

# The Use of Artificial Intelligence in Enterprises in Poland: A Literature Review\*

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## Abstract

Artificial intelligence is changing the scope of human activities within enterprises. AI systems and tools not only enable efficient coordination of selected areas of economic activity but also enable accurate decision-making based on available enterprise data. The development of artificial intelligence raises fear among labor market participants about job losses caused by replacement with AI tools and systems. There is a research gap in the literature regarding the use of artificial intelligence by companies, hence the need to address this issue. The aim of this article is to discuss the nature of artificial intelligence and identify examples of AI solutions designed for enterprises. This work serves as an introduction to further research on the approach to artificial intelligence in enterprises in Poland. The study draws on relevant literature and a review of reports, which allowed for an overview of exemplary solutions dedicated to various business sectors. Poland's assessment of AI adoption by 10+ companies among European Union countries is one of the lowest. Currently, there are many AI-based tools available on the market to improve business operations. Using AI allows for more efficient customer relationship building, while using AI solutions in business can be a tool for obtaining feedback and preferences from customers.

**Keywords:** Enterprise, artificial intelligence, AI,

## Introduction

Artificial intelligence has been a widely discussed topic recently in the political, media, technological and scientific spheres. According to the definition provided by the Organization for Economic Co-operation and Development (OECD), artificial intelligence means "a machine-based system that can, for a set of human-defined goals, predict, recommend, or make decisions that affect a real or virtual environment virtual environment" (Osiej 2022).

For many months, we have been observing the dynamic development of artificial intelligence, used primarily in business for the needs of enterprises in almost all sectors of the economy. Technological progress is being observed alongside the development of AI, but it nevertheless raises many doubts. Both society and enterprises recognize the benefits of using AI tools in business (Makowski 2023). However, it is worth considering setting limits on the use of AI by enterprises – as labor market participants fear being replaced by AI tools.

Thanks to the use of information and communication technologies, economic activity in business is being revolutionized. By using appropriate digital tools, enterprises gain easier and faster access to data and information, have the ability to effectively analyze data and resources, optimize processes, and can compete with other companies in a volatile market. Currently, many areas of business are utilizing digitalization processes: logistics, accounting, marketing, sales, purchasing, external and internal communications, and payments. However, it is important to note the risks arising from the use of AI solutions by companies in terms of cybersecurity. Artificial

intelligence also supports easier and faster attack detection, cybersecurity management, and the automation of defense processes (Łukasiakowski 2025).

Due to the availability of AI solutions not only to society but especially to entrepreneurs, it contributes not only to increased productivity but also to cost reduction and improved efficiency.

As a result, the impact of AI implementation can be observed, manifesting itself in improved economic indicators, including increased efficiency, competitiveness, and Gross Domestic Product. It is crucial, however, that the proposed AI solutions in business provide real support for enterprises, including management. It is worth noting that despite the benefits of implementing AI solutions, some enterprises choose not to implement AI into their operations to improve their operations.

## **Methodology**

The aim of the study was to discuss the essence of artificial intelligence and identify examples of AI solutions for enterprises in various economic sectors. The study outlines the importance of AI in driving economic growth. This article serves as a starting point for further research on the use of artificial intelligence by enterprises in Poland.

The publication utilizes an analysis of domestic and international literature and online sources. The method employed is the analysis and synthesis of source materials, the results of which are presented in descriptive, tabular, and graphical formats. In the author's opinion, the adopted research scheme is sufficient to analyze the phenomenon referred to.

## **The essence of artificial intelligence**

The term "artificial intelligence" is now a frequently used expression. Numerous definitions can be found in the literature. It is worth noting that artificial intelligence has introduced revolutionary changes in almost all areas of the economy. AI activities are a field of scientific research and a popular topic of discussion both among society and in the political sphere. However, one must remain vigilant to avoid falling victim to disinformation in today's information world.

The term "artificial intelligence" was first used in 1956 by John McCarthy, a computer scientist and professor at Stanford University at Dartmouth College (Tahiru 2021). According to John McCarthy, artificial intelligence is "the computational part of the ability to achieve goals in the world" (McCarthy 2007).

According to Polish scientist W. Duch, "artificial intelligence is a field of science that deals with solving problems efficiently without algorithms, based on knowledge models" (Duch 1997).

One of the pioneers of the development of the discipline of artificial intelligence, N.J. Nilsson, believes that: "Artificial intelligence is the result of human activity aimed at making machines intelligent; intelligence is the quality that allows a given entity to act appropriately and predictively in its environment" (Nilsson 2010).

A slightly different approach was proposed by R. Kurzweil, who viewed artificial intelligence as a field of research in which machines attempt to replicate the behavior of human intelligence. However, he perceived the AI area as knowledge base systems, robotics, image recognition activities, and automatic learning capabilities (Kurzweil 1999).

According to the PWN encyclopedia, artificial intelligence is a field of science that deals with the study of the mechanisms of human intelligence, modeling and constructing systems that are intended not only to support, but also to replace intelligent human actions (Wilk 2018).

The authors of the book *Artificial Intelligence: A New Perspective*, S.R. Russell and P. Norving, proposed dividing artificial intelligence into two distinct categories: "thinking" – "action," and typically "human" behavior – ideal "rational" human behavior. As a consequence, this led to the identification of four dimensions of artificial intelligence: (1) – human thinking (related to the automation of activities associated with human thinking: problem-solving, learning), (2) – human action (concerning the imitation of human intelligence related to action, especially in psychological terms), rational thinking (a computer system can understand similarly to a human, (3)

– the point of reference is logic and correct drawing of conclusions), (4) – rational action (acts in such a way as to achieve the best possible results) (Russel, Norving 2003).

According to W. Ilnicka, definitions of artificial intelligence pay particular attention to the use of software in machines and computers that was created in the image of the human brain. As a result, machines and computer devices would take over functions previously performed exclusively by humans, ultimately replacing them in many areas of life and work across diverse businesses (e.g., commerce, industry, and services). Currently, artificial intelligence systems and software are designed to enable the system to perceive its surroundings and draw conclusions based on observations. This is the foundation for skillful problem-solving and achieving programmed goals. Using data and information, machines and devices are able not only to take action but also to plan, taking into account the current situation. This enables the progressive autonomy of work and the analysis of the effects of previously undertaken actions (Ilnicka 2024).

It's worth noting that artificial intelligence also carries risks, hence the need for the best possible protection against cybercrime. Among the threats resulting from the use of AI by enterprises and society, W. Ilnicka pointed out primarily: generating false content, stealing data from databases, hacking into IT systems, manipulating sound and images, and disinformation.(Ilnicka 2024).

### **Artificial intelligence as a driving force of the economy**

According to research conducted by Implement Consulting Group, it was noted that thanks to the implementation of artificial intelligence, it is possible to increase Poland's GDP by 8%, which indicates approximately EUR 55 billion per year ([https://raportstrategiczny.iab.org.pl/wp-content/uploads/2025/06/Raport-Strategiczny-INTERNET-IAB-Polska-2024\\_2025.pdf](https://raportstrategiczny.iab.org.pl/wp-content/uploads/2025/06/Raport-Strategiczny-INTERNET-IAB-Polska-2024_2025.pdf) (access :20.06.2025)). However, according to EY, thanks to AI technology it is possible to achieve production value in Poland equivalent to the work of 4.9 million employees, which translates into almost USD 90 billion of additional production value per year (<https://www.libertyglobal.com/wp-content/uploads/2024/02/Wired-for-AI-EY-and-Liberty-Global-report.pdf> (access:31.08.2025)).

Artificial intelligence solutions are often used in complex systems in industrial enterprises. The use of AI in business enables the automation of many processes as well as the quick and effective use of collected data, which enables increased efficiency in industrial enterprises regardless of the industry. Due to the nature of artificial intelligence, AI tools facilitate the processing of huge amounts of data and storing information in a way that exceeds the capabilities of humans. Robots and machines that are used in the company for production can perform the necessary activities with exceptional precision and also make decisions. It is worth noting that artificial intelligence is also much more accurate and precise in the process of detecting faults and errors, which is often used in the production of car parts and components. Devices that use AI software can use infrared, which makes detecting errors and defects faster and more accurate than before. Artificial intelligence is also used in enterprises not only for servicing, but also for inspection of machines used for production in business, which in turn ensures the continuity of operation of production plants, minimizing the risk of downtime or delays in factory operations. Based on data, thanks to the use of appropriate artificial intelligence tools and systems, AI can determine whether a production company is at risk of downtime and allows it to indicate the appropriate moment to perform a technical inspection. In this case, AI has a significant impact on optimizing processes that take place in enterprises. Industry is one of the economic sectors characterized by the production of material goods using production equipment and machines. Artificial intelligence is one of the technological tools used in industrial enterprises (Ilnicka 2024).

Industry is one of the economic sectors characterized by the production of material goods using production equipment and machines. Artificial intelligence is one of the technological tools used in industrial enterprises. Thanks to AI, industrial plants gain opportunities to develop on a global scale. Therefore, artificial intelligence is an important part of the future of the industry, thanks to which it achieves benefits that include primarily: optimization of the processes of using production machines, reducing the costs of maintaining production machines (De Luca et al. 2023).

## Examples of AI solutions for enterprises

Among the artificial intelligence solutions implemented by enterprises, the main elements that constitute AI can be distinguished (Table 1).

**Table 1. Key components of artificial intelligence**

| Artificial intelligence techniques and tools | The essence of action                                                                                                                                                                                                                                                                                   |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Automatic learning                           | Artificial intelligence has the ability to learn independently based on available information. AI systems and tools are created in a way that allows them to recognize patterns, detect dependencies and adjust their actions based on the collected information.                                       |
| Pattern recognition                          | Artificial intelligence stands out for its ability to analyze huge amounts of data and identify hidden patterns and structures.                                                                                                                                                                         |
| Natural language processing                  | AI tools enable both the generation and understanding of natural language. They enable the analysis, understanding and response to texts created by humans, human utterances or other forms of communication.                                                                                           |
| Planning and decision making                 | AI systems enable the analysis of complex situations, taking into account various groups of factors, and can also make decisions based on available data. Moreover, it can generate an action plan that takes into account both goals and constraints                                                   |
| Robotics                                     | Artificial intelligence is popular in robotics, answering, among others, for controlling the movement of robots, processing sensory information, or making decisions and performing physical tasks.                                                                                                     |
| Adaptability and flexibility                 | AI systems have the ability to adapt to changing conditions and situations. They can learn based on new data, as well as update their models and modify actions depending on the user's needs.                                                                                                          |
| Expertise and specialization                 | Artificial intelligence can develop, among others: thanks to specific areas or problems, which allows the creation of expert systems with high knowledge in a specific area and are able to make advanced decisions.                                                                                    |
| The interaction between man and machine      | Artificial intelligence enables interaction between people and machines. This may take the form not only of natural language dialogue, but also of speech recognition systems, user interfaces, or virtual assistant systems. These systems operate intuitively and are tailored to the needs of users. |

*source: own study based on: P. Bovsheva, T. My Luong (2023), Manager's report. Artificial intelligence in business and management, p. 4-5.*

According to T.H. Davenport and N. Mittal in enterprises that are comprehensively powered by artificial intelligence, all possible AI technologies are implemented, without limiting themselves to single tools. According to the authors, companies that use artificial intelligence have sufficient knowledge of AI to make the right choices regarding the tools they implement. The tool evaluation process, however, may not always be simple and straightforward because the possible complexity of AI instruments must be taken into account (Davenport, Mittal 2023). Table 2 presents examples of AI technology tools used by entrepreneurs, divided into statistical, logical and semantic artificial intelligence systems.

**Table 2. Examples of AI technologies used in enterprises**

| Artificial intelligence techniques and tools | Description of operation                                                                |
|----------------------------------------------|-----------------------------------------------------------------------------------------|
| Automatic learning                           |                                                                                         |
| Pattern recognition                          | It concerns the creation of predictive models trained on data                           |
| Natural language processing                  | Refers to grouping similar cases together without prior training                        |
| Planning and decision making                 | Concerns finding control signals in data. The technology is still at the emerging stage |
| Robotics                                     | It is about learning through experimentation and maximizing reward                      |
| Adaptability and flexibility                 | Refers to using hidden layers for prediction/classification                             |
| Expertise and specialization                 | It concerns the use of multiple hidden layers to create predictive models               |
| The interaction between man and machine      | It concerns learning to recognize images in sets of labeled data                        |
| Artificial intelligence techniques and tools | It concerns learning to understand or produce speech and text                           |
| Automatic learning                           |                                                                                         |
| Pattern recognition                          | It concerns making simple decisions based on rules                                      |
| Natural language processing                  | It's about connecting workflows, data access, and rule-based decisions                  |
| Planning and decision making                 |                                                                                         |
| Robotics                                     | It concerns the recognition of human speech and transforms it into written text         |
| Adaptability and flexibility                 | Concerns the evaluation of textual content for meaning and intent                       |
| Expertise and specialization                 | It concerns the creation of text – adapted to the needs and suitable for reading        |

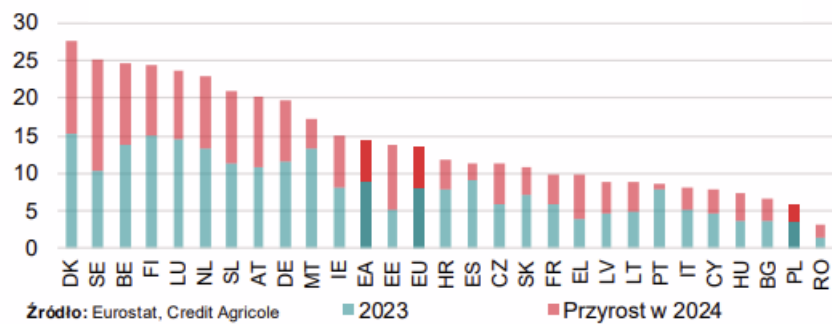
Source: own study based on T. H. Davenport, N. Mittal, Artificial Intelligence in Business: How to Gain a Market Advantage with AI, mt biznes, p.28-29.

It is worth noting that there are currently many companies on the market that, based on detailed intelligence and available data, are able to propose AI solutions for a given business, which will actually contribute to increasing productivity, reducing the number of errors made, or increasing work automation. An example of such companies may be APOLLOGIC or ANEGIS. These are companies that combine knowledge and experience with competences in the field of modern AI solutions.

### **Perception of Artificial Intelligence by enterprises in Poland**

When analyzing the perception of AI by enterprises in Poland, it is worth paying attention to Poland's position relative to other EU countries in terms of implementing artificial intelligence solutions. Based on Chart 1, there is a strong differentiation in the use of AI technology by enterprises in the European Union. In the ranking based on Eurostat data, it was noted that Poland was in the penultimate place in the ranking. The highest percentage of enterprises using at least one AI technology was recorded in Denmark, Sweden and Belgium.

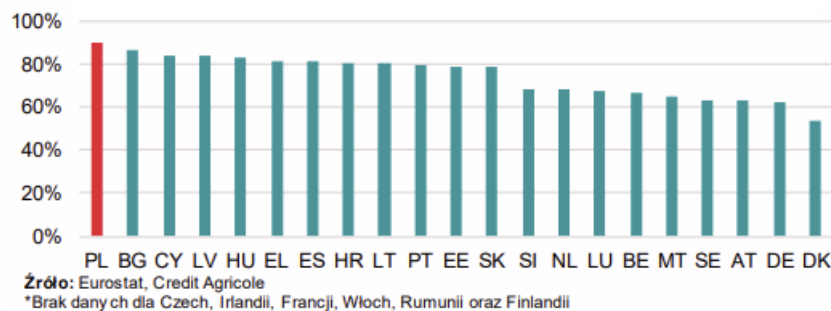
**Chart 1. Share of enterprises using at least one AI technology in EU countries**



Source: Eurostat, Credit Agricole

Taking into account one of the lowest shares of enterprises implementing at least one AI technology in Poland compared to European Union countries, it is worth paying attention to the tendency of enterprises to implement AI in their operations (they have not yet used artificial intelligence in their operations) (Chart 2).

**Chart 2. Share of enterprises that have not used and are not considering using AI technology in 2024**

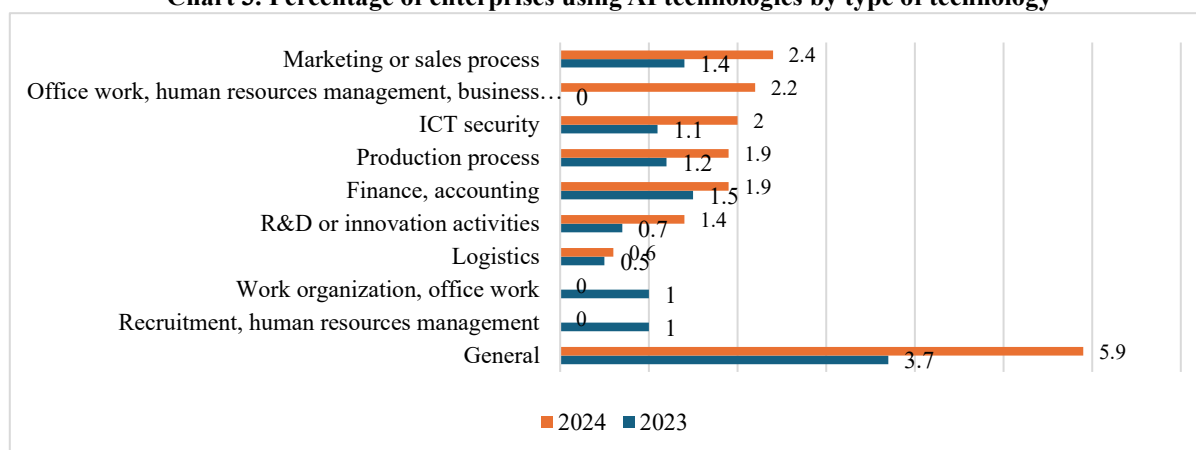


Source: Eurostat, Credit Agricole [https://static.credit-agricole.pl/asset/m/a/k/makromapa-20250217\\_31807.pdf](https://static.credit-agricole.pl/asset/m/a/k/makromapa-20250217_31807.pdf)

With the development of artificial intelligence, further threats resulting from the implementation of AI technology are noticed not only in Poland but also in the European Union. Based on Chart 2, it should be noted that among the EU countries in 2024, Poland had the highest percentage of enterprises that are not interested in implementing AI solutions in their business activities, which means that 9 out of 10 enterprises in Poland did not see the benefits resulting from the implementation of such solutions, which could not only improve the decision-making process, but also increase the effectiveness of implemented activities.

Based on the report on the state of the small and medium-sized enterprise sector in Poland 2025 prepared each year by PARP, an increase in the use of artificial intelligence by enterprises in Poland was noticed. In 2024, only 5.9% declared the implementation of AI solutions, indicating an increase compared to 2023 (3.7%) (Chart 3). It is worth noting, however, that the percentage of enterprises that use artificial intelligence varies depending on the size and industry in which the enterprise operates. Large enterprises are most likely to use AI solutions (33%), while the least interest is in small enterprises (only 4% in 2024). Among the implemented solutions, most implementations concerned the increase in process automation and decision support based on available data (2.6%). The least interest in 2024 was in solutions related to technologies that enable the physical movement of machines or vehicles (0.5%) (Report on the state of the small and medium-sized enterprise sector in Poland 2025).

**Chart 3. Percentage of enterprises using AI technologies by type of technology**



Source: own study based „Społeczeństwo informacyjne w Polsce w 2024 r.”, GUS, 2024.

Artificial intelligence supports enterprises in the personalization and automation of marketing activities based on the provided data. Based on continuous and automatic analysis of activity, companies can optimize the use of their advertising budget. Mechanisms based on artificial intelligence are currently used primarily by the largest technology enterprises both in the country and in the world (<https://www.tygodnikprzeglad.pl/sztuczna-inteligencja-biznesie/> (access: 15.03.2026).

### Examples of companies that have implemented AI

Based on the results of the PARP report on the use of artificial intelligence in the economy. A review of selected initiatives and technologies with recommendations for entrepreneurs, it can be concluded that artificial intelligence (AI) is a key element of the economic and business transformation of enterprises. Thanks to the development of artificial intelligence, many industries have undergone a revolution. Thanks to the use of AI, many enterprises record numerous benefits, which include not only automation or personalization, but also more accurate decision-making (Ratajczak 2025). Examples of companies that have implemented AI include (Rzeźnik et al. 2023):

- NAOKO – a Polish fashion company that uses artificial intelligence to design clothing collections based on customer data,
- NETFLIX – one of the most popular streaming services for watching movies and series, which uses artificial intelligence algorithms to recommend series or films,
- General Electric Inc. – a company using artificial intelligence to shorten the jet production planning process by almost 50%,
- Nethone – a company that specializes in anti-fraud activities based on artificial intelligence, thanks to which it is possible to minimize financial losses,
- Walmart Inc. – an enterprise that uses artificial intelligence to offer customers substitute products when first-choice products are not available.

Another example of using AI solutions in its operations is the SentiOne company, which, thanks to the implementation of artificial intelligence, contributed to increasing the efficiency of customer service by 40%. This was due to the implementation of chatbots that rely on AI. Thanks to this decision of the company, it was not necessary to employ additional people and expenses for the expansion of the call center were limited. This is a practical example of implementing an artificial intelligence solution in business, without lowering service standards (<https://www.bankier.pl/smart/5-sposobow-jak-ai-napedza-rozwoj-malych-i-srednich-firm-w-polsce> (access: 17.03.2026).

Examples of the implementation of AI technology can be found in almost every sector of the economy. One of them is Cardiomatics, which uses artificial intelligence to automate the reading of electrocardiograms. The Polish company has developed an innovative solution that uses AI algorithms to analyze ECG records. This makes it possible to diagnose problems with the cardiovascular system more accurately, faster and more effectively. This solution is used by healthcare professionals, providing tools for automatic detection of arrhythmias, heart attacks

and other disorders. Based on the use of advanced learning technologies, Cardiomatics has the ability to analyze large amounts of ECG data in real time, which significantly speeds up the diagnostic process and reduces the risk of human errors (<https://marketingibiznes.pl/ai/50-polskich-firm-zwiazanych-z-ai-rewolucja-jest-blizej-niz-myslisz/> access: 17.03.2026). The company's goal is to revolutionize the approach to diagnosing cardiac arrhythmias, which, thanks to advanced AI algorithms, will enable the detection of disorders at an early stage, which will increase patients' chances of effective treatment.

## Summary

Artificial intelligence has become an important element of digital transformation in recent years. By using the potential of AI, enterprises can not only increase operational efficiency, optimize production processes, or make more accurate business decisions. Taking into account the development of modern enterprises using AI, it is also worth paying attention to ensuring cybersecurity.

Currently, there are many AI tools available on the market that improve business operations in many sectors of the economy. However, based on the data presented for Poland and other European Union countries, it can be noticed that a significant part of the SME sector in the country does not use the potential of AI tools. However, it is worth noting that it is not only the implementation of AI solutions that determines the untapped potential in business. Currently, you can also find companies that still do not have access to broadband Internet or their own website. The use of artificial intelligence is an opportunity to build relationships with customers and can be a tool for obtaining feedback and preferences from recipients.

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