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ANALYZING THE DIGITAL ECONOMY INFRASTRUCTURE OF UZBEKISTAN IN THE CONTEXT OF GLOBAL PROCESSES

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Abstract. This paper evaluates the current state and development trajectory of Uzbekistan's digital economy infrastructure amid the rapidly evolving global digital transformation. Emphasis is placed on the institutional, technological, and human capital dimensions of the country's digital readiness, while highlighting the influence of global economic integration, cybersecurity risks, and digital sovereignty concerns. Through analysis of statistical data, national programs, and international benchmarks, the article identifies strengths, bottlenecks, and future priorities in Uzbekistan's transition to a sustainable and inclusive digital economy.

Keywords: Uzbekistan, digital infrastructure, digital economy, global integration, e-governance, ICT.

Annotatsiya. Ushbu maqolada jadal rivojlanayotgan global raqamli transformatsiya sharoitida O'zbekiston raqamli iqtisodiyoti infratuzilmasining hozirgi holati va rivojlanish trayektoriyasi baholanadi. Tadqiqotda mamlakatning raqamli tayyorgarligi institutsional, texnologik va inson kapitali omillari asosida tahlil qilinadi. Global iqtisodiy integratsiya, kiberxavfsizlik xatarlari va raqamli suverenitet masalalarining ta'siri alohida yoritiladi. Statistik ma'lumotlar, milliy dasturlar va xalqaro mezonlar tahlili orqali O'zbekistonning barqaror hamda inklyuziv raqamli iqtisodiyotga o'tish jarayonidagi ustun jihatlari, mavjud cheklovlari va istiqboldagi ustuvor yo'nalishlari aniqlanadi.

Kalit so'zlar: O'zbekiston, raqamli infratuzilma, raqamli iqtisodiyot, global integratsiya, elektron boshqaruv, AKT.

Аннотация. В данной статье оцениваются современное состояние и траектория развития инфраструктуры цифровой экономики Узбекистана в условиях стремительно развивающейся глобальной цифровой трансформации. Основное внимание уделяется институциональным, технологическим и кадровым аспектам цифровой готовности страны. Отдельно рассматривается влияние глобальной экономической интеграции, рисков кибербезопасности и вопросов цифрового суверенитета. На основе анализа статистических данных, национальных программ и международных индикаторов выявляются сильные стороны, существующие ограничения и перспективные приоритеты перехода Узбекистана к устойчивой и инклюзивной цифровой экономике.

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Ключевые слова: Узбекистан, цифровая инфраструктура, цифровая экономика, глобальная интеграция, электронное управление, ИКТ.

INTRODUCTION.

In the 21st century, the digital economy has become a decisive factor in determining the competitiveness and resilience of nations. For developing countries like Uzbekistan, building robust digital infrastructure is not only a technological endeavor but a strategic imperative in an increasingly interconnected world. With digitalization permeating every sector—from finance and manufacturing to health and education—governments must align their internal infrastructure with global trends while addressing domestic challenges such as the digital divide, policy lag, and institutional inertia.

Uzbekistan has undertaken significant reforms to digitalize public services, expand internet coverage, and stimulate ICT-based entrepreneurship. Nevertheless, the path toward a fully functional digital economy requires comprehensive evaluation, especially in light of accelerating global processes like cloud migration, data localization debates, and the platformization of commerce and labor.

MATERIALS AND METHODS.

Uzbekistan's digital economy is underpinned by several pillars: internet connectivity, ICT legislation, digital literacy, public-private innovation, and e-government services. According to 2023 data from the Ministry for Development of Information Technologies and Communications (MITC), the number of internet users in Uzbekistan surpassed 27 million, with over 75% internet penetration [2]. Mobile broadband coverage has improved significantly due to 4G expansion, and pilot projects for 5G deployment have commenced in urban areas like Tashkent and Samarkand.

RESULTS AND DISCUSSION.

A critical determinant of digital economy success is the level of ICT literacy and education. Uzbekistan has made strides in integrating computer science into school curricula and has opened specialized institutions like the Inha University in Tashkent and the IT Park Uzbekistan. By 2024, over 50,000 youth have completed state-supported digital skills training programs [1].

Despite this progress, challenges remain. A gap persists between theoretical knowledge and industry practice, particularly in areas such as artificial intelligence, cybersecurity, and blockchain technologies. English language proficiency, a prerequisite for global ICT engagement, remains limited outside major cities.

The ICT sector contributes around 2.2% to Uzbekistan's GDP as of 2023. IT Park Uzbekistan, with over 1,200 resident companies and multiple regional

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branches, has become the core hub for tech startups and foreign IT outsourcing. Tax incentives, venture capital development, and international partnerships (e.g., with Japan, South Korea, and India) are promoting innovation [3].

However, Uzbekistan faces stiff regional competition from Kazakhstan, Georgia, and Azerbaijan in attracting global tech firms. A key bottleneck is limited integration with global digital platforms, partly due to infrastructural constraints and regulatory ambiguity.

Global digital trends—such as the rise of the gig economy, AI automation, and cross-border data flows—have reshaped expectations for digital infrastructure. Uzbekistan's engagement with international organizations like the ITU, the World Bank, and UNDP has helped secure technical expertise and funding for large-scale digitalization.

Still, geopolitical tensions (e.g., internet sovereignty vs. open web access) and foreign tech dependencies (e.g., reliance on imported software/hardware) expose structural vulnerabilities. These factors highlight the importance of developing digital sovereignty through local innovation, open-source adaptation, and cloud infrastructure resilience.

In assessing Uzbekistan's digital economy infrastructure, one cannot overlook its environmental impact—a concern that is increasingly relevant in global digital governance discussions. The proliferation of data centers, fiber-optic networks, and ICT hardware inevitably raises questions about energy consumption, e-waste management, and the carbon footprint of digital expansion [4].

Currently, Uzbekistan is taking steps toward greening its ICT sector. The Ministry of Ecology, Environmental Protection, and Climate Change has collaborated with digital stakeholders to promote energy-efficient hardware and environmentally friendly disposal protocols. Nevertheless, data centers in the country often rely on conventional energy sources, and there is limited integration of renewable energy into the digital infrastructure.

To align with global standards such as the UN Sustainable Development Goals (SDG 9 and SDG 13), Uzbekistan must invest in green ICT infrastructure, such as solar-powered data farms, low-energy server systems, and e-waste recycling programs. Partnerships with countries experienced in green digitalization (e.g., Germany, Finland) could accelerate these transitions.

While digital transformation brings immense economic opportunity, it also risks deepening social inequality if access to infrastructure and training is not equitably distributed. In Uzbekistan, gender disparity in the ICT workforce remains a concern. Although women constitute over 48% of the total university

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population, their representation in tech-related programs and startups is significantly lower [5].

Government programs such as "Girls in ICT" and vocational training scholarships for rural girls have begun to address this gap, but long-term change requires more systemic efforts [7]:

- Inclusion of female tech mentors in education
- Flexible work policies for women in tech
- Gender-sensitive design of e-services and platforms

Moreover, digital inclusivity must account for persons with disabilities, ethnic minorities, and older populations, who often face structural barriers in accessing digital tools and platforms. Creating accessible e-government services, promoting content in multiple languages, and integrating assistive technologies are critical for ensuring that digital development is not only expansive, but also inclusive.

Uzbekistan's digital infrastructure shows strong growth in urban centers, yet rural and remote areas still lag behind. According to 2023 estimates, approximately 28% of rural households lack stable broadband access. This creates a dual-speed economy, where urban populations benefit from digital services (e-commerce, telemedicine, digital banking), while rural communities remain largely disconnected.

Bridging this gap is essential not only for national economic integration but also for social cohesion. The government has begun deploying Universal Service Funds (USF) to finance rural broadband projects, and low-orbit satellite solutions (e.g., Starlink trials) are being considered to enhance connectivity in mountainous and desert regions [8].

CONCLUSION.

Uzbekistan stands at a pivotal point in its digital evolution. Considerable achievements have been made in expanding internet access, building human capital, and launching digital public services. However, a full transition to a modern digital economy necessitates sustained investment in rural connectivity, digital governance, cybersecurity readiness, and ICT talent pipelines.

In the context of global processes—such as data globalization, artificial intelligence, and cross-border e-commerce—Uzbekistan must accelerate its policy reforms, nurture local tech ecosystems, and forge deeper digital trade alliances. A forward-looking, inclusive, and resilient digital infrastructure will ensure that Uzbekistan is not merely a passive participant but an active contributor in the global digital future.

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