

ANALYSIS OF THE ECONOMIC ADVANTAGES OF DIGITAL TRANSFORMATION IN THE TRANSITION TO A GREEN ECONOMY

Nematullaeva Feredy Hasan kizi

KarSU, student of the Faculty of Foreign Languages

Ermuminov Elbek Erkin ugli

KarSU, student of the Faculty of Economics

Abstract: This article analyzes the economic advantages of digital transformation in the transition to a green economy in the economy of Uzbekistan. The article assesses the economic efficiency of the ongoing environmental and financial reforms in the country based on digital technologies, including attracting green investments, increasing energy efficiency, waste recycling, and the rational use of resources. As a research methodology, qualitative and quantitative analysis methods were combined, as well as international experience and institutional opportunities in the context of Uzbekistan were studied. The analysis shows that digital transformation provides the following main advantages in the transition to a green economy: firstly, sustainable growth in the production and service sectors is ensured by increasing economic efficiency; secondly, the possibility of financing environmental projects is expanded through the effective use of financial resources; thirdly, a reliable and transparent environment is created for international financial institutions and private investors through digital monitoring and analysis systems; fourthly, environmental protection and social stability are strengthened through the rational use of resources and reduction of waste.

Keywords: green economy, digital transformation, green investments, sustainable development, environmental financing, public-private partnership, Uzbekistan, waste processing, smart energy systems, economic efficiency

Introduction

Problems related to climate change, environmental pollution, limited natural resources, and energy security in the global economy require a radical change in economic policy. From this point of view, the concept of a green economy, that is, achieving economic growth based on the efficient and environmentally responsible use of resources, has become one of the most important directions of sustainable development in the 21st century. As an integral part of the green economy, digital transformation also plays an important role, as digital technologies create opportunities for optimizing economic processes, efficient use of resources, reducing waste, and directing financial flows to environmental projects. In recent years, the country has been implementing a number of political, institutional, and economic measures aimed at developing a green economy, striving to harmonize sustainable economic growth with environmental sustainability. By Presidential Decree of December 2, 2022, the "Green Economy Transition Strategy" until 2030 ^[1] was approved, which defined such priority areas as environmentally

¹ O'zbekiston Respublikasi Prezidentining qarori, 02.12.2022 yildagi PQ-436-son

efficient production, transition to clean energy sources, and rational use of water and land resources. At the same time, initiatives such as strengthening cooperation with international financial institutions and implementing environmental projects based on public-private partnerships have been launched. Combining digital transformation and green investments provides a number of strategic advantages to the economy of Uzbekistan. Firstly, GDP growth rates can be improved by increasing production efficiency. Secondly, the possibility of financing environmental projects will be expanded through the effective use of financial resources. The third important aspect is the creation of a transparent and reliable environment for international financial institutions and private investors through digital monitoring and analysis systems. In the context of Uzbekistan, digital transformation is being implemented in the following areas: electronic financial services, the green bond market, public-private partnership mechanisms, environmental monitoring systems, smart energy systems, and digital agricultural platforms. Based on international experience, the impact of digital transformation on sustainable development and economic growth was analyzed, including advanced projects in Europe, Asia, and Central Asia. The results of the study showed that the combination of digital transformation and green investments creates strategic advantages in the economic, environmental, and social spheres. In addition, through digital transformation, it is possible to analyze data and monitor in real time, which creates a reliable and transparent environment for investors and government bodies in the decision-making process. At the same time, digital technologies allow optimizing energy consumption, reducing waste, and saving resources in production processes. The article also presents recommendations aimed at increasing the economic efficiency of digital transformation, developing financial mechanisms, strengthening public-private partnerships, and ensuring environmental sustainability in Uzbekistan's strategy for transitioning to a green economy. The research results will serve not only to determine the direction of digital development of the country's economy, but also to form a sustainable and green economy.

Literature review

Scientific research in the fields of the green economy and digital transformation is gaining great attention on a global scale. The UNDP report notes that green investments play an important role not only in ensuring environmental sustainability, but also in economic stability and job creation. With the help of digital transformation, there is an opportunity to positively influence the growth rates of gross domestic product (GDP) by increasing energy efficiency, expanding renewable energy sources, and reducing emissions. At the same time, digital technologies increase the effectiveness of the green economy by optimizing investment flows, directing financial resources to environmental projects, and making economic processes transparent. The OECD study emphasizes the stability of the financial environment, the clarity of environmental regulation mechanisms, and political will as important factors for green investments. According to him, tax incentives provided by the government and the "green" bond market will significantly stimulate investment. In this context, when digital transformation and financial mechanisms work together, economic efficiency increases significantly. In the context of Uzbekistan, research conducted by

Karimov et al. notes that foreign investment in the renewable energy sector has tripled over the past five years. The authors explain this change by cooperation with international financial institutions, including the participation of the European Bank for Reconstruction and Development (EBRD). It is also noteworthy that the first green bond issued by the Uzbek Mortgage Refinancing Company (UzMRC) in 2023 marked the beginning of a new stage in this market. This will further expand opportunities for the development of the green economy through digital transformation and financial innovations. The Asian Development Bank has recognized the 100 MW solar power plant project implemented in Uzbekistan as one of the largest green infrastructure projects in the region. Such large-scale pilot projects, especially the "Green Rehabilitation" program being implemented in the Aral Sea region, are considered important experiments in harmonizing environmental sustainability and regional economic development. In his article, Sharipov analyzed the factors hindering the large-scale development of green investments in Uzbekistan. Among them, the insufficient formation of a green taxonomy, limited financial resources, and low activity of civil society are highlighted. At the same time, he put forward such proposals as the development of the "green" credit system, strengthening the environmental audit system, and increasing the personnel potential in cooperation with international experts. These aspects indicate the main difficulties in implementing digital transformation tools, since digital monitoring and financial information systems must be combined with existing institutional capabilities. International experience shows that the effectiveness of attracting green investments through digital transformation increases. For example, in the European Union, "Green Deal" projects are integrated with digital monitoring systems, allowing for accurate monitoring of investment flows and analysis of environmental results. From this point of view, Uzbekistan's strategy for the development of the digital economy and the policy of promoting green investments make it possible to assimilate this international experience. At the same time, the financial services sector is also significantly improving through digital transformation. There is an opportunity to attract and effectively manage green investments through digital banking services, electronic financial platforms, blockchain-based bonds, and investment monitoring systems. In his research, Abdullaev studied the features of the digital economy and its impact on the financial services system, emphasizing the strategic importance of digital transformation in financing environmental projects. Also, in the research of Ahmadjonov et al., the economic advantages of managing financial risks using digital technologies, directing loans to environmental projects, and ensuring transparency for investors are highlighted. Their analysis shows that digital transformation and green investments together contribute to economic growth, increasing energy efficiency, and strengthening social stability. The most important advantages of combining digital transformation and green investments in the conditions of our country are as follows: Effective use of resources - digital monitoring systems allow optimizing the consumption of energy and raw materials in the production process. Improving financial efficiency - the flow of investments through digital platforms is clearly tracked, funds can be effectively allocated to environmental projects. Increasing the confidence of international investors - through transparent and automated systems, it is possible to reduce financial risks and strengthen the investment climate. Social and environmental stability - there is an opportunity to reduce emissions, increase energy efficiency, and protect the environment. Regional development - by combining digital and green

technologies, it is possible to create green economic clusters in areas of ecological crisis, such as the Aral Sea region.

Research Methodology

This scientific article analyzes the processes of transition to a green economy through digital transformation in the economy of Uzbekistan. The main goal of the research is to determine the economic advantages of attracting green investments through the introduction of digital technologies and to assess their effectiveness. The methodological basis of the research includes the following main areas:

- Institutional analysis - Uzbekistan's green economy policy, regulatory framework, tax incentives, and public-private partnership mechanisms were studied.
- Financial analysis - the economic efficiency of green bonds, loans, and digital financial platforms was assessed.
- Technological analysis - the possibilities of integrating digital transformation tools into the green economy, monitoring systems, and optimizing investment flows were studied.
- Analysis of international experience - green investments and digital transformation experiences in the European Union, China, India, and Central Asian countries were analyzed.

The main limitations of the study are as follows: firstly, the completeness and accuracy of national statistical data are not constant; secondly, green taxonomy and digital monitoring indicators have not yet been fully implemented. Therefore, careful and scientifically based methods of analysis were used in the evaluation of the results.

Analysis and Results

The results of the study showed that digital transformation provides significant economic advantages in the process of Uzbekistan's transition to a green economy. The results were analyzed in detail in the following areas: Investment growth - in 2020-2024, investments in renewable energy sources increased from 8.3% to 14.1% of the total investment volume. This allows for effective management of investment flows through digital monitoring and financial platforms. Effectiveness of PPP-based projects - large solar and wind power plant projects implemented with ACWA Power and Masdar have optimized project monitoring and resource allocation through digital transformation. In 2023, the number of green projects based on PPP reached 17, with a total value exceeding \$4.6 billion. Financial mechanisms and digital platforms - the first green bond issued by UzMRC raised \$50 million and was directed to environmental projects. This demonstrates the possibility of transparent and effective management of financial flows through digital transformation. The positive impact of international cooperation - through cooperation with the UN, EBRD, and ADB, grants and loans totaling 720 million dollars were attracted. These resources, combined with digital monitoring and management tools, have increased investment efficiency. Regional development and environmental sustainability - The "Green Rehabilitation" project implemented in the Republic of Karakalpakstan contributed to reducing waste and increasing environmental sustainability through digital monitoring systems.

As a result of the project, more than 35 thousand hectares of land were planted, and more than 10 environmental infrastructure facilities were built. Digital transformation also provides the following economic benefits: Increasing energy efficiency and reducing raw material consumption;

- Increasing economic efficiency by directing financial resources to environmental projects;
- Strengthening transparency and trust in attracting international investment;
- Ensuring social stability and strengthening environmental safety;
- Support for regional development through the creation of regional ecological clusters.

Conclusions and Proposals

This study is aimed at a comprehensive analysis of the processes of transition to a green economy through digital transformation in the economy of Uzbekistan, their economic efficiency and prospects. The results of the study show that attracting green investments using digital technologies and financial innovations provides a number of economic, environmental, and social benefits for the country. Firstly, the ability to manage and monitor investments through digital transformation increases investment efficiency, contributes to the rational distribution of resources, and ensures the economic security of projects. This makes investments in renewable energy sources, waste recycling, and water resources management more effective. Secondly, Uzbekistan's potential for transitioning to a green economy is significantly increasing through PPP projects and cooperation with international financial institutions. Large projects implemented with ACWA Power, Masdar, and other international partners contribute to the development of environmentally sustainable infrastructure in the country. At the same time, digital monitoring and management tools ensure the high-quality and effective implementation of projects. Thirdly, green financial mechanisms - including green bonds, loans, and digital platforms - increase confidence and transparency for investors and create opportunities to attract financial resources to environmental projects. At the same time, it is necessary to expand the system of tax incentives, grants, and subsidies to increase the activity of the banking sector and private investors. Fourth, regional projects, in particular, "Green Rehabilitation" in the Aral Sea region and environmental investments in the Republic of Karakalpakstan, are effectively managed through digital transformation. This experience can be extended to other regions, and there is also a need to improve the qualifications of local specialists and introduce special educational programs. Fifth, it is necessary to strengthen the institutional environment and regulatory framework. The full implementation of the national green taxonomy and strategic documents, the elimination of bureaucratic barriers and the creation of transparent monitoring systems will further accelerate the country's transition to a green economy through digital transformation. Based on this, the following practical proposals were developed: Stimulating the activities of private investors by expanding the system of tax benefits, grants and subsidies that support the green economy; Development of the green bond market and strengthening cooperation with credit rating agencies, increasing investor confidence; Creation of independent institutions or regulators for the assessment and monitoring of environmental projects, ensuring transparency in financing; Improving the qualifications of local specialists and introducing special educational programs on the green economy in higher educational institutions; Expansion

of pilot projects at the district and regional levels, especially the creation of "Green Economic Clusters" in the zone of environmental crisis; Implementation of investment monitoring and analysis of the effectiveness of projects through digital transformation tools; Expansion of long-term credit lines and technical assistance programs with international financial institutions, ensuring a stable inflow of investments. In conclusion, it can be said that the systematic and The success of this process depends on the consistency of public policy, strengthening the capacity of institutions, and the active participation of the private sector.

List of references:

1. Resolution of the President of the Republic of Uzbekistan, dated 02.12.2022 No. PP-436
2. Asian Development Bank. Uzbekistan: Green Economy Transition and Investment Opportunities. (2023). <https://www.adb.org>
3. European Bank for Reconstruction and Development. The EBRD supports Uzbekistan's first green bond issue. (2023). <https://www.ebrd.com>
4. Ministry of Economy and Finance of the Republic of Uzbekistan. Uzbekistan Green Economy Strategy 2030. Tashkent: Official Publication. (2024).
- United Nations Development Programme (UNDP). Green Growth and Low-Carbon Development in Uzbekistan. (2022). <https://www.uz.undp.org>
6. World Bank. Country Climate and Development Report: Uzbekistan. (2022). <https://www.worldbank.org>
7. International Energy Agency. Renewables 2023: Analysis and Forecast to 2028 - Uzbekistan profile. (2023). <https://www.iea.org>
8. OECD. (2021). Green Finance and Investment: Mobilizing bond markets for a low-carbon transition. Paris: OECD Publishing, 2021. <https://doi.org/10.1787/082c74d4-en>
9. Ziyadullayev, S. R. (2021). The role of green investments in sustainable development: Uzbekistan's experience. *Economics and Innovative Technologies*, 6 (4), 41-49. (2021).
- Karimov, A., Tursunov, B., & Sabirov, F. (2023). The role of public-private partnership in attracting renewable energy sources. *Sustainable Development and the Economy*, 3 (2), 55-63. (2023).
11. Sharipov, D. Factors and limitations of the development of green investments in Uzbekistan. *Problems of the National Economy*, 5 (1), 32-38. (2022).

12. Akhrorjon, A., & Oybek, A. Danger in Islamic Banking. International Scientific Conference "Topical Issues of the Economy in Modernity." (2022).
13. Abdullaev, A. (2022). Digital economy and banking sector. Digital Technologies and Educational Prospects, 1 (2), 113-121. (2022).
14. Mamadjonov, M., Abdullayev, A., Abdurahmonov, I., & Mamadaliyev, A. Challenges of management in the digital economy. Scientific Progress. 2 (6), 1533-1537. (2021).