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Economical Aspects of IT-Market in Several Central and Eastern European Countries

Summary: Taking into account the positive economic trends in the development of the IT-industry, the main objective of the study is to analyze the state of this industry in the Central and Eastern European countries, to identify the leaders among the analyzed countries based on determining the economic indicators which characterize the saturation level of IT-enterprises and the saturation level of the IT-employees in comparison with the working-age population as well as to examine the structure of export and import of IT-services in Poland and Ukraine.
Keywords: IT-industry, IT-enterprise, IT-market.

Introduction

The development of information and communication technologies is associated with advances in programming, cloud computing and technologies, video games, etc. In this connection, worthy of mention are computerization of firm's functioning and the growth in demand for software for individuals, including software for smartphones, tablets and other electronic devices.

The IT-industry has been recently formed and has rapidly gained importance in society. The dynamic development, innovativeness and creativity are the essential features of this industry. In the process of formation and functioning of the leading European countries, the changing trends in key industries of these countries were observed. The industries having the greatest contribution to GDP also form a positive image of these countries in the world.

Today, the IT-industry occupies a highly important place in the economic potential of export-oriented countries. Its advanced position in Poland is confirmed by positive statistical activities as well as by great number of orders coming from abroad and being in progress. The characteristics of

IT-industry in Poland were considered in [1], [14], [15], [17], [18]. The analysis of IT clusters in Romania under local conditions at regional level was made in [2]. Some aspects of IT market in Czech Republic were investigated in [6], [12]. Trends and competitiveness of information and communication technologies in Ukraine were studied in [4], [10], [11], [16]. The analysis of literature and the practice of IT-enterprises show the incompleteness of the study of current situation in IT-industry in the Central and Eastern European countries. In this paper, we compare the IT-market in Poland, Ukraine, Czech Republic, Romania, Bulgaria, and Belarus).

IT-enterprises in Central and Eastern European countries

The IT-industry exhibits significant growth potential, promotes economic development and ensures international cooperation in this field. The study aims to investigate the situation on the IT-market in some Central and Eastern European countries through studying the corresponding economic indicators. The comparison of the competitive position of the IT-market in Poland with some Central and Eastern European countries will enable to position the place of Poland in the international market among competitors.

During the considered period, the development of the domestic market of information and communication technologies was characterized by a general increase and a slight decline in times of economic crisis. Today the Polish IT-market is one of the best in Europe. Statistical data testify that the IT-industry is also developed in the Czech Republic, Ukraine, the Republic of Belarus, Bulgaria, and Romania. Table 1 presents the largest IT-companies in those countries.

Table 2 shows the total number of enterprises in several Central and Eastern European countries (average data from 2014 and 2015). The largest number of registered enterprises is observed in Poland, next are Romania and Czech Republic, while the lowest number of registered enterprises is in Belarus. Considering the geographical factor (the country area), we can conclude that Poland takes a leading place on the saturation level of enterprises. The Czech Republic occupies the second place and is followed by Bulgaria, Romania, Belarus and Ukraine.

The number of firms operating in the IT-industry of the country is the informative indicator describing the state of this industry (see Table 3). Poland and Czech Republic have the largest numbers of IT-enterprises and the largest saturation level with respect to the country area.

Table 1. The list of the most important IT-companies in several Central and Eastern European countries

No.	Country	The largest IT-companies
1	Poland	HP Polska, ABC Data, Atos w Polsce, Capgemini Polska, GK AB, IBM Polska, AB, Asseco Poland, Comtegra, Microsoft, Comarch
2	Ukraine	SoftServe, Eleks, Miratech, Sigma Software
3	Czech Republic	ArmA, AVG, Avast, eM Client, GoodData, Jablotron, SocialBakers
4	Romania	Adobe, Oracle, Endava, IBM, Cegeka
5	Bulgaria	POLYCOMP, Solytron Bulgaria, Telelink, STEMO, Kontrax
6	Republic of Belarus	EPAM Systems, PROGNOZ, IBA Group, Ericpol Telecom, Sam Solutions, Intetics, SoftClub

Source: own study based on [5], [20], [22], [24], [27], [33].

Table 2. The saturation level of enterprises in several Central and Eastern European countries

No.	Country	The area (km^2)	The average number of enterprises registered in the country (thousand)	The number of enterprises divided by the area of the country
1	Poland	312679	1878	6,01
2	Ukraine	603628	342	0,57
3	Czech Republic	78866	411	5,21
4	Romania	238391	488	2,05
5	Bulgaria	110994	320	2,88
6	Republic of Belarus	207595	145	0,70

Source: own study based on the data [3], [19], [21], [28], [29], [30], [34].

To estimate the level of development of the IT-industry in the countries under consideration we should identify the total number of IT-companies and set the ratio of the number of IT-companies and the total number of enterprises in these countries (Fig. 1). The larger the diameter of the circle is, the larger the number of active companies in the country is. The map shows that the highest ratio of the number of IT-companies to the total number of enterprises is observed in Poland and Romania, the lowest ratio is in Belarus.

Consider more statistics on the total number of enterprises in the studied countries (Fig. 2) as well as the number of operating IT-companies (Fig. 3).

Table 3. The saturation level of IT-enterprises in several Central and Eastern European countries

No.	Country	The area (km²)	The average number of IT-enterprises registered in the country	The number of IT-enterprises divided by the area of the country
1	Poland	312679	76302	0,244027
2	Ukraine	603628	13468	0,022312
3	Czech Republic	78866	33000	0,418431
4	Romania	238391	19485	0,081735
5	Bulgaria	110994	9452	0,085158
6	Republic of Belarus	207595	930	0,00448

Source: own study based on [7], [9], [25], [28], [29].

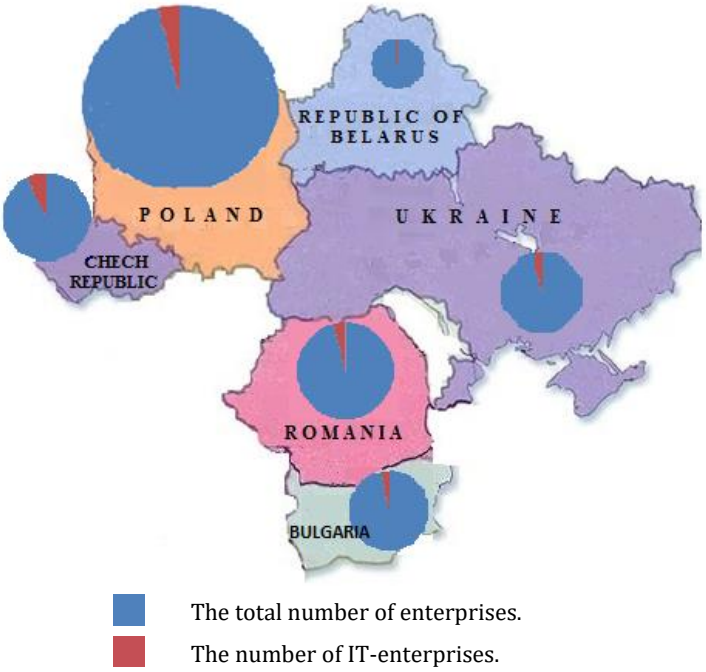

Fig. 1. The total number of enterprises and the number of IT-enterprises in several Central and Eastern European countries

Source: own study based on the data data [3], [19], [21], [28], [29], [30], [34].

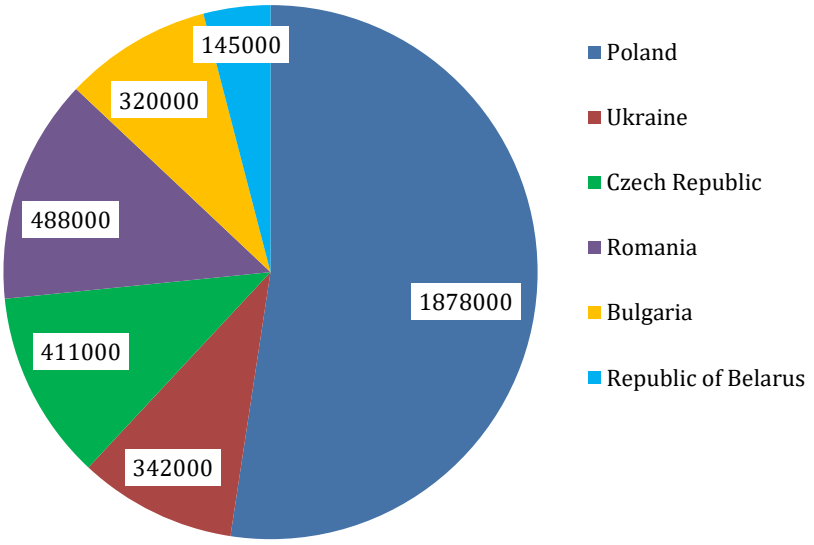

Fig. 2. The total number of enterprises in several Central and Eastern European countries

Source: own study based on the data data [3], [19], [21], [28], [29], [30], [34].

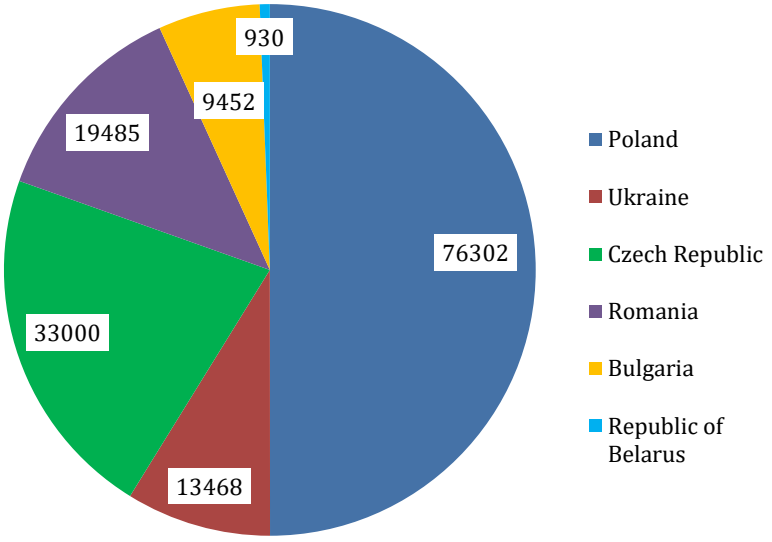

Fig. 3. The number of IT-enterprises in several Central and Eastern European countries

Source: own study based on the data [7], [9], [25], [28], [29].

Many factors influence on the number of enterprises in a country: current legislation, speed and simplicity of registration procedure, business support by government, tax deductions, grants, credits and loans, competitiveness, innovation of firm's product, etc. The number of the IT-enterprises in a country is influenced by market entry conditions, the availability of highly qualified specialists, performance of software engineers, main competitors, supporting innovative companies by government, etc.

In addition to the number of IT-companies in the market situation in this field describes the number of specialists for the operation of IT-industry. Let us discuss this indicator of situation on the markets of Central and Eastern European countries. Figure 4 illustrates the number of employees of IT-companies in Poland, Ukraine, Czech Republic, Romania, Bulgaria and Belarus.

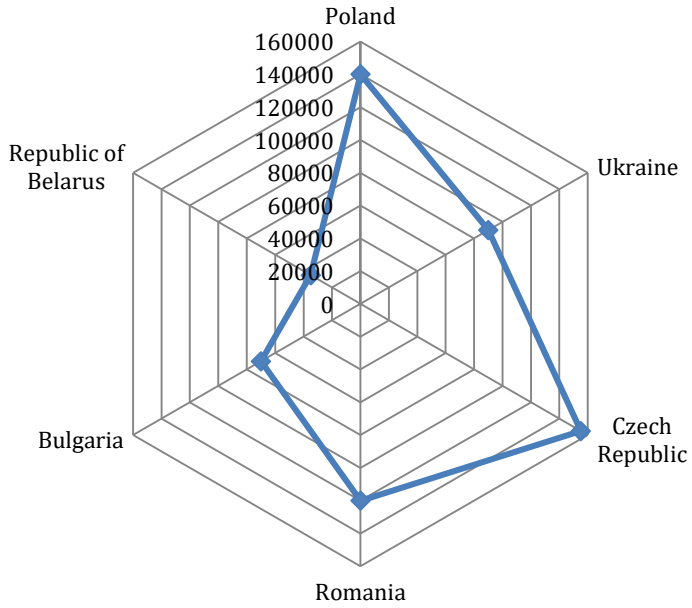

Fig. 4. The number of employees of IT-companies in several Central and Eastern European countries

Source: own study based on [7], [13], [23], [31], [32], [33].

According to statistics, the largest number of employees in the IT-sphere is in the Czech Republic and Poland, whereas the lowest number is in Belarus (Table 4). The highest concentration of IT-specialists is noted in the Czech Republic as well as in Bulgaria and is followed by Romania, Belarus, and Poland; the lowest concentration of IT-specialists is in Ukraine.

Table 4. The characteristics of IT imployees in several Central and Eastern European countries

No.	Country	The number of IT imployees	The working-age population	The ratio of IT employees to the working-age population (%)
1	Poland	140000	24230162	0,577792
2	Ukraine	90000	16200000	0,555556
3	Czech Republic	155100	8947632	1,73342
4	Romania	120000	12600000	0,952381
5	Bulgaria	70000	4376239,5	1,599547
6	Republic of Belarus	35000	4523250	0,77378

Source: own study based on [7], [13], [23], [31], [32], [33].

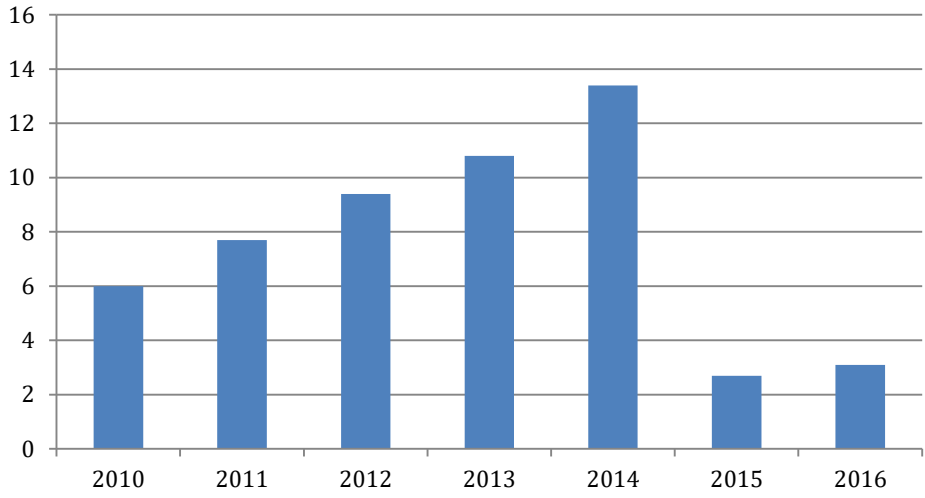

Fig. 5. The export volume of information and communication technologies (ICT) in Poland (mld PLN)

Source: own study based on [8].

According to the current practice of IT-companies, many of them involve outsourcing and export the results of their work. Both employer and contractor benefit from such cooperation as it strengthens international relations of a company and promotes the development of IT-sphere in the world.

Among the total export of services in Poland, the IT-services occupy a prominent position and increase their role in international cooperation. Figures 5 and 6 present export and import volume of information and communication technologies (ICT) in Poland, respectively.

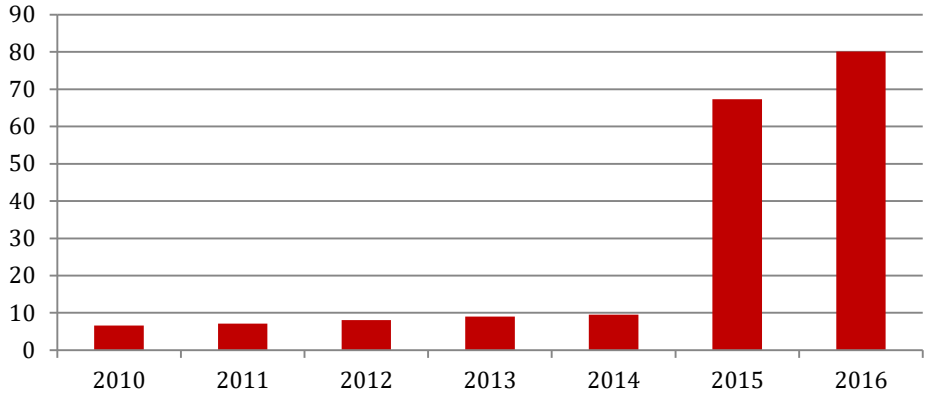

Fig. 6. The import volume of information and communication technologies (ICT) in Poland (mld PLN)

Source: own study based on [8].

Next, we present the structure of export and import of information, computer and telecommunications services in Ukraine (see Figures 7 and 8).

Analysis of the export volume of information, computer and telecommunications services in Ukraine in 2014 and 2015 shows that this volume remains approximately at the same level with small growth trends. A decrease in import volume of telecommunications services in Ukraine in 2015 in comparison with 2014 is connected with different factors, in particular, with military and political situation of the country. At the same time, import of information and computer services shows a slight increase. Experts predict stabilization of the IT-market in Ukraine in the nearest future.

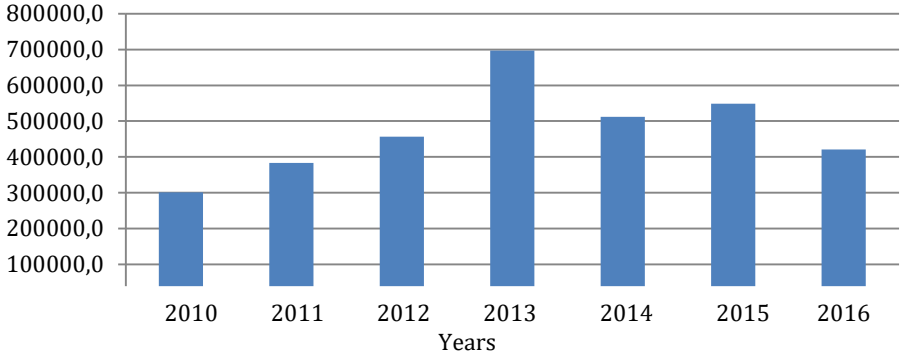

Fig. 7. The structure of export of information, computer and telecommunications services in Ukraine 2010–2016 (million USD)

Source: own study based on [26].

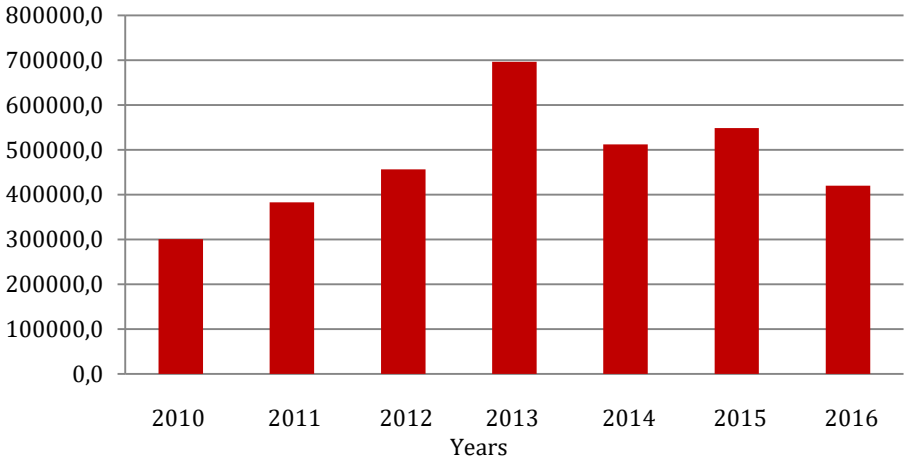

Fig. 8. The structure of import of information, computer and telecommunications services in Ukraine 2010-2016 (million USD)

Source: own study based on [26].

Conclusions

The development of the IT-industry affects positively the economic situation of the country as a whole, providing the latest trends in one of the most evolving sector of the international market. Our study gives grounds to assert that the IT-market in Poland has a strong position and takes a leadership role among the Central and Eastern European countries based on many criteria and indicators. Rapid development of the industry assists in initiation and activation of new IT-companies, promotes the IT-education, gives Poland the chance to occupy forward position among countries assuring a high level of IT-industry and the quality of IT-services. We can predict rapid advancement of information, computer and telecommunication technologies market in Poland.

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Aspekty ekonomiczne rynku IT w wybranych krajach Europy Środkowo-Wschodniej

Synopsis: Uwzględniając pozytywne tendencje gospodarcze branży IT, głównym celem badania jest analiza stanu tej branży w krajach Europy Środkowej i Wschodniej, identyfikacja liderów wśród analizowanych krajów na podstawie określonych wskaźników ekonomicznych, które charakteryzują poziom nasycenia terytorium IT-przedsiębiorstwami oraz poziom nasycenia pracowników branży IT w porównaniu z ludnością w wieku produkcyjnym; ustalenie struktury eksportu i importu usług telekomunikacyjnych, informatycznych i informacyjnych w Polsce i na Ukrainie.
Słowa kluczowe: branża IT, przedsiębiorstwo IT, rynek IT.