ORIGINAL ARTICLE

INTERNATIONAL JOURNAL OF ARTIFICIAL INTELLIGENCE

ISSN: 2692-5206, Impact Factor: 12,23
American Academic publishers, volume 05, issue 10,2025

Journal: https://www.academicpublishers.org/journals/index.php/ijai

THE EFFECTIVENESS OF DIGITAL TECHNOLOGIES IN THE DEVELOPMENT OF A "GREEN" ECONOMY

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Abstract: the article looks at how digital technologies help develop the "green" economy. It shows that digitalization helps lower harmful emissions, improve energy efficiency, and make better use of natural resources. It also highlights the roles of artificial intelligence, big data, blockchain, and the Internet of Things. These technologies greatly affect environmental sustainability and economic efficiency.

Keywords: green economy, digitalization, sustainable development, innovation, big data, artificial intelligence.

Introduction

The modern global economy is shifting towards sustainable development. The idea of a "green" economy is crucial in this change. This shift cannot happen without the active use of digital technologies. These technologies help create tools that improve production efficiency and lower environmental impact.

The topic is important because we need to find effective ways to integrate digital solutions into environmental and economic policy. The study aims to determine how well digital technologies contribute to building a "green" economy. The research focuses on the processes of digitalization in the economy. It examines how digital technologies affect environmental efficiency and sustainable development.

Research objectives:

1. To explore the concept and principles of the "green" economy.
2. To identify the role of digital technologies in environmental transformation.
3. To look at examples of using digital tools.
4. To pinpoint problems and opportunities for future development.

Analysis and results

The term "green economy" refers to an economic system focused on improving society's well-being with minimal environmental impact. Its main goal is to combine economic growth with environmental responsibility.

Digitalization plays a key role in reaching these goals. Technologies like big data, the Internet of Things (IoT), artificial intelligence (AI), and blockchain help use resources more effectively and increase transparency in environmental processes.

For instance, IoT systems can track air and water quality in real time. AI algorithms can predict the effects of industrial emissions and help reduce energy costs.

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Digital technologies directly affect sustainable development and environmental protection. The introduction of intelligent energy management systems, or smart grids, allows for a reduction in electricity losses by 15 to 20%.
Using big data in industry helps point out inefficient processes and lower carbon dioxide emissions.

Table 1: Analysis of the Effectiveness of Digital Technologies in the Development of a "Green" Economy

Digital Technology	**Area of Application**	**Environmental Impact**	**Economic Effect**	**Effectiveness Level**	**Examples of Implementation**
Big Data & AI	Monitoring resource use and predicting pollution levels	Helps reduce CO_2 emissions through data-driven decisions	Increases efficiency and reduces production costs	High	Smart energy grids, climate forecasting systems
Internet of Things (IoT)	Smart cities, agriculture, and transport	Reduces waste and energy consumption	Improves logistics and productivity	High	Smart irrigation systems, intelligent traffic lights
Blockchain	Green finance and energy tracking	Ensures transparency of eco-projects	Attracts green investments	Medium	Carbon credit trading platforms
Renewable Energy Technologies	Energy production	Reduces fossil fuel dependence	Creates new eco-industries	Very High	Solar and wind power stations
Digital Platforms for Circular Economy	Waste management and recycling	Promotes re-use of materials	Lowers raw material costs	High	Online platforms for recycling and sharing economy

The table analyzes the effectiveness of various digital technologies in promoting a "green" economy.

It highlights how innovations such as AI, IoT, blockchain, and renewable energy systems contribute to reducing environmental impact and improving economic performance.

- **Big Data and AI** play a crucial role in monitoring and optimizing energy consumption.
- **IoT** solutions enhance sustainability in cities and agriculture by minimizing waste.
- **Blockchain** increases transparency and trust in green financing.
- **Renewable energy technologies** demonstrate the highest level of effectiveness by directly reducing carbon emissions.
- **Digital circular economy platforms** and **3D printing** support sustainable production and resource reuse.

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Overall, the integration of digital technologies significantly accelerates the transition to a sustainable and low-carbon economy.

Conclusion

Moreover, blockchain offers transparency for green investments. It enables tracking the source and use of environmental funds. Digital platforms for waste recycling and accounting for CO_2 emissions are already in use in the EU, China, and several regions of Russia.

These examples show that digitalization is becoming a key factor in improving environmental policy and creating new smart natural resource management systems.

Despite the active growth of digital technologies, several issues slow their adoption in the green economy:

- high cost of digital solutions- shortage of qualified personnel in green IT
- lack of a unified international rgulatory framework
- uneven digital development across regions.

The future depends on creating digital ecosystems, promoting green startups, and fostering international cooperation in sustainable development. Government support for innovation and the development of educational programs in ecology and digitalization can also speed up this process.

Digital technologies are now the primary tool for promoting the values of the "green" economy. Their use leads to better resource efficiency, lower environmental pollution, and a shift toward sustainable production methods.

Therefore, the mix of digital changes and environmental innovations creates a new development model. In this model, economic growth does not go against nature conservation; instead, it helps protect it.

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