AN ANALYSIS OF AI RESEARCH DEVELOPMENT IN CENTRAL ASIA AND CIS COUNTRIES

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INTRODUCTION

Artificial intelligence (AI) has become one of the most transformative forces shaping modern economies, scientific progress, and technological innovation worldwide. In recent years, countries have increasingly invested in AI research to strengthen their global competitiveness and accelerate digital development (UNESCO, 2022). However, the growth of AI research is not evenly distributed across regions. While some countries demonstrate rapid progress, others continue to face structural and resource-related limitations (World Bank, 2023). This disparity is particularly visible in Central Asia and the Commonwealth of Independent States (CIS), where research output varies significantly between nations. Using publication data from 2020 to 2025, this paper analyzes the development of AI research in these regions, highlighting key trends, emerging leaders, and the underlying challenges and opportunities shaping their future trajectory.

Literature Review

The rapid expansion of artificial intelligence (AI) has attracted significant scholarly attention over the past decade, with research output increasingly concentrated in a small number of technologically advanced countries. According to the OECD AI Policy Observatory, global AI publications have grown substantially, driven by strong investments, institutional support, and international collaboration networks (OECD, 2023). Similarly, data from Scopus and OpenAlex indicate that countries such as the United States and China dominate AI research output, creating a significant gap between leading and emerging economies.

Several studies have highlighted that this disparity is closely linked to differences in research funding, access to advanced infrastructure, and the availability of skilled human capital. For instance, UNESCO (2022) reports that developing regions often face structural barriers, including limited research financing and weaker academic-industry linkages, which constrain their ability to compete in high-technology fields such as AI. In the context of post-Soviet states, this challenge is further compounded by transitional economic conditions and uneven digital transformation processes.

Within the Commonwealth of Independent States (CIS), research activity has historically been dominated by Russia, which inherited a strong scientific base from the Soviet era. However, recent trends suggest a gradual shift in this landscape. According to OECD AI datasets (2024), while Russia continues to produce the largest volume of AI publications in the region, its output has shown signs of fluctuation and

decline in recent years. At the same time, smaller economies—including Kazakhstan and Uzbekistan are demonstrating notable growth, reflecting increased policy attention toward digitalization and innovation.

In Central Asia, the development of AI research remains relatively limited but uneven. Emerging evidence suggests that Uzbekistan and Kazakhstan are investing more actively in higher education reforms and technology-driven initiatives, which may explain their rising publication outputs (World Bank, 2023). Nevertheless, other countries in the region, such as Tajikistan and Kyrgyzstan, continue to lag behind due to resource constraints and limited research ecosystems.

Overall, the existing literature indicates a growing but highly unequal landscape of AI research across regions. While global leaders maintain a strong advantage, there is increasing evidence of emerging research activity in Central Asia and parts of the CIS. However, comprehensive, data-driven analyses focusing specifically on these regions remain limited. This gap highlights the need for a more detailed examination of AI research trends using recent empirical data, which this study aims to address.

Methodology

This study adopts a quantitative and descriptive research design to examine the development of artificial intelligence (AI) research in Central Asia and the Commonwealth of Independent States (CIS) between 2020 and 2025. The analysis is based on secondary data obtained from the OECD AI Policy Observatory, which provides standardized indicators on AI-related scientific publications across countries.

The dataset includes annual publication counts for selected Central Asian countries (Kazakhstan, Uzbekistan, Tajikistan, Kyrgyzstan, and Turkmenistan) as well as CIS member states (including Russia, Belarus, Azerbaijan, and Armenia). These countries were chosen to enable both regional and comparative analysis, given their shared historical and economic contexts.

To analyze the data, a time-series approach was employed to identify trends in AI research output over the six-year period. This involved examining year-by-year changes in publication counts to detect patterns of growth, stagnation, or decline. In addition, a comparative analysis was conducted to evaluate differences between countries and regions, particularly focusing on leading and lagging performers.

Visual analytical tools, including line graphs and bar charts, were used to illustrate trends and facilitate clearer interpretation of the data. Line charts were applied to track longitudinal changes in publication output within Central Asia, while bar charts were used to compare country-level performance in specific years, particularly highlighting disparities within the CIS region.

Results and Analysis

3.1 AI Research Trends in Central Asia

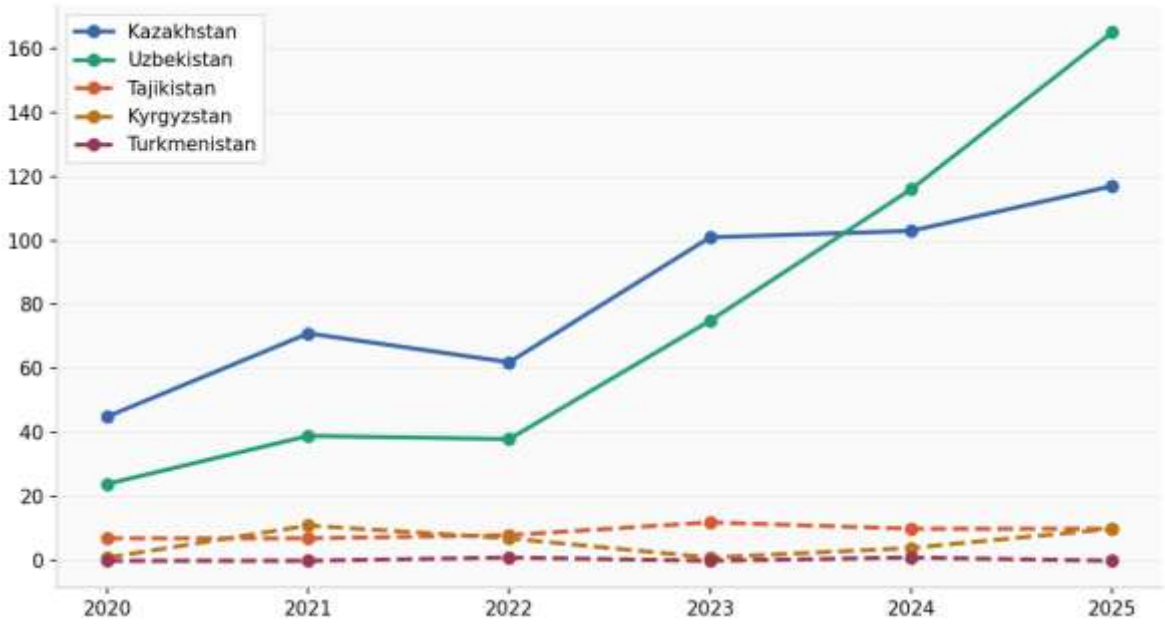
AI research output in Central Asia demonstrates an overall upward trend, although the growth remains uneven across countries. Among the five states, Uzbekistan shows the most significant increase in publication output, rising sharply

from 24 publications in 2020 to 165 in 2025. This rapid growth indicates a strong acceleration in research activity and suggests increasing national attention toward AI development. Kazakhstan also exhibits steady growth, with publications increasing from 45 in 2020 to 117 in 2025, reflecting a more stable but consistent expansion (Figure 1).

In contrast, other countries in the region display limited or irregular progress. Tajikistan’s output remains relatively low, fluctuating between 7 and 12 publications over the period. Kyrgyzstan shows an inconsistent pattern, with minor increases followed by declines, indicating instability in research productivity. Turkmenistan records minimal activity, with only isolated publications appearing during the observed years.

Overall, these trends highlight a clear regional disparity, where a small number of countries particularly Uzbekistan and Kazakhstan—are emerging as key contributors, while others remain significantly behind. This uneven distribution suggests differences in access to research funding, institutional capacity, and technological infrastructure across the region (Figure 1).

Figure 1. AI Research Publications in Central Asia (2020–2025)



Source: Compiled and elaborated by the author using OECD AI Policy bservatory data (2020–2025).

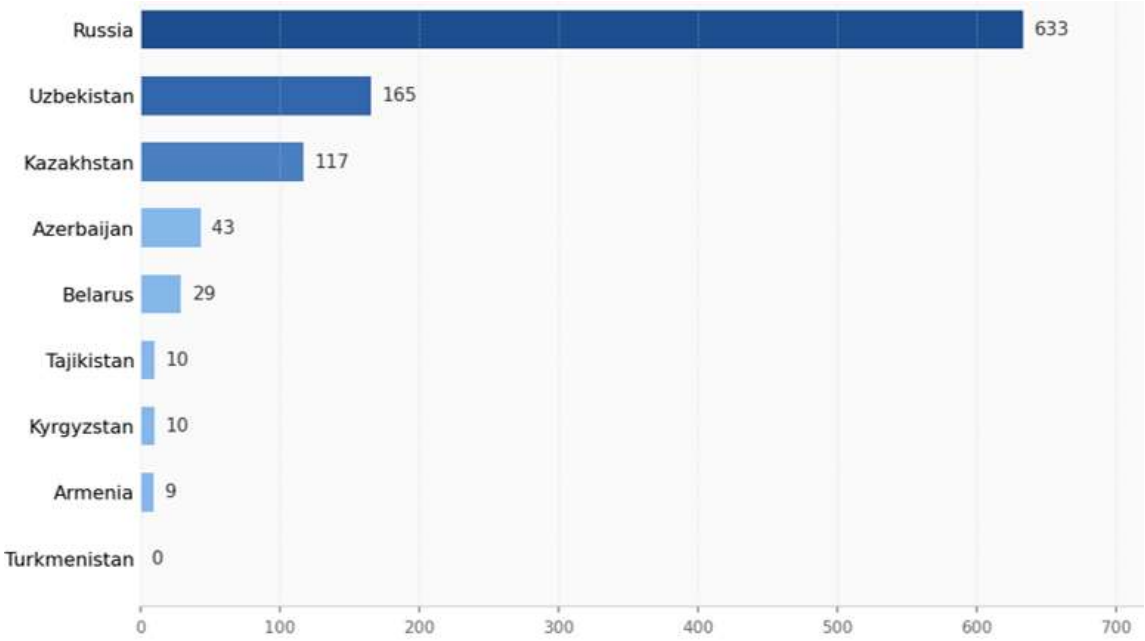
3.2 AI Research Trends in CIS Countries

The broader CIS region presents a contrasting pattern, largely shaped by the dominant role of Russia. Russia remains the leading contributor to AI research output, with publication counts significantly higher than other countries throughout the observed period. However, its output shows a noticeable decline, decreasing from 1100 publications in 2021 to 633 in 2025. This downward trend may reflect structural, economic, or geopolitical factors affecting research productivity.

At the same time, several smaller CIS countries demonstrate gradual growth. Uzbekistan, in particular, stands out with a rapid increase in publications, surpassing several traditionally stronger research systems by 2025. Azerbaijan also shows notable progress, growing from 8 publications in 2020 to 43 in 2025. Belarus maintains relatively stable output, fluctuating slightly but without significant long-term change (Figure 2).

This shift indicates that while Russia continues to dominate in absolute terms, its relative leadership is weakening as other countries begin to expand their research capacity.

Figure 2. Comparison of AI Research Output in CIS Countries (2025)



Source: Compiled and elaborated by the author using OECD AI Policy bservatory data (2020–2025).

3.3 Comparative Analysis and Regional Dynamics

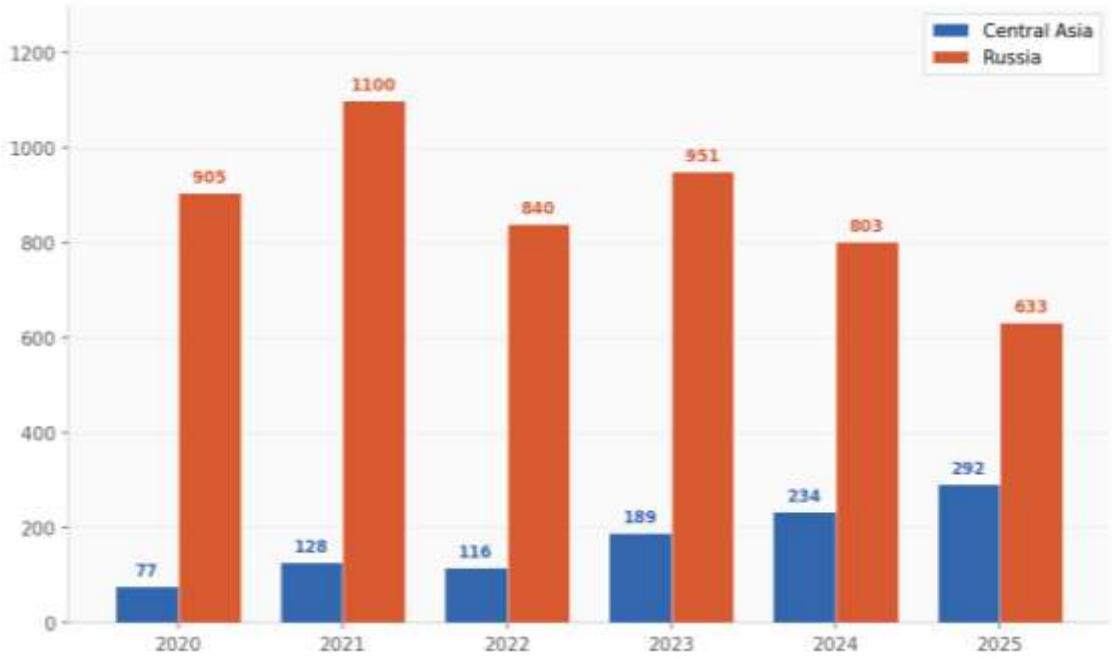
A comparative analysis of Central Asia and the broader CIS region reveal an important shift in the structure of AI research development. While Russia has historically been the central hub of scientific output, recent data suggests a gradual redistribution of research activity across the region. The steady decline in Russia’s publication output, combined with the rapid growth observed in countries such as Uzbekistan and Kazakhstan, indicates a movement toward a more decentralized research landscape.

This trend may be explained by several factors, including increased national investments in education and technology, policy reforms aimed at digital transformation, and expanding international collaboration. In particular, Uzbekistan’s sharp rise in publication output suggests the emergence of a new regional research hub within Central Asia.

However, despite these positive developments, significant inequalities remain. Many countries in both Central Asia and the CIS continue to face structural challenges,

including limited funding, insufficient research infrastructure, and a shortage of highly skilled specialists. As a result, the overall growth of AI research in the region remains uneven and fragmented.

Figure 3. Comparative Trends in AI Research: Central Asia vs CIS (2020–2025)



Source: Compiled and elaborated by the author using OECD AI Policy observatory data (2020–2025).

The findings of this study highlight a shifting landscape of AI research within Central Asia and the CIS region. While Russia continues to play a dominant role in absolute terms, its declining publication output suggests potential structural or external constraints affecting its research ecosystem. In contrast, the rapid growth observed in countries such as Uzbekistan and Kazakhstan indicates increasing national prioritization of digital technologies and scientific development.

Conclusion

In conclusion, AI research in Central Asia and the CIS region is experiencing gradual but uneven growth. While traditional leaders such as Russia still dominate in scale, emerging contributors particularly Uzbekistan and Kazakhstan—are reshaping the regional research dynamics. The analysis reveals both encouraging progress and persistent disparities, highlighting the importance of sustained investment, policy support, and regional cooperation. Strengthening these areas will be essential for ensuring more inclusive and competitive AI research development in the future.

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