

# APPLICATION OF ARTIFICIAL INTELLIGENCE IN INDUSTRIAL PRODUCTION OF THE REPUBLIC OF SRPSKA

**Jelena Damjanović**

Faculty of Business Economics Bijeljina, University of East Sarajevo, Republic of Srpska, Bosnia and Herzegovina  
jelena.damjanovic@fpe.ues.rs.ba  
ORCID: 0000-0002-0873-7539

**Abstract:** *The main goal of the research within this paper is to improve the socio-economic development of the Republic of Srpska through the application of modern achievements of artificial intelligence (AI) in various sectors, with an emphasis on supporting business entities, the public sector and local communities. By applying artificial intelligence, recommendations will be made for further development and improvement of business, through the improvement of existing legal regulations that regulate the establishment and operation of business entities, thus creating conditions for strengthening the competitiveness of the economy of the Republika Srpska and concluding international trade agreements as basic legal instruments for the development of the international economy. This paper will use all methods that could contribute to its higher quality. Primarily referring to methods that are characteristic of social research, which will include scientific description and content analysis (with synthesis), then inductive-deductive, historical and comparative analysis. The hypothesis of the work is the application of artificial intelligence that can contribute to the development of industrial production in the Republic of Srpska, with an emphasis on the energy sector, renewable energy sources, wood processing and metal industries, as well as small and medium-sized manufacturing enterprises. The result of the work is reflected in pointing out the advantages provided by artificial intelligence, based on which, in conjunction with legal science, it can lead to the stimulation of the development of industrial production and international trade in a multipolar world.*

**Key words:** *artificial intelligence, industrial production, international economy, business companies.*

**JEL classification:** K22

## 1. INTRODUCTION

The main hypothesis of this paper is as follows: The application of Artificial Intelligence (AI) can contribute to the development of industrial production in the Republic of Srpska, with an emphasis on the energy sector, renewable energy sources, wood processing and metal industries, as well as small and medium-sized manufacturing enterprises.

Hypothesis Explanation:

Energy sector and renewable energy sources: Artificial intelligence can optimize the management of energy production and distribution, especially in the context of integrating renewable sources such as solar energy and wind energy. Through advanced algorithms, artificial intelligence can predict energy demand and manage energy storage systems, reducing losses and increasing energy efficiency.

Woodworking industry: By introducing artificial intelligence, it is possible to optimize production processes, reduce waste and improve product quality. Artificial intelligence can analyze data on raw materials, operating conditions and market demand, which contributes to a faster and more efficient production process.

By applying AI to analyze large amounts of market data, it is possible to accurately forecast future

demand for products. This allows manufacturing companies to better manage inventory and execute production planning with less risk of shortages or excess inventory.

**Metal industry:** In this sector, artificial intelligence can significantly improve processes such as product quality monitoring, supply chain optimization, and forecasting maintenance needs for production equipment.

**Improving energy efficiency:** AI can analyze energy consumption in the production process and suggest measures to reduce consumption, such as optimizing machine operation or switching to more energy-efficient technologies. By using AI, industrial production becomes more efficient and sustainable.

Manufacturing companies can speed up production, reduce costs, and increase the quality of their products, all with a smaller negative impact on the environment. This would create a basis for sustainable development that includes innovation, efficiency and adaptation to the needs of the modern market, with a special emphasis on energy sustainability and the responsible use of natural resources.

**Small and medium-sized enterprises:** Artificial intelligence can give small and medium-sized businesses access to advanced technologies that were previously only available to large corporations. Through automation and intelligent systems, small and medium-sized businesses can improve their business processes, such as production management, logistics, and customer support, thereby increasing their competitiveness in the market.

For example, “Willis Towers Watson has developed a machine-guided reservation algorithm within their ResQ software. This algorithm uses machine learning to select from a variety of reservation methods (CL, BF, CC, and GLM) and their corresponding parameters. This approach aims to improve the accuracy of estimating future receivables payments in a way that minimizes the outflow function (the difference between realized payments and expected payments. (Mitrašević, Kočović, Koprivica, Graorac 2024a, chap. 2)

**Quality control:** AI is used to automatically detect defects and anomalies in products using computer vision. Cameras and imaging sensors analyze products in real time and identify potential quality issues, allowing for rapid response and reducing the percentage of defective products. This, of course, does not exclude the need to conclude a Control of Goods Agreement, whether in domestic or international trade in goods, but it certainly speeds up the control procedure on the

part of the person performing the control of goods as one of the contracting parties to the given contract.

**Product design and innovation:** AI helps create new designs and improve existing products by analyzing trends, customer requirements, and technical capabilities.

Machine learning algorithms can also suggest new materials or processes that will improve the production process. The only problem that arises here is the issue of the owner of the industrial design, trademark, sample and model, since AI cannot be the holder of Industrial Property Rights.

## **2. RESEARCH GOALS AND METHODS**

The main goal of this research is to improve the socio-economic development of the Republika Srpska through the application of modern achievements of artificial intelligence in various sectors, with an emphasis on supporting business entities, the public sector, and local communities.

The implementation of the project will enable the education of business entities, public administration units and local self-government through seminars and workshops, with the aim of introducing participants to the possibilities of applying artificial intelligence in their work and identifying the best solutions for their specific needs.

By applying artificial intelligence, recommendations will be given for further development and improvement of business, thereby creating conditions for strengthening the competitiveness of the economy of the Republic of Srpska.

In the long term, it is expected to contribute to the creation of new jobs through the development of innovations and the implementation of modern technologies.

At the same time, encourage digital transformation and contribute to the achievement of the strategic goals of the Republika Srpska in terms of sustainable economic development and improving the quality of public services, thereby laying the foundation for the sustainable and innovative application of artificial intelligence in socio-economic development.

The research methodology includes the application of empirical techniques, comparative methods in order to explore the possibilities of applying artificial intelligence in economic entities of the Republic of Srpska. The methodological approach will be adapted to the defined problem, the subject of the research, as well as its goal and field of research.

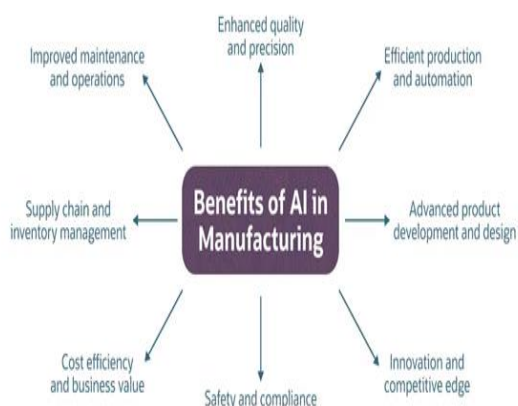
### 3. RESEARCH RESULTS AND DISCUSSION

“AI is increasingly recognized as a transformative force in global trade, impacting areas from supply chain management to trade finance. In this section, to better analyze the role of artificial intelligence, we have developed a conceptual framework that highlights its impact in three key areas:

- (1) trade operations
- (2) trade financing and
- (3) market access.

This framework provides a structured approach to understanding how artificial intelligence impacts international trade, offering solutions that simplify processes, reduce costs and improve overall efficiency. (Oturk, 2024, p., 298).

**Picture 1.**



**Source:**

<https://www.netsuite.co.uk/portal/uk/resource/articles/erp/ai-in-manufacturing.shtml> 22.03.2025.

The benefits of AI within industrial production are reflected in improved quality, more efficient production thanks to automation of the production process, improved product design, safety of consumer products, cost and maintenance efficiency, and better functioning of the supply chain.

"Predicting energy consumption in manufacturing processes is a proactive way to reduce environmental impact and improve sustainability. Using data on temperature, humidity, lighting usage, facility activity, and historical energy consumption data, regression models can predict energy consumption profiles at the plant level and specific processes. These can be extremely useful energy efficiency and demand response strategies, especially in energy-intensive industries such as mining and steelmaking, as well as in additive manufacturing applications." (Plathottam, Rzonca, Lakhnori, Iloeje, 2023., p., 10).

In the research paper, the Web of Science Core Collection (WOS CC) scientific database was searched and a total of 368 primary papers were collected, identified based on the listed keywords. Specifically, the study aims to:

1. Identify key researchers and their contributions in the field of artificial intelligence and its impact on business processes.
2. Analyze the main topics and areas of focus in current research on the application of artificial intelligence in business processes.
3. Predict future research directions and identify trends in the study of artificial intelligence and its impact on business processes.

In addition to a quantitative literature review, the study presents a qualitative literature review on the impacts of artificial intelligence on the domain of business processes. (Kovačević, Božić, 2024a, chap. 3)

According to data from the Statistical Office of the Republic of Srpska from "2023, there were 9283 active enterprises and 19,867 active entrepreneurs operating in the market, of which 28.4% operated in the area of wholesale and retail trade; repair of motor vehicles and motorcycles, while the structure of employees shows that out of 201,536 employed persons, 38.1% were engaged in the areas of industry.

The highest labor costs per employee were incurred by companies and entrepreneurs in the areas of Electricity, gas, steam and air conditioning production and supply, 35,365 BAM, and Mining and quarrying, 34,693 BAM, and the lowest in the area of Other service activities, 14,124 BAM.

In the creation of added value at factor costs, the largest share was held by enterprises and entrepreneurs from the areas of Wholesale and retail trade; repair of motor vehicles and motorcycles 23.5%, Manufacturing 21.4% and Production and supply of electricity, gas, steam and air conditioning 9.7%.

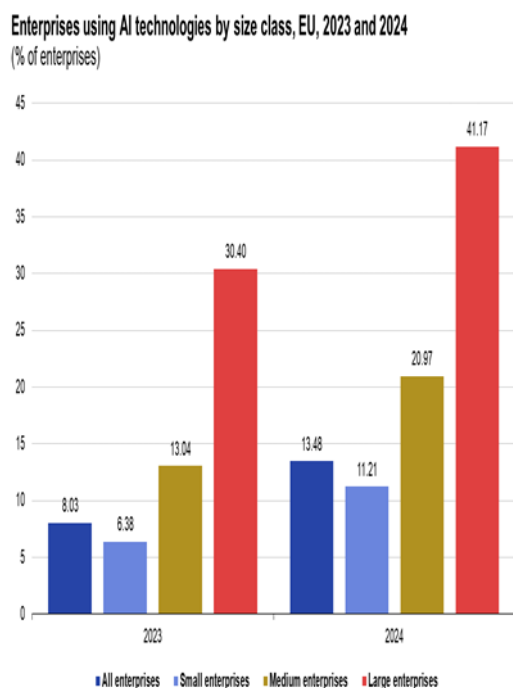
The highest added value per employee, as a measure of labor productivity, was achieved in the area of Information and Communication, 115,414 KM, followed by the areas of Production and supply of electricity, gas, steam and air conditioning, 105,480 BAM, and Arts, entertainment and recreation, 84,677 BAM.

The average gross operating rate, or the profitability rate of the non-financial business economy in the Republika Srpska in 2023, was 17.4%. The highest profitability rates were achieved in the areas of Information and Communication 53.5%, Real Estate 44.3% and Arts, Entertainment and Recreation 37.1%.

“AI enables efficient collection and analysis of large amounts of data, which contributes to more accurate and faster solutions.” (Petrović, Mirović, Simikić 2024a, chap. 10)

As Picture number 2 shows, the number of companies using Artificial Intelligence technology has increased significantly between 2023 and 2024.

**Picture 2.**



Source: Eurostat (online data code: isoc\_eb\_ai)

eurostat

**Source:** Eurostat

[https://ec.europa.eu/eurostat/statistics-explained/images/d/de/Enterprises\\_using\\_AI\\_technologies\\_by\\_size\\_class%2C\\_EU%2C\\_2023\\_and\\_2024\\_%28%25\\_of\\_enterprises%29.png](https://ec.europa.eu/eurostat/statistics-explained/images/d/de/Enterprises_using_AI_technologies_by_size_class%2C_EU%2C_2023_and_2024_%28%25_of_enterprises%29.png) 22.03.2025

Great progress in the establishment, operation and liquidation of companies, whether they are partnerships or limited liability companies, can be attributed to AI. A particular advantage is reflected in the conduct of bankruptcy proceedings, which is one of the irregular ways of winding up a company.

The main objectives of bankruptcy proceedings are provided for by positive legal regulations:

"(1) Bankruptcy proceedings are conducted for the purpose of collective settlement of the creditors of the bankrupt debtor, by monetizing his assets and distributing the collected funds to the creditors.

(2) During the bankruptcy proceedings, the reorganization of the bankruptcy debtor may be carried out in accordance with the provisions of Chapter V of this Law in order to regulate the legal position of the bankruptcy debtor and its relationship with creditors, and in particular in order to maintain its business operations. (Law on Bankruptcy Proceedings, revised text, Article 2.)

Artificial intelligence can make the greatest contribution when forming the bankruptcy estate, listing due and undue claims (which, upon maturity, form part of the bankruptcy estate), which contributes to a faster bankruptcy procedure from the opening of the bankruptcy procedure itself, the formation of the bankruptcy estate, and the settlement of creditors.

The Law on Bankruptcy Proceedings of the Republika Srpska provides for the filing of claims:

"(1) The creditor shall file his claims with the bankruptcy court in writing. The filing shall state:

1. the company name and registered office, i.e. the name, residence or domicile of the creditor,
2. the legal basis and amount of the claim,
3. the number of the creditor's bank account or other account.

(2) Creditors who have claims in foreign currency shall report them in domestic currency.

(3) The bankruptcy trustee shall compile a list of all claims of employees and former employees of the bankruptcy debtor arising before the opening of the bankruptcy and present them with a report of their claims in two copies for signature.

Employees and former employees may report the difference in their claims if they believe that the bankruptcy trustee's list does not fully cover their claims.

(4) If claims are reported for which litigation is ongoing, the report shall state the court before which the proceedings are being conducted, along with the case number.

(5) Separate creditors shall indicate in the application the part of the bankruptcy debtor's assets to which their claim relates and the amount up to which their claims are expected not to be covered by that separate right.

(6) Separate creditors shall indicate in the application the object in the assets to which their claim relates.

(7) Claims of lower-ranking creditors shall be filed only if the bankruptcy judge specifically calls for the filing of such claims. The filing of such claims shall indicate that they are claims of a lower

payment order and the rank to which the creditor is entitled. Otherwise, lower-ranking claims shall not be taken into account during the distribution.

(8) Bankruptcy creditors shall submit a declaration of their claims in two copies, with evidence of the merits of the claim. (Bankruptcy Procedure Act (consolidated text), Article 115).

Although bankruptcy proceedings represent the last legal remedy that ends the existence of a company and thus the termination of its legal and business capacity, they are inevitable in cases of permanent insolvency of the bankrupt debtor.

Thanks to the AI system, it will be much easier to monitor the conclusion of risky legal transactions for a given company and possibly anticipate the reasons that would lead to the initiation of bankruptcy proceedings.

Courts are guided by current legal regulations in the field of Bankruptcy Law, in Roman law systems, but "the advantage of the Anglo-Saxon system is that court decisions represent sources of law, unlike the Roman law system, which refers to general and special legal provisions, and in the future we can expect amendments to existing legislation and international conventions and the eventual adoption of *Lex specialis* in this area of law" (Damjanović, 2024a, chap. 11)

## CONCLUSION

One of the reasons why there is not a large number of foreign investments that would eventually increase industrial production in the Republika Srpska, the conclusion of foreign trade contracts, primarily purchase and sale contracts (*emptio – venditio*) with a foreign element, i.e. international purchase and sale, is the initiation of a large number of bankruptcy proceedings and the impossibility of reorganizing the bankrupt debtor

Legal certainty inevitably creates an economic environment favorable to both foreign investment in industrial development and the establishment of small and medium-sized enterprises in various areas of the economy, such as the wood processing industry and the metal industry.

However, the main advantage of AI in industrial production in the Republic of Srpska is reflected in the improvement of production processes, the reduction of industrial waste and the improvement of product quality. At the same time, AI analyzes energy consumption and, on that basis, determines measures to reduce costs in the form of more efficient technology.

AI allows small and medium-sized enterprises to access advanced technologies that were previously

only available to transnational companies. The possibility of improving business processes in the form of production management to the satisfaction of end consumers, thereby becoming more competitive in the domestic and international markets.

The advantage of being able to control product quality more accurately and faster thanks to AI is not negligible. This reduces the number of defective products that may have visible and hidden product defects, which reduces the number of product warranty activations, repairs of defective products, replacement of a defective product and compensation for damages in the event of termination of the purchase contract in the form of actual damages and lost profits, reflex damages and possibly abstract and specific damages.

The basic hypothesis of the work is confirmed: AI tools for production automation, logistics optimization and equipment maintenance prediction can significantly improve the efficiency and competitiveness of these sectors. Small and medium-sized enterprises, as carriers of industrial development, can use AI to reduce operating costs and increase production capacities.

## ACKNOWLEDGEMENTS

This research was supported by the Ministry of Scientific and Technological Development and Higher Education of the Republika Srpska under the Agreement on Co-financing of the Scientific and Research Project No.: 19.032/961-46/24 dated 30.12.2024.

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- [14] Picture 2: Eurostat [https://ec.europa.eu/eurostat/statistics-explained/images/d/de/Enterprises\\_using\\_AI\\_technologies\\_by\\_size\\_class%2C\\_EU%2C\\_2023\\_and\\_2024\\_%28%25\\_of\\_enterprises%29.png](https://ec.europa.eu/eurostat/statistics-explained/images/d/de/Enterprises_using_AI_technologies_by_size_class%2C_EU%2C_2023_and_2024_%28%25_of_enterprises%29.png) 22.03.2025



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