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AI AND AUTOMATION IN IT: SHAPING FUTURE JOBS AND SKILLS

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ABSTRACT

Purpose: *Amid the new developments in AI and Automation across the globe, it is noteworthy that the IT industry in Poland also shows growing trends in the applications of AI and automation technologies in the IT sector. It has shown that these trends have impacted on the labor market conditions in the IT industry in Poland.*

Need for the study: *Hence, this paper aimed at resolving the research problem of what are the impacts of artificial intelligence (AI) and automation on employment structures, job roles, and new skill requirements in the IT industry in Poland? In resolving this problem, the authors questioned the emerging new competencies and workforce perceptions in the IT industry, while assessing how education and HR strategies to be adapted to prepare for such future labor market trends in the IT industry in Poland.*

Methodology: *This research employed a mixed-methods approach that combined a review of scientific literature and global reports that present research results on the phenomenon in question as well as analyzed data, gathered qualitatively using in-depth interviews, held with the experts in the IT industry in Poland. This approach allowed the authors to obtain a greater understanding of context-specific trends and events around the phenomenon in question. The results revealed that AI and automation have impacted on the employment structures, new skills, and reskilling, changing job roles and organizational priorities, and redefining workforce expectations.*

Findings: *Further, the study presented the importance of proactive adaptation, redesigning education systems, and shaping hybrid skill sets that integrate technological proficiency with human-centric competencies. Last, the authors argued that fostering a synergistic partnership between human talents and AI technologies is essential to building a resilient, inclusive, and future-ready labor market.*

Practical Implications: *This will implicate in demanding continuous learning and digital fluency to equip the workforce with AI-driven competences and job structures, ensuring sustainable and inclusive employment growth. Importantly, this will create a critical need from the state for appropriate changes in relevant Acts and legal regulations.*

Keywords: Artificial Intelligence, Automation, Labor market trends, IT industry in Poland, Employment structures and reskilling, and Digital literacy.

JEL classifications: M15

1. INTRODUCTION

The integration of artificial intelligence (AI) and automation continues to accelerate in a way to profoundly changing the scope and way of working while redefining employment structures and transforming the skills required in the labor market (Sreerangapuri, 2024). Such technologies increase operational efficiency and new ways of creating value, however, they also pose significant challenges for individuals, organizations, and societies. Yet, the adoption of such modern technologies is inevitable as success depends on the ability to be adaptive to use future-proof strategies, based on lifelong learning, ethical responsibility and collaboration between people and intelligent systems. As a result of shifting towards AI-driven solutions, the IT industry is experiencing a dual shift: a rapid obsolescence of routine and automatable roles – such as junior IT support and data processing, and a growing demand for new interdisciplinary profiles. This has demanded AI strategists, cybersecurity specialists, cloud architects, and consultants capable of bridging technical expertise with the business acumen. According to recent industry reports, organizations are increasingly reallocating budgets toward AI development, workforce training, and digital infrastructure, reflecting the critical need to align human capital with evolving technological capabilities.

Fundamental human attributes – such as interpersonal communication, creativity, empathy, and visionary leadership remain essential. AI systems can outperform humans in performing repetitive or procedural tasks, but they lack the nuance to build trust, navigate complex social contexts, and inspire transformative change. As such, individuals with strategic foresight, emotional intelligence, and the ability to drive innovation will become increasingly important in shaping the future of work.

2. LITERATURE REVIEW

The employment structures are shifting jobs are evolving to include more and more AI in coordination, interpretation, and oversight processes rather than purely execution. Fteimi & Hopf (2021) outline how AI affects current working processes. Presenting Artificial Intelligence as a new actor and component of traditional knowledge management strategies and pointing out the growing role of AI as it reshapes knowledge work by introducing new forms of knowledge (e.g., machine-generated, pattern-based insights) and changing the human role from being sole knowledge creators to collaborators with AI systems. There is a need to redefine the strategy for managing processes within the organization, including knowledge management, and include Artificial Intelligence as an active participant. The authors point out the impact of AI on current jobs and task division while at the same time pointing out a huge need for the role of AI in the organizational context needs to be better understood, especially how people can train AI to support them in their work.

Yadav (2024) also emphasizes the need for tight collaboration between humans and AI. He states that automation also gives rise to new job roles focused on managing and developing AI systems, necessitating upskilling. Industries like transportation and manufacturing may experience immediate displacement, while those innovating with AI, such as healthcare and technology, may witness the creation of specialized roles.

The OECD's AI Expert Group AIGO defines an AI system in a broad sense as a “machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations or decisions influencing real or virtual environments” (OECD, 2019).

According to the Future of Jobs Report 2025 (World Economic Forum 2025), AI is one of the most transformative technological trends shaping the future of work. Alongside automation and digitalization, AI is expected to:

- reshape industries, altering workflows and job functions,
- serve as a dual force—creating and displacing jobs depending on sector and function.

It is estimated that, by 2030, new job creation and job displacement due to macro trends will represent 22% of today's total jobs. Macrotrend-driven creation of new jobs is estimated to amount to 170 million jobs, and this growth is expected to be offset by the displacement of 92 million current jobs, resulting in a net growth of 78 million jobs. The report highlights that on average, workers can expect that two-fifths (39%) of their existing skill sets will be transformed or outdated over the 2025-2030 period.

Manuti & Monachino (2020) present a philosophy of AI that focuses on creating workflows where an AI learns from the human operator while intuitively making the human's work more efficient and the approach according to which machine and human being coexist within the system (p. 183).

The transformative impact of AI on the future of work creates both significant opportunities and complex challenges for emerging professionals. As AI continues to transform industries through automation, data-driven decision-making, and new ways for humans to collaborate with machines, it becomes imperative for young professionals to adapt to this changing landscape. From Zebulon's (2024) perspective, staying competitive in this context requires a commitment to continuous learning, developing interdisciplinary competencies, and cultivating fundamental human-centric skills, including creativity, effective communication, and ethical judgment.

Masood (2024) emphasizes that AI impact on labor markets is markedly different between developed and emerging economies. In developed economies (United State study), AI tends to disrupt high-skilled jobs, leading to both opportunities and challenges. In contrast, in emerging economies (India study), AI's influence is less pronounced due to varying levels of technological adoption and economic structures (p.3). This suggests that building human capacity and preparing for labor market transformation and the growing need to integrate AI in curricula are crucial. Update educational programs to include AI literacy, preparing the workforce for future job markets (following the Council on OECD Legal Instruments Artificial Intelligence Recommendation, OECD 2019).

The alarmingly fast pace of changes that AI will bring to the job market also highlights Yang (2025). An increasing number of industries will be impacted by artificial intelligence, with jobs in these sectors facing the challenge of being entirely replaced by AI. Workers from those industries will encounter the same predicament as taxi drivers. Yang gives the example of the launch of Tesla's autonomous taxi, which Tesla also introduced, with its humanoid robots capable of communicating with humans and performing various actions. It is imaginable that jobs such as waiters, bartenders, and butlers are likely to be carried out by humanoid robots, traditionally belonging to middle-class occupations (p.364). It's not just lower-level positions that AI will replace. Yang (2025) states that the rapid development of AI and its potential for application in various fields have placed middle-class jobs and high-paying positions at risk of being replaced.

The swift integration of AI into the IT sector has introduced a double-edged shift in the job market, as tasks once reliant on manual effort – like data entry, routine network upkeep, and basic coding – are increasingly being automated by AI systems that perform them with higher speed and precision (Chhatre, 2024, p. 404).

Based on the Future of Jobs Report 2025 by the World Economic Forum (2025), the fastest-growing professions stand out as big Data Specialists, AI/ML Specialists, FinTech Engineers, Software Developers, and Green energy roles (e.g., Renewable Energy Engineers). The Most Declining Roles are data Entry Clerks, Administrative Assistants, Cashiers, postal clerks, and Bank Tellers.

The shift to AI-driven IT operations has made a significant skills transformation imperative for many companies. Recent studies by KPMG (2024) highlight that the majority of business representatives believe that AI will fundamentally change the nature of their business over the one-to-two-year horizon.

The Future of Jobs Report 2025 by the World Economic Forum (2025) highlights how AI is influencing organizations' structures and workforces. It states that by 2030, tasks are expected to be evenly distributed between humans alone (33%), machines (33%), and human-AI collaboration (34%).

McKinsey&Company global report (2025) shows how GenAI tools are rapidly changing workflows, with 92% of companies planning to invest more in AI, yet only 1% feel they've reached maturity in AI deployment. The report also identifies a readiness gap among leadership. It argues that the real barrier to AI adoption is lack of strategic vision from executives. Employees are already using AI regularly, and they are three times more likely than leaders realize to believe that AI will replace 30 percent of their work in the next year, and are eager to gain AI skills. Yet employees are not getting the training and support they need.

Studies by PwC (2024) highlight that the Polish market shows strong awareness and interest in AI among both consumers and businesses. However, full potential will only be realized with clear business strategies and skilled workforces. The support from the government is also welcome.

The emerging skills critical for future employment are: data literacy, AI awareness, and hybrid human-AI collaboration abilities. This is also supported by the research results described in the Future of Jobs Report 2025. The following skills were presented as core ones:

- AI and big data,
- networks and cybersecurity,
- technological literacy,
- creative thinking,
- resilience, flexibility and agility,
- curiosity and lifelong learning,
- leadership and social influence,
- talent management,
- analytical thinking.

This has many implications for the education system. A shift towards skill-based models and the inclusion of AI-related content in formal education is necessary.

Emerging Skills and the Future Workforce: The demand for cognitive and technical skills is surging as AI transforms workplace requirements. According to Li (2022), critical thinking, problem-solving, and technological proficiency are the skills of the future. Young professionals must prioritize acquiring hybrid skills that combine technical expertise with human-centric abilities like creativity and empathy (Manyika, 2017).

So, in addition to technical skills, there is an increasing demand for human-centered skills such as resilience, flexibility and agility, and leadership and social influence.

By the Future of Jobs Report (2025, p. 47), by 2030, 59 out of every 100 workers will need reskilling:

- 29 can be trained in current roles,
- 19 reskilled and redeployed,
- 11 risk lacking reskilling opportunities.

Current technological advances will drive more skill change than any other trend over the next five years. For employers, these insights emphasize the need for training and upskilling initiatives focusing on advanced prompt-writing skills and broader AI literacy.

There are also many challenges and limitations that AI brings. The impact of AI on human innovation, the reliability of content produced by AI, the ownership and rights of works produced by AI, and the potential for exploitation or abuse of AI technology are just a few of the moral, social, and artistic concerns raised by Bharathi & Vardhan (2024, p. 34).

On August 1, 2024, the Artificial Intelligence Act came into force in Poland (Regulation (EU) 2024/1689 of the European Parliament and of the Council of June 13, 2024, on establishing harmonized rules on artificial intelligence and amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139, and (EU) 2019/2144, as well as Directives 2014/90/EU, (EU) 2016/797, and (EU) 2020/1828 (Artificial Intelligence Act, Official Journal of the EU 2024/1689)). This is the first regulation that comprehensively addresses the AI sector.

It is important to emphasize that this regulation conditions the obligations of providers and entities implementing AI models and systems on the potential risk of harming the economy. Considering the labor market, AI is expected to transform the Polish job market while mitigating the negative effects of this process. It aims to simplify or eliminate tasks that previously required excessive time. According to the adopted assumptions, this should increase the productivity of certain workers. It may also serve as an incentive for acquiring new skills and enhancing qualifications (Korgul et al., 2024).

Yadav (2024, p. 7191) points out that it is necessary to take advantage of the opportunities that AI presents in art and creativity, while consciously addressing ethical issues, thus ensuring that AI remains a source of inspiration, innovation and cultural enrichment in the field of creativity. For this to happen, it is important to develop digital skills in society.

In the context of emerging development needs, the literature review made it possible to notice:

- the need for continuous reskilling and professional development, especially in AI-literate decision-making and oversight roles,
- these changes reinforce the need for adaptive learning environments, microlearning modules, and AI-oriented curricula in formal and corporate education,
- future organizations must re-architect workflows, team structures, and leadership styles to integrate AI tools.

3. METHODOLOGY

Data Collection:

- Industry Reports: Recent publications from organizations such as PwC, McKinsey, KPMG, and World Economic Forum form the basis for understanding the broader industry trends related to AI and IT employment.
- Academic Literature: Peer-reviewed journals and papers focusing on workforce automation, AI integration, and the evolution of skill requirements. The literature was classified based on its topic. As such, there are three major categories. The first is about how AI changes Employment Structures and Professional Roles. The second is about employee perceptions and expectations regarding AI. The last one is associated with skill development and education in AI.
- Data Analysis.
- Qualitative Analysis: In-Depth Interview Method: This study employed the in-depth interview method to gain a nuanced understanding of IT experts' perceptions, experiences, and expectations regarding the evolving nature of work in the context of artificial intelligence and automation. This method was chosen for its capacity to elicit rich, detailed insights and uncover underlying attitudes and motivations that may not be accessible through quantitative approaches.

A total of 14 in-depth interviews were conducted with professionals working in the information technology sector. The sample included IT experts, C-level executives, and employees from IT companies that develop IT services and products (also AI-enabled services) for clients across diverse sectors, including maritime, media, finance, and law. Participants were selected through purposive sampling to ensure a breadth of perspectives from individuals directly engaged in developing and implementing AI-driven solutions across industries. Question sections cover:

- general perspective on automation and AI,
- impact of AI on required competencies,
- transformation of the labor market,
- future of employment and education,
- impact of AI on professional competencies,
- perception of the future of the labor market.

In-depth interviews with IT experts were conducted in March 2025.

4. RESULTS AND FINDINGS

In-depth interviews with IT experts, representatives of IT services and products directed to various industries (maritime, financial, creative, legal) made it possible to obtain a broader perspective on topics related to how AI changes the labor market. The experts who took part in the research represent companies of various sizes and scale of operations, most of them operating on the European market and some globally (United States, India, etc.) – the collection of information obtained is, therefore a large supplement to the practical knowledge collected earlier as a result of the literature review.

The first part of the questions concerned the general perspective on automation and AI. Most surveyed companies have implemented automation or AI tools in the last 2 years. Some of the positions of the respondents (i.e. C-level) have changed as a result of automation/implemented AI-based solutions, this mainly concerns representatives of the creative and finance industries as well as IT consulting services. Changes related to the increasingly widespread introduction of AI apply even to the highest positions. Interestingly, other (lower positions) in their companies have changed more due to automation or the introduction of AI-based solutions.

The majority admitted that there has been a noticeable increase in the number of jobs directly related to AI and new technologies in their professional fields. Those who did not notice the emerging AI-related job offers in their domain of activity were representatives of IT services for the legal, creative, and maritime sectors.

The responses were varied when asked about changes in employment in the industry observed due to the development of automation and artificial intelligence. As follows:

- “Some senior developers were moved to projects related to Co-Pilot and AI integration with platforms, so we had to hire new developers”;
- “I do not observe any changes in employment. In the sense that employment decreases or increases due to automation and AI” (law sector);
- “Many entities use AI to streamline work, e.g. programmers. For some companies, this is an increase in efficiency, but for others it helps reduce the need for inexperienced and incomplete employees (who can be replaced by AI tools)”;
- “There is a visible decline in employment for freelancers, especially in the field of 2D graphics and voice-over recordings” (creative sector);
- “New positions are being created in the automation and transfer teams due to different demands in the departments” (finance sector);
- “There are fewer reasons to employ young people with experience, because such work results are already provided to them by an AI machine”;
- “It is clear that people who deal directly with AI are less sought after, and knowledge of AI and automation tools related to the position held is more valued, e.g. a programmer using a programming environment supported by AI”;
- “We are hiring new profiles related to AI/Data Science. We have added questions during technical verification about experience related to GenAI/AI technologies”;
- “Weak developers/beginners have become redundant”;
- “More AI specialists are needed”;
- “The development of automation and artificial intelligence has not affected the changes in employment in the company (which provides IT services and products for the maritime industry), which results from the fact that they play a supporting role for the activities undertaken by the headquarters located in another country. At the same time, as an industry (maritime), we are not exposed to the introduction of many new solutions in the area of AI, which in this sector appears rather in the area of initiatives supporting the process of creating products, i.e. all kinds of copilots (such as GitHub Copilot)” (IT for maritime).

The development of automation and AI leads to employment restructuring, not to even loss or gain of jobs. While some sectors and roles remain relatively unaffected, others are seeing both displacement (particularly low-skilled or creative freelancers) and the emergence of new AI-related roles. Organizations increasingly value AI skills within existing roles, signaling a shift toward hybrid human-AI collaboration as a standard employment model. The most significant change in the area of a position in the organization that was wholly or partially replaced/changed by automation or AI was indicated by a respondent from the creative industry (media and film). This points to copywriting for own marketing and film scripts, partly for 2D graphic designers and voice-over artists – film sketches are now created based on texts and AI voice. In the IT sector, part of the developer, DevOps, and tester workshop was identified as partially replaced/changed by automation or AI.

The answers were varied when asked whether the company sees more benefits or threats resulting from implementing AI in its workplace. Most companies at this stage of AI development and implementation see benefits such as: shortening the time of searching for information and previous use cases thanks to localized AI models. The work of the sales and promotion department has also increased, and the number of leads has increased. The main threat that companies see is juniors' inability to use tools, which forces the creation of internal policies and regulations regarding the use of AI. The threats, therefore, mainly concern confidentiality and data. The benefits are speeding up work (searching and writing first versions of the text). The only person who saw more threats was the media and film industry representative. He pointed to more threats because some orders for film and advertising materials ordered by companies will start to be implemented within the company structure, reducing outsourcing. One of the experts indicated the main benefit as his employees' more excellent work efficiency. At the same time, he indicated the threats as those related mainly to addressing security risks and verifying AI-generated content (whether it is correct or not hallucinatory).

An interesting perspective was presented by an IT representative for the maritime industry, who stated that: “due to the classification of most manufactured products (in maritime industry) as ‘mission critical’, the life cycle and update possibilities, the implementation of AI directly in the solutions used is very limited. Understanding artificial intelligence as the ability to interpret data, we implement

solutions in the area of interpretation of navigation data, video data or in the area of voice control and these are the actual benefits of implementing AI, but at the moment these are only fractions of the solutions we provide. The basic threats we see are related to the lack of solutions for recognizing hallucinations and too much trust in AI-generated solutions”.

A representative of the media and film industry expressed the greatest concern regarding the threat of reducing positions, tasks, or specific roles in the organization. He fears that automation will negatively impact his professional stability. When asked if the company cares about employee development in the context of equipping them with digital competencies (e.g., offering employees training in the use of AI tools), the majority confirmed such training. This means that representatives of IT companies are aware of the need for education, but only 2/3 of respondents gave an affirmative answer.

In the part of the interview concerning the skills needed and currently sought on the job market, one of the experts emphasized that now we have a breakthrough time where openness to new ways of operating and using IT tools will undoubtedly be important. Respondents identified the following new skills as currently most sought-after in their industry:

- skills related to big data, AI and machine learning, software and application development, and UI/UX design,
- key technologies include Python, as well as ML frameworks such as TensorFlow and PyTorch,
- a growing demand for specialists who can integrate AI with existing systems and for developers familiar with MLOps,
- skills related to current technologies, e.g. cloud administrators, programmers in new languages and frameworks,
- specialists who can create and integrate AI solutions are in high demand. In the era of Big Data, the ability to process and interpret large amounts of information is key. Data analysts support strategic decision-making by identifying trends and relationships in data. Data Science Engineers & AI Consultant, MLOps.

An important aspect was taken up by an expert from the IT industry for maritime. He points to the greatest deficit of soft skills (even among purely technical positions because even there, at least a minimum level of interaction and proper communication is required), and it is not related to the development of AI but rather to generational changes.

Experts were asked which skills they consider important given the current pace of technological change comparing the context from the AI side. Their responses are presented as percentages in Fig. 1.

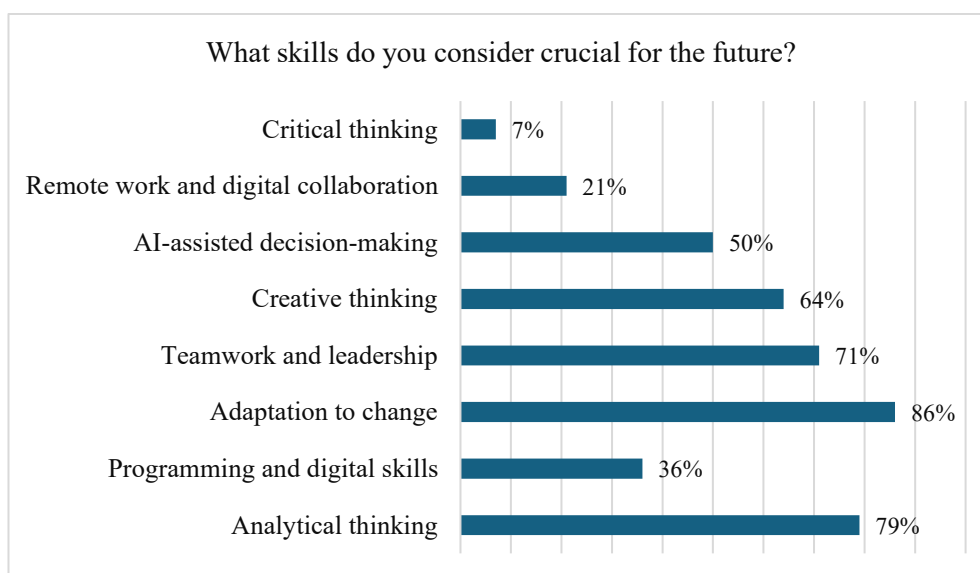


Figure 1. Skills considered as crucial for the future competency development

Source: own elaboration.

The following were identified as key skills for the future:

- Flexibility and resilience – quick adaptation to change;
- Analytical and critical thinking – the ability to make decisions in a world dominated by AI;
- Creativity and problem-solving – AI automates standard tasks, but it will not replace strategic thinking;
- Leadership and social competencies – AI supports, but people still manage;
- Lifelong learning – the ability to quickly and effectively learn new technologies and not only technologies. Simply the ability to adapt and learn;
- Programming and digital skills.
- Thinking critically, not taking everything for granted,
- AI-Enabled Decision Making,
- Remote Work and Digital Collaboration,
- Empathy and all kinds of social skills.

During the interview, experts gave varied answers to the question about the changes in employment expected in their industry over the next 5 years. Most agreed that we are facing a qualitative change in positions (this means that new tasks and new roles will be created). Some pessimistically indicated that there would be fewer jobs, while others were more optimistic, claiming that there would be more jobs. One of the experts mentioned that: “The development of AI is dynamic, but certain trends are already visible. Juniors and support workers will have the biggest problem, because their tasks can increasingly be automated. GenAI models, such as Claude Sonnet 3.7, are becoming better and better at programming, so it is not known whether there will still be a need for ‘code typists’ in 5 years. Similarly in graphics – AI generates images at a professional level, so there will be less and less room for people without a creative approach. Instructional design in e-learning is also undergoing a transformation – platforms for automatic creation of lessons are becoming more advanced, so instead of five average specialists, one expert with excellent knowledge of AI and the latest methodologies is enough. AI can write and execute tests, so the number of manual testers may significantly decrease. On the other hand, Project Managers will still be key – great leaders, able to manage people, communication and implementation of technologies. Interpersonal skills, strategic thinking and the ability to adapt will be really key.”

It is worth noting that there are market sectors where the implementation of AI will be a natural consequence of the sector’s development due to its strong correlation with modern technology. Examples include logistics, data analysis, and mass production. Even now, AI is replacing telemarketers, customer service representatives, and even cashiers.

However, some areas of economic activity remain reliant on human labor. Examples include the beauty and hairdressing industries, as well as the work of doctors. Teachers and educators should also be mentioned, as these professions involve building relationships between people and require exceptional interpersonal skills.

The topic was raised as to whether further development and implementation on a larger scale of AI-based tools will contribute to wage growth in the technology sectors. Some experts answered that it would not affect wages, while others claimed that further development of AI would contribute to a decline in wages in the technology sector.

During the in-depth interview, the topic of changes that AI will bring more broadly emerged, that is, in the general context of the labor market and professional competencies. Based on the collected statements, several main conclusions can be distinguished regarding the impact of artificial intelligence on the future of the labor market and professional competencies:

1. A transformation of the labor market structure awaits us:

- AI will cause a deep change in the employment structure. Many professions will disappear or be severely limited, especially those based on routine and repetitive tasks (e.g., administration, accounting, call centers, some programming professions, and even radiology or computer graphics).
- At the same time, new roles will appear, e.g. AI specialists, AI system testers, security experts, premium content creators, people managing data and AI interfaces.

2. Growing importance of new competencies:

- Digital, analytical competencies, creativity, flexibility, and the ability to work with AI will become key.
- Using AI tools, low-code/no-code, and understanding their operation will become standard requirements in many industries.
- The importance of soft skills, such as empathy, critical thinking, and interpersonal communication, is growing, especially where AI does not replace humans.
- 3. AI as an assistant, not just a replacement:
 - AI will not necessarily replace humans but will become their efficient assistant. People who can work well with AI will be more competitive and effective.
 - The use of AI can significantly increase an individual's productivity, reducing the need for large teams.
- 4. The need for re-industry and education:
 - Mass re-qualification of employees will be required. The education system and the labor market must prepare for continuous learning and adaptation.
 - Interdisciplinary education and lifelong learning will be important.
- 5. Social and ethical challenges:
 - There will be a risk of excluding a part of society from the labor market, especially people without digital skills.
 - There may be an increase in social inequalities, the emergence of an "unemployable" group, and pressure on social welfare systems.
 - AI may disrupt the relationship between the creator and the system being created, deepening the problem of users' lack of understanding of how tools work.
- 6. New sectors and areas of growth:
 - Development will occur, among other things, in the following industries: AI, IT, fintech, health, ecology, e-commerce, and intralogistics.
 - It will be possible to evolve new professional and scientific areas, which are still difficult to define today.

One of the experts gave an example of huge changes: “In my opinion, we are in the first 5% of changes that will occur due to the automation of work and services using AI. The e-commerce market will grow significantly, the intralogistics industry has been preparing for automation and shortening the supply chain for years. Giving up standard ways of delivering cargo, e.g. in REWE or Zalando warehouses, currently changes the entire structure of the building architecture, so that it is adapted to the convenience of robots, not people. This will speed up the supply chain, change the speed of the e-commerce market, but without taxing corporations with an additional tax on automation, it will not significantly affect the prices of deliveries, which are already low, but will deprive low-skilled people of work.” (...) “In the longer term, the introduction of a meta-programming language by AI (e.g. to a purely binary language), will speed up communication between devices, but will make us stop understanding it and having insight into the architecture of changes. This will cause a large reduction in jobs on the programmer market, automation, but will also lead to the development of science in directions that are currently difficult for us to think about, due to human limitations in the structure of thinking, which does not allow us to think beyond two ideas.”

Another issue raised in the in-depth interview concerns the perspective of which industries are most at risk of job losses as a result of the introduction of AI-based tools. Experts emphasized that AI does not eliminate jobs so much as change their nature, but some industries are particularly vulnerable to job cuts.

The expert highlighted that e-commerce and intralogistics are undergoing significant shifts, with warehouses being redesigned to suit robots rather than humans. This change will accelerate supply chains and market responsiveness. However, without implementing a tax on automation, it will not affect already low delivery prices and will likely result in significant job losses for low-skilled workers. An essential aspect was highlighted: further automation and the introduction of AI will require many changes in both the law and the tax system.

Undoubtedly, AI's role and significance are evident in automation and robotics processes. The development of new communication technologies, such as 5G, further supports this trend. In recent

years, communication has undergone a revolutionary transformation. A similar scale of transformation is expected in sectors such as energy, transportation, defense, and agriculture.

AI's importance will continue to grow in established areas such as power grids and logistics. It will undoubtedly expand into transportation, food production, and autonomous vehicles (Policy for the Development of Artificial Intelligence in Poland from 2020, 2020).

At the beginning of 2025, Poland's Ministry of Digital Affairs presented a new version of the draft Artificial Intelligence Systems Act, incorporating over two thousand comments submitted during public consultations. The core of this regulation is to establish a market oversight system and strengthen AI security measures, which is particularly important as AI expands into sectors such as the labor market.

The regulation will also introduce new support mechanisms for innovators. The planned oversight model aims to enable effective AI monitoring while minimizing interference in business operations. Additionally, the new provisions will regulate the financing of AI research using state budget funds and EU funding. The Minister responsible for digitalization will receive special competencies, primarily in supporting scientific and development projects, which will undoubtedly enhance the competitiveness of Poland's AI sector. Legal regulations should serve as a safety buffer for the large-scale implementation of AI systems (Draft Act on Artificial Intelligence Systems, 2025).

Table 1. A structured table summarizing the vulnerable industries and roles impacted by AI-driven changes

Industry/Sector	Roles/Functions Affected	AI Impact/Reason
Administration & Accounting	Routine office tasks, document analysis	AI automates repetitive processes (e.g. document analysis, workflow automation)
Customer Service	Call centers, technical support, receptionists, telemarketers	Chatbots and AI systems handle inquiries and support efficiently
Retail	Checkout operators, warehouse workers	Self-service tech, predictive systems, and automated logistics reduce jobs
Manufacturing	Assembly line workers performing simple operations	AI and robotics are replacing manual labor in production
Transport & Logistics	Truck drivers, couriers	Autonomous vehicles and route optimization tools threaten traditional roles
Media & Marketing	Copywriters, graphic designers (for standard projects)	Generative AI creates content and visuals, reducing demand for basic creative work
Entertainment (Acting)	Commercial actors, extras, voice-over artists	AI-generated avatars and voices can replace live performers
Finance	Credit analysts, investment advisors	AI handles data analysis and financial decision-making faster and more accurately
Legal & HR	Legal assistants, HR analysts, recruiters	Document review, contract screening, and resume filtering are increasingly automated
Agriculture & Construction	Manual laborers in basic tasks	Drones, robots, and predictive maintenance reduce physical job needs
Healthcare	Lower-level doctors, radiologists	AI image analysis and diagnostic tools support or replace initial evaluations

Consulting & Research	Analysts, researchers	AI enhances or replaces routine data gathering and analysis
Creative Industries	Advertisers, content creators, music producers	AI generates content (text, images, audio), reducing need for human input
Translation	Translators	Machine translation tools are increasingly accurate and widely adopted
IT (Junior Roles)	Beginner/front-end developers	AI tools can generate and debug code for basic/non-critical tasks

Source: own elaboration.

One of the experts gave a positive example of change, saying: “I would not consider this aspect in the category of vulnerable to job loss. Industries will undergo reconstruction as a result of automation or the use of AI tools. Repetitive activities will be replaced, the use of AI mechanisms will certainly open up new possibilities and services at a different level of complexity, better quality services or greater availability. Let's imagine the medical industry and the area of selecting medicines for the elderly or people with many diseases. Let's imagine that AI can analyze the mutual influence of medicines on each other and the influence of diseases on each other. Additionally, it can effectively indicate threats, exclusions or favorable connections. Thanks to this, the medicine selection service will be much more effective, it will eliminate unnecessary mistakes and the fact that it works quickly will make the service cheaper and more widely available. This is such a positive example, where no one will lose their job. I think that we should generally look positively and look for development and opportunities in every industry.”

During the interview, the topic of education and changes in the education system that would be necessary to better prepare employees for future challenges were touched upon. Experts indicated that the education system needs significant changes to prepare workers for the future. There should be a greater emphasis on practical digital skills, in particular training in generative AI tools, big data, AI and machine learning, software development, cybersecurity and emerging technologies such as IoT and DevOps. Curricula need to be more closely aligned with current labor market needs, and educational institutions should lead innovation rather than follow trends. Early childhood education should emphasize STEM subjects, while universities need to strengthen and modernize their technical programs, preferably led by practitioners. There also needs to be a complete shift from mechanical memorization to developing and applying different types of intelligence. In addition, internships should be integrated into the curriculum and conducted in real business environments. Finally, improving salaries and career attractiveness in teaching roles is crucial to attracting qualified professionals into education.

5. DISCUSSION

AI will bring deep, irreversible changes in the way of working, required competencies, and employment structure. The key will be to skillfully combine technological and human competencies to survive in the market and use the opportunities that this revolution brings. The education system should be restructured to provide continuous support for individuals in acquiring essential, up-to-date skills and effectively navigating the evolving demands of the labor market.

The in-depth interviews indicate in the given areas:

1. Employment Structures and Professional Roles:

- AI is reallocating roles, particularly for experienced professionals (e.g., senior developers moving to AI-integrated projects). New roles are appearing, especially in AI, Data Science, and automation teams (e.g., in finance and IT sectors).
- Companies are increasingly integrating AI experience into recruitment processes.
- There is a differentiated sectoral impact: creative industries (e.g., 2D graphics, voice-over work) and freelancers are experiencing a decline in employment, suggesting that automation is

replacing some artistic and repetitive tasks; the legal and maritime sectors report minimal to no impact on employment, mainly due to slower AI adoption or supporting, non-core AI roles.

- There is a decrease in demand for entry-level or weaker performers, especially junior developers and inexperienced workers, as AI tools can highly substitute basic-level output. In turn, high-performance professionals with AI experience are in greater demand.
2. Employee perceptions and expectations regarding AI:
 - More benefits than threats at the current stage of development. This includes faster access to information through localized AI models, increased efficiency in sales and promotion, and improved overall productivity, particularly in generating initial content drafts (enhanced employee efficiency is the main benefit).
 - The primary concerns relate to data confidentiality, misuse or lack of understanding of AI tools – especially by junior staff – and the resulting need for internal guidelines.
 - Great concern that automation would reduce outsourcing of creative tasks, potentially threatening job stability.
 - Content verification and security risks (experts caution against over-reliance on AI results, especially given the inability to reliably detect hallucinations).
 3. Education and skills development:
 - AI literacy and tool proficiency (e.g., use of AI-supported programming environments) are highly valued (the emphasis is shifting toward domain professionals who can effectively use AI tools rather than AI engineers alone).
 - The importance of employee development in digital competencies – such as training in AI tools – but only about two-thirds of IT companies currently offer such programs, suggesting room for broader implementation.
 - The most in-demand skills include expertise in big data, AI, machine learning, software and application development, UI/UX design, and proficiency in technologies like Python, TensorFlow, and PyTorch. There is also a growing need for professionals skilled in integrating AI with existing systems, MLOps, cloud computing, and new programming languages and frameworks.
 - There is a clear soft skills gap among technical professionals (pointing to generational changes, not technological ones).
 - The key competencies of the future include analytical and critical thinking, flexibility, resilience, creativity, strategic problem-solving, leadership and social skills. Lifelong learning, adaptability and the ability to make decisions using artificial intelligence are also key, alongside remote working skills, digital collaboration, empathy and effective communication.

6. CONCLUSION

This study investigates the emergence of new competencies and shifting workforce perceptions within the information technology sector, with particular emphasis on the necessity for educational and human resource strategies to adapt in response to anticipated labor market trends in Poland. Employing a mixed-methods research design, the study integrates a comprehensive review of scientific literature and global analytical reports with qualitative data derived from in-depth interviews conducted with experts in the Polish IT industry.

The findings affirm that the future of work, particularly within the IT industry, is undergoing an accelerated transformation driven by artificial intelligence and automation. As revealed through empirical evidence and expert interviews, the integration of AI is redefining existing job roles and organizational workflows and generating an urgent demand for new hybrid competencies that blend technical fluency with human-centric capabilities. Both quantitative data (WEF 2025 employment forecasts, other reports) and qualitative observations (expert interviews, thematic literature) indicate that AI and automation are reshaping labor markets and prompting urgent regulatory, economic, and social adaptation.

This aligns with the global trends outlined in the World Economic Forum's Future of Jobs Report 2025 (WEF 2025), which projects that by 2030, 22% of current jobs will be structurally transformed – with 170 million jobs created and 92 million displaced. Remarkably, this transformation is not a zero-

sum game but rather a qualitative shift: tasks are increasingly divided between humans (33%), machines (33%), and human-AI collaboration (34%). This triadic distribution is already becoming a reality within the IT industry, as seen in the rise of AI-enhanced programming environments, DevOps automation, and GenAI-supported development workflows.

The analyzed reports, thematic literature, and interviews with experts clearly indicate that retraining and improving qualifications are necessary. According to the WEF (2025), 59% of the global workforce will require training by 2030 – an estimate mirrored by our study, which found that two-thirds of IT companies already engage in digital skill development, though often in limited scope. The skills identified in our interviews – AI literacy, MLOps, data science, cloud integration, and soft skills like communication and empathy – mirror the WEF's fastest-growing competencies: AI & big data, technological literacy, creative thinking, and resilience.

Some sectors are undergoing transformative changes, with warehouses increasingly designed for robotic operations rather than human labor. This transition is set to accelerate supply chains and boost market responsiveness, but may intensify job losses among low-skilled workers unless accompanied by structural reforms, such as automation taxes. The spread of AI and automation is evident across multiple industries (bolstered by advancements in communication technologies like 5G).

Furthermore, both data sets highlight an evolving employment landscape: while lower-skill, routine-based roles face automation-driven decline (e.g., junior developers, manual testers), new, high-value roles emerge. These include AI system integrators, cybersecurity professionals, ethical AI advisors, and domain experts with advanced digital fluency. The IT experts interviewed anticipated that AI would not eliminate jobs but restructure them, demanding interdisciplinary skill sets and adaptive leadership.

The social dimension of this transformation should not be ignored. WEF data (2025) warns of growing inequality among those without access to upskilling opportunities. Our findings confirm these concerns, especially when it comes to generational and soft skills gaps. There is broad agreement among practitioners that lifelong learning, ethical judgment, and the symbiosis of humans and AI will define the employability and sustainability of digital economies. Ultimately, the convergence of these studies with global forecasts clearly indicates that to succeed in the AI era, the IT industry – and the broader job market – must change the status quo. This means redesigning education and organizational structures to prioritize human-centric innovation. AI will undoubtedly be a catalyst for this growth. However, uniquely human traits – creativity, empathy, and critical thinking – will guide its responsible implementation and ensure that the future of work is inclusive, resilient, and purpose-driven.

One limitation of the article is the scope of the data: The data analysis focuses on both global data (market-wide reports) and data mainly related to the outlook of the Polish market and neighboring countries (material from in-depth interviews), which may limit the possibility of generalizing the results to other countries.

Another limitation may be rapid technological advances: The rapid evolution of AI technology means that market data and perspectives can quickly become outdated, requiring constant research to maintain their relevance. Broadening the scope of analysis to encompass a more diverse range of countries would enhance the comprehensiveness of insights into the global implications of artificial intelligence on labor market dynamics.

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