

Sustainable economic development based on green innovation and digitalization

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Abstract: This article focuses on the formation of a closed-loop economy, achieving high efficiency in business information exchange and developing a green innovation project as a result of further improvement of digital economy and information communications technologies.

Keywords: digital economy, information and communication technologies, integration, productivity, entrepreneurship, innovative solutions.

Устойчивое экономическое развитие на основе зеленых инноваций и цифровизации

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Аннотация: В данной статье основное внимание уделяется формированию экономики замкнутого цикла, достижению высокой эффективности обмена бизнес-информацией и развитию проекта зеленых инноваций в результате дальнейшего совершенствования технологий цифровой экономики и информационных коммуникаций.

Ключевые слова: цифровая экономика, информационно-коммуникационные технологии, интеграция, производительность, предпринимательство, инновационные решения.

Introduction. In our country, comprehensive measures are being implemented to actively develop the digital economy, widely introduce modern information and communication technologies in all sectors and areas, primarily in public administration, education, healthcare and agriculture. At the same time, many measures are being implemented to digitize economic sectors in order to further increase the economic opportunities of small businesses and the population and increase the level of employment. A vivid example of this is the Decree of the President of the Republic of Uzbekistan No. PD-6079 dated October 5, 2020, the “Digital Uzbekistan-2030” strategy.

It aims to implement the following measures in order to develop digital technologies in the real sector of the economy: harmonizing programs for the introduction of modern information technologies at industrial enterprises with programs for the technological re-equipment of these enterprises; ensuring automation and management of all stages of enterprise supply, as well as reducing logistics and procurement costs; improving the quality of products and services, reducing their cost, production disruptions, and increasing the transparency of financial and economic activities through the introduction of modern information systems and software products; improving the regulatory and legal framework for the introduction of innovative automated management systems and software products; gradual automation of workplaces and robotization of production processes, as well as the introduction of artificial intelligence technologies; improving mechanisms for interaction with customers (clients) in order to increase sales volumes and improve customer service; improving the management information reception support system, including by introducing a real-time business analytics system. To achieve these goals, additional measures are needed, and this article summarizes the solutions to these issues.

Analysis of literature on the topic. The term digital economy is an economy that is driven by modern technologies and information communications, mainly formed through the Internet. The main goal of digitalization of the economy is to increase the level of production and service provision of the economy, improve new business models, accelerate economic growth, and adapt the economy to the global computer transformation [Yao, W., & Sun, Z. (2023)].

In order to achieve high economic efficiency, the concept of a digital economy has begun to take shape in the context of the development of a new digital economy using modern methods and its prospects, and considerable work is currently being carried out in this regard. The formation and consolidation of the digital economy has made it possible to create the term green innovation. A number of scientific developments and ideas have also been given in this regard [Henriques, R., Figueiredo, F., & Nunes, J. (2023). Product-services for a resource-efficient and circular economy: an updated review. *Sustainability*, 15(15), 12077].

To begin with, the digital economy has many advantages that help boost economic growth, innovation, and development. For example, it enables the creation and dissemination of knowledge.

Monitoring and controlling renewable energy installations involves the use of digital technologies by businesses to improve efficiency and effectiveness.

The circular economy has the potential to mitigate waste and pollution by ensuring that products, components and materials are continuously maintained at optimal value and utility. Implementing innovative solutions plays a crucial role in the digitalization of the circular economy, leading to increased resource efficiency, product longevity, customer engagement and resilience [Geng, Q., Wang, Y., & Wang, X. (2023). The impact of natural resource endowment and green finance on green economic efficiency in the context of COP26. *Resources*].

The second impact of ICT is the substitution effect, which includes dematerialization, decarbonization and demobilization, as well as the replacement of paper books with e-books, physical mail with e-mail, and newspapers with online paper, which reduces waste.

The convergence of the digital economy and sustainability creates both challenges and opportunities for entrepreneurs, policymakers, and society as a whole. One way in which the digital economy can contribute to sustainable development is by encouraging advances in environmentally friendly technologies and implementing circular economy models.

Consequently, it has facilitated new ways of collaborating and learning, as well as the development of new products and services, and has expanded corporations' access to untapped markets and prospects.

The digital economy is about increasing efficiency and productivity. Organizations are strategically using digital technologies to optimize their operational processes, improve the accuracy and efficiency of decision-making processes, and automate repetitive tasks. Advanced communication channels play a crucial role in accelerating communication and developing collaboration between company leaders, thus facilitating efficient work and rapid decision-making.

These ideas are mainly focused on the digitalization of the economy and the prospects for developing green innovation projects and achieving a highly circular economy as a result.

Methods. This study aims to assess the opportunities and challenges of the digital economy for sustainability. The current study used a systematic literature review methodology. A systematic literature review framework is considered a reliable approach. The literature review was conducted to identify relevant articles, validate the proposed idea, avoid repetition of previously discussed topics, and ensure that there were enough articles to comprehensively analyze the topic. The main focus of the topics was to explore the opportunities and challenges of the digital economy for sustainability, and the opportunities for achieving results were further enhanced by fully understanding and exploring the topic under study by examining relevant materials and actively participating in relevant discussions.

Analysis and results. Digitalization of the economy is the most effective way to build a sustainable economy and a green innovation system. To digitize the economy, we need to increase the upward trend of these indicators. These digital economy indicators are: 1. Digital trade volume 2. Investment in digital technologies 3. Number of Internet users 4. Employment rate in the ICT sector 5. Export of digital services and products 6. Number of jobs created through digital technologies 7. Level of diffusion of digital knowledge and skills 8. Internet speed 9. Digital security and privacy 10. Number of digital innovation and startups. These indicators play an important role in determining the level and state of the digital economy. Also, if we look at the opinions of a number of scientists conducting research in this area, the digitization of the economy also provides opportunities for higher employment and improved work efficiency.

Improving the integration level of the digital and real economy is conducive to the development of green innovation. Internal mechanisms have a significant mediating effect on financing constraints, corporate digital transformation and corporate social responsibility. The integration of the digital and real economy can promote enterprise green innovation by easing enterprise financing constraints, managing enterprise digital transformation and promoting corporate social responsibility. A systematic literature review analysis shows that the impact of integrating the digital and real economy on corporate green innovation is more significant for state-owned enterprises than for private enterprises. Compared with previous studies, this paper has developed three major trends in this field:

First, it is to isolate the mechanism of the impact of green innovation resilience on energy efficiency under the impact of the digital economy. It is possible to make progress in calculating green innovation resilience and taking digital elements into account in assessing energy efficiency.

Second, it demonstrates the dynamic evolutionary relationship between green innovation resilience and the digital economy, and substantiates the dynamic nonlinear relationship between green innovation resilience and energy efficiency.

Finally, it is the third that the impact of the digital economy weakens the impact of green innovation resilience on energy efficiency, and early digital development brings about the impact of energy barriers.

Conclusion. It can be concluded that the digital economy can significantly increase the green innovation of enterprises by improving the quality of internal control and promoting long-term investment. The results show that the digital economy has a special significance in enhancing the green innovation of enterprises with a high proportion of management ownership. This study not only enriches the research on the microeconomic consequences of the digital economy and the drivers of green innovation of enterprises, but also shows that as a result, Uzbekistan should accelerate the construction of new green infrastructure and the green transformation of local enterprises.

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