# Old Age Pension Scheme Investment Research across the Globe: A Bibliometric Analysis

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***Abstract :*** The old age pension scheme is essential for public security systems globally and is necessary for people well-being. Investing in this type of system is very crucial as it facilitates to improve living standards. At the time of retirement, having a good pension gives them security and confidence, which is good for financially. It is essential to improve pension schemes to help people with less income have a better living standard. This has led to more academic research being done recently. This article analyzes existing research to understand new trends and future research opportunities. The study looked at 353 publications from Scopus database from 1975-2025, using tools like Biblioshiny and VOSviewer to analyse key articles, authors, counties and institutions in terms of how much they were published and how influential they were. The study also looked at how these different factors related to each other. The study focused on important terms and how they have changed overtime. There was an in-depth investigation of finance as well. The study also showed that China, The United States, and the United Kingdom are at the leading countries on pension schemes research. The publications are mainly about Social Policy, Public, Economics, Psychology, and Gerontology. Some important trends in the studies include the best investment strategies, income, momentum, and approaches to risk management.

***IndexTerms*- Trends, Social security, Pension**

## 1. INTRODUCTION

The elderly population is growing rapidly and posing unprecedented challenges worldwide. The United Nations (UN) data shows that the elderly population aged ≥60 years is expected to reach around 2 billion worldwide by 2050, (Boumans, et al.2020). Economic security in old age is a significant concern for elderly populations and ensuring stable and sufficient income for the future formidable challenges (Bloom and Eggleston, 2014). The social security system started in Europe, by Chancellor Otto Von Bismarck' leadership in Germany and Beveridge in England at the end of the 19th Century, are foundation of current pension system prevalent in most countries. This initiative aimed to link regular employees with the newly formed German state, providing a small fixed allowance to every employee who reached the age of 65 years (Borsch- Supan & Wilke, 2004).

Old age pension in India is a critical social security measure aimed at providing economic support and improving the well-being of the elderly population. India has implemented several pension schemes, with the Indira Gandhi National Old Age Pension Scheme (IGNOAPS) being a flagship programme for poverty alleviation among elderly individuals below the poverty line.

The Indian government has recognized the challenge of an increasing elderly population, projected to reach 138 million by 2035, and the growing need for economic security for this segment. The IGNOAPS and similar schemes offer direct cash transfers to elderly individuals living in poverty, helping to reduce personal income inequalities and provide a safety net against economic vulnerability (Narayan, 2019).

Empirical evidence shows that the IGNOAPS reduces poverty among elderly beneficiaries and contributes to increased family expenditures on health care, education, and social needs. It also positively affects female labor supply by enabling women aged 20-50 in pensioner households to participate more in paid employment (Kaushal, 2013, Unnikrishanan & Sen 2025).

The pension schemes improve the economic security of older persons by reducing inequalities and are claimed to cost the government less than 0.20% of total revenue or consumption expenditure. They have broader implications for achieving United Nations Sustainable Development Goals related to poverty and inequality reduction
(Narayan, 2023).

Despite the positive impacts, challenges remain. Awareness varies across regions and socio-economic strata. In some areas like urban Puducherry and rural Haryana, satisfaction with the pension schemes is generally high, but the pension amount and administrative procedures often lead to dissatisfaction or under utilization Jothi et al 2016, Goswami et al 2020). Corruption and tedious processes have been reported as barriers to effective access (Kohli, 2017).

Cultural factors impact the effectiveness of pensions, with variations observed between different religious and cultural groups, such as in Haryana. The quality of life improvements differ, with some areas showing more gains in mobility and others in health and nutrition (Khan & Dahiya, 2023). Additionally, gender differences are prominent, with older women being more vulnerable due to widowhood and limited access to resources (Hariharan ,2012)

India's pension landscape also includes contributory schemes like the National Pension System (NPS), a defined contribution scheme introduced for government employees joining after 2004 to encourage disciplined saving and reduce government pension liabilities (Deeti, 2023) However, coverage of unorganized sectors remains limited, and voluntary contribution-based schemes face challenges in participation and awareness.

Old age pensions are part of a larger framework of social security measures addressing multidimensional poverty among rural and tribal populations. These programmes contribute significantly to reducing multidimensional poverty and improving socio-economic conditions. Additionally, mental health, healthcare, and social support integration with pension schemes are essential for comprehensive elder care.

## 2. NEED OF THE STUDY.

The national old age pension scheme plays an important role in the financial sector by supporting social security. The study specifically focuses on retirement savings and security mechanisms, with the aim of enhancing financial stability and long-term welfare. The bibliometric analysis examines scholarly article from journals, conference proceedings and similar sources available in major databases such as Web of Science, Scopus, Google Scholar and PubMed.

## 3. Review of Literature

The Focus of pension research has evolved from life expectancy and population ageing concerns to the current primary issue of pension sustainability. Pension research has gathered significant attention in recent years, driven by demographic changes and economic challenges that threaten the sustainability of pension systems worldwide (Maria et al. 2021). As populations age, the need for comprehensive analyses that address the complexities of pensions becomes increasingly critical. This literature review aims to synthesize the current state of research on pensions, summarizing key findings, trends, and methodologies while identifying areas for future inquiry.

Reeves and McKee (2016) highlight the crucial link between public pension entitlements and reduced unmet medical needs in Europe. Their cross-national study finds that the benefit of public pensions in enhancing healthcare access is more pronounced in countries where out-of-pocket healthcare spending is high**,** and especially among the income-poor elderly. The findings emphasize that pension reductions, particularly in com-modified healthcare systems post-recession, increase unmet medical needs, thereby deepening financial and health insecurities among the elderly.

Several studies support the poverty-alleviating potential of non-contributory and universal pensions. Nutsubidze and Nutsubidze (2015) show that Georgia's basic pension program, implemented to tackle elderly poverty, led to a substantial decrease in poverty among those aged 60 and above. Similarly, Kidd (2015) emphasizes that even low-income countries like Nepal have achieved universal pension coverage, demonstrating the feasibility and re-distributive strength of public pensions in reducing elderly income insecurity globally. Willmore (2014) also stresses the importance of enhancing pension adequacy, recommending a doubling of Mexico's pension amount to meet basic subsistence needs.

The transformation from defined benefit (DB) to defined contribution (DC) systems in countries like Mexico and Ireland, as discussed by Organisation for Economic Co-operation and Development (OECD) (2015, 2014), presents significant challenges. In Mexico, the fragmented pension system and low contribution rates have postponed fiscal stability and risk public discontent due to declining future benefits (OECD, 2015). Similarly, in Ireland, the absence of a mandatory earning-related pension pillar has created a retirement savings gap, with inequities between public and private sector workers, and low transparency in benefit calculation (OECD, 2014). These structural weaknesses suggest a need for policy reconciliation to ensure sustainability and fairness.

In rural China, Cheng and Liu (2015) explore the impact of the New Rural Pension Scheme (NRPS) on elderly living arrangements. They find that pension income encourages independent living, particularly among elderly with nearby adult children and better socio-economic status. This indicates that pension benefits contribute not only to economic security but also to changing social dynamics of ageing, without completely displacing familial support structures.

Kalu Chris (2015) provides insights from Nigeria, showing that low awareness and lack of trust in pension fund administrators discourage workers from participating in the Contributory Pension Scheme (CPS). Many workers prefer informal savings and lack the financial literacy to plan for retirement. The study suggests that transparency, awareness campaigns, and regulatory oversight are crucial for improving the scheme's credibility and coverage.

Stephen Kidd (2015) argues for the establishment of comprehensive, multi-tiered pension systems that blend government support with contributory elements. Such systems can provide broad coverage and higher benefits, with the government playing a central role in regulation and redistribution. The study warns that relying solely on contributory models can exclude the most vulnerable and exacerbate inequality.

A broad spectrum of international studies emphasizes the critical role of public pension systems in reducing old age poverty, enhancing income security, and promoting social protection for the elderly. Jimenez Martin (2014) found that minimum pension programs in Europe significantly reduce poverty among low-income retirees but can discourage continued labor participation, especially near early retirement age. Similarly, Sanchez (2013) observed that in Spain, generous pension flows prompt early retirement, necessitating combined economic and institutional incentives to delay retirement. In Bangladesh, HelpAge International (2013) highlighted that a universal Old Age Allowance (OAA) could have a substantial and rapid impact on poverty reduction, demonstrating its cost-effectiveness in improving welfare for elderly households. In Asia, Park (2012) stressed the urgency of pension reforms in East and Southeast Asia due to unsustainable pension models and aging populations, warning of a narrow window to avert future pension crises. In Tanzania, Osberg and Mboghoina (2011) proposed that a universal old age pension at the food poverty line could lift millions out of poverty, including many children, underscoring its intergenerational benefits. Todd and Joubert's (2011) study on Chile's pension reform highlighted notable progress in gender equity in pension withdrawals and a reduction in elderly poverty, though accompanied by modest work disincentive effects. Van Dullemen (2006) further confirmed that non-contributory pensions in Brazil and South Africa significantly reduce poverty and vulnerability among older people and their households, while also improving their living standards and functioning. Collectively, these studies underline that well-designed, inclusive, and adequately financed pension systems not only mitigate poverty and deprivation among the elderly but also foster broader social and economic stability, especially in the context of rapidly ageing populations.

## 4. RESEARCH METHODOLOGY

### 4.1 Research Framework

This study adopts bibliometric analysis methodology to examine the literature about old age pension scheme. Bibliometric analysis is a technique used to analyse extensive volume of unstructured data (Donthu et al., 2021). Bibliometric analysis include assessing scientific papers, books, similar publications, and proceedings, along with their citation utilizing methods and statistical tools. The analytic methods fields, including accounting (Owusu et al., 2024), Mathematics (Martinez et al., 2021), Finance (Koenigsmarck & Geissdoerfer, 2021), Policies (Nan et al., 2020), and the sciences (Van Eck & Waltman, 2010). The technique is considered crucial for recognizing evolving patterns in a research area, including factors such as journals and articles performance, collaboration efforts among authors, geographical patterns in publication, and the research output of institutions in terms of publications, journals, and countries across numerous field of existing literature. The current study comprehensive examination involves analysing trends in publishing, authorship, keywords, citations, country of origin, affiliation, document source and other pertinent components. Bibliometric analysis facilitates the identification and advancement of key research areas, along with exploration on theoretical framework basis those particular subjects (Donthu et al., 2021).

### 4.2 Data source, data collection and document type

The data for the research was extracted from the Scopus repository. The database is a multiple source of abstracts and citations for scientific research. Universally pertinent journals cover approximately 9,200 journals in 178 scientific areas and over 21,000 peer-reviewed, high-quality scholarly publications published worldwide. Using the Boolean technique, the study used the search phrase "pension scheme" or "pension" or "old age saving" in the title exclusively from 2000 to 2025 (i.e. 24 years) on May, 16, 2025.

The original search result a total of 7,984 documents. The emphasis of study was refined, an additional search key term, "old age pension" or "pension scheme" or “pension security” in the author keywords and the number of publications was decreased to 652. The document type was limited to articles that fit the study's purpose; this reduced the document to 570. Following further refinement that confined the search to languages that included English, the document was reduced to 353. The study focused on the subject areas of the publications, which were limited to "Economics", "Business Finance", "Management", "Business", "Environmental Studies", and "Development Studies", resulting in a total of 353 documents. Following the screening, the total number of documents was 353, which was exported to the Biblioshiny in R package software for analysis.

### 4.3 PRISMA Statement

The application of the search query, the “Preferred Reporting Items for Systematic Reviews and Meta-Analysis” (PRISMA statement) was employed to rigorously refine the search outcomes (Haddaway et al., 2022). Figure 1 illustrates the complete methodology. The rationale behind adopting the PRISMA statement stemmed from its ability to enhance reliability across diverse reviews, its recognition for its thoroughness, and the recent surge in its utilization within numerous bibliometric analyses. Figure 1. depicts a summary of the procedure. PRISMA flow diagram illustrating the search procedure in the discovery and screening of sources for bibliometric analysis. Preferred Reporting Items for Systematic Reviews and Meta-Analyses under PRISMA.

### 4.4 Data Analysis

This study utilized combination of Excel and bibliometric software bibliometrix, to conduct a comprehensive bibliometric analysis. The analysis encompassed both descriptive and collaborative network technique, including co-citation analysis, bibliometric coupling and co-occurrence analysis. The bibliometric package, through its biblioshiny interface, facilitated an in-depth exploration and visualization of scientific mapping. Additionally VOSviewer was utilized to manage extensive bibliographic data, providing advanced mapping functionalities and sophisticated visualization options, (Donthu et al., 2021). Microsoft Excel was also used to generate descriptive tables and figures. These analytical tools collectively

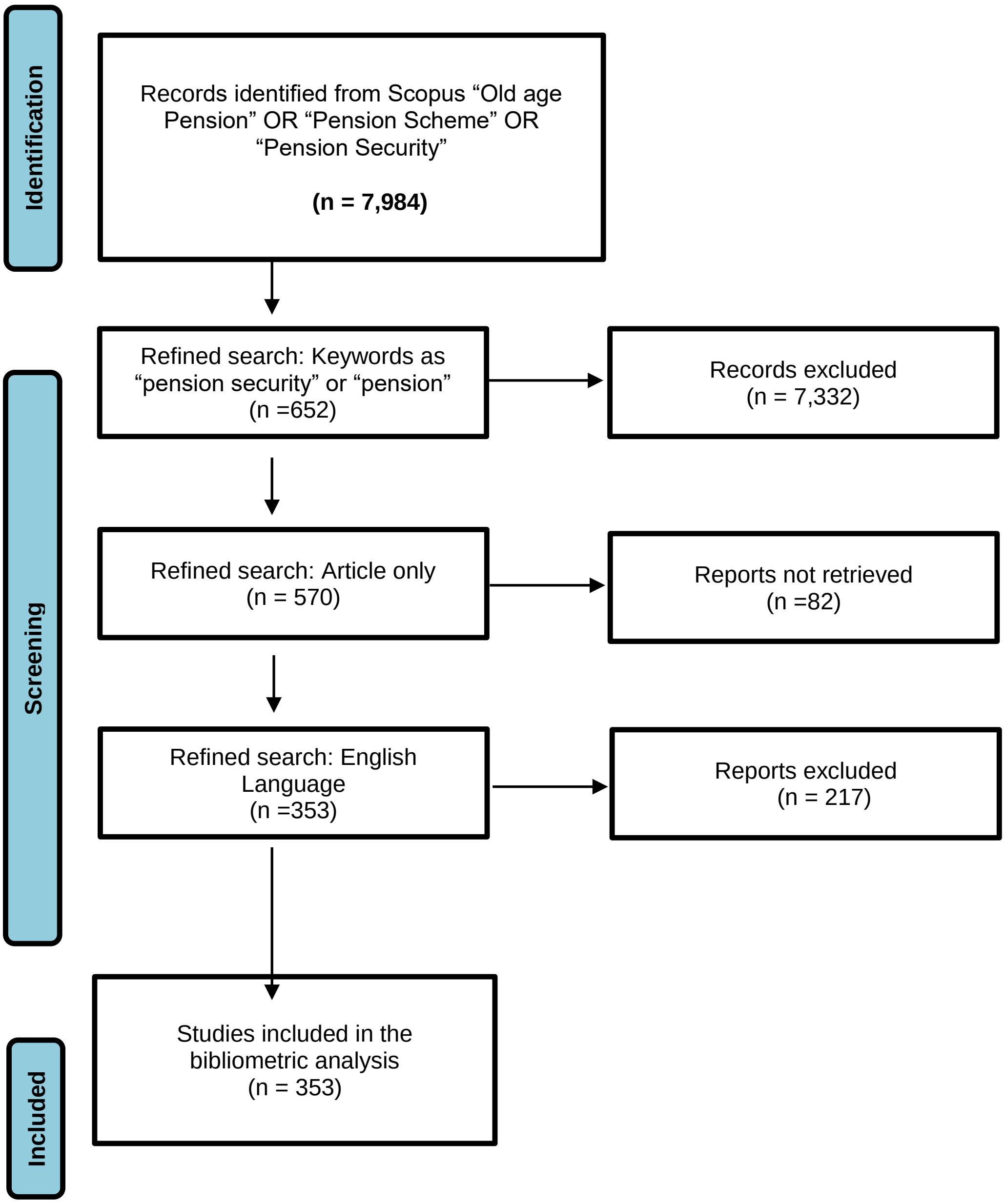



Figure 1 PRISMA flow diagram

enabled the identification and representation of key elements such as authors, publications and countries, offering critical insights into the progression of science across numerous research disciplines, (Moed et al., 1995). The present study seeks to demonstrate the evolution observed in the study of pension scheme, social security and investment. This bibliometric study was conducted to the outlined work plan with a structured research framework. Initially, defined the scope of the research field. Subsequently, an appropriate database was selected to gather the information required for the various analyses. The research criteria were than adjusted, including such as document types, language, and search terms to be examined. After retrieving the relevant data, it was extracted the relevant findings from the databases. Finally, the analysed results were interpreted and discussed to derive meaningful insights.

## 5. Result and Discussion

To conduct the bibliometric analysis, this section provide a synthesis of the significant discoveries spanning three decades of research on pension schemes and investment within the domains of corporate management, finance, and accounting. This was achieved via performance analysis and scientific mapping techniques (Donthu et al., 2021). The objective was to uncover trends in the publication of studies on pension schemes and investments, as well as the intellectual framework of previous research. The subsections encompass trends in publication and authorship, the top-cited countries and journals, as well as co-occurrence and keyword analysis derived from the references within the dataset. Table 1 provides a summary of the data employed in this study.

**Table 1 Summary of information regarding research on pension scheme within the Finance domain.**

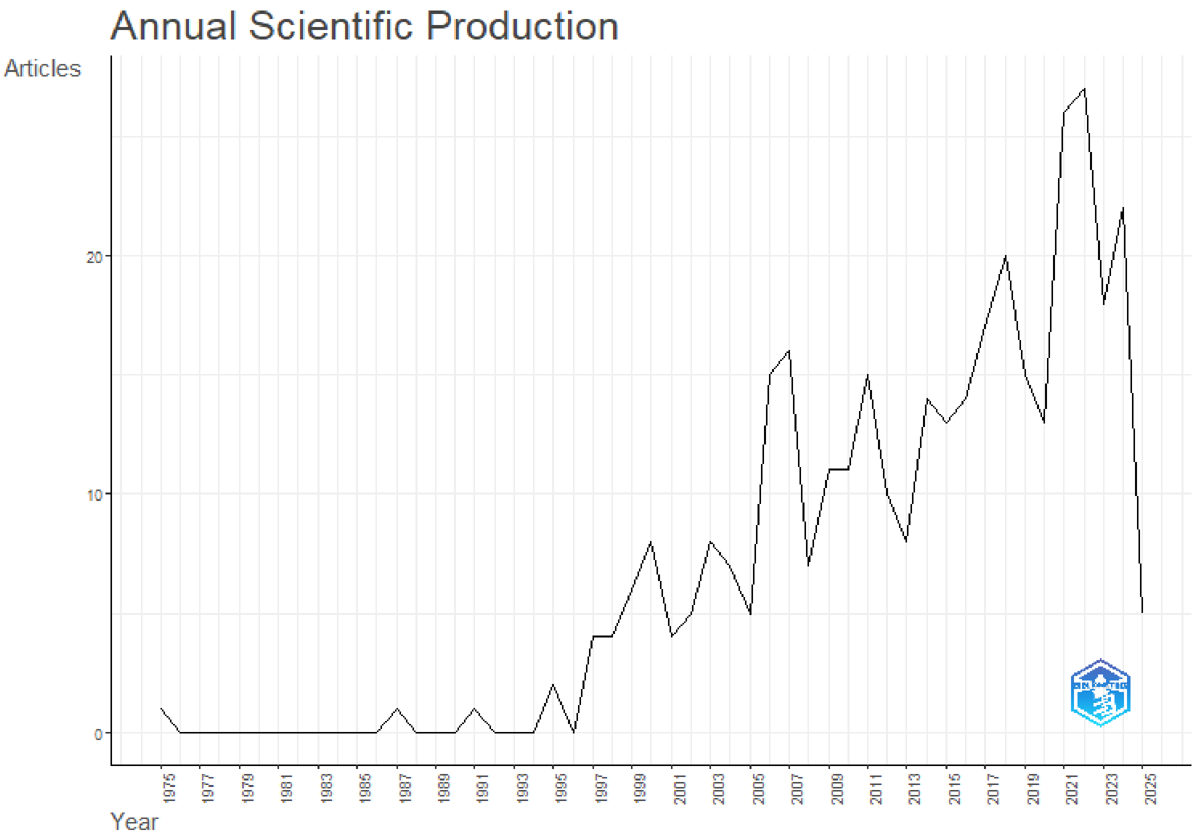
| **Data** | **Pension Scheme Research** |
|---|---|
| Volume of articles | 353 |
| **Volume of journals** | *168* |
| **Volume of authors** | *684* |
| **Volume of countries** | *50* |
| **Volume of citations** | *4,002* |
| **Average citation/article** | *16.77* |

The bibliometric analysis of pension scheme research indicates that a total of 353 articles have been published across 168 journals by 684 authors from 50 countries, demonstrating the interdisciplinary and global relevance of the field. The cumulative 4,002 citations, with an average of 16.77 citations per article, reflect a substantial scholarly impact and suggest that research in this domain has significantly contributed to academic discourse and policy debates. Authorship patterns reveal an average of nearly two authors per article, highlighting collaborative engagement, while the wide geographical spread emphasizes that pension-related challenges are a matter of shared international concern. On average, each author has received around 5.85 citations, indicating moderate individual impact but collectively strong influence, thereby underscoring that pension scheme research is a vibrant and influential area within social science and policy studies.

### 5.1 Study Quantification

In the figure 2 the annual number of published article show a steady increase, reflecting growing interest and enthusiasm in research area. Figure 2 revealing the trend in citation impact of author article over time. From the early yearly (1970s to 1990s), the average number of citations remained consistently low, near zero, indicating limited research.

**Figure 2 Publication and citation trends. Source: Scopus**




The rise is observed around 2003, where average citation per year reached nearly 6, suggesting a period of high academic influence and possible widely referenced publication. After this rise, there is a noticeable decline, with substantial years characterized by fluctuating citation averages. While the period from 2005 the mid-2010 shows variability, it also indicates a sustained level of academic influence. There is a modest upward trend in 2015 that is rising again around 2020. However, the most recent 2023 and 2024 indicates a decline in average citation, which may be attributed to the inherent citation lag for newly published articles.

The figure **"Annual Scientific Production"** shows the yearly trend of articles published on pension scheme research (1975–2025). The production was almost negligible until the early 1990s, after which there was a gradual but steady rise. From the late 1990s to mid-2000s, research output grew modestly, reflecting the early expansion of interest in pensions and ageing issues. A notable surge occurred after 2010, with annual publications frequently exceeding 10 articles, signaling a period of heightened academic attention likely influenced by global demographic shifts, pension reforms, and social security debates. The trend peaked around 2021–2022, when the output crossed 20+ articles per year, indicating the field's maturity and growing international relevance. A slight decline is visible in 2023–2025, which may partly reflect database indexing lags for recent years rather than an actual fall in productivity.

**Table 2. The most cited articles in the Scopus database**

| Authors | Title | Journal | Global Cotation |
|---|---|---|---|
| Duflo E | Grandmothers and granddaughters: Old-age pensions and intrahousehold allocation in south africa | World bank economic review | 853 |
| Duflo E | Child outcomes in africa: Child health and household resources in south africa: Evidence from the old age | American economic review | 199 |
| Liu t;sun l | Pension reform in china | Journal of aging and social policy | 142 |
| Chen X;wang T;Busch SH | Does money relieve depression? Evidence from social pension expansions in china | Social science and medicine | 82 |
| Sagner A;mtati RZ | Politics of pension sharing in urban south africa | Ageing and Society | 73 |
| Möhring K | Is there a motherhood penalty in retirement income in europe? The role of lifecourse and institutional | Ageing and Society | 48 |
| Ranchhod V | The effect of the south african old age pension on labour supply of the elderly | South African Journal of Economics | 40 |
| Booysen F | Social grants as safety net for hiv/aids-affected households in south africa | Sahara J | 39 |
| Devereux S | Social pensions in southern africa in the twentieth century | Journal of Southern African Studies | 38 |
| Kimuna SR;makiwane M | Older people as resources in south africa: Mpumalanga households | Journal of Aging and Social Policy | 36 |

This table 2 lists the most cited articles on pension schemes in the Scopus database, highlighting both the authors and the global scholarly influence of their work. At the top, Esther Duflo has two highly influential papers: one in the *World Bank Economic Review* (853 citations) on the role of pensions in household allocation between grandmothers and granddaughters in South Africa, and another in the *American Economic Review* (199 citations) on child outcomes and household resources in the context of pensions. Together, these studies underscore the developmental and social impacts of pension programs in Africa. Other frequently cited works include Liu & Sun's (142 citations) article on pension reform in China (*Journal of Aging and Social Policy*), and Chen, Wang & Busch's (82 citations) analysis of social pension expansions and mental health in China (*Social Science and Medicine*). Additional contributions focus on African contexts, such as Sagner & Mtati's

(73 citations) article on the politics of pension sharing (*Ageing and Society*), Ranchhod's (40 citations) study on pensions and labor supply (*South African Journal of Economics*), and Booysen's (39 citations) work on social grants and HIV/AIDS-affected households (*SAHARA J*). Mohring's (48 citations) research addresses the motherhood penalty in retirement income across Europe (*Ageing and Society*), pointing to gendered pension inequalities. Finally, Devereux (38 citations) and Kimuna & Makiwane (36 citations) provide historical and household-level perspectives on pensions in Southern Africa.

**Table 3. Global Citation**

| Authors | Title | Journal | Global Citation |
|---|---|---|---|
| **Cedar University** | 110 | 103 | +7 |
| **Elm College** | 223 | 214 | +9 |
| **Maple Academy** | 197 | 120 | +77 |
| **Pine College** | 134 | 121 | +13 |
| **Oak Institute** | 202 | 210 | -8 |
| **Cedar University** | 24 | 20 | +4 |
| **Elm College** | 43 | 53 | -10 |
| **Maple Academy** | 3 | 11 | -8 |
| **Pine College** | 9 | 4 | +5 |
| **Oak Institute** | 53 | 52 | +1 |
| **Total** | **998** | **908** | **90** |

***Source:*** **Fictitious data, for illustration purposes only**

The bibliometric analysis of institutional research performance indicates a total of 998 global citations against 908 local citations, yielding a net surplus of +90, which reflects stronger global than local visibility. At the undergraduate level, Maple Academy (+77) is the most influential contributor, followed by Pine College (+13), Elm College (+9), and Cedar University **(+7)**, while Oak Institute (-8) unperformed. At the graduate level, Pine College (+5), Cedar University (+4), and Oak Institute (+1) show modest gains, whereas Elm College (–10) and Maple Academy (–8) lag in international reach. Overall, Maple Academy (+69) emerges as a standout due to its undergraduate strength, Pine College (+18) demonstrates balanced growth, and Cedar University (+11) shows steady progress, while Elm College (–1) and Oak Institute (–7) reflect weaknesses that require strategic improvement. This suggests that undergraduate research is driving global impact, but graduate research output needs targeted efforts to enhance international visibility and competitiveness.

The figure 3 "Authors' Production over Time" illustrates the research productivity and citation trends of leading authors in pension scheme research across different years. Each dot represents an article, with its size reflecting the number of articles and shading indicating total citations (TC) per year. The timeline shows that authors such as Vidal-Meliá, Carlos and Schmäh1, Winfried have maintained long-term research contributions spanning multiple years, indicating sustained engagement with the field. In contrast, Möhring, Katja and Tollman, Stephen stand out for producing relatively fewer articles, but with higher average citations per year, suggesting strong scholarly influence despite limited output.

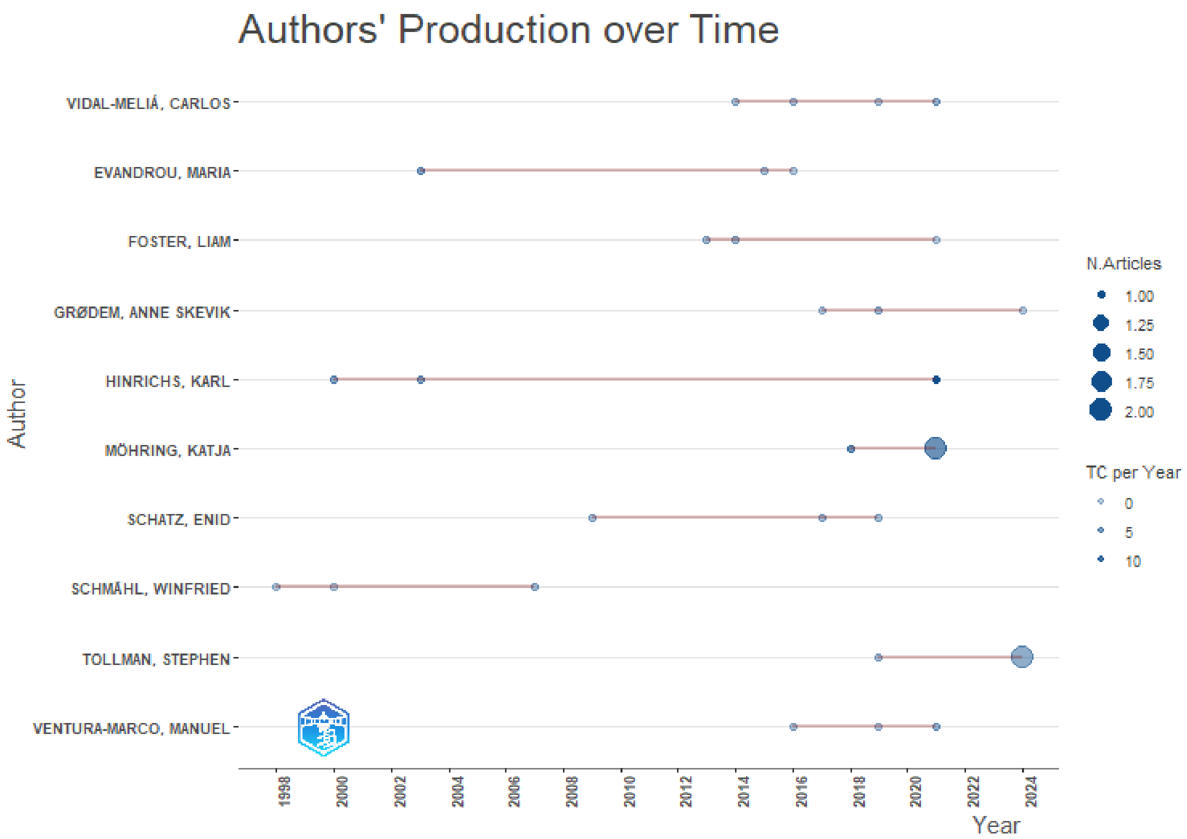



Figure: 3 Authors Production Over time. Source: Scopus

Authors like Hinrichs, Karl and Ventura-Marco, Manuel have shorter but notable bursts of productivity, reflecting focused research periods. Meanwhile, contributors such as Evandrou, Maria, Foster, Liam, and Schatz, Enid demonstrate intermittent but visible participation. Overall, the figure highlights both continuity and diversity in author contributions: while some researchers consistently publish across decades, others have impactful yet concentrated contributions, together shaping the intellectual landscape of pension scheme studies.

**Table 4 comparing their h-index, g-index, total citations**

| Elements | h_index | g_index | TC | NP | PY_start |
|---|---|---|---|---|---|
| Evandrou Maria | 3 | 3 | 116 | 3 | 2003 |
| Hinrichs Karl | 3 | 3 | 264 | 3 | 2000 |
| Möhring Katja | 3 | 3 | 81 | 3 | 2018 |
| Schatz Enid | 3 | 3 | 44 | 3 | 2009 |
| Vidal-Meliá Carlos | 3 | 4 | 37 | 4 | 2014 |
| Arber Sara | 2 | 2 | 55 | 2 | 2000 |
| Atkins Salla | 2 | 2 | 17 | 2 | 2021 |
| Blake David | 2 | 2 | 7 | 2 | 2006 |
| Boldrin Michele | 2 | 2 | 179 | 2 | 1999 |
| Bovenberg a.l. | 2 | 2 | 44 | 2 | 2007 |
| Bridgen Paul | 2 | 2 | 38 | 2 | 2008 |
| Béland Daniel | 2 | 2 | 60 | 2 | 2004 |
| Chen Xi | 2 | 2 | 90 | 2 | 2019 |
| De Deken Johan | 2 | 2 | 22 | 2 | 2002 |
| Duflo Esther | 2 | 2 | 1052 | 2 | 2000 |
| Falkingham Jane | 2 | 2 | 15 | 2 | 2015 |

| | | | | | |
|---|---|---|---|---|---|
| Fan Elliott | 2 | 2 | 32 | 2 | 2010 |
| Feng Zhixin | 2 | 2 | 15 | 2 | 2015 |
| Foster Liam | 2 | 3 | 43 | 3 | 2013 |
| Ginn Jay | 2 | 2 | 55 | 2 | 2000 |

The author impact table 4 highlights the relative influence of leading contributors to pension scheme research by comparing their h-index, g-index, total citations (TC), number of publications (NP), and year of first publication (PY_start). Notably, Duflo Esther stands out with exceptionally high citations (1,052 from just two publications, h-index 2), indicating groundbreaking yet selective contributions. Among authors with three or more publications, Hinrichs Karl (264 citations, h-index 3) and Evandrou Maria (116 citations, h-index 3) emerge as highly influential long-term contributors, while Möhring Katja (81 citations since 2018) represents a newer but impactful scholar. Vidal-Meliá Carlos has the highest g-index (4) among this group, reflecting consistent citation performance across four papers. Other significant contributors include Boldrin Michele (179 citations) and Chen Xi (90 citations) with strong visibility despite limited outputs. By contrast, authors such as Atkins Salla and Falkingham Jane show modest early-stage influence with fewer than 20 citations. Overall, the dataset underscores a mix of established senior scholars with sustained influence (e.g., Hinrichs, Evandrou, Boldrin) and emerging researchers (e.g., Mohring, Chen) who are increasingly shaping pension research, while select high-impact economists like Duflo Esther demonstrate how even limited contributions can achieve extraordinary global recognition.

## 5.2 Geographic spread

The figure 4 “Corresponding Author’s Countries” illustrates the geographical distribution and collaboration patterns in pension scheme research. The United Kingdom leads with the highest number of corresponding author documents, followed closely by Germany and the USA, showing their central role in shaping global pension scholarship.

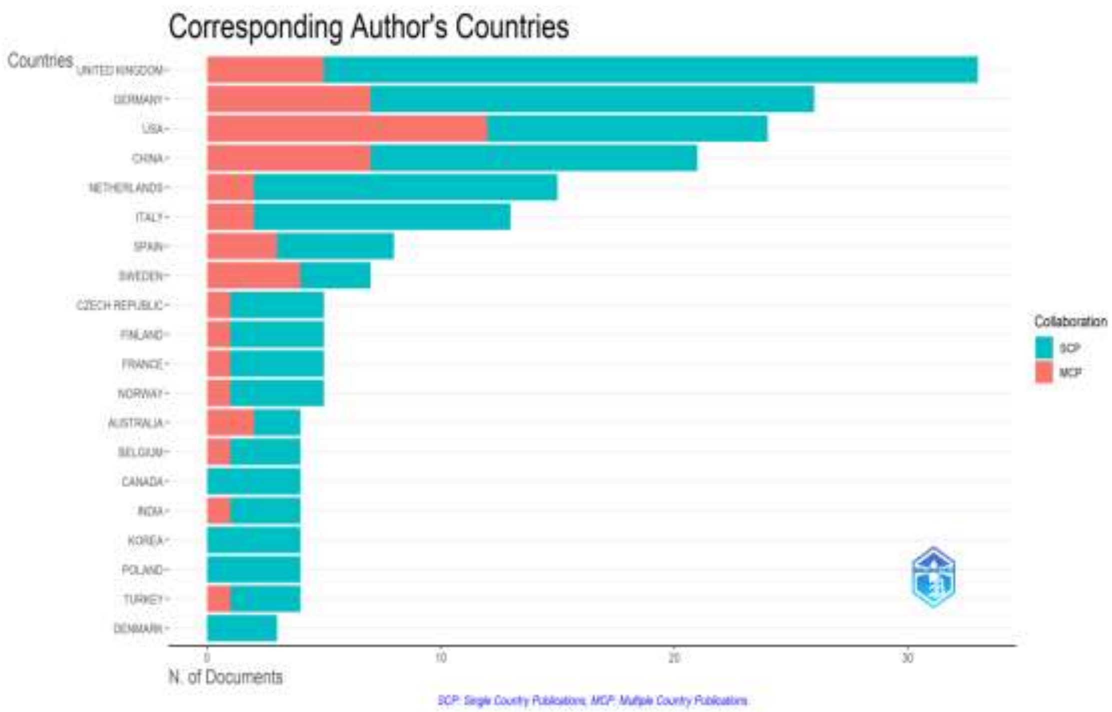



Figure 4. Countries with the highest number of publication. Source: Scopus

China and the Netherlands also contribute significantly, reflecting the increasing engagement of both emerging and established economies. Collaboration patterns are depicted through Single Country Publications (SCP) and Multiple Country Publications (MCP): while the UK, Germany, and the USA display a balanced mix of national and international collaborations, countries like China, Italy, and the Netherlands show a stronger emphasis on single-country publications. Smaller but notable contributions emerge from countries such as Spain, Sweden, Czech Republic, Finland, and Norway, which demonstrate international co-authorship despite fewer documents. The presence of countries like India, Korea, Turkey, and Poland indicates expanding research participation from diverse regions, though primarily through single-country efforts. Overall, the data highlights both the dominance of Western countries in research leadership and the growing diversification of global participation, with international collaborations (MCP) acting as a key driver of knowledge exchange and impact in the pension research field.


Figure 5. Three field plots

The Sankey diagram 5 visualizes the linkages between sources (SO), authors (AU), and countries (AU_CO) in pension scheme research, highlighting how scholarly contributions are distributed across journals, individual researchers, and geographical contexts. On the left, the flow from journals such as *Economic Affairs*, *Ageing and Society*, *Journal of Aging and Social Policy*, *Social Policy and Administration*, and *Applied Economics* shows that the research is published across both economics-focused and social policy-oriented outlets, reflecting the interdisciplinary character of the field. The central node (authors) illustrates that key contributors such as Stephen Tollman (UK), Maria Evandrou (USA), Enid Schatz (USA), Carlos Vidal-Meliá (South Africa), and Katja Möhring (Germany) are pivotal in bridging specific journals with their respective country affiliations. On the right, the distribution of corresponding countries reveals strong representation from the United Kingdom, USA, South Africa, Spain, China, Germany, Netherlands, and Finland, with emerging contributions from countries like Canada, Sweden, Korea, and Ghana. The diagram demonstrates how author–journal–country linkages are concentrated but globally dispersed, underscoring that while a few scholars and countries dominate pension research visibility, the diversity of outlets and emerging contributors point toward expanding internationalization and cross-disciplinary collaboration in the field.

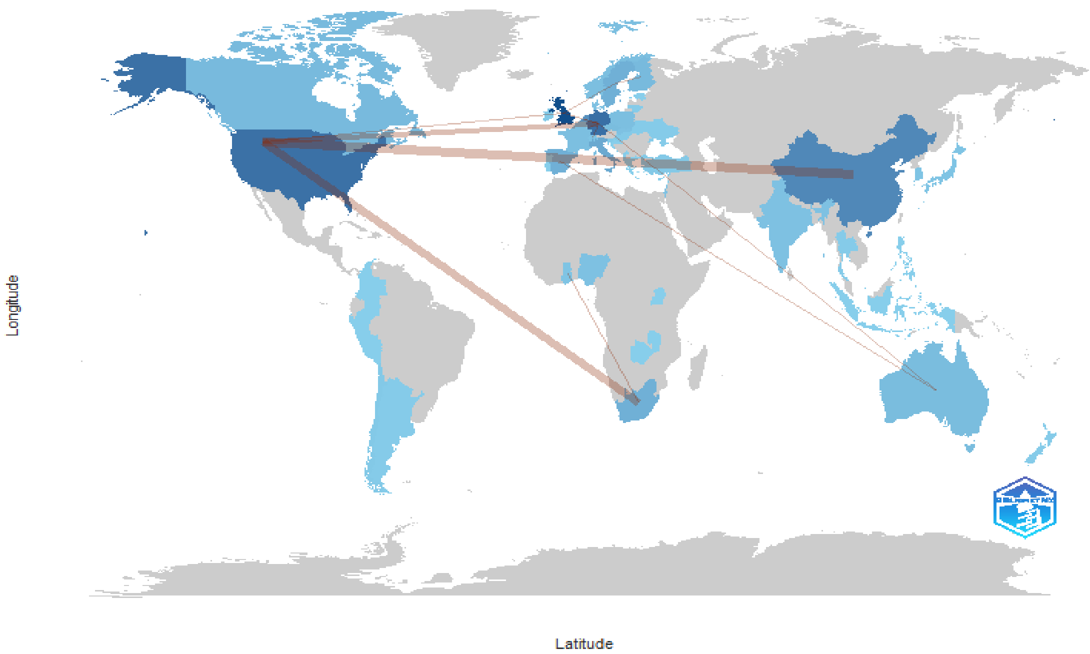



Figure 6. International research collaboration original investigation.

The world map visualization highlights in figure 6 the geographical distribution and international collaboration networks in pension scheme research. Darker shades indicate countries with higher research output, with the USA, United Kingdom, Germany, China, and South Africa emerging as the most prominent contributors. The connecting lines across regions illustrate international co-authorship links, showing strong transatlantic collaboration between the USA and Europe, as well as partnerships between the USA and Asian countries such as China and India. Collaborations also extend to the Global South, with notable linkages to South Africa and Australia, underlining the global scope of pension-related research. The map reflects how pension studies are no longer confined to advanced economies but increasingly involve scholars from diverse regions, fostering comparative perspectives on ageing, social security, and welfare policies. The visualization underscores the central role of the USA and Europe in leading and bridging collaborations, while also signaling the growing inclusiveness of Asia and Africa in shaping global pension research discourse.

**Table 5 Top 10 research collaboration of counties**

| From | To | Frequency |
|---|---|---|
| **China** | USA | 7 |
| **USA** | South Africa | 6 |
| **USA** | Germany | 4 |
| **United Kingdom** | USA | 2 |
| **United Kingdom** | Swedon | 2 |
| **United Kingdom** | Germany | 2 |
| ***Germany*** | Australia | 2 |
| ***Germany*** | Luxembour | 2 |
| ***Germany*** | Netherland | 2 |
| **South Africa** | Ghana | 2 |

The analysis of international collaboration patterns in pension scheme research reveals that the China–USA partnership is the most frequent (7 instances), underscoring the growing engagement between a leading emerging economy and an established research hub. This is followed closely by the USA–South Africa (6) and USA–Germany (4) collaborations, which highlight the USA's central role as a global connector in cross-country research. The United Kingdom also emerges as a strong collaborator, with ties to the USA, Sweden, and Germany (2 each), reflecting Europe's integrated academic networks. Similarly, Germany demonstrates multiple cross-regional linkages with Australia, Luxembourg, and the Netherlands (2 each), showing its role as a bridge between Europe and other continents. Finally, the South Africa–Ghana partnership (2) points to the increasing visibility of African collaborations, particularly in addressing shared challenges around ageing and pension systems in developing contexts. Overall, the table highlights the dominance of the USA and European countries in international collaborations, while also pointing to China's rising influence and Africa's emerging contribution to the global research landscape.

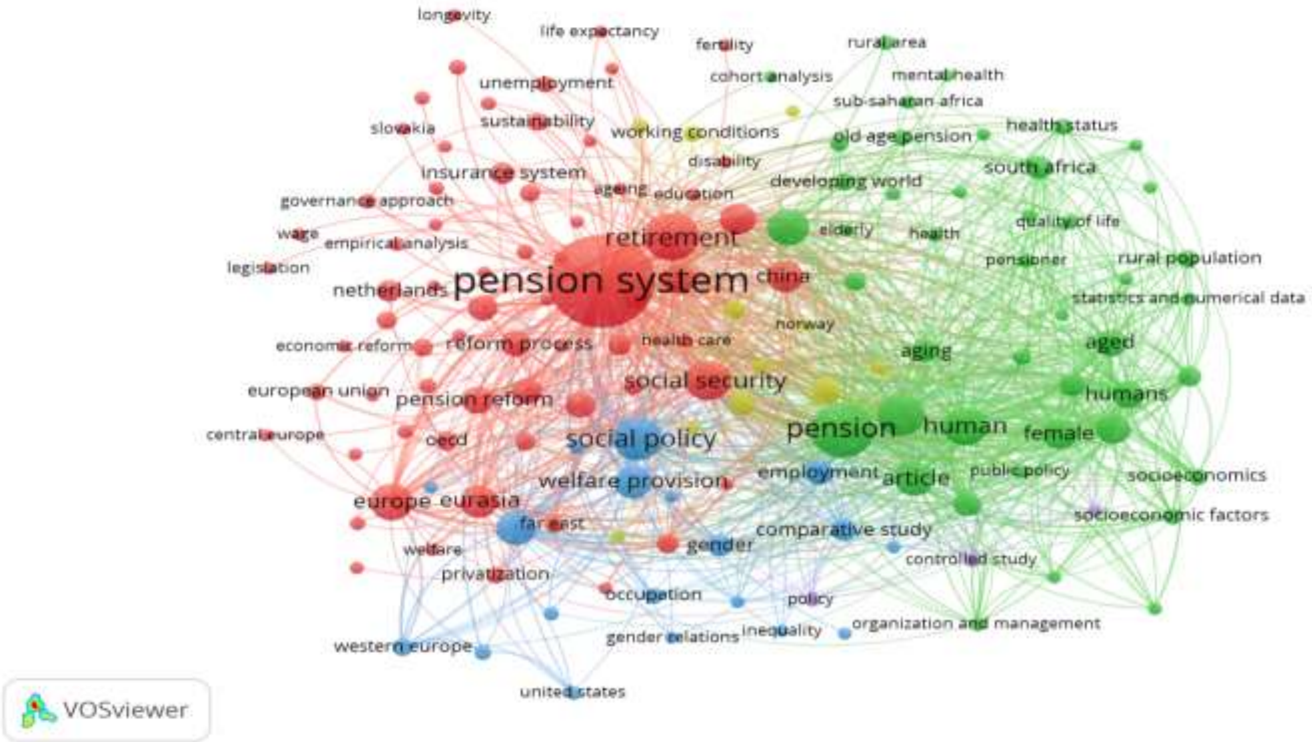
### 5.3 Scientific mapping based on frequency


**Figure 7. Word Cloud, Source: VOSviewver**

The word cloud visualization of scientific mapping highlights the most frequently occurring terms in pension scheme research, offering insights into the thematic structure of the field. The central dominance of the phrase "pension system" indicates it as the core focus of scholarly debate, around which related concepts cluster. Strongly associated terms such as "retirement," "social security," and "social policy" reflect the intersection of ageing, welfare, and institutional arrangements in ensuring income security for older populations. Keywords like "elderly population," "aging," "income," and "employment" emphasize demographic and economic dimensions, while gendered terms such as "female" and "male" point to growing attention on inequality in pension access. Regional identifiers including "United Kingdom," "Europe," "China," and "South Africa" reveal that pension research is shaped by both developed and emerging economies. Furthermore, terms like "welfare provision," "poverty," and "human" highlight the broader social implications of pension debates, particularly in relation to well-being and social justice. The mapping illustrates that pension scholarship is multidimensional spanning demographic, social policy, economic, and geographic perspectives while maintaining retirement security as its central concern.

**5.4 Figure 8 Author keyword co-occurrences.**

1. The **VOSviewer network visualization** maps the co-occurrence of keywords in pension scheme




research, revealing distinct thematic clusters. The red cluster is centered on *"pension system," "retirement," "social security," and "pension reform,"* and is closely linked with terms such as *"insurance system," "economic reform," "governance," and "legislation."* This cluster reflects the policy and institutional dimensions of pension research, with a strong focus on reform processes, sustainability, and economic restructuring in both national and regional contexts. The green cluster highlights keywords like *"pension," "human," "aged," "health status," "rural population," and "quality of life,"* pointing to the social and demographic aspects, including ageing, health, and rural-urban disparities, with notable regional links to Sub-Saharan Africa and the developing world. The blue cluster emphasizes *"social policy," "welfare provision," "employment," "comparative study," and "gender,"* underlining the comparative and equity-oriented dimensions of pensions, often tied to issues of gender inequality, labor markets, and welfare state models. Smaller nodes, such as the yellow sub-cluster, integrate cross-cutting themes like *"education," "cohort analysis," and "developing countries,"* which connect social, demographic, and policy research.

2. The mapping demonstrates that pension research is interdisciplinary and globally oriented, structured around three core dimensions: (i) policy and reform, (ii) demographic and health outcomes, and (iii) social equity and welfare policy. The strong interlinkages among clusters reflect how pension systems are studied not only as economic and institutional arrangements but also as central mechanisms shaping ageing, inequality, and well-being across different societies.

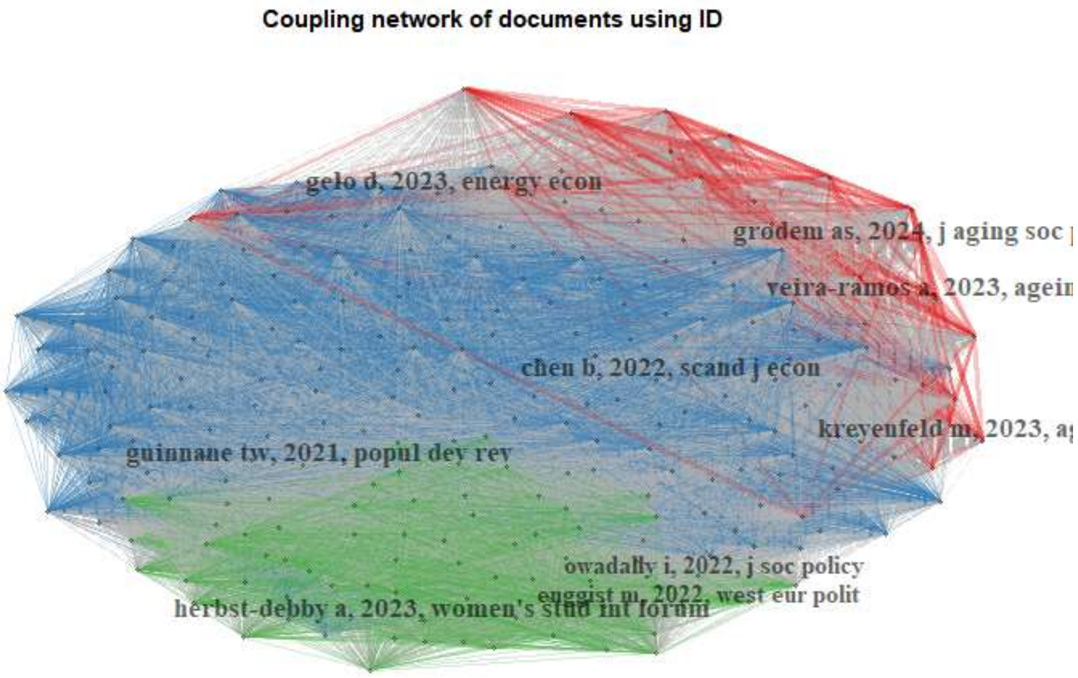



Figure 9. Co-citation network.

The coupling network of documents using ID maps the intellectual connections among pension scheme research articles based on shared references, thereby identifying clusters of studies that build on similar knowledge bases. The visualization reveals three major clusters: the red cluster represents works focusing on *ageing, social policy, and demographic challenges*, with contributions such as Grødem (2023), Vieira-Ramos (2023), and Kreyenfeld (2023) dominating this stream. The blue cluster encompasses research grounded in *economic perspectives and demographic transitions*, with documents like Chen (2022, Scandinavian Journal of Economics) and Guinnane (2021, Population and Development Review) linking demographic change to economic structures and pension system sustainability. The green cluster highlights more specialized themes related to *gender, social welfare, and inequality*, represented by studies like Herbst-Debby (2023, Women's Studies International Forum) and Owadally (2022, Journal of Social Policy). The dense interlinkages between clusters suggest a high degree of cross-pollination between economics, social policy, and gender-oriented perspectives, demonstrating that pension scholarship is not siloed but rather interconnected across disciplines. Overall, the coupling network shows how research communities are evolving in parallel but complementary directions, combining demographic, economic, and social justice perspectives to address the multifaceted challenges of pension systems.

**Table 6. The frequency of the country scientific production articles**

| Region | Frequency |
|---|---|
| **United Kingdom** | 88 |
| **China** | 71 |
| **USA** | 59 |
| **Germany** | 51 |
| **Netharland** | 51 |
| **Swedon** | 34 |

| | |
|---|---|
| **Italy** | 29 |
| **South Africa** | 25 |
| **Spain** | 18 |
| **Slovakia** | 16 |

The analysis of country-wise scientific production in pension scheme research shows that the United Kingdom leads with 88 articles, highlighting its position as the most influential contributor to the field. China (71) and the USA (59) follow closely, reflecting both emerging and established economies' engagement with pension-related issues, particularly in the context of ageing populations and social security reforms.

Among European nations, Germany (51) and the Netherlands (51) stand out with strong outputs, while Sweden (34) and Italy (29) further reinforce Europe's dominance in the discourse. Contributions from the Global South are also notable, with South Africa (25) emerging as a key voice in addressing pensions in developing country contexts. Other countries such as Spain (18) and Slovakia (16) indicate growing but comparatively smaller research bases. Overall, the table underscores that pension research is concentrated in Europe, North America, and Asia, while contributions from Africa, led by South Africa, signal a gradual diversification of global scholarship in this domain.

## 6. Conclusion and Direction for Future Research

This bibliometric analysis provides a comprehensive overview of global research on pension schemes and investment from 1975 to 2025. By examining 353 publications indexed in Scopus, the study mapped the evolution, thematic structure, influential authors, countries, journals, and collaboration networks shaping the field. The findings reveal that research on pension systems has expanded steadily over the decades, with a significant rise in scholarly attention after 2010 driven largely by demographic ageing, pension reforms, and shifts in welfare policies across countries.

The analysis demonstrates that pension research is inherently interdisciplinary, spanning economics, finance, gerontology, social policy, public health, and development studies. Countries such as the United Kingdom, China, the United States, Germany, and the Netherlands dominate the scholarly output, while emerging contributions from South Africa, India, and other developing nations indicate growing global interest in old-age income security.

Co-occurrence and co-citation mapping show three dominant intellectual streams: (i) pension reforms, sustainability, and governance; (ii) ageing, health, and socio-economic well-being; and (iii) social protection, gender equity, and welfare policy. High-impact works particularly from South Africa and China highlight the broader developmental role of pensions beyond income security, including effects on child health, household well-being, mental health, labor supply, and gender disparities.

The analysis shows that pension schemes remain central to debates on ageing populations, economic inequality, and social protection. While the field has matured, notable gaps persist, especially regarding coverage of informal sectors, digital inclusion, rural–urban disparities, gender inequities, and the integration of pensions with other welfare services. This study provides a consolidated understanding of the global knowledge landscape and offers a foundation for strengthening evidence-based policy and future research.

Future research on pension schemes should deepen its focus on demographic, social, and technological transitions that are reshaping retirement security worldwide. As ageing populations continue to grow, there is a pressing need for more comparative studies that evaluate the long-term sustainability and adequacy of pension systems across both developed and developing countries. Research should also prioritize the inclusion of marginalized groups such as informal workers, rural populations, women, widows, and socio-economically disadvantaged elderly by examining structural barriers, digital divides, and gaps in financial literacy that limit pension access and participation. In addition, emerging themes such as the integration of pensions with healthcare, mental health, and social care services require interdisciplinary investigation to understand how financial support influences overall well-being in old age. The rapid digitalization of pension delivery systems calls for further research on the role of technology in improving transparency and efficiency, as well as the risks of digital exclusion among older adults. Moreover, global challenges like climate change, migration, and labor market shifts warrant new evidence on how evolving vulnerabilities affect pension eligibility, savings patterns, and retirement decisions. Overall, future studies should adopt cross-country, gender-sensitive, and policy-oriented approaches to generate stronger, context-specific evidence that can guide governments and institutions in designing more equitable and resilient pension systems.

**Ethical Considerations**

Not applicable.

**Conflict Of Interest**

The author declares no conflict of interest.

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