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UKRAINE'S POLICY ON BRAIN DRAIN IN THE WARTIME AND POST-WAR PERIODS

Purpose. To analyse Ukraine's policy on brain drain and to find ways to improve it, taking into account foreign experience and possible scenarios of martial law development.

Methodology. General scientific and special research methods were used in the study: the method of categorical analysis, the systemic method, the institutional method, the comparative analysis, the cross-country analysis, the descriptive analysis the generalisation method.

Findings. The study has drawn the attention of the scientific community and public administration practitioners to the problem of the lack of systematic brain drain activities in Ukraine. Successful policies, measures and decisions that should be adopted are highlighted, and the main mistakes made in the experience of Moldova, Bosnia and Herzegovina, and Israel are traced. As a result, the study also outlines the main principles of a balanced long-term policy to encourage the return of personnel to Ukraine using holistic and systemic approaches.

Originality. The scientific and practical prerequisites and the current state of the problem of brain drain in Ukraine are revealed. The policy of stimulating the return of personnel is theoretically grounded and confirmed by the practice of individual countries, and should be based on fundamental steps: ensuring systematic, timely and comprehensive state data collection on brain drain, creating a target authority that will exclusively implement policies to promote brain circulation and brain gain.

Practical value. The implementation of the developed recommendations in several key areas, namely, the return of Ukrainian personnel, including refugees, and their reintegration; promotion of brain gain, including encouraging international specialists to immigrate to Ukraine; prevention of brain drain, primarily creating opportunities for the development of younger generations, jobs; active interaction and involvement of the Ukrainian diaspora; interstate cooperation in the interests of Ukrainian personnel; increasing the possibilities of post-war recovery and further development of Ukraine.

Keywords: *brain drain, migration, intellectual migration, public administration*

Introduction. Globalisation and the formation of a global society at a rapid pace have radically changed and continue to change the world, creating both new opportunities and challenges. Mutual opening of borders, intensification of international cooperation, international economic integration and other processes related to globalisation are quite expectedly accompanied by intensive migration of ideas and labor (since 1990, the share of migrants in the world's total population has increased from 2.87 to 3.6 %; in absolute terms, their number has increased by 128 million [1]). Such an exchange is a characteristic feature of modern developed economies, associated with the mobility of goods, services, information, finance, etc. Therefore, human capital is the main resource of the economy of the *21st* century. In the modern world, those countries that have significant intellectual assets are characterised by a higher level of development and a better quality of life (Scandinavian countries, Switzerland, Australia, the USA, Japan, etc.). A negative migration balance over a long period of time, i.e. a phenomenon in which emigration from a country exceeds immigration to the country, is a significant threat to developing countries and economies in transition, as it often indicates a migration crisis. The latter in this case often includes the so-called "brain drain" or skilled emigration, which is a serious challenge for the state.

The large-scale wave of mass emigration of skilled Ukrainians caused by Russia's full-scale invasion of Ukraine was fully justified, but is no less threatening, especially in the long term. The majority of refugees surveyed say they plan to return home, but the number of those willing to do so is gradually decreasing. This trend is expected, as the third year of the full-scale war is underway and a significant number of emigrants have managed to adapt to life in a new country and get used to a certain level of quality of life, which the Ukrainian state, unfortunately, is not able to provide at this stage. At the same time, this does not mean that Ukraine is doomed. The brain drain in question is not a unique phenomenon specific to our country, as wars have been fought before and caused waves of refugees. It is this area – the analysis of similar experiences gained by other countries – that requires scientific research. This will allow us to identify successful measures and solutions that should be adopted, as well as to trace the main mistakes made in relation to brain drain. At the same time, it is extremely important to first analyse Ukraine's own experience and draw objective conclusions about what has been done and what has not been done – this knowledge will certainly be needed in the further development and implementation of policies to encourage the return of personnel to Ukraine.

Literature review. Skilled emigration is dynamic, as it is constantly changing and depends on many factors: the current legislation of the country of immigration, socio-economic conditions of life and work, security situation, etc. Due to its negative connotations (drain – "outflow", "drainage"), brain drain was usually seen as a win-lose scenario or a zero-sum game: one country loses its personnel, while the other country gains them. However, over the past decades, the scientific community has been actively debating this narrow "black and white" view of the phenomenon.

The issue of skilled emigration has become the object of scientific research by many foreign and domestic scholars. Thus, in our opinion, the works by the following researchers attract special attention: Libanova E.; Vega-Muñoz A., Gónzalez-Gómez-del-Miño P. & Espinosa-Cristia J. F.; Radonjić O. & Bobić M.; Krasulja N., Blagojevic M. & Radojevic I.; İnce C.

The concept of brain drain in Ukrainian scholarship can be found under different names: in the form of a literal translation, such as "brain drain", "intelligence drain", "talent drain" and in a form adapted to the conceptual and categorical apparatus used in Ukraine, namely "skilled emigration", "intellectual emigration". This term was introduced by the British

Royal Society in 1963 to describe migration processes among scientists and engineers in the UK during and after the Second World War. Over time, the concept has changed in meaning and complexity. Today, it describes not only the departure of highly educated migrants from one country to another, but also the transition to different fields of science, etc. Typically, brain drain refers to mass emigration, in which a state loses highly qualified personnel (often engineers, doctors, scientists and other university-trained professionals) for economic, political, personal or other reasons. The term can also mean the direct loss of mass personnel by the state.

In this article, the term "brain drain" will be used to refer to the long-term emigration of skilled workers and specialists from one country to another, as well as their loss by the country of origin.

For developing countries with economies in transition, such as Ukraine, brain drain is a problematic phenomenon due to the high level of emigration, and its negative impact is only increasing [2]. The negative effect of brain drain occurs when the share of skilled labor exceeds 5 % of the migration rate. Despite the relevance of brain drain issue in the twenty-first century, in particular, according to statements by government officials, states generally do not keep records of intellectual migration. Therefore, it is impossible to estimate the real statistically substantiated scale of the loss of personnel at the national level, let alone at the global or regional level.

Skilled emigration leads to a decrease in the human and intellectual capital of the country of origin, impeding its development in the future, in the long term (the Human Development Index does not reflect this, as emigration does not directly affect 3 of the 4 measured factors). Brain drain leads to demographic losses, which, together with an ageing population and low birth rates (global trends in the civilised world), pose a serious threat in all spheres of life. Such emigration often causes a "staff shortage", a shortage of workers in certain industries. For example, if a disproportionately large number of healthcare workers or engineers leave, the state's ability to deal with healthcare crises (including epidemics) or introduce new technologies is significantly undermined. The brain drain clearly causes significant economic and financial losses to the country of origin: at the very least, the state budget finances the educational system to train specialists, and their departure leads to a drop in tax revenues and losses in value added – this is received by the country of immigration. For example, Greece loses €9.1 billion (at least 4.5 % of GDP) annually in lost tax revenues due to intellectual emigration [3]. For Serbia, brain drain costs €4.6 billion per year on average (at least 7.77 % of GDP) [4]. For its part, the fiscal burden slows down economic growth, reduces funding for social programs and infrastructure projects, and negatively affects the development of public services, including education. It also contributes to political instability [5] and leads to an increase in the number of people willing to emigrate. In general, a domino effect is at work. This bi-directional interdependence between brain drain and economic development makes it much more difficult for the country of emigration to solve this problem.

According to current research, limited intellectual emigration can be beneficial for the economic growth and development of the country of origin. The positive impact of brain drain can be traced in some of the cases studied, namely in certain large middle-income developing countries (China and India are the most common examples) [6]. However, such cases are related to another phenomenon, brain circulation, which will be discussed below, as well as a set of individual factors. We believe that these cases are not convincing enough to argue that brain drain is beneficial for the country of emigration, and the conclusions of the relevant studies are often based on the erroneous substitution of the concepts of "brain circulation" and "brain drain".

It is unclear which type of state benefits more from the brain drain and how, and which loses more. In the end, empirical studies show that the gains from skilled emigration, if any, are insignificant. And the losses for the state in which the outflow of personnel is observed (demographic, economic, political, etc.) are significant.

The opposite of brain drain is the concept of brain gain, which emerged in the 1990s and whose definition depends on the perspective. In the case of a country of immigration, this term refers to the improvement of its human capital through mass immigration of skilled professionals. In the case of the country of origin, brain gain may refer to the return of such personnel to their homeland and its corresponding replenishment with new skills and capital [7]. In this paper, the authors will use the latter interpretation, taking into account its focus on countries with skilled emigration.

Brain gain can be one of the key ways to increase human capital [2], the proper use of which will allow the state to enter the category of highly developed countries and improve the quality of life of its citizens. "...this is the result of a well-thought-out government policy and targeted efforts of the authorities, scientific institutions of the country, and public organisations" [8].

Brain drain and brain gain coexist [5], because migration itself is a two-way dynamic process. What is an "outflow" for one country is an "inflow" for another – an inverse relationship [2]. However, the relationship between these phenomena within one country may also be based on interaction. For example, the knowledge gained by emigrants abroad can return to their country of origin through diaspora networks [5], and their remittances are a stable source of funding for low-income countries [9]. This symbiosis of the two phenomena has led to the emergence of a new, collective concept – brain circulation – a circular movement of skilled professionals between countries, which includes both brain drain and brain gain. According to this concept, countries are not seen as winners or losers, but as places for human capital flows. Brain circulation enables the circulation of skills, technologies and capital [10].

The "brain circulation" is often asymmetrical, as migration has a dual nature that is not uniform: very rarely is the "outflow" and "inflow of brains" proportional for the same country. In general, we can talk about brain drain or brain gain in a particular country when one type of migration becomes massive and significantly outweighs the other in terms of numbers. In other cases, it is more appropriate to talk about brain circulation.

Although brain drain leads to an increase in the gap between countries, circulation can minimise this gap, according to some views [10].

Among the benefits, researchers note a particularly positive impact of brain circulation on the scientific and technical sphere of the country of origin [5] due to the exchange of knowledge. In the economic sphere, it stimulates trade, entrepreneurship, foreign direct investment, etc. [9]. In addition, it contributes to the social and economic development of the state in those areas that it is unable to meet on its own without borrowed knowledge and experience from outside [2].

Fortunately, the conditions under which a country experiences a brain drain or an inflow are not beyond its control. They are largely dependent on the policies implemented in both countries. For example, the application of intellectual property rights increases the likelihood that the "brain drain" will turn into a "brain gain" [5]. It is an axiom that the better the opportunities in a country experiencing brain drain, the higher the likelihood of its specialists returning from other countries. Historical examples show that massive "return" migration is a consequence, not a cause, of sound policy.

Unsolved aspects of the problem. Russia's full-scale invasion, which has created the biggest migration crisis in modern Europe, has put Ukraine's human capital at risk. Millions of highly skilled Ukrainians who have been forced to leave the country for an indefinite period of time is a challenge for Ukraine for years to come. It is widely believed that the return

and retention of such personnel can be the key to the country's successful reconstruction. However, the lack of scientific research on this issue indicates a delay in solving the problem, because without a theoretical basis, there will be no transition to the practical plane, no direct implementation of ideas. That is why in-depth research on brain drain as a phenomenon is needed, especially in a context like Ukraine's, to develop policies that will strengthen Ukraine's human capital.

It will not be possible to single out a specific policy, the implementation of which would guarantee the transition from brain drain to brain gain or at least brain circulation. It can be unequivocally stated that this problem is becoming more and more urgent, and the transition to brain circulation/brain gain is becoming an increasingly important task for the government to maintain a viable economy and society [11], given the increasingly frequent statements by government officials. A number of measures and solutions designed to stimulate brain circulation and brain gain vary from country to country and are more akin to trial and error, taking into account foreign experience. Therefore, it is advisable to study some relevant cases and identify specific successful and unsuccessful steps in brain gain/brain circulation policy.

The purpose of the article. The purpose of the article is to analyse Ukraine's policy on brain drain and to find ways to improve it, taking into account foreign experience and possible scenarios of war development. The main objectives of the work are to study the theoretical foundations of brain drain and related concepts; to analyse the state of brain drain and highlight its features in Ukraine in different periods of independence; to study foreign policies on brain drain of individual countries; to assess Ukraine's policy on brain drain at the current stage; to propose ways to improve it.

Methods. The paper uses general scientific and special research methods. The method of categorical analysis allowed us to identify the main definitions; using the systemic method, brain drain is considered as a set of individual elements and at times as an element of a larger system; the institutional method was used to study the public authorities involved in solving the problem of brain drain; the comparative analysis made it possible to identify common and distinctive characteristics of policies, as well as development trends; the cross-country analysis helped to identify mistakes made and successful steps among relevant experience. The descriptive analysis was conducted by accessing scientific sources on the topic. The generalisation method was used to draw conclusions.

Results. Brain drain is a common socio-political phenomenon in Ukraine, which has posed a serious challenge to the country throughout its independence. Ukraine inherited the second largest scientific potential among the 15 former republics of the Soviet Union, but already in the early 1990s, the economic crisis and low demand for specialists with higher education resulted in the largest wave of staff emigration in the history of the country (until 2022).

In 2000, the emigration rate of university graduates in Ukraine was 4.3 % of the national highly skilled labour force, which equated to about 250,000 people, making Ukraine one of the 25 largest international brain drainers [12]. This is in addition to unfavourable demographic trends: one of the lowest birth rates in the world in the early 2000s [13] and the ageing of the population, which is typical for Europe. This has resulted in Ukraine's demographic losses averaging about 200,000 people annually since 2005 – every 12 months, an average city, such as Bila Tserkva or Lutsk, loses its population. Consequently, Ukraine is significantly short of personnel, in part because of negative natural reproduction rates.

In 1991–2005, 525 doctors of sciences and 1026 PhDs (candidates of sciences) left Ukraine. In 2015, there were almost five times fewer scientists than in the early 1990s: about 63,000 as opposed to almost 313,000 people [8]. According to the State Statistics Service, the number of scientists decreased by almost 80 % between 2000 and 2017 (Table). Already in 2017, Ukraine had one of the lowest rates of the number of scientists per 1,000 people among European countries: 3.7 people/thousand [8]. In 2020, this figure was even lower – 0.85 people/thousand population [14].

Table

"Intellectual drain" from Ukraine during 2000–2017

Year	Number of scientists	Year	Number of scientists
2000	267	2008	87
2001	180	2011	53
2002	117	2012	43
2003	136	2013	52
2004	151	2014	30
2005	162	2015	31
2006	155	2016	39
2007	92	2017	53

Unfortunately, it is not possible to assess the real scale of brain drain in Ukraine due to the lack of a unified system for collecting data on skilled emigration and unified methodological approaches to measuring the intensity of migration processes. Accordingly, there is no data on the volume of intellectual emigration. The lack of an up-to-date population census (the last one, which is also the first and only all-Ukrainian census, was conducted in 2001), which should not be expected in the coming years, and the imperfections of the current system of migration data collection only complicate the assessment.

According to some estimates, since 1991, Ukraine "has lost about a third of its scientific potential and continues to lose it", as the intellectual emigration of Ukrainians is mostly irreversible. This result was also influenced by the annexation of Crimea and the war in Donbas, which Russia started in 2014, as some residents of Crimea and eastern Ukraine were forced to migrate for security and economic reasons. At the same time, Russia's aggression has also caused changes in the field of education: the number of Ukrainian students abroad has been growing rapidly ("the outflow rate, i.e. the percentage of mobile students out of all students, was 4.63") and only 10–20 % of them plan to return [15].

As for Ukraine's policy on brain drain, it should be noted that it was not systematic and conceptual. As for the institutional aspect of intellectual emigration, no specially authorised executive body in the relevant area was created, and management functions in the field of migration remained scattered. Thus, the Ministry of Internal Affairs of Ukraine ensures the formation of the state migration policy concerning skilled emigration, in particular, the State Migration Service implements such policy, the Ministry of Foreign Affairs maintains consular records of Ukrainian citizens abroad, the Ministry of Social Policy develops proposals for regulating migration flows, etc.

The fact that brain drain is not a priority as a problem may also be evidenced by the insufficient level of funding for Ukrainian science. For example, spending on research and development (R&D) compared to Ukraine's GDP has actually been gradually decreasing, despite a significant increase in public investment in science in absolute terms. For example, public investments in science increased from UAH 5 billion 289.4 million in 2016 to UAH 8 billion 326.6 million in 2018, i.e. by 57.4 %, while this increase is only 0.06 % of GDP in 2018 [16].

In Ukraine, spending on research and development amounts to about 0.4 % of GDP (the Law of Ukraine "On Scientific and Technical Activities" provides for 1.7 % of GDP), while the corresponding average figure in the European Union is 2.3 % of GDP [17], which is almost six times higher.

Of course, increasing funding alone is not enough to turn brain drain into brain gain. This task requires a comprehensive, balanced state policy, which was actually absent in Ukraine until 2017 (official documents did not even mention this problem for a long time).

In 2017, the Cabinet of Ministers adopted a general Strategy of the State Migration Policy of Ukraine for the period up to 2025. In order to address the issues related to the brain drain, the 3rd goal of this document was formed, which aims to ensure the creation of the necessary conditions for the return and reintegration of Ukrainian migrants into Ukrainian society.

Open sources show that during this period, the Ukrainian authorities implemented certain measures and initiatives that were supposed to prevent brain drain and promote at least brain circulation, if not brain gain. One of them is the large-scale state program "Come Back and Stay", announced at the end of 2019, the first stage of which is a program of cheap loans for small and medium-sized businesses "Affordable Loans 5–7–9 %", which is designed to help create conditions for the return of labor migrants to their homeland. By April 2021, 12.5 thousand entrepreneurs had already taken advantage of this government program, which was launched on 1 February 2020. However, it is not known how many migrants returned having started their own business with the support of this program (still ongoing as of March 2023) or having taken jobs in the respective enterprises, so it is impossible to state its effectiveness in the context of brain gain. The full content of the state program "Come Back and Stay" (including the main activities and action plan) has not yet been made public, and therefore remains unclear. This, in particular, may indicate the fragmentation of Ukraine's brain drain policy.

Another initiative that was supposed to promote brain circulation in Ukraine was the presidential program "Big Construction" (2020), which, among other things, "envisaged the creation of half a million new jobs, which were supposed to meet the employment needs of returning migrants" [15]. In 2021, more than 100,000 jobs were created. However, there is no data on the number of skilled workers who returned to Ukraine from emigration and took up the relevant vacancies. In 2022, the Big Construction project was forced to be suspended.

In general, the findings of the Migration Governance Review in Ukraine, published by the International Organization for Migration (IOM) in March 2019, on brain drain are still relevant despite being 4 years old: there is no comprehensive program to encourage the return of its own citizens who have moved abroad, and the only reintegration plan that exists is for labor migrants and their families. Ukraine also lacks proper migration statistics, which is crucial for a successful brain gain/circulation policy. Thus, the failure to implement a number of significant steps by the government, as well as the not-so-successful previous policy, prevented Ukraine from effectively combating brain drain.

In 2022, the second and final stage of the implementation of the State Migration Policy Strategy of Ukraine for the period up to 2025 was to begin in accordance with the approved action plan. However, on 24 February 2022, the Russian Federation launched a full-scale invasion of Ukraine.

The full-scale war unleashed by Russia has caused Europe's largest migration crisis since the Second World War [18], forcing more than 8 million Ukrainians to flee their homeland, according to the UN High Commissioner for Refugees (UNHCR), and about 6 million to become internally displaced. For a country with a population of approximately 41 million (excluding the Autonomous Republic of Crimea), this is a huge outflow of human capital, even in quantitative terms. In terms of quality, the assessment is similar: according to a UNHCR study (conducted in August-September 2022), the majority of refugees (70 %) have higher education and had a job before leaving (63 %) and a variety of professional experience. The OECD has similar figures. For example, according to its data, a higher proportion of Ukrainians have higher education than other refugee groups. Thus, 71 % of respondents had completed higher education, 41 % had a master's degree or higher, and another 11 % had complete vocational education [19].

Comparing the results of various relevant studies, it can be concluded that Ukrainian refugees were mostly skilled workers in the service sector (trade, education, medicine, etc.).

It is encouraging to note that, as of May–June 2022, 81 % of the respondents hoped to return to Ukraine one day, and 15 % of the refugees planned to return to Ukraine in the coming months [18]. However, it should be remembered that the longer the war lasts, the more Ukrainian refugees adapt to life abroad, and thus the greater the risk that they will remain there even after the victory.

The domestic labor market is also quite optimistic. Thus, the results of the Fifteenth National Survey in the Context of War, conducted by the Sociological Group Rating on 23–24 July 2022, show that "among those who are currently looking for a job, they [the majority] are rather not ready to move to another region or country to work". It is also worth noting that only 9 % would like to move abroad for permanent residence (3 years ago, this figure was three times higher). Of those who plan to move – which is 6 % of the respondents – one in five plans to move abroad, i.e. just 1.2 % of respondents, according to a study by the Kyiv International Institute of Sociology conducted in October-November 2022 [20].

This trend is quite comforting, as it indicates a significant decrease in the scale of emigration, as well as the possible prospect of immigration exceeding emigration, and thus brain gain over brain drain in the future.

At the same time, the issue of human resources as a matter of "brains" remains and will remain extremely acute for Ukraine in the coming decade. In addition to the forced emigration of Ukrainians, Russian aggression, having accelerated the brain drain, has led to a rapid decline in Ukraine's human capital due to fatalities among both military and civilians. It should be noted that the losses among Ukrainian servicemen concern not only qualified military personnel but also other areas of activity, as the vast majority of those who stood up to defend the state had civilian professions before 24 February 2022. That is why the Russian bullet hits twice.

According to the authors, due to the massive nature of this phenomenon and its irreversibility, the concept of brain drain alone is not sufficient to describe the current state of human capital in Ukraine – there is a need for a new concept that would reflect the irreplaceable loss of qualified personnel by the state because of their death. Such a concept may be appropriate not only in martial law, but also in emergency situations, in particular for man-made and natural disasters (such as the devastating earthquakes in Turkey and Syria or epidemics/pandemics) and in other cases.

Ukraine is also losing personnel as a result of the regular massacres of civilians by the Russians. Ukraine's loss of certain enterprises that were leading in their field and held a significant market share (Artemsil, Severodonetsk Azot Association, Art-Winery Private Joint Stock Company, etc.) as a result of Russian destruction and hostilities only exacerbates the brain drain as a problem, as highly specialised professionals find it difficult to find employment for their knowledge due to a lack of jobs, which leads them to emigrate. The war is causing a huge loss of human capital. Ukraine continues to lose its talent.

Thus, as a result of Russia's full-scale invasion, skilled emigration in Ukraine (albeit forced, for security reasons) has reached unprecedented levels. The previously developed migration policy, in particular with regard to brain drain, proved to be ineffective, fragmentary and unable to retain qualified specialists in the country before 24 February 2022, so it is quite expected that it is unable to cope with the unprecedented challenges of the wartime period. Fortunately, preliminary research shows that the vast majority of Ukrainians are optimistic and plan to return home sooner or later. Nevertheless, significant forced migration is justifiably ranked third among the

top 5 risks for Ukraine in 2023 by the World Economic Forum, as the war is still ongoing.

Ukraine's human capital is an asset for the entire continent, and its preservation and expansion is a priority for the EU.

Brain drain is a problem that is not unique to Ukraine. A number of countries, including European ones, are also losing skilled personnel on a significant scale. Some of these losses are caused by wars or other armed conflicts. Therefore, in this article on Ukraine, it is appropriate to examine the policies of other countries on intellectual emigration, to identify their advantages, disadvantages and mistakes, in order to use this experience in formulating our own strategy.

Since the current state of skilled emigration in Ukraine is almost entirely driven by security factors due to Russia's full-scale invasion, the authors decided to study only the countries with a similar conflict background. To make the comparisons and results of the study relevant, the countries studied belong to transition economies, like Ukraine, and are also part of the Euro-Asian continent. The scale of skilled emigration in the countries was also taken into account. The distinction made by the authors is a group of countries by income level, as there are no countries in the group to which Ukraine belongs that meet the other criteria. Therefore, the countries studied in this paper have above-average or high income levels, while Ukraine is below average. The preliminary selection based on the 5 above criteria was made on the basis of UN data on the respective countries [21]. The last stage of the selection – the selection of 3 countries – took into account the political peculiarities of the conflict backgrounds and development scenarios that are possible for the Ukrainian state at this stage.

Bosnia and Herzegovina (an EU candidate as of March 2024) is a European country characterized by an extensive brain drain. This is due in particular to the war in the country, which was one of the largest conflicts in Eastern Europe in modern history. In the period from 1992 to 1995, 1.3 million people were internally displaced, 1.1 million of whom resettled after the conflict in another country [18]. In the post-war period, there was a positive migration trend – about 40 % of Bosnian refugees were repatriated, but the return itself, quite expectedly, could not turn brain drain into brain gain. To make matters worse, more and more citizens of Bosnia and Herzegovina are not returning, in particular because they have obtained other citizenship, entire families are leaving the country or intend to do so [22].

The share of highly skilled workers among emigrants reached 34 % in 2016 [23]. The situation with skilled youth in Bosnia and Herzegovina is not catastrophic, but it is noticeable – 6 % of young emigrants were highly educated in 2011–2019 [24]. At the same time, almost 47 % of young citizens in 2021 were thinking about leaving the country [25], while in 2000, about 15 % of students did not want to leave Bosnia and Herzegovina at all, 10.5 % said they would definitely return home, and the rest were undecided. Eventually, as the above data shows, they made their choice.

This situation and trends naturally make us think about the success of the implemented brain drain policy and the ability of Bosnia and Herzegovina to have a real positive impact on the brain drain.

If we look at Bosnia and Herzegovina in the postwar period at the initial stage, the lion's share of initiatives to stimulate brain circulation were developed and implemented by international organizations and foreign partners. For example, the Netherlands provided financial assistance to Bosnian refugees to rebuild their homes in Bosnia and Herzegovina so that they could return to their homeland [22]. In addition, in 2001, UNESCO developed a Strategy for Southeast Europe to support the exchange of skills and experience, in particular to help young Bosnian professionals share [with their countrymen] the knowledge and skills they have acquired abroad. Also, a number of programs were implemented to repatriate Bosnian citizens and reintegrate them, such as "go and see" visits for Bosnian citizens living abroad (which proved to be not very effective, as refugees more often used the opportunity to stay abroad), or the IOM Project "Reconstruction, Capacity Building and Development through the Return of Qualified Nationals to Bosnia and Herzegovina" (1996–2001) (862 of the targeted 1,000 people returned). In general, the actions of the international community, although very supportive, were often inconsistent, which significantly affected the effectiveness of the implemented ideas and the state of the brain drain in the country.

As for the Bosnian-Herzegovinian institutions and the efforts of the state itself in the postwar period, at least until 2010, there was no real strategic approach to solving the brain drain problem, no focus on developing appropriate policies. This explains why, over the next decade, a significant number of Bosnian citizens continued to emigrate – 530,000 people (almost 6 percent of the country's total population) left the country in 2013–2019 [26], and why the brain drain, as well as emigration in general, is still ongoing. Even within the framework of cooperation with foreign partners, the government showed very little interest in this problem. The government's next steps that should be considered are to provide an opportunity to retain Bosnian-Herzegovinian citizenship when obtaining a new one (if the legislation of the host country allows for such a possibility) to reduce the number of lost citizens [22] (dual citizenship is prohibited in Bosnia and Herzegovina). This prevents their naturalization and leaves room for interaction with the diaspora, contributing to brain circulation or even gain. At the same time, until recently, the Diaspora Department of the Ministry for Human Rights and Refugees had only 6 specialists for a diaspora of 2 million [27] (61 % of the total population of Bosnia and Herzegovina in 2021). In 2017, the Policy on Cooperation with Diaspora was approved, but after all these years, it is rather a political compromise [27]. A significant mistake is the lack of reliable statistics on brain drain, as this information is manipulated to promote negative rhetoric in the public space and corresponding sentiments, demotivating young people in Bosnia and Herzegovina, as well as the lack of positive return stories in the media space [22].

Thus, based on the retrospective analysis, the authors come to the logical conclusion that in the long term, the measures taken were not enough to significantly reduce the rate of brain drain in Bosnia and Herzegovina, and the post-war "romantic-optimistic" mood of Bosnian-Herzegovinian emigrants (for 47.8 respondents, the greatest hope upon return was their participation in the reconstruction of the country), not supported by an effective policy of repatriation and reconstruction of the country have not been used effectively.

One of the countries experiencing a brain drain is Moldova. As a result of the "Transnistrian conflict", the de facto Russian occupation of the Moldovan (left-bank) part of the Dniester River, which led to hostilities in 1992, several hundred thousand citizens emigrated.

The emigration of Moldovans continues to this day, only for economic rather than security reasons (although the conflict has not been resolved, it is frozen) and is characterized by a significant proportion of specialists – back in 2000, 30.5 % of emigrants had higher education. Over the next 15 years, the level of emigration of highly qualified personnel increased by 14.6 percentage points (in Bosnia and Herzegovina, for example, by 11.5) [23]. From 1991 to 2004, the scientific potential of Moldova decreased threefold. Moldova is a classic example of a massive brain drain that is increasing year after year.

In the first decade after the end of the armed conflict, the Moldovan government did not pay sufficient attention to the problem of brain drain and was not too concerned about the long-term consequences, while remittances from Moldovan emigrants were coming into the country (in 2000 they amounted to 11.5 % of GDP, and in 2008 – 30 %). Since 2010, there has been a significant revival of Moldova's interest in brain drain. In cooperation with the International Organisation for

Migration, a grant program for Moldovan graduates abroad was launched to facilitate their return and employment in private and public institutions in Moldova, as well as an initiative to boost the temporary return of highly skilled citizens under the SIMP II project. Moldova also cooperates with other countries to stimulate brain circulation. One such example is the Agreement between the Government of Italy and the Government of Moldova in the field of labour migration and the relevant implementation protocol, signed on 5 July 2011. Thus, Moldovan healthcare workers often work in Italy.

Among the interesting innovative practices in Moldova are The Diaspora Engagement Hub, a government program of thematic grants for representatives of the Moldovan diaspora (54 grants have already been awarded since its inception in 2016), and The DAR 1 + 3 program 2019–2025, aimed at harnessing the human and financial potential of the diaspora and stimulating entrepreneurship.

Moldova does not have legal provisions on highly skilled migration, but it is mentioned in some legal acts, in particular, the National Strategy on Migration and Asylum (2011–2020) and the National Strategy Diaspora 2025. Reintegration continues to be a top priority [28]. Action Plans for 2014–2016 and 2017–2020 were also developed for the reintegration and support of returning citizens, but they did not focus on brain drain issues. There is a lack of long-term relevant data on skilled emigration and tools for monitoring this phenomenon.

The slight improvement in the rate of repatriation of Moldovan citizens, as well as the decrease in the level of legal emigration at the beginning of the *21st* century, unfortunately, do not indicate an effective brain gain policy. The latter is still characterised by a fragmentary, non-functional approach. Nevertheless, even the results of Moldova's brain drain policy are considered successful in comparison with other countries.

The two case studies of brain drain policies of countries with different conflict backgrounds considered by the authors are possible scenarios for the development of military events in Ukraine, provided the war ends or the conflict is frozen. The Israel of the twenty-first century is neither a country in transition, nor a lower-middle-income country, nor a part of the European continent, but it is a state in a permanent state of war, which is the last of the three main potential scenarios for Ukraine. Given this fact, as well as the achievements of Israel as a state in general, the case of Israel in this article will be an exception.

Israel's experience in the discourse of intellectual emigration is unique, as in the first decades of the armed conflict, the country experienced brain gain rather than brain drain (mainly due to historical and political factors, such as the Jewish mentality and other national characteristics). The state began to noticeably lose its "brains" only in the twenty-first century for economic reasons – this period will be studied, as well as how the Israeli government is fighting brain drain.

Since 1992, immigration and the return of Israeli citizens have ceased to significantly outweigh emigration: the migration balance (the difference between the number of arrivals and departures) dropped from about 60,000 to less than 5,000 in 2008. Israel's migration trends during 1995–2004 show that the higher the level of education, the more Israelis emigrated (interestingly, the "brain drain" was much stronger among immigrants than among Israeli natives). Over time, the ratio of emigrants with academic degrees to those who returned has become completely unfavorable to the latter: for every newcomer in 2017, there were 4.5 departures, which is 1.9 more than in 2014 [29]. Intellectual emigration in Israel continues to this day. This increases the security threat to Israel, as Israel's military advantage stems from its highly educated population and strong technical and R&D sectors. Therefore, ignoring the brain drain by the Israeli government would mean suicide for the country.

Since the early 2000s, this issue has become particularly relevant, but the most active phase of activity began in the second decade of the *21st* century. Several programs and projects have been launched to address the brain drain. In 2010, the Israeli Centers of Research Excellence program (I-CORE) was launched to bring prominent researchers back to Israel, among other tasks, but in 6 years this program was terminated (in particular, due to lack of priority for financial support). In 2010, the Israel National Brain Gain program was founded, but it began to function in 2012. Its goals include assisting repatriates in finding employment and in the process of returning to Israel; preparing recommendations to facilitate the return process, etc. This program was implemented in partnership with several institutions: The Ministry of Economy, the Ministry of Aliyah and Integration, the Ministry of Finance, and the Council for Higher Education. Its results were noticeable, but in 2016, after the pilot period, the program was suspended. According to the Innovation Authority, which managed the program in recent years, the results did not meet expectations (in terms of cost-benefit). In 2017, the Back to Tech program replaced The Israel National Brain Gain program, which is a national program to increase the skilled labor force in the field of high technology. That is, there has been a transition to a "point" solution to the problem of "brain drain" in a specific industry. Interestingly, unlike most other initiatives, this one is available to foreign specialists, and not exclusively to those who are somehow connected to Israel. The authors of this paper were unable to find any data on the current status of the Back to Tech program, but in 2020 it was still in the pilot stage and satisfactory results were expected. One of the current programs is The Center for Integration in Science, which provides various kinds of assistance (consulting, financial, etc.) for scientists who may potentially come to Israel. Thus, at least 768 residents have returned. Coming back to the correlation between brain drain and military capability, it is worth paying attention to the joint fund of the Ministry of Aliyah and Integration and the Ministry of Defense, which aims to involve scientists in security research projects [30]. As can be seen even from the above measures, there is no single Israeli government agency that would control and coordinate actions in the field of brain drain. Given that the negative effect of skilled emigration is noticeable over time, as well as the significant impact of the COVID-19 pandemic on migration trends, it is currently difficult to assess how successful Israel's decisions on brain drain have been over the past decade. Nevertheless, it can be assumed that Israeli programs are unlikely to have a real significant impact on the brain drain, as the factors that cause it, such as the combination of high taxes and low wages, and the deterioration of public funding for higher education, are not addressed by these initiatives. Therefore, such Israeli activities resemble the treatment of symptoms or indicate an urgent need for even minor but positive results here and now. This issue requires further research.

Thus, as can be seen in all 3 cases studied, the policy of preventing brain drain and stimulating brain circulation and brain gain is highly dependent on individual factors, such as the type, duration and state of war, the general policy of the government, the availability of political will, available resources, and the extent of support from foreign partners and international organisations. In fact, the experience of each state is unique. There is no universal method that can stop the outflow of qualified personnel. However, a balanced, comprehensive systematic approach to brain drain, taking into account the experience of other countries, the availability of clear objective statistics and an understanding of the stimulating factors over a long period of time, will help to achieve success.

It is now the third year of Russia's full-scale invasion. The frantic pace of emigration of Ukrainians observed during the first months of the escalation has been slowed down, but the demographic collapse still threatens both the present and future of Ukraine, and brain drain only accelerates it. According to an optimistic scenario, between 40 and 70 % of those who left will return after the war. However, the longer the war lasts, the less

optimistic the mood of citizens is, especially highly skilled ones, and the chances of their return. Therefore, the "brain drain" poses a risk of exhausting Ukraine's most valuable resources for reconstruction and recovery – vital knowledge and skills.

The authorities have repeatedly stated the importance of preventing skilled emigration and the need to create incentives for the return of specialists (in fact, brain retention and brain circulation), but so far these statements have not been implemented by the state. Throughout the full-scale invasion, the Ukrainian government has not yet developed any strategic documents directly related to the "outflow of personnel" (neither brain gain programs nor strategies for interaction with the diaspora, etc.) There is also no institution that would be responsible for the formation and implementation of the relevant policy, or at least its individual issues, such as the Israeli Ministry of Aliyah and Integration or any other body. Thus, the breadth of strategic coverage is currently out of the question.

Some government projects related to brain gain or brain circulation are listed in the Recovery Plan for Ukraine, presented in July 2022. However, firstly, they are all part of other national programs related to the area of brain gain, such as Ensuring Effective Social Policy, Development of the Education System, and Improving the Business Environment. Secondly, most of these activities are not focused on "brain" issues, but are related to migration in general, investment, etc. The stage of these projects, their content, responsible authorities, and other details are currently unknown.

Thus, as of March 2024, there was no comprehensive state policy on brain drain in Ukraine. However, the Ukrainian government claims to be well aware of the threat posed to the country by skilled emigration, but it seems that this policy area is still not considered a priority.

Conclusions. It is clear that brain drain in Ukraine is a problem that the country will face for decades to come. That is why the Ukrainian government, together with its stakeholders, must formulate a long-term, balanced, comprehensive policy using a holistic and systemic approach.

Taking into account the motives, nature and scale of Ukrainian skilled emigration, the government's activities in this area should focus on several key areas:

- return of Ukrainian personnel, including refugees, and their reintegration;
- promoting brain gain, including encouraging international specialists to immigrate to Ukraine;
- preventing brain drain, primarily by creating opportunities for the development of younger generations and jobs;
- active interaction and engagement of the Ukrainian diaspora;
- interstate cooperation in the interests of Ukrainian personnel.

Foreign experience will be particularly useful here. For example, the experience of Bosnia and Herzegovina proves that it is important not only to return refugees but also to keep them there, so programs to support and reintegrate this vulnerable population are needed. This example also shows that international assistance is not enough without proper attention and timely action by the government, and demonstrates the need for active work in the information space to prevent the promotion of negative rhetoric about brain drain. Among Moldova's achievements, attention should be paid to its fruitful interaction with the diaspora and the use of the latter's potential (both financial and human). It would be useful to study action plans for the reintegration of Moldovan citizens when developing our own programs, as well as intergovernmental agreements that allow the state not to lose its citizens irrevocably (dual-intent integration policies should be considered). Israel's experience warns of the significant threat posed by brain drain to a warring country in the modern world, which is an extremely important warning for Ukraine. Therefore, it would be quite appropriate to thoroughly study the functioning of the Israeli fund for engaging scientists in security research projects and consider creating our own. The Israeli National Brain Gain program and other similar programs should definitely be analysed to develop our own strategic documents. A thorough evaluation of previous projects and activities should be carried out.

The results of the analysis show that regardless of the stage of the conflict, the reasons for skilled emigration eventually turn from security to economic ones. Therefore, one of the tasks of the state to prevent brain drain is to improve the political, educational and economic environment, especially working conditions and a sufficient number of jobs. Economic changes, such as tax cuts, to reduce brain drain require further research.

Despite the fact that the war in Ukraine is still ongoing, the authors believe that the Ukrainian government should already focus on facilitating the return of ideas, if not people. This will require experience in remote work during the pandemic as a way to attract human capital across geographical boundaries, and cooperation with the diaspora to stimulate investment, entrepreneurship, knowledge exchange, etc. Another focus should be on retraining. Ukraine has the opportunity to reduce the future shortage of personnel in the healthcare, construction, and other sectors by training new ones. In this area, special attention should be paid to veterans.

Of course, we should start with the basic fundamental steps: to ensure systematic, timely and comprehensive state data collection on brain drain, to get rid of the declarative nature of documents and to create a targeted body that will exclusively implement policies to promote brain circulation and brain gain. The sooner Ukraine starts, the closer it will be to solving the problem of brain drain and the final Victory.

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Політика України щодо brain drain у воєнний і повоєнний періоди

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Мета. Аналіз політики України щодо brain drain і пошук шляхів її вдосконалення з урахуванням закордонного досвіду та ймовірних сценаріїв розвитку воєнного стану.

Методика. У роботі використані загальнонаукові та спеціальні методи дослідження: метод категорійного аналізу, системний метод, інституційний метод, порівняльний аналіз, крос-державний аналіз, дескриптивний аналіз і метод узагальнення.

Результати. У результаті проведеного дослідження привернена увага наукової спільноти та практиків державного управління до проблеми відсутності в Україні системної діяльності щодо brain drain. Виокремлені вдалі політики, заходи й рішення, що доцільно перейняти, а також прослідковано, які основні помилки були допущені щодо brain drain у досвіді Молдови, Боснії та Герцеговини, Ізраїлю. Результатом є також те, що в дослідженні викладені основні засади зваженої довготривалої політики стимулювання повернення кадрів до України за допомогою холістичного й системного підходів.

Наукова новизна. Розкриті наукові та практичні передумови й сучасний стан проблеми brain drain в Україні. Теоретично обґрунтована і підтверджена практикою окремих країн політика стимулювання повернення кадрів, що повинна базуватись на фундаментальних кроках: забезпечення систематичності, своєчасного й комплексного державного збору даних щодо brain drain, створення цільового органу, що займатиметься виключно впровадженням політики сприяння brain circulation і brain gain.

Практична значимість. Запровадження розроблених рекомендацій у кількох ключових напрямах, а саме, повернення українських кадрів, зокрема біженців, та їх реінтеграція; сприяння brain gain, зокрема заохочення міжнародних фахівців до імміграції в Україну; запобігання brain drain, насамперед створення можливостей для розвитку молодих поколінь, робочих місць; активна взаємодія й залучення української діаспори; міждержавна співпраця в інтересах українських кадрів; збільшить можливості повоєнного відновлення й подальшого розвитку України.

Ключові слова: *«відтік мізків», міграція, інтелектуальна міграція, державне управління*

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