

# IMPROVING BUSINESS INNOVATION MANAGEMENT THROUGH ARTIFICIAL INTELLIGENCE

Konina, Olga V.<sup>1</sup>

Received 01.02.2024.

Revised 11.03.2024.

Accepted 21.03.2024.

## Keywords:

*Artificial intelligence, innovation management, business management, research and development, technological modernization of management, management efficiency.*

## ABSTRACT

*The research aims to determine the prospects for improving innovation management in business using artificial intelligence (AI). To achieve the research goal, the author examined the international experience of 33 countries as of the end of 2023, relevant at the beginning of 2024, with reference to IMD statistics. As a result, the author developed an econometric model of innovation management in business using AI and alternative digital technologies. The model has shown that instead of risks, implementing AI generates advantages for innovation management in business. The main conclusion is that the application of AI is preferable for innovation management compared to alternative digital technologies because it makes it possible to significantly increase the results and reduce the costs of such management. Therefore, the authors proposed a new approach to innovation management in business, which achieves a high level of management automation based on AI for the first time. The theoretical significance of the obtained results and the author's conclusions is explained by the fact that they revealed the cause-and-effect relationships of using AI in innovation management in business. The managerial significance of this research lies in the fact that the application of the new approach will increase the efficiency of innovation management in business.*

## Original research



© 2024 Journal of Trends and Challenges in Artificial Intelligence

## 1. INTRODUCTION

Artificial intelligence (AI) represents an advanced technology that is increasingly prevalent across various sectors of the digital economy and its economic processes. The utilization of AI extends beyond manufacturing and encompasses business management. AI has gained the widest adoption among managerial practices in production management, where these technologies ensure production automation and continuous, high-precision quality control. Furthermore, AI is applied in the realm of HR management, contributing to enhancing workforce

inclusiveness and promoting fairness in the distribution of workloads, remuneration, and career management among employees. Thanks to AI, precise tracking of individual contributions to the business performance of each employee becomes possible, alongside ongoing monitoring of adherence to work schedules, corporate dress code requirements, and the identification of conflicts within the workforce.

It is also necessary to mention the active utilization of AI in business marketing management, where these technologies make it possible to collect a significantly larger volume of managerial (marketing) information and greatly accelerate its processing. AI also facilitates

<sup>1</sup> Corresponding author: Konina, Olga V.  
Email: [koninaov@mail.ru](mailto:koninaov@mail.ru)

continuous communication with stakeholders, ensures the targeted address of marketing communications, and offers flexible customization – standardization or individualization as necessary.

Supply chain and sales management are other areas of business management where AI is quite actively employed. These technologies offer opportunities to enhance the flexibility and efficiency of logistics. Intellectual decision-making support assists in selecting the most suitable partners, considering the business preferences.

Innovation management is one of the few management practices where the use of AI remains low. It is believed that innovation activity is one of the weak points of AI, where human intelligence surpasses it. Due to this circumstance, various digital technologies are actively used in the field of innovation management in business, not as means of automating R&D or as tools for intellectual decision support in innovation management but as auxiliary instruments for data collection, storage, and transmission.

This poses a scientific-practical problem of lower productivity of managerial work and lower effectiveness of innovation management in business compared to other management practices. It hinders business innovation activity and slows the pace of innovation economy development. Therefore, the relevance lies in the scientific exploration of the possibilities of applying AI to the practice of innovation management in business.

The above has defined the goal of this research, which is to determine the prospects for improving innovation management in business using AI. The novelty of this research lies in proposing a new approach to innovation management in business, where a high level of management automation based on AI is achieved for the first time.

The research section of this paper develops a model of innovation management in business using AI and alternative digital technologies. As a result, the author developed a new approach to innovation management in business based on the use of AI.

## **2. LITERATURE REVIEW**

### **2.1. The Existing Approach to Innovation Management in Business**

The fundamental basis of this research is the theory of innovation management as a managerial process in business (Abidin et al., 2024; Luo, 2024; Zare Khafri et al., 2023). The existing approach to innovation management in business allows and encourages the active use of digital technologies in management as tools of managerial work (Nu Minh Quyen & Khuong, 2024). In the established approach, the decision-maker in innovation management is the responsible manager (Walrave et al., 2024).

The essence of decision-making in innovation management lies in the intuitive decision-making by the manager, as innovations belong to the realm of creative

work (An & Mikhaylov, 2024). On the one hand, this allows the manager to think unconventionally, select and make creative decisions, and accelerate the decision-making process. On the other hand, intuitive decision-making entails high risks for the business innovation activity.

The labor intensity of R&D processes is high because research personnel play a key role in this process (Hamid et al., 2024; Jasin et al., 2024). Innovation sources can vary. It is permissible to acquire ready-made innovations, including borrowing technologies from competitors, as well as to form innovation teams to create fundamentally new innovations and adapt new technologies to the needs and specifics of business activities (Malakhatka et al., 2024).

### **2.2. Artificial Intelligence in Innovation Management in Business**

The advanced experience of using AI in business management is thoroughly discussed and examined in the available scientific literature (Benzidia et al., 2024; Jakobsen et al., 2024; Sullivan et al., 2024). Nevertheless, the issues regarding the application of AI in innovation management in business are underexplored and largely undefined, which is a drawback of the existing literature and presents a gap therein.

Separate published sources listed potential risks associated with the application of AI in business management, interpreted as barriers to the expansion of the use of these technologies in this managerial practice. These potential risks, linked to the deterioration of parameters (results and costs, as well as their ratio, from the standpoint of which the efficiency of innovation management is determined) in business innovation management, include the following:

- The risk of damaging managers' reputations due to the transition of managerial powers and responsibilities to AI (Mariani & Dwivedi, 2024);
- The risk of limiting women's participation in R&D and innovation management due to the transition of this management to a higher level of technical complexity (Jin et al., 2024);
- The risk of reducing R&D productivity in terms of researchers' publication activity because when AI is used, R&D results are expressed not in publications but in ideas (Shi & Wang, 2024);
- The risk of incomplete consideration of financial risk factors and inefficiency of financial risk management due to insufficient data for AI-driven management (Guo et al., 2024);
- The risk of return on investment in innovation due to increased business expenditures on R&D and decreased economic efficiency of innovation management (Yang, 2024);
- The risk of mass layoffs among researchers and a reduction in the number of knowledge-intensive jobs due to the automation of innovation management (Richardson et al., 2024).

According to the conducted literature review, potential risks associated with the use of AI in innovation management in business are unconfirmed and merely

speculative. This raises the following research question (RQ): How does the use of AI affect the parameters (results and costs) of innovation management in business?

The consequences of the considered technologies in innovation management in business remain unknown. Drawing on a series of existing evidence of the benefits derived from the application of AI in innovation management (Joshi & Negi, 2024; Kulkarni et al., 2024; Xiao & Su, 2024), this research proposes the following hypothesis (H): the application of AI makes it possible to improve parameters (results and costs) of innovation management in business and is preferable for innovation management compared to alternative digital technologies.

The author verifies the proposed hypothesis (H) through economic and mathematical modeling of the causal relationships between the use of AI in innovation management and the outcomes of this managerial practice in business, drawing on international experience.

### 3. MATERIALS AND METHODOLOGY

#### 3.1. Sampling and Indicator System for the Research

The empirical basis of this research consists of materials from the official international statistics of IMD (2024), which are publicly available. The research sample includes countries for which a complete set of data on statistical indicators selected for this research is available. The sample encompasses countries with different levels and rates of socio-economic development from various geographical regions of the world, ensuring adequate completeness of the sample for obtaining objective results on a global economic scale.

The period of the research is 2023 (using data from the end of the year, relevant as of the beginning of 2024). The results of innovation management in business are measured using the following indicators:

- Credibility of managers ( $R_{IM1}$ );
- Female researchers ( $R_{IM2}$ );
- R&D productivity by publication ( $R_{IM3}$ );
- Financial risk factor ( $R_{IM4}$ );
- Business expenditure on R&D (\$) ( $R_{IM5}$ );
- Total R&D personnel in business per capita ( $R_{IM6}$ ).

The statistical indicator of the use of AI in business management is represented by the indicator “Use of big data and analytics” ( $T_{AI}$ ) because AI is applied in conjunction with big data and serves as a means of intelligent (automated) big data analytics.

The indicator “Use of digital tools and technologies” ( $T_{DT}$ ) is introduced as a control variable reflecting the use of alternative (in contrast to AI) digital technologies in business management. Since the statistics for this research constitute a massive table, it is attached to this research as a separate file. This attached file presents all data in Microsoft Excel format, making the results of this research available for public scrutiny.

#### 3.2. Research Design and Methodology

The stated objective is addressed through the following two research tasks. The first task involves developing an econometric model for innovation management in business using AI and alternative digital technologies. This task is accomplished through correlation and regression analysis methods. The correlation analysis method is utilized to determine the strength of the relationship between the studied indicators.

The regression analysis is employed to identify dependencies of innovation management outcomes in business on two factors: (1) the use of AI in management and (2) the use of alternative digital technologies in business management compared to AI. The research model takes the following form:

$$R_{IM} = \alpha + \beta_{AI} * T_{AI} + \beta_{DT} * T_{DT} \quad (1)$$

Model (1) is constructed for each individual outcome of innovation management in business ( $R_{IM1}$ - $R_{IM6}$ ). The quality of the regression models is evaluated using Fisher's F-test. In the model, the regression coefficients ( $\beta_{AI}$  and  $\beta_{DT}$ ) are compared. Depending on the values (positive or negative) of the regression coefficients and which one is greater, conclusions are drawn regarding which technologies (AI or alternative digital technologies) make the greatest contribution to improving innovation management outcomes in business and are, therefore, preferable.

The second task of this research is to develop a new approach to innovation management in business based on the use of AI. The author's approach is schematically presented using scientific visualization methods (graphic method). To address this task, the author applied a comparative analysis method to compare the new approach with the existing one and demonstrate the differences between them.

To scientifically substantiate the advantages and quantitatively measure the consequences of the practical application of the new approach, the author turns to forecasting methods. According to Model (1), the forecasted values of innovation management outcomes in business are compared for alternative approaches to management: (1) under the existing approach – the maximum possible value of  $T_{DT}$  (10 points) is substituted into Model (1); (2) under the new approach – the maximum possible value of  $T_{AI}$  (10 points) is substituted into Model (1).

The forecasted changes in indicator values for each approach are determined using trend analysis. Improvements in indicator values (a more optimal trend) and a more pronounced positive effect are interpreted as advantages of the respective approach and arguments in favor of its application.

## 4. RESULTS

### 4.1. Model of Business Innovation Management Through AI and Alternative Digital Technologies

To address the first task of this research and conduct the econometric modeling of innovation management in

business using AI and alternative digital technologies, the authors conducted correlation and regression analyses of data from the statistics appendix to this article. The results of the correlation and regression analyses, reflecting the relationship between managers' reputation ( $R_{IM1}$ ) and the application of AI and alternative digital technologies, are presented in Table 1.

**Table 1.** Results of correlation and regression analysis for  $R_{IM1}$

Regression statistics	Multiple R	R <sup>2</sup>	Normalized R <sup>2</sup>	Standard error	Observations (n)	Number of factor variables (m)
	0.5513	0.3039	0.2575	0.7161	33	2
Variance analysis	-	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F observed</i>	<i>Significance F</i>
	Regression	2	6.7156	3.3578	6.5482	0.0044
	Residual	30	15.383	0.5128	Significance level: 0.01	
	Total	32	22.0991	-	-	-
Regression model parameters and F-test	-	<i>Coefficients</i>	<i>Standard error</i>	<i>k<sub>1</sub></i>	<i>k<sub>2</sub></i>	<i>F tabulated</i>
	Constant	2.5150	0.9487	m	n-m-1	
	T <sub>AI</sub>	0.0080	0.3351	2	33-2-1=30	5.3903
	T <sub>DT</sub>	0.5521	0.3124	Fisher's F-Test passed (6.5482>5.3903)		

**Source:** Calculated and compiled by the author.

The results from Table 1 indicate that managers' reputation in business from late 2023 to early 2024 is by 55.13% determined by the combined influence of the use of AI and its alternative digital technologies. The results of the regression analysis passed the F-test. Therefore, they are reliable at a significance level of 0.01. This allows the author to construct the following regression model:

$$R_{IM1}=2.5150+0.0080*T_{AI}+0.5521*T_{DT} \quad (2)$$

According to model (2), with the increase in the activity of using AI in innovation management by 1 point, the

reputation of managers increases by 0.0080 points. With the increase in the activity of applying alternative digital technologies in business management by 1 point, the reputation of managers increases by 0.5521 points. Consequently, the use of AI makes a significantly smaller (compared to alternative digital technologies) and weak (almost negligible) contribution to strengthening the reputation of managers. However, it does not diminish it. The results of the correlation and regression analysis, reflecting the relationship between women's participation in R&D ( $R_{IM2}$ ) with the use of AI and its alternative digital technologies, are presented in Table 2.

**Table 2.** Results of correlation and regression analysis for  $R_{IM2}$

Regression statistics	Multiple R	R <sup>2</sup>	Normalized R <sup>2</sup>	Standard error	Observations (n)	Number of factor variables (m)
	0.5090	0.2590	0.2096	7.8089	33	2
Variance analysis	-	df	SS	MS	F observed	Significance F
	Regression	2	639.5329	319.7665	5.2439	0.0111
	Residual	30	1829.3583	60.9786	Significance level: 0.05	
	Total	32	2468.8913	-	-	-
Regression model parameters and F-test	-	Coefficients	Standard error	k <sub>1</sub>	k <sub>2</sub>	F tabulated
	Constant	45.8220	10.3451	m	n-m-1	
	T <sub>AI</sub>	11.2644	3.6543	2	33-2-1=30	3.3158
	T <sub>DT</sub>	-10.8002	3.4064	Fisher's F-Test passed (5.2439>3.3158)		

**Source:** Calculated and compiled by the author.

The results from Table 2 indicate that the involvement of women in R&D activities in business from late 2023 to early 2024 is by 50.90% determined by the combined influence of using AI and its alternative digital technologies. The results of the regression analysis passed the F-test. Therefore, they are reliable at a

significance level of 0.05. This allows the author to formulate the following regression model:

$$R_{IM2}=45.8220+11.2644*T_{AI}-10.8002*T_{DT} \quad (3)$$

According to model (3), with the increase in the activity of using AI in innovation management by 1 point, the proportion of women among researchers conducting R&D increases by 11.2644%. With the increase in the

activity of applying alternative digital technologies in business management by 1 point, the proportion of women among researchers conducting R&D decreases by 10.8002%.

Therefore, the use of AI makes a significant and much greater contribution to expanding the opportunities for women's participation in R&D compared to alternative

digital technologies, the application of which, on the contrary, narrows these opportunities. The results of the correlation and regression analysis, reflecting the relationship between R&D productivity in terms of researchers' publication activity ( $R_{IM3}$ ) with the use of AI and its alternative digital technologies, are presented in Table 3.

**Table 3.** Results of correlation and regression analysis for  $R_{IM3}$

Regression statistics	Multiple R	R <sup>2</sup>	Normalized R <sup>2</sup>	Standard error	Observations (n)	Number of factor variables (m)
	0.3423	0.1172	0.0583	16773.4937	33	2
Variance analysis	-	df	SS	MS	F observed	Significance F
	Regression	2	1120516570.8111	560258285.4055	1.9913	0.1542
	Residual	30	8440502690.8130	281350089.6938	Significance level: 0.20	
	Total	32	9561019261.6241	-	-	-
Regression model	-	Coefficients	Standard error	k <sub>1</sub>	k <sub>2</sub>	F tabulated
	Constant	61054.7387	22221.3483	m	n-m-1	1.6990
	T <sub>AI</sub>	1698.1292	7849.4460	2	33-2-1=30	
	T <sub>DT</sub>	-8548.3189	7316.8620	Fisher's F-Test passed (6.5482>1.6990)		

**Source:** Calculated and compiled by the author.

The results from Table 3 indicate that the productivity of R&D activities in terms of researchers' publication activity from late 2023 to early 2024 is by 34.23% determined by the combined influence of the use of AI and its alternative digital technologies. The results of the regression analysis passed the F-test. Therefore, they are reliable at a significance level of 0.20. This allows the author to formulate the following regression model:

$$R_{IM1}=61054.7387+1698.1292 \cdot T_{AI}-8548.3189 \cdot T_{DT} \quad (4)$$

According to model (4), with the increase in the activity of using AI in innovation management by 1 point, the number of scientific articles over R&D expenditure increases by 1698.1292% of GDP. With the increase in

the activity of applying alternative digital technologies in business management by 1 point, the number of scientific articles over R&D expenditure decreases by 8548.3189% of GDP.

Therefore, the use of AI makes a significant and much greater contribution to increasing R&D productivity in terms of publication activity than alternative digital technologies, the application of which, on the contrary, reduces this productivity. The results of the correlation and regression analysis, reflecting the relationship between the success of managing financial risks in business ( $R_{IM4}$ ) with the use of AI and its alternative digital technologies, are presented in Table 4.

**Table 4.** Results of correlation and regression analysis for  $R_{IM4}$

Regression statistics	Multiple R	R <sup>2</sup>	Normalized R <sup>2</sup>	Standard error	Observations (n)	Number of factor variables (m)
	0.4899	0.2400	0.1893	1.2343	33	2
Variance analysis	-	df	SS	MS	F observed	Significance F
	Regression	2	14.4310	7.2155	4.7363	0.0163
	Residual	30	45.7035	1.5235	Significance level: 0.05	
	Total	32	60.1346	-	-	-
Regression model parameters and F-test	-	Coefficients	Standard error	k <sub>1</sub>	k <sub>2</sub>	F tabulated
	Constant	0.9630	1.6352	m	n-m-1	3,3158
	T <sub>AI</sub>	0.5520	0.5776	2	33-2-1=30	
	T <sub>DT</sub>	0.3309	0.5384	Fisher's F-Test passed (4.7363>3.3158)		

**Source:** Calculated and compiled by the author.

The results from Table 4 signify that the success in managing financial risks in business from late 2023 to early 2024 is by 48.99% determined by the combined influence of using AI and its alternative digital

technologies. The results of the regression analysis passed the F-test. Therefore, they are reliable at a significance level of 0.05. This allows the author to formulate the following regression model:

$$R_{IM4}=0.9630+0.5520*T_{AI}+0.3309*T_{DT} \quad (5)$$

According to model (5), with the increase in using AI in innovation management by 1 point, the success in managing financial risks in business increases by 0.5520 points. With the increase in applying alternative digital technologies in business management by 1 point, the success in managing financial risks in business increases to a much lesser extent – by 0.3309 points.

Therefore, the use of AI makes a significantly greater contribution (compared to alternative digital technologies) to enhancing the success of managing financial risks in business. The results of the correlation and regression analysis, reflecting the relationship between business expenditure on R&D ( $R_{IM5}$ ) with the use of AI and its alternative digital technologies, are presented in Table 5.

**Table 5.** Results of correlation and regression analysis for  $R_{IM5}$

Regression statistics	Multiple R	R <sup>2</sup>	Normalized R <sup>2</sup>	Standard error	Observations (n)	Number of factor variables (m)
	0.2998	0.0899	0.0292	29328.8040		2
Variance analysis	-	df	SS	MS	F observed	Significance F
	Regression	2	2548340105.1197	1274170052.5598	1.4813	0.2435
	Residual	30	25805362248.7930	860178741.6264	Significance level: 0.25	
	Total	32	28353702353.9127		-	-
Regression model parameters and F-test	-	Coefficients	Standard error	k <sub>1</sub>	k <sub>2</sub>	F tabulated
	Constant	21399.4750	38854.4916	m	n-m-1	
	T <sub>AI</sub>	23602.9630	13724.9203	2	33-2-1=30	1.4524
	T <sub>DT</sub>	18674.8422	12793.6860	Fisher's F-Test passed (1.4813>1.4524)		

**Source:** Calculated and compiled by the author.

The results from Table 5 indicate that business expenditure on R&D at the end of 2023 to the beginning of 2024 is by 29.98% determined by the combined influence of using AI and its alternative digital technologies. The results of the regression analysis passed the F-test. Thus, they are reliable at a significance level of 0.25. This allows the author to formulate the following regression model:

$$R_{IM5}=21399.4750-23602.9630 *T_{AI}+18674.8422*T_{D} \quad (6)$$

According to model (6), with the increase in the use of AI in innovation management by 1 point, business expenditure on R&D decreases by \$23602.9630 million. Conversely, with the increase in the activity of applying

alternative digital technologies in business management by 1 point, business expenditure on R&D increases by \$18674.8422 million.

Therefore, the use of AI makes a significant and greater contribution to enhancing the success and profitability of investments in innovation by reducing R&D expenses, compared to alternative digital technologies, the application of which, on the contrary, requires an increase in R&D expenses in business. The results of the correlation and regression analysis, reflecting the relationship between the labor intensity of R&D in business ( $R_{IM6}$ ) with the use of AI and its alternative digital technologies, are presented in Table 6.

**Table 6.** Results of correlation and regression analysis for  $R_{IM6}$

Regression statistics	Multiple R	R <sup>2</sup>	Normalized R <sup>2</sup>	Standard error	Observations (n)	Number of factor variables (m)
	0.6747	0.4553	0.4190	1.8208	33	2
Variance analysis	-	df	SS	MS	F observed	Significance F
	Regression	2	83.1272	41.5636	12.5369	0.0001
	Residual	30	99.4592	3.3153	Significance level: 0.01	
	Total	32	182.5864	-	-	-
Regression model parameters and F-test	-	Coefficients	Standard error	k <sub>1</sub>	k <sub>2</sub>	F tabulated
	Constant	-6.8294	2.4122	m	n-m-1	
	T <sub>AI</sub>	-2.1385	0.8521	2	33-2-1=30	5.3903
	T <sub>DT</sub>	3.4335	0.7943	Fisher's F-Test passed (12.5369>5.3903)		

**Source:** Calculated and compiled by the author.

The results from Table 6 indicate that the labor intensity of R&D in business at the end of 2023 to the beginning

of 2024 is by 67.47% determined by the combined influence of using AI and its alternative digital

technologies. The results of the regression analysis passed the F-test. Thus, they are deemed reliable at a significance level of 0.01. This allows the author to formulate the following regression model:

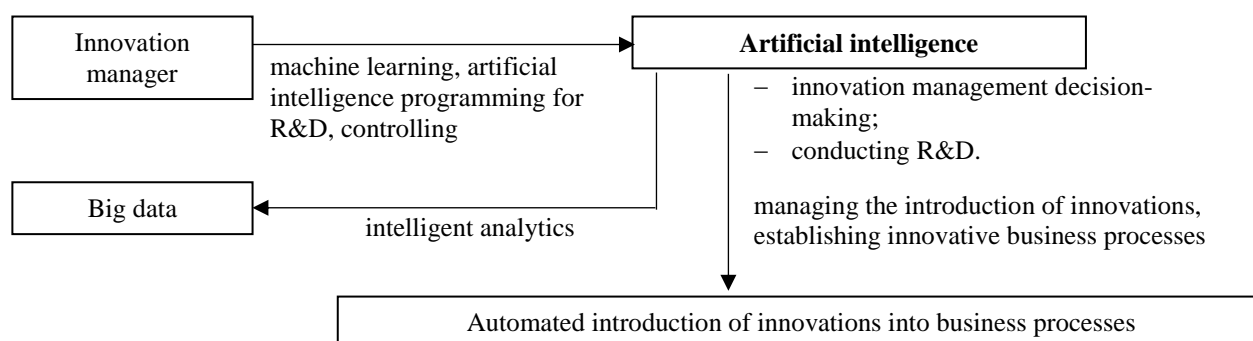
$$R_{IMI} = -6.8274 - 2.1385 * T_{AI} + 3.4335 * T_{DT} \quad (7)$$

According to model (7), with the increase in the use of AI in innovation management by 1 point, the total R&D personnel in business per capita decreases by 2.1385 individuals in full-time work equivalent per 1000 people. Conversely, with the increase in applying alternative digital technologies in business management by 1 point,

the total R&D personnel in business per capita increases by 3.4335 individuals in full-time work equivalent per 1000 people. Therefore, using AI reduces the labor intensity of R&D in business, unlike alternative digital technologies, which increase it.

## 4.2. New Approach to Innovation Management in Business Based on AI

To address the second objective of this research and develop a new approach to innovation management in business based on the use of AI, the author developed an approach, which is schematically presented in Figure 1.



**Figure 1.** New approach to innovation management in business based on the use of AI.

*Source:* Developed and compiled by the author.

As demonstrated in Figure 1, the developed approach emphasizes the central role of AI in innovation management in business. In this approach, the innovation manager serves as the initiator of innovation management. They are responsible for initiating the R&D

process in a timely manner and ensuring its effectiveness by programming artificial intelligence for R&D. The differences between the new approach to innovation management in business and the existing approach are illustrated in Table 7.

**Table 7.** Comparative analysis of the existing and new approaches to innovation management in business

Criteria for comparing approaches	Approach to innovation management in business	
	Existing approach	Propose approach
Decision-maker	Manager	AI
Essence of innovation management decision-making	Intuitive decision-making by the manager	Rational decision-making by AI, increasing predictability and reducing innovation risks
Labor intensity of R&D	High, with research staff playing a key role	Low due to the high degree of automation of R&D based on AI
Source of innovation	Acquisition of ready-made innovations, formation of innovation teams	Machine learning and AI programming in R&D

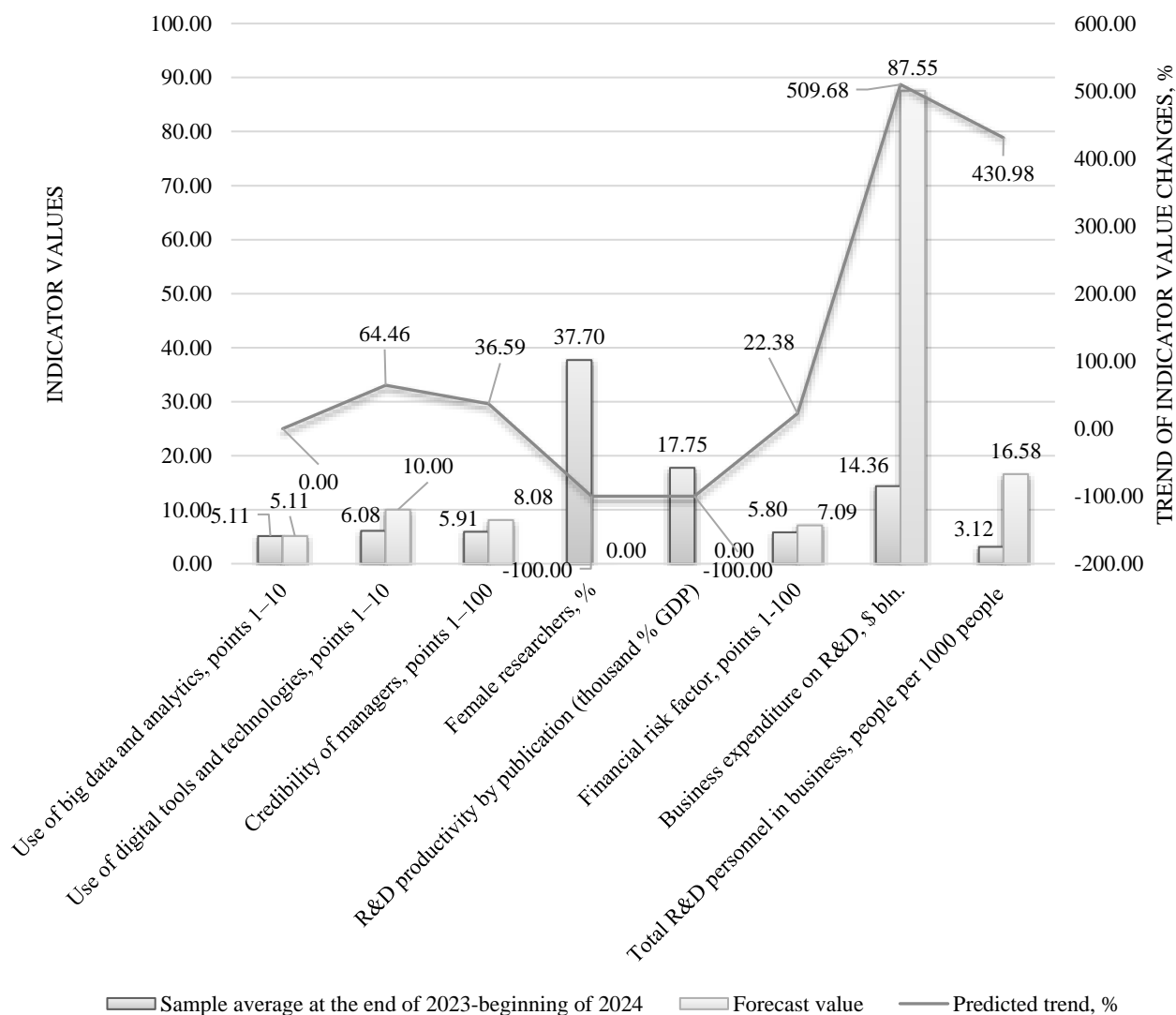
*Source:* Developed and compiled by the author.

As reflected in Table 7, unlike the existing approach, where the decision-maker in innovation management is the manager, the proposed new approach involves AI as the decision-maker. The essence of decision-making in innovation management lies not in the manager's intuitive decisions but in the rational decisions made by AI based on big data – pre-collected and supplemented during R&D processes. Consequently, the new approach ensures increased predictability and reduced risks in business innovation activities.

In contrast to the existing approach, where the R&D process is labor-intensive due to the significant role played by research staff, the new approach boasts low labor intensity in R&D processes owing to the high level

of automation facilitated by AI. In the developed approach, innovation does not stem from acquiring ready-made innovations or forming innovation teams, as in the existing approach. Instead, it arises from machine learning and programming artificial intelligence for R&D.

To scientifically substantiate the advantages and quantitatively measure the consequences of transitioning to the new approach, the author compiled a forecast of the consequences of fully unleashing the growth potential of innovation management under the existing approach (Figure 2). For this purpose, the maximum possible value of  $T_{DT}$  (10 points) is substituted into models (2)–(7).



**Figure 2.** Forecast of the consequences of fully unleashing the growth potential of innovation management effectiveness under the existing approach. *Source: Developed and compiled by the author.*

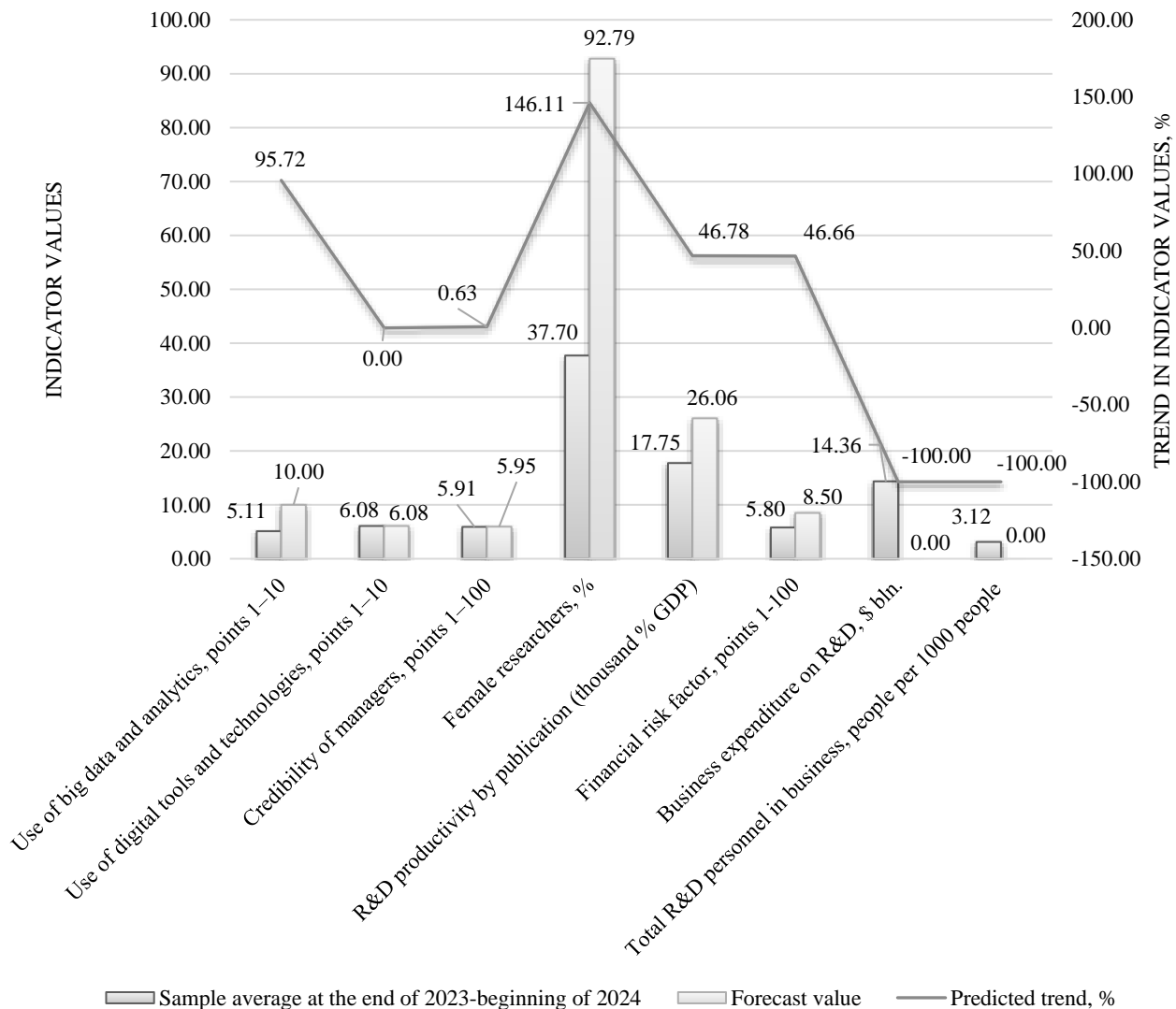
According to Figure 2, upon the fullest realization of the potential of the existing approach, according to the author's forecast, the following changes are expected due to the increased activity in the application of digital technologies (without AI) by 64.46%:

- Strengthening managers' reputation by 36.59% to 8.08 points;
- Reducing the proportion of women among researchers conducting R&D to 0%;
- Decrease in the number of scientific articles over R&D expenditure to 0% GDP;
- Increase in the success of managing financial risks in business by 22.38% to 7.09 points;

- Growth in business expenditure on R&D by 509.68% to \$87.55 million;
- Increase in total R&D personnel in business per capita by 430.98% to 16.58 persons in full-time work equivalent per 1000 people.

Furthermore, an author's forecast of the consequences of the fullest realization of the potential for increasing the effectiveness of innovation management under the proposed new approach was compiled (Figure 3). For this purpose, the maximum possible value of  $T_{AI}$  (10 points) was substituted into models (2)–(7).





**Figure 3.** Forecast of the consequences of the fullest realization of the potential growth in the effectiveness of innovation management under the new approach. *Source:* Developed and compiled by the author.

According to Figure 3, with the fullest realization of the potential under the current approach, as per the author's forecast, a 95.72% increase in the activity of applying AI is expected to yield the following outcomes:

- Strengthening managers' reputation by 0.63% to 5.95 points;
- Increase in the proportion of women among researchers conducting R&D by 146.11% to 92.79%;
- Growth of the number of scientific articles over R&D expenditure by 46.78% to 26.06% of GDP;
- Enhancement of success in managing financial risks in business by 46.66% to 8.50 points;
- Minimization of business expenditure on R&D;
- Minimization of total R&D personnel in business per capita due to complete automation of R&D;

Therefore, the new approach ensures significantly greater growth in the effectiveness of R&D while minimizing the costs associated with its execution. Hence, the author's

approach is deemed preferable and recommended for implementation in innovation management in business.

## 5. DISCUSSION

The contribution of this research to the literature lies in advancing the scientific tenets of innovation management theory as a managerial process in business (Abidin et al., 2024; Luo, 2024; Zare Khafri et al., 2023) by refining the consequences of employing AI in this managerial process. Consequently, the research supports and extends the scholarly discourse initiated by Benzidia et al. (2024), Jakobsen et al. (2024), and Sullivan et al. (2024) on the utilization of AI in business management. A comparative analysis between the anticipated impact as presumed in the existing literature and the actual influence of employing AI on innovation management in business is conducted in Table 8.

**Table 8.** Comparative analysis of the anticipated impact in literature and the identified influence of using AI on innovation management in business

Results of innovation management in business	Influence of using AI on innovation management in business	
	Perceived impact in the existing literature	Actual impact identified in this research
Reputation of managers	Decreases (Mariani & Dwivedi, 2024)	Remains practically unchanged (increases up to +0.63%)
Opportunities for women to participate in R&D	Limited (Jin et al., 2024)	Significantly increases (up to +146.11%)
Productivity of R&D in terms of researcher's publication activity	Decreases (Shi & Wang, 2024)	Significantly increases (up to +46.78%)
Success of financial risk management	Declines (Guo et al., 2024)	Significantly increases (up to +46.66%)
Business expenditure on R&D	Increases (Yang, 2024)	Minimized
Labor intensity of R&D	Decreases; considered a drawback (Richardson et al., 2024)	Reduced, but it saves on labor costs and is an advantage

**Source:** Developed by the authors.

As demonstrated in Table 8, unlike Mariani and Dwivedi (2024), the research shows that when using AI in innovation management in business, the reputation of managers does not decrease but remains practically unchanged (increasing up to +0.63%). Unlike Jin et al. (2024), the research shows that when using AI in innovation management in business, the opportunities for women's participation in R&D are not limited but substantially expanded (up to +146.11%).

In contrast to Shi and Wang (2024), the research states that when using AI in innovation management in business, the productivity of R&D in terms of researcher publication activity does not decrease but significantly increases (up to +46.78%). Unlike Guo et al. (2024), the research highlights that when using AI in innovation management in business, the success of financial risk management does not decline but substantially increases (up to +46.66%).

In contrast to Yang (2024), the research shows that when using AI in innovation management in business, business expenditures on R&D do not increase but are minimized. In confirmation of Richardson et al. (2024), the research proves that when using AI in innovation management in business, the labor intensity of R&D decreases. However, this is not necessarily a drawback; it can be regarded as an advantage since it makes it possible to save on labor costs.

Thus, the hypothesis (H) is proven. In support of Joshi and Negi (2024), Kulkarni et al. (2024), and Xiao and Su (2024), it is justified that the application of AI makes it possible to improve parameters (minimizing costs and maximizing results), thereby enhancing the efficiency of innovation management in business and is preferable for innovation management compared to alternative digital technologies.

## 6. CONCLUSION

Thus, as a result of studying international experience by the end of 2023, pertinent as of the beginning of 2024,

the Author identified broad opportunities for applying AI to innovation management practices in business. The main outcome of this research is the revelation of the perspective for enhancing innovation management in business through the utilization of AI, thereby achieving the set goal.

Particularly, the author developed an econometric model of innovation management in business using AI and alternative digital technologies. The model demonstrated that instead of risks, the implementation of AI generates advantages for innovation management in business, associated, first, with the increased effectiveness of R&D (the number of scientific articles over R&D expenditure and the success of financial risk management in business).

Second, it is associated with the enhancement of inclusiveness in R&D, which can also be attributed to the augmentation of results in innovation management in business (the strengthening of managers' reputation and the increase in the proportion of women among researchers conducting R&D). Third, it is associated with the reduction of costs in innovation management in business (minimizing business expenditures on R&D and minimizing total R&D personnel in business per capita due to the complete automation of R&D).

The main conclusion drawn from the conducted research is that the application of AI is preferable for innovation management compared to alternative digital technologies because it makes it possible to greatly improve the parameters (results and expenditures) of this management. In this regard, a new approach to innovation management in business is proposed, where a high level of management automation based on AI is achieved for the first time.

The uniqueness and novelty of the developed approach lie in the central role played by AI in innovation management in business. It serves as the decision-making entity in innovation management. The labor intensity of R&D processes is low due to the high degree of automation based on AI. In the newly devised approach,

machine learning and programming of AI in R&D serve as sources of innovation.

The essence of decision-making in innovation management lies in the rational decision-making by AI based on big data (previously gathered and supplemented during R&D). As a result, the new approach enhances predictability and reduces the risks of business innovation activity.

The theoretical significance of the results and conclusions obtained lies in their disclosure of cause-and-effect relationships regarding the use of AI in business innovation management. The practical significance is rooted in the fact that the newly developed approach to innovation management in business based on the use of AI will make it possible to extend these technologies to previously unautomated practices of innovation management. The managerial significance of this research is expressed in the fact that the application of the new approach will enhance the efficiency of innovation management in business.

In conclusion, it is necessary to note that alongside the numerous advantages reflected in this research (from the perspective of the economic efficiency of management), the use of AI in innovation management in business entails considerable social risk. This social risk is associated with reduced research personnel due to the automation of R&D processes resulting from implementing AI in innovation management practices in business.

While this research identified the mentioned social risk, determining ways to manage this risk is beyond the scope of this research, which is its limitation. Rejecting the use of AI to preserve jobs in R&D is impractical because it would hinder scientific and technological progress and innovative economic development. Instead, future scientific research should address the scientific and practical aspects of retraining the personnel released due to the proliferation of AI in managerial and research roles previously involved in business innovation activities.

## References

- Abidin, Z., Adawiyah, W. R., Shaferi, I., & Sodik, A. (2024). Financing innovation for sustainable supply chain management in social business: A case of Qurban rituals in Indonesia. *Journal of Islamic Accounting and Business Research*, 15(2), 342-366. DOI: 10.1108/JIABR-09-2021-0250
- An, J., & Mikhaylov, A. (2024). Technology-based forecasting approach for recognizing trade-off between time-to-market reduction and devising a scheduling process in open innovation management. *Journal of Open Innovation: Technology, Market, and Complexity*, 10(1), 100207. DOI: 10.1016/j.joitmc.2024.100207
- Benzidia, S., Bentahar, O., Husson, J., & Makaoui, N. (2024). Big data analytics capability in healthcare operations and supply chain management: The role of green process innovation. *Annals of Operations Research*, 333, 1077-1101. DOI: 10.1007/s10479-022-05157-6
- Guo, Y., Ge, H., Liao, Z., Hu, Y., & Huang, B. (2024). The influence of financial innovation on enterprise risk management. *Finance Research Letters*, 62, 105098. DOI: 10.1016/j.frl.2024.105098
- Hamid, N., Munizu, M., & Mardiana, R. (2024). The impact of knowledge-oriented leadership on innovation performance with e-based knowledge management system as mediating variable. *International Journal of Data and Network Science*, 8(1), 557-568. DOI: 10.5267/j.ijdns.2023.9.001
- IMD. (2024). *World Competitiveness Online*. Retrieved from <https://worldcompetitiveness.imd.org> (Accessed 3 March 2024)
- Jakobsen, H. S., Brix, J., & Jakobsen, R. S. (2024). Unraveling data from an idea management system of 11 radical innovation portfolios: Key lessons and avenues for artificial intelligence integration. *Journal of Innovation and Entrepreneurship*, 13, 9. DOI: 10.1186/s13731-024-00368-6
- Jasin, M., Anisah, H. U., Fatimah, C. E. A., Azra, F., Suzanawaty, L., Junaedi, I., ... Junaedi, I. W. R. (2024). The role of digital literacy and knowledge management on process innovation in SMEs. *International Journal of Data and Network Science*, 8(1), 337-344. DOI: 10.5267/j.ijdns.2023.9.020
- Jin, X., Wang, M., Wang, Q., Yang, J., & Guo, Y. (2024). Gender diversity of senior management teams and corporate innovation efficiency: Evidence from China. *Finance Research Letters*, 60, 104897. DOI: 10.1016/j.frl.2023.104897
- Joshi, K., & Negi, P. (2024). Artificial intelligence approach towards innovation management method: An overview. *AIP Conference Proceedings*, 2978, 060017. DOI: 10.1063/5.0184258
- Kulkarni, M. S., Pramod, D., & Patil, K. P. (2024). Assessing the net benefits of generative artificial intelligence systems for wealth management service innovation: A validation of the Delone and Mclean model of information system success. In S. K. Sharma, Y. K. Dwivedi, B. Metri, B. Lal, & A. Elbanna (Eds.), *Transfer, diffusion and adoption of next-generation digital technologies* (pp. 56-67). Cham, Switzerland: Springer. DOI: 10.1007/978-3-031-50192-0\_6
- Luo, X. (2024). Exploring entrepreneurial learning, digital business management, and business model innovation in internet new ventures: An empirical study. *Journal of System and Management Sciences*, 14(2), 35-54. DOI: 10.33168/JSMS.2024.0203

- Malakhata, E., Pitz, M., Maghnie, M., Mazidi, M., Plamanescu, R., Sumereder, C., ... Monti, A. (2024). From use cases to business cases: I-GReta use cases portfolio analysis from innovation management and digital entrepreneurship models perspectives. *Energy Informatics*, 7(1), 7. DOI: 10.1186/s42162-024-00310-w
- Mariani, M., & Dwivedi, Y. K. (2024). Generative artificial intelligence in innovation management: A preview of future research developments. *Journal of Business Research*, 175, 114542. DOI: 10.1016/j.jbusres.2024.114542
- Nu Minh Quyen, L., & Khuong, N. V. (2024). How market competition influences organizational performance: Mediation in the interplay of management accounting system, enterprise risk management, and organizational innovation performance. *Business Strategy and Development*, 7(1), e302. DOI: 10.1002/bsd2.302
- Richardson, C., Oster, N., Henriksen, D., & Mishra, P. (2024). Artificial intelligence, responsible innovation, and the future of humanity with Andrew Maynard. *TechTrends*, 68(1), 5-11. DOI: 10.1007/s11528-023-00921-2
- Shi, J., & Wang, Y. (2024). Prerequisites for the innovation performance of artificial intelligence laboratory: A fuzzy-set qualitative comparative analysis. *IEEE Transactions on Engineering Management*, 71, 5341-5356. DOI: 10.1109/TEM.2024.3355235
- Sullivan, Y., & Wamba, S. F. (2024). Artificial intelligence and adaptive response to market changes: A strategy to enhance firm performance and innovation. *Journal of Business Research*, 174, 114500. DOI: 10.1016/j.jbusres.2024.114500
- Walrave, B., Wal, N. V. D., & Gilsing, V. (2024). Knowledge diversity and technological innovation: The moderating role of top management teams. *Technovation*, 131, 102954. DOI: 10.1016/j.technovation.2024.102954
- Xiao, X., & Su, Z. (2024). Research on the innovation of science and technology management data service mode under artificial intelligence technology. *Applied Mathematics and Nonlinear Sciences*, 9(1), 20240118. DOI: 10.2478/amns-2024-0118
- Yang, M. (2024). A study on the impact of corporate financial accounting management system on corporate innovation under sustainable development strategy. *Journal of Information and Knowledge Management*, 2024, 2450008. DOI: 10.1142/S0219649224500084
- Zare Khafri, A., Sheikh Aboumasoudi, A., & Khademolqorani, S. (2023). The effect of innovation on the company's performance in small and medium-sized businesses with the mediating role of lean: Agile Project Management Office (LAPMO). *Complexity*, 2023, 4820636. DOI: 10.1155/2023/4820636

---

**Konina, Olga V.**

Department of Economic Theory and  
Management of the Moscow Pedagogical

State University, Moscow, Russia

[koninaov@mail.ru](mailto:koninaov@mail.ru)

**ORCID:** 0000-0002-9058-936X

---