and that such investor invests within the Republic of Belarus for the purpose of earning a profit (revenue) and/or achieving another significant result or for purposes unrelated to personal, family, household or other such uses.

In the Republic of Belarus, investments may be made in the following ways:

- creation of a commercial organization
- acquisition and creation, including construction, of immovable property
- acquisition of intellectual property rights
- acquisition of equity, participatory interests in authorized capital or shares in the assets of commercial organizations, including increases in the authorized capital of such organizations
- concession-based projects
- other means not prohibited by the laws of Belarus

Belarusian law guarantees that an investor's profits (revenue) and other lawfully obtained funds related to investments in Belarus can be freely transferred outside the Republic of Belarus. This right may be exercised after payment of taxes, levies (duties) and other mandatory payments stipulated by the laws of Belarus.

Investment law in Belarus does not apply to the provision of loans or the acquisition of securities other than shares.

Many legal mechanisms that are widely used in international practice for mergers and acquisitions are not envisaged by the laws of Belarus. For that reason, when sales of shares (participatory interests) in Belarusian companies involve a foreign investor, the transaction is often structured in a foreign jurisdiction under foreign law (e.g. English law), which is more flexible and adaptable than the laws of Belarus. Foreign law allows a contract for the sale of shares (participatory interests) to involve legal mechanisms familiar to foreign investors, such as representations and warranties, indemnities, escrow, etc., so that the agreements between the parties can be enforced to their fullest legal extent.

Many legal constructions typical of foreign corporate law are not envisaged in Belarus law and thus, for all practical purposes, cannot be used in Belarus. Only in 2016, for example, did the law explicitly permit agreements to be concluded between shareholders (participants) of a company to regulate corporate relations, although not all company shareholders (participants) may be parties to such an agreement at the same time, and the terms must be consistent with the binding laws of Belarus.

In world practice, by comparison, instruments such as option agreements, put and call options, drag-along and tag-along rights and convertible loans are commonly used to give shareholders (participants) convenient and rapid means of getting into and out of companies and alienating shares (participatory interests). There are sometimes ways of dealing with such issues under the laws of Belarus, but by means of quasi-instruments that are not evident or transparent for investors.

It should be noted that Belarusian law makes no provision for convertible loans that would allow a loan provided to a Belarus company to be converted into the company's shares (participatory interest). Moreover, in some cases (e.g. an interest-free loan from a foreign company), the permission of authorized state agencies may be required in order to provide/obtain a loan.

Venture financing

Belarus law contains only isolated provisions concerning venture financing, and as a result the concept of venture activity is not envisaged by law.

At the same time, a venture project is understood in law as an innovation project financed by a venture organization, which in turn is understood as a commercial organization whose activities consist of financing innovation. To obtain the status of a venture organization, a commercial organization must be registered as an innovation infrastructure organization. Such an organization is registered by the State Science and Technology Committee after it proposes a business project with a duration of at least three years and the project's significance has been evaluated.

The law mentions special-purpose loans and the purchase of shares (participatory interests) as means of financing venture projects. Funds may be provided without any pledge, guarantee or other means of securing obligations. No single venture project may receive financing in excess of 50% of the book value of the venture organization's assets. A venture organization may place its assets, including funds, in asset management.

Venture organizations qualify for an exemption from corporate profit tax on dividends from an innovation organization and interest on money provided to finance venture projects, provided that the innovation organization's proceeds from sales of high-tech goods (work, services) or property rights to intellectual property, calculated as a cumulative total from the beginning of the year, make up at least 50% of its total revenue.

Nevertheless, there are currently no private venture organizations registered in Belarus. The Belarus Innovation Fund performs the functions of a specialized state venture organization in financing venture projects.

In practice, high-risk innovation projects that promise high returns in the future are financed by companies in the same way that other projects are financed: debt (bank and other loans) and equity financing (purchase of shares/ participatory interests) and other means not prohibited by law.

Importation of equipment to the Republic of Belarus

General provisions on importation of equipment

The Republic of Belarus, along with Armenia, the Russian Federation, the Republic of Kazakhstan and the Kyrgyz Republic, is a member of the Eurasian Economic Union (EEU), which has a unified customs territory. The EEU has unified customs regulations and a unified list of customs duty rates applicable to goods imported into the customs territory of the EEU from third countries.

Most goods imported into Belarus from outside the EEU are subject to import duties and VAT. Duty rates range from 0% to 80% of the customs value of goods. The basic 20% rate of VAT is charged on the sum of customs value and customs duty.

Depending on how goods are to be used in Belarus, a specific customs procedure must be applied, and this determines the conditions of customs clearance. Goods released for domestic consumption – the most common customs procedure – are regarded as being in free circulation in the customs territory of the EEU following payment of customs duty, VAT and customs clearance fees.

Importation of goods by Hi-Tech Park residents

Belarusian IT companies that are residents of the Hi-Tech Park qualify for an exemption from VAT and customs duties on equipment and related components and/or spare parts imported into Belarus. Decree No. 392 of the President of the Republic of Belarus of 30 August 2012 "On Certain Tax Issues Affecting Hi-Tech Park Residents" approved a list of equipment to which this exemption applies. The list includes portable and other computers, their central processing units, data storage devices, etc.

A conclusion by the Hi-Tech Park Administration on the purpose of goods imported by a resident serves as the basis for an exemption. For such a conclusion to be issued, the resident must document the need to import such goods as well as provide commercial and other documents.

During the two years after their release, imported goods to which this exemption is applied may be used by Hi-Tech Park residents for purposes other than those allowed for residents or transferred to legal entities or individuals for ownership, possession, use and/or disposal via civil transactions only if import duties and VAT are paid to the customs authorities.

Importation of goods under an investment agreement

Belarusian IT companies that conclude investment agreements with the Republic of Belarus qualify for an exemption from customs duties and VAT on imported equipment and related components and spare parts to be used only in Belarus under an investment project.

The basis for such an exemption is a conclusion issued by the state body or executive committee that concluded the investment agreement on behalf of the Republic of Belarus, confirming that the imported goods are to be used exclusively under an investment project.

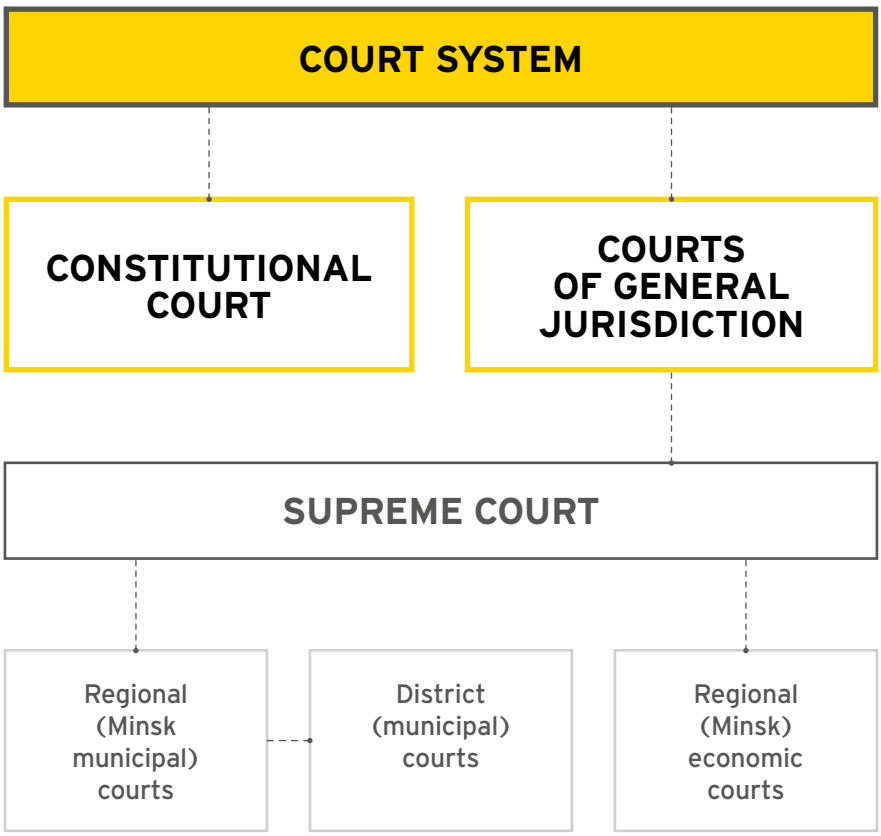
When such exemptions are used, restrictions on the use and/or disposal of the imported goods apply until the end of the investment project, but for no more than five years after such goods are placed under the appropriate customs procedure. If goods are used for purposes other than those designated, import duties and VAT are paid (collected) in accordance with the law.

Judicial system

Court system

Belarus's judicial system consists of the Constitutional Court of the Republic of Belarus and courts of general jurisdiction. Courts of general jurisdiction include:

- the Supreme Court of the Republic of Belarus
- regional (Minsk municipal) courts
- district (Minsk) economic courts
- district (municipal) courts



Legal entities may appeal directly to courts of general jurisdiction to defend their lawful rights and interests. Foreign legal entities have the same procedural rights and obligations as Belarusian legal entities.

Disputes between business entities may be heard by economic courts of the regions and the City of Minsk as well as the Supreme Court of the Republic of Belarus, but it is the Supreme Court that is the court of first instance in cases involving exclusive rights to intellectual property.

Arbitration courts

In the Republic of Belarus, organizations outside the judicial system have also been created to resolve disputes: permanent arbitration courts as well as ad hoc arbitration courts formed by agreement of the parties to resolve a specific dispute.

The best-known permanent arbitration court is the International Arbitration Court of the Belarus Chamber of Commerce and Industry.

The Republic of Belarus has been a party to the UN Convention on Recognition and Enforcement of Foreign Arbitral Awards (10 June 1958) since 1961. Under the Convention, signatory countries are obligated to recognize and enforce foreign arbitration decisions on their territory. As of today, the Convention has over 150 signatory countries.

Unlike the decisions of arbitration courts, foreign court decisions are recognized and enforced only if the Republic of Belarus has entered into an agreement to that effect with the state that seeks recognition and enforcement or on the basis of reciprocity.

Thus, if a court decision is to be enforced in a foreign state, it is recommended that the case be heard in an arbitration court, as its decisions will be recognized and enforced in most countries of the world.

Commercial litigation

Mandatory claim procedure for settling disputes

Effective 31 January 2011, a claimant, before filing suit in court, must present a claim (a written proposal to settle the dispute voluntarily) to the potential respondent, unless otherwise stipulated by contract.

The form and content of such a claim must meet the requirements of the laws of Belarus. The claim must be accompanied by copies of documents not possessed by the recipient, or excerpts therefrom, substantiating and verifying the claim.

Within one month of receiving such a claim, unless otherwise stipulated by contract, the recipient must notify the claimant in writing of the results of the claim's consideration. In practice, if no answer is received within this time, there is nothing to prevent the claimant from filing suit in court and using the claim as evidence that the recipient acknowledges (does not contest) the claim for the purpose of the writ proceedings.

Litigation

Economic courts of Belarusian regions and the City of Minsk hear cases involving commercial disputes arising out of civil, land, financial and other legal relations, cases arising out of administrative and other public law relations, cases involving the determination of legally significant facts (juridical facts), and other cases envisaged by law.

Such suits must be filed in writing with a court that hears commercial cases and must be signed by the claimant or the claimant's representative.

As a general rule, a case must be heard by the court of first instance within two months of its being listed for trial. If we include the preliminary court hearing and the period until a decision enters into force, it takes at least three months for a claimant to obtain satisfaction.

Writ proceedings

In writ proceedings, the court issues a writ without summoning the parties or a court hearing. As a result, the claimant may obtain satisfaction within 20 business days.

The courts may issue writs only for specific types of claims: claims for money or property or levying of execution on the debtor's property, where such claims are incontestable (based on documents verifying the debtor's liabilities) or acknowledged (uncontested) by the debtor, but have not been satisfied, or claims for up to 100 times the base unit.

To initiate writ proceedings, the claimant files a petition giving the information prescribed by law and attaches the appropriate documents.

Extra-judicial alternative to writ proceedings

In 2016, to optimize the workload of the courts, legal entities were given the ability to collect debts on an incontestable basis without going to court.

This is done on the basis of a notary's writ of execution, which the claimant must request from the notary in writing.

The main basis for obtaining such a writ of execution for claims arising out of agreements is the debtor's written acknowledgment of the debt. Documents that can be used to verify such acknowledgment include the debtor's response to a claim, acknowledging the obligation to pay, an accepted demand for payment, a settlement reconciliation report signed by the claimant and the debtor, etc.

Evidence in support of claims

The law requires a claimant filing suit in court to include evidence supporting the claim.

Written evidence is of prime importance: documents signed by persons authorized by the parties to an agreement and verifying that an agreement has been concluded, work or services provided or rights assigned.

The courts typically recognize only written documents personally signed by the parties and stamped in ink. In view of the high volume of information sent via the Internet and posted in the global network, the possibility of using electronic information as written evidence is an important issue. Despite the increased flow of electronic documents, however, documents sent via the Internet are frequently not recognized as evidence by the courts.

Protection of intellectual property

Software copyright

Software is protected by copyright in Belarus. A computer program is automatically protected by copyright as soon as it is created, and no formalities are required.

Unless proved otherwise, the author of a computer program is the person indicated as such on the original program or a copy. As additional proof of copyright, a computer program may be registered at the author's initiative with the National Center of Intellectual Property. The purpose of registration is to provide the applicant (author or rights holder) with independent verification of his/her assertion that he/she has created a computer program and holds the exclusive rights to the program.

Copyright includes property rights (the right to use a program in any manner or form, the right to royalties) and personal non-property rights (rights of attribution and name). Personal non-property rights are protected in perpetuity, while property rights are protected during the life of the author and for 50 years thereafter.

The law provides cases of free use of software. E.g., a person in lawful possession of a copy of a computer program may:

- make a copy of the program to be archived or to replace a legally acquired copy
- adjust the program, without changing the source code, for use on the user's computer
- modify the program if it was provided with an open source code and/or if such person was authorized to modify it
- record and store the program in computer memory

Contractual relations with developers

In practice, software developers often create software to a client's specifications. How relations are legally structured in such cases depends on whether the developers are individuals or legal entities.

Contractual relations with authors (individual developers)

An individual developer (author) may conclude the following types of agreement:

- employment agreements
- agreements assigning exclusive rights
- copyright agreements
- agreements on the creation and use of items protected by copyright

An **employment agreement** between an employer and an employee regulates the employee's (author's) creation of a computer program as a piece of work made to order upon the employer's instruction or as part of the employee's obligations under the employment agreement. In this case, exclusive rights to a computer program created by the employee pass to the employer, unless the employment contract stipulates otherwise. If the employer does not begin using the program within five years and does not assign exclusive rights to the program, the exclusive rights pass back to the author, unless the employment contract stipulates otherwise.

Under an **agreement assigning exclusive rights**, the author alienates his/her exclusive rights to an already created computer program in full and for the entire period covered by copyright. The author's personal non-property rights are not transferred, and the terms of an agreement transferring or limiting such rights are invalid.

A **copyright agreement** is a licensing agreement concluded directly with the developer of an already created computer program. Only an individual developer may be the licensor under such an agreement. If an agreement's territorial scope is not specified, its scope is limited to the Republic of Belarus. If the duration of an agreement is not specified, it may be terminated by the developer three years after its conclusion.

Under an **agreement on the creation and use of an item protected by copyright**, the author undertakes to create a computer program in the future and to grant the right to use it to a customer who is not the author's employer. Such agreements may be concluded only with individuals and must not contain the following terms (which would be invalid):

- terms transferring or limiting the author's personal non-property rights
- terms limiting the author's ability to create works of a specific kind or in a specific area in the future
- terms requiring the author to grant the customer exclusive rights to any computer programs that the author will create in the future

Contractual relations with developers that are legal entities

The following agreements may be used to formalize contractual relations with software developers that are legal entities:

- agreements assigning exclusive rights
- licensing agreements
- mixed agreements

Under an **agreement assigning exclusive rights**, the legal entity that is the rights holder alienates its exclusive rights to a computer program in full and for the entire period covered by copyright. The conclusion of an agreement assigning exclusive rights does not entail the termination of licensing agreements previously concluded in respect of the program.

Under a **licensing agreement**, the rights holder (licensor) permits the user (licensee) to use a computer program in ways directly stipulated by the agreement.

A licensing agreement for a computer program may be concluded by means of an adhesion contract the terms of which are set forth on the acquired copy of the program or the copy's packaging or included with the copy. The licensee consents to enter into such an agreement by starting to use the computer program.

Note that the laws of Belarus do not allow rights to use intellectual property to be provided without compensation in relations between commercial organizations. A licensing agreement that does not envisage compensation for rights to use a computer program will be invalid.

As already mentioned, an agreement on the creation and use of an item protected by copyright may be concluded only with an individual developer. Neither the laws of Belarus nor judicial practice give any direct indication as to what sort of agreement should be used when a software developer is a legal entity. In this situation, a mixed agreement should be used.

Contractual relations with authors (individual developers)

Type of agreement	Extent of rights	Terms/conclusion procedure	Term	Special provisions
Employment agreement	Exclusive rights to a computer program created by the employee pass to the employer, unless the employment contract stipulates otherwise	Concluded between an employer and an employee; regulates the employee's (author's) creation of a computer program as a piece of work made to order upon the employer's instruction or as part of the employee's obligations under the employment agreement		If the employer does not begin using the program within five years and does not assign exclusive rights to the program, the exclusive rights pass back to the author, unless the employment contract stipulates otherwise
Agreements assigning exclusive rights	Full exclusive rights to a computer program		The entire period covered by copyright	The conclusion of an agreement does not entail the termination of licensing agreements previously concluded in respect of the program
Copyright agreement	Stipulated in the agreement	A licensing agreement concluded directly with the developer of an already created computer program	Stipulated in the agreement, If an agreement's duration is not specified, it may be terminated by the developer three years after its conclusion	Only an individual developer may be the licensor under such an agreement. If an agreement's territorial scope is not specified, its scope is limited to the Republic of Belarus
Agreements on the creation and use of items protected by copyright	Right to use a program	The author undertakes to create a computer program in the future and to grant the right to use it to a customer who is not the author's employer	Stipulated in the agreement	Such agreements may be concluded only with individuals and must not contain the following terms (which would be invalid): ▸ terms transferring or limiting the author's personal non-property rights ▸ terms limiting the author's ability to create works of a specific kind or in a specific area in the future ▸ terms requiring the author to grant the customer exclusive rights to any computer programs that the author will create in the future

Contractual relations with developers that are legal entities

Type of agreement	Extent of rights	Terms/conclusion procedure	Term	Special provisions
Agreement assigning exclusive rights	Full exclusive rights to a computer program		The entire period covered by copyright	The conclusion of an agreement does not entail the termination of licensing agreements previously concluded in respect of the program
Licensing agreement	Use of a computer program in ways directly stipulated in the agreement	A licensing agreement for a computer program may be concluded by means of an adhesion contract the terms of which are set forth on the acquired copy of the program or the copy's packaging or included with the copy. The licensee consents to enter into such an agreement by starting to use the computer program		The laws of Belarus do not allow rights to use intellectual property to be provided without compensation in relations between commercial organizations. A licensing agreement that does not envisage compensation for rights to use a computer program will be invalid
Mixed agreement		In cases when the software developer is a legal entity		

IT COMPANIES

Overview

According to our estimates, more than 115,000 ICT specialists work in the Belarusian IT and other sectors. Of those, more than 34,000 specialists work in IT products and services, with over 30,000 employed by Hi-Tech Park residents, responsible for over 85% of computer services exports from the Republic of Belarus. The IT industry's rapid growth over the last ten years has been driven by the availability of talent, state support measures and an export-oriented strategy.

This section of the report provides detailed information on HTP residents, since they are the most prominent examples of the Belarusian IT industry. Our analysis was based on statistical information provided by the HTP Administration and EY's questionnaire surveying 42 of the 165 companies existing at that moment, covering 70% of total employment by HTP residents.

Hi-Tech Park residents are classified as follows:

- Companies specializing in providing IT services
- Companies specializing in developing and supporting proprietary products (including startups)
- Captive centers or representative offices of foreign IT companies

Originally, it was planned that the main activities of the newly established HTP would include outsourced development and the provision of IT services based on the offshore model – and these remain prevalent. Major residents such as EPAM Systems, IBA, Itransition, ISsoft, iTechArt, Exadel, SaM Solutions, ScienceSoft, etc. established their presence here with those aims in view and still pursue them. They offer a wide range of services, from providing individual developers or quality assurance engineers to assigning a whole team of hundreds of experts to develop complex digital solutions. Most companies are registered and are growing in Belarus, but have many representative offices on the key markets: USA, EU, UK, etc. EPAM Systems is a perfect example: in 1993, the company started developing customized software in Belarus and currently employs more than 20,000 people in 25 countries, including more than 8,000 in Belarus.

Customized software was initially developed by companies established to satisfy internal demand in Belarus, such as IBA, SoftClub, System Technologies, and BelHard. The upswing in the mobile and gaming segments, e.g. Game Stream (Wargaming), Viaden Media, etc., gave Belarusian developers a strong impetus and, as of now, there are many Belarusian companies successfully developing proprietary products, such as Apalon, Vizor, Targetprocess, etc.

Belarus still lacks a legal framework for venture financing, so startups either receive support from their founders or seek finance outside the country. There have been several significant M&A deals with Belarus-based startups over the last four years, e.g. Viber, Maps.me, MSQRD, and Juno. Successful Belarusian startups are usually taken over by foreign companies but carry on with their development projects in Belarus, thus becoming their captive centers.

The Republic of Belarus is becoming a popular destination for major international companies to open captive centers or global in-house centers (GIC). Some of them are already benefiting from the strong skills and relatively low labor costs, as well as from the favorable operating regime offered by the Hi-Tech Park. The best known captive centers include Playtika, IHS Markit, Netcracker, Viber, Yandex, Fitbit, Ciklum and SK Hynix.

Among the HTP residents, the most common are small companies with up to 100 employees, accounting for 72.8% of the total businesses. At the same time, more than 50% of all HTP staff are employed in major companies whose headcount exceeds 500.

Breakdown of HTP companies by headcount, 2016

Headcount	<10	11-50	51-100	101-500	501-1,000	>1,000
Number of companies	6.2%	40.1%	26.5%	23.5%	1.2%	2.5%
Total headcount	0.3%	7.2%	11.7%	29.7%	4.6%	46.5%

Source: [1] – Information provided by the Hi-Tech Park Administration

This demonstrates two major development trends at the HTP: on the one hand, the sector is growing due to the emergence of multiple small businesses that are able to develop and promote unique solutions, products and services, and quickly and easily adapt to market requirements. On the other hand, the sector relies on core companies that train specialists, cooperate with universities, annually increase staffing levels, and create an international image for the Belarusian IT industry.

More than half of the surveyed companies (59%) are headquartered in Belarus, while the other 41% have only a development center.

There are several types of HTP residents, classified according to the structure of their operations:

- Companies residing in and operating from Belarus
- Companies residing in Belarus and operating through their representative offices located abroad
- Companies residing outside Belarus but whose development center is located in Belarus
- Companies established or purchased to operate as development centers

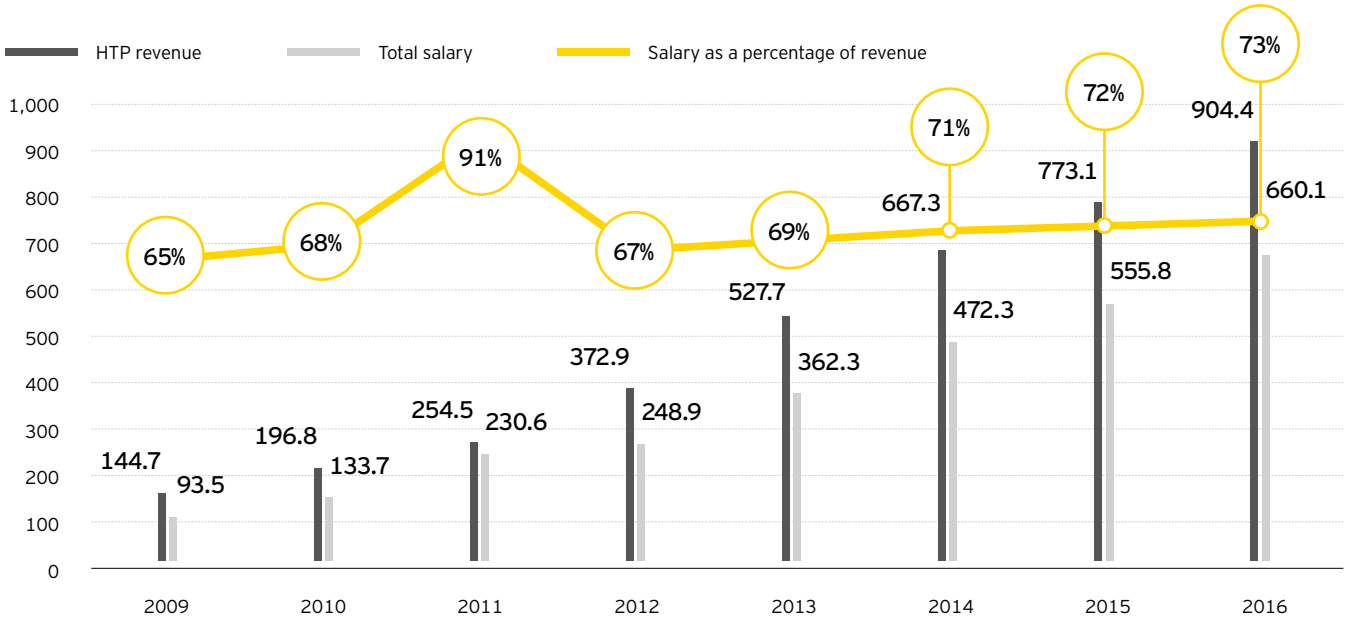
In all cases except the first, which is typical of small business, companies neither sign contracts nor sell services or products to foreign clients from the territory of Belarus, but use their foreign representative offices for these purposes. Therefore, there is no purpose in analyzing the profit or financial performance of Belarusian residents, since they do not reflect the economic reality. This is best demonstrated by the share of salary in the companies' revenue.

Salary is the most significant expense item. In 2016, its share exceeded 73% of revenue, demonstrating steady growth driven by the annual average growth of salaries across the sector. The salary growth results from the following:

- Higher competition for qualified IT professionals due to the explosive growth of the IT industry
- The emergence of multiple developers whose earnings exceed those of service companies and who are ready to offer a higher salary

HTP residents revenue and salary

Year	2009	2010	2011	2012	2013	2014	2015	2016
Revenue, USD million	144.7	196.8	254.5	372.9	527.7	667.3	773.1	904.4
Headcount	7,259	9,421	11,766	14,492	18,038	20,995	24,037	27,342
Average monthly salary, USD	1,073	1,183	1,633	1,431	1,674	1,875	1,927	2,012
Total salary, USD million	93.5	133.7	230.6	248.9	362.3	472.3	555.8	660.1
Salary as a percentage of revenue	65%	68%	91%	67%	69%	71%	72%	73%



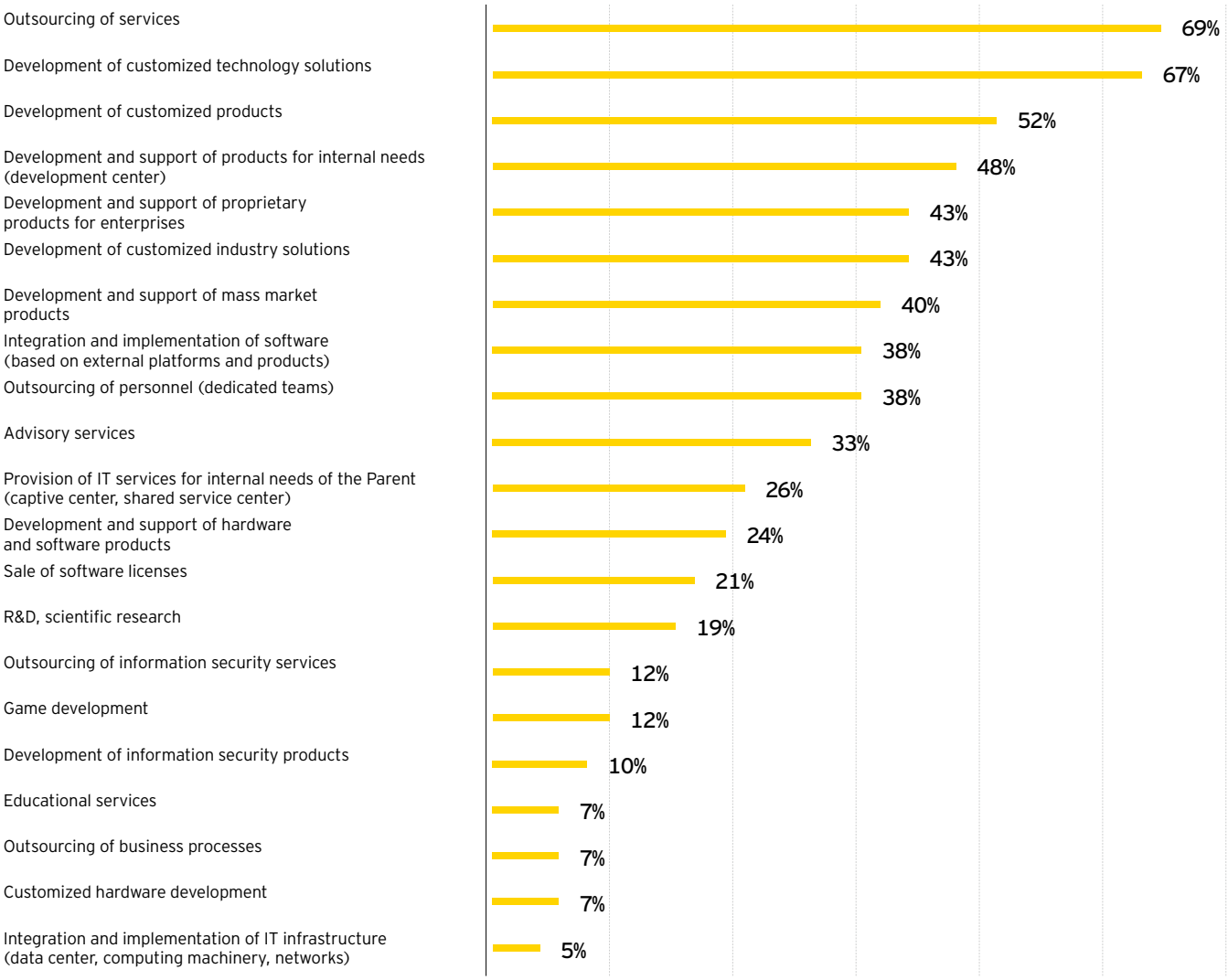
Source: [1] – Information provided by the Hi-Tech Park Administration

Business lines, types of service

More than half of the respondents (69%) noted that IT services outsourcing is their prevailing business line. In particular, the service model is the most common across the HTP, because software development was the key activity taken into account by the government when planning IT support initiatives. However, business is steadily moving from basic models of IT services outsourcing to more mature and complicated forms. Therefore, 67% of companies are engaged in the development of customized technical solutions, 52% develop customized products, and 43% develop customized industry solutions.

Many sector experts emphasize the significance of promoting and supporting those companies that develop and market proprietary products, and expect that this will be reflected in new legislative initiatives in the IT industry.

Business lines of HTP residents



Source: [2] – Results of EY's survey among Hi-Tech Park residents

Service-based companies are now starting to develop and support their own products. According to the survey results, 48% of respondents stated that they develop products and provide related support services for internal needs, 43% develop proprietary products for enterprises, and 40% develop products for the mass market.

We should separately mention the role and the progress of the game development segment in the Republic of Belarus. The oldest companies in this segment include Game Stream (Wargaming) and Viaden Media. The success of Wargaming had a strong impact on the IT segment in Belarus. Later, the rapid growth of the mobile games market was a key factor behind the popularity of game development as a whole, particularly in small companies, resulting in the emergence of companies such as Melsoft, Vizor Games, Playtika, etc.

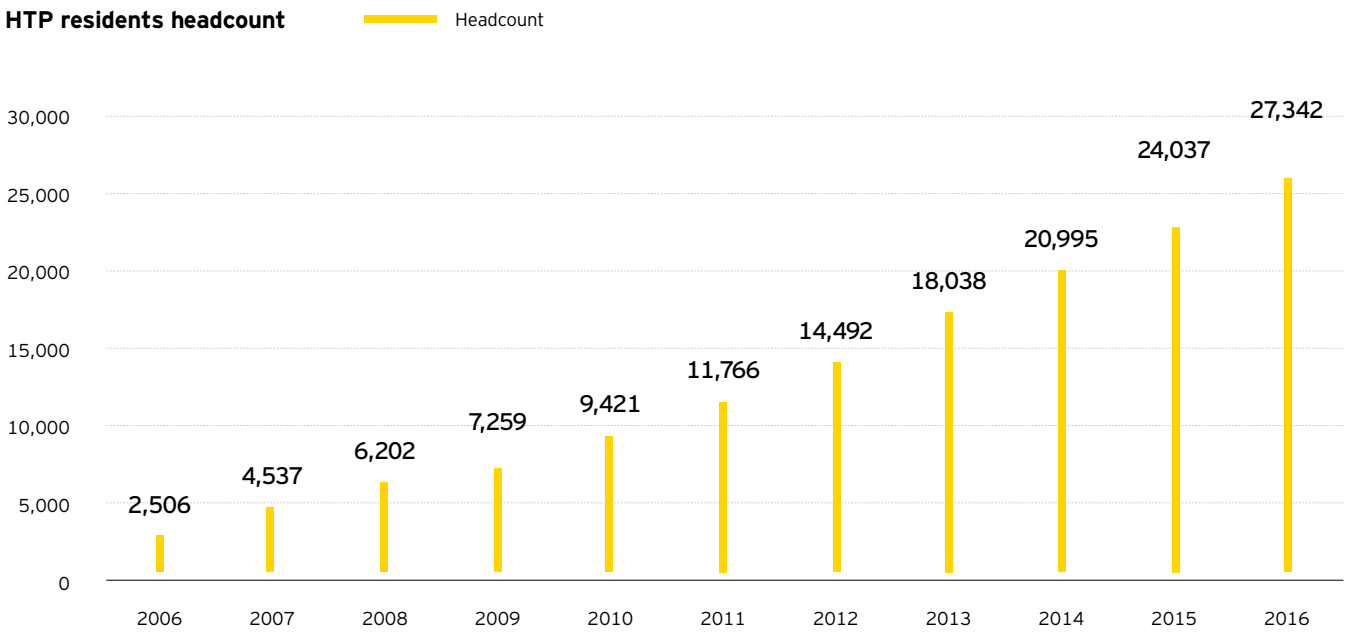
2020 HTP growth prospects

In the near term, we expect to see an improvement in HTP residents' performance, including revenues, headcount, and average salaries. Major growth factors include competitive advantages offered by the special HTP regime and the global growth of the IT products and services segment, which helps Belarusian companies to easily find new clients abroad.

The number of HTP employees is growing from year to year and, despite a relative slowdown, their number has doubled over the last five years. According to industry experts, most HTP residents demonstrate organic growth of 15%-20%.

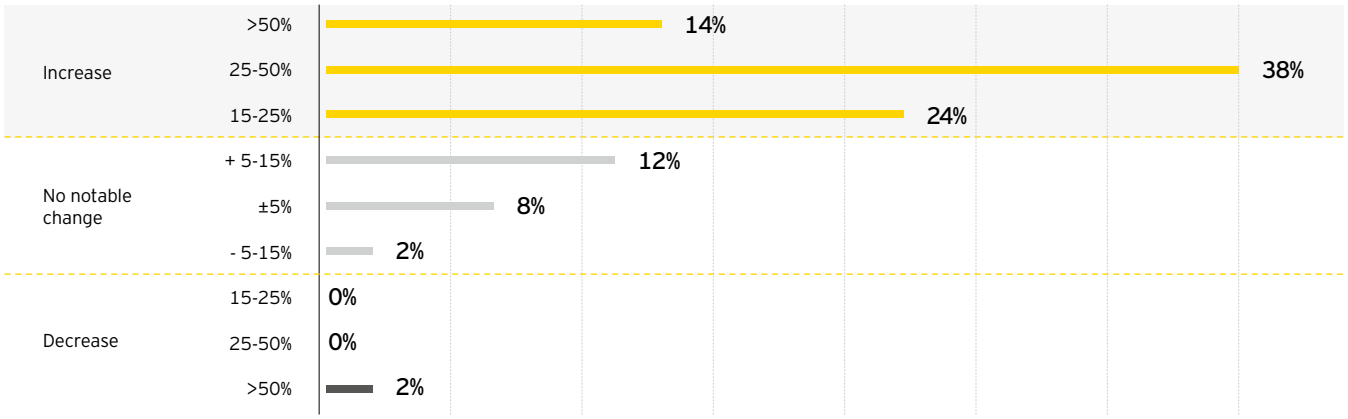
According to the survey, almost half of the surveyed IT companies expect headcount to increase by 25%-50% by 2019.

HTP residents headcount



Source: [1] – Information provided by the Hi-Tech Park Administration

How do you expect your company headcount to change by 2019?



Source: [2] – Results of EY's survey among Hi-Tech Park residents

HTP development forecast up to 2020

	Year	2017	2018	2019	2020
Accelerated development	HTP revenue, USD million	1,063	1,206	1,335	1,445
	Headcount	30,896	34,295	37,382	39,998
Normal development	HTP revenue, USD million	1,029	1,136	1,226	1,288
	Headcount	30,076	32,633	34,764	36,260
	Average monthly salary, USD	2,117	2,219	2,322	2,424

Source: EY analysis

Total revenue of HTP residents, as shown above, depends primarily on headcount and salary. Since 2010, salaries have demonstrated an average annual growth rate of 9.3%. The constant growth in salary is expected to persist in the coming years.

The forecast of HTP headcount is based on business and educational expectations (see the Education section for our forecast of graduates). Considering the headcount growth slowdown and decreasing number of graduates, and provided that current trends persist, we can suggest two possible scenarios of HTP headcount evolution:

- "Normal development" – If no additional state support initiatives are taken, the growth will slow and current conditions will persist
- "Accelerated development" – If measures to maintain growth, the necessary governmental decisions for IT education and the IT sector are taken, and assuming further promotion of the IT industry

Therefore, we suggest two possible development scenarios for the HTP up to 2020.

Currently, there are draft laws under consideration that seek to extend the special legal regime for the HTP, providing for additional government support measures to develop the product model and help HTP residents expand the scope of their business. If the initiatives are approved, the IT industry is likely to see faster growth following the "accelerated development" scenario.

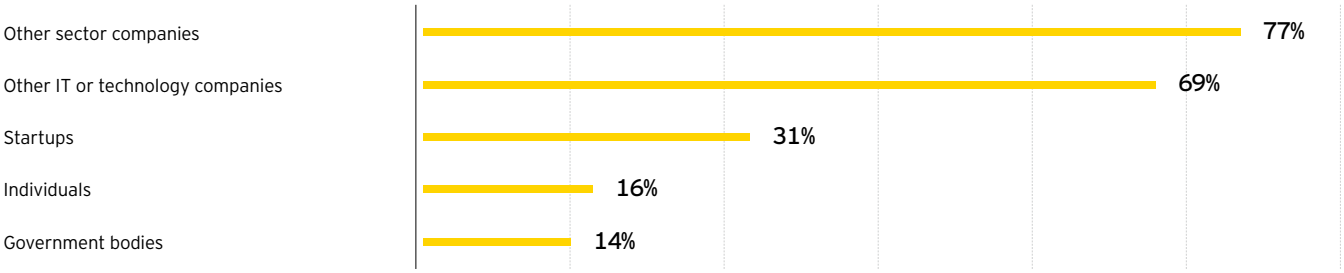
Customers

The Belarusian IT industry is oriented towards the B2B market, targeting other sectors rather than technological companies. At the dawn of the IT industry, in the early 2000s, most Belarusian companies worked to orders from other technological companies. However, the emergence of in-house expertise helped companies to find their own clients and markets.

Many of the world's biggest companies have already had dealings with the Belarusian IT sector. According to our survey, more than 30% of the Fortune Global 200 companies have worked with HTP residents. The most trending customers are Facebook, Microsoft, Northrop Grumman, PepsiCo, Whirlpool, 3M, Amazon.com, Cisco Systems, HP, Oracle, Xerox, Disney, Intel, Apple and IBM, which have worked with several companies from Belarus.

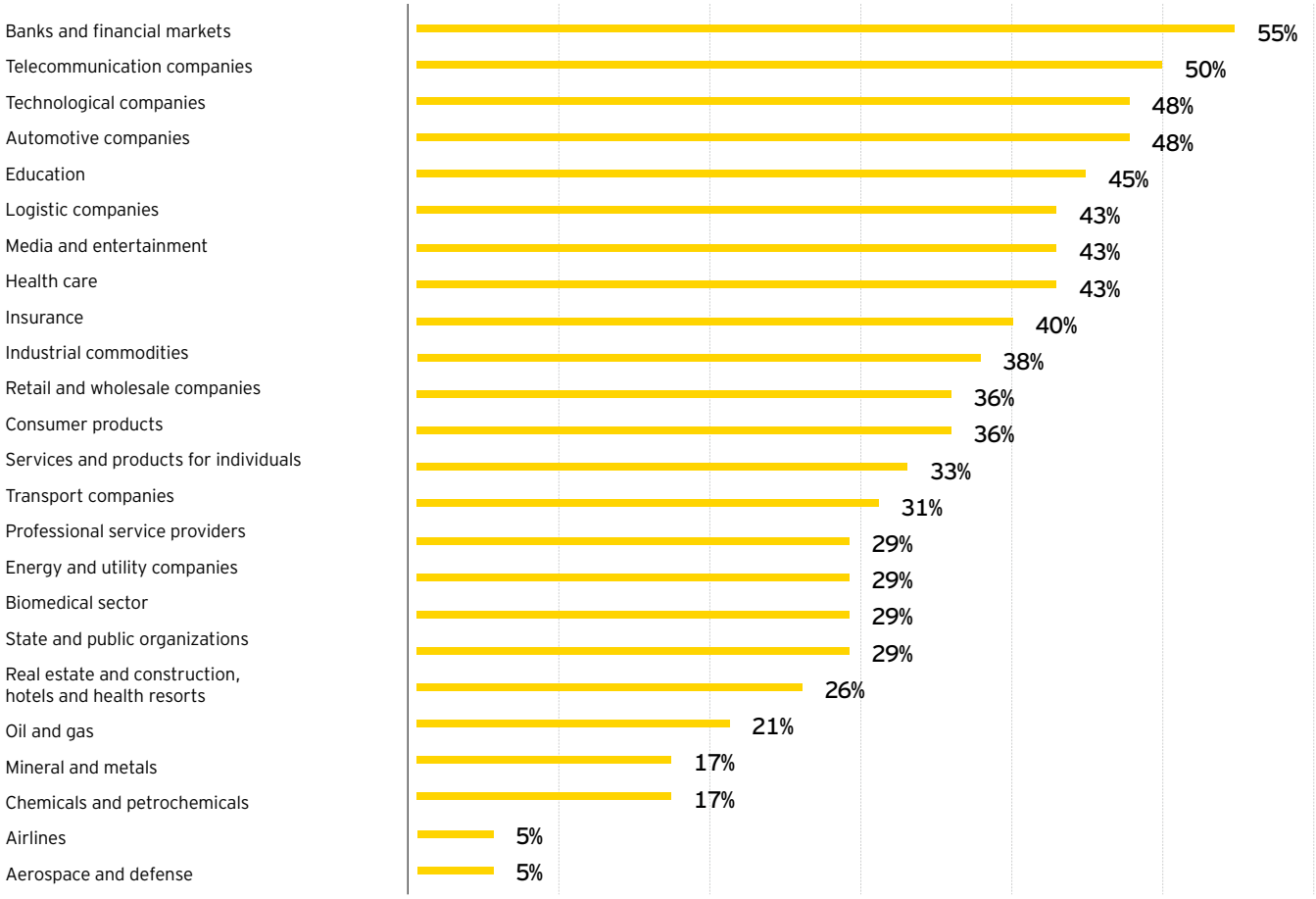
In most cases, HTP residents provide services to banks and the financial market (55% of respondents), telecommunication companies (50%) and technological companies (48%). On the one hand, these sectors are technologically sophisticated and are expected to be among the key clients, but, on the other hand, low penetration in other sectors may indicate a lack of industry expertise and an incomplete service offering.

Most sought types of customer for HTP residents



Source: [2] – Results of EY's survey among Hi-Tech Park residents

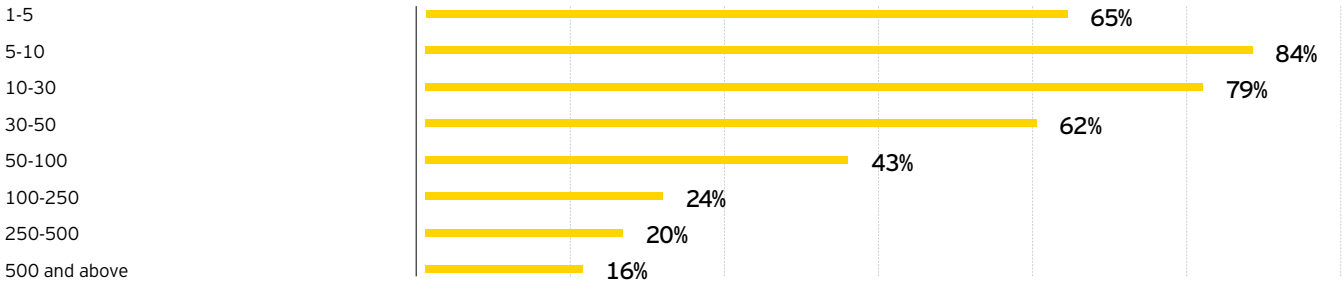
Distribution of customers by sector



Source: [2] – Results of EY's survey among Hi-Tech Park residents

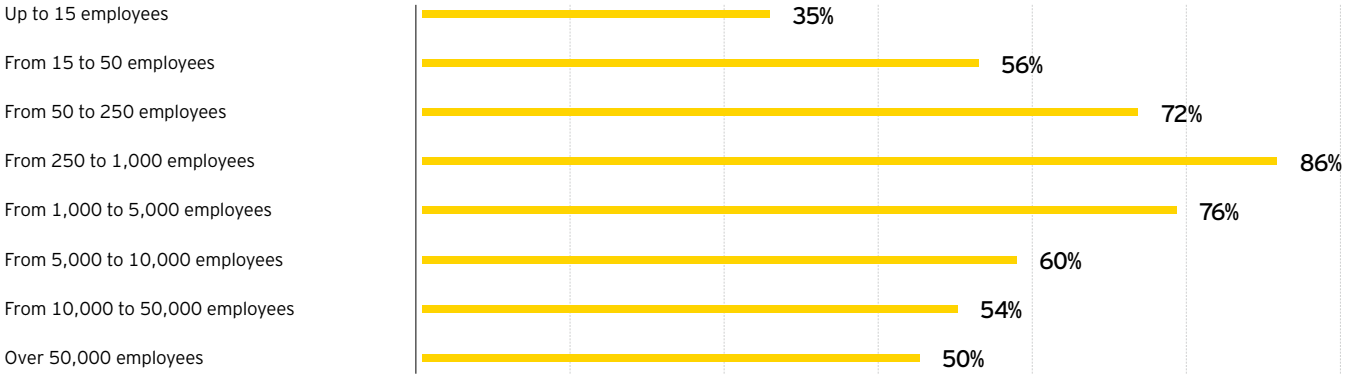
Due to the fact that most Belarusian IT companies run small and medium businesses (fewer than 500 employees), strong dependence on individual major clients and projects exposes their operations to certain business risks. Most respondents (63%) seek small projects (10-30 team members) while larger projects (more than 50 team members) are less common, which can be explained by the headcount gap – big projects are appealing for those few companies whose staff exceed 500 employees. Similarly, Belarusian IT companies are targeting medium businesses with 250 - 1,000 employees.

Most sought project team size for HTP residents



Source: [2] – Results of EY's survey among Hi-Tech Park residents

Most sought client company size (headcount) for HTP residents

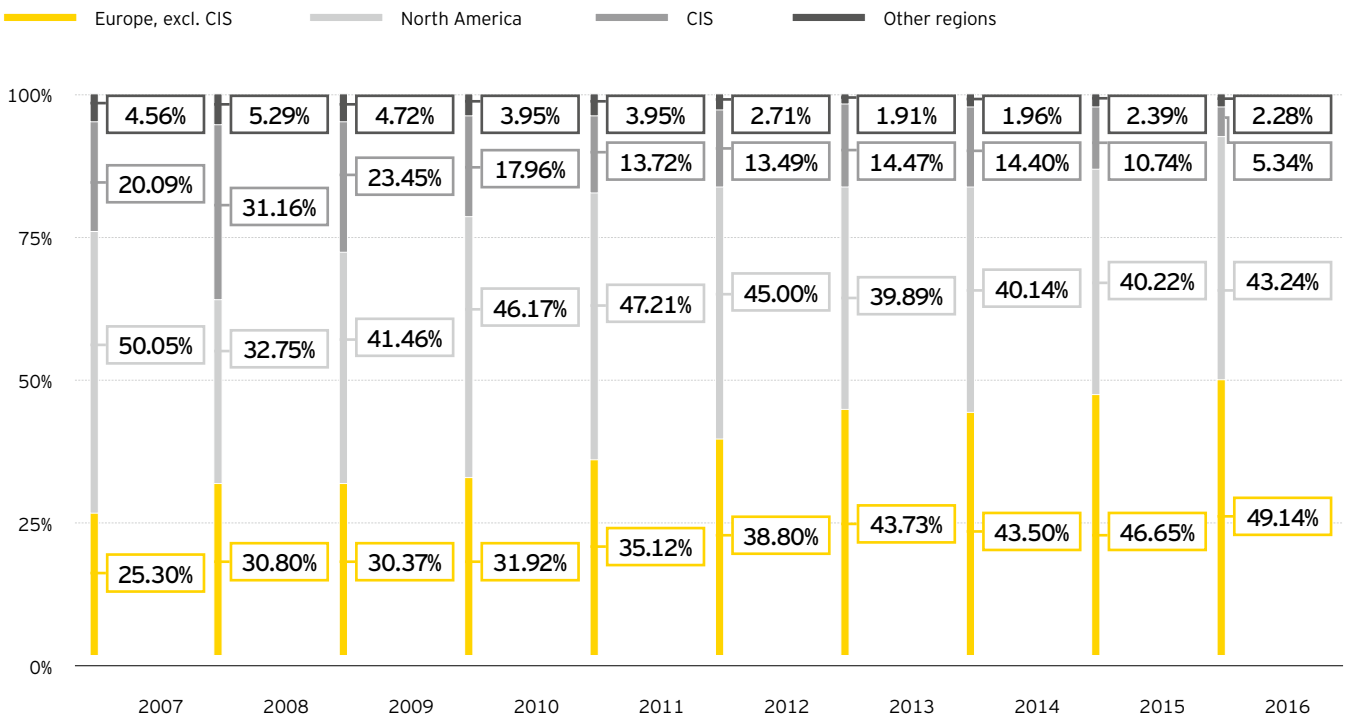


Source: [2] – Results of EY's survey among Hi-Tech Park residents

Sales geography

Despite bigger export volumes to Western Europe (49%), the USA is the most popular HTP export destination: in 2016, exports to the USA totaled USD 353.7 million, or 43% of the total, while exports to Western Europe are distributed among a number of countries, with the largest being the UK and Germany. The Russian Federation ranks fourth, with about 5% of total exports. The exports geography depends on regional penetration and arrangements usually made through the country closest to the customer. We should also note recent growth in exports to the EU, from 25% in 2007 to 49% in 2016.

Sales markets: geographic structure and trends

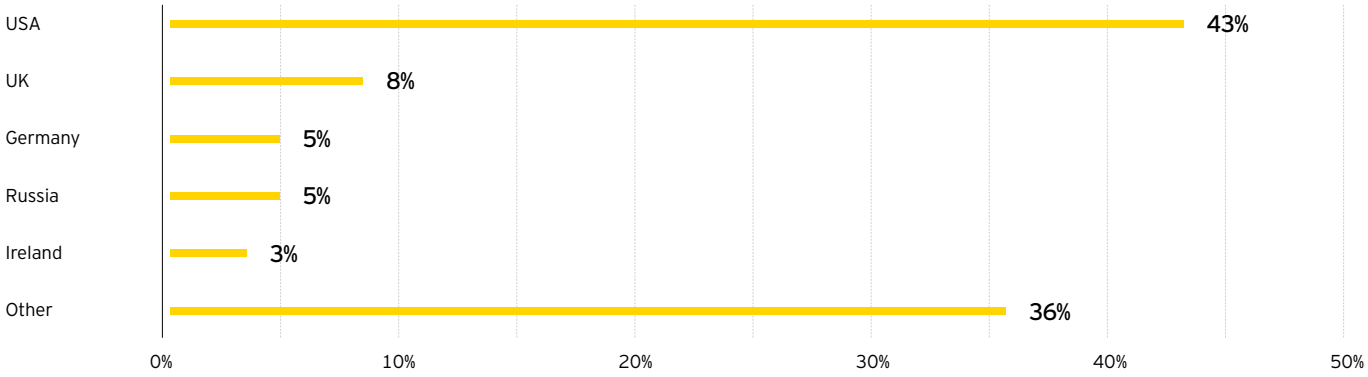


Source: [1] – Information provided by the Hi-Tech Park Administration

Sales by country, USD million

Country	2016	Share, %
USA	353.7	43.1
UK	63.9	7.8
GERMANY	41.4	5.0
RUSSIA	41.3	5.0
IRELAND	25.4	3.1
NETHERLANDS	17.1	2.1
LUXEMBOURG	12.6	1.5
SWITZERLAND	11.5	1.4

Country	2016	Share, %
FINLAND	10.1	1.2
CZECH REPUBLIC	9.1	1.1
ISRAEL	7.6	0.9
SOUTH KOREA	6.6	0.8
LATVIA	6.0	0.7
SWEDEN	5.2	0.6
AUSTRIA	4.0	0.5

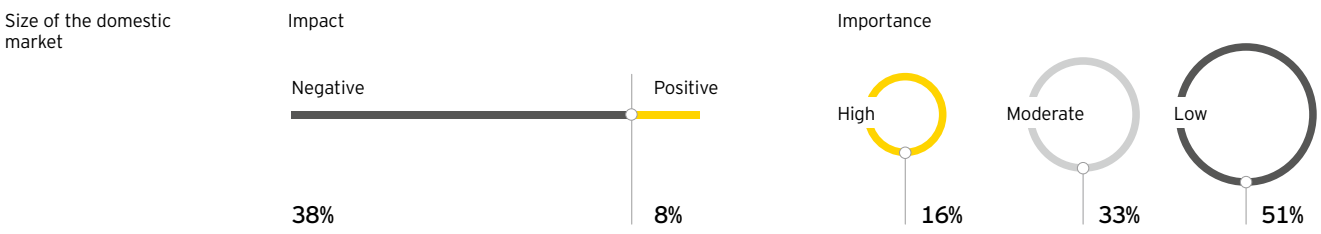


Source: [1] – Information provided by the Hi-Tech Park Administration

Most respondents (51%) have indicated that the size of the domestic market is the least important factor for IT companies. Even though domestic sales are on the rise and domestic revenue doubled compared with 2012, reaching USD 83.8 million, the share of domestic sales in total revenue has been sliding, down to just 9.3% in 2016. Therefore, the domestic market's impact on the sector performance was assessed as negative (38%). A larger domestic market would contribute to the growth and development of the Belarusian IT industry.

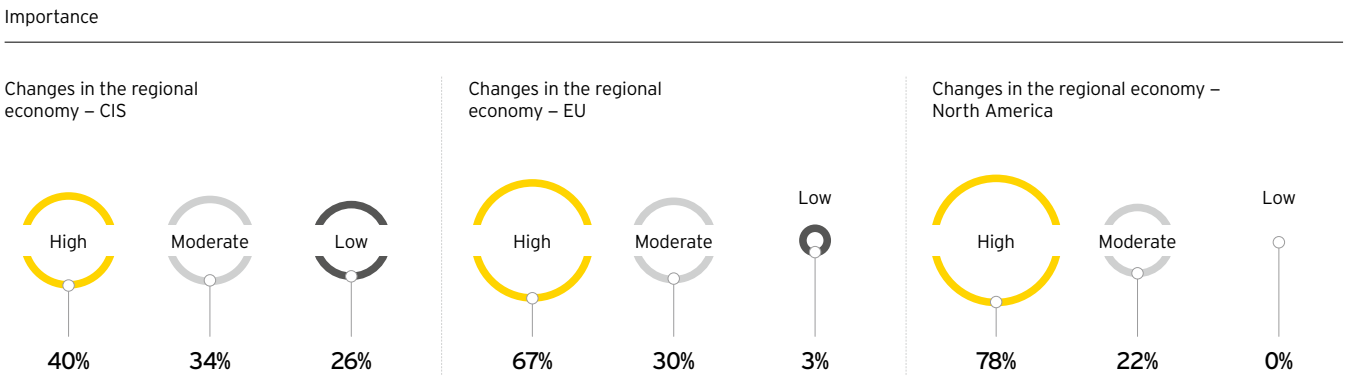
IT development prospects are associated with North America and the EU, which is to be expected, since these regions serve as major markets for Belarusian IT companies and their economic growth significantly affects trends in the Belarusian IT industry.

Importance of the domestic market for HTP residents' performance



Source: [2] – Results of EY's survey among Hi-Tech Park residents

Effect of market changes on the development prospects of the Belarusian IT industry



Source: [2] – Results of EY's survey among Hi-Tech Park residents

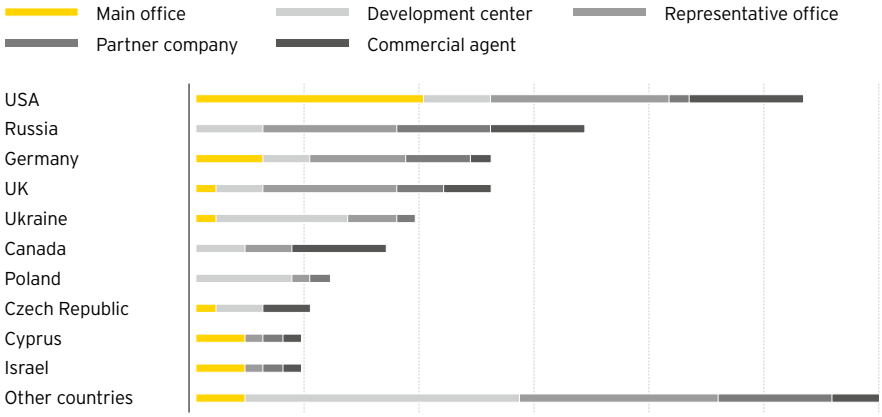
Branches and representative offices

The geography of representative offices mirrors the main sales and export trends. HTP companies are best represented in the USA – 24% of respondents have their main offices located in the USA, 7% have development centers, 19% have representative offices, 2% have partner companies and 12% have commercial agents there. The UK, Germany and Russia are popular destinations for establishing representative offices. The intent to be closer to the key markets is logical both in terms of sales and contracting performance, as well as in terms of understanding the local legal framework.

The most popular destinations for development centers are Belarus's neighbors – 14% of respondents have development centers in Ukraine, 10% in Poland, and 7% in the Russian Federation. Many industry experts believe that moving beyond the domestic market results from high competition for qualified IT professionals and from the need to diversify the network to reduce risks.

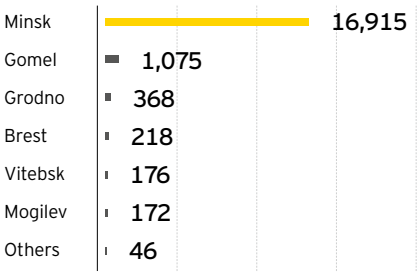
The majority of Belarusian companies are located in the capital (89.2%) and regional centers. Only seven offices of the respondents are located in smaller towns, with a 0.2% share of total employment.

Geography of HTP representative offices



Source: [2] – Results of EY's survey among Hi-Tech Park residents

Offices and staff in the Republic of Belarus



Source: [2] – Results of EY's survey among Hi-Tech Park residents

Map of sectoral industry competencies

We have compiled a map of Belarusian IT competencies based on analysis of the sectors and solutions.

The analysis of solutions shows that the industry is dominated by mobile and web design, with the Belarusian IT expertise being primarily focused on these segments. We should also note analytical systems, development support systems, project management systems, e-commerce and CRM systems.

The most prominent sector is banking and financial markets, with the highest level of competence concentrated on the development of universal solutions (e.g. mobile and web design), as well as specialized products such as financial management, analytics and payment systems.

We should also mention technological companies and related development competencies, e.g. software development tools and processes and project management tools.

Map of sectoral competencies of HTP companies

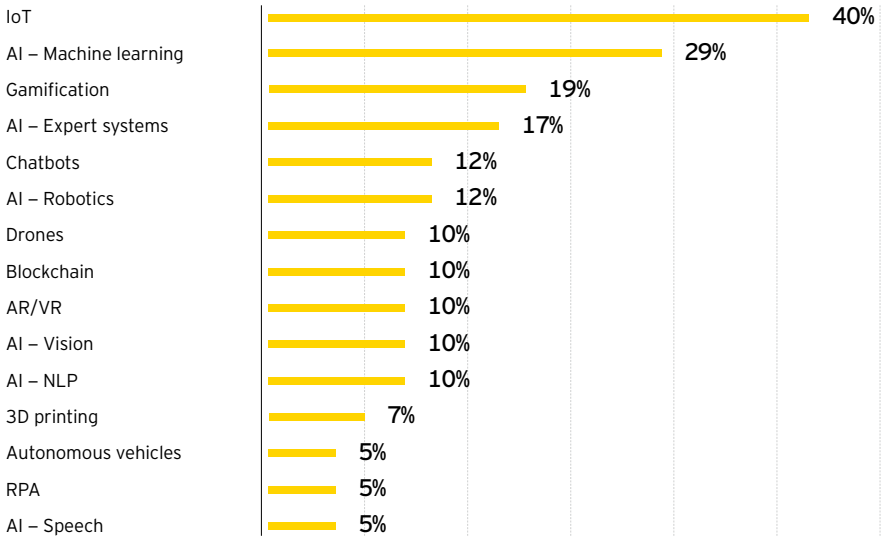
Source: [2] – Results of EY's survey among Hi-Tech Park residents

Based on analysis of new technologies, internet of things (40%), machine learning (29%) and gamification (19%) are the most common competencies for Belarusian companies.

Drivers of competitive performance

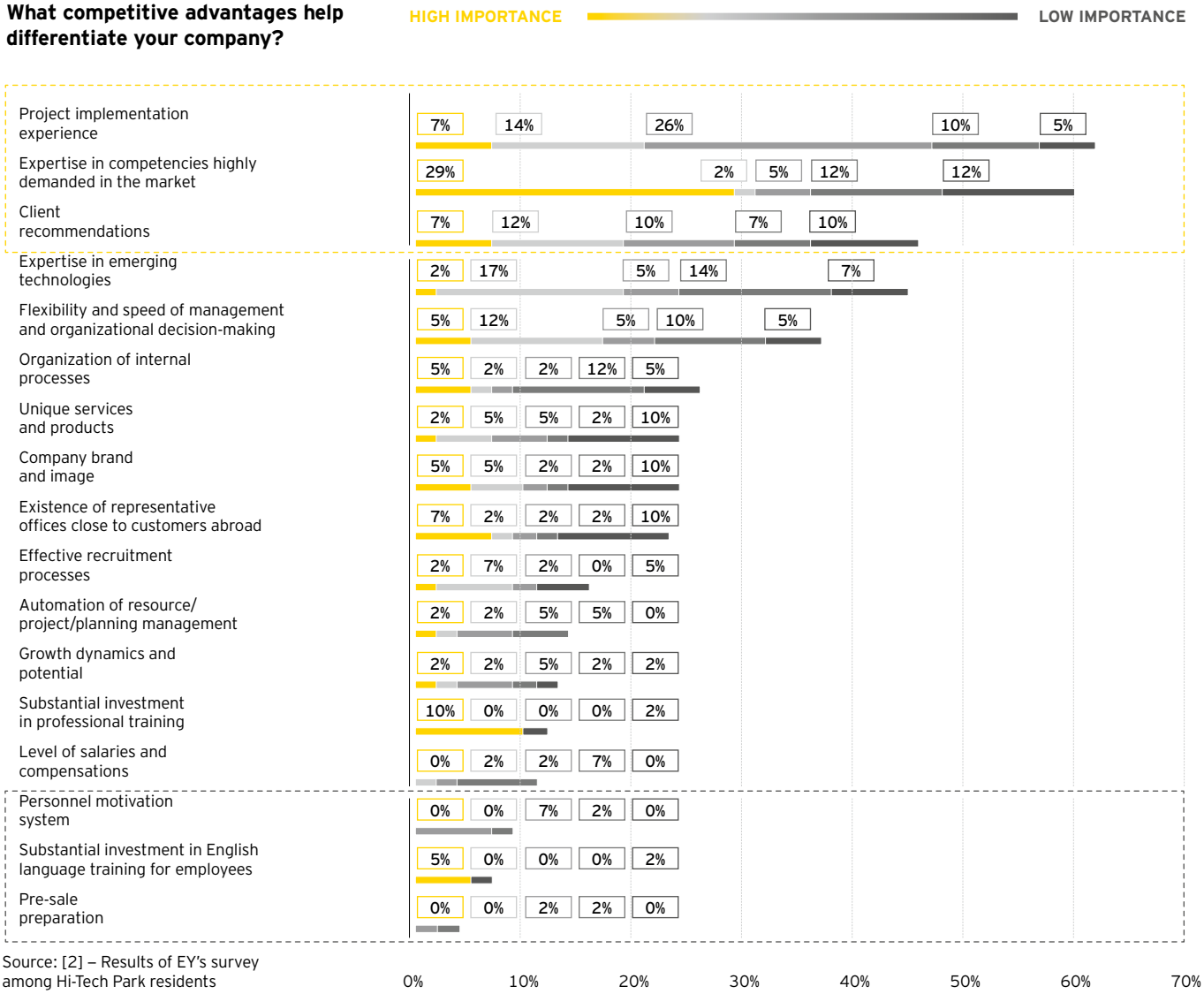
The respondents identified and prioritized factors that help Belarusian IT companies compete on the international IT outsourcing market. The most common drivers are measurable factors that help clients to assess commercial proposals. The survey results show that while the number of successful projects is the most important factor (62%), priority is still given to expertise in the most sought-after competencies (60%). Then come customer references and expertise in new technologies (45%).

Popularity of new technologies among Belarusian HTP companies



Source: [2] – Results of EY's survey among Hi-Tech Park residents

What competitive advantages help differentiate your company?

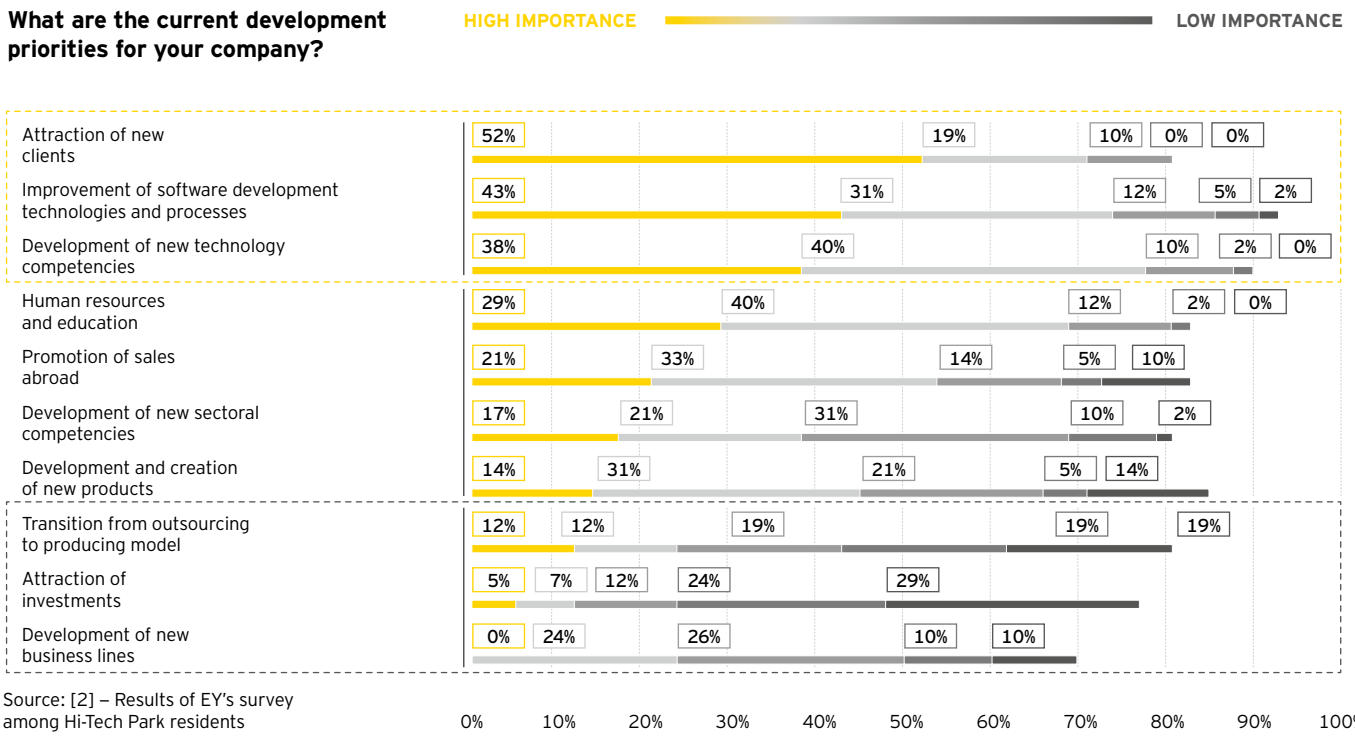


Source: [2] – Results of EY's survey among Hi-Tech Park residents

Development priorities

Key development priorities stem from the company' business profile and from the fact that most companies, including those outsourcing IT services, operate as development centers with their sales offices located abroad. Therefore, the most important development priority – attraction of new customers (52%) – is typical of outsourcing companies, while the next two – the improvement of software development technologies and processes (43%) and development of new technological competencies (38%) – are major functions of development centers. Business-related issues such as the development of new business lines and raising investment, as well as the transition from outsourcing to the product model, appeared to be the least popular answers.

What are the current development priorities for your company?

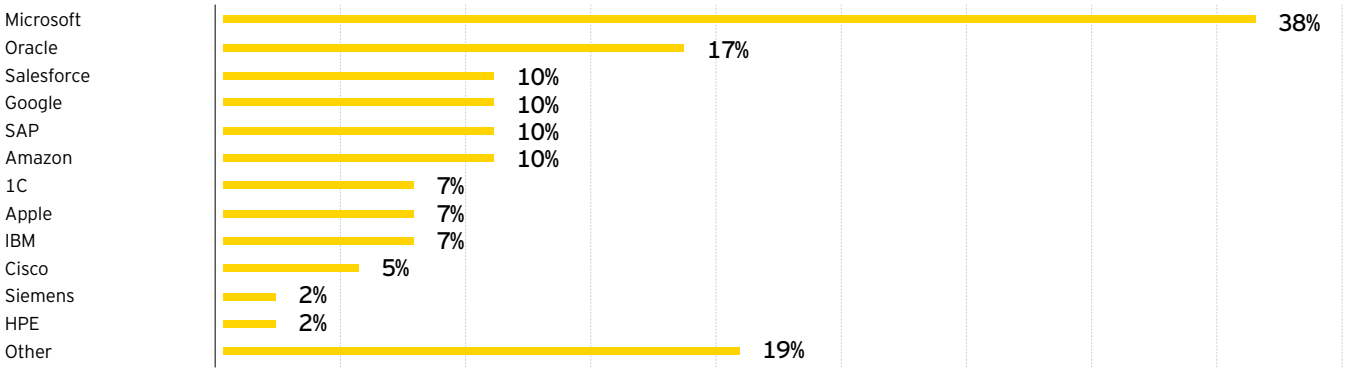


Source: [2] – Results of EY's survey among Hi-Tech Park residents

Partnerships with technological companies

Partnership with Microsoft enjoys the highest demand, with 38% of respondents having Gold or Silver partner status. Partnership relations are driven by the demand for technologies and solutions, in particular by the popularity of Microsoft, Oracle, Salesforce and SAP ERP/CRM solutions, Microsoft, Google and Amazon cloud solutions, and by the popularity of Microsoft and Oracle development tools. Partnerships with companies offering infrastructure solutions (HPE, Siemens, Cisco) are far less popular, since such services are outside HTP residents' portfolios.

Partnerships with technological companies

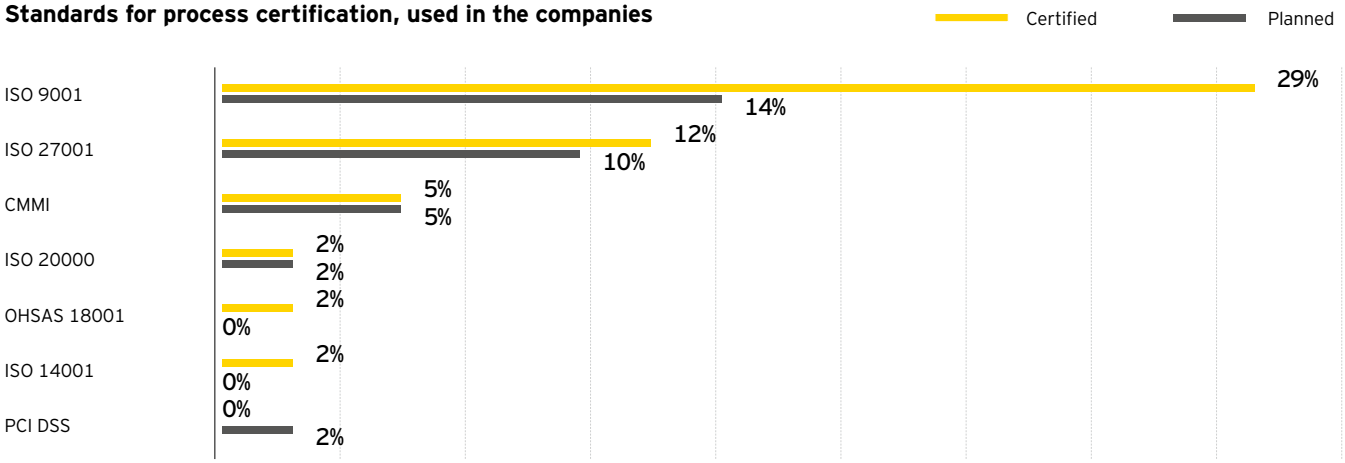


Source: [2] – Results of EY's survey among Hi-Tech Park residents

Certification

Certification or standardization of processes are not top priority for HTP residents. Only 29% of respondents have passed the most widespread ISO 9001 certification and 12% have passed ISO 27001 certification. Most companies are not certified and do not have any certification plans. According to sector experts, procurements or tenders would hardly ever have a certification requirement, so it gives no competitive advantages and is sought only by large companies from time to time.

Standards for process certification, used in the companies



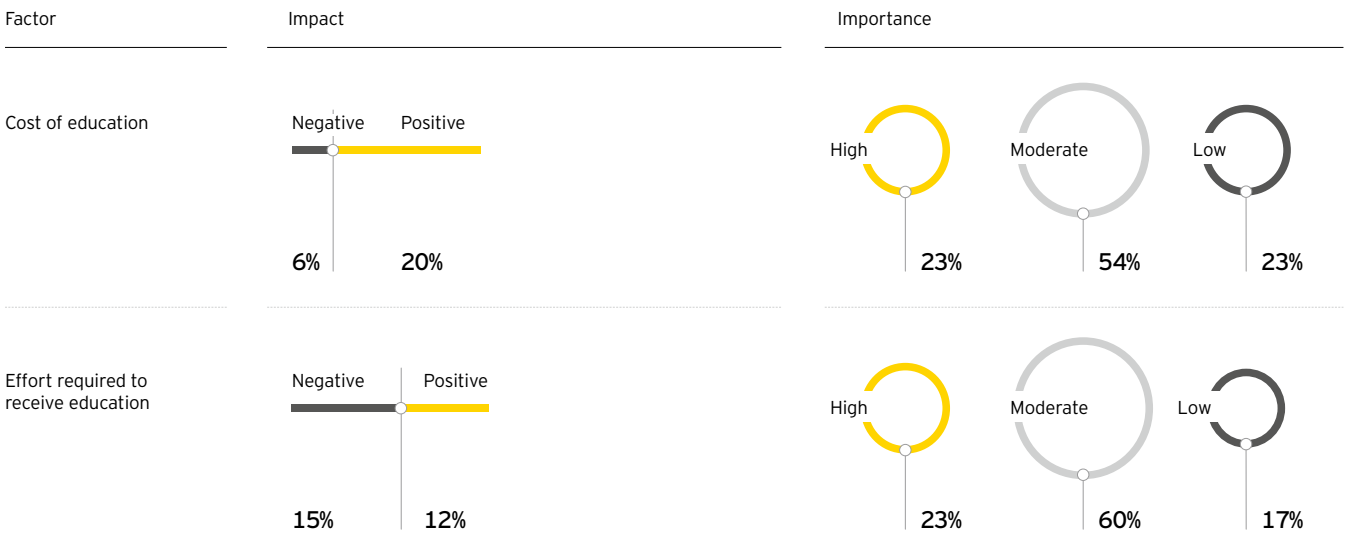
Source: [2] – Results of EY's survey among Hi-Tech Park residents

Personnel

According to the respondents, the most important factor in education is the level of technical competence (64% of companies accord a high priority to this issue). In general, the respondents note that qualitative and quantitative indicators of the educational system are of high priority for the sector, while the sophistication and cost of education are less but not the least important. At the same time, respondents believe that the quality of education produces a positive effect on the sector, while the number of students produces a negative effect.

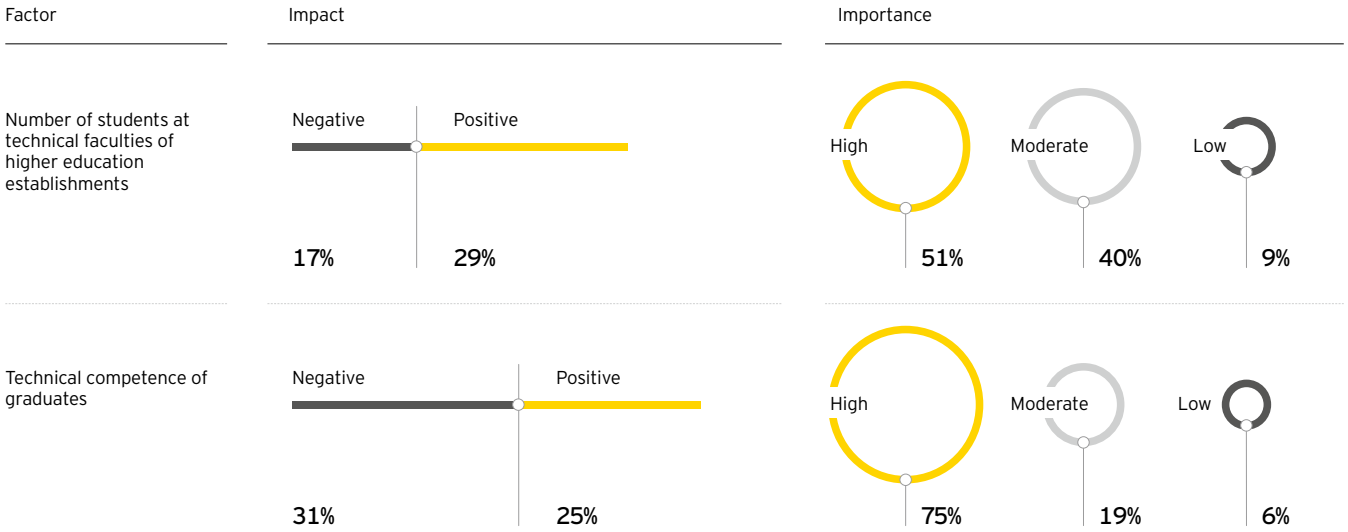
In general, companies expect the number of graduates, their competences and the relevance of their knowledge to improve in the near future.

Impact of education system on IT industry



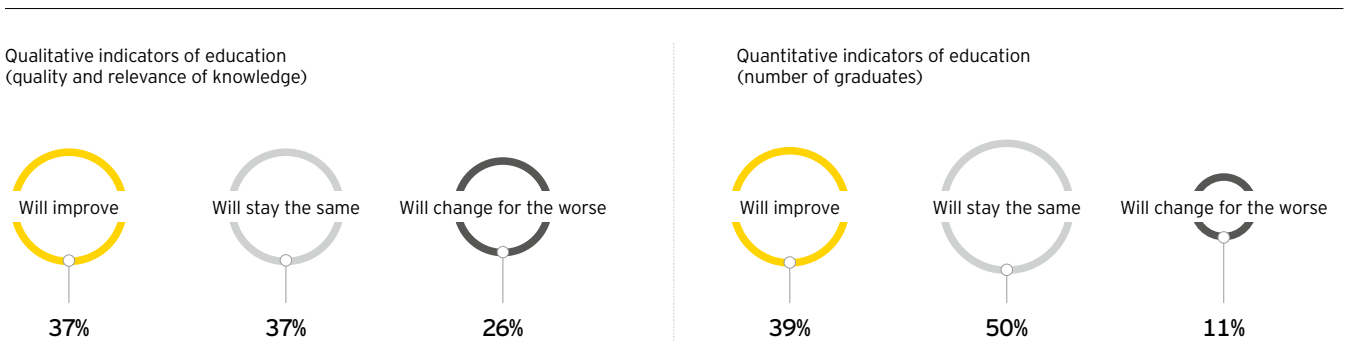
Source: [2] – Results of EY's survey of Hi-Tech Park residents

Impact of education on IT industry



Source: [2] – Results of EY's survey of Hi-Tech Park residents

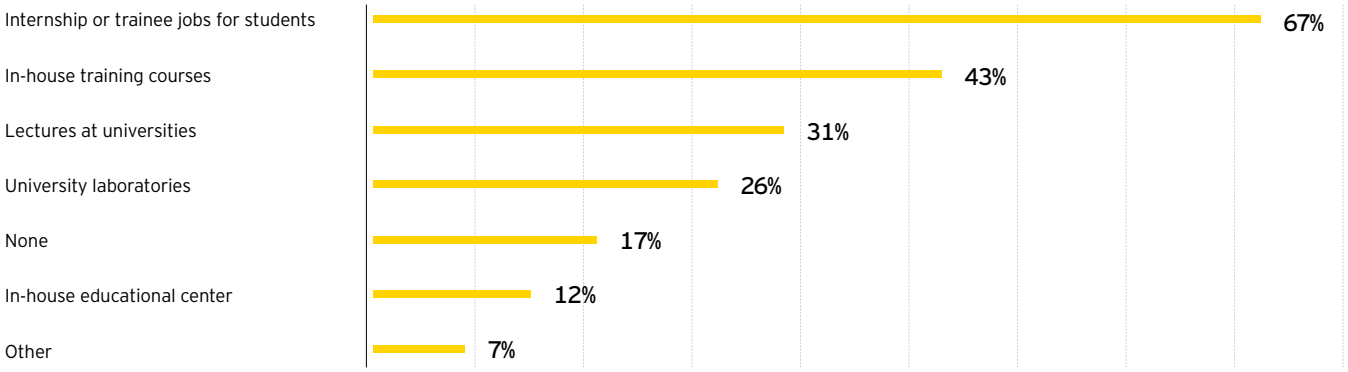
Impact of education system on development prospects for the IT industry



Source: [2] – Results of EY's survey among Hi-Tech Park residents

IT companies interact with educational institutions to improve competencies of their potential employees. Most of the surveyed IT companies (67%) offer internship or trainee jobs for students, 43% organize in-house training courses, and 31% send staff to lecture at universities.

Recruitment and training of new hires

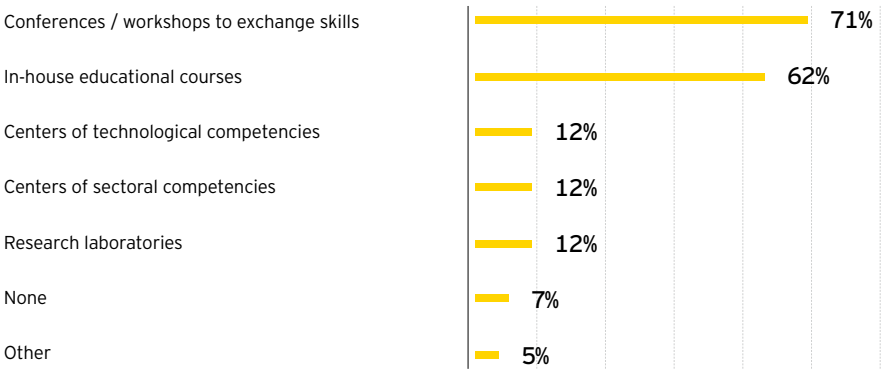


Source: [2] – Results of EY's survey among Hi-Tech Park residents

Companies invest in their personnel. Most respondents pursue professional development of their current personnel by sending them to conferences/ workshops (71%) and by organizing in-house educational courses (62%). Only 7% of the respondents do nothing in this respect.

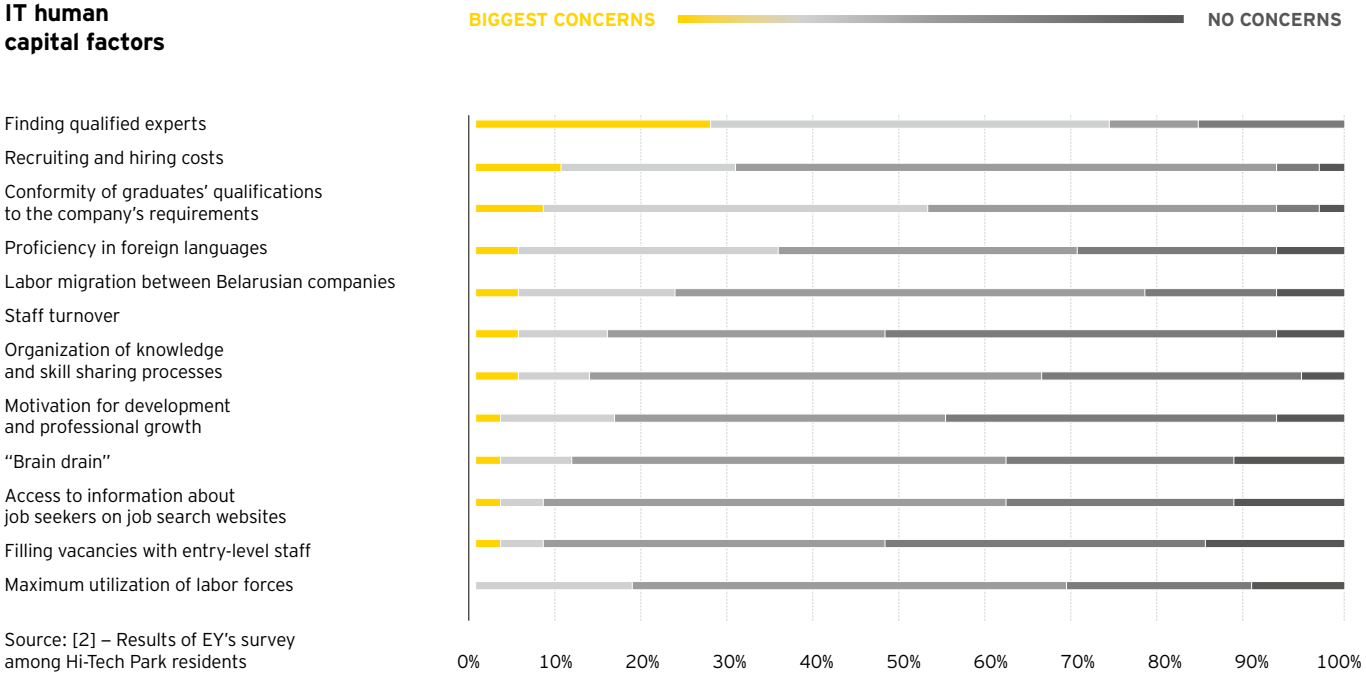
If we range various HR challenges by degree of complexity, finding qualified experts comes first, followed by associated recruiting and hiring costs and conformity of graduates' qualifications to the company's requirements. Knowledge of foreign languages is another issue, although less prominent. Job hopping between Belarusian companies appears to be more common than international emigration ("brain drain").

Professional development initiatives



Source: [2] – Results of EY's survey among Hi-Tech Park residents

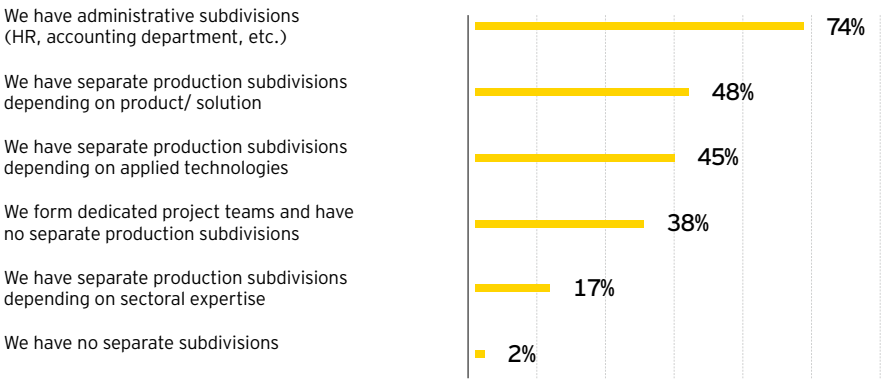
IT human capital factors



Source: [2] – Results of EY's survey among Hi-Tech Park residents

There are different approaches towards the organization of companies' internal structure. For example, 26% of companies do not have separate administrative subdivisions (HR, accounting department, etc.) and more than 50% of the companies do not establish separate departments by technology, product or solution.

Organizational structure of IT companies



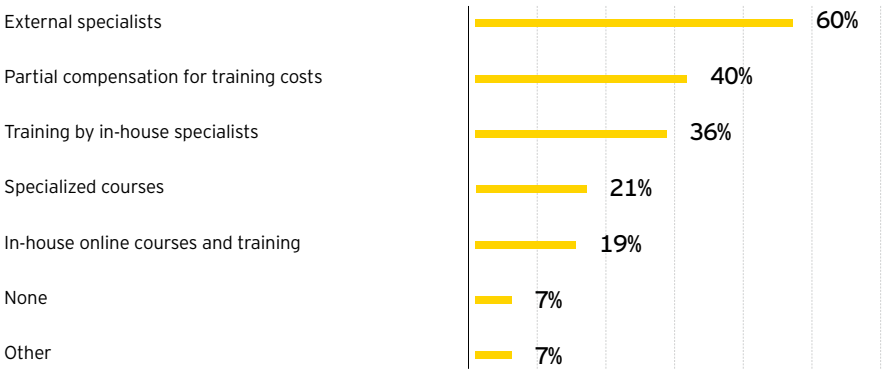
Source: [2] – Results of EY's survey among Hi-Tech Park residents

English language skills

Special attention in the IT industry is paid to improving English language skills. Less than half (48%) of the respondents stated that most of their employees have a good command of foreign languages.

IT companies are working hard to improve their staff's proficiency in foreign languages. Most respondents (60%) engage external teachers, while 40% provide partial compensation for training costs. In addition, IT companies organize online training or send their employees on specialized and in-house training courses.

Initiatives to improve proficiency in foreign languages



Source: [2] – Results of EY's survey among Hi-Tech Park residents

Business environment

The business environment and, in particular, the HTP special operating regime, are major success drivers for Belarusian IT companies. According to the survey, the most important and influential factors are current tax legislation and communication with the HTP Administration. More than half of respondents noted the great significance of non-fiscal regulations, which is generally assessed as positive (38% against 14%).

Factors such as frequent legislative amendments, inspections by the regulatory authorities, functioning of the judicial system and customs legislation have a mainly negative impact on operations, though their significance is lower.

Impact of business environment factors on operations

Source: [2] – Results of EY's survey among Hi-Tech Park residents

Impact of business environment factors on operations

Source: [2] – Results of EY's survey among Hi-Tech Park residents

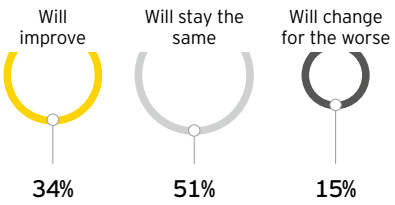
According to the surveyed companies, IT development prospects depend on existing and additional tax benefits, as well as the potential expansion of permitted activities. At the same time, more than 50% of respondents do not expect any improvements in tax benefits, versus 34% who do. 50% of respondents expect the list of permitted activities to be expanded, while 45% expect they will stay the same.

The activities of business unions representing IT industry interests, as well as the current infrastructure created to support and develop entrepreneurship, have a relatively low impact on IT companies' operations. Firstly, this results from the fact that a significant part of their functions is consolidated by the HTP Administration and, secondly, from the fact that these institutions are underdeveloped in the Republic of Belarus and business is not prone to rely on them.

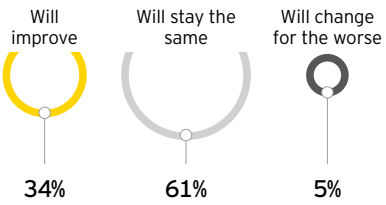
Prospective changes in the business environment

Expectation

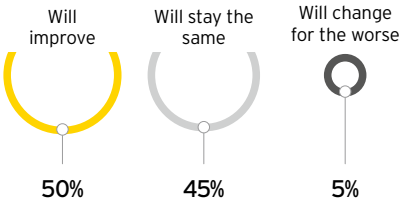
Existing tax benefits for IT companies



Additional tax benefits for IT companies

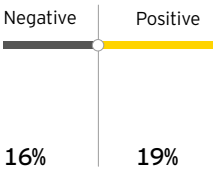
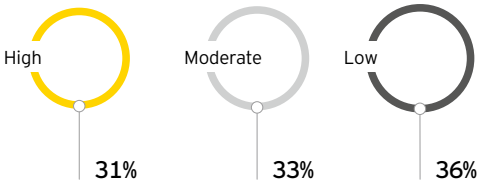
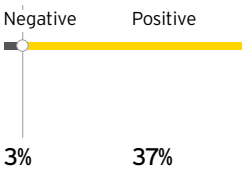
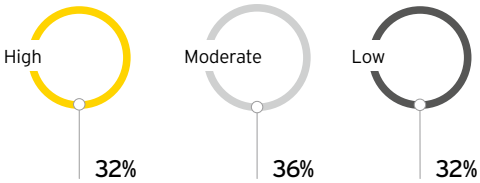


Changes in the HTP's activities



Source: [2] – Results of EY's survey among Hi-Tech Park residents

Impact of business unions and entrepreneurship support infrastructure

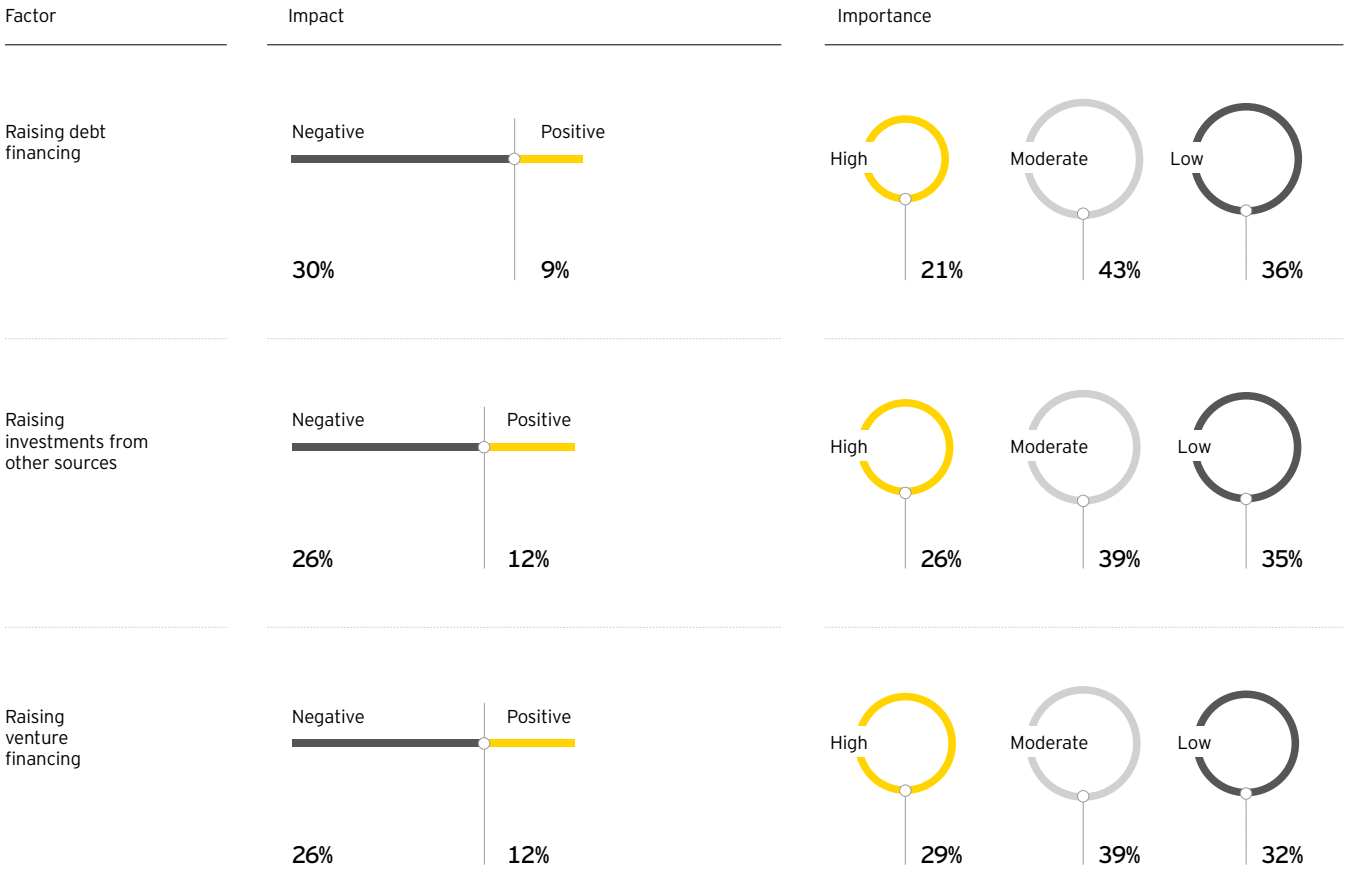
Factor	Impact	Importance
Activities of business unions representing IT sector interests		
Current status of the infrastructure created to support and develop entrepreneurship		

Source: [2] – Results of EY's survey among Hi-Tech Park residents

Raising finance

Most HTP companies believe that finance and investments are not currently of great significance for their operations. This is partially attributable to the prevalence of service companies over product companies that need financing in a large measure. According to sector experts, most Belarusian IT companies choose organic growth through own funds instead of debt financing or investment. At the same time, respondents note that financing issues have a negative impact on their operations, resulting from high costs and limited availability of borrowings in the Republic of Belarus due to the lack of available assets for collateral required by banks. Belarus does not have the infrastructure or legal framework to enable companies to attract venture financing.

Raising finance



Source: [2] – Results of EY's survey among Hi-Tech Park residents

SOURCES

[1] Information provided by the Hi-Tech Park Administration

[2] Results of EY's survey among Hi-Tech Park residents

DEVELOPMENT CENTERS OPENED BY INTERNATIONAL COMPANIES IN THE REPUBLIC OF BELARUS

Summary

Drawn by the qualification level, low cost and availability of technical staff in Belarus, some international technology companies have established development centers (R&D and captive centers) in Belarus. These entities have staff ranging from several dozen to several thousand employees. This example of successful investment in the Republic of Belarus is proof of the advantages that Belarus offers to IT companies. Forty-eight percent of respondents to a survey of Hi-Tech Park residents described their business as "product development and support for their company's internal needs (development center)," and 19% indicated "Research & Development."

Companies are drawn to Belarus by the high quality of human resources and the preferential and comfortable conditions afforded by the special Hi-Tech Park regime. Captive centers of companies that develop their own products generally offer a higher level of pay than companies providing IT services, thus enhancing their competitive advantage as employers. This section provides a partial list of such companies with brief descriptions of their activities in Belarus.

Playtika Bel

Employees: 1,500
Employees in Belarus: 230
Technology staff in Belarus: 200
HQ: Herzliya, Israel
Owner: Giant Interactive, China

Playtika has offices in Israel, Canada, the US, Belarus, Argentina, Japan, the Ukraine and Romania. The company's entertainment and social apps are designed for casual and midcore audiences and short play sessions. The company's most popular apps are Slotomania, Bingo Blitz and Caesars Casino

EPAM Systems

Employees: 22,000
Employees in Belarus: 8,000
Technology staff in Belarus: 6,000
HQ: Newtown, Pennsylvania, USA
Owner: EPAM Systems Inc.

The EPAM Systems development center is the largest Hi-Tech Park resident and Belarus's largest company in the IT products and services segment. The company was founded in the US by Belarus natives, and the main development center was established in Belarus.

EPAM is notable for its achievements in the financial sector and works with five of the ten largest investment banks and three of the five leading global banks as well as many management institutions, exchanges and brokerages, market data providers, and insurance and technology providers. The company provides agile digital banking transformation, including wealth management application development, service design and delivery, testing and automation, security and assurance, mobile strategy consulting, and user experience services.

Viber Media

Employees: 325
Employees in Belarus: 126
Technology staff in Belarus: 116
HQ: Luxembourg
Owner: Rakuten, Japan

Viber Media is an international company that develops its own free instant messaging and VoIP telephony services. The company was purchased by Rakuten in February 2014. The company's headquarters are in Luxembourg, with development centers in Minsk, Brest and Tel Aviv.

The Minsk development center is responsible for the client parts of an application for iPhone, Android and Windows Phone as well as for the development of a desktop version and billing and sticker-market web development.

Fitbit

Employees: 1,900
Employees in Belarus: 60
Technology staff in Belarus: 45
HQ: San Francisco, CA, USA
Owner: Fitbit, USA

Fitbit is an international company that develops wearable devices and accessories for fitness along with related software. The Fitbit Minsk team has primary end-to-end responsibility for the Fitbit Corporate Wellness product.

Fitbit Corporate Wellness uses the power of market-leading activity trackers and technology to get employees moving and make wellness programs more effective. The solution provides turnkey, easy-to-use software and services to help organizations drive engaging programs that motivate employees and make a bottom-line impact. Fitbit Corporate Wellness works with top-performing organizations across various verticals, including over 50 of the Fortune 500.

Ciklum

Employees: 2,500
Employees in Belarus: 154
Technology staff in Belarus: 140
HQ: Kyiv, Ukraine
Owner: Ciklum Inc.

Ciklum is an international company founded in 2002 that specializes in outsourced software development. The company has clients in Scandinavia, Western Europe, the US and Israel. Sales offices have been opened in Denmark, Sweden, the UK, Germany, Switzerland, the Netherlands, the US and Israel, and development centers have been opened in major cities in Ukraine (Kyiv, Kharkiv, Dnipropetrovsk, Odessa, Lviv and Vinnytsia), Belarus (Minsk), Poland (Wroclaw and Gdansk), Spain (Malaga) and Pakistan (Lahore, Islamabad). The company has over 2,500 developers working in various programming languages (Java, .Net, PHP, Mobile, C++, etc.) as part of over 200 teams.

Game Stream (Wargaming)

Employees: 4,000
Employees in Belarus: 2,100
Technology staff in Belarus: 2,000
HQ: Nicosia, Cyprus
Owner: Wargaming Public Co. Limited, Cyprus

Wargaming is an international game developer that originated in Belarus and now has its head office in Nicosia, with development centers in Minsk (Game Stream), Kyiv, St. Petersburg, Seattle, Chicago, Baltimore and Sydney. Game Stream is Wargaming's largest development center and the second largest Hi-Tech Park resident after EPAM.

Wargaming.net has gained worldwide recognition due to the success of its multiplayer online game World of Tanks, which has attracted millions of players all over the world. It has won several major game awards and is one of the five most profitable MMO games in the world with more than 140 million registered users.

YandexBel

Employees: 6,000
Employees in Belarus: 150
Technology staff in Belarus: 135
HQ: Moscow, Russian Federation
Owner: Yandex, Russian Federation

Yandex is a leading internet company in Russia, operating the most popular search engine and other Internet-related services and products.

Employees in the Minsk office work on products for Belarus and all other countries in which Yandex has a presence. They are involved in creating, developing and testing Yandex Search and Yandex.Browser for computers and mobile devices, Yandex.Maps, Yandex.Mail, Yandex.Metrica for applications, and the mobile Music and Store apps. Developers in the Minsk office use iOS and Android as well as JavaScript, C++, Python and Java.

Apalon Apps

Employees: 5,800
Employees in Belarus: 150
Technology staff in Belarus: 100
HQ: New York, USA
Owner: IAC, USA

The company was founded in 2007 and originally specialized in the development of games and web applications. Following the appearance of the iPhone and the App Store in 2008, the team concentrated on the development of iOS apps. The launch of Google Play, the Amazon Appstore and Samsung Apps opened up new markets for the company.

Apalon's portfolio includes worldwide best-selling apps such as Pimp Your Screen, Weather Live, Notepad+, Emoji Keypad, My Alarm Clock, and others.

IHS Markit

Employees: 13,000
Employees in Belarus: 100
Technology staff in Belarus: 90
HQ: London, UK
Owner: IHS Markit, UK

IHS Markit provides information and analysis for decision-making in various areas of the economy. For 15 years the Minsk Development Center has been responsible for developing the company's own Goldfire and IHS Connect products.

The Minsk team's latest project is based on a new data-retrieval model, analytics and semantic search powered by Big Data that will link over 7.2 million engineers around the globe.

NetCrackerBel

Employees: 5,000
Employees in Belarus: 140
Technology staff in Belarus: 110
HQ: Waltham, Massachusetts, USA
Owner: NetCracker Technology, USA

NetCracker Technology is a world-leading creator and implementer of integrated BSS/OSS solutions for telecom providers and major companies and state institutions, founded in 1993. NetCracker Technology has offices and representation in 34 countries of the world and development centers in Russia, Ukraine, the UK, India, the US and Israel.

The company uses Java, HTML, GWT, jquery, Windows, Unix, SQL, Oracle, etc. It has CMMI level-5 certification.

MSQRD

Employees: 38
Employees in Belarus: 11
HQ: London, UK
Owner: Facebook, USA

Masquerade, Inc. develops its own graphic information processing products. These include Masquerade Face Tracking and 3D Effects Rendering SDK, the MSQRD (Mask) mobile application, Masquerade Editor and a catalog of effects. The MSQRD app allows animated masks to be laid over users' faces in real time. The development center is in Minsk. The company was founded in 2015 in Minsk and was purchased by Facebook in March 2016.

SOURCES

This section is based primarily on the information about the companies from their own web-sites, companies' description from http://companies.dev.by/ and HTP information http://www.park.by/it/enterprises/type-search/

Gameloft

Employees: 5,000
Employees in Belarus: 50
Technology staff in Belarus: 45
HQ: Paris, France
Owner: Gameloft, France

Gameloft in Minsk is a production studio that uses iOS and Android for development in close collaboration with the international team. As of today, the studio is also working on virtual reality technologies and Apple TV.

Juno

Employees: 200
Employees in Belarus: 95
Technology staff in Belarus: 90
HQ: New York, USA
Owner: Juno Inc.

Juno is a US startup company founded by the creators of Viber VoIP messenger, Igor Magazinik and Talmon Marco. The development center, established in 2015 in Minsk, develops the company's core product: a new online taxi service. In June 2015, it became a Hi-Tech Park resident.

Workfusion

Employees: 100
Employees in Belarus: 70
HQ: New York, USA
Owner: WorkFusion, Inc.

WorkFusion develops software for robotics process automation and data processing, making use of artificial intelligence. The company specializes in developing products that make use of crowdsourcing and machine learning to help corporations automate the mechanical labor of office employees. WorkFusion's offices are in the US, Europe and India. The Company was founded in December 2010.

RECENT LANDMARK TRANSACTIONS AND EVENTS

Belarus has not yet gained a reputation as a hotbed for startups, however, high profile transactions involving Belarusian startups have taken place almost every year over the past 5-6 years. Examples include Viber, Maps.me, MSQRD, and Juno. Successful Belarusian startups are usually taken over by foreign companies but carry on with their development projects in Belarus, thus becoming captive centers.

MSQRD (Masquerade)

Founders: Eugene Nevgen, Sergey Gonchar, Eugene Zatepyakin

Masquerade is a startup that was set up in Minsk and became globally recognized for its mobile app that allows users to change their appearance during video-chats in real time by creating animated masks and laying them over human faces.

Idea

"We believe that video chats are the future of social networking. However, unlike text messaging, where smileys and stickers are common, video chatting lacks options for expressing positive emotions. It is the gap we tried to address," says Masquerade co-founder Eugene Nevgen [1].

Brief history

2010 – Eugene Nevgen and his team start developing face tracking technology [2].

27-29 November 2015 – The team took part in the GARAGE48 MINSK 2015 Hackathon, where it developed the app within 48 hours.

17 December 2015 – The first version of the app was available for iOS.

22 December 2015 – MSQRD was for the first time included in the top 50 apps on the App Store in Belarus. The same day, the app was featured on Product Hunt, the popular aggregation site for startups, where it received many five-star reviews.

8-22 January 2016 – The number of MSQRD users reached one million. It was among the most popular apps on the App Store in Russia, Belarus, Kazakhstan, and other countries.

26 February 2016 – The app raised over one million US dollars as seed funding, while its value was estimated at 'dozens of millions' of US dollars, according to the founders. No details of the transaction or the private investor were disclosed.

28 February 2016 – The app had 10 million downloads globally.

Transaction

A week after the first release, the MSQRD team was contacted by the major IT companies from the US, Asia and Russia. The higher the app's ranking on the App Store, the more companies became interested in it.

9 March 2016 – it was announced that the Belarusian startup was acquired by IT giant Facebook. The transaction amount was not disclosed. A similar project – the Looksery startup founded in Odessa – was purchased for USD 150 million by Snapchat in 2015 [3]. Experts believe that the acquisition of MSQRD will help Facebook to compete with Snapchat in this area.

MSQRD developers Eugene Nevgen and Sergey Gonchar were included by Forbes in the list of 30 Under 30 Most Brilliant Young Entrepreneurs. At the end of 2016, MSQRD was one of the Best Apps of the Year on Google Play and App Store [4].

Plans for the future

MSQRD will continue as a separate product. The team is enhancing the app by adding new masks and functions. Facebook acquired the entire company: the product, roadmap, technology and team. The technology has been integrated into core Facebook products and is available to billions of users. The team's main product – SDK – is a program package that integrates video filters into any mobile app for video chats, live streaming, or photo and video processing. The team is developing tools with which any person or company can create their own mask [5].

Viber Media

Founders: Talmon Marco, Igor Magazinnik

Viber Media is an international company that became famous for its cross-platform instant messaging and voice over IP (VoIP) application.

Idea

To create a high-quality communication app that people from across the globe will use to connect with anyone.

Brief history

2 December 2010 – The first version of Viber was launched for iOS. By the end of the first day, the app had gained 18,000 users.

December 2011 – 40 million users.

July 2012 – The Android version was released.

2012 – Release of Viber for WinPhone 7; 125 million users, 2 billion messages and 1.5 billion minutes of conversation; the company became a resident of the Hi-Tech Park.

2013 – Release of Viber for WinPhone, Viber Desktop for Windows and OS X, Android tablet; launch of the Viber OUT feature.

December 2013 – 280 million users, with 700,000 new users signing up every day.

January 2014 – Viber version for Windows 8 metro.

February 2014 – Acquisition of Viber by Japanese company Rakuten.

November 2014 – Launch of Public Chats.

December 2014 – Almost 495 million users in 193 countries worldwide.

December 2015 – Launch of the Viber WINK feature, 711 million users.

February 2016 – Launch of Viber Wallet [6]

Transaction

In February 2014, major Japanese retailer Rakuten reached an agreement to acquire Viber for USD 900 million. The acquisition of Viber was consistent with Rakuten's strategy to diversify its offering of digital services via its e-commerce site [7].

Hiroshi Mikitani, Rakuten's Chairman and CEO, noted when commenting on the deal that Viber still had "a huge potential as a gaming platform". The app's development continues in the captive center in Belarus.

Plans for the future

As a product, Viber is planning to develop the Public Chats social space that celebrities and companies can use to connect to a wider audience. The second development area is to turn the app into a stable and small-size tool that can be easily enhanced with new functionality but does not consume lots of computer resources and traffic. Still another area for development is to make it open for other apps and release an open SDK, that is, turn the app into an open social platform [6].

Juno

Founders: Talmon Marco, Igor Magazinnik

Idea

To create an ethical, socially responsible ride-sharing service that treats drivers right.

Brief history

2015 – The company was founded, with an office in Belarus.

May 2016 – The online taxi service Juno was launched in New York City in test mode.

February 2017 – Juno has grown to 28,500 rides a day.

Summer 2016 – The startup raised Series A investment from the venture fund Empire Angels, of nearly USD 30 million according to TechCrunch [8].

April 2017 – The acquisition of Juno by global online taxi service Gett for USD 200 million was announced [9].

Transaction

TechCrunch experts believe that, by joining forces, Gett and Juno can compete with Lyft for the second position on the ride-on-demand market, primarily in New York City and then across the US; Uber operating in 579 cities and having estimated capitalization of over USD 60 billion will remain number one.

Gett was founded in Israel and is now operating in more than 100 cities worldwide, including London, Moscow, and New York City. Its on-demand business mobility solution, Gett for Business, is used by more than 6,000 corporations. Gett has raised USD 640 million in venture financing, including USD 300 million from Volkswagen Group, and was ranked by Forbes among the 15 Fastest Growing Companies [8].

The deal covers all of Juno's existing business, from its network of licensed drivers through to its employees and founding team of Talmon Marco, Igor Magazinnik, Ofer Samocha, and Sunny Marueli. The four of them will remain based in New York to lead the combined companies' operations in the US, which for now are in New York City only. Juno is planning to expand to other markets to complement Gett's footprint in Europe covering 100 cities [9].

Apalon Apps

Founders: Peter Skoromnyi, Matvey Timoshenko

Apalon Apps is a leading developer of mobile applications and is now part of the global media and Internet company IAC (NASDAQ: IAC).

Idea

"We are not trying to form people's needs or force new needs upon people – we just make their day slightly better, every day" (Peter Skoromnyi) [10].

Brief history

2007 – The company was founded on the basis of a small Internet company MoveYourWeb.

By 2014, the company had released a number of applications that made it successful and determined its development as a product company. The best known products include Pimp Your Screen, Weather Live, My Alarm Clock, Calculator Pro for iPad, and many others. The company is the 8th worldwide publisher by iOS app downloads according to the App Annie index, after Google, Facebook, Microsoft, Baidu, Apple, and Alibaba group.

November 2014 – Apalon was acquired by US-based media and Internet company IAC, with the subsequent establishment of Apalon Apps [6].

Transaction

According to the co-founder Peter Skoromnyi, their original intention was not to sell the business. By 2014, the company had passed a number of milestones in its development, and the merger with IAC was the step that took it to the next level. The transaction amount was not disclosed.

The deal gave Apalon access to the leading experts interested in developing the company and promoting its digital products. Mindspark Interactive Network, an operating business of IAC, has large experience promoting digital products.

Plans for the future

No dramatic changes are expected in Apalon Apps's operations. The company's priority remains to develop rather than change. Matvey Timoshenko and Peter Skoromnyi will continue as leaders of Apalon's operations; new additions to the product portfolio are expected [10] [14].

EPAM Systems

Founders: Arkadiy Dobkin, Leo Lozner

EPAM Systems – a leading global software services company – was founded by Belarus natives. Currently, the company employs more than 22,000 and has grown by over ten times since 2006, showing a CAGR (compound annual growth rate) of 30% since its foundation.

Idea

"To build a large multinational company and compete on the global market. Probably, we just wanted to prove to everybody that we can do serious work." Arkadiy Dobkin [6].

Brief history

1993 – EPAM was registered in Princeton, New Jersey, with a captive center in Belarus.

2004 – EPAM acquired a Hungarian company Fathom Technology.

September 2006 – EPAM merged with VDI, a software outsourcing vendor based in Russia; the combined company started operating under the EPAM Systems name and employed over 2,200 software professionals [11].

8 February 2012 – EPAM Systems was the first company from Belarus [12] to be listed on the New York Stock Exchange (NYSE). This was the first IPO that came from the outsourcing industry in Eastern Europe [13].

Starting 2012, the company experienced a period of aggressive growth, taking over technology companies across the globe, in the USA, Canada, the UK, and other countries (Thoughtcorp, Empathy Lab, Netsoft USA, Jointech, GGA Software Services, Great Fridays, NavigationArts, Alliance Global Services, Dextrys) [11].

2016 – EPAM's revenue in 2016 exceeded USD 1 billion [16].

As of 15 May 2017, the company has market capitalization of USD 4.18 billion, or USD 80.91 per share, amounting to a 5.8 times increase in its share price since the IPO [16].

Plans for the future

According to Arkadiy Dobkin, EPAM is looking to become a company that delivers best-in-class IT and software engineering solutions combined with innovative strategy, consulting and design capabilities. EPAM has adopted a global growth strategy that is based on several principles: think and act as a startup; work in multidisciplinary teams; achieve specific results [17].

When speaking about market trends, Arkadiy Dobkin points out that different market segments are now starting to overlap. Their key players become competitors in completely new areas. Google, Facebook, Microsoft, Apple, and Amazon keep competing with each other and, at the same time, they are competing with banks, retail chains, and media/information companies. EPAM can respond to these market developments by bringing together 'hybrid teams' and providing sophisticated 'hybrid' solutions. The company has achieved this advantage as a result of new competencies and diverse experience it gained from customers, and can now benefit from the synergy of expertise in various technologies and sectors [6].

Viaden Media

Founders: Victor Prokopenya

Viaden Media is a software developer, one of the major CIS developers of custom written applications for the iPhone and iPad.

Brief history

2001 – Viaden Media is established as an outsourced software product developer.

2006 – The company changes its focus and starts releasing in-house software products for the online entertainment sector.

2007 – The company becomes a resident of the Hi-Tech Park.

2009 – New business line Viaden Mobile is established to develop mobile applications for the new iOS and later for Android. Co-shareholder Yuriy Gursky takes the lead in the subdivision.

2011 – The company is sold to Israeli entrepreneur Teddy Sagi.

Transaction

By 2011, the company had become a major CIS developer of mobile software, with particularly strong positions in the online gaming and health tracking segments. In-house products include applications such as All-in Fitness, Texas Holdem Poker Free, etc.

In 2011-2012, the company was sold to Israeli entrepreneur Teddy Sagi, the founder of gambling software development company Playtech. According to press reports, Viaden Media was valued at EUR 95 million.

Despite the change in ownership, the company maintained its captive center in Minsk. Subsequently, Viaden Media was split into two companies: Sport.com, a major developer of fitness applications and the owner of the sport.com and yoga.com websites, and Skywind Group, specializing in mobile and social games. The founder Victor Prokopenya has focused on new projects, including his new company exp(capital), which develops solutions for algo trading in financial instruments, and other projects [18].

MAPS.ME

Founder: Yuriy Melnichek

Idea

Develop offline maps able to compete with online services such as Google Maps.

Brief history

2010 – MapsWithMe is established in Zurich with a captive center in Minsk.

April 2011 – The first application version is released for iOS.

February 2012 – MapsWithMe appears in the Android application store.

July 2014 – The company name is changed to MAPS.ME.

November 2014 – MAPS.ME. is purchased by Mail.Ru Group.

September 2015 – A pedestrian route-mapping feature is added followed by a new map design for iOS and Android. The Company opens the source code.

April 2016 – OpenStreetMap becomes accessible for editing by users whose number exceeds 40 million [19].

Transaction

The Company considered selling the application to Yandex or Google. However, they chose Mail.ru Group as the Holding intended to continue developing the service and to maintain the startup's autonomy within its structure. The transaction was closed in November 2014.

Plans for the future

According to Yuriy Melnichek, MAPS.ME is working to personalize maps. Generally, there are far more points of interest than those shown on the map, and each time the user has to select which points to show / hide. Personalization suggests that the selection will be made not merely based on the points' significance but also based on users' preferences: e.g., priority will be given to places already visited.

Yuriy Melnichek selected AI technologies for the mobile segment as a new business line. Recent research demonstrates the considerable progress of AI technologies in the scientific community, however, there are still very few AI products that can be used in everyday life. Yuriy Melnichek's team is now working to integrate the most recent AI and computer vision developments into mobile applications. They are set to develop mobile applications based on neural networks. The team is looking for a method to launch neural networks on smartphones to edit video content in real time. In 2016, the team proceeded to creating a prototype [20].

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BELARUS IN INTERNATIONAL IT RANKINGS

Since 2006, Belarusian IT companies have regularly appeared in the internationally recognized Global Outsourcing 100 and Software 500 lists.

The growth of the IT industry in 2006-16 can be judged from the number of companies with captive centers in Belarus and by their changing positions in the lists.

Belarus also occupies a rather favorable position in Everest Group's MAP (Maturity, Arbitrage, Potential) Matrix™ for IT Applications, which contains comparative analysis of different cities as places for global IT in-house or captive centers.

Global Outsourcing 100

The International Association of Outsourcing Professionals (IAOP) conducts the following annual studies to assist companies with outsourcing solutions:

1. The Global Outsourcing 100, a list of the world's best outsourcing service providers, has been published since 2006
2. The World's Best Outsourcing Advisors, a list of the best outsourcing advisors and experts, has been published since 2009

These lists include companies of varying sizes from different countries and sectors of the outsourcing industry – for example, outsourcing of information technologies, business processes, infrastructure services, real estate, design, testing, manufacturing and logistics. Membership in the IAOP is not a prerequisite and is not taken into consideration in compiling the final lists.

The Global Outsourcing 100 list includes highly recognized transnational firms, known as "leaders," as well as fast-growing firms with an annual turnover of less than USD 50 million and/or a staff of less than 5,000, known as "rising stars." The listing process begins with the identification of leaders and rising stars, after which companies are evaluated in other categories [1].

The expert evaluation is based on a methodology that includes an independent assessment by a committee of association clients with extensive experience in selecting outsourcing service providers and advisors for their organizations.

Belarusian and foreign companies that have captive centers in Belarus appear on the list every year.

Changes in the lists show that the Belarusian IT industry began an upward trend in 2006, with the number of companies included in the lists and the number of leaders among them both increasing.

For the 2006 listing, companies were evaluated based on the following criteria: general information on the service provider, data on the company's clients, the company's level of competence and its management capabilities.

The study ultimately included over 1,000 service providers in the areas of IT, HR and business-process outsourcing around the world. Two Hi-Tech Park residents were in the top 100. The IBA Group (59th place) was listed as a leader, and EPAM (79th place) was among the rising stars. The list included a total of 65 leaders and 35 rising stars [2].

The 2011 listees demonstrated achievements in areas such as company size and growth rate, global presence, industry awards and successes, certifications, client references, HR management, leaders' successes and outsourcing experience.

Six Hi-Tech Park residents were listed in 2011 – two (EPAM and IBA Group) in the category of leaders and four (Intetics, Itransition, Artezio, and Ericpol Telecom) in the category of rising stars [3].

In 2016 and 2017, companies were judged on five criteria: size and growth, customer references, awards and certifications, programs for innovation, and corporate social responsibility.

Six Hi-Tech Park residents were listed in 2016: Bell Integrator, EPAM Systems, IBA Group, Ciklum, Intetics and Itransition [4]. The number of leaders increased to 4 (Bell Integrator, EPAM Systems, IBA Group and Ciklum) [5].

The same Belarusian companies were listed in 2017. Categories and positions were not assigned.

Software 500

Software Magazine is an international high-tech publication, owned and published by Rockport Custom Publishing in Beverly, Massachusetts, USA [9]. The first Software 500 list was published in 2003.

Belarusian IT Companies in Global Outsourcing 100

Company, year	2017	2016	2011	2006
Bell Integrator	+	Leader		
EPAM Systems	+	Leader	57 Leader	79 Rising star
IBA Group	+	Leader	59 Leader	59 Leader
Ciklum	+	Leader		
Intetics	+	Rising star	76 Rising star	
Itransition	+	Rising star	92 Rising star	
Artezio			94 Rising star	
Ericpol Telecom			95 Rising star	

Source: [5, 6, 7, 8]

Ranking and income of Belarusian Hi-Tech Park residents in the Software 500

	2016		2011		2006	
	Position	Income, USD million	Position	Income, USD million	Position	Income, USD million
IHS Inc.	63	2,184.34	74	898.00	–	–
EPAM Systems	107	904.70	181	222.00	272	40.00
Bell Integrator	213	234.25	–	–	–	–
IBA Group	281	110.85	278	76.00	–	–
Itransition	368	40.30	398	17.00	472	3.5
Coherent Solutions	393	25.32	–	–	–	–
SoftClub Ltd.	409	18.80	447	10.00	–	–
Artezio	416	15.80	462	8.00	–	–
Intetics Co.	419	14.15	465	8.00	–	–
Oxagile	456	6.80	–	–	–	–
Ericpol Telecom	–	–	310	51.00	–	–

Source: [10] Software 500

The list is based on a voluntary survey of companies and doesn't cover all IT companies that could potentially be included. Companies' positions in the list are based on data on revenue earned directly from sales of software or services in that area, headcount and R&D potential. The list makes use of data for the previous financial year.

Of companies with roots and representation in Belarus, only EPAM Systems and Itransition were listed in 2006. In 2006, these companies recorded income of USD 40 million and USD 3.5 million, respectively.

Eight major international software developers with subsidiaries and captive centers registered as Hi-Tech Park residents were included in the Software 500 list in 2011. Their positions in the list ranged from 310th (Ericpol Telecom) to 74th (IHS Inc.).

Ten companies were included in the list in 2016 – IHS. Inc., EPAM systems, Bell Integrator, IBA Group, Itransition, Coherent Solutions, SoftClub Ltd., Artezio, Intetics Co. and Oxagile – and all but the IBA Group improved their positions.

Everest Group MAP Matrix™ for IT applications

Everest Group, a research firm focused on global services, classifies Belarus as one of the front-runners among the Major Contenders category in their MAP Matrix™ for IT Applications. The assessment covers only a representative list of locations.

The matrix presents comparative analysis of various cities considered as destinations for global in-house and captive centers for IT services. The chart considers 3 dimensions: operating cost (fully-loaded, ongoing operating cost including compensation, facilities, and technology expenses), availability of relevant entry-level and experienced talent, and general risk profile.

SOURCES

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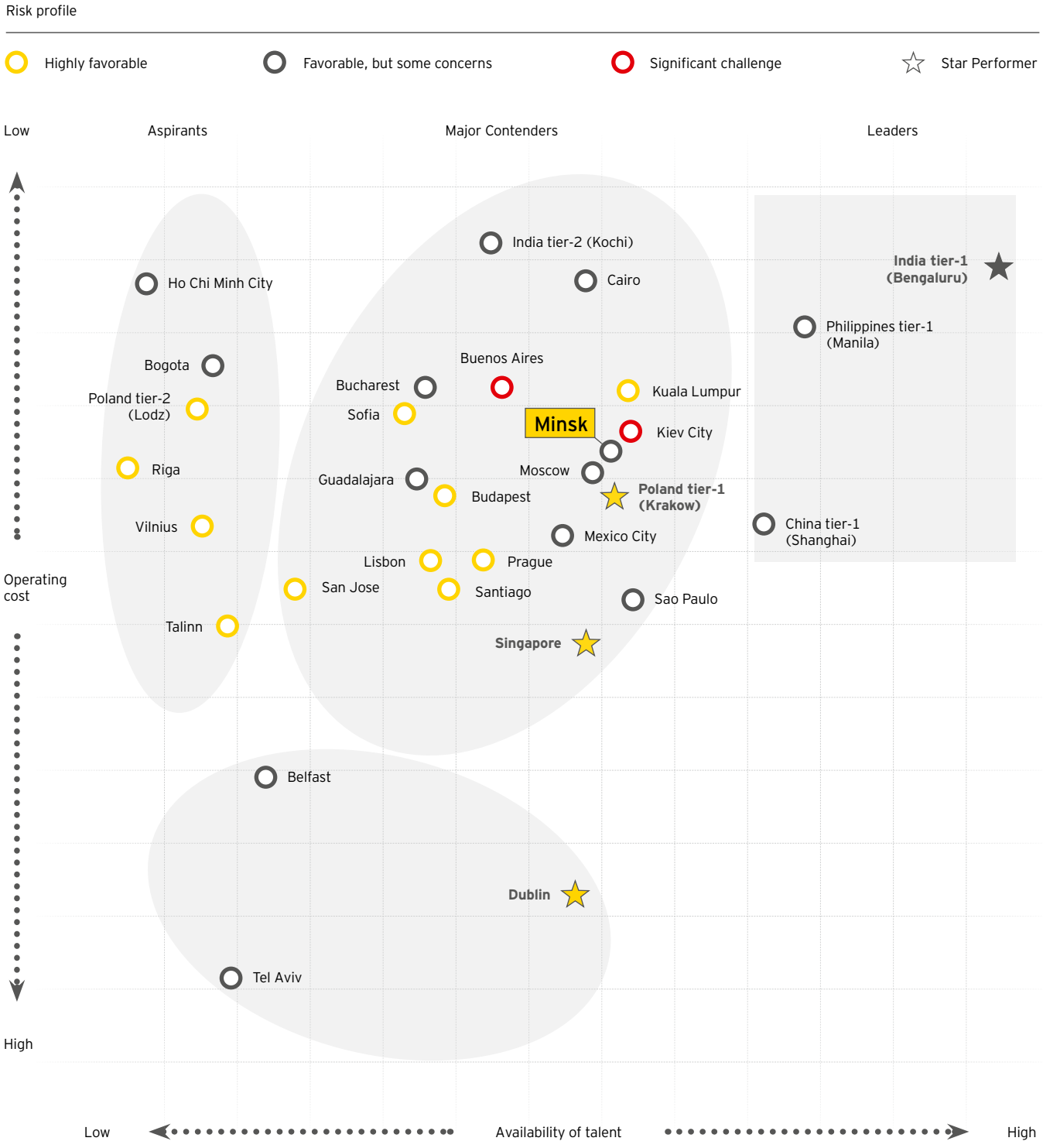
Minsk vs other destinations in the Everest Group MAP Matrix™ for IT applications



Note: Representative cities were used to depict typical talent-cost positioning for tier-1 and tier-2 cities for some countries (e.g., Bengaluru as a tier-1 city and Kochi as a tier-2 city in India); there could be other cities in the country that also offer propositions that are comparable to these cities

Source: [11] – Everest Group, 2017

RECENT MENTIONS OF THE BELARUSIAN TECHNOLOGY SECTOR IN THE INTERNATIONAL MEDIA

This section provides references to various mentions of the Belarusian IT industry in prominent international media.

Financial Times

Belarus tech dream is a walk in the park

https://www.ft.com/content/48f3b14a-f81e-11e6-9516-2d969e0d3b65

Reuters

World of Tanks shows Belarus potential beyond Soviet-era farms

http://www.reuters.com/article/us-belarus-tech-insight-idUSKCN0WX0DM

The Wall Street Journal

Belarus Is Emerging as the Silicon Valley of Eastern Europe

https://www.wsj.com/articles/belarus-is-emerging-as-the-silicon-valley-of-eastern-europe-1481032802

Emerging Europe

Belarus finalist among European Outsourcing Destinations of the Year

http://emerging-europe.com/regions/belarus/belarus-one-of-top-outsourcing-destinations-2016/

Young Well-Paid IT Specialists Are Making Belarus Known Internationally

http://emerging-europe.com/regions/belarus/young-well-paid-it-specialists-are-making-belarus-known-internationally/

Why Is Belarus Tech Booming?

http://emerging-europe.com/regions/belarus/why-is-belarus-tech-booming/

METHODOLOGY

This report was prepared by EY with the assistance of the Hi-Tech Park Administration. We set ourselves the goal of compiling key statistics and information to give readers an understanding of various aspects of the IT industry in Belarus.

We gathered and prepared information in the following categories:

- The Republic of Belarus
- The IT industry
- The education system
- The labor market in the IT industry
- Infrastructure
- The business environment for IT companies
- Companies specializing in IT products and services
- Development centers opened by international technology companies in Belarus
- Landmark transactions and events in the IT industry
- Analysis of the rankings of Belarusian IT companies
- Coverage of the Belarusian IT industry in the international media

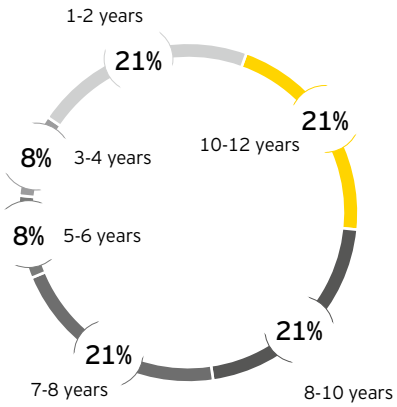
To gain a better understanding of the current state of the IT industry in Belarus, we held 15 interviews with industry experts from top management of leading IT companies and the Hi-Tech Park Administration. In our interviews with Hi-Tech Park officials, we discussed strategy and development as well as the outlook and economic indicators of the IT industry and the Hi-Tech Park itself. Our talks with industry experts focused on how they view the sector: we discussed the business environment in Belarus, companies' prospects in terms of growth and staff increases, the quality of education in Belarus, key aspects of providing IT services (in respect of companies involved in outsourcing) and of developing new products and marketing them internationally for product-oriented companies and development centers.

The most important source of information for the study was the statistical data we processed. For the sections on the Republic of Belarus, the IT industry and the education system, we used official statistics collected and published by the National Statistics Committee of the Republic of Belarus as well as data of the World Bank and the World Trade Organization. Since most of Belarus's official statistics are in the national currency, data was converted into US dollars at the appropriate average annual exchange rates of the National Bank of the Republic of Belarus (http://www.nbrb.by/engl/statistics/Rates/AvgRate/).

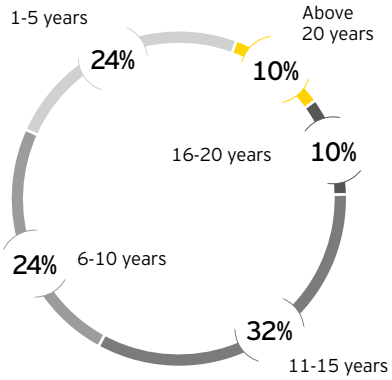
The section on the labor market in the IT industry makes use of information from jobs.tut.by, Belarus's top job search website, as well as the findings of an annual survey of IT specialists by the Belarusian Internet portal dev.by. In 2016 the survey had 1,542 respondents. For the purpose of benchmarking with world trends, these results are compared with the findings of a survey carried out by Stack Overflow, a major Internet portal for IT specialists. Their 2016 survey had over 55,000 respondents around the world. Statistical information on Hi-Tech Park residents was prepared using data provided by the Hi-Tech Park Administration.

EY also carried out a survey of HTP resident companies, using a questionnaire specially designed for our study. Forty-two companies took part in the survey, representing around 70% of the total headcount of all Hi-Tech Park residents. The respondents included young companies that are relatively new residents, as well as long-term residents and companies of widely varying sizes and business models. We thus believe that our sample is representative of companies in the Belarusian IT industry as a whole.

Residents (survey respondents) by length of operation in the Hi-Tech Park



Resident companies by length of operation in the Republic of Belarus



Source: EY Survey 2017

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We would additionally like to thank the portal dev.by for its cooperation and for the information it provided.

EY is also grateful to the Hi-Tech Park residents that accepted our invitation to take part in the survey.

Apalon Apps
Applied Systems
ARTOX lab
BELabat
Belitsoft international
CIB software
CTDev
Economy-soft
EPAM Systems
Exadel
FordeConsulting
Game Stream
Generation P Consulting
IBA Group
IHS
InSoft Engineering
Intetics Bel
ISsoft Solutions
iTechArt Group
Itransition
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Playtika Bel
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