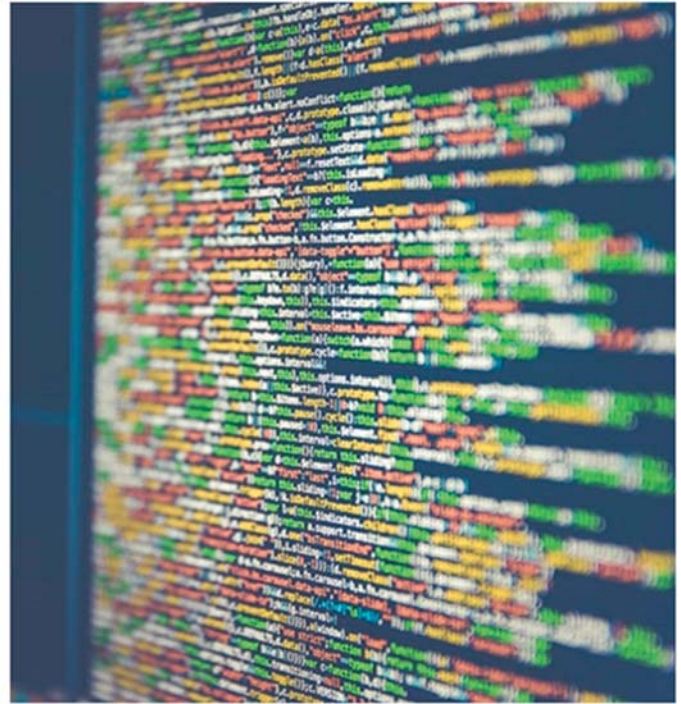




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## INFORMATION TECHNOLOGY AND PROGRAMMING

*IN-DEPTH REVIEW OF STRATEGIC TRADE SECTORS IN UKRAINE*

USAID COMPETITIVE ECONOMY PROGRAM IN UKRAINE  
(USAID CEP)

SEPTEMBER, 2020

DISCLAIMER: The authors' views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

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# INFORMATION TECHNOLOGY AND PROGRAMMING

## *IN-DEPTH REVIEW OF STRATEGIC TRADE SECTORS IN UKRAINE*

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*The report and its results do not necessarily reflect the views of the United States Agency for International Development or the United States Government.*

**USAID Competitive Economy Program in Ukraine (USAID CEP)** promotes a strong, diverse, and open economy of Ukraine by enhancing the business environment for small and medium enterprises (SMEs), improving competitiveness in promising industries, and enabling Ukrainian companies to benefit from international trade.

***This Research Conducted by:***



**INSTITUTE  
FOR ECONOMIC RESEARCH  
AND POLICY CONSULTING**

## Table of Contents

List of abbreviations.....	2
Executive Summary.....	3
1. The general situation in the IT sector .....	4
1.1. Domestic production .....	4
1.2. Employment .....	7
1.3. Sector development assessment.....	9
2. Foreign trade.....	10
2.1. Exports and imports .....	10
2.2. Revealed comparative advantage .....	11
3. Trade regime issues .....	12
3.1. Trade regime for exporters to Turkey.....	12
3.2. Trade regime for importers from Turkey .....	12
4. Impact of the FTA with Turkey.....	13
5. Conclusions .....	13

## List of abbreviations

EBA	European Business Association
GDP	gross domestic product
GVA	gross value added
PE	private entrepreneur (short for a physical person – entrepreneur)
RCA	revealed comparative advantage
SME	small and medium-sized enterprises
UAH	Ukrainian hryvnia

## Executive Summary

The Ukrainian IT sector is an important player in the global IT market. The country is home to more than 100 R&D offices of international companies, including Boeing, Aricent, Huawei, Siemens, Oracle, Magento, Apple, Microsoft, Deutsche Bank, Skype, eBay, IBM.

The sector generates ca. 2.1% of the gross value added in 2018 that is almost twice more than in 2013. Still, about a quarter of the market for IT services is informal. In 2017, out of 127 thousand people working in IT, approximately 46 thousand were officially employed, and around 80 thousand people worked as PEs.

The importance of IT services for Ukrainian exports increases. In 2018, computer services were the third largest sector in services exports from Ukraine following goods processing and pipeline transportation. There are no restrictions on hiring Turkish companies for IT services or the provision of services abroad. The only limitation is for hiring IT professionals due to the general restriction on the temporary movement of people. Business visitors in Ukraine are generally limited to a 90-day stay.

Since Turkey is not a member of the EU's Digital Single Market, it will not be able to prevent illegal commercial transactions by monitoring the VAT and tracking the goods. As Ukraine strives to join the European Digital Single Market, it is desirable to complete negotiations with the EU before opening up the IT sector within the FTA with Turkey.

### Summary table

Indicator	Value	Year of observation
Value added, % of GVA	2.1	2018
SMEs value added, % of sector total	66	2018
Real output growth, % CAGR, 2018	110	2018
Hired employees, thous.	55.2	2018
Average monthly wage, UAH	14746	2018
Exports, USD bn	1.63	2018
Exports, % of domestic production	57	2017
Imports, USD bn	0.25	2018
Imports, % of domestic absorption	21	2017
Ukraine RCA, world	1.70	2017

Sources: Ukrstat, WITS, authors' estimates

## 1. The general situation in the IT sector

### 1.1. Domestic production

*Value added.* The Ukrainian IT sector is an important player in the global IT market, with 16 of the Ukrainian IT service providers are in the 2019 Global Outsourcing-100 list.<sup>1</sup> Ukraine is home to more than 100 R&D offices of international companies, including Boeing, Aricent, Huawei, Siemens, Oracle, Magento, Apple, Microsoft, Deutsche Bank, Skype, eBay, and IBM.<sup>2</sup>

According to the IER estimates based on the official data, the IT sector in Ukraine generates ca. 2.1% of the gross value added in 2018 that is almost twice more than in 2013 (see Table 1). The Study of Sectoral Development Strategy for Information and Communication Technologies claims that the information and communication technologies together generate 3.4% of GDP.<sup>3</sup>

**Table 1: Value added in the IT sector\*, 2013 – 2018**

	2013	2014	2015	2016	2017	2018
Value added, UAH bn	12.9	16.8	20.6	35.5	52.4	64.8
Value added, % of output	45.6	41.6	31.9	37.1	40.5	37.9
Value added, % of GVA	1.0	1.2	1.2	1.8	2.1	2.1
Value added produced by PE, % of total	28.7	27.8	37.2	37.9	42.7	47.7

Source: Ukrstat, IER estimates

Note: \* based on information for private companies

In 2018, the total number of officially registered companies in the IT sector reached 12.6 thousand. However, this figure includes also economically inactive companies. According to the IT Ukraine Association, in 2018, there were around 4000 IT companies in Ukraine, and 2300 of them were active in the labor market. The majority of the companies (about 70%) provide IT services to a wide range of clients (EPAM, GlobalLogic, Netcracker), around 15% work as Global In-House Centers for the mother company (Wargaming.net, Ring, Samsung R&D Institute Ukraine, Oracle), and the remaining 15% create own software product (Genesis, EVO, Terrasoft).<sup>4</sup>

The sector has been expanding actively over the last six years, surpassing the average growth rate of the economy (see Figure 1).

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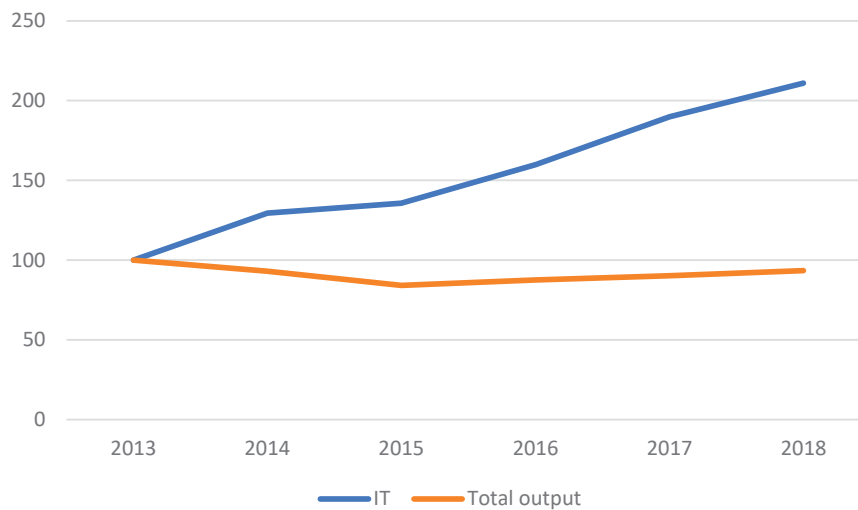
<sup>1</sup> Tech Ecosystem Guide to Ukraine. 2019.

<sup>2</sup> Ukraine: The Country That Codes. IT industry in Ukraine. 2019 Market Report.

<sup>3</sup> Study of Sectoral Development Strategy for Information and Communication Technologies 2019-2023. Ministry for Development of Economy, Trade and Agriculture. <https://issuu.com/mineconomdev/docs/>

<sup>4</sup> Development of Ukrainian IT Industry, October 2018. IT Ukraine Association, BRDO.

**Figure 1: Real output trends, 2013-2018 (index 2013=100)**



Source: Ukrstat

**Company size.** In the IT sector, 70-90% of the total value-added is produced by small and medium enterprises. The number differs by year and is hard to estimate because of fragmented and very often confidential data. Information about private entrepreneurs is more consistent. In 2018, they produced 49% of the value-added in IT, and their share has been growing.

The IT company size differs across the type of activity. The Study of Sectoral Development Strategy<sup>5</sup> distinguishes five types of activities: companies providing technological services, product companies, software development centres, technology start-ups, and auxiliary infrastructure.

Among *companies providing technological services*, 80% are small and medium enterprises. In most cases, such an enterprise is created when a freelance developer gets a contract that is too big for him and needs a team to do the work. Usually, such companies specialize in specific projects.

*Product companies* develop software for different domestic and foreign clients. Many new companies in this segment are registered abroad, and their Ukrainian offices work as R&D centers. All capital, revenues, and intellectual rights of such companies belong to their foreign owners.

*Software development centers* are owned by the clients, and such centers serve the IT needs of the mother company. There are around 100 such centers in Ukraine. They set high standards for software development in Ukraine and can attract other international companies to the market.

The number of *technology start-ups* was continuously growing and reached around 2000 in 2018. Start-ups play an essential role in the technological ecosystem as successful start-ups eventually become product companies and bring fresh ideas to the market. In the developed markets, start-ups can grow to a significant size in a short period. At the same time, the rate of failure among start-ups is very high. According to the Study of Sectoral Development Strategy, the start-up ecosystem in Ukraine is very immature compared to the neighboring countries.

*Auxiliary infrastructure* companies include server or system integrators, resellers of software and equipment, data centers. These mostly local companies install software or IT equipment.

**Ownership structure.** The IT market in Ukraine is mostly represented by private persons working as entrepreneurs. These are Ukrainian or foreign nationals registered in Ukraine as entrepreneurs who

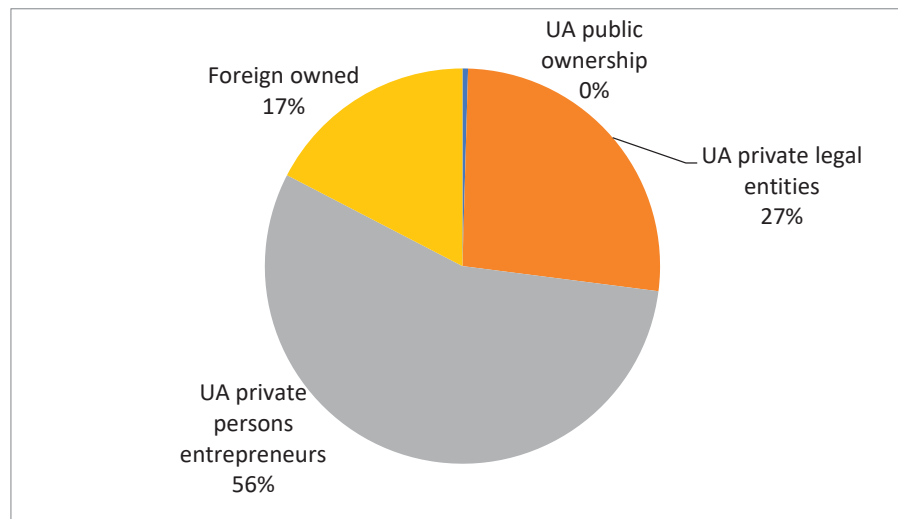
<sup>5</sup> Study of Sectoral Development Strategy for Information and Communication Technologies 2019-2023. Ministry for Development of Economy, Trade and Agriculture. <https://issuu.com/mineconomdev/docs/>

pay a single tax on revenues of 5% and a social security tax of 22% on the minimum wage in the country. As around 80% of IT companies' expenses are on wages, the industry is highly sensitive to changes in taxation on labor.

The IT sector is entirely private-owned; the share of public companies on the market is close to non-existent (see Figure 2). Traditionally, public companies prefer creating IT departments within their structure and hire IT professionals instead of registering a separate IT company.

Each sixth company on the market is in foreign ownership. The largest FDI deals in the IT-sphere in recent years were a USD 110 m investment in Grammarly, USD 30 m in BitFury, USD 10 m in Petcube, and USD 7 m in People.ai.<sup>6</sup>

**Figure 2: Ownership structure of the IT sector, 2018**



Source: Ukrstat

**Market concentration.** According to our estimates, the market for IT services is not very concentrated. Top-8 companies in the “Computer programming, consultancy, and information service activities” sector hold only 10% of the market. To-8 companies of the “Publishing, motion picture, video, television program production; sound recording, programming and broadcasting activities” sector hold 22% of the market, but the production of games and other software is only a small part of this sector. The market mostly consists of small companies and thus is highly competitive.

**Access to finance.** According to the CEP survey,<sup>7</sup> the IT companies in Ukraine have no access to primary sources of finance like incubators and accelerators, venture, corporate and private equity funds, and international organizations. The reason is that they cannot fulfil the requirements of obligatory financial audit, minimum required own capital, and quality of team composition. Moreover, none of the executives interviewed by CEP recalled receiving any donor assistance for the past years.

Banks are also not ready to lend money to IT companies since they mostly work with virtual objects like software, networks, internet sites, databases, etc.<sup>8</sup> Thus, the bank has no guarantee that such an object exists and classifies many IT activities as high-risk activities. According to our information, a similar situation is in Ukraine.

Thus, IT firms in Ukraine tend to use self-financing.

<sup>6</sup> Ukraine: The Country That Codes. IT industry in Ukraine. 2019 Market Report.

<sup>7</sup> Sector Selection Assessment Report. Competitive Economy Program. USAID Ukraine. February 15, 2019.

<sup>8</sup> [https://biz.ligazakon.net/ua/analitics/189384\\_bl-it-kompany-z-chim-vi-neodmnno-ztknetes](https://biz.ligazakon.net/ua/analitics/189384_bl-it-kompany-z-chim-vi-neodmnno-ztknetes)



*Informal sector.* According to our estimates, the informal sector constitutes a quarter of the market for IT services. In the “Computer programming, consultancy, and information service activities” sector, the informality index is 23.1<sup>9</sup>. In the “Publishing, motion picture, video, television program production; sound recording, programming, and broadcasting activities” sector, the informality index is 34.5<sup>10</sup>. These figures are relatively low, suggesting that IT companies prefer to show their revenues and try to minimize labor taxes mostly through registering their employees as private entrepreneurs.

In March 2019, the DOU internet site surveyed IT specialists on their attitude to the suggestion to increase taxes for IT specialists registered as private entrepreneurs (PEs) from 5% to 10%.<sup>11</sup> Among the respondents, 88.9% replied that they work as PEs, 1.7% told that they officially receive only a minimum wage and the rest is paid unofficially (“in the envelope”), 4% said that all their wages are paid “in the envelope”, and 5.3% said that a company officially employs them. The survey also confirmed that registration as a PE is very often used to evade taxes – for 42.8% of respondents, the employer compensates labor taxes fully or partially.

## 1.2. Employment

*Sector’s role as an employer.* Most IT specialists work at IT companies not as employees but as private entrepreneurs. According to the estimates of the BRDO, in 2017, out of 127 thousand people working in IT, approximately 46 thousand were officially employed, and around 80 thousand worked as PE.<sup>12</sup> It should be noted that a quarter of the personnel of IT companies is non-technical workers: designers, financial and HR managers, lawyers, security and administrative staff, etc. Surveys show that a third of PEs working in IT work for foreign companies.<sup>13</sup> At the same time, wages set in euros or US dollars in Ukrainian IT firms attract IT specialists from neighboring countries. Market players also note comparatively low taxes for PEs in Ukraine (see Table 2).

**Table 2: Employment in the sector\*, 2013 – 2018**

	2013	2014	2015	2016	2017	2018
The number of hired employees in the sector, thous.	56.3	54.4	46.9	48	51.9	55.2
Hired employees in the sector, % of total in the economy	0.7	0.7	0.7	0.7	0.8	0.8
Average monthly wage, UAH	4396	5113	8207	10705	12945	14746
Average monthly wage, USD	550	430.2	375.7	419	486.7	542.1

<sup>9</sup> Percentage of household GVA in the total CVA adjusted for FOP.

<sup>10</sup> Percentage of firms competing against informal firms.

<sup>11</sup> <https://dou.ua/lenta/articles/it-fop-and-new-taxes/>

<sup>12</sup> Development of Ukrainian IT Industry, October 2018. IT Ukraine Association, BRDO.

<sup>13</sup> Same source

	2013	2014	2015	2016	2017	2018
Real average monthly wage, index, 2013=100	100	101.9	110	126	133.1	136.7

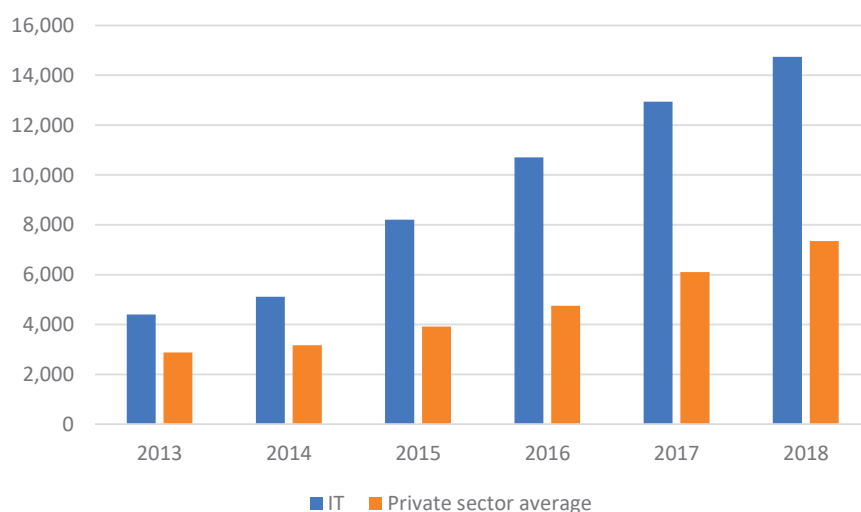
Source: Ukrstat

Note: \* based on information for private companies

**Self-employment.** In the IT sector, there is a widespread practice of disguised employment when permanent workers are officially employed as independent contractors to reduce the amount of taxes paid. That makes it hard to assess the distribution of firms in the sector. The Ukrstat gives the share of micro-sized firms<sup>14</sup> in computer programming to be 99.4%. Small-sized firms hold 0.5% of the market, the percentage of medium-sized firms is 0.1%, and the share of large-sized firms is 0.01%.<sup>15</sup> However, the Ukrainian IT community web portal dou.ua gives a higher number of large firms in the sector. Thus real shares of large, medium-sized, and small firms are higher than the data from financial statements. The same web portal gives the percentage of workers employed by the 50 largest IT companies at 43.6% of the total employment reported by Ukrstat.

**Wages.** In 2018, the official wage in the sphere of information and telecommunications was twice higher than the Ukraine private sector average (see Figure 3). Unofficial data<sup>16</sup> gives the wage numbers higher than the Ukraine average by 6.6 times. Company surveys show that the wages in IT companies are seven times higher than the average wage in Ukraine, and SME revenues are 7.8 times higher than the average wage.

**Figure 3: Average monthly wage, 2013-2018**



Source: Ukrstat

<sup>14</sup> The study defines micro-sized firms as business entities with 1-9 workers, small firms are the ones with 10-49 workers, medium-sized firms employ 50-249 workers, and the rest are large firms.

<sup>15</sup> How to boost export and foster private sector driven economic growth in Ukraine? Analysis of Ukrainian manufacturing, agriculture and IT (MAIT) sectors. KSE Discussion paper.

<sup>16</sup> Dou.ua, average for Software Engineer

*Labor turnover.* In 2018, 39.8 thousand people quit their jobs in the sector “Information and telecommunications,” which includes the IT sector.<sup>17</sup> That constitutes 33.7% of the total number of officially employed persons in the sector. For comparison, in 2017, 29.3% of the total number employed in the sector were hired, and 34.4% were fired. This means that approximately a third of people working in the IT sector change their jobs each year.

The study “How to boost export and foster private-sector-driven economic growth in Ukraine?”<sup>18</sup> noted a low exit rate for poorly performing IT firms, which locks in the inefficient use of resources due to the existence of a large number of ‘zombie’ firms (financially insolvent or illiquid firms that survive due to soft budgets and delinquencies in the financial sector). However, this factor is present in all sectors of the Ukrainian economy and indicates that there are regulatory barriers to exit that prevent poorly performing firms from shutting down. According to the study, 47% of an increase in productivity in the IT sector in 2009-2016 can be explained by the reallocation of market shares towards more productive firms.

The CEP Online Survey of IT industry players conducted in January 2019 showed that the IT market faces shortages of highly skilled employees, including those specializing in artificial intelligence and the internet of things.<sup>19</sup>

### 1.3. Sector development assessment

The sector heavily depends on the quality of human capital. If in 2014-2015, there was an outflow of IT specialists looking for a job abroad, nowadays, there is an outflow of students looking for education abroad. This trend, coupled with the low quality of IT education in Ukraine, creates a deficit of qualified IT personnel in Ukraine.<sup>20</sup> There is also a steady demand for IT managers able to develop reliable services for clients. Some companies note that due to the deficit of managers in Ukraine, they hire professionals from big foreign companies like Amazon and Paramount.

Another issue is the weak domestic demand. Big companies see no value in outsourcing IT services to a specialized company; they prefer to create IT departments within the company. Some big players, like GlobalLogic, develop IT products for the Ukrainian market as a form of social responsibility. For example, the company participated in the development of a new system for the management of military units and the National Healthcare Electronic Registry eHealth.

The recent trend is the increased demand for IT products from government institutions.<sup>21</sup>

Some market players expect consolidation on the IT market of Ukraine in the coming years: big players will push the so-called “body shops”, i.e. companies that lend IT specialists to foreign clients without creating a value added, out of business.

The recent COVID-19 pandemic will influence the IT sector, although the overall impact is not apparent. On the one hand, the industry will face lower demand due to the general decrease in economic activity. The EBA forecasts losses for IT companies working with product companies, e.g. developing algorithms for GPS trackers installed in vehicles or individual solutions for mobile phone

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<sup>17</sup> In addition, 2.8 thous. people were fired due to liquidation of job positions. Movement of workforce. 2018. Ukrstat

<sup>18</sup> How to boost export and foster private sector driven economic growth in Ukraine? Analysis of Ukrainian manufacturing, agriculture and IT (MAIT) sectors. KSE Discussion paper.

<sup>19</sup> Sector Selection Assessment Report. Competitive Economy Program. USAID Ukraine. February 15, 2019.

<sup>20</sup> Development of Ukrainian IT Industry, October 2018. IT Ukraine Association, BRDO.

<sup>21</sup> Same source.

manufacturers. The association thinks that during the crisis, the demand for cars or smartphones will not grow much, and IT companies will not get many orders from this sector. On the other, companies working in telecommunications, fin-tech or e-commerce will keep their order portfolio.<sup>22</sup>

According to sector informants, most IT firms switched to working remotely and do not expect any short-term layoffs or pay cuts. “So far, we haven’t felt a decline in orders, but some customers are delaying [the] launch of their projects”, said Yaroslav Lyubinetz, chairman of the board of SoftServe.<sup>23</sup> The delayed launch of products and a general decrease in demand for IT services may mean that in the longer period, the IT companies will have to cut wages or personnel.

## 2. Foreign trade

### 2.1. Exports and imports

Most IT companies in Ukraine earn their money abroad: half of the revenues come from the US; the second-largest revenue source is the UK. Ukrainian companies also work with firms from Germany, Canada, Israel, Sweden, and Switzerland.

The importance of IT services for Ukrainian exports increases. In 2018, computer services were the third largest sector in services exports from Ukraine following goods processing and pipeline transportation. The share of IT services exports in the total exports reached 14% in 2018, doubling compared to 2013 (see Table 3).

The IT exports significantly surpass imports, although the recent tax stimulus foster imports. The imports of software are exempt from the VAT until January 1, 2023. However, the official imports of the IT services remain quite low. In 2018, the share of IT services imports in the total imports was 4%.

**Table 3: Foreign trade in the IT sector\*, 2013 – 2018**

	2013	2014	2015	2016	2017	2018
Value of exports, USD bn	0.93	1.10	1.00	1.15	1.31	1.63
Exports growth, % year-on-year		18	-10	15	15	24
Exports, % of total exports	7	10	10	12	12	14
Value of imports, USD bn	0.28	0.22	0.19	0.19	0.2	0.25
Imports growth, % year-on-year		-22	-12	-2	7	26
Imports, % of total imports	4	3	3	4	4	4
Trade balance, USD bn	0.65	0.88	0.81	0.96	1.11	1.38

Source: Ukrstat/WITS

Note: \* based on information for private companies

<sup>22</sup> <https://eba.com.ua/koronavirus-ta-it-yak-ynyknuty-stagnatsiyi/>

<sup>23</sup> <https://www.intellinews.com/uncertain-prospects-for-ukraine-s-it-industry-180869/>

In 2019, Ukraine ranked 20<sup>th</sup> on the A.T.Kearney Global Services Location Index with a score of 5.36, surpassing Poland, Hungary, Romania, Latvia and other popular IT hubs of Eastern Europe. Information technology exports play an important role in Ukrainian IT production (see Table 4).

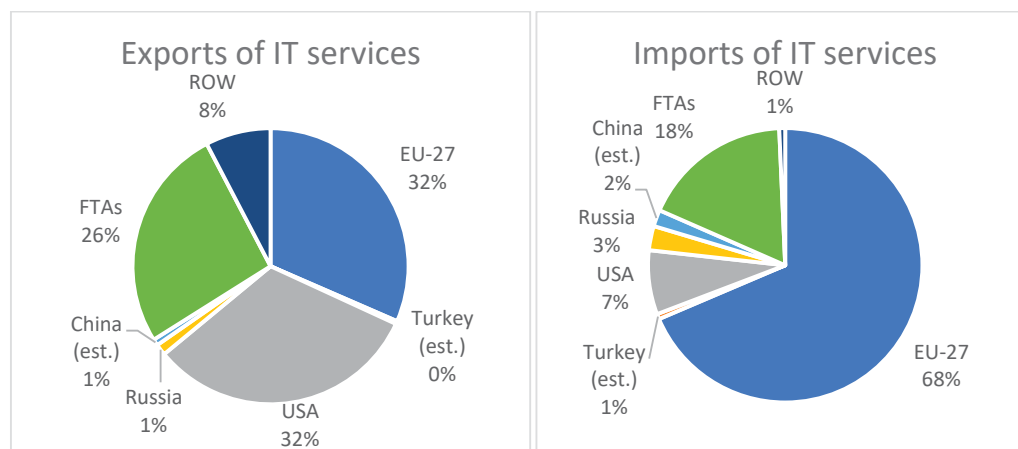
**Table 4: Export orientation and import dependence of the sector, 2017**

	% of exports in domestic production	% of imports in domestic consumption	% imported inputs in intermediate consumption
Information Technology	57	21	22

Source: SAM 2017

The biggest consumers of Ukrainian IT services are the EU countries, the USA and countries with which Ukraine signed free trade agreements (see Figure 4).

**Figure 4: Key trade destinations of IT sector, 2018**



Source: Ukrstat

Note: data for Turkey, China, Belarus, Moldova, Armenia, Azerbaijan, Georgia, Uzbekistan, Kazakhstan, and Tajikistan include IT services and telecommunications.

Turkey plays a very moderate role in the foreign trade of IT services; its share in Ukraine's exports to Turkey is 3.2%, while the IT share in Ukraine's imports to Turkey is below 0.4% in 2018.

## 2.2. Revealed comparative advantage

Ukraine's exports feature a comparative advantage in computer services, while Turkey has no competitive advantage in exports of these services. These figures suggest that the countries could benefit from the opening of computer services.

**Table 5: Revealed Comparative Advantage in computer services, 2013 – 2017**

	2013	2014	2015	2016	2017
Ukraine RCA	1.52	1.56	1.50	1.66	1.70
Turkey RCA	n/a	n/a	n/a	n/a	0.03

Source: Ukrstat, ICT Trade Map, own estimates

### 3. Trade regime issues

#### 3.1. Trade regime for exporters to Turkey

Ukrainian IT companies generally can freely provide services abroad, including the Turkish market. For example, in April 2020, global IT company Astound Commerce with offices in Ukraine and five other countries, opened an office in Turkey to expand its technical personnel.<sup>24</sup> Turkish companies actively hunt Ukrainian IT specialists through business associations. In 2017, the Turkish business association arranged for a visit of Tubitak representatives to Ukraine to meet Lviv IT companies.<sup>25</sup>

Turkey attracts global IT companies by introducing a patent box regime (also referred to as intellectual property, or IP, regimes). Such regimes provide lower tax rates on income derived from IP. In Turkey, a full tax deduction (zero per cent effective tax rate) is allowed for qualified IP income<sup>26</sup> resulting from R&D activities that were undertaken in Turkish Technology Development Zones.<sup>27</sup> For other areas in Turkey, the reduction is 50% of the corporate tax for patents and utility models.

Turkey is not a member of the EU's Digital Single Market. According to Turkish analysts, this disadvantages Turkish companies in competition with European companies (in both commerce and e-commerce), excludes Turkey from digital structures, legislation, and free-roaming services in Europe.<sup>28</sup> Turkey also will not be able to prevent illegal commercial transactions by monitoring the VAT and tracking the goods. As Ukraine strives to join the European Digital Single Market, it is desirable to complete negotiations with the EU before opening up the IT sector within the FTA with Turkey. That way, Ukraine's access to the European digital market will not depend on the success of negotiations on the modernization of the EU-Turkey Customs Union.

#### 3.2. Trade regime for importers from Turkey

In Ukraine, hiring Turkish companies for IT services has no restrictions. The only limitation is for hiring IT professionals due to the general restriction on the temporary movement of people. Business visitors in Ukraine are generally limited to a 90-day stay.

The work permit in IT is issued for three years. The foreigner needs to submit three documents: a work permit, a D-type visa, and a temporary residence permit. Since the D-type visa is not issued in Ukraine, the foreigner needs to travel abroad to obtain it.

Ukrainian companies surveyed by CEP in January 2019 (including foreign-owned) perceived little competition from imported IT services.<sup>29</sup> Nearly 60% saw the main competitors in the domestic market to be other IT companies in Ukraine or independent contractors (e.g. freelance IT specialists). The companies consider their key competitive factors to be excellent customer service, quality reputation, and timely delivery.

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<sup>24</sup> <https://itukraine.org.ua/en/us-based-it-company-astound-commerce-opens-new-office-in-izmir.html>

<sup>25</sup> <http://mostyska.loda.gov.ua/lvivshhina-turechchina-nalagodzhennya-kontaktu-mizh-biznesom/>

<sup>26</sup> Qualifying assets refer to patents, software, and 3<sup>rd</sup> category of IP. To qualify under the 3<sup>rd</sup> category of IP, the IP asset must be certified as patentable, meaning it meets the patentability criteria, but has not been patented. [https://qdd.oecd.org/subject.aspx?Subject=IP\\_Regimes](https://qdd.oecd.org/subject.aspx?Subject=IP_Regimes)

<sup>27</sup> <https://taxfoundation.org/patent-box-regimes-europe-2019/>

<sup>28</sup> <http://tages.biz/turkey-misses-digital-single-market/>

<sup>29</sup> Sector Selection Assessment Report. Competitive Economy Program. USAID Ukraine. February 15, 2019.

## 4. Impact of the FTA with Turkey

We considered several policy shocks to assess the impacts on FTA with Turkey on Ukraine, including:

- The reduction in trade costs due to reduced time required to import or export goods, both on the Ukrainian and the Turkish sides;
- The reduction of non-tariff barriers on goods by both Ukraine and Turkey;
- The mutual elimination of tariffs between Ukraine and Turkey; and
- The reduction of barriers on foreign providers of services for selected categories of services, not including tourism and hospitality sector.

As the sector's trade is liberal, and thus the model foresees no direct changes related to the IT sector, its response to the policy shock is driven by indirect effects only.

The model shows that in the deep liberalization FTA scenario, the sector's output will reduce by 11.8%, driven by the reallocation of resources within the economy after the liberalization of trade in goods, including the removal of tariff barriers and the reduction in other trade costs. The sector's exports will decrease by 15.2%, while imports will go down by 6.0%. As a result, the reduction in domestic supply will constitute 7.5%, causing a small increase in local prices.

## 5. Conclusions

The Ukrainian IT sector is an important player in the global IT market. The country is home to more than 100 R&D offices of international companies, including Boeing, Aricent, Huawei, Siemens, Oracle, Magento, Apple, Microsoft, Deutsche Bank, Skype, eBay, IBM.

The sector generates ca. 2.1% of the gross value added in 2018 that is almost twice more than in 2013. Still, about a quarter of the market for IT services is informal. In 2017, out of 127 thousand people working in IT, approximately 46 thousand were officially employed, and around 80 thousand people worked as PEs.

The sector depends on the qualified labor force, so the low quality of IT education and brain drain are among the main challenges for the sector's development.

The importance of IT services for Ukrainian exports increases. In 2018, computer services were the third largest sector in services exports from Ukraine following goods processing and pipeline transportation. There are no restrictions on hiring Turkish companies for IT services or the provision of services abroad. The only limitation is for hiring IT professionals due to the general restriction on the temporary movement of people. Business visitors in Ukraine are generally limited to a 90-day stay.

Since Turkey is not a member of the EU's Digital Single Market, it will not be able to prevent illegal commercial transactions by monitoring the VAT and tracking the goods. As Ukraine strives to join the European Digital Single Market, it is desirable to complete negotiations with the EU before opening up the IT sector within the FTA with Turkey.

To strengthen the sector's development, we recommend focusing on the following:

- The improvement of the educational programs, including both training of IT specialists and the IT sector managers;
- The facilitation of the domestic demand by the promotion of e-services, including the development of government e-services;

- The strengthening of property rights protection, including intellectual property rights, so new creative ideas are realized in Ukraine;
- To facilitate the development of clusters, including both the IT clusters and the integration of IT companies into manufacturing clusters.