

**Olha Kravchenko**

<sup>1</sup> National Technical University of Ukraine «Igor Sikorsky Kyiv Polytechnic Institute», Kyiv, Ukraine.

**Nadiia Antypenko**

National Technical University of Ukraine «Igor Sikorsky Kyiv Polytechnic Institute»,  
Kyiv, Ukraine.

**Nadiia Roshchyna**

National Technical University of Ukraine «Igor Sikorsky Kyiv Polytechnic Institute»,  
Kyiv, Ukraine.

## **TRANSMISSION MODELS AS A TOOL FOR ECONOMIC AND MATHEMATICAL MODELING IN THE CONDITIONS OF THE DIGITAL ECONOMY**

The current stage of economic development is characterized by deep structural transformations, which are caused by the simultaneous influence of globalization processes, the rapid spread of digital technologies, the growing importance of the knowledge economy, the need to take into account the principles of sustainable development, and the formation of a new wave of neo-industrialization, which combines digital innovations with the modernization of production system. Digitalization ceases to be just a technological trend and becomes a key factor in the modernization of economic and social systems. The aim of the article is to substantiate the use of transmission models as a tool for economic and mathematical modeling in the digital economy. It is shown that transmission models in the digital economy constitute a specialized tool of economic and mathematical analysis, which, unlike linear approaches, is able to reflect the multilevel nature of digital transformations, including direct and indirect effects, feedback loops, and threshold phenomena, and thereby provides a more comprehensive justification for digital modernization and sustainable development policies. The theoretical basis of nonlinear transmission models is considered, which includes the theory of technological paradigms and technological trajectories, the theory of the diffusion of innovations, the endogeneity of the nature of technological progress in the digital economy, and the concept of digital platforms and ecosystems. The features of the use of transmission models are highlighted, namely: high efficiency in analyzing complementary and substitution interactions between various factors of digitalization, taking into account threshold effects, and the ability to reflect the delayed dynamics of the implementation of digital transformation. In the context of Ukraine, integral models for assessing digital stability and resilience are considered. It is shown that the use of transmission models in the digital economy is accompanied by methodological limitations, which are due to the quality and availability of statistical data, time lags in the manifestation of effects, external structural distortions and the lack of

standardized indicators of digitalization, which affects the accuracy, reproducibility and practical applicability of the analysis results.

**Keywords:** transformation, neo-industrialization, transmission, modeling, transmission model, technological progress, digital economy.

\* Публікація підготовлена у межах виконання науково-дослідної роботи «Трансмісійні моделі цифровізації та неоіндустріального відновлення інноваційної інфраструктури» (тема № 2908ф, номер державної реєстрації № 0126U001339), що виконується відповідно до Наказу МОН України від 09.01.2026 № 23 та Наказу КПІ ім. Ігоря Сікорського № НОН/47/26 від 26 січня 2026 року у 2026-2028 рр.