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ABANDONED CODE: WAR AND MIGRATION OF UKRAINIAN IT SPECIALISTS

Introduction. *Modern conditions, including the full scale war and economic instability in Ukraine, present Ukrainian IT specialists with a series of complex challenges, among which migration-related issues are prominent. In this context, the problem of migration among Ukrainian IT specialists becomes crucial and requires attention from the government, IT companies, and other stakeholders. This problem requires a comprehensive analysis and the development of effective strategies and solutions to attract and retain IT specialists in Ukraine.*

Problem Statement. *This research examines various aspects of migration among Ukrainian IT specialists, identifies the key challenges they face in times of armed conflict, and proposes recommendations and strategies to address the issues related to intellectual migration.*

Purpose. *The main objective is to identify the primary problems encountered by Ukrainian IT specialists during migration and to develop specific recommendations and strategies to support and attract this category of professionals to contribute to the development of the IT industry in Ukraine.*

Materials and Methods. *The study employs general scientific and specialized research methods, such as investigating cause-and-effect relationships, using the scientific abstraction method, comparative assessments, analysis, and synthesis.*

Results. *Some key challenges affecting the migration of Ukrainian IT specialists have been identified. These include restrictions on leaving the country, migration of IT specialists and their families, conscription into the army, currency regulations, challenges related to working with foreign clients, relocation challenges, and the occupation of Ukrainian territory.*

Conclusions. *To support Ukrainian IT specialists and harness their potential for the country's development, it is essential to focus on creating favorable working conditions, fostering interaction with IT specialists, developing the innovation sector, facilitating knowledge transfer, and providing promising opportunities for their growth.*

Keywords: migration, refugees, IT specialists, brain drain, Industry 4.0, state of war, emigration, IT clusters.

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Today, IT plays an incredibly important role in the modern world, encompassing technologies such as the Internet of Things (IoT), artificial intelligence, smart technologies, and robotics and forming the foundation of the fourth industrial revolution, known as Industry 4.0. Key features of Industry 4.0 include digital transformation, where computerized systems and intelligent technologies intertwine with physical processes, creating so-called “smart factories”. The Internet of Things (IoT) enables data collection and exchange between objects and machines, promoting the optimization of production processes and improved efficiency. Artificial intelligence is used for analyzing vast amounts of data, predicting outcomes, and automating decision-making. The fourth industrial revolution impacts all aspects of life, including the economy, education, healthcare, and society as a whole. The IT sector, being a key driver of this revolution, has the potential to reshape production standards and resource allocation methods and create new opportunities for business and national development. In Ukraine, understanding the importance of the fourth industrial revolution can determine the country’s future development. Rapid adoption of digital technologies, innovative approaches, and the development of the IT industry can become crucial factors in strengthening the economy and enhancing Ukraine’s competitiveness in the international market. Falling behind in this direction would mean lagging behind in overall progress.

Before the war, the IT sector was one of the few actively developing industries that brought significant revenue to the country. By preserving and promoting IT development, Ukraine can maintain its competitiveness and ensure stable economic growth in the future.

During the full-scale war in Ukraine, the migration of IT professionals has gained significant importance. At the beginning of 2022, most IT companies were expanding their businesses, hiring even more employees, creating new job opportunities, even for beginners in the field, and actively exploring new markets. However, after

February 24, 2022, everything changed as the war brought significant changes to the plans of many IT companies and their employees. The war created an unstable situation that affected the development and functioning of the IT industry. Many companies were forced to revise their strategies and plans for the future. The increase in the number of relocations and migrations of IT professionals resulted from changes in working conditions and the sociopolitical context. Companies and their employees were forced to adapt to the new conditions and seek ways to cope with the challenging situation, affecting the further development of the IT industry in Ukraine.

Various aspects of intellectual migration have been studied by foreign researchers. Some authors divide refugees into categories of “bad” and “good” refugees, where the latter contribute to the economy and culturally integrate into the host country [1]. IT specialists are referred to as the creative class, which serves as the locomotive of economic growth [2]. In their studies, an inclusive policy towards refugees from Ukraine is advocated [3]. In Western Europe, particularly in the UK, a positive attitude towards those who fled from the USSR during the Cold War is noted [4]. Highly skilled individuals may find more opportunities abroad, potentially leading to their reluctance to return to Ukraine, as they may have established local networks and better conditions [5]. Factors such as the industrial environment, career prospects, corporate culture, job nature, and overall remuneration are considered the most significant determinants influencing the brain drain of IT professionals [6].

Before 2022, the relocation of IT professionals from Kyiv and Kharkiv was a rare occurrence. However, with the onset of a full-scale war, everything changed. In the early days of the war, some IT professionals evacuated independently of their homes, and later, IT companies assisted their employees in the evacuation process. Chats were created, and employees of various companies united to shelter their colleagues from affected cities and across Ukraine. There were also IT pro-

professionals who chose to stay in their own homes during the occupation and continued to work.

Businesses and offices also migrated along with their employees. According to Forbes' estimates, the largest IT companies in Ukraine have opened at least 33 new international offices since February 24, 2022, with a preference for countries like Poland, Romania, and the Czech Republic. Engineers' salaries in those countries were comparable to those in Ukraine, and the number of refugees from Ukraine was one of the highest in Europe [7].

In the fall of 2022, Ukrainian IT companies started cautiously seeking employees but placed more emphasis on those who had emigrated from Ukraine or were seeking employment in Europe. Companies were no longer hiring interns or juniors (beginners) in their offices in Ukraine, and the number of open vacancies decreased by 40%.

In the summer of 2022, the issue of salary accrual and withdrawal for IT professionals arose, as many of them received funds on their individual entrepreneurs' (FOP) accounts. Spending dollars or euros from FOP accounts for personal needs was prohibited; they could only be kept or converted into hryvnia. To withdraw their earned money, IT professionals had to sell their salaries in dollars or euros at the National Bank of Ukraine's official rate, which significantly differed from the market rate. As a result, there was a considerable loss of approximately USD 200 when converting USD 1000. Those who had left Ukraine with Ukrainian bank cards were also dissatisfied. Despite the smaller gap between the official rate and the card rate, translation difference losses per USD 1000 were still around USD 108 [8].

As shown by research, the majority of companies in Ukraine experienced a reduction in the number of employees during this period [9]. Some companies aligned with Ukraine's position and closed their offices in Russia, while others reduced their workforce or closed their offices in Ukrainian locations.

A study conducted in September 2022 revealed that the largest number of IT specialists emigrated from Kharkiv, Kherson, Mykolaiv, Mariupol, and

Kyiv. The geography of settlement for IT professionals who immigrated to Europe after February 24th has notably changed compared to March 2022. The share of those residing in Poland (from 35% to 28% of all emigrants) and Romania (from 6% to 3%) decreased. At the same time, the percentage of those living in Portugal and Spain more than doubled (from a combined 6% to 13%), as well as in the United Kingdom (from 0% to 2%) [10].

In the fall of 2022, when some IT professionals began to return to their homes, there were massive blackouts and rocket attacks. In response, IT companies provided funds to their employees to purchase additional power sources (generators and power banks), use Starlink, buy fuel, establish departments for critical situation work, offer relocation compensation (full or partial), or provide workspaces in coworking spaces.

During the winter of 2022, many IT professionals who moved abroad at the start of the full-scale war faced the issue of tax payment (tax residency). If a Ukrainian works remotely for a Ukrainian employer and stays in the EU for more than 183 days during the tax year, they are considered a tax resident. Their income is then taxed in the EU on all their worldwide earnings, taking into account the Convention on Avoidance of Double Taxation with Ukraine [11].

Conditions for obtaining tax residency in most EU countries include having life interests in the country of residence, residing in the country for more than 183 days, owning or renting accommodation, and having economic interests in the country of residence.

However, in Poland, there is still a possibility for Ukrainian IT professionals to remain tax residents of Ukraine if they do not work for local companies. Currently, around 9000–10000 Ukrainian IT individuals (entrepreneurs) abroad (approximately 18% of the total) are considering changing their jurisdiction [7].

In the spring of 2023, the number of job openings for IT specialists increased by 17%, but this indicator is still lower compared to the figures of 2021, almost 60% lower [12].

The IT sector continued to be a vital contributor to the country's budget during the war. Programmers can work from anywhere, and the IT sphere relies on people and their knowledge, talent, and skills. Therefore, preserving these "minds" is crucial for Ukraine [13].

In the first quarter of 2023, the export of IT services from Ukraine decreased by 16% compared to the same period in 2022, amounting to USD 1.68 billion. IT services accounted for 43% of the service exports during the first quarter, according to data from the National Bank of Ukraine [14].

Currently, a self-governing initiative called "Association of Diia City Residents" is being formed in Ukraine. The main goal of this association is to improve working conditions under the special regime "Diia.City", support and protect the interests of IT companies, and create conditions for international IT companies with a global reputation to open representations in Ukraine. However, this project is still under development [15].

The current development of the global IT market has sparked growing interest in the migration of Ukrainian IT specialists. This topic triggers discussions and raises the question – whether Ukrainian IT professionals should stay in their home country or move abroad to seek new opportunities and career development.

The purpose of the research is to identify the main challenges faced by Ukrainian IT specialists during migration and to develop specific recommendations and strategies to support and attract this valuable category of professionals to the development of the IT industry in Ukraine. To achieve this, the study will examine the challenges encountered by Ukrainian IT specialists during the war, analyze the opportunities offered by other countries for IT specialists, identify potential advantages of working abroad, explore cultural and personal factors influencing the emigration of Ukrainian IT specialists during the war, review the role of urban IT clusters in retaining and attracting IT specialists, and draw conclusions and recommendations regarding the migration of IT specialists.

CHALLENGES FACED BY UKRAINIAN IT SPECIALISTS DURING THE WAR

IT companies make all necessary efforts to provide comfortable working conditions for IT professionals in Ukraine. However, these measures are insufficient, and it is crucial to realize that unforeseen obstacles may arise, requiring the IT industry to be prepared to confront these new challenges.

Currently, Ukrainian IT specialists encounter several challenges, including:

- ◆ Travel ban abroad;
- ◆ Migration of IT specialists and their families;
- ◆ Military conscription;
- ◆ Currency regulation;
- ◆ Challenges related to working with foreign clients;
- ◆ Challenges related to relocation;
- ◆ Occupied territories.

One of the primary issues faced by IT professionals during the armed conflict is the need for relocation. According to the data, 64% of them were forced to move due to the war. However, 24% have already returned to their places of residence before the invasion. As a result, it is necessary to change the approach to work. Since the beginning of the full-scale conflict, 71.5% of companies have been compelled to switch to remote work, with over 75% of IT specialists working remotely [16].

The ban on men aged 18 to 60 leaving the country during the state of war creates several problems for IT specialists, such as the impossibility of traveling to clients and relocating with their families to safer places. Research conducted by dou.ua shows that Ukrainian IT specialists who emigrated during the war were typically 31-year-old male migrants, senior-level programmers from major cities like Kyiv, Kharkiv, or Lviv, and often without children [17]. However, it's essential to consider that there may be a broader diversity of IT professionals in this group.

Currently, there is a discussion about the possibility of reserving IT specialists from mobilization, but the authorities are hesitant to grant

privileges to the IT industry, despite its significant importance to the country's economy.

The migration of IT specialists and their families is another significant challenge faced by Ukrainian IT professionals during the war. The unstable situation and security threats may prompt them to consider the possibility of moving to other regions or countries with more favorable conditions. Making the decision to migrate requires IT specialists to make considerable efforts and may risk their careers, families, and social environment. Additionally, the migration process may involve adapting to a new culture, language, and work habits, which can be challenging for both the professional and their family. Such changes can have both positive and negative consequences for Ukrainian IT specialists and their professional development.

According to a survey by the Association IT Ukraine, since the beginning of the war, nearly 2% of IT professionals with military experience have decided to join the Armed Forces of Ukraine. In some small companies with up to 200 employees, even 20% of specialists joined the ranks of the Armed Forces [18]. Military conscription is one of the challenges faced by Ukrainian IT specialists during the state of war. Obligations to serve in the army may influence their career plans and professional development. The military service process can take a significant amount of time, depriving them of the opportunity to work in the IT field and engage in projects or education, leading to career interruptions. However, not all IT specialists choose military service; some may be frightened by the words military draft leading them to consider emigration, even illegally, but avoiding mobilization.

Currency regulations for Ukrainian migrants, including IT service providers, result in significant financial losses due to the National Bank of Ukraine's currency restrictions [19]. For IT specialists, this means they cannot receive their full salaries, leading to income losses.

Millions of Ukrainians who emigrated abroad initially relied on their Ukrainian bank cards,

leading to a massive outflow of currency. The National Bank later froze the official exchange rate and imposed strict currency restrictions. This allowed for relatively controlled circumstances, but the country had to pay a high price for this conditional stability, using over USD 28 billion in gold and foreign currency reserves in 2022. In the same year, international partners who provided the state budget with billion-dollar loans and grants helped cover massive currency outflows from Ukraine. Additionally, the economy received currency from labor migrants. However, even with stable inflows from migrant workers, 2022 was probably the first year when Ukrainian's expenses abroad exceeded remittances to Ukraine [20].

The wartime situation has led to a reduction in orders within the IT industry as clients have become cautious with their investments and are postponing projects indefinitely during times of uncertainty. This reduction in work volume and income is affecting IT specialists. Concerns among foreign clients regarding network instability, limited internet access, and security threats have complicated interactions and communication with international clients and, in some cases, influenced their decision to seek employees in other countries.

Occupation of territories poses a significant challenge for IT specialists working or residing in the occupied areas. They face limited access to resources, personal safety threats, and additional difficulties in conducting business and advancing their professional careers.

INTERNATIONAL OPPORTUNITIES FOR UKRAINIAN IT SPECIALISTS

In Ukraine, there is a significant presence of foreign IT companies, and for their employees, migration may be less problematic. These employees of foreign companies can be considered potential "semi-migrants" as they reside in Ukraine but work on projects for international clients, contributing to the competitiveness of other countries. The taxes paid by such employees of foreign companies contribute to the development of the

Ukrainian economy, and their expenses remain within the country, stimulating financial circulation within Ukraine.

Currently, it is challenging to assess the number of IT specialists leaving the country. The lack of data on high-skilled emigration complicates our understanding of the difference between those who have left and those who have stayed. In recent years, digital data tracking has been used to understand various social, political, and economic phenomena. However, there is less knowledge about the dynamics of high-skilled emigration and mobility during the crisis.

A study conducted by the internet portal of Ukraine's largest developers' community, dou (<https://dou.ua/>), reveals the approximate geography of IT specialists from Ukraine who have emigrated abroad during the war. According to dou, at the beginning of the full-scale war, the majority of Ukrainians, including IT specialists, moved to neighboring countries such as Poland and Romania. Meanwhile, the number of those residing in Portugal and Spain more than doubled. The highest number of Ukrainian IT specialists during the full-scale war moved to Poland, Germany, Portugal, and Spain. Let's explore the reasons for this.

Poland

- ◆ Most IT companies with offices in Ukraine also have offices in Poland. At the beginning of the full-scale war, the number of IT company offices significantly increased in Poland. Therefore, the relocation was not as challenging, and the adaptation process is much faster than in other countries.
- ◆ The language is similar to Ukrainian.
- ◆ The country's location allows for a quick return to Ukraine if necessary.
- ◆ Taxes have a significantly lower impact on salaries compared to other European countries.
- ◆ Poland can be considered a "transit country".

Germany

- ◆ High salaries.
- ◆ Allowances for family members.

- ◆ Simplified procedure for obtaining temporary protection and work permits.
- ◆ The right to receive financial compensation for housing.
- ◆ Legally employed Ukrainian citizens are entitled to receive 219 euros per month for each minor child.
- ◆ All temporarily displaced Ukrainians have the right to receive assistance covering necessary expenses for clothing, food, heating, healthcare, and basic needs.
- ◆ Free health insurance and various vouchers for medical services.

Portugal

- ◆ Granting a temporary status that allows working, studying, receiving medical assistance, and receiving social benefits.
- ◆ After five years of residency in the country, it is possible to obtain Portuguese citizenship.
- ◆ Provides a special tax status (Non-Habitual Resident, or NHR) with a reduced flat rate.
- ◆ Prices for products and housing are significantly lower than, for example, in Germany or Spain.
- ◆ High-quality and free healthcare for every citizen or resident of the country in state medical institutions.
- ◆ The use of the English language is widespread in all cities (which is not the case, for example, in Spain). Knowledge of the Portuguese language when searching for a job will only be an advantage, but it is extremely rarely specified as a mandatory requirement for vacancies.
- ◆ There is a high demand for IT specialists. In fact, some IT companies that had offices in Ukraine before the full-scale war have opened their representations in Portugal [21].

Spain

- ◆ Provides temporary protection (similar to Portugal) and the opportunity to work and study within the country.
- ◆ Possibility of obtaining documents allowing travel to other EU countries.
- ◆ Free healthcare.

- ◆ Lower prices for products and clothing compared to the Netherlands or Germany.
- ◆ Free primary and secondary education for children.
- ◆ Some IT companies have opened offices here in cities such as Barcelona, Malaga, and Madrid.
- ◆ Diverse nature depending on the region [22].
Currently, there is a demand for IT specialists in the United Kingdom and Canada.

United Kingdom

- ◆ Opportunity for quick employment: 63.6% of companies with leading digital technologies are based in London [23].
- ◆ The UK government initiated the charitable sponsorship program “Homes for Ukraine”, where sponsors (hosts) for Ukrainians can be individuals, families, businesses, or organizations.
- ◆ Good prospects for children and excellent education are recognized by other countries.
- ◆ The language of communication is English.
- ◆ Possibility of obtaining British citizenship after 5 years of residence in the country.

Canada

- ◆ Simplified procedure for obtaining Canadian visas for Ukrainians.
- ◆ A one-time payment can be expected from the government (3,000 Canadian dollars, approximately 2,000 US dollars per adult, and 1,500 Canadian dollars, approximately 1,000 US dollars per child).
- ◆ Free accommodation for two weeks.
- ◆ Opportunity to work and study in the country.
- ◆ The majority of the population speaks multiple languages, and there is a large Ukrainian diaspora.
- ◆ Good healthcare system.

The main advantages of working abroad for IT specialists are:

- ◆ Promising career opportunities.
- ◆ Higher salaries in economically developed countries allow for a higher standard of living and financial stability.

- ◆ Working in an international environment allows Ukrainian IT professionals to broaden their professional horizons and gain valuable experience in utilizing advanced technologies, handling complex projects, collaborating with diverse teams, and improving their foreign language skills.
- ◆ Working abroad offers the chance to see new countries, visit interesting places, and gain a deeper understanding of different cultures, making opportunities available today for IT specialists.
- ◆ Good education for children, recognized by other developed countries.

Of course, besides the positive aspects, there are significant downsides to living abroad compared to life in Ukraine. According to a survey conducted by Gradus Research in 2022, among those seeking refuge from full-scale aggression in other countries, the highest ratings were given to store operating hours (54%), followed by the digitalization of financial and other services, both commercial and government (37%). Additionally, the price-quality ratio in the beauty industry was also highly regarded (44%). The majority of respondents (36%) also mentioned that they greatly appreciated the “mentality and lifestyle” in Ukraine and “people and their relationships” at home (32%), considering these aspects better in Ukraine than in their temporary country of residence [24]. Therefore, the Gradus Research survey demonstrates that living abroad has its advantages but is not without certain negative aspects, and the decision to stay or return to Ukraine depends on the individual priorities and personal needs of each IT specialist.

In a study conducted by the Center for Economic Strategy, it is noted that the longer the war lasts, the more Ukrainians will seek work abroad and adapt to new living conditions there. Despite all the drawbacks of the host country, many Ukrainians will stay abroad because the prospects for their children will be considered better abroad than in Ukraine. Also, those who have lost their homes will almost certainly remain abroad [25].

CULTURAL AND PERSONAL FACTORS OF EMIGRATION AMONG UKRAINIAN IT SPECIALISTS DURING WARTIME

During the war, Ukrainian IT specialists considering emigration faced cultural and personal factors that influenced their decision to either stay in Ukraine or emigrate. Here are some of them:

- ◆ **Security and stability:** The military conflict poses a threat to personal safety and the stability of life. Safety is one of the main reasons driving IT specialists to consider emigration to protect themselves and their families. According to the Center for Economic Strategy's research on Ukrainian refugees, IT specialists belong to the "professionals" group (29% of all migrants), and security for them and their children is an important factor influencing migration [25].
- ◆ **Economic prospects:** The war affects the country's economic situation, leading to reduced wages and limited opportunities for growth in the Ukrainian IT sector. Some clients have refrained from hiring employees from Ukraine after the onset of the full-scale war. IT specialists may view emigration as a means to secure more stable and advantageous economic prospects.
- ◆ **International experience and cultural diversity:** Emigration provides IT specialists with an opportunity to gain international experience, work with colleagues from different countries, and explore new cultures. This can broaden their horizons and help them develop international contacts. Some IT specialists consider this experience from the perspective of returning to Ukraine.
- ◆ **Political and social situation:** The conflict can create uncertainty and instability in the political and social spheres, prompting IT specialists to consider emigration to find more favorable conditions for personal and professional development.
- ◆ **Patriotism:** On the other hand, some IT specialists may choose to stay in Ukraine, motivated by their sense of patriotism and a desire to contribute to the country's development during challenging times.

These key factors shape the decisions of Ukrainian IT specialists regarding emigration during wartime. However, each specialist has his or her own motivations and circumstances that influence their choices.

THE ROLE OF URBAN IT CLUSTER IN RETAINING AND ATTRACTING IT SPECIALISTS

Over the past two decades, clustering has become a popular and practically important strategy for promoting innovation in the small and medium-sized enterprise sector [26]. Clusters act as an important component of social capital, facilitating direct interaction and exchange of information, knowledge, and creativity [27]. The use of various tools, such as municipal marketing and branding, can promote the development and promotion of local clusters by attracting highly skilled specialists, investors, and entrepreneurs to collaborate with cluster participants. An essential aspect is the establishment of shared goals and a unified vision for the activities of local clusters, both within the city and beyond [28].

Urban IT clusters are groups of companies, startups, educational institutions, and other IT industry participants that come together in a specific location or region. They contribute to creating favorable conditions for the development of the IT sector, attracting talented professionals, and reducing the need for migration. According to the IT Ukraine Association, in 2021, there were 21 IT clusters operating in various regions of Ukraine. The first IT clusters were established in Lviv in 2010 and then expanded to other cities in Ukraine.

The activity of the Lviv IT Cluster (<https://it-cluster.lviv.ua/>) focuses on creating favorable conditions for business development by improving the quality of education, talent development, comprehensive support for tech companies, and advocating for industry interests. Its main areas of activity include promoting small and medium-sized companies and finding new clients for them in the international market; providing special discounts and

benefits for cluster members; and organizing the largest IT conference, IT Arena, aimed at building valuable business connections and expanding networking. The cluster also has several education-related projects, such as IT Future, which promotes IT education among school students, and IT Expert, which modernizes and conducts specialized IT courses in higher education institutions.

The Kyiv IT Cluster (<https://kyivitcluster.ua/>), a public organization founded in 2015, aims to create a community that improves the factors of production and activities of cluster participants and realizes the potential of local IT projects. Among its initiatives are the Kyiv IT Breakfast, where representatives of the IT industry gather to exchange experiences and ideas. The Kyiv IT Cluster is the organizer of the Games Gathering 2023 conference, dedicated to game development and creating quality gaming content. The conference provides an opportunity for professionals to enhance their skills, network with new business partners, and showcase their products. Additionally, they organize the Hatathon 4.0: Ukraine Heritage Edition, an online marathon aimed at developing innovative projects in the fields of culture, creativity, and Ukraine's history.

At the beginning of the full-scale war, IT clusters paused their activities, but they quickly adapted to the new demands. On April 5th, the representatives of the IT industry registered the 22nd cluster, the "IT Cluster Zakarpattia".

Urban IT clusters foster a collaborative environment where IT specialists can exchange knowledge, find partners for joint projects, and stimulate innovative ideas. This promotes the retention of talented IT specialists in the city, as they have the opportunity to work in a stimulating and evolving environment. Additionally, urban IT clusters play a crucial role in attracting new IT specialists. They draw attention to talented professionals by offering promising job opportunities and career growth prospects, thereby increasing the pool of IT specialists in the city and advancing its technological potential. Thus, urban IT clusters play a vital role in retaining existing IT specialists and attracting

new talents, creating incentives for growth and development in the field of information technology.

CONCLUSIONS

The current migration of Ukrainian IT specialists is a relevant topic that requires careful analysis. The decision to migrate or stay in Ukraine is a personal choice, depending on individual needs and priorities.

Currently, the issue of attracting IT specialists needs to be considered in light of various factors. It is evident that some professionals may not adapt well to new conditions, may not find themselves comfortable in the host country, and may not see prospects for their families. However, there will also be those who, even after the full-scale war in Ukraine ends and favorable conditions are offered, may not show a desire to return. In this context, the government and IT companies can take certain actions to provide a comfortable environment for businesses and IT specialists and promote work in Ukraine for IT migrant professionals. However, it is unlikely that they can force IT specialists to return if they lack the willingness to do so. Therefore, it appears more promising to create favorable working conditions for those who have chosen to stay in Ukraine. This requires collaboration with IT specialists in the creation and development of an innovative sector, support for knowledge transfer, the creation of opportunities for IT professionals' development, favorable tax conditions, and the popularization of IT education in Ukraine. Such measures will help retain talented IT professionals in Ukraine and contribute to the sustainable growth of the industry.

Additionally, it is essential to support the creation and development of Ukrainian IT companies. Crucial to this is the presence of government support, which can help create a conducive environment for the emergence of new Ukrainian IT projects and support innovation with initiatives like Diia.City serving as an example. Prospects for further research lie in exploring initiatives and programs aimed at developing the domestic IT sector.

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ПОКИНУТИЙ КОД: ВІЙНА І МІГРАЦІЯ УКРАЇНСЬКИХ ІТ-СПЕЦІАЛІСТІВ

Вступ. Сучасні умови, зокрема повномасштабна війна та економічна нестабільність в Україні, ставлять перед українськими ІТ-спеціалістами низку складних викликів, серед яких основні проблеми пов'язані з міграцією. У цьому контексті проблема відтоку українських ІТ-спеціалістів стає актуальною та потребує уваги з боку держави, ІТ-компаній та інших зацікавлених сторін, вимагає комплексного аналізу та розробки ефективних стратегій і рішень для залучення і збереження ІТ-спеціалістів в Україні.

Проблематика. У дослідженні розглянуто різні аспекти міграції українських ІТ-спеціалістів, з'ясовано основні виклики, з якими зіштовхуються ІТ-спеціалісти в умовах воєнного стану, запропоновано рекомендації та стратегії для вирішення проблем, пов'язаних з інтелектуальною міграцією.

Мета. Виявлення основних проблем українських ІТ-спеціалістів під час міграції, а також розробка конкретних рекомендацій та стратегій для підтримки й залучення цієї категорії фахівців до розвитку ІТ-галузі в Україні.

Матеріали й методи. Використано загальнонаукові та спеціальні методи досліджень: дослідження причинно-наслідкових зв'язків, метод наукової абстракції, порівняльних оцінок, аналізу та синтезу.

Результати. Виявлено деякі ключові виклики, які впливають на міграцію українських ІТ-спеціалістів. Зокрема, такими є заборона виїзду за межі країни, міграція ІТ-спеціалістів та їхніх родин, призов до армії, валютне регулювання, виклики, пов'язані з роботою з іноземними клієнтами, виклики, пов'язані з релокацією, окупація території України.

Висновки. Для підтримки українських ІТ-спеціалістів та залучення їхнього потенціалу до розвитку країни варто зосередитися на створенні гідних умов праці, взаємодії з ІТ-спеціалістами, розвитку інноваційного сектору, доцільно також сприяти трансферу знань та створення перспективних можливостей для їхнього розвитку.

Ключові слова: міграція, біженці, ІТ-спеціалісти, відтік мізків, Індустрія 4.0, воєнний стан, еміграція, ІТ-кластери.