

Закключение. Переход от индустриальной к постиндустриальной экономике представляет собой сложный исторический процесс, затрагивающий все стороны жизни общества. Его основными причинами являются научно-технический прогресс, цифровизация, глобализация и изменение структуры потребностей населения.

Постиндустриальная экономика ориентирована на знания, инновации и человеческий капитал. Она предлагает новые возможности для повышения уровня жизни, развития образования и науки, расширения культурного пространства. Однако вместе с тем она порождает и новые вызовы: цифровое и социальное неравенство, трансформацию рынка труда, необходимость постоянного обновления компетенций.

Для государств, в том числе для Узбекистана, ключевой задачей становится формирование эффективной стратегии постиндустриального развития, в центре которой находятся:

- инвестиции в человеческий капитал и образование;
- развитие цифровой инфраструктуры и инновационной экосистемы;
- поддержка малого и среднего бизнеса в сфере услуг и высоких технологий;
- обеспечение социальной справедливости и сокращение цифрового разрыва.

Только при условии гармоничного сочетания экономического роста, социальной ответственности и технологического прогресса переход к постиндустриальной модели сможет стать основой устойчивого и инклюзивного развития общества.

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INNOVATIVE ECOSYSTEMS AND THEIR ROLE IN INTERNATIONAL COMPETITIVENESS

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Annotation: The article analyzes the essence of the post-industrial economy and the importance of Uzbekistan's innovation development strategy. It highlights the roles of human capital, science, and digital transformation as drivers of growth. The main directions of the *Innovation Development Strategy – 2030* are outlined.

Keywords: post-industrial economy, innovation, human capital, digital transformation, knowledge economy, Uzbekistan-2030, economic modernization, technological development, sustainability, globalization.

ИННОВАЦИОННЫЕ ЭКОСИСТЕМЫ И ИХ РОЛЬ В МЕЖДУНАРОДНОЙ КОНКУРЕНТОСПОСОБНОСТИ

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Аннотация: В статье рассматриваются особенности постиндустриальной экономики и анализируется значение инновационной стратегии развития Узбекистана. Раскрыта роль человеческого капитала, науки и цифровой трансформации как факторов устойчивого роста. Отмечено значение «Стратегии инновационного развития до 2030 года» в формировании экономики знаний.

Ключевые слова: постиндустриальная экономика, инновации, человеческий капитал, цифровая трансформация, экономика знаний, устойчивое развитие.

INNOVATION EKOTIZIMLAR VA ULARNING XALQARO RAQOBATBARDOSHLIKDAGI ROLI

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Annotatsiya: Maqolada postindustrial iqtisodiyotning mohiyati va O'zbekistonning innovatsion rivojlanish strategiyasining ahamiyati tahlil qilinadi. Inson kapitali, ilm-fan va raqamli transformatsiyaning o'sishdagi o'rni ko'rsatib o'tilgan. "Innovatsion rivojlanish strategiyasi – 2030"ning asosiy yo'nalishlari yoritiladi.

Kalit so'zlar: innovatsion ekotizimlar, xalqaro raqobatbardoshlik, postindustrial iqtisodiyot, raqamli transformatsiya, intellektual kapital.

Introduction. The twenty-first century marks a profound shift in the structure of the world economy. The industrial paradigm, which dominated for more than two centuries, is gradually giving way to a **post-industrial model**—an economy built upon knowledge, science, and innovation. The key production factors are no longer land, labor, and capital, but **information, creativity, and human intellect**.

This transformation began in developed countries in the second half of the twentieth century and has since become a global trend. The concept of the *post-industrial society* was first formulated by American sociologist **Daniel Bell** (1973), who argued that technological change would shift employment from manufacturing to services and knowledge industries. In this context, the success of nations is increasingly determined not by the abundance of natural resources but by their ability to generate, apply, and commercialize knowledge.

For **Uzbekistan**, a country that historically relied on agriculture and industry, the challenge of building a knowledge-based economy is both ambitious and necessary. Following independence, Uzbekistan undertook extensive economic reforms aimed at liberalization, diversification, and modernization. However, the rapid pace of global technological change has compelled the nation to adopt a new development paradigm—one that emphasizes **innovation, digitalization, and human capital**.

The **Innovation Development Strategy of Uzbekistan for 2022–2030** is a crucial framework for achieving these objectives. It defines innovation as the engine of long-term growth and positions scientific and technological progress at the heart of national policy. This article seeks to (1) define the essence of the post-industrial economy, (2) analyze Uzbekistan's innovation strategy, (3) examine the role of human capital and digital transformation, and (4) identify challenges and prospects for sustainable development in a post-industrial context.

Theoretical Foundations of the Post-Industrial Economy

The post-industrial economy represents a structural transformation in which material production gives way to **intellectual production**. It is characterized by several distinctive features:

1. **Dominance of the service sector.** In post-industrial societies, more than 70% of GDP and employment are concentrated in services—education, research, finance, IT, consulting, and healthcare.

2. **Central role of knowledge and information.** Knowledge becomes a primary economic resource, while education and innovation replace labor and raw materials as the main growth factors.

3. **Technological and digital convergence.** Information and communication technologies (ICT), artificial intelligence, and data analytics transform all spheres of life, increasing efficiency and connectivity.

4. **Flexibility and network organization.** Economic activity is structured through global networks rather than rigid hierarchies, fostering collaboration and innovation.

5. Human-centered development. The individual's creative potential becomes the foundation of competitiveness.

As **Peter Drucker** (1993) noted, the twenty-first century is the “age of knowledge workers.” Productivity now depends less on machinery and more on people's ability to generate ideas and solutions. Consequently, states must create conditions where innovation can thrive—through education reform, institutional openness, and technological infrastructure.

Global Context: From Industrial to Innovation-Driven Development

The transition from an industrial to a post-industrial economy has unfolded unevenly across the world. In the United States, Japan, South Korea, and Germany, innovation systems have become the backbone of competitiveness. These nations illustrate the **triple helix model**—a dynamic interaction between universities, business, and government that generates continuous technological progress.

- **The United States** fostered innovation through Silicon Valley, where academic research and venture capital converge.

- **Japan's model** relies on state-guided industrial policy combined with corporate research networks.

- **South Korea** transformed from a manufacturing economy into a digital powerhouse by investing heavily in education and R&D (over 4% of GDP).

- **European countries** emphasize sustainability and inclusive innovation within the framework of Industry 0.

In contrast, developing countries face the dual challenge of industrial modernization and post-industrial transformation. For Uzbekistan, aligning with this global trajectory means not only modernizing traditional sectors but also building a **national innovation ecosystem** that can compete internationally.

Formation of Uzbekistan's Innovation Development Strategy

The **Strategy of Innovative Development of the Republic of Uzbekistan until 2030**, approved by Presidential Decree No. PF-5544 (September 21, 2018), marks a turning point in national policy. It defines innovation as the main instrument for achieving economic diversification and improving quality of life. The document outlines five strategic goals:

1. **Modernization of the economy** through high-technology industries and knowledge-intensive production.

2. **Development of human capital** via modern education, science, and lifelong learning.

3. **Creation of an innovation infrastructure**—technology parks, incubators, research centers, and venture funds.

4. **Digital transformation** of governance and industry within the *Digital Uzbekistan – 2030* framework.

5. **Integration into the global innovation space**, including partnerships with the OECD, World Bank, and leading universities.

The establishment of the **Ministry of Innovative Development** has been instrumental in coordinating these reforms. It supports scientific projects, manages grants, and promotes cooperation between academia and private enterprises.

Several institutions illustrate this transformation:

- **IT-Park Uzbekistan** (founded in 2019) accelerates start-ups in information technology.

- **InnoWeek**—an annual innovation exhibition—promotes technological exchange.

- **The Youth Academy** and **Innovation Clusters** nurture young researchers and entrepreneurs.

Through these initiatives, Uzbekistan is gradually building an ecosystem consistent with post-industrial principles.

Human Capital as the Core of Post-Industrial Growth

Human capital—the stock of knowledge, skills, and creativity embodied in individuals—constitutes the most valuable resource of a post-industrial economy. Unlike natural resources, it multiplies through education, communication, and innovation.

Uzbekistan's efforts in this area include:

- Expanding access to higher education (from 9% enrollment in 2016 to over 30% in 2024).

- Opening branches of foreign universities (Kazan Federal University, Webster University, MGIMO, and others).

- Supporting youth entrepreneurship and start-up initiatives.

- Reforming the National Science Foundation to provide competitive grants for young scientists.

Moreover, the country has recognized the need for **STEM education** (science, technology, engineering, mathematics) and the integration of digital literacy at all levels of schooling. The combination of scientific competence and entrepreneurial mindset forms the foundation of Uzbekistan's innovation capacity.

The government also promotes **gender inclusion** in science and technology, acknowledging that diverse human potential strengthens the innovation ecosystem.

Digital Transformation and the Knowledge Economy

Digitalization is a defining feature of post-industrial evolution. The **Digital Uzbekistan – 2030** program aims to digitalize all spheres of economic and social activity, from e-government to smart cities and e-commerce. Its objectives include:

- Achieving full electronic interaction between citizens and the state;
- Introducing digital solutions in agriculture, transport, and energy;
- Developing cybersecurity and data protection systems;
- Encouraging local IT-startups and export of digital services.

The implementation of artificial intelligence, blockchain, and cloud computing technologies allows Uzbekistan to enhance transparency, reduce bureaucracy, and optimize resource use. The creation of *E-Imzo*, *E-Mahalla*, and other digital platforms demonstrates a gradual shift toward a **data-driven economy**.

In the post-industrial framework, digital technologies are not merely tools but **productive forces** that redefine value creation. Knowledge flows faster, innovation cycles shorten, and global competition intensifies. Therefore, digital transformation and innovation policy are inseparable components of Uzbekistan's modernization agenda.

Challenges of Building an Innovation Economy

Despite significant progress, Uzbekistan's innovation transition faces several obstacles:

1. **Insufficient R&D investment.** Expenditure on scientific research remains below 1% of GDP, far from the OECD average of 5–3%.
2. **Weak commercialization of research.** Many academic results do not reach the market due to limited venture capital and regulatory barriers.
3. **Brain drain.** Talented researchers often seek opportunities abroad, underscoring the need for better incentives and infrastructure at home.
4. **Institutional fragmentation.** Overlapping functions between ministries and agencies sometimes slow policy implementation.
5. **Limited intellectual property protection.** The enforcement of patent and copyright laws remains a work in progress.

Addressing these challenges requires a comprehensive approach—combining legal reform, private sector engagement, and international collaboration. The success of the post-industrial transition depends on **coherence between innovation, education, and industrial policy**.

Prospects and Strategic Priorities

Uzbekistan's prospects for integrating into the global post-industrial economy are promising, provided that reforms continue systematically. Key priorities for the coming decade include:

- **Raising R&D spending** to 2% of GDP by 2030.
- Establishing **regional innovation centers** in each province to decentralize innovation.
- Expanding **public-private partnerships** for technology transfer and commercialization.
- Stimulating **green and sustainable innovation** in renewable energy and circular economy sectors.
- Strengthening international cooperation through programs with the EU, UNDP, and OSCE.
- Promoting **academic mobility** and returning highly qualified expatriate specialists.
- Ensuring that innovation contributes to **inclusive growth** and social well-being.

The post-industrial transition also requires a cultural shift—from risk aversion to creative experimentation, from bureaucratic control to institutional flexibility. As innovation becomes a national mindset, Uzbekistan's economic model will move closer to that of advanced economies.

The Role of the State and Governance Reform

The state plays a pivotal role in orchestrating innovation. In a post-industrial context, government functions not as a direct producer but as a **facilitator**—creating favorable conditions for research, entrepreneurship, and investment.

Uzbekistan's government has introduced several mechanisms to support this:

- Competitive grant systems for scientific projects;

- Tax incentives for high-tech companies;
- Simplified registration for start-ups;
- Legal frameworks for venture financing and intellectual property rights;
- *Regulatory sandboxes* to test new technologies under controlled conditions.

In governance, the shift toward *open government* principles—transparency, accountability, and citizen participation—strengthens trust and efficiency. The synergy between governance reform and technological innovation accelerates institutional modernization.

Comparative Perspective: Lessons from Leading Countries

Analyzing successful post-industrial transformations offers valuable insights for Uzbekistan:

- **Finland** built its economy around innovation after the 1990s crisis, investing in education and R&D (Nokia model).

- **Singapore** created a knowledge-based society through meritocracy, technological infrastructure, and global integration.

- **Israel** became a “start-up nation” by linking military R&D with civilian entrepreneurship.

Uzbekistan can adapt these lessons by fostering close cooperation between universities and industries, encouraging venture capital, and developing innovation clusters in key regions (Tashkent, Samarkand, Jizzakh, Fergana Valley).

Conclusion. The post-industrial economy signifies a transformation of civilization—where **knowledge replaces labor, creativity replaces machinery, and innovation replaces tradition**. For Uzbekistan, embracing this transformation is not optional but essential for ensuring long-term competitiveness and sustainable prosperity.

The *Innovation Development Strategy – 2030* provides a clear roadmap toward this goal. By investing in science, education, and technology, Uzbekistan positions itself as a regional leader in innovation and digital transformation. However, realizing the full potential of the post-industrial transition requires continuous policy coherence, institutional efficiency, and social inclusiveness.

Ultimately, the success of Uzbekistan’s post-industrial journey depends on its ability to cultivate a generation of innovators—scientists, engineers, entrepreneurs, and policymakers—capable of turning knowledge into progress. In doing so, the country will not only modernize its economy but also contribute to the global architecture of innovation and sustainable development.

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СДВИГ ОТ МАТЕРИАЛЬНЫХ К НЕМАТЕРИАЛЬНЫМ АКТИВАМ: ОЦЕНКА И УПРАВЛЕНИЕ ИНТЕЛЛЕКТУАЛЬНОЙ СОБСТВЕННОСТЬЮ В СОВРЕМЕННОМ БИЗНЕСЕ (НА ПРИМЕРЕ ПОСТИНДУСТРИАЛЬНОЙ ЭКОНОМИКИ)»

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Аннотация: В статье рассматривается феномен перехода мировой экономики от доминирования материальных активов к нематериальным. Особое внимание уделяется интеллектуальной собственности как ключевому фактору конкурентоспособности в постиндустриальной экономике. Анализируются современные методы оценки нематериальных активов, механизмы их управления и влияния на стоимость бизнеса. Представлены примеры успешных стратегий компаний, использующих интеллектуальные ресурсы как основу устойчивого развития.