DOI: 10.52694/LES.I/2025.4

Mariusz Miąsko
Faculty of Law, Nicolaus Copernicus Superior School
ORCID 0000-0003-0872-0486
biuro@viggen.pl

Research analysis on the impact of AI, robotics and autonomous systems on the labour market

Analiza badań nad wpływem AI, robotyki i systemów autonomicznych na rynek pracy

Abstract: The study titled "Research Analysis on the Impact of AI, Robotics, and Autonomous Systems on the Labour Market" offers a comprehensive synthesis and comparison of leading reports and analyses addressing the effects of artificial intelligence, robotics, and autonomous systems on the labour market. Based on multiple studies conducted in 2023, 2024, and 2025, the research aims to identify the general direction and implications of AI-driven changes in employment. The author critically evaluates the conclusions of many prominent reports, arguing that they underestimate the risk of a potential collapse of the global labour market. According to the study, while report authors may be aware of the alarming findings, they often avoid emphasising them – perhaps to prevent public panic. The publication maintains that, despite the emergence of new jobs in AI and cybersecurity, a severe global employment crisis is likely. The study also highlights the dual-use nature of AI technologies and explores strategic approaches for responding to their disruptive influence on labour markets worldwide.

Keywords: artificial intelligence, digital intelligence, labour law, impact of robots, labour market, autonomous systems

Streszczenie: Artykuł zatytułowany „Analiza badań nad wpływem sztucznej inteligencji, robotyki i systemów autonomicznych na rynek pracy" stanowi kompleksowe zestawienie i porównanie wiodących raportów i analiz dotyczących wpływu AI, robotów i systemów autonomicznych

na rynek pracy. Celem badania jest wskazanie ogólnego kierunku oddziaływania sztucznej inteligencji na rynek pracy, określonego na podstawie analizy szeregu raportów i badań przeprowadzonych w latach 2023, 2024 i 2025. Autor polemizuje z wnioskami wielu raportów, które – jego zdaniem – nie doceniają ryzyka związanego z możliwością załamania globalnego rynku pracy. W publikacji wyrażono opinię, że autorzy tych raportów często są świadomi niepokojących wyników swoich badań, jednak – być może w obawie przed wywołaniem globalnej paniki – nie eksponują w pełni płynących z nich wniosków. Mimo prognozowanego powstawania wielu nowych miejsc pracy związanych z sektorem sztucznej inteligencji i cyberbezpieczeństwa, autor wyraża przekonanie, że globalny kryzys na rynkach pracy jest nieunikniony.

Słowa kluczowe: sztuczna inteligencja, inteligencja cyfrowa, prawo pracy, wpływ robotów, rynek pracy, systemy autonomiczne

Introduction

It is now widely recognised that artificial intelligence is exerting — and will continue to exert — an impact on global, regional, and national labour markets. The media juggle selective information, out-of-context figures, and percentages drawn from numerous reports dedicated to the future of the labour market. From the selectively cited information, it is difficult to construct a coherent and reliable message outlining the future of the labour market in the age of AI[1]. There are several main reasons justifying the development of this study.

Firstly, numerous global, regional and national reports have been published. The research findings are often divergent or even contradictory, and the percentage results frequently differ significantly. This situation motivated me to attempt to identify directions and trends based on an analysis of numerous diverse reports. I considered it necessary to gather, process, and analyse as many of the most important global reports as possible. The study primarily focuses on the analysis of global trends, although in a few instances, it also refers to local or national examples (e.g., the USA or Poland).

[1] Artificial intelligence.

Secondly, when analysing the subject matter of individual reports, it becomes apparent that the reports often addressed various scopes of research. For example, one could argue that the WEF report did not cover certain forms of employment, such as 'self-employment' (primarily freelancers), of which there are estimated to be 1.2 billion worldwide. As a result, some reports fail to account for a large portion of the workforce who may potentially belong to the highest-risk group for job loss (e.g. the profession of copywriting, which is at risk from AI, may involve over 204 million people worldwide[2]).

Thirdly, even with a cursory analysis of the reports, it becomes evident that they attempt to introduce a reassuring narrative by comparing the number of jobs that may be eliminated due to AI with the forecasts for job creation. Such contrasts, although undoubtedly valuable, essentially reveal very little about local and regional labour market issues. What impact will newly created jobs in Asia or Africa have on the regional labour market in Europe and vice versa?

Fourthly, when analysing some leading reports, it can be observed that certain reports attempt to present the issue of job loss and forecasts for the creation of new jobs in a very simplified manner, without considering the individual human dimension – such as the age of the workers who lost their jobs and their ability to adapt to the demands of the new labour market. For a person aged, for example, 55, who has spent their entire life working as a customer advisor in a bank call centre, the creation of hundreds of thousands of jobs as AI or Big Data database experts is of little relevance, as their limited skill set and age-related constraints will prevent them from taking advantage of such opportunities in the labour market.

Fifthly, leading reports reliably indicate that job losses due to AI will mainly affect very attractive and relatively well-paid positions, while the newly created jobs will largely be in agriculture and forestry, and these will be seasonal, lower-paid, and less accessible in terms of location. Workers from Warsaw, Tokyo, New York, or London will have limited access to jobs in agriculture and forestry. The authors of the reports cannot be accused of manipulating data, but it is certainly noticeable that they do not highlight this issue. From the workers' perspective, what

[2] B. Ciesielski, *Jakie kraje przodują w tworzeniu treści? Popularność content writing na świecie,* https://contentwriter.pl/popularnosc-content-writingu-na-swiecie/ (accessed: 08.05.2025).

will be crucial is where and to what extent the new jobs will be accessible to them – not how many lower-paid, potential jobs will be created.

Sixthly, in public awareness, the impact of AI on the labour market has taken root, but the influence of robotics and autonomous systems that replace human workers is often overlooked. Some reports address this issue, while others almost completely overlook this aspect. I have tried to highlight the threats to the labour market posed by robotics and the development of autonomous systems that replace humans (e.g., autonomous truck driving systems, which could eliminate at least several million jobs worldwide).

Seventhly, most reports essentially do not address the issue of the uneven demand for workers due to the ageing of societies. The issue of job loss in the European Union may turn out to be less severe than in countries with a young workforce population. In EU countries, due to the ageing population, the impact of AI may be less severe than in countries with a young workforce, where there is an excess of workers and a shortage of jobs. Therefore, it is worth considering this issue in greater depth.

Eighthly, it is important to address the issue of job loss due to AI in the context of jobs in developed regions (e.g., EU countries) being taken over by potentially less skilled workers from less developed regions (e.g., India) Until now, many analysts have wrongly assumed that AI would lead to a complete disappearance of the demand for labour from Indian workers for global corporations due to the capabilities of AI. At the current stage of AI development, a completely opposite trend has emerged. Individual experiences indicate that jobs in highly developed countries are being taken over by workers from less developed countries, particularly from India, because AI compensates for the skill gaps of these workers in exchange for lower labour costs. This could certainly exacerbate problems in the labour markets of highly developed countries.

Ninthly, in the study, I also attempted to highlight the benefits for the labour market in the era of AI. In particular, we will discuss the new trends in job creation associated with the development of AI.

This study aims to present a broader perspective on the issue of the global labour market and regional labour markets than what is provided by the analysis of individual reports. The publication is divided into three main parts (excluding the introduction). In the first part, I conducted a case study of selected global companies and their differing concepts and

issues related to AI. In the second part of the publication, I presented key reports or analyses of the global labour market. I evaluated the results of the reports. In the third part, I provided a summary, which essentially stands in opposition to the narrative presented in some of the leading global reports.

To understand the scale and significance of the issue being analysed, it is worth referencing the McKinsey report[3] from 2023, which estimates that generative artificial intelligence could eventually automate up to 70% of tasks currently performed by workers. Additionally, analysts at Goldman Sachs[4] believe that one-quarter of all jobs in the USA and Europe could be completely replaced by AI. It should be noted that this trend began many years earlier as a result of "traditional" automation. However, automation caused neither a collapse in the global labour market nor in local labour markets. Robots perform the heaviest and most undesirable tasks on production lines, which were inherently low-paid. Traditional automation did not take away jobs from people in a socially destructive manner. It is therefore worth considering the differences between the rise of robotics and the rise of artificial intelligence.

The dynamics of AI, robotics, and autonomous systems development are enormous. Reports from just two years ago may be completely outdated today due to the rapid development of AI. The development of AI can be understood in two ways: a) as the growth of computational power, which is increasing at an unimaginable rate (new chips whose computational capabilities are thousands of times greater than previous ones, quantum computers[5], etc.); b) the enormous increase in the number of AI engines globally.

It is estimated that by 2025, 800 million AI applications[6] could be created worldwide, and that in the next 24 months, an additional 200 million AI applications will be added. Therefore, the annual increase amounts to 100 million applications per year (!). Currently, literally every person (regardless of profession and skills) can create "AI agents", which are

[3] McKinsey & Company, https://www.mckinsey.com/ – a global strategic and operational consulting firm (accessed: 08.05.2025).

[4] Goldman Sachs, https://www.goldmansachs.com/ (accessed: 08.05.2025).

[5] EY, *GenAI kontra Komputery Kwantowe,* https://www.ey.com/pl_pl/insights/digital-first/genai-kontra-komputery-kwantowe-ai-fy25 (accessed: 08.05.2025).

[6] M. Marczyński, *Czy dzięki ChatGPT w 2025 roku będziemy mieli na świecie 1 mld aplikacji?*, ITwiz, published on: 28.04.2023, https://itwiz.pl/czy-dzieki-chatgpt-w-2025-roku-bedziemy-mieli-na-swiecie-1-mld-aplikacji/ (accessed: 08.05.2025).

advanced AI tools based on existing AI engines, creating a new quality and performing unique, individually needed tasks with little or no human involvement. One does not need to have strict programming skills to create AI applications, which could negatively impact the job market for programmers. This is stated, among others, by Chamath Palihapitiya, the former Facebook Director[7]. Thus, AI is developing in three ways – on one hand, a massive number of new AI engines are being created; on the other hand, every person can assemble their own AI "agents" like building blocks to perform advanced AI tasks; and on the third hand, AI computational power is expanding dramatically. Taken together, this creates an entirely new quality that we have never encountered before.

At the same time, in addition to the threats to the job market, AI also creates enormous opportunities for micro, small, and medium-sized enterprises. Global reports almost completely overlook this fact, probably because the studies were often conducted among very large or large employers – which is a constraint of the research. AI may be the source of the loss of advantage for corporations over sole proprietorships or micro-enterprises. AI may be a source of job creation in the form of sole proprietorships. It is interesting whether national, regional, or global consortia consisting of micro-enterprises will be formed, working towards a common goal. It is possible that corporations in their current centralised form may cease to exist altogether. It is possible that cooperatives of micro-enterprises will replace them.

This publication seeks to answer the question of whether there are considerations for such directions in the labour market's development that are based on limiting or annihilating the role of large employers in favour of the massive growth of clusters of micro-enterprises utilising AI. This second direction seems highly likely, as, for the first time, an individual (a sole micro-entrepreneur) has access to massive computational power, almost on equal terms with large corporations.

[7] S. Gulina, *Były dyrektor Facebooka uważa, że nie warto uczyć dzieci programownai. Oto jego rady,* enroid, published on: 7.04.2025, https://android.com.pl/tech/912443-dyrektor-facebooka-co-warto-studiowac/ (accessed: 08.05.2025).

I have dedicated a significant portion of my academic, professional[8], and social work[9] to the development of AI, including organising international conferences on AI[10], publishing scientific papers, and giving interviews in the media on AI-related topics[11]. I have also developed many computer applications (nine applications) operating in the field of law, including two award-winning ones[12]. This publication is therefore based not only on the analysis of reports related to AI but also on my own professional and academic experience in the field of AI development. This publication was developed using several research methods: (critical) comparative analysis (desk research), case study analysis (focusing on selected companies and examples of AI implementation in economic practice), and elements of autoethnography, referring to the author's own experiences in the AI industry.

The publication presents a research hypothesis that the leading global reports on the impact of AI on the labour market do not reflect the actual level of risk concerning job loss. It is also hypothesised that within the next five years, the labour market may experience a radical collapse, leading to mass unemployment or the replacement of jobs with less attractive work, thereby lowering the standard of living for workers. Current reports tend to slightly manipulate global figures and fail to consider the social consequences of changes affecting individual workers, taking into account their place of residence, age, abilities, predispositions, job satisfaction, and other relevant factors.

Analysis of Selected Individual Cases

Conflicting information reaches the public through the media regarding the impact of AI on employment in enterprises, as exemplified

[8] Co-author of the official document "POLICY FOR THE DEVELOPMENT OF ARTIFICIAL INTELLIGENCE IN POLAND 2025-2030" within GRAI (Working Group on Artificial Intelligence under the Minister of Digital Affairs) Section for Current Artificial Intelligence Development Policy.

[9] Leader of the team for analyzing the impact of AI on the labor market within GRAI – the Working Group on AI Development in Poland.

[10] Member of the Organizing Committee and moderator of the panel at the international scientific conference organized by the Faculty of Legal Sciences at the Nicolaus Copernicus University in Warsaw, titled "Artificial Intelligence and Law" (April 9, 2024), during the largest scientific international Futurological Congress in Central Europe, „"FUTURIST OF THE YEAR 2024.".

[11] https://youtu.be/XtwPOBx5Umg (access: 08.05.2025)

[12] Award from IBM and an award from Euro Logistics for innovative computer applications. (access: 08.05.2025)

by the headline: "In August 2024, one of the Polish companies proudly announced the layoff of several hundred employees and replacing them with AI" ["Jedna z polskich firm w sierpniu 2024 r. dumnie ogłosiła zwolnienie kilkuset pracowników i zastąpienie ich AI"]. As of February 2025, the company's executives assert that in the era of AI, people are of paramount importance[13]. Indeed, the Polish company Klarna[14] eliminated several hundred positions in its customer service department; however, practice has revealed the shortcomings of contemporary AI systems and the necessity of rehiring employees. CEO Sebastian Siemiątkowski expressed the view that "in the world of AI, people will be the most valuable asset"[15]. Certainly, optimistic inferences can be drawn from this example. However, the key question to which we do not yet have an answer is: how long will AI be unable to replace humans due to technological limitations?

Another contrasting example could be the staffing policy of Singapore's largest bank, DBS, which announced plans to lay off 4,000 employees over the next three years[16] as a result of the implementation of AI systems. The bank had been preparing for employee layoffs for 10 years. During this time, the bank commissioned over 800 AI models, which were utilised in approximately 350 different processes within the bank's operations. This means that for some corporations, AI systems are not a novelty or a curiosity, but rather a long-term component of their strategic program. This is a crucial observation, as AI is often mistakenly treated as a temporary, fleeting novelty rather than a long-term element of employers' strategic plans. This also means that AI systems are mature and often fully capable of replacing humans in the workforce. DBS Bank plans to lay off up to 9,000 employees. Although the bank announces the hiring of 1,000 employees related to AI development, the balance remains significantly negative. The bank's declaration of replacing traditional banking employees with AI programmers is rather insincere or

[13] R. Rudnicki, *Polska firma wyrzuciła tysiące osób I zastąpiła ich AI. A teraz znów zatrudnia*, Komputer Świat, published on: 17.02.2025, https://www.komputerswiat.pl/aktualnosci/internet/polska-firma-wyrzucila-tysiace-osob-i-zastapila-ich-ai-a-teraz-znow-zatrudnia/fdex2g4 (accessed: 08.05.2025).

[14] Klarna website: https://www.klarna.com/pl/o-nas (accessed: 08.05.2025).

[15] Komputer Świat, *Polska firma zastąpiła pracownikó AI. Teraz się z tego wycofuje*, published on: 21.02.2025, https://isportal.pl/polska-firma-zastapila-pracownikow-ai-teraz-sie-z-tego-wycofuje/ (accessed: 08.05.2025).

[16] P. Czajkowski, *Gigant przestał zatrudniać programistów. Sztuczna inteligencja radzi sonie świetnie*, ITHARDWARE.PL, published on: 28.02.2025, https://ithardware.pl/aktualnosci/sztuczna_inteligencja_programista-39391.html (accessed: 08.05.2025).

naïve, as research indicates that one of the most at-risk sectors for layoffs is, in fact, programming. AI essentially handles programming tasks independently, effectively excluding professional programmers from the workforce. The example of DBS Bank is very valuable as it aligns with the findings from global research on the impact of AI on various professions. At DBS, the primary groups of employees who are losing their jobs are data analysts, customer service staff, and risk management analysts. The bank's experiences align with market analyses. It is worth noting that contrary to popular belief, AI has displaced jobs of individuals with intermediate and high qualifications.

The issue arising from the DBA experience should be viewed from a broader perspective. The Bank DBA is a leader in the banking sector in Asia and the Pacific, which means that other banks and financial institutions must take similar actions to avoid marginalisation in local markets and on the global market. Thus, the "arms race" of corporations primarily driven by financial results, where the prize is "survival" at the expense of employees, has already begun. The use of AI is no longer a novelty, nor a concept for functioning, but a necessary direction for survival.

A similar business strategy is being presented by the German newspaper Bild, which plans to lay off some editors, proofreaders, and graphic designers in favour of AI. This is expected to bring the company savings of around 100 million euros[17][18]. Similarly, IBM has announced that within a few years, AI will replace around 8,000 employees[19].

Another interesting example is the experience of the American company Salesforce[20], a leading producer of web-based business software and the creator of the Slack communication platform. The employer announced that by the end of 2025, they do not plan to hire new developers, as their role has been successfully taken over by AI systems, mainly through a significant increase in the productivity of the developers already employed. These explanations perfectly align with the results of

[17] Puls Biznesu, *Telegraph: najlepiej sprzedająca się niemiecka Gazeta zwalnia ludzi zastępując ich AI*, published on: 19.06.2023, https://www.pb.pl/telegraph-najlepiej-sprzedajaca-sie-niemiecka-gazeta-zwalnia-ludzi-zastepujac-ich-ai-1188420 (accessed: 08.05.2025).

[18] https://cyberdefence24.pl/biznes-i-finanse/bild-zwalnia-setki-osob-czesc-dziennikarzy-zastapi-sztuczna-inteligencja (accessed: 08.05.2025).

[19] https://l-a-b-a.pl/blog/454-7-zawodow-ktore-juz-powstaja-dzieki-sztucznej-inteligencji (accessed: 08.05.2025).

[20] https://ithardware.pl/aktualnosci/sztuczna_inteligencja_programista-39391.html (accessed: 08.05.2025).

studies on the effects of AI implementation in companies. Research has revealed that the use of AI increases employee efficiency and creativity by as much as several dozen per cent. This naturally reduces the demand for new employees. Salesforce CEO Mark Benioff claims that AI has proven to be "extremely effective", which is positively reflected in the economic results. The company has implemented a "cost-reduction strategy". It is symptomatic that the company did not implement a strategy of scaling profits by increasing the number of developers to achieve even higher profits; on the contrary, it introduced a strategy of saving and reducing jobs. "We do not plan to hire any new engineers this year – said Benioff during the announcement of the fourth-quarter results for 2024"[21]. Interestingly, the company's profitability increased by 30% and instead of allocating part of these profits to invest in human capital, the company is directing its profits towards AI development, at the cost of jobs. What projects is Salesforce currently working on? It plans to build an "intelligent agent" that will support both the company's employees and customers. This is a very important statement, as it means the company is essentially programming a "virtual employee". Thus, instead of hiring Homo sapiens, the company decided to design a predictable, replicable, and physically limitless "virtual employee". If such an approach may seem difficult for some to accept, it is worth mentioning even more extreme directions of AI development predicted by the company Mechanise, owned by economist Tamay Besiroglu (co-founder of the think tank Epoch). The company's actions are aimed at the full automation of the labour market and the complete replacement of human labour with robots and artificial intelligence engines[22]. Is this possible? In the near future? Many signs suggest that it is, as the company Ainos has developed new humanoids based on the AI Nose system, which combines the senses of hearing, sight, smell, and touch[23]. Even further in the direction of robotics is the Polish startup Clone Robotics, which in Wroclaw is developing a project for humanoid bio-robots under the leadership of Łukasz Koźlak. The

[21] P. Czajkowski, *Gigant…* op.cit.

[22] G. Kubera, *Jego firma chce zautomatyzować całą gospodarkę. Mamy żyć w dobrobycie I oddać pracę AI*, Business Insider, published on: 27.04.2025, https://businessinsider.com.pl/technologie/nowe-technologie/jego-firma-chce-zautomatyzowac-cala-gospodarke-mamy-zyc-w-dobrobycie-i-oddac-prace-ai/lt3ddyp (accessed: 08.05.2025).

[23] Rzeczpospolita, *Maszyny zyskają kolejny zmysł. To rewolucja w robotyce*, published on: 25.04.2025, https://cyfrowa.rp.pl/technologie/art42168441-maszyny-zyskaja-kolejny-zmysl-to-rewolucja-w-robotyce (accessed: 08.05.2025).

goal of the project is for the bio-robots to achieve full autonomy[24]. Thus, the automation of the labour market may soon significantly exceed our current perceptions of the role of robots based on AI engines.

Among the companies that are reducing their workforce, there are those doing it for profit maximisation, and those that AI has directly forced to eliminate jobs. An example of this is the educational service Chegg, which has essentially been "attacked" by AI and driven to the brink of bankruptcy. The Chegg service was almost wiped out (experiencing a considerable drop in viewership) because, according to the company's management, access to Chegg was "blocked" by AI Overviews, which led to dramatic declines in visits and revenue, and consequently, the threat of job losses[25]. This may be one of the first examples where an AI system itself "attacked" a competing employer, ultimately eliminating jobs at the competitor's company. Until now, businesses around the world have generally failed due to intellectual competition between humans. A new development is the elimination of jobs as a result of an AI system attacking the employer.

In summary, analysing selected case studies, several trends can be observed regarding the impact of AI on the labour market. The first trend shows a rather isolated return to hiring humans and limiting the use of AI. The second example is the opposite of the first; a bank that has invested 10 years in several hundred AI engines treats artificial intelligence as an alternative to hiring highly educated analysts, as well as a source of savings and a competitive business advantage. The third example shows an unprecedented situation in world history, where AI essentially attacked the jobs of another company. Based on these three extreme examples, it is difficult to draw definitive conclusions, but it was valuable to compare them in order to see the different perspectives on the impact of AI[26].

The analysis of individual cases, although interesting, does not constitute sufficient evidence for establishing trends regarding the impact of

[24] A. Serafinowicz, *"Syntetyczny człowiek". Oto Polski humanoidalny robot Protoclone*, android.com.pl, published on: 19.04.2025, https://android.com.pl/tech/918189-protoclone-polski-robot-jak-z-westworld/ (accessed: 08.05.2025).

[25] G. Kubera, *AI zniszczyła biznes edukacyjny tej firmy. Teraz pozywa Google'a*, Busines Insider, published on: 26.02.2025, https://businessinsider.com.pl/technologie/nowe-technologie/ai-zniszczyla-biznes-edukacyjny-tej-firmy-teraz-pozywa-googlea/x4wrb6v (accessed: 08.05.2025).

[26] D. Kotlorz (ed.), *Mikro- I makroekonomiczne aspekty rynku pracy w Polsce*, "Studia Ekonomiczne. Zeszyty Naukowe Wydziałowe Uniwersytetu Ekonomicznego w Katowicach", Katowice 2012, https://www.ue.katowice.pl/fileadmin/_migrated/content_uploads/SE_111.pdf (access: 08.05.2025).

AI on the labour market. From the presented examples, no far-reaching conclusions can be drawn, as at the current stage of awareness and social acceptance, chatbots may not be acceptable, but in just three years, the situation may be different. Moreover, the technology behind chatbots is developing so rapidly that some AI-based language models can no longer be distinguished from humans by scientists. Evidence supporting this assumption comes from a study conducted in March 2025 at the University of California, San Diego, which examined four language models (LLM[27]) of artificial intelligence. One of them "passed" the Turing test, meaning it was deemed indistinguishable from a human[28]. Thus, technology that imitates human conversation almost perfectly and is nearly indistinguishable is already available. Therefore, drawing general conclusions from individual experiences of employers who have used older AI models (LLMs) is interesting, but does not create a broader and more accurate picture. Key to assessing the future of the labour market will be identifying national, European, and global trends regarding the impact of AI on the job market, as well as attempting to confirm or refute the theses put forward by representatives of the largest and most influential global institutions. "The International Monetary Fund (IMF) predicts that AI will impact nearly 40% of jobs worldwide. Kristalina Georgieva, Managing Director of the IMF, warns that AI could deepen global inequalities, as automation primarily affects low-skilled workers"[29]. Analysing this statement, one could immediately counter that the examples of DBA, IBM, or Bild contradict the narrative that AI leads to the annihilation of low-skilled jobs, as in these corporations, it is primarily medium- and highly-skilled workers who are losing their jobs.

However, setting this issue aside (which will be developed later), it is noticeable that representatives of major institutions, when speaking about the effects of AI on the labour market, often seem to base their beliefs not on solid evidence, but rather on personal conviction — or even faith. An example might be Andrew Bailey, the Governor of the Bank

[27] LLM (Large Language Model) is a type of artificial intelligence (AI) algorithm that uses deep learning techniques and vast datasets to understand, summarise, generate, and predict new content.

[28] A. Serafinowicz, *AI przeszła test Turinga. Jeden model z cztereach skutecznie oszukał człowieka*, android.com.pl, published on: 16.04.2025, https://android.com.pl/tech/917825-test-turinga-zaliczony-przez-ai/ (accessed: 08.05.2025).

[29] iPolska24.pl, *Sztuczna inteligencja wkracza do bankowości: DBS zwolni 4000 pracowników*, published on: 25.02.2025, https://ipolska24.pl/sztuczna-inteligencja-wkracza-do-bankowosci-dbs-zwolni-4000-pracownikow,7128990677700032a (accessed: 08.05.2025).

of England, who – quote: "...remains moderately optimistic, claiming that AI will not be a 'mass destroyer of jobs', and that workers will learn to collaborate with new technologies"[30].

An issue as critical as maintaining social order and ensuring the ability to preserve jobs and sources of livelihood for a significant portion (and possibly nearly half) of the human population cannot be left to our personal optimism. This issue must urgently be addressed in scientific, political, and social discourse before it is too late—that is, before millions of unemployed people take to the streets in search of means to live with dignity.

What is crucial at this point is to ensure a dignified life – not merely the ability to survive. The right to human dignity is the most fundamental of all Human Rights. Therefore, the impact of AI on the labour market and social security systems must always be considered in the context of safeguarding the inherent right to human dignity – both of the individual and of humanity as a global collective.

It cannot be acceptable for an AI system to target the jobs of a competing company, thereby –in some sense – undermining the inherent right to work and the inherent right to dignity of both employees and employers. This is an unprecedented situation in the sense that, never before in the history of the world – during any previous wave of technological advancement – has any product of human thought independently attacked an entity it identified as a competitor, nor has it ever possessed the technical capability to do so. After the invention of the wheel, humanity was not attacked by the wheel. After the invention of the steam engine, no steam engine ever attacked humanity. Devices have been used by humans against other humans in the course of military, economic, and trade wars, but they have never had the ability to independently attack people, businesses, or workplaces — as happened with the educational service Chegg, which was attacked (blocked) by AI Overviews. Challenges are emerging that the world has never known before. Indeed, we have had many examples of cyberattacks using AI as a deliberate action initiated by humans, rather than through the autonomous decision-making of AI[31].

[30] Ibidem.

[31] Polski Instytu Ekonomiczny, *Rotacja pracowników w Polsce,* Working Paper 6/2023, A. Kiełczewska, I. Rozbicka (eds.), Warszawa 2023, https://pie.net.pl/wp-content/uploads/2024/03/WP-6_2023-Rotacja-pracownikow.pdf (accessed: 08.05.2025).

For the above reasons, it is important to understand the potential problem and forecast it, followed by determining a strategy for further actions with AI in the context of shaping the labour market, planning steps, and taking measures to minimise the negative effects of AI or promote its positive impact on the labour market.

Assessment of AI's impact on the global labour market through a comparative analysis of global, regional, and national research findings and reports

The basis of this publication is a comparative compilation of the results of several analyses, studies, reports, and publications conducted by institutions with international, regional, or national reach, particularly:

a) WEF_Future_of_Jobs_Report_2025;
b) PwC Global AI Jobs Barometer 2024;
c) Tony Blair Institute for Global Change 2024;
d) McKinsey Global Institute Report 2023;
e) Goldman Sachs Analysis 2023;
f) Future of Jobs Survey;
g) Future of Jobs Report 2020;
h) Gartner Marketing Practice 2024;
i) Nokia Bell Labs Study;
j) The Transformational Opportunity of AI on ICT Jobs;
k) Oxford Economics Report;
l) American Center for Mobility Analysis;
m) Report prepared by the UK Office for National Statistics;
n) OpenAI Article (non-peer-reviewed) – AI Skills Test;
o) Adecco Group and Beautiful.ai Study.

In many cases, it was difficult to directly conduct a comparative analysis of the results of the mentioned analyses and reports, as they often refer to different subject areas, entities, and timeframes. However, by analysing the results of studies from leading research centres, an attempt can be made to draw average conclusions and assessments that define the impact of AI on the labour market.

An analysis of professions most vulnerable to elimination in the labour market, based on the "Future of Jobs Report" (2025)

The "Future of Jobs Report"[32] identified 15 of the fastest disappearing professions: postal workers, bank tellers and related clerks, data entry workers, cashiers and ticket sellers, administrative assistants and secretaries, printers and related printing industry workers, accountants, bookkeeping and payroll workers, materials and inventory record-keepers, transport carriers and conductors, direct sales workers, street vendors and related occupations, computer graphic designers, appraisers, claims adjusters and investigators, legal workers, legal secretaries, telemarketers, etc.

Many of the professions listed are in decline due to the development of artificial intelligence. On the other hand, some of the least likely to disappear include jobs in sectors such as agriculture, forestry, or gastronomy. The "Future of Jobs Report" is largely based on findings from the World Economic Forum[33], which expresses the view that by 2030, automation and robotics could replace 20 million jobs in the manufacturing sector worldwide, and the number of workers in production positions will be reduced by as much as 30%. To a large extent, the takeover of human jobs by robotics can be linked to the development of AI. It is worth mentioning that the share of robots taking over human work has increased by 100% in recent years and it can be assumed that as a result of the development of AI, the scope of competences of robots will increase and this will accelerate the process of displacing people from their current jobs[34] [35].

[32] World Economic Forum, *Future of Jobs Report 2025,* Geneva, January 2025, https://reports.weforum.org/docs/WEF_Future_of_Jobs_Report_2025.pdf (accessed: 08.05.2025).

[33] Ibidem.

[34] Mikrokontroler.pl, *Globalne zagęszczenie robotów w fabrykach podwoiło się w ciągu siedmiu lat*, published on: 13.01.2025, https://mikrokontroler.pl/2025/01/13/globalne-zageszczenie-robotow-w-fabrykach-podwoilo-sie-w-ciagu-siedmiu-lat/ (accessed: 08.05.2025).

[35] Elektrotechnikinformatyk.pl, *Kolejna bariera pokonana. Na całym świecie pracuje już ponad 4 miliony robotów* przemysłowych, published on: 24.09.2024, https://elektrotechnikautomatyk.pl/artykuly/kolejna-bariera-pokonana-na-calym-swiecie-pracuje-juz-ponad-4-miliony-robotow-przemyslowych (accessed: 08.05.2025).

It is important to note at this point that a "robot" traditionally refers to a device performing a specific physical task[36]. However, in AI environments, the concept of "AI agent" has developed, which typically refers to a set of various programs based on AI engines, tailored to the individual needs of each person in a given job position. These agents automatically perform a range of tasks that may seem unrelated to each other (e.g. they analyse and read emails, interpret, select, process information related to invoices, direct and prepare them for payment, and after the payment is made, they report and conduct profitability analyses in order to ultimately plan a set of actions to reduce costs and increase profitability in the company). AI agents are an intermediate link between robots and AI applications. They can be considered "virtual robots". If we view the involvement of robots in the labour market in this way, the assumptions regarding the impact of AI and robotics on the labour market may be even less optimistic than the findings presented in the "Future of Jobs Report" by the WEF 2025. One could argue that the report overly reassures and even distorts reality, as it emphasises that the number of jobs, in total, will increase globally. However, the problem is that AI will take away attractive jobs from employees who are relatively well-educated and often older (as evidenced empirically in the examples presented earlier). The net increase in jobs will occur in less attractive, lower-paying professions or in regions of countries or the world far from the areas where workers have lost or will lose their jobs due to AI and robotics. This uncomfortable circumstance is either omitted or downplayed in the "Future of Jobs Report" by the WEF 2025. The fact that hundreds of thousands of low-paying and unattractive jobs will be created in Asia or Africa does not bring anything positive for the hundreds of thousands of workers who will lose well-paid jobs in Warsaw or New York. Therefore, presenting the WEF's data on the planned 14% net increase in total employment, which equates to 170 million jobs, is based on true analyses but simultaneously presents a false picture of the labour market from the perspective of the employee.

At the same time, the report indicates that 8% (i.e., 92 million) of current jobs will be eliminated due to AI and automation (which seems

[36] A robot is a technical device designed to perform certain manipulative and locomotive functions of a human, possessing a specific level of energy, information, and machine intelligence.. Machine intelligence is the autonomy of action in a certain environment. The block diagram of the robot has been presented here: https://robotyka.pl/1-3-pojecia-podstawowe-i-definicje/ (accessed: 08.05.2025).

drastically underestimated – as I've already mentioned regarding the number of jobs threatened, such as copywriters, etc.). A large number of attractive and well-paid jobs will be eliminated and largely replaced by less attractive jobs or, in some cases, attractive jobs requiring very high qualifications (e.g. database experts or cybersecurity specialists). As a result, attractive jobs will become increasingly exclusive and even elitist. Mainly middle-class jobs will be eliminated and replaced either by less attractive and lower-paid jobs or by elitist jobs requiring unique skills. This is a very concerning trend that the report seems to overlook. A 7% increase in employment is predicted, which means 78 million jobs, but these are either less attractive or, in some cases, unattainable for individuals who will lose their current jobs. The report points out that science is not keeping up with training in fields needed in the future and continues to "produce" employees for dying professions. I made the same observation in an interview for one of the key Polish newspapers[37]. I pointed out that, in my opinion, universities are mass-producing lawyers for whom, due to the development of AI, there will not be the same demand in the future as there is today[38].

The report indicates that the greatest consequences will be borne by workers in the developed parts of the world due to the higher average age of employees, who will have less time and greater difficulty adapting to the mass effects of radical changes in the labour market. It may appear that the Future of Jobs Report, based on its research findings, in my opinion, underestimates the risk arising from the effects of massive fluctuations – affecting millions – on the global labour market.

[37] B. Mejssber, *Jak AI wyręcza prawników?*, Rzeczypospolita, published on: 31.10.2025, https://pro.rp.pl/raporty-ekonomiczne/art41375831-jak-ai-wyrecza-prawnikow-w-ciagu-5-lat-przychody-wyzsze-o-30-proc (accessed: 08.05.2025).

[38] Bilans Kapitału Ludzkiego, *Polski rynek pracy – procesy I zjawiska. Na podstawie badan BKL 2021-2022*, Polska Agencja Rozwoju Przedsiębiorczości, Uniwersytet Jagielloński, Warszawa 2023, https://www.parp.gov.pl/storage/publications/pdf/Polski-rynek-pracy_procesy-i-zasoby_WCAG.pdf (accessed: 08.05.2025).

Analysis of Expectations and Trends in Enterprise Transformation Affecting the Labour Market Based on the Future of Jobs Survey (2025)

The Future of Jobs Survey[39] attempted to determine the effects of employer development through 2030 as a result of key technological advancements. Employers surveyed indicated that three technologies have the greatest impact on their enterprises – and indirectly on the labour market: robots (58%), energy storage (41%), and AI and information processing (86%). When these employer expectations are compared with current trends in the development of AI and AI-based robotics – namely the rise of AI agents and generative artificial intelligence (GenAI), which is expanding rapidly across multiple sectors of the economy – the implications for the labour market may be far more profound than the Future of Jobs Report suggests. The assumption that 92 million workers will lose their jobs over the next five years seems overly optimistic, as it fails to account for the accelerating pace of AI and robotics development. Clearly, the report does not consider the potential impact of future AI technologies that have not yet emerged, as they are still under development. However, the fact that over 100 million AI applications are created each year must have significant labour market consequences. The referenced reports and employer assessments also overlook the dramatic increase in AI's computational power and the emergence of new computing technologies such as quantum computing, among others. The report assumes that generative artificial intelligence will allow less qualified workers to perform "expert-level" tasks. In the short term, this may be true, but over the long term, AI will likely replace them entirely, as that is the core purpose and function of AI. AI exists to multiply human capabilities—executing tasks far faster, cheaper, and more efficiently than humans. An excellent example is the Indian company Dukaan, which, upon reaching a sufficient level of AI development, laid off 90% of its workforce. [40] What had previously limited the company from doing so were the technological shortcomings of AI. Once those barriers were

[39] World Economic Forum, *Future…,* op.cit.

[40] A. Skrzypek, *Dukaan zwolnił 90 procent zaspołu wsparcia klienta – zastąpiła ich Sztuczna Inteligencja*, ITbiznes.pl, published on: 12.07.2023, https://itbiznes.pl/technologie/dukaan-zwolnienia-sztuczna-inteligencja/ (accessed: 08.05.2025).

overcome, the employer eliminated human labour, which had become drastically less efficient. The company's owner stated that after replacing workers with AI, the time required to complete tasks dropped from 2 hours and 13 minutes to just 3 minutes and 12 seconds. Therefore, the assumption that AI will support low-skilled workers in the long term appears naïve from a purely technological standpoint. AI will no longer compete with humans – but with itself and its own limitations, which, in my view, it will continue to overcome at a staggering pace (at least as rapidly as it does today).

The report indicates that robotisation has seen a massive surge since 2020, growing by approximately 5-7% annually. In 2023, the average robot density reached 162 units per 10,000 employees — a 100% increase compared to seven years ago (!). The combination of robotisation and AI will drastically accelerate this trend, eliminating jobs.

Probably like never before in the history of the labour market, we are witnessing a convergence of technologies that are displacing workers. In the past, industrial revolutions (e.g. the steam revolution) stimulated job growth. The more technology there was, the greater the demand for workers in mines, steelworks, etc. The current trend is the opposite — AI and robotisation are directly reducing the role of human labour.

Autonomous vehicle technologies (e.g., in truck transportation) and drone systems are lowering the demand for drivers. It is likely just a matter of a few years before millions of drivers across Europe lose their jobs to autonomous systems integrated with AI. These systems have been successfully tested for many years. Once automated transport systems are implemented on a larger scale, several million drivers worldwide may lose their jobs. However, in this particular profession, the negative impact of AI and autonomous systems may be negligible or even positive, because – as shown by the IRU report[41] – the global transport industry is currently facing a severe shortage of drivers.[42] [43]

For reasons difficult to explain, the analysed reports overlook the professions of copywriters and content writers, who, according to the 2022

[41] IRU official website: https://www.iru.org/ (accessed: 08.05.2025).

[42] Polski Instytut Transportu Drogowego, *Zbliża się prawdziwe trzęsienie ziemi. W kilka lat odejdzie pół miliona kierowców*, published on: 13.12.2024, https://pitd.org.pl/pl/news/brak-kierowcow-uderzy-za-kilka-lat-zniknie-pol-miliona-truckerow (accessed: 08.05.2025)

[43] Ł. Kuś, *Na świecie pogłębia się problem braku kierowców zawodowych*, intermodalnews.pl, published on: 18.12.2023, https://intermodalnews.pl/2023/12/18/na-swiecie-poglebia-sie-problem-braku-kierowcow-zawodowych/ (accessed: 08.05.2025).

Payoneer Report, make up 8-10% of all freelancers – that is, as many as 123 million people in the labour market[44]. Other estimates suggest this number could be as high as 204 million.[45] The professions of copywriter and content writer are particularly vulnerable to the impact of AI and could be eliminated from the job market within just three years. Yet, they have not been included among the at-risk professions – perhaps because they fall under the category of freelancers. If just this one sector is "freed up" through AI-driven elimination of 100 million workers (which is over 100% more than the total expected job losses projected in the mentioned reports), the number of eliminated jobs would exceed the planned global job growth by 30%.

Based on professionally available information, an AI application aimed at replacing copywriters and content writers is currently in development. When we look at the expected effects of AI on the labour market from this perspective, we should not expect a mere labour market downturn, but rather an armageddon. The examples of drivers, copywriters, and content writers reveal the naivety of the assumptions in reports estimating job losses at only 92 million positions.

The Future of Jobs 2025 report predicts anticipated job growth in fields such as Big Data, FinTech, AI, machine learning, and cybersecurity. These are attractive professions, but inaccessible to the majority of workers who lack specialised qualifications. The report attempts to reassure by claiming: *"Both machines and humans could be significantly more productive by 2030 – performing more or higher-value tasks in the same or shorter time than they would have in 2025 – so any concern that people will 'run out of things to do' due to automation would be unfounded"*.

This creates an impression of internal contradiction. On the one hand, it claims that the net increase in jobs between 2025 and 2030 will amount to just 78 million positions, yet on the other, it ignores the rapidly accelerating impact of AI, robotisation, and automation. It fails to account for over 100 million professionals – including copywriters, content writers, and truck drivers – and makes an unjustified claim that fears about people "running out of things to do" due to automation are baseless.

[44] B. Ciesielski, *Ilu jest copywriterów? Rynek pisarski w liczbach*, contentwriter.pl, published on: 19.07.2023, https://contentwriter.pl/ilu-jest-copywriterow/ (accesseed: 08.05.2025).

[45] B. Ciesielski, *Jakie kraje przodują w tworzeniu treści? Popularność content writing na świecie*, contentwriter.pl, published on: 30.09.2024, https://contentwriter.pl/popularnosc-content-writingu-na-swiecie/ (accessed: 08.05.2025).

The real issue is not whether people will run out of things to do, but rather what kinds of jobs will remain, how well-paid they will be, and to what extent they will satisfy workers' ambitions and be attractive to them. In my opinion, the conclusions presented by the authors of these reports are unjustified in this respect, while the concerns are absolutely warranted. Evidence supporting the validity of these concerns can be found in the report itself. However, the authors seem to downplay their own alarming findings using semantic strategies – for example, the phrase "collaboration between AI and humans." Common sense dictates that the moment AI surpasses the competencies of a human employee, that person will be eliminated as an unnecessary and costly element – as demonstrated in the examples of the mentioned companies. This is confirmed by the most recent developments in the labour market in Kraków, where, in just the first quarter of 2025, ten large companies reported plans for collective layoffs of 1,877 employees due to the implementation of AI systems[46] – more than in the entire previous year. In addition to those ten companies, the hosting company USB, operating in Krakow, Wroclaw, and Warsaw, plans to lay off 1,200 employees for the same reason, while another Krakow-based company, HSBC, has announced the dismissal of 200 employees. If, in a single city, within one quarter, 2,000 highly qualified workers are losing their jobs due to AI developments, it is fair to speak of a troubling trend – contrary to the moderate optimism presented in the aforementioned WEF reports.

I have repeatedly conducted audits in very large enterprises or global corporations where the human factor has been almost entirely replaced by robots. Why should it be any different with the implementation of AI? The principles of economics and competition between businesses have not changed. What has changed are the tools for maximising employer profits, such as AI, robotisation and autonomous systems, which are the result of combining AI with robotics. The report reveals that: "All sectors are expected to see a reduction in the share of work tasks performed solely by humans by 2030, though they differ in terms of how much of that reduction will be due to automation versus augmentation and collaboration between humans and machines. Insurance and pension management, along with telecommunications, lead the automation

[46] M. Waluś, *Fala zwolnień grupowych w Krakowie*, wiadomości.onet.pl, published on: 5.04.2025, https://wiadomosci.onet.pl/tylko-w-onecie/turbulencje-na-rynku-pracy-w-krakowie-trend-bedzie-sie-utrzymywal/x2gp15n (accessed: 08.05.2025).

trend – it is expected that more than 95% of the reduction in human-only tasks in both sectors will result from deeper automation. On the other hand, nearly half of the proportional reduction of human-only tasks in the healthcare and medical services sector, as well as in government and public sectors, is expected to be driven by increased augmentation and collaboration between humans and machines. In four sectors – oil and gas, chemicals and advanced materials, financial services and capital markets, and electronics – automation is projected not only to reduce the share of all tasks currently performed solely by humans, but even reduce the share of tasks currently carried out through human-machine collaboration, resulting in a calculated "automation share" of over 100%, as illustrated in the figure". Analysing the content of the report, one gets the impression of 'newspeak' and an attempt to obscure the true state of affairs.

In my view, the current situation on the labour market is similar to the situation preceding the greatest crash caused by toxic mortgage loans in the U.S.[47], which shook the global economy and led to the collapse of key banks. This time, however, the scale of the crisis may be disproportionately greater. In the U.S., on the eve of the largest financial crisis, much like in today's WEF reports, the upcoming and obvious crisis was concealed by the magic of words such as: 'no bank has ever collapsed', 'the real estate market is safe', 'experts assure that securing loans with other unpaid mortgages is safe'. And then the financial market collapsed, triggering a global crash.

Analysing some of the WEF reports, one can have the exact same impression. Numbers and facts give way to the magic of words: "We hope for cooperation between humans and machines". However, this is just a meaningless phrase – a semantic manoeuvre – because neither machines nor company boards are willing or able, for economic reasons, to "cooperate with human workers" (as demonstrated by the examples I have provided). It is therefore worth checking whether the eliminated jobs have a real chance of being compensated by newly created positions resulting from the development of AI. What kind of workers are respondents to these reports expecting in the new robotised world, and which types of workers are least likely to face job cuts?

[47] Barbara Kalinowska, *The Crisis in the U.S. Subprime Mortgage* Market, Department of Investment and Real Estate, Faculty of Economic Sciences and Management, Nicolaus Copernicus University in Torun, 2008.

It is worth quoting a fragment of the report. In the future, the most valued competencies and traits will be: "(knowledge of) artificial intelligence and big data, networks and cybersecurity, technological skills, creative thinking, resilience, flexibility and agility, curiosity and lifelong learning, leadership and social influence, talent management, analytical thinking, environmental awareness, systems thinking, motivation and self-awareness, empathy and active listening, user experience and design, service orientation and customer care, teaching and mentoring, programming, marketing and media, resource and operations management, quality control, global citizenship, multilingualism, sensory processing abilities, reliability and attention to detail, reading, writing, and mathematics, manual dexterity, endurance, and precision".

One might argue that the traits listed above characterise the "ideal human" rather than a minimal set of skills and attributes needed to secure employment in the future. Yet people vary in their characteristics, abilities, competencies, and life circumstances. Such a collection of employer expectations, driven by the changing situation and the digital and robotic revolution, may lead to very strong social stratification.

An analysis of research from Indeed (the largest job search engine in the U.S.) and the Global Skills Taxonomy (WEF)

Generative AI has a particularly significant impact on the labour market. It currently enhances worker productivity and creativity, but it should be expected that in the future, as computational power and logic improve, AI will also take over some human competencies. Research and surveys by Indeed[48] and the Global Skills Taxonomy (WEF) indicate an increasing demand for workers who can operate in an AI-driven environment. However, it is also expected that over time, AI will increasingly absorb workers' skill sets. Analyses show that at this moment, "no skill has been rated as having a 'very high substitutability' by AI" (author's note). According to the report, the ability of GenAI to replace humans in performing any given skill – measured as a percentage of all detailed skills – has not been rated as "very high" in any skill group. An analysis

[48] Official website: https://pl.indeed.com/ (accessed: 08.05.2025).

conducted using GPT-4o, on a dataset of 2,800 skills (from the Indeed database, 2024) did not reveal a very high level of substitutability of human skills by AI (specifically GPT-4o).

However, in my opinion, many people mistakenly interpret the findings of the referenced study as reassuring. The study focused exclusively on the competencies of a single specific AI engine (while over 100 million AI applications are developed annually). Therefore, contrary to appearances, the study was very narrow, not only in scope but also methodologically. For instance, creating virtual "AI agents" using multiple tools (including GPT) could yield radically different observational outcomes. Moreover, the pace of development in applying this technology is immense, making it unreasonable to draw conclusions about the lack of full GPT AI substitution for a period longer than 12 months. This implies that the study does not allow for any long-term conclusions.

An analysis of the report "The Transformational Opportunity of AI on ICT Jobs" (2024) shows that as much as 66% of testing and quality assurance processes will be taken over by AI systems. This sector-specific report, published in July 2024 and focused on the ICT industry, highlights that at least 90% of positions in the ICT sector will undergo transformation due to AI. The report indicates significant risks to employment, stating: "Mid-level (40%) and entry-level (37%) employees – primarily responsible for management, UX design, testing, and quality—will be most affected by changes." According to forecasts, more than 60% of tasks in these sectors will undergo significant modifications. Furthermore, the report reveals that in ICT management, as much as 62% of all activities will require the use of AI, and in UX design, 66% of actions will depend on AI tools. As much as 66% of testing and quality assurance processes will be taken over by AI systems, effectively eliminating the need for traditional methods. The key phrase in the report is: "eliminating the need for traditional methods," which is, quite clearly, a euphemism and a form of corporate newspeak, as it essentially equates to eliminating the demand for the work of certain employees. The Transformational Opportunity of AI on ICT Jobs is yet another partial (sector-specific) report whose conclusions, in fact, contradict some of the general findings from reports such as the PwC Global AI Jobs Barometer 2024, as it

points to the possibility of mass job losses even among highly qualified professionals[49].

Analysis of the PwC Global AI Jobs Barometer Report (2024) – "We have not seen any reports suggesting that AI will not cause mass job losses worldwide". The PwC Global AI Jobs Barometer report presents the impact of artificial intelligence on jobs, wages, workers' skills, and their productivity. The PwC publication appears particularly valuable, as it is based on the analysis of half a billion job postings from 15 countries[50], which together account for over 30% of global GDP. The report confirms the findings of other analyses, indicating that artificial intelligence will have a particularly strong impact on the job market for financial analysts, customer service employees, and programmers. However, the report's most valuable findings concern the assessment of productivity growth resulting from the use of AI.

The report states that "Sectors more exposed to artificial intelligence are experiencing nearly five times (4.8x) greater productivity growth ('exposure to AI' means that artificial intelligence can be easily applied to certain tasks)." At the same time, "The number of AI-related job postings is growing 3.5 times faster than overall job postings. For every AI job posting in 2012, there are now seven such postings. In some markets, positions requiring AI skills come with a wage premium of up to 25%." The productivity gains driven by artificial intelligence could help many countries break out of a prolonged period of low productivity growth, leading to economic development, higher wages, and improved living standards. The skills demanded by employers are changing 25% faster in occupations most exposed to AI. To remain relevant in these roles, workers will need to demonstrate or acquire new skills".

The PwC Global AI Jobs Barometer 2024 appears to be particularly interesting because it presents the perspectives of both employers and employees in a very honest way. As has been noted, the report refers to sectors "exposed to artificial intelligence". This is a very fair approach to addressing the impact of AI on the job market.

[49] D. Zajdel, *Trójsektorowa struktura zatrudnienia w polskiej gospodarce jako miernik rozwoju (wybrane aspekty)*, Katedra Polityki Ekonomicznej, Uniwersytet Łódzki, https://www.ur.edu.pl/files/ur/import/Zeszyty/zeszyt-16/27.pdf (accessed: 08.05.2025).

[50] PWC, *AI-exposed sectors experience productivity surge as AI jobs climb and see up to 25% wage premium: PwC 2024 Global AI Jobs Barometer*, Press Release, May 21, 2024, https://www.pwc.com/gx/en/news-room/press-releases/2024/pwc-2024-global-ai-jobs-barometer.html (accessed: 08.05.2025).

The report openly presents AI not only as an opportunity for development but also as a potential threat to employment. According to the report's findings, "as many as 41% of managers and directors believe that the presence of AI will reduce the number of jobs in many companies". The report's key conclusion is that over 4 in 10 executives expect a decrease in employment within firms. Denis Machuel, CEO of Adecco, stated: "Almost all jobs will in some way be affected by AI" and "AI can be a job killer, but it can also be a job creator. Between the jobs created by AI and the jobs destroyed, we believe it will balance out".

Therefore, the question of maintaining a balance between jobs lost and jobs created comes down not to a rational assessment, but to the 'belief' of the Adecco CEO. It is hard to fully trust the sincerity of this statement, as someone holding such a high position in a leading global employment services company is certainly not naive.

The report very accurately notes that: "AI companies and those responsible for implementing the technology in their organisations like to promote the narrative that it will reduce the time employees spend on routine tasks, increase efficiency, and serve as a useful collaboration tool. However, we have not seen any reports suggesting that it will not result in mass job losses globally".

The PwC Global AI Jobs Barometer 2024 findings align with the studies from Beautiful.ai[51], which specialises in AI-assisted presentation software. According to these findings, nearly half of the 3,000 managers surveyed expressed hope that AI will replace employees with cheaper AI tools by 2024. Moreover, they believe AI will "create the opportunity to lower salaries" for current workers. In particular, 12% of the respondents admitted using AI "in hopes of reducing employment and saving on employee wages." The results of this survey are strikingly clear and suggest a trend where AI is seen as a tool for cost reduction, even at the expense of job security. Similarly, Adecco Group, the second-largest staffing agency in the world, conducted a survey of 2,000 executives from

[51] G. Kubera, *Najnowsze badaine dotyczące AI: praca będzie, ale będzie jej mniej*, COMPUTERWORLD.PL, published on: 6.04.2024, https://www.computerworld.pl/article/2512211/najnowsze-badanie-dotyczace-ai-praca-bedzie-ale-bedzie-jej-mniej.html?utm_source=chatgpt.com (accessed: 08.05.2025).

large global companies. The conclusion is straightforward: AI will lead to fewer jobs. The conclusion is simple. AI will lead to fewer jobs[52] [53].

Gartner's 2024 Report Analysis

Gartner's report forecasts that 95% of customer service interactions will be taken over by AI. A study conducted by the Gartner agency revealed extreme pessimism among employees in the marketing industry. The study showed that employees in this industry do not perceive AI-based new technologies as tools to assist their work, but rather as a threat to their jobs. "89% of surveyed marketers fear mass layoffs in their companies, with 87% of them expressing anxiety about the widespread use of generative artificial intelligence"[54][55]. Even more interesting are the results that indicate a lack of flexibility among employees. The Gartner study revealed that 55% of employees feel that their employers' expectations are mismatched with the original scope of the roles they held when they were hired. Additionally, 61% of employees stated in the study that they had experienced changes in the company's technological or internal processes over the past year. These concerns may somewhat indicate a lack of flexibility among employees and an unwillingness to adapt to new conditions. As someone with some life experience, living on the border of three realities: a) the fully analogue reality, b) the digital reality, c) the reality of artificial intelligence, and very soon, d) the humanoid reality. I vividly remember the resistance employees put up when the first computers were introduced in the geodesy department of one of the offices where I did my first professional job. For nearly 10 years, some employees boycotted the convenient and efficient computers on their desks in favour of archaic, several-decades-old analogue

[52] D. Przewoźnik, *Badanie Adecco – AI zmniejszy liczbę pracowników?*, ITReseller.pl, published.on: 5.04.2024, https://itreseller.pl/badanie-adecco-ai-zmniejszy-liczbe-pracownikow/ (accessed: 08.05.2025).

[53] M. Druś, *Adesso: dzięki sztucznej inteligencji firmy będą zatrudniały mniej ludzi*, Puls Biznesu, published on: 5.04.2024, https://www.pb.pl/adecco-dzieki-sztucznej-inteligencji-firmy-beda-zatrudnialy-mniej-ludzi-1212595 (accessed: 08.05.2025).

[54] J. Rusak, *Raport Gartnera: marketingowcy obawiają się AI. Czy słusznie?*, digitalized.pl, https://digitized.pl/raport-gartnera-marketingowcy-obawiaja-sie-ai-czy-slusznie/ (accessed: 08.05.2025).

[55] Eng. *generative artificial intelligence*, *generative AI*, *GenAI.* Generative artificial intelligence refers to AI models designed to generate new content in the form of written text, sound, images, or videos. It encompasses a range of AI tools used to generate text, images, videos, and other data through generative models, typically based on user-provided prompts. Generative AI models learn patterns and structures from input data, then generate new data with similar characteristics.

or electronic typewriters. Currently, when I analyse Gartner's research, I almost experience déjà vu. In 1995, I could barely turn on a computer and nothing beyond that, yet in 2013, I was a laureate of two prestigious awards in competitions, presenting two computer programs I developed and produced (including receiving an award in an IBM competition for the most innovative IT product being worked on at the time in Poland's IT sector). I mention this to provide a longer and broader perspective on the research results, drawing on past experiences from previous technological transformations. I do not diminish the significance of Gartner's findings in this area; on the contrary, I recognise their importance, but I also try to frame them within a wider context. I encourage readers of this publication to engage in deeper intellectual discourse, rather than focusing solely on the research's percentage results. It is clear that most employees would prefer to function in a comfort zone where there are no noticeable changes in their jobs, which is confirmed by further research indicating that 20% of employees in the marketing industry perceive "leadership instability in managerial positions." It is hard to avoid increased turnover in management positions, given that we are witnessing the greatest revolution since the transformation from the analogy to the digital reality. Employer management must keep up with the changes related to AI transformation, so turnover is not only inevitable but necessary for the benefit of the employees, as long as the intent of management is not a premeditated "attack" on jobs but rather the development of AI utilization models that will enhance the value (effectiveness) of employees.

The labour market is in a state of constant transformation – or a slow-moving revolution that occasionally accelerates. Nothing is permanent, and such is the nature of progress. An excellent example is the globally renowned magazine LIVE, published in print since 1883, which, due to the rise of the internet, effectively became a digital-only periodical after the year 2000, resulting in mass layoffs. Employee concerns may stem from overlapping variables, such as fatigue from successive transformations among some respondents, or a lack of creativity and comfort-driven attitudes among younger generations. For a segment of workers active on the labour market before 1994, this is yet another radical transformation. It's worth remembering that the internet was first introduced in Poland on August 17, 1991, but only became widely accessible in 1994 – just 20 years ago. Since then, there have been explosive technological changes

in sectors such as IT, computing, telecommunications, and others. The scale and pace of change can overwhelm a portion of the workforce. Therefore, it would be more interesting to conduct research identifying the sources of employees' concerns and how those concerns vary across different age groups. I do not fully share the opinion expressed by Iliana Hadjistanova, a director at Gartner Marketing Practice, who said that "the findings should set off red flags in the minds of Chief Marketing Officers" because "a mismatch between expectations and workloads may lead to increased exhaustion and burnout".

As someone born in 1975, I feel compelled to express the apparent view that work, in general, is tiring and leads to burnout – and that the working conditions employees currently enjoy are by far the best and most comfortable in the several decades of my life. Of course, this does not exempt us from recognising potential problems. Still, we should not demonise studies that indicate a sense of threat among employees, because a "sense" is an emotional state, not a factual one. Humans are emotional by nature, and evolution has conditioned them to fear – a trait that enabled survival in complex ecosystems. The mere fact that workers are worried is not in itself grounds for raising a red flag. A "red flag" should instead be raised by those managing employers, who must understand that, on the one hand, the use of AI is necessary to maintain competitive balance, and on the other hand, it is both rational and necessary to combine AI functions symbiotically with the human competencies of employees. If employer representatives in roles such as COO[56] fail to recognise in time that the use of AI cannot be in opposition to human labour, then sooner rather than later, they too may lose their own jobs.

Opinions based on studies suggesting that AI will "spare" the most creative, educated, and experienced employees seem naive. The example of the LIVE magazine contradicts this thesis, as technological changes reduced the demand for certain competencies. The mass elimination of specialist doctors performing oncological imaging diagnostics also disproves the idea that AI spares highly qualified individuals. It is not the level of qualification but the ability to apply AI that determines the elimination of jobs. This position is fully supported by Bill Gates, who

[56] Chief Operating Officer

claims that AI will fully cover shortages of doctors and teachers[57]. If AI will cover the shortages of doctors and teachers, then sooner or later it will eliminate them from the job market as a more expensive and slower link – just as has happened in companies like DBA, Bild, IBM, Dukaan and others.

At the top of the business ecosystem, humans have traditionally stood, but I believe that now, at the top of the ecosystem of some companies, will be the computational power of AI. In the long term, no one can feel safe, so it is important to emphasise, perhaps through legally enforced symbiosis between AI and humans. *De lege ferenda*, it should be considered to introduce legal regulations prohibiting the implementation of AI without simultaneously ensuring a specific ratio of symbiotic relationships between humans and AI. A similar situation exists in the area of environmental protection. For every tree cut down, we plant a new one. For every job position taken over by AI, a certain number of job positions should be created.

I am aware of both the necessity and the naivety of such a proposal, as it would lead to generating costs in countries that implement such solutions, and ultimately result in a lack of competitiveness in the global market. However, perhaps this concept should be raised at the UN forum and included in an international convention as a necessity to protect the global labour market in the context of safeguarding the human right to work and dignity.

It is difficult, however, to expect actions from employer management conditioned on symbiosis between employers and AI, as a Gartner study reveals that 63% of marketing leaders believe that "they lack the technical skills to effectively integrate and manage technologies within their specialisation. This means that over half of management does not understand how AI tools work, which consequently results in their failure to understand how AI could symbiotically interact with already employed workers.

[57] L. Chong Ming, *Brakuje lekarzy I nauczycieli? Bill Gates twierdzi, ze luki wypełni Sztuczna Inteligencja*, Business Insider, published on: 21.04.2025, https://businessinsider.com.pl/technologie/nowe-technologie/bill-gates-ai-zapewni-medyczne-iq-niedobory-znikna/h6496m8 (accessed: 08.05.2025).

Analysis of the sense of threat in the labour market, based on the McKinsey report (2023)

Very similar conclusions are drawn from the 2023 McKinsey report. The McKinsey Global Institute report suggests that AI could automate up to 70% of employee tasks. Although the report does not openly state this, it is obvious that such a conclusion cannot fail to affect the labour market. The report indicates that AI can take over repetitive tasks or tasks based on procedural patterns. In particular, the report points out that AI could automate 50% of administrative work. The report presents a highly debatable thesis that AI will take over tasks requiring minimal emotional intelligence because empathy, creativity, and emotional intelligence are human traits that are difficult for artificial intelligence to replicate. Therefore, healthcare, education, and tasks requiring complex human interactions are among those least likely to be replaced by machines, according to the creators of the report . This is partially true, but we must remember the strong development of behavioural AI engines, which engage in deep interaction with humans. It is worth noting behavioural AI engines (e.g. the AI application "James Walker" produced by Samurai Labs[58]) or AI applications used in medicine or financial consulting. One might get the impression that the report overestimates the role of human uniqueness, sensitivity, and creativity, when in fact, our behaviours boil down to learned empirical experiences

Analysis of reports from Goldman Sachs (2023), the University of Oxford, EY Poland, the American Center for Mobility, the UK Office for National Statistics, and the Tony Blair Institute for Global Change (2024) – divergent assessments of the level of task automation.

The Goldman Sachs report indicates that AI could perform 44% of tasks typically handled by legal assistants. Additionally, one-quarter of jobs in the US and Europe could be completely replaced by AI. At the same time, the same report highlights that AI leads to increased productivity and cost efficiency. Although the report does not directly link productivity and efficiency to job losses, the conclusions are clear. The report fairly points out that a reduction in job numbers should be

[58] Nicolaus Copernicus Superior School, *Patrycja Tempka I Samurai Labs – AI as an ally in the prevention of cyberbullying and suicice*, SGMK_Nicolaus Copernicus Superior School You Tube, published on: 19.06.2024, https://www.youtube.com/watch?app=desktop&v=zUN1bwVSBto (accessed: 08.05.2025).

expected in sectors particularly sensitive to profitability. Thus, it can be said that the conclusions apply to nearly the entire economy.

Assessments of the level of task automation by AI are highly divergent. For example, representatives from the University of Oxford argue that 47% of jobs in the US will be automated within 20 years due to cost savings. On the other hand, experts from EY Poland claim that AI will automate 5% of tasks performed in the US and 2.6% of tasks in Poland. According to the American Center for Mobility, autonomous vehicles alone in the US could replace 294,000 long-haul truck drivers.

The UK Office for National Statistics suggests that approximately 25.4% of positions for auditors and certified accountants are at high risk of automation. Meanwhile, the Tony Blair Institute for Global Change reports that the use of AI by British companies could save nearly a quarter of employees' working time in the private sector—equivalent to the annual output of 6 million workers. This certainly does not inspire a sense of security among employees.

Analysis of the OpenAI Article *(Non-Peer-Reviewed)* – AI Skills Test

At this point, it is natural to confront the findings presented in the previously cited reports with the opinion of a representative of AI developers – OpenAI. Before presenting OpenAI's position, it is worth noting that the article in question refers to a well-known but at the same time very narrow domain of AI. Therefore, overly broad conclusions should not be drawn from it.

Nonetheless, the publication offers a certain perspective and point of reference. The OpenAI publication challenges the thesis that AI will eliminate programmers from the labour market. The article describes a benchmark – an AI skills test. A tool called SWE-Lancer was developed to assess AI's ability to solve programming-related tasks. SWE-Lancer included 1,400 tasks and job orders from the American freelance platform Upwork. Three AI models were tested: OpenAI o1, OpenAI GPT-4o, Anthropic Claude 3.5 Sonnet. It is regrettable that the Chinese model DeepSeek was not included in the study. The models were tasked with fixing bugs in code and performing project management tasks. The results

showed that AI performed significantly worse than human programmers. However, one crucial aspect must be noted: during the test, the AI systems were denied access to the internet (from which they typically draw a large portion of their information). This makes the study scientifically interesting but entirely unrealistic, since in real-world conditions, AI routinely uses internet-based information. It's also unclear whether the human programmers were allowed internet access. Therefore, although this study is well-known and often cited as proof of human superiority over AI, it does not provide a full picture of AI's actual impact on the job market.

However, the results of the study in question should be compared with the findings of a study conducted by PARP and SWPS University (in cooperation with the Polish National Evaluation Unit), which compared the quality of analytical documents prepared by AI with their counterparts created by experts. The quality of the prepared analyses was evaluated across several categories, and in all of them, the analyses prepared by AI received higher ratings[59].

The above studies ultimately prove nothing more than the fact that in certain areas, AI is still less effective than humans, while in others, quite the opposite is true. The key difference, however, is that humans–specifically Homo sapiens–have undergone an evolutionary journey spanning between 200,000 and 300,000 years, whereas AI has had roughly 65 years of development (dating back to the research of Alan Turing, Charles Rosen, and John von Neumann). That said, serious advances in AI are often associated with the famous match between Garry Kasparov and IBM's Deep Blue. However, AI as we understand it today has only existed since around 2010, with milestones such as Apple's Siri in 2011, Google's DeepMind in 2016, OpenAI's GPT-1 in 2018, ChatGPT-3.5 in 2022, and the Polish BIELIK-11B-v2 system developed by AGH, among others.

It can therefore be assumed that, depending on the perspective, AI has been developing for anywhere between 15 and 65 years, and in this extremely short time, it has significantly surpassed human capabilities in many fields. Even in areas where it has not yet matched human abilities, this situation should be seen as temporary and transitional.

[59] Forum Akademickie, *Czy Ai pisze lepsze raporty niż eksperci?*, published on: 24.04.2025, https://forumakademickie.pl/badania/czy-ai-pisze-lepsze-raporty-niz-eksperci/ (accessed: 08.05.2025).

Analysis of professions emerging thanks to AI development – based on LinkedIn portal data (2023)

The administrators of LinkedIn reported that the number of job offers related to generative AI increased 36-fold compared to 2022. The dynamics are therefore enormous, although this does not mean it will compensate for the loss of jobs resulting from AI development. Among the professions of the future are expected to be: Prompt Engineer, Human-Machine Teaming Manager, AI Ethicist, AI Personality Designer[60], AI Biotechnology Engineer, Data Detective.

There will undoubtedly be significant demand for specialists in the field of cybersecurity. For example, Poland has announced a national "cyber shield" development project, which over the coming years will cover thousands of public institutions, generating a demand for experts in this field. However, it is difficult to assume that the demand for cybersecurity specialists will significantly offset the loss of jobs such as office clerks, graphic designers, bank analysts, or customer service employees.

It is also worth noting that the development of robotics may lead to increased demand for programmers and robotics engineers (back-end semiconductors). This is indicated, for example, by the assumptions of Poland's Ministry of Digital Affairs (which forecasts a 20% employment increase in this sector), as well as by research conducted by K+Research and Trumpf Huettinger.[61]

Moreover, an important aspect that is likely significantly underestimated – and that could have a major impact on increasing the labour market – is the strong development of AI among micro, small, and medium-sized enterprises. Paradoxically, AI could level the playing field between large corporations and micro-enterprises, as access to computing power may be similar, and the efficiency of AI use – driven by economic motivation and the greater amount of time dedicated to task execution – could be

[60] Rana El Kaliouby, founder of Affectiva – an American company specialising in AI-based software – claims that personalised systems resembling living humans are becoming increasingly important. According to her, such interaction between humans and machines will become the norm in the near future. Communication with AI will take on a more "human" character.

[61] M. Madejski, *Ta branża może stworzyć miejsca pracy dla polskich programistów*, Business Insider, published on: 25.04.2025, https://businessinsider.com.pl/gospodarka/ta-branza-moze-stworzyc-miejsca-pracy-dla-polskich-programistow/r63qhb9 (accessed: 08.05.2025).

much higher among owners of small, one-person businesses than among employees of large corporations.

Summary

The analysis of the referenced reports revealed that many leaders of international organizations and corporations are aware of the threats posed by the technological revolution. Some leading companies are participating in projects aimed at developing new competencies for employees at risk of losing their jobs. An excellent example of such an important initiative is the Skills First project (under the patronage of the World Economic Forum – WEF). Dozens of the world's largest corporations (employers) are involved in the project. The idea behind the project is to raise awareness and highlight the necessity for both employers and employees to keep pace with the global digital transformation. The project serves as evidence that the executives of leading corporations are aware of the urgent need to change competencies in the labor market.

When comparing the findings of various reports and studies, one can encounter the view that AI does not pose an excessive threat to humanity, including the labour market. This is due, among other reasons, to the fact that AI lacks self-determination—it cannot make decisions that are destructive to humans or the labour market. Researchers have long been intrigued by the question: Can algorithms become conscious and have emotions? Tom Whipple, science editor at The Times, explored this issue in an article titled: *"What if robots start feeling sad? What if it's our fault?* Scientists claim that humanity must prepare for the possibility that AI machines may become conscious beings. Whipple aptly quotes Robert Long, Executive Director of the research organisation Eleos AI, who stated: "Evolution did not aim to create conscious beings; it aimed to create beings that survive and reproduce. Consciousness emerged as a byproduct of navigating and thinking about the world." Now, Long suggests, machines could break free—and evolve even without human programming. This is far from an isolated opinion. A similar position is held by DeepMind, a company owned by Google and a pioneer in developing next-generation AI known as Artificial General Intelligence (AGI). In simplified terms, the company claims that by 2030, AI could exist on the market with capabilities nearly equal to, and in many areas

far surpassing, human abilities. This would further accelerate the dynamics of change in the labour market.

In conclusion, it seems necessary to urgently begin a discussion about mitigating the impact of AI on the labour market. A strategy must be developed to protect employment from the consequences of AI's influence. In this context, legislative initiatives at national, regional, and global levels appear unavoidable. AI's potentially destructive impact on the labour market could lead to economic collapse, irreversible social and economic consequences, the breakdown of social security systems, and the collapse of universal access to healthcare services, among others.

It may be time to seriously consider implementing a form of "AI taxation" to ensure the liquidity of social insurance and welfare systems. Even if the "worst-case scenario" does not come to pass, we must assume its possibility and prepare accordingly – this is a sign of responsibility and maturity.

AI systems will likely present a tremendous opportunity for self-employed individuals and micro-enterprises. Access to vast computing power could level the playing field between micro businesses and large corporations – but only on the condition that corporations do not restrict access to computational resources. This is impossible to predict with certainty today, but as a precaution, it is essential to begin intense efforts to safeguard the future of millions of workers against the potential adverse effects of AI.

Bibliography

Reports and analyses:

World Economic Forum, *Future of Jobs Report 2025*

PwC, *Global AI Jobs Barometer 2024*

Tony Blair, *Institute for Global Chabge 2024*

McKinsey, *Global Institute Report 2023*

Goldman Sachs, *Analysis 2023*

World Economic Forum, *Future of Jobs Report 2020*

Gartner, *Marketing Practice 2024*

The Transformational Opportunity of AI on ICT Jobs, July 2024

Reports of Oxford Economicst, Nokia Bell Labs

Analysis of American Center for Mobility

Report prepared by the UK Office for National Statistics

OpenAI Article (non-peer-reviewed) – AI Skills Test

Adecco Group and Beautiful.ai Study

Bilans Kapitału Ludzkiego, *Polski rynek pracy – procesy i zjawiska. Na podstawie badan BKL 2021-2022*, Polska Agencja Rozwoju Przedsiębiorczości, Uniwersytet Jagielloński, Warszawa 2023, https://www.parp.gov.pl/storage/publications/pdf/Polski-rynek-pracy_procesy-i-zasoby_WCAG.pdf (accessed: 08.05.2025).

Internet sources

Chong Ming L., *Brakuje lekarzy I nauczycieli? Bill Gates twierdzi, ze luki wypełni Sztuczna Inteligencja*, Business Insider, published on: 21.04.2025, https://businessinsider.com.pl/technologie/nowe-technologie/bill-gates-ai-zapewni-medyczne-iq-niedobory-znikna/h6496m8 (accessed: 08.05.2025).

Ciesielski B., *Ilu jest copywriterów? Rynek pisarski w liczbach*, contentwriter.pl, published on: 19.07.2023, https://contentwriter.pl/ilu-jest-copywriterow/ (accesseed: 08.05.2025).

Ciesielski B., *Jakie kraje przodują w tworzeniu treści? Popularność content writing na świecie*, contentwriter.pl, published on: 30.09.2024, https://contentwriter.pl/popularnosc-content-writingu-na-swiecie/ (accessed: 08.05.2025).

Cyberdefence24.pl, https://cyberdefence24.pl/biznes-i-finanse/bild-zwalnia-setki-osob-czesc-dziennikarzy-zastapi-sztuczna-inteligencja (accessed: 08.05.2025).

Czajkowski P., *Gigant przestał zatrudniać programistów. Sztuczna inteligencja radzi sobie świetnie*, ITHARDWARE.PL, published on: 28.02.2025, https://ithardware.pl/aktualnosci/sztuczna_inteligencja_programista-39391.html (accessed: 08.05.2025).

Druś M., *Adesso: dzięki sztucznej inteligencji firmy będą zatrudniały mniej ludzi*, Puls Biznesu, published on: 5.04.2024, https://www.pb.pl/adecco-dzieki-sztucznej-inteligencji-firmy-beda-zatrudnialy-mniej-ludzi-1212595 (accessed: 08.05.2025).

Elektrotechnikinformatyk.pl, *Kolejna bariera pokonana. Na całym świecie pracuje już ponad 4 miliony robotów przemysłowych*, published on: 24.09.2024, https://elektrotechnikautomatyk.pl/artykuly/kolejna-bariera-pokonana-na-calym-swiecie-pracuje-juz-ponad-4-miliony-robotow-przemyslowych (accessed: 08.05.2025).

EY, *GenAI kontra Komputery Kwantowe*, https://www.ey.com/pl_pl/insights/digital-first/genai-kontra-komputery-kwantowe-ai-fy25 (accessed: 08.05.2025).

Forum Akademickie, *Czy AI pisze lepsze raporty niż eksperci?*, published on: 24.04.2025, https://forumakademickie.pl/badania/czy-ai-pisze-lepsze-raporty-niz-eksperci/ (accessed: 08.05.2025).

Gulina S., *Były dyrektor Facebooka uważa, że nie warto uczyć dzieci programownai. Oto jego rad*y, endroid, published on: 7.04.2025, https://android.com.pl/tech/912443-dyrektor-facebooka-co-warto-studiowac/ (accessed: 08.05.2025).

Interview – Mariusz Miąsko, prof. SGMK, Scientific Congress "AI&EDU", published on: 12.07.2024, https://youtu.be/XtwPOBx5Umg (accessed: 08.05.2025).

iPolska24.pl, *Sztuczna inteligencja wkracza do bankowości: DBS zwolni 4000 pracowników*, published on: 25.02.2025, https://ipolska24.pl/sztuczna-inteligencja-wkracza-do-bankowosci-dbs-zwolni-4000-pracownikow,7128990677700032a (accessed: 08.05.2025).

Komputer Świat, *Polska firma zastąpiła pracownikó AI. Teraz się z tego wycofuje*, published on: 21.02.2025, https://isportal.pl/polska-firma-zastapila-pracownikow-ai-teraz-sie-z-tego-wycofuje/ (accessed: 08.05.2025).

Kubera G., *AI zniszczyła biznes edukacyjny tej firmy. Teraz pozywa Google'a*, Busines Insider, published on: 26.02.2025, https://businessinsider.com.pl/technologie/nowe-technologie/ai-zniszczyla-biznes-edukacyjny-tej-firmy-teraz-pozywa-googlea/x4wrb6v (accessed: 08.05.2025).

Kubera G., *Jego firma chce zautomatyzować całą gospodarkę. Mamy żyć w dobrobycie i oddać pracę AI*, Business Insider, published on: 27.04.2025, https://businessinsider.com.pl/technologie/nowe-technologie/jego-firma-chce-zautomatyzowac-cala-gospodarke-mamy-zyc-w-dobrobycie-i-oddac-prace-ai/lt3ddyp (accessed: 08.05.2025).

Kubera G., *Najnowsze badanie dotyczące AI: praca będzie, ale będzie jej mniej*, COMPUTERWORLD.PL, published on: 6.04.2024, https://www.computerworld.pl/article/2512211/najnowsze-badanie-dotyczace-ai-praca-bedzie-ale-bedzie-jej-mniej.html?utm_source=chatgpt.com (accessed: 08.05.2025).

Kuś Ł., *Na świecie pogłębia się problem braku kierowców zawodowych*, intermodalnews.pl, published on: 18.12.2023, https://intermodalnews.pl/2023/12/18/na-swiecie-poglebia-sie-problem-braku-kierowcow-zawodowych/ (accessed: 08.05.2025).

Laba. International Business School, *7 zawodów, które powstają dzięki sztucznej inteligencji*, https://l-a-b-a.pl/blog/454-7-zawodow-ktore-juz-powstaja-dzieki-sztucznej-inteligencji (accessed: 08.05.2025).

Madejski M., *Ta branża może stworzyć miejsca pracy dla polskich programistów*, Business Insider, published on: 25.04.2025, https://businessinsider.com.pl/gospodarka/ta-branza-moze-stworzyc-miejsca-pracy-dla-polskich-programistow/r63qhb9 (accessed: 08.05.2025).

Mejssber B., *Jak AI wyręcza prawników?*, Rzeczypospolita, published on: 31.10.2025, https://pro.rp.pl/raporty-ekonomiczne/art41375831-jak-ai-wyrecza-prawnikow-w-ciagu-5-lat-przychody-wyzsze-o-30-proc (accessed: 08.05.2025).

Marczyński M., *Czy dzięki ChatGPT w 2025 roku będziemy mieli na świecie 1 mld aplikacji?*, ITwiz, published on: 28.04.2023, https://itwiz.pl/czy-dzieki-chatgpt-w-2025-roku-bedziemy-mieli-na-swiecie-1-mld-aplikacji/ (accessed: 08.05.2025).

Mikrokontroler.pl, *Globalne zagęszczenie robotów w fabrykach podwoiło się w ciągu siedmiu lat*, published on: 13.01.2025, https://mikrokontroler.pl/2025/01/13/globalne-zageszczenie-robotow-w-fabrykach-podwoilo-sie-w-ciagu-siedmiu-lat/ (accessed: 08.05.2025).

Polski Instytut Transportu Drogowego, *Zbliża się prawdziwe trzęsienie ziemi. W kilka lat odejdzie pół miliona kierowców*, published on: 13.12.2024, https://pitd.org.pl/pl/news/brak-kierowcow-uderzy-za-kilka-lat-zniknie-pol-miliona-truckerow (accessed: 08.05.2025)

Puls Biznesu, *Telegraph: najlepiej sprzedająca się niemiecka Gazeta zwalnia ludzi zastępując ich AI*, published on: 19.06.2023, https://www.pb.pl/telegraph-najlepiej-sprzedajaca-sie-niemiecka-gazeta-zwalnia-ludzi-zastepujac-ich-ai-1188420 (accessed: 08.05.2025).

Robotyka.pl, Machine intelligence – 1.3 Pojęcia podstawowe i definicje, https://robotyka.pl/1-3-pojecia-podstawowe-i-definicje/ (accessed: 08.05.2025).

Rudnicki R., *Polska firma wyrzuciła tysiące osób I zastąpiła ich AI. A teraz znów zatrudnia*, Komputer Świat, published on: 17.02.2025, https://www.komputerswiat.pl/aktualnosci/internet/polska-firma-wyrzucila-tysiace-osob-i-zastapila-ich-ai-a-teraz-znow-zatrudnia/fdex2g4 (accessed: 08.05.2025).

Rusak J., *Raport Gartnera: marketingowcy obawiają się AI. Czy słusznie?*, digitalized.pl, https://digitized.pl/raport-gartnera-marketingowcy-obawiaja-sie-ai-czy-slusznie/ (accessed: 08.05.2025).

Rzeczpospolita, *Maszyny zyskają kolejny zmysł. To rewolucja w robotyce*, published on: 25.04.2025, https://cyfrowa.rp.pl/technologie/art42168441-maszyny-zyskaja-kolejny-zmysl-to-rewolucja-w-robotyce (accessed: 08.05.2025).

Serafinowicz A., *AI przeszła test Turinga. Jeden model z cztereach skutecznie oszukał człowieka*, android.com.pl, published on: 16.04.2025, https://android.com.pl/tech/917825-test-turinga-zaliczony-przez-ai/ (accessed: 08.05.2025).

Serafinowicz A., "*Syntetyczny człowiek". Oto Polski humanoidalny robot Protoclone*, android.com.pl, published on: 19.04.2025, https://android.com.pl/tech/918189-protoclone-polski-robot-jak-z-westworld/ (accessed: 08.05.2025).

Skrzypek A*., Dukaan zwolnił 90 procent zaspołu wsparcia klienta – zastąpiła ich Sztuczna Inteligencja*, ITbiznes.pl, published on: 12.07.2023, https://itbiznes.pl/technologie/dukaan-zwolnienia-sztuczna-inteligencja/ (accessed: 08.05.2025).

Waluś M., *Fala zwolnień grupowych w Krakowie*, wiadomości.onet.pl, published on: 5.04.2025, https://wiadomosci.onet.pl/tylko-w-onecie/turbulencje-na-rynku-pracy-w-krakowie-trend-bedzie-sie-utrzymywal/x2gp15n (accessed: 08.05.2025).

YouTube.com, *Patrycja Tempka I Samurai Labs – AI as an ally in the prevention of cyberbullying and suicice*, SGMK_Nicolaus Copernicus Superior School, published on: 19.06.2024, https://www.youtube.com/watch?app=desktop&v=zUN1bwVSBto (accessed: 08.05.2025).

Literature

Kalinowska B., *The Crisis in the U.S. Subprime Mortgage Market*, Department of Investment and Real Estate, Faculty of Economic Sciences and Management, Nicolaus Copernicus University in Torun, 2008.

Kotlorz D. (ed.), *Mikro- i makroekonomiczne aspekty rynku pracy w Polsce*, "Studia Ekonomiczne. Zeszyty Naukowe Wydziałowe Uniwersytetu Ekonomicznego w Katowicach", Katowice 2012, https://www.ue.katowice.pl/fileadmin/_migrated/content_uploads/SE_111.pdf (access: 08.05.2025).

Polski Instytu Ekonomiczny, *Rotacja pracowników w Polsce*, Working Paper 6/2023, A. Kiełczewska, I. Rozbicka (eds.), Warszawa 2023, https://pie.net.pl/wp-content/uploads/2024/03/WP-6_2023-Rotacja-pracownikow.pdf (accessed: 08.05.2025).

Przewoźnik D., *Badanie Adecco – AI zmniejszy liczbę pracowników?*, ITReseller.pl, published.on: 5.04.2024, https://itreseller.pl/badanie-adecco-ai-zmniejszy-liczbe-pracownikow/ (accessed: 08.05.2025).

Zajdel D., *Trójsektorowa struktura zatrudnienia w polskiej gospodarce jako miernik rozwoju (wybrane aspekty)*, Katedra Polityki Ekonomicznej, Uniwersytet Łódzki, https://www.ur.edu.pl/files/ur/import/Zeszyty/zeszyt-16/27.pdf (accessed: 08.05.2025).