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THE IMPACT OF ARTIFICIAL INTELLIGENCE ON THE EFFICIENCY OF FINANCIAL ANALYTICS

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This article examines the impact of artificial intelligence on the efficiency of financial analytics. Important aspects of artificial intelligence application are explored, including the automation of routine operations, improvement of forecasting accuracy, risk management, and personalization of customer experience. The analysis focuses on how modern technologies such as machine learning, big data processing, and predictive analytics are transforming traditional approaches to financial information processing. Examples of successful artificial intelligence implementation in companies are provided. Limitations related to model interpretability, compliance with ethical standards, and data confidentiality are also discussed.

KEYWORDS: ***Artificial Intelligence, Financial Analytics, Machine Learning, Big Data Processing, Forecasting, Risk Management.***

INTRODUCTION

Financial analytics (FA) occupies a pivotal role in modern business, providing firms and organizations with data for strategic planning, risk assessment, and performance measurement. However, traditional financial analysis methods based on manual processing of huge amounts of data or outdated statistical methods are typically insufficient. In the past few years, artificial intelligence (AI) has become one of the primary tools for restructuring the financial sector.

The reality of this problem is due to the need to adapt to digitalization, which has become a key part of transformations in the financial industry. The use of AI brings new opportunities for improving the efficiency and credibility of financial analysis, which is especially important in the context of rising uncertainty and rapidly changing market conditions. The purpose of this research is to examine the impact of AI on the efficacy of FA.

MAIN PART. FUNDAMENTAL PRINCIPLES OF FA

The systematic study of financial information to make informed decisions that help effectively manage resources, reduce risks, and increase profits is called **FA**. The initial process of working with financial information is **gathering and analyzing data**. In today's advanced and dynamic business world, gathering data involves consolidation of multiple sources like company databases internally and macroeconomic data and statistical reports externally. Data cleansing, structuring, and transformation processes refine the accuracy of analysis.

Interpretation of the gathered data entails mathematical, statistical, and graphical analysis to determine patterns, relationships, and outliers. This forms a basis for prediction to create scenarios for the future based on several economic, political, and social factors. **Decision-making processes**, encompassing strategy optimization, investment planning, and performance evaluation, are directly relevant to the application of FA results. Analytical findings give management a window into data about the impact of various strategic initiatives, such as new product introduction or business expansion, on performance metrics. They also facilitate the application of timely adjustments in the event of unexpected outcomes.

It is essential to the competitiveness and sustainability of business FA. It makes it possible to **discover and manage financial risks**. The analysis enables the identification of potential hazards, such as market fluctuation, currency exchange rate change, or unfavorable macroeconomy, and develop strategies for minimizing them [1]. This becomes especially important in the context of global economic volatility. With the guidance of the FA, new areas of **growth and development are being identified.** Full analysis of the market data assists in identifying potentially successful segments and areas of growth which could be overlooked by traditional means. It also assists significantly in achieving maximum financial performance, including analysis of the effectiveness of current business operations, reduction of expenses, and optimizing capital structure. Analytics not only identifies weaknesses in existing processes but also indicates scope for improvement, thereby improving the overall profitability of a company.

Thus, FA is a multi-level system that incorporates data collection, analysis, forecasting, and application to decision-making. Its function in modern business is not just determined

by its ability to handle current operations but also by its ability to create a strategic vision that maximizes long-term sustainability and competitiveness.

TECHNOLOGICAL ASPECTS OF THE USE OF AI IN FINANCIAL ANALYTICS

In recent years, the adoption of AI in the financial services sector has accelerated significantly. Its application is rapidly transitioning from experimental pilot projects to full-scale business transformation. In 2022, 60% of financial institutions used these technologies across various business functions. According to forecasts, AI usage is expected to rise to 85% by 2025 (fig. 1).

Figure 1. Usage AI in processes FA, % [2]

Modern AI technologies have a significant impact on FA, providing new tools for data processing, analysis, and interpretation. **Machine learning models** enable the identification of complex patterns in data and automation of analysis. Among the most common approaches are **neural networks**, which are powerful tools for analyzing large datasets, particularly in tasks involving nonlinear dependencies. Neural networks are used in FA for stock price modeling, volatility forecasting, and portfolio management. For instance, recurrent neural networks are effectively applied in forecasting time series, such as stock market index dynamics. Decision trees and their ensemble methods, such as random forest and gradient boosting, are widely used for credit risk assessment and anomaly detection. These models are highly interpretable, making them preferred in tasks where analytical results need to be explained. Regression models, including linear and logistic regression, remain important tools in FA [3]. They are used to assess the impact of various factors on financial performance, such as profitability or risk level. Their advantages lie in simplicity and high learning speed.

Modern financial markets generate vast amounts of data, including transactions, market indices, news, and social signals. Processing this data requires high-performance algorithms and technologies. **Big data analysis** in FA allows for real-time processing of datasets, uncovering hidden correlations and patterns. This is achieved using tools such as Apache Hadoop and Spark, which ensure scalability and high performance.

It also enables the establishment of FA with a robust backup by integrating AI with other emerging technologies such as **blockchain and the Internet of Things (IoT).** Highly reliable and transparent, blockchain has been proposed to be utilized in financial data storage and processing that forbids the possibility of tampering with the information. The problem is pertinent specifically for security and authenticity functions. For example, AI-based transaction analysis stored in the blockchain not only quickly detects anomalies but also develops predictive models to forecast potential threats. Additionally, integration with smart contracts simplifies the automation of financial condition fulfillment, while AI capabilities refine parameters and assess the effectiveness of such solutions in real time. The IoT provides additional opportunities by connecting physical devices and sensors that generate real-time data. Using IoT data in conjunction with AI enables the analysis of asset and object dynamics.

Methods of intelligent data analysis play an essential role in identifying hidden patterns in financial data. For example, clustering algorithms are used for segmenting clients by profitability level, enabling the development of more targeted offerings. Associative analysis methods aid in the identification of the associations between financial assets, which is helpful for diversifying investment portfolios. These technologies have been used in the financial sector, where they are used to scan transactions to identify fraud. For instance, clustering and anomaly detection algorithms identify malicious transactions, hence reducing financial loss due to fraudulent transactions.

Therefore, modern AI methods significantly improve prediction accuracy since they are capable of handling multi-dimensional and complex information. Their usage also facilitates the development of highly sophisticated simulation models taking into account various considerations, from macroeconomic indicators to market metrics and behavior factors.

Many companies are actively adopting these technologies to solve complex problems in FA. **BlackRock** investment company demonstrates an example of how AI can be used using its Aladdin platform. It is a sophisticated system that applies the technology to process and examine massive amounts of market data, founded on machine learning models along with big data technologies. By doing this, Aladdin enables enterprise-wide risk discovery for diverse portfolios, thus helping asset managers predict and prevent future risks. The system also facilitates the modeling of various investment scenarios to allow users to evaluate the potential outcomes of strategic decisions under different market conditions. This level of analysis allows asset managers to make data-driven decisions, optimize performance, and enhance the stability of investment strategies [4].

Similarly, **S&P Global** exemplifies the transformative potential of AI in financial services through its integration of machine learning algorithms. These technologies are employed to detect subtle correlations among macroeconomic metrics, corporate financial reports, and market patterns. By connecting these diverse data points, S&P Global's artificial intelligence software provides a rich understanding of the factors influencing market conditions. This capability not only improves the accuracy of forecasts but also amplifies the pace of analytical processes, enabling quicker responses to market changes. The approach taken by the firm showcases the ability of AI to streamline complex data streams and give actionable insights to stakeholders [5]. New-age technologies like machine learning models, predictive analysis and big data processing are thus emerging as the backbone of modern business. They help companies learn more about the market, reduce risks and make smarter decisions. These achievements highlight the importance of further developing AI and implementing it in the banking sector.

PRACTICAL IMPACT OF AI ON PROCESSES FA

The merging of AI with FA leads to evident transformation by automating processes, improving the quality of risk analysis accuracy, and establishing the interaction with customers. Such transformations allow financial institutions to reduce operational expenses and meet the needs of the prevailing market environment. AI is traditionally used in automating processes that are repetitive in nature. Traditionally, analysts devoted a lot of time to activities involving data manipulation, structuring, and preparation for analysis. The application of machine learning algorithms and robotic process automation has greatly decreased the time spent on these tasks, enabling professionals to concentrate on strategic analysis and decision-making [6].

The arrival of AI has replaced traditional risk management methods. These technologies allow for real-time financial risk evaluations, which are particularly important in the unpredictable global market climate. Through the application of deep learning technology and large data analysis in bulk, the financial institutions can detect possible risks, i.e., market movements, interest rate changes, or geopolitical incidents, before they become perceptible in their effects on the business. In addition, incorporating non-traditional sources of data like text messages, social media, and other market signals can help build more precise risk assessment models, thus lowering the risk of unforeseen financial loss.

The arrival of AI has also changed customer analytics, with new opportunities for personalization and improved customer experience. New technologies enable the study of customer behavior, needs, and preferences using big data and machine learning algorithms. This makes it possible to develop personalized financial products that better meet the needs of individual clients. For instance, AI algorithms can offer investment management or financial product recommendations automatically, taking into account factors such as income level, age, and client preference. These approaches result in higher customer satisfaction, increased confidence in financial institutions, and subsequently higher customer loyalty.

The practical application of AI extends beyond technological advancements, profoundly influencing the operational models of financial organizations. Process automation, more accurate risk management, and enhanced customer experiences not only improve companies' competitiveness but also create conditions for more sustainable development of the financial sector as a whole. These changes underscore the crucial role of modern technologies as tools for strategic management and sources of innovative solutions for contemporary businesses.

However, the widespread adoption of AI also comes with limitations related to model interpretability, ethical considerations, and legal aspects. Understanding these advantages and limitations is a critical step in evaluating of these technologies impact on FA efficiency and in developing strategies for its safe and responsible implementation (table 1).

Table 1. Advantages and limitations of AI in processes FA [7, 8]

Aspect	Advantages	Limitations
Technical	Accelerates processing of large data volumes, enabling real-time analysis; automates routine tasks, freeing resources for strategic work; supports integration with technologies like blockchain and IoT.	Limited interpretability of models like neural networks; dependency on high-quality input data; high computational and infrastructure costs.
Analytical	Improves forecast accuracy by considering multiple factors; identifies hidden patterns and correlations; supports predictive modeling for proactive risk management.	Difficulties in explaining complex results; risks of overfitting, reducing generalizability; challenges integrating AI insights into traditional decision-making processes.
Ethical and legal	Reduces human errors and biases; ensures consistent compliance through automation; enhances transparency and fairness in decision-making processes.	Privacy concerns over sensitive data use; ethical dilemmas in decision-making; regulatory challenges due to lagging legal frameworks; resistance from users and regulators.

According to the author, the application of AI offers significant advantages but requires a balance between technological innovations and a responsible approach to their use. For its successful implementation, financial organizations must consider both its capacity to enhance process efficiency and the challenges it poses in terms of transparency and compliance [9]. In the context of rapid technological development, this necessitates adapting organizational strategies, improving the qualifications of specialists, and engaging with regulatory authorities to create a reliable and secure analytical ecosystem.

CONCLUSION

The application of AI is now vital in enhancing the speed, accuracy, and efficiency of analytical operations. The application of machine learning, big data analytics, and predictive analytics makes it possible for companies to automate operations, take informed decisions, monitor risks in real-time, and create customized financial products for customers. These innovations integrate AI into the modern financial industry, giving it competitive strength and sustainable growth.

Still, there are various limitations involved in the transparency of intricate models, adhering to ethics, and ensuring data secrecy while using it. For optimum use of AI integration, steps should be taken to overcome such challenges by offering transparency in technology, creating apt regulations, and enhancing the ability of experts.

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