

Predicting Jobs, Shaping Economies: Bibliometric Insights into AI and Big Data in Workforce Demand Analysis

EL Massi Fouad, ELouadi Abdelmajid

Advanced Systems Engineering-National School of Applied Sciences, IBN Tofail University, Kenitra, Morocco

Abstract—The integration of Big Data and Artificial Intelligence (AI) is fundamentally transforming how labor markets are analyzed, predicted and managed. Despite significant advances in using these technologies for workforce analytics, the field suffers from several critical limitations: existing approaches predominantly rely on data from online job portals that may not capture informal employment sectors, current predictive models lack robustness in long-term forecasting under rapid economic transformations and cross-border data integration remains insufficiently addressed for comprehensive global analyses. Moreover, the field lacks a structured, quantitative assessment of scientific production that provides a comprehensive overview of research developments, with most existing studies being case-specific or focusing on narrow applications, leaving significant gaps in understanding the intellectual structure, key contributors and thematic evolution of this interdisciplinary domain. To address these research gaps, this study presents the first comprehensive bibliometric analysis of global scientific research examining the intersection of AI, Big Data and labor market prediction. Drawing on a systematic dataset of 276 publications from Scopus, Web of Science and OpenAlex databases spanning 2003 to 2025, this research employs advanced bibliometric techniques to map the intellectual landscape of this rapidly evolving field. Through a structured four-phase methodological framework incorporating performance analysis, science mapping and thematic evolution, the study identifies research trends, intellectual structures, influential contributors and emerging themes. The analysis reveals significant developments in predictive modeling, natural language processing, and hybrid AI approaches for recruitment forecasting and workforce analytics, while highlighting critical challenges posed by algorithmic bias and ethical considerations in AI-driven systems. Key contributions include: 1) the first systematic scientific mapping of the AI-Big Data-labor market intersection, 2) identification of research gaps and future directions for long-term labor market prediction, 3) comprehensive analysis of institutional networks and collaborative patterns and 4) evidence-based recommendations for addressing data integration and model interpretability challenges. The findings offer actionable insights for researchers, policymakers and practitioners seeking to leverage intelligent systems to shape the future of work in the digital economy while addressing current methodological limitations.

Keywords—Big data; Artificial Intelligence; predictive modeling; bibliometric analysis; natural language processing; labor market analytics

I. INTRODUCTION

In recent years, the convergence of Big Data and Artificial Intelligence (AI) has significantly reshaped the analysis and understanding of labor markets. The growing availability of large-scale employment data, together with advancements in

predictive modeling, has enabled new approaches to forecasting labor demand and supply, monitoring workforce dynamics and informing evidence-based labor market policies. As economies transition to more digital and knowledge-intensive models, the ability to derive actionable insights from complex labor datasets has become a strategic imperative for researchers, employers, and public authorities.

Despite the growing number of studies that apply these techniques to hiring forecasts, the field lacks a comprehensive and structured quantitative analysis of the scientific output necessary for extensive reviews. Most existing research remains case-specific or narrowly focused, leaving significant gaps in understanding the intellectual structure, key contributors and thematic development of the discipline. To address this gap, the present article offers a bibliometric analysis of the scientific literature on the application of Big Data and Artificial Intelligence to labor market prediction. The study examines publications from three major scientific databases, Scopus, Web of Science and OpenAlex, covering the period 2003 to 2025.

The analysis is organized into several sections to ensure a comprehensive and coherent exploration of the field. Section II provides a synthesis of related studies and prior reviews addressing the intersection of Big Data, Artificial Intelligence and labor market forecasting. Section III details the methodological framework employed for this bibliometric study, including the selection criteria, data collection procedures and analytical tools such as Bibliometrix and VOSviewer. Section IV presents the results and key findings, focusing on publication trends, networks of authors and institutions, patterns in keywords and phenomena and the identification of thematic clusters. Section V offers a critical discussion of the observed patterns, highlights the research landscape and proposes directions for future investigation. The article concludes with a final section summarizing the main contributions and discussing the broader implications for research and policy in labor market analysis. Through this structured approach, the study aims to provide an extensive scientific mapping of this interdisciplinary domain and to offer meaningful insights relevant to both academic and policy-oriented debates concerning the future of labor market analysis.

II. RELATED WORK

The convergence of Big Data Analytics, Artificial Intelligence (AI) and Predictive Modeling have made a paradigm change in the way of analyzing, understanding and forecasting

labor market dynamics to researchers. Over the past decade, this interdisciplinary domain has expanded rapidly as organizations and governments seek to harness large scale datasets and advanced computational methods to inform workforce planning, skills development and employment policy.

Labor market surveys refer to the collection and analysis of big data posts, social media, professional networks, government statistics and company registers, collection and analysis of large versions of unarmored data from different sources. These data sets have valuable information on employment patterns, skills requirements, salaries and career paths that were previously difficult to capture through traditional surveys on the labor market.

Artificial intelligence, especially machine learning algorithms, enables researchers to treat these mass datasets effectively, recognize complex patterns and produce insights that would be impossible through manual analysis. This AI-operated equipment can identify new job categories, predict future skills requirements, analyze regional employment beaches and even detect prejudices in practice as hiring. The future analysis implements statistical techniques, machine learning algorithms and data mining to analyze current and historical data to provide predictions on future labor market conditions. In human resources and work plan, these predictions organizations help to estimate the lack of talent, identify high -capacity candidates, reduce sales and optimize recruitment strategies.

The growing research that examines the intersection of these technologies with labor market analysis is documented through various systematic reviews, text list analysis and literature reviews. These research synthesis approaches provide a valuable framework to understand how these technological innovations change employment, skills requirements and the development of careers in the digital economy.

A. Big Data Application in Labor Market Analysis

The rise of large data has revolutionized the labor market analysis by providing unique access to granular, multidimensional information that was not available through traditional research methods earlier. Especially online job portals have become valuable data sources to understand the labor market's dynamics, skills requirements and employment beaches. Like Mrazova et al. Expelled in its analysis of the Indian job portal Babjob, Online Work Portal Data can contribute to labor market policy in five main areas: Monitoring of the labor market, the workforce evaluation, evaluation of job-sex behavior, prognosis analysis of skills and experimental studies [1].

The ability to collect, treat and analyze on a large scale from online sources provides significant benefits on traditional labor market survey methods. Vankevich et al. Note that the methods of traditional labor market analysis often depend on chronic information collection technologies and fail correctly to the account correctly for specific skills in CVS and vacancies. They propose function based on large computer technologies and Artificial Intelligence, which is to quickly collect, process and imagine data on profit requirements in businesses, fields and financial fields [2].

A particularly powerful application is the use of natural language processing (NLP) to start job postings and restart on

scale. Researchers have used NLP methods to identify changes in different businesses and industries. Nicolev emphasized how calculation language and lesson analysis equipment enable researchers to analyze labor changes at the level of personal competencies by checking the text of online positions [3]. This approach allows for real-time monitoring of vacancies across regions and countries, predicting demand for specific skills and comparing labor markets internationally.

Some researchers have leveraged Big Data to develop advanced recommendation systems that more effectively match job seekers with suitable employment opportunities. For example, Qin et al. designed neural network models to evaluate the degree of fit between job seekers and job requirements, thereby reducing reliance on manual screening by human resource professionals [3][4]. Similarly, Zhou et al. constructed models to assess the popularity and relevance of job skills using large-scale recruitment data, helping to identify which competencies are most strongly associated with high-paying employment opportunities [3][5].

Advanced machine learning techniques enable researchers to detect complex patterns in labor market data. For instance, Alakl et al. applied machine learning methods to analyze 35,000 article abstracts and 57,000 LinkedIn posts, identifying 28 variables grouped into five macro-level categories related to multigenerational labor markets [6]. Similarly, Rai et al. conducted a comparative analysis to evaluate the effectiveness of different models—including GPT-3 and BERT—for analyzing Artificial Intelligence methods, particularly natural language processing (NLP), in the context of regional labor markets [7].

Big Data-driven labor market monitoring has significant economic implications, particularly in terms of enhancing analytical integration. Zaloznova et al. demonstrated that Big Data analytics offer valuable labor market insights that improve competitiveness and enable the creation of online job exchanges analogous to financial stock markets [8]. These digital platforms facilitate real-time monitoring of labor market dynamics and evolving skill demands across various local and regional contexts.

These innovations are particularly valuable for tracking the rapid transformations driven by digitization and technological advancement. Cymbal et al. emphasize that traditional survey-based sources of labor market information are insufficient for capturing the profound changes in the content and nature of work resulting from digitalization [9]. Their study compiles international experiences with the use of digital technologies and Big Data in labor market monitoring, concluding that online job vacancy data significantly complement and enhance traditional labor market statistics and analyses.

The introduction of these technologies has not only transformed the analysis of labor markets, but also reshaped the recruitment process. As Spadina notes, the integration of Artificial Intelligence into recruitment has fundamentally altered the landscape, where Big Data, algorithms, and predictive outcomes now play an active role in shaping the relationship between humans and technology in hiring practices [10].

B. Limitations of Existing Methods and Contribution of the Article

Despite significant advances in using Big Data, Artificial Intelligence (AI), and predictive analytics for labor market analysis, several limitations persist in the current state of the art. First, many existing approaches are heavily based on data from online job portals and social media, which may not fully capture informal employment sectors or underrepresented populations, leading to potential biases and gaps in labor market coverage. Second, while AI-driven models excel at processing large-scale unstructured data, challenges remain in ensuring model interpretability and transparency, which are critical for policy-making and ethical considerations (5). Third, most predictive models focus on short- to medium-term forecasting and often lack robustness in long-term labor market trend prediction, especially under rapid technological and economic transformations (57). Furthermore, cross-border data integration and standardization are not adequately addressed, limiting comprehensive global labor market analyses.

Furthermore, existing methods frequently overlook the integration of multi-source data that combine quantitative labor market indicators with qualitative contextual information, such as policy changes or regional economic shifts, which are essential for nuanced understanding and actionable insights. There is also a scarcity of frameworks that systematically incorporate ethical concerns related to data privacy, algorithmic bias, and equitable representation in AI applications within labor market analytics.

This article contributes to reducing these gaps by proposing a comprehensive framework that integrates diverse data sources, including underutilized datasets, to enhance labor market coverage and reduce bias. It emphasizes the development of interpretable AI models that balance predictive accuracy with transparency, facilitating trust and adoption by policymakers and stakeholders. Moreover, the adopted approach extends predictive capabilities to better capture long-term labor market dynamics by incorporating adaptive machine learning techniques sensitive to economic and technological disruptions. The article also addresses data standardization challenges by proposing harmonized protocols for multi-jurisdictional labor data integration. Finally, it incorporates ethical guidelines into the design and deployment of AI tools to ensure responsible use, privacy protection, and fairness in labor market analyses.

By addressing these limitations, this work advances the field toward more inclusive, transparent, and effective labor market analytics, supporting informed decision-making in workforce planning, skills development, and employment policy in the digital economy.

III. METHODOLOGY

The purpose of this bibliometric study is to map and analyze the scientific landscape related to the use of large data and Artificial Intelligence (AI) for the labor market's prediction and workforce analysis. The functioning adopted follows a structured and reproducible workflow, which is grounded (preferred reporting elements for systematic reviews and meta-analysis) in Prisma (Fig. 1).

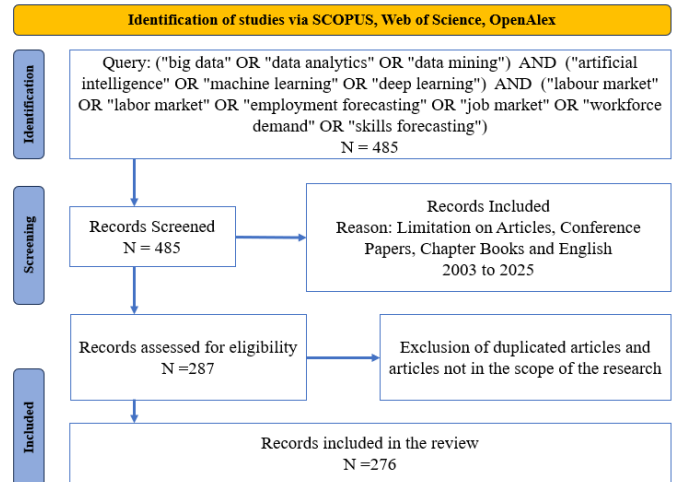


Fig. 1. Prisma approach.

A. Data Source and Query Construction

The data collection was performed using three large academic database: Scopus, Web of Science (WOS) and OpenAlex, which provides extensive coverage of colleagues underwent by colleagues. A carefully designed search was implemented to reconstruct relevant publications, including conditions related to Big Data, AI techniques and labor market forecasts:

Query: ("big data" OR "data analytics" OR "data mining") AND ("Artificial Intelligence" OR "machine learning" OR "deep learning") AND ("labour market" OR "labor market" OR "employment forecasting" OR "job market" OR "workforce demand" OR "skills forecasting").

This query targeted title, essence and keyword field. The discovery was limited to documents published between 2003 and 2025, and objects written in English were only assessed. Document types include journal articles, conference letters and book chapters.

B. Inclusion and Exclusion Criteria

Originally, a total of 485 items were obtained. The inclusion criteria were as follows:

- Publication related to the intersection of Big Data/AI and the labor market forecast.
- Documents in English.
- Publication Type: Articles, conference articles and book chapters.
- Time limit: 2003-2025.

In the screening phase, 198 documents were excluded due to irrelevance due to the extent of research, repetition or incorporation criteria. The move was considered as a result of 287 items for evaluation of qualifying.

C. Bibliometric Equipment and Analytical Techniques

The selected data was exported to BIBTEX and CSV formats for further procedure. Two large bombers used tools used:

- Bibliometrix R-Package (through the Biblioshiny interface) for publishing development, co-author, Country Cooperation, Citation Matrix and quantitative analysis of keywords CO-event).
- VOSviewer for network visualization and thematic mapping, which includes cohabitation networks, author groups and fellow phenomenon maps.

These units enabled a multi-phase exploration of intellectual and ideological structures in the region.

IV. RESULTS AND ANALYSIS

A. Descriptive Bibliometric Overview

Fig. 2 presents a comprehensive overview of key bibliometric indicators for a total of 276 documents published between 2003 and 2025 across various sources. The dataset includes contributions from 560 authors, among whom 81 were sole authors. An annual scientific growth rate of 14.84% indicates a rapidly expanding research interest in the intersection of Big Data, AI, and labor market analysis.

The relatively low rate of international co-authorship (9.03%) and an average of 2.21 authors per document suggest that research collaborations are predominantly national or confined within institutions. A total of 2,885 references were cited across the corpus, reflecting a strong theoretical and conceptual foundation in the field.

The average citation age per document (5.73 years) and the average document age (3.24 years) further indicate that the topic is both emergent and dynamic, positioning itself as a growing area of academic inquiry.



Fig. 2. Bibliometric overview.

B. Temporal Evolution of Scientific Production

As shown in Fig. 3, scientific output in this domain remained minimal between 2003 and 2015, followed by a steady increase beginning in 2016. The trend culminated in a notable peak in 2024, with over 65 publications. This upward trajectory reflects the growing influence of the digital economy and the increasing importance of data-driven decision-making processes in workforce management and labor market analysis. The apparent decline in 2025 is likely attributable to the incomplete publication window for the year, rather than an actual reduction in research productivity.

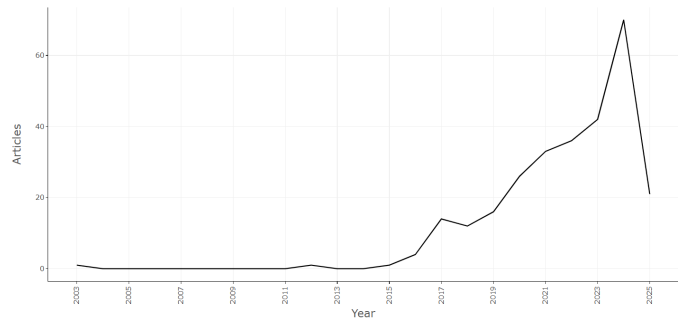


Fig. 3. Temporal evolution of scientific production.

C. Citation Dynamics and Impact

Fig. 4 illustrates the average number of citations per year. Around 2015, the citation curve shows a notable peak with high variability, followed by a gradual decline in subsequent years. This decrease can be attributed to the recency of many documents, which have not yet had sufficient time to accumulate citations.

Overall, the trend reflects an area that is expanded in volume, but which is still in accordance with academic effects.

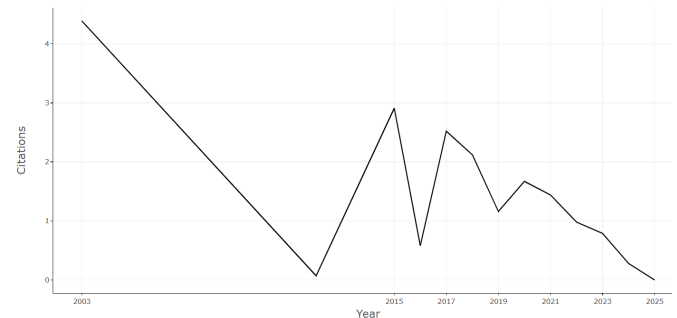


Fig. 4. Citation dynamics and impact.

D. Mapping Authors, Sources, and Thematic Domains

Fig. 5 (three-region plot) reflects mutual action between major authors, publishing sources and research domains. Christin L. Authors such as Wood, Quan Hua Lim and Janses are closely associated with influential magazines such as Emerald Publishing, SSRN and Rxiv, while thematic fields expand economics, informatics, computer science, law and political science.

It confirms the visual field field's multi-discipline, where AI and Big Data intelligence with both technical and social sciences regarding the prediction of the labor market.

E. Core Publication Outlets

Fig. 6 identifies the most active publication withdrawal. Emerald Publishing Limited ebooks proceed with 38 documents, followed by people to Jobs (15) and SSRN Electronic Journal (13).

This distribution indicates a hybrid publication environment, which combines colleague-rated sources with preproofs

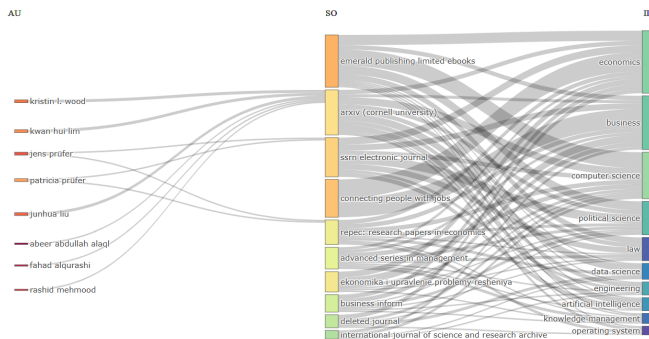


Fig. 5. Mapping authors, sources, and thematic domains.

and policy-centered outlets, which enables widespread spread in academia and decision institutions.

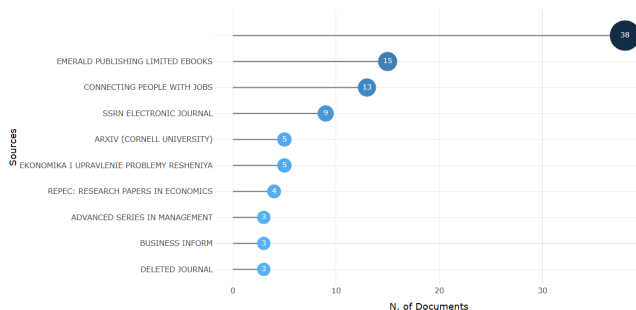


Fig. 6. Core publication outlets.

F. Evolution of Source Contributions

This Fig. 7 shows how the most relevant magazines in the area over time have contributed. Emerald Publishing Limited E -Books has conducted continuous and early involvement, reflecting a steady growth from 2017. Conversely, people with jobs later joined the field, but quickly, trapped by 2023.

The emergence of ekonomika in upravlenie and Arxiv for many last years reflects a change to various forms (open depot and regional sources), reflecting expansion inclusion and interdisciplinary in the region.

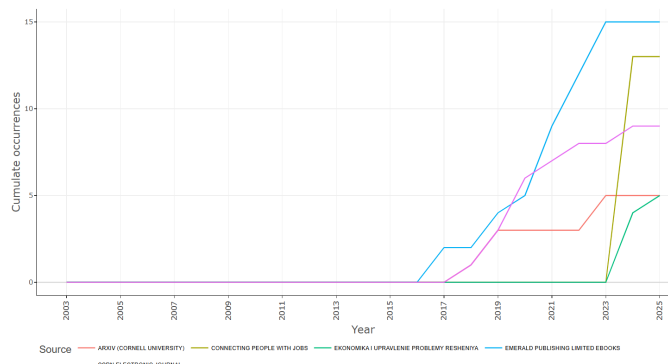


Fig. 7. Evolution of Source Contributions

G. Key Author Contributions

This rod map, Fig. 8, identifies the most powerful authors of the region, with Abir Abdullah Alakl, Alina Vankevich, Fahd Alkurashi, Irina Kalinskakaya and Rashid Mehmud 4 - Publications.

Such repeated contributions reflect the emergence of special researchers dedicated to bridge AI, Big Data and Work Economics. This elite group can serve as a main education network that governs the thematic and methodological development of the region.

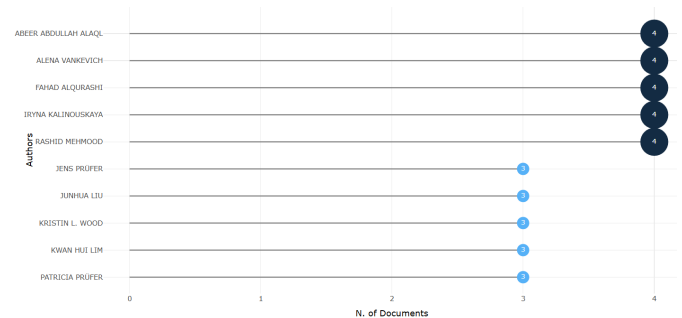


Fig. 8. Key author contributions.

H. Temporal Distribution of Author Productivity

This plot, Fig. 9, highlights the temporary research activity of the top authors. Janses and Petricia reflects quick and focused contributions around 2019-2021, while Rashid Mahmood, Alina Vankevich and Fahd Alkurashi recently showed more continuous activity, reflecting the current speed of the workforce.

The diagram showed both basic contributors and new ideas, and reflects the genetic layering of expertise in the field.

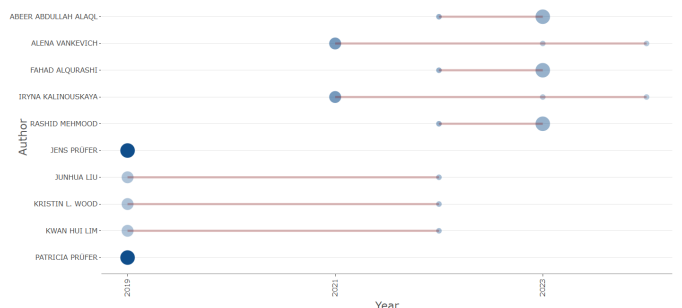


Fig. 9. Temporal distribution of author productivity.

I. Institutional Leadership in the Field

This Fig. 10 refers to the most productive institutions. The University of Texas in San Antonio is accompanied by 12 articles, followed by King Abdulziz University and Singapore University and Design (both with 9). These institutions represent a mix of America-based, the Middle East and Asian universities, highlighting global and multidisciplinary commitment to the forecast of the AI-controlled labor market. The presence of both technical and social science oriented universities confirms double anchoring the field.

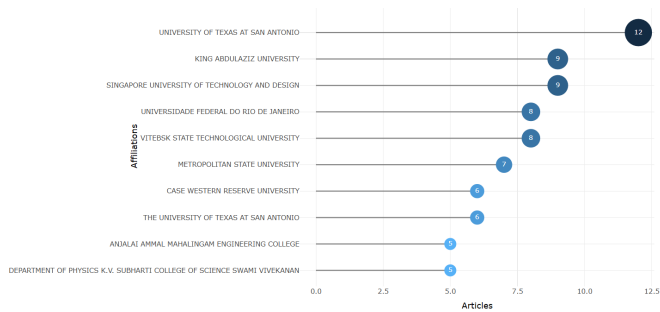


Fig. 10. Institutional leadership in the field.

J. Country-Level Scientific Output

At the country level, Fig. 11 shows that China leads in author productivity, followed by the United States, Russia, and the United Kingdom. Notably, the majority of publications are classified as Single Country Publications (SCP), indicating relatively low levels of international collaboration—an observation consistent with the metadata findings.

This trend may reflect national labor policy priorities and potential barriers related to data protection and privacy. However, it also highlights significant opportunities to foster international co-authorship and enhance global knowledge exchange in the field.

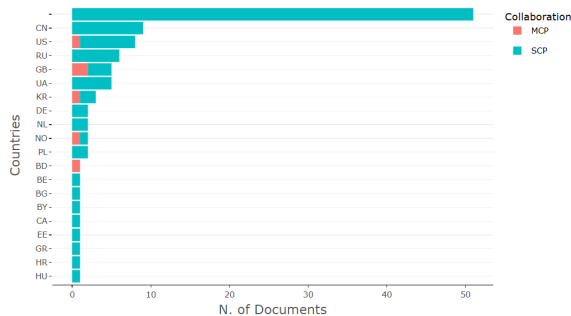


Fig. 11. Country-level scientific output.

K. Evolution of National Scientific Production

Fig. 12 reveals strong growth in publications from China (CN) since 2016, which now leads the domain. The United States (US) shows steady growth, while Russia (RU), Ukraine (UA) and Canada have shown more less, but increasing contributions in recent years.

This upward trend reflects the growing national investments and large computer strategies related to work forecasts in AI. Various contributors indicate that the area is globalization, although it is with regional intensity centers.

L. Citation Impact by Country

The United States leads in citation impact with a total of 518 citations, followed by the Netherlands (195) and Canada (97). Interestingly, China, despite its high research output, ranks relatively low in citations.

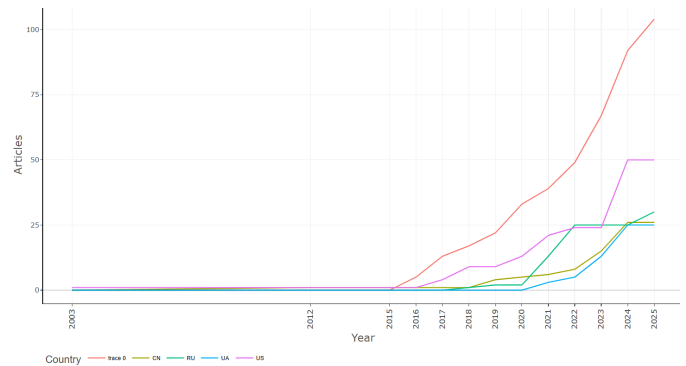


Fig. 12. Evolution of national scientific production.

This suggests that its publications are either more recent or receive comparatively less international attention. This emphasizes a difference between the opposite volume and the effect, and provides an opportunity to increase the visibility and collaboration for non-Western research production (Fig. 13).

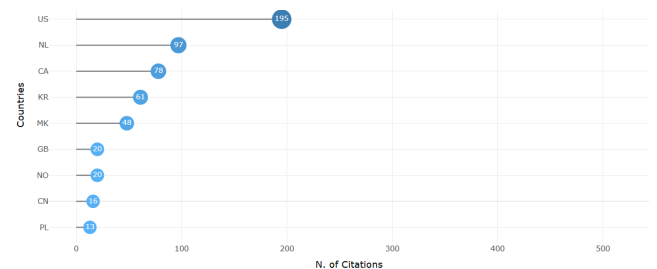


Fig. 13. Citation impact by country.

M. Conceptual Structure: Most Frequent Keywords

The most recurring concepts are “Computer science” (194 events), “Economics” (134) and “Business” (128), which confirms the interdisciplinary convergence between technical and socio-economic domains.

“Political Science”, “Computer Science” and “Artificial Intelligence” follows closely, and shows that this research sector is equally shaped by politics, analysis and calculation appliances (Fig. 14).

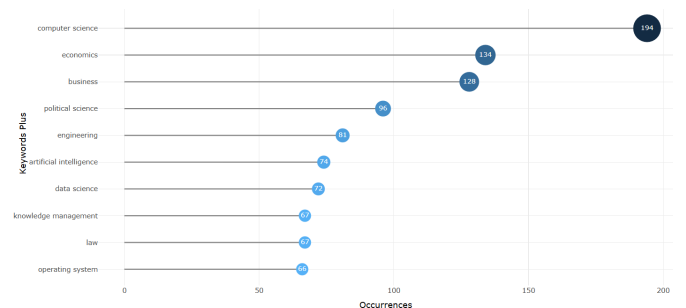


Fig. 14. Conceptual structure: most frequent keywords.

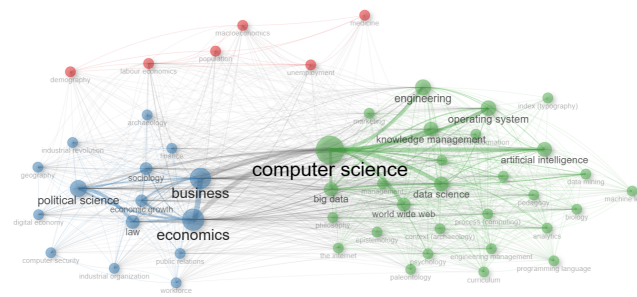


Fig. 19. Co-occurrence network of keywords.

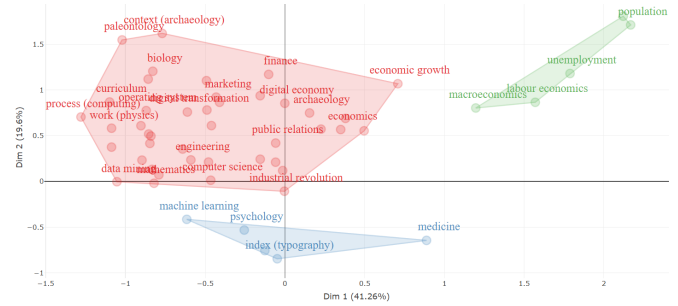


Fig. 21. Factorial analysis of conceptual structure.

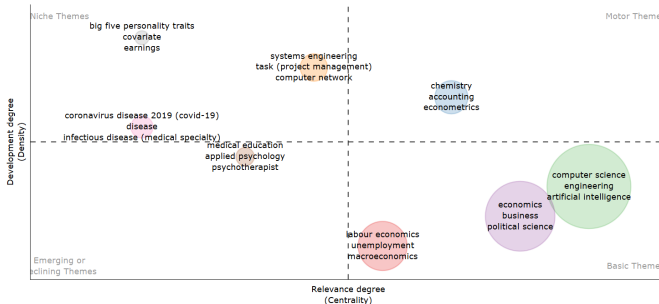


Fig. 20. Thematic map.

S. Thematic Map

This map, Fig. 20 shows:

- Basic themes: “computer science”, “engineering”, “AI” → foundational and well-established.
- Emerging/Declining: “labor economics”, “macroeconomics” → growing but still under-structured.
- Niche themes: “psychology”, “COVID-19” → specialized but with less general impact.
- This helps frame future research directions and gaps in labor analytics.

T. Factorial Analysis of Conceptual Structure

This factorial map, Fig. 21 shows three main conceptual dimensions:

- A dominant cluster (red) linking “computer science”, “economics”, and “digital transformation”.
- A green cluster focused on “labour economics”, “population”, and “unemployment”.
- A blue cluster with “machine learning”, “psychology”, and “typography”.

These axes confirm the coexistence of technical, economic, and human-centered subfields, reinforcing the interdisciplinary fabric of AI and big data applications in labor market prediction.

U. Collaboration Network

The cooperation network, Fig. 22, reveals a fragmented but practical map of large data applied to international co-author and labor market analysis within AI in Fig. 22. The United States (USA) appears the most connected and central hubs to cooperate with countries such as Singapore (SG), Bangladesh (BD).

Other regional groups are visible:

- A strong Europe -Asia Bridge (e.g. UK - Italy - Pakistan).
- Eastern European alliances such as Russia - Ukraine - Bulgaria.
- Isolated regional partnership (e.g. Brazil - Portugal, France - Netherlands, Australia - New Zealand).

However, the lack of dense intercontinental cooperation is clear. Many clusters are insular, showing limited integration. This indicates the need for extensive international research participation, especially between high outputs and emerging areas.

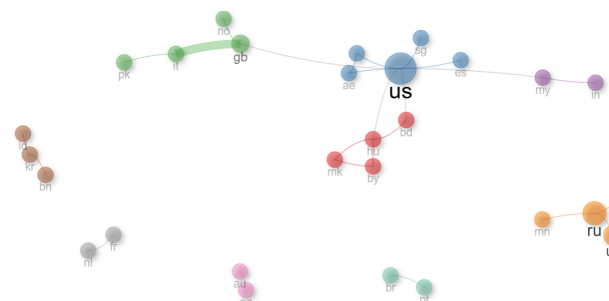


Fig. 22. Cooperation network.

V. Countries Collaboration World Map

The global heatmap reinforces the dominant role of the United States, China, Russia, and Western Europe as key actors in international research collaboration. However, the intensity of cooperation is noticeably higher in North America and Europe, while parts of Asia, and especially regions in Africa and Latin America, exhibit lighter or neutral tones—indicating limited global engagement.

As illustrated in Fig. 23, this pattern suggests that, although the field holds global significance, the infrastructure for international cooperation remains uneven. Enhancing South–South and North–South collaboration could broaden the scientific discourse and ensure that labor market analysis incorporates insights from diverse socio-economic and regional contexts, thereby enriching both policy and academic relevance.

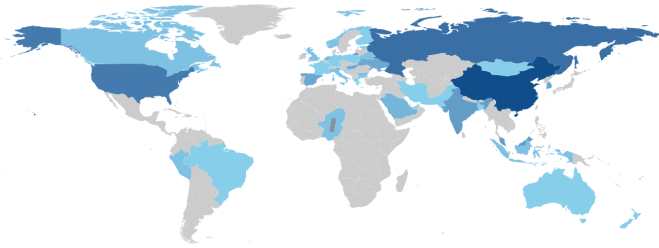


Fig. 23. Countries' collaboration world map.

V. DISCUSSION

A. Bibliometric Discussion

Results of collaborative analysis expose both forces and significant intervals in the global research scenario on AI and large data for labor market forecast. The United States stands as the most active and well-linked country, and serves as a central center within a broad cooperation network consisting of partners of Europe, Asia and the Middle East. Other countries, such as Russia, China and the United Kingdom, also contribute continuously, but their networks are often more territory concentrated.

Despite these active nodes, the general structure of the collaboration network is fragmented and works in small, insulated clusters or silos with many countries. This fragmentation is more depicted in the co-writing world map, where many regions, especially in Africa, Latin America and parts of Southeast Asia, are smaller or disconnected than the global research discourse.

Such asymmetry is a challenge for the development of globally used and the development of solutions. Since the challenges in the labor market are quickly complicated and interconnected - driven by digitalisation, automation and demographic changes - it is necessary to promote broad international and interdisciplinary collaborations. Encouraging the South South and North South partnership will not only strengthen the prosperity of research, but will also ensure that the conclusions are inclusive and relevant in different socio-economic contexts.

In summary, while scientific production in the region is growing rapidly, the cooperative ecosystem remains uneven. It is important to address this imbalance to strengthen the basis for global knowledge and support the development of justified and informed labor market policy through AI and data-driven strategies.

B. Research Trends and Future Directions

The development of research at the intersection of big data, Artificial Intelligence and labor market analysis reveals

many different trends that indicate to promote future directions. A remarkable tendency is to change vocabulary and focus in the region. Over the past decade (2010–2019), the traditional “Business Intelligence” gradually decreased in use as “analysis”, “Artificial Intelligence”, “big data” and “machine learning”, both prominent academic literature and professional applications [11]. This linguistic change reflects the intensive change that contacts the organization that makes production decisions, more sophisticated than descriptive analysis leads to a sophisticated future and leads to the prescription feature.

A new research direction focuses on the integration of several technical approaches to create hybrid models with increased abilities. Researchers quickly detect the CO - intelligence ability to combine Artificial Intelligence with large data analysis, provided that when these technologies work together, they create abilities can either become independent [12]. For example, recent research in the financial markets emphasizes the important ability to limit the Hybrid AI model that integrates large data analyzes for more accurate stock market paves [13]. These integrated approaches represent a promising opportunity for future research in labor market analysis, where complex economic and social factors interact in ways that no analytical approach can capture perfectly.

Application landscape for AI and Big Data Analytics continues to expand to different fields. In the food industry, these techniques have achieved remarkable results in food matching, safety monitoring and testing processes [12] [14]. This application of these technologies shows their versatility and suggests the opportunity to expand further in special labor market analysis for different industries. For small and medium -sized companies (SME), research indicates that digital changes increase innovation and dynamic abilities, helping these businesses to overcome the lack of resources and provide better feedback to market changes. Large technologies that run these reforms include big data, Artificial Intelligence and digital platform [15]. This discovery indicates a growing research direction how small organizations and labor market participants can use these advanced technologies despite having less resources than large companies. Extensive research on digital economy suggests how Big Data Analytics enables organizations to gain valuable insight into marketing strategies and operating processes. Artificial intelligence applications are expanded in customer service, scam detection and product development, leading to a complex ecosystem of technological changes that originally resume labor markets [16]. Future research must find that these techniques can be distributed in a responsible manner to encourage economic growth by reducing negative effects on employment. As these research trends evolve, several future directions can be anticipated: more refined integration of different data sources, the development of specific accurate future models for labor market dynamics, focus on more focus on moral ideas and prejudices mitigating in AI-implemented recruitment systems, and to address the workforce in the development of economies. Research also suggested the upcoming convergence of technologies where big data, Artificial Intelligence, machine learning and blockchain can work in concerts to solve the challenges in complex labor market.

VI. CONCLUSION

This bibliometric study provides a comprehensive exploration of scientific production on the application of Big Data and Artificial Intelligence for labor market forecasting. By analyzing 277 documents published between 2003 and 2025 and indexed in Scopus, Web of Science, and OpenAlex, the research offers valuable insights into publication trends, key contributors, thematic evolution, and collaboration patterns in this rapidly emerging field.

The analysis reveals a remarkable acceleration in scientific production, particularly over the last five years, reflecting the growing importance of data-driven employment policies and the increasing relevance of predictive analytics to support workforce planning strategies. Disciplines such as informatics, economics, business, and computer science emerge as prominent throughout the literature, confirming the interdisciplinary nature of the research domain. Additionally, the increasing emphasis on topics such as labor economics, unemployment, digital transformation, and AI-based recruitment tools reflects a shift toward policy-oriented investigation.

While the thematic structure of the field demonstrates maturity in some areas, such as job-matching algorithms and digital workforce analysis, other domains remain underdeveloped or emerging, particularly those related to ethics, inclusivity, and regional specificity. Furthermore, the collaboration analysis highlights a fragmented global research network with high productivity concentrated in countries such as the United States and China, yet limited cross-regional partnerships, especially with African and Latin American institutions. These patterns indicate the need for more inclusive, equitable, and interdisciplinary cooperation to fully harness AI and Big Data for addressing global labor market challenges.

A. Study Limitations

Despite its comprehensive scope, this study acknowledges several important limitations that may affect the generalizability of findings. First, the analysis is restricted to publications indexed in three major databases (Scopus, Web of Science, and OpenAlex) and limited to English-language documents only. This methodological constraint may introduce language and database bias, potentially excluding relevant research published in other languages or indexed in regional databases, particularly from non-Western academic traditions where significant AI and labor market research may be conducted in local languages.

Second, the study employs a purely quantitative bibliometric approach focused on publication patterns, citation networks, and keyword co-occurrence analysis. While this methodology provides valuable insights into the structural and temporal dynamics of the research field, it does not capture the qualitative dimensions of research quality, methodological rigor, or practical applicability of the studied approaches. The absence of content analysis limits the understanding of the actual effectiveness, implementation challenges, and real-world impact of the AI and Big Data solutions proposed in the literature.

B. Future Research Directions

Building on the findings and limitations identified in this study, several promising avenues for future research emerge. First, there is a critical need for comprehensive qualitative meta-analyses that examine the methodological approaches, implementation frameworks, and practical outcomes reported in the most influential studies. Such research should focus on identifying best practices, common challenges, and success factors in deploying AI and Big Data solutions for labor market prediction across different economic and cultural contexts.

Second, future investigations should prioritize the development of international collaborative frameworks that bridge the identified research gaps between high-productivity regions and underrepresented areas, particularly in the Global South. This could involve establishing international research consortiums, cross-regional data sharing protocols, and collaborative platforms that enable knowledge transfer and capacity building in AI-driven labor market analysis.

Finally, given the ethical concerns identified in this analysis, future research should systematically investigate bias mitigation strategies, algorithmic fairness, and the socio-economic implications of AI-driven labor market interventions. This research agenda should include longitudinal studies that track the long-term impacts of these technologies on employment patterns, wage inequality, and workforce development across diverse demographic groups and economic sectors.

In conclusion, this study maps the intellectual landscape of a rapidly expanding research domain and identifies both its strengths and its gaps. It lays the groundwork for future investigations that should aim to bridge disciplinary silos, enhance international cooperation, and develop robust, ethical, and globally relevant models for predictive labour market analysis. Such efforts are essential to ensuring that intelligent technologies contribute meaningfully to sustainable, inclusive, and data-informed workforce development.

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