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INNOVATIVE
UKRAINE

2019

INNOVATIVE UKRAINE

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INTRODUCTION

This report is the joint product of UNIT.City, the largest IT cluster in Ukraine, and StrategEast. We have decided to join our efforts because we share the understanding of the great importance that the IT industry plays in the development of Eurasian states.

For these young states, where reforms are under way, the IT industry is not simply a source of substantial export revenues and well-paid jobs. Its role is paramount: it becomes a point of intersection for young specialists and the Western world. By choosing a career in the industry, IT specialists maintain close and constant interaction with their Western colleagues, adopt the Western corporate culture, and integrate into the global IT industry. This means operating in a world where rules are shared by all countries and where values such as the rule of law and IP protection rights are an integral aspect of society. As the IT industry in Eurasian states develops, a constantly increasing number of young people will adopt those values and spread them to all other areas of their life, thus also raising the bar for the government and non-governmental institutions in their countries. By this the IT industry greatly contributes to the transformation of the public sector and society in the Eurasian states in accordance with the principles of transparency and accountability.

As a typical Eurasian country whose economy is in transition, Ukraine is along the path leading from a natural resource-based economy to a knowledge-driven one. Our goal is to facilitate the acceleration of such transition by developing the IT industry in Ukraine.

Incorporated in this report is an in-depth understanding of the Ukrainian IT industry and of the obstacles that are restraining its growth. This understanding is based on the everyday experience of the UNIT.City experts. The report then proposes the ways for the Ukrainian IT industry's integration into the global ecosystem and recommends an action plan for Western policymakers, financial institutions, and global IT companies, which they can follow to facilitate the global integration of the Ukrainian IT industry. Those proposals and recommendations are based on the extensive international experience of StrategEast.

We are sure that our joint report will be of great use to anyone who is interested in the success of economic and social reforms in Ukraine and is committed to making Ukraine a prosperous country with Western values.

EXECUTIVE SUMMARY

- Ukraine's IT industry has become one of the factors driving the country's economic growth: the industry's exports totaled $4 billion USD, or 9% of the country's total exports. In 2018, investments into the IT industry reached $337 million USD, which amounted to 14% of the total foreign investments. These results were achieved with the efforts of 184,000 persons employed in the IT industry (1.2% of the nation's total workforce).

- Ukraine's IT industry continues to exhibit rapid growth: in the last five years, its export volume has doubled, total investments quadrupled, and every year Ukrainian universities turn out 23,000 new IT specialists. The IT industry also fuels the growth of related industries, such as biotech, agrobiotech, pharmabiotech, and aerospace. The further growth of the IT industry is restrained by several systemic factors: a flawed state system of protecting intellectual property (Ukraine is included in the Special 301 Report Priority Watch List), far-from-perfect customs legislation as it concerns IT, absence of a uniform government policy or state system of supporting education in the field of IT, and excessive bureaucratization which obstructs the employment of highly-skilled foreign specialists in Ukraine.

- The improvement of the intellectual property protection system in Ukraine would help increase the number of orders placed with the Ukrainian IT industry by Western companies. The key measures the Ukrainian government must take to develop intellectual property protection system include: reorganizing the system for collective management of proprietary copyright and related rights, legislative definition and consolidation of the specific principle of IP rights exhaustion, working on the procedure of customs clearance suspension, im-

proving the process of destructing counterfeit goods, adopting a law establishing the National Authority on Intellectual Property of Ukraine, and intensifying international cooperation at the highest level through the facilitation of a consistent dialogue between the Presidential Offices of Ukraine and the USA.

- Among other measures the government must implement to create the conditions for accelerated growth of the IT industry are: establishing the legislative framework for software development on a "customer-owned" basis (i.e. when software is developed in Ukraine but is the property of a nonresident customer), instituting a government loan program for the education and training of IT specialists, and optimizing the process of employment for foreigners in Ukraine.

- The implementation of these measures by the Ukrainian government would additionally accelerate the growth rate of Ukraine's GDP by 1-2% per annum, increase the exports of Ukraine's IT industry by $1-1.5 billion USD, create 30,000-40,000 new jobs, and bring $80-120 million USD in additional tax revenues to the Ukrainian budget every year.

- We recommend Western policymakers, international financial institutions, and representatives of the global IT industry to provide the following support to proposed reforms for the Ukraine's IT industry: endorse legislative initiatives related to the reorganization of the IP protection system, explore the possibility of co-funding a special Ukrainian state loan program to fund education in the IT industry, incorporate the development of the Ukrainian IT industry into foreign policy agenda, and stimulate investments by Western IT companies into the Ukrainian IT industry.

Photo credit: UNIT.City

UKRAINE'S IT INDUSTRY

According to the official records of the first half of 2018 there are 12,534 IT-related legal entities registered in Ukraine. It is worth noting that liquidated companies are also accounted in the statistics, therefore a number of actually operating companies may be lower. At the same time one company may own a few different legal entities simultaneously, which may also affect the official statistics, which represents a number of legal entities on the whole.

A number of IT-related legal entities registered in Ukraine in 2014-18, in thousands
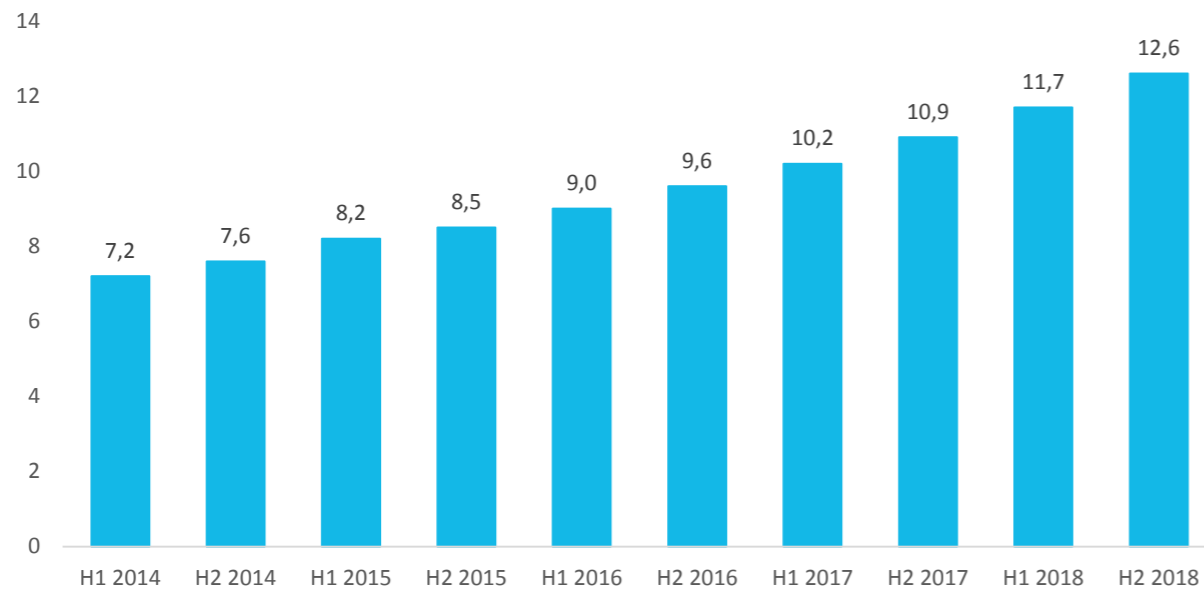
According to unofficial data there are around 4,000 companies, majority of which have 80 employees or less, however a lot of people work in companies with over 80 employees. 2,309 companies are active on the labor market.

A sampling allows us to assume that around 70% of companies provide services to a broad range of clients (EPAM, GlobalLogic, Netcracker and others), around 15% work as Global In-House Centers (GIC) for one parent company (Wargaming.net, Ring, Samsung R&D Institute Ukraine, Oracle) and 15% create their own product (Genesis, EVO, Terrasoft).
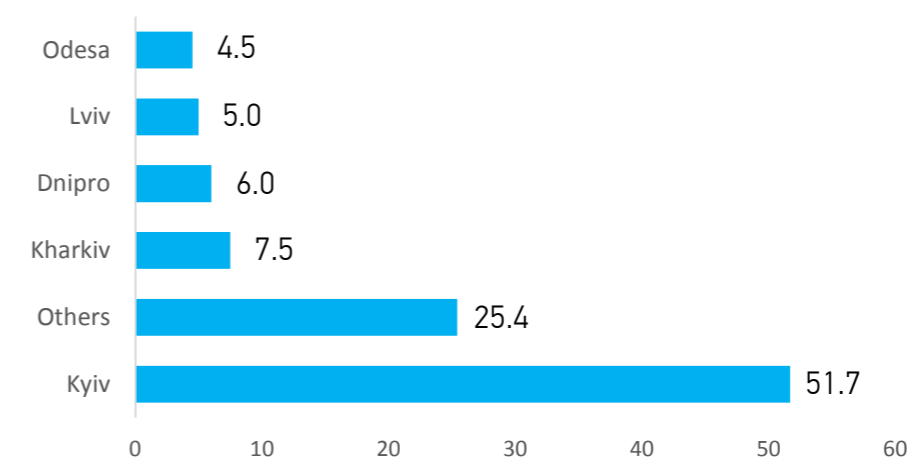
Specialization of large IT companies, by the number of employees

	80-200	200-800	800+
Services	70	43	14
Products	15	10	4
GIC	14	16	0
Total	99	69	18

According to the official data around 50% of the companies are registered in Kyiv. Also a lot of the companies reside in Kharkiv, Dnipro, Lviv and Odesa.

IT-related legal entities by the city, in %

The Ukrainian IT industry is a successful competitor on a global market and is a reliable source of foreign currency revenue which strengthens the UAH currency. Thus, **despite the decline in exports and economy on the whole, the IT industry has been showing a stable growth of 11-26% annually.**

IT services export in the 1st and 2nd half, USD mln
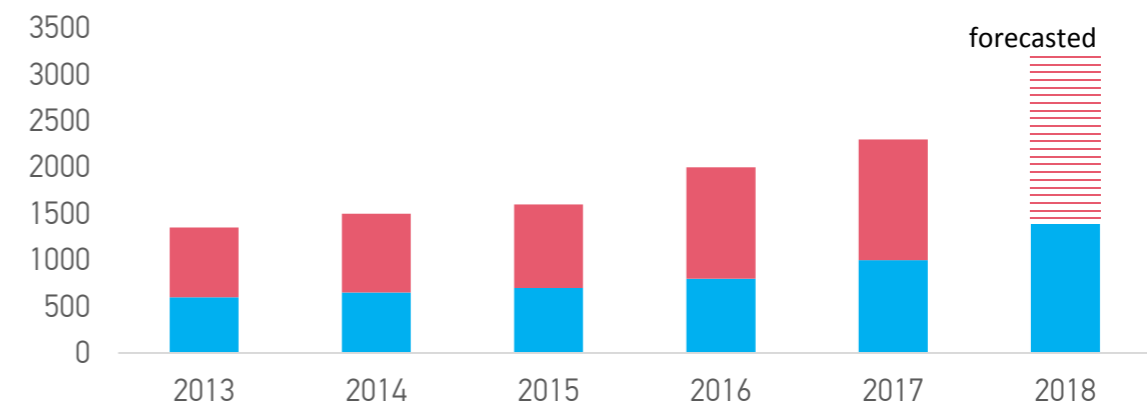
Therefore, the importance of IT services in Ukraine's export structure is growing. For instance, IT services were 3rd in Ukraine's export of services after the services of processing of goods and pipeline transport.

According to a survey of IT companies, the absolute majority of revenue is of foreign origin. Over 50% comes from the USA, the UK is on the second place. Ukrainian companies also have a long record of cooperation with Germany, Canada, Israel, Sweden, and Switzerland. Despite positive trends the Ukrainian market still cannot boast a large amount of orders.


>50%

USA
UK
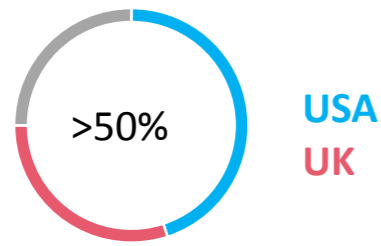
Other Countries

Canada	Ireland	
Cyprus	Israel	Sweden
Germany	Norway	Ukraine
Netherlands		

Such growth is accompanied by an increase in tax revenue. On average tax revenue from IT companies in 2014-17 has been growing by 27% yearly and reached UAH 4.1 bln. This trend remains valid in 2018 as well: tax revenue grew by 30.1% in the first half of the year.

State tax revenue from legal entities, 1st and 2nd half of the year, UAH bln
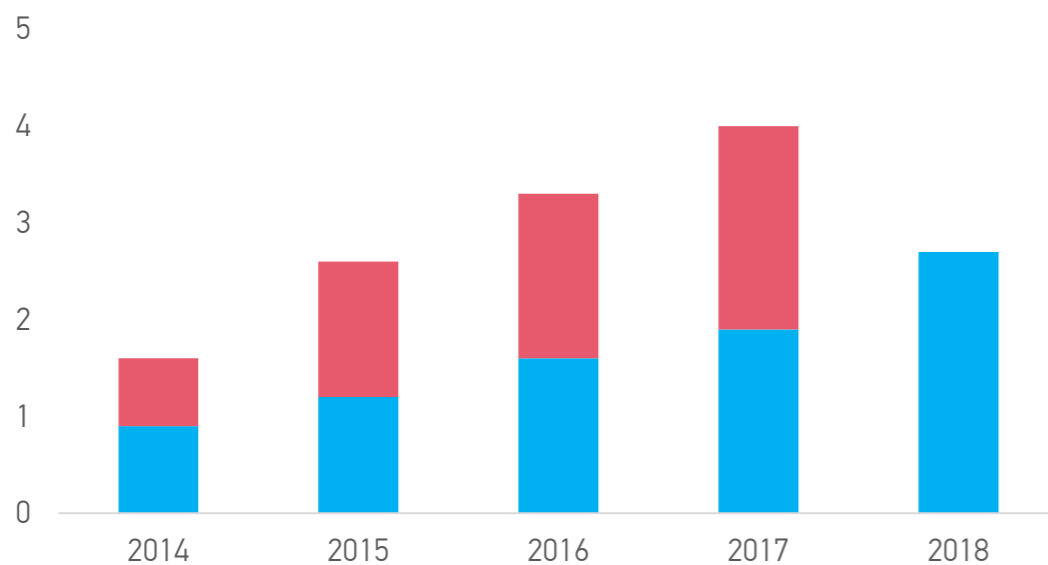
Tax revenue per 1 employee in IT was substantially higher than on the average in the country. An individual income tax paid by those employed in IT was 3.7 times higher than on the average in the country. Since instead of traditional employment a lot of IT companies widely use contracts with individual entrepreneurs, a unified tax paid by an active individual entrepreneur is also taken into account. Nevertheless, its size in IT was also 3.4 bigger than individual income tax per one employee on the average in the country.

State tax revenue per one employee, UAH thousands

■ individual income tax on the average in Ukraine
■ individual income tax in IT in Ukraine
■ unified tax in IT in Ukraine
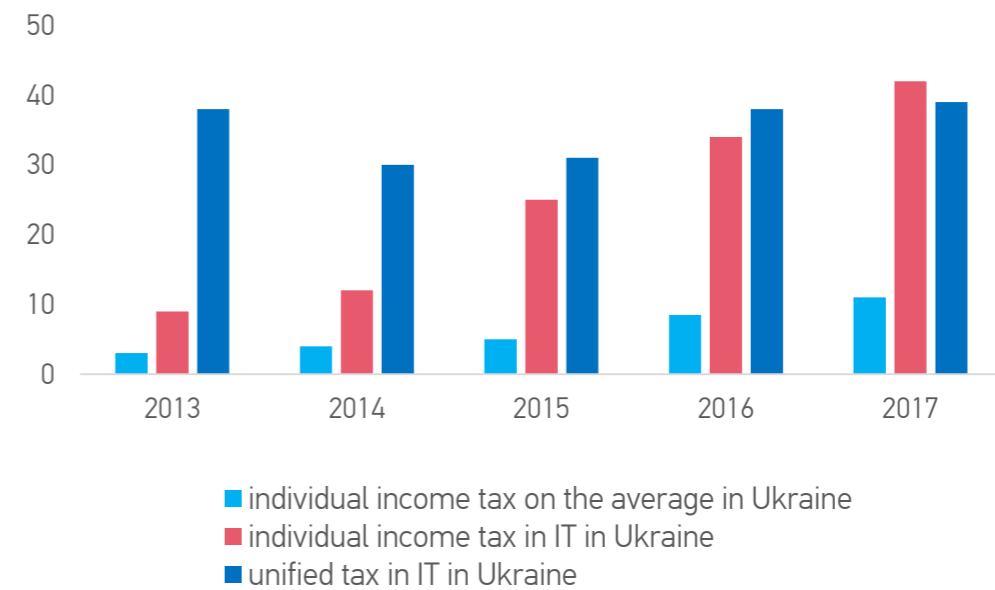
According to surveys IT companies spend around USD 2.2K per one person per month on the average, while average company income per one person is USD 2.5K, which provides a 13% margin.

Average income, expenses and margin in IT companies per person per 1 month, USD thousands

■ Expenses per person ■ Income per person
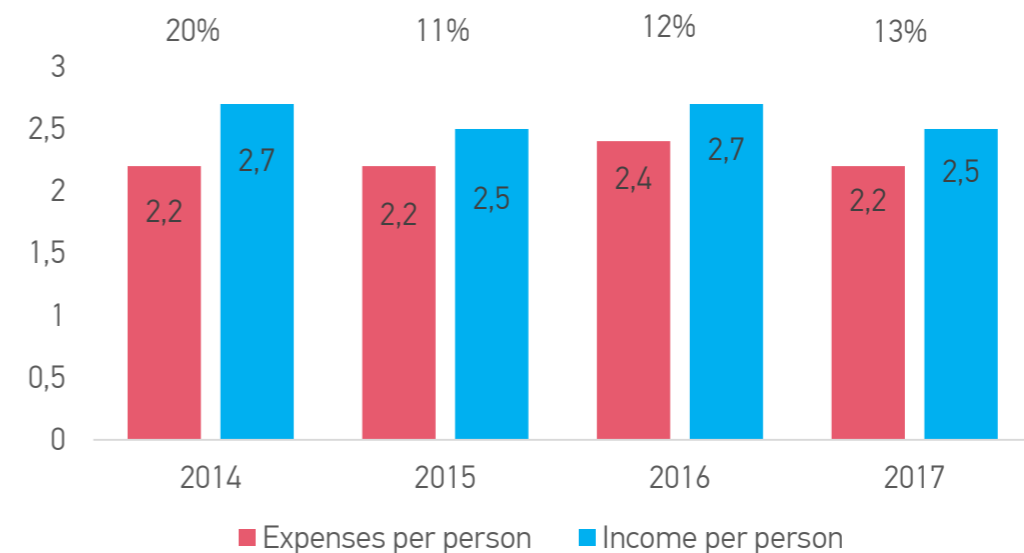
*Note: some information can be duplicated on further pages
Source: Ukrainian IT Industry Report 2018, IT Ukraine Association, BRDO

UKRAINIAN HIGH-TECH INDUSTRY HIGHLIGHTS

- More than 184,000 highly skilled programmers;

- 4th place in the world (after the USA, India and Russia) by the number of certified IT specialists;

- $337 million venture investments in 2018;

- $25 million value of M&A deals in 2018;

- 16 exits in 2017, 8 exits in 2018;

- 20+ investment funds;

- At least quarter of world-leading companies in the field of software development for mobile platforms have their offices in Ukraine;

- $4 billion IT export volume in 2018 (4% of GDP);

- 16 companies in The 2019 Global Outsourcing-100;

- 24th most attractive software development country;

- Global Sourcing Association named Ukraine the Offshoring Destination of 2017;

- 43 place in the world by the number of start-ups (Startup Ranking 2018);

- 43 place in the ranking of the most innovative countries in the world (Global Innovation Index 2018);

- 53d country by the level of innovation of the economy (Bloomberg Innovation Index 2019);

- 58th country in the digital competitiveness rating (IMD World Digital Competitiveness 2018);

- 64 place by the level of ICT development (Networked Readiness Index 2016);

- About 150 higher education institutions that annually prepare 23,000 IT specialists;

- More than 140,000 patents and utility models over the past 10 years (10-15 thousand per year);

- More than 100 Fortune 500 companies which choose Ukrainian IT services;

- More than 110 R&D centers of the world-known international companies;

- More than 1,000 events for IT-specialists, start-ups and investors every year.

INTERNATIONAL RANKINGS

INNOVATION

⭐ **Top 50 most Innovative Countries**
Global Innovation Index 2018 – 43 place.
- This is the highest ranking of the GII that Ukraine has attained.
- Ukraine is in the category of Innovation achievers for 5 years in a row.

⭐ **Top 60 most Innovative Countries**
Bloomberg Innovation Index 2019 – 53 place.
- Ukraine maintains a high position on the effectiveness of higher education and patent activity.

⭐ **Top 50 Startup Ranking**
Startup Rankings 2018 – 43 place.
- In the world by the number of startups.

⭐ **Top 60 Digital Courtiers**
The IMD World Digital Competitiveness Index 2018 – 58 place.
- Strong points: starting a business, the speed of Internet connections, e-democracy, use of large data, the quality of education.

⭐ **Top 65 most ready countries**
Networked Readiness Index 2016 – 64 place.
- Strong points: infrastructure and digital content, affordability, skills.

⭐ **1st in Science and Technology**
The Good Country Index 2018 – 75 place, 1st in Science and Technology.
- Strong points: international students, journal exports, international publications, Nobel prizes, patents.

OUTSOURCING

⭐ **1st Outsourcing market in Eastern Europe**
- Ukraine is ranked as number one for outsourcing markets in Eastern Europe by Outsourcing Journal.

⭐ **Top 30 offshoring and outsourcing destinations**
- Ukraine has consistently featured in Gartner's top 30 offshoring and outsourcing destinations for the past 7 years.

⭐ **Top 50 in outsourcing activities**
A.T. Kearney Global Services Location Index 2017 – 24 place.
- Strong points: financial attractiveness, people skills and availability.

⭐ **Offshoring Destination of the 2017 Year**
The GSA UK Awards 2017
- The abundance of highly-qualified developers, competitive prices, rapidly developing business, and IT infrastructure made Ukraine an Offshoring Destination of the Year.

TALENT AND EDUCATION

⭐ **Top talent pool country in CEE, 4th globally**
- 1st in the CEE by the number of IT specialists and engineers;
- 4th globally by the number of certified IT specialists.

⭐ **Top 65 most talented countries**
Global Talent Competitiveness Index 2018 – 63 place world wide, 32 place in Europe.
- Strong points: vocational and technical skills, retain, grow.

⭐ **4th globally at Math**
- 4th place at International Mathematical Olympiad.
- Ukraine has remained in top 30 countries worldwide in the past 10 years

⭐ **6th by TopCoder**
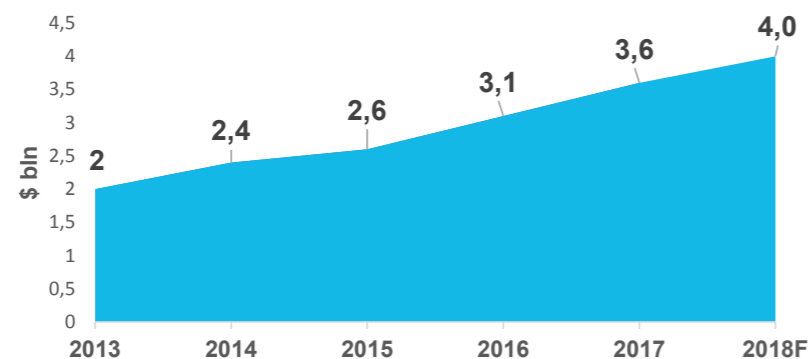By Programmers Activity

8th by SkillValue
By Best Programmers

Photo credit: UNIT.City

Photo credit: UNIT.City

TRENDS

EXPORTS OF IT SERVICES

- Since 2013 the volume of IT services export has steadily increased and reached $4 bln in 2018.

- The contribution of industry to GDP of Ukraine - 4% in 2018F.

- IT industry took 2d place according to export volumes in 2018.

NUMBER OF INVESTMENT TRANSACTIONS

- 115 investment agreements with innovative companies worth $337 million were concluded in 2018.

- The prevalent number of funds operating in Ukraine focused on the Seed stage.

- The number of deals and the volume of investments grow not proportionally. So, in 2015 there was a rapid increase in investment volume with a decrease in the number of transactions.
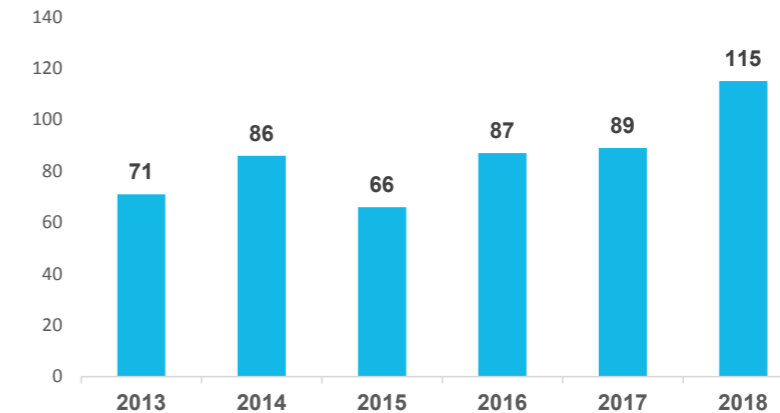
INVESTMENT VOLUME IN STARTUPS

- However, since 2016, the figures are steadily growing.

- In total over the last six years, investments in startups amounted to about $955 million.
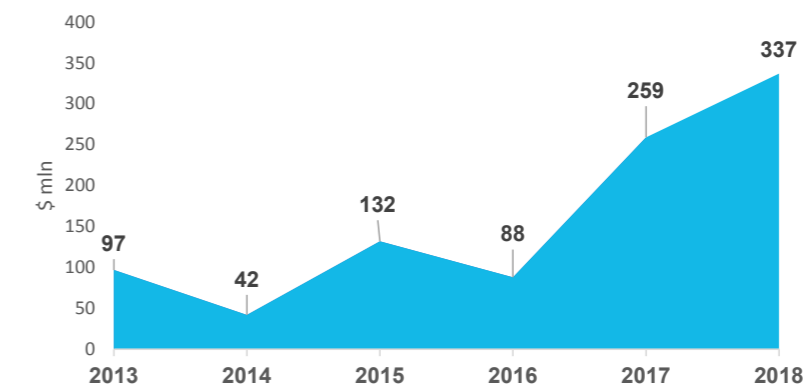
- In 2018 investments in startups amounted to about $337 million.

- There are 300-500 new startups in Ukraine annually. At the end of 2017, there were about 2,000 high-tech startups in Ukraine. According to Startup Ranking, Ukraine ranks 43rd in the world by their number.

- The rapid increase of exits began in 2016, if earlier there were isolated cases, then in 2016 there were 8 exits, in 2017 – 16, in 2018 - 8. Also, in 2017 there were 19 successful ICOs, during which $160 million was attracted, in 2018 – 8 ICOs with app. $58 million attracted.

- The number of investment funds has increased, for example, Overkill and Arkley VC funds have joined the search for startups for investments in Ukraine over the past years. Western NIS Enterprise Fund (WNISEF) launched U.Ventures fund for investment in IT startups. According to 2017 data, there were 33 investment funds in Ukraine, including corporate and private ones.

Source: Ukrainian Venture Capital and Private Equity Overview 2018, UVCA; Tech Ecosystem Guide to Ukraine 2019; IT Ukraine Association, 2017

INVESTMENTS

Photo credit: UNIT.City

TOTAL CAPITAL INVESTED

- Total capital invested in 2018: $336.9m*, exceeding 2017 by 1.3 times

- Round A stage: $18.4m

- Round B stage: $30m

- Growth stage: $180m

- Undisclosed deals: $86.9m

- The largest deal of 2018 was done by GitLab – a system for managing program code repository, with $100m raised at growth stage.

Legend: ■ Pre-seed ■ Seed ■ Round A ■ Round B ■ Growth ■ Undisclosed ■ Other

THE MOST ACTIVE INVESTORS 2018*

DIGITAL FUTURE   ICU   TA VENTURES   CHERNOVETSKYI INVESTMENT GROUP

u.ventures   SMRK VC Fund   Horizon Capital

AlmazCapital   SYWORKS GROUP

CROWDFUNDING PLATFORMS AND GRANTS

European Bank for Reconstruction and Development   KICKSTARTER   Open Data Challenge

6 grants
$251.8k

7 campaigns**
$1.4m

5 grants
$70.9k

*by number of deals and exits
**startups from only technology and internet sectors were included
Source: Ukrainian Venture Capital and Private Equity Overview 2018, UVCA; Tech Ecosystem Guide to Ukraine 2019
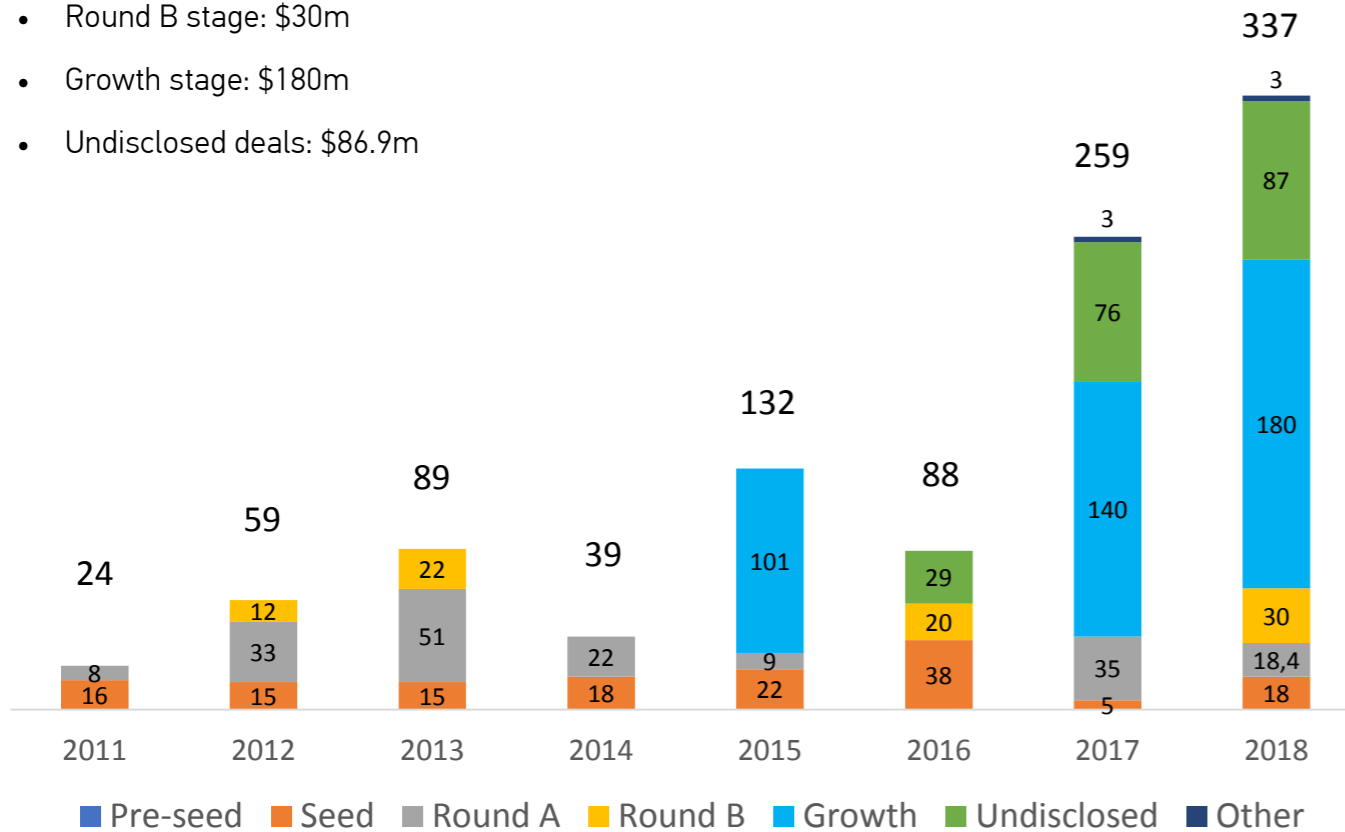
TOP DISCLOSED DEALS 2017-2018

Company	Deal value, $mln	Investors
GitLab	130	GV, ICONIQ Capital, Khosla Ventures and Goldman Sachs
Grammarly	110	General Catalyst, IVP, Spark Capital
BitFury	110	Credit China Fintech Holdings, Korelya Capital, Naver Group, Macquarie Capital, Dentsu, Armat Group, Lian Group and iTech Capital
Neuromation	70	ICO
People.ai	37	Andreessen Horowitz, GGV Capital, Lightspeed Venture Partners, Index Ventures, Shasta Ventures, Y Combinator and SV Angel
Rentberry	30	ICO
DMarket	25	ICO
Remme	20	ICO
Propy	15.4	ICO
YayPay	13.7	QED Investors, Birchmere, Information Venture Partners, QED, Gaingels 500 Fintech Fund and Fifth Third Capital
Petcube	10	Almaz Capital, Y Combinator, AVentures Capital, U.Ventures, Digital Future and others
TAAS	7.9	ICO
DreamTeam	6	ICO
CallPage	5.5	Innovation Nest, Market One Capital and TDJ Pitango Ventures
Allset	5	Greycroft, Andreessen Horowitz, Vaizra Investments, Compound, FJ Labs and SMRK
Restream	4.5	Silverton Partners, Anorak Ventures, COLOPL, K Cube, Liquid2 and James Armstrong
Preply	4	Nine Point Capital and others
Hacken	4	ICO
Busfor	4	Vostok New Ventures
Spinbackup	1.5	bValue VC, TMT Investments, angels

Photo credit: UNIT.City

COMPANIES

STARTUPS

- There are 300-500 new startups in Ukraine annually.

- At the end of 2017, there were about 2,000 high-tech startups in Ukraine.

- According to Startup Ranking, Ukraine ranks 43rd in the world by their number.

THE MOST PERSPECTIVE STARTUPS

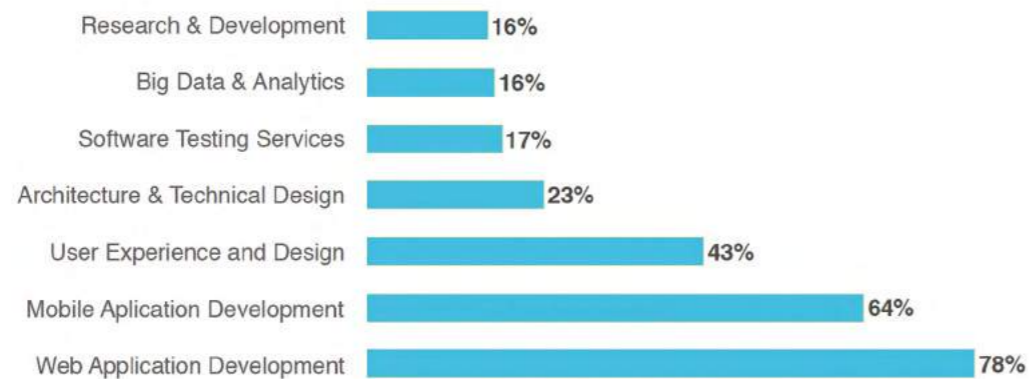## THE MOST SUCCESSFUL PRODUCT COMPANIES

Photo credit: UNIT.City

SERVICE COMPANIES

- 750+ IT Service Companies, 245 with 50+ employees

- IT service export volume in 2017 - $3.6 bln, 2018F - $4.5 bln. 70% of export – developments, 30% - consulting, R&D, etc.

- Among the 55 most attractive countries for the development of software, Ukraine ranks 24th. According to the IT export volume – the 1st in Europe.

- By the quality and effectiveness of freelance workers in digital environment ranked 7th in the world, as well as 11th in the top 50 developers in the world.

- The 2019 Global Outsourcing 100 included 16 Ukrainian IT companies and companies with offices in Ukraine: EPAM, Ciklum, ELEKS, Luxoft, N-iX, Miratech, Intetics, Softjourn, Sigma Software, TEAM International Services, Program-Ace, Softengi, Infopulse, Intellias, Svitla, AMC Bridge.

Research & Development	16%
Big Data & Analytics	16%
Software Testing Services	17%
Architecture & Technical Design	23%
User Experience and Design	43%
Mobile Aplication Development	64%
Web Application Development	78%

- Ukrainian IT service companies offer a wide range of services.

- An absolute majority does web and mobile application development, followed by architecture consulting and testing services

Source: Software Development in Ukraine, Poland, Belarus and Romania in 2019

THE LARGEST SERVICE COMPANIES

CEE REGION SOFTWARE DEVELOPMENT

- Software development market in Ukraine, Poland, Belarus and Romania grows x4-5 faster than globally, with the US and the EU being the main customers

- $13B+ Total IT Exports generated by the region

- $5B+ Revenues generated by 477 companies in the 4 countries

- Over 580K professionals serve the market

- The market is highly fragmented with many small companies and just a handful reaching USD 200M mark in annual revenue

- Largest players are likely to become IPO candidates within the next five years

- The sector presents hot market for M&A activity, with over 70 deals in 2015 – 2018

Poland
100 companies* generating
$1.35B revenues***
255K IT specialists
31 universities and colleges

Belarus
77 Companies* generating
$0.75B revenues***
49K IT specialists
14 universities and colleges

Romania
66 companies* generating
$648M revenues***
105K IT specialists
15 universities and colleges

Ukraine
245 companies* generating
$2.07B revenues***
172K IT specialists
150 universities and colleges

Note: Companies presented on this slide are examples. The slide does not represent any ranking within respective categories

R&D

Photo credit: UNIT.City

- There are more than 110 R&D centers in Ukraine.

- Ukraine's largest R&D partner is the United States (45% of companies), followed by Europe and Israel.

- The areas of expertise of Ukrainian R&D centers include games, e-commerce, big data and AI, telecommunications, IoT, software and e-commerce.

- Many international companies that have R&D centers in Ukraine (Samsung, Siemens, Sitecore, Aricent) have started with one office and later either expanded the number of employees in one office, or opened one/several new offices in one of Ukraine's major IT hubs.

- More than half of R&D centers are located in Kyiv. The major research centers are also Dnipro, Lviv, Kharkiv, Odesa and Vinnytsia.

INTERNATIONAL R&D IN UKRAINE

- Kyiv – 52+
- Odesa – 23
- Lviv – 14
- Dnipro – 14
- Kharkiv - 11

Source: Software Development in Ukraine, Poland, Belarus and Romania in 2019 , N-iX Research, 2017

Source: IT Ukraine from A to Z, 2015

GOVERNMENT

Photo credit: president.gov.ua

- Ukraine has a separate executive body involved in implementing the digital strategy of the Cabinet of Ministers "Development of Ukraine" - the State Agency for e-Governance.
- In addition, there is a panel of experts that coordinates the needs of industry and government experts in implementing reforms.

- In May 2018, the Ministry of Economic Development announced a course to support startups at the state policy level.
- In July 2019 State Startup Fund was launched, which is allocated UAH 390 million from the state budget.

STATE LEVEL INSTITUTIONS

CITY LEVEL INSTITUTIONS

ECOSYSTEM INITIATIVES

Photo credit: UNIT.City

ASSOCIATIONS

Branch professional associations in Ukraine:

- IT Ukraine Association
- Ukrainian Venture Capital and Private Equity Association (UVCA)
- American Chamber of Commerce (ACC)

- European Business Association (EBA)
- Blockchain Association of Ukraine
- UAngel

CLUSTERS

There are 16 IT clusters in Ukraine, the most significant of which are located in Kyiv, Dnipro, Odesa, Kharkiv, Lviv, Lutsk, Ivano-Frankivsk.

20 IT companies is an average number of IT cluster members. Lviv IT Cluster is the largest in Ukraine, uniting over 80 members.

- Kyiv IT Cluster
- IT Dnipro Community
- Odesa IT Cluster
- Kharkiv IT Cluster
- Lviv IT Cluster
- LITaC: Lutsk IT Cluster
- Ivano-Frankivsk IT Cluster

COWORKINGS AND HUBS

- There are more than 100 coworking spaces in Ukraine, most of which are located in Kyiv.
- In addition to the capital, coworkings are gaining popularity in Lviv, Odesa and Kharkiv.
- The overwhelming majority is focused on IT specialists and startups, and besides space for work, workshops, conferences and networking, one can find mentoring programs or support from large companies.

№	Coworking or HUB	City
1	UNIT.City	Kyiv
2	Platforma	Kyiv
3	Chasopys	Kyiv
4	HUB 4.0	Kyiv
5	iHub	Kyiv, Lviv, Vinnytsia, Chernihiv
6	Impact Hub	Odesa
7	ITEA Hub	Lviv
8	Startup Depot	Lviv
9	Spalah	Kharkiv, Dnipro
10	Fabrika.space	Kharkiv

ACCELERATORS AND INCUBATORS

- As more and more startups are being founded in Ukraine every year, the infrastructure around them is catching up as well.
- New trend in Ukraine — acceleration programs launched and sponsored by major corporations.

№	Accelerator/Incubator	Industry
1	Radar Tech	Telecom, Energy, FinTech, Agro
2	MHP ACCELERATOR	Agro
3	Concepter	Hardware
4	Ukrinnovate	Defense
5	IoT Hub Accelerator	IoT
6	1991 Open Data Incubator	Open Data
7	GrowthUP	Business
8	Sector X	Big Data, VR/AR, IoT, AI, Machine learning
9	AgroHub	Agro
10	Sikorsky Challenge business incubator	Business

LABORATORIES

- Professional events and hubs are used for networking, as well as laboratories, where the equipment and people who are already working in this field are concentrated, and on the basis of which there are thematic events. For example, you can prototype new hardware products or create applications for virtual reality.

№	LABs	Industry
1	Sensorama Lab	VR/AR
2	DIY Lab	Prototyping, 3D-printing
3	FabLab Fabricator	Prototyping, 3D-printing
4	Syngenta	Agriculture
5	ARTKB	Hardware
6	BlockchainLab	Blockchain
7	IZOLAB	Digital, ART
8	Lampa	Electronics
9	America House Makerspace	Prototyping, 3D-printing
10	Sikorsky Lab	Prototyping, 3D-printing

EVENTS

- Ukrainian IT professionals eagerly share their knowledge and try to master new tools and technologies. So there are a lot of IT events and active community life. In 2018, the events attracted more attendees, more famous speakers and covered more topics.

№	Event	City	Number of participants
1	iForum	Kyiv	12,000
2	Kyiv Outsourcing Forum	Kyiv	2,000
3	Lviv IT Arena	Lviv	3,300
4	ITEM	Dnipro	1,600
5	IT Weekend Ukraine	Kyiv	5,000
6	Mobile Beach Conference Odesa	Odesa	1,200
7	SaaS Nation	Kyiv	500
8	JEEConf	Kyiv	1,000
9	Devoxx Ukraine (former JavaDay)	Kyiv	1,000
10	UNIT Fintech Forum	Kyiv	1,000

COMMUNITIES

- There is an increasing number of communities and associations by interests or special themes.
- Participants organize conferences and meetings, profile events, share experiences, find partners and clients.

№	Community	Participants*
1	UTEW - Ukrainians at Tech events of the world	2,600
2	Data Science UA	3,800
3	Test UA startups	970
4	PM community	1,560
5	Bitcoin Foundation	3,080
6	UNIT Residents Club	470
7	SaaS Nation Community	770
8	IT community	980
9	IT Directors of Ukraine	n/a
10	DOU	290,000

*According to FB 2018

TALENT POOL AND EDUCATION

Photo credit: UNIT.City

IT SPECIALISTS

- Ukraine has 1st place in CEE by the number of IT specialists.
- 2018 has brought over 30,000 more IT specialists, which shows 26% annual growth of the Ukrainian engineering talent pool.
- So today there are over 184,000 specialists working in the country's IT industry. Such impressive progress even beats the rates of the period before the crisis of 2007-2008. Moreover, by 2020 the industry will have over 240,000 employees.

116 000
2017
high-skilled professionals in 2017

242 000
2025
expected number of professionals in 2025

144%
2011 — 2016
Number of IT-specialists in Ukraine is growing rapidly - +144% from 2011 to 2016
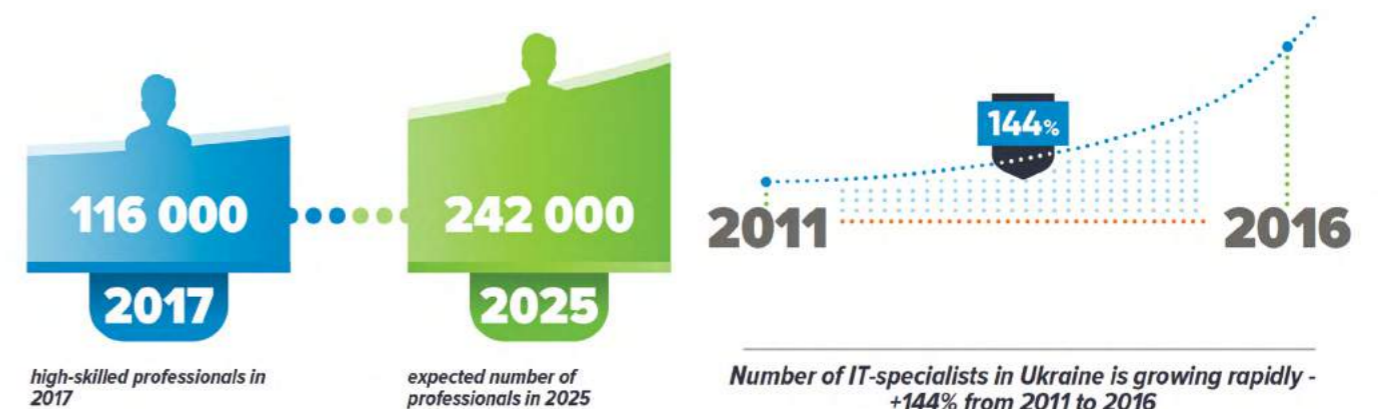
Source: N-iX Research, 2017; IT Ukraine Association, 2017, DOU

- Despite the ever-increasing number of IT professionals, market demand for them continues to grow.

- The number of vacancies published on DOU has grown one and a half times a year, from 3,111 to 4,606 per month.

- The number of reviews increased by 23% compared to last year - from 270 thousand to 330 thousand. The number of companies that post vacancies increased by 38% - from 2,419 to 3,339.

New vacancies per year
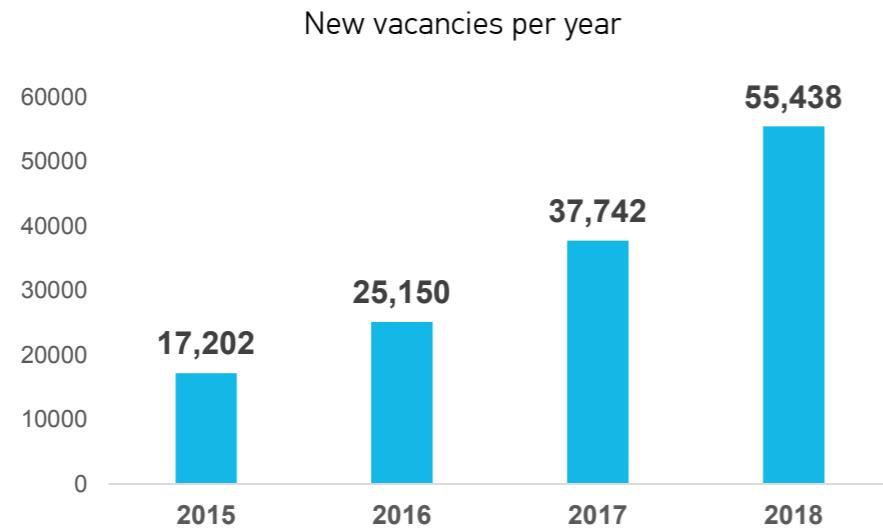
- Ukraine is 4th in the world by the number of certified technical specialists;

- It is 1st in CEE by the number of talents;

- 23,000 annual engineering graduates;

- 87% of Ukrainians obtained higher education, and 61% of IT specialists have STEM degrees;

- 79% of IT professionals working in the country speak English;

- 13% of Ukrainian IT specialists have over 10 years of experience, 16% – 6-10 years of experience, and 27% – 3-5 years of experience.

HIGHER EDUCATION

- IT education is provided by 150+ higher education institutions of different forms of ownership in all major cities of the country.

- 58% of women and 64% of men have higher IT education in Ukraine.

- 83% of IT Specialists in Ukraine have completed higher education at a university, of which 56% focused their studies on either programming or specific sciences.

- There is recognition of strong basic math and science education in Ukraine, as well as problem solving skills.

№	University	Number of graduates	Number of Tech graduates
1	NTUU "Kyiv Polytechnic Institute"	30,000	4,314
2	Taras Shevchenko National University of Kyiv	25,000	1,324
3	State University of Telecommunications	n.a.	1,100
4	Kharkiv National University of Radioelectronics	11,000	2,968
5	NTU "Kharkiv Polytechnic Institute"	22,000	2,105
6	National Aerospace University "Kharkiv Aviation Institute"	8,000	1,296
7	Lviv Polytechnic National University	30,000	2,675
8	Oles Honchar Dnipro National University	20,000	842
9	National Aviation University	50,000	1,692
10	Odessa National Polytechnic University	15,000	1,366

SPECIALIZED EDUCATION

- IT Clusters working in major Ukrainian IT cities cooperate with the local universities and IT companies to launch new educational programs and set up innovation labs at schools and colleges.

- Amid increased demand for talent, more companies seek to hire junior professionals. As a result, the number of IT schools is growing with 43K+ graduates per year.

- While most schools offer traditional courses like PHP, Java, Python and mobile, the new entrants specialize in niche languages and emerging tech stacks like Big Data.

№	IT Courses and Schools	Number of graduates
1	Computer academy "STEP"	95,000
2	Main Academy	6,000+
3	CyberBionic Systematics	3,000**
4	GoIT	2,000**
5	UNIT Factory	900*
6	uData School	90*
7	SoftServe IT Academy	1,600**
8	Sigma Software University	600**
9	QALight	8,000+
10	Ukrainian IT School	1,600**

*number of students, **annually
Source: DOU, Software Development in Ukraine, Poland, Belarus and Romania in 2019; Tech Ecosystem Guide to Ukraine 2019

DESTINATIONS IN UKRAINE

Photo credit: Alexxx Malev

- Ukraine has a well-established reputation as one of the leading IT destinations in Eastern Europe.

- Global Sourcing Association named Ukraine Offshoring Destination of the Year 2017.

- PwC ranked Ukraine 5th among Top 25 IT services exporters, and Gartner included it in top 10 emerging-market locations for off-shore services.

- Thanks to the abundance of highly-qualified developers, moderate prices, rapidly developing business and IT infrastructure, the country attracts numerous global companies looking for a software development partner.

KYIV

- The city boasts Ukraine's largest IT talent pool comprising over 40,000 specialists in the IT outsourcing sector, which is around 46.6% of all resources in Ukraine.

- The city has a strong educational system with 68 universities that prepare future IT professionals. The 3 top-rated technical universities located in Kyiv include NTUU "Kyiv Polytechnic Institute", Taras Shevchenko National University of Kyiv, National University of "Kyiv-Mohyla Academy".

- There are numerous possibilities to enrich knowledge or share it with colleagues, thanks to the abundance of various tech events. They include big conferences like IForum, IT Talk Kyiv, JEEConf, IT Weekend Ukraine, IDCEE.

- Kyiv is the most attractive destination for opening an R&D center in Ukraine due to its favorable geographical location and 2 airports with regular flights to major European cities. Such global companies as Microsoft, Samsung Electronics, Wargaming, Boeing, eBay, Siemens, IBM have R&D centers in Kyiv.

KHARKIV

- Kharkiv is the 2nd largest city in Ukraine with developed IT infrastructure. Over 22,000 specialists work in the software development sector in the city, which is around 16.2% of all IT resources in Ukraine.

- The city is a home to more than 20 higher educational institutions, 5 of which have technology and engineering faculties. Currently, more than 200,000 students study in colleges and universities in Kharkiv with more than 2,000 IT graduates every year.

- Kharkiv is also an attractive destination for opening an R&D center. Global companies like Plarium, Mirantis, Gameloft, Grid Dynamics, TOA technologies, Huawei, Maxymiser and SightPower have already opened their R&D.

LVIV

- Lviv is ranked the 3rd biggest IT hub in Ukraine comprising 10% of the Ukrainian IT resources. The city concentrates mover 20,000 qualified IT software developers.

- More than 192 IT companies are located in Lviv.

- Lviv boasts a well-developed technical educational system, which includes 10 colleges and 7 higher technical educational establishments. Currently, more than 12,000 IT specialists are studying in Lviv. Around 5,000 engineers graduate from Lviv educational institutions every year.

- Lviv is one of the main destinations to host various large-scale IT events like Lviv IT Are-

KYIV
AND THE KYIV REGION

- 52+ Software outsourcing firms with 80+ employees
- 52+ International R&D Centers
- 40,000+ IT professionals
- 38+ Universities & colleges with technical education
- 16,000+ Technical graduates (2015)

- In 2015, Kharkiv has made a big step towards the development of its IT infrastructure by establishing a non-governmental organization Kharkiv IT Cluster. It is supported by major Ukrainian companies, local authorities and technical universities. They have united their efforts to develop the city's IT ecosystem.

KHARKIV
AND EASTERN UKRAINE

- 35 Software outsourcing firms with 80+ employees
- 11 International R&D Centers
- 22,000+ IT professionals
- 5 Universities & colleges with technical education
- 16,000+ Technical graduates (2015)

na, GDG DevFest, and Lviv Outsourcing Forum. Speakers from such global companies as Facebook, IBM, Fitbit, Microsoft, Clever Cloud, Deloitte Digital HP, SAP, Epson, and Amazon have participated in these events.

LVIV
AND WESTERN UKRAINE

- 32 Software outsourcing firms with 80+ employees
- 14 International R&D Centers
- 15,000+ IT professionals
- 17 Universities & colleges with technical education
- 15,000+ Technical graduates (2015)

DNIPRO

- Dnipro is the 4th largest IT destination by the number of IT specialists in Ukraine. Around 9,000 IT professionals are engaged in Dnipro's software development outsourcing sector. This is 7.9% of all Ukrainian IT resources.

- The city's IT sector enumerates more than 44 software vendors providing a variety of software development services.

- Dnipro is the second by the number of R&D centers in Ukraine. The region has already attracted such international companies as Playtika, Siemens, ISM, Sitecore, Oracle, Wix, Transferwise to open their offices.

- IT companies in Dnipro have recently launched Dnipro IT Cluster, which is now the driving force behind the region's technological development.

DNIPRO
AND CENTRAL UKRAINE

- **44** Software outsourcing firms with 80+ employees
- **14** International R&D Centers
- **9,000+** IT professionals
- **5+** Universities & colleges with technical education
- **17,000+** Technical graduates (2015)

ODESA

- Odesa is the 5th biggest IT hub in Ukraine with around 8,000 technical specialists, which constitutes 5.5% of the Ukrainian IT talent pool.

- Around 150 IT companies are situated in Odesa (approximately half of them are IT service providers and the other half are software publishers).

- Five technological universities are located in the city. Moreover, local IT companies and IT coaching centers provide advanced training in software development, UX/UI design, QA and testing, data science, and other disciplines.

- Odessa is also convenient in terms of establishing an R&D center. Around 23 offices of multinational companies are located in this region, including Comodo, DIDWW, Netcracker, LogNET, Opera, Social Quantum, Teradek, and others.

ODESA
AND SOUHERN UKRAINE

- **28** Software outsourcing firms with 80+ employees
- **23** International R&D Centers
- **8,000+** IT professionals
- **10+** Universities & colleges with technical education
- **10,000+** Technical graduates (2015)

Source: N-iX Research, 2017

OTHER INDUSTRIES

Photo credit: UNIT.City

PHARMACEUTICAL MARKET

- Total market is 2.3 bln USD, growth +8%.

- State participation has become more tangible - 9.2 bln UAH, which is 16%.

- The pharmaceutical market is growing in money and stagnating in packs.

- The growth of the market is due to the active development of the prescription group in the retail segment and the prevailing development of foreign manufacturers over domestic.

- Deliveries on centralized procurement for the budget of 2016, 17 and 18 took place, which is reflected in the three-digit growth of this segment

- Growth in packages and money under the

"Dostupni Liki" program continues (budgeted UAH 1 billion in 2018).

Market dynamics in values, USD
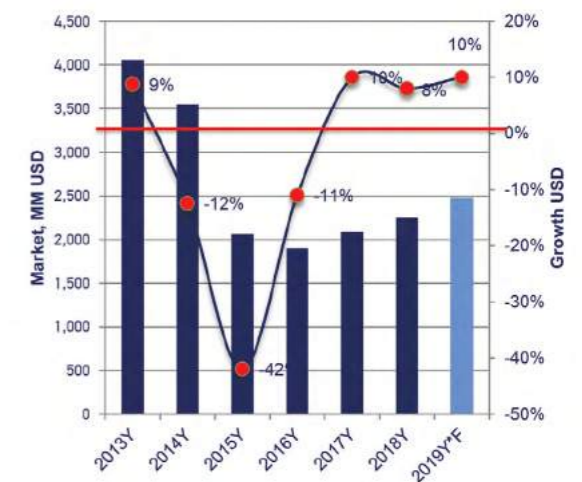
Source: SMD

TOP PHARMA COMPANIES

As of 2017, there were 135 enterprises involved in the production of drugs in Ukraine, 20+ - global ones.

Farmak

teva

PHARMACEUTICAL FIRM Darnitsa

gsk GlaxoSmithKline

BAYER

ARTERIUM

NOVARTIS

SANOFI

the MENARINI group

Key factors, influencing market development:

- Russia's aggression and high geopolitical and geo-economic risks;

- Slowdown in the global economic growth. The IMF and the World Bank predict that in 2019, the world economy will slow down by 0.1-0.2 pp compared to 2018;

- Based on Ukraine's economic reforms and its competitive advantages, Ukraine should be able to achieve higher rates of economic growth in the next years;

- Forecast of GDP growth +5% per annum, going to 7-8% pa if major reforms are carried out.
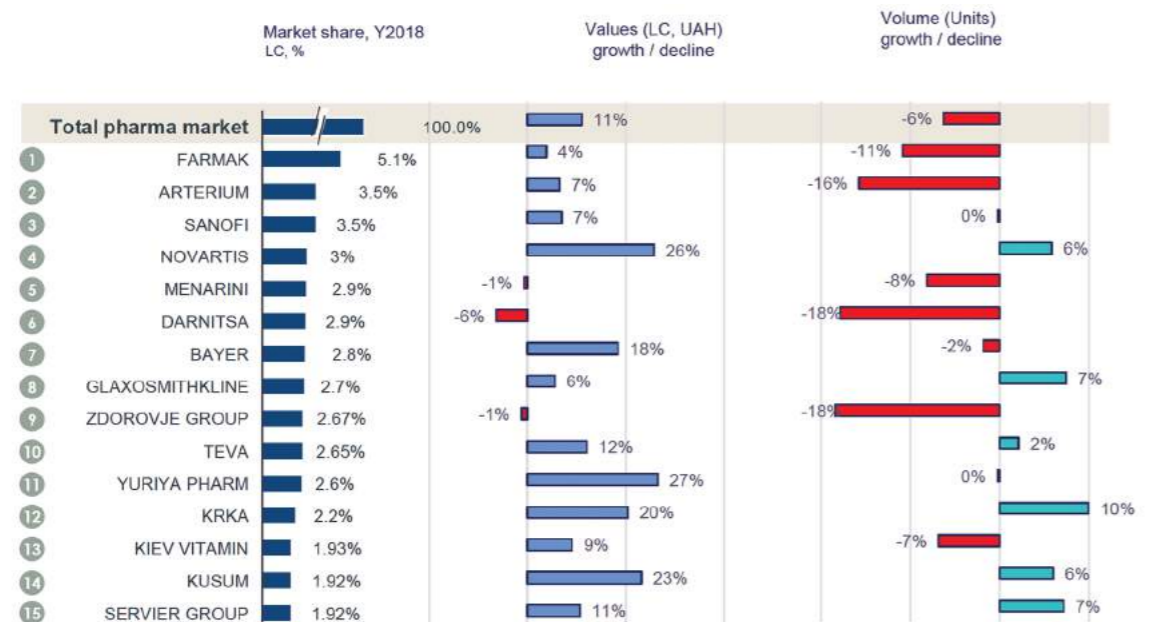
TOP-15 CORPORATIONS, RETAIL, 2018

- The most of companies among Top 15 have positive growth in values (LC). Locals, except Kusum, have negative dynamics in volume

Note: Companies presented on this slide are examples. The slide does not represent any ranking within respective categories
Source: SMD

Photo credit: Steve Buissinne

PHARMACEUTICAL CHAINS Y2018

Rank 17	Rank 18	Group of companies	Market share 2018
1	1	Apteka Nizkih Tsin (Blagodija, ANC, Kopijka)	13.8%
2	2	Sirius 95 (Bajaemo Zdorovja)	9.2%
4	3	Osan (apteka 911, 03, Plastik, Persha Apteka)	3.1%
3	4	Farmastor (ADD, FarTop, Persha Socialna Apteka, Apteka Mirra, Biocon)	2.3%
6	5	Solomija Service (Podorojnik)	2.0%
8	6	I.K.VEL (Receptika, OptTorg)	1.6%
7	7	RUAN	1.4%
11	8	Koneks	1.2%
5	9	Med Service	1.1%
12	10	Lekpharm	1.0%

- Concentration of sales among top chains increased.

- Top 10 increased share from 34% in Y2017 to 37% in Y2018

PHARMACEUTICAL INVESTMENTS

- According to the State Statistics Committee, Ukrainian pharmaceutical industry shows high growth rates of capital investments. It is 18% over the past seven years. While with the foreign direct investment the situation is getting worse, its volume has shrunk.

- During the last 10-15 years, significant sums have been spent on switching to European standards of GMP, i.e. Good Manufacturing Practice.

- Secondly, companies were investing in the modernization of production, the purchase of modern production lines for their traditional drugs.

Source: SMD

Capital investment in pharmaceutical production, mln UAH

2010	2011	2012	2013	2014	2015	2016	2017
566	803	824	1,073	1,413	1,623	1,598	1,846

FDI in pharmaceutical production, $ mln

2010	2011	2012	2013	2014	2015	2016	2017	2018F
40.7	43.0	80.4	83.6	71.7	49.5	45.5	38.8	38.2
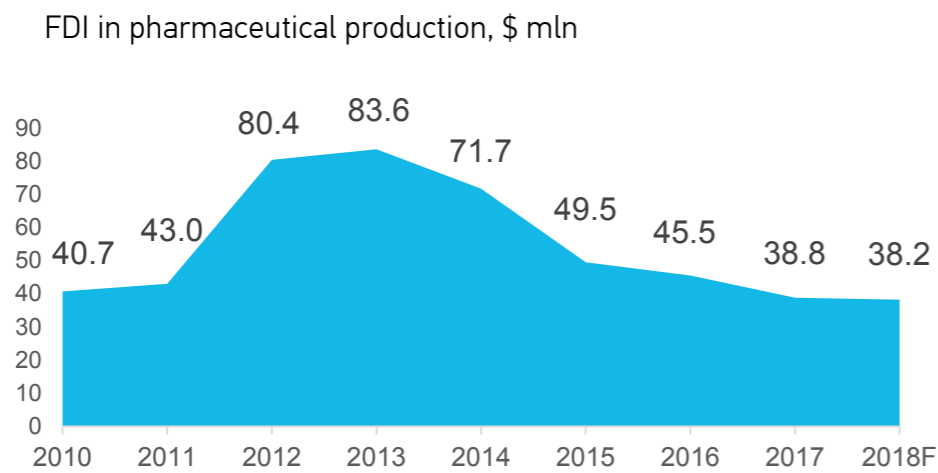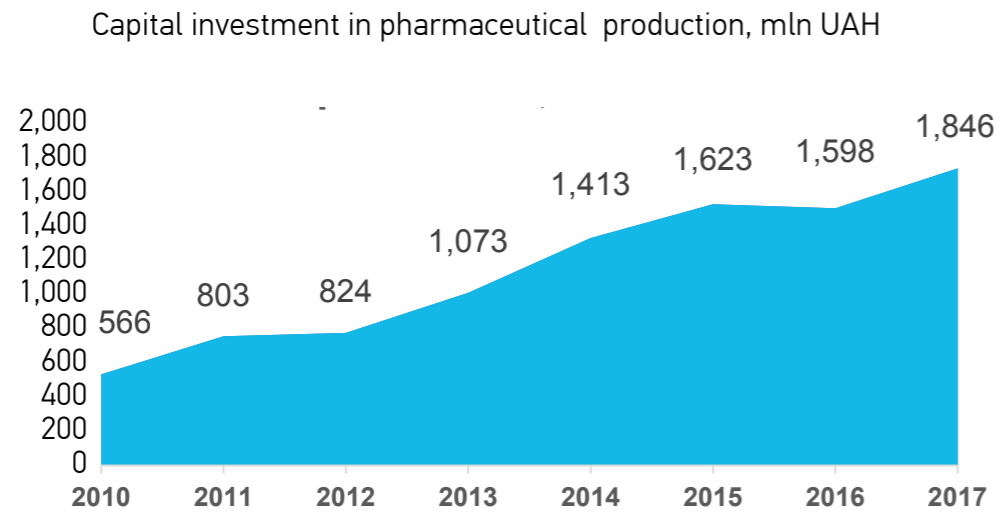
- In 2017, domestic pharmacists actively modernized their production facilities. Darnitsa registered 7 new medicines in various forms and dosages last year, and another 20 are scheduled for this year. In total, over the past decade, the company has invested 20 million euros in technology and equipment.

- Farmak invested more than UAH 500 million in technical re-equipment and introduced 21 products to the market in 2017. And there are another 125 projects.

- BCCP plans to invest UAH 317 million in its modernization by the end of 2018, and Bio-pharm intends to launch a blood plasma plant in July 2018. It has already invested $35 million in its construction.

Photo credit: Thilo Becker

AGRIBUSINESS

- The agricultural sector covers 70.8% of Ukraine's total landmass (42.7 mln ha).

- 33% of World's black soil (chornozem).

- 1st World's Producer and Exporter of sunflower oil.

- 3rd World's Exporter of barley, rapeseed, corn.

- Big Ukrainian agro-holdings are currently developing innovative in-house products,

- Highly skilled and large labor pool where app. 25% of population is employed in the agricultural sector.

- Industry experts predict that by the mid-2020s, Ukraine will be No. 3 in food production worldwide, second only to the U.S. and Brazil.

launching accelerators and cooperating with local and foreign startups.

UkrLandFarming *Public Limited Company*

AP Group

ASTARTA-KYIV *agri-industrial holding*

MHP *AGRO & INDUSTRIAL HOLDING*

KERNEL

AGRITECH

- The pent-up demand for agritech is increasingly bringing together Ukraine's large pool of IT specialists and mechanical design engineers to work together in the thriving agricultural sector.

- Only about 10% of Ukrainian agricultural companies use innovative technologies.

- At the same time, our country grows more than 70% of crop varieties traded on the world's stock exchanges. This makes Ukraine an ideal test site for agribusiness innovations.

AGRITECH MARKET MAP

FARM MANAGEMENT SOLUTIONS
software developers
CROPIO, ArpoOnline
арро, SOVTES
Forland, agro core
SmartLand, Global GIS
Precision Agriculture, АГРОКОНТРОЛЕР
Soft.Farm
hardware developers
RCS, lynx
PITREK, LIVE AG

DRONE-BASED & REMOTE SENSING SOLUTIONS
hardware developers
AeroDrone, KRAY
MEGADRONE, iTEC
UKR SPEC systems, DeViRo
MATRIX UAV, AGRIEYE
software developers
skyglyph, AVISION
EARTH OBSERVING SYSTEM
integrators
SMART Drones, DRONE.UA, AgroDrone

PRECISION FARMING SOLUTIONS
hardware developers
eFarmer, Skok Agro
ITINNOVATIONS, Craft Scanner
Greenbe, DATAFIELD
MONADA
integrators
SMART farming, FRENDT
Agri, Bueling Inc.
AgriLab, АГРОТЕК

URBAN FARMING SOLUTIONS
startups
УКРАЇНСЬКА ПОЛУНИЦЯ
ALANA-ECO
Cyber Grow, smartep
WATTENS
BIOSENS, petlela

powered by UNIT.City

AGRITECH INVESTMENTS

- Despite a large agricultural market, Ukraine does not have investment funds focusing solely on AgriTech startups.

- In 2014, Evhen Utkin and his company, KM Core, has invested $ 1.2 million in eFarmer. And in early 2017, his fund, Borsch Ventures, created a joint company Agro Core with Viktor Ivanchyck's Astarta-Kiev.

- Experts estimate that the annual volume of investments in Ukrainian AgriTech startups does not exceed $4 M.

- In 2017, there were some 5 deals signed, among them:

    Agrieye - $200,000 from Norwegian Katapult Accelerator
    Drone.ua has obtained investments from several private investors from the UK, Poland and Moldova.
    CIG announced the investment into Kray Technologies.

Source: Ukrainian Agritech Industry Guide

BIOTECH

- Applications of biotech range from advanced medicines to improvements in agriculture and biofuels, and extend further to exotic industrial materials.

- Ukraine takes 53rd place at Biotech Innovation Rating 2018.

- The U.S.-Ukraine Foundation launched its new biotechnology initiative in 2017.

- Lviv scientists, universities and business created biotech cluster to implement startups, joint business projects and youth training.

- The biotechnology regulatory system in Ukraine is still not fully developed, but the country has committed to shape its policy in-line with EU standards.

AGRIBIOTECH

- There is no legal commercial production and export of GE products in Ukraine in 2017. However, positive test results for corn and soybeans at export facilities imply there is GE crop production.

- There is no known animal cloning or GE animal products under research, production or export in Ukraine as of 2017.

- The Ukrainian public has a negative opinion about agribiotech that is either based on emotional perceptions or due to misleading news stories that are not based on sound science.

PHARMABIOTECH

- The segment of biologically active drugs is actively developing now.

- The technology of growing stem cells is being developed since 2012 in one of the private clinics in Kyiv. The first experiments on growing cells began in 2000 in Donetsk, at the Institute of Emergency and Reconstructive Surgery.

- At the largest biotechnological production of Ukraine - the Enzym plant in Ladyzhyn, both preparations for plant growing, animal husbandry and medicines are produced.

- The pharmaceutical group of companies "Lekhim" is considering the possibility of producing biotechnological preparations and raw materials for pharmaceutical production.

PROMISING BIOPHARMACEUTICAL ENTERPRISES

Farmak, LEKHIM, Darnitsa, BIOFARMA, bcpp, epam

- MBioS Challenge is a competition for scientists, inventors and entrepreneurs in the fields of medicine, biology and health.

- In 2018, there were 97 participants. Most prominent startups are:

- MUSIC-Med is a mobile ultrasound surgical instrument;

- Esper Bionic - Bionic prosthesis of the hand;

- LATRAX is a device that helps with epilepsy, depression and other neurological diseases.

Note: Companies presented on this slide are examples. The slide does not represent any ranking within respective categories
Source: thinkBiotech LLC 2018; GAIN Report – UP1725 – Biotechnology Annual Report, USDA

AEROSPACE

- Ukraine is one of the few nations with a developed aerospace industry, building civil, military and cargo aircraft as well as supplying space technology.

- Home to the world famous Antonov design bureau known for designing the world's largest airplane, the AN-225 "Mriya".

- 65th country in the world by Aerospace Manufacturing Attractiveness.

- An important supplier of turbine engines for aircraft, helicopters and aerospace industries worldwide.

- Manufacturer of space launch vehicles, spacecraft and space management, orientation and trajectory measurement systems.

Photo credit: valdazf

Photo credit: Oleg Belyakov

- State space Agency of Ukraine: 8 manufacturing enterprises, 5 design bureaus, 11 companies of other types.

- 200+ R&D, engineering centers and production companies in the industry

- 100,000+ engineers, specialists and workers employed in the industry.

- Ukraine was participating in the Sea Launch program, alongside the United States, Russia and Norway. Ukraine constructed the expendable carrier rocket Zenit-2, used extensively in space launches from this platform.

- Two of Ukraine's largest state owned defense conglomerates include "UkrOboronProm", a state management company of more than 100 enterprises in 5 major defense industry sectors, and "Ukrainespecexport", which is engaged in the import and export of military arms and hardware.

Photo credit: Little Visuals

Source: Ukraine Now Investment Booklet; 2017 Aerospace Manufacturing Attractiveness Rankings, PwC; DLA Piper Ukraine

AEROSPACE HIGHER EDUCATION

- 8 universities offer aerospace engineering degrees

- annually graduating app. 5,000 students

№	University	Number of students
1	National Aviation University	50,000
2	NTU "Kharkiv Polytechnic Institute"	22,000
3	Oles Honchar Dnipro National University	20,000
4	Zaporizhia National Technical University	13,000
5	National Aerospace University "Kharkiv Aviation Institute"	8,000
6	Ivan Kozhedub National Air Force University	2,600
7	Kirovograd Flight Academy	1,800
8	Cherkasy Branch National Aerospace University "Kharkiv Aviation Institute"	n.a.

Source: education.ua

AEROSPACE CENTERS

ANTONOV

YUZHNOYE design office

YUZHMASH

IVCHENKO PROGRESS

AUTOMOTIVE

- Industry has become one of the fastest growing manufacturing sectors owing to a favorable combination of increasing demand, availability of skilled workers, competitive salaries and integration into the EU supply chain.

- Rapidly growing auto parts manufacturing clusters produce components for major EU and global auto brands.

- Within the automotive industry of Eastern and Central Europe, together with Poland and Russia, Ukraine is one of the "Big Three", which has developed a highly technological approach to passenger vehicle and truck production.

- Domestic production enjoys a market revival in heavy industry trucking, buses, trolley cars, farm tractors, etc.

- Auto manufacturing output is approximately 200,000 vehicles per year.

- From 2000, more than 20 global automotive companies established production in Ukraine with more than 30 new plants and 40,000 jobs created.

B⁺ BADER **Fujikura**

LEONI **PRETTL** automotive

YAZAKI **KROMBERG & SCHUBERT**

- Ukrainian vehicle manufacturers produced 8,586 vehicles in 2017, which was 63% more than in 2016; the output of passenger cars alone increased by 68.1%, to 7,296 units.

- Eurocar remained the leader in terms of production, as it produced 6,145 Skoda passenger cars, which was 56.1% up on 2016.

- It is followed by ZAZ with 1,674 vehicles, whereas its output in 2016 included 526 vehicles.

- The production of buses during the year grew by 2.5 times, to 804 units.

- NJSC Cherkasy Autobus (Cherkasy Bus) boosted production of buses by 93%, to 382 vehicles.

ŠKODA **БОГДАН**
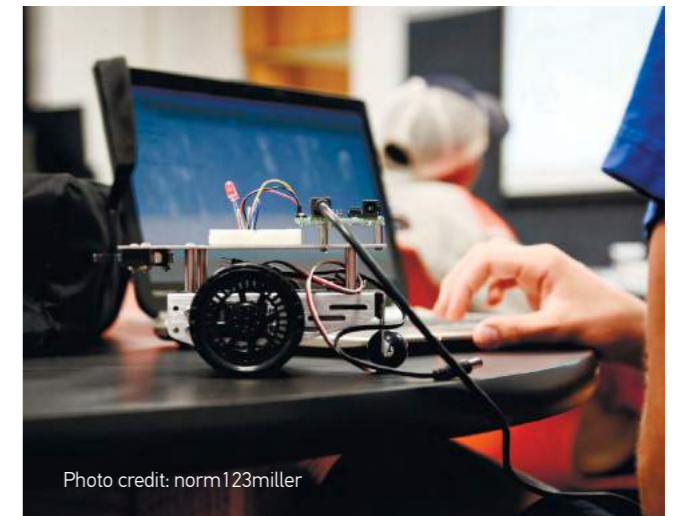
ZAZ **ЧР**

AUTOMOTIVE SOFTWARE HUB

- Software is becoming one of the main differentiators for competing car brands.

- Ukrainian IT companies develop pretty much everything: focus on embedded software, on UI/UX services; car navigation systems, on platform development and platform integration in the automotive industry and on the future of mobility.

- Automotive companies keep distinguishing Ukraine as the top outsourcing destination.

intellias **infopulse** **N-iX**

<epam> **LUXOFT**

SIGMA Software **GlobalLogic**

ROBOTICS

- Robots are most often used for the automotive industry, chemical and electronic industries, agribusiness, military, for cutting and welding processes, packaging, palletizing, etc.

- The most famous enterprises using robotic complexes: Philip Morris Ukraine, Procter&Gamlbe, Henkel, AvtoZAZ.

- Ratio of robots to the number of personnel serving this area: 1 per 20,000 persons.

- The educational segment is rapidly developing both commercial robotics courses for adults and children, and free courses of interest.

Photo credit: norm123miller

PRODUCTION

СТАНДАРТ ПАК **INFOCOM Ltd** **DRONEUA**

KDI group **МЕХАНИЗМУС** **UkrOboronProm**

STARTUPS*

R&D 64 → **HELLO EGG!** **WAVERLEY** → **JIBO** **mobidev** ↓ **Pluto The Robot** **URP**

ELFi Robotics **robo wunderkind**

- Hubs are mostly provided with the necessary equipment for creating prototypes of the maker's devices. For example, a 3D printer, soldering stations, a laser cutter, etc.

№	Courses	City
1	Vynakhidnyky	Kyiv, Dnipro, Lviv, Vinnytsia, Kharkiv, Odesa
2	Boteon	Kharkiv, Kyiv, Odesa, Dnipro
3	RoboCode	Kyiv
4	RobotSchool	Kyiv, Poltava
5	Robo.House	Kyiv
6	TechMaker	Kyiv
7	Funtronica	Odesa
8	Techclub	Odesa
9	Guru IT School	Uzhgorod
10	Basic Robotics and Programming	Kyiv

- There are several educational centers for robotics for children and adults.

- Team of Ukrainian schoolboys entered the top 20 in the first World Olympiad in Robotics in Washington in 2018.

№	LABs
1	LabSeven
2	Ultimate Robotics
3	Mechatronics ROBOT Laboratory
4	Hub Lab
5	Noosphere Engineering School
6	Robo.House

Source: DOU

Photo credit: UNIT.City

Photo credit: UNIT.City

MEASURES ON IT DEVELOPMENT IN UKRAINE

1. Removal of constraints on cooperation between non-resident and domestic companies in the field of itellectual property.

Key point: Economic partners (incl. the EU and USA) estimate that Ukraine remains a country which does not properly handle significant problems with intellectual property protection.

The Office of the United States Trade Representative (USTR) annually releases the Special 301 Report on Intellectual Property Protection and Review of Notorious Markets for Piracy and Counterfeiting. The Special 301 Report identifies trading partners that do not adequately or effectively protect intellectual property (IP) rights or otherwise deny market access to U.S. innovators and creators that rely on protection of their IP rights.

The trading partners that are currently considered as the most significant concerns regarding IP rights are placed on the Priority Watch List or Watch List. USTR identified 36 countries for these lists. Ukraine is in the "worst" of them – the Priority Watch List.

The grounds for inclusion into the 301 Report are as follows:

- the unfair and nontransparent administration of the systems for collective management organizations (CMOs);

- widespread use of unlicensed software by government agencies;

- failure to implement effective means to combat copyright infringement.

As a matter of fact, in April 2018, the lack of reforms necessary for the protection of IP rights led to the suspension of the duty free import of 155 Ukrainian goods to USA.

Practical effect – resident and domestic IT companies are no longer entitled to perform a number of US contracts (including those related to public procurement) due to the inclusion of Ukraine into the 301 Report.

Suggestions on resolution thereof:

Final reorganization of the system for collective management of proprietary copyright and related rights. Establishment of the system of monitoring of IP rights protection in Ukraine;

Legislative definition and consolidation of a particular principle of rights exhaustion. This will speed up the approval and implementation of the necessary changes to harmonize the Ukrainian IP right protection law at the customs border of Ukraine;

The Law "On the Protection of Rights to Trademarks for Goods and Services" should be amended to limit the abuse by "patent trolls" through the use of the Customs Intellectual Property Registry;

The procedure for suspension of customs clearance, destruction of counterfeit goods should be improved;

The draft law on the establishment of the National Authority of Intellectual Property of Ukraine (NAIP) that will perform certain public functions (authorities) for implementing the state policy (issuance of titles (patents, certificates) for intellectual property objects should be adopted).

It is also necessary to intensify international cooperation at the highest level through facilitation of a consistent dialogue between the Presidential Offices of Ukraine and the USA, as well as at the governmental level – between the Ministry for Economic Development and Trade of Ukraine and the Office of the United States Trade Representative.

Effects: experts estimate that harmonization of intellectual property rights in Ukraine (with the US restrictions to be subsequently cancelled) will ensure the provision of:

+ 1-1.5 bln USD from computer services export;

+ 2 bln UAH of taxation revenues from IT industry;

+ 10 thousand jobs in the IT industry and 20 thousand jobs in related industries.

2. Povision of software development on a "customer-owned" basis.

Key point: establishment of the legislative framework for software development on a "customer-owned" basis, meaning that the software is developed in Ukraine but is the property of a non-resident customer. Legislative consolidation of rights and guarantees for customers.

Suggestions on resolution thereof: The Tax Code of Ukraine and of the Law of Ukraine "On Copyright and Related rights" should be amended.

Effects: guarantee of the customer rights implies that the number of orders for Ukrainian IT companies will be increased.

3. Government support for IT competence development.

Key point: IT is a global industry. Nowadays,

IT-specialists are in demand almost in all countries, and the competition for qualified personnel keeps growing. Experts say that one of the most important factors hampering the development of the domestic industry is the number of IT specialists available in the market. Based on unofficial data, the annual market growth was about 19% and amounted to 127 thousand people at the end of 2017. At the same time, experts estimate that technical universities of the country annually produce about 16 thousand of young specialists, while the industry demands more than 20 thousand The shortage of specialists is also enhanced by labor migration.

Suggestions on resolution thereof:
Implementation of a government loan program for IT specialists education and training (funds administrated by the Ministry of Education and Science of Ukraine or the Social Insurance Fund):

- loan should be granted for 2-3 years with the annual grace period;

- There should be no loan interest charged or it should be minimally charged;

- A loan should be granted through government agent banks (PrivatBank, Oschadbank, Ukrgasbank, and Ukreximbank) based on the agreements concluded with institutions (regardless of ownership) providing training for IT specialists (on the principle of the "Warm Loans" program);

- a person receiving the loan for education should be restricted to travel abroad (until the loan is repaid).

Sources of financing:

• Partly financed by the Fund of Obligatory State Social Insurance of Ukraine against Unemployment. For the period from 2012 to 2018, the amount of actual revenues (including the balance at the beginning of the year) for the Fund budget exceeded its actual expenditures (approx. 1 bln UAH). The 2019 Fund budget amounts to 12.8 bln UAH (incl. 12.6 bln of insurance premiums), of which 9.6 bln. UAH are intended to be paid as unemployment assistance, and 3.1 bln UAH (almost 25%!) are directed to the maintenance of office

(fund office and state employment service). Should the Fund's expenditure on the staff be optimized and the balance surplus utilized, about 1.5-2 bln UAH per year can be additionally attracted to finance the loan program for IT specialists education and training;

- Partly financed by the President's Foundation for support of educational and scientific programs for the youth in Ukraine. The 2019 Fund budget amounts to 1 bln UAH.

- Optimization and further redistribution of expenditures of the Ministry of Education and Science of Ukraine, etc.

Legislative changes required:

- The Cabinet of Ministers of Ukraine should develop and approve the Government targeted loan program for IT specialists education and training, as well as the procedure for funds application; or alternatively the Law "On the State IT Support Fund" should be adopted (similar to the State Energy Efficiency Fund). Funds are to be administrated by the Ministry of Education and Science of

Ukraine or by the Social Insurance Fund;

- The Law "On Compulsory State Social Insurance" regarding the application of the social insurance funds for financing the government loan program for IT specialists education and training should be amended;

- The Tax Code of Ukraine regarding the grant of a tax deduction for IT specialist (individual entrepreneur) training should be amended.

Fiscal effect of the program implementation:

To implement this program, 25-50 mln USD should be drawn from the State Budget of Ukraine in the form of a loan that will be fully repaid thereafter.

Instead, based on conservative forecasts, the implementation of the Government targeted loan program for IT specialists education and training will make it possible to additionally attract about 80 mln UAH to the budget of Ukraine per year, which are the direct tax revenues from "new" IT specialists, with another 200-300 mln UAH to be attracted from taxation of IT industry and related industries.

	2020	2021	2022	2023	2024	Total
Public Spending (annual education - 5 thous. USD)	25 mln USD	25 mln USD	25 mln USD	25 mln USD	25 mln USD	125 mln USD
Number of education loans	5 thous.	5 thous.	5 thous.	5 thous.	5 thous.	25 thous.
Loan repayment	-	25 mln USD	25 mln USD	25 mln USD	25 mln USD	100 mln USD
Additional budget revenues from taxation of individual entrepreneurs (5% of the annual turnover of the 12 thous. young IT specialists)	-	3 mln USD	3 mln USD	3 mln USD	3 mln USD	12 mln USD
Budget expenditures / revenues	-25 mln USD	3 mln USD	3 mln USD	3 mln USD	3 mln USD	

4. Optimization of the process for employment of foreigners in Ukraine

Background: Due to the global shortage of IT specialists and universality of developers' skills, the migration of such specialists is a common thing that happens worldwide. Moreover, the domestic market needs to attract foreigners who are knowledgeable about a certain technological domain or industry, which simply does not exist in Ukraine.

At the same time, to legally work in Ukraine a foreigner from a visa-free country (in particular, the USA or the EU) must pass a number of artificial bureaucratic barriers, which significantly complicate and prolong the process. For example, in order to get the temporary residence permit, the foreigners are obliged to leave Ukraine to apply for a long-term visa (D-type visa), and then return to Ukraine again.

To work legally in Ukraine, the foreigner must have:

- the permit for employment of foreigners and stateless persons;

- D-type visa;

- the temporary residence permit (which is issued on grounds of the permit and D-type visa).

In fact, this implies that the foreigner must take

the following steps:

1) come to Ukraine and obtain the permit;

2) go abroad to apply for D-type visa that is not issued on the territory of Ukraine, but by a foreign diplomatic institution;

3) return to Ukraine to apply for the permit.

It is irrational and absolutely needless for a foreigner to take the second step.

Suggestions on resolution thereof:

- to authorize the issuance of D-type visas on the territory of Ukraine is the most acceptable and effective option, with the Resolution of the Cabinet of Ministers of Ukraine No. 118 dated March 1, 2017 to be amended;

- The D-type visas should be issued in electronic form, which requires that technical means should be used and the budget financing should be attracted);

- The application for D-type visa as the one necessary to obtain the temporary residence permit should be cancelled, with the Article 5-2 "On the Legal Status of Foreigners and Stateless Persons" to be amended.

The abovementioned changes will significantly simplify the procedure for employment of foreigners in Ukraine.

ESTIMATED EFFECTS OF THE ABOVE MEASURES:

ESTIMATED EFFECTS	
+1-2%	Growth of Ukraine's GDP
+$1-1.5 bln	In exports of IT services
+30-40K	New jobs in IT and related industries
UAH +2-3 bln	In additional tax revenue

RECOMMENDATIONS TO THE WESTERN POLICYMAKERS

- Government agencies responsible for IP protection, primarily USTR, should internationally support the legislative initiatives related to the reorganization of IP protection system on the territory of Ukraine as outlined in this report of the Ukrainian IT community;

- International donor and financial organizations, such as USAID, World Bank, EBRD and others, should explore the possibility of co-funding a special Ukrainian state loan program for education in the IT industry;

- Representatives of the EU and US Ministries of Foreign Affairs should insist on equal employment rights for foreign IT specialists in Ukraine when negotiating with their Ukrainian counterparts;

- Should incorporate the IT industry development into the policy agenda in relations between the West and Ukraine by organizing workshops with representatives of the governments of the Western states and Ukraine, and should stimulate investments from the Western IT companies into Ukrainian IT industry.

Photo credit: Aymane Jdidi

LIST OF SOURCES

1. Ukrainian Venture Capital and Private Equity Overview 2018, UVCA. https://www.slideshare.net/UVCA/ukrainian-venture-capital-and-private-equity-overview-2018-141626280
2. Tech Ecosystem Guide to Ukraine 2019. https://data.unit.city/tech-guide/Tech_Ecosystem_Guide_To_Ukraine_En-1.1.pdf
3. Development of the Ukrainian IT industry, Analytical report, 2018. https://ko.com.ua/files/u125/Ukrainian_IT_Industry_Report_UKR.pdf
4. Ukrainian IT General Overview, IT Ukraine Association. https://itukraine.org.ua/en/news/infographics-ukrainian-it-general-overview-and-professional-profile-specialists-0
5. Software Development in Ukraine, Poland, Belarus, and Romania in 2019. https://software-development-cee-report.com/
6. 20 facts about best IT outsourcing destinations in Ukraine. N-iX 2017. https://www.n-ix.com/20-facts-best-it-outsourcing-destinations-ukraine/
7. All you need to know about Ukrainian IT Outsourcing, N-iX, 2018. https://www.n-ix.com/need-know-ukrainian-it-outsourcing-2017/
8. 29 facts about outsourced software engineering in Eastern Europe, N-iX, 2018. https://www.n-ix.com/facts-outsourced-software-engineering-eastern-europe/
9. IT Ukraine from A to Z, 2015. http://www.uadn.net/files/ua_hightech.pdf
10. The community of Developers, Dou.ua. https://dou.ua/
11. The Global Innovation Index 2018: Energizing the World with Innovation. https://www.globalinnovationindex.org/gii-2018-report#
12. The IMD World Digital Competitiveness Ranking 2018. https://www.imd.org/wcc/world-competitiveness-center-rankings/world-digital-competitiveness-rankings-2018/
13. The Global Information Technology Report 2016, WEF. http://www3.weforum.org/docs/GITR2016/GITR_2016_full%20report_final.pdf
14. The annual Bloomberg Innovation Index. https://www.bloomberg.com/news/articles/2019-01-22/germany-nearly-catches-korea-as-innovation-champ-u-s-rebounds
15. The Global Talent Competitiveness Index 2019. https://gtcistudy.com/wp-content/uploads/2019/01/GTCI-2019-Report.pdf
16. Startup Ranking. https://www.startupranking.com/countries
17. A.T. Kearney Global Services Location Index 2017. https://enterprise.press/wp-content/uploads/2017/09/ATK-2017-GLSI-The-Widening-Impact-of-Automation.pdf
18. GSA UK AWARDS 2017. http://www.gsa-uk.com/event/gsa-uk-awards-2017/
19. Ukraine pharma market trends Y2018, SMD 2019. http://smd.net.ua/files/166_fy2018ukraine_eng.pdf
20. State Statistics Service of Ukraine. https://ukrstat.org/en
21. The story of recovery: how the Ukrainian pharmaceutical market is getting over the crisis, 2018. https://mind.ua/en/publications/20184072-the-story-of-recovery-how-the-ukrainian-pharmaceutical-market-is-getting-over-the-crisis
22. Medical investment: where Ukrainian pharmacy needs support, 2018. https://mind.ua/en/publications/20184249-medical-investment-where-ukrainian-pharmacy-needs-support
23. Ukraine Investment Booklet, 2018. https://ukraineinvest.com/wp-content/uploads/2018/07/Ukraine-NOW-investment-booklet.pdf
24. Ukrainian Agri Business Report 2017, Baker Tilly, Credit Agricole, and AEQUO. https://ukraineinvest.com/wp-content/uploads/2017/12/the-infographics-report-ukrainian-agribusiness-2017-eng.pdf
25. UkraineInvest, Agribusiness. https://ukraineinvest.com/sectors/agribusiness/
26. Ukrainian Agritech Industry Guide, 2017. https://ukraineinvest.com/wp-content/uploads/2017/12/AgriTech_Industry_guide_en.pdf
27. UkraineInvest, Agritech. https://ukraineinvest.com/sectors/agri-tech/
28. Global Biotechnology Innovation Scorecard, thinkBiotech LLC. http://www.thinkbiotech.com/globalbiotech/country/Ukraine
29. Biotechnology Initiative, USUF. https://www.usukraine.org/biotechnology-initiative/
30. GAIN Report – UP1725 – Biotechnology Annual Report, USDA. https://gain.fas.usda.gov/Recent%20GAIN%20Publications/Agricultural%20Biotechnology%20Annual_Kiev_Ukraine_11-16-2017.pdf
31. Information Agency LigaBusinessInform. https://project.liga.net/projects/ukraine_investment/
32. Interfax-Ukraine News Agency. https://interfax.com.ua/news/pharmacy/482718.html
33. AgroPortal. http://agroportal.ua/multimedia/sekrety-biotekhnologicheskogo-proizvodstva/
34. 2017 Aerospace Manufacturing Attractiveness Rankings, PwC. http://www.michman.org/resources/Pictures/PWC%202017%20Aerospace%20Manufacturing%20Attractiveness%20Rankings.pdf
35. UkraineInvest, Aerospace, and Technology. https://ukraineinvest.com/sectors/aerospace-and-technology/
36. DLA Piper in Country Profile, 2018. https://www.dlapiper.com/~/media/files/insights/publications/2018/02/dla-piper-in-country_profile_2018_eng.pdf?la=en&hash=13218458F8634F-BC77E46DF7EFC90B98778B13E3
37. Education.ua - specialized portal about education in Ukraine. https://www.education.ua/
38. Ukraine's automotive industry on its way to a revival. https://www.automotivelogistics.media/18922.article