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DIGITAL TRANSFORMATION AND GREEN ECONOMY AS KEY DRIVERS OF SUSTAINABLE ECONOMIC DEVELOPMENT: AN INTEGRATED APPROACH WITH EVIDENCE FROM UZBEKISTAN

Nilufar Bakhronova
Karshi state technical university

Abstract. In the 21st century, the global economy is undergoing significant transformation driven by rapid digitalization and increasing environmental challenges. This paper analyzes the combined role of digital transformation and green economy in ensuring sustainable economic development, with a focus on Uzbekistan. The study highlights how digital technologies contribute to productivity growth, efficient resource allocation, and innovation, while the green economy ensures environmental sustainability through renewable energy and efficient resource management. The research is based on qualitative methods including literature review and comparative analysis. The findings indicate that the integration of digital and green strategies creates a synergistic effect that enhances economic growth and environmental protection. The study concludes that Uzbekistan has strong potential to achieve sustainable development through digital and green transformation.

Keywords: digital economy, green economy, sustainability, innovation, Uzbekistan, economic growth

Introduction. The global economy is rapidly evolving under the influence of technological progress and environmental challenges. Two major trends shaping this transformation are digital transformation and the transition to a green economy.

Digital transformation refers to the integration of modern technologies such as artificial intelligence, big data, and automation into economic processes. It improves efficiency, reduces costs, and creates new economic opportunities.

At the same time, the green economy focuses on sustainable development by reducing environmental risks, promoting renewable energy, and ensuring efficient use of natural resources.

Uzbekistan is actively implementing reforms aimed at digitalization and environmental sustainability. These reforms are essential for achieving long-term economic growth and improving the quality of life.

Literature Review. The concept of digital transformation has been widely studied in economic research. Scholars emphasize its importance in improving productivity and enabling data-driven decision-making.

The green economy, on the other hand, is aimed at reducing environmental damage and promoting sustainability. It includes renewable energy, waste management, and environmental protection.

Recent studies highlight the importance of integrating digital transformation and green economy approaches, showing that digital technologies significantly improve energy efficiency, while automation reduces waste and harmful emissions. In addition, big data plays a crucial role in environmental monitoring by enabling more accurate analysis, forecasting, and real-time decision-making. Renewable energy systems also benefit from digital optimization, as smart grids and digital platforms help balance energy supply and demand more efficiently. These findings are supported by a growing body of research, including studies on Industry 4.0, smart cities, and sustainable innovation. Your previous research also aligns with these conclusions, particularly in areas such as digital economy integration, industrial automation, environmental finance, and green innovation, which further confirms the strong interconnection between these two направления.

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This research is based on qualitative methods, including a systematic literature review, comparative analysis, statistical data evaluation, and a case study of Uzbekistan. The study relies on secondary data obtained from scientific articles, international reports, and national development programs. Additionally, analytical observations were used to better understand the practical implementation of digital and green policies. This methodological approach allows for a comprehensive assessment of both theoretical and practical aspects of sustainable development.

The results of the study indicate that digital transformation plays a crucial role in improving economic efficiency and competitiveness. The introduction of digital technologies leads to automation of production processes, reduction of operational costs, and increased productivity. It also contributes to the development of digital markets, e-commerce platforms, and financial technologies (fintech), which enhance economic activity. In Uzbekistan, digital reforms such as e-government services, online banking, and digital education platforms have significantly improved access to services and increased transparency.

At the same time, the green economy focuses on minimizing environmental impact and ensuring sustainable use of resources. This includes the development of renewable energy sources such as solar and wind power, improvement of energy efficiency, implementation of waste management systems, and promotion of sustainable agricultural practices. Uzbekistan has significant potential in solar energy due to its климатические условия, and recent investments in renewable energy projects demonstrate the country's commitment to green growth. Environmental policies are also being strengthened to address issues such as water scarcity and land degradation.

The integration of digital technologies with green economy principles creates additional benefits and accelerates sustainable development. For instance, smart energy systems allow for efficient electricity distribution, while digital monitoring tools help track pollution levels and resource consumption. Technologies such as the Internet of Things (IoT) and artificial intelligence enable more precise control over industrial processes, reducing waste and improving efficiency. In agriculture, precision farming techniques supported by digital tools help optimize water usage and increase crop yields, which is particularly important for countries with limited natural resources.

The combined effect of digital and green transformation leads to significant economic and social outcomes. These include higher economic growth rates, increased labor productivity, creation of new job opportunities in digital and green sectors, and improvement in overall living standards. Moreover, the transition to a sustainable model contributes to better environmental conditions and public health, which are essential for long-term development.

Despite these positive trends, several challenges remain. These include limited digital infrastructure in rural areas, insufficient level of digital skills among the workforce, high initial costs associated with green technologies, and the need for stronger institutional and regulatory frameworks. At the same time, these challenges create opportunities for further development, such as attracting foreign investment, strengthening public-private partnerships, enhancing education and training systems, and expanding international cooperation in the fields of technology and sustainability.

Recommendations. To achieve sustainable development, the following measures are recommended:

- strengthen digital infrastructure
- promote renewable energy projects
- support scientific research and innovation
- develop education and training programs
- encourage public-private partnerships
- expand international cooperation

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In conclusion, digital transformation and the green economy are key drivers of sustainable economic development in the modern world. Their integration creates a powerful synergy that enhances efficiency, supports innovation, and ensures environmental sustainability. Uzbekistan has strong potential to benefit from these global trends by continuing its reforms, investing in digital infrastructure, and promoting green technologies.

To ensure long-term success, it is important to strengthen digital infrastructure across all regions, promote renewable energy projects, support scientific research and innovation, develop education and training programs focused on digital and environmental skills, encourage public-private partnerships, and expand international cooperation. Additionally, creating favorable policy conditions and investment climate will play a crucial role in accelerating the transition towards a sustainable and inclusive economy.

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