ORIGINAL ARTICLE

INTERNATIONAL JOURNAL OF ARTIFICIAL INTELLIGENCE

ISSN: 2692-5206, Impact Factor: 12,23
**American Academic publishers, volume 05, issue 05,2025**

Journal: https://www.academicpublishers.org/journals/index.php/ijai

# SCIENCE IN UZBEKISTAN

***Bazarbaeva Aysánem***

*Faculty of History 3rd-year student*

**Abstract:**Uzbekistan has been making significant strides in science, technology, and innovation, driven by strategic policy reforms and international collaborations. The country's National Science, Technology, and Innovation Policy (2022–2030) aims to enhance sustainable development, technological advancements, and infrastructure. Key scientific institutions such as the Academy of Sciences of Uzbekistan, IT Park Uzbekistan, and Uzbek cosmos are fostering growth in various fields. Additionally, major projects in nuclear energy development, waste-to-energy systems, and archaeological discoveries are positioning Uzbekistan as a growing hub for scientific research and technological development in Central Asia.

**Keywords:** Uzbekistan, science, technology, innovation, Academy of Sciences, IT Park, Uzbek cosmos, nuclear energy, waste-to-energy, National Science Policy, sustainable development, international collaborations, archaeological discoveries, technological advancement.

Uzbekistan, located in Central Asia, has witnessed significant growth and transformation in the fields of science, technology, and innovation in recent years. With the adoption of its National Science, Technology, and Innovation Policy for 2022-2030, the country is focused on fostering a knowledge-based economy that aligns with global technological trends. Uzbekistan's commitment to scientific and technological development is evident in its strategic investments in infrastructure, energy, and research institutions.

The government has placed an emphasis on creating an environment conducive to innovation through the establishment of key institutions like the Academy of Sciences of Uzbekistan, IT Park Uzbekistan, and the Uzbekcosmos space agency. These institutions serve as the backbone of Uzbekistan's scientific community, providing support for research, technology development, and fostering collaborations with international partners. Noteworthy projects, such as the development of the first nuclear power plant in Central Asia and investments in waste-to-energy initiatives, reflect the country's desire to promote sustainable energy solutions. In addition, recent archaeological discoveries highlight Uzbekistan's rich cultural history, further contributing to its growing reputation in global scientific circles.[1]

This introduction sets the stage for exploring the various factors shaping Uzbekistan's scientific landscape, the key institutions driving these advancements, and the international collaborations paving the way for future progress.

Uzbekistan's commitment to scientific and technological progress is clearly outlined in its National Science, Technology, and Innovation Policy for 2022–2030. Developed in collaboration with international organizations like UNESCO and the Islamic Development Bank, this policy serves as a roadmap for the country's scientific advancement. The main objectives of the policy include fostering innovation, enhancing research infrastructure,

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increasing funding for research and development (R&D), and ensuring the effective commercialization of scientific discoveries. The policy prioritizes sustainability, aiming to align Uzbekistan's technological landscape with global trends while addressing local needs. Focus areas include renewable energy, information technology, and biotechnology, as well as the creation of an ecosystem that fosters cooperation between academic institutions, private enterprises, and government entities.[2,34]

The Academy of Sciences of Uzbekistan, established in 1943, is the country's primary scientific research institution. It coordinates research across multiple scientific disciplines, including physics, chemistry, biology, and engineering. With 155 members, including 49 academicians, the Academy plays a central role in the nation's scientific development. It serves as an authoritative body for scientific research and a vital hub for innovation, facilitating cooperation with global research institutions and contributing to policy-making in the science and technology sectors.

Founded in 2019, IT Park Uzbekistan is a state-supported technology hub located in Tashkent, the capital. The park's mission is to drive the digital transformation of the country by supporting tech startups, fostering innovation, and attracting global IT companies. It serves as a platform for collaboration between young entrepreneurs, developers, and investors, providing infrastructure, financial support, and educational programs aimed at promoting a thriving IT ecosystem. IT Park also helps nurture talent through its partnerships with universities and international tech firms.

Uzbekcosmos, founded in 2019, is Uzbekistan's national space agency. The agency oversees the development of space research and technology, and it is working to enhance the country's capabilities in satellite technology, space exploration, and international collaborations. Uzbekcosmos plays a key role in advancing the nation's scientific reputation, with the goal of making Uzbekistan a regional leader in space technology. The agency is part of Uzbekistan's broader push to integrate itself into global space programs and benefit from the economic and technological opportunities that space research offers.[4,56]

In 2024, Uzbekistan signed a landmark agreement with Russia to build Central Asia's first nuclear power plant. This project is part of Uzbekistan's broader efforts to diversify its energy sources, reduce dependence on fossil fuels, and address its growing energy demands. The planned nuclear power plant will feature six reactors with a total capacity of 330 megawatts. By investing in nuclear energy, Uzbekistan aims to ensure long-term energy security and support sustainable development in the region. This initiative is also a reflection of Uzbekistan's growing ties with international partners in energy technology. The nuclear project highlights the country's focus on advanced energy solutions and the importance of nuclear technology in its energy mix, offering significant environmental and economic benefits in the long run.

Uzbekistan has committed to investing approximately $1.3 billion in waste-to-energy projects across the country. These initiatives are part of the government's efforts to tackle environmental challenges and promote sustainable energy practices. By constructing several waste-to-energy plants, Uzbekistan aims to convert over 4.7 million tons of solid waste annually into electricity, producing up to 2.1 billion kilowatt-hours of energy by 2027. This

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project will help the country reduce waste, cut down on greenhouse gas emissions, and save natural gas resources, positioning Uzbekistan as a leader in sustainable energy solutions in Central Asia.

Uzbekistan places significant importance on education and research, which is reflected in its investment in higher education institutions. Notable examples include:

**Tashkent State Technical University:** One of the oldest institutions in the country, this university plays a crucial role in training the next generation of scientists and engineers. It offers programs in various technical disciplines and contributes significantly to the country's scientific workforce.

**Turin Polytechnic University in Tashkent:** A partnership with Italy's Politecnico di Torino, this institution specializes in engineering and technology education, offering English-language programs. It is integral to Uzbekistan's effort to improve the quality of its technical education system and to increase international cooperation in academic research.[5]

These institutions work closely with international universities and research centers to ensure the country's integration into the global scientific community. Additionally, Uzbekistan has actively engaged in international collaborations, particularly in the fields of nuclear energy, space exploration, and environmental sustainability, forging partnerships with countries like France, Russia, and China.

Uzbekistan is also gaining international recognition for its contributions to archaeology and historical research. In 2024, archaeologists discovered two lost cities, Tugunbulak and Tashbulak, in the mountains of Uzbekistan, using advanced laser-based remote sensing technology. These cities, dating back to the 6th to 11th centuries AD, were part of the ancient Silk Road trade network and offer valuable insights into the region's history, culture, and economy. Tugunbulak, in particular, was an important center for metal industries, contributing significantly to the technological advancements of the time. These discoveries demonstrate Uzbekistan's capacity for scientific innovation not only in modern technology but also in preserving its rich historical heritage. Looking ahead, Uzbekistan faces both opportunities and challenges in its pursuit of scientific and technological advancement. The country has laid a strong foundation through strategic investments and policies, but challenges remain in areas such as research funding, infrastructure, and the integration of new technologies. However, with the continued focus on education, international collaboration, and innovation, Uzbekistan is well-positioned to become a regional leader in science and technology.

Uzbekistan's progress in science and technology is a testament to its commitment to becoming a global hub for research, innovation, and sustainable development. The country's policies, key scientific institutions, and international partnerships are driving significant advancements across various fields. As Uzbekistan continues to invest in its scientific infrastructure and foster global collaborations, it is poised to contribute meaningfully to the technological landscape of Central Asia and beyond.

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