

IMPACT OF ARTIFICIAL INTELLIGENCE ON MONITORING AND MANAGEMENT OF STOCK LEVELS

Filip Dimitrov^{1*}, Mile Samardžić², Gordana Stojmenović¹, Pavle Trpeski³

¹Belgrade Academy of Business and Art Vocational Studies, Department of Business and IT Studies, Belgrade, Republik of Serbia, e-mail: filip.dimitrov@bpa.edu.rs, gordana.stojmenovic@bpa.edu.rs

²Academy of Vocational Studies South Serbia, department for technological art studies, Leskovac, Republik of Serbia, e-mail: mile.samardzic@bpa.edu.rs

³European University, Skopje, Republic of North Macedonia, e-mail: pavletrpeski1@gmail.com

Abstract: Inventory management is one of the main issues facing businesses in the current business environment because of the increased unpredictability, quick changes in the market, and increasing complexity of supply chains. Through the use of sophisticated analytical and predictive models, artificial intelligence (AI) becomes a crucial tool for enhancing inventory level monitoring and management. This paper's goal is to examine how artificial intelligence affects inventory management efficiency, with a particular emphasis on automating inventory monitoring, optimizing ordering, and cutting expenses associated with both excess and inadequate inventory. The theoretical examination of contemporary inventory management techniques and the identification of critical domains where the use of artificial intelligence enhances decision-making serve as the foundation for this work. The use of machine learning algorithms in demand forecasting, identifying obsolete and slow-moving goods, and enhancing supply chain coordination are all given particular attention. Along with possible dangers related to data quality and reliance on automated judgments, organizational and information conditions for the effective adoption of VI systems in inventory management are also covered.

The study's conclusions show that artificial intelligence can greatly increase inventory level monitoring accuracy and help make better use of resources, but that its full impact requires integration with current information systems and sufficient management oversight. Managers, accountants, and researchers interested in the digital transformation of inventory management procedures may find the study interesting as it offers a foundation for more empirical research.

Keywords: *artificial intelligence, inventory management, automation, inventory costs, predictive analytics*

Field: Social Sciences

1. INTRODUCTION

The accounting function of the enterprise will be significantly affected by the use of artificial intelligence in inventory management, especially in the areas of inventory recording, valuation, control and reporting. Since inventories constitute a significant part of current assets, the accuracy of information about their condition has a direct impact on the accuracy of financial statements, liquidity and management choices. Periodic inventories, manual controls, and retrospective data processing are major components of traditional inventory accounting systems. Delays in identifying differences, estimation errors, and mismatches between actual and book inventory levels are often caused by such a method. AI-based solutions would enable continuous and automatic recording of inventory changes, significantly improving the timeliness and quality of accounting data.

Inventory, one of the most important components of a company's current assets, directly affects liquidity, profitability and overall financial stability. Large financial outlays and costs are necessary for any inventory holding at any stage of the process. One of the most important and complex aspects of working capital management in companies is inventory management. In addition to being a major source of cost and risk, inventories enable continued production and sales. Serious business consequences, including excessive financial liability, higher storage costs, product obsolescence, write-offs and losses, as well as loss of customers due to shortages, can result from improperly balancing inventory levels. Conventional inventory management methods, such as min-max inventory systems, ABC analysis, and EOQ (economic order quantities), are based on overly simplistic assumptions about linear correlations between variables, consistent lead times, and demand stability. Despite the fact that these models have long served as the basis for the theory and practice of inventory management, their relevance in modern circumstances is becoming less and less.

The following are the main problems with conventional methods:

- dependence on the average demand in the past,

*Corresponding author: filip.dimitrov@bpa.edu.rs



- static inventory thresholds
- poor ability to adapt to transient changes,
- inadequate communication with other corporate operations,
- There is a lot of manual decision making.

Inadequate inventory control can lead to capital being locked up in excess inventory, higher storage costs, product obsolescence or, conversely, shortages that threaten the continuity of production and sales. Because of this, these systems often lead to less-than-ideal choices when the market is volatile, which directly affects rising costs and reducing corporate efficiency.

Artificial intelligence systems enable data from production, sales, procurement and logistics to be combined with inventory accounting records to create a single, real-time database. This reduces the possibility of discrepancies between operating and financial data, which is critical to balance sheet accuracy and cost of goods sold calculations.

In terms of inventory valuation, the use of artificial intelligence allows for a more sophisticated estimate of the net realizable value of inventory, especially in situations with fluctuating demand and short product life cycles. Artificial intelligence systems can quickly detect inventory at risk of obsolescence or depreciation by analyzing turnover rate, seasonality and market trends. According to accounting standards, this allows earlier and more objective recognition of losses based on the decline in the value of inventory.

Inventory management assumes a strategic role in the context of international markets, dynamic supply chains and increasingly noticeable disruptions in input availability. Businesses are now forced to implement modern, adaptable and flexible systems that enable a quick response to changes in the environment, instead of relying solely on static planning models.

2. MATERIALS AND METHODS

The empirical research of this paper is based on the analysis of how the use of artificial intelligence in inventory management affects the company's business performance and accounting metrics. A case study was used in a descriptive and analytical research methodology, which allows for a thorough examination of the causal relationships between the implementation of artificial intelligence, inventory management modifications and financial impacts.

Company financial statements, internal inventory data, and operational indicators relevant to inventory management serve as the basis for empirical research. The observed period covers the time frame before and after the implementation of AI-based solutions, allowing a comparative examination of changes in inventory levels, turnover and structure. Predictive analytics were used in demand planning, purchasing decisions were automated, and inventory tracking was improved as part of research to operationalize the use of artificial intelligence. The variables of total inventory level, average inventory value, inventory turnover ratio, and inventory share in current assets were used to examine the effects on inventory. While business results were examined using liquidity indicators (current and quick liquidity ratios) and profitability indicators, the effect of stock optimization on the company's accounting position was observed through changes in the balance sheet, mainly through the structure of current assets. In this way, the connection between the financial performance of the company and the operational impact of the use of artificial intelligence is guaranteed.

The methodological framework of the research, which is based on a cause-and-effect approach, allows testing the basic assumption that the use of artificial intelligence through inventory optimization improves the financial performance and balance sheet structure of the company.

3. RESULTS

An integrated cause-and-effect diagram linking technology solutions, accounting categories, and company business success can be used to illustrate how artificial intelligence is applied to inventory management. AI → inventory → balance → performance is a conceptual representation of this relationship.

By improving the collection, processing and analysis of inventory data, artificial intelligence serves as the first catalyst for change. Artificial intelligence technologies enable demand estimation, identification of slow turnover, more accurate tracking of inventory movements and automation of the ordering process. As a result, excess quantities are reduced, inventory structure and levels are optimized, and essential items are rapidly replenished.

The paper uses the example of the consumer goods wholesale company "T" to demonstrate the

empirical approach. In 2025, the company implemented an artificial intelligence-based system to monitor inventory levels and manage the procurement process. Optimizing the width of the assortment, avoiding the accumulation of slow-moving items and automating the ordering of items with low stock are all things that were given special attention during the implementation of the system.

By comparing relevant indicators before and during the implementation of the artificial intelligence system, operational effects on inventory, as well as accounting and financial implications, were examined.

- Modifications to the trading company's inventory management

After implementing an artificial intelligence system, the business improved sales tracking by item, identified products with reduced turnover, and implemented dynamic inventory thresholds based on customer behavior and seasonality. Organization and inventory levels have changed significantly as a result, as shown in Table 1.

Table 1: Inventory indicators before and after the implementation of AI (example)

| Indicator | Before applying AI | After applying AI |
|--|---------------------------|--------------------------|
| Average inventory value (mil. RSD) | 260 | 190 |
| Inventory turnover ratio | 5,2 | 7,1 |
| Share of inventory in current assets (%) | 61% | 46% |
| Share of slow-moving items (%) | 18% | 9% |

Source: Authors' research

The collected results show that the trading company was able to improve the assortment structure, achieve a faster turnover of items and drastically reduce the capital tied up in the inventory by using artificial intelligence.

- Impacts on financial performance and balance sheet

The company's accounting position is directly affected by inventory optimization. Working capital was relieved as a result of the decline in inventory value, and the freed money was used to reduce short-term liabilities and increase liquidity.

Table 2: Selected financial indicators - trading company (example)

| Indicator | Before applying AI | After applying AI |
|-----------------------|---------------------------|--------------------------|
| Liquid ratio | 1,20 | 1,65 |
| Brzi racio | 0,75 | 1,10 |
| Net profit margin (%) | 4,8 | 6,9 |
| Cash cycle (days) | 54 | 37 |

Source: Authors' research

The financial performance and business efficiency of a trading company are directly and quantitatively affected by the use of artificial intelligence in inventory management, which can be seen by improving liquidity indicators and reducing the cash cycle. These findings support the validity of the empirical mini-model of work:

Artificial intelligence → inventory optimization → better balance sheet structure → increased profitability and liquidity

The accounting approach to inventory on the balance sheet directly reflects better inventory management. Reduced differences between the actual and book balance, quick recognition of damage and more realistic stock valuation are made possible by more accurate data. This improves the quality of financial reporting, strengthens the structure of the balance sheet and increases the reliability of the reported current assets. A company's key performance indicators are also affected by changes in cost of goods sold and the balance sheet. While more efficient inventory management helps reduce operating costs and increase profitability, reducing equity tied up in inventory has a beneficial effect on liquidity. Increased profit margins, liquidity ratios, and inventory turnover are examples of improved financial metrics that testify to the direct and quantitative effects of investing in artificial intelligence in inventory

management on a company's overall business performance. Artificial intelligence therefore affects not only the operational procedures of inventory management, but also plays a significant role in improving the accounting system and strategic business management, linking technological progress with the company's financial results.

4. DISCUSSIONS

The fact that the example is illustrative in nature and is based on a simplified situation of a trading corporation is the first indication of the limitations of empirical research. The results show the possible consequences of using artificial intelligence in inventory management, but cannot be applied to the entire retail industry.

Another shortcoming is the concentration of the analysis on accounting and financial metrics, rather than on a wider range of qualitative elements, such as organizational changes, the degree of digital maturity of the company and the costs associated with the introduction of artificial intelligence systems. In addition, the impact of the use of artificial intelligence may vary depending on the size of the company, the nature of the product, the state of the market and the stability of supply chains.

Despite the above shortcomings, the empirical analysis unequivocally shows the direction and strength of AI's impact on inventory optimization and financial performance, offering a solid foundation for further, more thorough research based on larger sample sizes and more sophisticated statistical techniques.

5. CONCLUSIONS

Inventory management is one of the key areas where operational, accounting and strategic decision-making intertwine in today's corporate environment, characterized by high demand uncertainty, complex supply chains and an increasing need for effective working capital management. The theoretical part of the paper highlighted the potential of artificial intelligence as a technological framework that enables dynamic, data-driven and predictive inventory management, while at the same time highlighting the shortcomings of conventional inventory management methods.

Examining modern theoretical methods has shown that the use of artificial intelligence helps in improving demand forecasting, automating the ordering process and more precisely tracking inventory movements, all of which foster conditions for optimizing inventory levels and structures. This method improves the quality of balance sheet data, strengthens the internal control system, and enables a more current and realistic valuation of assets, all of which have important consequences for inventory accounting.

The theoretical assumptions are additionally supported by the empirical part of the work, which used a trading company as an example. The results showed that the use of artificial intelligence in inventory management results in lower average inventory levels, higher inventory turnover and a lower proportion of slow-moving items. By improving the structure of current assets and freeing up financial resources, these modifications had a favorable impact on the balance sheet. This further improved the liquidity and increased the profitability of the company.

Efekti primene veštačke inteligencije mogu se sažeto predstaviti kroz validirani mini-model koji integriše teorijska razmatranja i empirijske nalaze: primena sistema veštačke inteligencije → optimizacija zaliha → poboljšana struktura bilansa stanja → poboljšanje pokazatelja likvidnosti i profitabilnosti. Ovaj lanac jasno pokazuje da veštačka inteligencija utiče ne samo na operativni nivo upravljanja zalihama, već igra i značajnu ulogu u poboljšanju računovodstvenog sistema i finansijskih performansi preduzeća.

Artificial intelligence should be used gradually and carefully to accounting and inventory management procedures, concentrating on tasks that have the biggest effects on working capital, like order automation, inventory tracking, and identifying slow-moving commodities. Close integration with ERP and accounting systems is required to fully appreciate the benefits of such solutions, which guarantees the prompt connection of inventory data with financial records and boosts the dependability of financial reporting. Artificial intelligence systems' analytical outputs should be actively utilized at the management level, particularly for procurement planning, working capital management, and cost control. Because accountants and financial analysts play a crucial role in data interpretation, evaluating the impact on financial statements, and guaranteeing adherence to accounting rules, the strengthening of accounting's role is particularly highlighted in that process. In order to make prompt adjustments to business decisions, it is also required to regularly evaluate the effects of the use of artificial intelligence through changes in the level and turnover of stocks as well as through pertinent financial indicators. Despite the limitations of

empirical analysis, the study's findings demonstrate that artificial intelligence is a potent tool for enhancing inventory control and the quality of accounting data. Future research can concentrate on sectoral variations and long-term impacts on the sustainability and financial stability of businesses.

REFERENCES

- Agrawal, A., Gans, J., & Goldfarb, A. (2019). *Prediction machines: The simple economics of artificial intelligence*. Boston: Harvard Business Review Press.
- Baryannis, G., Dani, S., & Antoniou, G. (2019). Predicting supply chain risks using machine learning. *Computers & Industrial Engineering*, 137, 106024.
- Choi, T. M., Wallace, S. W., & Wang, Y. (2018). Big data analytics in operations management. *Production and Operations Management*, 27(10), 1868–1883.
- Chopra, S., & Meindl, P. (2023). *Supply chain management: Strategy, planning, and operation* (7th ed.). Boston: Pearson Education.
- Gartner Research. (2022). *Artificial intelligence in supply chain planning*. Stamford, CT: Gartner.
- Goodfellow, I., Bengio, Y., & Courville, A. (2016). *Deep learning*. Cambridge, MA: MIT Press.
- International Accounting Standards Board. (2023). *IAS 2 – Inventories*. London: IFRS Foundation.
- Kache, F., & Seuring, S. (2017). Challenges and opportunities of digital information at the intersection of big data analytics and supply chain management. *International Journal of Operations & Production Management*, 37(1), 10–36.
- Knežević, S., & Mitrović, A. (2021). Predviđanje finansijskih teškoća preduzeća primenom savremenih analitičkih alata. *Ekonomika preduzeća*, 69(3–4), 201–214.
- Lee, H. L., Padmanabhan, V., & Whang, S. (1997). Information distortion in a supply chain: The bullwhip effect. *Management Science*, 43(4), 546–558.
- McKinsey & Company. (2021). *The AI-powered supply chain*. New York: McKinsey Global Institute.
- Milojević, I., & Terzić, I. (2022). Uloga digitalnih tehnologija u unapređenju upravljanja obrtnim kapitalom. *Računovodstvo*, 66(5–6), 45–57.
- Ross, S. A., Westerfield, R. W., & Jordan, B. D. (2019). *Fundamentals of corporate finance* (12th ed.). New York: McGraw-Hill Education.
- SAP SE. (2022). *Intelligent inventory management with AI*. Walldorf: SAP White Paper.
- Wamba, S. F., Gunasekaran, A., Akter, S., Ren, S. J. F., Dubey, R., & Childe, S. J. (2017). Big data analytics and firm performance. *British Journal of Management*, 28(3), 549–573