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ORIGINAL PAPER

The Role of Artificial Intelligence in Creating New Business Models in The Digital Economy: From Digitalisation to Fully Automated Solutions

S.V. Savin^a, A.D. Murzin^b^a Result Region Ltd., Rostov-on-Don, Russia;^b Southern Federal University, Rostov-on-Don, Russia

ABSTRACT

Purpose of the article is to study the impact of artificial intelligence (AI) on the transformation of business models in the digital economy. Object of the study are companies implementing AI to automate processes and improve efficiency. Subject of the study is the changes in key elements of business models: the creation, delivery, and monetization of value. Methodology includes the analysis of practical cases, the calculation of return on investment (ROI), and the assessment of reductions in operating costs. Scientific novelty lies in the development of an approach to fully automating AI-based business processes, and identifying related challenges, such as problems with trust in AI systems, and ethical aspects of its use. Practical significance of this work is to demonstrate the need for reviewing existing business models, and investing in AI infrastructure, to increase the competitiveness of companies in the digital economy.

Keywords: artificial intelligence; business models; digital economy; automation; operational efficiency; ROI; personalization; AI ethics

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INTRODUCTION

Digital transformation influences almost all aspects of business practical activities and it is one of the key factors, which bring changes in the operational activities of companies. Introduction of modern digital technologies generate not only a growing efficiency of processes, but also improve interactions with customers, as well as open new opportunities for growth and development.

Artificial intelligence (AI), cloud solutions, Big Data analysis and Internet of Things (IoT) are among the most significant technologies that make a strong impact on this process.

According to the McKinsey report (2023), over 70 per cent of business entities have already integrated digital technologies into business process, which resulted in cost optimization and faster adaptation to market changes.¹

Companies that actively use AI show impressive results in areas such as automation of production, supply chain management and tailoring personalized recommendations for customers. Studies indicate, that introduction of AI tools in supply chain management can reduce operating costs by 20–30 per cent and increase the speed and accuracy of order fulfillment.

98% of companies' executives forecast, that within the next few years, AI will become a basic instrument for business strategies to provide personalized recommendations and create new digital products.²

Large corporations, such as Amazon and Netflix, are actively using AI for analysing customer preferences and personalising content, which in its turn contributes to sales growth and retention of customer. Companies that effectively implemented AI in their business models have increased operational performance by 25–35 per cent, which indicates a high potential of these technologies.

Thus, AI contributes not only to optimising current business processes, but also to generating new business models. This allows enterprises to quickly get adapted to potential changes and respond more effectively to challenges of the modern market.³

METHODOLOGY

The current research used the following methods:

1. Business model analysis. Traditional and digital models were analyzed and examined, which allowed the authors to determine key changes in creation, delivery and monetization of value.

2. Comparative analysis. It employs data on traditional approaches to product development and their automation using Artificial Intelligence tools employed in order to identify its impact of tools on key elements of business models. Comparisons included using metrics such as operational efficiency and personalisation of recommendations for customers.

3. Economic analysis. It involves assessment of economic benefits with implementation of AI, particularly focusing on calculating the return on investment (ROI) for companies, which use AI in business.

A business model is a strategy that describes how a company plans to create, deliver and capture value for customers. The following three key components are fundamental elements of a business model (see *Figure* below):

1. Creation of value is an element reflecting the process of developing and offering products or services that meet the needs of the target market. This strategic guideline helps the company to determine how exactly it will create unique products that will be in demand on the market.

2. Delivery of value is the way a company delivers its products or services to customers. This element includes distribution channels,

¹ URL: <https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai-in-2023-generative-ais-breakout-year>

² URL: <https://newsroom.accenture.com/news/2023/accenture-technology-vision-2023-generative-ai-to-usher-in-a-bold-new-future-for-business-merging-physical-and-digital-worlds>

³ URL: <https://www.gartner.com/en/information-technology/insights/top-technology-trends>

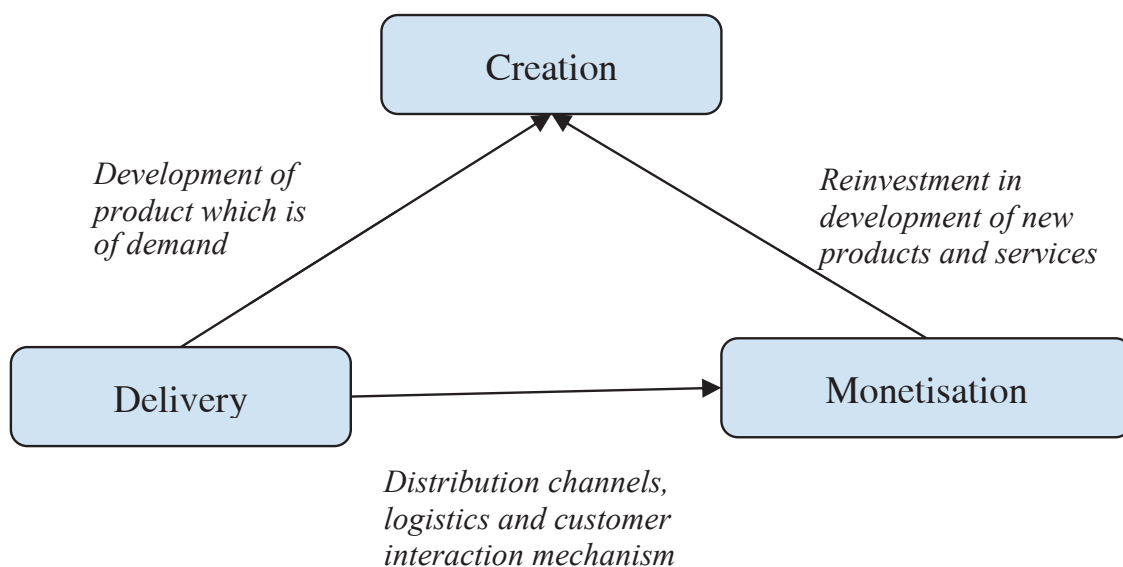


Fig. Business model elements

Source: [1].

logistics and mechanisms of interaction with customers.

3. **Value monetisation** is the way a business company transforms the value it created into the capital. This element includes pricing, revenue sources and financial models.

Classic business model includes the following elements:

- Key Partners;
- Key Activities;
- Key Resources;
- Value Proposition;
- Channels, Customer Relationship;
- Customer Segments;
- Cost Structure;
- Revenue Streams [1].

However, currently the employment of AI in digital economy transforms traditional models of business (Table 1).

AI tools allow economic entities improve the accuracy of forecasts and automate processes. Besides, they also transform the fundamental mechanisms of monetization through digitalization of the studied business models [2].

According to the 2024 Annual Report by PricewaterhouseCoopers (PwC), AI could contribute \$ 15.7 trillion to the growth of the world economy by 2030 with 45 per cent of this amount attributed to improved products and services.⁴

⁴ URL: <https://www.pwc.com>

Table 1

The changes in key elements of business model

Business model element	Traditional approach	AI changes in business models
Value creation	Product development	Automation, predictive analytics
Value delivery	Traditional channels	Personalisation, automation of customer interaction
Value monetisation	Traditional revenue schemes	New digital business models (subscriptions, platforms)

Source: compiled by the authors.



China and North America are expected to win more than most other countries with \$ 10.7 trillion supplement in their GDP thanks to the application of AI technologies.

According to the **Boston Consulting Group** (2024), 54 per cent of executives expect cost-saving effect for their capital in 2024 due to implementation of AI tools in their companies. However, 90 per cent of companies only start testing new AI tools, which indicates a gap between leaders and those who lag behind.⁵ In the near future, it is planned to reach 50 per cent in the level of implementation of AI technologies in the Russian economy.

In 2023, despite sanctions leading to restrictions on resources and access to international technologies,⁶ the AI market in Russia reached 650 billion Rubles (\$ 7.3 billion), which is a strong indicator of the growing interest in AI.

The content of the aforementioned studies indicates that Russian companies are following

global trends, trying to implement artificial intelligence to increase operational efficiency and develop new products and services [3].

RESEARCH FINDINGS

The impact of AI on business models

Modern technologies make a significant impact on traditional business models, forming new approaches to monetisation and delivery of value to customers. Let's elaborate the technologies developed thanks to implementation of AI.

Platform models make a striking example of successful integration of AI into business operations, as far as corporations such as Amazon and Airbnb demonstrated.

These platforms use AI in processing Big Data by means of optimising interactions between buyers and sellers, improving personalisation of offers and increasing the effectiveness of recommendations.

Particularly, Airbnb uses machine learning algorithms for dynamic pricing, which helps to automatically adjust the cost of renting housing depending on demand, season and other factors.

Table 2

Particular changes that occur during the implementation of AI in specific entities

Business model element	Description of changes
Value creation	"Machine intelligence" used for information analysis and creation of new products. For example, Tesla uses AI to expand functionality of its cars and, simultaneously, to develop ecosystems of self-driving cars.
Value delivery	AI gets the most out of logistics and warehouse process activity. For example, Amazon uses AI to reduce costs by 20–30 per cent and speed up delivery of goods ¹
Value monetisation	AI helps to create new revenue models. For example, Spotify uses it to personalize music recommendations, which led to a 16 per cent growth of subscription and advertising revenue due to a rise in premium subscribers

Source: compiled by the authors.

Note: URL: <https://www.mckinsey.com/capabilities/quantumblack/our-insights/how-artificial-intelligence-can-deliver-real-value-to-companies>

Business entities also actively use AI in the format of subscription models. Thus, Spotify and Netflix rely on algorithmic solutions to analyse custom behavior data and offer personalised content, which helps to retain customers. According to Zuora, the revenues of companies, which use subscription-based business models, are growing six times faster, compared to those, which use traditional schemes.⁷

Artificial intelligence changes traditional business models significantly, by means of transforming their fundamental elements (Table 2).

Thus, it is definite, that nowadays Artificial Intelligence is drastically changing traditional approaches to making business, creating new opportunities for more accurate forecasting of demand, for product personalisation and increased efficiency in delivery value.

As it appears, application of “machine intelligence” systems is of especial importance in the sphere of industrial automation where the following three key activities should be determined:

1. **Predictive Maintenance**, which has become one of the key tools for preventing equipment breakdowns and minimizing downtime.

Siemens Corporation has successfully implemented predictive service mechanisms to use AI for analysis of data from industrial equipment sensors and predict possible breakdowns. This allows for timely replacement of dilapidated components, which increases productivity and reduces costs and operating risks.⁸

2. **Collaborative robots (Cobots)** in production employed along with people, become an integral part of modern industrial process.

Amazon Corporation actively employs such cobots in its system of warehouse complexes to perform complicated routine tasks, such as sorting and packing. On the one hand, this

speeds up the processing of orders. On the other hand, it improves interaction between robots and staff members, which reinforces overall organizational productivity.⁹

3. **Automated production lines.** Rockwell Automation implemented analytics system FactoryTalk LogixAI with machine learning algorithms to forecast potential problems and optimise equipment operation. This solution has doubled the throughput of assembly lines and increases their efficiency by 20 per cent. Thus, “machine intelligence” has already influenced significantly traditional business processes by means of providing new opportunities for product personalisation, optimising operations and generating more flexible monetisation models.

The abovementioned AI implementation justify the point of view that AI becomes an important competitive advantage for companies focused on innovation and commercial growth.

From digitalization to complete automation

Digital transformation of business activities includes several stages. “Machine intelligence” plays a significant role in each of these stages: from basic digitalization of processes to transition towards a completely automated development and implementation of decisions [4] (Table 3).

Analysing the content of the Table above, we note that the applied use of “machine intelligence” consistently transforms organisational business processes at all stages: from simple conversion of information to comprehensive automatic accomplishment of key operations. This enables companies to improve efficiency, as well as to build entirely new business models based on data and forecasting [7].

Artificial intelligence plays a critical role in providing total automation of business processes and creating new approaches for data-driven business development.

⁷ URL: <https://www.businesswire.com/news/home/20200923005296/en/>

⁸ URL: <https://blog.siemens.com/2023/07/predictive-maintenance-at-scale-is-entering-the-mainstream/>

⁹ URL: <https://www.rockwellautomation.com/en-us/company/news/press-releases/ai-predictive-maintenance.html>



Table 3

Stages of the digital transformation

Stages	Description	The function of AI
Digitalisation	Initial stage. At this phase, commercial companies start to use digital technologies to improve their own business operations, particularly, their document flow and communication. As an example, they implement CRM systems for a comprehensive support to work with clients [5]	It helps in automating data collection and storage, which makes it possible to convert analog processes into digital form, ensuring faster processing of information and its availability for further transition to automatic processing. For example, many companies start with the implementation AI-based CRM and ERP system to simplify management operations and data analysis*
Integration	At the second, integration stage, digital technologies begin to interconnect various business aspects. Companies generate digital integrated mechanisms (commonly, as ERP systems) to provide one solution for several processes at once	It integrates different systems and technologies into a single ecosystem. It helps combine separate operations and data, improving interaction between business units. One of the key application areas is logistics management, where machine learning algorithms help optimise logistics and forecast demand. It enables companies to solve multifaceted tasks (predictive maintenance of equipment, production line management, etc.) in a fully automated mode. In particular, companies are able to automatically manage production operations, predict potential breakdowns and minimise downtime in plants**
Automation	Third stage. AI technologies create conditions for robotisation of fundamental processes, particularly, in production and supply chain management. Corporations such as Siemens and Amazon actively implement predictive service and collaborative robots to optimise operational performance	Enables companies to solve multitasks (predictive maintenance of equipment, production line management, etc.) in a completely automated mode
Complete automation	At the final stage AI and digital systems become the basis of the business model, largely eliminating the need for human participation. This allows business entities to create new options for business models based on data and algorithms [6]	In particular, companies are able to automatically manage production operations, predict potential breakdowns and minimise plant downtime***

Source: compiled by the authors.

Note: * URL: <https://www.botsandpeople.com/blog/automation-digitization-and-digital-transformation-these-are-the-differences>;

** URL: <https://www.emerald.com/insight/content/doi/10.1108/SL-01-2023-0009/full/html>;

*** URL: <https://www.mdpi.com/2071-1050/16/5/1790>

By 2027, expenses for software of this kind will reach \$ 297 billion, which indicates a rapid growth of automation of operational procedures in a wide range of industries, including manufacturing, logistics and finance.¹⁰

One of the key trends of the third decade of the 21st century is the introduction of generative AI mechanisms. According to forecasts, up to 40% of employees' working time can be mechanised, robotised and, accordingly, opti-

¹⁰ URL: <https://www.gartner.com/en/information-technology/>

[insights/top-technology-trends](https://www.gartner.com/en/information-technology/insights/top-technology-trends)

mised from an organisational and economic point of view using AI language models, which contribute to a significant increase in the efficiency of the functioning of economic entities.¹¹

In general, it should be noted, that significant improvements in operational performance was reached among those enterprises that actively pioneered application of fully automated AI-based procedures in their production operations (in particular, the previously mentioned **Amazon** and **Tesla**).

It can be assumed that by 2030, such AI-based solutions will replace up to 50 per cent of manual production process and supply chain management.

It seems that in the long run, such implementation of operational activities will become the standard for the majority of business entities, which will open new opportunities for the creation of autonomous systems and business models where human involvement will be minimal or reduced to zero.

Approach to full automation of business processes

Comprehensive modernisation of business processes, their conversion into a robotic format by means of AI tools is the goal of many companies. It is worth noting that this approach requires a certain systematic approach. In our opinion, such transformation should include the following stages:

1. **Analysis.** Before implementing AI, it is important to perform a detailed diagnosis of existing business processes. For example, **Sberbank** uses process analysis methods to identify bottlenecks in customer service and this allows to identify the areas most in need of automation.

2. **Determination of objectives.** It is important not just to aim some specific isolated goals and objectives, but also to make a comprehensive vision of the future state of modernised operations in the company [8].

¹¹ URL: <https://newsroom.accenture.com/news/2023/accenture-technology-vision-2023-generative-ai-to-usher-in-a-bold-new-future-for-business-merging-physical-and-digital-worlds>

3. **Implementation of AI technologies** is the main stage, which includes both the selection of the technology stack and the integration of the selected solutions. **T-Bank** applies machine learning algorithms transforming the process of lending and risk assessment into a new, automated format, which reduces failures and speeds up the approval process for loans.

4. **Integration with existing systems.** Transferring operations to a modern format requires integration of new AI systems with current IT solutions. Here it is of particular importance for them to competently “fit” into the already maintained IT infrastructure of the given business entity.

5. **Training and adaptation of the personnel.** To achieve the target indicators, it is necessary to train employees to operate new systems.

6. **Monitoring and adjustment of processes.** After integration is adopted, it is necessary to regularly monitor the flow efficiency of automated processes and make adjustment updates. For example, LLC “**Tander**”, the largest retail chain, uses AI for analysing sales and inventory management, which allows to update it timely with changes, including the updates in the management strategy.

AI technologies have made a noticeable impact on cost reduction and productivity growth in different areas of economy [9].

Specifically, in the financial sector, AI transforms routine tasks such as data processing and generation of reports into automated-mechanical forms, which help to reduce transaction costs.

According to Cloudera, companies that implemented AI were able to reduce information processing costs by up to 25 per cent, which had a positive impact on the quality of customer service.¹²

In industry, predictive maintenance technologies can significantly decrease equipment downtime and repair costs [10].

According to NextDeveloper, integrating predictive maintenance tools diminishes the number of unexpected equipment failures by 20–30 per cent. This not only reduces repair costs, but

¹² URL: www.cloudera.com



it also increases service life of equipment and minimises the risks of production activities.¹³

To make an assessment of AI economic efficiency it is necessary to determine a number of key indicators. One of them is Return on Investment (ROI), which should be determined and calculated by means of the following formula:

$$ROI = (\text{Income from IT} -$$

– Implementation costs) ÷ Implementation costs (1)

This indicator allows it to assess the feasibility of investing in AI for a particular enterprise.

Another important parameter is reduction of operating costs, which is the difference in operating costs before and after the implementation of AI.

The third parameter is productivity, evaluated by the growth speed for tasks completion and reduction of time to complete such tasks.

Finally, the level of customer satisfaction is also a key factor determined by the increase in the degree of customer loyalty. It is obtained, as a result of personalisation of services and optimisation of interactions with the customers [11].

The stages of performance evaluation include:

- analysing the company's initial condition before implementing AI;
- assessment of short-term and long-term results;
- non-stop monitoring to adjust business processes and improve efficiency furthermore.

Investments in AI indicate different returns depending on the industry. Companies that have implemented AI are expected to get income nearly \$ 3.5 per dollar invested, which equates to 250 per cent ROI.

In the financial sector, banks and insurance companies employ AI to automate data processing, manage risks and improve customer service.¹⁴

¹³ URL: <https://nextdeveloper.com/blog/reducing-operational-costs-with-ai-powered-automation>

¹⁴ URL: <https://venturebeat.com/ai/idc-study-businesses-report-a-massive-3-5x-return-on-ai-investments>

For example, **Siemens**, through predictive maintenance, has reduced the number of unexpected equipment breakdowns, improving ROI.¹⁵

In e-commerce, companies (in particular, **Amazon**) make ROI of 10–20 per cent due to supply chain optimisation and improved logistics.¹⁶

In retail, automation helps reducing inventory in warehouses by 10–20 per cent, which leads to 5–10% increase in profit.

The financial sector develops automated risk management and data analytics, which results to cutting operating costs by 20–25 per cent and increase profits by 15–20 per cent.¹⁷

By 2030, it is expected, that AI will replace about half of manual-labour processes in such industries as manufacturing, logistics and finance. Automation of manufacturing operations will increase flexibility of production process and reduce costs, meanwhile, the use of chatbots and recommendation algorithms in the service sector will improve customer service.¹⁸

Economic assessment of AI implementation for Russian companies

Currently, Resalt Region LLC actively implements AI in its operational processes. It made calculations to assess the impact on business models (including its value creation, delivery and monetisation).

1. Reduction of operational costs. Implementation of AI to automate warehouse management processes reduced transport costs by 14.2 per cent and inventory management costs by 9.4 per cent.

2. Return on investment (ROI). The revenues of Resalt Region LLC from the use of AI during the first year of operation amounted to 44.2 million Rubles, while the implementation

¹⁵ URL: www2.deloitte.com

¹⁶ URL: www.aiexponent.com

¹⁷ URL: <https://www.quixl.ai/blog/the-present-and-future-of-ai-based-automation-a-roadmap-for-business-leaders/>

¹⁸ URL: <https://www.metadialog.com/blog/ai-for-business-automation-transforming-impact-in-2024/>

costs was equal to 20.7 million Rubles. Thus,

$$ROI = (44,2 - 20,7) \div 20,7 * 100\% = 113,5\%.$$

This indicates a high economic feasibility of investment in AI, since the company's revenues significantly exceeded the integration costs.

3. Time to Payback (TTP) is the evaluation of the amount of time, within which the company will recoup its investment in AI.

$$TTP = \text{Implementation costs} \div \text{Annual savings from AI.} \quad (2)$$

Resalt Region LLC invested 20.7 million Rubles in AI and expected annual savings of 10 million Rubles, thus, the payback time was:

$$TTP = 20.7 \div 10 = 2.07 \text{ years.}$$

4. Automation Coefficient (AC). This is another key coefficient for consideration. It allows estimating the share of business processes automated thanks to AI against the total number of processes.

$$AC = A (\text{Auto}) \div A (\text{General}) * 100\%, \quad (3)$$

Meaning:

A (Auto) — the number of automated processes;

A (Total) — the total number of processes in the company.

Resalt Region LLC ran six out of eighty-four business processes automated with the help of AI. Thus, the automation ratio was 7.14 per cent (Table 4).

DISCOURSE

Problems and challenges

Although artificial intelligence opens the door to significant changes in business management processes, it brings a number of strong challenges in its practical application regarding interaction between the staff and AI systems.

1. Lack of trust in AI is one of the major challenges for its implementing in management processes. The complexity of AI algorithms often leads to the problem that their recommenda-

tions are too hard to understand even for specialists with a high level of qualification [12].

For example, if employees in the banking sector do not understand recommendations on lending issues generated by AI, they do not often feel confident enough about AI involvement in their job.¹⁹

2. Loss of control over AI carries a risk, which expands as the level of automation of business processes increases. In some situations, software products can make critical decisions leading to solutions without any human input. This raises risk security and liability concerns for professionals due to potential errors.

For example, Siemens has implemented predictive maintenance in manufacturing plants where AI manages processes with minimal human intervention.²⁰

3. Ethical aspects of using AI become increasingly relevant. AI systems trained on high volume of data can be biased due to limited or distorted raw datasets, which increases the risk of discrimination and errors in decision making, especially, in such areas as HR and finance. This aggravates ethical issues that require stricter regulatory and auditing standards for AI mechanisms [13].

4. Risks of AI adoption. According to a McKinsey research,²¹ about 70 per cent of AI implementation projects fail to achieve their goals. This occurs due to the lack of a clear and specific strategy, lack of qualified experts, as well as due to poor management in the company. It is critical, in our view, to consider these risks and develop strategies that will help organisations adapt to the new business environment.

5. Data dependency. The effectiveness of AI systems is directly dependent on the quality of the data trained on. For instance, IBM Watson could not successfully integrate into a cancer diagnosis system because the AI algorithms

¹⁹ URL: <https://www.mdpi.com>

²⁰ URL: <https://eng.vt.edu>

²¹ URL: <https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai-in-2023-generative-ais-breakout-year>



Table 4

Digital transformation indicators applied to Result Region Ltd.

Indicator	Evaluation
Reduction of operating costs (%)	20%
Return on investment (ROI)	113.5%
Time to Payback (TTP, years)	2.07 years
Automation ratio (AC,%)	7.14%

Source: compiled by the authors.

were trained on data that did not match the real clinical conditions. Therefore, it is extremely important that companies properly ensure a high level of data quality [14].

It is also worth considering that not all AI integration projects turn out to be successful. There are a large number of examples where automation has failed to meet expectations.

Amazon Corporation tried to automate the recruitment process with an AI product that analyses resumes and recommends candidates. However, the algorithm indicated a certain gender bias, as it was trained on data where men in their majority had engineering positions.

As a result, discrimination against women was revealed and they had to terminate the project.²²

Microsoft launched a chatbot called Tay, which was trained on data from Twitter users. However, within 24 hours, computer trespassers misdirected its training, so that Tay started generating some kind of offensive messages. Consequently, the project was discontinued as well.

Such examples demonstrate the importance of extensive testing and monitoring of AI systems, especially in areas with potential risks and consequences, which are particularly high, such as recruiting and communications.

CONCLUSIONS

The results of the analysis show that AI technologies make a significant impact on transformation of business schemes, including the essential content of their key aspects: creation, delivery and monetization of value.

Examples of corresponding cases in such companies as Amazon, Tesla and Siemens indicate that in general AI integration contributes to increasing operational efficiency, reducing costs and optimisation of processes.

AI is particularly practicable in such fields as commercial retail services and logistics, where it contributes to improving supply chain management, forecasting demand and personalising services.

Thus, AI is not only able to modernise traditional business models, but it also creates opportunities to generate new, more flexible and sustainable business schemes for commercial activity based on automation and the use of Dig Data.

All-round automation to manage organisational processes opens up new horizons for the growth of productivity and competitiveness of business entities. However, this requires significant capital investment, development of infrastructure and revision of modern management approaches.

Prospects for further research include exploring long-term effects of full automation of

²² URL: www.lexalytics.com

the labour market, assessment of moral, ethical and legal aspects of employment of AI tools, as well as development of models to evaluate cost-effectiveness of integrating AI mechanisms into operational activities of business entities in different industries.

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ABOUT THE AUTHORS



Sergey V. Savin — Sales department CEO, Result Region Ltd., Rostov-on-Don, Russia

<https://orcid.org/0009-0004-4627-5576>

Corresponding author:

sesavin@sfedu.ru



Anton D. Murzin — Dr. Sci. (Tech.), Cand. Sci. (Econ.), Associate professor, Professor at the Department of Spatial and Economic Systems Development Management, Faculty of Management, Southern Federal University, Rostov-on-Don, Russia

<https://orcid.org/0000-0001-9190-8919>

admurzin@sfedu.ru

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