Проблемы оценки влияния уровня цифровизации на достижение национальных целей

Problems of assessing the impact of the level of digitalization on the achievement of national goals

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Abstract
The relevance of this study stems from the global transition toward an information society, where a significant portion of the workforce is engaged in the production, storage, processing, and dissemination of information—with knowledge representing its highest form. Following Klaus Schwab's articulation of the Fourth Industrial Revolution, digitalization has experienced a surge globally and particularly in Russia. However, many scholars and practitioners have overlooked the core premise of this revolution: the integration of cyber-physical systems (e.g., smart machines and smart factories) with traditional physical infrastructures to enhance their efficiency. Although this issue has been previously addressed in the literature, the societal impact of digitalization remains insufficiently considered. The objective of this study is to develop a framework for assessing both the direct and indirect impact of digitalization on achieving the national development goals of the Russian Federation, as defined by Presidential Decree No. 309 (May 7, 2024), and detailed further in the Unified Plan for National Development Goals through 2030 and towards 2036. The scientific novelty of the research lies in the development of a model to evaluate the cumulative effect of core cross-cutting digital technologies on the success of achieving these national objectives. The practical significance of the findings is their applicability in evaluating the impact of digital technologies on the effectiveness of achieving national development goals for the period up to 2030 and in the long term to 2036, as well as the associated tasks outlined in the Unified Plan approved by the Government of the Russian Federation.
Keywords: assessment methodology, digitalization impact, national development goals, cross-cutting technologies, digital transformation.

Introduction

As information technologies continued to evolve, humanity deliberately advanced toward the formation of an information society. This society is interpreted as one in which the majority of the employed population is fully or partially engaged in the production, storage, processing, and dissemination of information, with particular emphasis placed on its highest form—knowledge.

The processes underlying the development of an information society are characterized by several distinct features, which are illustrated in Figure 1.

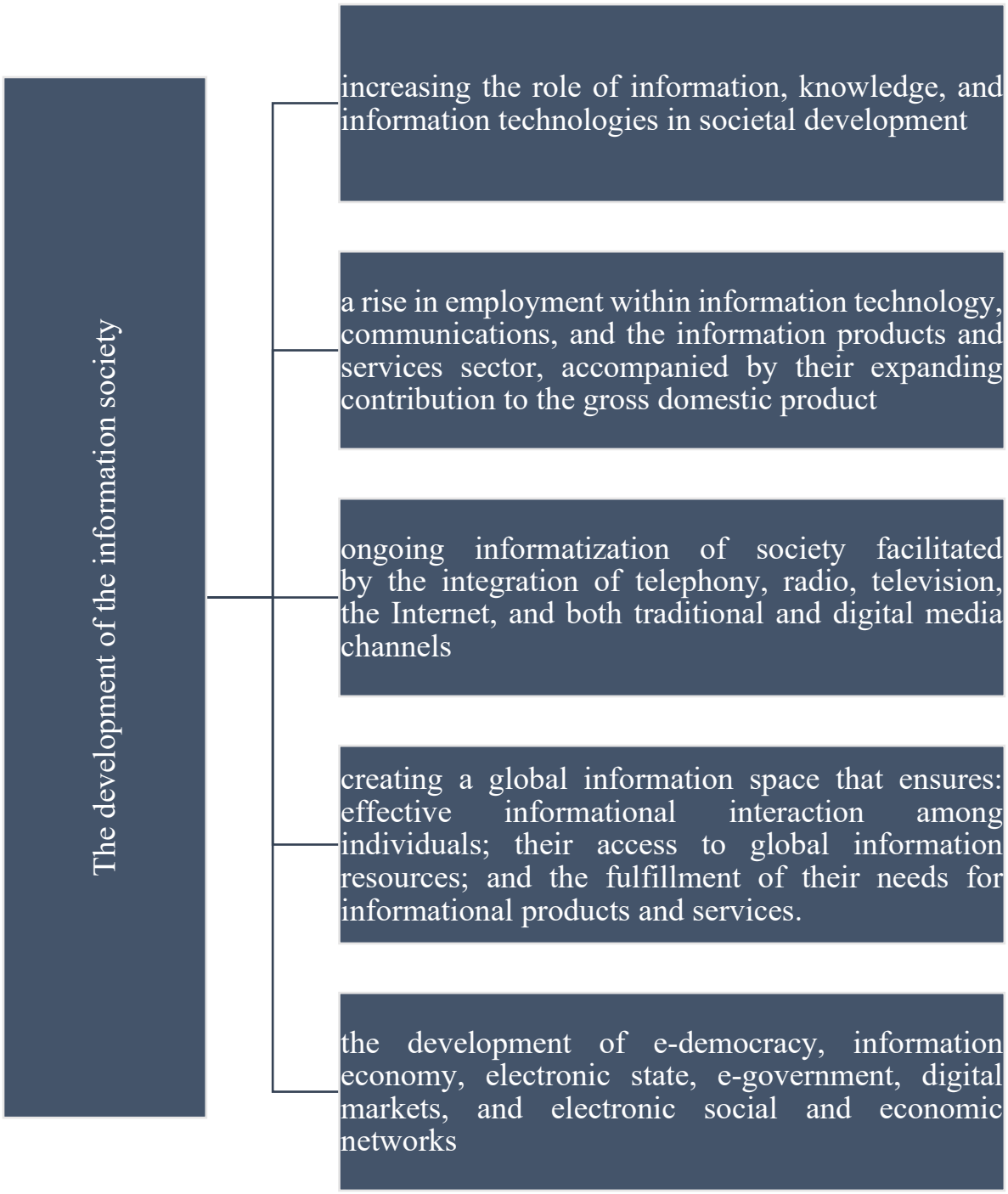

Figure 1. Key characteristics associated with the development trajectory of the information society

Many scholars have contributed to the study of the processes driving the development of the information society, including T. Umesao, F. Machlup, M. Porat, Y. Masuda, T. Stonier, R. Katz, M. Bangemann, D. Bell, J. Martin, R. Mills, among others.

Since Klaus Schwab proclaimed the Fourth Industrial Revolution [29], a true boom in digitalization has begun worldwide, and particularly in Russia.

Unfortunately, many researchers and practitioners have quickly started to lose sight of the core idea of the Fourth Industrial Revolution — the addition of a cyber-physical dimension to the physical one [28] (such as smart machines and smart factories) aimed at enhancing the efficiency of the original physical systems.

This issue has been repeatedly highlighted, notably in studies [13, 22].

Digitalization has increasingly been interpreted as a standalone field within the economic sphere (digital economy) and the social sphere (including the provision of public services). However, for example, James Martin [1] once identified the main directions for the development of the information society, the key criteria characterizing its progress (see Fig. 2), and the expected major changes (see Fig. 3).

Even today, there remains insufficient consideration of the impact of digitalization on the development of society as a whole.

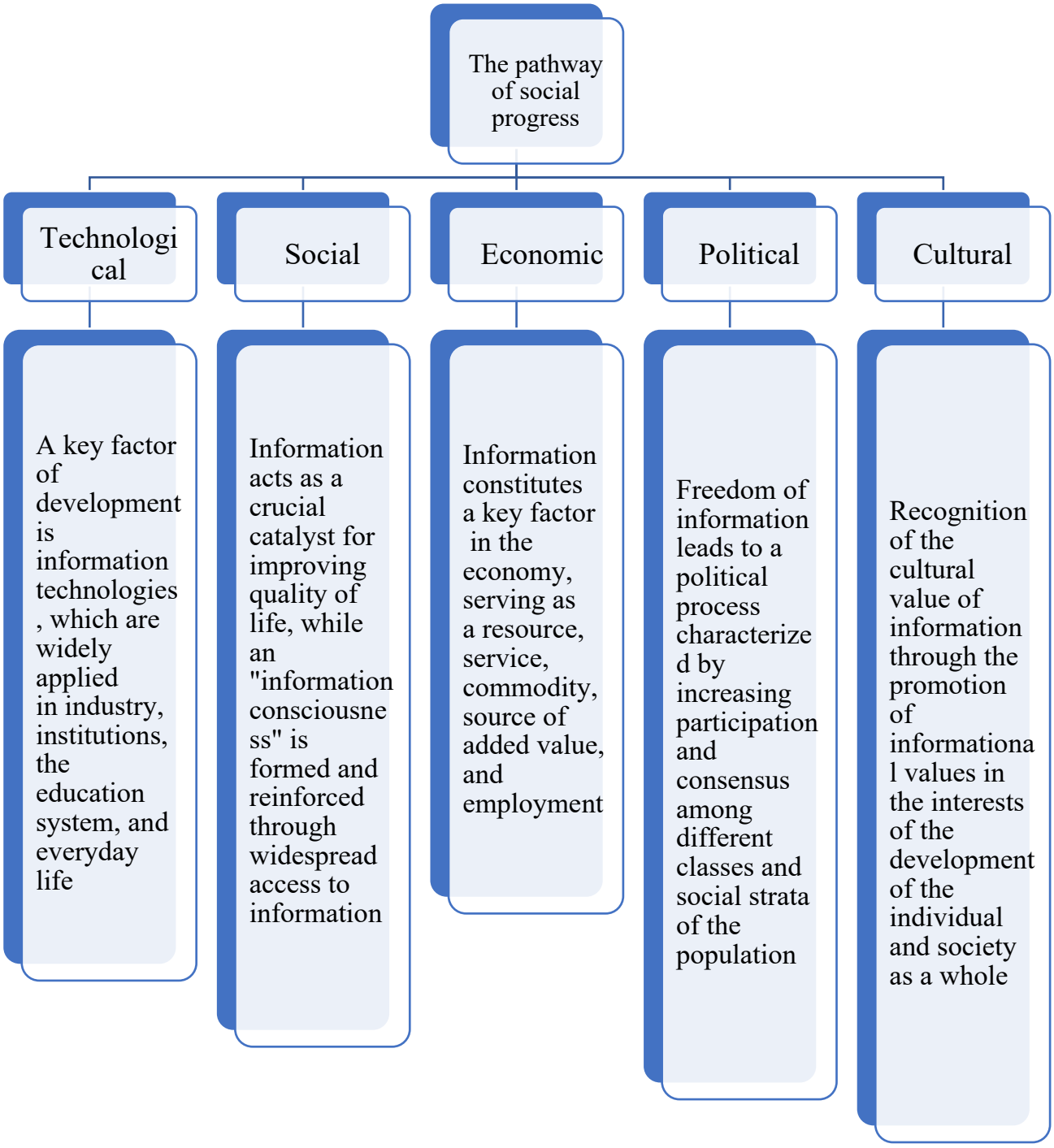

Figure 2. Principal directions for the development of the information society and key criteria defining its advancement, as outlined by James Martin [1]

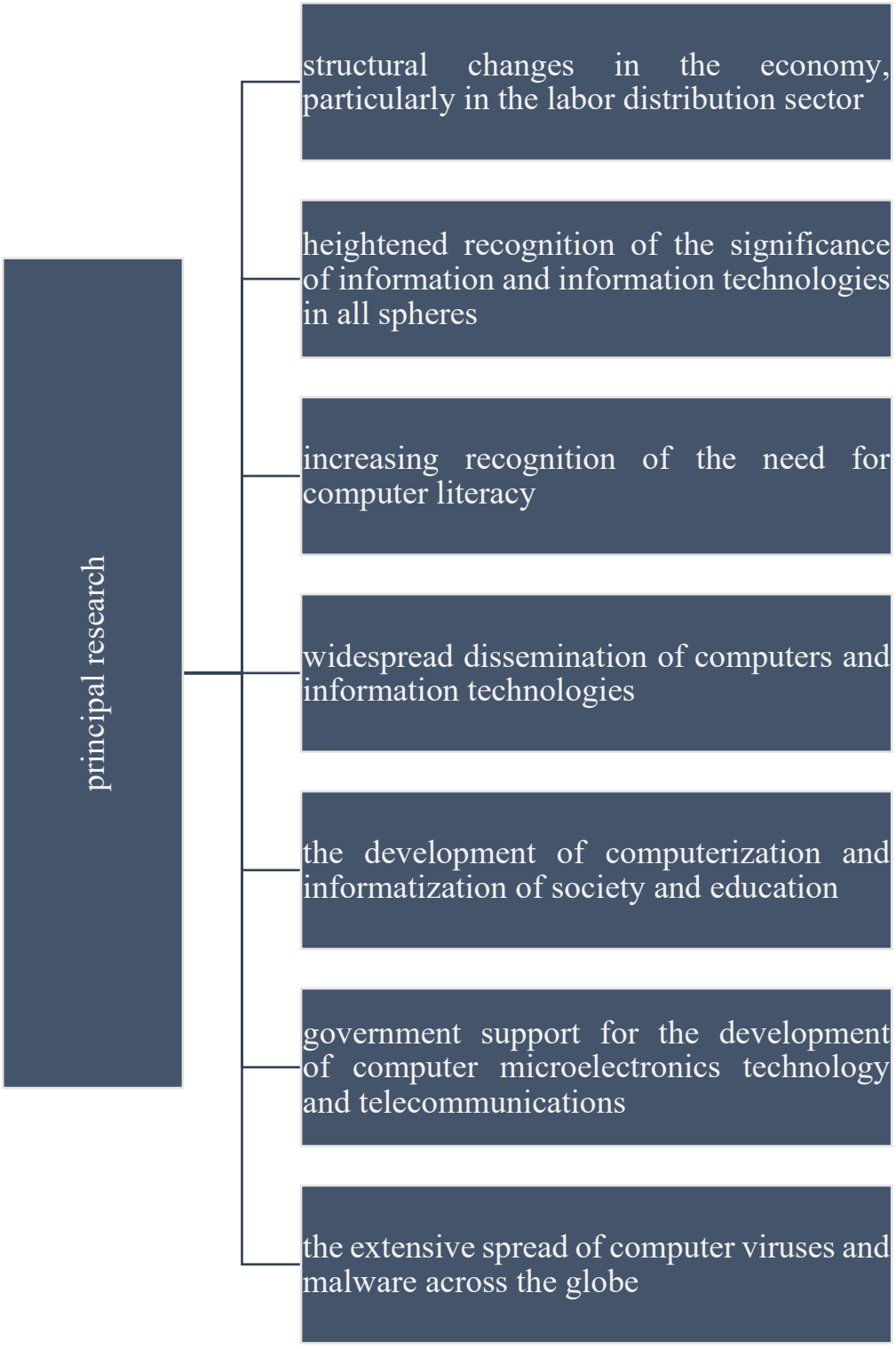

Figure 3. Anticipated key changes associated with the development of the information society, as outlined by James Martin [1]

These circumstances predetermined the choice of the research topic.

Research Objective

The objective of this study is to establish criteria for assessing the influence of both direct and indirect levels of digitalization on the achievement of the national development goals of the Russian Federation [25]. The detailed processes for accomplishing these goals have been further elaborated in the Unified Plan of the Government of the Russian Federation [5].

Methodological Framework

The methodological foundation of this research is based on prominent scholarly works addressing the assessment of digitalization's impact on the attainment of the Russian Federation's national development objectives. These include contributions by V.I. Abramov, V.D. Andreev [2], I.V. Bocharnikov, N.A. Chemezov [3], E.I. Dobrolyubova, A.N. Starostin [4], O.V. Ledneva [8], G.V. Osipov, S.V. Ryazantsev, V.K. Levashov, T.K. Rostovskaya [10], O.E. Sidorova [7], A.S. Tinkov [24], V.G. Khalin, G.M. Chernova [26], S.I. Chernykh, D.V. Baybulatova [27], V.N. Yuzhakov, A.N. Pokida, N.V. Zybunovskaya, A.N. Starostin [30], among others, as well as the author's own works focused on evaluating the efficiency of digitalization processes [6,11,12,15-20,23], and others.

Main Research Findings

The analysis of existing literature indicates that the issue of assessing the impact of digitalization levels on the achievement of the Russian Federation's national development goals remains unresolved. In this context, the current study examined the possibility of evaluating the influence of basic cross-cutting digital technologies, as defined in the "Digital Economy of the Russian Federation" program [9], whose composition is illustrated in Fig. 4 [14], with key characteristics outlined in [21], on the implementation of the national development goals of the Russian Federation [25] (Fig. 5). The detailed processes for achieving these goals have been further developed in the Unified Plan of the Government of the Russian Federation aimed at accomplishing the national development goals [5].

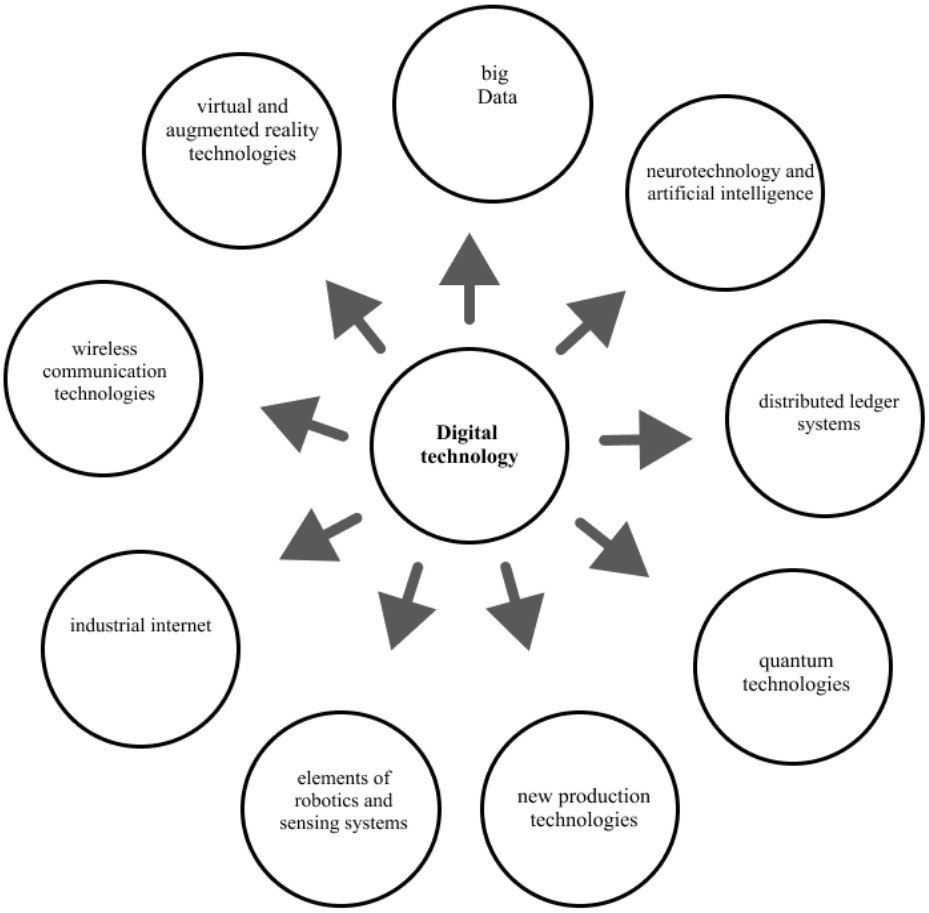

Figure 4. Structure of the core cross-cutting digital technologies as defined in the "Digital Economy of the Russian Federation" program [9]

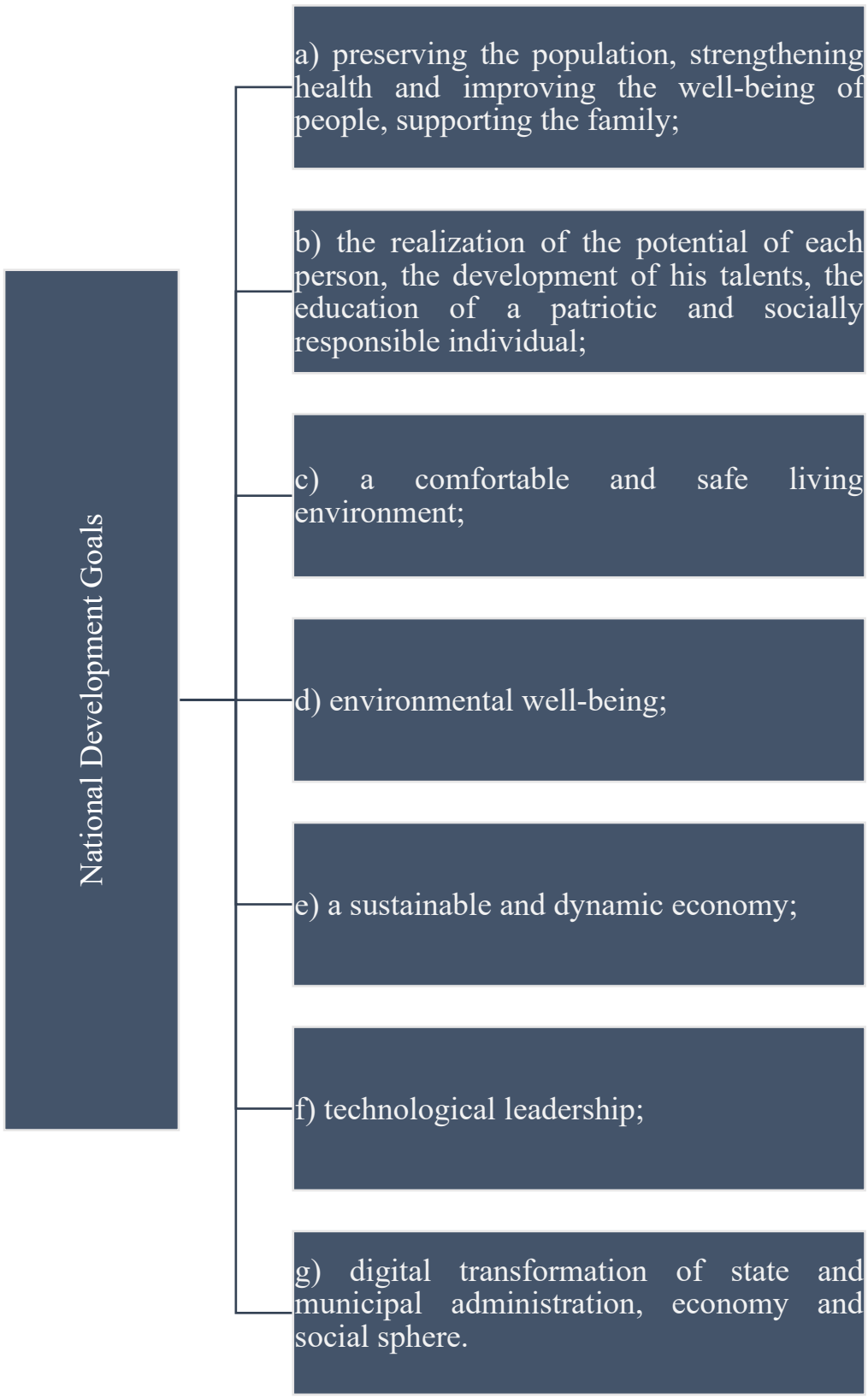

Figure 5. National development goals of the Russian Federation for the period through 2030 and the projected outlook to 2036, as set forth in Presidential Decree No. 309 of May 7, 2024 [25]

On the set of basic cross-cutting digital technologies (see Fig. 4) and the composition of the national development goals of the Russian Federation (see Fig. 5), a matrix of their interrelation can be constructed to illustrate the influence of the former on the latter (Table 1).

Table 1

Impact Matrix of Basic Cross-Cutting Digital Technologies on Russia's National Development Goals

		Structure of the National Development Goals						
		A	**B**	**C**	**D**	**E**	**F**	**G**
Basic end-to-end digital technologies set	1. Big Data	I_{1A}	I_{1B}	I_{1C}	I_{1D}	I_{1E}	I_{1F}	I_{1G}
	2. Neurotechnology and artificial intelligence	I_{2A}	I_{2B}	I_{2C}	I_{2D}	I_{2E}	I_{2F}	I_{2G}
	3. Distributed ledger systems	I_{3A}	I_{3B}	I_{3C}	I_{3D}	I_{3E}	I_{3F}	I_{3G}
	4. Quantum technologies	I_{4A}	I_{4B}	I_{4C}	I_{4D}	I_{4E}	I_{4F}	I_{4G}
	5. New production technologies	I_{5A}	I_{5B}	I_{5C}	I_{5D}	I_{5E}	I_{5F}	I_{5G}
	6. Elements of robotics and sensing systems	I_{6A}	I_{6B}	I_{6C}	I_{6D}	I_{6E}	I_{6F}	I_{6G}
	7. Industrial internet	I_{7A}	I_{7B}	I_{7C}	I_{7D}	I_{7E}	I_{7F}	I_{7G}
	8. Wireless communication technologies	I_{8A}	I_{8B}	I_{8C}	I_{8D}	I_{8E}	I_{8F}	I_{8G}
	9. Virtual and augmented reality technologies	I_{9A}	I_{9B}	I_{9C}	I_{9D}	I_{9E}	I_{9F}	I_{9G}

Each of the indicators Iij in the matrix of values {Iij}, presented in Table 1, can be defined as a relative value:

$$Iij = Lij(fact) / Lij(base), \quad (1)$$

where Lij(fact) is the actual level of influence of the i-th basic cross-cutting digital technology on the effectiveness of achieving the j-th national development goal;

Lij(base) is the baseline (planned or reference) level of influence of the same technology on the achievement of the j-th goal.

Using the indicators calculated according to expression (1), it is possible to assess the overall impact of basic cross-cutting digital technologies on the effectiveness of achieving the national development goals of the Russian Federation through the following model:

$$I0 = \Sigma (Iij \times \alpha ij), \quad (2)$$

where αij is the normalized weighting coefficient of the indicator Iij, reflecting the significance of the influence of the i-th basic cross-cutting digital technology on the effectiveness of achieving the j-th national goal.

Thus, the proposed approach allows for assessing not only the direct impact of digitalization on the achievement of the national development goals of the Russian Federation (for example, national goal (g): digital transformation of public and municipal governance, the economy, and the social sphere — see Fig. 5), but also the indirect impact of digital technologies on the achievement of all national development goals of the Russian Federation, as defined by Presidential Decree No. 309 dated May 7, 2024 [25].

It should be noted that this approach can be further detailed, particularly to assess the influence of digitalization on the effectiveness of implementing elements of the Unified Plan for achieving the national development goals of the Russian Federation by 2030 and in the long-term perspective until 2036 [5]. An example of such detailing, related to the national goal "Preservation

of the population, strengthening health and well-being, and support for families" [25], is presented in Figure 6.

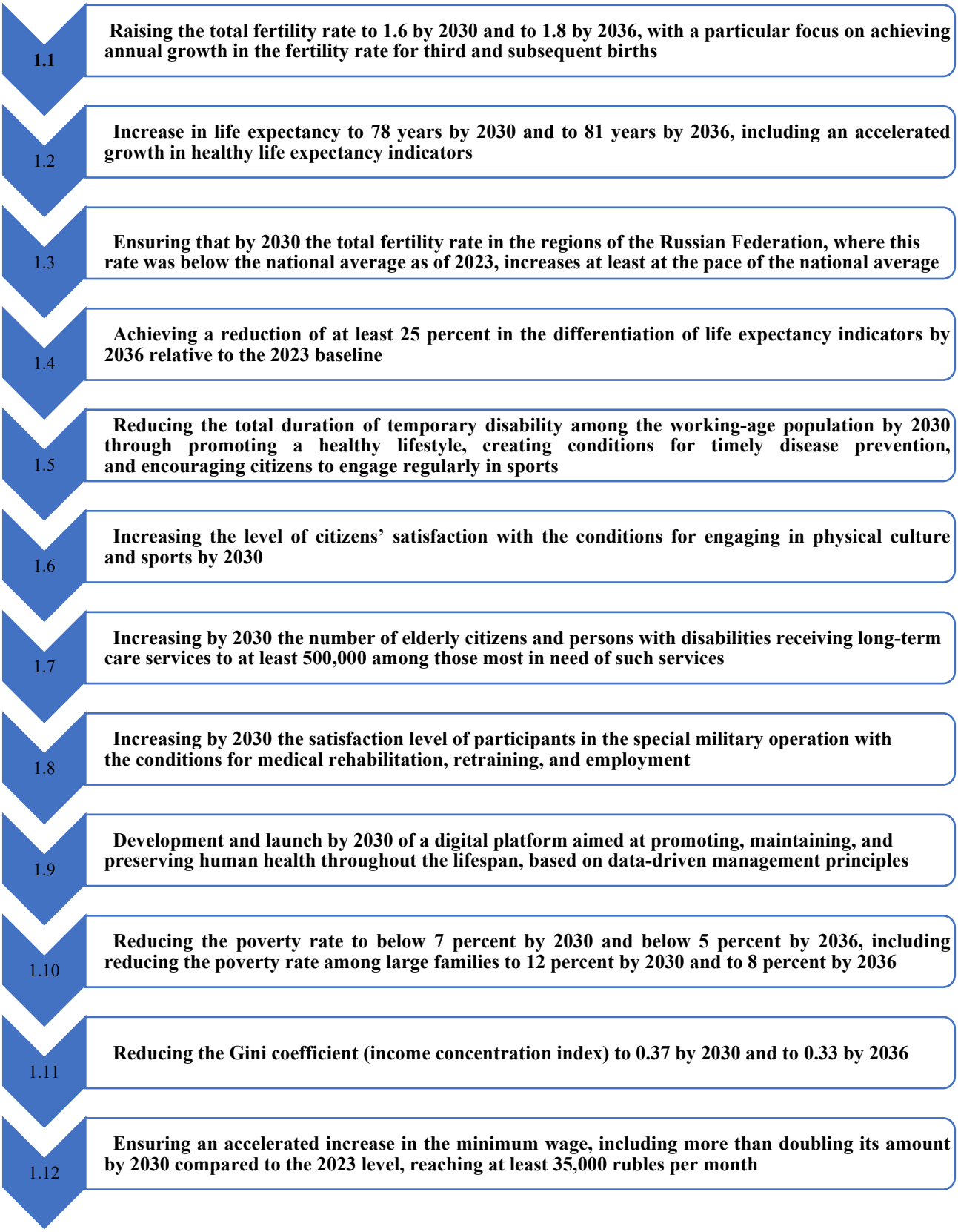

Figure 6. Tasks for achieving the national goal "Population preservation, health improvement, and enhancement of well-being, family support" [25], as defined in the Unified Plan for Achieving the National Development Goals of the Russian Federation until 2030 and with a perspective until 2036, approved by the Government of the Russian Federation [5]

Discussion of Results and Conclusions

The conducted research has demonstrated that the issue of assessing the impact of the level of digitalization on achieving the national development goals of the Russian Federation remains unresolved.

In this regard, the study examined the possibility of evaluating the influence of basic cross-cutting digital technologies, as defined by the "Digital Economy of the Russian Federation" program, on the implementation of the national development goals, the achievement processes of which have been detailed in the Unified Plan of the Government of the Russian Federation for achieving these goals.

Based on the set of basic cross-cutting digital technologies and the composition of the national development goals of the Russian Federation, an influence matrix mapping the former to the latter was constructed.

Each indicator IijIij of the matrix {Iij}{Iij} is proposed to be described as the ratio of the actual level of influence of the ii-th basic cross-cutting digital technology on the efficiency of achieving the jj-th national goal to the baseline (planned or reference) level of influence of the same technology on the efficiency of achieving that goal.

It has been shown that using these indicators, one can assess the overall level of influence of basic cross-cutting digital technologies on the effectiveness of achieving the national development goals of the Russian Federation through a weighted additive model, where IijIij are the indicators and αijαij are normalized weighting coefficients reflecting the significance of the influence of the ii-th digital technology on the achievement of the jj-th national goal.

Overall, the proposed approach allows evaluation not only of the direct impact of digitalization on achieving the national development goals but also of the indirect influence of digital technologies on all the national development goals defined by Presidential Decree No. 309 of May 7, 2024.

It was demonstrated that the proposed method can be further detailed, particularly for assessing the influence of digitalization on the effectiveness of implementing components of the Unified Plan for achieving the national development goals of the Russian Federation up to 2030 and with a perspective up to 2036.

References

1. Abramov V.I., Andreev V.D. Analysis of Digital Transformation Strategies of Russian Regions in the Context of Achieving National Goals // Issues of State and Municipal Administration, 2023, No. 1, pp. 89–119.
2. Bocharnikov I.V., Chemezov N.A. Problems and Priorities of Digitalization Policy in Russia // Science. Society. Defense, Moscow, 2020; 8(2):19.
3. Breakthrough Strategy and Digital Reality of Russia. Socio-Political Situation and Demographic Status in 2019: Collective Monograph, eds. G.V. Osipova, S.V. Ryazantsev, V.K. Levashov, T.K. Rostovskaya. Moscow: ITD “PERSPEKTIVA”, 2019. 786 p.
4. Chernykh S.I., Baybulatova D.V. National Project (Program) “Digital Economy of the Russian Federation”: Problems of Goal-Setting and Financing // ETAP: Economic Theory, Analysis, Practice, 2023, No. 2, pp. 19–38.
5. Dobrolyubova E.I., Starostina A.N. Assessment of Digitalization in the Interaction Between State and Citizens // Statistics and Economics, 2021, Vol. 18, No. 2, pp. 45–56.
6. Kondratyev A.Yu., Surat L.I., Tebekin A.V. “Digital Curator” Technology as a Tool for Improving the Effectiveness of Methodological Training Systems in Subject Areas Based on Informatization // In: Informatization of Education and Methodology of E-Learning: Digital Technologies in Education. Proceedings of the 7th International Scientific Conference, Krasnoyarsk, 2023, pp. 361–365.
7. Khalin V.G., Chernova G.M. Digitalization and Its Impact on the Russian Economy and Society: Advantages, Challenges, Threats, and Risks // Management Consulting, 2021, No. 10, p. 46.

8. Ledneva O.V., Sidorova O.E. Analysis of the Results of the National Project “Digital Economy” Implementation in the Russian Federation // Informatization in the Digital Economy, 2025, Vol. 6, No. 2.
9. Ledneva O.V. Statistical Study of the Level of Digitalization of the Russian Economy: Problems and Prospects // Issues of Innovative Economy, 2021, Vol. 11, No. 2, pp. 455–470.
10. Martin James. Viewdata and the Information Society. Englewood Cliffs, N.J.: Prentice-Hall, 1982. 293 p.
11. Presidential Decree of the Russian Federation No. 309 of May 7, 2024 “On the National Development Goals of the Russian Federation until 2030 and with a Perspective to 2036”. http://www.kremlin.ru/acts/bank/50542.
12. Program “Digital Economy of the Russian Federation”. Approved by the Government of the Russian Federation Order No. 1632-r of July 28, 2017. https://www.garant.ru/products /ipo/prime/doc/71634878/.
13. Schwab K. The Fourth Industrial Revolution. Moscow: Eksmo, 2016. 138 p.
14. Tebekin A.V. Criteria for Assessing the Effectiveness of Change Management in the Digital Economy // In: Digital Transformation of Social and Economic Systems. Proceedings of the International Scientific and Practical Conference, Moscow, 2024, pp. 66–75.
15. Tebekin A.V. Assessment of the Impact of Central Bank Digital Currencies on Financial System Stability // Journal of Economic Research, 2022, Vol. 8, No. 3, pp. 53–69.
16. Tebekin A.V., Anisimov E.G., Tebekin P.A., Egorova A.A. Analysis of Industrial Revolution Signs in the Initiative “Industry 4.0” // Transport Affairs of Russia, 2021, No. 2, pp. 13–21.
17. Tebekin A.V., Egorova A.A. Digital Economy as a Source of Economic Growth // Journal of Economic Research, 2019, Vol. 5, No. 6, pp. 3–9.
18. Tebekin A.V., Mitropolskaya-Rodionova N.V., Khoreva A.V. Change Management in Socio-Economic Systems under Digital Transformation // In: Digital Transformation of Social and Economic Systems. Proceedings of the International Scientific and Practical Conference, ed. I. A. Korolkova, Moscow, 2022, pp. 70–79.
19. Tebekin A.V., Mitropolskaya-Rodionova N.V., Khoreva A.V. Digital Transformation of the Russian Economy: Problems and Prospects // In: Theoretical and Practical Aspects of Digitalization of the Russian Economy. Proceedings of the 4th International Scientific and Practical Conference, Yaroslavl State Technical University, Yaroslavl Regional Government, Yaroslavl, 2021, pp. 167–172.
20. Tebekin A.V., Petrov V.S. Opportunities of Digital Transformation to Improve the Efficiency of Monetary Settlements Management in Russia // Journal of Economic Research, 2021, Vol. 7, No. 2, pp. 48–53.
21. Tebekin A.V., Petrov V.S., Petrova O.V. Impact of Central Bank Digital Currencies on Financial Flows Management in the Economy // Journal of Economic Research, 2022, Vol. 8, No. 1, pp. 62–72.
22. Tebekin A.V., Petrov V.S., Petrova O.V. Risks of Implementing the Digital Ruble in Russia // Journal of Economic Research, 2023, Vol. 9, No. 4, pp. 46–57.
23. Tebekin A.V., Surat L.I., Kondratyev A.Yu. Informatization of Methodological Training Systems in Subject Areas and Metasubject Application of Digital Resources in Education // Journal of Pedagogical Research, 2023, Vol. 8, No. 3, pp. 14–25.
24. Tebekin A.V., Tebekin P.A., Egorova A.A. Analysis of National Economy Development Prospects through Implementation of Cross-Cutting Digital Technologies // Journal of Economic Research, 2020, Vol. 6, No. 4, pp. 3–18.
25. Tebekin A.V., Tebekin P.A., Egorova A.A. Is the Initiative “Industry 4.0” an Industrial Revolution? // Theoretical Economics, 2021, No. 7 (79), pp. 59–73.
26. Tebekin A.V., Khoreva A.V. Assessment of the Development Potential of Logistics Systems as a Result of Digital Technologies Implementation // Journal of Management Studies, 2021, Vol. 7, No. 2, pp. 51–62.

27. Tinkov S.A. Problematic Issues in Assessing the Level of Digitalization of the Economy // Bulletin of the Altai Academy of Economics and Law, 2021, No. 5-2, pp. 281–287.
28. The Fourth Industrial Revolution: Internet of Things, Circular Economy, and Blockchain. http://www.furfur.me/furfur/changes/changes/216447-4-aya-promyshlennaya-revolyutsiya.
29. Unified Plan for Achieving the National Development Goals of the Russian Federation until 2030 and Beyond 2036 (approved by the Government of the Russian Federation). February 13, 2025. https://www.garant.ru/products/ipo/prime/doc/411156963/.
30. Yuzhakov V.N., Pokida A.N., Zybunovskaya N.V., Starostina A.N. Digitalization of Interaction Between Citizens and the State: Citizens' Assessment of Effects, Risks, and Prospects // Issues of State and Municipal Administration, 2023, No. 2, pp. 33–73.