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From Brain Drain to "Brain Circulation"

How International Best Practice Can Be Applied to the "Great Return" Program

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"Highly skilled human capital migration appears to be one of the most important elements, contributing to countries' economic progress."

–undated ILO report

One of the important questions asked during a policy forum titled "Karabakh: Back Home after 30 years Accomplishments and Challenges" held on 5 December 2023 in Zangilan, co-organized by the Institute for Development and Diplomacy at ADA University and the Center of Analysis of International Relations (AIR Center), was: "*What new skillful workforce is needed to ensure a sustainable return of the former IDPs to their lands [isolated from Azerbaijan for 30 years, to stimulate the economic development of the region] within the Great Return program?*"

In the knowledge-based world of today, one of the main driving forces of the socio-economic development of a country is learning, research, innovation as well as collaboration with other institutions and countries. Researchers Rasa Daugeliene and Rita Marcinkeviciene in their 2009 article "Brain Circulation: Theoretical Considerations" wrote that "the migration of highly-qualified persons is a natural phenomenon of this century which is called as knowledge society or knowledge economy era."

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The Karabakh Economic Region and the East Zangezur Economic Region, which were under a 30-year illegal Armenian occupation, together serve as an unprecedented, unique example not only for the country but also for the South Caucasus (and perhaps beyond) due to plans to dynamically revitalize this part of the country from scratch. Socio-economic reintegration, where building and reviving its looted and destroyed villages and cities within the framework of the Great Return program will be based on the innovative "smart village" and "smart city" concepts.

This framework envisions the socio-economic revival of the region and the return of IDPs. According to *Caspian News*, by the completion of the first stage of the Great Return program in late 2026, 34,500 families (or 140,000 people) will have gone back to the liberated territories. In addition, the government has allocated significant state funds to the economic development and reconstruction of the region through an innovative approach to sustainable rural development. In 2021, the total financial allocations for this purpose stood at 2.178 billion AZN (around $1.28 billion). In 2022, 4.315 billion AZN (around $2.5 billion) was invested in the revival of the liberated lands. The 2023 state budget allocated 5.26 billion AZN (about $3.1 billion) for ongoing and new reconstruction projects in Karabakh and East Zangezur. However, President Ilham Aliyev confirmed that, by the end of 2023, the total investment had reached 12 billion AZN (about $7 billion). By 2030, 30 billion AZN (around $17.6 billion) will be channeled into the restoration of the liberated territories.

As the government-set priority goals and investments to turn Karabakh into the exemplary innovation hub of the South Caucasus (and perhaps beyond), meeting the demand for highly-qualified "knowledge workers" has become essential for achieving those goals. Hence, amidst meeting the demand for the highly-qualified workforce due to the skills shortage indicated by the smart agricultural operators, a critical topic on the state's agenda has become concerned with what skillful workers are demanded to outsource, the skills the returning population bring with them, and the need for upgrading their skills. An in-depth IDP survey conducted by ADA University in 2022 indicated that 51 percent of the respondents stated that they have entrepreneurial experience of about 7-24 years and are planning to start their own entrepreneurial activities on their return to their native lands in Karabakh. Five percent indicated that they do not need any support from the government to start their businesses. Agriculture, industry, and construction are, respectively, the top three entrepreneurial activities were indicated in the IDP survey. The survey results also show that respondents were interested in innovative productions, but still needed to learn skills and competencies in the application of technologies in their businesses.

Therefore, this IDD Analytical Policy Brief will analyze the conditions that enable the establishment of an environment for stimulating the migration of a highly-qualified "knowledge workforce" in the liberated areas of Azerbaijan. This will be done within the framework of the "brain circulation" concept, as outlined below. The paper will conclude

with the provision of several recommendations, bearing in mind the specific context of Karabakh for attracting a "knowledge workforce" to the region.

The Concept of "Brain Circulation"

"Brain circulation" is a multifaceted phenomenon that can be defined as the circular movement of highly-skilled and highly-qualified "knowledge workers" within or across states (or across institutions); its main purpose is to establish, share, and spread knowledge and experience, and, in turn, stimulate the development of a state's knowledge-based economic development.

In their aforementioned article, Daugeliene and Marcinkeviciene point out that the "brain circulation" theory investigated by AnnaLee Saxenian, who is a professor at the University of California, Berkeley's School of Information, is primarily based on the experience of the Silicon Valley-Hsinchu connection, in that they are both world-class "technical communities," as Saxenian put it in 2001. (Hsinchu is located in Taiwan, China, and is considered to be one of Silicon Valley's most successful imitators and most important partners.)

In another article co-authored with Jin Yuh Hsu (also published in 2001), Saxenian argues that the

> dynamism of these [Silicon Valley and Hsinchu] regional economies is attributable to their increasing interdependencies. A community of U.S.-educated Taiwanese engineers has coordinated a decentralized process of reciprocal industrial upgrading by transferring capital, skill, and know-how and by facilitating collaborations between specialist producers in the two regions. This case underscores the significance of technical communities and their institutions in diffusing ideas and organizing production at the global as well as the local level.

The authors also highlighted that many policymakers apply the theory of "latecomer regions" in trying to kickstart the development of their own high-tech industries. The idea is that returnees bring back human, financial, and social capital, and can thereby positively contribute to the development of home economies. Even if people do not permanently return, their frequent contacts and movements back and forth can contribute to growth. This is an integral aspect of the "brain circulation" concept.

Piyasiri Wickramasekara, a senior migration specialist, in his article titled "Policy Response to Skilled Migration: Retention, Return, and Circulation" points out four main lessons from Taiwanese and also South Korean experiences. *First*, the rapid surge of the local economy was crucial in pooling back skilled persons, and the conducive factors at both sending and receiving ends such as good infrastructure at home and circulation-friendly migration policies at both ends must be there. *Second*, targeted active government policies, political will, and special incentives were important. *Third*, the establishment of parallel Silicon Valleys was crucial (e.g. Hsinchu Industrial Park). The emigration (from Taiwan and South Korea) was mostly of students, and a majority of the returning migrants were seasoned experts with 10-15 years of experience abroad. In both

of the aforementioned cases, the governments of Taiwan and South Korea prioritized the promotion (and funding) of research and development at home. The paper refers to Saxenian's statement, which can be drawn as the *fourth* lesson: while many experts returned and started making investments at home, some began to commute frequently between Taiwan and the U.S., and thus were able to exchange information, technological skills, and human resources. As a result "over half of the companies in the Hsinchu Science-Based Industrial Park have been started by Silicon Valley returnees."

Potential Economic Benefits of Applying the "Brain Circulation" Concept to Karabakh and East Zangezur

How, then, can this experience from halfway across the world be applied to the revival of the liberated territories?

Reviving the Karabakh and East Zangezur Economic Regions by building an exemplary innovation center in that part of the country is the point of departure for applying the "brain circulation" concept. There are two criteria on the basis of which "brain circulation" would help in building transnational communities of "knowledge workers" in the region: *first*, establishing educational and training programs for building capacity for an innovative high-tech ecosystem in a narrow geographic location, i.e., in the small cities being built in the liberated areas; *second*, establishing conditions for attracting national and transnational businesses and startups to those same areas.

A number of nascent steps have already been taken in this regard, and these would need to be better coordinated in the context of applying the "brain circulation" concept in the liberated territories.

For example, the Enterprise Azerbaijan portal, which is operated by the country's Center for Analysis of Economic Reforms and Communication, is launching the Startup School 2 project (its motto is "AI for Karabakh") in cooperation with the University of Nevada and the German Research Center for Artificial Intelligence. From 1 February 2024, individuals or teams from higher education institutions who have a project or idea related to Artificial Intelligence have been able to apply for funding consideration. The geography of applicants is not limited to Azerbaijan but includes the United States, Türkiye, Germany, Mauritania, Kazakhstan, Pakistan, and so forth.

Another example is the establishment of Karabakh University in Khankendi, a city in the Karabakh Economic Region. In a speech delivered at the Azerbaijan National Academy of Sciences, Azerbaijan's Minister of Science and Education Emin Amrullayev stated that "Karabakh University will become the research center Azerbaijan has been waiting for [...]. However, we want to believe that we will have the opportunity to see students, researchers, and young scholars there in September 2024." In addition, the education programs were based on the specific needs of the region: "the University is

created to train highly-qualified personnel in accordance with the socio-economic needs of the region and to preserve historical educational traditions," the Turan news agency reported. The academic specializations of this university, as disclosed by the Ministry, focused on five main directions: 1) education in history and teacher training programs, 2) IT engineers, computer science, media, and digital communication, 3) business management and economics; 4) food engineering, and 5) regional studies.

A third example involves the setting up of an IT training program for new hires at Dost Agro-parks in Karabakh by highly-qualified Turkish IT professionals. This initiative was discussed in a previous IDD Analytical Policy Brief that may be accessed here and will not be repeated in this paper.

There is another set of examples that revolve around efforts by the government to establish conditions for attracting entrepreneurs and start-ups to the two Economic Regions that encompass the liberated areas.

For instance, the Tax Code of the Republic of Azerbaijan indicates that micro and small business entities that have received the "Startup" certificate are exempted from taxation on their income from innovation activity for a period of three years. Two startups located in the cities of Agdam and Terter have received such certificates and begun operations there.

A second example concerning government efforts to attract entrepreneurs and start-ups to the liberated areas centers on the city of Lachin. On 26 October 2021, a partnership of Turkish and Azerbaijani private companies announced the first $100 million venture capital investment (in the form of building the first Dost smart Agro-park) in the East Zangezur Economic Region, including data-driven production processes based on the application of IoT technologies like machine learning and AI programming. This enterprise expects to employ more than 5,000 workers.

A related example centers on the city of Agdam, located in the Karabakh Economic Region, which is being rebuilt from scratch after having been completely raised to the ground during the Armenian occupation. Upon the completion of its reconstruction, it will become the largest high-tech city in Karabakh. During his presentation at the aforementioned 5 December policy forum, Special Representative of the President of Azerbaijan to the Liberated Territories (Except Shusha) Emin Huseynov projected that by 2030, about 150,000 people will be employed in the Agdam Industrial Park complex, the public sector, in smart agricultural production activities, tourism, mining operations, and small and medium enterprises.

Lastly, innovations will also require the production of renewable energy. Hence, on 17 December 2023, the leaders of Azerbaijan, Georgia, Romania, and Hungary signed an Agreement on Strategic Partnership in the Field of Green Energy Development. EU Commission President Ursula von der Leyen attended the ceremony. This opens another

window of opportunity for "brain circulation" opportunities.

First Recommendation: A Four-Factor, Structured "Brain Circulation" Stimulus Action Alternative

Daugeliene and Marcinkeviciene write that "each country must find [its own] recipe of success how to attract, accumulate [and retain] highly-skilled workers, and this can represent a country's situation in a knowledge-based world." Therefore, bearing in mind the demographic and ethnic composition, geopolitical, and socio-economic peculiarities of the Karabakh region, it is important to establish a set of likeminded networked firms that would circulate a "knowledge workforce" in Azerbaijan.

A 2007 paper by Yun-Chung on "brain circulation"—it is referenced by Daugeliene and Marcinkeviciene in their aforementioned study—indicates that a combination of four structural elements could be considered as a key to success while stimulating "brain circulation":

Firstly, the industrial system should be decentralized and encourage a strong division of labor and innovation among networked firms.

Secondly, the agglomerated economies between a given set of two countries, places, and organizations must encourage entrepreneurship and learning between the firms on a regional level. For example, high-tech firms from Kazakhstan could sign a long-term contract with high-tech firms in Azerbaijan and together be involved in innovative projects in Karabakh. In this example, "brain circulation" will be stimulated by the host country—Azerbaijan—which will benefit Kazakhstan through knowledge-sharing in building smart villages and innovative ways to sustainably use natural resources and produce renewable energy; Kazakhstan, for its part, will benefit Azerbaijan by sharing its IT specialists who will collaborate with Azerbaijani IT specialists working on the Karabakh revival project.

Thirdly, venture capital is key to technologically risky startups with super-profit compensation (when a business takes in more revenue than it spent in expenses, this is understood as constituting supernormal profit) when it launches an Initial Public Offering (IPO) or is acquired by other companies. Therefore, Karabakh should boost its venture capital investment, supported by the government and private entities. At least one or two private enterprises should establish "unicorn" companies (a private startup company with a value of over $1 billion in investments) in Karabakh by 2030.

Fourthly, the role of the state in facilitating technology transfer must be significant. Governments should fund private sectors, because they put more emphasis on their activities in innovation, thus stimulating a country's economic development, its competitiveness. The initial investment of the state into reconstruction and developmental

projects in Karabakh was $1.3 billion; however, the figure has increased since then as the implementation process progresses. The government must make restricted and targeted investments into research, innovation, and local and transnational start-up partnerships.

Second Recommendation: Outsourcing "Knowledge Workers" to Build Transnational Communities

According to Daugeliene and Marcinkeviciene, a variety of policymakers within national and international institutions should advocate measures to facilitate the movement of highly-skilled migrants who are working both in their homelands and in foreign countries. Their main idea is that "brain circulation" systems could be managed in ways that benefit receiving countries by meeting labor market shortages, for sending countries by guaranteeing remittances for development, and for migrants themselves through offering employment and control over the use of their wages.

In the context of Karabakh and East Zangezur, meeting the shortage of "knowledge workers" should consist of five main sources that will stimulate "brain circulation."

First, diaspora networks should be involved in the strategic leveraging of Azerbaijani expatriates abroad. They should promote the active circulation of scientists and professionals to help Azerbaijan—particularly in the rebuilding of Karabakh from scratch. One of the several international good practices described by the International Labor Organization (ILO) that is worth introducing is the Reverse Brain Drain Project (RBD), which was established by Thailand's National Science and Technology Development Agency (NSTDA) in 1997. This program encourages the exchange of scientists and professionals, hence, it "facilitates and coordinates technology and knowledge transfers through short-term visits of overseas Thais and the development of institutional linkages between Thai state agencies and Thais abroad. According to the ILO, around 35 such projects were initiated before RBD began to shift its emphasis to short-term visits involving knowledge sharing, seminars, and technology transfer workshops." In the same article, Wickramasekara states that "source countries have to promote linkages with nationals abroad in cooperation with receiving countries. Dual citizenship and arrangements for diaspora recognition and according to them special status would also contribute to more return and circulation."

Second, local think tanks, the government, and non-governmental organizations should establish a return program for professionals and scientists, which can be described as an "Assisted Return" program. Such programs have proven to be successful when the international developmental organizations are involved. For example, the International Organization for Migration was involved in the logistics of the program. UNDP and several EU programs have also been involved in funding such programs. For example, the Center for China and Globalization (CCG) has more than ten branches and overseas representatives and over 100 full-time researchers and staff engaged in research on

globalization, global governance, international economy and trade, international relations, and global migration. It has built an international research network of leading experts in China and overseas. CCG also conducts seminars focused on the contributions of Chinese students educated abroad to the development of China and the country's communication with the world.

Third, state-sponsored study abroad programs could also contribute to applying the "brain circulation" concept in the liberated areas of Azerbaijan. The policies of these scholarships should provide an incentive mechanism so the youth returning from their study abroad program could have an alternative to be placed to work in Karabakh or East Zangezur Economic Regions for the first three years upon their return to Azerbaijan (especially those in IT and urban planning professions).

Fourth, university internship programs should include paid and unpaid work placement in Karabakh or East Zangezur and should be an important part of the curriculum. The Ministry of Science and Education should have a placement quota for paid internships in the liberated areas. These interns must be allocated housing, which will help their smooth transition to the work environment there.

Fifth, the internationalization of education in Karabakh. Educational institutions contribute to building transnational communities. Hence, allocating a quota for international professors and Azerbaijani professors working abroad, dual programs, and international students could also be an option to consider.

The foregoing should be sufficient to generate a debate about the advantages of adopting the "brain circulation" concept in the context of the Karabakh Economic Region and the East Zangezur Economic Region.