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# Labor Market The Impact of Artificial Intelligence on Employment Skills

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## ABSTRACT

*AI's rapid evolution has profound effects on the labor market, influencing the levels, skills needed for jobs, and overall jobs content. This SLRs' goal is to synthesize empirical studies concerning AI and the implications of these implications on labor skills in all sectors. Between 2017 and 2025 studies identified current trends of the AI induced changes on blue collar and white collar occupations. It identifies new emerging skills needed for jobs such as data, machine learning skills and digital communication skills that the next generation of the workforce should have in the future. Also, it studies how AI induced changes is displacing the existing labor jobs and creating new, requiring high technological skills. Furthermore, it analyzes some of the barriers and challenges that the labor force faces in meeting new skill requirements by emphasizing how training centers, training programs and the education system and governments have to adapt so as to help close skills gap. The research ultimately shows how adaptative measures from the workers, employers and government are crucial to enable the new labor force to thrive under the future of AI.*

***Keywords:*** *Artificial Intelligence, Labor Market, Bibliometric analysis & Artificial Intelligence*

## INTRODUCTION

The introduction of Artificial Intelligence (AI) is causing drastic transformation on several industries, automation on repetitive jobs and creation of new job openings in work sector. AI brings the opportunities of efficiency, productivity and innovation but also a challenge to employment regarding to skills requirement and the way we work. The advancement of AI technology not only transforming business process but also the type of skills worker should posses in various industry. It becomes essential to take into account the skills that workers need in the AI driven economy. Automation and application of AI tools have a huge effect in current work and forcing world to reconsider role of the human workers and it became essential for workers to adapt to the new environment and learn new skill set to be competent in such era.

In this study, the objective is to conduct a systematic literature review (SLR) on the effect of AI towards employment skill for the period of 2017-2025 and identify and understand how AI will change the way jobs and skill requirements for workers in different industries under its transformation and impact due to automation and introduction of AI tools. Because AI becomes more widely adopted in people's life and work, it becomes critical to identify what skills become obsolete, new skills set for workers are created and how the world workforce has been influenced and adapted by AI technology.

AI's entrance into the labor market is a double-edged sword. It offers avenues for new skill-based jobs that leverage advanced technical skills, and simultaneously threatens jobs that entail routine, manual or cognitively simple tasks. With the widespread use of AI, it influences not only technical, but also soft skill aspects such as the need for problem-solving skills, creativity, and teamwork, coupled with the importance of developing both digital skills and adaptability to new technology for the workforce.

The purpose of this review is to consider how AI changes the skills needed across industries like manufacturing, health care, finances, education, and customer service and also how governments, academic and private institutions respond to the increasing need of reskilling and upskilling the labor force so that they can adapt to new job positions. This SLR intends to deliver a holistic snapshot on current research and its shortcomings and further provides recommendations to policy makers and relevant stakeholders for an effortless and inclusive adoption of future workforce and skills in the age of AI.

Recent research on artificial intelligence (AI) and skills in employment has been burgeoning, but still contains various shortcomings. The first one is that while the effects of AI-induced automation in terms of labor and productivity have been widely studied in the literature, specific changes in skills within diverse industries, ranging from health to manufacturing, finance to education, have not been adequately covered. Besides this, the literature on AI and skills in employment has been spread out over various disciplinary fields such as economy, labor study, management and technology, but there appears to be lack of a comprehensive body of work on AI-driven transformation in labor market and work skills. Second, prior literature predominantly focuses on developed economies, particularly the United States and Europe, and less attention is devoted to the experience in emerging economies, making it geographically imbalanced to explore the effects of varying capacities of institutional support, technological maturity and labor market structure on workforce's response to AI. Third, even though several studies indicate the need of worker retraining and upskilling, limited evidence has been generated on whether the present education systems and policies enable workforce to confront AI-driven labor market transformation. Finally, the ethical and social implications of AI on workers, including job destruction, wage dispersion, digital divide and labor insecurity, are still underexplored and insufficient work has been produced. Last, even though there are abundant studies on the impacts of AI in terms of labor and skills, there are only a limited number of bibliometric and systematic synthesis studies attempting to delineate the intellectual structure, research trends and thematic evolutions of AI in shaping employment skills.

**The Following Research Objectives Examined:**

- To summarize the development and spread of academic works relating to AI and employment skills.
- To identify main streams, trends, and clusters in the academic works relating to AI-driven changes to the labor market and work skills.
- To determine how AI-induced transformations to skills are evolving across occupations and industries.
- To identify research gaps and policy problems related to workforce adaptation and retraining at the age of AI.

**Following are Research Questions followed by Research objective accordingly :**

- How has the academic discourse on Artificial Intelligence and employment skills evolved from 2017 to 2025?

- What are the major stream and trend of research literature on the impact of AI on labor market and skill employment?
- In which manner has the demand for skills been impacted by AI along various occupations and industries?
- Which are the research gap and policy issue with regard to workforce adjustment and reskilling at the age of AI?

## LITERATURE REVIEW

Artificial Intelligence is revolutionizing almost every industry by taking over tasks previously done by people, creating a need for new skills in the workforce including both technical skills such as data science, AI programming and creative and interpersonal skills such as creativity and emotional intelligence. Brynjolfsson and McAfee (2017) suggest that although many jobs will be lost, others will be created, which demand more technical expertise and Interpersonal skills.

The way that AI has influenced blue-collar jobs versus white-collar jobs has been different. In the case of blue-collar jobs, which are prevalent in the manufacturing and logistics industries, there is a greater chance of being replaced by AI. A survey conducted by Frey and Osborne (2013) indicated that 47% of all jobs in the United States could be replaced by automation, the majority of these belonging to industries dependent on manual work. On the other hand, the majority of white-collar jobs are undergoing an evolution rather than being entirely replaced by AI. Many of these jobs are administrative, however there are increased demands on skills that handle complex business process and decision making, whereas tasks that can be automated (such as data entry and simple analysis) are handled by AI. McKinsey Global Institute (2018) supports this, showing that administrative, clerical and sales sectors contain the most automatable jobs, however they emphasize that the number of workers who can handle business processes is expected to grow.

As a result of the rapid development of AI, the formation of hybrid "techno-functional" jobs will become prevalent. These roles involve using knowledge from both the specific industry, and that of the technology itself in order to combine the industries that the AI is applied to, and the AI technology. Examples are; business analysts with the required skills in AI, health workers, etc. And workers familiar with the utilization of AI-driven diagnostics systems. According to National Bureau of Economic Research (2020), having to constantly adapt to new and evolving skills is vital when working in hybrid roles, as such roles require workers to continuously reskill, and learn, how to work with evolving AI technology.

Since some jobs will inevitably be replaced, upskilling and reskilling is very important, as suggested by OECD (2019) who have identified 'complementary' skills such as creativity, leadership and emotional intelligence which will need to be taught and developed. However, it seems that leading firms such as Amazon, and the European Union are taking these steps as they are helping to upskill workers to move into AI driven professions.

Educational institutions and policymakers have a significant part to play in preparing the workforce for a workplace influenced by AI. The World Economic Forum (2020) recommends that AI be taught at all educational levels with the use of programming, data literacy and critical thinking being promoted throughout. It is suggested that Policymakers provide continuous learning schemes for the workforce in response to the AI-based workplace. On the other hand, adapting to AI involves huge challenges especially for low-income workers. According to the International Labour Organization (2019), a major challenge to the work force of developing regions and low-income sectors is that of the digital divide. Digital divide refers to situations in low-income sectors of the economy where workers do not have access to the training necessary to stay updated with changes being brought about by AI. This could worsen the income disparity and trigger societal instabilities.

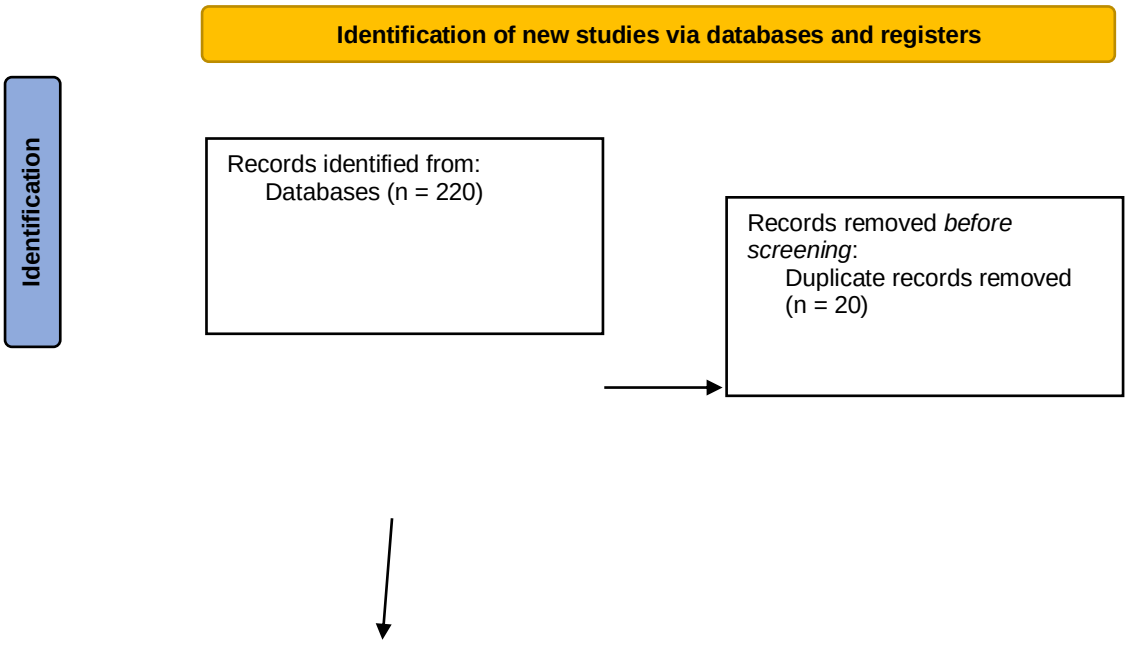
## METHODOLOGY: SYSTEMATIC LITERATURE REVIEW

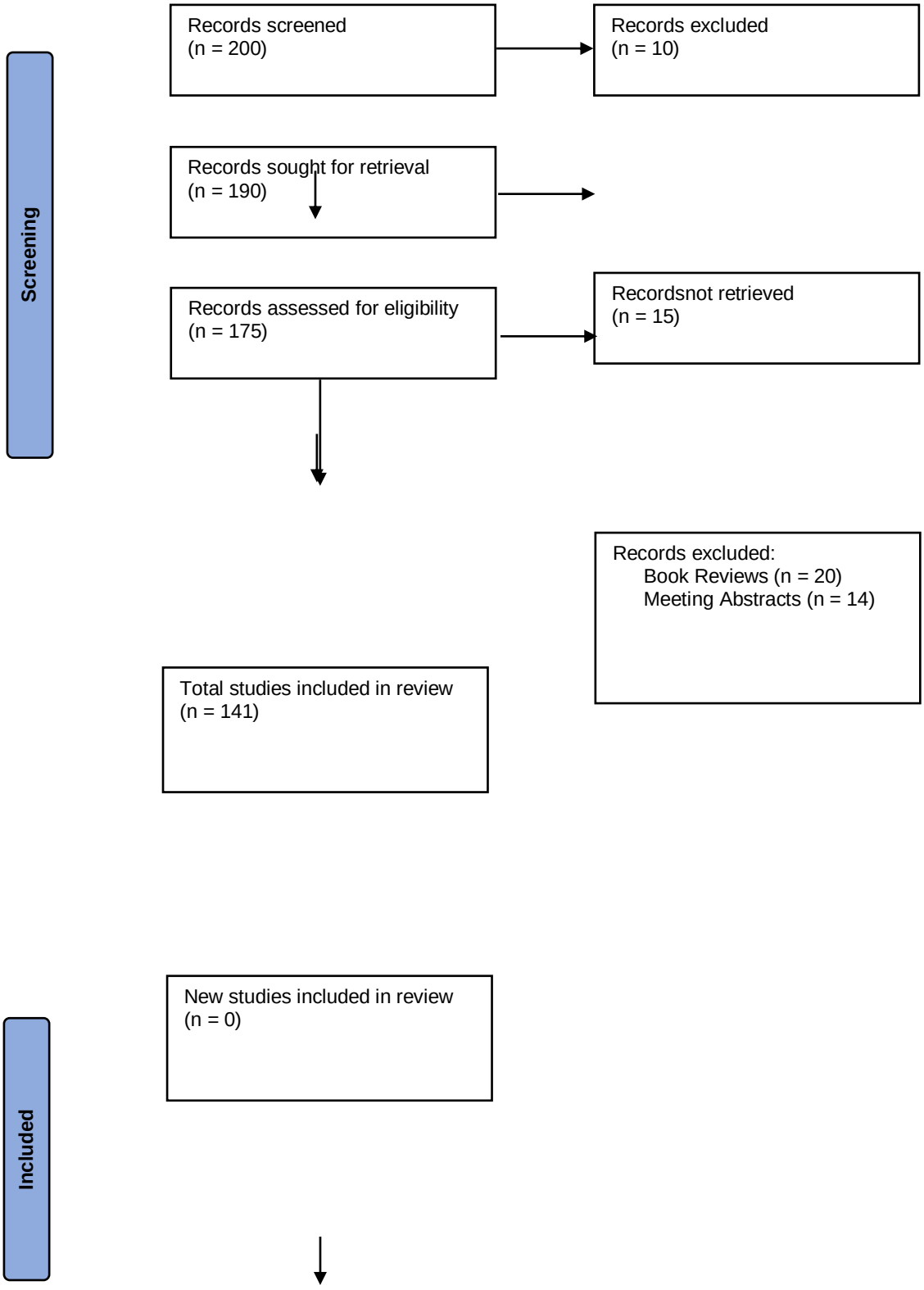
The objective of this SLR is to synthesize relevant literature on the impact of AI on the labor skills required. A systematic review process was employed to ensure comprehensive and unbiased results by reviewing articles between the years 2017 and 2025. In order to restrict the scope of this SLR, detailed research questions were formulated which helped in the systematic nature of this review. Main research questions were formulated to analyze how AI changes the skills needed in different industries, the importance of up-skilling and re-skilling interventions and worker adaptation issues to AI based change.

In relation to the selection, research used a vast search on various peer-reviewed academic journals, conference proceedings, industry reports and governmental documents. In undertaking the search, keywords such as "Artificial Intelligence," "employment skills," "automation," and "workforce development," were utilized to scan popular academic databases like Google Scholar, Scopus, and openAlex. Based on the established inclusion criteria concerning relevance, methodology, and the stipulated time period of 2017-2025, pertinent, high quality studies were selected. As a result, research specifically highlighting the implications of AI on skill dynamics, technological disruption, or workforce development was deemed relevant for inclusion in the SLR.

Following this filtering stage, we then reviewed the papers for their relevance and validity, by examining the abstract, methods section, size of samples, and clarity of results and conclusions. Finally all the pertinent data were extracted and registered. This data was then critically reviewed to identify themes, trends and gaps in the knowledge concerning how specific economic sectors experienced the direct impact of AI and how rapidly work skills were being updated. A systematic and critical comparison of each study to the other studies within the synthesized body was conducted in order to draw out convergences and divergences. The methodology within each study was critically examined in order to determine the appropriateness of the results drawn. Synthesizing the research was completed after the comparative study of the findings. The findings offer concrete data which demonstrate the nature of the changing work landscape through the use of a robust literature review strategy; furthermore, it offers insights for possible interventions in terms of policy or education.

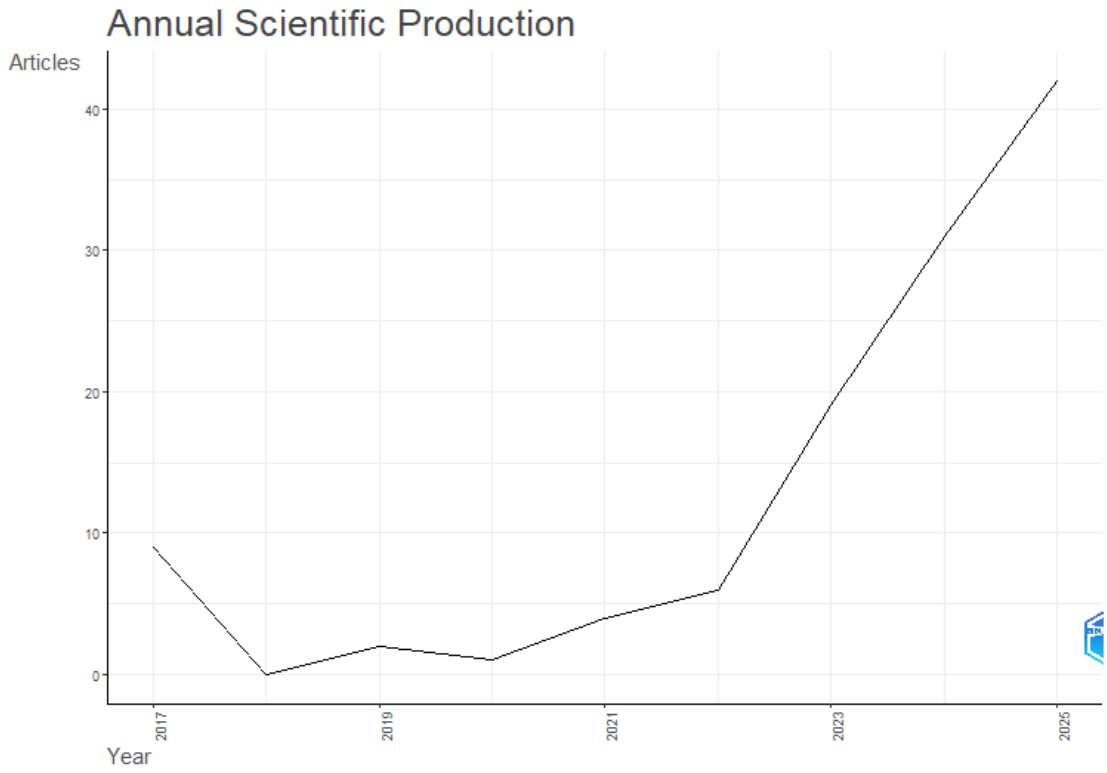
### PRISMA Flow Diagram




Records screened
(n = 200)
Records excluded
(n = 10)
Screening
Records sought for retrieval
(n = 190)
Records assessed for eligibility
(n = 175)
Recordsnot retrieved
(n = 15)
Records excluded:
Book Reviews (n = 20)
Meeting Abstracts (n = 14)
Total studies included in review
(n = 141)
New studies included in review
(n = 0)
Included

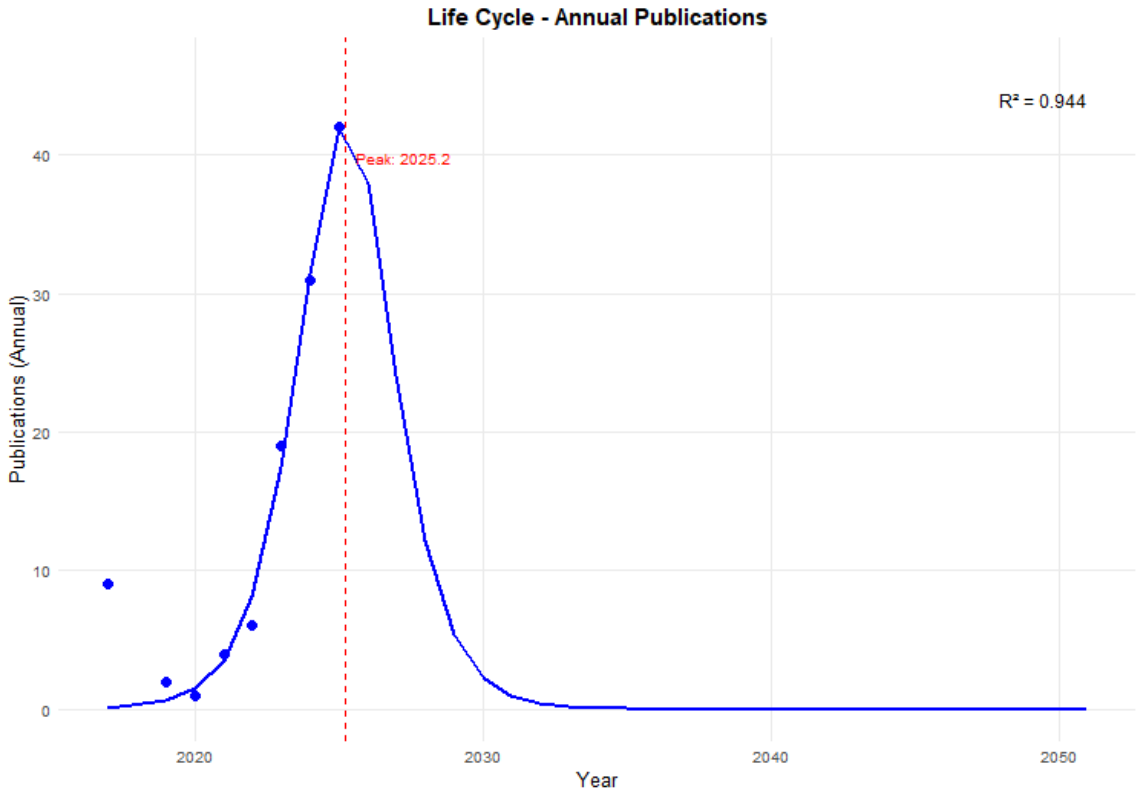
| Description | Results |
|---|---|
| MAIN INFORMATION ABOUT DATA | |
| Timespan | 2017:2025 |
| Sources (Journals, Books, etc) | 92 |
| Documents | 114 |
| Annual Growth Rate % | 21.23 |
| Document Average Age | 2.68 |
| Average citations per doc | 11.94 |
| References | 1268 |
| DOCUMENT CONTENTS | |
| Keywords Plus (ID) | 119 |
| Author's Keywords (DE) | 236 |
| AUTHORS | |
| Authors | 242 |
| Authors of single-authored docs | 29 |
| AUTHORS COLLABORATION | |
| Single-authored docs | 39 |
| Co-Authors per Doc | 2.43 |
| International co-authorships % | 9.649 |
| DOCUMENT TYPES | |
| article | 114 |

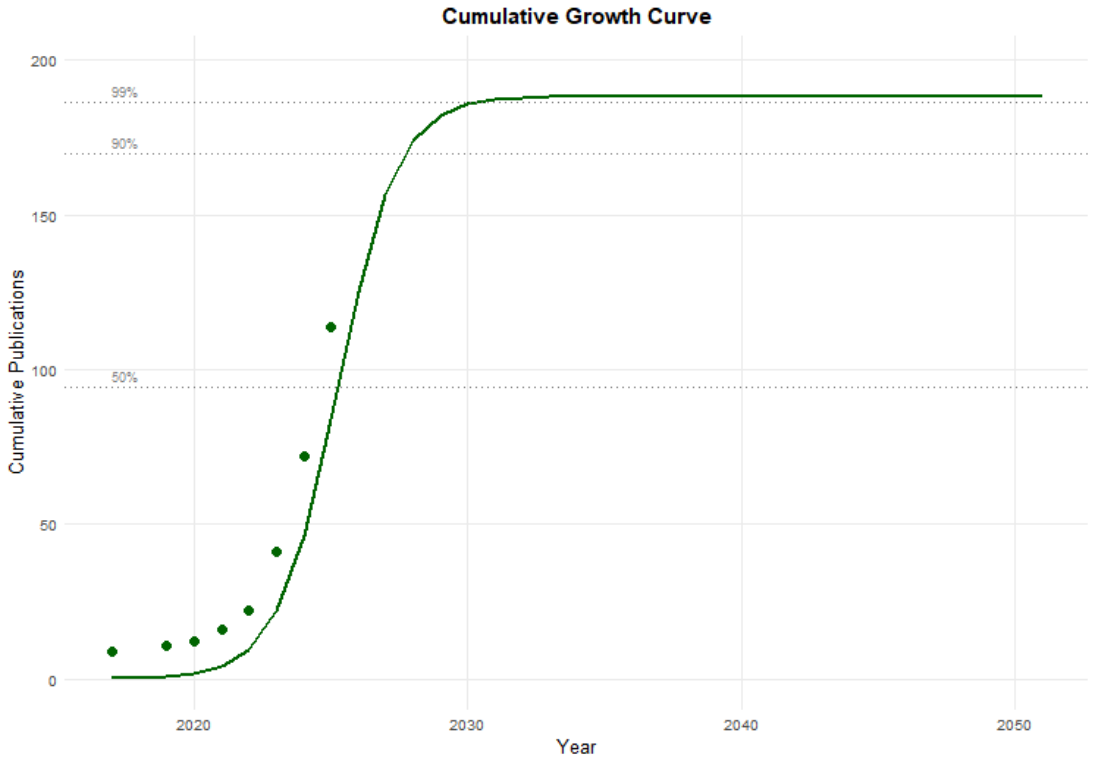
This dataset covers the period from 2017 to 2025, where a total of 92 documents (including journal articles, books, and others) were reviewed from their corresponding 114 documents in this dataset. The documents in the analysis demonstrate a growth rate of 21.23%, which indicates that the interest and research of the field have significantly increased. The average age of the document is 2.68, and on average the document is cited 11.94 times. A total of 242 authors contributed to the document in the analysis, with 29 authors writing individually, whereas 213 authors participated in writing collaborative documents. The average number of co-authors is 2.43 and about 9.64% of the papers are with international co-authorships. In this case, only the articles were chosen for a more detailed analysis (114 articles were evaluated). Keywords given by authors such as "Keywords Plus" (119 items) and "Author's Keywords (DE)" (236 items) also provided more related context information.




The objective of this topic is to analyze the growing number of research and scientific articles in the field of Artificial Intelligence (AI) and its effect on skill employment. The increase in scientific production, both annually, but more importantly in recent years, is shown by the rise in the number of published articles from 2020 to 2025, for instance. The reasons of the interest in the topic and the changes that occurred in terms of research questions and current trends in the field are studied in the topic.

This research theme would consist of looking at the trends in the scientific production and the citation of the AI's effect on jobs skills. There would be an analysis of the evolution of the scientific production of this subject per year and especially the exponential increase in the number of cited articles in 2022. It would be also important to highlight the increasing interest and relevance over the time in this topic and show the most relevant articles through an analysis of the citation data. Analysis of this evolution may reflect on the growing academic research efforts for better understanding of the future labor market and the need of new skills.

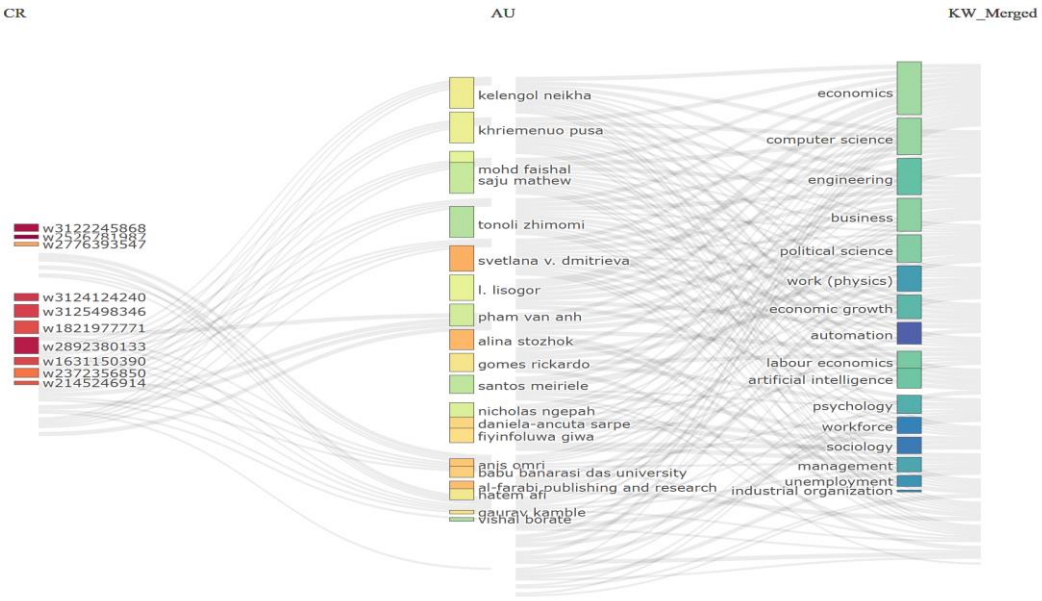


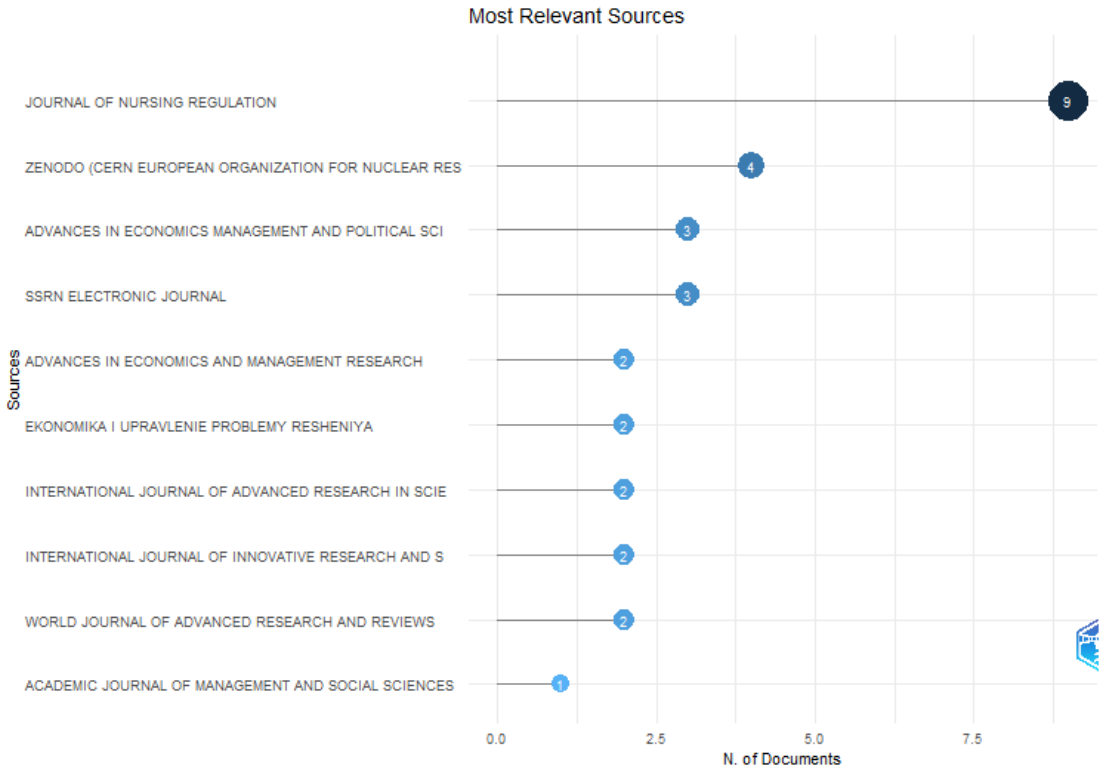

The given graphs represent two different growth models for publication on this issue. The Life Cycle - Annual Publications graph shows a sharp increase in publication that begins around 2020 and increases steadily up to 2025 where it reaches a peak. The rapid growth in publication since 2022 is the primary indication of recent and intense research interest in this issue. The trend demonstrates that

"AI's ability to change skills in the employment area" has recently become an important research topic, and it will be one that reaches its apex in 2025.

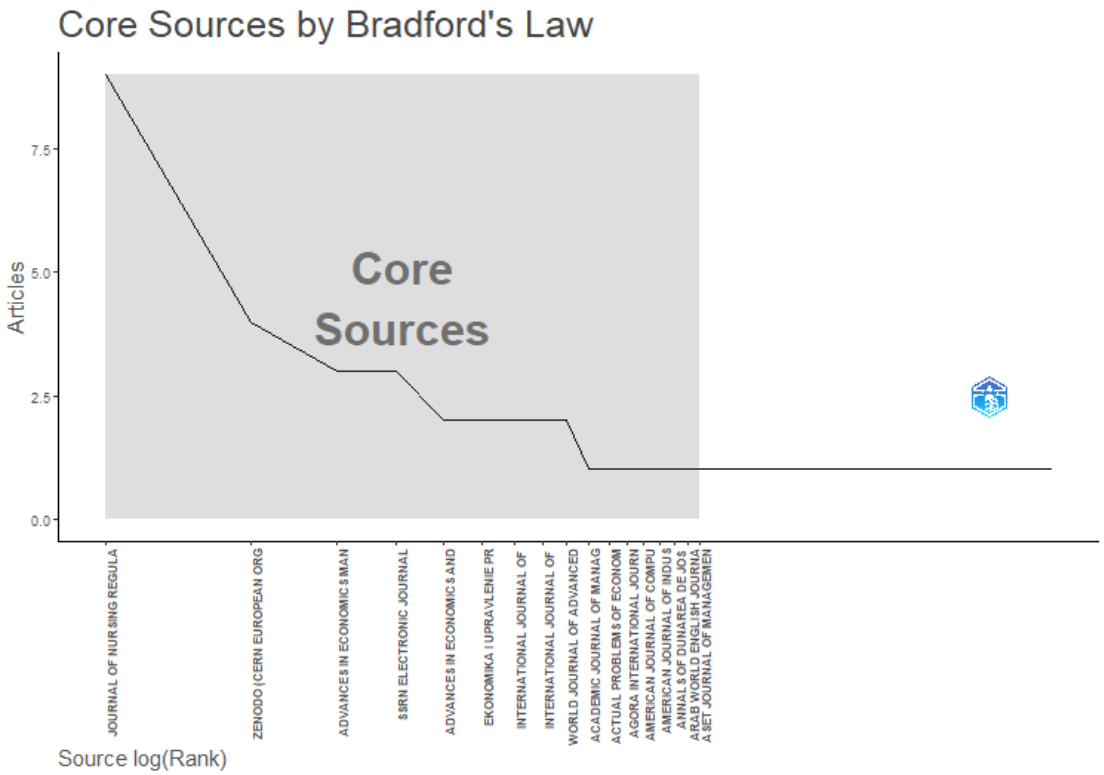
The Cumulative Growth Curve shows the fast rate at which the amount of research has multiplied. It shows the steep increase that has taken place since 2020, and the flattening that suggests it has been gaining more work to continue publishing. While earlier years of research on this issue have produced a relatively small amount of published work compared to now, there has been a steep curve and considerable accumulation of publication on this topic since 2020 and it seems the amount of work is starting to plateau. Combined, the graphs provide evidence that there is exponential growth occurring in research on this issue, which was present in the literature as of 2020, peaking at 2025. The growth in publications proves there is a high level of interest to examine and respond to issues concerning AI's implications.



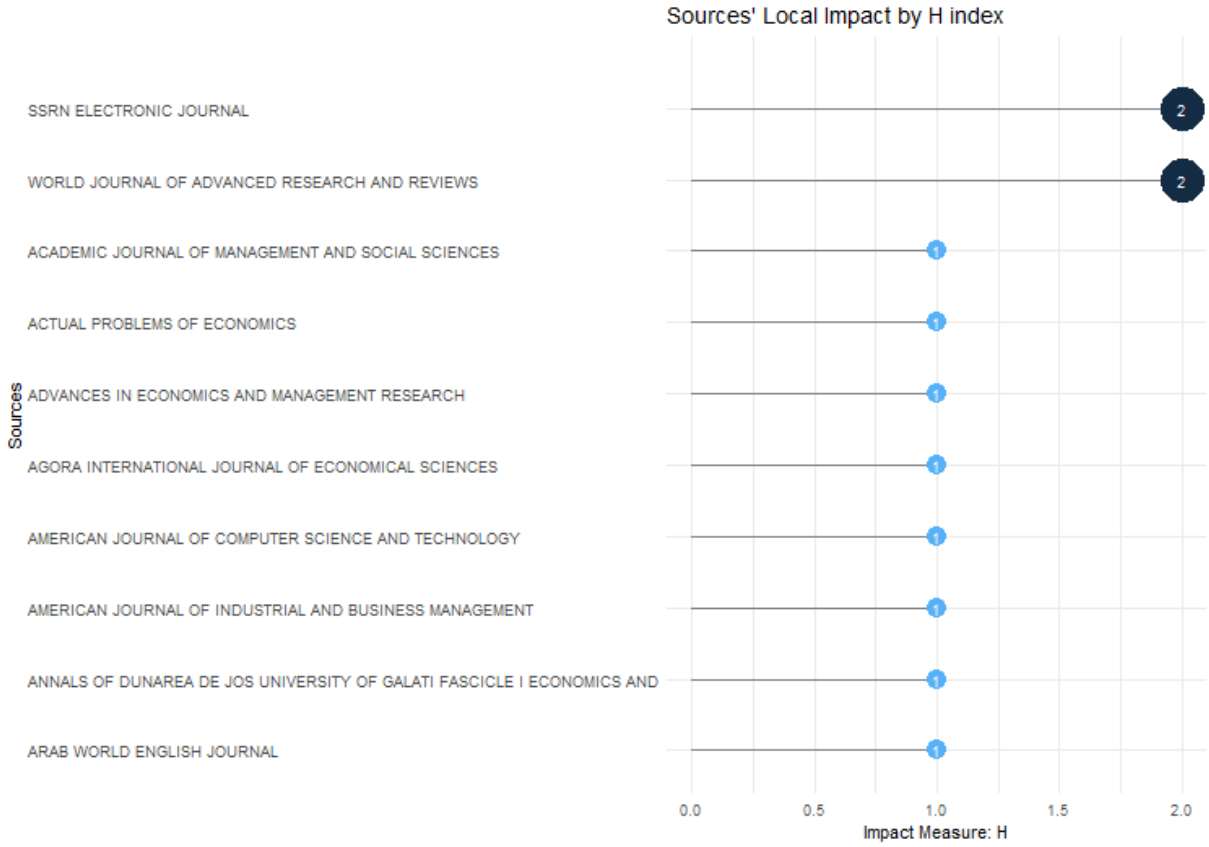

The diagram in Figure 1 displays authors (AU) and their keywords (KW_Merged) linked by their references (CR). The authors can be related to a research area that is in line with a specific theme; For example, Mohamed Faishal and Saju Mathew are connected to economics and automation showing authors who deal with the impact of automation on an economic domain. Authors such as Gomes Rickardo and Santos Meirele deal with labor economics and artificial intelligence indicating authors focusing on the connection between artificial intelligence and employment aspects. Thus, the network presents what research area is studied by whom and it shows to which main theme the area is linked. The lines from the authors to keywords mean that authors have references on that specific subject, e.g. Authors such as Gomes Rickardo are in connection with artificial intelligence and labor economics, authors such as Saju Mathew is in connection with economics and automation. The networks indicate that some researchers are already dealing with the theme at stake. The network diagram also includes engineering, psychology and sociology so it can be assumed that this study does deal with a broad range of subjects.




In this bar chart, we focus on the relevant sources, that research most relevant for researching the influence of the impact of AI on employment skills. By visualizing the number of documents published in every source, we gain an overview of the distribution of the majority of relevant research on this topic. It is clearly visible that Journal of Nursing Regulation is the most relevant source with a count of 9 documents that deal with the topic. Among the relevant sources, there are also Zenodo (CERN European Organization for Nuclear Research) and Advances in Economics Management and Political Science with 4 and 3 documents, respectively. The remaining journals, namely SSRN Electronic Journal, Advances in Economics and Management Research, etc., each include 2 relevant documents. Overall, there seems to be a diversity of research journals, that take care of the issue of the impact of AI on employment skills. It can be seen that there is a scattered, but increasing academic interest among a variety of disciplines such as economics, management and political science. The high proportion of publications in certain journals could be attributed to the relevance of interdisciplinary journals on research topics related to the impact of AIon employment skills.




The image presented shows the Law of Bradford for the core sources of research pertaining to the impact of AI on employment skills. Bradford's Law is a concept that describes the distribution of articles among journals, identifying the key "core" sources for a particular subject. On the graph the x-axis is the rank of the sources, presented on a logarithmic scale, and the y-axis represents the number of articles found in each journal. It is apparent that there is a sharp drop after the few sources presented, as the first few sources alone account for a majority of the articles in this area, forming the core of relevant journals for this research area. It can be concluded that these areas, highlighted as the "core sources", are the primary journal for research on this topic where a great many articles are published. The drop after this indicates that other journals may contain some articles relevant to this research area, but at a significantly less amount. From the graph it can be concluded that only a select few sources account for a great majority of this research area's published articles, adhering to Bradford's Law where a bulk of articles will lie within only a few core journals, with the rest lying thinly in a vast majority of other sources.



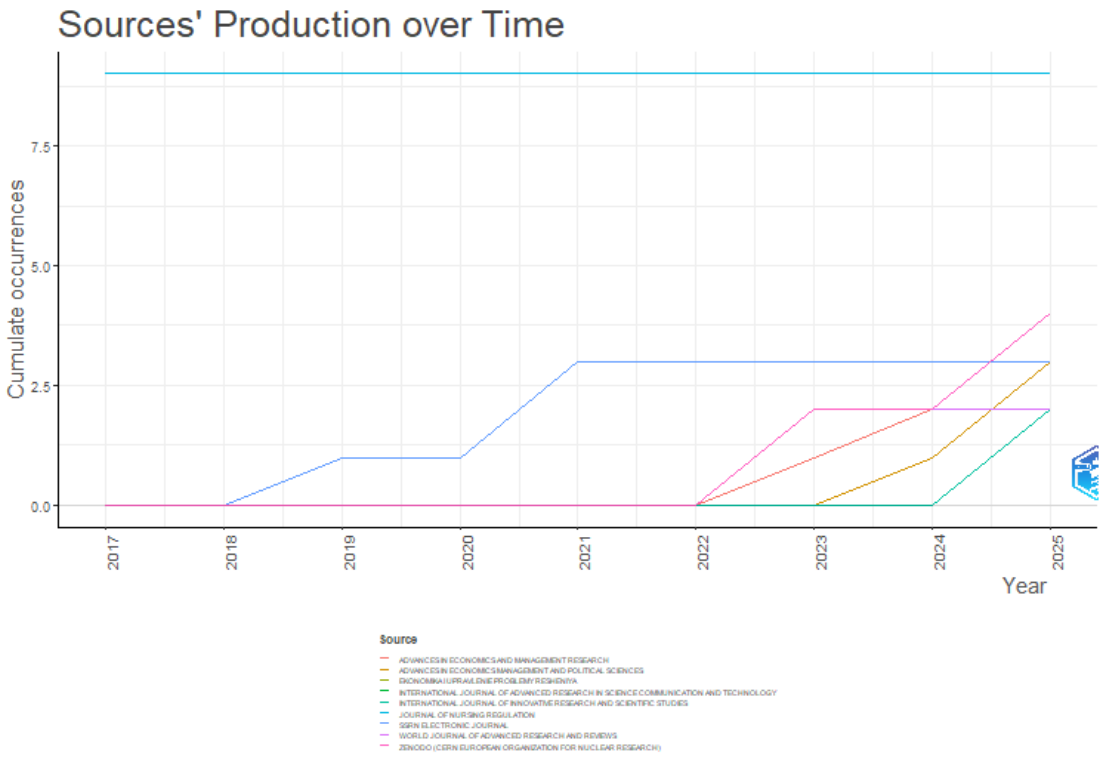

The above picture shows the local impact of sources by H-index. H-index is the index which evaluates the productivity and the citation impact of a journal/a source. On y-axis is source/journal and on x-axis is H-index ranging from 0 to 2 in this picture. H-index considers number of article published and number of citations that a single article has obtained.

By looking at the graph, we can find:

- SSRN Electronic Journal and World Journal of Advanced Research and Reviews have the highest H-index of 2, meaning these two journals are highly productive with high citation impact in the field.

- Other journals like Academic Journal of Management and Social Sciences, Actual Problems of Economics etc. Have a H-index of 1, indicating less, but not insignificant, citation impact compared with their published articles.

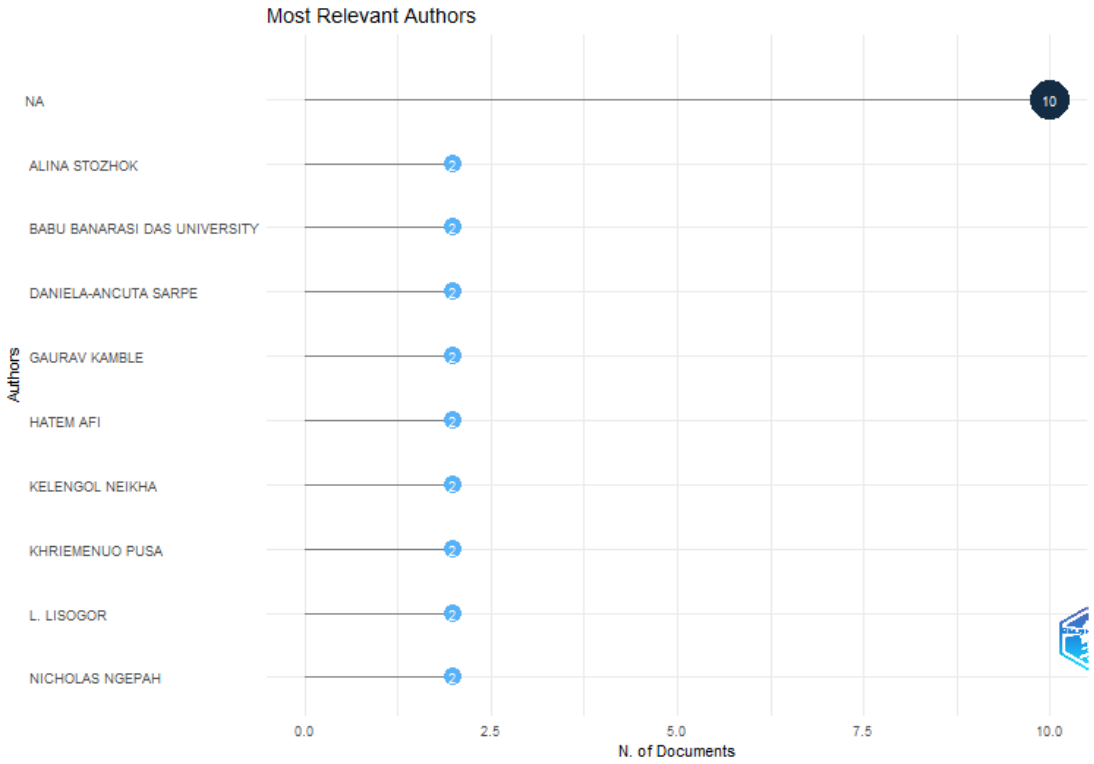
From the picture we can infer that though few journals are highly impacting in the field of AI and employment skills, some other journals have moderate impact. H-index provides the way for us to quantify the influence of a single journal in a research field and shows which journals has the most important impact on the research topic.



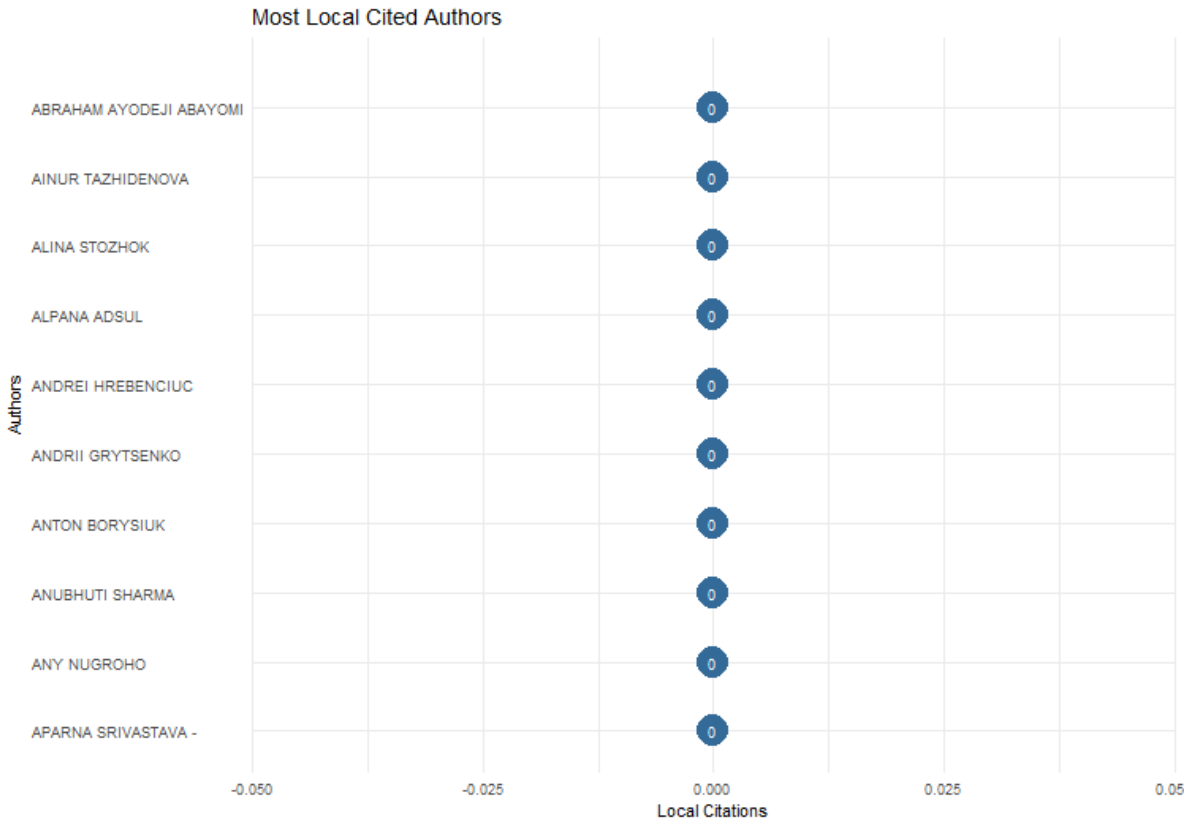

The graph titled "Sources' Production over Time" plots the accumulated number of publications from different sources about the topic of the impact of AI on labor market skills for the years ranging from 2017 to 2025.

The X axis presents the year, while the Y axis represents the accumulated number of publications. Every line represents one particular source and shows the increased academic literature on the topic, over the course of the years.

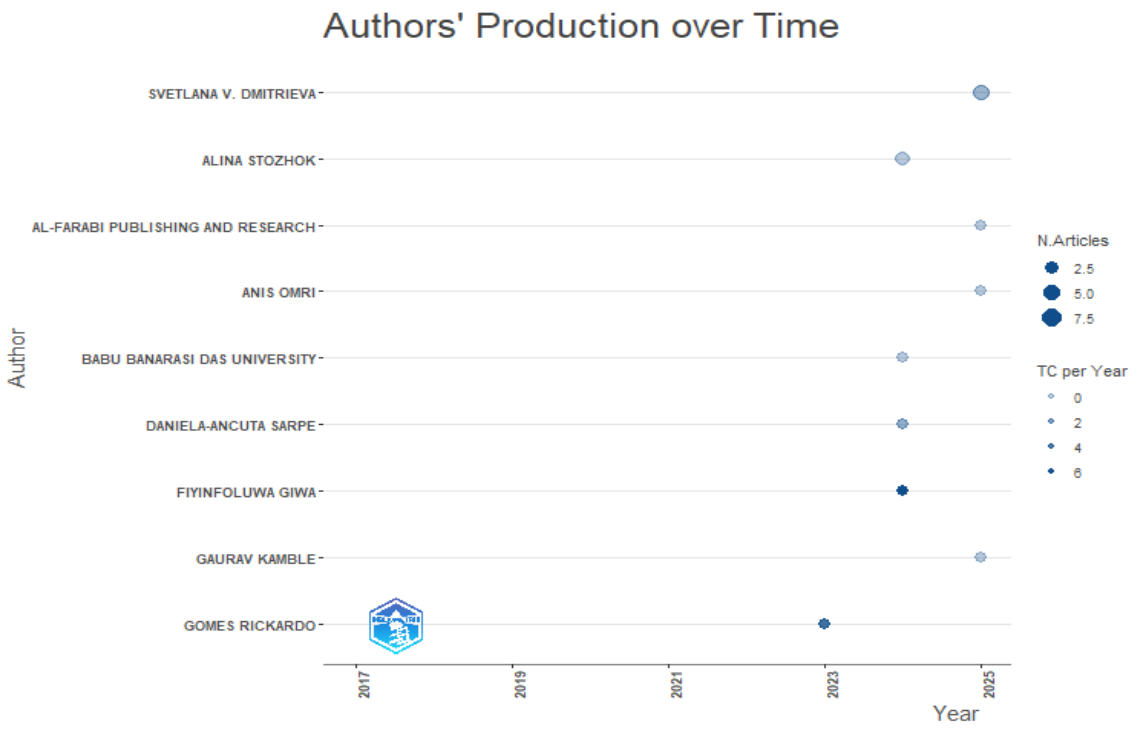
This graph displays the increase in the number of sources involved in the study of AI's impact on labor market skills, and it seems that only recent years have started to attract a large number of publications from different sources and focus on the interdisciplinary nature of the topic. The steep increase in the number of publications from 2022 on show how academics start to focus on the investigation of the effects of AI on society from an economic, social and technological point of view and on the change in labor market demand and skill requirements.

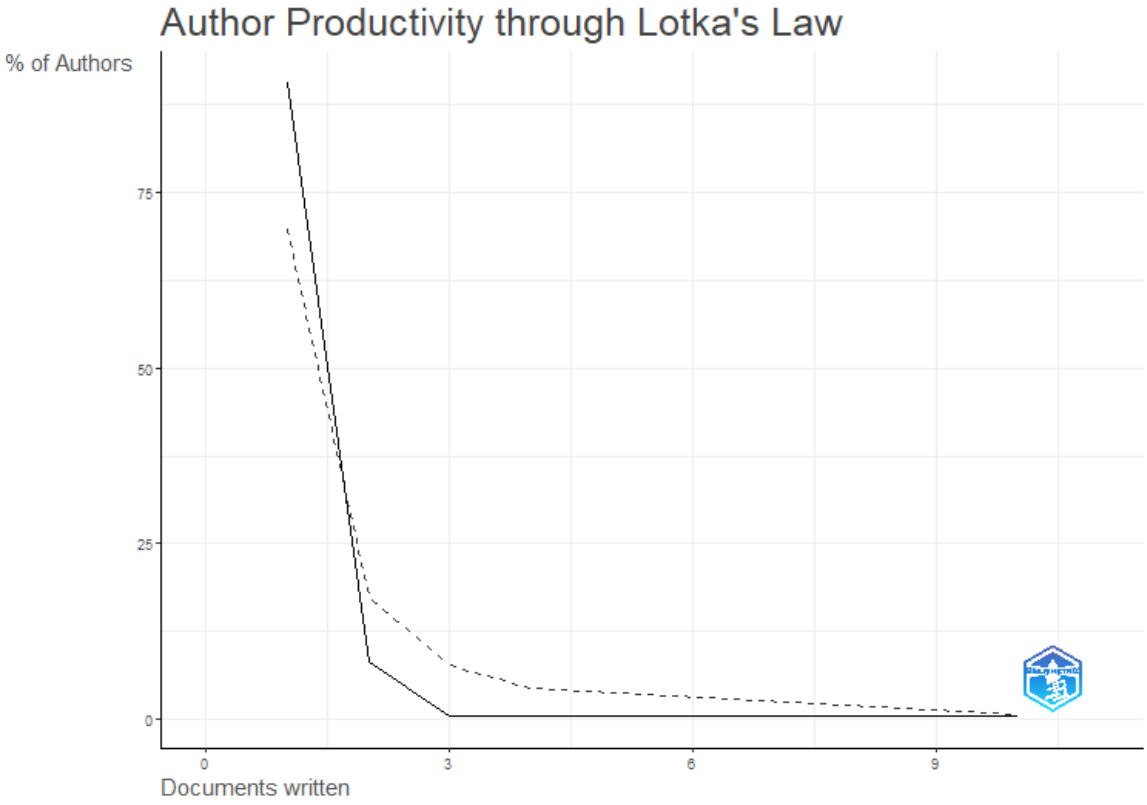



This image is the graph for most relevant authors which contributed to the topic concerning on the influence of AI on employment skills. This graph presents the amount of publications for each author, in this case indicating which authors were most productive regarding this topic. Based on the graph, it can be said that author NA(presumably referring to an undefined author or authors) are the most productive authors on the topic of influence of AI on employment skills, with 10 documents dedicated to it. After the NA author, authors such as Babu Banarasi Das University, Daniela-Ancuta Sarpe and Alina Stozhok each has 2 contributions to the topic. Other authors that participated were Hatem Afi, Kelengol Neikha, Gaurav Kamble, Nicholas Ngepa, L. Lisogor and Khriemenuo Pusa, each with 2 contributions to the topic. This is to highlight the variety of scholars working on this topic; on the other hand, it seems that a lot of research is available with a concentration of few authors to the topic, with the exception for NA author that may have the data summarized under this category or unknown contributor.



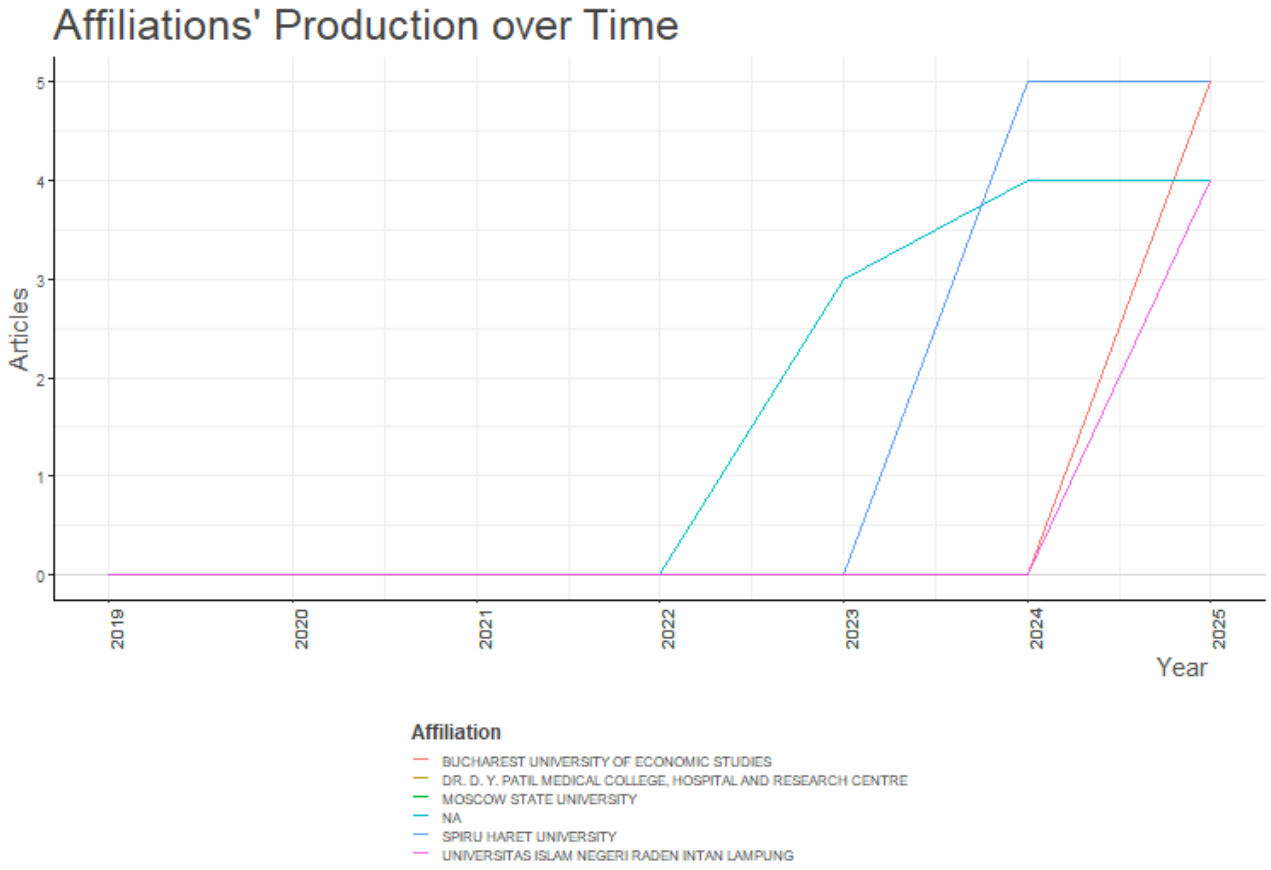

The graph displays the Most Local Cited Authors and indicates the local citations of each authors regarding the impact of AI on skills and employement. A local citation means the number of times an author is cited in a dataset or a community of study. From the graph, it is clear that all of the authors that appear in the list (Abraham Ayodeji Abayomi, Ainur Tazhidenova, Alina Stozhok, Alpana Adsul etc) have local citations of 0, meaning that they have not been cited in this particular dataset or study context. Despite their contributions to the study topic, it appears that none of them are as relevant in this particular study community as they are within a wider context (indicated by their 0 local citation count). One possible explanation of this is that the authors have not had their work accepted or their network has not adopted their contribution yet. It is evident that in this case the visualization proves to be a useful tool to highlight certain authors that require greater visibility.

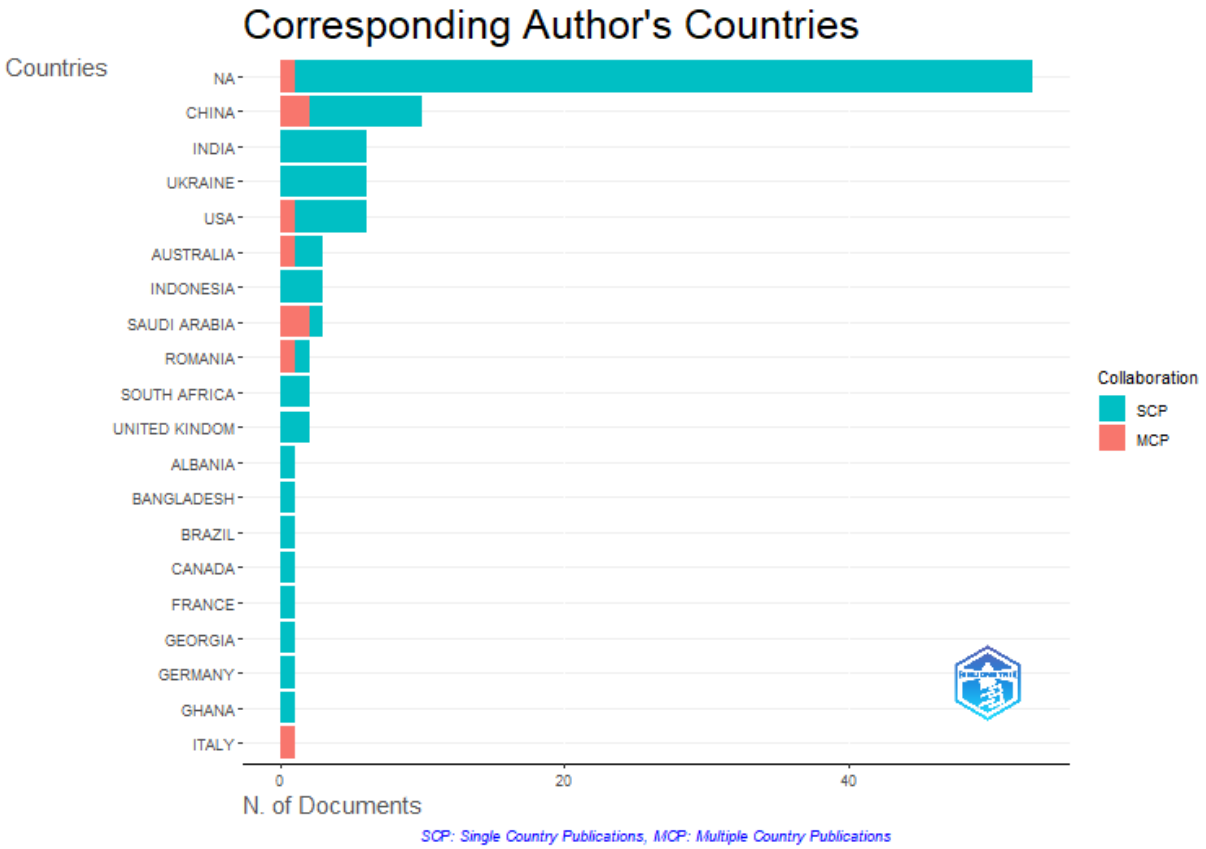


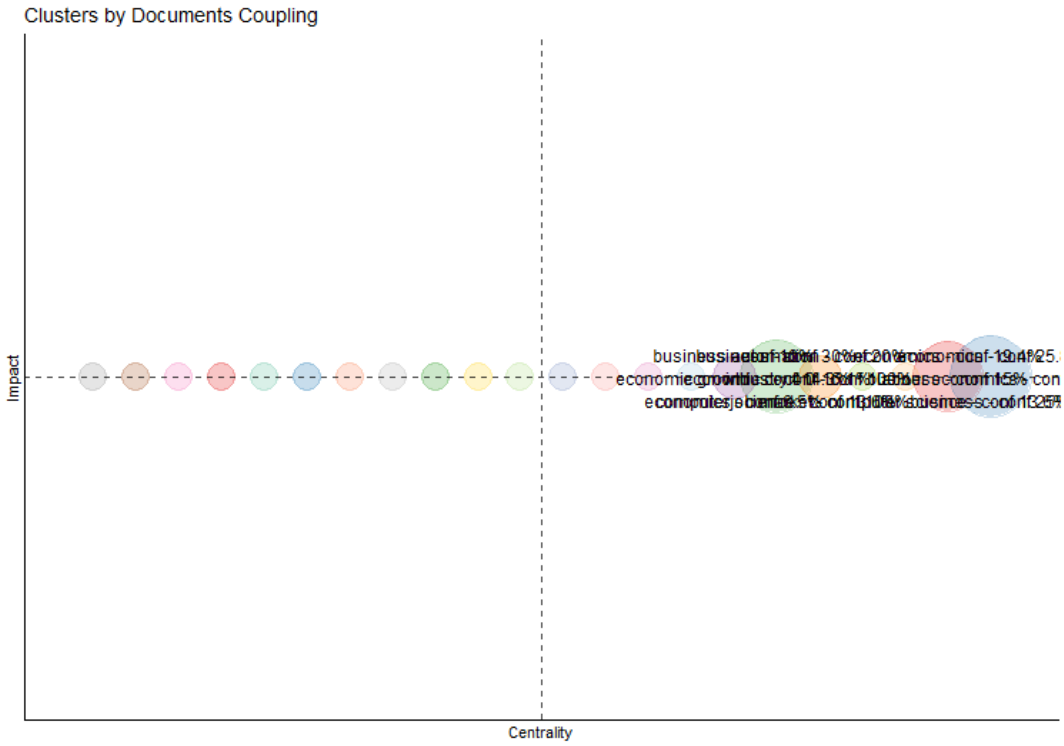

The graph depicts the Productivity of the Author via Lotka's Law.Lotka's law states that small numbers of author contribute a disproportionate share of a given field's work, that is, there are very productive and not so productive authors. In this graph, x-axis is the number of document produced and y-axis represents the percent of authors, having written number of documents indicated by x-axis, producing. In this graph, a steep decline shows a relatively small percentage of authors are very productive that means having produced significantly more documents than most authors. The curve is

clearly indicative of Lotka's Law where few authors are prolific and majority are only casual/peripheral. Hence few of these authors are influential enough to be cited/contribute significant output of the papers. While researchers and authors in field of AI and its affects on skills of working men are plenty, a few authors carry the torch and dictate the conversation.

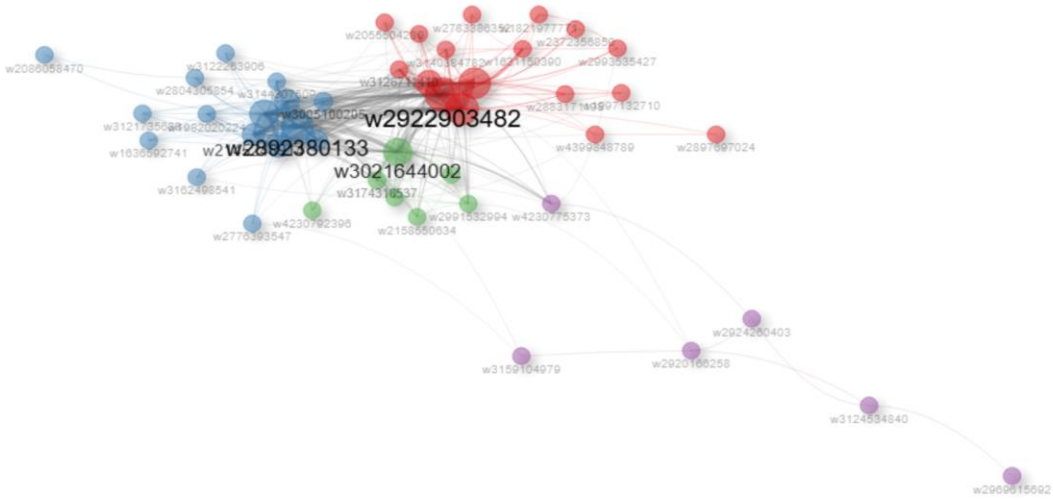





Here in the above figure we can clearly distinguish countries that the corresponding author belong to in reference to publication with regard to the influence of the AI on employment skills. In the x-axis, the x represents number of documents, in the y-axis, it represents the country where corresponding author is based. An interesting point that can be noted is the overwhelming prevalence of NA (Not Available) meaning majority of the research is either not associated with a particular country or the corresponding author details were not provided. Among other countries that have contributed immensely to the literature are China, India, and Ukraine, with both single country and multiple country publications in great abundance from China and India. On the other hand, countries such as USA, Australia and Indonesia, had a significant distribution of single country publication and multiple country publication. Other countries such as Saudi Arabia, South Africa and Romania contribute little to the literature with mix of both single and multiple countries publication. It can also be seen that international collaboration has a strong presence in this domain with countries such as Brazil, Germany and Canada producing majority of multiple countries publications.




The cluster visualization below is designed to show documents' pairings according to impact and centrality. The x-axis signifies centrality while y-axis denotes impact. Centrality refers to how central the documents and clusters are to the entire field whereas the research impact denotes how influential a document cluster is according to scholarly literature citations. In the following plot, different clusters of documents are depicted as colorful circles and circles indicate how close the related themes are to one another. As the circle position moves toward the right on the x-axis, the centrality of a theme becomes higher and this theme becomes more important or influential to the entire field of research. Topics related to business, economic growth... Appear on the right side on the centrality axis. This suggests that these topics are more related to AI influence and the change of employment skills as they are more central to research fields compared with topic related to computers jobs or business which are nearer to the center. By studying the positions of the circles, we could compare how much a document and cluster has importance relative to the others in the field of AI research and how close some research themes are.




It's an illustration of a document network concerning researches about AI effect on employment skills. Each dot (node) corresponds to one document. Lines (edge) linking documents are a measure of how "coupled" those two documents are. This coupling can come from citation links and themes the documents deal with. In that picture nodes are colored for highlighting clusters (groups of documents). This allows showing that documents are clustered in different topic groups (related to researches of AI effect on employment skills). Blue cluster is probably representing the "center of gravity" (or most representative ones) documents. Red, green, purple represent others topics. Clusters (the color) seem to show close documents. Therefore, it's a clear illustration showing the main researches areas on AI's effect on employment skills and main documents dealing with it.

## CONCLUSION

This research investigated the impact of AI on required job skills, demonstrating the emerging importance of reskilling and changing skill demands across industries. AI, while creating jobs, also generates job losses and demands significant policy and education related intervention. In the literature, a keen interest in the impact of AI, specifically regarding workforce development, is demonstrated although gaps remain in understanding sector specific adaptations and reskilling programs.

## FUTURE RESEARCH

Future research could be more sector-specific and would explore the differences in global AI adoption and impacts on labor market in a comparative manner. Studies are needed about the impacts of reskilling programs and education policies, and the social and ethical dimensions of AI in the workplace, including job losses and wage inequality. The research has to be interdisciplinary in technology, economics and social sciences.

## LIMITATIONS

There are various limitations to this study. The literature review included only the literature published between 2017 and 2025, excluding any relevant works prior to and post this period. By focusing on this timeframe, some seminal research and advancements in the impact of AI on skills required for employment may have been overlooked. The literature search included only English language

publications, leading to a possible language bias in favor of developed western countries. Additionally, Publication Bias could influence the findings as only published works were selected. The possibility that null or negative research findings would not be published is another limitation. There was a lack of concrete information on re skilling efficacy and practical impact of AI for the majority of articles reviewed, thus not providing an accurate measure on how AI has affected real world skills. It is worth mentioning the geographical bias; mostly the literature review encompassed research published in Western countries and thus can be considered to not portray a complete picture of the global influence that AI is posing as its application is likely to be quite different in developing countries and "emerging economies". The review also did not delve into more critical ethical issues such as the impact of AI in creating inequality and on worker psychology.

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