A Systematic Review of AI's Impact on Employment and Skill Demand

Shi Zhenglong, Noorasiah Sulaiman, Chen Peiwen

Faculty of Economics and Management, Universiti Kebangsaan Malaysia, 43600 Bangi Selangor Malaysia

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ABSTRACT

As Artificial Intelligence (AI) continues to evolve and become widely used, its impact on employment and skills has become a major topic of discussion globally, as evidenced by the World Economic Forum's focus. This Systematic Literature Review (SLR) aims to comprehensively review and analyse relevant research on how AI affects employment structures, creates or replaces jobs, and reshapes skill demand patterns. A comprehensive review of the existing literature suggests that the impact of AI on employment is multifaceted, with new opportunities arising from the emergence of new high-skilled jobs and the rising demand for interdisciplinary talent on the one hand, and new challenges arising from the replacement of low-skilled jobs and the polarization of the employment structure on the other. At the same time, the demand for skills driven by AI is moving towards higher levels of expertise and multidisciplinary integration. This review provides a comprehensive frame of reference for further in-depth research on the relationship between AI, employment and skills demand.

Keywords: Artificial Intelligence, Workforce transformation, Labor market, Skill evolution, Automation

INTRODUCTION

With the rapid development of artificial intelligence, its impact on the job market and the demand for skills is growing. According to existing trends, AI will contribute even more than 15 per cent to global economic growth by 2030 (Stanford University 2024). This suggests that AI is not only an important driver of economic development, but is also slowly changing global employment trends and demand for skills (Hanappi & Egger 1993). In recent years, AI technology has rapidly entered various industries and its impact on employment and skills has attracted widespread attention. As a result, the study of how AI affects employment and skills has become an important topic.

From an employment perspective, the rapid growth of AI has had an impact on the employment situation. In particular, jobs that are highly repetitive and low-skilled are being gradually replaced by automation technology and intelligent robots. This change has brought a huge impact on traditional industries, and many workers who rely on these jobs have to face the risk of job reduction or even unemployment. At the same time, this trend has triggered extensive discussions on how the labour force can adapt to technological change. For example, occupations such as assembly line workers, bank tellers and data entry clerks are highly susceptible to being replaced by automation technology because of the more fixed and programmed nature of their work (Greu 2017; Bluestone & Chinke 2020; Wang 2018).

On the other hand, from the point of view of skills demand, the development of AI has given rise to many new occupations with skills in demand, including AI algorithm engineers, data scientists, machine learning engineers and so on. Most of these positions require skilled harnessed professionals to develop and optimise AI systems, present a new change in skill demand and thus driving the advancement of AI technology (Sonderling 2022; Nilsson 1984; Bonfiglioli 2024).

The rise of AI has prompted various stakeholders to consider multiple strategies for adapting to its rapid advancement. Recent studies highlight, for instance, the need for educational institutions to realign curricula with market demands to enhance workforce competitiveness. Enterprises, meanwhile, have been advised by some authors to rationally allocate resources in the face of possible economic fluctuations, leveraging AI for greater operational efficiency. Policymakers are also increasingly urged to integrate research findings into industrial policies that sustain market stability and foster long-term economic growth (Varghese 2020; Sonderling 2022; Shao 2022).

Specifically, this study focuses on two key questions: Firstly, how is AI changing the structure of employment? Second, what new technological needs has it triggered? Through in-depth research on these questions, we hope to provide valuable references for workers, enterprises, and policymakers to help them better respond to the opportunities and challenges brought by the job market and technological development in the era of AI.

This study explores the impact of AI on employment and skills demand through a systematic literature review. It provides insights into how AI technologies are reshaping the structure of employment and changing the demand for multidisciplinary expertise across industries. This study points out that the impact of AI on every industry and on different regions and labour force structures is multifaceted. AI-driven automation poses the challenge of unemployment and labour force fragmentation on the one hand, but on the other hand, by creating new occupations and redefining required skills, which drives innovation and economic growth. This study synthesizes relevant data from across the globe to provide a comprehensive perspective on how AI is changing employment and skills needs. At the same time, it emphasizes that policymakers, educators, and industry leaders can play a key role in guiding these transformations by supporting workforce retraining, closing socioeconomic gaps, and responsibly harnessing AI's potential for innovation and sustainable growth.

The paper is structured as follows: section 2 outlines the methodology, section 3 presents the findings, section 4 assesses the evolving technology and skills needs, and section 5 summarises the insights and recommendations.

METHODOLOGY

To write a good SLR, our study used the Preferred Reporting Items for Systematic Evaluation and Meta-Analysis (PRISMA). The PRISMA model is a well-known standard for publishing SLR papers. It helps authors to clearly define the research question of systematic evaluation. Research topics for systematic evaluation. Since Nilsson's (1984) early discussion of AI on employment has received academic attention since 1984, this study takes that year as the starting point for the literature search (Choudhari 2024; Hanappi 1993).

Searching Strategy

First, we searched the databases such as Web of Science, Scopus, and IEEE Xplore with the terms “Artificial Intelligence”, “employment impacts”,“Artificial Intelligence”, “employment impacts”, “skills requirements”

and other keywords in Web of Science, Scopus and IEEE Xplore databases, and the time limit is from 1984 to 2024; then, the literature is de-duplicated and preliminarily screened to exclude the literature that has nothing to do with the topic of the study; then, the screened literature is read in full text and the qualification is determined according to the research quality and relevance. The literature will be read in full and eligibility will be determined according to the quality and relevance of the study, and the literature that meets the criteria will be finally included. All the included literature will be extracted with key data and integrated into a systematic literature database to ensure the comprehensiveness and accuracy of the research results, and further ensure the reliability and academic quality of the conclusions (Figure1)To ensure that the search results were comprehensive and relevant to our research topic (the impact of AI on employment and skills requirements), we used a combination of English search terms and Boolean logic operators.(e.g. AND, OR, NOT).

For example, we used the combination 'AI and Employment Impact' to search for literature that directly explores the impact of AI on employment; the combination 'AI and Skills Requirements' to search for literature that directly explores the impact of AI on employment; and the combination 'AI programming' combination to search for literature that directly explores the employment impact of AI. Artificial Intelligence and Alternative or New Job Creation' to focus on studies related to changes in labour market skill requirements in the context of AI development; and "Artificial Intelligence and Alternative or New Job Creation" to search for literature that directly explores the impact of AI on employment. Artificial Intelligence AND (Job) Displacement OR Job Creation' to retrieve literature on the impact of AI on changes in the number of jobs. (job displacement and job creation) By using these search terms and sensible Boolean logic operator combinations, we are able to more effectively screen out high-quality literature that meets the research requirements from the vast literature database, and then systematically and comprehensively sort and analyse the complex relationship between artificial intelligence, employment, and technology demand.

To screen the search results, a timeframe was first set from 1984 to 2024 to ensure that the selected research results could reflect the dynamics of the relationship between AI and employment and technological needs at the present time. The literature was then screened by reading key information such as titles, abstracts, and keywords to identify literature that was closely related to the research topic. We then read the full text of the pre-screened literature, further eliminating those with weak research relevance, inappropriate research methodology, or poor data quality, and finally retaining the high-quality.

Finally, to gain a comprehensive understanding of the impact of AI on employment and skills needs, we carefully screened and assessed the literature. Figure 2 demonstrates the inclusion and exclusion criteria for the literature screening. When assessing the literature, we focused on three key aspects: research methodology, data sources, and relevance of the study. We prioritised studies that adopted a rigorous research design, used reliable data and reached reasonable conclusions. In terms of information extraction, we focused on multiple dimensions, including changes in employment structure, such as the growth of demand for high-skilled jobs and the decline of low-skilled jobs; the information collected from these dimensions will provide a solid data base for us to conduct a comprehensive and in-depth systematic literature review, which will help us to better analyse the complex relationship between AI, employment, and skills demand.

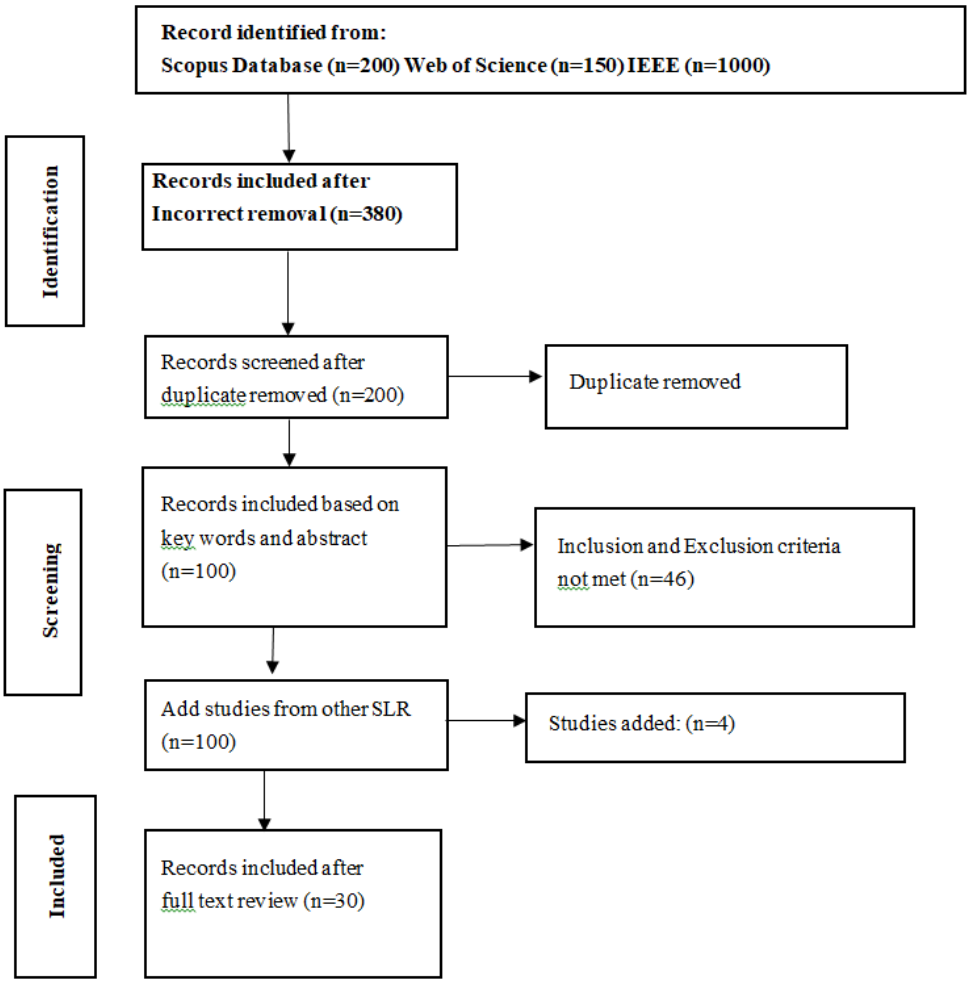

Figure1. Literature review search and selection process.

Source: Authors' compilation based on PRISMA model (2020)

Figure 2. Inclusion and exclusion criteria for literature selection

Category	Inclusion Criteria	Exclusion Criteria
Research Topic	Studies on AI's impact on employment structure, job creation/displacement, and skill demand; Those exploring AI's relation with workforce, labor market, skill evolution, and automation	Literature on non - employment - and skill - demand - related AI applications; Studies only about AI technical principles
Research Type	Peer - reviewed journal articles and international conference papers analyzing AI - employment - skill demand relations	Books, non - academic reports, blog articles, unpublished working papers; Over - broad literature
Time Frame	Literature published from 1984 to 2024	Before 1984; After 2024 (at the time of writing)
Research Method	Studies using quantitative, qualitative, or mixed - methods, with sound research designs	Those lacking rigorous methods or empirical support
Geographical	Research covering multiple countries/regions or major	Single - company cases,

Scope	AI - developing and advanced economies	industry - internal reports, unrepresentative small - area studies
Language	Academic literature in English	Literature in other languages without reliable English translations

Source: Authors' compilation (2024)

FINDINGS

This section presents the impact of AI on employment and skills demand. First, an overview of research trends and country distributions is provided; second, changes in the structure of employment as a result of AI are analyzed, including the growth of high-skill demand and the reduction of low-skill jobs; and, finally, a summary of the increased demand for core skill areas as a result of AI technology is presented to inform subsequent research and practice.

Table 1 classifies the papers according to their year of publication. In terms of research publication trends, these papers began publication in 1984. The subject gained attention from researchers worldwide since 2018. The year 2021 showed the highest number of publications, this is an indication of the growing interest in research in this field.

Table 1. Publication years

Publication years	Number of publications	Percentage of total publications (%)
2024	4	13.3
2023	3	10
2022	4	13.3
2021	5	16.6
2020	2	6.6
2019	2	6.6
2018	2	6.6
2016	1	3.3
2013	1	3.3
2011	2	6.6
2006	1	3.3
2001	1	3.3
1993	1	3.3

1984	1	3.3
Total	30	100

Notes: As of Dec 2024.

Source: Authors' compilation (2025)

We categorized the selected studies according to the journals in which they were published, resulting in the inclusion of 27 prestigious journals and conference proceedings. (Table 2) The majority of these journals are listed in Journal Citation Reports (JCR) or Scimago Journal Rankings (SJR), indicating rigorous peer review and good academic reputation, with only a few sources not having a quartile ranking .(NA) By focusing on high-impact, well-respected outlets, we ensure that our systematic reviews capture research of considerable methodological quality and scholarly impact - an approach that fits well with our research goal of synthesizing authoritative evidence on how AI technologies are affecting employment and skills needs.

Table 2. Number of studies classified by published journal and quartile

Source Titles	**Record Count**	**% of Total Papers**	**2021 SJR Index**	**2021 JCR Impact Factor**
Cognitive Systems Research	1	3.70%	0.957 (Q2)	2.1 (Q2)
Technology and Economics of Smart Grids and Sustainable Energy	1	3.70%	0.524 (Q2)	NA
Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics	1	3.70%	0.551 (Q4)	NA
Saudi Journal	1	3.70%	0.241 (Q3)	0.70 (Q3)
Hawaii International Conference on System Sciences	2	7.40%	0.28 (NA)	NA
Proceedings of the Hamburg International Conference of Logistics	2	7.40%	0.13 (NA)	NA
Information Economics and Policy	1	3.70%	1.637 (Q1)	2.769 (Q1)
International Journal of Technology Assessment in Health Care	1	3.70%	0.846 (Q2)	2.6 (Q2)
Skin Research and Technology	1	3.70%	0.495 (Q3)	2.24 (Q3)
Journal of Mathematical Sciences	1	3.70%	0.357 (Q3)	0.38 (Q4)

European Workshop on Structural Health Monitoring	1	3.70%	0.24 (NA)	NA
International Journal of Bank Marketing	1	3.70%	1.328 (Q1)	6.3 (Q1)
SSRN Electronic Journal	1	3.70%	NA	0.3
University of Miami Law Review	1	3.70%	0.1 (Q4)	0.2 (Q4)
Journal of China University of Labor Relations	1	3.70%	NA	1.543
AI Magazine	1	3.70%	0.5 (Q3)	1.2 (Q3)
Economic Policy	1	3.70%	3.5 (Q1)	4.2 (Q1)
Contemporary Finance & Economics	1	3.70%	NA	1.2 (Q3)
Intereconomics: Review of European Economic Policy	1	3.70%	0.24 (Q4)	0.5 (Q4)
International Journal of Financial Engineering	1	3.70%	0.59 (Q4)	0.6 (Q4)
Journal of Physics: Conference Series	1	3.70%	0.21 (Q4)	NA

Note: NA refers to not available.

Source: Authors' compilation

Table 3 categorizes these studies according to the sample of countries. Most of the studies focused on individual country analyses, which accounted for about 85 percent of the total number of papers. The country with the highest number of publications was the USA with 9 papers, followed by China with 5 papers and Germany with 4 papers. India published 3 papers and Russia's 2 papers. Austria, Brazil, Ethiopia, Georgia, Saudi Arabia, Sweden, Turkey, and the United Arab Emirates each published one research paper. Only 15 percent of the studies used multi-country samples, including OECD countries, regions such as sub-Saharan Africa, and cooperation between Canada and the United States. This distribution suggests that there are more studies in this area in developing countries where there is more demand for employment, reflecting the fact that AI is more significant in developing countries where there is a wider demand for job markets and skills.

Table 3. Number of papers by country

Country	**Reference Numbers**	**No. of Papers**
Austria	5	1
Brazil	32	1
China	22, 23, 26, 28, 30	5

Ethiopia	2	1
Georgia	31	1
Germany	10,16, 17, 29	4
India	3, 6, 8	3
OECD countries	25	1
Russia	16	2
Saudi Arabia	18	1
Sweden	14	1
Turkey	15	1
United Arab Emirates	13	1
United States	1, 7, 9, 11, 12, 19, 21, 24, 27	9

Note: This table lists the number of publications per country/region. The number of papers corresponds to the list of APPENDIX.

Source: Compendium of authors (2023) Compendium of authors (2023)

Table 5 summarizes how AI technologies are being applied in many areas, from business innovation and education to healthcare and other industrial settings, while also illustrating the diverse workforce and skills impacts associated with these applications. For example, in business innovation, AI-driven analytics and predictive modeling require employees trained in data science, prompting a shift to more technical roles and hybrid skill sets. In education, AI-enhanced learning platforms require teachers to be proficient in integrating digital tools into the curriculum, reshaping professional development and teaching methods. Meanwhile, healthcare applications such as diagnostic imaging and patient monitoring are not only increasing the demand for AI-savvy medical professionals, but also creating new opportunities for data annotators, algorithm developers, and clinical decision-support specialists. Similarly, in industrial environments, AI-driven automation and process optimization require engineers capable of designing, programming, and maintaining advanced robots, thereby redefining the balance between manual tasks and highly skilled responsibilities.

By quantifying the amount of research in each area, Table 5 demonstrates not only the growing popularity of AI, but also how different usage scenarios are shaping the types of expertise, training, and job profiles most in demand. This distribution thus reveals emerging workforce trends and highlights the evolving interplay between AI innovations and the skills needed to sustain them.

Table 5 Classification of AI-Related Studies by Application Areas.

AI Technology Mechanism	**Papers**	**No. of Papers**
AI in Business Innovation	9, 10, 11	3
Decision Support Systems	10, 7	2
Education and Skill Development	1, 8, 3	3

Healthcare and Diagnostics	14, 15, 16, 6	4
AI in Immune Disease Treatment	16	1
Industry-Specific Skill Demand	12, 13	2
Technical and Mathematical Applications	2, 5	2
Economic and Investment Impacts	26	1
General Job Market Shifts	22, 23, 24, 25, 27	5
Industry-Specific Workforce Trends	19, 30	2
Structural Changes in Employment	28, 29	2
Workforce Trends During COVID-19	19, 31	2

Note: The table below lists the number of publications per country/region. The paper numbers correspond to the list in the APPENDIX.

Source: Authors' compilation (2025)

Table 6 illustrates the two-sided nature of the labour market impact of AI. Positive impacts include driving demand for high-skilled jobs (e.g., AI engineers), thereby promoting innovation and economic efficiency. Negative impacts include the replacement of low-skilled, repetitive jobs by automation, leading to job polarization and posing challenges to the retraining of low-skilled labour.

On the positive side, AI drives efficiency, innovation, and economic growth by creating new opportunities and optimizing existing systems. On the negative side, it highlights challenges such as labour mobility, ethical issues and unequal access to AI resources between firms. The findings highlight the need for proactive measures, such as labour force retraining, ethical AI governance and policies that support the equitable adoption of AI, to ensure that the benefits of AI are maximized while mitigating its negative impacts. Together, these tables provide a comprehensive understanding of how AI technologies impact employment trends and the evolving demand for skills across various industries.

Table 6 Classification of AI Applications and Its Impacts

AI Technology Mechanism	**Effects**	**Papers**	**No. of Papers**
Employment and Workforce Impacts			
-AI and Employment Change	+	22	1
-Employment Discrimination	-	21	1
-Employment Impact During COVID-19	NS	19	1
-Employment Structures	+	28, 29	2
-Workforce Dynamics	+	23, 24, 25, 27	4

-Pandemic Workforce Impacts	+	31	1
Business and Industry Innovations			
-Business Innovation	NA	9	1
-Economic Growth and Employment	+	26	1
-Financial Services and Retail	+	18	1
-Procurement and Sales	+	10	1
AI-Driven Technology Applications			
-Advanced Data Analysis	+	17	1
-Decision Support Systems	+	5, 6, 7	3
-Image Analysis and Detection	+	15	1
-Ultrasonic Inspection	+	17	1
Cognitive and Knowledge Enhancements			
-Embodiment and Cognitive Models	+	1	1
-Creative Work	+	12	1
-Learning and Memory Models	+	8, 3	2
-Prediction and Judgment	+	11	1
Specialized Industry Applications			
-Manufacturing Jobs	+	30	1
-Mathematical Optimization	+	2	1
Problem Solving and Design	+	5	1

Note: NS denotes ‘not significant’ and NA denotes ‘no data’. This table shows the number of papers by country/region. The number of papers corresponds to the list in APPENDIX.

Source: Authors’ compilation (2025).

IMPACT OF AI ON THE STRUCTURE OF EMPLOYMENT

With the widespread application of AI, the employment structure of the labor market is undergoing profound changes. On the one hand, there is a significant growth in the demand for high-skilled talents, such as professionals mastering programming, data analysis, and machine learning, who play a key role in developing AI algorithms, processing massive amounts of data, and optimizing the performance of models (Negash 2016; Choudhari 2024). In Internet technology companies, for example, the advancement of AI projects requires a large number of algorithm engineers and data scientists, with a high demand for programming and data analysis skills (Mueller et al, 2022). On the other hand, low-skill, repetitive jobs are decreasing, such as

workers responsible for simple assembly and welding in traditional factories, which are being efficiently replaced by intelligent robots (Motah 2006). However, those workers who are able to operate and maintain smart devices are gradually being forced to take on equipment operation, troubleshooting, and maintenance duties in automated production, becoming an important role in ensuring the smooth operation of production (Holland 2023).

The employment impact of artificial intelligence on people with different educational backgrounds shows a "polarization" trend. People with specialized education and above are better able to adapt to the changes brought by AI and get more employment opportunities. For example, in the field of AI research and development, data analysis, and financial technology, enterprises prefer highly educated talents, who are able to quickly master complex technologies and be qualified for senior positions (Negash& Yohannes 2016; Choudhari et al. 2024). In contrast, people with junior and senior high school education face a higher risk of substitution, especially in repetitive labor positions, such as data entry clerks and telephone customer service, which have seen a decrease in demand due to the popularity of intelligent systems (Schemmer 2022). The analysis shows that the demand for highly educated personnel in high-tech industries in developed regions continues to grow, while employment opportunities for low-educated people are mainly concentrated in traditional service industries or basic manufacturing, and the number of jobs is decreasing year by year (Hanappi, 1993).

The wave of artificial intelligence is significantly changing the structure of traditional occupations. Many routine and easily replaced by automation positions are gradually reduced, such as telemarketing greatly replacing manual sales work due to the application of intelligent voice systems that can automatically make phone calls and screen customers; data entry clerks also significantly reduce their reliance on human labor due to the popularity of automated collection and entry tools (Spreitzenbarth&Bode 2021). At the same time, AI-related emerging occupations continue to emerge, such as AI engineers who are responsible for designing and optimizing algorithms and are the core force driving technological progress, and AI trainers who make continuous improvements in system performance through data annotation and parameter adjustment (Motah 2006). In addition, some occupations that require high innovation and social skills are gradually gaining attention, such as health consultants who provide personalized advice by combining AI diagnostic information, and creative designers who achieve unique design creations with the help of AI tools (Velichenko& Pritykin 2011). The rise of these occupations has brought new directions and more possibilities to the labor market.

Data from recruitment platforms show that the recruitment demand for AI-related positions has grown rapidly in recent years, for example, on a well-known recruitment platform, the recruitment of AI engineer positions has increased by nearly 300% over the past five years, while the recruitment of traditional positions for some occupations that can be replaced by automation has decreased by about 50%, which fully reflects the trend of changing the structure of the type of occupation under the influence of AI.

The widespread application of AI is significantly transforming the employment structure, as highlighted in Table 7. Key changes include a growing demand for high-skilled jobs, particularly in areas requiring expertise in programming, data analysis, and machine learning (Negash & Yohannes 2016; Choudhari et al.; Mueller et al. 2022). Simultaneously, there is a notable decline in low-skilled, repetitive jobs, leading to employment polarization—where individuals with higher education levels gain more opportunities, while those with lower education levels face heightened risks of displacement. Furthermore, AI has driven the emergence of interdisciplinary roles, such as AI engineers, data analysts, and system operators, reflecting the increasing need for multifaceted skill sets (Negash & Yohannes 2016; Hanappi &Egger 1993; Nilsson 1984). These shifts underscore both the opportunities created by AI and the structural challenges it poses to the labor market.

Comprehensive literature studies show that the impact of AI on employment is complex and varied, and manifests itself differently across industries and levels. In terms of positive impacts, AI has spawned new jobs and created more employment opportunities. For example, in the manufacturing industry, although intelligent robots have replaced some assembly worker positions, they have also brought new occupations such as intelligent manufacturing engineers and robot maintenance technicians (Motah 2006). In the service industry, intelligent customer service systems have reduced traditional customer service positions but created new positions such as data analysts and AI trainers (Choudhari et al. 2024). In addition, AI promotes the upgrading of the employment structure, increases the demand for high-skilled talents, and promotes the development of cross-field composite talents, making workers with multidisciplinary knowledge more competitive (Hanappi& Egger 1993).

Artificial intelligence has also brought negative impacts. Some repetitive jobs, such as assembly workers and bank tellers, have been replaced by automation, resulting in some workers facing unemployment (Schemmer& Satzger 2022). In terms of employment structure, low-skilled laborers are in trouble because they are easily replaced, while the surge in demand for high-skilled personnel has widened the employment gap (Schemmer& Satzger 2022). IMF research shows that AI may affect nearly 40% of jobs worldwide, with the risk being greater in developed economies, and its impact varies across countries due to differences in industrial structure (Schemmer& Satzger 2022; Spreitzenbarth et al. 2021). All in all, the impact of AI on employment needs to be viewed comprehensively, and measures need to be taken to address it (Agrawal&Goldfarb 2019).

Table7; Summary of the Impact of Artificial Intelligence on Employment Structure

Aspect	**Job Characteristics**	**Examples**	**Statistics**	**References**
High-skilled job demand	Significant growth in demand for professionals skilled in programming, data analysis, and machine learning.	Algorithm engineers, data scientists in tech companies.	AI engineer recruitment increased by 300% in five years.	[1][6][17]
Low-skilled job reduction	Reduction in repetitive, low-skill jobs, such as assembly workers and simple manufacturing roles.	Factory assembly workers, manual welders.	50% decrease in recruitment for automation-replaceable roles.	[3]
Employment polarization	Greater opportunities for highly educated individuals; higher risk of job loss for lower-educated workers.	AI R&D, financial technology favor highly educated; clerks and call center roles decline.	Demand grows for high-tech industry jobs in developed regions.	[2][5][6][7]
Emerging AI-related roles	Emergence of roles like AI engineers, data annotators, and health consultants leveraging AI tools.	AI trainers, interdisciplinary designers, health consultants.	Emerging occupations span multiple disciplines and focus on AI-related tasks.	[8][16]
Impact on traditional occupations	Automation reduces routine jobs (e.g., telemarketing, data entry) while enhancing roles requiring creativity and innovation.	Telemarketing replaced by AI voice systems; creative roles like content designers rise.	Routine jobs decline as automation takes over; innovative roles emerge.	[10][7]
Education level effects	Higher education correlates with better adaptation to AI-driven changes; low education faces higher replacement risk.	College graduates gain; high school or less see higher unemployment risks.	Highly educated talent dominates the high-tech job market.	[2][5]

Industry-specific impacts	Manufacturing sees job creation in intelligent engineering; services gain roles like data analysts but lose traditional customer service jobs.	Robotics engineers in factories; automated systems replacing customer service.	40% of jobs globally affected, with variation by industry and region.	[3][6][10]
Positive impacts of AI	AI spurs new jobs, promotes cross-disciplinary skills, and enhances competitiveness of multidisciplinary workers.	Creation of intelligent manufacturing engineers, robot maintenance technicians.	Cross-disciplinary knowledge increases worker competitiveness.	[3][5][6]
Negative impacts of AI	Displacement of low-skill workers widens the employment gap; developed economies face higher risks due to structural differences.	Automation replacing bank tellers, data entry clerks.	Widening employment gap, with low-skilled workers at highest risk.	[7][10][4]

Note: This table lists the number of publications per country/region. The paper numbers correspond to the list in APPENDIX.

Source: Authors' compilation (2025).

IMPACT OF AI ON THE STRUCTURE OF SKILL DEMAND

With the booming development of AI, its demand for technical fields also directly affects the requirements for people's skills, especially in the core areas of machine learning, natural language processing, and computer vision. The rapid development of these technologies has made specialized technicians familiar with the relevant algorithms and applications key to the competitiveness of companies (Ghazwani et al. 2022). For example, in the field of machine learning, engineers with skills in model development and optimization can help e-commerce enterprises (e.g., Amazon, Taobao) to achieve accurate recommendations by analyzing massive amounts of data, thereby enhancing user experience and platform sales (Bluestone&Wallace 2020). These practical applications (e.g., Table 8) highlight the high demand for machine learning algorithm developers in enterprises.

The wide application of natural language processing technology also promotes the skills of language engineers and interaction designers. Through natural language processing, intelligent voice assistants (e.g., Siri, Little Love Classmate) are able to recognize user commands and generate diverse services, which requires practitioners to be proficient in core skills such as speech recognition model training, semantic analysis, and user interaction logic design (Schemmer&Satzger 2022; Sonderling et al. 2022). These technological demands are particularly prominent in smart device development, which directly changes the core competency requirements of engineers.

In the field of computer vision technology, the demand for specialists has likewise surged. Developers in the medical imaging field need to be skilled in the use of deep learning and image processing technologies to design tools that can accurately identify lesion features and greatly improve diagnostic efficiency (Varghese 2020). Meanwhile, in the security industry, technicians familiar with target detection and real-time video analytics need to design systems that can automatically identify abnormal behaviors to safeguard public safety (Wang&Jue 2018).

Data, as the core resource of AI, also profoundly affects the demand for talent skills related to it. In terms of data collection and organization, practitioners need to master data cleansing, standardization, and denoising techniques to ensure that the quality of data is suitable for model training (Šukjurovs&Jeromanova 2019). For

example, big data engineers usually perform data preprocessing through tools such as SQL and Python, and this skill has become a key indicator for recruitment in many companies.

The demand for data analytics capabilities also continues to grow. By analyzing massive amounts of data, practitioners can distill insights that are valuable for corporate strategic decision-making. For example, Tencent uses social data to analyze user interests and behavioral patterns to optimize advertising and product design (Sonderling&Casimir 2022). Such data analysis skills have become an important technological competency for technology companies. However, the prominence of data security issues has also made the demand for data security technology talents more and more urgent for enterprises. Data breaches (e.g., the Equifax breach) have dramatically increased the demand for data encryption, access control, and privacy protection technologies in society (Qin&B 2019; Wang&Jue 2018). Therefore, security engineers with these technologies play a key role in protecting user privacy and core enterprise assets.

The development of human-computer interaction technology driven by artificial intelligence has further shaped the demand for the skills of interface designers, voice interaction engineers, and gesture recognition experts. In smart home scenarios, users can achieve device control through voice. For example, the Xiaomi smart home system relies on high-precision speech recognition and interactive interface design to make the user experience more natural and convenient (Yu 2011； Bonfiglioli& Papadakis 2024). In addition, gesture recognition technology is increasingly becoming a core function of smart devices. For example, smart TVs support users to switch channels and adjust volume through gesture recognition technology, which requires technicians to be skilled in sensor data processing and gesture recognition algorithms (Dan&Yun 2023). Similar technological needs are equally important in the field of smart driving. Tesla's in-vehicle system improves driving safety and comfort by combining simple interface design and voice interaction technology, allowing drivers to complete navigation, speed adjustment, and other operations without distraction (Graglia 2020).

Table 8: Summary of the Impact of Artificial Intelligence on Skill Demand Structure

Aspect	**Skill Requirements**	**Examples**	**References**
Machine Learning Skills	High demand for engineers skilled in model development and optimization to enhance AI applications in fields like e-commerce.	Machine learning engineers in Amazon and Taobao for recommendation systems.	[18][19]
Natural Language Processing Skills	Growing need for language engineers and interaction designers proficient in speech recognition, semantic analysis, and interaction logic.	Development of voice assistants like Siri and Xiaomi's Little Love Classmate.	[7][21]
Computer Vision Skills	Increased demand for specialists in medical imaging and security industries, skilled in deep learning and real-time video analytics.	Medical imaging tools for lesion detection; real-time security analytics for public safety.	[12][23]
Data Collection and Organization Skills	Practitioners need to master data cleansing, standardization, and denoising techniques to ensure data quality for AI models.	Big data engineers using SQL and Python for data preprocessing.	[20]
Data Analytics Skills	Practitioners skilled in analyzing large datasets to extract insights valuable for business strategy and optimization.	Tencent's use of social data to optimize advertising and product designs.	[21]
Data Security Skills	Urgent demand for expertise in data encryption, access control, and privacy protection to address data security challenges.	Addressing breaches like the Equifax incident with encryption and access control.	[22][23]
Human-Computer Interaction Skills	Interface designers, voice interaction engineers, and gesture recognition experts are increasingly needed for smart devices and	Voice-activated smart home systems; Tesla's in-vehicle systems.	[26][27][28][32]

	driving systems.		

Note: This table lists the number of publications per country/region. The paper numbers correspond to the list in APPENDIX.

Source: Authors' compilation (2025).

The impact of artificial intelligence on the number of jobs in different industries

In today's manufacturing field, the application of artificial intelligence has been very extensive, in the large number of robots has become a typical feature (Motah 2006). For example, in automobile manufacturing enterprises, the automated production line is equipped with a large number of intelligent robots, they can accurately and efficiently complete such as the welding of parts, assembly and other repetitive work, so that the original need for a large number of manpower positions are gradually replaced, which reflects the obvious substitution effect.

However, the development of things is always a double-edged sword. At the same time as intelligent robots replace some of the manpower positions, it has also given rise to a series of emerging positions related to artificial intelligence. Intelligent manufacturing engineers, robot maintenance technicians, and other positions have emerged, who not only need to master complex intelligent algorithms and automation technology but also need to have the ability to optimize and innovate the production process (Motah 2006). The emergence of these emerging positions not only provides strong technical support for the intelligent transformation of the manufacturing industry but also provides new employment opportunities and development space for workers, reflecting the employment creation effect of artificial intelligence.

In the field of service industry, artificial intelligence technology has diverse application scenarios. In the financial industry, intelligent customer service systems can automatically answer customers' common questions and provide services around the clock, greatly improving service efficiency, which makes some of the traditional manual customer service position (Agrawal&Goldfarb 2019). And in the medical industry, AI-assisted diagnostic systems can provide diagnostic references for doctors by analyzing a large number of medical images and case data, assisting in improving the accuracy and efficiency of diagnosis (Jonsson 2018).

However, on the other hand, AI has also given rise to emerging professions such as data analysts and AI trainers. Data analysts provide a scientific basis for the strategic decisions of enterprises through in-depth mining and analysis of massive data; while AI trainers are responsible for optimizing algorithms, labeling data, and continuously improving the performance and accuracy of AI systems (Choudhari&Teja 2024). The emergence of these emerging positions not only enriches the employment structure of the service industry but also provides workers with more diversified career choices and development paths.

Compared with the manufacturing and service industries, although the application of artificial intelligence in agriculture started later, its development potential is equally huge. Like the intelligent irrigation system can automatically and precisely irrigate according to the soil humidity, crop water demand, and other data; automated planting and harvesting equipment can complete the sowing, harvesting, and other agricultural operations according to the preset procedures to improve the efficiency of agricultural production (Holland&Kavuri 2023).

However, relatively speaking, its impact on the number of people employed in agriculture is relatively small, mainly because agricultural production activities have a certain degree of specificity, and many links still require manual fine operation and empirical judgment, which is difficult to be completely replaced by artificial intelligence. However, in the sales of agricultural products, agricultural data management, and other links, AI

has created new employment opportunities. For example, in the sales of agricultural products, the combination of e-commerce platforms and intelligent logistics systems makes it easier for agricultural products to reach the market; in the management of agricultural data, farmers can collect and analyze soil, climate, and other data through intelligent equipment to provide decision-making support for scientific planting (Holland&Kavuri 2023). The emergence of these emerging positions and income-generating channels not only enhances the intelligent level of agricultural production but also provides farmers with more employment options and income-generating opportunities.

Overall, the most urgent technical needs are focused on the innovation and optimization of AI core technologies, data security, and improving the experience of human-computer interaction (Ghazwani&Gala 2022). In the future, with the development of AI in greater depth and breadth, cross-domain integration technology, more intelligent and efficient algorithms, and personalized interaction technology may become a new key development trend. Industries must continue to follow the trend of these technological developments to better achieve their own upgrading and transformation with the help of AI.

DISCUSSION

The discussion related to the impact of AI on employment and technology demand that emerges from this study has important implications in a number of ways, as follows:

Importance for companies in formulating HR strategies

For businesses, understanding the impact of AI on employment is key to developing an effective HR strategy. To cope with changing skill requirements, enterprises should provide targeted training. For example, traditional production line workers could receive training in the operation and maintenance of smart equipment, while data analysts could receive advanced training in deep learning and big data processing to meet the growing demand. In terms of recruitment, companies should plan ahead in line with AI-driven job changes. For example, financial firms should prioritize candidates with expertise in both finance and AI, while manufacturing firms need to adjust their workforce structure, anticipate staffing needs and allocate resources effectively to improve overall operations (Negash&Yohannes 2016; Motah 2006).

Implications for the government in formulating industrial policy

In formulating industrial policies, the Government must take into account the impact of AI on employment and technology demand, so as to balance industrial growth and employment stability. To support the AI industry, the Government should invest in AI core technology research, encourage industry-university-research collaboration, and provide incentives, such as tax breaks and subsidies, to attract more enterprises to enter AI-related fields. It is also crucial to ensure stable employment. Employment monitoring systems can be set up to analyze region- and industry-specific impacts and provide re-employment training and entrepreneurial support to affected groups, which could be an important way to help alleviate unemployment caused by the adoption of AI.(Hanappi & Egger 1993).

Table 9: Discussion Summary of AI's Impact

Stakeholder	Recommendations	Examples
Companies	Develop HR strategies by providing targeted training for employees to adapt to changing skill requirements. Adjust recruitment plans in line with	Train traditional workers for smart equipment operation. Recruit finance professionals with AI

	AI-driven job changes.	expertise for financial firms.
Government	Formulate industrial policies to balance AI development and employment stability. Invest in AI research, encourage industry-academia collaboration, provide tax incentives, and monitor employment impacts.	Provide pre-employment training for groups affected by AI-driven unemployment. Offer subsidies to AI-related enterprises.

Note: This table lists the number of publications per country/region. The paper numbers correspond to the list in References.

Source: Authors' compilation (2025)

Limitations and Prospects of the Study

Although this study provides a more comprehensive and in-depth exploration of the impact of AI on employment and skill demand by means of a systematic literature review, there are inevitably some limitations. Firstly, there are some limitations in the scope of literature selection. Although several authoritative academic databases were used in the search process, and a time frame of nearly ten years as well as relevant core and expansion keywords were set to obtain the literature as comprehensively as possible, it is still possible to miss some relevant studies.

On the one hand, research on the impact of AI on employment and technology demand in some emerging industry sectors or interdisciplinary cross-cutting areas may not have been fully published or included in commonly used databases, for example, reports on the employment and technology changes in some small start-ups exploring the application of AI in niche areas may only exist in internal corporate materials or not widely disseminated.

On the other hand, there is a bias in the selection of literature in different languages, and this study mainly focuses on English literature, which may have excluded some high-quality research results in non-English languages, which may be able to complement and improve the understanding of the topic from other perspectives. Secondly, there are some shortcomings in the application of research methods. This study mainly adopts qualitative analysis methods to analyze the impact by summarizing the cases and opinions in the literature. Although this method can visually present the phenomena and laws, it is relatively lacking in quantitative data support, making it difficult to accurately measure the extent of the specific impact of AI on the changes in the number of jobs, and the increase or decrease in the number of jobs with different skills, and so on. For example, when discussing the number of job replacements caused by AI in a certain industry, it is only possible to give examples based on approximate data in some literature, and it is not possible to derive more generally representative and accurate values through large-scale statistical analyses as in the case of quantitative research.

Based on the above limitations, the following outlook is proposed for further in-depth research on the impact of AI on employment and skill demand in the future. Firstly, the scope of industries under research should be expanded. For example, subsequent research can focus on the unique impacts of AI on employment and skill demand in emerging scenarios such as virtual reality art creation and intelligent music production in the cultural and creative industries, as well as in environmental protection fields like assisted environmental monitoring and intelligent rubbish classification.

The second is to enrich the sources of literature, try to include literature in more languages, especially relevant results published in countries or regions where AI research is distinctive, and comprehensively integrate research perspectives and cases under different cultural backgrounds and levels of economic development, to make the research conclusions more universally applicable.

Finally, more advanced data analysis methods should be applied, such as combining quantitative analysis tools, collecting detailed employment data and technology input costs of enterprises in different industries before and after the introduction of AI, constructing appropriate measurement models, and accurately analyzing the quantitative relationship between various factors of AI and the quantity and structure of employment as well as technological demand, to provide more convincing databases for policy formulation, enterprise decision-making, and education guidance. It will provide a more convincing data basis for policy-making, enterprise decision-making, and education guidance.

All in all, this study highlights the need for educational institutions, businesses, and governments to proactively respond to the changes in employment and technology needs brought about by AI. By implementing targeted strategies, all stakeholders can contribute to sustainable economic and social development in the age of AI.

Implications for the reorientation of educational institutions towards the training of human resources

It is clear from the findings that the development of AI has led to an increase in the demand for highly skilled personnel in the job market, with emerging technology-related positions such as machine learning engineers and data analysts. This requires educational institutions to adjust the direction of talent training based on these changes. On the one hand, artificial intelligence-related courses should be increased, such as the introduction of machine learning, natural language processing, computer vision, and other professional courses, so that students can systematically learn the core technical knowledge of artificial intelligence. For example, colleges and universities can refer to the relevant manufacturing fields on the job skills requirements of intelligent manufacturing engineers, in the engineering curriculum into intelligent manufacturing technology teaching content, including the application of intelligent algorithms, automated equipment maintenance and production process optimization, etc., to cultivate professionals who can meet the development of the manufacturing industry intelligent. (Shao&Shi 2022).

On the other hand, it is necessary to strengthen the cultivation of practical skills, through the construction of practical platforms, school-enterprise cooperation projects, etc., so that students have the opportunity to apply theoretical knowledge to practical scenarios and improve problem-solving ability. For example, vocational colleges and universities cooperate with AI enterprises to establish practical training bases, simulate real working environments, and allow students to participate in projects such as intelligent customer service system training, medical image data annotation, etc., so that they can have certain practical skills upon graduation, and better adapt to the requirements of emerging positions in the market. (Varghese 2020; Majji&Baskaran 2021).

CONCLUSION

In summary, this study provides insights into the impact of Artificial Intelligence (AI) on employment and skills demand through a systematic literature review. The findings suggest that AI has both positive and negative impacts on employment. On the one hand, it facilitates the creation of new jobs, especially in emerging fields that require advanced expertise. On the other hand, it leads to the replacement of certain jobs, especially those characterized by repetitive or routine tasks. In terms of skills demand, AI has increased the

need for new advanced technical skills in many areas. These impacts cut across a wide range of industries, reshape the structure of employment and continue to influence the future of a wide range of industries.

As AI technology continues to evolve, its impact on employment and skills needs is expected to become more pronounced, leading to new changes and challenges. Stakeholders in industry, academia, and policy-making sectors must remain alert to the dynamic developments in the field and proactively address the opportunities and challenges presented by AI. As envisaged by Greu (2017), AI has the potential to achieve 'ubiquitous intelligence' in the future, penetrating more scenarios and applications. To take full advantage of its benefits, efforts should be made to optimize the job market and promote technological innovation (Greu 2017).

At the same time, it is critical to take a more targeted and proactive approach to aligning AI with employment and skills development. For example, policymakers could prioritize technical training in areas such as data analytics, machine learning, robotics operations, and cybersecurity, especially in rapidly automating sectors (e.g., industries such as logistics). In the manufacturing sector, a large number of advanced robot operation and maintenance skills are needed to handle automated production lines. To ensure a balanced labor market, the government can also incentivize SMEs to adopt AI responsibly by subsidizing workforce retraining and requiring clear layoff mitigation plans. At the same time, companies should focus on embedding AI responsibly, balancing efficiency with retaining and retraining the existing workforce. Educational institutions can work with industry partners to incorporate AI-oriented modules into existing curricula, thereby equipping future graduates with the hybrid skill sets required for an AI-driven economy.

This study focuses on the multiple impacts of AI on employment and skills needs, providing insights for stakeholders in the intelligence field. As AI continues to evolve and become more widely used across industries, its transformative effects are expected to deepen, creating both new challenges and a wealth of opportunities. Future research should focus on how to strike a balance between advancing the outcomes of AI-driven innovations and preserving social equity, especially in exploring practices in workforce retraining and preventing skills gaps. In addition, interdisciplinary collaboration and policy coordination on a global scale will play a key role in addressing the ethical and economic implications of AI. By contributing to these efforts, stakeholders can ensure that AI contributes to sustainable economic growth while minimizing its potential negative economic impacts.

Embracing the transformative potential of AI while mitigating its disruptive impacts is key to promoting inclusive and sustainable growth. Future research could utilize longitudinal data or econometric models to quantitatively assess how the adoption of AI affects employment rates and skills gaps in specific industries. Comparative studies of different regions, such as rural versus urban areas, or developed versus emerging economies, would also help clarify how the impact of AI varies according to local industry composition and labor force characteristics. This empirical evidence will better inform policy decisions about where to channel resources for skills upgrading, how to fine-tune retraining incentives, and which industries are worthy of targeted investments. By leveraging robust data analytics and cross-sector collaboration, stakeholders can more accurately predict the impact of AI on the labor market and develop adaptive strategies to maximize innovation, minimize displacement, and ultimately ensure that AI-driven advances are aligned with broader social and economic goals.

REFERENCES

1. Abuselidze, G., & Mamaladze, L. (2021). The impact of artificial intelligence on employment before and during pandemic: A comparative analysis. Journal of Physics: Conference Series, 1840(1), 012040. https://doi.org/10.1088/1742-6596/1840/1/012040

2. Alekseeva, L. et al. (2020). AI adoption and firm performance: Management versus IT SSRN Electronic Journal. https://doi.org/10.2139/ssrn.3677237
3. Agrawal, A. K. et al. (2019). Exploring the impact of artificial intelligence: Prediction versus judgment. Information Economics and Policy, 47, 1–6. https://doi.org/10.1016/j.infoecopol.2019.05.001
4. Ayhan, E., & Alagöz, Y. (2024). Artificial dermatitis versus artificial intelligence: Detecting etiology with Google Lens. Skin Research and Technology, 30(6), e13725. https://doi.org/10.1111/srt.13725
5. Bluestone, P.et al. (2020). The future of industry and employment: COVID-19 effects exacerbate the march of artificial intelligence. SSRN Electronic Journal London. https://doi.org/10.2139/ssrn.4179851.
6. Bonfiglioli, A.et al. (2024). Artificial intelligence and jobs: Evidence from US commuting zones. Economic Policy (US) https://doi.org/10.1093/epolic/eiae059
7. Boonipat, T.et al. (2020). Using artificial intelligence to measure facial expression following facial reanimation surgery. Plastic & Reconstructive Surgery, 146(5), 1147–1150. https://doi.org/10.1097/PRS.0000000000007251
8. Cheng, J. Y. et al. (2021). Challenges in the development, deployment, and regulation of artificial intelligence in anatomic pathology. American Journal of Pathology, 191(10), 1684-1692. https://doi.org/10.1016/j.ajpath.2020.10.018
9. Chhadi, D. K., & Patil, D. (2022). Artificial intelligence versus conventional orthosis. Journal of Pharmaceutical Negative Results, 13, S06-376.
10. https://doi.org/10.47750/pnr.2022.13.S06.376
11. Choudhari, S. et al. (2024). Diagnostic accuracy of artificial intelligence versus dental experts in predicting endodontic outcomes: A systematic review. Saudi Endodontic Journal, 14(2), 153–163. https://doi.org/10.4103/sej.sej_171_23
12. Crooks, C. L. et al. (2024). Designing human-centered artificial intelligence to assist with domestic abuse recovery: Mitigating technology enabled coercive control. In Proceedings of SoutheastCon 2024 (pp. 1–8). IEEE. https://doi.org/10.1109/southeastcon52093.2024.10500080
13. Dhanapal, C. et al. (2024). Impact of Artificial Intelligence Versus Traditional Instruction for Language Learning: A Survey. World Journal of English Language, 14(2), 182–190. https://doi.org/10.5430/wjel.v14n2p182
14. Fer, D. et al. (2023). An artificial intelligence model that automatically labels Roux-en-Y gastric bypasses: A comparison to trained surgeon annotators. Surgical Endoscopy, 37(7), 5665–5672. https://doi.org/10.1007/s00464-023-09870-6
15. Georgieff, A., & Hyee, R. (2021). Artificial intelligence and employment: New cross-country evidence. OECD Social, Employment and Migration Working Papers, No. 265. https://doi.org/10.1787/5d8f7c6e-en
16. Ghazwani, S. et al. (2022). Artificial intelligence, financial anxiety and cashier-less checkouts: A Saudi Arabian perspective. International Journal of Bank Marketing, 40(6), 1200–1216. https://doi.org/10.1108/IJBM-09-2021-0444
17. Graglia, M. A. V., & Huelsen, P. G. V. (2020). The sixth wave of innovation: Artificial intelligence and the impacts on employment. RISUS – Journal on Innovation and Sustainability, 11(1), 3–17. https://doi.org/10.23925/2179-3565.2020v11i1p3-17
18. Greu, V. (2017). Developing information and communications technologies with more artificial intelligence, using artificial intelligence, when internet of things is “intelligence everywhere” part 2. Romanian Distribution Committee Magazine Romanian, 8. http://crd-aida.ro/RePEc/rdc/v8i1/2.pdf
19. Greu, V. (2019). The information and communications technology is driving artificial intelligence to leverage refined knowledge for the world sustainable development – part 2 –. Romanian Distribution

Committee Magazine, 10.

20. Hanappi, G., & Egger, E. (1993). Intelligent design versus solving artificial problems: Artificial intelligence research at the crossroads. In Proceedings of the 1993 IEEE Region 10 Conference on Computer, Communication, Control and Power Engineering (TENCON '93) (Vol. 1, pp. 1051–1056). https://doi.org/10.1109/TENCON.1993.320115
21. Hanappi, G., & Egger, E. (1993). Intelligent design versus solving artificial problems: Artificial intelligence research at the cross-roads. In Computer, Communication, Control and Power Engineering. Proceedings. TENCON '93. 1993 IEEE Region 10 Conference on (Vol. 1, pp. 1–5). https://doi.org/10.1109/TENCON.1993.365358
22. Hassan, A. E. et al. (2021). Abstract P266: The implementation of artificial intelligence significantly reduces door-in door-out times in primary care center prior to transfer. Stroke, 52(Suppl. 1), A266. https://doi.org/10.1161/str.52.suppl_1.p266
23. Holland, C. P., & Kavuri, A. S. (2023). Artificial Intelligence (AI) and Business Innovation in Insurance: A Comparison of Incumbent Firms versus New Entrants. In Proceedings of the Annual Hawaii International Conference on System Sciences (pp. 3807–3816).
24. Jonsson, E. (2018). VP30 The use of artificial intelligence in health technology assessment. International Journal of Technology Assessment in Health Care, 34(S1), 20. https://doi.org/10.1017/S0266462318003483
25. Majji, K. C., & Baskaran, K. (2021). Artificial intelligence analytics—Virtual assistant in UAE automotive industry. In Inventive Systems and Control (pp. 309–322). Springer Singapore. https://doi.org/10.1007/978-981-16-1395-1_24
26. Morkhat, P. M. et al. (2019). Artificial intelligence versus public administration: Limitations of application. Humanities & Social Sciences Reviews, 7(3), 516–520. https://doi.org/10.18510/hssr.2019.7376
27. Motah, M. (2006). The ontogeny of memory and learning: natural intelligence versus artificial intelligence in information technology education. In InSITE 2006: Informing Science + IT Education Conference (Vol. 6). https://doi.org/10.28945/3028
28. Mueller, I. et al. (2022). Performance assessment for artificial intelligence-based data analysis in ultrasonic guided wave-based inspection: A comparison to classic path-based probability of detection. In Proceedings of the 10th European Workshop on Structural Health Monitoring (pp. 953–961). Springer. https://doi.org/10.1007/978-3-031-07258-1_96
29. Nagendran, M. et al. (2020). Artificial intelligence versus clinicians: Systematic review of design, reporting standards, and claims of deep learning studies. BMJ, 368. https://doi.org/10.1136/bmj.m689
30. Negash, K. et al. (2016). Artificial intelligence versus conventional mathematical techniques: a review for optimal placement of phasor measurement units. Technology & Economics of Smart Grids & Sustainable Energy, 1(1), 10. https://doi.org/10.1007/s40866-016-0009-y
31. Nilsson, N. J. (1984). Artificial intelligence, employment, and income. AI Magazine, 5(2), 5–5. https://doi.org/10.1609/aimag.v5i2.433
32. Ostherr, K. (2022). Artificial intelligence and medical humanities. Journal of Medical Humanities, 43(2), 211–232. https://doi.org/10.1007/s10912-020-09636-4
33. Peng, H. et al. (2023). Recent advancements of artificial intelligence in particle therapy. IEEE Transactions on Radiation and Plasma Medical Sciences, 7(3), 1–1. https://doi.org/10.1109/TRPMS.2023.3234567
34. Qin, H. E. et al. (2019). An exploratory study on artificial intelligence and employment change. Journal of China University of Labor Relations China. https://doi.org/10.3969/j.issn.1009-4325.2019.01.004
35. Rampton, V. (2020). Artificial intelligence versus clinicians. BMJ, 369, m1326.

https://doi.org/10.1136/bmj.m1326

36. Saheb, T. (2023). Ethically contentious aspects of artificial intelligence surveillance: A social science perspective. AI and Ethics, 3(2), 369–379. https://doi.org/10.1007/s43681-022-00196-y
37. Schemmer, M. et al. (2022). Intelligent decision assistance versus automated decision-making: Enhancing knowledge work through explainable artificial intelligence. In Proceedings of the Hawaii International Conference on System Sciences US. http://arxiv.org/abs/2109.13827
38. Shao, S. et al. (2022). Impact of AI on employment in manufacturing industry. International Journal of Financial Engineering, 9(3), 1–18. https://doi.org/10.1142/S2424786321410139
39. Seow-En, I. et al. (2023). Real-time artificial intelligence-assisted colonoscopy and the effect of endoscopist experience on polyp detection rates at a tertiary referral center. World Journal of Colorectal Surgery, 12(3). https://doi.org/10.4103/wjcs.wjcs_27_23
40. Smith, J.et al. (2024). Man versus machine: cost and carbon emission savings of 4G-connected artificial intelligence technology for classifying species in camera trap images. Scientific Reports, 14(1), 1–10. https://doi.org/10.1038/s41598-024-65179-x
41. Sonderling,K. E. et al. (2022). The promise and the peril: Artificial intelligence and employment discrimination. University of Miami Law Review, 77(1), 1–1. https://doi.org/10.2139/ssrn.4179851
42. Spreitzenbarth, J. M. et al. (2021). The state of artificial intelligence: Procurement versus sales and marketing. Proceedings of the Hamburg International Conference of Logistics, 31, 223–234. https://doi.org/10.15480/882.3990
43. Stanford University. (2024). Artificial intelligence index report 2024. Stanford Institute for Human-Centered Artificial Intelligence US. https://aiindex.stanford.edu/report/
44. Šukjurovs, I. et al. (2019). Artificial intelligence in workplaces and how it will affect employment in Latvia. Environment. Technology. Resources. Proceedings of the International Scientific and Practical Conference, 2, 154–158. https://doi.org/10.17770/etr2019vol2.4151
45. Varghese, M. (2020). Creative work versus artificial intelligence. In A brief history of creative work and plutonomy (pp. 85–88). Springer Singapore. https://doi.org/10.1007/978-981-15-9263-8_13
46. Velichenko, V. V., & Pritykin, D. A. (2011). Using artificial intelligence and computer technologies for developing treatment programs for complex immune diseases. Journal of Mathematical Sciences, 172(5), 635–649. https://doi.org/10.1007/s10958-011-0209-x
47. Waidlein, N. (2024). The impact of artificial intelligence on productivity and employment – How can we assess it and what can we observe? Intereconomics: Review of European Economic Policy, 59(1), 22–27. https://doi.org/10.2478/ie-2024-0006
48. Wang, J., & Jue, X. (2018). Artificial Intelligence and Employment. In Proceedings of the 2018 International Conference on Artificial Intelligence and Computer Engineering (pp. 19–22). Springer. https://doi.org/10.1007/978-981-13-2209-9_4
49. Yu, Z. (2011). The role of employment in the process of investment and economic growth. In Proceedings of the 2011 IEEE International Conference on Artificial Intelligence and Mechatronics (pp. 1–4). IEEE. https://doi.org/10.1109/AIMSEC.2011.6010482
50. Zant, T. V. D. et al. (2012). Generative artificial intelligence. In V. C. Müller (Ed.), Philosophy and theory of artificial intelligence (pp. 107–120). Springer. https://doi.org/10.1007/978-3-642-31674-6_8

APPENDIX LIST OF REVIEW'S PAPERS

No	Year	Author	Title
1	2024	Stanford University	Artificial intelligence index report 2024
2	2016	Negash, K., Khan, B., & Yohannes, E	Artificial intelligence versus conventional mathematical techniques: a review for optimal placement of phasor measurement units
3	2006	Motah, M.	The ontogeny of memory and learning: natural intelligence versus artificial intelligence in information technology education
4	2019	Agrawal, A. K., Gans, J. S., & Goldfarb, A.	Exploring the impact of artificial intelligence: Prediction versus judgment
5	1993	Hanappi, G., & Egger, E.	Intelligent design versus solving artificial problems: Artificial intelligence research at the crossroads
6	2024	Choudhari, S., Ramesh, S., Shah, T. D., & Teja, K. V.	Diagnostic accuracy of artificial intelligence versus dental experts in predicting endodontic outcomes: A systematic review
7	2022	Schemmer, M., Kühl, N., & Satzger, G.	Intelligent Decision Assistance Versus Automated Decision-Making: Enhancing Knowledge Work Through Explainable Artificial…
8	2006	Motah, M.	The ontogeny of memory and learning: natural intelligence versus artificial intelligence in information technology education
9	2023	Holland, C. P., & Kavuri, A. S.	Artificial Intelligence (AI) and Business Innovation in Insurance: A Comparison of Incumbent Firms versus New Entrants
10	2021	Spreitzenbarth, J. M., Stuckenschmidt, H., & Bode, C.	The state of artificial intelligence: Procurement versus sales and marketing
11	2019	Agrawal, A., Gans, J. S., & Goldfarb, A.	Exploring the impact of artificial intelligence: Prediction versus judgment
12	2020	Varghese, M.	Creative Work Versus Artificial Intelligence
13	2021	Majji, K. C., & Baskaran, K.	Artificial intelligence analytics—Virtual assistant in UAE automotive industry
14	2018	Jonsson, E.	VP30 The use of artificial intelligence in health technology assessment
15	2024	Ayhan, E., & Alagöz, Y.	Artificial dermatitis versus artificial intelligence: Detecting etiology with Google Lens

16	2011	Velichenko, V. V., & Pritykin, D. A.	Using artificial intelligence and computer technologies for developing treatment programs for complex immune diseases
17	2022	Mueller, I., Freitag, S., Memmolo, V., Moix-Bonet, M., Möllenhoff, K., Sridaran Venkat, R., et al.	Performance assessment for artificial intelligence-based data analysis in ultrasonic guided wave-based inspection…
18	2022	Ghazwani, S., van Esch, P., Cui, Y. G., & Gala, P.	Artificial intelligence, financial anxiety and cashier-less checkouts: a Saudi Arabian perspective
19	2020	Bluestone, P., Chike, O. E., & Wallace, S.	The future of industry and employment: COVID-19 effects exacerbate the march of artificial intelligence
20	2019	Šukjurovs, I., Zvirgzdia, R., & Jeromanova-Maura, S.	Artificial intelligence in workplaces and how it will affect employment in Latvia
21	2022	Sonderling, K. E., Kelley, B. J., & Casimir, L.	The promise and the peril: artificial intelligence and employment discrimination
22	2019	Qin, H. E., Management, S. O., & University, B. U.	An exploratory study on artificial intelligence and employment change
23	2018	Wang, J., & Jue, X.	Artificial Intelligence and Employment
24	1984	Nilsson, N. J.	Artificial intelligence, employment, and income
25	2021	Georgieff, A., & Hyee, R.	Artificial intelligence and employment: new cross-country evidence
26	2011	Yu, Z.	The Role of employment in the process of investment and economic growth
27	2024	Bonfiglioli, A., Crinò, R., Gancia, G., & Papadakis, I.	Artificial intelligence and jobs: evidence from US commuting zones
28	2023	Dan, S., & Yun-Ling, Y. E.	Artificial intelligence, employment structure and high-quality development
29	2024	Waidlein, N.	The Impact of Artificial Intelligence on Productivity and Employment – How Can We Assess It and What Can We Observe?
30	2022	Shao, S., Shi, Z., & Shi, Y.	Impact of AI on employment in manufacturing industry
31	2021	Abuselidze, G., & Mamaladze, L.	The impact of artificial intelligence on employment before and during pandemic: a comparative analysis
32	2020	Graglia, M. A. V., & HuelseP. G. V.	The sixth wave of innovation: artificial intelligence and the impacts on employment