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The long way home: Migration trends of Ukrainian researchers in the modern world (1991–2023)

Abstract. *In a modern world marked by intense migration processes, the analysis of the migration of Ukrainian scientists and their choice of destination countries, especially in the context of recent events in Ukraine, is an important subject of scientific research. This study examines migration trends among Ukrainian researchers in various historical periods from the early 1990s to the present. The research is based on the analysis of scientific literature for theoretical insights and previous studies, the use of statistical data from the State Statistics Service of Ukraine, the analysis of political, economic, and sociocultural contexts to understand migration factors, methods of observing real events and processes, and historical analysis to trace the evolution of migration processes. Factors influencing scientists' decisions regarding migration and their motivations, as well as destination countries, were analyzed in the article. Three key migration stages are highlighted: the post-Soviet period (1991–2012), the post-revolutionary period (2013–2021), and the period of full-scale war (2022 and onwards). The first stage, covering the years 1991–2012, was characterized by the outflow of scientists in search of economic opportunities and stability. Destination countries during this stage included the USA, Russia, Germany, Israel, Canada, and Poland. The second stage, from 2013 to 2021, was marked by deep social and political transformations in Ukraine following the Euromaidan Revolution and the annexation of Crimea by Russia. Scientists chose Germany, Canada, and Poland for academic collaboration and research funding. The third stage, which began in 2022 and continues to the present, is defined by the full-scale war in Ukraine. Scientists are leaving the country due to a sense of danger and military conflict. The primary migration destinations are EU countries, which offer opportunities for academic cooperation and safety. Prospects for further scientific research lie in the analysis of the historical roots of the migration of Ukrainian scientists, including the impact of events and reforms in Ukraine and the world on migration processes.*



Keywords: *migration; Ukrainian researcher; brain drain; scientific mobility; forced migration; refugees*

Introduction.

In recent years, the global landscape of scientific research has undergone significant transformations, with an increasing number of researchers seeking new opportunities and collaborations beyond their home countries. Ukraine, a country known for its rich scientific heritage and intellectual capital, has been an active participant in this global scientific migration. The relocation of Ukrainian researchers to other countries in search of better resources, career prospects, and professional growth has contributed to dynamic knowledge and experience exchange on an international scale.

The study of the migration process of Ukrainian scientists holds important societal and scientific significance for several reasons. The migration of scholars from Ukraine can lead to a loss of the country's intellectual potential. Scholars who leave for abroad take with them knowledge and research experience. Ukraine already faces issues with an insufficient number of scientists, especially young and talented researchers. The migration of scientists can exacerbate this deficit and result in a loss of human resources for future research and the country's development. The loss of scientists can impact the advancement of science and education in Ukraine. A reduction in the number of researchers can limit opportunities for conducting research, developing new technologies, and fostering innovation. The migration of scientists can have economic implications for Ukraine. The loss of highly skilled professionals can lead to economic losses and a decrease in the country's competitiveness on the global market.

Several researchers have explored the issue of scientist migration: Romanjuk and Smutchak (2017) analyzed the main reasons for the migration of scientists during the years of Ukraine's independence; Oppeld and Shabardina (2013) examined trends in intellectual migration in the context of European integration; Polishchuk and Nagorna (2021) studied the lessons from the EU and the USA regarding scientist migration; Svityashchuk and Stadny (2014) examined the migration of Ukrainian scholars through two narrower issues: academic mobility and academic migration; Vavilova, Isakova, Oliynyk, Sayenko, and Troyan (2016) identified the main goals of Ukrainian scientists' departure abroad at the beginning of the 21st century, including qualification enhancement, gaining experience in international projects, and improving their and their families' well-being. A wide range of issues related to the migration of Ukrainian scientists during the full-scale war are considered in the works of Ukrainian researchers. In a study conducted by Lytvynchuk and Yurkivsky (2023), aspects of the contemporary migration crisis that arose as a result of the Russian-Ukrainian war are discussed. The scholar notes that the arrival of skilled immigrants contributes to increased labor productivity and does not require significant costs for their education in the host country. Furthermore, this process helps reduce the pace of population aging thanks to new immigrants. Fiialka (2022) examines the consequences of the war for Ukrainian researchers and explores the attitudes and motivations of Ukrainian scientists regarding their scientific activities and the publication of their results in

scientific journals. Suchikova, Tsybuliak, Lopatina, Shevchenko and Popov (2023) investigate how to prevent the loss of scientific potential due to the full-scale war, identifying the connection between the residence of Ukrainian researchers and their ability to engage in scientific activities, as well as identifying factors that reduce scientific efficiency during times of war. Harashchenko, Hladchenko, and Korytnikova (2022) focused on determining the needs of Ukrainian scientists, both those who stayed in Ukraine and those who left Ukraine due to the war. Among the most important personal needs of Ukrainian scientists, the authors highlight financial support, creating new social contacts, and stable access to the internet, while the most crucial needs in their scientific work are research projects, access to scientific literature, information, and data, and mobility programs for scientists.

The intensification of migration processes in Ukraine underscores the relevance of this topic for scientific research. However, some critical aspects, such as the factors behind scientists' decisions to migrate to other countries in different contemporary periods and the directions of scientist migration, have not received enough attention and thorough investigation, both theoretically and practically. This indicates the need for further scientific research and consideration of these issues to better understand and support Ukrainian scientists. The aim of this research is to analyze the dynamics of migration among Ukrainian researchers from the early 1990s to 2023, taking into consideration specific factors and the unique characteristics of their migration patterns. Within the scope of this study, we will examine the determining factors that have motivated Ukrainian scientists to seek international migration opportunities and identify the key routes of their migration during the specified historical period.

Research Methods.

The study employs various scientific methods, including an analysis of scientific literature to understand theoretical approaches and previous research on this issue; statistical data, such as data from the State Statistics Service of Ukraine; an analysis of political, economic, and sociocultural contexts to comprehend the impact of factors on scientist migration; methods of real-time event and process observation to provide information about scientists' migration decisions; historical analysis to trace the evolution of migration processes, identify the most influential factors in scientists' decisions, and understand how changes occurred over time; a chronological approach to structure the research and highlight key events that influenced migration processes; and a problem-oriented approach to delve deeper into the causes and consequences of scientist migration.

Results and Discussion.

The migration of Ukrainian researchers can be traced back to the early 1990s, following Ukraine's declaration of independence. While academic migration also occurred during other periods in Ukraine's history, the Soviet era presented significant challenges for researchers seeking to migrate due to the totalitarian regime and geopolitical restrictions such as the Iron Curtain. However, the social and political changes in combination with economic challenges and the opening of international

borders created the foundation for increased mobility among scientists. Understanding the historical context provides the basis for comprehending the factors influencing the migration of Ukrainian researchers.

The contemporary migration of Ukrainian scientists can be divided into three stages:

1. The First Stage, "Post-Soviet Period" (1991–2012): This period was characterized by the initial dissolution of the Soviet Union and economic shocks. Many people emigrated from Ukraine in search of better economic opportunities and stability. It was a time of brain drain among highly skilled professionals and labor migrants. The State Statistics Service of Ukraine also reported that the total number of scientists and educators decreased by 74% from 1991 to 2012 (Lobova, 2022). Reasons for migration often included political instability and limited local employment prospects. The breakup of the Soviet Union resulted in economic problems and the restructuring of academic institutions, prompting many scientists to seek better opportunities abroad. During this stage, there was a noticeable trend of researchers immigrating to European countries and the USA (Lobova, 2022). Economic factors, access to better research facilities, and career prospects were key motivators for migration during this period.

2. The Second Stage, "Post-Revolutionary" (2013–2021): The period from 2013 to 2021 in Ukraine was marked by profound political and social transformations, including the Euromaidan Revolution, the annexation of Crimea by Russia, and the war in the country's eastern regions. These events significantly affected Ukraine's political, economic, and social realities. A new stage of migration trends among Ukrainian researchers emerged during this time. Opportunities for academic collaboration, research funding, and participation in international research projects drew scientists to European Union countries. Countries such as Germany, Canada, and Poland became increasingly popular destinations for Ukrainian scientists during this stage (State Statistics Service of Ukraine, 2013b). The desire to integrate into the European research community and gain access to advanced academic networks played a significant role in scientists' migration decisions.

3. The Third Stage, "Full-Scale War" (2022–Present): The full-scale war in Ukraine has had a profound impact on migration trends among researchers. The sense of personal danger and threats to the lives of individuals and their families, the occupation of territories, the destruction of infrastructure, and exacerbated socio-economic issues became the primary factors influencing the migration decisions of many scientists. EU countries continue to be the most common destinations for researchers (Mishchuk & Oliinyk, 2022). Researchers Mishchuk and Oliinyk (2022) note that every seventh migrant scientist from Ukraine does not intend to continue their professional activity, making them a lost intellectual capital for Ukraine.

These three stages reflect different characteristics, factors, and dynamics of migration processes in contemporary Ukraine (see Table 1).

Table 1. Three stages of researchers' migration processes in modern Ukraine (1991–2023).

Stage	Period	Main characteristics	Factors influencing researcher migration	Migration dynamics	Countries commonly chosen by ukrainian researchers in this period
1	"Post-Soviet Period" (1991–2012)	The dissolution of the USSR. Transition to a market economy and privatization of state-owned enterprises. Social challenges, including issues of unemployment and a high level of corruption.	Economic crisis, political instability, restructuring of academic institutions, deepening financial crisis in science due to "optimization" and the cessation of program-targeted funding by the government.	Significant initial outflow with subsequent weakening.	USA, Russia, Germany, Israel, Canada, Poland.
2	"Post-Revolutionary" (2013–2021)	Annexation of Crimea; war in eastern Ukraine; security threats; political instability.	Challenging economic conditions in science, low wages, unfavorable working conditions, and difficulties in professional self-realization.	Increasing emigration, departure of skilled professionals from Ukraine.	Germany, USA, Russia, Canada, Poland.
3	"Full-Scale War" (2022–Present)	Full-scale war; internally displaced persons.	Concerns for personal safety, resource constraints, and institutional instability.	Ongoing increase in outflow due to war.	Poland, Germany, and other European countries.

First stage of the "Post-Soviet period" (1991–2012).

The first stage of the migration of Ukrainian scientists can be associated with Ukraine gaining its independence. Since 1991, the Ukrainian population has been decreasing. At the beginning of 1991, there were nearly 52 million people living in Ukraine, by 2012, the total population had decreased to almost 45 million people (Minfin, 2022). Although the proportion of scientists in the overall migration flows

from Ukraine during this period (1991–2012) is relatively small, the number of scientists in the country decreased critically. The number of scientists in Ukraine fell from 313,079 individuals in 1990 to 82,032 individuals in 2012 – a decrease of nearly four times (Svityashchuk & Stadny, 2014). The decrease in the number of scientists during this period is associated not only with migration but also with the prequalification of scientists. However, it is challenging to determine the exact number of scientists who migrated from Ukraine during this period, as Ukraine does not keep complete statistics regarding the emigration of scientists abroad.

The first wave of migration of Ukrainian scientists in the period from 1991 to 2012 was driven by several factors:

1. The dissolution of the Soviet Union and Ukraine's gaining independence in 1991 led to significant political changes in the country. The reforms accompanying this transition influenced the decisions of some scientists to migrate in search of better conditions for their work.

2. In the early years of Ukraine's independence, the country faced economic challenges, including hyperinflation and financial difficulties. These economic complications were one of the reasons that pushed some scientists to seek opportunities abroad.

3. After years of isolation under the Soviet regime, Ukraine began to engage more actively with international partners. This created new opportunities for scientists to acquire knowledge and collaborate with foreign colleagues.

4. Reforms in the education and science systems were one of the reasons that motivated some scientists to seek new opportunities abroad.

5. The lack of financial resources for scientific research and professional growth was a factor that influenced scientists' decisions to migrate to countries with greater financial opportunities.

Funding for science in Ukrainian universities during that period was meager and represented only 0.6% of the total expenditures on higher education. Clearly, under such conditions, Ukrainian universities were unable to finance quality scientific research that would be of interest to the global scientific community and contribute to the improvement of the quality of education. It is not surprising that the reduction in funding led to a decrease in the share of research and development in the GDP. If in 1996 this indicator was 1.36%, by 2012 it had already fallen to 0.8% (Nikolaevskii & Omelchenko, 2006).

Due to the economic crisis, the material base of science has significantly deteriorated, and there is a threateningly insufficient level of funding for science in Ukraine. Low wages for scientists and a low quality of life are often decisive factors in the brain drain phenomenon. In addition, the decision to migrate was influenced by the reduction in material and technical support for the scientific process. Ukrainian scientists were not provided with modern scientific equipment and literature. The average age of most measuring instruments exceeds 15 years, while in the West, such instruments are considered outdated after only five years of use (Oppeld & Shabardina, 2013).

Most often, Ukrainian scientists migrated to the United States during this period – a total of 420 individuals, including 343 PhD and 77 doctoral degree holders. Russia ranks second as a destination for Ukrainian scientists, with 388 individuals migrating, including 292 PhD and 96 doctors of science. Germany was hospitable to Ukrainian researchers, attracting a total of 251 individuals, including 208 PhD and 43 doctors of science. A significant number of Ukrainian researchers also immigrated to Israel (117), Canada (109), and Poland (52). In total, 311 scientists immigrated to other countries, including 252 PhD and 59 doctors of science (Khmelovska, 2013). While emigration to all of these countries began to decrease at the end of the 1990s, it remains consistently high in the United States, primarily due to numerous scholarship programs that attract young scientists to the USA (Svityashchuk & Stadny, 2014).

Over the first decade and a half of Ukraine's independence, 600 employees of the National Academy of Sciences of Ukraine, particularly to the United States, according to the U.S. National Science Foundation, 50,000 Ukrainian scientists emigrated (Naboka & Sherstiuk, 2009). Ukraine is an important intellectual donor for the United States, as approximately 30% of highly qualified migrants currently working in the fields of science and technology in the USA originate from Ukraine. Therefore, it is worth noting that in recent years, approximately 90% of scientific inventions developed in the United States were created by highly qualified migrants, including Ukrainians (Baranyk & Romanenko, 2014). This underscores the importance of further research and analysis of this issue for the development of both Ukraine and the countries that accept Ukrainian scientists.

According to State Statistics Service data, during this period (from 1990 to 2012), representatives of the physical-mathematical, technical, biological, and medical sciences emigrated most intensively (State Statistics Service of Ukraine, 2016).

In the second half of 2011, a group of researchers, with financial support from the World Bank, conducted a large-scale sociological study to determine the nature of migration from Ukraine: "brain drain" or "brain gain." A total of 6,676 individuals from 5,985 households in 63 cities in Ukraine were surveyed. The data showed that 42.8% of migrants living abroad at the time of the survey had higher education, 1.4% were PhDs, and 0.3% doctors of science. Although the share of researchers in the overall migration flow from Ukraine is relatively small, the number of scientists in Ukraine has significantly decreased (Svityashchuk & Stadny, 2014). The substantial reduction in the number of scientists in Ukraine is also related to the transformation processes taking place in the country. Transformation, including political and economic changes, has affected the working conditions of scientists, access to resources, research funding, and the overall scientific climate in the country.

The survey conducted among scientists and educators in 2012 revealed that the main reasons for choosing destination countries during this period were better employment opportunities and income, the presence of relatives and friends, knowledge of the state language, and the geographical and cultural proximity of the destination country (Kupets, 2013).

The second stage, the "post-revolutionary" stage (2013–2021).

The second stage of migration from Ukraine, referred to as the "post-revolutionary" phase, covers the period from 2013 to 2021 and is characterized by significant events. The start of this period was marked by the Maidan and the events of the Revolution of Dignity (2013–2014), when thousands of Ukrainians took to the streets of Kyiv and other cities, demanding democratic reforms and fighting against corruption. These events led to a change in government and opened a new chapter in Ukraine's history. Russian aggression and the annexation of Crimea, as well as the 2014 conflict in eastern Ukraine, resulted in profound changes in the country. Thousands of people became internally displaced, seeking safety in other regions of Ukraine and abroad.

The second wave of migration of Ukrainian scientists, the "post-revolutionary" period covering 2013 to 2021, was driven by several factors:

1. The onset of this period was defined by the Revolution of Dignity, leading to a change in the political landscape in Ukraine and causing instability in the country's political and economic climate.
2. Russian aggression and the conflict in eastern Ukraine brought about significant societal changes, forcing many residents of the eastern regions to seek safety elsewhere in Ukraine or even beyond its borders.
3. The government of Ukraine has initiated a wide range of reforms aimed at combating corruption, improving democratic institutions, and creating a more favorable business environment. However, these reforms were often accompanied by challenging economic difficulties that affected the citizens' quality of life.
4. Complications for scientists and educators. The government was working to improve conditions for scientists and educators, but numerous challenges remained, leading many to continue their migration abroad.

A noticeable decrease in Ukraine's population was observed from 2014 to 2015, dropping from 45.4 million to 42.9 million individuals, with a continuous decline in subsequent years. This was due to the annexation of Crimea (2.3 million residents in 2014) and the war in the Donbas region (over 200,000 refugees and over 10,000 deceased citizens) (Kulu, Christison, Liu, & Mikolai, 2023). During this period, a significant influx of Ukrainians to EU countries was observed, facilitated by the introduction of visa-free travel in 2017. In 2020, Lapshyna (2022) reported that 601.2 thousand Ukrainians became the largest national group in the EU. This migration to the EU can be explained by various factors, including economic opportunities, seeking refuge, and the desire for better living conditions.

Official statistics show a significant decrease in the number of organizations engaged in scientific research and development in Ukraine during this period, as well as a corresponding reduction in the number of working scientists. If, in the initial stage (early 1990s), the country had 1,344 organizations employing 313,079 scientists, by 2015, these figures had decreased to 978 organizations and 63,864 scientists (State Statistics Service of Ukraine, 2016). At this time, the number of scientists per thousand inhabitants in Ukraine became one of the lowest in Europe (Shtyfurko, 2018).

The ongoing decrease in science funding, which in 2016 constituted only 0.48% of the GDP, drove Ukrainian scientists towards even more active migration. According to data from the State Statistics Service, just in 2014, 42 PhDs and 7 doctors of science moved to other countries (State Statistics Service of Ukraine, 2013a).

Ukraine faced a significant drain of scientific personnel; only in 2015, the National Academy of Sciences saw 2,730 scientists leave, including 95 doctors of science and 511 PhDs. One of the primary reasons was the low salaries and limited material-technical facilities (Five ways to escape from Ukraine, 2016). However, these figures are just the tip of the iceberg. Determining the number of scientists who ceased their scientific activities and emigrated is challenging. After 2015, the State Statistics Service ceased tracking migrating scientists from Ukraine (Erman, 2018).

During this stage, scientists chose migration due to low pay, excessive bureaucracy, low scientific prestige, a lack of research funding, and political instability (Rasulova, 2021). There were valid reasons for this – research conducted in 2017 among NASU scientists showed that over 52% were low-income, and factors influencing scientists' migration from Ukraine at that time included low salaries and minimal science funding (around 90%), adverse work conditions (around 60%), and professional fulfillment challenges (around 20–30%) (Zhabin, Kazmina, & Vasyliuk, 2018).

Despite the fact that the list of countries where Ukrainian scientists emigrated remained largely unchanged after 2013, including the USA, Russia, and Germany, there was an expansion in the geography of migration for Ukrainian scientists. Canada and Poland joined this group of countries (State Statistics Service of Ukraine, 2013b).

The third wave, the "full-scale war" (2022 – present).

Due to Russia's aggression, a significant number of Ukrainian scientists were forced to leave their scientific positions. Some decided to join the defense forces, while many others opted to migrate abroad, contributing to approximately six million documented departures from the country. Although it's challenging to establish precise figures amid the ongoing conflict, reports from the Council of Young Scientists under the Ministry of Education and Science of Ukraine as of April 4, 2022, indicated that between four and six thousand scientists left Ukraine due to the invasion. Recent estimates suggest this figure might reach 22,000, which accounts for approximately a quarter of the country's researchers (The future of science in Ukraine, 2022). The forced displacement and emigration of Ukrainian scientists have devastatingly impacted the scientific community and the research landscape of the country. The loss of such a significant number of talented individuals jeopardizes the continuity and development of scientific activities in Ukraine.

The third wave of migration of Ukrainian scientists from 2022 to the present was driven by several factors:

1. Military conflict and heightened political tension in Ukraine, particularly events related to the war, the occupation of parts of the territory, and losses among the population, have created feelings of danger and threat.

2. The economic situation in Ukraine has reduced funding for science and education, leading to constraints in the development of scientific institutions and the field in general.

3. Decreased opportunities for professional growth and development for scientists, and limited access to modern technologies and equipment.

4. Increased immigration policies in host countries actively seek highly qualified scientists, making their territories more attractive for Ukrainian researchers.

5. The expansion of professional networks among Ukrainian scientists abroad contributes to increased migration opportunities.

The highest risks of non-return are typical for, on the one hand, the most vulnerable groups who might expect to receive support as refugees in EU countries, and on the other hand, the most active and qualified individuals capable of quickly finding employment and adapting to new conditions (Libanova, Pozniak, & Tsymbal, 2022). Unfortunately, there are no precise statistics on the proportion of researchers in these specific migrant groups, as such data may depend on various factors, including the individual circumstances of each migrant. Researchers with higher education, candidates, or doctoral degrees may belong to both the group of active and qualified individuals who can quickly find work in other countries and the group of individuals who might expect support or refuge in complex circumstances.

A study conducted among Ukrainian scientists in April–May 2022 revealed that the financial situation worsened for 84% of academic and scientific staff compared to pre-war times. This study also showed that Ukrainian scholars more often chose Germany (26.8%) and Poland (25.1%) for migration during the full-scale war (Lutsenko et al., 2023). The third wave of migration of scientists from Ukraine is characterized by greater geographical diversity among European host countries and an increase in the number of Ukrainian scientists choosing different directions for migration.

Based on semi-structured interviews conducted by the author of this article with Ukrainian scientists who migrated from Ukraine during the war in September 2023, researchers considered several key aspects when choosing their country of residence, including the availability of job opportunities, the possibility of obtaining grants and internships for Ukrainian scientists, personal interest, the attractiveness of the chosen country for living, the influence of recommendations from friends and relatives who already lived in that country, as well as the possibility of receiving social benefits from the country. The selected countries in this case were EU member states.

The research conducted by Suchikova (2023) reveals the impact of the war on the productivity and research outcomes of Ukrainian scientists. The conclusions indicate that the location of researchers significantly influences scientific effectiveness. Additionally, 33.8% of respondents reported that they couldn't continue their research at all. These findings underscore the destructive nature of the war against the scientific community in Ukraine. The displacement of scientists from their initial research environments and the challenges associated with relocating to new places are hindering their productivity and ability to engage in scientific activities.

Fiialka (2022) investigates the effect of Russian military aggression on the scientific activities and interests of Ukrainian researchers. The results emphasize the significant impact of the war on the scientific landscape in Ukraine. According to survey data, 15.5% of respondents had stopped their scientific work due to the conflict. Moreover, half of these individuals expressed the intention not to return to scientific work in the future. These results point to the deep despair and disillusionment experienced by Ukrainian researchers due to the ongoing aggression. Challenges linked to the war, such as resource constraints, institutional instability, and concerns about personal safety, contributed to a decline in scientific activity.

The presence of numerous international grants allowing scientists to work abroad plays a significant role in facilitating the migration of Ukrainian researchers. Although determining the exact number of scientists who have secured positions abroad is challenging, there are projects that exemplify such opportunities. For instance, the Research Center for the History of Transformations – RECET (<https://www.recet.at/>) offers scholarships to Ukrainian scientists under the "Ukraine and the Transformation of Eastern Europe" program. Claude Bernard Lyon 1 University (<https://www.univ-lyon1.fr/en>) offers employment opportunities for Ukrainian researchers, their families, and doctoral students under the PAUSE program. This program is an initiative of the French Ministry of Higher Education, Research, and Innovation aimed at providing financial support to Ukrainian scientists facing complex circumstances due to the war with the Russian Federation. Moreover, the University of Duisburg-Essen (<https://www.uni-due.de/en/>) offers positions for Ukrainian researchers in the fields of organic chemistry, supramolecular chemistry, and organocatalysis.

Various countries have their own unique approaches to attracting Ukrainian scientists. Canada implements the "Express Entry for Skilled Workers" program (<https://schindlervisa.ca/uk/immigration/express-entry/>), which streamlines immigration for skilled professionals, including scientists. Canadian universities and research centers actively provide scholarships and grants for international researchers. Recognizing the destructive impact of Russian aggression on Ukrainian scientific, innovative, and intellectual potential, the Prime Minister of Canada announced the creation of the Canada-Ukraine Science Partnership, which plans to invite up to 20 scientists from Ukraine to work and live in Canada (Prime Minister of Canada Justin Trudeau, 2022).

Germany has launched the "EU Blue Card" program (<https://www.recht.bund.de/bgbl/1/2023/217/VO.html>), offering European Union citizens and those from other countries the opportunity to work as scientists and researchers. It's essential to note that Germany currently employs 800,000 scientists, and this number is steadily increasing. One in every ten scientists in the country is a foreign specialist, and this trend is growing. The majority of foreign scientists in Germany are content with their work and life in the country. With additional state funding, particularly for a series of elite universities, Germany's higher education institutions have become even more attractive to international scholars (Kokh & Holovko, 2013). The German Academic Exchange Service (DAAD) predicts that German universities will eventually host around 100,000 students and researchers from

Ukraine. In order to expand its support program, the DAAD has appealed to the German government to allocate 80 million euros annually (Moroz, 2022). Considering the forecasts about demographic developments in Germany, it is evident that in the future, Germany will need even more scientists from abroad to reduce the shortage of skilled professionals (Kokh & Holovko, 2013).

The United States of America (USA) offers numerous programs for scientists, including the "H-1B" for skilled professionals and the "O-1" for outstanding individuals (<https://dream-visa.com/visa/viza-talantiv-o-v-ssha/>). Renowned universities like the Massachusetts Institute of Technology (MIT) and Stanford University attract researchers from around the world.

Israel also offers the "Blue Card" initiative, simplifying the process of obtaining a work visa for scientists and specialists in the fields of technology and science. Israel is known for its high share of research and development in its gross domestic product (GDP). As of September 2021, this share was around 4.5% of the GDP (Science and Technology, 2023). Regarding Ukrainian scientists, they might be interested in working in Israel due to the opportunity to gain new experiences, establish international contacts, improve their financial status, and realize their scientific ambitions.

The outflow of scientists from Ukraine has a negative impact on the development of the research and development sector, the country's competitiveness on the global stage, and could limit opportunities for the development of innovative technologies and scientific achievements in the future.

Conclusions.

In summary, the intensification of migration processes in Ukraine is a relevant subject for scientific research. However, some important aspects, such as the factors influencing scientists' decisions regarding migration and their choice of destination country, require further research. This issue requires attention both theoretically and practically. This article analyzes the impact of various factors on the migration decisions of Ukrainian scientists from Ukraine during three main periods: the post-Soviet era, the post-revolutionary period, and the period of full-scale war. The research considers various aspects, including economic, sociocultural, scientific, and individual factors influencing migration decisions. The analysis reveals that each of these stages had its peculiarities and determining factors that influenced the decisions of scientists. In the first stage (1991–2012), after Ukraine gained independence, the main motivators were economic factors and the search for stability. During this stage, scientists chose destination countries such as the USA, Russia, Germany, Israel, Canada, and Poland. In the second stage (2013–2021), after the Revolution of Dignity and the events associated with the annexation of Crimea, scientists more frequently selected Germany, Canada, and Poland as migration destinations for academic collaboration and financial support for research. In the third stage (2022– to-date), during the full-scale war, the primary factors were the sense of danger and the reluctance to continue professional activities in Ukraine. During this stage, the geography of migration for Ukrainian scientists significantly expanded, with the primary migration destinations being EU countries. It is noted that many scientists are leaving Ukraine during the war and do

not intend to return, resulting in a loss of intellectual potential for the country. Further research opportunities lie in examining the historical roots of migration among Ukrainian scientists and understanding how events and reforms in Ukraine and the world have influenced the dynamics of migration processes.

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Довга дорога додому: тенденції міграції українських дослідників у сучасному світі (1991–2023 рр.)

Анотація. У сучасному світі, який відзначається інтенсивними міграційними процесами, важливим об'єктом наукових досліджень є аналіз

міграції українських науковців та їх вибору країни для переїзду, особливо в контексті останніх подій в Україні. У цьому дослідженні розглядаються тенденції міграції українських дослідників у різні історичні періоди від початку 1990-х років до сьогодення. Представлене дослідження ґрунтується на використанні аналізу наукової літератури для теоретичного уявлення та попередніх досліджень, використання статистичних даних із Державної служби статистики України, аналіз політичних, економічних і соціокультурних контекстів для розуміння факторів міграції, методи спостереження за реальними подіями та процесами, історичний аналіз для відстеження еволюції міграційних процесів. Було проаналізовано фактори, які впливають на рішення науковців щодо міграції та їхню мотивацію, а також країни призначення. У статті виділяються три ключові етапи міграції: пострадянський період (1991–2012 роки), постреволуційний період (2013–2021 роки) та період повномасштабної війни (2022 рік і до тепер). Перший етап, який охоплює 1991–2012 роки, характеризувався відтоком науковців в пошуках економічних можливостей та стабільності. Країнами призначення на цьому етапі стали США, Росія, Німеччина, Ізраїль, Канада, Польща. Другий етап, з 2013 по 2021 рік, відзначився глибокими соціальними та політичними трансформаціями в Україні, після Революції Гідності та анексії Криму Росією, науковці обирали Німеччину, Канаду та Польщу для академічного співробітництва та фінансової підтримки досліджень. Третій етап, який розпочався у 2022 році та триває до сьогодення, визначений повномасштабною війною в Україні. Науковці залишають країну через відчуття небезпеки та військовий конфлікт. Основними напрямками міграції є країни ЄС, які надають можливості для академічного співробітництва та безпеки. Перспективи подальших наукових досліджень вбачаються в аналізі історичних коренів міграції українських науковців, включаючи вплив подій і реформ в Україні та в світі на міграційні процеси.

Ключові слова: міграція; український дослідник; відтік мізків; наукова мобільність; вимушена міграція; біженці

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