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## The Role of Intelligent Data Processing in Optimizing Companies' Financial Efficiency

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### Conflicts of interest

The authors declare that there is no conflict of interest.

**Abstract.** The relevance of the research lies in the increasing need for the use of intelligent data processing (IDP) to increase the financial efficiency of a business in conditions of economic instability. The development of artificial intelligence and machine learning allows organizations to effectively manage risks, optimize internal processes, and improve the accuracy of financial forecasting. The purpose of the research is to assess the impact of intelligent data processing on the financial efficiency of a business, identify key problems and propose solutions. To achieve this goal, a review of the literature was conducted, methods for optimizing business processes were identified, barriers to the introduction of IDP and prospects for its application were identified. The research methods include comparative, systematic and statistical analysis. The use of these methods allowed us to deeply explore the problem of implementing IDP in real business cases. The results of the study confirm that intelligent data processing significantly increases the financial efficiency of companies. However, the implementation of IDP is fraught with a number of problems, such as the need for additional investments, restructuring of business processes and ensuring staff qualifications. Despite the difficulties, the introduction of IDP allows companies to significantly increase their competitiveness and profitability. The conclusion of the research emphasizes that intelligent data processing in the modern economy is an important tool for improving the financial stability and competitiveness of businesses. With well-organized implementation, IDP helps optimize processes, improve forecasting and risk management, which leads to improved financial results.

**Keywords:** business process optimization, financial forecasting, risk management, artificial intelligence, machine learning, comparative, system and statistical analysis, financial sustainability

### Authors' contribution

Chaplygina E.I. — conducting research, writing, visualization; Kruglova L.V. — planning and overall supervision; Glavina S.G. — validation. All authors read and approved the final version of the article.

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## Роль интеллектуальной обработки данных в оптимизации финансовой эффективности компаний

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### Заявление о конфликте интересов

Авторы заявляют об отсутствии конфликта интересов.

**Аннотация.** Актуальность исследования заключается в возрастающей необходимости применения интеллектуальной обработки данных (ИОД) для повышения финансовой эффективности бизнеса в условиях экономической нестабильности. Развитие искусственного интеллекта и машинного обучения позволяет организациям эффективно управлять рисками, оптимизировать внутренние процессы и повышать точность финансового прогнозирования. Цель исследования — оценка влияния интеллектуальной обработки данных на финансовую эффективность бизнеса, выявление ключевых проблем и путей их решения. Для достижения цели проведен обзор литературы, определены методы оптимизации бизнес-процессов, выявлены барьеры внедрения ИОД и перспективы его применения. Методы исследования включают сравнительный, системный и статистический анализ. Применение данных методов позволило глубоко исследовать проблему внедрения ИОД в реальные бизнес-кейсы. Результаты исследования подтверждают, что интеллектуальная обработка данных значительно повышает финансовую эффективность компаний. Однако внедрение ИОД сопряжено с рядом проблем, таких как необходимость дополнительных инвестиций, перестройка бизнес-процессов и обеспечение квалификации персонала. Несмотря на сложности, внедрение ИОД позволяет компаниям существенно повысить конкурентоспособность и прибыльность. Результаты исследования показали, что интеллектуальная обработка данных в условиях современной экономики является важным инструментом для повышения финансовой устойчивости и конкурентоспособности бизнеса. При грамотно организованном внедрении ИОД способствует оптимизации процессов, улучшению прогнозирования и управлению рисками, что приводит к улучшению финансовых результатов.

**Ключевые слова:** оптимизация бизнес-процессов, финансовое прогнозирование, управление рисками, искусственный интеллект, машинное обучение, сравнительный, системный и статистический анализ, финансовая устойчивость

### Вклад авторов

Чаплыгина Е.И. — проведение исследования, написание текста, визуализация; Круглова Л.В. — общее руководство, планирование; Главина С.Г. — валидация. Все авторы ознакомлены с окончательной версией статьи и одобрили ее.

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### Introduction

In current dynamic business environment, companies are forced to be able to quickly adapt to constantly changing conditions [1]. The economic situation encourages businesses to be flexible and

make prompt management decisions. The financial efficiency of companies is often determined by the quality and speed of information processing, the accuracy of internal forecasts, and competent risk management [2]. Intelligent data processing (IDP) is gradually becoming one of the key tools

for business optimization and increasing competitiveness in the market [3].

Intelligent data processing is a set of data analysis methods based on artificial intelligence and machine learning, which allows companies to automate their own processes [4]. IDP contains a wide range of technologies and tools that enable companies not only to automate routine tasks, but also to significantly improve the accuracy of analytical reporting [5]. Analysis of large volumes of data allows businesses to minimize errors and improve the efficiency of management decision-making [6]. Modern approaches to intelligent data processing involve analyzing big data in real time [7]. By using IDP, enterprises are able to respond quickly enough to market changes and adjust their own strategies if necessary.<sup>1</sup>

One of the most important areas of application of IOD is the financial component [8]. The main goal of any business is to make a profit. With the help of implementing intelligent data analysis, companies strive to optimize financial processes and increase efficiency. As part of increasing the financial efficiency of enterprises, IOD algorithms are used as follows:

1. Implementation of predictive analysis, which calculates a forecast based on historical data and market trends.
2. Intelligent cost control, which allows you to analyze cost efficiency and identify excess costs.
3. Investment risk management, which determines the most profitable investment direction for the business.
4. Dynamic pricing and competitive environment analysis, which makes it possible to automate pricing based on market trends, etc.

The implementation of analytical tools helps businesses increase the level of automation, which is quite important and promising in the current unstable economic environment.

The relevance of studying the role of intelligent data processing in business economic processes is due, first of all, to significant technological

progress, expressed in the development of artificial intelligence and machine learning, which is becoming an integral part of the strategic management of companies [9].

The purpose of the study is to assess the impact of intelligent analysis on the financial performance of a business: identifying key problems and proposing ways to solve them. To achieve this goal, the following research objectives were defined:

1. Review of literature on the use of IOD in financial management.
2. Definition of the main methods for optimizing business processes.
3. Identification of key barriers to the implementation of intelligent algorithms in financial management.
4. Study of promising areas for the development of IOD in the context of improving the financial efficiency of business.

The object of the study is the financial processes of companies associated with the use of intelligent data processing. The subject of the study is the methods and technologies of IOD used to analyze financial flows.

Organizations that actively use smart data analysis have more competitive advantages in the market and achieve higher financial results [10]. There is also a downside to using IOD, which is expressed in the need for additional investment, forced restructuring of internal business processes, and ensuring cybersecurity.

This article is aimed at reviewing studies on the topic of intelligent data processing in the context of improving business financial processes. The article analyzes the advantages and disadvantages of using smart data analysis, discusses prospects, identifies problems, and suggests ways to solve them.

## 1. Methods

The following methods were used in the study: comparative analysis, system analysis and statistical analysis of intelligent data processing in

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<sup>1</sup> Vysotsky V.I. *Artificial intelligence in financial analytics: a revolution in decision-making*. (In Russ.) Available from: <https://visotsky.com/public/site/knowledges/iskusstvennyy-intellekt-v-finansovoy-analitike-revolyuetsiya-v-prinyatii-resheniy> (accessed: 14.03. 2025).

the financial sector [11]. Each of the mentioned research approaches makes it possible to study the problem of using IOD in the financial component of business in sufficient depth, identifying not only general trends, but also key aspects that require special attention and improvement.

In this work, comparative analysis was used to evaluate various technologies in the field of IOD on the domestic market, which made it possible to identify the most effective methods of intelligent information analysis, as well as to determine opportunities for improving existing technologies [12].

In the context of the study, system analysis was aimed at studying how various methods of intelligent information processing can be integrated into specific processes of companies, what kind of business infrastructure is necessary for their successful application, and what changes may be required for their implementation [13]. A systematic approach to the implementation of analytics, according to the authors of the study [14], requires taking into account the entire ecosystem of the organization, including technologies, processes and personnel, which increases the effectiveness of decision-making and adaptation.

In this paper, statistical analysis was applied to evaluate the effectiveness of financial forecasting methods using two types of analysis:

1. Regression analysis aimed at studying dependencies between processes.
2. Correlation analysis tracing the relationships between processes.

This approach allowed us to determine how big data analysis can optimize and improve the efficiency of financial forecasting and improve the management of financial processes<sup>2</sup>.

The study focused on methods for forecasting financial flows, optimizing business processes, and managing risks using big data analytics. The problems of implementing intelligent data processing in business processes of real companies contain both technological and financial aspects, as well as organizational problems, which, for

example, may be associated with the operational adaptation of existing processes. The mentioned methods allowed us to comprehensively study the situation, identify the main barriers and prospects for using IOD. Despite the difficulties in implementing intelligent analysis in real business cases, the use of intelligent algorithms can significantly improve the efficiency of financial management.

## 2. Results and Discussion

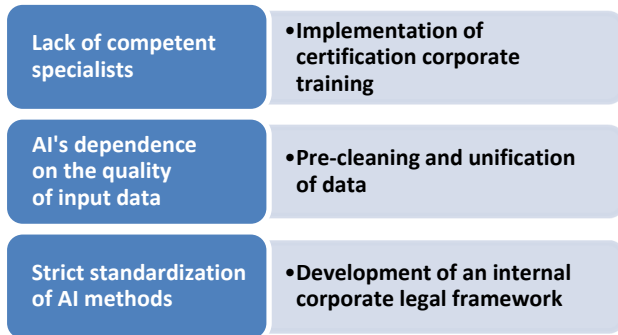
The analysis of literature in our country within the framework of the study confirmed the extremely important role of intellectual data processing in financial business processes. The main areas of use of IOD by organizations are: financial forecasting, optimization of business processes, and risk management. The most common areas were identified, distinguished by their effectiveness in improving financial results and increasing the financial efficiency of companies, and it was determined that this process is associated with a number of problems that require solutions.

### 2.1. Forecasting Financial Flows

In the scientific work “Application of neural networks in monitoring and forecasting financial flows” the author I.V. Matyush analyzes the application of artificial intelligence (AI) methods in the context of increasing the accuracy of forecasting business economic indicators. The author refers to the matrix of payment balance coefficients and notes that financial flows determine the stability of companies in the market, and monitoring and forecasting directly affect the financial efficiency of a business. While traditional statistical forecasting methods have limited accuracy, neural networks are capable of processing big data in real time, automating analysis and building complex relationships. AI transforms approaches to assessing, monitoring and forecasting business economic indicators, which contributes to making more informed management decisions and optimizing companies’ financial resources [15]. As shown in

<sup>2</sup> UP lab. *Big Data Analysis*. (In Russ.) Available from: <https://www.uplab.ru/blog/analiz-bolshih-dannyh-big-data/> (accessed: 14.03. 2025).

the study [16], the application of machine learning methods in financial modeling significantly increases the accuracy of forecasts and reduces the level of uncertainty in managing financial flows. At the same time, the implementation of artificial intelligence methods in real business processes within the framework of forecasting financial flows has some certain problems (Figure 1):



**Figure 1.** Issues in Financial Flow Forecasting with IDP and Their Solutions  
Source: by E.I. Chaplygina

To obtain and process reliable results, as well as to support intelligent analysis systems, competent specialists with the relevant competencies are required. The labor market may not have enough experts in these areas. It is recommended to implement corporate employee training programs. Investing in the development of company’s own certification programs will not only improve the qualifications of personnel, but also strengthen employee loyalty to the employer.

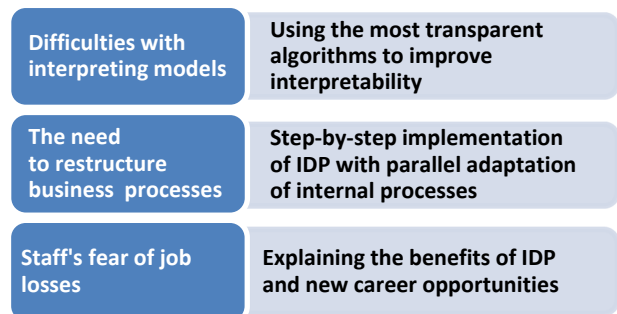
The dependence of artificial intelligence on the quality and completeness of the source data directly affects the result obtained. In the event of errors and inconsistencies in the financial and economic information of the business, smart analysis may not be built entirely correctly. Companies often experience problems with distortion of analytical conclusions due to the integration of information from different internal sources. The use of preliminary data cleaning systems will allow tracking and eliminating inconsistencies even before they enter the AI model. Standardization of data at all levels of the company can also prevent potential errors.

Requirements for compliance with regulatory and legal acts create risks of violation of legislation and reduce the likelihood of using intelligent analysis methods. Artificial intelligence must comply with strict rules and standards of Russian legislation governing financial and economic processes. The creation of an adaptable legal framework will ensure compliance with regulations, taking into account the company’s use of datamining methods and minimize the risks of violations.

## 2.2. Optimization of Business Processes

In the work of R.S. Nazipov “Prospects for the application of artificial intelligence in the optimization of business processes of companies” the prospects for the application of intelligent data analysis in the framework of business optimizations are studied. The automation of routine tasks through the elimination of errors obtained in the presence of the human factor, improvement of the quality of customer service, as well as the increase in the competitiveness of companies are noted as positive aspects of implementation. The author emphasizes that the implementation of AI requires careful planning and risk assessment [17].

The use of intelligent data processing methods in the framework of business process optimization also has some barriers that require clarification (Figure 2).



**Figure 2.** Issues in business process optimization with IDP and their solutions  
Source: by E.I. Chaplygina

Difficulties with interpreting artificial intelligence models can accompany businesses, since neural networks do not have simplicity and trans-

parency. Decision-making in organizations based on complex AI mechanisms can be difficult. However, the most transparent intelligent algorithms are perceived easier and more understandable. For example, the modern intelligent software “Sber Business Soft” is focused on simplification and accessibility. The system provides ready-made solutions within the framework of data analysis, which are configured automatically and produce results. Through a simple interface, clients have access to a set of tools, for example, for financial analytics, cost planning, optimization of business processes, etc.<sup>3</sup>. Such IOD algorithms are also able to better convey the essence through visualization, which in turn can significantly increase the level of customer trust.

An important problem on the way to process automation using IOD technologies may be the forced restructuring of business processes. The implementation of intelligent analysis, one way or another, involves a revision of the internal processes of the organization that affect the formation of the financial results of the business. Changes are often a hard hit. However, it is possible to switch to IOD gradually and consistently, which can reduce staff stress, as well as enable the business to apply smart analysis methods most effectively.

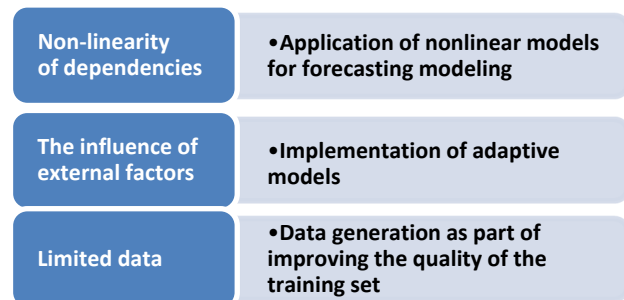
Automation of processes in companies often gives rise to employee concerns about preserving their own jobs. Negative perception can slow down the implementation of new technologies. To eliminate barriers of misunderstanding between personnel and management, employees should be informed about the benefits of implementing intelligent data processing in the company and the opportunities that can positively affect their work. Demonstration of new career options for employees that will open up as a result of the digitalization of business processes will improve interaction.

### 2.3. Financial Risk Management

The authors A.A. Savvin et al. discuss the use of machine learning (ML) methods to improve the

accuracy of forecasts in the context of economic growth. They emphasize the correlation between accurate estimates in the current time and future risks. Risk forecasting taking into account the use of IOD allows us to identify complex relationships between data and external factors, which increases the accuracy of the analysis [18].

The implementation of intelligent information processing technologies in the context of financial risk management has many prospects, but also some features that must be taken into account (Figure 3):



**Figure 3.** Issues in Financial Risk Management with IDP and Their Solutions

Source: by E.I. Chaplygina

Traditional data processing methods, such as linear regression, suggest that a change in one indicator will lead to a proportional change in another. When considering situations from the real economy, it is worth considering that changes may not be linear and proportionate. Linear approaches may not take into account more complex relationships, which can distort the final results. Neural networks are able to take into account hidden relationships, which allows you to make the most accurate forecasts and competently manage risks. For example, the DataRobot automated machine learning platform is engaged in the construction and training of risk assessment models based on business data. DataRobot analyzes production processes, financial transactions, logistics processes, etc.<sup>4</sup> The use of the recommended platform allows for automated forecasting of operational and financial risks.

<sup>3</sup> *Sber Business Software*. (In Russ.) Available from: <https://sberbs.ru/> (accessed: 14.03.2025).

<sup>4</sup> *DataRobot*. (In Russ.) Available from: <https://www.datarobot.com/> (accessed: 14.03.2025).

Traditional risk management methods may not take into account such external circumstances as: economic crisis, exchange rate fluctuations, changes in legislation, etc., which can lead to incorrect decisions. Accordingly, it is recommended to use adaptive models of smart machine learning analysis that are able to take into account not only internal corporate information, but also focus on current market and political circumstances.<sup>5</sup> For example, the RoboKassa platform, a tool for online payments and transaction analysis, helps companies adapt their strategies to current market realities using its own assessment of changes in the external environment.<sup>6</sup>

Often, businesses face the lack of complete data, which can adversely affect the performance of the IOD model. The problem can be solved by generating data to improve the quality of the training set. For example, integration with data from external sources (government registries, open economic reports, etc.), as well as information simulation will expand the current data sets for training. Such a solution will improve the quality of training sets, which will positively affect the accuracy of financial forecasts and estimates. Intelligent IOD tools make it possible to optimize risk management strategies.

#### **2.4. Discussion**

The implementation of intelligent analysis methods in real business processes demonstrates an improvement in the accuracy of forecasts, on the basis of which management decisions are made that affect business strategy and the development of the company as a whole. However, the results of IOD largely depend on the quality of the source data and the qualifications of personnel. Organizations that actively use intelligent data

analysis methods have the opportunity to reduce risks and increase efficiency.

The global study by Enterprise Strategy Group and Oracle “Competitive Advantage in Finance and Operations Management” demonstrates that companies using AI and intelligent data analysis in financial and operational activities increase annual profits several times faster, and also significantly reduce the number of errors in the financial function and increase labor productivity.<sup>7</sup>

The scientific study was conducted among 700 executives from 13 countries. Enterprises that implemented innovative technologies in financial management received much more benefits than they initially expected. It is worth noting that 82% of companies that use smart analysis in business processes are ahead of competitors who do not use intelligent data processing methods. The survey confirmed an increase in the financial efficiency of companies and labor productivity due to the implementation of IOD methods (Figure 4).

Theoretically speaking, IOD proves its effectiveness in improving financial analysis and forecasting. This statement is supported by the results of scientific research and practical experience of corporations. However, problems with data quality and the need for qualified personnel remain relevant. The main reason for the positive results of implementing smart analysis methods is the ability of IOD to process large volumes of data and identify important hidden relationships.<sup>8</sup>

IOD technologies allow organizations not only to better forecast financial results, but also to minimize risks and adapt to changes in the market. However, without high-quality data and employee training, the benefits may be limited.

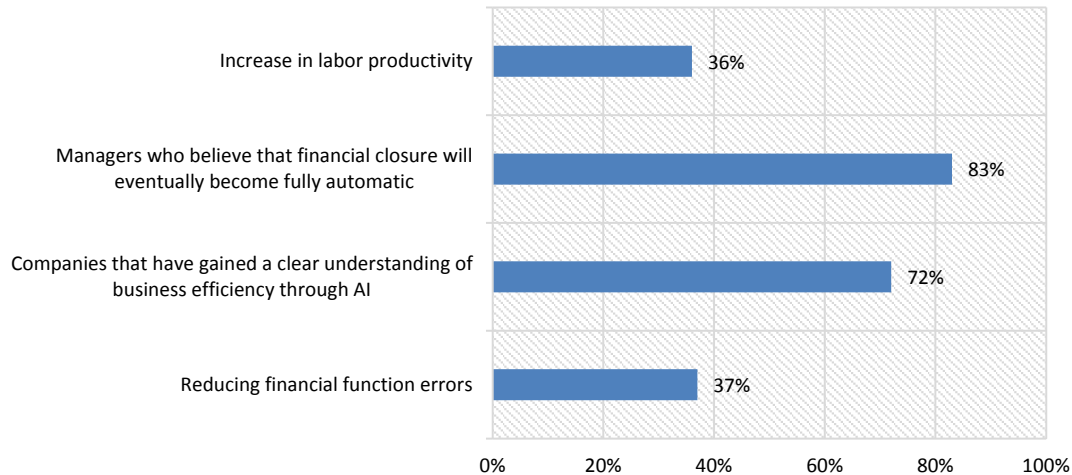
Future research in this area could focus on adapting IOD for small and medium-sized enterprises, as well as developing more robust models for dealing with uncertainty in initial data.

<sup>5</sup> *RB. Artificial intelligence in finance.* (In Russ.) Available from: <https://rb.ru/opinion/iskusstvennyj-intellekt-v-finansah/> (accessed on 14 March 2025).

<sup>6</sup> *Robokassa.* (In Russ.) Available from: <https://robokassa.com/> (accessed: 14.03. 2025).

<sup>7</sup> *Oracle. Artificial intelligence helps organizations accelerate growth and drive innovation.* 2020. Available from: <https://www.oracle.com/cis/corporate/pressrelease/ai-helps-organizations-growth-2020-02-12.html> (accessed: 14.03. 2025).

<sup>8</sup> *FSE Editors and Writers. Methods of intelligent data analysis: extracting hidden patterns and trends.* (In Russ.) Available from: <https://falconediting.com/ru/blog/metody-intellektualnogo-analiza-dannykh-izvlechenie-skrytykh-zakonov-i-tendentsii/> (accessed: 14.03. 2025).



**Figure 4.** Key trends in financial process automation

Source: by E.I. Chaplygina

## Conclusion

In an unstable and rapidly changing economic environment, the use of intelligent data processing is becoming a key element that has a significant impact on the optimization of financial processes of companies. The implementation of IOD methods demonstrates excellent results for business, giving companies that use innovative solutions strong competitive advantages.

Intelligent data analysis offers a wide range of tools that allow organizations to obtain the most accurate estimates and forecasts based on the analysis of not only internal corporate information, but also taking into account external circumstances, effectively manage financial, operational and investment risks, and automate business operations, reducing the number of errors due to the human factor. The implementation of IOD technologies helps enterprises adapt more quickly to market changes, increasing their competitiveness and financial stability.

However, despite the numerous advantages, the use of intelligent analysis is associated with a number of certain difficulties. Implementation of innovations requires additional investments, restructuring of internal business processes and development of personnel qualifications. In addition, it is necessary to take into account addi-

tional risks associated with the legal and ethical aspects of the use of artificial intelligence. The results of the study confirm that with a competent approach, planning and solving emerging problems, intelligent data processing can significantly increase financial efficiency and ensure the competitiveness of a business. The implementation of IOD methods is becoming an important step in achieving long-term success on the market.

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