


Review of Labor Force and Active Aging Studies: Trends, Collaborations and Perspectives


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Abstract: *Bibliometric analysis is an effective method to gain a detailed overview of trends in the labor force, with a focus on active aging. This approach examines relevant scientific publications to identify trends, key authors, frequently used terms and, last but not least, important contributions to the field. The specific area of workforce and active aging focuses on the relationship between the process of population aging and its impact on the workforce. The focus here is on how older people can remain active and productive in the labor market, including by adapting skills and implementing policies and practices that facilitate employment and retention. In order to carry out this study, articles on workforce and active aging were identified using data available on the Web of Science. Although the results of the study show that, unlike other topics, a relatively small number of studies were identified in the Web of Science for workforce and active aging, research in this area is increasing, particularly in the USA and Spain. This approach provides a basis for the analysis and interpretation of workforce developments in the context of active aging. It enables a deeper understanding of workforce work with a focus on active aging and can serve as a basis for sound research and policy decisions.*



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JEL Classification:

J11; J14; J20; J70.

Keywords: *Labor Force; Active Aging; Bibliometric Analysis; Specialized Literature; Studies.*

Introduction

The issue of workforce and active aging has become a highly relevant topic, especially in light of the demographic changes of recent decades. Rising life expectancy, often accompanied by falling birth rates, has led to an aging population and changes in its structure. These changes in the population structure have led to increased interest in the question of how society adapts to and manages the challenges associated with aging.

Demographic changes, such as the aging of the population, raise the question of how society adapts and responds to these changes. In addition, demographic changes can affect demand in

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the labor market and determine whether the workforce needs to be retrained to meet new requirements.

The aging population brings challenges and opportunities in terms of workforce, pensions, health services and other aspects of society. As more and more people remain in the workforce into old age, the question of the adaptability of the labor market to their needs arises. Research and development of policies and practices to promote active aging and to optimize the contribution of older people to the workforce are important directions for contemporary society.

Given the increasingly evident demographic changes of recent years and their impact on the working population, this study aims to provide an overview of researchers' concerns regarding the “labor force” and “active ageing”. In particular, the approach focuses on the application of a largely quantitative method of analysis to assess and understand the development of these topics in science and research.

Bibliometric analysis in this area identifies trends in recent research, developments in academic thinking and important contributions by researchers.

This type of study has gained popularity in the field of scientific and academic research in recent years (Ellegaard & Wallin, 2015; Donthu et al, 2021; Khan et al, 2021). The increasing popularity is partly due to their multiple benefits (Figure 1).

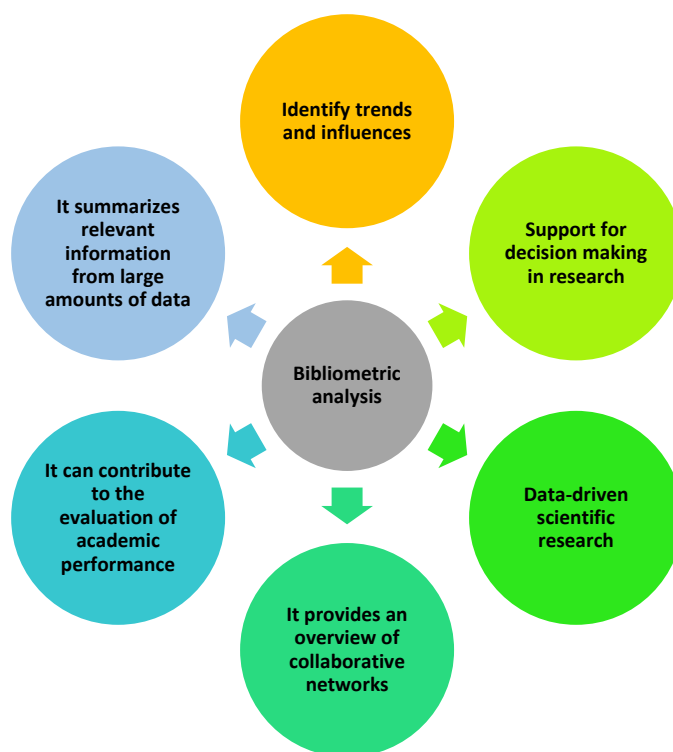


Fig. 1 Key aspects of bibliometric analysis

Source: Information collected from specialized literature.

With the exponential growth of scientific publications, bibliometric analysis is essential to summarize and extract relevant information from large amounts of data. It helps to identify emerging trends, influential authors and links between different areas of research by providing an efficient method of extracting information from the databases used.

This type of analysis is often used by universities, research institutes and researchers themselves to assess the impact and relevance of their work, including the number of citations and the impact factor of journals.

Another important aspect of this type of study is the results obtained, which can serve as a basis for strategic decisions on future research directions and the allocation of resources, while also providing an overview of collaborative networks between researchers and institutions, facilitating collaboration and the exchange of ideas.

Therefore, bibliometric analysis has become a necessary tool to understand and manage the ever-changing scientific landscape.

Literature Review

The literature on the labor force and active ageing has explored various aspects of the topic, including the motivations, solutions, and impact of an aging workforce on economic growth. Key findings and trends in the specialized literature include topics such as: the elderly in the labor market (Duminică & Hosszu, 2020; Carrillo Roa, 2012; Bujnakova & Stefanik, 2013), labor force and economy (Loichinger, 2015), demography and labor force (Temple & McDonald, 2008; Skupskyi et al, 2017), labor market and migration (Bălan, 2015; Marois et al, 2020; Zimmermann, 2005; Feld, 2000), the rural workforce (Iorga et al, 2014; Popescu, 2013), women's participation in the labor market (Marchand, 1993; Fontaine, 2021), labor force and retirement age (Skoog & Ciecka, 2010), inequalities (Gustafsson & Sai, 2009; Duro & Esteban, 1998), unemployment (Alba-Ramírez, 1999) and many others .

The relationship between population aging and economic growth has long been a topic of interest. Some studies suggest that the aging workforce could have negative fimpact on the economy, while others argue that the impact may not be as pronounced as originally thought (Cylus & Al Tayara, 2021; Maestas et al, 2016).

The aging of the working population raises the question of how likely it is that changes in the size of the working-age population will in practice lead to negative economic outcomes, and whether there are factors that can mitigate these negative economic effects. Policies that address aging at work, such as care, policy and legislation, have been the subject of another review (Barakovic Husic et al., 2020).

The literature covers many topics and shows that the aging of the working population has complex effects on society, the economy and the labor market. The studies deal with both practical aspects, such as the active participation of older people in the labor market, and more theoretical aspects, such as the relationship between demographics and the labor force or the inequalities associated with the aging of the working population.

Results and Discussions

In an attempt to provide a comprehensive overview of developments in the field of “labor force” and “active ageing”, bibliometric information was collected from the Web of Science for the period 1990-2022, identifying a relatively small number of studies related to, for example, “labor force” and “population” (Table 1).

Table 1. The number of publications for the analyzed subject in the period 1990 - 2022

Topics	Number of publications on themes from 1990 to 2022
Labor force and active ageing	268
labor force and population	5116

Source: Authors’ processing based on data from Web of Science.

This significant difference indicates the existence of different levels of research interest or focus in these sub-areas.

For the search of the terms “labor force” and “active ageing”, 268 studies in several WoS domains were identified (Figure 2).

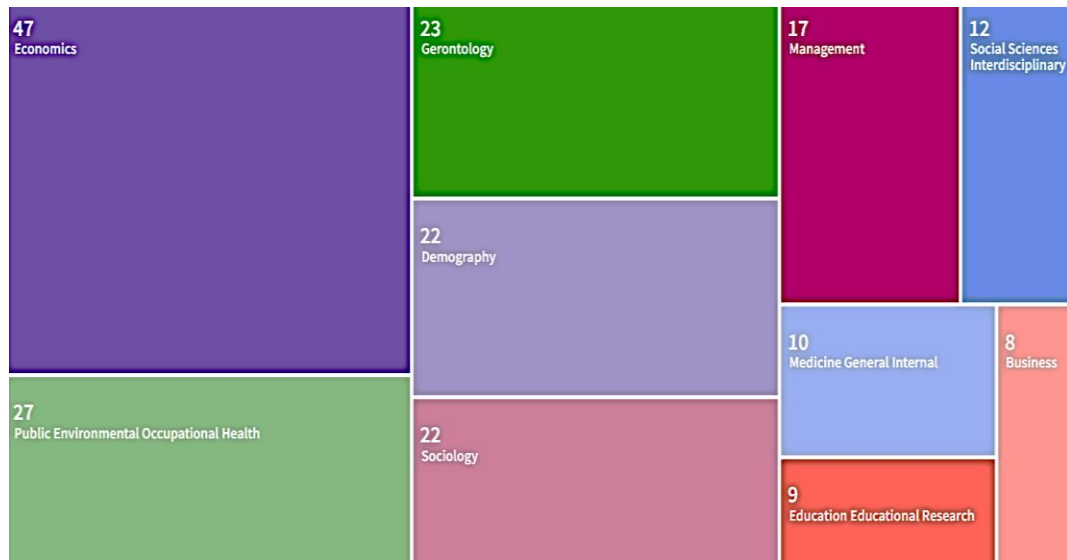


Fig. 2. Top ten WoS domains with most publications

Source: WoS.

Publications on the labor force and active ageing can be found in 92 areas. Among the fields with the most studies identified are Economics, Occupational Health in the Public Sector, Demography and Sociology.

The present study comprises four units of analysis. For each unit of analysis, the total number of items does not change, regardless of the type of analysis. However, the way in which the items are grouped on the map changes. The type of analysis depends on the type of links used to connect the items (Gheorghe et al, 2023) (Table 2).

Table 2. Unit of analysis

Unit of analysis	Total number of items
Authors	769
Keywords	1336
Countries	58
Organizations	443

Source: Authors' processing based on data from Web of Science.

More than 82% or 220 studies were published in an international language (English), making them more accessible to the global public.

Four types of analyses were conducted in the study: Co-authorship, co-occurrence, citation and bibliographic linkage (Table 3).

Table 3. Type of analysis

Type of analysis	Unit of analysis	Total number of items
Co-authorship	Authors	769
	Organizations	443
	Countries	58
Co-occurrence	Keywords	1336
Citation	Authors	769
	Organizations	443
	Countries	58
Bibliographic coupling	Authors	769
	Organizations	443
	Countries	58

Source: Authors' processing based on data from Web of Science.

To make it easier to understand, the link types used are explained in more detail below:

- o Co-authorship links refer to the relationships between two or more researchers who have collaborated on the same scientific publication.
- o Co-occurrence links refer to the relationships between keywords that occur together in scientific publications and indicate their connection in an academic context.
- o Citation links refer to connections between two articles, where one article (the so-called source article) cites or references another article (called the cited article).
- o Bibliographic coupling links are links between two articles that both cite the same document and indicate a connection between the bibliographic sources of these articles.

Bibliographic coupling links play an essential role in academic research, as they facilitate the understanding of connections between different works and contribute to the development of knowledge in a particular field. These types of links are essential in bibliometric analysis for understanding collaborative networks between researchers, associated research themes, and the impact of articles in the scientific community.

Examining how the number of studies has evolved over time provides information on the rise or fall of interest in these topics (Figure 3).

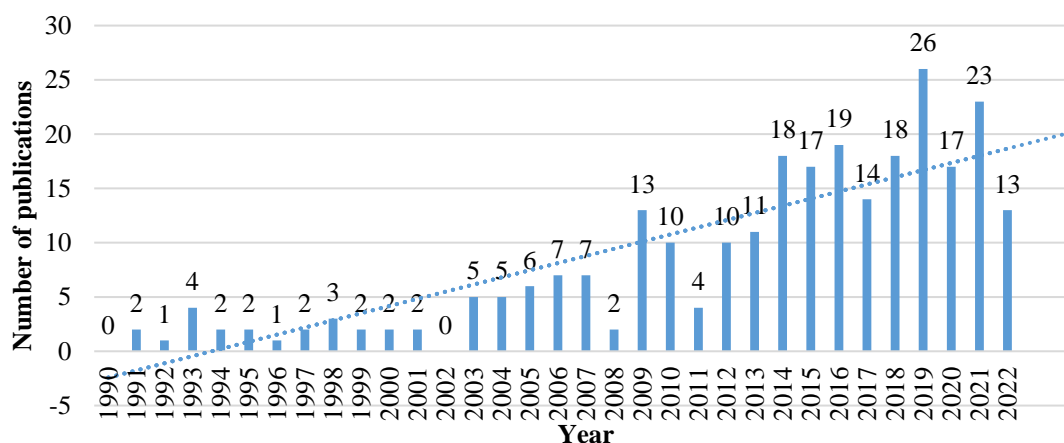


Fig. 3. Annual evolution of the number of publications on labor force and active aging from 1990 to 2022

Source: Authors’ own research, based on a Web of Science database in Excel.

The trend in the figure above is difficult to interpret. From 1990 to 2007, we can identify only a few publications on the labor force and active ageing, no more than seven publications per year. After 2008, there is a general growth trend, but it is not constant. The highest value was recorded in 2019 with 26 publications. With the emergence of the pandemic and a topic of the highest interest (Covid-19 pandemic), the number of studies on this topic declined.

In the next step we analyzed co-author links which usually refer to connections between people who have collaborated on academic or research publications as co-authors (Figure 4).

In academic and scientific communities, co-authorship is a common practice, especially in multidisciplinary projects where individuals with diverse expertise collaborate to produce comprehensive research. Co-authorship links may be established through published papers, articles or other scientific work in which multiple authors are credited.

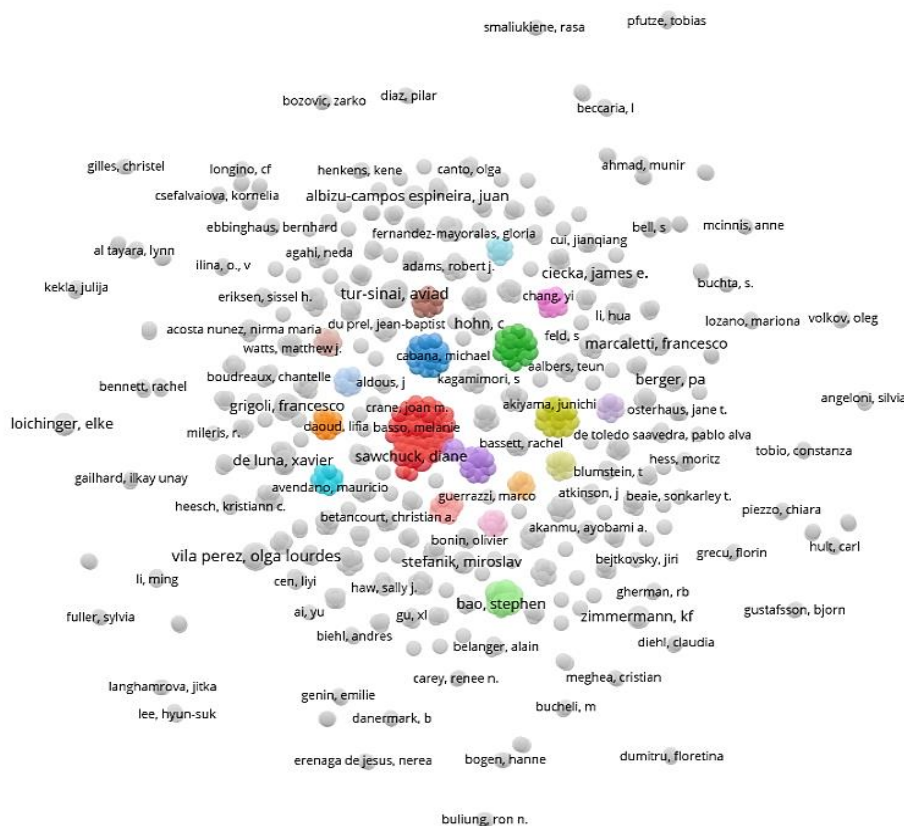


Fig. 4. Network map of the 769 authors with co-authorship links

Source: Authors' own research based on Web of Science data in VOSviewer.

In the present work the 268 studies have a total of 769 authors. The largest items on the map above show the names Aviad Tur-Sinai (labeled “Tur-Sinai, Aviad”), Stephen Bao (“Bao, Stephen”), Diane Sawchuck (“Sawchuck Diane”) and Olga Lourdes Vila Perez (“Vila Perez, Olga Lourdes”), which shows that they are co-authors of most publications on labor force and active aging.

The identification of keywords (Figure 5) in the field of “labor force” and “active ageing” can bring to light significant information about the evolution and impact of research in these areas.

Figure 5 shows that the most important sub-themes of labor force and active aging are: employment, migration, human capital, risk, age, women and inequality.

Aspects related to the employment and participation of people in the labor market, employment rates, types of occupations and conditions of employment, the impact of migration on the labor market and on demographic changes, investments in education, training and personal development that contribute to increasing the qualifications and skills of workers, the impact of population aging and last but not least the way age influences employment, respectively performance at work are among the directions addressed in the analyzed studies. This diversity reflects the complexity of workforce challenges and opportunities in the context of an aging population.

The co-author link network map is a visualization of the connections between authors based on collaboration within the same scientific paper.

In this type of work, identifying the countries of origin of the authors and co-authors enables a comparison of the level of research activity and the impact of their contributions (Figure 6). In this way, regional differences in the approach and prioritization of research can be identified.

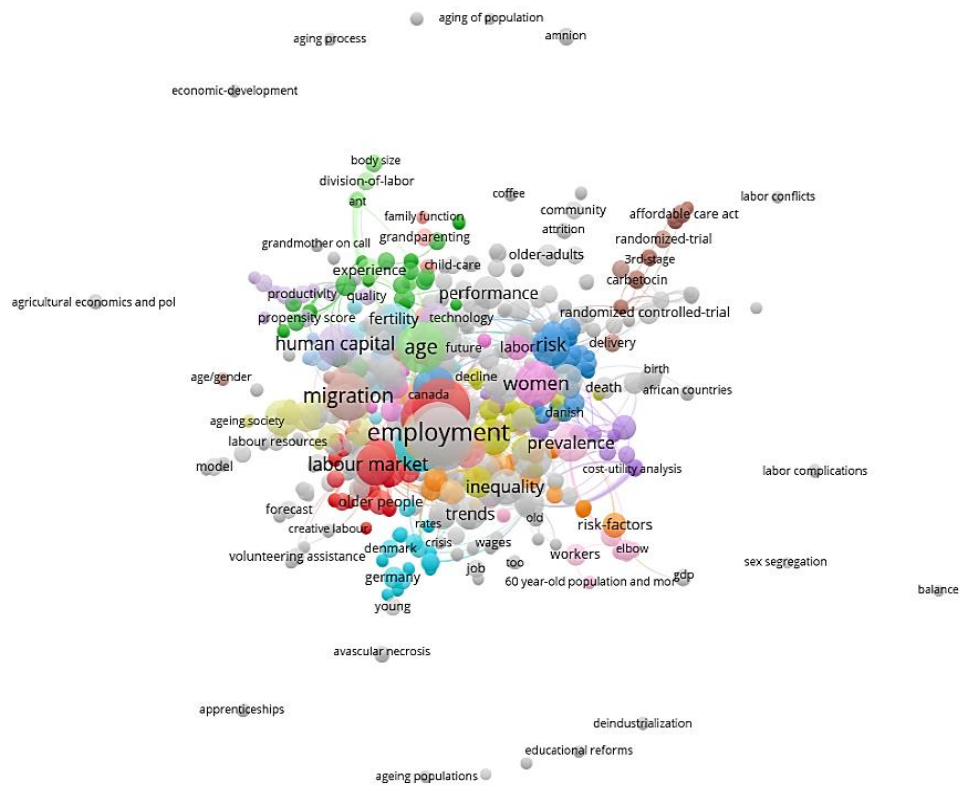


Fig. 5. Network map of all 1336 keywords of the labor force and active aging

Source: Authors' own research, based on Web of Science data in VOSviewer.

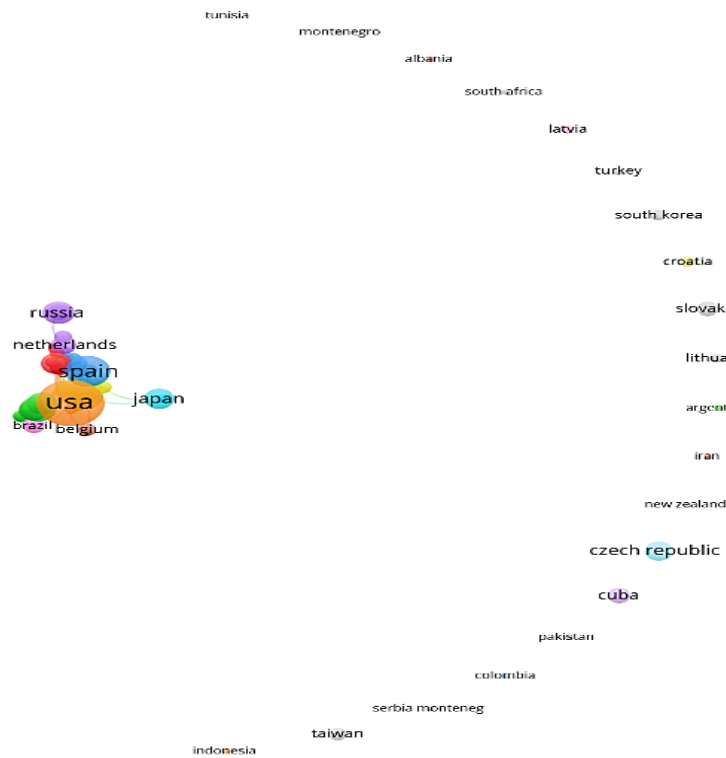


Fig. 6. Network map of all 58 countries with co-author links

Source: Author's own research based on Web of Science data in VOSviewer.

As can be seen from the figure above, a significant proportion of researchers who have co-authored a publication on labor force and active aging with another researcher are mainly from the USA, Spain, Russia, Japan and the Netherlands.

The authors include Romanians with six studies published since 2007, with affiliations to the University of Agronomic Science & Veterinary Medicine - Bucharest, Romanian Academy of Sciences, Babes Bolyai University from Cluj and University of Pitesti.

Organizations are important in bibliometric analysis, a quantitative method for assessing scientific production and its impact. Among the types of organizations we find universities, research institutes, companies or other entities that contribute to scientific production (Figure 7).

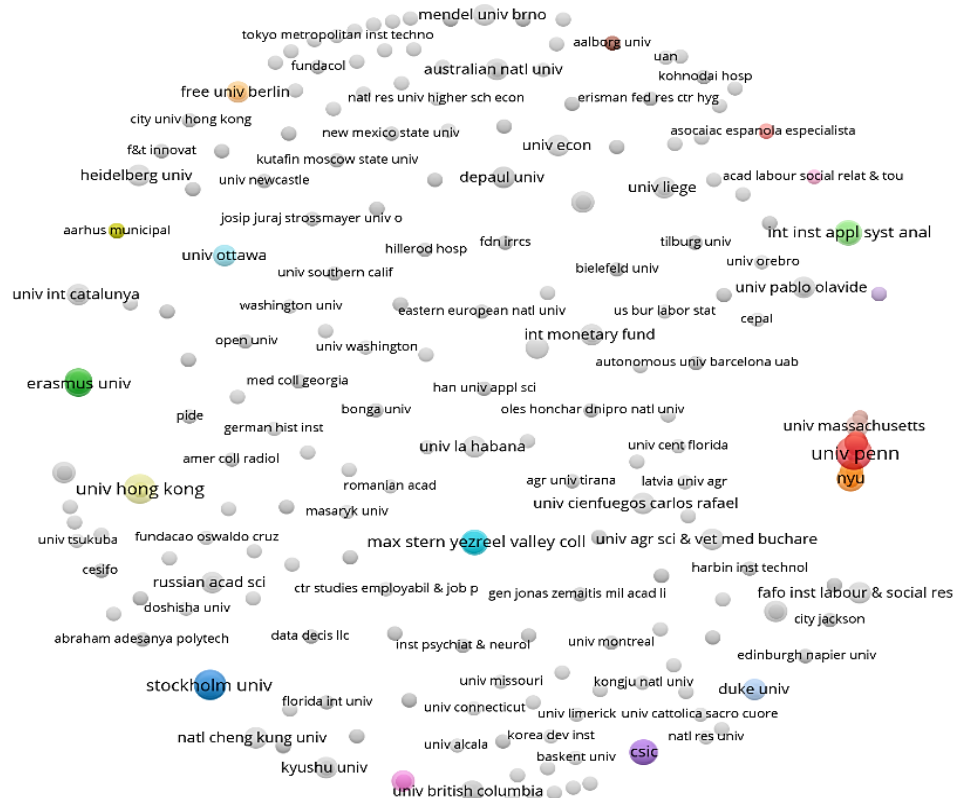


Fig. 7. Network map of 443 organizations with co-authorship links

Source: Authors' own research based on Web of Science data in VOSviewer.

A significant part of the authors who contributed to publications in the analyzed field worked at the University of Pennsylvania (“Univ Penn”), Erasmus University Rotterdam (“Erasmus Univ”), Stockholm University (“Stockholm Univ”), University of Hong Kong (“Univ Hong Kong”), Max Stern Yezreel Valley College (“Max Stern Yezreel Valley Coll”), the Spanish National Research Council (“CSIC” - “Consejo Superior de Investigaciones Científicas”) and the International Institute for Applied Systems Analysis (“Int Inst Appl Syst Anal”).

Authors often include a list of references or citations in their publications to acknowledge the sources that influenced their work. These citations generally create a network of interconnected research in a particular field (Figure 8).

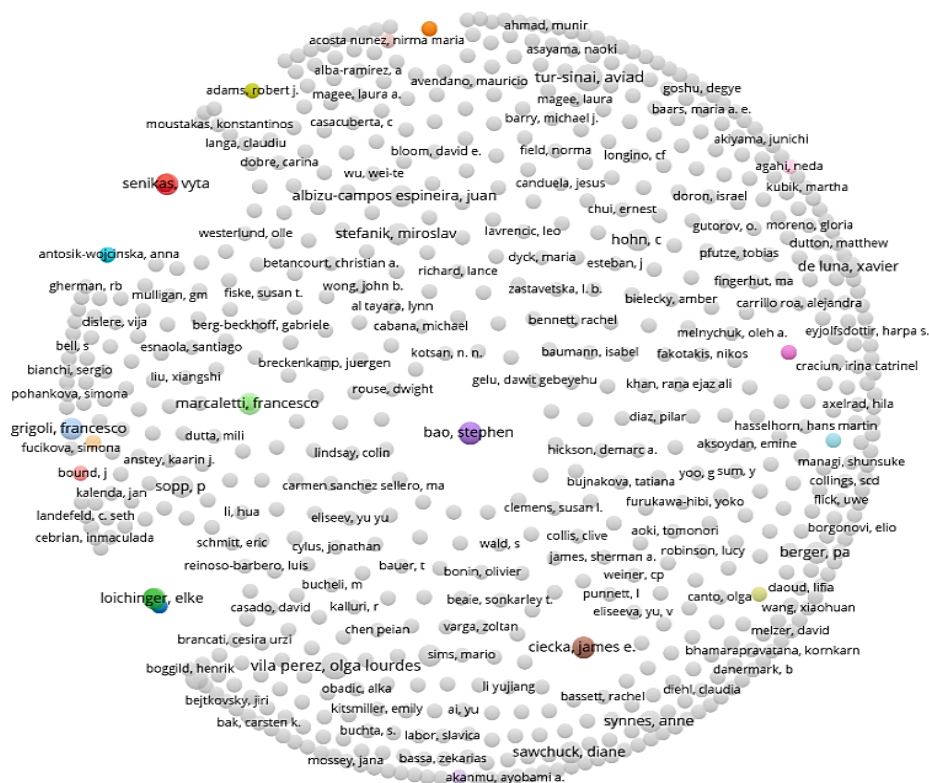


Fig. 8. Network map of all 769 authors with citation links

Source: Authors' own research based on Web of Science data in VOSviewer.

In Figure 8 we find the researchers who cited other researchers in their documents most often are Stephen Bao (“Bao, Stephen”), Vyta Senikas (“Senikas, Vyta”), Elke Loichinger (“Loichinger, Elke”), James E. Ciecka (“Ciecka, James E.”), Francesco Marcaletti (“Marcaletti, Francesco”) and Francesco Grigoli (“Grigoli, Francesco”).

Citations in academic publications are often the result of recognition and evaluation of work by other researchers around the world (Figure 9). When an author cites a work in their own research, it often indicates that the cited work has had a significant influence on the citing authors' thinking or methodology. The citations can come from different countries and academic fields, reflecting the diversity and collaboration in the global academic community. This referencing and citation process helps to provide a solid framework for the continuous growth of knowledge in different scientific fields.

In this analysis, we identified 58 countries of origin of authors who have contributed to publications on labor force and active aging and who have cited each other in these publications. The majority of citations are mainly from authors from the USA, Spain and Canada.

The citations of papers published by an organization can be used to measure its influence in the academic community. A high number of citations can indicate the relevance and influence of the research conducted by the organization (Figure 10).

As can be seen in Figure 10 a significant proportion of the authors who cited each other in these publications worked at the University of Pennsylvania (“Univ Penn”), at the Carlos III University of Madrid (“Univ Carlos III Madrid”), the International Institute for Applied Systems Analysis (“Int Inst Appl Syst Anal”), Umeå University (“Umeå Univ”), the University of Hong Kong (“Univ Hong Kong”), University of Helsinki (“Univ Helsinki”) and Max Stern Yezreel Valley College (“Max Stern Yezreel Valley Coll”).

Bibliographic coupling links are a type of link that can be used to identify networks of scientific publications, scientific journals, researchers, research organizations, countries, keywords or terms (Van Eck & Waltman, 2022).

The bibliographic linking network is an overview of the links between documents based on common references. Small (1973) and Marshakova (1973) assume that the analysis of co-citation relationships consists of identifying and evaluating the links between two or more documents, sources or authors. This analysis is based on the fact that two papers are considered co-cited if both are cited in the reference list of a third document (Kessler, 1963). The degree of bibliographic coupling between any two documents increases with the number of shared references (Figure 11; Figure 12; Figure 13).

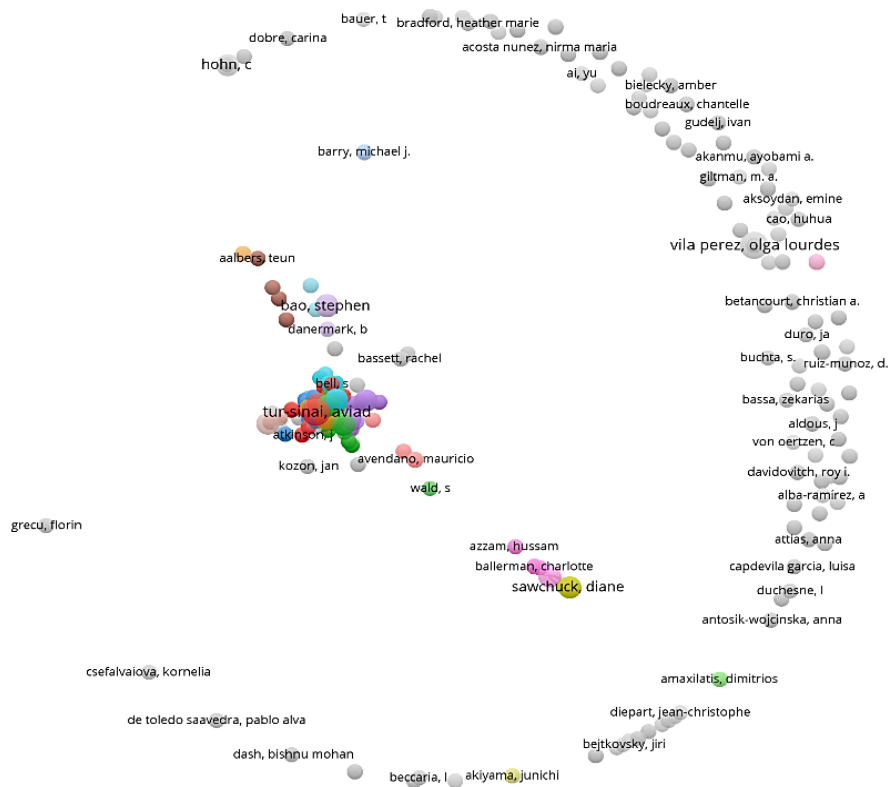


Fig. 11. Network map of all 769 authors with bibliographic coupling links

Source: Authors’ own research based on Web of Science data in VOSviewer.

As can be seen, among the researchers who most often cite the same document(s) are Aviad Tur-Sinai (“Tur-Sinai, Aviad”), Stephen Bao (“Bao, Stephen”), Diane Sawchuck (“Sawchuck Diane”) and Olga Lourdes Vila Perez (“Vila Perez, Olga Lourdes”).

Figure 12 shows the bibliographic coupling links of the 58 countries. Numerous authors who have published in the field of interest and who have cited the same document(s) are mainly from the USA and then from Spain.

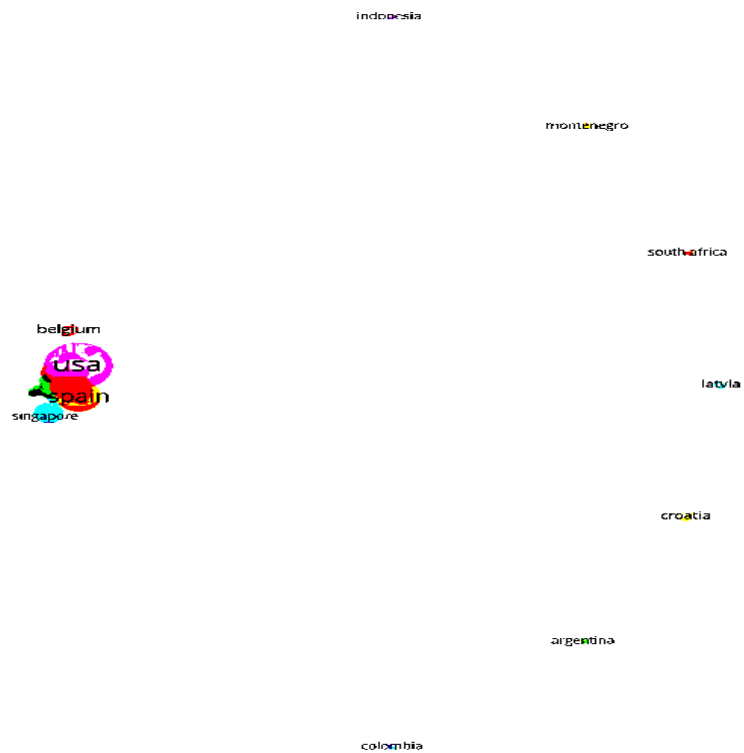


Fig. 12. Network map of all 58 countries with bibliographic linkages

Source: Authors' own research based on Web of Science data in VOSviewer.

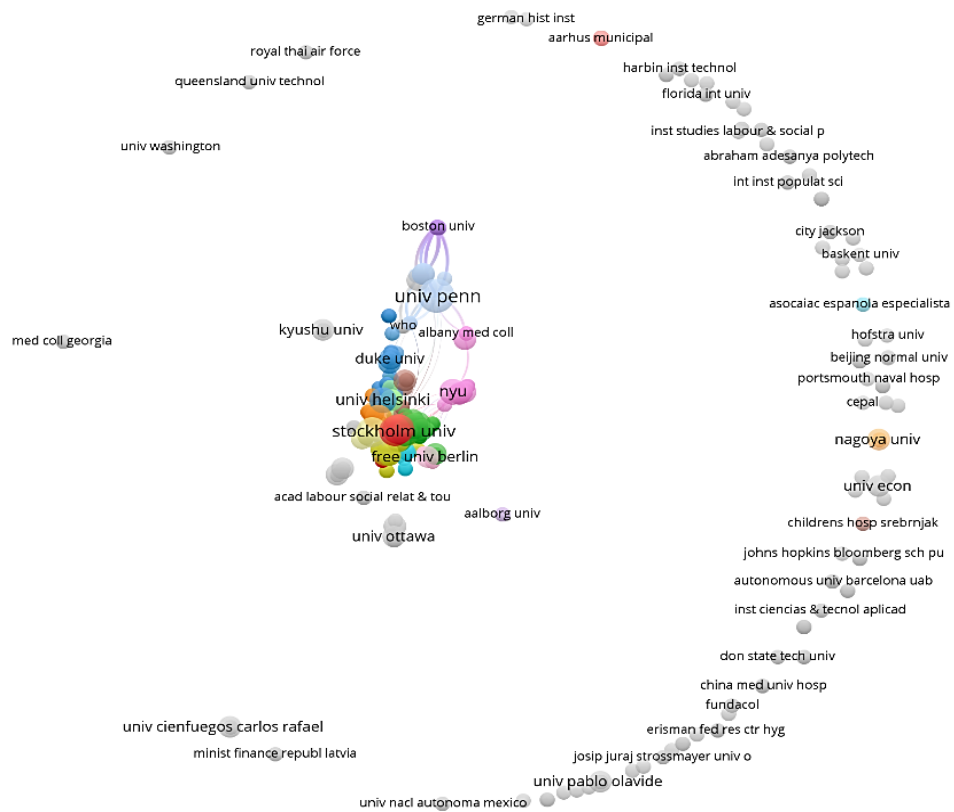


Fig. 13. Network map of 443 organizations with bibliographic coupling links

Source: Authors' own research based on Web of Science in VOSviewer.

A large number of authors worked mainly at the University of Pennsylvania (“Univ Penn”), the University of Stockholm (“Stockholm”) Univ”) and the University of Helsinki (“Univ Helsinki”).

Conclusions

Although the Web of Science database contains a relatively small number of studies on labor force and active aging compared to other topics, the results of the study indicate an increasing trend in the number of studies in this area.

The results of the data analyzed suggest that there is an interest and geographical diversity in research on workforce and active aging.

The USA and Spain are at the top of the list, both in terms of the number of studies and the way they are cited. This could be an indication of the greater participation and significant contribution in this area of research. More than 440 organizations are involved in the research, indicating extensive collaboration between institutions and the need to approach the topic from multiple angles: economic, social, demographic and, last but not least, environmental. Of the more than 1300 keywords identified, the following are the most common: employment, labor market, migration, age, human capital, women and risk.

Overall, these results show that labor force and active ageing is a complex, global and interdisciplinary topic to which researchers and institutions from around the world are making an important contribution. This area of research is critical to understanding and addressing the challenges and opportunities associated with the labor force in the context of an aging population.

In summary, bibliometric analysis is highly useful for assessing and managing the performance of organizations in the scientific field, as it facilitates the understanding of their impact and contribution in the broader context of research.

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