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DEVELOPMENT OF IT OUTSOURCING IN UKRAINE: A PROSPECT OF THE BRAIN DRAIN REDUCTION*

Nataliia Marynenko¹ , Halyna Tsikh², Iryna Kramar³ 

ABSTRACT

Ukraine is faced by a devastating problem of economically active population emigration, which has reduced the labor force in the country by 5-8% in the last two years and demonstrated a negative impact on the potential Gross Domestic Product (GDP). Despite this, Ukraine is one of the leading software development centers in Central and Eastern Europe and ranks fourth in the export of information technology (IT) products and services in the world nowadays. The IT industry is one of the four priority sectors for Ukraine's export strategy, it is one of the most perspective, dynamic and innovative branches of Ukraine's economy. Professional expertise, cost effectiveness and high standard technical education make this industry attractive also in terms of employing Ukraine's own intellectual resources within the country. The article aims to characterize the state of affairs, potential and prospects for the development of the Ukrainian IT outsourcing market as well as to analyze and evaluate it including comparison with foreign practice. Research methods used are as follows: desk research, inductive and deductive methods, abstract and logical method, system approach, analysis and synthesis, empirical methods, and statistical analysis. The essence of IT outsourcing, its types, aims and main advantages of use are revealed in the article. The features of IT outsourcing industry trends both in Ukraine and the world practice are researched. Competitive advantages of Ukraine in the world IT outsourcing market are identified. Challenges, obstacles, risks as well as potentials and prospects of IT outsourcing development are determined and analyzed. Recommendations for the brain drain reduction due to the IT industry progress are offered and its impact on the potential GDP growth and

economic development of Ukraine as a whole is provided.

Keywords: IT outsourcing, brain drain, competitive advantage, development

JEL: L24, O15, M15, O30

1. INTRODUCTION

As estimated by the United Nations (2019) by 2050, the population in Ukraine will decrease to 36 million (43.9 million – in 2019) and 50 years later it may be recorded at 28 million. Next to low fertility rates, migration plays a key role for the situation to happen. Every Ukrainian who leaves in search of a better life is contributing to the loss of one of country's most valuable resources – human potential (Talmazan, 2019). The representative of the National Bank of Ukraine (NBU) Nikolaichuk (2018) said that for the last two years migration has reduced Ukrainian workforce by 5-8% and the impact on potential GDP is quite high. The tendency for young people to leave abroad to study is also strong. Despite this, Ukraine is one of the leading software development centers in Central and Eastern Europe (CEE). Professional expertise, cost effectiveness and high standard technical education makes this branch attractive in terms of use of its own intellectual resources within the country in particular (Komsa & Hrebennyk, 2017).

The research on the possibilities to lower Ukraine's drastic brain-drain by ensuring appropriate institutional conditions for IT professionals is of great importance.

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The aim of the article is to characterize the state of affairs and potentials for the formation of Ukraine's IT market, as well as to analyze and evaluate the prospects for its development, including comparison with foreign practice.

2. PREVIOUS RELATED RESEARCH

Features of IT outsourcing development are studied in the works of foreign and Ukrainian scientists. Significant contribution to the development of the concept of outsourcing belongs to Heywood (2001) who presented the arguments for and against outsourcing.

Gottschalk and Solli-Saether (2006) focused their attention on the issues related to the strategy, structure, principles and methods of effective IT outsourcing management. Bravard and Morgan (2006) showed how to make efficient outsourcing-related decisions.

St. Amant (2009) covered business process outsourcing (BPO), government IT outsourcing, localization and offshoring, outsourced IT projects, trust in offshore outsourcing, etc. Hirschheim, Heinzl, and Dibbern (2009) attempted to synthesize what is known about information systems outsourcing by studying its three parts (traditional IT outsourcing, IT offshoring, and BPO). Beulen, Ribbers, and Roos (2010) presented both research and practical examples to explore how relationships with external provider(s) have to be established and managed successfully. Willcocks, Lacity, and Sauer (2017) shared a report for the findings of 405 major research studies on offshoring, and offered the analysis of emerging findings and practices for the future. The work by Aubert and Rivard (2016) is devoted to theoretical principles and modern trends of IT outsourcing.

Features of IT outsourcing in Ukraine were studied by Ukrainian scholars Osadchuk, Yohhna (2010), Matvii (2013), Herasymchuk (2013), Meshko, Yefremova (2015), Litoshenko (2017), Iliencko, Moroz (2014), who researched the nature, types, advantages and disadvantages of outsourcing, and analyzed the dynamics of the IT outsourcing market in Ukraine. Tyshchuk and Pavlova (2013) analyzed the potential and prospects of IT

outsourcing in Ukraine. Tropitsyna (2014) revealed the stages and mechanism of using outsourcing services to improve enterprise efficiency and analyzed the market for outsourcing services in Ukraine. Koshkariyeva (2016) studied distinctive features of outsourcing as a service and the purpose of its application. IT outsourcing in Ukraine as an activity was studied by Tonyuk (2016), who considered its trends and development forecasts. Sadchykova, Khomenko, and Gorobinska (2018) studied the essence of "outsourcing" as a concept and highlighted the features of outsourcing in different types of economic activity. Dubovskyi (2018) modeled the country's labor potential in the field of IT outsourcing.

However, in all those studies the IT-professionals emigration issues were not disclosed. This fact makes the proposed analysis to be distinguished among the others related to the IT outsourcing aspects.

3. RESEARCH METHODOLOGY

The methods used to achieve the aim of the research are desk research, inductive, deductive, abstract, empirical and logical methods; system approach; analysis and synthesis; and morphological and statistical analysis. The data for GDP, total goods and service exports and Information and Communications Technology (ICT) exports, budget tax revenues are provided by the State Statistics Service of Ukraine, NBU, PricewaterhouseCoopers (PwC), the World Bank, International Data Corporation (IDC), European Business Association (EBA), Eurostat, and the United Nations. Surveys of the Ukrainian IT professionals and a detailed overview of the country's IT market are provided by the largest Ukrainian developer community DOU.ua, IT Ukraine Association, Better Regulation Delivery Office (BRDO), N-iX, IDAP, ITCua, *etc.*

4. IT OUTSOURCING: NATURE, TYPES, ADVANTAGES AND DISADVANTAGES OF USE

Outsourcing refers to contracting third party entities to do specific business functions for the organization (Patterson, 2019). Information technology outsourcing (IT Outsourci-

ng) involves tech-based functions such as software and application development, network administration and web development, datacenter services, and infrastructure technology outsourcing (enterprise resource planning, customer relationship management, supply chain management, e-commerce, enterprise asset management, etc.). The types of outsourcing services can be divided into: (a) onshore/home shoring (outsourcing done within the borders of a country); (b) nearshore (outsourcing to a company in a neighboring country); (c) offshore/services overseas (outsourcing to a country far away as a rule because it is significantly cheaper) (What Is Outsourcing?; Different Types of IT Outsourcing).

IT outsourcing advantages are (Deloitte, 2018; Meshko & Yefremova, 2015):

- capacity optimization and ability to concentrate resources on core activities;
- lead time and cost reduction, profit incrementation;
- simplified organizational structure;
- possibilities of activity diversification due to the released production and intellectual potential;
- minimizing risks by transferring IT infrastructure to third parties;
- gaining financial flexibility;
- enabling competitive advantage, *etc.*

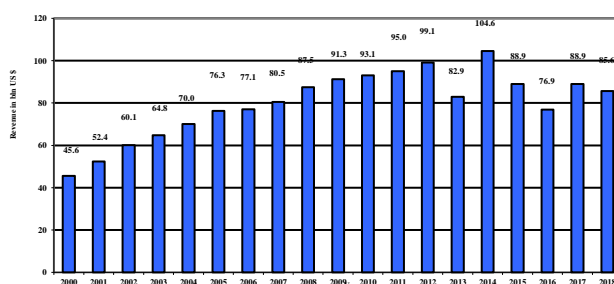
The main disadvantages of IT outsourcing are identified as follows (Hrebeshkova & Stelmakh, 2011):

- loss of complete control over the IT infrastructure servicing company;
- dependence on the outsourcer, especially in security matters;
- and decrease in labor productivity of own personnel because of loss of motivation during changes.

IT outsourcing is not the only way to transform a business, although when properly managed, it can act as a catalyst for change.

5. IT outsourcing in the global dimension

The global market size of outsourced services in 2000-2018 is shown in Figure 1a. According to the 2019 annual Global Services Location Index (GSLI), which measures the viability of countries as an offshore destination based on their financial attractiveness, people skills and availability, and business environment (The 2019 Kearney Global Services Location Index, 2019), top 10 leading countries in offshore business services worldwide in 2019 were India, China, Malaysia, Indonesia, Vietnam, United States (US), Thailand, United Kingdom (UK), Brazil and Philippines. Global services revenue across the regions and year-over-year growth are presented in Figure 1b.



a) The global market size of outsourced services in 2000-2018, in USD bln.



b) Global Regional Services Revenue (First Half of 2018, in USD bln) and Year-Over-Year Growth (in %).

Figure 1. The global market size of outsourced services in 2000-2018 (in USD bln) and Global Regional Services Revenue (First Half of 2018, in USD bln) and Year-Over-Year Growth (in %)

Source: Statista, 2019a, 2019b, IDC, 2018.

According to Technavio's IT outsourcing report (2018), the Americas held the largest share of the market in 2017, accounting for over 50% share, followed by the EMEA (Continental Europe, the Middle East, and Africa) and APAC (Asia-Pacific) respectively. However, during the forecast period, the EMEA region is expected to register the highest incremental growth. The market will be accelerating and growing at a compound annual growth rate (CAGR) of over 4%, with the incremental growth of USD 75.99 bln from 2017 to 2022, where 60% of the growth will come from the EMEA region.

6. IT MARKET IN THE STRUCTURE OF UKRAINE'S ECONOMY: RANKINGS, TRENDS, CHALLENGES AND PERSPECTIVES

Ukraine's IT industry, in addition to its significant economic effect, has become an important element in creating an image of the country nowadays. In 2018, Ukraine and its tech companies appeared among top positions in many influential international rankings, more than 100 representatives of the Fortune 500 list (Fortune 500, 2019) in the world are loyal customers of the Ukrainian IT businesses while The Global Sourcing Association has named Ukraine as the best IT services provider to the UK (The Global Sourcing Association). In 2019, 11 Ukrainian IT companies and 6 providers with development centers in Ukraine were included in the Best of the Global Outsourcing 100 (IAOP, 2019). Ukraine has been chosen as one of their R&D facilities location for 20% of world leading companies (Tech Ecosystem Guide to Ukraine, 2019, Ukraine is one of the leading countries in the field of IT outsourcing, 2019). In 2017, Gartner included Ukraine in the research on top offshore services locations in the EMEA region (Gartner, 2017). In the Global Innovation Index 2019, Ukraine was ranked 47th (The Global Innovation Index, 2019). According to HackerRank, Ukraine ranked 11th of 100 among the top 50 countries with the best software developers in the world (HackerRank). Also, it was the 7th on the TopCoder rating of the best programmers (TopCoder Ranking). Ukraine was the 33rd (42nd – in 2018) in Top 50 Digital Nations and its capital city of

Kyiv held 75th position in the Top 100 Super Cities rankings (Tholons Services Globalization Index, 2019). Ukraine was ranked 20th in the Kearney GSLI of the most attractive outsourcing destinations in 2019 (The 2019 Kearney Global Services Location Index, 2019).

The statistics presented by different organizations such as the World Bank, PwC, IT Ukraine Association, State Statistics Service of Ukraine, and NBU vary in terms of different methodology used. But according to all these sources, Ukraine's IT industry demonstrates a steep growth.

In 2016, EBA and PwC presented a comprehensive analysis of the Ukrainian IT industry (Andrienko-Bentz, 2016). The Ukrainian IT services market increased by 2.5 times between 2011 and 2015 and it is predicted to reach USD 5.7 bln by 2020. Ukraine's export proceeds from the IT industry are to increase from USD 2.5 bln. to USD 5.1 bln in 2020 and its share in the total export will grow from 5.2% to 7.5%. The share in Ukraine's GDP is also expected to increase, from 3.3% to 4.5% while budget revenues were estimated at 10.3 bln of Ukrainian hryvnias, UAH (UAH 27.2 bln in 2020). Bank deposits of IT specialists accounted for approximately UAH 5.8 bln, mandatory sale of foreign currencies was USD 2.0 bln, and banks' income from transactions with foreign currencies was approximately UAH 1.7 bln. In 2018, the industry surpassed 180,000 specialists and was projected to grow to 200,000 professionals by 2020. As a result, the tech industry created 420 thousand jobs in IT and related industries and 670 thousand are expected in 2020 as one new programmer involved in the industry creates up to 4 additional jobs in related industries (the National Association of Software and Services Companies, 2019). According to the forecast (the basic one), provided in the PwC research in 2017, in 2025 IT industry revenue will increase to USD 8.4 bln, the number of IT-professionals by almost 2.5 times – to more than 240 thousands, industry taxes paid – to UAH 46.1 bln, and contribution to GDP may be recorded at 4.65% (Pylypenko, 2017).

ICT became the 3rd largest export service industry, amounting to more than 20% of all Ukrainian service exports (State Statistics Ser-

vice of Ukraine, 2019). According to the dynamics of the balance of payments of Ukraine (National Bank of Ukraine, 2019), ICT exports increased by 31.4% during the first half of 2019, to USD 1.64 bln, compared to the same period of the last year (IT Ukraine Association, 2019). The vast majority of Ukrainian software development companies are exporting IT services and 60% of Ukrainian developers are currently employees in software development outsourcing, 29% are engaged in product development and 11% in outstaffing (N-iX).

Most company employees and almost all freelancers (with the obligation to register as Private Entrepreneurs, PEs, Sole Proprietors) are hired as independent contractors – a framework which provides substantial tax advantages and easy reporting, benefiting both companies and employees (Contact Ukraine). Under such agreement, the employer does not pay taxes on salaries and the employee, being taxed according to the simplified (unified) tax regime and belonging to the third group of such taxpayers (among the four ones currently existing), pays a fixed rate (single tax) of only 5% of his/her gross income if VAT is not paid (3% if VAT is paid). In addition, they are subject to a United Social Contribution (USC) of 22% of a minimum wage (around USD 155 as of 2019). According to the Ministry of Justice of Ukraine, 2019 and Ippolitova (2019a), the number of IT specialists registered as PEs increased by 23% in 2018 to 154 thousand persons compared to 125 thousand in 2017, while the total the number of all PEs in Ukraine increased by only 4%.

Revenues from single tax increased by an average of 58.8% annually during 2013-2017 and amounted to UAH 3.2 billion in 2017 (USD 118.5 mln). By contrast, the amount of taxes paid by IT companies during 2014-2017 was steadily growing by 27% each year and in 2017 it reached 4.1 billion UAH (USD 151.9 mln). In the first half of 2019, the amount of taxes paid to the state budget of Ukraine increased by 28.9%, to UAH 6.1 bln, and the payments of the

USC – by 31.4% to UAH 1.89 bln, respectively. The personal income tax paid by IT workers was 3.7 times higher than the national average (Shelest, Kutovyi & Samokhodskyi, 2019; State Fiscal Service of Ukraine, 2019; IT Ukraine Association, 2019; The Price of the State, 2019; Ukraine. The country that codes. IT Industry in Ukraine, 2019).

At the beginning of September 2019, a meeting of the newly appointed Prime Minister of Ukraine Oleksii Honcharuk with the representatives of the IT industry was held. Honcharuk pointed out the problem of the lack of staff in the industry and proposed to establish a Human Capital Development Fund – IT Creative. A new tax to generate revenues for it was introduced: it should increase to 5% in 2024-2029 and this fee is not to be paid by companies, but by PEs working in the industry. Additionally, such PEs have to pay doubled USC and 1.5% of military fee (Karpus, 2019). Ishchenko (2019), commenting on this, considers that relatively low cost of living and services, plus low taxes, are now the reasons for IT professionals to stay in Ukraine. If taxes are simply raised without providing anything in return, it will only exacerbate the problem of the outflow of talents. The DOU.ua (Ippolitova, 2019b) carried out a research in which it has been estimated that increasing the tax for IT professionals can encourage them to leave abroad.

In Ukraine, 72% of employees in IT are under 30 years old (DOU, 2019a), there are more than 4,000 tech companies operating on the market and over 1,600 IT service companies (IT Ukraine Report, 2018). Kyiv and Kyiv region remains the leader in the number of IT specialists (Unified State Register of Legal Entities, Individual Entrepreneurs and Public Formations, 2019; Ippolitova, 2019a). Comparison of Ukrainian cities with the most developed IT industry in terms of number of IT companies and software developers, and the level of average salaries are given in Table 1.

Table 1. *Number of IT companies, software developers in top-5 IT-cities of Ukraine and their average salaries*

City	Kyiv	Kharkiv	Lviv	Dnipro	Odesa
Number of tech companies	42	20	24	12	15
Number of software developers in top-50 companies	23061	8289	8536	2685	2883
Total number of IT specialists	45778	21847	15643	13213	7193
Level of the software developer	Average salaries, US dollars (as of June-July, 2019)				
Senior	3900	3500	3500	3400	3600
Software Engineer	2100	1800	2000	1900	2000
Junior	750	700	645	600	650

Source: Compiled by the authors on the basis of (DOU, 2019b, 2019c, 2019d) and (Ippolitova, 2019a)

The positive dynamics has been recorded in the developers' salaries for the last three years: average income per developer is USD 50,000 per year, average hourly rate is USD 34-64. In this context, it should be noted that the minimum wage in Ukraine currently is UAH 4173 (approx. USD 155) and the average salary in Ukraine is UAH 10783 (approx. USD 400) as of June 2019 (Ministry of Finance of Ukraine, 2019).

One of the reasons why Ukraine occupies the leading position in the list of IT outsourcing locations, is its strong orientation towards IT as about 200 higher education institutions (HEIs) train IT professionals (The Unified State Electronic Database in Education, 2019).

Antoniuk, the CEO of the largest Ukrainian IT company EPAM, considers that global competition for talents is growing and that not the outflow of professionals, but the beginning of the outflow of students is urgent under the current trends of migration (Shelest, Kutovyi & Samokhodskyi, 2019). SoftServe, Luxoft, Ciklum, GlobalLogic are the companies actively cooperating with HEIs in the field of IT professionals training and they launch their own IT academies.

7. PERFORMANCE OF UKRAINE'S IT OUTSOURCING IN THE CEE REGION

Eastern Europe has established itself as one of the world's best software outsourcing

destinations. Its IT sector offers an impressive diversity of tech professionals, developed infrastructure and provides a good educational background (Anisimova, 2019). Compared to other countries in the CEE region with developed IT outsourcing services (see Table 2), Ukrainian competitive advantages are (Eurostat, 2018; IT Ukraine, 2016, Ukraine. The country that codes. IT Industry in Ukraine, 2019; Ukraine Invest, 2018):

- the cheapest and largest engineering labor force in Europe;
- ease of recruiting and laying-off employees in the absence of strong legal restrictions or trade unions;
- highly educated population (99.7% literacy rate, 70% have a secondary or higher education);
- European mentality;
- novisa regime and easy work permit regime for foreigners from most countries;
- favorable geographic position;
- well-developed and developing IT infrastructure, with a fast-growing innovation ecosystem;
- lots of world-famous tech giants operating on its territory;
- one of the most promising startup scenes (Grammarly, Terra-soft, Petcube, just to name few);
- well-developed market of software development companies for hire;
- local offices in the USA and Western Europe;

- quality of developed products is not compromised despite the cost of hiring a Ukrainian developer being lower when compared to western countries;
 - high English language proficiency level of developers.
- mating manual processes through artificial intelligence, and focusing less on reducing costs and more on delivering value (IT Outsourcing News from Central and Eastern Europe, 2019).

Table 4.2 *Comparison between Ukraine and Central and Eastern Europe countries in key indicators*

Country	Criteria	Population, mln. (as of 2018)	Number of software developers, thous.	ICT Seervices export volume, in bln. USD (as of 2017)	GDP nominal, in bln. USD	GSLI, rank
Poland		38.0	279.8	6.4	581.3	24
Ukraine		43.9	184.7	2.8	132.9	20
Romania		19.6	116.1	4.5	248.8	28
Czech Republic		10.7	95.3	3.8	264.5	33
Hungary		9.8	80.1	2.2	164.5	31
Bulgaria		7.1	70.0	1.2	66.2	17
Belarus		9.5	54.2	1.5	60.0	n/a
Slovakia		5.4	36.9	1.5	112.3	35
Lithuania		2.8	27.4	0.5	54.5	16
Estonia		1.3	20.7	0.7	31.2	12
Latvia		2.0	18.6	0.7	35.8	21

Source: United Nations, 2019; State of European Tech, 2018; Ukraine Invest, 2018; Infoshare CEE Developer Landscape, 2017; The World Bank, 2019a, 2019b; Statistics Times, 2019; The 2019 Kearney Global Services Location Index, 2019; The country that codes. IT Industry in Ukraine, 2019

Ukraine is among top IT countries not only in the region but worldwide as well, due to:

- the growth rate of Ukrainian IT companies which exceeds the total world rate by 5 times (Atamas, 2019), their year to year international ranking improvement;
- attracted investments in new startups;
- new signed contracts with world well-known IT giants;
- government's involvement in the industry's development by using its successes as a part of the state's international public relations in particular, cooperation of industry representatives with Ukrainian universities, creating demand for professionals and adjusting educational programs by doing so.

8. DISCUSSION

Top 5 IT outsourcing trends in 2019 were identified as: shifting away from single-vendor outsourcing, outsourcing core business service, increasing focus on cybersecurity, auto-

The key challenges facing Ukraine's IT industry successful development are identified in (Atamas, 2019; Shelest, Kutovyi & Samokhodskyi, 2019; Hlova, 2019a, 2019b) as:

- most IT companies are not ready for faster growth due to underdeveloped management systems;
- less focus on reducing costs;
- IT outsourcing market is saturated, competition among the companies is increasing;
- customers shift away from a single IT outsourcing provider;
- the risk of losing customers;
- European requirements for personal data protection;
- possibility of restricting or prohibiting subcontracting with PEs;
- global IT skills shortage which limits growth;
- political and economic instability in Ukraine, not always sufficient transparency and predictability of doing business;
- abuse by public authorities.

According to Shelest, Kutovyi, and Samokhodskyi (2019), IT industry trends and perspectives are discussed by the heads and representatives of Ukraine's leading IT companies. Antoniuk is sure that in order to succeed, the industry is in need of a predictable tax policy, no regulatory barriers, human capital development, and growing demand for development services in the domestic market, taking into account the risks posed by global competition for skilled workers. Ukraine's chance to stand out in the global market is to work on the creation of complex products and services with significant added value.

Lutskyi, the founder and CEO of Innovecs, also considers that added value should be emphasized. Mostovyi, the CEO of AltexSoft and the Chairman of the Kharkiv IT Cluster supervisory board, puts forward an idea that domestic IT companies have to foster the implementation of public-private partnerships between universities and businesses, and the corporatization of universities.

Kushnir, Vice President of Luxoft Global Development Centers, considers that human resources should be a priority for both the IT industry and the state.

Bieda, the CEO of the Ukrainian office of GlobalLogic, believes that consolidation of all industry participants is paramount: development of the education system and, higher technical education in particular; tax legislation reform; stronger Ukraine's positive image in the international arena; internal market development; and R&D – as Ukraine's niche in the world market (Kulesh, 2016).

Kitsmei, the co-founder of SoftServe Inc. and President of the IT Ukraine Association, agrees that focus should be made on human and organizational capital.

Chaikovska, the Chairman of the Board of STEM-coalition of Ukraine, adds that increasing the number of women in the IT sector can improve performance and further avoid gender inequalities in top management (Komsa & Hrebennyk, 2017).

Sharma (2017), the CEO of BMC Software India Pvt. Ltd., points out that government regulation, special taxation regime for attracting

large numbers of foreign investors, and land rent for free are required.

Strategy and action plan to the IT industry development are also offered in (Andrienko-Bentz, 2016) and they mostly coincide with the views given above.

This paper offers a comprehensive analysis of the IT industry, IT outsourcing in particular, in terms of its impact on not relocating to other countries by identifying share and contribution in the country's GDP, total and services exports, tax revenues, salary rates, and prospects for further development.

9. CONCLUSION

Outsourcing is a powerful management tool and its proper use is a key in the processes of transforming an organization and reforming its assets. The research results testify that the IT-industry is one of the most perspective, fast growing and innovative sectors of the Ukraine's economy and the one that may stop the brain drain taking place in the country. IT companies in Ukraine ensure a steady capital inflow into the country's economy, attract foreign investments, assist in creation of a demand for consumer goods and services in the fields of education, insurance, healthcare, real estate, help create additional jobs in related industries, make constant foreign exchange earnings, assure that a significant amount of taxes is paid, etc. Ukraine's strong scientific and mathematical education system makes it possible for programmers to become innovative technical leaders as opposed to functioning as body-shop programmers. Therefore, the Ukraine's IT-industry performs one of the best in the CEE region and global market. There are all necessary prerequisites for its successful growth and it will continue doing so under recommendations mentioned above to be followed.

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