Nataliia Pitel
PhD, Associate Professor
Central Ukrainian National Technical University
Kropyvnytskyi, Ukraine

PUBLIC GOVERNANCE OF SCIENTIFIC RESEARCH DEVELOPMENT IN THE DIGITAL ERA: STRATEGIC ORIENTATIONS AND CHALLENGES

In the era of rapid digital transformation, the development of scientific research has become one of the key determinants of national competitiveness and sustainable progress. Public governance plays a crucial role in shaping the institutional, financial and digital foundations of the research ecosystem. The effectiveness of governance mechanisms increasingly depends on the ability of public authorities to integrate innovation-driven approaches, ensure openness of data, and promote international collaboration in science.

However, the transition to a digital model of science management remains uneven. Limited resources, fragmented policy frameworks and insufficient coordination between government, academia and business hinder the establishment of an integrated and adaptive research environment. Therefore, defining strategic orientations of public governance in the digital era becomes essential for enhancing scientific potential, promoting innovation, and strengthening the global positioning of national science.

The current system of public governance of scientific research in Ukraine is characterised by several systemic imbalances that slow down its development and weaken institutional effectiveness. Among the key problems are the insufficient integration of digital technologies into the processes of planning, monitoring and evaluation of scientific activities; the lack of coherent coordination between national and regional authorities; limited opportunities for financing research initiatives; and the fragmented interaction between science, business and society. These shortcomings lead to duplication of functions, inefficient use of resources, and the absence of a unified digital environment for evidence-based policy-making. As a result, the scientific governance framework remains reactive rather than proactive, hindering the transition towards an innovation-driven model of sustainable development [1].

An additional challenge lies in the low level of institutional capacity of public authorities in the field of science and the absence of effective mechanisms for knowledge transfer and commercialisation of research results. These factors reduce the competitiveness of the national research sector, slow down integration into the European Research Area, and limit the potential for digital modernisation. Therefore, it is essential to develop a strategically oriented system of public governance capable of ensuring the sustainable development of science in the digital era.

In this context, the development of an integrated conceptual framework becomes a prerequisite for improving the coherence and effectiveness of science governance. The growing complexity of digital transformation processes requires a shift from fragmented administrative measures to strategically oriented and adaptive models that combine innovation, openness, and institutional collaboration.

Such a framework should reflect the interdependence between key governance challenges, strategic orientations, and practical responses aimed at enhancing scientific capacity and policy coordination. To illustrate this interaction, a cyclic model of strategic orientations, challenges, and responses in science governance is proposed (Figure 1).

The proposed model reflects the cyclic nature of public governance of scientific research in the context of digital transformation. Its structure is based on the interaction of three key components – challenges, strategic orientations, and governance responses – which together form a continuous process of science policy development and implementation. This approach makes it possible to trace the cause-and-effect relationships between systemic problems, strategic priorities, and the practical instruments used for their implementation. The model also demonstrates the dynamic character of governance, where each cycle generates new challenges that require the

renewal of strategic approaches. This ensures flexibility, adaptability, and sustainability in the development of the public governance system of science in the digital era.

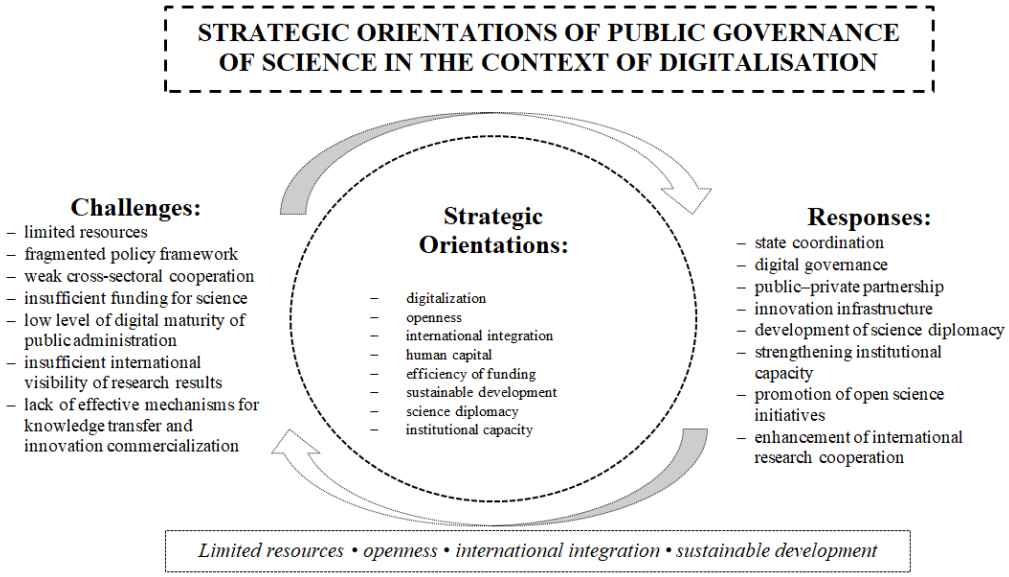

Figure 1 – System of strategic orientations for effective public governance of science
Source: developed by the author

An analytical assessment of the state of public governance of scientific research and the economic environment of Ukraine reveals persistent structural imbalances that constrain the sustainable development of the national research sector. Gross domestic expenditure on R&D amounted to approximately **0.33% of GDP** in 2022, which is significantly lower than the average level observed across European countries [2]. At the same time, Ukraine's real GDP growth rate in 2024 reached only **2.9%**, reflecting a gradual yet fragile recovery of the economy under wartime conditions [3].

Against the backdrop of general economic instability, the technological sector demonstrates relatively high resilience and dynamics. According to the Ministry of Digital Transformation of Ukraine, there were more than **2,600 IT start-ups** operating in the country in 2024, which indicates the formation of innovation-oriented business initiatives even under adverse circumstances [4]. However, the level of innovation activity among industrial enterprises remains low, and the commercialisation of research results continues to be limited.

The conducted analysis confirms that insufficient financial, institutional, and infrastructural resources continue to hinder Ukraine's transition towards an innovation-driven model of economic growth. Strengthening the efficiency of science governance therefore requires the implementation of a strategically oriented and digitally supported management framework that ensures coherence between national policies and global research trends. Such an approach will enhance scientific capacity, foster sustainable economic development, and reinforce Ukraine's competitiveness within the European and global innovation landscape.

References:

1. Mykhalchenko H., Cherniaieva O., Bashtannyk O., Shumliaieva I., Pitel N. Public Administration in the Context of Global Challenges. // Management (Montevideo). 2025. Vol. 3. P. 209. URL: https://managment.ageditor.uy/index.php/managment/article/view/209
2. The Global Economy. Research and Development: Ukraine. 2024. URL: https://www.theglobaleconomy.com/Ukraine/Research_and_development
3. National Bank of Ukraine. Comment on the Change in Real GDP in 2024. URL: https://bank.gov.ua/en/news/all/komentar-natsionalnogo-banku-schodo-zmini-realnogo-vvp-u-2024-rotsi
4. Ministry of Digital Transformation of Ukraine. Ukraine's IT Shift: From Outsourcing to Innovation. 2024. URL: https://digitalstate.gov.ua/news/it-outsourcing/ukraines-it-shift-from-outsourcing-to-innovation