

Modern Mechanisms of Transition to A Green Economy Based on Digital Management

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Abstract: This article analyzes modern mechanisms for the transition to a green economy based on digital governance. It highlights the role of digital technologies, including artificial intelligence, big data, and IoT systems, in ensuring environmental sustainability. The study also examines the potential of digitalization in public administration to improve resource efficiency, environmental protection, and economic performance. The findings justify the importance of innovative approaches in achieving a sustainable transition to a green economy.

Keywords: Digital governance, green economy, environmental sustainability, artificial intelligence, big data, IoT, digitalization, resource efficiency, innovation.

Introduction: In the 21st century, global economic development has reached a new level, and environmental problems and resource scarcity pose serious challenges to humanity. Factors such as climate change, increased emissions of harmful emissions into the atmosphere, and inefficient use of water and land resources demonstrate the limitations of the traditional economic development model. Therefore, a new approach to ensuring sustainable development has been formed - the concept of a green economy, which is now being accepted as a priority strategic direction by many countries around the world.

A green economy is a development model that, while ensuring economic growth, also provides for environmental protection, rational use of natural resources, and increased social well-being. However, the implementation of this model in practice is a complex and multi-stage process that requires modern management methods. It is at this point that digital management systems become important. Digital management serves to increase management efficiency by deeply introducing information and communication technologies into all sectors of the economy and society. This process not only optimizes economic activity, but also creates new opportunities

for solving environmental problems. For example, by collecting and analyzing data in real time, it will be possible to determine the level of resource use, control the volume of waste and reduce energy consumption.

In recent years, digital transformation processes have accelerated dramatically worldwide. The introduction of artificial intelligence, big data, cloud technologies and "smart" systems not only increases efficiency in various sectors of the economy, but also serves to ensure environmental sustainability. Therefore, the integration of digital governance and the green economy is becoming one of the current areas of modern scientific research.

In Uzbekistan, this issue is also in the spotlight. The country is implementing large-scale reforms aimed at developing the digital economy, eliminating environmental problems and efficiently using resources. In particular, the introduction of renewable energy sources, saving water resources, improving the waste management system and the widespread use of digital technologies in public administration have been identified as priority tasks.

The purpose of this article is to scientifically analyze modern mechanisms for transitioning to a green economy based on digital management, to

substantiate their practical significance, and to identify existing problems and promising solutions in this area. At the same time, the role of digital technologies in ensuring environmental sustainability is also studied in depth within the framework of the study.

In today's conditions of globalization and technological progress, the concept of a green economy as a new model of economic development is gaining increasing relevance. This approach is aimed at ensuring a balance between the efficient use of natural resources, environmental protection, and economic growth. In this regard, the introduction of digital management systems is emerging as one of the important factors accelerating the transition to a green economy.

Digital governance is a system aimed at increasing management efficiency through the widespread use of modern information and communication technologies in the activities of state and economic entities. With the help of this system, decision-making processes are accelerated, errors due to the human factor are reduced, and control over the use of resources is strengthened. In particular, the use of digital technologies in solving environmental problems is yielding significant results.

One of the modern mechanisms for the transition to a green economy is the use of large-scale data analysis capabilities (big data). This makes it possible to monitor energy consumption, water resources, and waste flows in real time and optimize them. As a result, the efficiency of resource use increases and environmental damage is reduced. At the same time, artificial intelligence technologies make it possible to predict the impact on the environment in advance and develop alternative solutions.

Internet of Things (IoT) technologies are also considered an integral part of the green economy. Smart devices and sensors are used to continuously monitor production processes, transport systems, and utilities. For example, in "smart city" systems, the environmental load is significantly reduced through energy-efficient lighting, automatic waste management, and optimization of water supply.

Digitalization processes in public administration also play an important role in the transition to a green economy. Electronic government systems reduce the circulation of paper documents, which in turn reduces the cutting of trees. Also, digital platforms provide opportunities for financing environmental projects, attracting investments, and ensuring their transparency. Another important mechanism is the combination of green energy and digital management. The use of digital systems is necessary for the effective management of renewable energy sources (solar, wind,

hydropower). For example, smart grids play an important role in maintaining the balance between energy production and consumption. This reduces energy waste and ensures environmental sustainability.

In Uzbekistan, the integration of digital management and the green economy is also being identified as an important strategic direction. The country is gradually implementing reforms aimed at accelerating digital transformation, reducing environmental problems, and rational use of resources. In particular, the widespread introduction of renewable energy sources, digital monitoring of water resources, and improving waste management systems are among the priorities.

Issues of data security and cybersecurity are of particular importance in the process of transition to a green economy based on digital governance. Because environmental monitoring, energy management, and resource allocation systems operate in a fully digitalized environment. For these systems to operate reliably, it is necessary to protect them from cyberattacks and ensure the integrity and confidentiality of data. Otherwise, decisions made on the basis of incorrect information can cause environmental and economic harm. In addition, there is a problem of the digital divide between regions in the implementation of digital governance. In some regions, the insufficient development of Internet infrastructure and limited access to modern technologies slow down the transition to a green economy. Therefore, developing digital infrastructure, providing high-speed internet, and expanding access to technology in all regions is an important task.

In the transition to a green economy, along with the use of digital innovations, it is also important to assess their economic efficiency. Each introduced technology should be justified by its economic, environmental and social impact. In this regard, it is appropriate to use modern methods such as "cost-benefit analysis" and "life-cycle assessment". Through these methods, the long-term impact of technologies is determined and optimal decisions are made. Public participation is also one of the important factors in the integration of the green economy and digital governance. Through digital platforms, it is possible to collect public feedback on environmental issues, create open databases and support environmental initiatives. This increases the transparency of management processes and strengthens the trust of citizens. Another important aspect is the combination of green and digital transformation in corporate governance systems. Modern enterprises, while adhering to environmental standards in their activities, are striving to increase efficiency by digitizing production processes. For

example, in production, automated systems are expanding the possibilities of reducing energy consumption, recycling waste and reusing resources. In agriculture, land and water resources can be used more efficiently by introducing “smart agriculture” technologies. Using sensors, drones and artificial intelligence-based systems, crop condition monitoring, fertilizing and irrigation can be used to increase productivity and reduce environmental damage. In the transport sector, “green logistics” systems can be developed through the use of digital management. There is an opportunity to significantly reduce the amount of harmful substances emitted into the atmosphere by optimizing routes, managing traffic flows and reducing fuel consumption. In general, the process of transition to a green economy based on digital management is a multi-level and complex system that requires a combination of technological innovations, institutional reforms and social factors. By effectively organizing this process, it is possible not only to solve environmental problems, but also to bring economic growth to a new level.

The importance of institutional and legal mechanisms in the process of transition to a green economy based on digital governance is also incomparable. In particular, it is important to create a regulatory and legal framework that encourages the use of environmental standards and digital technologies by the state. In this, a “green” tax policy, a system of quotas and subsidies aimed at reducing carbon emissions serve as one of the main tools. Through this, enterprises are encouraged to introduce environmentally friendly technologies and the transition to digital solutions is accelerated. Financial mechanisms also play an important role. The possibility of attracting “green” investments, issuing and monitoring “green bonds” through digital platforms is expanding. This provides transparency for investors and increases confidence in environmental projects. As a result, the level of energy efficiency and environmental safety in various sectors of the economy increases. Human resource development is also an integral part of this integration. It is necessary to train, retrain and improve the competencies of qualified specialists in the fields of the digital economy and ecology. Significant results in this direction can be achieved by introducing programs that combine modern IT knowledge and environmental thinking into the education system.

In addition, international cooperation is also an important factor. The process of transition to a green economy will be accelerated by studying the experience of developed countries, transferring advanced technologies, and actively participating in

global environmental initiatives. In particular, international programs and grants in the framework of the fight against climate change create additional financial and technological opportunities for countries. From a practical point of view, significant environmental benefits can be achieved by introducing digital management in the industry, agriculture, and transport sectors. For example, “smart irrigation” systems in agriculture reduce water consumption, while digital logistics systems in the transport sector optimize fuel consumption. In industry, automated control systems increase energy efficiency and reduce waste.

In terms of future prospects, the integration of digital management and the green economy will deepen further. In particular, blockchain technology can strengthen monitoring and control of environmental projects and ensure transparency. Also, digital twins technology creates virtual models of real objects, which expands the possibilities for preliminary assessment of environmental impact.

In general, the transition to a green economy based on digital management is a multifaceted and complex process that requires the interaction of technological, economic, social and institutional factors. By effectively organizing this process, it is possible to achieve sustainable development goals, reduce environmental problems and create a healthy environment for future generations. Digital management is an effective tool for the transition to a green economy, which plays an important role in ensuring economic growth, environmental sustainability and social well-being. The widespread introduction of modern technologies allows for rational use of resources, environmental protection and increased economic efficiency. Therefore, further development of digital management systems and their integration with the green economy will remain an urgent task in the future.

The above analysis shows that the transition to a green economy based on digital governance is one of the inevitable and strategic directions of modern development. The widespread introduction of digital technologies will increase the efficiency of economic activity, as well as the opportunities for rational use of natural resources, reduction of negative environmental impact and ensuring ecological sustainability.

The results of the study confirm that artificial intelligence, big data, IoT and other digital innovations are becoming the main drivers of the green economy. With their help, resource management systems are optimized, environmental monitoring is strengthened and decision-making processes are organized on a scientific basis. As a result, the level of efficiency and

environmental safety in all sectors of the economy will increase.

At the same time, the integration of digital governance and the green economy will not happen by itself. This process requires the creation of an effective institutional environment, the development of modern infrastructure, the training of qualified personnel and support for innovations. In particular, the formation of an integrated approach at the level of state policy, the improvement of the regulatory and legal framework and the promotion of green investments are of great importance.

In the conditions of Uzbekistan, reforms aimed at ensuring digital transformation and environmental sustainability once again confirm the relevance of this direction. The country has the opportunity to achieve sustainable economic growth through the efficient use of existing natural resources, the expansion of renewable energy sources, and the introduction of digital management systems. In conclusion, the transition to a green economy based on digital management is not only an effective means of solving environmental problems, but also an important factor in the innovative development of the economy. By deepening this integration, it is possible to create an environmentally safe and economically sustainable environment for future generations. Therefore, expanding scientific research in this direction, introducing best practices, and improving practical mechanisms remain urgent tasks.

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