The impact of changes in the labour market due to the increasing use of new technologies and AI

Prepared for the Association of Independent Trade Unions by

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Introduction

The development of new technologies, particularly information and communication technologies and artificial intelligence (AI), is fundamentally changing the nature of the labour market and the way businesses operate. The impact of these changes is reflected not only in the technological equipment of enterprises, but also in the organization of work, requirements for employees and forms of management. The study maps the current state of the art in Czech enterprises, the obstacles and opportunities associated with the introduction of AI and offers recommendations for employers, employees and trade union representatives.

The text is based on extensive data sources, statistical surveys and expert studies and provides a picture of the extent of digitalization of enterprises in the Czech Republic compared to other EU Member States, sectoral and size differences, as well as the real use of AI in practice - from production and logistics through HR and corporate management to risk prediction and planning. Thus, the study identifies the underlying factors that complicate the adoption of AI - from inadequate IT infrastructure and data quality to lack of internal strategies to human concerns and low digital literacy of employees.

Separate attention is paid to the role of trade unions in this process and the issue of ethics, transparency and accountability in the use of AI in the workplace. Particular emphasis is also placed on the importance of workforce training and preparedness, which, in the context of European legislation (AI Act), is becoming a key prerequisite for the safe and effective integration of AI into the work environment.

I. New technologies and their use in business processes

Information and communication technologies and artificial intelligence are key tools for economic development in all sectors and in all countries. enterprises are aware of the benefits of adopting new technologies across various areas, particularly in terms of increasing the efficiency and productivity of business processes, cost savings through more efficient use of resources including human labour, improved decision-making processes, increased workplace safety and protection of assets, data and finances. Awareness of not only these benefits, but a host of others, is leading businesses to invest in AI. The World Economic Forum estimates that the global AI market in the manufacturing sector will grow from $3.2 billion to $20.8 billion by 2028.

I.1 Information and digital technology equipment of enterprises

The availability of information and digital technologies is a prerequisite for the adoption and use of AI technologies. Enterprises located in the Czech Republic are significantly less equipped with information and communication technologies compared to enterprises in economically developed EU countries. This is evidenced by the value of the Digital Intensity Index (DII) published by Eurostat. The level of digitalization of enterprises is determined by the number of times the 12 conditions are met, which relate in particular to internet facilities and use, and cyber security. For each condition fulfilled, the enterprise receives one point; the level of digitization is expressed through four levels. A very low DII is associated with a maximum of three points, a low index is associated with four to six points, a high index with seven to nine points and a very high index with ten to twelve points. A category of "at least basic level of digital intensity" is also introduced, which includes businesses with between four and twelve points.

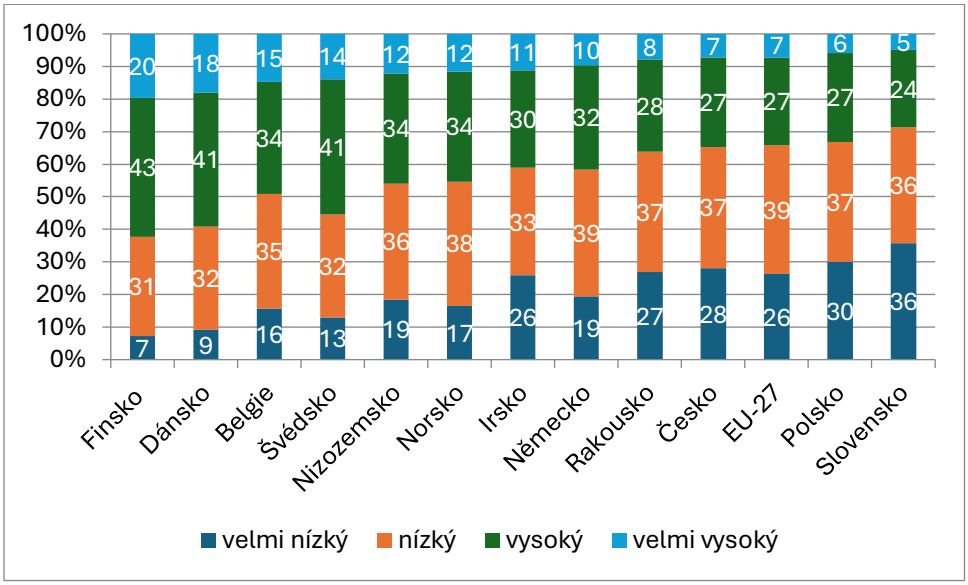
Box 1: Structure of the Digital Intensity Index (DII)

1	at least 50% of employees use enterprise devices with internet access
2	their internet speed allows downloads of at least 30 Mbit/s
3	use at least one artificial intelligence (AI) technology
4	employ IT professionals
5	conduct online working meetings
6	ensure that employees are aware of their obligations in relation to cybersecurity in the enterprise
7	use at least three of the eleven cybersecurity measures identified
8	have documentation in place regarding cyber security
9	allow employees to remotely access work email, documents or enterprise applications via the Internet
10	provide IT training to employees or IT professionals
11	web or EDI sales exceed 1% of their revenues
12	web sales exceed 1% of their revenues and sales to end customers exceed 10% of revenues from website sales

Source: CSO: The Information Society in Numbers - 2025, Chart D52. https://csu.gov.cz/produkty/informacni-spolecnost-v-cislech-0s2jhpch3i

The Czech Republic's digital intensity of businesses with ten or more employees is **comparable to the EU-27 average.** Enterprises with a very high level of digitalization accounted for seven percent of the total number of enterprises in 2024, while the share of enterprises with a high level of DII reached 27% both in the Czech Republic and in the EU-27 average. However, the Czech Republic has a higher share of enterprises with very low digital intensity at the expense of enterprises with only lower digital intensity (see Chart 1).

Chart 1: Enterprises with more than ten employees with each level of DII (%, 2024)



Finland, Denmark, Austria, Belgium, Sweden, Netherlands, Norway, Ireland, Germany, Czech Republic, EU-27, Poland, Slovakia

Very low *low* *high* *very high*

Source: Eurostat, table code: [isoc_e], own processing

Note: Data for all EU Member States and Norway are given in the Annex, Table 11.

The Czech Republic **is significantly behind** those countries that can be considered EU leaders in the digital intensity of enterprises, i.e. Finland, Denmark, Belgium. The share of enterprises with the highest DII in the Czech Republic is about half that of the above-mentioned countries. Compared to geographically close countries, the Czech Republic shows slightly worse results than Austria, where the share of enterprises with the highest level of DII is 1 p.p. higher, while in relation to Germany the lag in this respect is at the level of 3 p.p. On the other hand, the Czech Republic has a slight lead over Poland and Slovakia, namely by 1 p.p. over Poland and 2 p.p. over Slovakia.

Enterprises in the high DII category are relatively **well placed** to move into the group of enterprises with the highest level of DII. In the Czech Republic, only 27% of enterprises are in this category, while in Finland, Denmark and Sweden about 40% of enterprises are in this category. This does not give a very positive picture of the expected development, where we can assume that the Czech Republic will continue to lag behind the EU-27 leaders rather than getting closer to their level and, as a consequence, deteriorating competitiveness. The shift to higher categories does not have to be gradual, and it is possible to imagine enterprises moving from very low DII to very high DII in a relatively short period of

time, assuming critical levels of investment not only in the provision of relevant technology but also in people to ensure that they are used effectively.

The **shift** in terms of the representation of enterprises at each level of the DII between 2022 and 2024 in selected countries is illustrated in Table 1. Enterprises in Finland have been the most active in terms of adopting the digital intensity elements monitored, with the share of enterprises with a very high level of DII increasing by 10 p.p., and enterprises from all lower levels of DII moving into this category. Countries with a low share of enterprises with the highest level of DII in 2024 are also characterized by slow progress, with the share of enterprises increasing by only two to three percentage points in 2024 compared to 2022. In the Czech Republic, the increase of three percentage points was due to a decrease in the share of enterprises with very low DII. The fact that there are not necessarily only positive developments in the provision and use of digital infrastructure is illustrated by the situation in Sweden, where the reduction in the share of enterprises with high levels of DII has been spread to the benefit of both higher and lower levels of DII.

Table 1: Change in the share of enterprises with each level of DII in 2024 compared to 2022 (p.p.)

	very low	low	high	very high
Finland	-3	-2	-4	10
Denmark	-2	0	-3	5
Belgium	-6	0	1	6
Sweden	0	4	-7	3
Netherlands	-1	-2	-2	5
Norway	2	-3	-4	5
Ireland	1	-9	0	8
Germany	-2	-1	-2	5
Austria	-5	2	0	3
Czech Republic	-3	-1	0	3
EU-27	-4	2	-1	3
Poland	-8	3	2	2
Slovakia	-3	-1	2	2

Source: Eurostat, table code: [isoc_e], own processing

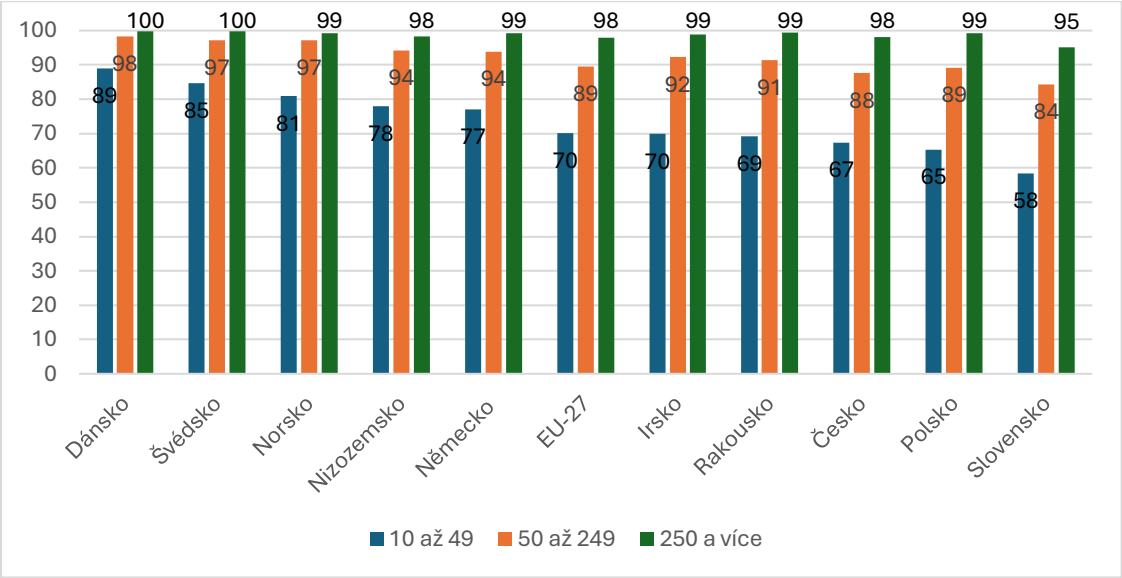
Note: Data for all EU Member States and Norway are given in the Annex, Table 1Table 12.

The availability and use of modern technologies by enterprises depends on the **size of the enterprises** (see Chart 2). In this respect, large enterprises with more than 250 employees are outperformed in particular by small enterprises with 10-49 employees, but also by medium-sized enterprises with 50-250 employees. Differences between enterprises of different sizes are more pronounced in countries with a higher proportion of very low and low DII enterprises. This group includes Slovakia, Poland, Austria and the Czech Republic. In the Czech Republic, 98% of large enterprises, 88% of medium-sized enterprises and only 67% of small enterprises have at least a basic level of DII. In Denmark, Sweden and Norway, on the other hand, the gap between medium-sized enterprises and large enterprises is minimal, at only 2-3 p.p.; for small enterprises, it is greater, by 11-18 p.p.

Large enterprises have greater financial resources that can be invested in the purchase of IT infrastructure, as well as new technologies, the effective use of which and a favourable rate of return

on investment is associated with a certain volume of production / performance, which small and often even medium-sized enterprises do not achieve. Large enterprises usually have more favourable opportunities to attract specialized experts, but also to train existing employees accordingly, so that they are willing and able to use new technologies. Often they also have their own innovation centres, which become a driving force for the introduction and use of new technologies, and branching cooperation with technology enterprises, research centres and start-ups is also important. They are able to deal with issues related to ensuring cyber security, which is one of the biggest risks of using new technologies. Large enterprises also have the advantage of a more sophisticated strategic management system, which includes the digitalization of the enterprise, which is becoming a necessity in order to maintain its position in global competition.

Chart 2: Enterprises with at least a basic level of DII by enterprise size (%, 2024)



Denmark, Sweden, Norway, Netherlands, Germany, EU-27, Ireland, Austria, Czech Republic, Poland, Slovakia

10-49 *50-249* *250 and above*

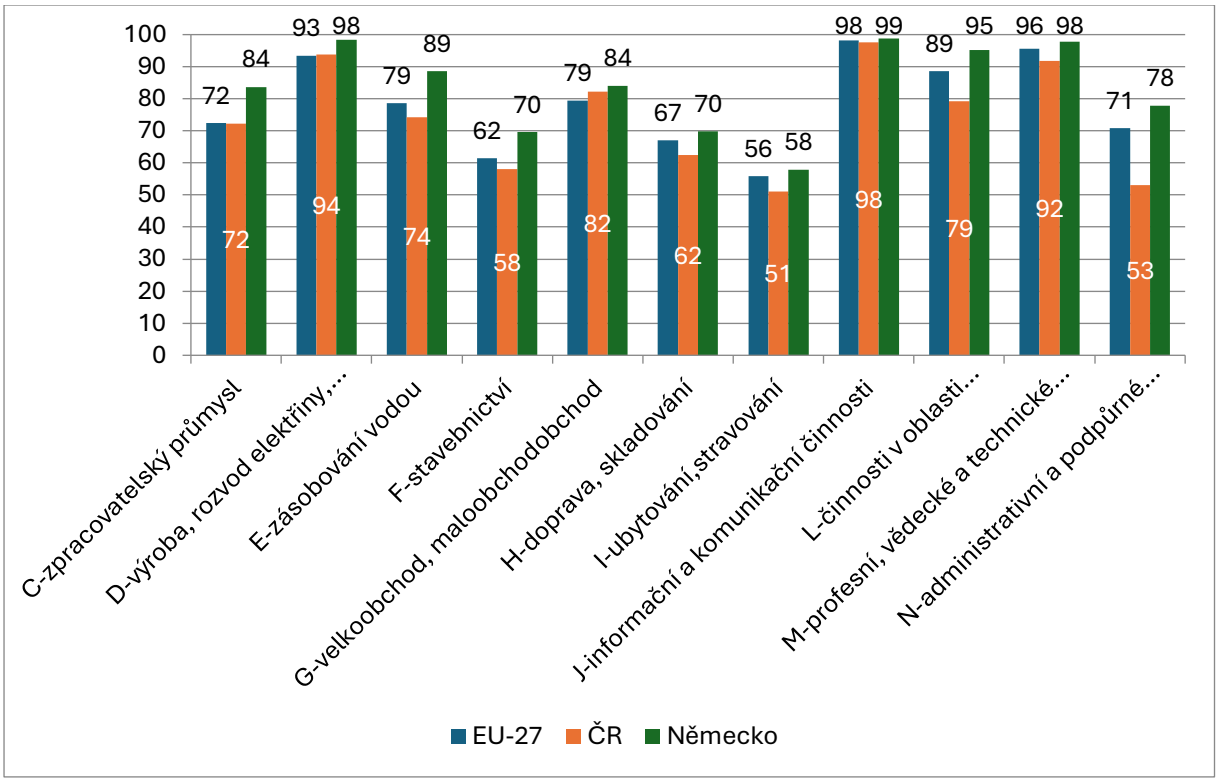
Source: Eurostat, table code: [isoc_e], own processing

Note: Data for all EU Member States and Norway are given in the Annex, Table 13.

In addition to the size of the enterprise, the DII is also influenced by **the sector** in which the enterprise is active (see

Chart 3). At least a basic level of DII is most evident in enterprises operating in the Information and communication technology, Professional scientific and technical activities and Production, distribution of electricity, gas and heat sectors. On average for the EU-27, more than 90% of enterprises in these sectors achieve at least a basic level of DII. This is also true for the Czech Republic, but we lag behind the European average in a total of seven sectors out of the eleven sectors for which data are available. The biggest difference is evident in the Administrative and support activities sector, where only about half of the enterprises in the Czech Republic achieve at least a basic level of DII, compared to 71% in the EU-27 average and 78% in Germany. Enterprises in this sector are mainly engaged in employment intermediation (employment agencies), security activities, renting and operating leasing, and travel agency activities are also included.

Chart 3: Enterprises with at least a basic level of DII by sector (%, 2024)



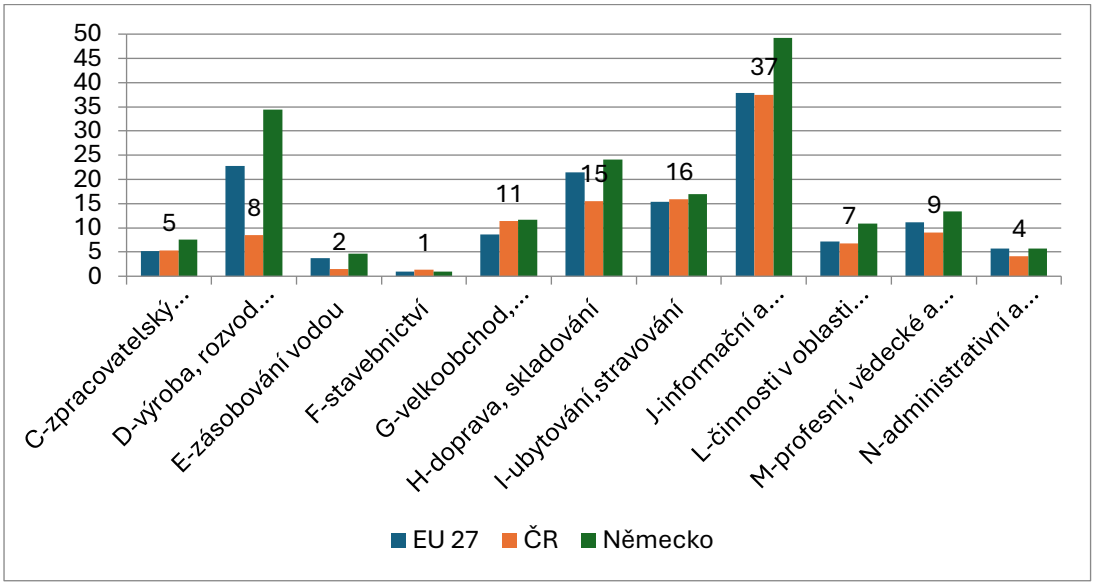
C-manufacturing, D-production, electricity distribution .., E-water supply, F-construction, G-wholesale, retail, H-transport, storage, I-housing, catering, J-information and communication activities, L activities in the field of .., M- professional, scientific and technical ...,
N-administrative and support ...
EU-27 *Czech Republic* *Germany*

Source: Eurostat, table code: [isoc_e], own processing

Note: Data for all EU Member States and Norway are given in the Annex, Table 14.

The ability of businesses to respond quickly to new opportunities, including new technologies, is important for their competitiveness. In this respect, a basic digital technology capability is usually not sufficient, but the availability of the most advanced technologies available for the activities in question plays an important role. In the share of enterprises with a very high DII, the Czech Republic lags behind the EU-27 average, especially in the sector Production, distribution of electricity, gas and heat, where only 8% of enterprises achieved the highest DII, while the EU-27 average is 23% and a full third of enterprises in Germany. In the Czech Republic, enterprises in the Transport, storage and professional, scientific and technical activities sector also lag behind the European and German levels. In the ICT sector, businesses in the Czech Republic keep pace with the European level, but German businesses are well ahead, with almost half of them (49%) reaching the highest level of DII.

Chart 4: Enterprises with very high DII by sector



C-manufacturing, D-production, electricity distribution .., E-water supply, F-construction, G-wholesale, retail, H-transport, storage, I-housing, catering, J-information and communication activities, L activities in the field of .., M- professional, scientific and technical ..., N-administrative and support ...

EU-27 *Czech Republic* *Germany*

Source: Eurostat, table code: [isoc_e], own processing

Comparing the data from the previous two graphs leads to the observation that the lagging of firms in the Czech Republic compared to Germany is more pronounced at the lower levels of the DII than at the highest level. There are two sectors that stand out from this observation, the Production, Electricity, Heat and Gas Distribution and the Information and Communication Technology sectors, where the digital technology endowment of enterprises is more favourable at lower levels than at the highest level. In terms of the share of enterprises with the highest DII, the situation is identical in the Construction and Wholesale Trade sectors.

Table 2: Czech Republic lagging behind Germany in DII by sector

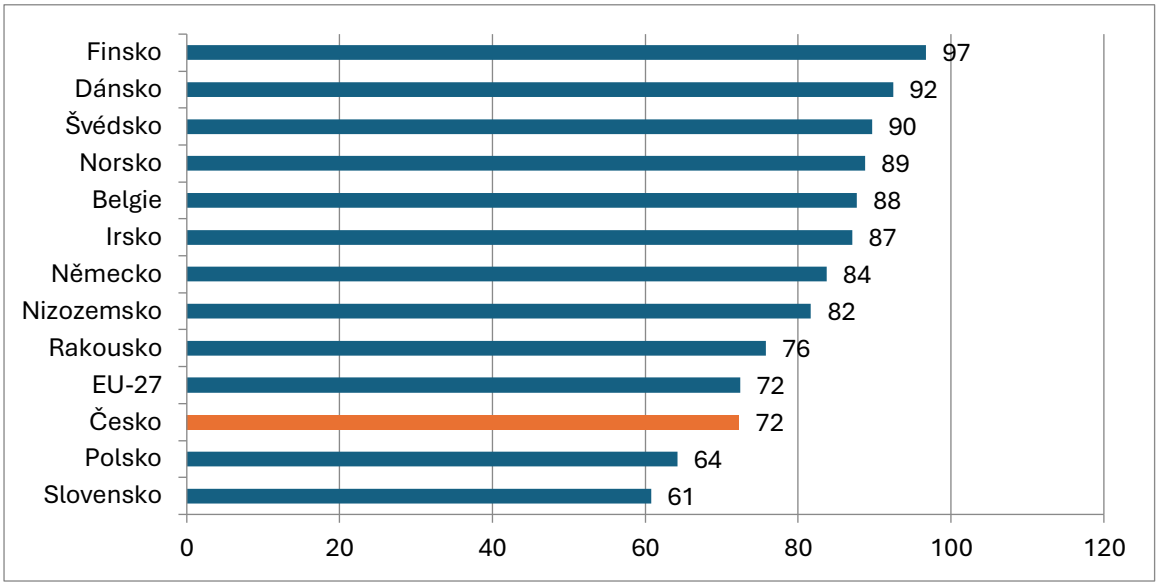
DII	C	D	E	F	G	H	I	J	L	M	N
at least a basic level of DII	-11	-5	-14	-12	-2	-8	-7	-1	-16	-6	-25
Very high DII	-2	-26	-3	0	0	-9	-1	-12	-4	-4	-2

The technological maturity of all sectors is important for the competitiveness of the Czech economy, but their weight in the economic structure is different. **Manufacturing** is the largest contributor to gross value added (GVA), and its dominance in this respect is slightly increasing. In 2010, it contributed 21% to GVA, increasing by 2 p.p. in 2022.[1] Given the importance of this sector, a comparison is made not only with Germany but also with other selected EU Member States. Although enterprises in this sector in the Czech Republic manage to keep up with the EU-27 average in terms of achieving at least a basic

[1] Source: ČSÚ - Statistical Yearbook of the Czech Republic 2024, table 5.4, own calculations

level of DII, the gap with the Nordic EU Member States is significant. In Finland, Denmark and Sweden, ninety per cent or more of manufacturing enterprises have this level of DII, compared to 72% of enterprises in the Czech Republic. The comparison with Germany is also not encouraging, although the level of underperformance is more moderate, at 12 p.p. (72% vs. 82%). Compared to Poland and Slovakia, Czech enterprises are better equipped with digital technology.

Chart 5: Manufacturing enterprises with at least a basic level of DII (%, 2024)



Finland, Denmark, Sweden, Norway, Belgium, Ireland, Germany, Netherlands, Austria, EU-27, Czech Republic, Poland, Slovakia

Source: Eurostat, table code: [isoc_e], own processing
Note: Data for all EU Member States and Norway are given in the Annex, Table 15.

Of course, the share of manufacturing firms with very high DII is much lower, with the EU27 average at 5%. enterprises belonging to this sector located in the Czech Republic keep pace with the EU average in this respect, but the lag behind the Nordic member states is significant. The value of the indicator is three times higher in Finland than in the Czech Republic, and two and a half times higher in Denmark and Ireland. If we look at the countries neighbouring the Czech Republic, then the enterprises in Germany are comparable, in Austria the situation is better by 4 p.p., Before Slovakia and Poland the enterprises in the Czech Republic are ahead, in the case of Poland by 1 p.p., in the case of Slovakia by 2 p.p. (see Table 15: Manufacturing enterprises in the EU27 and Norway with a very high digital intensity index in 2024 (%)Table 15 in the Appendix).

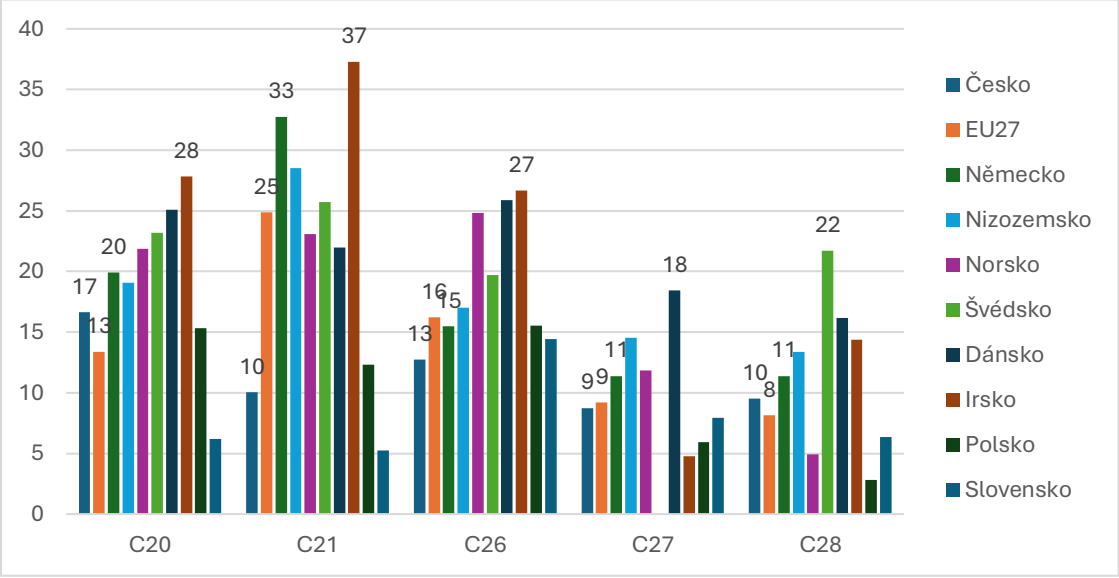
The manufacturing industry encompasses a wide range of sectors. The available data on DII allow an assessment of the situation in a total of **five sectors**. Across the manufacturing industry, Finland is the leader in terms of at least basic digital technology, but more detailed data for Finnish enterprises are not published. As illustrated in the

Chart 6, Ireland, Sweden and Denmark shared the top spot in terms of the share of enterprises with the highest DII. Denmark leads in Manufacture of electrical equipment (C27; 18%), Sweden in

Manufacture of machinery and equipment n.e.c. (C28; 22%), Ireland in Manufacture of chemicals and chemical products (C20; 28%), Manufacture of basic pharmaceutical products and pharmaceutical preparations (C21; 37%) and Manufacture of computers, electronic and optical instruments and apparatus (C26; 27%).

Digital technologies are most comprehensively used in the **pharmaceutical industry** (C21). However, the Czech Republic is the most lagging behind in this sector, the situation is better in all compared countries except Slovakia. Only 10% of pharmaceutical enterprises in the Czech Republic achieve the highest level of DII, the average for the EU-27 is more than double, and in Germany and Ireland more than triple. Czech enterprises engaged in the **production of electrical equipment** (C27) perform best in international comparison, but this is a sector where digital technologies are less penetrating. Although the situation in this sector in the Czech Republic is comparable to the EU-27 average, and the gap with Germany is only 2 p.p., the situation in Denmark is twice as favourable. The Czech Republic outperforms the EU27 average in **Production of chemicals** (C20) by 4 p.p., but 3 p.p. below Germany, and 11 pp below Ireland. Another sector in which the Czech Republic compares favourably with the EU-27 is **Manufacture of machinery n.e.c.**. (C28), where we outperform the EU27 average by 2 p.p., the gap with Germany is only 1 p.p. In Sweden, which is the leader in this sector, the share of enterprises with a given level of digital intensity is double that of the Czech Republic.

Chart 6: Enterprises in selected manufacturing industries with very high DII (%, 2024)



Czech Republic, EU-27, Germany, Netherlands, Norway, Sweden, Denmark, Ireland, Poland, Slovakia

Source: Eurostat, table code: [isoc e], own processing

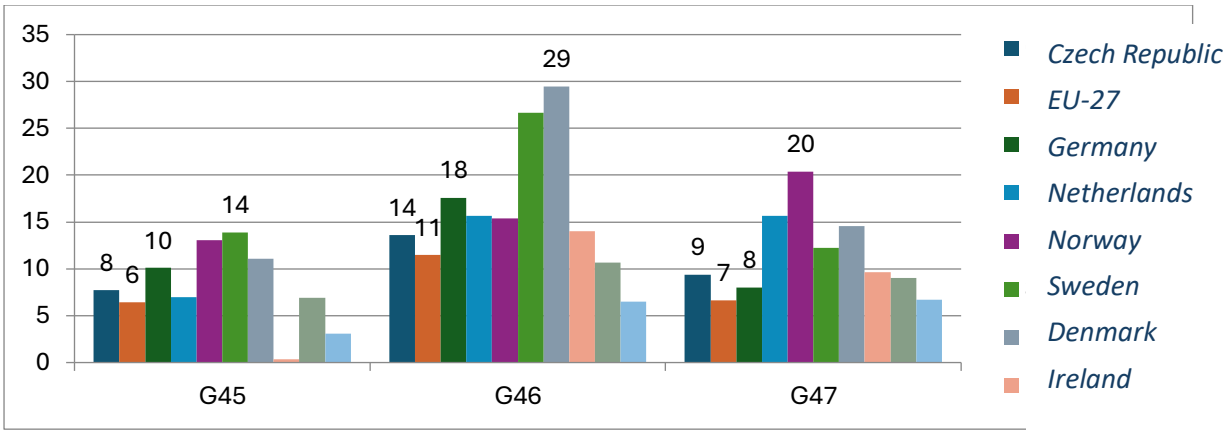
Explanation: C20 - Manufacture of chemicals and chemical products
C21 - Manufacture of basic pharmaceutical products and pharmaceutical preparations
C26 - Manufacture of computers, electronic and optical apparatus and equipment
C27 - Manufacture of electrical equipment
C28 - Manufacture of machinery and equipment n.e.c.

Enterprises in the Czech Republic whose main activity is **trading** lag slightly behind the EU-27 in terms of at least a basic level of digital technology equipment (see

Chart 3), but in the highest level of equipment they slightly outperform the average in all three sectors (see

Chart 7). In the Retail Trade sector (G47), the Czech Republic is also 1 p.p. ahead of Germany, while enterprises in the Czech Republic are 11 p.p. behind Norway. The greatest emphasis on digital technology equipment is placed by enterprises engaged in wholesale trade (G46), in which, however, the Czech Republic lags behind the most, both in relation to Germany and the best equipped Denmark, which shows twice the share of enterprises with the highest level of DII. Businesses focused on trade and repair of motor vehicles (G45) show relatively the lowest differences in terms of digital technology equipment. In the Czech Republic, 8% of enterprises reported the highest DII value, in Germany 10%, and the highest share at 14% is seen in Denmark.

Chart 7: Enterprises with very high DII - trade (%, 2024)

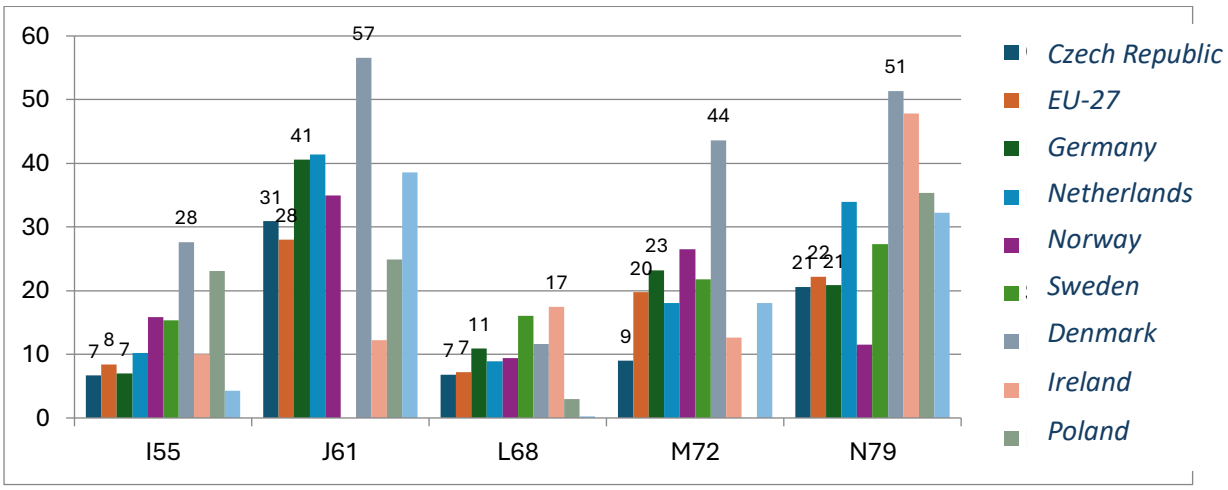


Source: Eurostat, table code: [isoc_e], own processing

Explanation: G45 - Wholesale and retail trade and repair of motor vehicles
G46 - Wholesale trade, except of motor vehicles
G47 - Retail trade, except of motor vehicles

In the **Accommodation** (I55) and Travel agency activities (N79) sectors, the share of enterprises in the Czech Republic with a very high DII is comparable to the EU-27 average and to Germany; in Telecommunication activities (J61) we are ahead of the EU average, lagging behind Germany by 10 p.p. The worst performing Czech enterprises are in the Research and Development sector, where enterprises with the highest level of DII account for only 9% of the total number of enterprises engaged in these activities, compared to 20% in the EU27 and 23% in Germany. In all sectors (see Chart 8), the Czech Republic is two to three times behind Denmark, which is the leader in this respect.

Chart 8: Businesses with very high DII - accommodation, telecommunications, ICT, research, travel agencies



Source: Eurostat, table code: [isoc_e], own processing

Explanation: I55 - Accommodation
J61 - Telecommunications activities
L68 - Real estate activities
M72 - Research and development
N79 - Travel agency, tour operator and other reservation and related activities.

Overall, it can be summarized that the Czech Republic is not doing very well in terms of the representation of enterprises with the highest levels of DII. While the gap with the EU27 average is not very high, with a few sectors showing comparable or even slightly higher values, the gap with the sector leaders is usually more than double. The differences between countries in terms of the digital technology endowment of enterprises are related to a number of factors, as illustrated in the previous charts, including the representation of enterprises in different size categories and the sectoral structure of the economy. Last but not least, there is a clear link between the **availability of** ICT educated **persons**, i.e., analysts, developers, programmers and data and network specialists. As illustrated by Table 3, countries where the share of enterprises with the highest DII exceeds 10%, the share of ICT specialists in employment exceeds 3%. However, it is not true that the higher the share of ICT specialists in total employment, the higher the share of enterprises with the highest DII. An example of this is Sweden, which ranks first in the comparator countries in terms of the share of ICT specialists, but only fourth in terms of the observed level of digitalization of enterprises.

Table 3: Digitalization of enterprises and employment of ICT specialists

	share of enterprises with the highest DII (%)	share of ICT specialists in employment (%)
Finland	20	4.2
Denmark	18	3.3
Belgium	15	3.4
Sweden	14	5.5
Netherlands	12	4.7
Ireland	11	3.6
Germany	10	2.5
Austria	8	2.7
Czech Republic	7	2.3
EU 27	7	2.4
Poland	6	2.5
Slovakia	5	2.2

Source: Eurostat, table code: [isoc_e], own elaboration, CSO - Digital economy in numbers - 2024, chart A8, own processing

I.2 Use of artificial intelligence technologies

The digital technology capability of enterprises is a prerequisite for the adoption and use of artificial intelligence (AI)-based technologies. The leap in the proportion of businesses using AI is also largely related to the free launch of ChatGPT, when generative AI tools became widely known and became part of businesses' development strategies. When comparing how long it took businesses to use computers, the use of AI is considered the fastest adoption of a new technology in history. At the same time, however, it is also pointed out that in many cases these are still experiments that are not supported by a sophisticated **strategy**. Omitting this component of AI implementation is often associated with unsuccessful business process transformations and failure to achieve expected results.

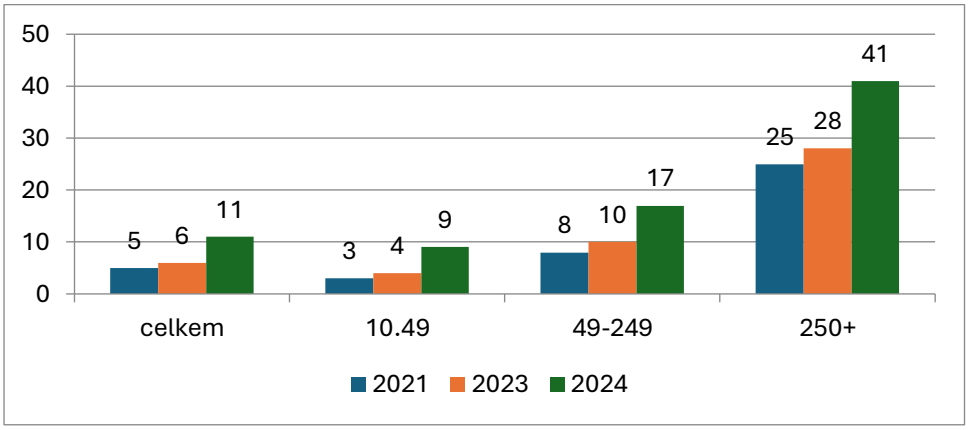
According to the results of the survey "The State of Generative AI in enterprises[2], conducted by Deloitte, activities that are intended to lead to the adoption of generative AI technologies often remain in the pilot or testing phase. The majority of respondents who took part in this international survey (68%) said that they had managed to put into practice no more than 30% of their attempts to use generative AI. The cause is seen mainly in the underestimation of effective change management, including employee education, integration of technology into the structure of the organization, problems with data, security. The effects are expected not only in increased productivity and reduced costs, but also in increased innovation, improved products and services, and strengthened customer relationships.

Information on the state of the **use of artificial intelligence technologies** is provided by the CSO's publication Information and Communication Technologies in the Business Sector 2024, Table 11 - Artificial Intelligence Technologies. The share of enterprises using at least one AI technology in the Czech Republic in 2024 has almost doubled compared to the previous year, from 6% to 11% (see ChartChart 9). These are the following AI technologies:

- Advanced text analysis,
- Text or speech generation,
- Machine or deep learning,
- Robotic Process Automation (RPA) with AI elements,
- Image-based person/object recognition,
- Speech recognition,
- Technology that allows machines to make decisions/move independently.

The share of enterprises using at least one AI technology has increased by only one to three percentage points over the 2021-2023 period, depending on the size of the enterprise; in 2024, compared to the previous year, this share has increased by 5 percentage points (p.p.) for small enterprises with 10-49 employees, by 7 p.p. for enterprises with 50-249 employees, and the largest increase of 17 p.p. is seen in large enterprises.

Chart 9: Development of the share of enterprises using at least one AI technology in the Czech Republic (%, 2024)



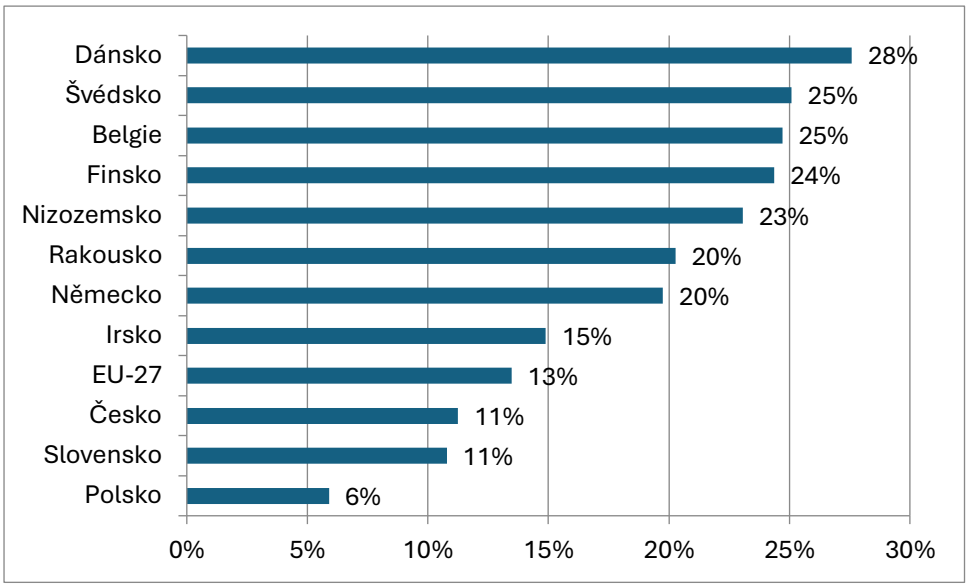
Total

[2] Deloitte: Now decides next: Generating a new future.
https://www2.deloitte.com/content/dam/Deloitte/us/Documents/consulting/us-state-of-gen-ai-q4.pdf

Source: CSO - Enterprises using artificial intelligence, chart 33, own processing

Although businesses in the Czech Republic have made a relatively large shift in the use of AI technologies, they are still below the European average by 2 pp and at about half the level of selected economically developed countries. The use of AI technologies is at a comparable level to Slovakia and outpaces Poland by 5 pp.

Chart 10: Businesses using at least one AI technology (2024)



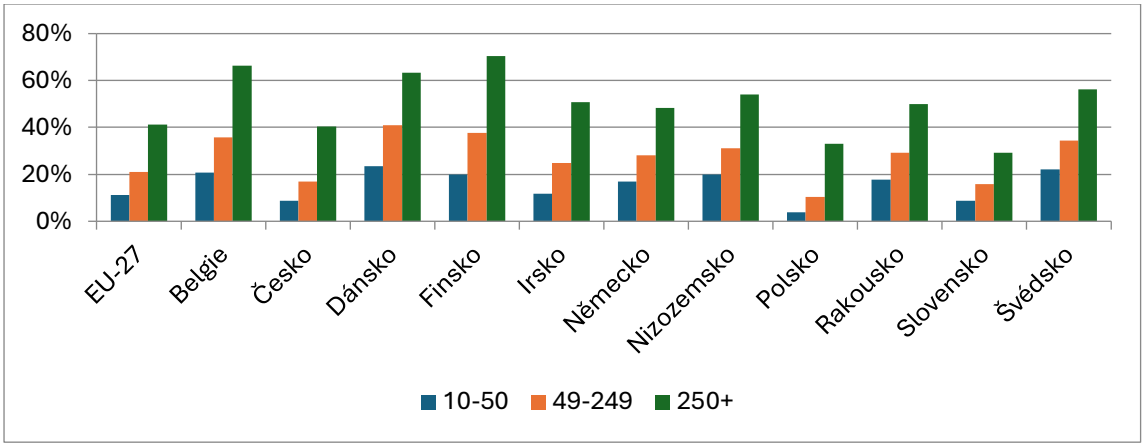
Denmark, Sweden, Belgium, Finland, Netherlands, Austria, Germany, Ireland, EU-27, Czech Republic, Slovakia, Poland

Source: CSO: Table 11.10, own processing

Note: Data for all EU Member States are given in the Annex

Similar to the Digital Intensity Index, the use of AI technologies varies with the **size of the enterprise**, with the use of these technologies in business processes increasing with enterprise size. Small and large enterprises in the Czech Republic manage to keep pace with the European average to a certain extent, lagging behind only at the level of 2 p.p. and 1 p.p. respectively, in the case of medium-sized enterprises the difference increases to 4 p.p. (see Chart 11). The comparison with Germany is much worse, with only 9% of small enterprises in the Czech Republic using at least one of the technologies compared to 17% in Germany, the difference is 9 p.p. for medium-sized enterprises and 7 p.p. for large enterprises. Denmark, which has the largest share of enterprises with this characteristic (see Chart 10), significantly outperforms the Czech Republic in all size groups of enterprises, least of all in small enterprises (by 15 p.p.), while the difference in medium and large enterprises is broadly comparable at 24 p.p. and 22 p.p. respectively.

Chart 11: Percentage of enterprises using at least one AI technology by enterprise size (%, 2024)



EU-27, Belgium, Czech Republic, Denmark, Finland, Ireland, Germany Netherlands, Poland, Austria, Slovakia, Sweden

Source: CSO: Table 11.10, own processing

Note: Data for all EU Member States are given in the Annex, Table 16.

The usability of AI technologies varies by **industry**, which is reflected in the significant differences in the proportion of businesses using at least one of these technologies. Similarly to digital capabilities, AI technologies have the least penetration in the construction and transport sectors, and the most penetration in the ICT sector (see Table 4). In this sector, more than 60% of enterprises in the economically developed EU countries use at least one AI technology, almost half of enterprises in the EU-27 average, and only 46% of enterprises in the Czech Republic. A comparison of the situation in the Czech Republic and Germany shows that we are lagging behind the most in the Information and Communication Technologies sector (15 p.p.), and the least in the Trade sector (3 p.p.), which is dominated by German multinational chains (e.g. Lidl, Kaufland, Billa, Penny, macro, Globus Obi, Kik, Hornbach and others[3]). These chains usually introduce similar technologies in their countries of operation as in their home country.

Table 4: Enterprises using at least one AI technology by sector (%, 2024)

	manufacturing (C)	construction (F)	trade (G)	transport (H)	accommodation (I55)	information and communication activities (J)
EU27	**11%**	**6%**	**12%**	**8%**	**12%**	**49%**
Belgium	23%	11%	22%	23%	-	64%
Czech Republic	**10%**	**2%**	**13%**	**6%**	**6%**	**46%**
Denmark	22%	12%	27%	21%	16%	68%
Finland	21%	11%	22%	7%	23%	66%
Ireland	18%	6%	12%	8%	14%	49%
Germany	16%	10%	16%	11%	12%	61%
Netherlands	18%	9%	23%	11%	25%	58%
Poland	5%	2%	6%	2%	3%	33%
Austria	23%	7%	16%	13%	29%	61%
Slovakia	8%	6%	12%	8%	4%	29%

[3] Divinová Jana: Kdo vlastní obchodní řetězce a které jsou české, in peníze.cz
https://www.penize.cz/nakupy/431219-kdo-vlastni-obchodni-retezce-a-ktere-jsou-ceske-prehled

Sweden	19%	13%	22%	16%	16%	68%

Source: CSO: Table 11.10, own processing
Note: Data for all EU Member States are given in the Annex, Table 16.

Enterprises are implementing the different types of AI technologies studied with varying degrees of intensity. Data is available for only five AI technologies, lacking data for speech recognition and technologies that allow machines to make decisions and move independently. It can be assumed that the use of these two technologies is very limited.

Businesses in the Czech Republic are using these five **AI technologies** to a comparable extent to the EU27 average, deviating by a maximum of 1 p.p., upwards for two AI technologies and downwards for three of these technologies. Businesses in the Czech Republic make more use of text or speech generation and robotic process automation with AI elements, while the use of advanced text analysis, machine or deep learning and image-based person/object recognition is below the European average. The lag behind the leaders in this area, Denmark and Finland, is twice as high in the case of technologies used by five to six percent of enterprises in the Czech Republic and three times as high for technologies implemented by only two to three percent of enterprises in the Czech Republic. Enterprises have so far implemented robotic process automation to a very small extent, which is associated with the use of software robots that work with data and communicate across enterprise information systems. These robots can be used to register invoices, match payments, generate reports, calculate prices, transfer information between systems, automatically respond to customers, etc. These are primarily repetitive activities that are prone to human error.

The most widespread AI technology is advanced text analysis, which is used by 7% of businesses in the EU27, 6% in the Czech Republic, 10% in Germany and 17% in Denmark. The "popularity" of this technology is related to its availability, with simpler versions of this technology being offered for free download.

Table 5: Enterprises using selected AI technologies (2024)

	advanced text analysis	text or speech generation	machine or deep learning	Robotic Process Automation (RPA) with AI elements	image-based person/object recognition
EU-27	**7%**	**5%**	**4%**	**4%**	3.
Belgium	15%	13%	8%	10%	6%
Czech Republic	**6%**	**6%**	**5%**	**3%**	**2%**
Denmark	17%	18%	11%	11%	6%
Finland	15%	13%	10%	11%	6%
Ireland	6%	7%	6%	6%	3%
Germany	10%	7%	5%	5%	5%
Netherlands	14%	13%	7%	6%	5%
Poland	1%	2%	2%	3%	2%
Austria	13%	8%	7%	5%	3%
Slovakia	6%	4%	3%	4%	2%
Sweden	16%	12%	8%	8%	5%

Source: CSO: Source: own processing
Note: Data for all EU Member States are given in the Annex, Table 17.

Of the five **areas in which businesses use AI technologies**, the most frequent use in the EU-27 average is in marketing and sales (5%), where, for example, intelligent chatbots are used for customer support, evaluating completed sales and estimating future sales, segmenting customers and optimizing offers and prices, and creating individual business offers. In the Czech Republic, 6% of enterprises use AI technology in this area, 10% in Germany and 17% in Denmark.

The second area in which enterprises use AI technologies is administrative processes, management and HR, where they use, for example, virtual voice assistants, speech recognition and text or speech generation, the use of translators to/from foreign languages, machine sorting of resumes according to the requirements of HR, for pre-selection of suitable candidates for individual positions, the use of machine learning for investment or strategic decision-making, risk assessment. On average, 4% of businesses in the EU27 use them, 5% in the Czech Republic, 5% in Germany and 7% in Denmark.

For cyber security, i.e. using e.g. computer image recognition for user authentication, machine learning to detect and prevent cyber attacks, identifying spam from previous data, etc. are used by 3% of enterprises in the EU27 average, the same proportion in the Czech Republic, 4% in Germany and 7% in Denmark.

In R&D and innovation activities, AI is used by three percent of enterprises at EU27 level, the same in the Czech Republic, only 2% in Germany and 4% in Denmark.

Surprisingly, a low proportion of businesses are using AI in accounting and finance. Automated processing of received invoices, the use of machine learning to analyze data to support financial decision-making, is used by only 3% of businesses in the EU27, 1 pp less in the Czech Republic, 5% in Germany and 8% in Denmark.

Table 6: Enterprises are using AI technologies in selected areas (2024)

	in marketing, in sales	in organizational and administrative processes, management or HR	for cyber security	in the field of research and development, in innovation activities	in accounting, in finance
EU-27	**5%**	**4%**	**3%**	**3%**	**3%**
Belgium	6%	9%	7%	6%	8%
Czech Republic	**6%**	**5%**	**3%**	**3%**	**2%**
Denmark	9%	7%	6%	4%	8%
Finland	9%	7%	6%	6%	7%
Ireland	6%	6%	4%	4%	3%
Germany	7%	5%	4%	2%	5%
Netherlands	9%	7%	5%	6%	6%
Poland	2%	2%	2%	1%	2%
Austria	10%	7%	4%	4%	6%
Slovakia	3%	1%	2%	2%	2%
Sweden	10%	6%	4%	4%	4%

Source: CSO: Source: own processing

Note: Data for all EU Member States are given in the Annex, Table 18.

As illustrated in Table 4, there are quite significant differences in the use of AI technologies between industries. A closer look at the sectoral differences in the Czech Republic in terms of which business activities enterprises use AI technologies is provided in the following Table 7. The **information and communication technology** sector has a significant lead in all areas surveyed, followed by the professional, scientific and technical activities sector. Businesses operating in these sectors most often use AI technologies in organizational and administrative processes, management or HR. The low uptake of AI technologies in the professional, scientific and technical R&D&I sector (6%) is quite striking, also in view of the fact that 11% of enterprises use technologies enabling text analysis and text generation, which greatly facilitate the search for sources informing the state of knowledge and innovation (see Table 8). Compared to other industries, businesses involved in wholesale, retail and motor vehicle repair and maintenance and those involved in the purchase, sale, rental and maintenance of real estate are relatively advanced in the use of AI technologies in their respective fields.

Table 7: Enterprises in the Czech Republic using AI technologies in selected areas by industry (%,2024)

predominant economic activity (CZ NACE)	in marketing, sales	in organizational and administrative processes, management or HR	for cyber security	in the field of research and development, in innovation activities	in accounting, areas of finance
Total	6,0	5,3	2,9	2,5	2,4
Manufacturing - C (10-33)	3,9	4,0	2,3	1,9	2,4
Production and distribution of energy, gas, water, heat and waste management activities	3,8	2,5	2,0	.	2,1
Construction	1,4	1,2	0,6	0,4	0,6
Wholesale and retail trade; repair and maintenance of motor vehicles	9,1	4,7	2,9	1,5	2,0
Transport and storage	2,5	3,1	0,9	0,9	1,6
Accommodation, catering and hospitality	2,7	2,1	0,8	.	0,8
Information and communication activities	22,9	24,3	16,1	23,8	9,4
Real estate activities	7,4	5,6	4,1	1,0	3,1
Professional, scientific and technical activities	10,3	13,1	4,8	5,6	5,2
Administrative and support activities	5,0	4,8	3,0	0,4	1,9

Source: CSO: Table T11B, own processing

The maturity of industries in terms of the use of AI technologies in particular areas is related to their maturity in terms of the implementation of these technologies. Advanced text analytics plays a major role in all sectors, which is to some extent related to the free availability of these technologies. Very little variation in the use of selected AI technologies is evident in the professional, scientific and technical sectors, with the exception of image-based person/object recognition technology. This technology is used about three times less than the other selected technologies. Most of the technologies are applied in the ICT sector, which is pulling up the overall share of enterprises using these technologies.

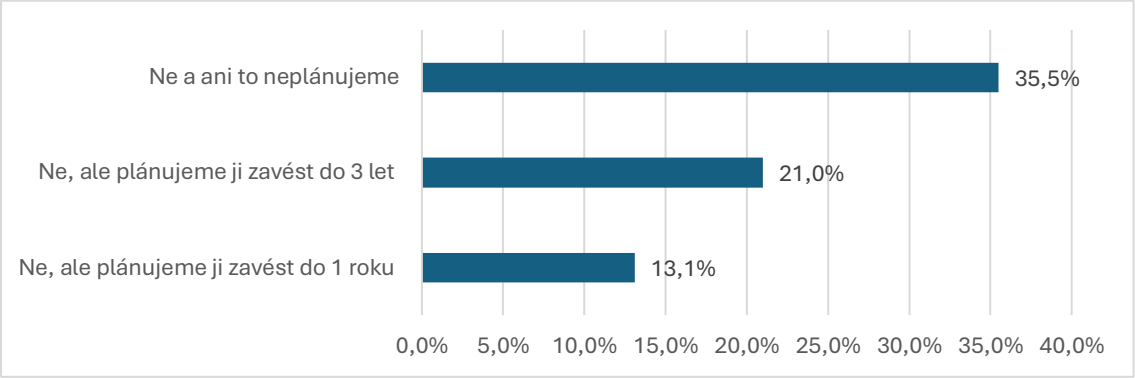
Table 8: Enterprises in the Czech Republic using selected AI technologies by industry (%,2024)

predominant economic activity (CZ NACE)	advanced text analysis	text or speech generation	machine or deep learning	Robotic Process Automation (RPA) with AI elements	image-based person/object recognition
Total	6,4	5,9	4,5	2,9	2,0
Manufacturing industry	4,6	4,1	3,4	2,6	2,0
Production and distribution of energy, gas, water, heat and waste management activities	3,7	1,8	1,8	2,7	0,9
Construction	1,0	1,1	0,7	0,7	0,3
Wholesale and retail trade; repair and maintenance of motor vehicles	7,8	8,7	3,9	1,7	1,6
Transport and storage	3,2	3,1	1,6	0,9	0,5
Accommodation, catering and hospitality	2,0	1,6	0,7	0,8	0,3
Information and communication activities	31,3	27,3	28,5	14,2	13,6
Real estate activities	6,9	5,9	3,7	2,6	1,8
Professional, scientific and technical activities	11,4	10,7	10,6	8,1	3,0
Administrative and support activities	6,3	4,2	4,0	2,4	0,9

Source: CSO: Table T11A, own processing

The increase in the use of AI in enterprises is related to the confidence of senior leaders in the benefits of AI for their business. According to the Chamber of Commerce of the Czech Republic's survey on automation, robotics and artificial intelligence from the autumn of 2024, the Chamber Barometer[4], 35.5% of 358 respondents from micro, small, medium and large enterprises answered that they do not use and do not plan to introduce AI into their business processes within the next three years (see Chart 12). The negative answer regarding the implementation of AI was mainly chosen by representatives of micro enterprises (47.7%) and small enterprises (42.9%). For these businesses, it may not be reluctance, but a range of other influences, including a lack of information about AI technologies suitable for their business.

Chart 12: Enterprises' intentions in implementing AI



No, and we don't plan to implement it.
No, but we plan to implement it within 3 years

[4] Hospodářská komora: Komorový barometr. https://www.komora.cz/aktivity/setreni/#vysledky-setreni

No, but we plan to implement it within 1 year
Data source: Chamber of Commerce of the Czech Republic; Chamber Barometer

On the other hand, 34.1% of enterprise representatives who have not used AI so far, but will introduce AI into their enterprise processes within one year (13.1%) or three years (21%), expect to implement AI technologies. In the coming years, medium-sized enterprises (43.4%) in particular are counting on implementing AI, and this is significantly more often in the medium-term timeframe of three years (26.4%) than in the short-term timeframe of one year (17%). It can be assumed that given the lead of large enterprises in the use of AI technologies over medium and small enterprises, large enterprises will remain the leader in the use of AI technologies, despite the fact that only less than a third of these enterprises (31.5%) plan to use them in the coming years.

II. Barriers to the introduction of new technologies

Despite the growing availability of AI technologies and a relatively significant shift in their use in 2024 compared to 2023, the Czech Republic is still lagging behind the economically developed EU-27 Member States (see Chapter 2). What are the main reasons that make it difficult or even impossible for enterprises to implement these technologies have been the subject of investigations by the Confederation of Industry of the Czech Republic, Deloitte, Manpower Group, etc. Other enterprises have also focused on this issue, publishing interviews with experts in the field and business representatives through online news, print, television and radio broadcasts. Based on a search of these sources, can identify the key challenges that enterprises face in adopting AI technologies. This is a combination of various obstacles across technological, economic, organizational, personnel and legal areas. Experts who advise businesses see the biggest barriers preventing businesses from fully exploiting the potential of new technologies in the low willingness of businesses to experiment, but also in the lack of emphasis on innovation, the unpreparedness of the data base and also in excessive regulation.

Technological barriers

Many enterprises face problems with the integration of AI systems into existing IT structures. Their **lack of coherence** prevents enterprises from fully exploiting the potential of AI technologies and often leads to enterprises experimenting with AI rather than following a comprehensive strategy to guide the implementation of IT and AI systems. In small enterprises, the implementation of AI technologies is also hampered by the overall lack of IT equipment.

The unpreparedness and quality of data is another barrier to the adoption and use of AI technologies. Relevant data is not sufficiently available to businesses, or is available in unstructured or paper-based form, not centralized and available across systems. Without prior data digitization, advanced AI algorithms cannot be used effectively, enterprises must first ensure consistent digitization of processes. For smaller enterprises, providing these prerequisites can present an insurmountable barrier to the adoption of AI technologies that can only work effectively once a critical threshold of data is reached.

Another obstacle mentioned by experts is the need to **adapt** available AI technologies **to the enterprise conditions.** enterprises usually do not have sufficient staff and financial capacity for these activities. A large number of enterprises have also not encountered an offer that would adequately convince them of the benefits of introducing AI technologies, i.e. streamlining processes, increasing productivity, improving products and services, intensifying customer relationships, and the potential to increase the level of innovation. This leads businesses to wait and delay investment to some extent.

Economic barriers

The cost of implementing AI technologies is one of the main limiting factors for the development of AI technologies in enterprises. This is especially true for smaller enterprises, who are often unconvinced of the return on these investments and consider implementing AI technologies a financially risky experiment. This concern is further amplified by the overall economic situation, with businesses having to cope with the Covid pandemic, the energy crisis and high inflation rates, which ultimately led to depleted reserves and a lack of spare funds for innovation. So small businesses often wait for AI technology to become cheaper and prove itself to other businesses. They also have the disadvantage of very limited scaling options. The wait-and-see tactic is also often reinforced by past negative experiences where a enterprise has invested in a particular new technology but the investment has not yielded the expected results.

Organizational barriers

Many enterprises do not have a clear internal **strategy** on how to deploy and use AI technologies in the enterprise, and there is no set timeline or financial schedule. According to a survey by the Confederation of Industry of the Czech Republic among 190 mainly small and medium-sized enterprises[5], about half of them have no strategy in place for using AI technologies. The strategic deficit is not only related to AI technologies themselves, but also to working with data in general. Without a data-driven approach, which is a prerequisite for AI technologies, businesses cannot expect to successfully deploy and use AI technologies.

The corporate culture in many enterprises is not very conducive to innovation. Management often clings to existing practices, is not given the space to try new technologies, and lacks the willingness to take the risk that comes with introducing new technologies. The day-to-day operational agenda takes priority and innovative activities are pushed back. Employees are not encouraged to experiment with new AI tools, there is a lack of appreciation for trying to improve things, a lack of appreciation for innovative ideas. Failure is often seen as a personal failure rather than a lesson for the way forward in innovation.

[5]BusinessInfo: Nevyužitá příležitost. https://www.businessinfo.cz/clanky/nevyuzita-prilezitost-s-ai-firmy-zatim-prilis-nepracuji/

The problem may also be that there is no clearly identified **person/department responsible** for the implementation of AI, the responsibility is fragmented and so are the activities, which are then not supported by adequate budgetary resources, leading not only to fragmentation of finances but also of human resources and to some extent to unhealthy competition within the enterprise. The initial enthusiasm wanes and the continuation of activities is either halted or postponed for several more years. The projects will then not go beyond the pilot phase.

However, the clear responsibility for the implementation of AI technologies does not mean that only the responsible department will address these issues, **collaboration between departments** is essential, the solution must be the result of a team consisting of sales, operations, marketing departments. A concerted creative search for appropriate AI technologies for specific needs is essential. A multidisciplinary approach, combining knowledge of AI technologies and knowledge of the relevant field, is key to truly effective deployment and use of AI technologies.

It is also important to **inform** individual departments about AI applications, practical examples of AI use in individual departments of the enterprise, so that managers and rank-and-file employees get a basic overview of the possibilities of using AI technologies and their benefits and impacts on individual employees. There is a lack of adequate awareness of the available AI technologies and the specific possibilities of their implementation.

Incorporating AI technologies into existing processes is associated with the need to modify workflows, change **organizational structures** or overcome interdepartmental barriers, and establish accountability for the outcome recommended by AI technology. These circumstances may lead to resistance to the intended changes in the operation of individual enterprise processes.

Personnel obstacles

The national and global **demand for** AI technology **specialists** and data analysts is enormous, and businesses face major challenges in finding such dedicated workers. Small enterprises cannot build their own teams of specialists due to the financial demands of these experts. If a enterprise does not have the necessary educated people, either internally or externally, it usually does not even consider the actual introduction of new technologies. The Chamber Barometer[6] survey conducted by the Chamber of Commerce in the autumn of 2024 among 358 enterprises showed that 48% of micro and 43% of small enterprises do not plan to use AI technologies within three years.

The low **data and digital literacy of** existing employees is another barrier to the use of AI technologies. Most employees use only basic tools, (Excel, economic software), awareness of advanced AI applications is at a low level. For example, even if employees have information about applications like ChatGPT, it does not mean that they use this technology regularly.

Education of the population in information and communication technologies should contribute to increasing the digital literacy of employees. The results of the survey on non-formal education show that the adult population of the Czech Republic has slowed down in their efforts to acquire or improve their ICT knowledge and skills. In 2016, almost 6% of the population aged 25-69 was educated in ICT,

[6] Hospodářská komora: Komorový barometr: automatizace, robotizace a umělá inteligence https://www.komora.cz/aktivity/setreni/#vysledky-setreni

i.e. in computer use, database design and management, and networking, compared to less than 5% in 2022. Men are still more educated than women in this area, although women are reducing this handicap, and the gap has been reduced to 1 p.p. from an initial 2 p.p. There has been a decline in participation in ICT education for all educational groups, with the population with lower levels of education lagging behind the population with higher levels of education. The tertiary educated population is the most educated (see Table 19 in the Appendix).

Businesses also quite often face **employee resistance** to change. According to a survey conducted by ManPowerGroup [7]in 2024 among 525 employers, 30% of employers face this problem. Resistance is evident not only among rank-and-file employees, but also among managers, with 17% of employers expressing their reluctance to implement AI. The reluctance of managers is influenced mainly by the fact that they cannot imagine the appropriate use of AI, they have not found an AI tool that would fully meet their needs, they consider the implementation of AI too complex, they also see the problem in the data base, which currently does not suit, or does not allow the use of AI technologies.

Employees' resistance to change is also related to **psychological barriers**, where they see the introduction of AI technologies as a threat to their jobs. They fear that they will be replaced by these technologies or that they will not understand the new technologies, will not be able to use them, will have to acquire new knowledge and skills that do not match their intellectual capabilities. These fears then lead to resistance, to clinging to established practices. The only way to deal with these quite legitimate concerns is through open communication between management and employees and employee training. It is necessary to overcome employees' belief that work with AI technologies should be reserved for IT specialists and overcome employees' reluctance to adopt new technologies.

Enterprises are overwhelmingly aware of **the lack of** employee **education** about the capabilities and benefits of AI technologies. At the same time, however, employers see the potential of AI technologies to provide employee training itself and make it more effective, for example, by personalizing learning. Around a quarter of respondents to the ManPowerGroup survey expect AI to improve employee training.

The European Commission has responded to the lack of attention paid by EU27 businesses to AI training for their employees. In the **Artificial Intelligence Act** (EU Regulation 2024/1689 of the European Parliament and of the Council), it imposes an obligation on employers to take measures aimed at ensuring that **employees are** sufficiently **AI literate**. With effect from 2 February 2025, enterprises are required to ensure that their employees have a sufficient level of knowledge about the use of AI systems. In Article 4. The AI Act states that enterprises should "*shall take measures to ensure, to their best extent, a sufficient level of AI literacy of their staff and other persons dealing with the operation and use of AI systems on their behalf, taking into account their technical knowledge, experience, education and training and the context the AI systems are to be used in, and considering the persons or groups of persons on whom the AI systems are to be used*." The obligation to ensure AI literacy of employees applies not only to the providers of AI systems themselves, but also to entities that use AI in their day-to-day activities. Employees must be trained to ensure that AI systems are

[7] ManpowerGroup: AI na trhu práce. https://www.manpowergroup.cz/cr-naskocila-na-vlnu-ai/

implemented in an informed manner and that employees are aware of all the risks associated with AI and are able to identify the potential harm that the use of AI can cause.

The regulation does not specify how AI literacy is to be ensured. The European Bureau for Artificial Intelligence offers some help to employers in the form of a 'live repository' where examples of practices used by selected enterprises to ensure AI literacy among employees are stored. While these examples can serve as inspiration for other enterprises, the specific forms and content of training must be tailored to the specific conditions and needs of individual enterprises and their employees.

Training should include, in particular, an explanation of how AI systems work, how they will be used, how they will affect the performance of the profession of the employees concerned, what the possible risks of using AI systems are, what distortions or errors may occur, and how to identify these errors. Training can be provided not only through traditional forms of training or hands-on workshops and e-learning courses, but also through modern forms such as podcasts or videos, which can be accompanied by subtitles or other text-based materials to accommodate employees who learn better from written text or employees with hearing impairments.

There are no immediate sanctions for businesses failing to ensure AI literacy, but there are penalties for failing to comply with other provisions of the AI Act, which may be breached as a result of employees being insufficiently informed. Businesses are aware that employees must have the appropriate knowledge to ensure that AI technologies are used proficiently, but also that employees are aware of any regulations/laws for which the enterprise may face fines or legal action. These include, for example, leaks of enterprise data and personal data, copyright infringements, etc. It can therefore be assumed that the use of AI will be regulated by internal regulations at enterprises, which will have to respond not only to the rapid development of AI and the related legal aspects of its use, but also to the ethical level of working with these systems. Staff training will have to be a continuous process, linked to the job description of each specific position.

A positive role in employee education should be played by the Working Group for AI Education, which was established at the Czech Association of Artificial Intelligence. This working group aims to create and promote quality education for businesses and employees.

Legal and ethical obstacles

The legal framework defining the use of AI is gradually evolving, and for many enterprises, some **uncertainty** about future regulations is leading firms to be cautious about investing in AI, with firms reluctant to invest in solutions that could be burdened with new obligations or even prohibited from use. This legal uncertainty is removed, or at least mitigated, by the AI Act, which has established a **set of rules** for the development and use of AI in order to promote the development of AI while avoiding the adverse effects of AI. The AI Act came into force on 1 August 2024, enterprises have two years to implement it. Certain headings have been identified that must be implemented earlier, these are (a) AI literacy prohibitions and obligations, effective February 2, 2025 and (b) governance rules and obligations regarding universal AI models, effective August 2, 2025. For rules for high-risk AI systems incorporated into regulated products, the implementation obligation is extended to August 2, 2027.

Businesses are concerned about complying with privacy laws (GDPR) to prevent sensitive personal data from being leaked to a third party. Concerns about **data security** are particularly pronounced in the

financial and healthcare sectors, but also in other industries dealing with sensitive information. Ensuring data security, preventing unauthorized access to data are among the frequently mentioned threats related to the use of AI technologies. Data anonymization and activities related to obtaining consent for data use make it more expensive and difficult to implement and use certain AI technologies.

The lack of **transparency in the operation of** complex AI models, where it is not entirely clear how they arrive at a given output, causes quite justified distrust of management in the use of these models and fear of incorrect results. Independent certification of model reliability would help to alleviate these concerns. An important question is also who will bear the responsibility for the consequences resulting from erroneous results of AI models. There are also ethical concerns about whether the models discriminate against certain population groups, for example.

When using **chatbots** to communicate with customers, there are concerns about possible inappropriate responses that may damage the enterprise reputation and lead to customers switching to competitors. There are also concerns about the misuse of AI to generate fraudulent messages or automated cyber attacks. A survey by eD system[8] found that more than a quarter of enterprises (27%) have faced a cyber-attack in recent years and 12% have lost their data. Enterprises are aware that the deployment of AI technologies can also produce side effects, and concerns about reputational or legal risks lead to a reserved approach to these technologies.

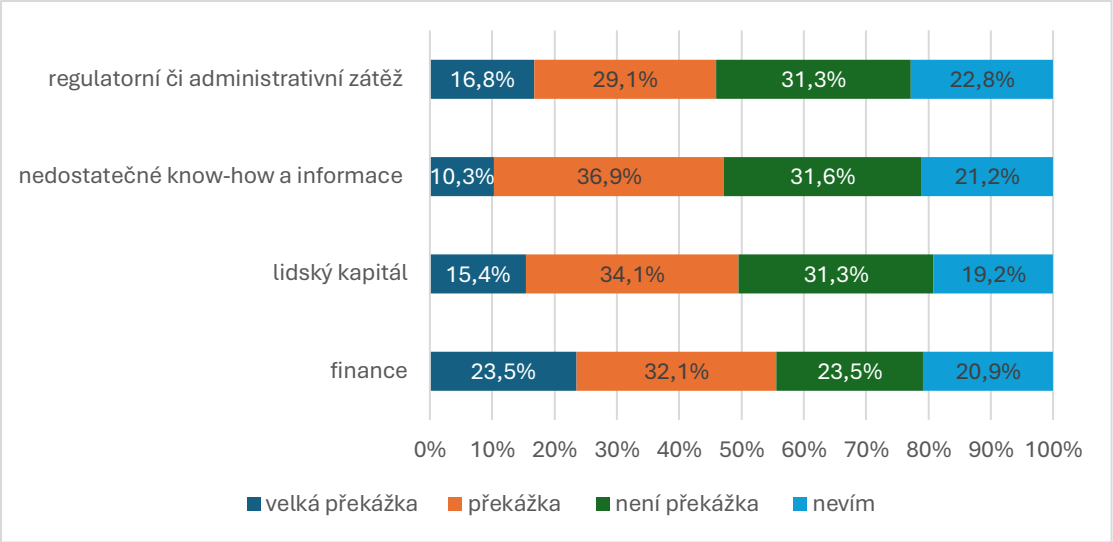
Intensity of the impact of selected barriers to the introduction of new technologies

The overview of individual obstacles is quite comprehensive, which of the identified obstacles affects the decision of enterprises to implement AI technologies the most can be illustrated to some extent through the results of the survey conducted in the autumn of 2024 by the Chamber of Commerce of the Czech Republic (Chamber Barometer)[9]. It compares the importance of four basic barriers to the adoption of automation or robotics in enterprises (see Chart 13). It can be assumed that the order of the mentioned barriers will be more or less the same for the introduction of any new AI-based technology, although the individual technologies may differ in terms of financial and human capital requirements, information about their existence and availability, as well as the regulations governing their implementation.

Chart 13: Barriers to the introduction of automation or robotics in enterprises

[8] BusinessINFO: Průzkum https://www.businessinfo.cz/clanky/pruzkum-kybernetickym-utokum-v-posledni-dobe-celila-kazda-ctvrta-firma/

[9] Hospodářská komora: Komorový barometr. https://www.komora.cz/aktivity/setreni/#vysledky-setreni



Regulatory or administrative burden, Insufficient know-how and information, Human capital, Finances

Big obstacle *obstacle* *not obstacle* *I don't know*

Source: Chamber of Commerce of the Czech Republic. Chamber barometer; autumn 2024.

Among the 358 respondents, the most important obstacle is the **financial complexity of** introducing new technologies, which exceeds the current capabilities of enterprises, whether it is their own free funds or the availability of credit provided on acceptable terms. Overall, 56% of firms feel this constraint, 24% of which feel it is a major obstacle.

The second most common obstacle identified in this survey was human capital, the availability of an adequately skilled workforce. The human capital factor was identified as an obstacle by 50% of respondents, with 15% of them identifying it as a major obstacle. Lack of know-how and information is perceived as a barrier by 47%, of which 10% perceive it as a major barrier. The smallest share, "only" 46% of respondents, evaluated regulatory or administrative burden as an obstacle to the introduction of the mentioned technologies, while 17% of respondents identified it as a major obstacle.

If we consider only the "major obstacle" rating, then the ranking of obstacles would change slightly, with regulatory or administrative burdens moving to second place behind finance, followed by human capital, and the lack of know-how and information rounding out the ranking.

Approximately 30% of respondents do not see a problem with the first three barriers examined, with the financial barriers falling out of this relative consensus in the ratings. Only ¼ of the respondents do not consider finance as a limiting factor for the introduction of new technologies. Clearly, dealing with this obstacle is the most difficult for businesses.

Quite striking is the large proportion of respondents (about 20%) who could not estimate the impact of individual obstacles, which is probably related to the fact that there is no enterprise strategy for the introduction of new technologies, that this issue is not discussed at work meetings.

An insight into the barriers that employers in the Czech Republic face when **implementing AI technologies** is offered by the ManPowerGroup survey[10], which was attended by 525 employers in the Czech Republic. Employers perceive **employee resistance to** change (30%) or the **high cost of** implementing AI (27%) as the biggest challenges. Another challenge is the lack of **employee skills** needed to use AI effectively, as well as concerns about **data security** and regulatory breaches (25% and 25% respectively). A smaller percentage of enterprises perceive **resistance from managers** as a challenge (17%).

Employers in the Czech Republic differ in their assessment of individual calls from the results of the global survey. The biggest challenge for employers **globally** is the high cost of implementing AI (33%), followed by concerns about data protection and regulations and the lack of skills to use AI effectively (31%). The least enterprises perceive the resistance of managers to the introduction of AI as a problem (18%).

III. Use of AI in HRD

Traditionally, the employee care, recruitment and development agenda has been linked to direct contact activities, recruitment interviews, the creation of written records and their recording, report generation, etc. This left little time for ongoing interaction with employees, monitoring their satisfaction, preventing potential conflicts, tailoring measures to their needs, and selecting the optimal training for each individual according to their experience and the needs of the profession. The automation of routine activities, enhanced by artificial intelligence, allows HR professionals to get rid of routine administrative and basic communication tasks and address strategic questions of how to attract, retain and develop their human resources in an era of global competition and competition for talent. The use of AI in the HR development agenda is particularly beneficial in those organizations that make greater use of remote working or hybrid working environments.

According to a survey conducted by Grafton[11] among HR professionals from 328 medium and large enterprises in the Czech Republic, more than half (54%) of Czech enterprises are already using or intend to deploy artificial intelligence (AI) technologies to streamline human resources (HR) activities. AI is a significant support in several areas of activities: i) routine communication with employees; ii) recruitment and onboarding of new employees; iii) benefits management; iv) training and retraining.

Communication support that uses automated programmed voice robots has been a reality for some time, but with the application of artificial intelligence it is reaching a qualitatively higher level. The voice robot can not only answer standardized questions, but can learn from past actions and find the right

[10] ManpowerGroup: AI na trhu práce. https://www.manpowergroup.cz/cr-naskocila-na-vlnu-ai

[11] Grafton (2024): Artificial Intelligence in HR: Firmy novou éru vítají, zaměstnanci preferují osobní přístup. https://absl.cz/cs/news/umela-inteligence-v-hr-firmy-novou-eru-vitaji-zamestnanci-preferuji-osobni-pristup/

answers for a given interviewer, always in real time, and can handle multiple interactions at once. This is especially important in times when employees need reliable guidance and ongoing communication for whatever reason, whether during the onboarding process or during organizational and technical changes.

Recruitment and onboarding is an area where AI is greatly simplifying and speeding up administrative tasks. They are not only able to collect information about candidates and keep the characteristics of vacant positions in the enterprise, but they are able to compare and evaluate this data, conduct initial screening interviews, ask adequate questions, evaluate candidates' answers and pre-select suitable candidates who best fit the position and the enterprise culture. For new hires, AI-equipped chatbots can then answer their questions and provide personalized information in a given situation, as well as recommendations for further development based on the identified strengths and weaknesses of the employee in relation to the demands of their position. Artificial intelligence can create a test or questionnaire to test candidates, compare their results with each other. It is also able to analyze written speech, evaluate the candidate's behaviour based on the video recording of the interview and create a psychological profile of the candidate. The results of such evaluations, including the input data, are of course very sensitive data.

In a tight job market and a highly competitive talent pool, AI can help in finding and reaching out to potential candidates. It allows you to screen candidates on professional and other social networks, get information about their skills and experience, and even get an overview of their personality setup. This then gives room for targeted outreach to potential candidates.

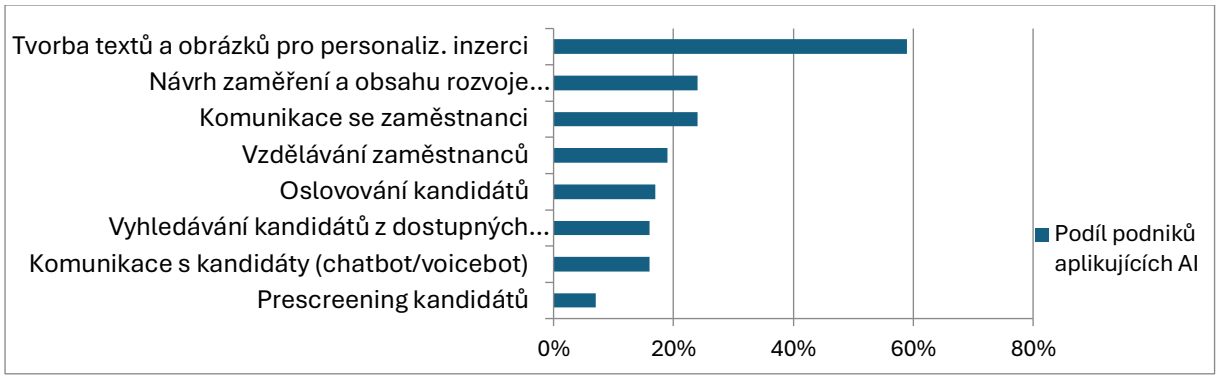
Artificial intelligence can support the **setting and correction of remuneration policies.** Because AI can process large amounts of data quickly, it can provide data to support wage analysis and determine whether wage levels are competitive for certain categories of workers relative to the supply that is common in a given sector or region. It can also analyze the labour market in a given segment, trends in employee turnover and estimate their further development. This allows you to better plan for your own employee needs, choose the right tools for retention and attract new talent.

Benefits management using AI tools enables employers to apply flexible benefits programs where AI helps employees choose and customize benefits packages according to their needs and preferences, increasing employee satisfaction. It can be a mix of benefits in the field of pension insurance, professional development, cultural and health development, investment advice, etc. Virtual assistants help employees navigate these programs and make recommendations based on the employee's individual needs.

Artificial intelligence also brings significant effects in the area of **training and retraining of employees**. It allows you to analyze the skills of employees, compare them with the requirements of the profession and job, and suggest relevant courses and learning resources. AI can be directly part of internal learning platforms, guide employees through training programs, and offer personalized support in real time. It can also monitor employee progress, provide feedback and plan further follow-up actions to reinforce learning. It can also continuously assess knowledge retention through quizzes, gamified learning opportunities, etc.

The extent of the use of AI tools in the HR agenda in enterprises was tracked by Grafton's 2024 survey (see Figure 14).

Chart 14: Use of AI in the HR agenda in enterprises



Creation of texts and images for personalized advertising, Design of focus and content of development, Communication with employees, Employee training, Reaching out to candidates, Searching candidates from available ..., Communication with candidates (chatbot/voicebot), Prescreening candidates

Share of enterprises applying AI

Source: Grafton (2024): Artificial Intelligence in HR: Enterprises welcome the new era, employees prefer a personal approach.

It is clear from the chart that, excluding the creation of texts and images prepared for advertising, which is an activity of a more administrative nature, the use of AI in individual segments of the HRD agenda is applied in approximately 10-23% of cases. Artificial intelligence applications help relatively strongly in communicating with employees and also in assessing the training needs of individual employees and finding the appropriate content and training method according to their capabilities.

New demands on HR specialists and involvement of IT experts

Integrating artificial intelligence and machine learning into the HR process agenda requires professionals who have a deep understanding of these technologies and are able to apply them correctly to the specific needs and goals of the business. These professionals should have the ability to analyze and understand data, develop and optimize algorithms for planning and implementing the necessary training and education activities, for selecting and evaluating candidates for positions, and for ensuring that these processes are objective, transparent and fair.

Information technology professionals are essential for creating and managing AR (augmented reality) applications that enable realistic simulation of work situations, virtual tours of workplaces and interactive employer presentations. Their programming and application development skills are essential to effectively use AR to benefit recruitment processes[12].

On the other hand, with the increasing automation of sub-functions, especially of a routine and administrative nature, it may lead to job cuts in some areas of HRD, such as recruitment and HR administration or payroll.

Enterprises have already emerged to provide HRD services to businesses, saving them time and improving the clarity and organization of these processes. An example is the modern AI-powered HR

[12] Halbrštát, J. (2023): Využití umělé inteligence v náboru zaměstnanců. https://www.manpowergroup.cz/vyuziti-umele-inteligence-v-naboru-zamestnancu/

system "Sloneek.com", developed by the Czech startup[13]. It is a comprehensive HR system that includes everything for managing employees from recruitment to offboarding without paperwork. It includes attendance management, recruitment support, performance management to appraisals, payroll and benefits, with each module available to users online. In addition, Sloneek as an HR platform is also available in the form of a mobile HR app, which allows you to have all important data accessible from anywhere at all times.

There is also an online library of the best AI prompts for HR teams[14], which support the use of AI tools in business practice. Includes suggestions for prompts within several areas: interview questions; job offer formulation; email templates; onboarding checklists; handouts for management meetings; generating key goal setting indicators (OKRs) and key performance indicators (KPIs); skills; evaluation questionnaires; survey questions.

Benefits and risks of using AI in HRD for employees

The use of AI in HR development in organizations brings obvious benefits to employers, but it also has a significant impact on their workforce, both in a positive sense and in terms of potential drawbacks and risks.

Employees benefit in particular from AI's ability to design **personalized courses and training** based on an analysis of individual employee skills and preferences. This allows employees to develop the knowledge and skills that are most relevant to them and that will enhance their career development. Within training, AI can also assess learning progress, give immediate feedback and adapt the speed and progress of training to the person's capabilities.

Another advantage is the ability to **communicate online and provide advisory support** or get answers to employees' questions at any time, whenever needed, during or outside working hours. This gives workers confidence, reducing stress in new situations or periods of change. Recruitment and onboarding processes can also be made faster and more enjoyable through the use of AI by using videos and other visual aids to familiarize yourself with the new situation.

Because AI can be data-driven, there is the potential to reduce personal biases that can influence employment decisions, such as gender, age or ethnicity. If set up correctly and audited regularly, algorithms can contribute to greater equality in the workplace.

On the other hand, there may be some **risks or disadvantages for the employees**. When using AI, recruiters may focus more on algorithms than on face-to-face meetings and communication with employees or job applicants. This may lead to some "soft" skills not being sufficiently considered, which may affect the quality of the decision.

If an AI system makes career decisions based on automated algorithms, people can feel overlooked, which can reduce their motivation and loyalty.

There is also a **risk of bias**, as AI systems are trained on past data that may contain patterns that may no longer be adequate for the current situation, or even discriminatory. If the system is not set up properly or monitored regularly, these problems can be reproduced, which can discriminate against

[13] Sloneek Europe s.r.o. https://www.sloneek.com/ ; https://www.startupjobs.cz/startup/sloneek-s-r-o
[14] https://knowledgebase.sloneek.com/cs/hc/priklady-promptu-pro-ai-dle-modulu-v-aplikaci#pohovor

certain groups of employees, such as women. Self-assessment algorithms may also amplify reality distortions if employees/job seekers identify assessment criteria that they will try to match to secure a selection/assessment advantage, even though this may not correspond to reality.

Another disadvantage is that AI algorithms **are not always transparent** and may make decisions based on factors that are not clear to the user. This can lead to frustration for employees who feel unfairly judged or misunderstood.

European regulation of AI in HRD

The use of AI in human resource development may be largely influenced by the AI Act passed in 2024[15]. Through it, the EU is emphasizing a cautious approach to AI, particularly where the technology can affect vulnerable populations, identify people through biometrics or impact their health, property and careers. The law, which will come into full force in 2026, assesses the risks of individual AI applications and distinguishes between prohibited AI practices, high-risk AI systems, limited-risk AI systems, and minimal-risk AI systems (see Chapter VIII for more details). It is the application in HR, recruitment and workforce management that is considered high risk under the definitions of the law.

It is important for enterprises to establish AI governance boards, keep abreast of global regulatory developments, and lead innovation teams according to ethical guidelines. Firms should raise awareness of the changing regulatory environment among employees, partners and clients. When selecting technology solutions, then, you need to carefully consider the impact of AI and avoid high-risk solutions such as black-box AI tools that automate HR processes with minimal documentation and transparency.

IV. The use of AI in business management

Changes in the labour market in connection with the introduction and use of new technologies and artificial intelligence (AI) are closely related to the characteristics of individual technologies, what business processes they are introduced into, what specific activities they replace in individual professions, and what new knowledge and skills they require to ensure their effective use.

Artificial intelligence enables enterprises to significantly streamline their management system. Advanced machine learning algorithms and big data analytics can streamline everything from production and inventory planning to supply chain management and logistics. For example, AI can be used to optimize production scheduling for complex production lines: intelligent agents take into account machine capacity, material availability, demand fluctuations, order deadlines and other

[15] EU (2024): Nařízení Evropského Parlamentu a Rady EU 2024/1689 (harmonizace pravidel pro umělou inteligenci). https://eur-lex.europa.eu/legal-content/CS/TXT/HTML/?uri=OJ:L_202401689#anx_II

parameters and calculate the best way to maximize production flow with minimal line adjustment costs[16].

Enterprise management

The AI tools used in enterprise management are an extension of the commonly used ERP (Enterprise Resource Planning) systems through which day-to-day activities such as accounting, procurement, project management, risk and compliance management, and supply chain operations are managed. However, these systems face limits due to their inability to respond to change. Artificial intelligence in the form of APS (Advance Planning and Scheduling) eliminates these shortcomings, planning with the use of AI technologies allows the enterprise to eliminate subjective decision-making that takes into account the interests of a particular department, not the entire enterprise.[17]

Managerial decision-making, whether at the strategic or operational level, is made in an increasingly complex business environment, with dynamic and often unexpected changes in the external and internal environment. Traditional analyses as a basis for objective managerial decision-making often fail due to lack of data, time or knowledge of advanced analytical methods, lack of information about the broader context of the enterprise operations. This can lead to intuitive decision-making at the expense of objective decision-making based on sound and comprehensive analyses.

The penetration of new technologies into the management system of enterprises will affect the work of managers at all levels of management. The organizational form of enterprises is changing from a strictly hierarchical arrangement, from a steep organizational structure to a flatter structure, which is associated with more independent decision-making of employees based on information obtained from monitoring and optimization systems, which include coordination, control and follow-up activities. To a much greater extent, work teams will be formed on an ad hoc basis to accomplish a specific task or solve a specific problem. The maturity of communication technologies also enables the creation of work teams composed not only of employees of a given enterprise, but also from outside the enterprise and cooperation with independent specialists or consultants. Project managers are becoming increasingly important in the corporate management system.

Based on the ability to process vast amounts of historical sales data, seasonal trends and economic indicators, AI tools can create more accurate demand forecasts than traditional forecasts, giving managers a better basis for their decision-making. Enterprises can better plan production, optimize inventory levels, preventing situations where the enterprise would have unnecessary stocks of raw materials, materials, finished products (so-called dead stock) or, on the contrary, would be exposed to stock shortages and the inability to continuously fulfill orders. This allows the enterprise to not only maintain its credit as a trusted supplier, but also to save warehouse space and lower the amount of capital tied up in inventory.

[16] Weforum: Creating Growth and Jobs for a New Era. https://www.weforum.org/meetings/world-economic-forum-annual-meeting-2024/themes/creating-growth-and-jobs-for-a-new-era/

[17] Inventi: Jak na plánování ve výrobní firmě. https://www.inventi.cz/clanky/jak-na-ai-ve-vyrobni-firme

The impact of AI on senior management

In large enterprises, which are the most active in the use of new technologies, there are quite significant changes in the structure of the top management of the enterprise. Enterprises are responding to the ever-increasing importance of technology for business, for a competitive position in the relevant product market. The traditional position of the CIO (Chief Information Officer) is expanding, changing and transforming, as the development of technology is very dynamic, affecting all activities, and it is becoming increasingly difficult for one person to cover this entire area. The position of IT Director is being supplemented by **new Technology Directors** who are taking on some of the responsibilities associated with the advent of new technologies and changing business models. The CIO thus works in tandem with other CIOs, retaining responsibility for coordinating the digitization of business processes and accountability for investments in emerging digital technologies. The new management positions specialize in specific areas of technology, taking over various operational aspects of IT management, allowing CIOs to focus their work in a more strategic position that has a greater impact on the overall digital transformation of the business.

The importance of technology to businesses continues to grow, expanding not only the role of the CIO, but other senior executives are expected to have deep technology knowledge to be able to support or directly manage the implementation of important technology programs that impact the operation of the business processes for which they are responsible.

Enterprises are adding new positions to their top management, and their titles more specifically reflect the job description of these directors. Examples are the following positions[18]

- Chief AI Officer (CAIO), who leads the enterprise AI strategy, defines improvements to business processes and management models, and assesses and evaluates opportunities for AI projects.
- Chief Transformation Officer (CTO), whose job responsibilities include developing digital infrastructure, leveraging data, ensuring information accuracy.
- The Chief Digitization Officer (CDO) is to some extent considered a more modern take on the CIO, similarly this position is focused on IT infrastructure, information and data.

It is also possible to encounter other positions that reflect each enterprise focus on certain processes, such as sustainability - Chief Sustainability Officer (CSO), end-customer satisfaction - Chief Customer Experience Officer (CEO), or business - Chief Business Technology Office (CBTO), which coordinates collaboration between business and technology teams, ensures transparency of their operations, and builds their mutual trust.

A key management issue today is the prediction of future trends. Not only retrospective analysis, but also prediction of results, simulation and verification of solution options and selection of the most suitable option in terms of achieving corporate goals are becoming a standard part of the work of managers.

[18] Esther Shein: Vrcholové vedení podniků se rozrůstá o lídry IT; in CIO Business World, květen 2024, číslo 3.

CIOs face an additional challenge, which is the need to ensure sufficient relevant and reliable information for **ESG reporting**. Reporting covers three areas: environmental (E), social (S) and governance (G). Within each area, it is necessary to collect mostly non-data information on certain defined aspects, which are listed in the Annex Box 3. IT is key to introducing automated tools for monitoring and data collection and processing ESG reports, digitizing and automating the entire process, streamlining it and eliminating errors that occur in manual processes. As the data for ESG is located throughout the enterprise, the cooperation of other managers responsible for different areas is essential in determining which departments will be involved in data collection, what data will be collected and how it will be verified. The necessary data should be extracted at source for greater transparency and accuracy. The obligation for large and listed enterprises to prepare such reports has been postponed by two years from the original deadline of 1 January 2025 to allow more time for the necessary documents to be prepared in depth.

Businesses today operate in a globally competitive environment, one characterized by rapid technological advances but also changing customer preferences and a growing emphasis on sustainability. As management becomes more complex, there is a growing demand for **management consultancy**, for specialists who are equipped with deep industry knowledge, analytical skills and problem-solving abilities. Their role does not end with the mere design of a specific solution, but they also assist enterprises in the implementation of these solutions, monitor its implementation and ensure that these solutions are fine-tuned as necessary to achieve all the proposed effects.

Management consulting focuses on both strategic and operational consulting. Specialists focusing on **strategic consulting** help top management to identify unexplored development opportunities, innovation possibilities, make decisions on the future direction of the enterprise, which markets to focus on, which products to launch and how to strengthen its competitiveness. On the other hand, **operational consulting** focuses on evaluating the enterprise daily operations in order to find ways to improve productivity, reduce costs, and streamline individual processes.

The consultancy ranges from supply chain management processes to the management and quality control of all enterprise processes. Advice can also be applied to the area of finance, **financial advisors** provide advice on everything money related, from investment strategies, risk management, ensuring compliance with all regulations, how to keep finances under control and achieve maximum profitability**. IT consultants** focus on how to effectively use these technologies, what systems to implement, how to ensure cyber security, digital transformation. At a time of labour shortages, **human resources consultancy** is also gaining importance in terms of how to attract and retain talent, how to motivate employees to improve their qualifications, participate in training programmes, and create a friendly and stimulating working environment.

There will be a growing **demand** for managers of emerging business activities among top management due to the penetration of new technologies, but also the emphasis on sustainability. In particular, the demands on their technical skills and knowledge of new technologies will increase, as well as their understanding of the ethical implications of AI and ensuring its responsible use. Deep disciplinary and interdisciplinary knowledge is a prerequisite for critical evaluation of possible options for further development and selection of the most suitable one.

There will be a growing demand for management consultancy, for specialists in particular areas, not only in smaller enterprises that do not have sufficient capacity to consistently monitor developments

in all areas of their business, but also in larger enterprises for which an external view, unencumbered by links within the enterprise, is important.

The impact of AI on the work of project managers

AI has a major impact on the work of project managers, who spend a lot of time on activities such as planning, monitoring progress, and anticipating potential risks. These are largely routine activities that can be effectively replaced by the use of AI. AI is changing the way projects are managed, but the **experience of managers** is not losing its importance. The more complex the project, the greater the need for an experienced manager.

Their ability to use AI, which takes over the **administrative work** of project managers, enables automatic reporting on the progress of work on the project and optimization of resources in a given period, is becoming important. This allows managers to focus on strategic planning, creating a positive working environment, a culture of cooperation, and motivating employees to identify with the goals of their department and the enterprise as a whole. AI is capable of eliminating human error, improving decision-making, creating more efficient workflows, but it will not replace a manager's ability to lead and motivate people, show empathy, negotiate, and make decisions. Project managers must have skills that AI is not yet capable of.

The deployment of AI requires a **change in mindset**, creating a hybrid workforce where a manager's expertise is combined with AI tools. Although there is a relatively wide range of project management software on the market, research conducted in 2023 by the Project Management Institute (PMI)[19], found that only 20% of project managers report extensive or good hands-on experience with AI tools and technologies, and 49% have little or no experience with AI in a project management context. However, almost all respondents (91%) believe AI will have at least a moderate impact on the performance of the project management profession, and more than half (58%) expect a significant or transformative impact.

AI offers a wide range of possible applications in project management. Several specific examples can be given:

- Optimization of teamwork - automatic summarization of meeting results, assignment of tasks and thus optimization of information flow.
- Preparation of work schedules - help with the creation of schedules depending on the types of projects.
- Creating analyses - creating first drafts of documents, working with numbers, creating tables, graphs, etc., cost-benefit analyses.
- Generation of reports - analyses and summaries of documents, factual and graphical processing of reports.
- Strategic plans - building business cases and simplifying decision making for complex projects with many variables.

[19] PMI: Shaping the Future of Project Managment With AI (www.pmi.org)

- Risk management - evaluating historical data to identify potential risks and designing appropriate measures.
- Division of labour - the basis for optimal allocation of human resources with regard to the skills of team members, their availability and the project requirements.

In addition to managers must ensure that AI applications comply with regulatory standards, they must also ensure that AI complements, not replaces, human workers, and that it is seen as a tool that enhances, but **does not replace, human judgment**. Managers must ensure not only the effective use of AI tools, but also their ethical use.

In summary, the main **advantages of** using AI in project management are seen mainly in

- Increased efficiency and time savings related to project management administration through automation of routine tasks such as processing minutes of meetings, generating reports on project progress, checking that deadlines and financial budgets are met, etc,
- more space to work with the project team,
- knowledge creation in dialogue with AI, information about experiences with similar projects,
- learning from your own data by combining risks, problems and lessons learned with general answers from the web,
- greater certainty in decision-making based on data analysis,
- cost savings through process optimization and error reduction.

In addition to the advantages, AI also brings certain **limitations** or disadvantages to project managers that managers need to be aware of even when using large language model (LLM) tools. LLMs understand the content of the data but not its meaning, so it is essential that managers understand how these models work with the data, verify that the AI has correctly understood the question or task at hand, and pay attention to checking the results the AI generates. The biggest **challenges** for managers are:

- hallucinations - AI systems can make up information,
- low quality of results due to low quality of the underlying information, the data that AI works with,
- limited understanding of how AI systems arrive at the results presented,
- data protection and security, it is necessary to restrict access permissions to data.

Managers cannot accept AI results uncritically, they must compare them with their own knowledge and experience, adjusting them if necessary. It is also possible to report discrepancies to the AI, which can learn from them in the future and not repeat them. To use AI, it is essential that project managers are familiar with the basic relationship between data and AI. This knowledge is an important prerequisite for evaluating AI outputs, identifying and addressing the risks that the use of AI can bring to management.

On the Czech market, one of the enterprises that offer management tools is Easy Software. "Through six built-in AI assistants, the platform enables smarter planning, more efficient prioritization and faster real-time decision-making. It also helps break down barriers between departments by connecting all

project data, people and processes in one shared workspace."[20]The enterprise internal case study shows that using AI can save up to 80% of the time needed to create a plan.

The demand for **project managers** is growing in connection with changes in the management systems of individual enterprises, where the importance and significance of project management is increasing. The challenge for project managers is the willingness to adapt to new technologies, to monitor the availability of appropriate tools. Years of experience are no longer enough, what matters is how quickly individuals can learn, adapt and use new technologies. Those who reject these challenges put their position at risk, while those who accept them gain a competitive advantage in the labour market thanks to their greater efficiency.

V. Using AI in logistics

Logistics is already considered to be one of the most digitalized industries, and with the availability of drones, autonomous driving systems and artificial intelligence, logistics is set for another major shift. Wide-ranging logistics networks provide a wealth of data on the causes and consequences in supply and demand chains that allow predicting expected developments. By recognizing patterns in this data, it is possible to predict the occurrence of specific events. Through this predictive analysis, computer-generated models of a particular logistics system (e.g., supply chain) can be created. It is possible to predict which items will be ordered in larger volumes or more frequently and thus better plan, for example, the required warehouse capacity, the handling equipment needed or the warehouse staff. It is also possible to predict and correct risks throughout the supply chain by using data from tracking sensors to provide information on the status of goods in transit, the situation on the transport routes, etc., and to take appropriate action in a timely manner. This is **intelligent planning** based on simulation of individual events.

AI also enables the prediction of **risks** in the supply chain, identifying vulnerabilities and developing timely actions to find alternative suppliers or routes in the event of a supply disruption. Overall, AI brings greater resilience and flexibility to supply chains - enabling them to respond quickly to change and proactively address issues, ultimately reducing downtime, delivery delays and excess costs.

According to a survey by the digital association Bitkom[21] among 508 enterprises with logistics processes, 88% of the enterprises surveyed perceive digitalization as an opportunity, while only eleven percent see it as a risk. In the long term, respondents anticipate effects mainly in the form of reduced costs (89%), faster transport (86%), reduced errors in the transport chain (72%) and greener transport (58%). Most businesses expect data glasses to make employees' jobs more efficient by locating stock

[20] AI nahradí 80 % práce projektových manažerů. https://www.ceskenoviny.cz/zpravy/ai-nahradi-80-prace-projektovych-manazeru-behem-5-let-a-to-je-dobre-rika-zakladatel-easy-software/2666585?utm_source=rsspr&utm_medium=feed

[21] Možnosti využití umělé inteligence v logistice. https://www.bito.com/cs-cz/odbornost/artikel/moznosti-vyuziti-umele-inteligence-ai-v-logistice/

items faster and more accurately (75%), two-thirds (65%) believe self-learning AI systems will take over a number of logistics tasks such as planning the best route, a slight majority of respondents expect autonomous drones to take over warehouse and inventory inventory management, and that goods will be transported by autonomous vehicles (58% and 57% respectively).

Warehouses are an important area for the use of AI in logistics. The productivity and efficiency of the warehouse is ensured by **an intelligent warehouse management system** (WMS) that consistently visualizes and uses data about logistics objects, detects anomalies before problems occur, and processes the information to achieve effective optimization, such as reducing transport time. Automation solutions such as AI robots, automated guided vehicles (AGVs), visual artificial intelligence, picking solutions, augmented reality glasses and many more are integrated into the intelligent WMS.

Robotics offers a wide range of applications in logistics. Robots are particularly useful in handling goods, using robotics to track, locate and move stock in warehouses. Unloading, loading robots and cobots will shape the future of intralogistics. An AI-based solution not only increases picking speed many times over, but also helps employees work faster and more accurately.

In the functioning of the warehouses are human-operated forklifts are gradually being replaced by automated guided vehicles (AGVs), which can significantly reduce the number of empty and erroneous journeys. The vehicles automatically drive to the correct position, controlled by various technologies such as indicator strips, guidance lasers, reflectors. AGVs follow a programmed path, so bottlenecks, collisions or other obstacles can be eliminated. These vehicles require pre-arranged routes and operations, and autonomous vehicles are now available that are AI-equipped, learning as they work to improve their performance. Great emphasis is placed on safety, a number of safety features are installed in vehicles and other handling equipment, various types of anti-collision systems.

Visual AI can also be used to detect and classify damage to goods. It is much quicker and more accurate than estimating the extent of the damage with human senses. Visual Artificial Intelligence or Deep Learning technologies can also be used to recognize objects without barcodes, to count and measure products, to automate the receipt of goods, to identify products independently by determining the dimensions and weight of the product and to read other information if necessary.

Despite its great development potential, the introduction of fully **automated warehouse systems** is still very limited and, according to the practical experience of experts, unrealistic in the near future. Human power can be significantly reduced, but not completely replaced. Collaboration between technology and human operators will be essential in dealing with non-standard situations to which technology will not be able to respond. Examples include non-standard items that are received at the warehouse entrance, items that do not have the quantity or quality parameters they should have.

Warehouses of online stores show a high level of robotization. For example, a warehouse in Andover, UK, owned by online grocer Ocado, is entirely manned by robots that sort, lift and move pallets and storage boxes of food. The warehouse set also makes extensive use of AI, which evaluates which products are ordered most frequently and then moves these products to the nearest dedicated locations.

A similar solution is used, for example, by the online supermarket Rohlík in its distribution centre in Chrášť any. Here, an automated AutoStore system was put into operation, which significantly increases the efficiency of the warehouse, allows to reduce the share of human labour by almost half, at the

same time reduces the error rate of delivered orders, increases the productivity of assortment preparation threefold and makes better use of the warehouse space by a third. The system uses a total of 44,000 box-shaped trays, 265 robots and 50 ports to receive and prepare goods, and can dispatch up to 1,000 orders per hour. The boxes themselves, which contain the individual items, are stored in several tiers, on top of the structure, with robots moving them to a window where the order is completed and the bags filled by a human employee. Thanks to automation, the delivery time was reduced from ninety to sixty minutes in some locations in Prague. Other representatives of e-commerce (Alza, Zásilkovna, Datart [22]) have taken the same step as Rohlík.

In the context of the growing importance of e-commerce, the optimization of the last mile delivery is becoming an important factor in the further development of logistics. Technologies such as delivery vehicles, drones and other innovations will be key to delivering goods quickly.

The survey[23] among two hundred logistics managers, which was prepared for SKLAD[24] association by the Ipsos agency, showed that 99% of respondents are planning at least partial automation of their operations in the coming years. With regard to return on investment, the warehouse is usually not fully automated, but those activities that make the most sense in the logistics chain are gradually automated. Robots are being introduced for handling goods, automatic order picking and the use of autonomous vehicles. It is wrong to automate an **isolated process** that will create costs for its operation at the input or output or even increase costs. When partially automating warehouse management, it is essential to identify the relevant processes and their interdependence. The development of a long-term strategy is essential. A reactive approach that only responds to emerging problem situations leads to inefficient use of resources, increased costs and reduced quality of warehouse processes.

In logistics too, the pressure for **sustainability** is increasing, with enterprises having to focus more on eco-innovations that will reduce their carbon footprint and energy intensity. Emphasis will be placed on certification of buildings confirming environmental standards. Reducing energy consumption is becoming a priority, leading to the installation of renewable energy sources such as photovoltaic systems and the use of energy efficient technologies. Care must be taken to ensure that the operation of handling equipment and automation is optimal in terms of energy consumption.

The emphasis on sustainability has led some e-shops to abandon additional packaging of original packaging from manufacturers, or to pack goods in size-optimized boxes so that no space is left unused. This leads not only to a reduction in the consumption of packaging and filling material.

The actual **transport of goods** to the customer by car is undergoing gradual automation changes, the development of which can be characterized by the following six stages:[25]

[22] https://cc.cz/rohlik-ma-novy-sklad-a-sazi-v-nem-na-roboty-nakup-se-z-nej-k-zakaznikum-dostane-i-do-hodiny/

[23] Šetření se uskutečnilo v květnu až srpnu roku 2024

[24] Spolek kompetentních logistiků a dodavatelů (SKLAD vznikl v roce 2014 a spojuje lídry v jednotlivých oblastech logistiky. Díky svým členům je schopno nabídnout zákazníkům komplexní portfolio služeb.

[25] Pět stupňů k autonomnímu řízení. https://www.automobilrevue.cz/rubriky/specialy/pet-stupnu-k-autonomnimu-rizeni_47042.html

- Level zero is "no automation". The vehicle is driven exclusively by the driver. The vehicle may be equipped with warning systems.
- The first level, "driver assistance", requires the driver to drive, but the vehicle is able to perform some functions on its own (adaptive cruise control, parking assist, etc.).
- The second level, "partial assistance", requires the driver to intervene if the automatic system fails. The automatic steers, accelerates and brakes. If the driver intervenes, the system is deactivated.
- The third level, "conditional automation", allows the driver not to fully dedicate himself to driving in a defined environment (e.g., highways). If necessary, the driver must be able to take over driving.
- The fourth level "high automation" driver can engage in driving, but it is not necessary.
- In the fifth level, "full automation", the target is entered and the system is activated. The entire vehicle is controlled by an automatic.

The extremely high speeds of 5G networks enable autonomous driving of vehicles. The benefits of autonomous truck driving are seen mainly in increased traffic safety, as 5G networks are capable of transmitting huge amounts of data almost instantaneously, which, combined with the use of other advanced technologies such as cameras and sensors, allows the driver to react to a dangerous situation much faster than a human. Trucks will be able to carry goods without a driver, thus reducing the time needed to cover a certain distance by eliminating the necessary rest breaks for drivers. The cars can follow each other and thus use less energy.

In particular, the following challenges hinder the use of autonomous vehicles and need to be addressed[26]:

- Technological constraints: artificial intelligence and sensor technologies must continuously improve to cope with complex and unpredictable driving scenarios.
- Infrastructure: the transport infrastructure must include features that support the operation of autonomous vehicles, such as intelligent traffic signals, dedicated lanes.
- Regulatory barriers: different regions have different regulations and standards for autonomous vehicle operation.
- Public acceptance: gaining public trust and acceptance is essential for widespread use.

In the future, not only autonomous vehicles, but also drones are expected to be used to deliver packages to end customers.

Although the introduction of automated systems requires high initial investments, the future of logistics is seen in further automation and the deployment of artificial intelligence tools. These tools will enable enterprises to face the challenges of labour shortages, upward pressure on wages and the need to increase efficiency and flexibility in all transport and warehousing processes. They are thus a key factor in maintaining competitiveness in the long term.

A plan for changes that are intended to be functional in the long term is not made with a one-year view, but at least five years in advance. Preparing the analysis is not an easy task, it requires a rich understanding of the available technologies and the ability to assess all aspects of future changes. The

[26] Umělá inteligence v dopravě Umělá inteligence v dopravě: Revoluce v budoucnosti mobility

range of technologies in the field of automation or robotization of logistics is already so wide that the decision-making is very difficult and enterprises use the consulting services of **logistics integrators to** ensure the mutual compatibility of individual elements and create a functional logistics system.

Currently, investments in logistics are mainly directed towards the purchase of autonomous handling technology (AGVs - automated guided vehicles, AMRs - autonomous mobile robots) for picking or mobile sorting robots (see Table 9). 84% of respondents plan to implement an AI tool within five years. Along with AI, sensors and other technologies are making inroads into warehouses, the integration of which will form the basis of future logistics process optimization.

Table 9: Warehouse automation trends by time horizon (%)

	Now	Up to 1-3 years	Up to 3-5 years
Autonomous manipulation technology (AGV, AMR)	47	31	16
Picking or mobile sorting robots	35	33	16
Artificial Intelligence (AI) and Machine Learning (ML)	18	40	26
Fully automated warehouses (ASRS)	23	24	17
Robotic Cubes (robotic cube warehouse)	25	26	15
Digital Twins	9	26	24

Source: Trends in Czech Logistics, https://www.sklad.cz/trendy2025/

New technologies are also penetrating **warehouse security**, and enterprises in the Czech Republic are currently using a combination of different security features. As the following table illustrates, the most frequently used systems are CCTV, alarm and emergency systems. The human factor in warehouse security still plays an important role, whether in the form of a receptionist or physical security. Only 18% of the enterprises surveyed do not use these forms of security

Table 10: Currently used means for warehouse security

	Own resources	Outsourcing	Not using
Camera system	79%	18%	3%
Access system (readers, turnstiles)	67%	21%	12%
Remote camera video surveillance	56%	13%	31%
Emergency Alarm System (EAS)	49%	41%	10%
Electronic vehicle control (barrier, camera system, SW)	46%	33%	21%
Reception services	41%	41%	18%
PCO (monitoring)	38%	41%	21%
Electronic receptionist (online entry registration, electronic entry training for visitors, e.g. occupational health and safety, etc.)	31%	26%	43%
Weighing of vehicles at entry and exit, photo documentation of cargo (checking of dispatched goods)	31%	13%	56%
Physical security	26%	56%	18%

Source: Trendy v české logistice, https://www.sklad.cz/trendy2025/

The shortage of workers is leading to more intensive automation and robotization, but it also places demands on the **retraining of** the existing workforce. In the future will need employees to have new

skills, especially in IT and working with technology, which is essential to effectively manage the modern logistics environment.

Considering the fact that it will take many years before logistics will operate completely without human manual labour, it is extremely important to secure and retain skilled staff, of which there is still a shortage in logistics; enterprises are particularly faced with a shortage of experienced technicians to provide continuous service and maintenance in the context of increasing automation.

The role of people will gradually shift to higher value-added activities in the implementation and operation of automated warehouses so that the individual fragments of technology, management systems and human potential form an effective functional whole.

Warehouse automation makes it easier for workers to perform their jobs, fewer workers are needed to operate the warehouse, but people working in warehouses are not expected to be fully replaced. However, their role is changing significantly, with a reduction in routine tasks related to the movement of goods, and an increase in more specialist activities related to the use of new tools and the resolution of non-standard situations that cannot yet be fully automated.

Robots controlled by artificial intelligence can depalletize, label and repalletize goods and optimize receiving and dispensing processes in the warehouse, and will gradually replace workers performing these activities. Deploying robots in warehouses increases operational efficiency and safety, while freeing up warehouse workers to focus on higher value-added activities.

Autonomous trucking may not be a reality yet, but it will definitely become one. This will have a significant impact on the employment of drivers and a significant decline in demand for this profession can be expected.

Every enterprise should analyze the state and optimization of its warehouse and other logistics processes, so there is a growing demand for logistics audit experts.

VI. The impact of AI on wages

With the onset of digitalization, automation and the introduction of AI, there have been concerns that income disparities between professions, and particularly between skill groups, will become more pronounced. Contrary to expectations, a number of indicators point to a slowdown in the growth of income inequality. OECD analyses suggest that the **impact of AI on wage inequality between occupations has so far been insignificant** in the period up to around 2022, probably because the extent of its deployment has been limited so far[27]. At the level of specific industries, however, a **reallocation of jobs** can already be observed - new AI-related jobs are being created (e.g. data analysts, machine learning specialists) and other, usually less skilled, jobs are disappearing (e.g., some administrative

[27] OECD (2024). *Artificial intelligence and wage inequality. OECD Artificial intelligence papers. April 2024.* https://www.oecd.org/content/dam/oecd/en/publications/reports/2024/04/artificial-intelligence-and-wage-inequality_563908cc/bf98a45c-en.pdf .

support positions)[28]. Overall, then, AI is currently acting more **locally** - changing the mix of jobs in some firms and sectors, but **without significant impacts on average wages across the economy.**

The analysis carried out on the statistical data of the Czech Republic also confirmed a similar trend. Income inequality in the Czech Republic rose sharply in the 1990s after the change of the system, but it gradually stabilized after 2000[29]. The data for 2012-2022 also show no signs of widening earnings inequalities between income, education or occupational groups. Specialist and technical and professional workers (ISCO 2 and 3) saw wages rise at a very similar rate to low-skilled occupations (ISCO 8 and 9) over this period[30]. However, it is likely that analyses based on statistical data may not reflect all aspects of the impact of digitalisation on income differentiation. Some practitioners point out that differences and inequalities are more pronounced between individuals within these groups than between educational groups and professions, based on differences in their level of digital skills and flexibility.[31]

Expected changes in the future

Given that the demand for AI developers, algorithm trainers, data and cyber security specialists, etc. will grow in the future, and that AI literacy will be important even in professions outside the IT sector, it is to be expected that **employees capable of working with AI will be valued in every field**. These people will have a head start in the labour market and can negotiate better wages because they will increase the productivity of the enterprise. **The overall effect of AI on wages across sectors will thus be polarizing.** Positions that are significantly enhanced by AI (typically expert and creative roles) will see faster salary growth, while positions that are directly threatened by AI replacement may experience stagnation or a decline in real wages.

Forecasts from international institutions agree that **the wage gap between skilled and unskilled workers will continue to widen** due to AI[32]. Workers with higher education who can effectively use AI technology can see a significant increase in productivity and thus wages. In contrast, some lower-skilled workers face the risk of job loss or stagnating earnings. The result can be wage polarization - the skilled get richer faster, while the less skilled get stuck in the lower income categories. There may be a growing pool of unskilled workers who move into less secure, lower paid jobs (e.g. agency work, gig economy).

Lifelong learning will gain a great deal of emphasis in the future. The rapid evolution of AI will require workers to continuously learn new skills. Those who **can retrain quickly** will avoid falling into low-wage positions. For example, an administrative employee with a course in data analytics can become an AI

[28] Babecký, J.: Vliv umělé inteligence na trh práce. ČNB, 2024. https://www.cnb.cz/cs/o_cnb/cnblog/Vliv-umele-inteligence-na-trh-prace/

[29] Večerník, J. (2019). Role vzdělání v diferenciaci výdělků a příjmů domácností: Vývoj v České republice v letech 1988–2017. In: Anýžová, P., Večerník J. *Vzdělání, dovednosti a mobilita. Zaměstnání a trh práce v České republice a evropských zemích*. Praha: Karolinum, s. 13–35.

[30] NVF: Průmysl 4.0

[31] Předpoklad o zhoršujícím se příjmovém postavení starších generací má určitou oporu ve statistikách o výdělcích v ČR (ISPV). V letech 2012–2022 rostl medián výdělků ve mzdové sféře padesátníkům mírně pomaleji (+67 %) než dvacátníkům (+70 %) i třicátníkům (+73 %).

[32] Babecký, J.: Vliv umělé inteligence na trh práce. ČNB, 2024. https://www.cnb.cz/cs/o_cnb/cnblog/Vliv-umele-inteligence-na-trh-prace/

system operator. However, if massive retraining is not provided, there is a risk of creating a large digitally excluded group of people who do not understand new technologies enough to get a well-paid job.

Going forward, the **older generation of workers** is expected to face the challenge of continuously learning new technologies. Those older employees who fail to adopt AI tools may be pushed out of skilled positions or forced to retire earlier than planned. **The wage gap between older and younger workers could thus be reduced**. In some professions, there may even be an inversion of the wage curve - younger professionals with up-to-date digital skills may be worth more than older colleagues with long experience but outdated methods. However, a positive scenario is also possible: If AI takes over the arduous tasks while humans focus on creative and decision-making activities, older employees can stay productive longer and continue to earn adequate wages. The reality is likely to vary by industry: in highly technical sectors (IT, finance), the younger generation will come to the fore and perhaps reduce the age wage premium, while in industries requiring experience (law, management, public administration), older workers will remain valued and AI will support rather than replace them.

For the younger generation, the AI economy will bring many opportunities, but also **tougher competition**. Young people with high qualifications in technical fields will be in high demand and can dictate salary conditions. Going forward, **AI-savvy professionals under the age of 30** can be expected to be among the highest paid employees given the combination of current knowledge and the long horizon ahead of them. On the other hand, **young people with no qualifications** will compete with technology for jobs on the lowest rungs of the job/payment ladder - for example, in logistics, autonomous trucks may take the place of a young warehouse worker, in administration a chatbot will take the place of a graduate. For this group, it will be crucial to acquire at least some specialization (e.g., a certificate, a vocational course), otherwise they risk remaining in insecure and low-paid jobs. The OECD warns that young people with low education and precarious jobs are among the most vulnerable to automation globally.

The age wage profile is likely to change. The traditional situation where wages peak at middle age and decline slightly towards the end of a career could be disrupted as some of the older workers with outdated skills drop out, while the wages of capable young people rise rapidly. The social challenge will be to ensure that older generations are not left without lifelong learning support, otherwise **income insecurity in pre-retirement age may increase.**

Groups at risk of falling into low-income categories

Based on the above trends, we can identify several groups of employees who are **at risk of falling into low-income** categories as a result of the advent of AI. These include in particular:

- **Workers with low skills and education:** This group is most affected by the automation of routine tasks. Many blue-collar and support occupations in manufacturing, logistics or service industries are easily automated. Once these positions are replaced by machines or software, these workers often have nowhere to go - their skills are limited. This may result in leaving for lower paid activities or taking up less secure forms of work (agency work, short-term jobs) with low earnings.

- **Women in administrative and business occupations:** women are over-represented in activities that have a **high potential for automation** (administration, cashiering, customer service). If these jobs disappear, there is a risk that a significant proportion of women could leave for lower paid activities if 'middle wage' female jobs are abolished and replaced by low skilled roles. Moreover, the OECD notes that women are more likely to take lower-paying jobs - if the quality of available jobs declines in competition with AI, it is women who are forced to settle for lower earnings. This group therefore requires special attention to minimize any potential fall into low wages (e.g., by promoting women in technical professions, flexible forms of work, etc.).

- **Older workers with a lack of adaptation:** Older generations who are not up to speed or able to learn about new technologies may be pushed out of skilled jobs. Many older workers can then only stay in simple, low-paid jobs - e.g., security guards, porters, relief work - if they want to stay in the labour market. **Older workers are at risk in two ways**: either they lose their jobs and take early retirement, or they stay on in a less skilled role for lower pay. It is possible that there will be more people in the low-income category who are pre-retirees, who were previously middle-income earners but have "fallen" to the lower rungs with the advent of AI.

- **Young workers without qualifications:** At the other end of the age scale are young people entering the labour market with minimal qualifications. These young people may find that the traditional easy **start positions no longer exist for them** as technology takes their place (e.g., entry-level accountants vs. automated accounting systems). Some young people may be forced to take temporary jobs, work on platforms (Uber, food delivery) or remain unemployed for longer. This would mean expanding the low-income group to include young people, often with insecure and low earnings. However, young people are more likely to be able to retrain or complete their education if they are motivated to do so and second-chance programmes exist.

Wage differentiation

The above trends suggest that the advent of AI will have a significant impact on **wage differentials**. The wage gap between skilled and unskilled workers is likely to widen. This is because of the **skill-biased** nature of AI - the technology multiplies the productivity of those who can use it, while replacing the routine activities of those who do not have specialized skills[33]. The overall income distribution shifts in favour of the highly skilled and capital. **The wage differential (premium) for the qualification will thus increase** - the qualification will be even more valuable than today.

The inter-generation wage gap could change, although it is difficult to quantify. Nowadays, older, more experienced workers usually take higher wages than young workers. In the future, **this gap may narrow** - not only because wages will rise for the young, but also because some older people will lose well-paid jobs. As noted, older workers without digital skills may leave or stagnate in terms of pay. This would reduce the average wages of older workers. The younger generation, especially those aged 30-40, could

[33] Babecký, J.: Vliv umělé inteligence na trh práce. ČNB, 2024. https://www.cnb.cz/cs/o_cnb/cnblog/Vliv-umele-inteligence-na-trh-prace/

q thanks to their tech competencies. Starting salaries for talented graduates are rising, which counters the traditional "gradual wage growth with age" curve.

There will be **greater differentiation within generations** (young achievers vs. young failures, older adapters vs. older dropouts). Overall, the wage differentials by age could be slightly reduced in the sense that the experience premium will fall. A young worker with AI skills will quickly work their way up and not miss opportunities to wait "their turn" for a promotion, while some older ones may lose their traditional seniority as an advantage. The real impact will depend on actions such as promoting lifelong learning and protecting against discrimination.

VII. Social dialogue for safe, ethical and responsible implementation of AI in the workplace

VII.1 The role of trade unions in the introduction of AI

An important factor in the success of an artificial intelligence (AI) implementation is consultation with the employees who will be affected by the changes. These meetings are often initiated by the employer, whose aim is to involve workers in the preparation of the AI implementation and gain their trust. This involves organizing workshops where employees are introduced to AI technology, how it will be implemented, how it fits into the company's strategy and how it will impact the workplace. This has led to an easing of employees' fears of losing their jobs.

Trade unions play an important role in the negotiations between employers and employees in the introduction of new technologies and artificial intelligence in the workplace. Their tasks cover a fairly wide range of activities.

Key areas of trade union activity in relation to the application of AI tools

Protection of workers' rights: Trade unions should ensure that the introduction of AI does not lead to discrimination or violation of workers' rights. This includes overseeing algorithmic control so that decisions are not made solely on the basis of automated processes without human intervention. For example, the collective bargaining agreement in the US between the United Auto Workers and General Motors contains provisions that protect employees from disciplinary action based solely on the decisions of algorithms.

Ensuring transparency and information: Unions should demand that employers provide transparent information on the introduction of new technologies and AI, including their purpose, operation and impact on working conditions. This includes the right of staff to be informed about the use of algorithmic tools and their programming criteria.

Support early involvement of executive staff in the actual process of developing the AI tools to be applied**:** Early engagement with workers and ensuring they are in contact with developers is important to understand the needs of the job, identify new ways to use AI to make work easier, increase efficiency,

eliminate repetitive activities and work frustration. In addition to development, it is also important to involve employees in testing AI prototypes as they can identify bugs, potential problematic impacts on employees, and help build adequate training data.

Negotiation of implementation modalities: Collective bargaining should include discussions on how to implement AI, with the aim of minimizing negative impacts on employment and working conditions. In Spain, for example, El Norte de Castilla's collective agreement stipulates that the introduction of new technology will not lead to a reduction in the number of permanent employees.

Support for retraining and education: Trade unions should seek to provide programmes for retraining and further training of workers to adapt to new technological requirements. This is key to keeping workers employable in a changing environment.

Current scope of collective bargaining

At present, collective bargaining on the terms and conditions for the introduction of AI-based systems and their impact on workers is still in its early stages. This applies not only to the Czech Republic, but also to many other countries. According to a 2024 survey of 148 unions from 32 countries by the international service sector union UNI Europe[34], it appears that unions are beginning to discuss the issue widely. According to this survey, 42% of UNI Europe offices are engaged in discussions on various AI-related topics. However, only a small proportion, namely only 20%, of respondents reported having collective agreements in place that cover AI-related issues at the organizational or sectoral level. The majority of trade unions (69%) do not have any collective agreements on AI and 11% are not aware of any such agreements. This suggests that most unions have not yet fully integrated AI issues into their bargaining agendas.

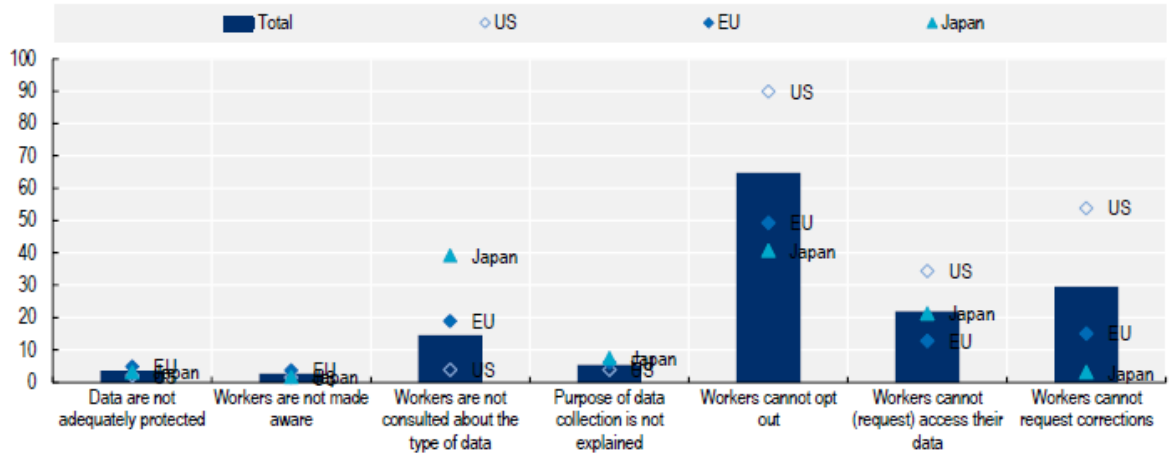
With the increasing use of technology in the workplace, the importance of collective bargaining on AI can be expected to continue to grow. Even if it is not yet collective bargaining in the true sense, unions are engaging in debate on AI-related topics, in particular on issues of data protection, worker privacy, the impact of AI on working time, monitoring of worker activities and automated shift planning, workers' right to challenge decisions made through automated decision-making and their right to be consulted by an external data expert, the right to information and consultation on the use and evaluation of AI tools.

According to a recent OECD survey[35], there are a large number of problems accompanying the application of artificial intelligence tools in business practice, especially when it comes to algorithmic control systems. Here, there is clearly much scope for strengthening the role of trade unions. OECD research shows that data protection and worker awareness is not the biggest gap. These basic requirements are mostly met. A far bigger problem is that workers cannot actively influence much in terms of the type of data that is collected on them, they do not have access to that data, and they do not have the ability to request correction of that data in serious cases, or the ability to opt out of the monitoring set up.

Chart 15: Occurrence of problems associated with the introduction of algorithmic control

[34] futureofwork.fes.de+3UNI Europa+3UNI Europa+3

[35] OECD (2025/2): Algorithmic management in the workplace. Working Paper. https://www.oecd.org/en/publications/algorithmic-management-in-the-workplace_287c13c4-en.html



Source: OECD (2025): Employer survey on algorithmic management.
Note: Percentage of managers who expressed whether they experience the problem

In the Czech Republic, the National Strategy for Artificial Intelligence was adopted in 2019, which emphasizes the creation of a trusted ecosystem for AI and support for the digital transformation of businesses. However, the involvement of trade unions in the implementation of this strategy is not explicitly mentioned, suggesting scope for greater trade union participation in this area. Trade unions in the Czech Republic are currently more likely to be participants in discussions and information platforms organized by employers than active initiators of collective bargaining in this area. This is also the case in sectors where we have traditionally had strong trade unions, such as the automotive sector.

Weaknesses of trade unions

In the opinion of experts on labour relations and labour market trends, trade unions are currently not performing their function at a level that keeps pace with technical and technological changes in the nature of work that fundamentally affect the status of employees[36]. There are numerous weaknesses in the work of trade unions, in particular with regard to the following issues:

- **Lack of awareness and expertise:** Many unions lack a deeper understanding of the technological aspects of AI, limiting their ability to effectively negotiate on these issues.
- **Reactive approach:** Trade unions often react to technological changes after they have been introduced, rather than being proactive partners in the implementation process.
- **Lack of cooperation with technology companies:** There is a lack of increased dialogue between unions and AI companies, which could lead to better understanding and regulation of these technologies.

[36] Equal Times: Trade union strategies on artificial intelligence and collective bargaining on algorithms. https://www.equaltimes.org/trade-union-strategies-on. Equal Times je trojjazyčný (anglicky, francouzsky a španělsky) globální zpravodajský a názorový web, který byl založen v roce 2012 se zaměřením na práci, lidská práva, kulturu, rozvoj, životní prostředí, politiku a ekonomiku z pohledu sociální spravedlnosti. Web je podporován mezinárodními organizacemi ILO a ITUC, Evropskou unií a dalšími donory.

To ensure fair and ethical implementation of AI in the workplace, it is essential that unions strengthen their capacity in technology, become more active in collective bargaining on these issues and work closely with other stakeholders.

Differences in trade union involvement in AI implementation across sectors

The differences in trade union involvement in the introduction of AI and algorithmic management between different sectors are significant and are mainly related to the degree of technological transformation, the traditional strength and structure of the trade union movement in the sector and the culture of social dialogue. While some sectors are already actively negotiating rules for the introduction of new technologies, elsewhere unions are still looking for a way to enter the process. Below is an overview of the main characteristics by sector.

- Information technology, digital services and the platform economy

This sector is dominated by a very high technological dynamic. New AI-based tools, automation of development and customer processes or algorithmic workforce management (e.g., in platforms like Uber, Deliveroo) are fundamentally transforming the way we work. Despite this, there is traditionally a lack of strong union structures - employees often work as freelancers, on contract, or in a startup culture with a low level of union organization.

Unions in these sectors are therefore often lagging behind technological developments. Their ability to respond to change is limited, not only because of fragmented working relationships but also because of a lack of expertise in new technologies. However, the first examples of innovative approaches are emerging. The Danish platform Hilfr entered into a collective agreement with the 3F union in 2018, which regulates algorithmic decision-making and introduces transparent rules for employee evaluation.

In the Czech Republic, trade union activity in the field of IT and platform work is still in its early stages. There are as yet no examples of collective bargaining on AI in this sector.

- Automotive and industrial production

This is a sector where traditionally there are strong trade unions, for example IG Metall in Germany or the KOVO trade union in the Czech Republic. These organizations have many years of experience in negotiating changes to working conditions, including the introduction of new technologies in the context of Industry 4.0**.**

With the introduction of AI, predictive maintenance, smart manufacturing systems and algorithmic shift planning, unions are actively looking at the impact of these technologies on work organization. IG Metall, for example, seeks the right of employees to be informed about the use of algorithms, to be provided with training and retraining, and to keep their jobs in the era of advanced automation.

In the Czech Republic, trade unions in car companies such as Škoda Auto participate in dialogues about the impact of technological transformation, although the topic of AI is not always explicitly mentioned. Rather, trade unions are involved in the debate on the impact of digitalization in general, the future of employment and the need for skills. Employers play a primary role in communicating with employees when implementing AI tools in Czech companies in the automotive sector. For example, Škoda Auto,

which has long invested in the development of new technologies (virtual reality, voice assistants, cloud-based solutions for testing new cars, process optimization, quality control and defect detection, predictive maintenance, occupational safety, etc.), organizes information seminars, materials and training for employees through its Škoda Academy programme. Trade unions are involved in these activities as part of the discussions, but not as the main organizer and driver.

- Banking and finance

The financial sector is undergoing a profound digital transformation. Chatbots are being deployed**,** client requests are being automatically evaluated using algorithms (e.g., scoring) and internal processes are being accelerated. AI is playing a growing role, particularly in data analytics, fraud prevention and customer service.

Although unions are active in this sector, they often encounter centralized management decision-making that implements AI without consulting workers or their representatives. Processes tend to be non-transparent, and employees are often unaware of how algorithms affect their performance or appraisals.

In some countries, such as France and Italy, unions have tried to raise the issue of algorithmic management in collective bargaining, but the results so far have been rather limited. In the Czech Republic, unions in the banking sector remain conservative and the discussion on AI is not yet taking place in a significant way. So far, the topic of technological change is more limited to general demands for job and benefit protection.

- Public sector (education, health, public administration)

The uptake of AI in the public sector has so far been slow and selective, partly due to regulations, partly due to limited budgets. However, AI is beginning to play a more significant role in some areas - for example, in healthcare (e-health tools, predictive service planning) or public administration (automated decision-making systems).

Trade unions in these sectors tend to be quite active, especially when it comes to protecting working conditions and workload. They warn of the risk of staff overload due to new technologies being introduced without the necessary training or capacity building. In some European countries, such as Finland or the Netherlands, there are efforts to include ethical aspects of AI use in collective agreements, including the right to human supervision and data protection.

There are no collective agreements in the Czech Republic that explicitly take into account AI-related issues. Unions focus mainly on traditional areas of bargaining such as wages, working hours and occupational safety.

- Logistics and transport

The industry is undergoing rapid algorithmization - especially in the areas of shift planning, performance monitoring, route optimization and warehouse automation. Digital tools using real-time data play a big role, bringing efficiencies but also new challenges.

Trade unions, particularly in Germany and France, have warned of a loss of employee autonomy, deteriorating working conditions and increasing performance monitoring through digital tools. There is also the question of whether and how employees have the right to look into the data and the logic

of algorithmic decisions. There is an international debate about the status and right of workers in platform logistics (e.g., Uber drivers, Amazon couriers) to be transparently informed about the algorithms that influence their remuneration or work scheduling. In the Czech Republic, the topic of artificial intelligence and algorithmic control has not yet emerged as a subject of systematic negotiation.

Box 2: Collective bargaining in the introduction of AI - differences between sectors

Sector	Trade union activity in the introduction of AI	Typical theme
IT and platforms	Low - rising	Transparency of algorithms, working conditions
Automotive industry	High	Training, restructuring, job retention
Banking and finance	Medium	Awareness, access to algorithms
Public sector	Low - medium	Burden of digitalization, right to disconnect
Logistics and transport	Medium - high	Algorithmic control, supervision, flexibility

Source: Equal Times: Trade union strategies on artificial intelligence and collective bargaining on algorithms. Own modification. https://www.equaltimes.org/trade-union-strategies-on

VII.2. Supporting trade union activities - experience from abroad

Although existing collective agreements mostly refer only in general terms to the use of modern technologies, there are already trade union activities in some countries that have resulted in successful agreements that can serve as examples of more detailed rules and arrangements on the introduction and impact of AI, in particular on the right to disconnect, digital rights of workers in the workplace, information sharing and worker control, and some other areas. Some specific examples are given below:

Hilfr and 3F in Denmark: The Danish platform Hilfr has entered into a collective agreement with the 3F union, which specifies the conditions for the use of AI and algorithmic management of workers on the platforms. The contract stipulates that Hilfr can use AI to make decisions, but must be transparent about how the decision was made, including an explanation of the assessment and the facts used. This ensures the legal verifiability of these decisions[37].

Another notable example is the collective bargaining agreement at Air Nostrum Training Operations, which specifically addresses the use of algorithms in labor relations and provides that the works council must be informed in advance of any plans the company has for the use of decision-making software or algorithms in labor processes of any kind.

[37] apps.eurofound.europa.eu

In 2019, for example, the United Auto Workers (in the US) negotiated a contract with General Motors that included provisions for the use of artificial intelligence and algorithms in the workplace. The contract protects workers from disciplinary action or dismissal as a result of decisions made solely by the algorithm. Similarly, the International Brotherhood of Electrical Workers (IBEW) has signed agreements with various companies to ensure that the use of algorithms does not result in job losses for its members.

Many examples of collective bargaining algorithms in the U.S. are given in a study by the Center for Labor and Education Research at the University of California, Berkeley[38]. The study presents union responses to technological change in the country. It describes how unions are using their collective actions and bargaining agreements to address digital and technological transformation, how rights and obligations are defined in collective agreements to implement digital tools, and discusses clauses designed to mitigate the impact of technological change in the workplace.

It is clear from the above examples that, where collective agreements do address the issue, they have mostly focused so far on basic worker protections relating to job retention, avoiding negative impacts on wages, information rights and data protection. Some contracts go beyond these core areas and also seek to establish a systemic framework for engaging workers in decisions about the application of AI. Examples include the collective agreements of IBM and CBA.

IBM in Germany: IBM Germany has a group works council that has entered into an agreement on the internal use of AI in the workplace. This agreement ensures that the implementation of AI is in line with the rights of employees and that the principles of transparency and fairness are respected. The agreement ensures that in the end, the human always decides. Employees should be able to see at any time what data the system was developed and learned from and how it arrived at certain results. One of the achievements of the agreement is the establishment of the AI Ethics Council. It consists of AI experts from IBM, as well as representatives from the corporate board, human resources, and the company's disability representative. It meets once a month to review the AI systems in use and to further develop them. The Council's role is to further adjust and refine the Framework Agreement on an ongoing basis based on real results.[39].

A similar example is the CBA collective bargaining agreement for players in the United States National Basketball Association (NBA). The agreement, signed in 2017 and renewed until 2030, sets limits on the use of information obtained through monitoring technology in player evaluation, particularly for salary negotiations. The NBA contract guarantees the right of unions and employees to participate and cooperate in decisions about monitoring technologies. It also establishes a joint advisory committee to review monitoring procedures and technologies and the use of sensor data.

These examples highlight the importance of including specific clauses on algorithms and artificial intelligence in collective agreements to ensure the protection of labour rights and due process in the introduction of technology in the workplace. They also reflect an increased awareness of the ethical and labour aspects associated with the use of AI in the workplace and the need to address these challenges through social dialogue and collective bargaining.

[38] https://laborcenter.berkeley.edu/roundups-on-tech-and-work-policy-and-research/
[39] https://www.boeckler.de/de/magazin-mitbestimmung-2744-das-letzte-wort-hat-der-mensch-36555.htm

Information support and guides for collective bargaining

The effectiveness of social dialogue for the ethical and responsible adoption of AI in the workplace depends on the ability of social partners to obtain the necessary up-to-date information and to choose adequate forms of negotiation. Given the complexity of AI systems, trade unions need to improve their professional capacity. They can also now take advantage of lessons learned from existing best practices. As noted in a report by the international organization The Global Deal[40], some remarkable initiatives have been set up to this end[41] to provide advice and information to support trade unions. These initiatives provide resources for trade unions, including examples of successful bargaining to regulate the introduction of AI in workplaces in a way that respects workers' rights and promotes transparency and fairness. Here is an overview of some of these initiatives:

- PSI Digital Bargaining Hub

Public services international (PSI), which is part of the Global Union Federation of Employees in Public Services[42], has created a Digital Bargaining Hub[43]. It is a free and publicly available online resource to help unions negotiate the complex issues of digital transformation, including AI and algorithm management through collective bargaining. The Hub website provides information on eight key themes and 28 related sub-themes related to digitalization. It also provides access to real bargaining clauses through a database of existing clauses collected from unions around the world. The Hub was launched in April 2023. The portal is available in English, Spanish and French and is structured according to the following themes. One section of this website focuses on digital tools, artificial intelligence and algorithms. It offers comprehensive guidance on how to address the challenges and opportunities presented by these technologies. It has four sub-themes in the context of workers' rights, digital tools, artificial intelligence and algorithm management.

- The first sub-theme concerns information sharing practices with regard to the use of digital tools at work and the importance of clearly defining their use.
- The second sub-theme deals with the possible limitations of the use of digital tools and technologies in the context of electronic monitoring and surveillance equipment.
- The third sub-theme concerns the importance of transparency in the design and use of tools, artificial intelligence and algorithm management. The design and operation of automated systems at work should be clearly defined and transparent to all.
- The fourth subtopic deals with intervention mechanisms in AI and automated systems. The principle of subjecting these mechanisms to human control should become the norm in this respect.

The Hub provides detailed information on the implications of using AI and digital tools in the workplace and helps union representatives and employees understand the evolving technology landscape. It

[40] https://www.theglobaldeal.com/
[41] Global Deal Flagship Report 2024: https://flagship-report.theglobaldeal.com/case-study/responsible-adoption-of-artificial-intelligence-through-collective-bargaining
[42] Global Union Federation in of Employees in Public Services je celosvětová organizace, která zahrnuje odborové svazy zaměstnanců ve veřejné správě, zdravotnictví, vzdělávacím sektoru, sociálních službách, kultuře, apod. https://publicservices.international/resources/page/sectors?id=9416&lang=en
[43] https://publicservices.international/digital-bargaining-hub

includes clauses taken from collective agreements that illustrate successful negotiations involving AI and digital tools and provides practical examples of how social dialogue can benefit workers and employers to ensure that these policies protect workers, address the use of AI and algorithmic decision-making in providing social protection, and promote the ethical use of AI.

- TUCA Information Support

To strengthen information support for trade unions in the context of digitalization, the Trade Union Confederation of the Americas (TUCA), through its Observatory on Latin America (OLA), has published a series of bulletins and reports. The papers address issues such as the use of artificial intelligence (AI) and algorithmic labor management, and provide the labor movement in America with analytical and strategic tools to address these issues. TUCA has also created a space for reflection and discussion within working groups such as the Hemispheric Development and Integration Working Group (GTDIH), which hold outreach events on the implications of AI developments and the challenges this technology poses for workers.

- UNI Europe - collective agreements database

In March 2024, UNI Europa[44] and Friedrich-Ebert-Stiftung created a **database of collective bargaining agreement clauses related to the negotiation of AI tools and algorithm management**[45]. This database serves as a repository of negotiated agreements that address the use of artificial intelligence and algorithms in the workplace and highlights the role of collective bargaining in managing the impact of these technologies. The database contains 23 collective agreements from different sectors, where you can browse and select specific topics, sectors, countries and validity.

It covers a wide range of topics: training on new AI tools; the role of unions in implementing new technologies; working hours and the right to disconnect; privacy laws; the role of unions in data protection; monitoring and surveillance; the use of AI in recruitment; and more. Sample collective agreements for negotiating AI-related clauses are also shown.

- UNI Global Union Algorithmic Management Guides

In 2020, UNI Global Union created a **collective bargaining guide on AI**[46], which provides specific guidance and tools for unions when negotiating collective agreements on the impact of AI on labour relations and the protection of workers' rights. The guide provides practical advice on how to negotiate fair and transparent use of algorithms in the workplace. It explains the basic concepts and mechanisms of algorithm management, focusing on the three main areas of algorithm application: recruitment, workplace decision making, and performance management. It outlines the potential risks, including privacy issues, data security, bias and interference with worker autonomy. It summarizes ten key requirements for unions to use in collective bargaining on the issue of algorithmic management. These requirements focus on notice and evaluation periods, decision-making, right to information, discrimination, discipline, health and safety, data collection and access, monitoring and supervision, benefit sharing and training.

[44] UNI Europa (Union of workers in the services sectors), https://www.uni-europa.org/
[45] https://www.uni-europa.org/news/a-database-of-ai-and-algorithmic-management-in-collective-bargaining-agreements/
[46] https://uniglobalunion.org/report/algorithmic-management-a-trade-union-guide/

Strengthening the professional position of trade unions

In order to be able to actively defend workers' rights not only in the area of wages or working conditions, but also in relation to technological innovations that may threaten employment, privacy or equal treatment, trade unions need to be well informed and trained. For effective bargaining, it is essential that unions themselves understand the basic technical principles of AI, know examples of its use in different sectors, and are familiar with the legal and ethical issues involved. This requires systematic training of their representatives, building interdisciplinary teams (e.g., collaboration with IT experts, lawyers and social scientists) and monitoring the domestic and international debate on digital technology regulation. Beyond technical understanding, unions should formulate their own conceptual frameworks and proposals - what they consider to be a fair and sustainable implementation of AI - and be able to communicate these proposals to both employers and the public.

In the United States in late 2023, the American Federation of Labor and Congress of Industrial Organizations (AFL-CIO) and Microsoft Corp. announced a partnership to discuss how AI should look at workers' needs and incorporate their voices into AI development and implementation. This is the first AI-focused agreement between a union and a technology company. Its goals are threefold: to share detailed information on AI technology trends with union leaders and workers; to incorporate workers' perspectives and expertise into the development of AI technology; and to help shape public policy that supports the technology skills and needs of executives.

Key provisions of the agreement include a commitment to respect workers' rights and support workers in an era of rapid technological change, to expand the role of workers in developing AI tools that affect them, in deciding on necessary training and education activities, and in setting adequate and credible procedures for implementing AI in the workplace.

One of the pillars of the partnership between the AFL-CIO and Microsoft is the creation of feedback mechanisms in which union representatives share knowledge and concerns directly with AI product developers, creating opportunities for collaborative design and development of worker-focused technology prior to implementation.

The work plan for the agreement between the AFL-CIO and Microsoft lays out a roadmap for AI training for workers and students beginning in 2024. It also includes further joint action to increase training opportunities in new AI-related technology occupations.

VIII. AI regulation and recommendations for trade union activity

European Act on Artificial Intelligence

The European Artificial Intelligence Act (AI Act)[47] establishes a comprehensive framework for the regulation of artificial intelligence (AI) systems in the EU, emphasizing the protection of workers, the identification of risks associated with AI and highlighting the role of trade unions in the implementation of these systems. Below is an overview of the key provisions:

1. Worker protection and risk identification:

- **Prohibition of certain AI practices:** The Act prohibits the use of AI systems that pose an unacceptable risk. This includes systems that use subliminal techniques to manipulate people's behaviour or exploit individuals' vulnerabilities, for example based on age or health. Such practices are considered a violation of fundamental rights and are therefore prohibited.
- **Prohibition of emotional recognition in the workplace:** AI systems designed to recognize employee emotions in the workplace are prohibited, except in specific cases such as for safety or health reasons. This prohibition protects the privacy and mental well-being of workers.
- **Classification of AI systems according to risk:** The Act categorizes AI systems according to their level of risk. High-risk systems, such as those used for recruitment or performance management, are subject to strict requirements for transparency, human oversight and fundamental rights impact assessments.

2. The role of trade unions:

- **Obligation to consult with trade unions:** Before introducing AI systems in the workplace, employers must consult with workers and their union representatives. This ensures that the implementation of AI is transparent and takes into account the rights and concerns of employees.
- **Strengthening collective bargaining:** Trade unions play a key role in negotiating terms and conditions relating to the introduction of AI in the workplace. Studies show that 42% of trade unions are already holding talks on AI and algorithmic management in the service sector, highlighting the growing importance of these talks.
- **Right to information and training:** Employers are obliged to provide employees with information on the operation of AI systems and to ensure that they are adequately trained. This allows workers to better understand and work effectively with these technologies.

[47] https://digital-strategy.ec.europa.eu/cs/policies/regulatory-framework-ai; Plné znění dokumentu v češtině: https://eur-lex.europa.eu/legal-content/CS/TXT/HTML/?uri=OJ:L_202401689 ; High level summary of the AI Act: https://artificialintelligenceact.eu/high-level-summary/?utm_source=chatgpt.com

These provisions reflect the EU's commitment to protect workers' rights in the digital era and to ensure that the implementation of AI in the workplace is done ethically and transparently, with the active involvement of trade unions.

Recommendations for trade union action/collective bargaining

The introduction of artificial intelligence and automation into the workplace is changing the way work is managed, skill requirements and working conditions themselves, affecting workers across sectors and posing a major challenge to trade unions. The following recommendations summarize the key areas that unions should focus on when collectively bargaining on the introduction of AI and other digital technologies.

- Increasing professional knowledge

Unions should systematically invest in training their officials and wider membership in digital technologies, with a particular focus on artificial intelligence, algorithmic labour management, cyber security and digital workplace law. This includes both the technical underpinnings of AI and the legal and ethical implications of its deployment. Training should be practically oriented and linked to concrete examples from practice.

- Proactive approach

Trade unions should act as initiators in the debate on the digitalisation of work - not wait for employers to confront them with a fait accompli. They should monitor technological developments and analyse their potential impact on workers, and actively bring these findings into collective bargaining. This includes the requirement for early union involvement in the decision-making process on the implementation of new technologies.

- International cooperation

The globalised development of technology also requires an internationally coordinated response. Trade unions should work with partner organizations at European and global level (e.g., ETUC, ITUC) to share experiences, best bargaining strategies and participate in international initiatives to regulate AI and protect labour rights in the digital environment.

- Focus on transparency and ethics

One of the key requirements should be transparency in algorithmic decision-making systems - employees and their representatives must have the right to know what data is collected, how it is evaluated and how decisions are made about their working conditions. Unions should enforce the principles of human oversight of AI, prevent discrimination based on algorithms and protect employees' personal data from misuse. This includes the requirement to regularly audit AI algorithms and their outputs to ensure that there is no discrimination and that employment decisions are objective.

- Support for retraining and lifelong learning

Trade unions should actively negotiate on the availability of training programmes and retraining, especially for vulnerable professions most affected by automation. Lifelong learning should be included in collective agreements as an employee right, not a benefit, and should be jointly funded by employers and public institutions.

- Creating an ethical framework for AI deployment

Trade unions should work together to develop ethical frameworks for the use of AI in the workplace that take into account the principles of human dignity, autonomy and equality. These frameworks can serve as a basis for negotiation and as a defense against unethical use of technology, for example to monitor or automatically evaluate employees without context, or to put pressure on their performance beyond a healthy working environment.

- Strengthening legal protection for employees

It is important that trade unions are also involved in legislative changes that reflect new forms of work and digital management. This may include, for example, the right not to be subjected to purely algorithmic decision-making, the right to an explanation of the AI's decisions, or the right to access data collected about the employee.

Summary

Enterprises equipped with new technologies and their use by them

The information and digital technology (ICT) capability of enterprises is a prerequisite for the adoption and use of AI technologies. According to the Digital Intensity Index (DII), enterprises located in the Czech Republic with ten or more employees are comparable to the EU-27 average in this respect, but they lag significantly behind countries that can be considered EU leaders in terms of the digital equipment of enterprises, i.e., Finland, Denmark and Belgium.

The level of ICT equipment depends on the size of enterprises, but also on the sector in which they operate. Large enterprises have an advantage over small and medium-sized enterprises in that they have greater financial resources to invest in the purchase of ICT and have a volume of production that guarantees effective use of ICT and a favourable rate of return on investment. The most equipped enterprises are those in the Information and communication technologies, Professional, scientific and technical activities and Production, distribution of electricity, gas and heat sectors.

The next evolutionary stage in the equipment of enterprises is the equipment of **technologies using artificial intelligence** (AI). Small and large enterprises in the Czech Republic manage to keep pace with the European average to a certain extent, but the gap with the Nordic EU Member States is significant, the share of enterprises using at least one AI technology in the Czech Republic is half that of these countries.

Barriers to the introduction of new technologies

The adoption and use of new technologies is influenced by a combination of factors across economic, technological, organizational, personnel, legal and ethical domains. The biggest obstacle is perceived by companies as the **financial difficulty of** acquiring AI tools, but also the resistance of existing employees who fear losing their jobs or having to learn new knowledge and skills, low data and digital literacy.

Corporate culture can also be an obstacle to the introduction of new progressive technologies, with management clinging to established practices. Management's distrust of the use of complex AI models is also caused by the lack of transparency in their operation. The problem is also the lack of a long-term strategy for the introduction of new technologies, which would define the individual process steps and ensure their coherence across all parts of the company and determine the responsible person/department for its implementation, while ensuring the necessary cooperation across all departments.

Use of AI in HRD

A survey among HR professionals in more than 300 Czech companies showed that more than half of them either already use AI in HR or are planning to implement it. The most common areas of use include support for HR development and training, recruitment and onboarding, communication with employees, support for setting remuneration policy and benefits management. Incorporating AI into HR processes requires experts who have deep knowledge of these technologies and are able to analyze and understand data, create and optimize algorithms for planning and implementing the necessary

training and education activities, for selecting and evaluating candidates for positions, while ensuring that these processes are objective and transparent.

In addition to the obvious benefits for employers, the use of AI in the HR agenda also has a significant impact on their workforce, both in a positive sense and in terms of potential drawbacks and risks. Employees benefit **in particular from** AI's **ability to** design personalized courses and training based on an analysis of individual employee skills and preferences. The advantage is also the possibility of online communication, consultancy support, including demonstration videos whenever necessary. This gives workers confidence in new situations or periods of change. On the other hand, there may be **some risks.** It may be that recruiters focus more on algorithms than on face-to-face meetings and communication. There is also a risk of bias, as AI systems are trained on past data that may contain previous patterns inadequate to the current situation, or even discriminatory. Another disadvantage is that algorithms are not always transparent and may make decisions based on factors that are not clear to the user. The use of AI in HRD may be largely influenced by the EU AI law adopted in 2024. It is the application of AI in recruitment and management that is considered high risk under the law's definitions.

The use of AI in enterprise management

Enterprise management at the strategic and operational level is made under increasingly complex conditions, traditional analyses often fail due to a lack of data or information about the broader context of the company's operations, which can lead to intuitive decision-making at the expense of objective decision-making supported by high-quality and comprehensive analyses. The penetration of AI technologies into all corporate activities leads to the fact that, especially in large companies, the management of the company is being supplemented by new technology directors who specialize in specific areas of AI, such as the director of artificial intelligence, who leads the AI strategy of the company, assesses and evaluates the possibilities of using AI in corporate processes, or the director of transformation, who ensures the development of digital infrastructure.

The deployment of AI requires a change in mindset, creating a hybrid workforce where a manager's expertise is combined with AI tools. Managers must ensure that AI applications comply with regulatory standards, that it is seen as a tool that enhances but does not replace human judgment, and that they ensure not only effective use but also ethical use of AI tools.

AI is changing the workload of **project managers** and is able to take over routine administrative tasks such as reporting on the progress of project work, optimizing resources in a given period, but it will not replace the manager's ability to lead and motivate people, show empathy, negotiate, make decisions. Project managers must have skills that AI is not yet capable of. Managers also need to be aware of certain risks such as AI hallucination, where AI can make up information, low quality results due to low quality data/information.

Using AI in logistics

Logistics is one of the most digitized activities. The automation of warehouse operations is also advancing into areas that were previously the domain of human operators; picking robots and automatically guided vehicles are being used. The introduction of fully automated warehouse systems is still very limited, with regard to return on investment, those activities that make the most sense in the logistics chain are automated.

The actual transport of goods to the customer by car is undergoing gradual automation changes. The extremely high speeds of 5G networks enable autonomous driving of vehicles. The use of autonomous vehicles has so far been hampered mainly by unpreparedness of transport infrastructure, technological constraints, regulatory barriers and, last but not least, confidence in their use.

The range of technologies in the field of automation or robotization of logistics is already so wide that the decision-making process is becoming more and more demanding and companies use the consulting services of logistics integrators **whose** task is to ensure the mutual compatibility of individual elements and the creation of a functional logistics system. There is also a growing demand for logistics audit experts.

The impact of AI on wages

Initial fears that the introduction of artificial intelligence could widen wage inequalities between different occupational and skill groups have not yet materialized, according to the available data. Analyses of OECD and Czech statistics show that the impact of AI on income differences has so far been rather insignificant. This may be due to the limited scope of its practical deployment so far, with the first changes being more visible at the level of individual sectors or companies.

Going forward, however, the **overall effect of AI on wages across the economy** can be expected **to be polarizing.** The wage gap between occupations, skilled and unskilled workers will continue to widen. **Groups at risk of falling into low-wage categories** will include low-skilled workers whose jobs will be affected by automation and, for the same reasons, women in administrative and business occupations. In addition, older workers with a lack of adaptation to new technical requirements will be at a disadvantage, as will young workers with low skills who may find that easier entry-level positions within traditional occupations have disappeared as they have been handed over to modern technology.

Social dialogue and the role of trade unions

At present, collective bargaining on the terms and conditions for the introduction of AI-based systems and their impact on workers is still in its early stages. This applies not only to the Czech Republic, but also to many other countries. Only a small proportion (about 20%) report having collective agreements that cover AI-related issues at the organizational or sectoral level. The differences in trade union involvement between different sectors are significant and are mainly related to the degree of technological transformation and the tradition of social dialogue in the sector.

There are numerous **weaknesses** in trade union activity. Many lack insight into the technological aspects of AI, which limits their ability to effectively negotiate these issues. Trade unions often react to technological changes after they have been introduced, instead of being proactive partners in the design and implementation process. There is a lack of intensified dialogue between unions and AI experts, which could lead to better understanding and negotiation of adequate conditions in workplaces.

Although social dialogue in this area is not widespread, there are already trade union activities in some countries that have resulted in successful agreements that can serve as **good examples of more detailed rules and arrangements**. Trade unions abroad have created some platforms and materials that can be used to inspire bargaining on the introduction of AI tools and algorithm management, such as: collective agreement databases; information guides; the Digital Bargaining Hub, a digital portal

providing structured information on the key topics of digitalisation in companies and examples of relevant clauses in collective agreements.

AI regulation and recommendations for trade union activity

The European Artificial Intelligence Act (AI Act) is the first comprehensive legal framework that seeks to regulate the use of AI technologies within the EU. Emphasizes the protection of workers' rights, risk prevention. It completely prohibits certain practices such as subliminal manipulation techniques or the recognition of emotions in the workplace. It differentiates between systems according to their level of risk, with tools used in, for example, recruitment or appraisal classified as high-risk and subject to strict rules.

The Act also strengthens the role of trade unions. Employers have a duty to consult with employees and their representatives before introducing AI systems in the workplace, including providing detailed information on how AI systems work. Employers are also obliged to ensure that employees are adequately trained.

In connection with the rapid development of modern technologies, it is important that trade unions in the Czech Republic systematically invest in the education of their officials and the wider membership base in the field of digital technologies, with a special emphasis on artificial intelligence. This includes both the technical underpinnings of AI and the legal and ethical implications of its deployment. This is the only way for unions to monitor technological developments and analyze their potential impact on workers, and to actively feed this knowledge into collective bargaining. This includes the requirement for early union involvement in the decision-making process on the implementation of new technologies. They should also work with partner organizations at European and global level that have more experience in this area.

Annex

Table 11: Share of enterprises in the EU27 and Norway with each level of the Digital Intensity Index in 2024 (%)

	very low	low	high	very high
EU-27	26.35	39.4	27.08	7.17
Euro zone	25.54	40.05	27.14	7.27
Belgium	15.7	35.14	34.34	14.82
Bulgaria	49.06	33.35	14.82	2.77
Czech Republic	28.15	37.08	27.49	7.29
Denmark	9.24	31.63	41.07	18.06
Germany	19.49	38.9	31.93	9.68
Estonia	28.14	35.14	28.78	7.94
Ireland	25.87	33.01	29.9	11.22
Greece	45.95	34.56	16.32	3.17
Spain	25.19	41.46	26.63	6.73
France	30.69	46.03	19.95	3.33
Croatia	35.66	35.28	21.3	7.76
Italy	29.28	43.48	23.34	3.9
Cyprus	25.16	36.43	30.61	7.81
Latvia	39.9	32.74	22.04	5.31
Lithuania	32.7	37.92	23.7	5.68
Luxembourg	28.73	35.71	28.24	7.32
Hungary	41.53	34.58	19.68	4.21
Malta	18.28	33.6	34.36	13.76
Netherlands	18.54	35.56	33.77	12.13
Austria	26.97	36.89	28.24	7.9
Poland	29.99	36.79	27.32	5.89
Portugal	25.21	36.7	30.24	7.85
Romania	30.11	46.89	20.48	2.52
Slovenia	31.49	35.	25.6	7.9
Slovakia	35.78	35.52	23.77	4.93
Finland	7.24	30.54	42.64	19.59
Sweden	12.98	31.68	41.45	13.89
Norway	16.55	38.16	33.73	11.57

Source: Eurostat, table code [isoc_e], own modifications

Table 12: Change in the share of enterprises in the EU27 and Norway with each level of the Digital Intensity Index in 2024 compared to 2022 (p.p.)

	very low	low	high	very high
EU-27	-3.8	1.7	-0.8	3.0
Euro zone	-3.0	0.8	-1.0	3.2
Belgium	-6.3	-0.2	1.0	5.5
Bulgaria	-2.7	3.1	-1.6	1.2
Czech Republic	-2.6	-0.8	0.4	3.0
Denmark	-1.6	0.2	-3.4	4.8
Germany	-2.5	-1.0	-1.6	5.0
Estonia	-4.2	-1.1	1.7	3.6
Ireland	0.6	-8.6	-0.3	8.3
Greece	-11.9	11.4	-1.1	1.5
Spain	-6.5	1.4	2.0	3.1
France	-4.8	3.4	0.7	0.7
Croatia	-5.3	5.1	-2.1	2.3
Italy	-0.3	0.9	-1.7	1.1
Cyprus	-4.2	-0.1	0.1	4.2
Latvia	-6.9	1.2	3.1	2.6
Lithuania	-2.6	3.7	-2.6	1.4
Luxembourg	-4.0	-1.3	0.7	4.5
Hungary	-5.5	6.9	-2.3	0.9
Malta	-3.4	0.5	-3.0	6.0
Netherlands	-0.8	-2.1	-2.5	5.4
Austria	-4.8	1.9	-0.5	3.4
Poland	-7.8	3.4	2.2	2.1
Portugal	-3.8	1.3	-0.6	3.2
Romania	-16.3	12.8	1.9	1.6
Slovenia	-0.5	0.3	-2.4	2.6
Slovakia	-2.6	-1.3	1.8	2.0
Finland	-3.0	-2.2	-4.4	9.6
Sweden	0.2	3.5	-7.1	3.4
Norway	2.1	-3.4	-3.9	5.2

Source: Eurostat, table code [isoc_e], own calculations

Table 13: Enterprises in the EU27 and Norway with at least a basic level of digital intensity index by enterprise size in 2024 (%,)

	number of employees		
	10 to 49	50 to 249	250 and more
EU-27	70.07	89.48	97.98
Euro zone	70.97	90.36	98.22
Belgium	81.61	94.74	99.58
Bulgaria	46.45	69.77	91.14
Czech Republic	67.4	87.63	98.17
Denmark	88.88	98.39	99.82
Germany	77.12	93.87	99.2
Estonia	67.59	90.42	98.74
Ireland	69.86	92.35	98.91
Greece	49.98	69.91	86.43
Spain	71.79	88.08	96.37
France	65.7	88.05	98.93
Croatia	60.29	83.96	97.1
Italy	67.76	90.34	97.79
Cyprus	71.66	92.39	100.
Latvia	55.13	81.27	97.75
Lithuania	61.78	87.49	98.41
Luxembourg	66.83	86.82	100.
Hungary	53.85	81.09	96.26
Malta	78.68	93.56	94.57
Netherlands	78.04	94.18	98.22
Austria	69.21	91.33	99.39
Poland	65.29	89.2	99.26
Portugal	71.65	90.45	98.25
Romania	67.55	77.34	91.6
Slovenia	64.32	84.8	100.
Slovakia	58.33	84.35	95.05
Finland	91.34	98.77	100.
Sweden	84.61	97.27	99.72
Norway	80.88	97.1	99.23

Source: Eurostat, table code [isoc_e], own modifications

Table 14: Enterprises in the EU27 and Norway with at least a basic level of digital intensity index in 2024 by sector (%)

	C	D	E	F	G	H	I	J	L	M	N
EU27	72.39	93.33	78.62	61.50	79.41	67.03	55.83	98.16	88.65	95.62	70.84
Belgium	87.65	:	:	73.97	87.99	:	:	100.00	:	99.47	79.89
Bulgaria	44.30	:	43.10	29.96	56.63	46.09	42.84	95.40	:	76.58	52.49
Czech Republic	72.27	93.84	74.32	58.08	82.27	62.38	50.99	97.61	79.25	91.85	52.99
Denmark	92.41	100.00	83.51	82.78	95.67	82.27	79.33	99.79	92.58	99.30	83.83
Germany	83.71	98.42	88.65	69.63	84.08	69.90	57.95	98.77	95.18	97.82	77.77
Estonia	70.43	74.47	95.56	52.61	82.63	56.60	71.18	96.10	83.20	96.68	56.00
Ireland	87.05	100.00	55.41	60.73	73.91	60.37	57.33	97.91	95.43	93.59	84.17
Greece	45.16	49.00	59.27	50.63	60.00	75.65	38.69	91.45	76.67	87.27	64.40
Spain	71.04	:	80.85	60.23	82.31	74.28	68.35	98.15	94.47	95.78	61.10
France	64.46	95.54	73.16	49.79	76.19	54.02	56.65	99.00	94.37	97.67	70.86
Croatia	59.04	92.48	61.91	38.23	83.56	59.03	50.42	98.88	82.20	87.60	74.85
Italy	73.93	:	:	66.43	76.95	67.27	47.02	98.09	:	95.34	63.26
Cyprus	60.73	100.00	70.99	50.64	76.07	82.49	72.58	98.55	95.80	97.98	75.99
Latvia	55.77	76.60	65.31	42.10	68.91	54.63	46.78	95.54	62.04	87.89	56.79
Lithuania	63.79	:	80.13	54.03	77.19	61.50	56.02	97.61	71.63	86.92	63.16
Luxembourg	69.16	:	:	56.79	75.29	70.69	38.57	99.68	:	94.97	79.79
Hungary	53.69	72.01	58.70	44.72	62.07	52.37	50.43	94.71	58.85	82.11	56.23
Malta	74.93	:	:	63.62	83.13	83.27	75.21	98.20	81.28	95.44	80.01
Netherlands	81.66	98.37	90.83	76.68	86.80	70.52	55.06	98.97	93.39	97.50	74.88
Austria	75.76	97.73	89.96	56.06	78.30	59.49	62.14	99.74	86.20	96.51	67.36
Poland	64.18	92.92	80.90	53.15	76.64	66.78	67.69	98.44	85.29	92.66	66.91
Portugal	71.07	100.00	86.87	62.75	84.55	75.50	58.52	99.23	:	96.00	80.57
Romania	63.42	88.50	65.96	62.19	74.14	71.32	62.22	94.31	82.26	87.85	69.49
Slovenia	67.56	69.82	100.00	44.30	85.06	70.05	66.29	100.00	71.54	80.47	48.64
Slovakia	60.75	82.89	49.26	47.03	75.09	50.79	43.95	93.31	75.42	79.22	64.03
Finland	96.72	:	:	88.18	96.22	80.33	77.28	100.00	100.00	100.00	93.91
Sweden	89.66	100.00	98.47	83.91	93.25	82.11	67.47	97.47	96.36	98.56	76.16
Norway	88.72	100.00	91.05	78.27	88.38	71.14	64.49	99.63	94.89	98.64	75.38

Source: Eurostat, table code [isoc_e], own modifications

Explanation:

C - manufacturing industry
D - production, distribution of electricity, gas, heat
E - water supply
F - construction
G - wholesale, retail trade
H - transport, storage
I - accommodation, catering
J - information and communication activities
L - real estate activities, real estate
M - professional, scientific and technical activities
N - administrative and support activities

Table 15: Manufacturing enterprises in the EU27 and Norway with a very high digital intensity index in 2024 (%)

EU27	5.14	Latvia	3.08
Euro area	5.38	Lithuania	3.4
Belgium	12.33	Luxembourg	9.13
Bulgaria	0.68	Hungary	2.45
Czech Republic	5.38	Malta	5.99
Denmark	12.87	Netherlands	8.81
Germany	7.57	Austria	9.62
Estonia	4.86	Poland	4.08
Ireland	12.87	Portugal	3.89
Greece	2.01	Romania	1
Spain	4.23	Slovenia	5.59
France	4.06	Slovakia	2.79
Croatia	3.54	Finland	16.4
Italy	3.13	Sweden	12.97
Cyprus	1.22	Norway	6.32

Source: Eurostat, table code [isoc_e], own modifications

Table 16: Enterprises in the EU27 using at least one artificial intelligence (AI) technology; 2024

	Enterprises using at least one AI technology	enterprise size (number of employees)			predominant economic activity - NACE sectoral section					
		small (10—49)	medium (50—249)	large (250+)	manufacturing (C)	construction (F)	trade (G)	transport (H)	accommodation (I55)	information and communication activities (J)
EU27	**13.5%**	**11.2%**	**21.0%**	**41.2%**	**10.6%**	**6.1%**	**12.1%**	**8.1%**	**12.3%**	**48.7%**
Belgium	24.7%	20.7%	35.7%	66.3%	23.2%	11.1%	22.5%	23.0%	-	64.1%
Bulgaria	6.5%	5.5%	10.0%	20.2%	4.4%	1.6%	6.1%	4.4%	6.1%	33.9%
Czech Republic	**11.3%**	**8.7%**	**16.9%**	**40.5%**	**9.5%**	**2.3%**	**12.7%**	**5.7%**	**5.8%**	**46.5%**
Denmark	27.6%	23.5%	40.9%	63.4%	21.8%	11.7%	27.3%	21.1%	15.9%	68.3%
Estonia	13.9%	12.1%	19.3%	39.0%	9.8%	8.0%	10.5%	10.1%	25.4%	44.3%
Finland	24.4%	20.0%	37.7%	70.4%	20.7%	11.3%	21.7%	7.0%	22.5%	66.4%
France	9.9%	8.5%	14.5%	32.7%	7.4%	3.1%	9.8%	5.3%	11.6%	41.8%
Croatia	11.8%	10.5%	16.5%	28.4%	9.7%	4.4%	10.2%	7.8%	14.9%	56.9%
Ireland	14.9%	11.8%	24.8%	50.8%	17.5%	6.2%	11.7%	7.9%	14.3%	49.1%
Italy	8.2%	6.9%	14.7%	32.5%	8.0%	5.2%	8.2%	5.2%	8.5%	34.6%
Cyprus	7.9%	6.3%	14.3%	34.9%	3.0%	2.4%	4.1%	7.3%	10.4%	41.4%
Lithuania	8.8%	6.5%	15.1%	31.2%	8.8%	3.4%	7.7%	5.0%	4.6%	45.9%
Latvia	8.8%	7.2%	13.6%	33.3%	8.4%	5.3%	6.7%	5.2%	3.1%	37.4%
Luxembourg	23.7%	21.1%	31.9%	45.6%	27.1%	19.1%	20.2%	14.5%	12.7%	48.7%
Hungary	7.4%	6.5%	10.1%	23.5%	4.8%	4.3%	6.8%	3.9%	8.7%	32.9%
Malta	17.3%	14.3%	25.6%	46.7%	13.7%	9.4%	10.2%	20.6%	17.6%	55.1%
Germany	19.8%	16.9%	28.2%	48.2%	16.1%	10.0%	16.3%	11.5%	12.5%	60.5%
Netherlands	23.1%	20.0%	31.2%	54.1%	18.0%	8.9%	23.2%	11.0%	24.7%	58.0%
Poland	5.9%	3.9%	10.4%	33.0%	5.1%	2.0%	5.5%	2.5%	3.0%	32.6%
Portugal	8.6%	6.7%	15.4%	41.9%	6.8%	2.7%	5.8%	4.9%	15.5%	52.5%
Austria	20.3%	17.8%	29.1%	49.9%	22.7%	7.3%	15.7%	13.5%	29.3%	60.7%
Romania	3.1%	2.6%	3.9%	11.3%	1.3%	0.2%	3.6%	2.7%	0.3%	15.7%
Greece	9.8%	8.2%	15.9%	24.3%	7.5%	5.2%	10.5%	11.6%	7.9%	25.6%
Slovakia	10.8%	8.8%	15.7%	29.1%	8.1%	6.3%	11.6%	8.2%	4.2%	29.2%
Slovenia	20.9%	19.3%	22.7%	59.7%	21.6%	11.9%	23.5%	19.0%	37.2%	52.9%
Spain	11.3%	8.6%	20.5%	44.0%	9.8%	4.4%	9.6%	8.6%	11.9%	46.6%
Sweden	25.1%	22.0%	34.5%	56.3%	19.5%	13.1%	22.5%	15.5%	16.1%	67.6%

Source: CSO: Use of information and communication technologies in the business sector in 2024 - table part. Table 11.10

Explanatory note: share of enterprises in the total number of enterprises in a given size and sectoral group

Table 17: Use of selected artificial intelligence technologies by businesses in the EU27

	Businesses using at least one artificial intelligence (AI) technology	enterprises using selected AI technologies:				
		advanced text analysis	text or speech generation	machine or deep learning	Robotic Process Automation (RPA) with AI elements	image-based person/object recognition
EU27	13.5%	6.9%	5.4%	4.2%	4.2%	3.2%
Belgium	24.7%	15.1%	12.7%	8.1%	10.3%	6.2%
Bulgaria	6.5%	3.9%	2.3%	2.1%	2.9%	1.8%
Czech Republic	11.3%	6.4%	5.9%	4.5%	2.9%	2.0%
Denmark	27.6%	16.7%	18.5%	10.7%	10.9%	5.5%
Estonia	13.9%	7.8%	5.8%	3.5%	2.8%	4.2%
Finland	24.4%	15.4%	13.0%	9.7%	10.6%	5.5%
France	9.9%	4.4%	3.2%	4.0%	3.2%	2.2%
Croatia	11.8%	7.7%	4.0%	4.1%	3.1%	2.7%
Ireland	14.9%	6.4%	7.3%	5.5%	6.2%	3.1%
Italy	8.2%	4.5%	3.7%	2.6%	2.3%	2.1%
Cyprus	7.9%	3.2%	3.1%	5.2%	2.0%	1.5%
Lithuania	8.8%	6.3%	3.6%	2.8%	4.4%	2.6%
Latvia	8.8%	5.8%	2.2%	2.0%	2.5%	2.7%
Luxembourg	23.7%	17.6%	8.7%	6.3%	6.0%	4.6%
Hungary	7.4%	3.3%	2.7%	1.8%	2.6%	2.3%
Malta	17.3%	6.6%	3.7%	6.5%	6.7%	5.8%
Germany	19.8%	9.6%	6.6%	5.3%	5.2%	4.7%
Netherlands	23.1%	14.1%	12.6%	6.5%	6.3%	4.6%
Poland	5.9%	1.5%	2.4%	1.6%	2.5%	1.7%
Portugal	8.6%	4.2%	3.1%	2.9%	3.6%	3.1%
Austria	20.3%	13.1%	8.2%	6.9%	4.9%	3.4%
Romania	3.1%	1.9%	1.5%	1.3%	1.1%	0.9%
Greece	9.8%	3.7%	3.2%	4.0%	3.3%	1.7%
Slovakia	10.8%	6.0%	3.9%	2.6%	4.0%	2.5%
Slovenia	20.9%	4.5%	11.6%	4.2%	4.1%	12.0%
Spain	11.3%	5.0%	4.3%	3.9%	4.4%	3.5%
Sweden	25.1%	15.6%	12.0%	8.1%	8.2%	5.1%

Source: CSO: Use of information and communication technologies in the business sector in 2024 - table part. Table 11.9

Explanation: Share of enterprises with ten or more employees in the total number of enterprises

Table 18:Use of AI technologies in selected areas by enterprises in EU27 countries

	enterprises using AI technologies in selected areas:				
	in marketing, sales	in organizational and administrative processes, management or HR	for cyber security	in the field of research and development, in innovation activities	in accounting, areas of finance
EU27	4.6%	3.7%	3.0%	2.5%	3.1%
Belgium	6.0%	9.5%	7.4%	6.3%	7.8%
Bulgaria	2.1%	2.0%	1.0%	1.2%	1.1%
Czech Republic	6.0%	5.3%	2.9%	2.5%	2.4%
Denmark	9.5%	6.8%	6.1%	3.5%	8.4%
Estonia	7.0%	6.9%	3.3%	3.3%	3.0%
Finland	9.2%	6.6%	5.6%	6.4%	6.6%
France	-	-	-	-	-
Croatia	3.1%	1.9%	2.7%	3.3%	1.0%
Ireland	5.6%	5.6%	3.9%	3.9%	3.4%
Italy	2.9%	2.3%	1.5%	2.0%	1.1%
Cyprus	3.6%	3.5%	2.5%	2.3%	1.5%
Lithuania	2.9%	2.6%	1.9%	2.8%	2.3%
Latvia	3.4%	2.9%	1.5%	1.8%	1.9%
Luxembourg	4.3%	6.2%	4.4%	4.3%	4.7%
Hungary	2.3%	1.3%	1.1%	1.3%	1.1%
Malta	6.5%	3.0%	5.0%	2.0%	1.2%
Germany	6.6%	4.7%	4.0%	2.2%	4.8%
Netherlands	8.9%	7.0%	4.8%	5.9%	5.5%
Poland	2.4%	2.2%	2.0%	1.4%	1.9%
Portugal	2.9%	3.2%	2.5%	2.1%	2.1%
Austria	9.6%	6.6%	3.7%	3.8%	5.6%
Romania	1.1%	0.9%	1.0%	0.7%	0.6%
Greece	1.7%	2.2%	4.8%	1.4%	1.0%
Slovakia	3.5%	1.4%	2.1%	2.0%	2.4%
Slovenia	6.8%	8.4%	12.9%	3.8%	5.3%
Spain	3.2%	3.2%	2.6%	2.7%	2.2%
Sweden	10.0%	6.3%	3.6%	4.5%	4.1%

Source: CSO: Use of information and communication technologies in the business sector in 2024 - tabular part. Table 11.9

Explanation: Share of enterprises with ten or more employees in the total number of enterprises

Table 19: Participation of the population aged 25-69 in non-formal ICT education (%)

	total		from work reasons	
	2016	2022	2016	2022
total	5.7	4.9	4.9	4.6
gender				
men	6.5	5.0	5.8	5.1
women	4.9	4.5	3.9	4.1
education:				
secondary school without school-leaving exam and lower	2.4	1.4	1.2	1.2
secondary school with a school-leaving exam	7.1	5.9	6.0	5.8
higher vocational and higher education	11.5	10.9	10.1	10.4

Source: CSO: Adult Education in the Czech Republic 2016, 2022, https://csu.gov.cz/produkty/vzdelavani-dospelych-v-ceske-republice-setreni-aes-2022, https://csu.gov.cz/produkty/vzdelavani-dospelych-v-ceske-republice-2016

Box 3: ESG report structure

Environment

Climate change
greenhouse gas emissions (carbon footprint)
efficient use of energy
clean energy (energy mix)

Pollution and waste
emissions of toxic gases and other substances
waste policy
handling and disposal of packaging materials

Recycling and circular economy principles

Water quality and water resources

Biodiversity and landscape character

Opportunity for the environment
clean technologies
green buildings
innovation and digitalization

Policies to protect the environment

Social

Human Resources
Employee care and recruitment policy
health and safety in the workplace
equal opportunities - diversity and inclusion
human rights
child and forced labour
staff training and development
well being a work-life balance
security of personal data

Other stakeholders

controversial sources
community relations
charity and philanthropy
supplier-customer relations
public education
consumer protection
product safety

Governance

Governance and Management
independence of leadership
management remuneration
shareholders' rights
enterprise culture
business ethics and code of ethics
tax transparency
fight against corruption and bribery
whistleblowing
risk management
internal controls and audit
structure of the audit committee
compliance

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Literature and resources

ageing.ox.ac.uk.

AIMTEC: Automatizace v logistice – od hardwaru k umělé inteligenci https://insights.aimtecglobal.com/automatizace-v-logistice-od-hardwaru-k-umele-inteligenci/?utm_medium=cpc&utm_source=google&utm_term=&utm_campaign=PER_SEA_DSA_CZ~DSA&hsa_acc=8926995911&hsa_cam=22132858286&hsa_grp=179177253288&hsa_ad=729264437667&hsa_src=g&hsa_tgt=dsa-2391713265973&hsa_kw=&hsa_mt=&hsa_net=adwords&hsa_ver=3&gad_source=1&gbraid=0AAAADlE1Eq3qiard1H_sdHPGyHdogXve&gclid=EAIaIQobChMIqMrG17D_jAMVz4toCR24ZQwlEAAYASAAEgL_7PD_BwE

Asociace malých a středních podniků a živnostníků ČR: Investice malých a středních podniků do IT https://www.amsp.cz/aktuality-a-multimedia/investice-malych-a-strednich-podniku-do-it

BCG & Evropa v datech (2023). *Analýza trhu práce 2030 (ČR)* – predikce úbytku a vzniku míst v důsledku automatizace. businessinfo.czbusinessinfo.cz.

Bito: Možnosti využití umělé inteligence v logistice. https://www.bito.com/cs-cz/odbornost/artikel/moznosti-vyuziti-umele-inteligence-ai-v-logistice/

BUSINESS World: Kdo je datový analytik, říjen 2024, číslo 5

BusinessINFO: Průzkum: Kybernetickým útokům v poslední době čelila každá čtvrtá firma. https://www.businessinfo.cz/clanky/pruzkum-kybernetickym-utokum-v-posledni-dobe-celila-kazda-ctvrta-firma/

BusinessINFO: Umělou inteligenci používá jen více než čtvrtina českých firem. https://www.businessinfo.cz/clanky/pruzkum-umelou-inteligenci-zatim-pouziva-jen-vice-nez-ctvrtina-ceskych-firem/

CEPR (2020). *Robots and the Gender Pay Gap in Europe* – studie vlivu robotizace na genderový mzdový rozdíl.cepr.orgcepr.org.

CEPR (2025). *AI, automation, and the rise of female employment in Europe* – výzkum dopadů AI na zaměstnanost žen v Evropě. cepr.org.

Česká asociace umělé inteligence: Evropská komise zveřejnila pokyn k zakázaným praktikám AI podle AI Act. https://asociace.ai/evropska-komise-zverejnila-pokyny-k-zakazanym-praktikam-ai-podle-ai-act/

Česká asociace umělé inteligence: Prognóza AI 2027: Hlavní zjištění a varování pro vývoj umělé inteligence. https://asociace.ai/prognoza-ai-2027-hlavni-zjisteni-a-varovani-pro-vyvoj-umele-inteligence/

České noviny: AI nahradí 80 % práce projektových manažerů. https://www.ceskenoviny.cz/zpravy/ai-nahradi-80-prace-projektovych-manazeru-behem-5-let-a-to-je-dobre-rika-zakladatel-easy-software/2666585?utm_source=rsspr&utm_medium=feed

ČNB (2024). *Vliv umělé inteligence na trh práce* – analýza dopadů AI na produktivitu, mzdy a nerovnost v ČR. cnb.czcnb.cz.

ČSÚ: Digitální ekonomika v číslech-2024. https://csu.gov.cz/produkty/digitalni-ekonomika-v-cislech-iecmll81wr,

ČSÚ: Informační společnost v číslech – 2025. https://csu.gov.cz/produkty/informacni-spolecnost-v-cislech-0s2jhpch3i

ČSÚ: Využívání informačních a komunikačních technologií v podnikatelském sektoru za rok 2024. https://csu.gov.cz/produkty/vyuzivani-informacnich-a-komunikacnich-technologii-v-podnikatelskem-sektoru-2024

Deloitte: Now decides next: Generating a new future. https://www2.deloitte.com/content/dam/Deloitte/us/Documents/consulting/us-state-of-gen-ai-q4.pdf

Divinová Jana: Kdo vlastní obchodní řetězce a které jsou české, in peníze.cz https://www.penize.cz/nakupy/431219-kdo-vlastni-obchodni-retezce-a-ktere-jsou-ceske-prehled

Druid (2025): The new normal in HR is agentic. White Paper. https://info.druidai.com/conversational-ai-hr-whitepaper .

EasyCargo: 5G síť umožní autonomní nákladní dopravu. https://www.easycargo3d.com/cs/blog/5g-sit-umozni-autonomni-nakladni-dopravu/

EasyCargo: Jak ovlivní příchod umělé inteligence logistiku a nákladní dopravu? https://www.easycargo3d.com/cs/blog/jak-ovlivni-prichod-umele-inteligence-logistiku-a-nakladni-dopravu/

Equal Times: Trade union strategies on artificial intelligence and collective bargaining on algorithms. https://www.equaltimes.org/trade-union-strategies-on

Esther Shein: Vrcholové vedení podniků se rozrůstá o lídry IT; in CIO Business World, květen 2024, číslo 3

EU (2024): Nařízení Evropského Parlamentu a Rady EU 2024/1689 (harmonizace pravidel pro umělou inteligenci). https://eur-lex.europa.eu/legal-content/CS/TXT/HTML/?uri=OJ:L_202401689#anx_II

EUROFOUND – Platform economy database

Eurostat database: Science, technology, digital society. https://ec.europa.eu/eurostat/data/database

Evropská komise: Akt o umělé inteligenci. https://digital-trategy.ec.europa.eu/cs/policies/regulatory-framework-ai

Florkin Julien: Umělá inteligence v dopravě. Umělá inteligence v dopravě: Revoluce v budoucnosti mobility

Fridrich Ebert Stiftung (2024): Collective bargaining practises on AI and algoritmic management in European services sectors. Collective Bargaining Practices on AI and Algorithmic Management in European Services sectors

Global Deal Flagship Report 2024: https://flagship-report.theglobaldeal.com/case-study/responsible-adoption-of-artificial-intelligence-through-collective-bargaining

Grafton (2024): Umělá inteligence v HR: Firmy novou éru vítají, zaměstnanci preferují osobní přístup. https://absl.cz/cs/news/umela-inteligence-v-hr-firmy-novou-eru-vitaji-zamestnanci-preferuji-osobni-pristup/

Halbrštát, J. (2023): Využití umělé inteligence v náboru zaměstnanců. https://www.manpowergroup.cz/vyuziti-umele-inteligence-v-naboru-zamestnancu/

Hospodářská komora ČR: Průzkum ukazuje potřebu posílit automatizaci a robotizaci v českých firmách. https://www.komora.cz/blog/tiskove-zpravy/pruzkum-ukazuje-potrebu-posilit-automatizaci-a-robotizaci-v-ceskych-firmach/

Hospodářská komora: Komorový barometr: automatizace, robotizace a umělá inteligence https://www.komora.cz/aktivity/setreni/#vysledky-setreni

HR forum: Dopad AI na zaměstnance a společnosti. https://www.hrforum.cz/aktuality/pruzkum-manpowergroup-dopad-ai-na-zamestnance-a-spolecnosti-66-spolecnosti-v-cr-naskocilo-na-vlnu-ai-a-plne-ji-vyuziva-nebo-to-brzy-planuje

ILO (2025). *Generative AI and Jobs: A Global Index of Occupational Exposure.* inc.com.

Inventi: Jak na plánování ve výrobní firmě https://www.inventi.cz/clanky/jak-na-ai-ve-vyrobni-firme

Labor Centre: Tech + Work Roundups. Policy and research updates related to technology and work. University of Berkley. https://laborcenter.berkeley.edu/roundups-on-tech-and-work-policy-and-research/

Lasserre, A.; Dobson, M. (2020): *AI in HR: The Opportunities, Risks and Ethical Considerations*. MIT Sloan Management Review.

ManpowerGroup: Index trhu práce. https://www.manpowergroup.cz/cr-naskocila-na-vlnu-ai/

MIT & Boston Univ. (2022). *Study on automation and wage inequality.* hrdive.com.

Národní strategie AI ČR (2019), mpo.cz

Národní vzdělávací fond: Dopady Průmyslu 4.0 na trh práce. In Marik, V. , Keil, R. a kol.: Průmysl 4.0 – Základ ekonomické transformace ČR. Management Press, 2024. ISBN 978-80-7261-604-6.

OECD (2019). *Prepping for tomorrow's job markets.* old.khk.cz.

OECD (2024). *Artificial intelligence and wage inequality. OECD Artificial intelligence papers. April 2024.* https://www.oecd.org/content/dam/oecd/en/publications/reports/2024/04/artificial-intelligence-and-wage-inequality_563908cc/bf98a45c-en.pdf .

Oxford Institute of Population Ageing (2023). *Are Older Workers Ready for an AI Takeover?* ageing.ox.ac.ukageing.ox.ac.uk.

PMI: Shaping the Future of Project Managment With AI. www.pmi.org

PSI Digital Bargaining Hub, https://publicservices.international/digital-bargaining-hub

Psychological testing in recruitment: The risks and rewards of using AI in HR. (2021). *Human Resources Magazine*.

SKLAD: Trendy v české logistice, https://www.sklad.cz/trendy2025/

Sloneek: Knihovna nejlepších AI promptů pro HR týmy. https://knowledgebase.sloneek.com/cs/hc/priklady-promptu-pro-ai-dle-modulu-v-aplikaci#pohovor

Toman Pavel: Umělá inteligence proměňuje sklady, roboti se v nich při práci sami učí. https://ekonom.cz/c1-67299020-umela-inteligence-promenuje-sklady-roboti-se-v-nich-pri-praci-sami-uci

UNI Database: https://www.uni-europa.org/news/a-database-of-ai-and-algorithmic-management-in-collective-bargaining-agreements/

UNI Europa (Union of workers in the services sectors), https://www.uni-europa.org/

Weforum: Creating Growth and Jobs for a New Era. https://www.weforum.org/meetings/world-economic-forum-annual-meeting-2024/themes/creating-growth-and-jobs-for-a-new-era/