

Наука и инновации в информационном обществе

INTELLECTUAL “BRAIN DRAIN” IN AZERBAIJAN: CAUSES AND SOLUTIONS

Статья рекомендована к публикации главным редактором Т. В. Ершовой 16.09.2023.

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Abstract

“Brain drain”, especially the emigration of highly-skilled persons is one of the most complex issues facing many developing countries. This process has not bypassed Azerbaijan either, due to a number of internal and external circumstances, also Azerbaijani specialists have been involved in the process of intellectual migration. Outflow of intellectual human resources negatively affects the growth rate of the country’s economy, lowers the quality of human capital in the field of innovation and science. Article examines the problem of “brain drain” in Azerbaijan, also the reasons for the intellectual migration and the main factors affecting its intensity. Finally, statistical data on intellectual migration are analyzed and some proposals for solutions to the problem are presented.

Keywords

brain drain; intellectual migration; human capital; brain gain; brain circulation; intellectual potential

Introduction

Over the past decade, increasing of migration activity of the population and labor resources as a whole, and the involvement of highly qualified specialists, including scientific personnel, in its example, made the countries of the world face the problem of intellectual migration, which is called “brain drain”. The term “brain drain” was first used by the Royal Society of Great Britain to describe the emigration of scientists and technologists to the United States and Canada from third world countries and Western European countries in the late 50s and early 60s of the last century [1,2]. Brain drain is the migration of highly skilled workers from underdeveloped countries to developed countries for better living conditions, better earnings, access to advanced technology, and secure political conditions in various parts of the world [3]. In the non-academic literature, the term is generally used in a narrower sense and refers the migration of engineers, physicians, scientists, and other very highly qualified professionals with university training [4]. In general, researchers have treated all tertiary educated migrants as among the skilled. Also, student mobility is considered an integral part of skilled migration. According to the OECD [5] “student mobility is a potential flow of qualified workers, either in the course of their studies or through subsequent recruitment”. Recent brain drain disquiets have extended to middle level professionals such as nurses, teachers, etc. [6]. As can be seen from study of IOM, the number of international migrants around the world has grown over time. In 2020, 232 million international migrants were in the world in 2020, which equates to 3.6 per cent of the world population. This figure is 128 million more than in 1990 and over three times

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the estimated number in 1970. In recent years, the interest in migration to different countries has been increasing among more qualified personnel, especially among young people [7]. According to the OECD and World Bank, stock of highly educated migrants reached to the 40 million in OECD member countries in 2015/2016. As seen in the numbers presented by OECD, China, India, Philippines, Russia, Poland and Mexico are the most important skilled labor emigrating countries of the OECD. China (2,25 million) and India (3.12 million) had sent the most highly skilled migrants abroad as of 2015/16. But, compared to the size of their populations, the numbers are comparably low. For example, the Philippines, Poland, Mexico and Russia have lost many more talented workers(“brains”) in relative terms. So that, 14.3 percent of highly skilled Filipinos, also 1.2 million highly educated polish, 1.14 million highly educated Mexican and 1.06 million highly educated Russian had emigrated to the OECD, in that period. Philippines is the third-most important skilled labor emigrating country of the OECD behind Mexican and Indian migration to the United States. This rate is even higher in small or non-developing countries. In Caribbean state Guyana, almost 71% of the highly educated had left for the OECD, also 66% in Trinidad and Tobago and 63% in Mauritius. While skilled migrants are certainly welcomed by labor markets in most developed economics especially, the migration of the educated have a negative effect on their home countries [8,9].

The “brain drain” process did not bypass Azerbaijan either. After Azerbaijan declared its independence, independent economic and political reforms began to be implemented in the country. However, in the first years of independence, the loss of former Soviet economic connections damaged the country's economy, and many enterprises that operated during the Soviet era stopped operating due to lack of state funding. As a result, thousands of educated and skilled Azerbaijanis became unemployed in a short period of time. This, in turn, caused to foreign brain drain - the migration of qualified Azerbaijanis to Russia, Turkey, Western Europe and the United States in search of work, or the migration of highly qualified specialists to fields not suitable for their qualifications within the country [10]. One of the basic conditions of sustainable economic development is related to the activity of highly qualified personnel. From this point of view, it is of particular importance to detection the problems that create the basis for the brain drain in the country and to determine the solutions in this direction.

1 Current situation with brain drain in Azerbaijan

The current labor migration in Azerbaijan differs from similar processes in previous periods. Now more, the departure of qualified personnel from the country has accelerated. Every year has observed 100-150 scientists leave the country [11]. The below graph (Fig. 1) shows the amount of brain drain in Azerbaijan by year based on statistical data provided by the Peace Research Institute [12]. As can be seen from the graph, there is a high increase in the amount of brain drain in 2009. Moreover, although brain drain has generally decreased since 2010, it has increased since 2016.

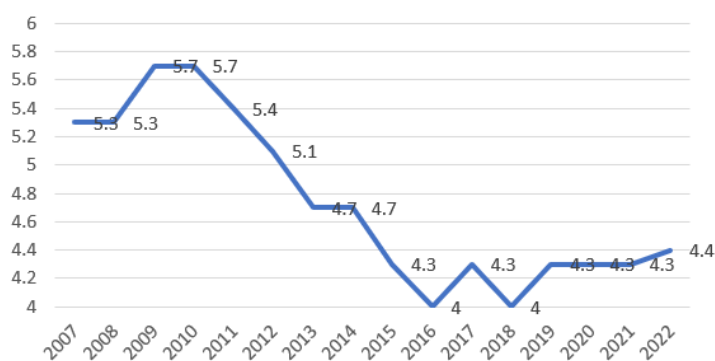


Fig. 1. Human flight and brain drain from Azerbaijan between 2007-2022 years

Starting from the 1990s, there has been a mass migration of personnel in Azerbaijani science at the expense of the most active and efficient generation. Although the volume of the “brain drain” – the emigration of the most highly qualified scientists – was not significant at the time, in terms of quality it was a loss of talent, and this loss for the state was huge [13]. Azerbaijani scientists who have made significant contributions to the development of science in many developed countries are working in many leading universities and scientific institutions today. In the information system “Azerbaijani scientists diaspora” created at the Institute of Information Technologies the distribution of Azerbaijani scientists living and working in foreign countries in 1990-2020 by countries and fields of science, as well as statistical figures on

their demographic indicators has been presented [14,15]. According to statistical data, Azerbaijani scientists work in more than 40 countries of the world, including Russia, Turkey, and the United States (Fig. 2). As can be seen from the graph, Russia and Turkey take the leading position in the process of “brain drain” from Azerbaijan.

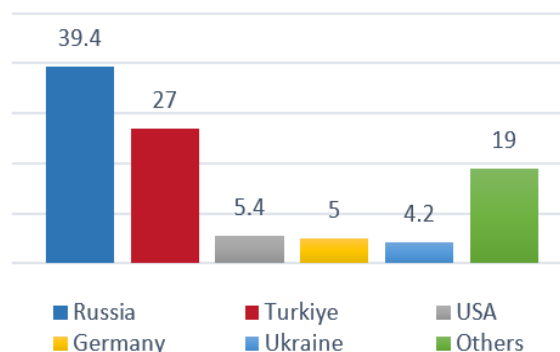


Fig.2. Distribution statistics of Azerbaijani scientists acting abroad by countries (%)

According to statistical data, Azerbaijani scientists in 25 fields of science work in foreign countries (Fig. 3). 88% of scientists living and working in foreign countries are men, and 12% are women.

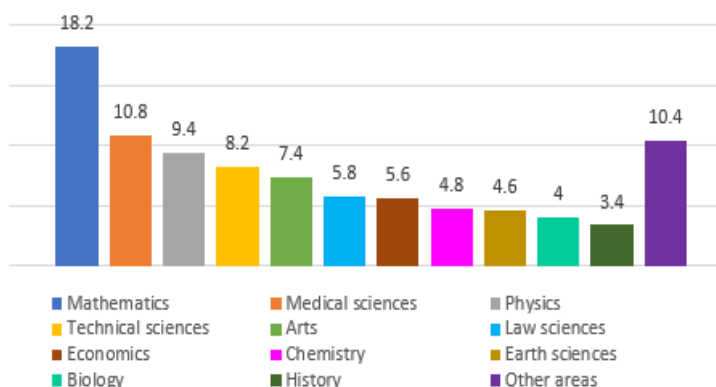


Fig. 3. Distribution statistics of Azerbaijani scientists acting abroad by scientific fields (%)

As can be seen from the graph, among the emigrants, scientists dealing with medical sciences, technical and exact sciences prevail.

The “brain drain” category also includes statistical indicators of young personnel studying abroad. In 2007-2015, 3,302 students studying abroad for bachelor's and master's programs were financed by the government within the framework of the scholarship program implemented by the state (“State Program for the Education of Azerbaijani Youth in Foreign Countries in 2007-2015”). From the data provided by the Statistics Committee [16], it can be seen that there is a high increase in the number of students studying abroad between 2008 and 2016 (Fig. 4). Also, the government plans to sponsor up to 400 students per year to study abroad for undergraduate and postgraduate study programs in 2022-2026. In these scholarship programs, it is assumed that after graduation, the students will return to Azerbaijan and work for 2-5 years, where the main goal is to strengthen the country's intellectual potential (human capital) and influence the brain flow at the expense of highly qualified personnel studying in prestigious universities [17,18]. But the initiative falls short of eliminating the factors causing brain drain.

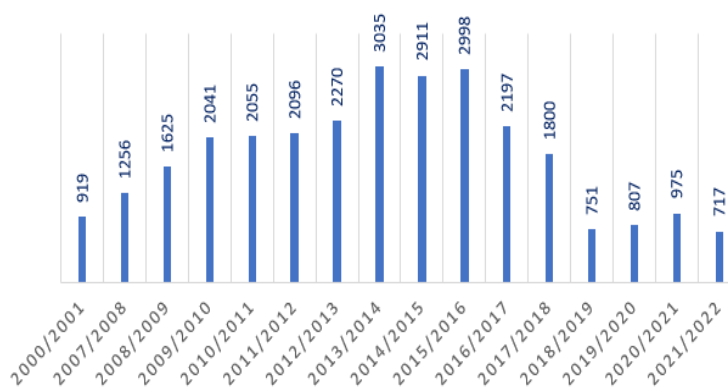


Fig. 4. The number of Azerbaijani students studying abroad between 2000 -2022 years

According to the Statistics Committee [16], citizens of Azerbaijan study in higher education institutions in more than 39 foreign countries of the world, including Russia, Turkey, Germany and the United States (Fig. 5).

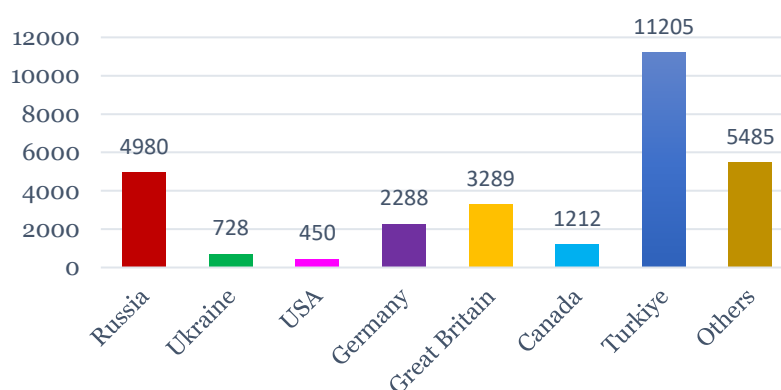


Fig. 5. The number of citizens from Azerbaijan studying abroad by countries between 2000-2020

2 The main causes of intellectual migration in Azerbaijan

The main stimulating factors of intellectual migration in Azerbaijan include the lack of conditions (insufficient material and technical support for the research process) and funding, low salaries, and low material and moral evaluation of the work of researchers. Investments allocated to scientific research in the country do not even reach 1% of GDP, which is an extremely low indicator in the world. This can be observed by comparing the share of research and development (R&D) expenditures in GDP in the CIS countries (Table 1) [16,19].

Table 1. The research and development expenditure in Azerbaijan and CIS countries

Research and development expenditure, percent of GDP					
Country	2017	2018	2019	2020	2021
Russia	1.1	1.11	0.99	1.04	1.07
Belarus	0.58	0.6	0.58	0.55	0.56
Ukraine	0.48	0.45	0.47	0.43	0.46
Georgia	0.27	0.28	0.28	0.3	0.29
Moldova	0.25	0.25	0.24	0.23	0.25
Armenia	0.23	0.19	0.18	0.21	0.21
Azerbaijan	0.18	0.18	0.2	0.22	0.2
Uzbekistan	0.1	0.11	0.13	0.13	0.13
Kazakhstan	0.13	0.12	0.12	0.13	0.13

Source: The United Nations

Most of the above-mentioned issues are to some extent related to the problems of science funding. As can be seen from the table, according to the results of the last five years, Azerbaijan, which has rich resources and financial potential, lags behind other CIS countries, except for Kazakhstan and Uzbekistan, in terms of the specific weight of expenses incurred on R&D. It should be noted that if in the 1980s and 1990s, the expenditures on science in the state budget of the Republic of Azerbaijan its share in the gross domestic product was 0.3-0.5% [20], in 2018-2021, but this indicator decreased to 0.18-0.22%. According to statistics, Israel (5.44%), South Korea (4.81%), Sweden (3.53%), Belgium (3.48%) and USA (3.45%) was in the top five in the rating list of R&D expenditures in 2020 [19]. A serious indicator of science funding is not absolute numbers, but data on science expenditures per researcher. According to statistics, in the ranking of research and development expenses per researcher, Switzerland is the first (406.7 thousand US dollars), the United States is the second (359.9 thousand US dollars), China is the 8th (266.6 thousand US dollars), and Russia It ranks 47th (\$93,000), and the cost per researcher in Azerbaijan is about 10 thousand US dollars [20].

Another reason for the “brain drain” from Azerbaijan is the huge gap between high living costs and low labor wages of high skilled personnel. This can be observed by comparing the average wage and living wage of qualified personnel in Azerbaijan and the countries [21] that became the main centers of intellectual migration (Fig. 6).

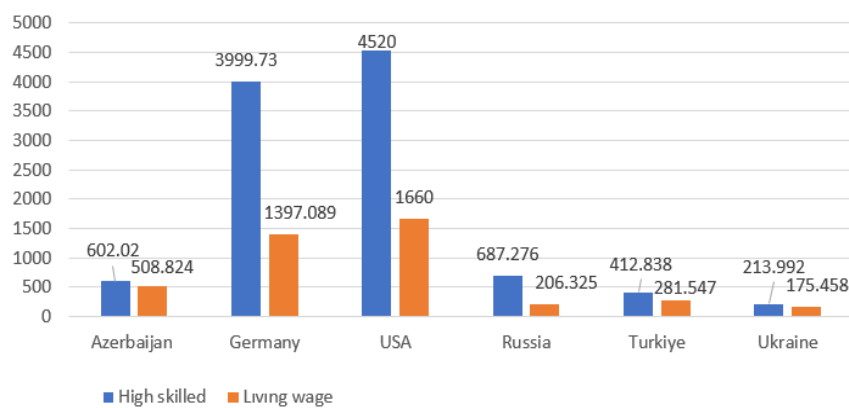


Fig. 6. The average wage of high skilled works and living wage (USD/month) for individual in the Azerbaijan and developed countries, 2018.

Experts point to the following as the main factor in the brain drain of young people who graduate from foreign universities: young people who have received a high level of education from European or American universities return to their homeland, then they cannot realize their potential in Azerbaijan, given salary is not advantageous, or even though the salary is normal, their freedom is not guaranteed. Young people are looking for places where they will feel more comfortable, that's why they leave the country [22]. This trend is observed not only among the unskilled labor group, but also among the people working in the fields of demand and relatively high wages in Azerbaijan [23]. This shows that “pushing” rather than “pulling” [24] factors prevail in the emigration mood of young people.

One of the factors driving the flow of young people abroad is the existence of injustices and injustices in the country related to employment and work environment. According to unofficial statistics, more than 120,000 Azerbaijani citizens with higher education left the country and went abroad in the last 10 years alone. According to the study of OECD, by 2015/16, 116.000 Azerbaijani emigrants lived abroad, which 54.52 of them or 47 percent were high educated [9]. Also, the lack of quality of local education and failure to meet the requirements of private or public enterprises prevents the employment of young people. A study conducted by the Ministry of Labor and Social Protection of Population in October 2022 showed that one of every 25 people between 20–25 years old are unable to find a job in Azerbaijan [23]. According to the World Bank, unemployment among 15-24-year-olds in Azerbaijan was reported 12.41% in 2019 and 13.40% in 2022 [25].

Thus, young people and professionals are increasingly turning to foreign countries citing local unemployment, lack of possible job opportunities and limited prospects for the future in their own countries. On the other hand, there is a migration of highly skilled workers to forms of employment not requiring the application of skills and experience applied in the previous job, which leads to another form of labor migration in the country – loss of skills or “brain waste”. So, many scientists and specialists leave

the scientific organizations and they go to more prestigious and high-paying fields of activity bringing high income. The reduction of the number of employees working in organizations conducting research and development work in recent years proves this. According to the Statistical Committee of the Azerbaijan Republic [16], the number of employees working in organizations carrying out R&D work was 20.5 thousand people in 2020, while the number of employees involved in this field decreased to 19.8 thousand people in 2021.

3 Possible solutions to the Brain drain problem in Azerbaijan

The flow of intellectual resources abroad has a negative impact on the growth rate of the country's economy, and lowers the quality of human capital in the field of innovation and science. The negative impact of intellectual migration is also noticeable from a demographic point of view. Since the majority of those who leave are young people with higher education, the trend of "aging" continues in the field of science in the country. For example, 66% of those engaged in the Doctor of Sciences program are mostly over 60 years old, while 65.6% of scientists with a PhD degree are over 40 years [26].

According to an analysis by the Institute for Public Policy Research, brain drain can also have positive consequences for countries of origin. For example, "brains" often support their country by providing financial assistance to their relatives in their homeland, or some of the "brains" returning to their homeland can create significant benefits for the country by bringing with them new knowledge, skills and experience. Note that such trends are called "Brain Circulation". For example, some Asian countries (India, China, Korea, and Taiwan) have created and implemented successful policies (the creation of research funds for the purpose of financing scientific activity, the establishment of world-class universities, the development of digital infrastructure, the active cooperation with scientific diaspora, the creation of better living and working conditions etc.) which have led to the returning of their scientists and brain circulation, even brain gain [27]. Also, European countries have implemented effective measures such as the increase in financing of R&D, various grants and scholarships to young researchers, the incentives to the researchers and their career, the tax reduction, the recruiting policies etc. for the returning of their scientists and the attraction of promising young scientists from third countries [28]. Also, Luxembourg, Ireland, Sweden, Finland, Denmark and the Netherlands are the countries with the highest migration attractiveness in the EU according to the "brain gain" indicator [29].

However, it should be noted that this model often fails in developing countries, because the vast majority of this intellectual potential, as a rule, does not return to their homeland, preferring to invest their professional skills in a more developed country.

Projects are being implemented in Azerbaijan to stimulate scientific and innovative activities and prevent brain drain. Education plays a particularly strong role in the growing problems of international migration. The state's scholarship programs allow students to study abroad at the world's best universities and require students to return home for two to five years. However, the experience of other countries shows that many students who are "forced" to return plan to leave the country after fulfilling their obligations [17].

Thus, the analysis of statistical data, as well as the positive and negative aspects of intellectual emigration, shows the necessity of implementing concrete measures to prevent the migration of qualified personnel and to achieve the return of "brains" from other countries. Our suggestions for solving this problem are as follows:

1. The establishment of world-class universities. Providing individuals with quality education and developing digital infrastructure, creating better educational infrastructure, employment of new graduates;
2. Development and implementation of state policy to encourage young people to engage in scientific activities. For example, increasing the salaries of experienced scientists and young scientists in the field of education and science, creating conditions for professional advancement and career;
3. Creating ample opportunities for scientific research, providing scientific laboratories with modern equipment, providing high salaries according to qualifications, creating better living and working conditions;
4. Increasing the financing of R&D, involvement of private companies and business structures in the financing of science, as well as the state, application of the results of scientific research;

5. To take advantage of the opportunities of the "Scientific diaspora", which creates a connection between local and foreign Azerbaijani communities;
6. Creating of high-level work and living conditions for graduates and "brains" returning to the homeland and etc.

Conclusion

The intellectual potential of society is a measure of influence, a determining factor in the development dynamics of the world. In this regard, the preservation and development of the intellectual resources of the country, especially the solution of the "brain drain" problem (both internal – that is, the transition from science to other fields of activity, and external) are of great importance, the nation's intellectual potential, the state of the country's economy, its population its standard of living and also its security and sovereignty depend on its solution. In such a context, in order to solve the problem of intellectual migration in Azerbaijan, there is a need to implement a proper migration policy aimed at turning the negative phenomenon of "brain drain" (or worse, "brain waste") into "brain gain" and "brain circulation".

References

1. Cervantes M., Guellec D. The Brain Drain: Old Myths, New Realities // OECD Observer, 2002, no. 230, January. Pp. 40-42.
2. Balmer B., Godwin M., Gregory J. The royal society and the 'brain drain': natural scientists meet social science // Notes Rec. R. Soc. J. Hist. Sci. 2009. Vol. 63, Pp. 339-353.
3. Lowell L. B. and Allan F. Migration of Highly Skilled Persons from Developing Countries: Impact and Policy Responses, Published: Geneva, Switzerland: International Labour Office, 2002, 41 p.
4. Docquier F., Rapoport H. 2006. "The Brain Drain." In New Palgrave Dictionary of Economics (2nd edition), ed. L. Blume and S. Durlauf. London: Palgrave and MacMillan.
5. Student mobility between and towards OECD countries: a comparative analysis. Trends in International Migration: SOPEMI 2001. Paris, OECD, 2002. Pp. 93-117. URL: <https://www.oecd.org/els/mig/2507712.pdf>
6. Wickramasekara P. Policy responses to skilled migration: retention, return and circulation. International Labour Office. Social Protection Sector. International Migration Branch, Geneva, Switzerland: International Labour Office, 2003. URL: http://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---migrant/documents/publication/wcms_232366.pdf (date of the application: 30.09.2023)
7. World Migration Report 2022, <https://worldmigrationreport.iom.int/wmr-2022-interactive/>
8. Buchholz K. Where Highly Educated Migrants Come From," March 9, 2022, <https://www.statista.com/chart/4015/the-top-countries-for-highly-educated-migrants/2022>
9. R. d'Aiglepierre, A. David, Ch. Levionnois, G. Spielvogel, M. Tuccio and E. Vickstrom, A Global Profile of Emigrants to OECD Countries: Younger and More Skilled Migrants from More Diverse Countries, OECD Social, Employment and Migration Working Papers No. 239, 14 February 2020.
10. Abbasov T. Responding to Azerbaijan's Brain Drain Challenge, Commentary at Good Governance Worldwide, URL: https://archive.goodgovernanceworldwide.org/glbl_commentary.html
11. Sadygova S. Intellectual potential and competitive status of Azerbaijan: Status and trends // Silk Road. 2017. №2. Pp. 101-108.
12. Human flight and brain drain, 2022. URL: <https://www.theglobaleconomy.com> (date of the application: 12.05.2023).
13. Suleymanov A. D. Sotsiologicheskiy analiz intellektual'noy migratsii Azerbaydjana // Sotsiologiya nauki i tekhnologii. 2010. Tom 1. № 1, S. 109-117.
14. The Azerbaijan Republic Information System of "Azerbaijani Scientists Diaspora", 2021. URL: <https://elmidiaspora.az/en/content/342> (date of the application: 24.03.2023)
15. Hajirahimova M. Sh, Aliyeva A. S. Migration problems of intellectual human resources: Impact of brain drain on national security / Proc. of the International Scientific Conference of Educational and scientific activity in a new time: Realities and challenges, Mingachevir, 16-17 Dec., 2022. Vol. 2, Pp. 70-73.
16. State Statistical Committee of Azerbaijan. 2023. URL: stat.gov.az

17. Walsh-Zamanbayova M. Reversing the Impact of Brain Drain in Azerbaijan. 25 Apr. 2023. URL: https://idd.az/en/publications/sustainable_development/
18. Gurbanov S. Migration and brain drain: survey for the Azerbaijan economy // Journal of Qafqaz University- economics and administration. 2014. Vol. 2, No. 1. Pp. 3-13.
19. Research and development expenditure - Country rankings, 2022. URL: <https://www.theglobaleconomy.com/> (date of the application: 24.04.2023).
20. Nauka Azerbaydjana: Sovremennoye sostoyaniye i prognoz na budushcheye. 2020, URL: <https://science.gov.az/ru/news/open/14289>
21. Country ranking by minimum and average wages, 2020. URL: <https://take-profit.org/en/statistics/wages/> (date of the application: 24.05.2023).
22. Azerbaycandan “beyin kocu”: kimler hara və niye gedir? 15 Fev 2019, <https://fed.az/az/sosial/azerbaycandan-beyin-kocu-kimler-hara-ve-niye-gedir-50339>
23. Geybullayeva A., The Southern Caucasus has a brain drain problem, 19 January 2023. URL: <https://globalvoices.org/2023/01/19/the-southern-caucasus-has-a-brain-drain-problem/>
24. Semiv L., Hvozdo vych Y. The intellectual migration of the youth in Ukraine: the backgrounds for «brain circulation» // Journal of International Studies. 2012. Vol. 5. No. 2. Pp. 72-81.
25. Azerbaijan: Youth unemployment 2022. URL: <https://www.theglobaleconomy.com/> (date of the application: 28.04.2023).
26. Niftiyev F.Q. Study of changes in the system of higher education and science in the conditions of human capital development in the Republic of Azerbaijan // Scientific Reviews in UNEC. 2022. Vol. 10. Pp. 55-65.
27. Zweig D., Fung C.S., Han D. Redefining the Brain Drain: China’s “Diaspora Option” // Science, Technology & Society. 2008. PP. 1 – 33.
28. Giannoccolo P. Brain Drain Competition, Policies in Europe: a Survey, 2009. URL: http://www.morebrain.net/Brain_Drain_competition_policies_in_Europe.pdf (date of the application: 16.04.2023).
29. Oliinyk O., Mishchuk H., Bilan Y., Skare M. Integrated assessment of the attractiveness of the EU for intellectual immigrants: A taxonomy-based approach // Technological Forecasting and Social Change. 2022. Vol. 182. No 7.

ИНТЕЛЛЕКТУАЛЬНАЯ «УТЕЧКА МОЗГОВ» В АЗЕРБАЙДЖАНЕ: ПРИЧИНЫ И РЕШЕНИЯ

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Аннотация

«Утечка мозгов», особенно эмиграция высококвалифицированных специалистов, является одной из самых сложных проблем, с которыми сталкиваются многие развивающиеся страны. Этот процесс не обошел стороной и Азербайджан, в силу ряда внутренних и внешних обстоятельств, в процесс интеллектуальной миграции были вовлечены и азербайджанские специалисты. Отток интеллектуальных человеческих ресурсов негативно влияет на темпы роста экономики страны, снижает качество человеческого капитала в сфере инноваций и науки. В статье рассматривается проблема «утечки мозгов» в Азербайджане, а также причины интеллектуальной миграции и основные факторы, влияющие на ее интенсивность. Наконец, проанализированы статистические данные об интеллектуальной миграции и представлены некоторые предложения по решению проблемы.

Ключевые слова

утечка мозгов; интеллектуальная миграция; человеческий капитал; приток умов; интеллектуальный потенциал

Литература

1. Cervantes M., Guellec D. The Brain Drain: Old Myths, New Realities // OECD Observer, 2002, no. 230, January. Pp. 40-42.
2. Balmer B., Godwin M., Gregory J. The royal society and the 'brain drain': natural scientists meet social science // Notes Rec. R. Soc. J. Hist. Sci. 2009. Vol. 63, Pp. 339-353.
3. Lowell L. B. and Allan F. Migration of Highly Skilled Persons from Developing Countries: Impact and Policy Responses, Published: Geneva, Switzerland: International Labour Office, 2002, 41 p.
4. Docquier F., Rapoport H. 2006. "The Brain Drain." In New Palgrave Dictionary of Economics (2nd edition), ed. L. Blume and S. Durlauf. London: Palgrave and MacMillan.
5. Student mobility between and towards OECD countries: a comparative analysis. Trends in International Migration: SOPEMI 2001. Paris, OECD, 2002. Pp. 93-117. URL: <https://www.oecd.org/els/mig/2507712.pdf>
6. Wickramasekara P. Policy responses to skilled migration: retention, return and circulation. International Labour Office. Social Protection Sector. International Migration Branch, Geneva, Switzerland: International Labour Office, 2003. URL: http://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---migrant/documents/publication/wcms_232366.pdf (date of the application: 30.09.2023)
7. World Migration Report 2022, <https://worldmigrationreport.iom.int/wmr-2022-interactive/>
8. Buchholz K. Where Highly Educated Migrants Come From," March 9, 2022, <https://www.statista.com/chart/4015/the-top-countries-for-highly-educated-migrants/2022>
9. R. d'Aiglepierre, A. David, Ch. Levionnois, G. Spielvogel, M. Tuccio and E. Vickstrom, A Global Profile of Emigrants to OECD Countries: Younger and More Skilled Migrants from More

- Diverse Countries, OECD Social, Employment and Migration Working Papers No. 239, 14 February 2020, [https://one.oecd.org/document/DELSA/ELSA/WD/SEM\(2020\)4/pdf](https://one.oecd.org/document/DELSA/ELSA/WD/SEM(2020)4/pdf)
10. Abbasov T. Responding to Azerbaijan's Brain Drain Challenge, Commentary at Good Governance Worldwide, URL: https://archive.goodgovernanceworldwide.org/glbl_commentary.html
 11. Sadygova S. Intellectual potential and competitive status of Azerbaijan: Status and trends // Silk Road. 2017. №2. Pp. 101-108.
 12. Human flight and brain drain, 2022. URL: <https://www.theglobaleconomy.com> (дата обращения: 12.05.2023).
 13. Сулейманов А. Д. Социологический анализ интеллектуальной миграции Азербайджана // Социология науки и технологий. 2010. Том 1. № 1, С. 109-117.
 14. The Azerbaijan Republic Information System of "Azerbaijani Scientists Diaspora", 2021. URL: <https://elmidiaspora.az/en/content/342> (date of the application: 24.03.2023).
 15. Hajirahimova M. Sh, Aliyeva A. S. Migration problems of intellectual human resources: Impact of brain drain on national security / Proc. of the International Scientific Conference of Educational and scientific activity in a new time: Realities and challenges, Mingachevir, 16-17 Dec., 2022. Vol. 2, Pp. 70-73.
 16. State Statistical Committee of Azerbaijan. 2023. URL: stat.gov.az
 17. Walsh-Zamanbayova M. Reversing the Impact of Brain Drain in Azerbaijan. 25 Apr. 2023. URL: https://idd.az/en/publications/sustainable_development/
 18. Gurbanov S. Migration and brain drain: survey for the Azerbaijan economy // Journal of Qafqaz University- economics and administration. 2014. Vol. 2, No. 1. Pp. 3-13.
 19. Research and development expenditure - Country rankings, 2022. URL: <https://www.theglobaleconomy.com/> (дата обращения: 24.04.2023)
 20. Наука Азербайджана: Современное состояние и прогноз на будущее, 2020. URL: <https://science.gov.az/ru/news/open/14289>
 21. Country ranking by minimum and average wages, 2020. URL: <https://take-profit.org/en/statistics/wages/> (дата обращения: 24.05.2023).
 22. Azerbaycandan "beyin kocu": kimler hara ve niye gedir? 15 Fev 2019, <https://fed.az/az/sosial/azerbaycandan-beyin-kocu-kimler-hara-ve-niye-gedir-50339>
 23. Geybullayeva A., The Southern Caucasus has a brain drain problem, 19 January 2023. URL: <https://globalvoices.org/2023/01/19/the-southern-caucasus-has-a-brain-drain-problem/>
 24. Semiv L., Hvozdo vych Y. The intellectual migration of the youth in Ukraine: the backgrounds for «brain circulation» // Journal of International Studies. 2012. Vol. 5. No. 2. Pp. 72-81.
 25. Azerbaijan: Youth unemployment 2022. URL: <https://www.theglobaleconomy.com/> (дата обращения: 28.04.2023).
 26. Niftiyev F.Q. Study of changes in the system of higher education and science in the conditions of human capital development in the Republic of Azerbaijan // Scientific Reviews in UNEC. 2022. Vol. 10. Pp. 55-65.
 27. Zweig D., Fung C.S., Han D. Redefining the Brain Drain: China's "Diaspora Option" // Science, Technology & Society. 2008. PP. 1 - 33.
 28. Giannoccolo P. Brain Drain Competition, Policies in Europe: a Survey, 2009. URL: http://www.morebrain.net/Brain_Drain_competition_policies_in_Europe.pdf (дата обращения: 16.04.2023).
 29. Oliinyk O., Mishchuk H., Bilan Y., Skare M. Integrated assessment of the attractiveness of the EU for intellectual immigrants: A taxonomy-based approach // Technological Forecasting and Social Change. 2022. Vol. 182. No 7.