



March 2025

Artificial Intelligence as an Engine of Economic Growth: Opportunities and Challenges for the Future

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Summary

AI has already penetrated many areas of everyday life and is transforming work processes, posing the greatest threat to repetitive jobs and office work. The Czech Republic, like the rest of Europe, lags behind the US and China in both fundamental and applied AI research due to insufficient investment and weak research support. To remain competitive, Europe should focus on broad AI education, fostering innovation, and effectively implementing existing solutions.

Key Takeaways

- AI is transforming the economy and job market. Repetitive tasks and office jobs are the most at risk, while companies will need to invest in specialists or ready-made AI solutions.
- Europe is falling behind in AI research. A lack of investment, strict regulations, and high costs are slowing down Europe's progress in AI compared to the US and China.
- The need for AI education and implementation. The main priority is educating younger generations and effectively utilizing available AI tools to prevent Europe from becoming dependent on foreign technologies.

Europe is at a critical moment as it tries to maintain its competitiveness on the global stage with other players such as the USA and China. According to Mario Draghi's report on the EU's single market and competitiveness, artificial intelligence will be a decisive engine of productivity. Technological innovations and the use of AI will be absolutely essential for further economic growth and increasing competitiveness. In the Czech context, it will be crucial how successful small and medium-sized businesses, which contribute approximately 60% of GDP, are in adapting and effectively using new technologies.

How can Czech companies maximize their potential with the help of artificial intelligence? What role does the state play in this process? And how can the state cooperate with the private sector to create an environment that allows companies to grow and innovate and fully utilize the potential that new technologies bring?

The Third Boom

Many of us associate AI with large language models and generative AI like ChatGPT, Copilot, Grok, or Dall-E, which function as chatbots and can create documents of various quality, quick analyses, or newly generated images. However, the penetration of artificial intelligence in the life of the average Central European in 2025 is so widespread that some of us do not even realize that we are using AI practically every day. For example, when we type a query into the search field on google.com, we are also using artificial intelligence—trained to search for results. AI is everywhere today, and the current boom is just the beginning of how our thought and work processes, manufacturing processes, and the entire economic and social structure will transform in the future.

The future of AI is, of course, promising. Since 2012, we have witnessed an exponential increase in various projects that surpass what we were convinced AI could handle. Today, we can confidently state that humanity has already overcome the two initial disappointments (in the 70s and 80s of the 20th century), and thanks to the rapid development, primarily of computational power and cheap components (graphics cards), significant progress is being made in leaps and bounds. We must realize that AI has the potential to change our societies in the same way that the printing press, the discovery of electrical energy, or automotive transportation did in the past, as artificial intelligence has nearly unlimited “analytical capacity.” In a world overflowing with an enormous amount of information (data) and with 402.74 million terabytes created every day, AI is an essential part of enabling us to process and exploit this raw material of the 21st century effectively.

It is possible that the current optimism may slide back into the so-called AI winter, that is, the realization that promising prospects are complicated by fundamental limitations and that invested funds may not pay off, which will limit investments and overall interest in development. However, the current boom is fundamentally different from the 1980s. It is no longer about development in isolated scientific workplaces from the Cold War era with limited budgets and human resources. Today's development is backed by technological giants with budgets larger than those of the average-sized states, and thanks to their personnel policies, they can afford to hire almost anyone. Additionally, the current globalized world is an ideal place to monitor trends, imitate, and copy. This is also the engine that currently drives AI development forward. For these reasons, we should rather assume that AI will become one of the important economic sectors of the 21st century.

How to Make Money with AI

As part of the discussion on how AI will transform the economy of the Czech Republic, let's use a seemingly bizarre question: "How will AI help a digger dig a hole?" At first glance, it may seem that

a shovel, pickaxe, and a group of workers with reflective vests will always be needed when replacing a water pipe. Unless autonomous robots, like in Karel Čapek's play R.U.R., were available. However, there is a catch. Even the excavation business is expecting changes with the development of AI.

Not only has robotics made a truly enormous leap thanks to AI over the past 20 years, but artificial intelligence will enter this process much earlier than people or robots will take up tools. Thanks to detailed data analysis about accidents, the operator will know which parts of the infrastructure are critical and where it is not yet urgent. Engineers will predict the behavior of the water supply system much better and plan repairs more effectively. This will mean lower labor costs because, thanks to better organization and fewer urgent accidents, there will be no need to employ as many workers. And once again, we are in the realm of data analysis and processing.

AI is already influencing economic sectors in the Czech Republic. For example, the demand for translators and graphic designers has sharply decreased after affordable and inexpensive AI substitutes appeared (Kasík, 2024). In general, the people most at risk are those doing repetitive tasks such as document creation, processing reports, or what we could collectively call office work. For companies, this, on the one hand, means lower costs in terms of man-hours, as there will no longer be a need to employ a large number of administrative workers who generally do not earn minimum wage. On the other hand, it also means that if companies want to fully utilize the advantages of artificial intelligence, they will have to employ someone who can implement these advantages or the company will have to purchase a ready-made solution. And here, the Czech Republic and Europe, in general, are creating a huge problem.

AI Development is Elsewhere

In the discussion about AI and its use by Czech companies, we touch on two different disciplines. The first is development: new research activities in the field of AI require top scientists and sufficient resources. For example, the first truly functioning convolutional neural network, AlexNet, which could accurately recognize images thanks to machine learning, was created in 2012 as part of Alex Krizhevsky's doctoral project at the University of Toronto. The insights from this breakthrough are behind today's AI development from the USA to China.

It is precisely the support of basic and applied research that is one of the fundamental prerequisites for technological success, and Europe is already falling behind in AI. Currently, EU states are not playing in the global league in AI development. Even in 2018, Europe had the most published scientific articles on AI according to the Scopus database. In 2019, the USA overtook it (see the graph below; Moltzau, 2020), and this is now also reflected in the number of patents, with communist China at the top with over 12,000 patents for the year 2024, followed by the USA with 8,600 patents, and the first EU country—Germany—recording 784 patents (Buntz, 2024). We can console ourselves by saying that quantity does not say anything about quality, but the dynamics at this point are negative for Europe.

Figure 1: Annual number of AI papers on Scopus

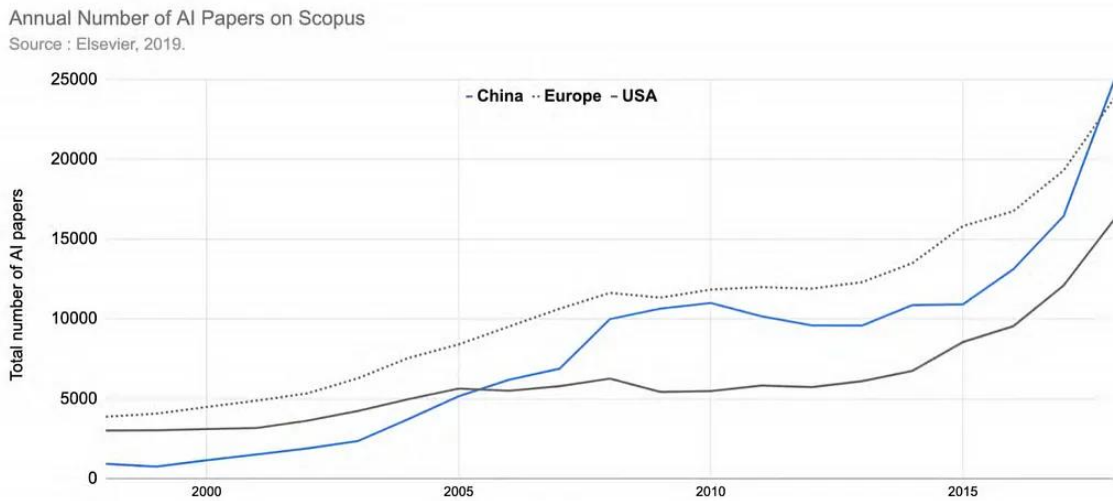
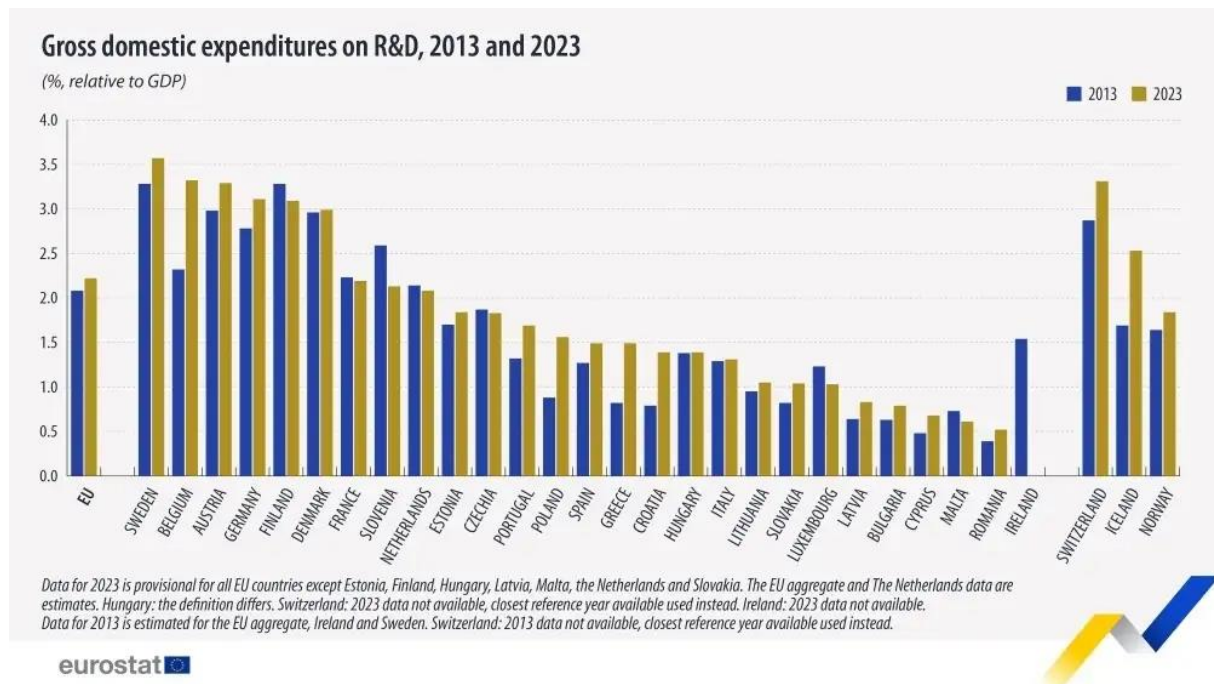


Fig. 1.2a.

Source: Elsevier, 2019

In today's globalized world, it is hard to stand outside the mainstream of AI research and development and hope that we will remain at the technological forefront thanks to precise engineering and an excellent gaming industry. If we look at the graph below, we can see which EU countries realize that investments in research and development must be strengthened. The Czech Republic has evidently chosen a different path than, for example, Belgium, Austria, or neighbouring Poland.

Figure 2: Gross domestic expenditures across Europe



Source: Eurostat

Europe is pulling the shorter straw. Where the USA attracts the best minds in the world with incredibly high salaries, research freedom, and the American lifestyle like Silicon Valley, China catches up with its very loose approach to intellectual property, enormous human resources, and military discipline. European states can offer regulations and expensive energy.¹ The American vice president J. D. Vance summed it up quite accurately in Paris: "We need an international environment that will support rather than stifle the development of AI technologies. And especially, we need our European friends to look at this new industry with optimism rather than fear." (Reuters, 2025)

At Least Use It

Given the circumstances mentioned above, Europe is unlikely to be the place where major discoveries in the field of AI will take place in the coming years. However, this does not mean that it cannot profit from the development – and especially the implementation – of AI.

The first step is, of course, the educational role, where the state still plays the main role. In the Czech Republic, people are still encountering AI as inexperienced users. It is important to educate primarily young and economically active people, focusing on potential risks and dangers, as well as on the possibilities of using AI in practice. For example, we do not have to look far. Last week, the Estonian government, together with OpenAI, announced a project aimed at providing all high school students and teachers with access to ChatGPT Edu (i.e., the version tailored for schools) from September 2025 (OpenAI, 2025). This is the only right approach. Only personal experience can bring innovative behaviour that will allow AI to be fully utilized.

Conclusion

The conclusion of the analysis literally belongs to artificial intelligence.

Assignment: Answer the question below for the paper for the Digital Czechia 2025 conference in 3 paragraphs: How can Czech companies maximize their potential with the help of artificial intelligence? What role does the state play in this process? And how can the state cooperate with the private sector to create an environment that allows companies to grow and innovate and fully utilize the potential that new technologies bring?

Generated Answer: "Czech companies can maximize their potential with the help of artificial intelligence (AI) by strategically integrating it into their processes and products. AI enables companies to streamline operations, analyze large volumes of data for better decision-making, automate routine tasks, and provide personalized services to customers. A key step is investing in the development of their own AI solutions or collaborating with technology partners and research institutions. Companies should also focus on educating their employees so they can effectively utilize new technologies. Success, however, depends on the ability of Czech companies to adapt to the rapidly changing digital environment and create innovations that stand up to international competition.

The role of the state in this process is crucial. It should create an environment that supports innovation while minimizing regulatory barriers to the introduction of new technologies. The state should invest in educational programs focused on digital skills and artificial intelligence, both at the school level and through lifelong learning and retraining programs. At the same time, the state should support AI research and development through grants, tax incentives, and investments in technological

¹ According to the European Commission, the dangers of AI are as follows: 1) discrimination based on gender, race, socio-economic status, or past behavior, 2) bias in decision-making algorithms, 3) invasion of privacy, and 4) manipulation affecting ways of thinking and behavior (European Commission, 2025).

infrastructure, such as data centres, high-speed internet, and cloud services. It is also important to ensure an ethical framework for the use of AI so that its deployment is safe and responsible.

Cooperation between the state and the private sector can be based on partnerships that connect businesses, universities, and research institutions. The state should support the creation of innovation centres and platforms where companies can share know-how and access new technologies. At the same time, it is important to simplify access to funding for innovative projects and allow companies to experiment with AI in a controlled environment. In this way, an ecosystem can be created that will support growth and innovation, increase the competitiveness of Czech companies, and allow them to fully utilize the potential of new technologies." (ChatGPT, 2025)

With the above, one cannot disagree. The problem is that other countries have been asking similar questions and are investing much more and much more effectively into research and development, as well as the connection between universities and companies, than the Czech Republic. Perhaps we have known for a long time the direction we should take. Now, it would be enough to at least somewhat implement these plans.

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