

ORIGINAL PAPER



DOI: 10.26794/2304-022X-2025-15-4-139-149
УДК 351;004.738(045)
JEL H11, L86, H83, O33

Industry Ecosystems of Digital Platforms in Public Governance

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ABSTRACT

The **relevance** of this study stems from the key role of digital platforms in public governance in the modern world. Transformation of the digital economy's architecture based on industry ecosystems of digital platforms (IEDPs) is outpacing the development of a corresponding theoretical and methodological framework, which necessitates a comprehensive scientific understanding of this issue. The **research objective** was to develop a conceptual framework for the development of IEDPs as a tool for improving the efficiency of public governance through three interrelated processes: the establishment of new industry standards based on unified digital platforms; the transition to algorithmic regulation and transactional taxation during the integration of IEDPs; and the formation of a metasystem for solving macro-level problems through the synergy of order parameters. The **methodological basis** consists of a comparative and structural-functional analysis. The given article considers conceptual approaches to creating the architecture of the abovementioned ecosystems, demonstrates their effectiveness in a public-private partnership format that maintains a balance between government regulation and the autonomy of digital participants. The **results** obtained can be used by government agencies in developing regulatory policies and designing IEDPs, opening up prospects for scientifically assessing the effectiveness of digital platform types and their impact on the quality of public governance..

Keywords: public governance; state information system; public-private partnership; big data; industry digital platforms; industry ecosystem of digital platforms; labor productivity; technological sovereignty; digital economy

For citation: Yukhno A.S. Industry ecosystems of digital platforms in public governance. *Upravlencheskie nauki = Management Sciences*. 2025;15(4):139-149. DOI: 10.26794/2304-022X-2025-15-4-139-149

INTRODUCTION

The active adoption of digital technologies and the expansion of network communication are stimulating the development of the platform economy. A qualitatively new paradigm of economic relations is emerging, based on Internet communications as the infrastructural foundation, distributed computing as the technological core, and big data as the primary productive resource [1–2].

Digital platforms (DPs) [3] enable the real-time integration of participants in digital interaction into a unified information space. They provide opportunities for mutual data exchange, reduce transaction costs, and transform their structure. The proliferation of DPs generates new formats of interaction among users, businesses, and the state; however, their scale and societal impact necessitate government regulation to ensure the security, transparency, and fairness of the digital environment.

Contemporary challenges of digital transformation have underscored the need for a systematic scholarly investigation of such regulation, including: (a) the development of conceptual foundations for state involvement in the evolution of the platform economy; (b) the assessment of the effectiveness of various types of DPs; and (c) the analysis of systemic barriers to their implementation.

As the methodological foundation of the study, the author employed a combination of general scientific and specialized methods aimed at conducting a comprehensive examination of the phenomenon of industry ecosystem digital platforms (SEDPs) within the context of public governance. The theoretical framework was grounded in scholarly works on the digital transformation of government and the platform economy. To systematize existing approaches and develop the fundamental principles underlying the architecture of SEDPs, a comparative analysis was applied. This made it possible to identify their distinctive features in comparison with other types of information systems (such as state information systems and private digital platforms) and to substantiate the

author's definition of this concept. The principal tool for structuring the research findings and ensuring their clarity and coherence was structural-functional analysis. Its results enabled the identification of the key characteristics, advantages, challenges, and risks associated with the formation of SEDPs. Particular attention was devoted to those platforms developed in the format of public–private partnerships (PPPs), with their competitive advantages and systemic constraints being specifically highlighted.

The scientific novelty of the study lies in the selection of SEDPs as an object of analysis at the meso-level, which made it possible to overcome the limitations of traditional micro-level approaches. The proposed interaction architecture ensures a balance between the autonomy of participants and sector-wide coordination, while providing a methodological justification for the optimal number of SEDPs based on a systematic classification of types of economic activity. The theoretical significance of the research consists in the establishment of a new scholarly domain – the economics of industry ecosystem digital platforms – whereas its practical value lies in the development of analytical tools for government authorities to support the design of SEDPs and the assessment of their economic efficiency. This opens up opportunities for measuring the contribution of digital platforms to labour productivity growth.

DEFINITION AND CHARACTERISTICS OF AN INDUSTRY ECOSYSTEM OF DIGITAL PLATFORMS

The specific features of the legal and regulatory framework governing the digital economy have contributed to the rapid development of digital platforms (DPs), while simultaneously revealing systemic gaps in this domain. As noted in the UNCTAD Report (2019),¹ the dominance of DPs in markets is driven by network effects, exclu-

¹ World Investment Report URL: https://unctad.org/system/files/official-document/wir2019_overview_ru.pdf

sive access to user data, and the high degree of dependence of economic agents on platforms [4]. This configuration generates a complex set of challenges, including the need to develop specialized governance mechanisms, ensure a balance between the innovative potential of platforms and the protection of public interests, overcome resistance by DPs to regulatory interventions by states, and counteract violations of antitrust legislation. Particular relevance is attached to the typologization of DPs, which makes it possible to differentiate regulatory approaches in accordance with the architectural features of platforms and their monetization models.

An analysis of the current stage of the platformization of socio-economic activity allows for the identification of four basic types of information systems:

- state information systems (SIS);
- private digital platforms (e.g., Yandex Taxi, Avito, CIAN);
- industry ecosystems of digital platforms;
- the state automated system for strategic governance of economic sector development and regulation (GASSU).²

The predominance of a particular type of information system within the economy makes it possible to assess the effectiveness of state strategies in the field of platform-based governance, including at the international level.

Contemporary research on DPs demonstrates substantial variability in their definitions [5–8], which is driven by a set of interrelated factors, including architectural diversity [9], multifunctionality [10], sector-specific applications [11], differences in value creation mechanisms [12], the regulation of platform activities [13–15], their integration into public governance [16], and the study of multi-sided markets [17–18]. In this context, particular scholarly interest is directed toward the development of industry ecosystems of digital platforms (SEDPs) [19].

² The analysis of SIS, private digital platforms and GASSU lies beyond the scope of the present study.

A SEDP may be defined as a dynamic, self-developing, complex, and integrated information and communication platform that brings together digital platforms and state information systems. It is characterized by unified standards and interaction protocols and ensures end-to-end digitalization and synchronization of business processes among participants within a specific sector. Furthermore, it facilitates the formation of digital profiles, automated real-time data collection and analysis, support for managerial decision-making based on big data analytics, as well as the automation of legal and regulatory processes, monitoring, and reporting in order to establish a unified digital environment.

SEDPs differ fundamentally from traditional information systems. Compared with private digital platforms, they incorporate built-in mechanisms for automated legal and regulatory governance, maintain a balance between commercial and public interests, and perform functions of public governance. In contrast to SIS, SEDPs are distinguished by their multidimensional interaction with sector participants, real-time data processing capabilities, and the potential for cross-platform integration with other information systems. A key feature of SEDPs is their hybrid model, which organically combines market-based self-regulation mechanisms with instruments of state governance. This configuration enables SEDPs to effectively integrate the advantages of platform technologies with regulatory functions within a unified ecosystem. Thus, SEDPs represent a new type of digital infrastructure that ensures synergy between technological capabilities and institutional mechanisms in support of sustainable industry development.

FEATURES OF INDUSTRY ECOSYSTEMS OF DIGITAL PLATFORMS

The importance of developing digital platforms in the Russian Federation was emphasized by the President of the Russian Federation in the Address to the Federal Assembly: “We need to establish our own digital platforms, naturally compatible

with the global information space. This will enable a new organization of production processes, financial services, and logistics, including through the use of distributed ledger technology, which is extremely important for financial transactions and for the registration of property rights³...” The necessity of the practical implementation of platform-based solutions has been formalized in the Presidential Decree “On the National Development Goals of the Russian Federation for the period up to 2030 and for the outlook to 2036.” In particular, the target indicator for achieving the national goal “Digital transformation of public and municipal governance, the economy, and the social sphere” envisages “the automation of the majority of transactions within unified industry digital platforms and a data-driven governance

³ Address of the President of the Russian Federation to the Federal Assembly, 1 March 2018. URL: https://www.consultant.ru/document/cons_doc_LAW_291976/

model, taking into account the accelerated adoption of big data processing technologies, machine learning, and artificial intelligence.⁴ “In order to ensure effective coordination among federal executive authorities, the Bank of Russia, governmental bodies of the constituent entities of the Russian Federation, and other public institutions involved in implementing state policy in the development of digital economy ecosystems and digital platforms”, an interagency working group on the advancement of digital economy ecosystems and digital platforms has been established.⁵

⁴ Decree of the President of the Russian Federation No. 309, 7 May 2024, “On the National Development Goals of the Russian Federation for the period up to 2030 and for the outlook to 2036.” URL: https://www.consultant.ru/document/cons_doc_LAW_475991/

⁵ Order of the President of the Russian Federation No. 325-rp, 14 October 2024, “On the Interagency Working Group on the Development of Digital Economy Ecosystems and Digital Platforms”. URL: <https://www.consultant.ru/cons/cgi/online.cgi?req=doc&base=EXP&n=859527#vtjtysUCg0dDvnJO2>

Table 1

Specifics of Industry Ecosystems of Digital Platforms

Criteria	Description	Result
Access to information	Instant online access to up-to-date data enables managers to make informed decisions within limited timeframes.	Significant acceleration of business processes and increased adaptability of economic agents to changing market conditions.
Functions of SEDPs	Establishment of a unified digital environment for interaction among market participants; automation of processes for identifying partners and investment opportunities; implementation of real-time monitoring and control functions; capacity for end-to-end governance of value-added chains; reduction of transaction costs in interindustrial interaction; development of transparent managerial reporting for public authorities.	Enhanced efficiency in monitoring business processes and the timely identification of opportunities aimed at optimizing interaction among economic agents.
Data analytics	Formation of comprehensive rankings of ecosystem participants based on multifactor analysis; assessment of workforce professional potential; identification of the economy’s demand for qualified personnel.	Improved quality of human resource management and the targeted development of human capital.
SEDP metasystem	Optimization and automation of business processes; development of advanced taxation mechanisms; creation of innovative financial instruments; operation of a self-developing intelligent digital system with adaptive algorithms.	Stimulation of ecosystem participants toward more efficient interaction with counterparties.

Source: Compiled by the author.

The integration of multiple digital platforms and state information systems into a industry ecosystem of digital platforms (rather than a single “universal” platform) makes it possible to ensure more systematic and strategically grounded monitoring and governance of economic sectors. It also helps to minimize subjective assessments of their effectiveness and contribution to the achievement of the state’s strategic development objectives (Table 1).

Under conditions of the digitalization of the economy, the need to establish SEDPs increases substantially. Unlike aggregated information published in statistical reports and SIS, platform-based data contain information on the history of their emergence. On this basis, it becomes possible to understand how transactions between platform participants were conducted, where difficulties arise, which forms of activity are rarely used, and which, conversely, operate on a large scale. This approach enables the fine-tuning of industry development and the effective governance of its evolution. SEDPs contain information on industrial value-added chains in which various economic actors are in-

involved. Managing such chains — which is practically unattainable using Rosstat data and SIS — becomes a feasible task through the use of digital platforms [20]. Public officials thereby gain the ability to analyze these chains in real time, identifying specific areas that require particular attention.

Moreover, the transparency of platform-based interactions among participants facilitates monitoring and oversight functions exercised by government authorities. As an example, attention should be drawn to the Federal Tax Service of Russia’s use of preventive oversight instead of punitive measures (for instance, through the automation of tax administration), which positively affects the agency’s financial performance.⁶ Thus, SEDPs represent a fundamentally new stage in the digital transformation of the economy and exert a significant influence on public governance.

The justification of the number of SEDPs should be based on a detailed classification of economic activities according to the All-Russian Classifica-

⁶ Working Meeting between Vladimir Putin and the Head of the Federal Tax Service Daniil Egorov. URL: <http://www.kremlin.ru/events/president/news/75610/>

Table 2

Advantages and Drawbacks of Forming Industry Ecosystems of Digital Platforms

Advantages	Difficulties
Interaction among digital platform participants is conducted online in real time.	The need to transform the activities of platform participants into a digital format.
Reduced time required for managerial decision-making in real time due to the availability of relevant data.	The increasing importance of data quality and of infrastructure for data storage, transmission, and processing.
Growing demand for innovative solutions and their rapid implementation in practice, including at the intersection of sectors.	The need for increased investment in R&D and the accelerated commercialization of its results.
Use of automated algorithms for enforcing legal and regulatory acts in order to govern relations between parties.	The requirement to algorithmize and automate the state’s legal and regulatory framework.
Release of system participants from the obligation to submit reporting to public authorities	The need to algorithmize state supervisory and enforcement activities.
Formation of dynamic rankings of system participants based on data analytics.	The challenge of working with large volumes of fragmented and heterogeneous data.
Identification of industrial workforce needs and the training of personnel on the basis of data analytics.	The necessity of integrating the education system into the digital governance framework.

Source: Compiled by the author.

tion of Types of Economic Activity (OKVED 2). As a structural foundation, it is proposed to employ the levels of subclasses (XX.X) and groups (XX.XX), comprising 272 and 623 units, respectively.⁷ Given the possibility of consolidating adjacent groupings within a single SEDP, the relevant set of platforms may be estimated at a minimum of 272 units. Such extensive coverage of major segments of the economy creates prerequisites for integrating SEDPs into a unified metasytem.

The formation of this metasytem constitutes a necessary condition for addressing tasks that cannot be realized within the boundaries of individual sectors, in particular, the governance of cross-cutting processes (such as logistics and financing), the conduct of cross-industrial analysis, the development of unified data standards, and the coordination of state regulation. The implementation of this approach in the Russian Federation entails significant investments and requires a long-term planning horizon, which corresponds to the global trend toward building integrated digital ecosystems.

In this context, it is appropriate to highlight the advantages and challenges associated with the practical implementation of SEDPs. (*Table 2*).

The implementation of the proposed strategy will result in the establishment of an integrated governance system for economic processes, with an emphasis on real performance indicators. Its adoption will improve the planning and regulation of socio-economic development, expand the volume of data and information subject to analysis, and enhance the overall reliability of the system.

CONCEPTUAL APPROACHES TO THE DEVELOPMENT OF THE ARCHITECTURE OF INDUSTRY ECOSYSTEMS OF DIGITAL PLATFORMS

As noted above, the development and implementation of SEDPs require a comprehensive

approach that encompasses organizational, technological, legal, and other changes in the governance system and presupposes a deep understanding of the needs of all stakeholders involved. The key advantage of such platforms lies in their capacity to facilitate the effective exchange of experience and technologies across different levels of government and sectors of the economy, provided that equal access to digital solutions is ensured.

It appears that the creation and development of SEDPs should involve the following measures:

- identifying the principal directions of interaction;
- ensuring the openness of the SEDP infrastructure to all participants;
- creating conditions for convenient entry into the ecosystem;
- conducting continuous monitoring and analysis of user behavior;
- adapting SEDPs to the specific needs of different segments of the economy.

Such an approach creates prerequisites for achieving significant socio-economic outcomes while ensuring the economic justification of investments in the digitalization of public governance. SEDPs may include marketplaces (for the provision and sale of services, equipment, and products, as well as for reporting purposes), digital platforms, and the necessary supplementary modules, services, and databases, including those adapted for mobile devices depending on the market segment. Integration through marketplaces enables economic actors to reduce transaction costs, enhance efficiency, and build trust by automating processes, standardizing oversight, and ensuring operational transparency. Platform-based solutions lower production costs while simultaneously improving quality, accelerate the diffusion of innovations, and increase capital turnover through the optimization of logistics and financial settlements. They contribute to the automatic compliance with regulatory requirements through embedded algorithms and smart contracts. Taken together, these mecha-

⁷ OK 029–2014 (NACE Rev. 2). All-Russian Classification of Types of Economic Activity, approved by Order of Rosstandart No. 14-st of 31 January 2014 (as amended on 25 June 2025). URL: https://www.consultant.ru/document/cons_doc_LAW_163320/

nisms create conditions for sustainable industrial development based on technological, economic, and regulatory synergy [21]. They make it possible not only to synchronize supply and demand, but also to shift toward algorithmic coordination of regulatory governance and reporting procedures, transaction-based taxation [22], and the management of interdependent segments of the economy. The implementation of such digital platforms and cloud services implies the automation of business processes, cost reduction, and increased labour productivity.

The key objectives of SEDPs may be summarized as follows:

- the creation of a personal digital account for an economic entity to enable remote electronic interaction with public authorities;
- the implementation of an automated system for the electronic submission of reports by economic entities to government bodies;
- the use of an automated system for the collection and analysis of reporting data by public authorities in order to obtain information on the current state of the sector and trends in its development;
- ensuring the visualization of industrial data across economy;
- the formation of an up-to-date electronic register of economic entities;
- enabling real-time remote interaction among market participants;
- the provision of real-time electronic information on the production and sale of goods;
- the development of a reference system on government support measures and mechanisms for submitting applications for state support in electronic form.

Thus, the functioning of SEDPs is aimed at reducing the administrative burden on users in the processes of reporting, obtaining subsidies, and accessing other forms of state support, as well as at automating the product life cycle and internal quality control. This should lead to improved accessibility of services and a reduction in costs.

PUBLIC-PRIVATE PARTNERSHIP AS A TOOL FOR THE DEVELOPMENT OF INDUSTRY ECOSYSTEMS OF DIGITAL PLATFORMS

The foregoing analysis indicates that, at the present stage, there is an increasing need to expand the parameters of the governance model through the establishment and integration of SEDPs. As a key instrument for addressing this objective, the public-private partnership (PPP) model should be regarded as particularly relevant, as it enables the effective integration of the financial, administrative, and intellectual resources of business, public authorities, and the academic community. This approach is based on a clear allocation of functions among the participants in the process. Private operators, in cooperation with industrial and scientific associations, develop and implement the digital platform, relying on their own investment resources with potential support from development institutions. The state, in turn, provides the necessary conditions for platform integration, in particular through their connection to SIS, the adaptation of the regulatory framework, and the regulation of tariffs for socially significant services (by analogy with natural monopolies). Such a distribution of responsibilities contributes to the establishment of a sustainable interaction system: business gains the opportunity to realize its technological and managerial competencies; the state ensures the protection of public interests and systemic stability; and industrial and academic organizations promote the innovativeness of solutions. The result is a balanced model of digital transformation that combines the efficiency of market mechanisms with the social orientation of state regulation. This form of synergy makes it possible to minimize risks and maximize the beneficial outcomes for all stakeholders involved. The advantages and challenges of developing and establishing SEDPs in the format of PPP are presented below (*Table 3*).

Table 3

**Advantages and Drawbacks of Developing and Establishing Industry Ecosystems
of Digital Platforms in the Public-Private Partnership Format**

Advantages of SEDPs in the PPP format	Difficulties in developing and establishing SEDPs in the PPP format
The possibility of digital regulation of economic sectors.	Weak competition from other market participants (or its absence), reducing platform efficiency.
Algorithmization of industrial governance systems.	High costs of platform development and establishment without the use of PPP mechanisms
Commitment to increasing public value	Prolonged development timelines in the absence of a clear division of responsibilities between the state and private business.
Absence of an orientation toward profit maximization at any cost.	Bureaucratic complexities in coordination and decision-making procedures.
The possibility of generating additional budget revenues through the provision of ancillary services not directly related to core activities.	The need for continuous staffing of platform operations by leading specialists given the rapid evolution of digital technologies.
Sector participants automatically become platform participants upon meeting state-established criteria.	Regulatory and legal constraints on the innovative and other activities of the platform.
No requirement for commercial promotion of the platform in the market.	High cost of errors during platform development and establishment.
Reduction of government expenditures on sector regulation in the medium and long term.	Limited speed of changes in the functional characteristics of the platform.
Reduction of transaction costs.	The necessity of maintaining a high share of expenditures on R&D.
Real-time digital assessment of the effectiveness of sector regulation.	Unpredictable economic consequences in the absence of regulatory mechanisms and appropriate legal regimes, taking into account industrial specificity.
Availability of comprehensive and well-structured industrial information.	High proportion of expenditures on hardware and software infrastructure.
Improved quality of interagency and cross-industrial interaction at federal and municipal levels.	-
Availability and analysis of participant profiles updated in real time within the digital ecosystem.	-
Increased competition among platform participants.	-
Reduction of government expenditures on the creation and maintenance of state information systems at federal and regional levels.	-

Source: Compiled by the author.

PROSPECTS FOR THE DEVELOPMENT OF SEDPS

Despite all the advantages of the proposed instruments of public governance, particular attention should be paid to the risks associated with the

implementation of SEDPs in the socio-economic activities of states. These risks include, inter alia:

- inefficient allocation of budgetary resources due to the lack of alignment between the digital platforms and state information systems (SIS)

being developed and national development goals and strategic priorities;

- the risk of functional duplication and over-spending resulting from the absence of inter-agency integration;
- the threat of incorrect data interpretation in managerial decision-making due to insufficient verification and validation of information;
- a decline in the quality of digital transformation projects caused by technological and architectural fragmentation between digital platforms and SIS, which hampers seamless system integration;
- difficulties in planning expenditures for the development of SEDPs due to high and non-transparent costs;
- the risk of violating non-discriminatory access to information within digital platforms and SIS, particularly when a significant number of them are operated by private companies;
- the danger of digital monopolization of markets.

In addition, it is recommended that governments develop unified standards for the interaction of digital platforms with SIS, introduce automated tools for data monitoring and analysis, and ensure an appropriate balance between regulation and the free development of digital technologies. Consequently, the use of monitoring and data analytics mechanisms can contribute to the establishment of a secure and sustainable digital environment that aligns with the interests of society and the economy.

In this regard, foreign experience is of particular interest. For instance, scholarly literature notes that the economy of the People's Republic of China functions as a complex of SEDPs, which accelerates operational cycles and enhances the quality of governance. Online access to information reduces the time required for managerial decision-making and facilitates interaction among economic agents, thereby increasing the flexibility of economic sectors. SEDPs form a digital environment both for identifying counterparties, technologies, and investments, and for automated managerial accounting and reporting for public authorities. This

enables officials to monitor markets in real time, identifying opportunities for necessary optimization and potential growth areas. The next stage of SEDP integration involves the establishment of an SEDP metasystem, providing tools for the development of effective taxation and monetary systems. It operates as an advanced digital infrastructure with self-adjusting mechanisms that incentivize the most efficient participants. Multifactor dynamic rankings based on data analytics, in turn, help to assess workforce potential and formulate demand for the training of qualified specialists for the economy [19]. Such an approach is aimed at the formation of open, self-developing systems that ensure more effective socio-economic and scientific-technological development.

In conclusion, it should be noted that the development of SEDPs enables the state to move to the next stage of ensuring technological sovereignty. This stage involves the design and practical implementation of a unified state automated system of strategic governance, with the gradual connection of existing SEDPs, and is aimed at the step-by-step automation of public governance processes at all levels in order to ensure a consistent and progressive increase in its effectiveness.

CONCLUSION

In the context of the growing importance of network-based governance, SEDPs offer an alternative to traditional competition by replacing it with cooperation among market participants. Participation in such platforms enables organizations to expand production capacity, reduce costs, and improve product quality. At the same time, the acceleration of operational cycles within a platform ecosystem, necessary for adaptation to new economic realities, requires corresponding changes in state regulation. In this regard, one of the key vectors of development is the introduction of network-centric governance within the public sector, aimed at creating open, self-developing systems operating on the basis of SEDPs and utilizing high-precision forecasting and algorithmic execution of decisions in real time.

The analysis conducted in this study allows several conclusions to be drawn. First, contemporary challenges require the establishment of a flexible governance mechanism capable of rapid planning, timely identification of emerging threats and challenges of the digital era, and effective responses to them. Thus, there is a need for comprehensive adaptation of the institutional environment to new conditions, as well as for the implementation of advanced digital technologies and the construction of an effective system of interaction among the state, society, and business.

Second, platform-based solutions and digital ecosystems are forming a new paradigm of socio-economic development and offer modern governance models, expanding the capabilities of the state, citizens, and business, while simultaneously creating new challenges for the system of public governance. Participants in such activities gain access to an open digital infrastructure for cooperation and incentives for development. In this context, it should be noted that contemporary digital platforms are transforming from instru-

ments of interaction among economic entities into systemic solutions for the strategic governance of the state, enabling a shift from reactive to predictive economic regulation.

Third, in the Russian Federation, in order to enhance the effectiveness of economic regulation, it is necessary to stimulate the digital platformization of sectors, aimed at the joint development and support of all economic actors.

These factors determine a shift in state development priorities toward the establishment of SEDPs and highlight the need to maintain a balance between public governance and the autonomy of participants within digital ecosystems. Consequently, under current conditions, the development and implementation of a national strategy for platform-based development becomes a key task for sovereign states. At the same time, the introduction of SEDPs generates the need for a well-considered approach to goal-setting in public governance and for taking into account multiple factors when selecting instruments for achieving strategic national development objectives.

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Conflicts of Interest Statement: The author has no conflicts of interest to declare.

The article was submitted on 15.09.2025; revised on 06.10.2025 and accepted for publication on 15.10.2025. The author read and approved the final version of the manuscript.