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Analyzing the Impact of AI on Job Reallocation: A Bibliometric Perspective on Lost and Emerging Careers (2010–2025)

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Abstract

The research analyzes academic publications about artificial intelligence (AI) on labor reallocation through bibliometric analysis spanning a period of time from 2010 to 2025. The research examines 999 articles from Web of Science Core Collection to study thematic progressions alongside research collaboration patterns and the intellectual organization of this interdisciplinary field. The authors use VOSviewer software to produce visualizations which show keyword co-occurrence and co-authorship by country and citation analysis of top publications. The study identifies four primary thematic clusters: automation and job displacement, digital reskilling and workforce transformation, policy responses to labor disruption, and innovation in employment systems. The main contributors to this field are the United States, China, the United Kingdom and Germany, while new research are increasingly coming from India, Brazil and South Africa. The research presents the first bibliometric investigation which concentrates on the effects of AI on job reallocation analysing both the risks of job replacement and new occupational possibilities. The work reveals ongoing research challenges because it lacks thorough examinations of labor transitions across specific sectors and regional inequalities and extended reskilling effects. The authors propose three recommendations to build adaptive skill-building systems while protecting labor rights in algorithmic work environments and promoting inclusive research participation across underrepresented regions. Overall, the study provides a complete meta-level evaluation of AI's impact on employment systems and institutional resilience and inclusive economic adaptation pathways.

Keywords: artificial intelligence, labor reallocation, employment transformation, job displacement, bibliometric analysis, VOSviewer, Web of Science.

Introduction

The labor market undergoes transformation through integration of artificial intelligence (AI) technologies because they automate work processes while changing employment distribution between different sectors. AI creates labor reallocation effects which generate new positions while changing required skills and modifying the total workforce structure. The essential understanding of these dynamics enables the creation of effective economic policies and workforce strategies and education systems for the digital era.

Academic research about AI and employment transformation has shown substantial growth during the recent period. Early discussions about job automation[4] have evolved into current research that examines workforce reskilling and new occupations and human-AI collaboration. The expanding body of research lacks a unified framework which integrates its thematic progression with its research domains.

The research fills this knowledge gap through a bibliometric analysis of 999 peer-reviewed articles from the Web of Science Core Collection covering from 2010 to 2025. The VOSviewer software analyzes keyword co-occurrence and co-authorship networks and citation analysis to reveal the intellectual structure of the field and identify prominent researchers and emerging patterns and collaborative relationships.

The main research objective focuses on the need for a systematic review to track the temporal development of AI-induced labor reallocation scholarly discourse. This research helps address the knowledge gap by presenting an organized framework of the field's progression while specifying necessary areas for additional study.

The paper follows this structure: Section 2 reviews theoretical foundations; Section 3 describes the bibliometric methodology; Section 4 presents the findings; Section 5 discusses their implications; and Section 6 concludes with recommendations for future research.

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[4] Automation refers to the substitution of human labor with machine-based processes, often driven by AI or robotics

Literature Review

The labor market transformation due to artificial intelligence and digital automation happens through a dual mechanism of job elimination and workforce redistribution. Both Hepaktan and Şimşek (2022) and Neto and Silva (2013) take a structurally cautious stance regarding the disruptive employment effects of technological progress. The study (Hepaktan and Şimşek, 2022) examines Industry 4.0 innovations through cyber-physical systems and autonomous production lines which result in "dark factories" that exclude human labor from core production processes. According to its findings, technological unemployment harms mostly low-skilled workers and labor institutions that have not adapted properly to industrial changes. Neto and Silva (2013) review macroeconomic studies on unemployment and growth while discussing three theoretical frameworks: creative destruction, capitalization, and coordination failure. These frameworks show limited practical application to actual labor market statistics. The research establishes that modern labor systems remain susceptible to technological change yet demands more effective institutional solutions to mitigate automation's negative effects.

The studies by Zhou et al. (2025) and Turulja, Vugec, and Bach (2023) present an adaptable and evidence-based perspective regarding AI's effects on labor markets. A bibliometric study conducted by Zhou et al. (2025) of more than 1600 scholarly publications demonstrates how researchers have moved from simplistic job elimination predictions toward more sophisticated examinations of wage patterns and skill transformation and digital job readiness. According to their study, researchers have discovered important clusters of employment structure and policy mediation research. These findings suggest that AI can enable beneficial labor redistribution with proper institutional foresight. Turulja et al. (2023) analyze how big data and machine learning tools have improved labor market responsiveness through better job-matching systems and improved forecasting abilities. These advantages exist only when digital infrastructure and governance systems maintain high quality standards but their distribution remains uneven. The researchers present differing viewpoints about research themes and technological policy applications yet they agree that institutional and technological quality determines how AI affects labor.

Authors studying labor and AI scholarship have identified persistent biases in research that focus on normative and geographic dimensions. The research papers by De Freitas Barboza et al. (2023) and Kozar and Sulich (2023) examine overlooked dimensions of inequality and sustainability. De Freitas Barboza et al. (2023) conduct a bibliometric assessment of worldwide labor inequality research, showing that most investigations study high-income nations while disregarding labor experiences in developing countries. This geographic bias, they argue, creates system disparities and restricts the creation of fair labor. While Kozar and Sulich (2023) do not directly investigate AI, their research on green jobs demonstrates how environmental sustainability interacts with digital transformation to transform the workforce. The authors demonstrate how ecologically oriented jobs have grown but they also recognize definitional issues with green jobs which may create challenges for effective labor transition strategies. These two studies combine to demonstrate that any valid evaluation of AI-driven labor reorganization requires consideration of the fundamental socio-economic factors including inequality and sustainability.

The analyzed literature reveals both commonalities and disagreements among researchers. The destabilizing effects of automation on employment structures receive emphasis from Hepaktan and Şimşek (2022) and Neto and Silva (2013) while Zhou et al. (2025) and Turulja et al. (2023) outline scenarios for labor market success in adapting to AI transformations. De Freitas Barboza et al. (2023) and Kozar and Sulich (2023) extend the analysis by including both inequality and environmental justice in their discussion. The literature lacks an integrated model which explains the process of labor absorption through coordinated skill development and sectoral shifts and institutional transformations.

This research studies the knowledge gap through a complete bibliometric examination of 999 scholarly articles from 2010 to 2025. The study establishes a common policy framework through its thematic clusters and co-authorship networks and disciplinary trends analysis to guide current and future labor market inclusion policies.

Methodology

The bibliometric evaluation extracted its data from Web of Science Core Collection which represents a widely recognized multidisciplinary citation database. The research team developed a Boolean search term that pulled every academic paper related to artificial intelligence in labor reallocation from across the database fields of titles, abstracts and author keywords.

The research examined peer-reviewed articles between 2010 and 2025 from three Web of Science indexes: SSCI, SCIE and ESCI. The authors removed duplicate entries from 1,456 initial records to obtain the final dataset of 999 documents by applying inclusion criteria and relevance filters (see Figure 1).

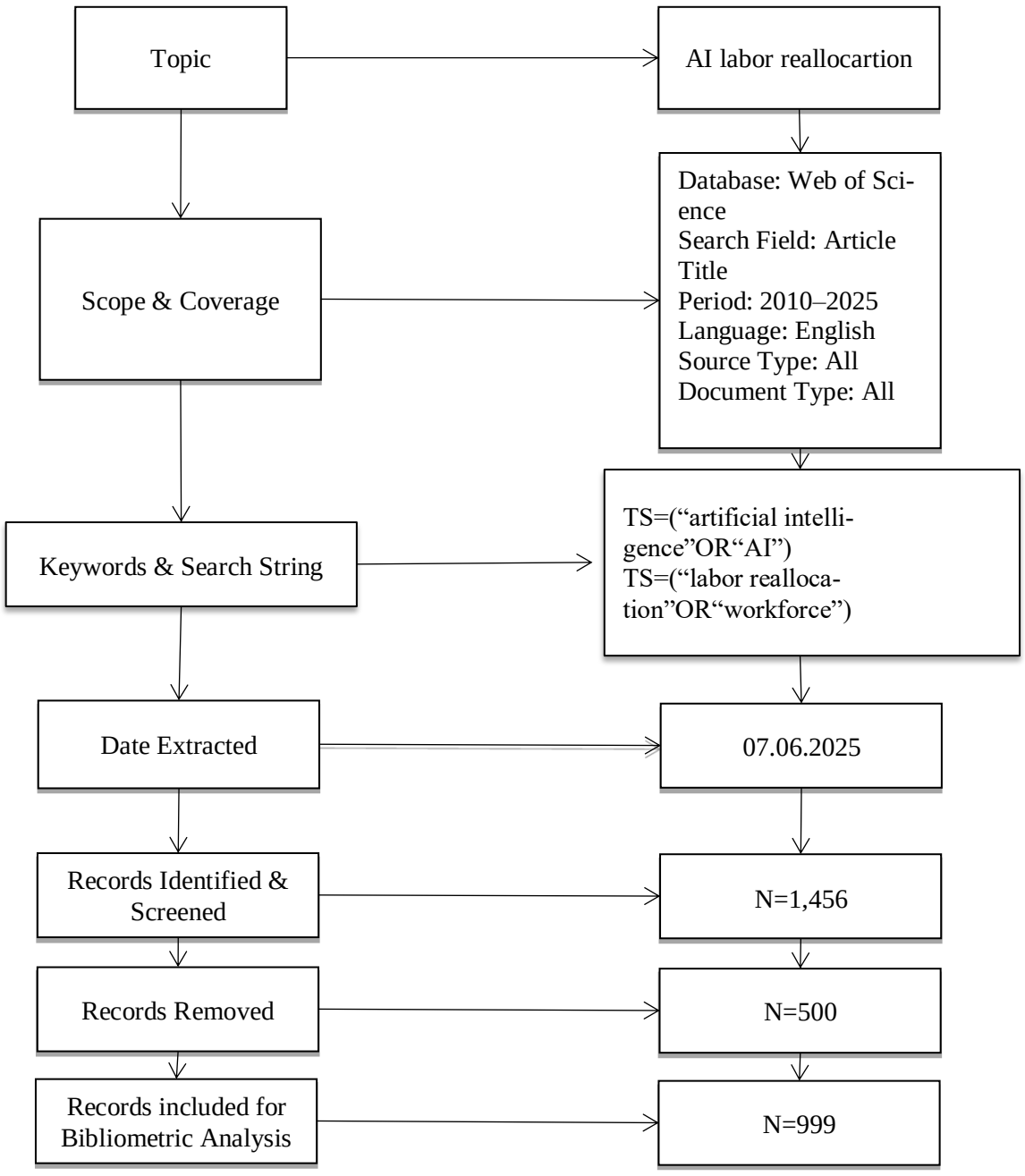

Figure 1. Full Diagram of Search Strategy

The exported data included metadata from titles, abstracts, author affiliations, keywords, citation counts, and source journals in BibTeX format. The BibTeX file with inconsistent author names and institutional affiliations and keyword terminology underwent data cleaning procedures before standardization preprocessing. The VOSviewer used a thesaurus file to merge synonymous terms and unify variant forms of keywords, such as “AI”, “artificial intelligence,” and “labor reallocation” and “workforce.”

The VOSviewer[1] bibliometric mapping tool performed data analysis on the cleaned data set to display scientific landscapes. The research implemented four distinct analytical techniques to analyze the data.

The co-authorship analysis studied international research collaborations on AI labor reallocation by showing which countries participated in these research initiatives. The research network demonstrated how countries connect through academic cooperation while showing important regions that function as thematic or regional research centers.

The keyword co-occurrence analysis detected dominant research themes within the field by analyzing their occurrences. This research employed the full counting method with a threshold of ≥8 keyword occurrences to identify and organize conceptual clusters that shape academic discourse.

The citation analysis identified 106 highly cited articles from 2012 publications by setting a citation threshold at 49 occurrences. This approach highlighted key works that have shaped the field and allowed for a temporal overview of scholarly impact based on average publication year.

The research explored how Web of Science categories along with journal sources and index databases affect the disciplinary scope and temporal concentration of publications about this topic.

The VOSviewer clustering algorithm based on modularity optimization used to group keywords together with countries. The researchers performed manual cluster interpretation to develop thematic categories such as job displacement and human capital alongside AI governance and policy response.

The macro-level analysis of research fields through bibliometric methods lacks the ability to assess individual study depth of argumentation and theoretical value. Web of Science serves as the sole data source which restricts the representation of non-English and regionally published research from the Global South thereby limiting the generalization of the research results.

Findings

The number of scholarly publications on AI labor reallocation increased substantially from 2010 to 2025, as shown in Figure 2. The number of studies published on this topic started with 4 articles in 2010 and reached its highest point at 238 articles in 2024. The number of publications stayed low and steady between 2010 and 2015 before starting to rise more dramatically from 2016 until 2018. The number of articles reached its highest point at 172 in 2021 before decreasing to 2022 and 2023 levels before reaching the peak in 2024. The 76 articles published in 2025 probably stem from incomplete indexing for the current year. The trend shows a distinct and increasing academic focus on labor market effects of AI throughout the 15-year period.

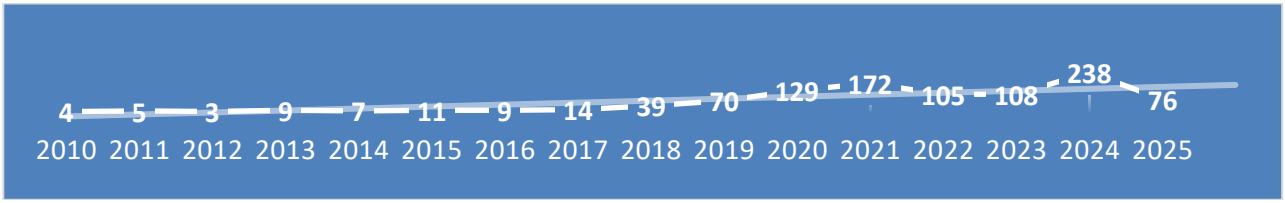

Figure 2. Annual number of publications on AI labor reallocation

The period between 2019 and 2024 proved to be the most productive publishing phase because it produced 822 articles which made up more than 85 % of all retrieved documents in the dataset. The high concentration of research during this brief period shows that AI labor reallocation has become a pressing issue because of quick technological changes and post-pandemic workforce adjustments and rising discussions on work's future. The initial period from 2010 to 2015 presents minimal academic involvement because AI adoption was still developing and researchers lacked sufficient data about its workforce impacts. The significant growth in AI-related research started after 2018 which indicates the subject gained importance in labor economics and spread across public policy and innovation studies and socioeconomic resilience fields.

The majority of the 1,064 indexed documents about AI labor reallocation come from peer-reviewed journal articles. Figure 3 indicates that academic journals account for about 69 % of all publications in this field.

[1] VOSviewer is a software tool for constructing and visualizing bibliometric networks based o citation, co-authorship, co-occurrence, or bibliographic coupling data.

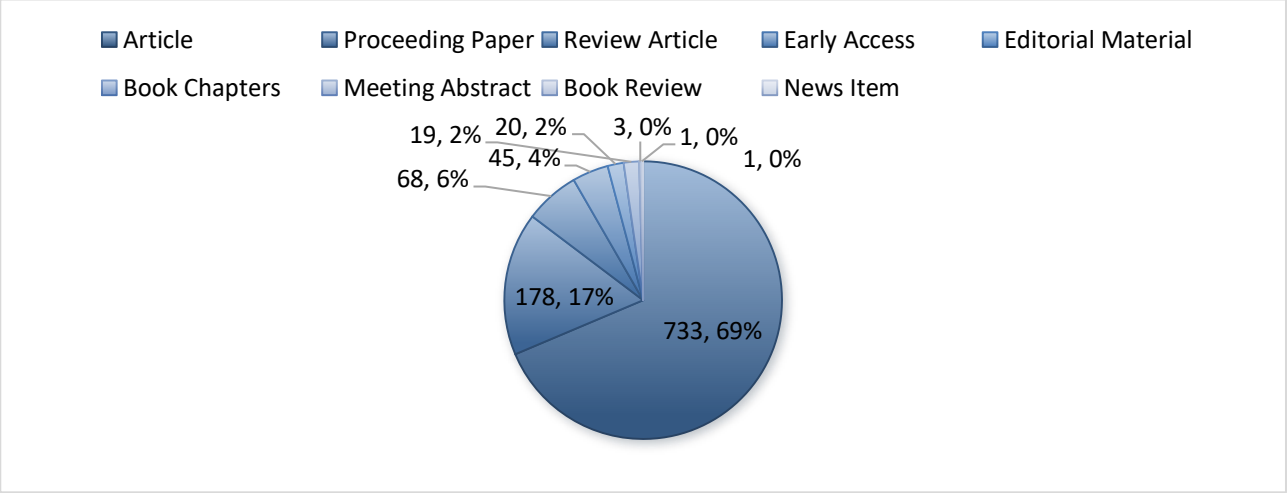

Figure 3. Distribution of document types in the dataset

The dataset shows a small number of document types other than articles. These include:

- Books and book chapters, each comprising a small fraction of the total dataset;
- A limited number of book reviews, review articles, and editorial materials;
- A few conference proceedings, meeting abstracts, and items categorized as early access.

The field demonstrates high-quality control through its minimal number of retracted or non-peer-reviewed publications. The distribution pattern demonstrates the academic advancement of the field, together with its established position within scholarly peer-reviewed journal publications. The prevalence of journal articles confirms the reliability of bibliometric network analysis that uses co-citations, authorship, and keyword frequencies.

Figure 4 illustrates the most prolific authors on AI labor reallocation between 2010 and 2025, ranked by publication count. The most active contributors have released between 2 to 5 articles throughout the study duration, indicating that scholarly engagement with this topic is distributed across a relatively wide range of contributors rather than concentrated in a small number of prolific individuals. The leading author, Lee J., published five articles, demonstrating sustained research output and consistent interest in the subject matter.

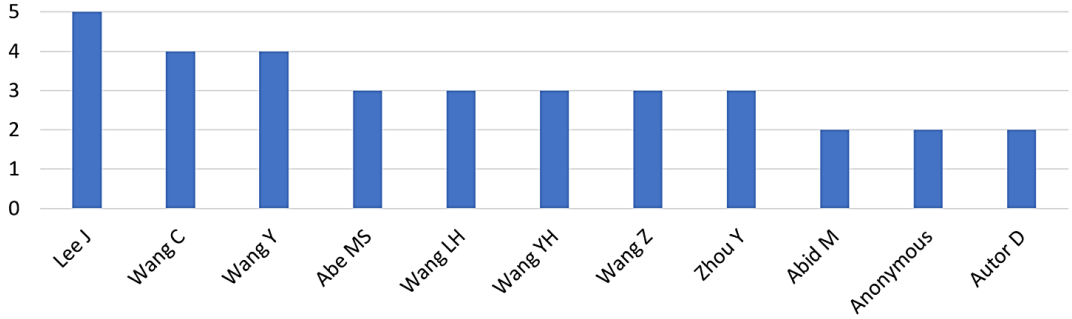

Figure 4. Most productive authors on AI labor reallocation

Wang Y., Fossen F.M., and Hanzo L. each contributed four articles, marking them as key voices in the evolving discourse. Three articles each have been published by authors Kiely R., Liu J., Rutkowski T.M., Shen Y., Stephany F., and Sumner A., indicating their consistent participation in the literature. The field maintains its position in mainstream labor economics because of the involvement of well-known economists, such as Autor D. The list shows both international and interdisciplinary breadth because these contributors probably have affiliations in economics, computer science, public policy, and technological innovation studies.

The authors who published between five and three times each (Lee J., Wang Y., Fossen F.M., Hanzo L., Kiely R.) show a moderately collaborative and distributed scholarly field that lacks strong dominance from either a single scholar or institution. These findings suggest a growing but decentralized body of research shaped by a mixture of individual contributions and thematic clusters. The 1,064 publications in the dataset receive their Web of Science (WoS) subject category classifications as shown in Figure 5.

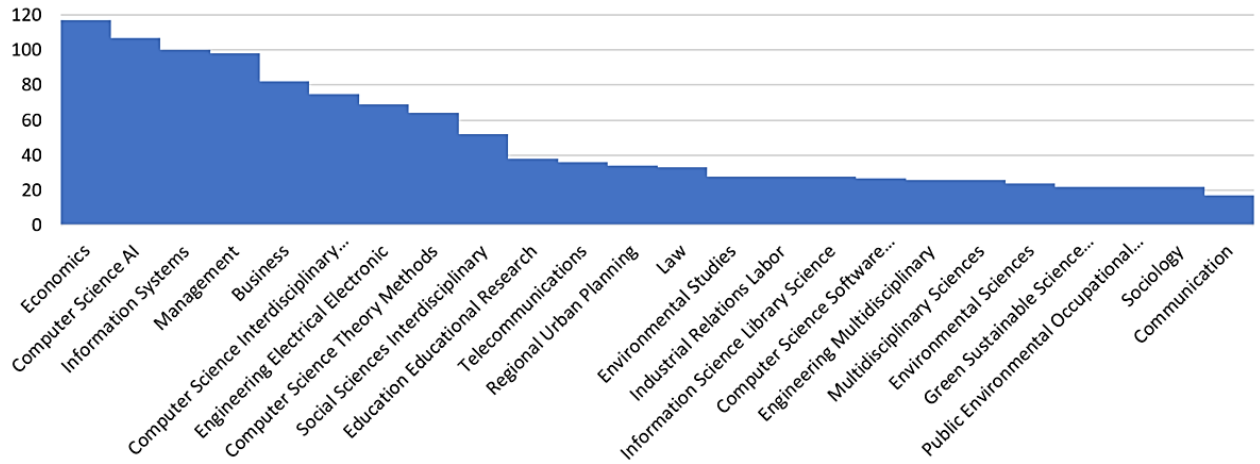

Figure 5. Most popular Web of Science subject categories

Economics stands as the leading field in the literature with 117 entries which demonstrates how economic analysis of technological change and productivity and labor market adjustment underlies the study of AI labor reallocation. The technological and algorithmic foundation of the field emerges through the 107 records in Computer Science Artificial Intelligence and the 101 records in Computer Science Information Systems. The domain of Management (100) and Business (94) investigates organizational adaptation and corporate restructuring and strategic human resource planning. The technical domains of Engineering Electrical Electronic, Computer Science Interdisciplinary Applications and Computer Science Theory Methods demonstrate substantial contributions to the applied dimensions of automation and machine learning systems in labor processes.

The combination of Educational Research (49), Social Sciences Interdisciplinary (47) and Telecommunications (40) demonstrates scholarly interest in workforce development and digital skill acquisition and communication infrastructure development. The institutional and legal and governance frameworks that affect employment structures through AI are studied in Law (31), Industrial Relations Labor (28) and Information Science Library Science (28). The data set reveals new research in Environmental Sciences together with Green Sustainable Science Technology and Public Environmental Occupational Health which indicates a growing discussion about sustainability and workplace safety. The presence of Sociology (22) and Communication (17) in the data set indicates the necessity to study inequality and social perception and ethical implications.

The category distribution presents how AI labor reallocation research unites fundamental economic models with multiple viewpoints from engineering and education and law and environmental studies to create a multi-disciplinary framework for studying artificial intelligence impacts on the labor market.

The citation topics at the meso-level (Figure 6) show significant disciplinary convergence within the literature on AI labor reallocation. Economics leads the list with 117 records, underscoring the field's core concern with labor market dynamics, productivity shifts, and income distribution under the influence of automation and algorithmic management. This dominant presence confirms that AI labor reallocation is primarily conceptualized through economic theory and empirical labor analysis.

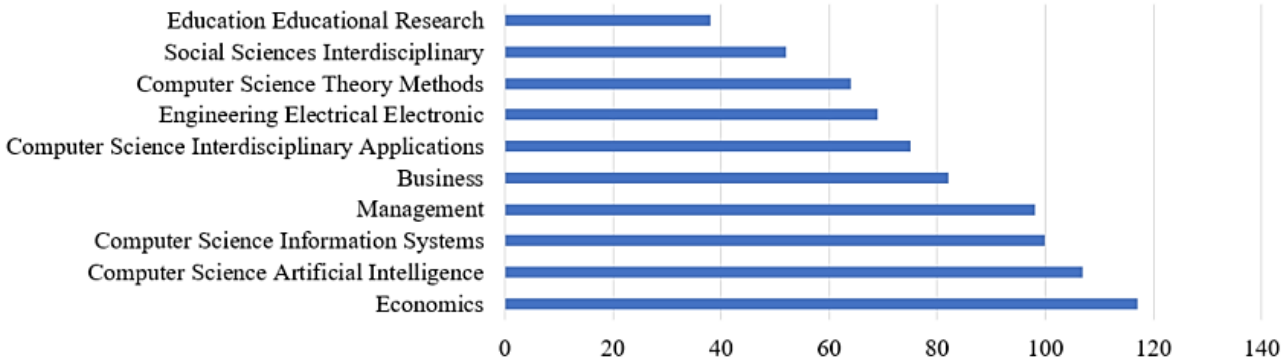

Figure 6. Most common meso-level citation topics

The following topics closely follow Computer Science Artificial Intelligence (107) and Computer Science Information Systems (100) which demonstrate that AI system technical knowledge production depends

on employment transformation discussions. The topics demonstrate that algorithmic architectures together with data processing and automation platforms serve as the main focus of academic discussions about workforce reconfiguration.

The topics Management (98) and Business (82) demonstrate how the private sector leads the way in AI implementation while driving organizational change and new work structuring approaches. The entries demonstrate how organizations must handle strategic decision-making and human capital deployment and corporate governance within AI-rich environments.

The growing importance of computational modeling and hardware integration and simulation tools in studying labor displacement and augmentation scenarios is demonstrated by Computer Science Interdisciplinary Applications (75) Engineering Electrical Electronic (69) and Computer Science Theory Methods (64). The inclusion of these topics demonstrates how theoretical and practical research methods interact to study AI's workplace effects.

The list concludes with Social Sciences Interdisciplinary (52) and Educational Research (38) which demonstrates that social adaptation and re-skilling strategies and institutional responses to AI have become essential areas of new academic research. The topics play a crucial role in studying how technological change affects inequality and digital literacy and labor market inclusion.

The research on AI labor reallocation demonstrates a strong interdisciplinary character[1]. The meso-level topics demonstrate both the economic and technological foundations of the field while showing how managerial and educational and policy-oriented perspectives have been integrated into labor studies which are evolving because of AI-driven innovation across different domains.

The micro-level citation topics in Figure 7 present an expanded view of the thematic content within AI labor reallocation research. The topic "AI Ethics" appears as the most cited subject in the dataset at 38 %. The scholarly community continues to focus on the normative and regulatory aspects of artificial intelligence because of its impact on labor markets and its need for transparency and fairness. The topic "Sharing Economy" appears in 36 % of the records which makes it the second most frequent topic. The high frequency of this topic indicates a strong relationship between AI implementation and new labor systems which include platform-based gig work and digital intermediation and flexible employment structures.

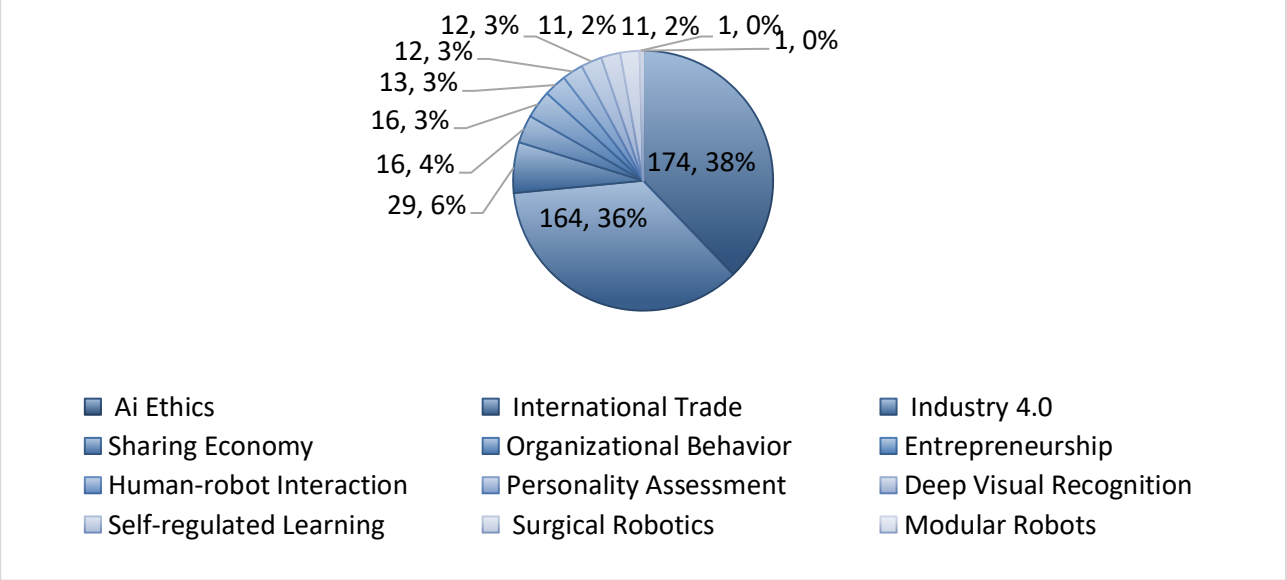

Figure 7. Most common micro-level citation topics

The topic "Human-robot Interaction" (6 %) demonstrates significant growth because researchers study how human-machine physical and cognitive collaboration transforms workplace dynamics and job roles and ergonomic design. The field demonstrates its interdisciplinary nature through topics such as "Self-regulated Learning" (4 %) and "International Trade," "Organizational Behavior," "Entrepreneurship," and "Personality Assessment" (each with 3 %). These topics demonstrate the field's focus on adaptability together with labor reskilling and institutional transformation and innovation ecosystems.

[1] Interdisciplinary character refers to the integration of concepts, methods, and analytical frameworks from multiple academic fields—such as economics, computer science, public policy, and labor studies—to address complex phenomena

The topics “Surgical Robotics” and “Deep Visual Recognition” (2 % each) appear infrequently yet remain important because they show how healthcare automation and computer vision technologies are emerging as new connections. The topics “Modular Robots” and “Industry 4.0” appear rarely because they represent specific or developing research areas that may become more prominent in upcoming research cycles.

The research distribution shows that AI labor reallocation studies move past traditional economic boundaries to embrace ethical and behavioral aspects as well as educational and industrial perspectives. The research demonstrates how the field combines detailed technological aspects with large-scale workforce changes through its broad intellectual scope.

The research field now encompasses economic and technological and educational and sustainability approaches with labor-focused studies according to the results. The analyzed literature demonstrates its connection to the United Nations Sustainable Development Goals (SDGs) (Figure 8). The dataset shows that Goal 8: Decent Work and Economic Growth stands as the most frequently mentioned SDG since it appears in 206 records. The core focus of AI labor reallocation research emerges from the employment disruption and job creation and workforce participation changes caused by automation and digitization.

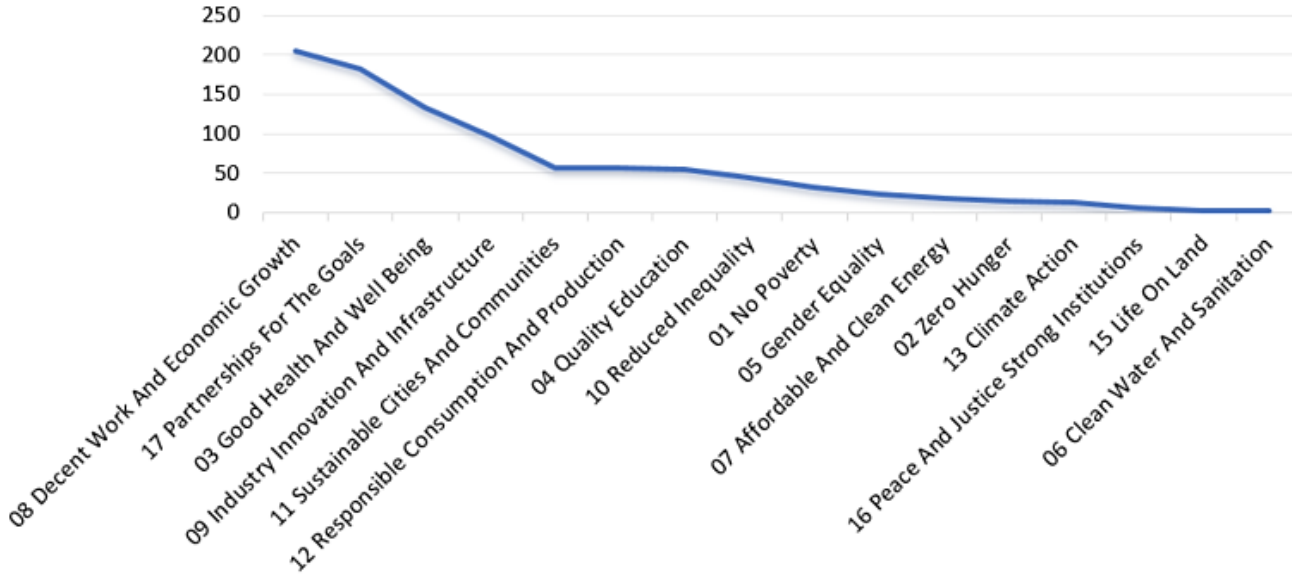

Figure 8. Distribution of literature by sustainable development goals

The second most cited is Goal 17: Partnerships for the Goals (182), indicating strong interest in global cooperation, cross-sectoral strategies, and institutional alignment for navigating labor transitions. Goal 3: Good Health and Well-Being (133) is also highly represented, highlighting growing awareness of occupational health, job-related stress, and the psychological impacts of technological displacement.

Other SDGs that appear include:

• Goal 9: Industry, Innovation and Infrastructure and Goal 11: Sustainable Cities and Communities (97 and 56 records respectively), both of which emphasize structural modernization and smart urban labor systems;

• Goal 12: Responsible Consumption and Production (56), which connects labor optimization with sustainability agendas;

• Goal 4: Quality Education (55), reflecting widespread concern with reskilling, digital literacy, and human capital development in the face of AI transformation.

Moderately represented goals include Goal 10: Reduced Inequality (44), Goal 1: No Poverty (32), and Goal 5: Gender Equality (24), all of which address the distributive effects of AI and its role in exacerbating or mitigating existing disparities.

Less frequently addressed but still relevant are Goal 7: Affordable and Clean Energy, Goal 13: Climate Action, Goal 16: Peace, Justice and Strong Institutions, and environmental goals such as Goal 15: Life on Land and Goal 6: Clean Water and Sanitation, which suggest emerging interdisciplinary overlaps.

These findings confirm that research on AI labor reallocation is strongly grounded in economic development and social inclusion, while increasingly integrating educational, technological, and sustainability considerations. The field reflects a broadening multidisciplinary engagement with the societal consequences of automation, echoing both macroeconomic transformation and individual well-being.

The distribution of analyzed publications across different Web of Science (WoS) citation indexes appears in Figure 9. The Social Sciences Citation Index (SSCI) contains 370 articles, which demonstrates AI labor reallocation research mainly occurs within economics sociology political science and labor studies fields. Social science frameworks lead the analysis of AI labor market changes because they dominate the study of their societal and institutional effects.

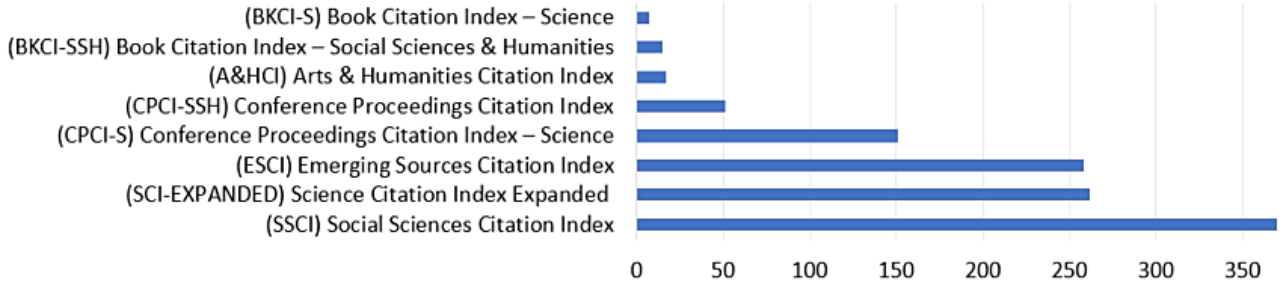

Figure 9. Distribution of publications by Web of Science index

The Science Citation Index Expanded (SCI-EXPANDED) ranks second with 262 records while the Emerging Sources Citation Index (ESCI) ranks third with 258 entries. The indexes demonstrate substantial interdisciplinary collaboration between engineering and information systems and new emerging journals that showcase the field's fast-paced growth into multiple directions.

Less prominent but still notable are:

• Conference Proceedings Citation Index — Science (CPCI-S) contains 138 records which demonstrate the importance of engineering and computer science conference-based dissemination.

• Conference Proceedings Citation Index — Social Science & Humanities (CPCI-SSH) contains 42 articles that show active participation in interdisciplinary academic exchanges.

• Arts & Humanities Citation Index (A&HCI) contains 11 articles which demonstrate occasional interest in ethical philosophical or historical perspectives about technology and labor.

Marginal contributions include:

• Book Citation Index — Social Sciences & Humanities (BKCI-SSH) and Book Citation Index — Science (BKCI-S) contain minimal entries which indicate the limited use of monographs or edited volumes in this research field.

The research field bases its core social science foundation on extensive scientific and engineering and interdisciplinary research. The various WoS indexing categories demonstrate how AI labor reallocation research connects different fields and shows its increasing significance in academic and policy discussions.

The institutions which have been most active in AI labor reallocation research from 2010 to 2025 are shown in Figure 10. The University of London leads the list with 18 publications, indicating its strong engagement in labor economics, digital transformation, and public policy studies related to artificial intelligence. Three institutions—IZA Institute of Labor Economics, Ministry of Education and Science of Ukraine, and the University of California System—follow closely with 12 publications each, indicating a geographically diverse and methodologically varied research base. Their contributions span empirical labor market analysis, policy advising, and AI's socioeconomic impacts.

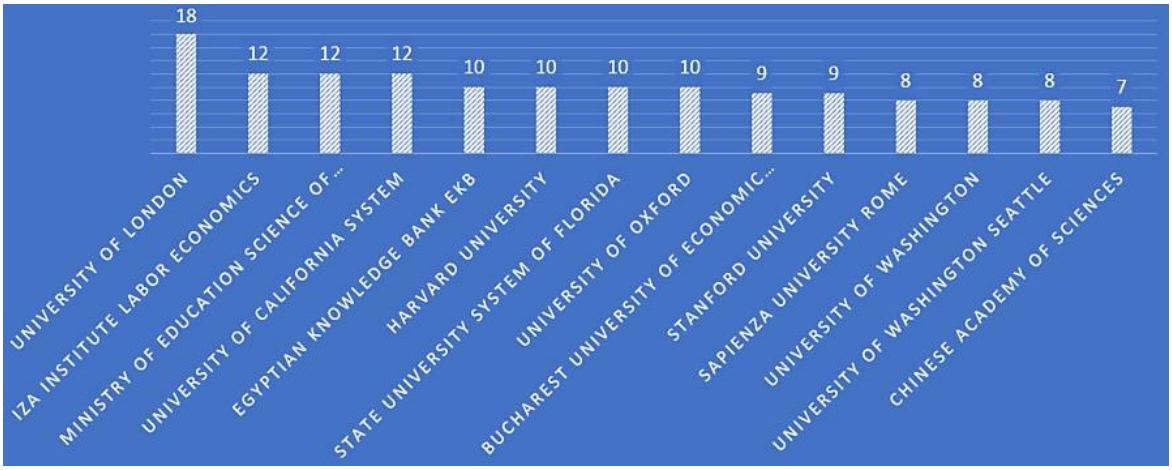

Figure 10. Most productive institutional affiliations

The publications from Harvard University, the Egyptian Knowledge Bank, the State University System of Florida, and the University of Oxford reached 10 each because these institutions received strong support from both North America and the MENA region. These institutions function as academic powerhouses that also serve as innovation centers for technology and economic transformation.

The Bucharest University of Economic Studies and Stanford University each contributed nine publications to the research which demonstrates their strong presence in Eastern Europe and Silicon Valley, respectively. The University of Washington, Sapienza University of Rome, and the University of Washington Seattle each produced eight records, which indicates their continued academic participation from European and U.S. West Coast institutions. The Chinese Academy of Sciences completes the list of top affiliations through its 7 publications which indicate AI and labor policy's increasing importance in Chinese academic research.

The research on AI labor reallocation receives backing from an extensive academic network that operates across the globe. The research draws its contributions from institutions which excel in economics and education as well as data science and public administration. The field demonstrates interdisciplinary characteristics through its engagement of institutions ranging from national policy centers and labor institutes to elite research universities which shows how technical economic and social perspectives unite to study labor transformation during the artificial intelligence era.

Scholarly research on AI labor reallocation is published in a limited number of academic journals (Figure 11). The journal Technological Forecasting and Social Change stands out as the leading one, with 19 articles, as it maintains its position as a key platform for research on technology-based employment and work studies. The 18 records in IEEE Access demonstrate how the field combines technical AI applications with practical implementation. Sustainability has published 16 articles that demonstrate a rising academic interest in the effects of AI-driven labor on environmental sustainability and socioeconomic systems.

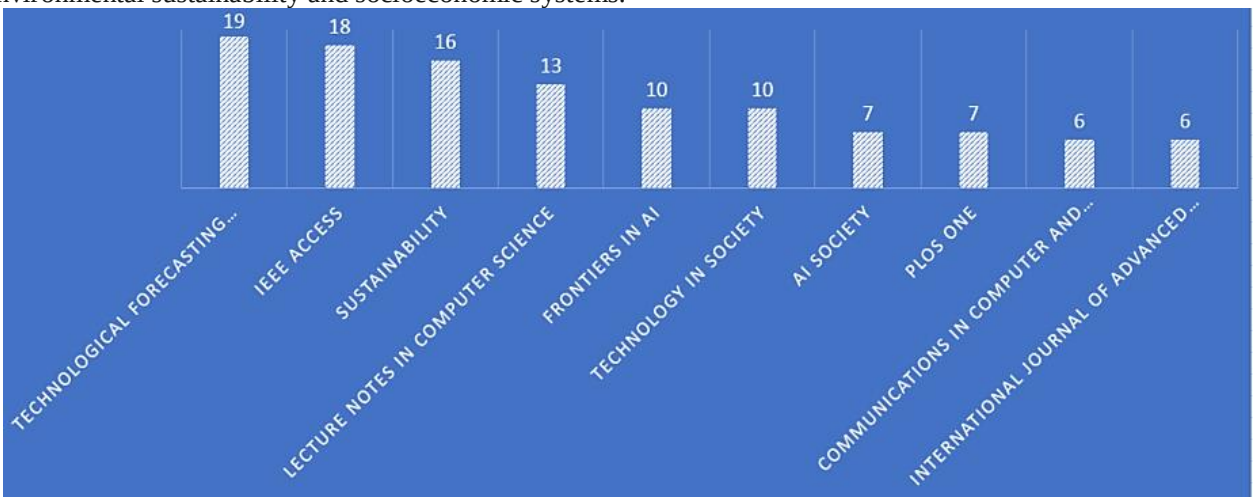

Figure 11. Number of publications by Web of Science journal titles

The 13 records in Lecture Notes in Computer Science demonstrate how methodological and computer science-based research approaches contribute to the field. The two journals Frontiers in AI and Technology in Society each publish 10 articles which indicates their active focus on AI ethical matters and social technological aspects. The publication records of AI & Society and PLOS ONE amount to 7 articles each while Communications in Computer and Information Science and the International Journal of Advanced Computer Science and Applications each publish 6 articles.

The field demonstrates interdisciplinary characteristics through its journal distribution because leading publications cover technology forecasting and applied engineering alongside ethics and governance and sustainability and open-access platforms which show how AI labor market effects draw scholars from multiple academic fields.

Figure 12 shows 1,064 scholarly publications on AI labor reallocation spanning from 2010 to 2025. The United States leads with 213 publications, reflecting its prominent role in discussions on artificial intelligence, labor economics, and technological disruption. The United States leads this result because it maintains a robust academic system and houses prominent research institutions and implemented AI technologies first in various sectors.

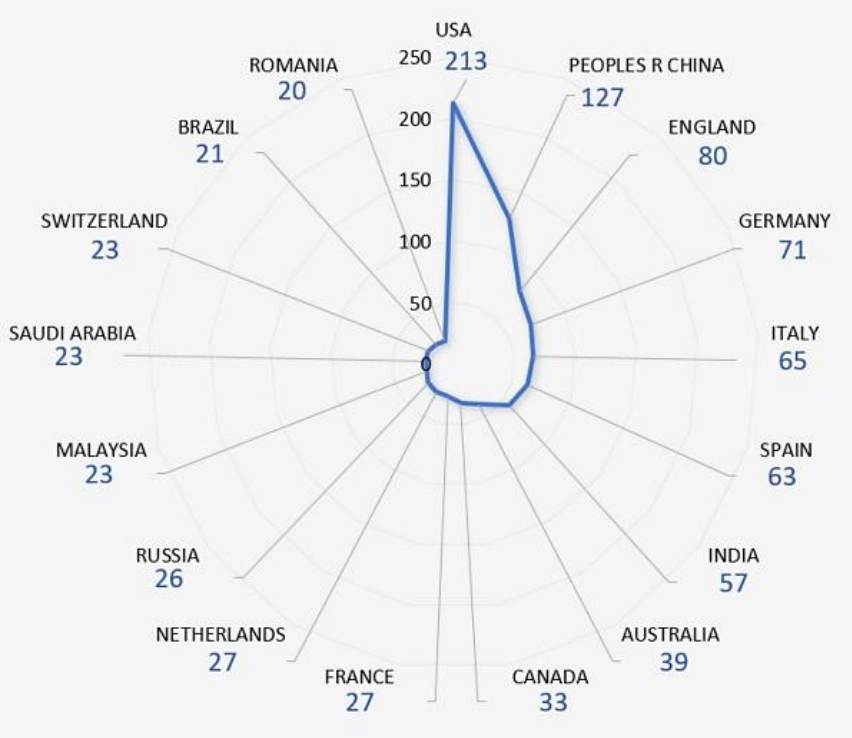

Figure 12. Number of publications by country/region

The second position belongs to China which has published 127 papers because of its deliberate AI development investments and its increasing focus on modernizing the labor market. The workforce impact of AI on labor markets receives substantial scholarly attention from European institutions through 80 publications from England and 71 publications from Germany.

The combination of computational research with socio-economic analysis makes Italy (65), Spain (63) and India (57) important contributors in Southern Europe and South Asia. The research activities of Australia (39), Canada (33) and France (27) are mainly focused on interdisciplinary research centers and public policy initiatives.

The publication range of 20 to 30 papers includes research from emerging economies and research-active middle-income countries which includes Russia (26), Malaysia (23), Saudi Arabia (23), Switzerland (23), Brazil (21) and Romania (20). The countries show increasing academic strength in studying automation and labor dynamics because they link their research to regional economic shifts and industrial changes.

The significant contributions to AI research come from East Asian countries, such as South Korea (19), Japan (18) and Taiwan (17), while Ukraine (15), Poland (16) and Portugal (14) demonstrate rising academic interest in labor inclusion and digital transitions within transitional and developing contexts.

The publication records show that Finland, Iran, Pakistan, South Africa, Austria, Ireland, Hungary, Egypt and Vietnam each published between 10 to 13 papers. The research output of Slovakia, Jordan, Mexico, Croatia, Czech Republic, Singapore, Colombia, Slovenia, Israel and Nigeria falls between 5 to 9 publications.

The research demonstrates that scholars worldwide actively study AI labor reallocation. Research communities from high-income and emerging and transitional economies participate in the topic because AI labor market implications affect all economies while each economy develops localized strategies for technological transformation.

The VOSviewer co-authorship network visualization in Figure 13 maps 83 countries that have collaborated on scholarly publications meeting the threshold of at least one document per country. The bibliometric analysis is based on bibliographic data sourced from databases such as Web of Science and Scholar. The type of analysis selected was co-authorship, using countries as the unit of analysis and full counting as the method. Documents co-authored by more than 25 countries were excluded to reduce analytical distortion from large multinational collaborations. The resulting map shows 417 links among the countries with a total link strength of 673, highlighting global research collaboration patterns in the context of artificial intelligence and related economic themes.

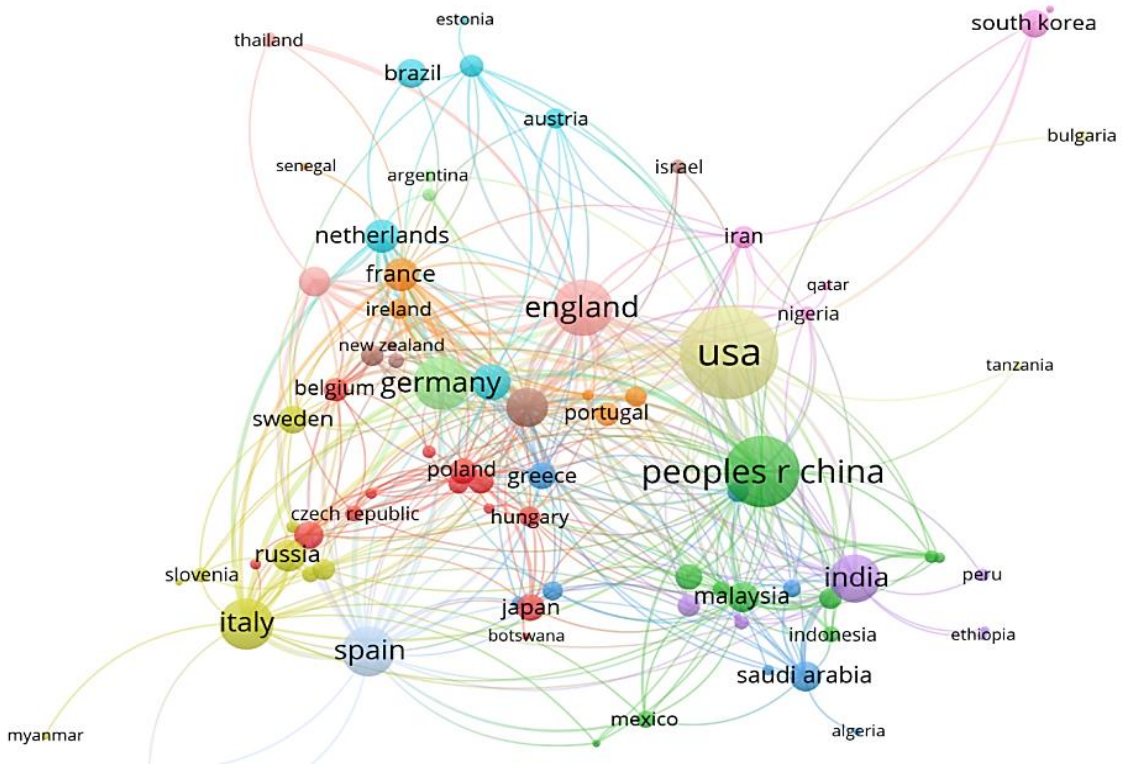

Figure 13. International Co-authorship Network in Publications

Note –Some clusters identified by VOSviewer are not visible due to overlapping nodes or very light colors, but are described in the text

Cluster 1 (red) — Central and Eastern European scientific cooperation. Countries: Belgium, Botswana, Czech Republic, Hungary, Japan, Lithuania, Norway, Poland, Romania, Serbia, Slovakia, Ukraine. The dense research collaboration network exists between Central European nations alongside post-socialist nations and Scandinavian countries as well as Japan. The nations in this cluster engage in cooperative research activities that stem from their common interests in technological development and labor market policies and digital industrialization initiatives backed by EU research funding.

Cluster 2 (green) — Asia-led research partnerships. The research cooperation group consists of Angola, Bangladesh, Indonesia, Malaysia, Mexico, Pakistan, People's Republic of China, Scotland, Taiwan, and Vietnam. The research cluster focuses on China-based South–South cooperation. Many emerging economies dedicate funds to build up their artificial intelligence infrastructure and digital technology systems. Asia as

well as Africa and Latin America follow China as their main leader for AI economic and policy research development.

Cluster 3 (blue) — Middle Eastern and North African policy focus. Countries: Algeria, Egypt, Greece, Jordan, Kenya, Oman, Saudi Arabia, Tunisia, United Arab Emirates. This cluster unites MENA nations along with Greece because they share common policy interests in technological adoption as well as labor market reforms and energy transitions. The UAE together with Saudi Arabia demonstrate their status as leading research investors and Greece acts as a bridge through its Mediterranean academic relationships.

Cluster 4 (orange) — Mediterranean and Balkan academic networks. Countries: Bosnia & Herzegovina, Croatia, Cyprus, Italy, Myanmar, Russia, Slovenia, Sweden, Turkish. This cluster extends across southern and southeastern Europe where Sweden operates as the Northern European connection. The countries share research activities about economic modernization together with migration issues and energy policy matters which correspond to EU strategic goals and regional security concerns.

Cluster 5 (purple) — Global South development and inequality research. The nations involved in this research cluster are Colombia, Ethiopia, India, Latvia, Peru, South Africa and Sudan. The central node in this cluster belongs to India while it connects research activities between South America and Africa. This cluster thematically explores economic inequality alongside employment transformation and AI-driven development frameworks[1] which serve sustainability and inclusive growth objectives.

Cluster 6 (yellow) — Advanced economies and innovation systems. Countries: Austria, Brazil, Canada, Estonia, Finland, Netherlands. Research nations with high-income or high-capacity status maintain strong connections between themselves while concentrating on AI innovation and digital labor transformation alongside institutional strategies for economic disruption.

Cluster 7 (brown) — Western European policy coordination. Countries: France, Ireland, North Ireland, Portugal, Senegal, Turkey. The research community comprises European and Euro-African alliances that most likely study migration along with trade and educational matters. Turkey functions as an organization that connects European Union networks to Middle Eastern and North African networks.

Cluster 8 (pink) — Anglo-Pacific and innovation diplomacy. Countries: Australia, Denmark, Israel, New Zealand, Singapore. These countries maintain robust AI ecosystems together with strong academic output in economic and technological fields. The research collaboration between these countries investigates labor automation as well as innovation policy and global market competition.

Smaller clusters that are not marked by color in Figure 13:

Cluster 9 — Gulf–Asia–Africa nexus. The research connections between Brunei, Iran, Nigeria and Qatar and South Korea form this specific research network. The distinctive cluster represents economic diversification efforts together with digital transformation plans. South Korea exports technology while Gulf countries concentrate on workforce market reorganization and development planning.

Cluster 10 — UK-led transnational research links. Countries: England, Iraq, Switzerland, Thailand. England stands as the main central actor in this cluster because of its academic history alongside international funding programs from UKRI. The research initiatives within this cluster analyze economic transformations taking place in developing and reconstructing post-conflict markets.

Cluster 11 — Transatlantic and Southern Cone connections. Countries: Argentina, Chile, Germany. The presence of Germany in this cluster demonstrates its position as a major research center. Research collaborations with Latin America function to develop knowledge transfer programs as well as economic modernization strategies.

Cluster 12 — Iberian and Latin American knowledge flows. Countries: Cuba, Ecuador, Spain. The Spanish connections to Latin American nations are prominent in this group which probably studies public administration reform and digital administration and pandemic recovery plans.

Cluster 13 — U.S.-led global outreach. Countries: USA, Bulgaria, Tanzania. The USA maintains its position as the largest node on the map through extensive international partnerships which it leads with research leadership and funding capabilities. This cluster demonstrates how the USA actively engages with developing countries and Eastern European regions through strategic partnerships.

Research networks show a tightly connected global academic world that features strong regional groupings together with widespread involvement from both advanced and developing economic nations. The leading positions of the USA and China and England and Germany demonstrate their influential role in forming AI-

[1] AI-driven development frameworks refer to strategic models that integrate artificial intelligence into economic planning, labor market design, and policy innovation to promote sustainable and inclusive growth.

related economic research. International academic discourse about labor inequality and technological change demonstrates growing participation of Global South countries within the academic framework according to the network structure.

The VOSviewer density visualization in Figure 14 displays the 112 most frequently occurring keywords that appeared at least 8 times in the dataset. This analysis is based on a co-occurrence method, with all keywords selected as the unit of analysis and the full counting method applied. The visualization uses a density map, where the color gradient represents the concentration of keywords: yellow areas indicate high-frequency terms, while blue and purple areas indicate lower frequency.

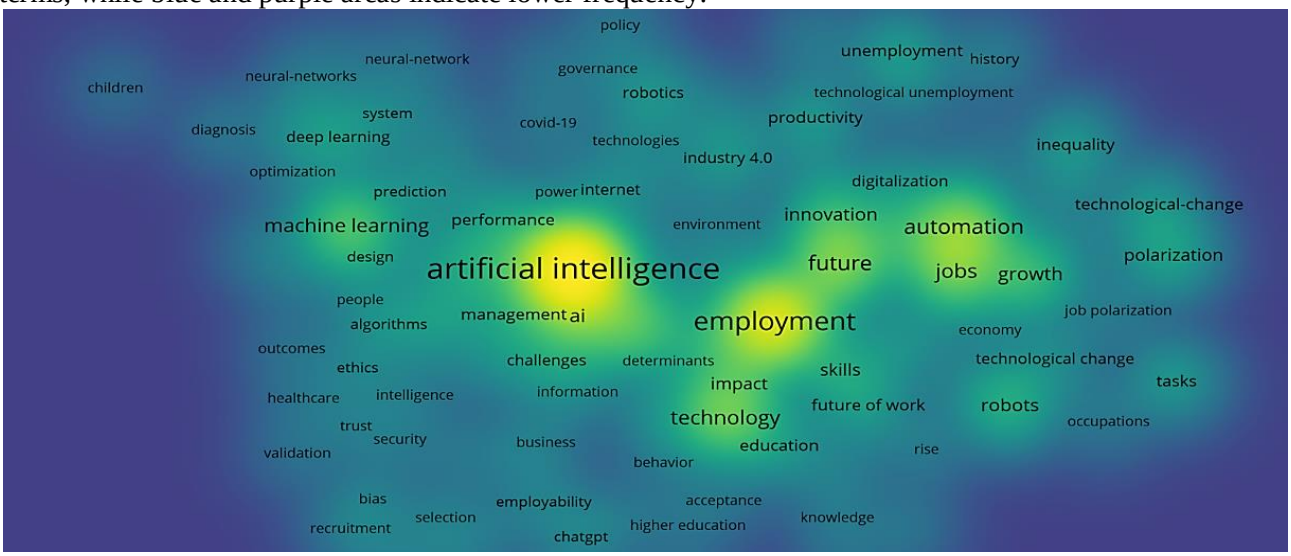

Figure 14. Keyword Co-occurrence Density (keywords ≥8 occurrences; N=112)

The research core consists of high-density terms which include “artificial intelligence”, “employment”, “automation”, “technology”, and “machine learning”. The central research topics appear frequently with economic and labor-related themes because the literature demonstrates interdisciplinary characteristics.

The research focuses heavily on “jobs” and “future” and “robots” and “inequality” and “unemployment” and “technological unemployment” and “productivity” terms which demonstrate AI’s disruptive impact on labor markets. The scholars focus on long-term labor transformations through their use of “future of work” and “technological change” and “job polarization” and “digitalization” keywords.

The density visualization reveals substantial interest in social educational and normative aspects through repeated occurrences of “education”, “skills”, “employability”, “ethics”, “discrimination” and “trust” terms. The academic community now focuses on workforce adaptation and human capital development and governance challenges during the automation and AI era.

The density visualization reveals key research directions and thematic priorities which dominate the discussion about artificial intelligence and employment through its conceptual hotspots.

The colour scale in Figure 15, representing the average publication year, reveals temporal patterns in the citation dynamics of 106 highly cited documents published between 2015 and 2023. The foundational contributions of Autor (2015), Arntz (2017), Makridakis (2017), Wright (2018), Berg (2018), and Huang (2018) are depicted in darker blue and purple tones, indicating that they were published in the earlier years of the dataset and have remained central to the academic discourse. These works laid the conceptual foundation for understanding automation risks, labor displacement, and the economic modeling of task-based transformations in the workforce. In contrast, more recent studies such as Acemoglu (2022), Kolade (2022), Fossen (2022), and Yu (2023) are shown in lighter green to yellow hues, highlighting their emergence in the latter part of the analyzed period. These contributions are gaining prominence by addressing contemporary challenges such as algorithmic bias, inequality, AI governance, and post-pandemic labor market adaptation. Although these documents are less centrally positioned within the citation network, their color intensity suggests increasing scholarly attention, indicating that they may soon become influential pillars in the evolving literature.

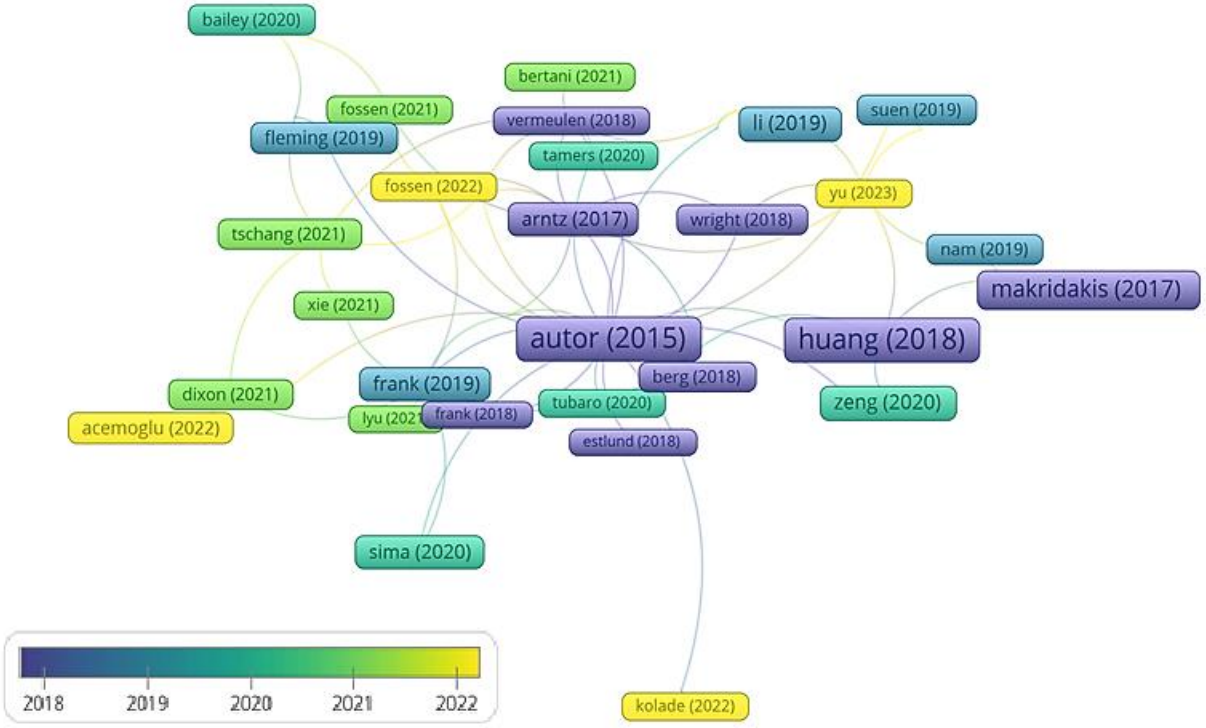

Figure 15. Citation Overlay Visualization of Highly Cited Documents (Average Year of Publication Shown; Citations ≥49; N = 106)

The intermediate documents by Frank (2019), Zeng (2020), Tubaro (2020) and Tschang (2021) function as transitional works both in terms of time and conceptual development. These studies use earlier foundational theories to develop new research that examines the platform economy and digital skills transitions and the socio-technical aspects of automation. Their central position in the map demonstrates their function as connectors between theoretical and applied research across different publication years.

The citation network visualization demonstrates intellectual clustering through strong connections between important documents which share common research approaches. The network between Autor, Huang, Arntz and Frank demonstrates a unified group of research that investigates task-based labor economics and middle-skill job automation. The documents that form tight clusters demonstrate both conceptual and methodological consistency in the literature and function as central points that attract new research.

The citation overlay visualization shows how knowledge in AI and employment research developed chronologically from 2015 through 2023. The visualization demonstrates how initial research maintains its influence on the field's intellectual framework while new publications introduce fresh concerns and theoretical developments. The diachronic mapping demonstrates how research evolves dynamically because of fast technological progress and its social economic effects.

Discussion

The bibliometric examination evaluates the complete evolution of research on AI labor reallocation throughout 2010 to 2025. The combined analysis of keyword co-occurrence mapping and co-authorship networks and citation overlay visualizations reveals crucial intellectual foundations and thematic transformations and temporal shifts in scholarly influence. The analytical techniques demonstrate how structural field elements influence development while showing academic priorities adjust through technological and policy changes.

The citation overlay visualization demonstrates that the field has experienced two essential time-based developmental phases (Figure 15). Darker shades in the early phase from 2015 to 2018 reveal the dominance of foundational works authored by Autor, Arntz, and Huang. The fundamental concept of AI-induced labor disruption took shape through task-based frameworks and automation risk assessments which were established by these research studies. The research by Acemoglu, Fossen and Kolade now appears in lighter yellow tones within the recent publications indicating their focus on policy-relevant research about inequality and governance as well as post-pandemic employment restructuring. The field has transformed its focus from displacement models to adaptive labor market solutions that promote inclusion and social equity as it develops greater interdisciplinarity and relevance for modern socioeconomic issues.

The keyword co-occurrence map demonstrates that scholars focus their research on artificial intelligence and automation together with employment and skills. The research now explores institutional and moral and developmental aspects as indicated by the prominent keywords "inequality", "governance", "ethics" and "education". The field has progressed beyond traditional economic modeling through these conceptual links by integrating sociopolitical aspects of AI transformation.

The co-authorship analysis demonstrates that scholars from around the world are forming an emerging collaborative network with central positions held by the United States, the United Kingdom, Germany and China. The selected countries serve as central hubs for both theoretical research and empirical studies. New AI labor research participants from India, South Africa and Brazil are entering the scientific networks through increased co-authorship and citation activities that demonstrate how AI labor issues have spread to global areas beyond the Northern Hemisphere.

The research findings demonstrate that AI labor reallocation studies have evolved beyond predictive technology displacement assessments into a practical multidimensional academic dialogue. The current research focuses on labor market resilience together with human capital development and ethical governance of technological transformations. This transformation brings academic research into alignment with current policy demands while demonstrating how bibliometric data supports institutional and scholarly approaches to address AI's socioeconomic effects.

Policy Recommendations

The research methods in this study are bibliometric, yet the findings hold significant relevance for policy development, particularly in economics undergoing rapid digital transformation and in countries where labor markets are highly vulnerable to AI-induced disruption. The analysis identifies structural research gaps, thematic concentrations, and evolving scholarly priorities that inform the following policy recommendations.

Governments should prioritize inclusive and adaptive workforce development policies by supporting national skills audits and investing in modular, lifelong learning systems. These initiatives should be aligned with sector-specific AI integration patterns to facilitate smooth labor reallocation, especially for low- and middle-skill workers at high risk of automation. Public funding must also be directed toward evaluating the effectiveness of reskilling programs, with a particular emphasis on digital literacy, green jobs, and human-centered professions.

Policymakers must adopt forward-looking regulation that ensures algorithmic transparency[1] and protects worker rights in both traditional and platform-based labor environments. Given the field's emerging attention to algorithmic governance and labor ethics, legislative frameworks should mandate the fair use of AI in recruitment, surveillance, and performance evaluation, ensuring that AI deployment aligns with international labor standards.

International organizations and development agencies should provide financial and institutional support for labor-focused AI research in underrepresented regions, particularly in the Global South and post-socialist economies. Cross-national collaborations can help overcome data asymmetries and foster comparative insights into how different institutional arrangements mediate AI's labor effects.

Finally, national statistical offices and labor ministries should modernize data collection systems to better capture the nuanced effects of AI across formal, informal, and hybrid employment sectors. Improved data infrastructure will not only support evidence-based policymaking but also enable early intervention strategies in response to labor displacement trends. Together, these measures will help ensure that AI-induced labor transformation fosters economic resilience, equity, and social cohesion.

Conclusions

The bibliometric analysis of 999 articles spanning time period from 2010 to 2025 delivers fresh knowledge about the academic progress of artificial intelligence and labor reallocation research. The study analyzed data from prominent academic databases through VOSviewer visualization tools to reveal the thematic development and citation patterns and global research collaboration dynamics of this rapidly expanding field. The analysis reveals significant findings with emerging interdisciplinary research clusters and the rising influence of scholars who study policy alongside ethics and workforce transformation.

[1] Algorithmic transparency refers to the clarity and openness with which automated decision-making systems disclose their processes, criteria, and impacts, allowing affected stakeholders to understand, audit, and contest outcomes.

The AI employment research field has evolved beyond its first focus on automation risks and labor displacement to adopt a comprehensive framework which now includes governance structures alongside inequality analysis and reskilling initiatives and algorithmic accountability frameworks. The research demonstrates both conceptual agreement and geographic inequalities because high-income nations along with top academic institutions maintain control over co-authorship relationships and citation networks. The research demonstrates how scholars from emerging economies together with underrepresented regions have started to participate more actively in the field especially during recent years.

The research provides a comprehensive analytical framework to understand the intellectual structure of AI labor studies. The research identifies multiple areas that require additional study including informal work and public sector employment as well as labor market outcomes in the Global South and longitudinal assessments of reskilling programs. Future research should address two essential extensions by including non-English publications from various regions to enhance global representation and by merging bibliometric analysis with qualitative content evaluation to better understand theoretical advancements and policy significance.

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