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THE CONTRIBUTION OF ARTIFICIAL INTELLIGENCE TO THE DEVELOPMENT OF AN INNOVATIVE CULTURE AND IMPROVING THE QUALITY OF HIGHER EDUCATION

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Original research

A B S T R A C T

The research aims to identify the trends and prospects for developing a digital society under the influence of AI, using Russia as a case study. This empirical research is based on the practical experience of the world's top 20 countries in AI development in 2020 and 2024, as reflected in the socio-economic statistics of these nations. As a result, the authors developed an econometric model of AI's impact on the digital society in Russia and other leading AI countries. Drawing on this model, the primary conclusion is that the key specific conditions for the diffusion of AI, which, in turn, shape the development of a digital society in Russia, are the innovativeness of AI technologies, social adaptation to AI, and the accessibility and reliability of AI infrastructure. The scientific novelty and theoretical contribution of this research lie in clarifying the social consequences of modernizing economic systems based on AI. The comparative and trend analysis reveals that Russia's AI exhibits high global competitiveness (with Russia ranking among the world leaders in overall terms and specific conditions for AI diffusion during 2020–2024), as well as favorable trends in AI (five-year trends indicating improvements in overall and specific conditions for AI diffusion), which encourage further development of the digital society in Russia. The research outlines the prospects for developing a digital society in Russia under the influence of AI through two alternative scenarios – one envisioning the evolution of the digital society in Russia and the other suggesting enhanced inclusiveness, thus highlighting the alternative nature of these digital society characteristics.

1. INTRODUCTION

Social and scientific-technological progress are intimately intertwined, which has led to the succession of two distinct forms of economic organization in the 21st century. The Fourth Industrial Revolution served as a catalyst for the emergence of the "information society." In the era of Industry 4.0, information drove social development. This shift was reflected in the rise of knowledge-based employment, the increasing value of higher education, the promotion of lifelong learning, and the active engagement of workers in corporate R&D processes to create and optimally utilize new valuable information – knowledge, technologies, and know-how (Gilbert, 2024).

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The recent advent of the Fifth Industrial Revolution has paved the way for a new form of economic organization – the digital society. Its defining feature is that, while all types of information continue to hold high value, smart automation tools based on artificial intelligence (AI) are increasingly employed to process this information. The fusion of social and technological transformations manifests in forming cyber-social systems. However, these systems are ambiguous and often unfriendly to individuals, who face growing psychological pressure and risk a social crisis due to the lag in adapting socially to technological progress.

From an economic perspective, the Fourth and Fifth Industrial Revolutions are equivalent because both have boosted economic efficiency by creating new high-tech markets, expanding production capacities, and accelerating economic growth. Technologically, Industry 5.0 is even more attractive, given the vast, untapped potential for automating economic processes with AI, while Industry 4.0 introduced less radical technological changes. However, from a social standpoint, the Fifth Industrial Revolution poses a serious threat to social stability and well-being.

In the information society, new technologies were generally embraced to stimulate development and unlock human potential, enhancing labor productivity and infusing work with greater intellectual and creative value. In contrast, in the digital society, new technologies often carry a distinctly negative connotation and are viewed with caution. Although Industry 5.0 brings certain improvements to social processes (such as streamlined communication and scalable AI-driven information and consulting services), the proliferation of AI technologies is accompanied by numerous social side effects.

Among these side effects, in the realm of consumption, is the limited functionality of the information and consulting services provided by AI, which cannot be replaced by human effort, as the introduction of AI is typically preceded by a mass displacement of workers – a "side effect" in the labor market. This reality underscores the need for in-depth scientific exploration of the social consequences of modernizing economic systems based on AI. Considering these arguments, the research aims to identify the trends and prospects for developing a digital society under the influence of AI, using Russia as a case study.

2. LITERATURE REVIEW

2.1 Scientific and Theoretical Perspective on the Digital Society from an SDG Perspective

A digital society is a social system in which social interactions are carried out using digital technologies (Alotaibi & Aljaafari, 2024; Couture et al., 2024; Hong et al., 2025; Montezuma et al., 2025; Muñoz-Pradas et al., 2025; Neri & Cordeiro, 2025; Rohayati & Abdillah, 2024). To accurately interpret the changes occurring in the digital society, it is advisable to analyze them from the perspective of the Sustainable Development Goals (SDGs) because this allows for a clear distinction between changes related to the enhancement of the digital society's development level and those associated with increased inclusiveness.

The literature review identified the following key positive changes in the digital society in accordance with the SDGs. The changes that contribute to the enhancement of the digital society's development level are as follows:

- An increase in the population's basic ICT skills, contributing to the achievement of SDG 10 (DSL_1) (Onorboyev et al., 2024);
- The training of highly qualified ICT specialists and researchers in higher education contributing to the achievement of SDG 4 (DSL_2) (Andekina et al., 2024);
- A rise in ICT employment and a corresponding expansion of the ICT segment in the labor market, contributing to the achievement of SDG 8 (DSL_3) (Otakuzieva, 2023);
- The development of an electronic civil society contributing to the achievement of SDG 17 (DSL_5) (Lisina et al., 2022);
- The growth of Internet activity among the population, contributing to the achievement of SDG 9 (DSL_6) (Mkrtchyan et al., 2024).

The changes related to enhancing the inclusiveness of the digital society include the following:

- Ensuring gender neutrality on the Internet by increasing its use among women, contributing to the achievement of SDG 5 (DSI_1) (Abdumalikova, 2022);
- Reducing inequality by decreasing the proportion of youth who are neither educated nor employed, contributing to the achievement of SDG 16 (DSI_2) (Buitek et al., 2023).

The selected indicators are reflected in official international statistics, making them applicable in empirical research for monitoring the development of digital society across countries worldwide.

2.2 AI as a Factor of Social Transformation in Today's World

AI is a universal technological solution with a wide range of practical applications, integrated into numerous automated systems in Industry 5.0 (Ammah et al., 2024; Gerlich, 2025; Hassan et al., 2025; Kumar & Choudhury, 2024; Rajan, 2025). However, AI technologies are heterogeneous; their practical use requires a series of preparatory measures (Capone et al., 2024; Ferhataj et al., 2025; Hirata, 2024; Nechesov et al., 2025; Pecheranskyi et al., 2024; Romano, 2025; Tagarro, 2024). As a driver of social transformation in today's world, AI influences these changes depending on the following conditions:

- The comprehensiveness and robustness of the legal framework, as well as the clarity and observance of ethical standards for AI usage in society (CAI_1) (Przhedetskiy et al., 2019);

- The digital functional potential of AI and the extent of its implementation in the social environment (CAI_2) (Mukhomorova et al., 2020);
- The degree to which AI technologies are adapted to address specific social challenges (CAI_3) (Tursunov, 2022);
- The maturity, technical complexity, and level of detail of AI technologies, along with the reliability of the engineering support for their deployment (CAI_4) (Abdurakhmanova et al., 2022);
- The innovativeness of AI technologies, which affects their uniqueness and appeal to innovators (CAI_5) (Kirillova et al., 2023);
- Social adaptation to AI in terms of developing digital competencies, psychological preparedness, and enhancing professional skills and retraining (CAI_6) (Lobova et al., 2020);
- The accessibility and reliability of AI infrastructure, referring to households' provision of necessary technical devices and services (CAI_7) (Kobilov et al., 2023);
- The accessibility of data for AI analytics, which sets the boundaries of its functionality in society (CAI_8) (Karbekova et al., 2023);
- The representativeness of the data processed by AI for its high-quality and effective operation (CAI_9) (Omir et al., 2024).

The favorability of these conditions determines the strength and nature of AI's influence on social transformation in the world.

2.3 Analyzing Gaps in the Concept of Cyber-Social Systems

The concept of cyber-social systems represents a multidisciplinary field of research that examines the interplay between society and technology in the context of the Fifth Industrial Revolution (Bogoviz, 2020; Daribekova et al., 2023; Popkova et al., 2021; Samieva et al., 2023). In these systems, the social component is embodied by the digital society, while the technological component is centered around AI, which serves as the core of Industry 5.0.

A comprehensive literature review has revealed a well-developed understanding of this research problem, resulting in a clear, theoretically informed perspective on the digital society in terms of the SDGs, as well as a lucid conceptualization of AI as a driver of social transformation in the modern world. However, a gap remains at the intersection of digital society theory and AI regarding the specific conditions that influence the development of a digital society under the impact of AI – this constitutes the research question of the present research.

Addressing this identified gap in the literature is essential. Without specifying the conditions related to AI, assessing its impact on the digital society is difficult. While the overall conditions for the diffusion of AI within the economic system may improve, this can be accompanied by a deterioration in specific conditions that could be crucial for developing a digital society. To fill this gap, this research examines the influence of each identified AI condition on the development of the digital society, thereby isolating the most significant factors and determining their individual effects on both the level of digital society development and its inclusiveness.

3. MATERIALS AND METHODOLOGY

3.1 Sample and Empirical Base of the Research

To study leading international practices, this research sample includes the top 20 countries in the world in terms of AI development, including Russia. The selection criterion was the "Government AI Readiness Index" ratings for 2024 by Oxford Insights (2025), which represent the highest scores among all countries in this global ranking. The empirical foundation of the research comprises, first, the digital society statistics for 2024 based on materials from UNDP & MBRF (2023), as presented in Table 1.

Table 1. Statistics of the digital society in 2024, %

Country	Individuals with standard ICT skills	Tertiary graduates from ICT programs	ICT employment	E-participation	Internet activities by individuals	Female-to-male ratio in Internet usage	Youth not in employment, education, or training
	DSL_1	DSL_2	DSL_3	DSL_4	DSL_5	DSI_1	DSI_2
Australia	0.0	44.2	43.3	98.9	0.0	99.0	88.7
Austria	70.7	28.7	43.9	77.3	73.1	98.4	77.4
Belgium	57.3	16.6	53.9	45.5	75.4	98.8	92.0
Canada	0.0	33.3	0.0	83.0	0.0	0.0	78.7
Denmark	72.8	33.9	54.4	88.6	89.7	100.0	92.8
Finland	70.7	45.2	67.2	95.5	85.7	99.5	89.9
France	62.4	21.1	43.6	71.6	69.1	98.7	81.7
Germany	42.7	30.2	43.4	72.7	60.2	97.5	91.9
Ireland	52.0	47.8	78.3	68.2	0.0	100.0	92.6
Malaysia	72.0	45.7	14.6	68.2	78.0	97.0	77.5

Netherlands	71.6	22.3	55.9	96.6	100.0	97.6	100.0
Norway	80.2	34.9	55.5	69.3	92.3	100.0	93.9
Russia	19.1	30.8	20.3	60.2	46.8	99.0	76.5
Saudi Arabia	100.0	59.1	0.0	69.3	52.8	100.0	63.4
Singapore	57.2	59.7	69.7	97.7	84.1	98.1	93.3
South Korea	74.8	29.1	42.7	94.3	91.6	98.8	78.7
Sweden	54.8	33.0	80.1	72.7	84.2	100.0	96.0
UAE	98.0	36.7	28.6	78.4	64.2	100.0	62.3
UK	67.2	26.1	51.8	95.5	73.9	99.1	82.2
USA	0.0	29.9	52.4	90.9	0.0	100.0	78.8

Source: Developed by the authors based on the materials from UNDP & MBRF (2023).

Second, this research is also based on Oxford Insights (2025) statistics characterizing the conditions for AI diffusion in the sample countries (Table 2).

Table 2. Conditions for the proliferation of AI, score 0–100

Country	**Government AI readiness index**	**Governance and ethics**	**Digital capacity**	**Adaptability**	**Maturity**	**Innovation capacity**	**Human capital**	**Infrastructure**	**Data availability**	**Data representativeness**
		CAI_1	CAI_2	CAI_3	CAI_4	CAI_5	CAI_6	CAI_7	CAI_8	CAI_9
Australia	76.45	96.18	75.25	73.30	35.00	71.88	61.89	68.39	93.32	99.00
Austria	72.84	91.72	60.92	60.85	43.99	62.90	62.80	64.53	87.68	98.50
Belgium	72.69	92.00	68.25	64.79	44.92	70.63	53.14	59.45	84.26	98.01
Canada	78.18	94.14	69.77	78.03	52.09	64.81	68.17	70.40	93.15	98.50
Denmark	74.71	97.38	66.05	72.85	42.30	66.44	62.76	72.94	78.01	97.73
Finland	76.48	96.88	66.92	75.62	42.38	70.46	69.75	72.60	80.55	98.05
France	79.36	91.44	86.07	63.66	51.34	70.77	68.48	76.20	92.55	99.00
Germany	76.90	94.19	69.08	53.68	52.36	74.06	68.32	74.86	87.98	96.80
Ireland	73.18	94.14	53.60	54.14	53.13	55.56	65.68	67.32	91.02	99.50
Malaysia	79.98	89.91	75.49	72.97	38.61	80.54	68.66	86.26	98.32	93.64
Netherlands	71.40	83.47	77.52	68.88	33.78	60.42	68.31	57.45	86.36	88.86
Norway	77.23	96.42	81.87	60.02	50.32	68.71	61.31	79.53	86.47	95.00
Russia	76.12	96.35	75.93	73.23	46.52	69.11	53.20	71.09	87.97	98.05
Saudi Arabia	64.72	66.97	65.39	56.25	20.41	54.24	61.48	49.36	86.79	93.72
Singapore	72.36	74.88	78.24	69.77	31.65	61.69	65.41	73.71	90.19	86.39
South Korea	84.25	89.90	84.24	89.70	54.53	74.95	76.47	84.61	95.65	99.15
Sweden	75.40	96.23	74.17	52.01	44.05	78.48	67.82	73.55	78.02	94.90
UAE	75.66	78.89	91.30	65.37	37.59	67.26	72.75	74.96	79.70	97.00
UK	78.88	93.88	74.14	69.85	56.55	79.89	63.25	69.72	87.13	100.00
USA	87.03	91.14	89.20	76.69	83.80	92.48	66.56	88.38	84.81	99.50
Average in 2024	76.19	90.30	74.17	67.58	45.77	69.76	65.31	71.77	87.50	96.56
Average in 2020	72.93	74.63	74.14	70.24	42.39	66.35	67.86	75.45	85.41	90.89

Source: Developed by the authors based on the materials from Oxford Insights (2025).

In addition to the baseline statistics, Table 2 summarizes the calculated arithmetic mean values of the CAI1-9 indicators for the sample in 2024 and 2020 to examine the data over the last five years.

3.2 Procedure and Methodology of the Research

This research is conducted in three stages. The first stage involves modeling the impact of AI on the development of the digital society in Russia and other leading AI nations. For this purpose, the authors employed a correlation analysis to establish relationships, along with a regression analysis to identify how changes in the digital society in terms of its development level (DSL_{1-5}) and its inclusiveness (DSI_{1-2}) depend on the conditions for AI diffusion (CAI_{1-9}).

Based on this analysis, only those conditions that trigger positive changes in the digital society, namely, an

improvement in its development level and an increase in its inclusiveness, are selected; the nature and strength of their influence on these aspects are compared.

The second stage consists of assessing competitiveness and identifying trends in AI development in Russia. For this purpose, a trend analysis is conducted to calculate the growth rate of the selected specific conditions for AI diffusion and the overall conditions for AI diffusion in 2024 compared to 2020. A comparative analysis is also applied to determine the ratio of the values of the selected specific AI diffusion conditions and the overall AI diffusion conditions in Russia to the arithmetic mean for the sample in 2020 and 2024. This reveals the five-year trends in AI diffusion in Russia and provides an essential interpretation of them.

The third stage involves determining the prospects for developing a digital society in Russia depending on AI's impact. Forecasting and scenario analysis methods are used to develop two alternative scenarios for the next five years (up to 2029).

The first scenario, "the digital society in Russia under the assumption of 'all else being equal,'" is developed by substituting the forecasted values of the selected specific AI diffusion conditions – assuming the continuation of the previous five-year trends – into the regression equations for digital society development and inclusiveness.

The second scenario, which envisions an acceleration in the development of the digital society in Russia through the optimization of AI's influence, is formulated by substituting the optimal possible values (100 points) for the selected specific AI diffusion conditions into the regression equations for digital society development and inclusiveness. The scenarios are then compared in terms of the growth rate of the statistical indicators.

4. RESULTS

4.1 The Model of AI's Impact on the Development of the Digital Society in Russia and Other Leading AI Nations

At this first stage of the research, a model of AI's impact on the development of the digital society in Russia and other leading AI nations was constructed, comprising seven multiple linear regression equations. The equation for SDG 10 took the following form:

$$DSL_1=134.31-1.32CAI_1-0.15CAI_2-0.58CAI_3-1.15CAI_4-0.48CAI_5+1.09CAI_6+1,11CAI_7-1.59CAI_8++1.72CAI_9,\ R^2=0.6979 \quad (1)$$

From model (1), it follows that the conditions for AI diffusion account for 69.79% of the variance in the population's basic ICT skills in the digital society. Positive effects on DSL_1 were demonstrated by the conditions CAI_5, CAI_6, CAI_7, and CAI_9. The equation for SDG 4 took the following form:

$$DSL_2=142.29-1.08CAI_1-0.85CAI_2+0.03CAI_3-0.43CAI_4--0.13CAI_5-0.32CAI_6+1.24CAI_7-0.10CAI_8++0.22CAI_9,\ R^2=0.8165 \quad (2)$$

From model (2), it follows that the conditions for AI diffusion explain 81.65% of the variance in the training of highly qualified ICT specialists and researchers in higher education. Positive effects on DSL_2 were demonstrated by CAI_3, CAI_7, and CAI_9. The equation for SDG 8 took the following form:

$$DSL_3=363.72+1.40CAI_1-0.29CAI_2-37CAI_3+0.72CAI_4--0.25CAI_5+0.81CAI_6-0.06CAI_7-1.40CAI_8--3.53CAI_9,\ R^2=0.6905 \quad (3)$$

From model (3), it follows that the conditions for AI diffusion account for 69.05% of the variance in ICT employment in the digital society. Positive effects on DSL_3 were demonstrated by CAI_1, CAI_4, and CAI_6. The equation for SDG 17 took the following form:

$$DSL_4=101.09+0.30CAI_10.08CAI_2+0.88CAI_3+0.17CAI_4+0.17CAI_5+1.46CAI_6-0.61CAI_7-0.40CAI_8--1.42CAI_9,\ R^2=0.7416 \quad (4)$$

From model (4), it follows that the conditions for AI diffusion account for 74.16% of the variance in the development of the electronic civil society. Positive effects on DSL_4 were demonstrated by CAI_1, CAI_3, CAI_4, CAI_5, and CAI_6. The equation for SDG 9 took the following form:

$$DSL_5=394.07+1.23CAI_1+0.39CAI_2+0.19CAI_3-1.17CAI_4+0.43CAI_5+0.83CAI_6+0.23CAI_7-1.85CAI_8--3.84CAI_9,\ R^2=0.6407 \quad (5)$$

From model (5), it follows that the conditions for AI diffusion explain 64.07% of the variance in Internet activity among the population in the digital society. Positive effects on DSL_5 were demonstrated by CAI_1, CAI_2, CAI_3, CAI_5, CAI_6, and CAI_7. The equation for SDG 5 took the following form:

$$DSI_1=180.30-0.70CAI_1+0.01CAI_2-0.69CAI_3--0.64CAI_4+0.75CAI_5-0.88CAI_6+0.89CAI_7-0.82CAI_8++0.68CAI_9,\ R^2=0.5165 \quad (6)$$

From model (6), it follows that the conditions for AI diffusion account for 51.65% of the variance in Internet gender neutrality within the digital society. Positive effects on DSI_1 were demonstrated by CAI_2, CAI_5, CAI_7, and CAI_9.

The equation for SDG 16 took the following form:

$$DSI_2=258.86+1.35CAI_1-0.06CAI_2-0.05CAI_3+0.31CAI_4-0.05CAI_5+0.30CAI_6-0.48CAI_7-0.06CAI_8--2.90CAI_9,\ R^2=0.8890 \quad (7)$$

From model (7), it follows that the conditions for AI diffusion account for 88.90% of the variance in inequality in terms of the share of youth lacking education and employment within the digital society. Positive effects on DSI_2 were demonstrated by CAI_1, CAI_4, and CAI_6. The results of the regression analysis are summarized in Figure 1.

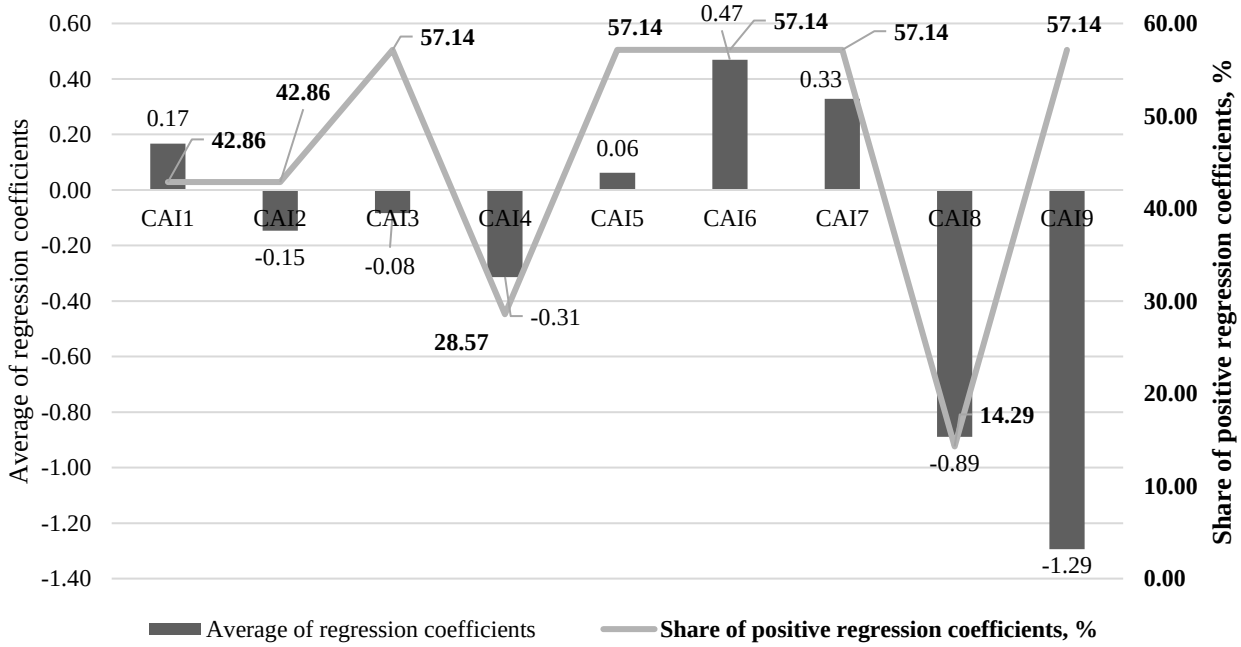

Figure 1. Generalized results of regression analysis.
Source: Developed by the authors.

Thus, according to Figure 1, only three specific conditions for AI diffusion demonstrated a statistically significant relationship – a sufficiently high correlation (exceeding 50.00%, specifically 57.14%) – with the development of the digital society, along with a positive arithmetic mean of the regression coefficients: CAI_5 (0.06), CAI_6 (0.47), and CAI_7 (0.33). Consequently, the key specific conditions for AI diffusion that determine the development of the digital society in Russia are (1) the innovativeness of AI technologies, (2) social adaptation to AI, and (3) the accessibility and reliability of AI infrastructure.

4.2 Competitiveness and Trends of AI Development in Russia

In the second stage of this research, the authors conducted a trend analysis on the statistics from Table 2 to identify current trends in AI development in Russia. This analysis made it possible to determine the growth rate of the selected specific AI diffusion conditions and the overall conditions for AI diffusion in 2024 compared to 2020 (Figure 2).

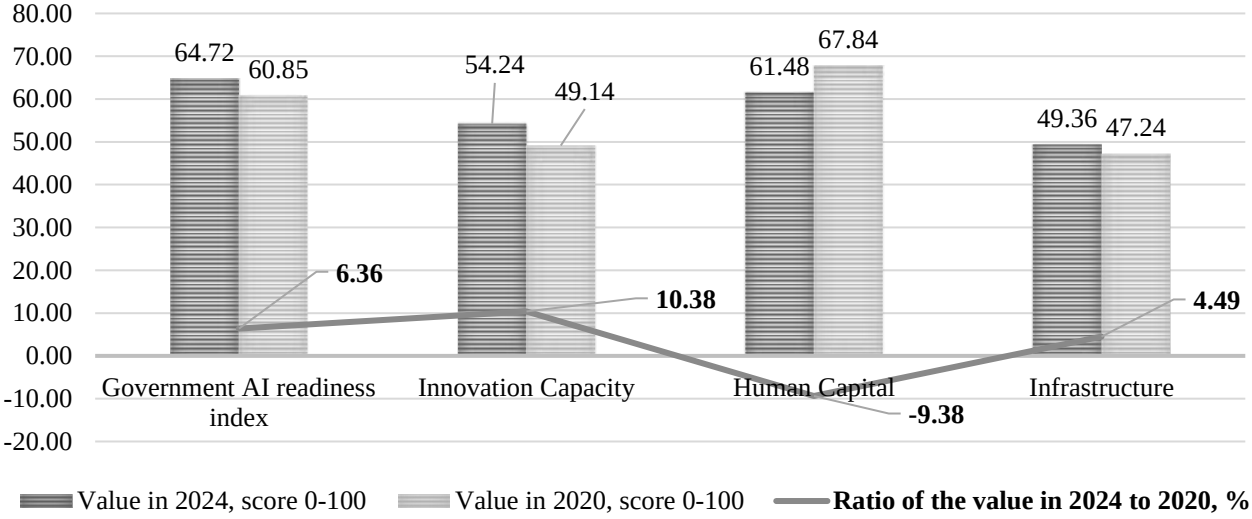

Figure 2. Trends of AI development in Russia in 2020–2024.
Source: Developed by the authors.

The results of the trend analysis, summarized in Figure 2, revealed the following contemporary trends representing the five-year trends in AI development in Russia:

- An improvement in the overall conditions for AI diffusion in Russia, evidenced by a 6.36% increase in the government and society's readiness index for AI from 60.85 points in 2020 to 64.72 points in 2024;
- A more complete realization of AI's innovative potential in Russia and an enhancement of its global competitive advantages, reflected in a 10.38% rise in the innovativeness of AI technologies from 49.14 points in 2020 to 54.24 points in 2024;
- A lag in social progress behind technological progress in Russia, accompanied by a 9.38% decrease in the level of social adaptation to AI from 67.84 points in 2020 to 61.48 points in 2024;
- An increase in the accessibility and reliability of AI infrastructure in Russia, marked by a 4.49% improvement in the level of AI infrastructure development from 47.24 points in 2020 to 49.36 points in 2024.

Additionally, the assessment of AI competitiveness in Russia and its changes over the past five years was conducted by calculating the ratio of the values of the selected specific conditions for AI diffusion and the overall conditions for AI diffusion in Russia to the arithmetic mean for the sample in 2020 and 2024 (Figure 3).

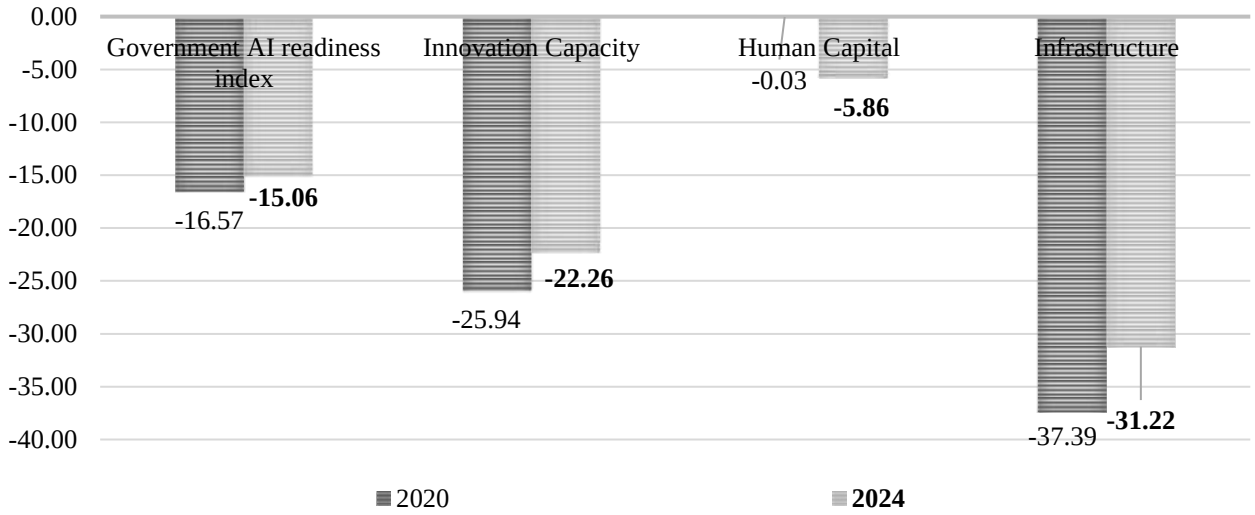

Figure 3. Competitiveness of AI in Russia in 2020 and 2024, %.
Source: Developed by the authors.

The results of the comparative analysis presented in Figure 3 revealed, first, a reduction in Russia's lag behind other leading AI nations in overall conditions for AI diffusion – from 16.57% in 2020 to 15.06% in 2024. Second, the gap in the innovativeness of AI technologies narrowed from 25.94% in 2020 to 22.26% in 2024. Third, Russia's lag in social adaptation to AI deepened, increasing from 0.03% in 2020 to 5.86% in 2024. Fourth, Russia reduced its lag in the accessibility and reliability of AI infrastructure from 37.39% in 2020 to 31.22% in 2024.

Thus, overall, the global competitiveness of AI in Russia is quite high because the country demonstrates results comparable to those of other leading AI nations in overall terms and in all of the key specific conditions for AI diffusion that are crucial for developing the digital society. On average, Russia's lag in AI development relative to other leading nations was approximately 11% in 2020 ((15.06+22.26+5.86+31.22)/4 = 11.07) and 2024 ((16.57+25.94+0.03+37.39)/4 = 11.70), which is negligible.

The substantive interpretation of these five-year trends in AI diffusion in Russia based on a dynamic analysis of official international statistics characterizes them as reflecting improvements in overall and specific conditions for AI diffusion that are conducive to further development of the digital society in Russia.

4.3 Prospects for the Development of Digital Society in Russia Depending on the Influence of AI

At this third stage of the research, two alternative forecast scenarios have been developed to determine the prospects for developing the digital society in Russia, depending on the impact of AI, for the next five-year period (until 2029). The first scenario envisions the digital society in Russia based on a forecast of AI development "all else being equal." To construct this scenario, the preceding five-year trends in the selected specific conditions for AI diffusion (trends illustrated in Figure 2) are maintained. The forecasted values for CAI_5, CAI_6, and CAI_7 have been substituted into regression equations (1)–(7), with the results shown in Figure 4.

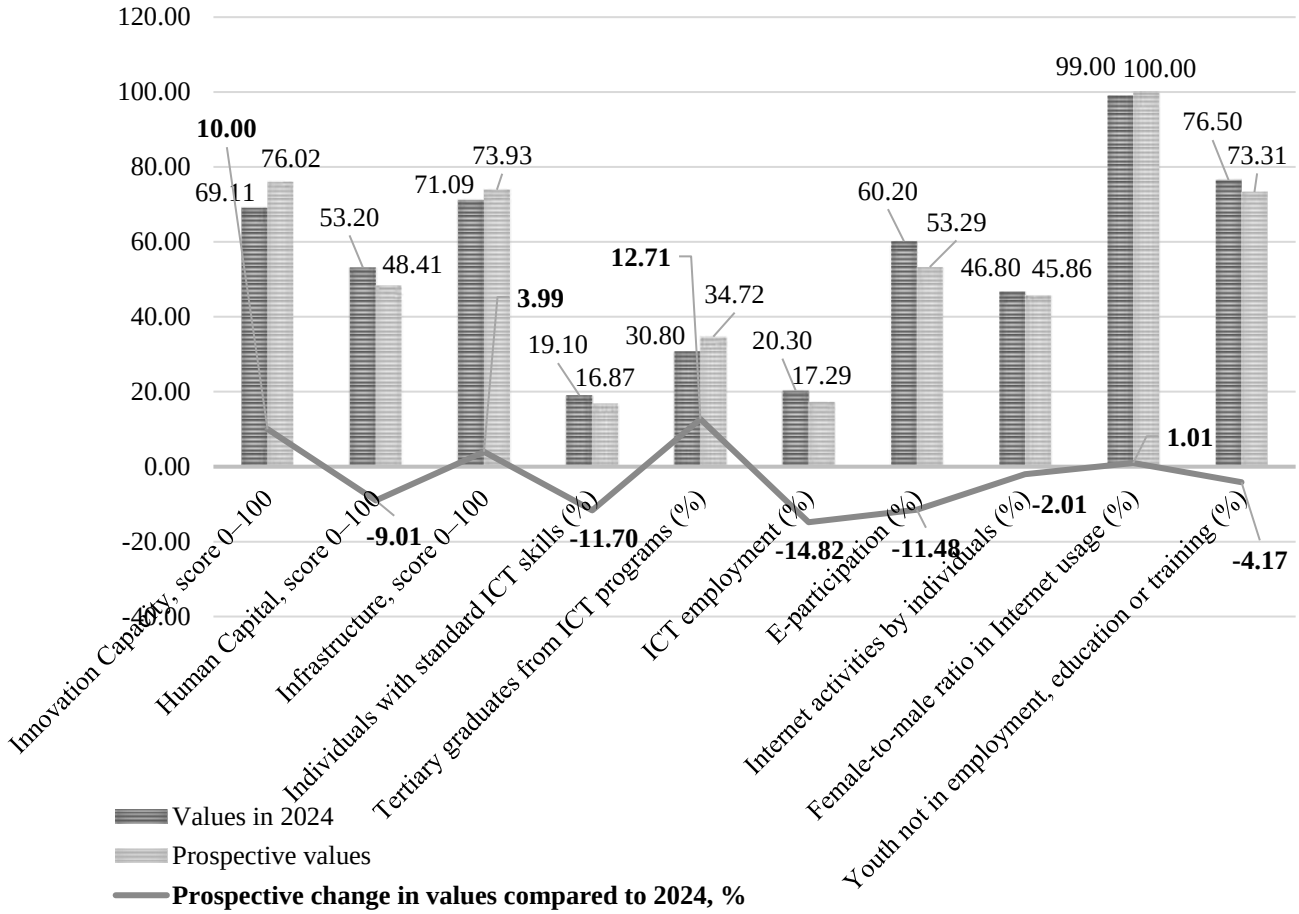

Figure 4. The perspective of the digital society in Russia under the forecast of AI development "other things being equal."
Source: Developed by the authors.

As shown in Figure 4, the "all else being equal" forecast suggests the following future trends for the selected specific conditions for AI diffusion:

- A 10.00% increase in the innovativeness of AI technologies, from 69.11 points in 2024 to 76.02 points;
- A 9.01% decrease in the level of social adaptation to AI, from 53.20 points in 2024 to 48.41 points;
- A 3.99% increase in the development level of AI infrastructure, from 71.09 points in 2024 to 73.93 points.

Based on this "all else being equal" forecast, the scenario for the development of the digital society in Russia envisions the following:

- A reduction in the proportion of the population with basic ICT skills in the digital society (due to a revision of these basic skills as digital technologies become more complex and modernized) by 11.70%, from 19.10% in 2024 to 16.87%;
- An increase in the training of highly qualified ICT specialists and researchers in higher education by 12.71%, from 30.80% in 2024 to 34.72%;
- A decrease in ICT employment in the digital society by 14.82%, from 20.30% in 2024 to 17.29%;
- A reduction in the share of the electronic civil society by 11.48%, from 60.20% in 2024 to 53.29%;
- A decline in the proportion of the digital society's population exhibiting Internet activity by 2.01%, from 46.80% in 2024 to 45.86%;
- The achievement of complete gender neutrality on the Internet in the digital society, thanks to an increase in the proportion of women (relative to men) using the Internet by 1.01%, from 99.00% in 2024 to 100.00%;
- A reduction in inequality within the digital society by decreasing the proportion of youth who are neither educated nor employed by 4.17%, from 76.50% in 2024 to 73.31%.

The second scenario for the digital society in Russia is based on a forecast of accelerated development resulting from the optimization of the selected specific conditions for AI diffusion. For this forecast, the maximum possible (i.e., optimal) values (100 points) for CAI_5, CAI_6, and CAI_7 were substituted into regression equations (1)–(7). This second scenario is illustrated in Figure 5.

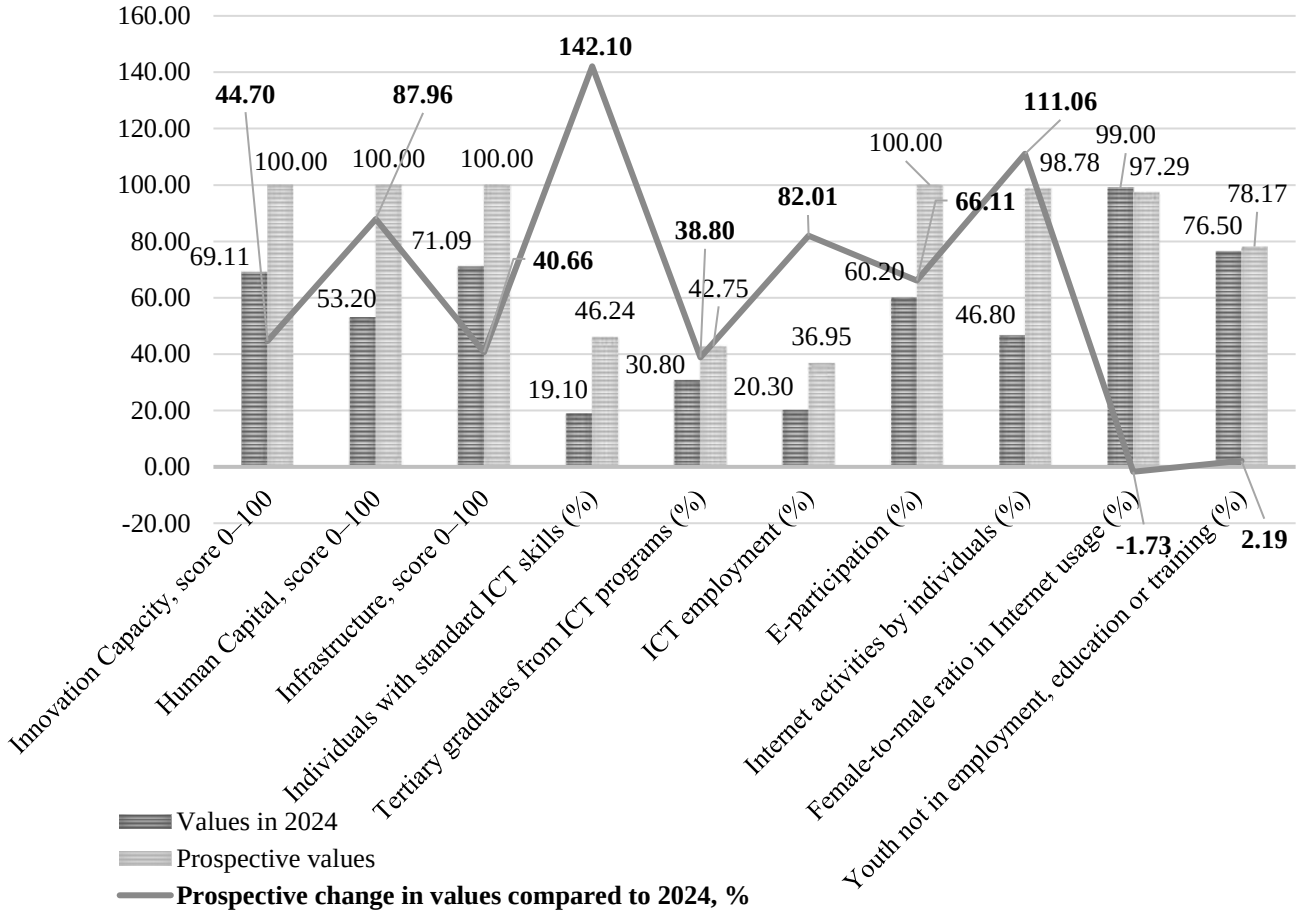

Figure 5. The prospect of accelerating the development of digital society in Russia while optimizing the impact of AI.
Source: Developed by the authors.

As shown in Figure 5, the optimization forecast is associated with the following future trends in the selected specific conditions for AI diffusion:

- A 44.70% increase in the innovativeness of AI technologies, from 69.11 points in 2024 to 100.00 points;
- An 87.96% improvement in the level of social adaptation to AI, from 53.20 points in 2024 to 100.00 points;
- A 40.66% rise in the development of AI infrastructure, from 71.09 points in 2024 to 100.00 points.

Based on this optimization forecast, the scenario for the development of the digital society in Russia offers the following prospects:

- An increase in the share of the population possessing basic ICT skills in the digital society by 142.10%, from 19.10% in 2024 to 46.24%;
- A 38.80% improvement in the training of highly qualified ICT specialists and researchers in higher education, from 30.80% in 2024 to 42.75%;
- An 82.01% increase in ICT employment in the digital society, from 20.30% in 2024 to 36.95%;
- A 66.11% expansion of the electronic civil society, from 60.20% in 2024 to 100.00%;
- A 111.06% increase in the share of the digital society's population exhibiting Internet activity, from 46.80% in 2024 to 98.78%;
- A reduction in Internet gender neutrality due to a decrease in the proportion of women (relative to men) using the Internet by 1.73%, from 99.00% in 2024 to 97.29%;
- A 2.19% rise in inequality within the digital society, resulting from an increased share of youth who are neither educated nor employed, from 76.50% in 2024 to 78.17%.

Thus, the results of the scenario analysis indicate that the scenario based on the "all else being equal" forecast for the selected key conditions for AI diffusion implies a surge in the inclusiveness of the digital society but also a contradictory development that poses a risk of crisis.

The alternative scenario, which is based on the optimization forecast for the selected key conditions for AI diffusion, is more favorable because it, despite a slight decline in inclusiveness, ensures a significant enhancement in the development level of the digital society, thereby promising substantial social, technological, and economic progress in the coming years.

5. DISCUSSION

The achieved results contribute to the findings of Bogoviz (2020), Daribekova et al. (2023), Popkova et al. (2021), and Samieva et al. (2023), complementing the theoretical foundations of the cyber-social systems concept with a new perspective on the interplay between society and technology in the context of the Fifth Industrial Revolution. The findings of this research provide a clearer explanation of the integrative interaction between the social component of cyber-social systems, represented by the digital society, and the technological component (i.e., AI, which serves as the core of Industry 5.0) by specifying the conditions for AI diffusion upon which its contribution to the development of the digital society depends (Table 3).

Table 3. Identified the relationship of conditions for AI diffusion with inclusiveness and development of digital society in Russia

Conditions for the proliferation of AI	Coverage in the past literature	Mean of regression coefficients	Share of positive regression coefficients, %
The comprehensiveness and robustness of the legal framework and ethical standards for AI use in society	Przhedetskiy et al. (2019)	0.17	42.86
The digital functional potential of AI	Mukhomorova et al. (2020)	-0.15	42.86
The degree to which AI technologies are adapted to address specific societal challenges	Tursunov (2022)	-0.08	57.14
The maturity of AI technologies, reflected in their technical complexity and level of detail	Abdurakhmanova et al. (2022)	-0.31	28.57
The innovativeness of AI technologies	Kirillova et al. (2023)	0.06	57.14
Social adaptation to AI	Lobova et al. (2020)	0.47	57.14
The accessibility and reliability of AI infrastructure	Kobilov et al. (2023)	0.33	57.14
The availability of data for AI analytics	Karbekova et al. (2023)	-0.89	14.29
The representativeness of the data processed by AI	Omir et al. (2024)	-1.29	57.14

Source: Developed by the authors.

As shown in Table 3, the presented research has demonstrated that significant positive contributions to the development of the Russian digital society are made by the innovative advancement of AI technologies (regression: 0.06, correlation: 57.14%, confirming the findings of Kirillova et al. (2023)), social adaptation to AI (regression: 0.47, correlation: 57.14%, confirming Lobova et al. (2020)), and the enhancement of the accessibility and reliability of AI infrastructure (regression: 0.33, correlation: 57.14%, confirming Kobilov et al. (2023). Thus, these factors are the key specific conditions for AI diffusion that determine the development of the digital society in Russia.

In contrast, the remaining conditions for AI diffusion examined in the research demonstrated either statistically insignificant relationships or even negative impacts on the Russian digital society. These include the comprehensiveness and robustness of the legal framework and ethical standards for AI use in society (in contrast to Przhedetskiy et al. (2019)), the digital functional potential of AI (in contrast to Mukhomorova et al. (2020)), the degree to which AI technologies are adapted to address specific societal challenges (in contrast to Tursunov (2022)), the maturity of AI technologies in terms of technical complexity and level of detail (in contrast to Abdurakhmanova et al. (2022)), the availability of data for AI analytics (in contrast to Karbekova et al. (2023)), and the representativeness of the data processed by AI (in contrast to Omir et al. (2024)).

The scientific novelty of this research lies in the systemic, theoretically grounded perspective on the digital society from the standpoint of the SDGs under the influence of AI diffusion. Contrary to Abdumalikova (2022) and Buitek et al. (2023), the research has found that the current level of digital society development in Russia is very high and comparable to that of global leaders; however, its further improvement will require the implementation of specific measures in Russia.

In opposition to Andekina et al. (2024), Lisina et al. (2022), Mkrtchyan et al. (2024), Onorboyev et al. (2024), and Otakuzieva (2023), the research establishes that while the inclusiveness of the digital society in Russia is very high, it remains incomplete. Nevertheless, it shows an upward trend and could become significantly more comprehensive in the coming years if current trends persist.

6. CONCLUSION

Thus, the results achieved in this research provide a comprehensive and detailed scientific examination of the social consequences of modernizing economic systems based on AI. The findings are as follows:

1. An econometric model of AI's impact on the digital society in Russia and other leading AI nations was developed, revealing previously unknown causal relationships between the development of the digital society and changes in its inclusiveness. The

theoretical significance of the new model lies in its identification of the key specific conditions for AI diffusion that determine the development of the digital society in Russia, namely, the innovativeness of AI technologies, social adaptation to AI, and the accessibility and reliability of AI infrastructure;

2. The research substantiates the high global competitiveness of AI in Russia (overall and in terms of the selected specific conditions for AI diffusion, with Russia lagging behind global leaders by an average of no more than 12% during 2020–2024) and positive trends in AI (five-year trends showing improvements in both overall and specific conditions for AI diffusion) that are conducive to further development of the digital society in Russia;
3. The prospects for developing the digital society in Russia under the influence of AI have been elucidated through two alternative scenarios. The scenario based on the "all else being equal" forecast for the selected key conditions for AI diffusion suggests progress in the inclusiveness of the digital society. However, it is accompanied by contradictory effects that may jeopardize its overall development. As a more favorable alternative, a scenario based on the optimization forecast for the selected key conditions for AI diffusion is proposed because it predicts a substantial enhancement in the development level of the digital society despite a slight decline in inclusiveness.

The author's recommendations for improving state regulation of AI diffusion within each scenario have practical significance because they will enable a fuller realization of the digital society's potential in Russia and increase the predictability and flexibility of state social policy through the precise selection of regulatory measures either to support increased inclusiveness or to accelerate the digital society's development.

The social significance of these results lies in their deepening of scientific understanding and in revealing the prospects for the sustainable development of the digital society through the diffusion of AI technologies. On the one hand, the research identifies a high current level of digital society development in Russia, comparable to that of global leaders, although recent trends indicate contradictory changes that call for state support to sustain further growth. On the other hand, while the inclusiveness of the digital society in Russia is high, it remains incomplete. However, there is a clear trend toward reducing inequality.

The author's proposals for enhancing the digital society in Russia will accelerate the achievement of SDG 4, SDG 8, SDG 9, SDG 10, and SDG 17, while measures to sustain the growth in inclusiveness will further contribute to achieving SDG 5 and SDG 16.

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