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## POSSIBILITIES OF USING ARTIFICIAL INTELLIGENCE IN THE PROCESS OF INTERNATIONAL MIGRATION MANAGEMENT

**Abstract:** Artificial intelligence can be considered the main achievement of the modern world and the driving factor for developing new opportunities. It can be used in almost all sectors of the economy. Despite the mistrust of a certain part of society towards artificial intelligence and the caution shown during its use, due to the limitless possibilities of artificial intelligence, it is inevitable that its role will increase in the economic development of countries and progress in general.

The article explores and evaluates the possibilities of using artificial intelligence in the process of managing international migration and ensuring border security. Currently, there is no unified model of international migration management. However, the sharing of migration management's best practices by developing countries, the use of innovative technologies and artificial intelligence significantly improve the legal framework of migration processes and the safe movement of migrants.

**Keywords:** international migration, artificial intelligence, migration management.

**JEL classification:** F6, F22, R23.

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## ხელოვნური ინტელექტის გამოყენების შესაძლებლობები საერთაშორისო მიგრაციის მართვის პროცესში

**აბსტრაქტი:** ხელოვნური ინტელექტი თანამედროვე სამყაროს მთავარ მიღწევად და ახალი შესაძლებლობების განვითარების მამოძრავებელ ფაქტორად შეიძლება მივიჩნიოთ. მისი გამოყენება შესაძლებელია ეკონომიკის თითქმის ყველა სექტორში. მიუხედავად ხელოვნური ინტელექტის მიმართ საზოგადოების გარკვეული ნაწილის უნდობლობისა და მისი გამოყენების დროს გამოჩენილი სიფრთხილისა, ხელოვნური ინტელექტის უსაზღვრო შესაძლებლობებიდან გამომდინარე, გარდაუვალია მისი როლის ზრდა ქვეყნების ეკონომიკური განვითარებისა და ზოგადად პროგრესისკენ მიმავალ გზაზე.

სტატიაში შესწავლილი და შეფასებულია ხელოვნური ინტელექტის გამოყენების შესაძლებლობები საერთაშორისო მიგრაციის მართვისა და საზღვრების უსაფრთხოების უზრუნ-

ველყოფის პროცესში. დღეისათვის არ არსებობს მიგრაციის საერთაშორისო მართვის ერთიანი მოდელი, თუმცა განვითარებადი ქვეყნების მიერ მიგრაციის მართვის საუკეთესო პრაქტიკის გაზიარება, ინოვაციური ტექნოლოგიების და ხელოვნური ინტელექტის გამოყენება, მნიშვნელოვნად სრულყოფს მიგრაციული პროცესების სამართლებრივ ჩარჩოში მოქცევას და მიგრანტების უსაფრთხო გადაადგილებას.

**საკვანძო სიტყვები:** საერთაშორისო მიგრაცია, ხელოვნური ინტელექტი, მიგრაციის მართვა.

**JEL კლასიფიკაცია:** F6, F22, R23.

## **Introduction.**

International migration, which is a significant feature of the global world, can be seen in two directions: on the one hand, it is the best opportunity for people to live, study and work in a country of their choice, and on the other hand, when they are forced to leave their homeland. The sad experience of this is the Russian war in Ukraine, after the beginning of which, according to the report of the International Organization for Migration (IOM), 5,012,708 Ukrainians left the country, and most of them remain displaced today [1]. International migration processes are especially active during severe economic and political crises, climate-related disasters, pandemics, and armed conflicts [2]. On the one hand, migration significantly contributes to the economic and social development of countries to achieve the Sustainable Development Goals (SDGs), increases the incomes of migrants, and improves the quality of life in their countries of origin through the transfer of new labor skills and financial resources [3]. However, on the other hand, we should not forget about the losses from the "brain drain" from the country.

## **Aim of research.**

The purpose of the research is to study and evaluate the dynamics of international migration, the possibilities of artificial intelligence and its use in the process of international migration management. Also, taking into account the best practices of developed countries, develop recommendations for the use of artificial intelligence in the process of improving international migration management.

## **Methodology.**

The theoretical-methodological basis of the research is an in-depth analysis of relevant scientific literature, conducted studies and statistical data.

## **Literature review.**

The International Organization for Migration (IOM) provides significant information on the dynamics of international migration. The International Organization for Migration (IOM) has been publishing its flagship world migration reports biennially since 2000. The latest addition to the series, the World Migration Report 2022, aims to enhance our comprehension of migration and mobility on a global scale. This updated version provides relevant data and insights on migration, along with thematic chapters that cover current and pressing migration-related issues. It is structured to focus on two key contributions for readers:

Part I: Key information on migration and migrants (including migration-related statistics).

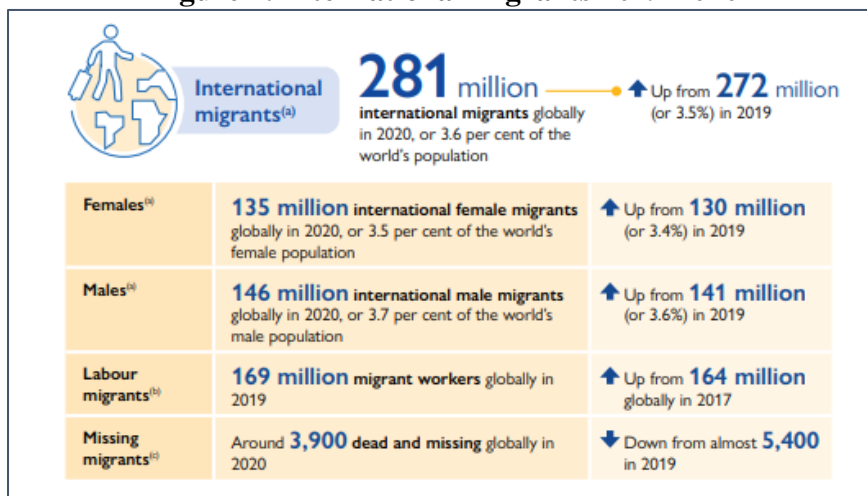
Part II: Balanced, evidence-based analysis of complex and emerging migration issues.

Most people still live in the countries where they were born and only a minority of one in thirty are migrants. Often, discussions about migration begin with numbers. By understanding the changes in scale, emerging trends, and shifting demographics related to global social and economic

transformations, such as migration, we can make sense of the ever-changing world where we live and plan for the future.

According to the IOM, in 2019, there were approximately 272 million international migrants worldwide, accounting for 3.5% of the world's population. By 2020, the number of migrants reached 281 million [4].

**Figure 1. International migrants 2019-2020**



**Source:** WORLD MIGRATION REPORT 2022

The dynamics of migration are growing in Georgia, too. In 2020, the number of Georgian emigrants abroad amounted to 861,077 people, which is about 22% of the total population. In 2021-2022, 87,222 people emigrated from Georgia. In the last ten years, the number of emigrants has reached 245,000. Saxstat summarizes data on migrants. According to the information from the National Statistics Service, in 2022, the number of immigrants increased by 25.3 percent compared to the previous year [5]. The number of immigrants in Georgia has been increasing in recent years. The main groups of immigrants come to Georgia mainly for study, temporary work, or business.

A large part of international migrants are labor migrants who, through remittances, ensure the growth of the economic well-being of their families and the population of the country in general [6]. In Georgia, as well as in many countries of the world, the factors causing emigration and immigration are complex. Now emigration flow growth in Georgia is mainly determined by economic and social factors [7]. European Union countries are especially interesting for Georgian immigrants. Georgia currently has four bilateral agreements on circular migration: France (2013, the agreement covers the employment of qualified young specialists and circular migration), Bulgaria (2019), Germany (2020), and Israel (2020). Circular labor migration helps to legalize migration flows [6]. Unfortunately, migration processes are often illegal and are associated with certain risks. Against the backdrop of increased poverty rates, it is unlikely that emigration flows will decrease in the near future. Thus, it is significant to inform the population of Georgia about the possibilities of legal migration and the dangers associated with illegal migration, bring migration processes into the legal framework, and its effective management, which is the state's prerogative.

The use of digital technologies, namely artificial intelligence, plays a fundamental role in international migration management. To date, there is no single, universally agreed definition of artificial intelligence. Although, in a broad sense, it can be considered as "programming computers to perform tasks that normally require human intelligence."

AI-based systems can be software-only, operating in virtual worlds (e.g., voice assistants, image analysis software, search engines, and speech and facial recognition systems), or AI can be embedded in hardware devices (e.g., advanced robots, autonomous vehicles, drones and Internet applications).

The main technologies of Artificial Intelligence are Algorithms, Machine learning, Deep learning, Big data, Digital identity and Chatbot. [4]

**Algorithms:** These are machine instruction sets used to process and solve problems. AI algorithms can analyze data, find patterns, make inferences, and predict behavior at a level and speed greatly surpassing human capabilities;

**Machine learning:** Machine learning is one of the techniques by which machines are trained to perform tasks that are generally associated with human intelligence, such as natural language processing. Machines learn from vast amounts of data, including big data sets, using algorithms;

**Deep learning:** A subset of machine learning, deep learning imitates the functioning of the human brain and is increasingly being relied upon for image and face recognition. Deep learning applications structure algorithms into layers to create an artificial neural network, enabling machines to learn and make decisions on their own. That makes it difficult or even impossible to explain how the machines reach specific decisions;

**Big data:** Big data can be defined as the "large volumes of high velocity, complex and variable data that require advanced techniques and technologies to enable the capture, storage, distribution, management, and analysis of the information;"

**Digital identity:** A digital identity refers to a set of attributes available in digital format and relating to a person or entity. These attributes include biometric data (e.g. fingerprint, eye scan, 3D face map) and demographic data (e.g. date and place of birth). They can also be combined with evidence of government-issued ID (e.g. passport, driver's license) and digital activities on social media, including search history online and geotagging data. Existing digital identity platforms use AI as well as blockchain-related technologies to verify the identity of individuals by enabling "digital identity wallets" to run via online platforms and mobile phone devices;

**Chatbot:** A computer program designed to converse with humans, especially over the Internet.

Data-driven AI technologies have played a central role in the fight against COVID-19. Many governments around the world have implemented measures to monitor public health, such as mobile phone applications for contact tracing and digital health passports, with the help of artificial intelligence [8].

The role of artificial intelligence (AI) in the post-pandemic period is increasing. The COVID-19 pandemic has further accelerated the adoption of technology-driven decisions that directly affect migration and mobile systems. Artificial intelligence - a set of "smart programs" offers new ways of solving problems of the post-pandemic period, making technological decisions, managing migration processes using modern innovative achievements, improving border services, etc. [9]. At the current stage of artificial intelligence development, one of the tangible results for the general public is the knowledge generated by it, which is widely used in the financial, banking, business, agricultural, law, education, health sectors, e-government process, etc. [10].

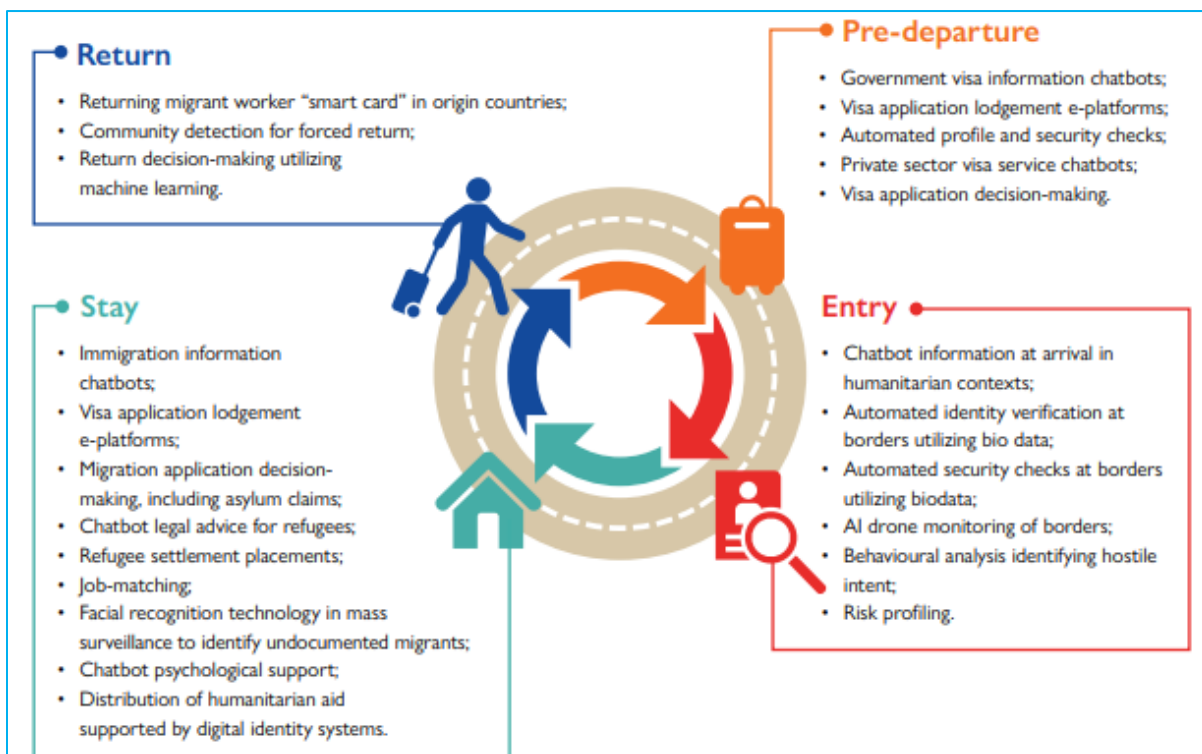
Artificial intelligence (AI) technologies underlie everyday activities more than many people realize. Just as personalized news uses AI to serve millions of people around the world, every Google search relies on AI algorithms to deliver search results in the shortest possible time. AI-powered "smart" phones, "smart" appliances, "smart" homes, and "smart" digital voice assistants are increasingly common in societies, allowing people to better manage their time and information. However, one should also consider the concerns of people who worry about the long-term adverse effects of artificial intelligence on humanity, which may be related to the development of artificial intelligence weapons, the violation of human rights, and more [4].

**Discussion/Results.** It is worth noting that artificial intelligence is increasingly used in the context of migration and mobility. The use of such technologies is not new, but recently - there has been an increased interest in the use of artificial intelligence in migration: on the one hand, as part of a wider profile of artificial intelligence, and on the other hand, as concerns about its development. For many years, state authorities related to migration have used various technologies, including AI systems, to support the administrative processing and decision-making process of migration-related issues. AI is increasingly being used around the world to facilitate the control of migration processes. However, AI poses many challenges for policymakers, practitioners and migrants, with concerns expressed about the negative impact of technology on the protection of migrants' rights.

Ana Beduschi, Associate Professor of Law, University of Exeter, repeatedly mentions in her works that many countries already use artificial intelligence to check the identity of migrants (Biometric Identity Management System - BIMS), border security and control, analyzing data on visa and asylum applicants, forecasting migration flows, monitoring and evaluating government policies and programs, etc. [11].

AI and related technologies are used in Australia, the United States, Japan, many European countries and the European Union to manage a growing number of border movements. Artificial intelligence is increasingly being used throughout the migration cycle, for example, to facilitate pre-departure identity checks, support online visa applications, manage administrative decision-making, enable 'smart' border processing and generate data analytics on travelers' compliance with legal frameworks. (See **Figure 2.**)

**Figure 2. Artificial Intelligence and the migration cycle**



**Source:** WORLD MIGRATION REPORT 2022



AI technologies can help people get the latest information in real-time, improve system efficiency, and reduce customer service time.

The growth in global travel has led to a need for more efficient movement of people internationally. AI systems can help solve problems related to security threats, terrorism, drug smuggling, carrier penalty regimes, and efficiency gains for border agencies. To enhance its cross-checking processes, 30 API plans to utilize AI capability to conduct searches and match biodata and other variables stored in different domains. With the increasing use of AI in border systems, online visa application platforms and e-visa processing systems have also emerged. These systems use the analytical capability of machine learning to process routine visa applications and refer more complex applications to case officers.

The possibilities of artificial intelligence for studying and understanding migration are endless: AI can provide international migrants with the information and advice they need in the optimal time frame. There are a number of apps available for migrants to help them better integrate into host countries, navigate visa processing requirements, and more [12]. Through using e-mail data and IP geolocation, significant studies can be carried out to assess international migration flows and study migration and mobility [13]. The artificial intelligence use reduces the need for manual processing and in-person meetings.

It should also be noted that the technology introduction increases certain risks related to personal information protection and privacy. AI tools lack transparency and accountability, and their growing use carries cyber risks. Thus, an effective AI system creation requires the appropriate ethical and legal framework establishment that takes into account the technological nature of artificial intelligence [14].

Multinational technology corporations operating transnationally are increasingly involved in migration processes toward AI systems implementation. Data collection and analysis on migrants often transcend national borders. The technology can be deployed mainly in high-income economies, leading to deep asymmetries between countries in terms of migration and adoption of AI technologies in mobile systems. Thus, using artificial intelligence technologies in the migration processes management developed states take the leading positions. Consequently, states with less advanced technology may become even more isolated. According to some researchers, such a situation could create a condition in which states with the ability of artificial intelligence will set the agenda and priorities for international migration management.

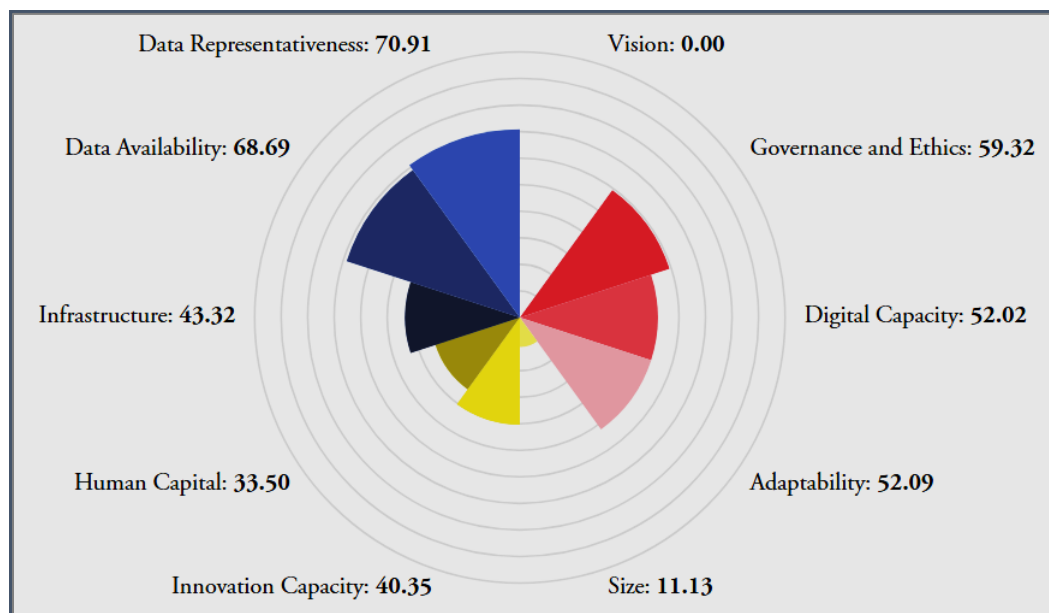
The process of artificial intelligence development is irreversible. In order to use it safely and get maximum benefits, first of all, it is necessary to increase trust in artificial intelligence. 2022 was the first year in a decade that private AI investment declined, although AI is still a hot topic. Global AI private investment was \$91.9 billion in 2022, which represented a 26.7% decrease since 2021 [4].

Interest in artificial intelligence has grown dramatically among policymakers, industry leaders, researchers, and the public. Policymakers are talking about AI more than ever. Industry leaders who have integrated AI into their businesses are seeing tangible value and benefits. Publications on AI and the number of researchers interested in the issue continue to grow. The public has formed a sharper opinion about artificial intelligence, as they know which elements they like and dislike. Studies confirm that artificial intelligence development is mainly driven by the actions of actors in small groups in the private sector. The 2022 AI Index provides insight into where the world is with AI development and what we can expect in the future. According to the Artificial Intelligence Index Report 2023, NRI 2022 At-A-Glance: Georgia Network Readiness Index Rank: 75 (out of 131) Score: 47.14. [15]

For a successful implementation of artificial intelligence in a country, it is essential to have a highly developed ICT infrastructure and the practice of large-scale use of digital governance and interoperable databases. According to the AI Readiness Index 2020, published by Oxford Insight, a

British international consulting group, Georgia ranks 72nd in the world in terms of state readiness for AI. However, when compared to other countries in the South and Central Asian region, Georgia is in 5th place out of 16 countries, with a score of 43.39. This score is lower than that of other countries in the region, such as Turkey (46.01), Azerbaijan (46.44), Kazakhstan (46.55), and India (55.58). Figure 1 provides a graphical representation of the scores assigned to Georgia in each of the ten sections of the AI readiness index evaluation areas [16].

**Figure 3. AI Readiness Index of Georgia 2020**



*Source: Oxford Insights*

Studies confirm that Georgia has a favorable business environment for the artificial intelligence establishment. However, despite this, there are no appropriate investment programs and necessary infrastructure in the country [17]. The Government of Georgia is actively involved in promoting the introduction of the artificial intelligence process and its use in migration process management. It is planned to strengthen high-quality research and technology support with the involvement of the Technology Transfer Office of the Georgian Innovation and Technology Agency, Horizon Europe University Offices, and hubs of innovative ecosystems operating at the national or regional levels.

**Conclusion.** It is clear that AI can collect and analyze large amounts of data at a much faster rate than humans but it is significant to understand the challenges related to the quality of the data used to train AI algorithms, the privacy of migrant data, and algorithmic accountability and fairness. Therefore, both quantitative and qualitative data, such as data from academic research projects, should be taken into account for the preparation of AI algorithms, which allows not only the analysis of statistical data but also the reflection of the complete picture of migration.

AI systems can increase the efficiency of migration management. Artificial intelligence systems can quickly control identity checks at border checkpoints. They can also contribute to better potential security threats identification and facilitate refugee resettlement through chatbots that provide information and counseling services to migrants in destination countries. Also, with artificial intelligence use, it is possible to predict the movement of migrants, which will help the authorities to

prepare more effectively to receive a large flow of people or, conversely, to strengthen the policy of not allowing unwanted migrants to enter the country.

Strengthening communication between countries and sharing best practices in migration management using innovative technologies and artificial intelligence significantly improves the legal framework of migration processes and the safety of migrants.

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