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STIMULATING INNOVATION AND SUPPORTING SUSTAINABLE DEVELOPMENT: INTEGRATION OF INVESTMENT POLICY AND DIGITAL TRANSFORMATION IN THE CONTEXT OF PANDEMICS

Background. *This article examines the interconnection between state investment policy and the digital transformation of society in the context of pandemics, with an emphasis on stimulating innovation and sustainable development. The paper is dedicated to analyzing strategies that foster innovation and sustainable growth within the integration of investment policy and digital transformation, particularly under pandemic conditions. The study considers the potential of digitalization as a catalyst for the development of smart cities, which can significantly enhance the quality of life for citizens by ensuring safety, energy efficiency, and creating comfortable living conditions.*

Methods. *Employing an analytical approach, the research assesses current strategies and initiatives, as well as explores the potential of digitalization for the development of smart cities.*

Results. *The analysis demonstrates that digitalization can significantly improve the quality of life for citizens by ensuring safety and energy efficiency. It highlights the challenges and opportunities that arise for states and economic entities. The paper analyzes how states, regions, and business structures can adapt to rapid changes induced by digital innovations and global crises, including pandemics. It emphasizes the necessity of developing comprehensive strategies that integrate investment policy and digital technologies to achieve sustainable development and form smart cities capable of effectively responding to contemporary challenges. The role of informational transformation in creating smart cities as a platform for enhancing educational systems, healthcare, production innovation, and increasing energy efficiency is outlined.*

Conclusions. *The conclusions underscore the relevance of smart city development in the context of integrating investment policy and digital transformations, which require new approaches to management, societal development, and interaction with global challenges. The development of comprehensive strategies that integrate investment policy and digital transformation is key to achieving sustainable development and creating smart cities capable of effectively responding to modern challenges.*

Keywords: *innovation, sustainable development, investment policy, digital transformation, pandemics, smart city, information society.*

Background

Problem Statement. In the context of global pandemics, the integration of investment policy and digital transformation becomes crucial for stimulating innovation and supporting the sustainable development of states and enterprises. Digitalization plays a pivotal role in ensuring market competitiveness, influencing the efficiency of production, service delivery, education, healthcare, and other areas. However, alongside the advantages, challenges related to the security of digital technologies and the protection of personal data emerge. Pandemics introduce adjustments in the development of digital technologies, requiring new approaches to investment policy that account for rapid changes in the global environment. This necessitates research into digital transformation processes that facilitate the formation of a "smart" society, where information and communication technologies underpin the enhancement of life quality, comfort, and safety of citizens, as well as effective interaction with government structures.

Analysis of Recent Research and Publications. The theme of integrating investment policy and digital transformation, particularly in the context of pandemics, is garnering increasing attention in the scientific world. This is reflected in the growing body of research focused on stimulating innovation and supporting sustainable development through digital technologies. Scholars from various countries, including Ukraine, are actively investigating how digital transformation can contribute to the realization of smart city concepts and adaptation to rapid changes induced by global crises. Researchers such as A. Andrienko, H. Zhekalo, I. Zhukovych, N. Kraus, I. Ryzhkova, S. Chukut have made significant contributions

to the exploration of these issues. However, the need for further research remains pressing, as digital transformation and investment policy in pandemic conditions demand new knowledge and innovative solutions.

Research Objective. The research aims to determine how the integration of investment policy and digital transformation can aid in stimulating innovation and supporting sustainable development amidst pandemics, as well as to devise recommendations for the effective implementation of these strategies at national and local levels. The primary tasks of the study include analyzing the impact of pandemics on investment policy and digital transformation, particularly their interplay and influence on innovative activity; exploring the potential of digital transformation to support sustainable development and stimulate innovation under the constraints imposed by pandemic crises; and developing strategic recommendations for integrating investment policy and digital initiatives that consider the needs for sustainable development and the capacity for rapid adaptation in crisis conditions.

Methods

Employing an analytical approach, the research assesses current strategies and initiatives, as well as explores the potential of digitalization for the development of smart cities.

Results

The use of information and communication technologies began in the late 20th century, leading to their rapid development and global dissemination. This has resulted in the emergence of new tools and methods of application, creating new opportunities for societal benefits. Digitalization processes have become a tool for shaping the information society, which entails, among other things,

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the use of information and communication and computer technologies to transform and optimize all aspects of human life activities – from production to consumption (Volume of data/information..., 2021).

The foundation of digitalization consists of the widespread use of various devices connected to the internet that can collect, compute, and generate available volumes of digital data with the aim of improving the quality of life, convenience, and comfort of citizens. Today, digitalization is not just a popular trend; it underpins the main aspects of society's functioning. Analysts note that investments in the digitalization of business processes will account for 55% of all investments in the development of information and communication technologies by the end of 2024. The digitalization processes received the most significant boost during the COVID-19 pandemic and define the possibility of increasing profitability and economic efficiency through the further implementation of digital solutions. Among the most common processes, analysts highlight further automation and electronic document management (Vernyhora, 2022).

Key aspects of digitalization that contribute to stimulating innovation and supporting sustainable development, especially in pandemic conditions, include the development of components such as the internet of things, cloud computing, artificial intelligence, blockchain, digital platforms, and cybersecurity. These elements are an integral part of modern spheres of activity and form the basis of new directions such as FinTech, InsurTech, AgroTech, HealthTech, EdTech, as well as digitalization in the fields of public administration, defense, and environmental protection. Digital infrastructure is rapidly developing and is already considered the fourth essential element for human life, second only to basics such as water, gas, and electricity (Markevych, 2021). The implementation of digital technologies opens new opportunities for competition, increases flexibility, and allows for rapid scaling of activities in new markets, which is particularly important in pandemic conditions.

The integration of state investment policy and digital transformation at the city level in pandemic conditions includes several key steps. Firstly, it is necessary to analyze the current situation, namely, to study the impact of the pandemic on the city's economy and identify sectors that need the most support, and to assess the existing infrastructure and the city's technological readiness for digital transformation. Secondly, to develop a strategic plan, which means defining priority directions for investments that can contribute to recovery from the pandemic and stimulate digital transformation, and to develop a long-term plan for integrating investment policy with digital initiatives. Thirdly, the involvement of stakeholders, which is implemented as establishing partnerships between the government, the private sector, academic institutions, and the public, and ensuring citizen participation in the planning and implementation of digital projects. Fourthly, investing in key technologies. This involves focusing on the development of broadband internet, cloud technologies, big data, and artificial intelligence, and supporting startups and innovative projects that promote digital transformation. Fifth, monitoring and evaluation, which involves implementing a monitoring system to track the progress and effectiveness of investments and regularly assessing the results and adjusting the strategy according to the data obtained. Sixth, adaptation and flexibility, which requires building an adaptive management model capable of quickly responding to changes caused by pandemic conditions and readiness to modify investment plans in response to new challenges and opportunities.

These steps help ensure that investment policy and digital transformation work together to support the sustainable development of the city and its ability to effectively respond to crisis situations, such as pandemics.

The main directions of digitalization that contribute to stimulating innovation and supporting sustainable development in pandemic conditions include the comprehensive development of digital infrastructure and the growing dependence on software. According to international studies, almost 70 % of the next decade will be supported by digital processes. The contribution of digital enterprises to GDP indicates significant development of digital tools and infrastructure (Krupianyk, 2023). Promising directions such as 5G technologies, virtualization, digital education, digital health, and alternative energy will define the development of the digital economy. However, security issues in digitalization processes are critical, as 5G technologies carry both opportunities and threats.

The needs for information security systems are growing and are projected to reach \$25.9 billion by 2030. The realization of the information society, with an emphasis on the digitalization of public and regional management, requires cooperation with international organizations and the involvement of technical assistance (Zhekalo, 2019). The development of digital technologies, accelerated by the COVID-19 pandemic, expands their application in all spheres of social life, from improving the life cycle of citizens to influencing the social status of communities. Digital transformation involves providing convenience for citizens, delivering services electronically, developing online stores, internet banking, and social networks. The digitalization of the economy includes digital reforms in education, medicine, public administration, and business, promoting the implementation of innovations through information technologies (Batchenko, 2023).

Digitalization of society in the context of pandemics opens new opportunities for stimulating innovation and supporting sustainable development, offering economic and social benefits. Economic advantages include GDP growth, increased employment and labor productivity, as well as the development of small and medium-sized businesses. Social benefits encompass enhancing inclusivity, reducing poverty, and improving the accessibility and quality of medical services and education, as well as a positive impact on the environment and a reduction in crime rates.

Digitalization implies the intensive use of information and communication technologies and global networks, realized through the internet and mobile networks, facilitating the automation of business processes. This is necessary for the realization of the smart city concept, which forms new relationships between citizens, business, and government. Understanding digitalization and its impact on society is key to the development of smart cities that ensure a high standard of living, economic prosperity, social stability, and environmental responsibility.

Smart cities, which use digitalization to enhance efficiency and productivity, provide citizens with real-time interaction opportunities with the urban environment, quickly adapting to their needs. They also ensure access to open data, expanding citizens' possibilities. Digitalization is a tool for forming communities that promote local economic development and citizen comfort, building an urban environment based on effective planning and competitiveness. The realization of a smart city is impossible without extensive digitalization, as it relies on innovative communication technologies that cover all spheres of societal life, increasing its efficiency and competitiveness.

The state's investment policy can significantly contribute to the digitalization of cities through infrastructure funding if the state can invest in the development of digital infrastructure, such as broadband internet, data centers, and 5G networks, which are the foundation for digital innovations in cities. Investments in startups and technology companies developing solutions for smart cities can stimulate the development of new products and services. Additionally, investments in electronic platforms for providing government services online can increase the efficiency and accessibility of these services for citizens. Funding programs for digital literacy and education can prepare the workforce for work in the digital economy. The development and implementation of laws that promote digital transformation and protect user rights and data are key to creating trust in digital initiatives (Krupianyuk, 2023). Collaboration with international organizations can provide access to best practices and additional funding for digitalization. These directions allow the state to create a conducive environment for the digital transformation of cities, leading to improved quality of life for citizens and the efficiency of urban management.

The smart city concept embodies comprehensive socio-technological transformations that have arisen thanks to progress in information and communication technologies, the latest standards of energy efficiency, and the reform of relationships between citizens and government. In such cities, citizens become active participants in urban services, not just consumers.

Smart cities represent an innovative model of urban transformation where information technologies solve complex problems, modernize the management system, and contribute to community development (Ryzhova, & Zakharova, 2018). This concept aims to enhance the

quality of life through the integration of information and communication technologies into the urban infrastructure, ensuring a high level of service and comfort for residents.

Smart technologies not only optimize the use of urban resources, such as transportation networks and energy consumption, but also engage citizens in interaction with the government, improving safety, meeting the needs of the elderly, and developing infrastructure.

Digital transformation paves the way for the realization of the smart city concept, enhancing the efficiency of information resource utilization in various areas, including energy efficiency and municipal transport. Digitalization transforms cities into drivers of the economy, raises the level of education and culture, and becomes a platform for the implementation of technological and social innovations (Ryzhova, 2017).

Information infrastructure is key to attracting qualified professionals and investments, so the development of smart cities entails systemic changes through modern information and communication technologies and energy efficiency standards, as well as a new model of interaction between the government and citizens (Kraus et al., 2018). The smart city concept provides citizens with opportunities for real interaction with the urban environment, rapid adaptation to their needs, access to open data, and the expansion of their capabilities. The realization of a smart city is based on the widespread implementation of information and communication technologies that promote safe and comfortable living for residents, as well as other advantages made possible by the digitalization of society. Digitalization is a necessary condition for the realization of the smart city concept, as it is based on the implementation of innovative communication technologies in all spheres of societal life, increasing its efficiency and competitiveness (tabl. 1).

Table 1

PEST analysis of factors influencing the stimulation of innovation and support for sustainable development: integration of investment policy and digital transformation in pandemic conditions (conducted by the author)

Factors	Impact on stimulating innovation and supporting sustainable development: integration of investment policy and digital transformation in the context of pandemics
Political	Government support for investments in digital technologies. Legislation on cybersecurity and data protection. International cooperation in the digital economy
Economic	Availability of capital for innovative projects. Economic incentives for digitalization. Market trends and the growing demand for digital services
Social	Public awareness and acceptance of digital innovations. The level of digital literacy and access to education. Demographic changes and their impact on digital needs
Technological	Progress in technological research. Development of digital infrastructure. The importance of cybersecurity in digital transformation

This table helps to systematize external factors that can influence the success or risks associated with the integration of investment policy and digital transformation, especially in the context of pandemics.

To stimulate innovation and support sustainable development through the integration of investment policy and digital transformation in pandemic conditions, the following recommendations can be formulated:

1. Develop specialized investment instruments. Stimulate investment processes. They will contribute to economic stability and development, particularly in supporting small and medium-sized enterprises (SMEs) and attracting international companies. Implement measures that stimulate investments in key economic sectors, especially during pandemics.

2. The economy must increase the share of the innovative component at its core, which means focusing on

innovations as a key factor in activating economic development and recovery.

3. Formation of an innovative culture system, namely, creating conditions for the development of an innovative culture that includes education, training, and knowledge exchange. Support for innovative entrepreneurship. Encouraging the development of innovative entrepreneurship as a necessary condition for socio-economic development.

4. Improvement of legislation, providing legal support. Development and implementation of legal frameworks that will facilitate investments in innovation and digital transformation.

5. Support for scientific research and development on this topic. Increase funding for scientific research that promotes innovative activity and technological progress.

These recommendations can help governments, international organizations, and investors create conditions for stimulating innovation and supporting sustainable

development, providing an effective response to the challenges that arise in pandemic conditions.

Discussion and conclusions

The issue of ensuring the effectiveness of investment policy requires in-depth research. Additionally, there is a need to identify the best practices and models for integrating digital solutions into the recovery and development of local communities, the role of artificial intelligence, how to stimulate green innovations, the potential role of the circular economy, the necessary steps for rapid technological development, and how the state can initiate innovations during and after wartime. These questions demand thorough analysis and discussion among experts, government officials, business representatives, and the public to develop comprehensive strategies that meet the needs of society and the economy in pandemic conditions.

The informational transformation of society has paved the way for the realization of the smart city concept, which integrates information and communication technologies to enhance the quality of life, comfort, and safety of citizens, as well as to ensure energy efficiency. The development of the information society has stimulated digital transformations that have led to the creation of smart cities focused on improving the standard of living and comfort of the population. Digitalization is becoming a strategic direction for national development, where the implementation of innovative tools such as the internet of things, artificial intelligence, blockchain, and others, contributes to increased productivity and competitiveness in various economic sectors. These technologies play a key role in public administration and significantly affect everyday societal life. However, digitalization is associated with risks, such as cybersecurity issues and the need for continuous innovation updates, which require attention and a strategic approach to ensure sustainable development in pandemic conditions.

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СТИМУЛЮВАННЯ ІННОВАЦІЙ ТА ПІДТРИМКА СТАЛОГО РОЗВИТКУ: ІНТЕГРАЦІЯ ІНВЕСТИЦІЙНОЇ ПОЛІТИКИ ТА ЦИФРОВОЇ ТРАНСФОРМАЦІЇ В УМОВАХ ПАНДЕМІЇ

Вступ. Розглянуто взаємозв'язок між інвестиційною політикою держави та цифровою трансформацією суспільства в контексті пандемії з акцентом на стимулювання інновацій та сталого розвитку. Присвячено аналізу стратегій, які сприяють інноваціям та сталому розвитку в межах інтеграції інвестиційної політики та цифрової трансформації з особливим акцентом на умови пандемії. Досліджено потенціал цифровізації як каталізатора для розвитку смарт-міст, що може значно підвищити якість життя громадян, забезпечуючи безпеку, енергоефективність та створення комфортних умов проживання.

Методи. За допомогою аналітичного підходу оцінено поточні стратегії та ініціативи, а також досліджено потенціал цифровізації для розвитку смарт-міст.

Результати. Аналіз показує, що цифровізація може значно підвищити якість життя громадян, забезпечуючи безпеку та енергоефективність, та висвітлює виклики та можливості, що виникають перед державами та суб'єктами господарювання. Проаналізовано, як держави, регіони та бізнесові структури можуть адаптуватися до швидких змін, викликаних цифровими інноваціями та глобальними кризами, зокрема пандеміями. Наголошено на необхідності розробляти всебічні стратегії, які інтегрують інвестиційну політику та цифрові технології для досягнення сталого розвитку та формування смарт-міст, здатних ефективно відповідати на сучасні виклики. Окреслено роль інформаційної трансформації у створенні смарт-міст як платформи для удосконалення освітніх систем, охорони здоров'я, інноваційності виробництва та підвищення енергоефективності.

Висновки. Підкреслено актуальність теми розвитку смарт-міст у контексті інтеграції інвестиційної політики та цифрових трансформацій, що вимагають нових підходів до управління, розвитку суспільства та взаємодії з глобальними викликами. Акцентовано, що розроблення комплексних стратегій, які інтегрують інвестиційну політику та цифрову трансформацію, є ключовим для досягнення сталого розвитку та створення смарт-міст, здатних ефективно реагувати на сучасні виклики.

Ключові слова: інновації, сталий розвиток, інвестиційна політика, цифрова трансформація, пандемії, смарт-місто, інформаційне суспільство.

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