Unveiling A Century of Research on Retirement Schemes: A State-of-the-Art Bibliometric Review

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Abstract: This bibliometric study investigates research on retirement schemes from 1985 to 2023, using data from the Scopus database. It comprises a qualitative assessment of influence using citation measures including citation counts, h-index, and g-index, as well as a quantitative assessment of publication output among authors and journals. The study offers a thorough overview of the field by identifying significant works and important contributors. Co-word occurrence analysis also identifies important study themes and emphasizes understudied topics in the literature on retirement plans. This method lessens the subjectivity present in conventional literature evaluations while providing insights into research trends, significant writers, and hot themes. The study also fills gaps in the literature and makes recommendations for future research directions to guide future investigations and support the creation of retirement plan policy.

Keywords: *Bibliometric, Retirement Scheme, Pension Scheme, Scopus, VOS Viewer*

1. Introduction and Background

Retirement schemes are crucial financial frameworks created to guarantee that people have enough money to sustain their quality of life after they stop working. Although these programs differ greatly across the globe, they all aim to give participants financial security in retirement. Retirement schemes in Malaysia are designed to give people a secure financial base during their post-employment years. The Employees Provident Fund (EPF), a required savings plan for workers in the private sector and non-pensionable public sector, is the main vehicle for retirement savings (Zabri, Ahmad & Lian, 2016). One of the oldest and most dependable retirement plans in the nation, the Employees Provident Fund (EPF) was created in 1991 under the Employees Provident Fund Act to encourage employees to set aside a percentage of their salary for retirement (Shah et al, 2023).

Complementing the EPF are Private Retirement Schemes (PRS), which are voluntary investment schemes introduced to provide an additional layer of financial security. These schemes, managed by approved private sector providers, offer flexibility in contributions and are designed to supplement the mandatory savings of the EPF.

All these retirement schemes work together to provide a complete framework that protects Malaysian retirees' financial future. Malaysia aims to establish a retirement system that is inclusive, sustainable, and flexible enough to adjust to changing economic conditions and demographic changes through the combination of government-backed pensions, required savings, and voluntary contributions. This comprehensive strategy emphasizes how crucial it is to be financially ready for retirement and how various savings options contribute to long-term financial security. Thus, by performing a bibliometric analysis of retirement scheme research, this work seeks to close this gap. Finding the most common themes and interesting directions for further investigation is the aim.

2. Literature Review

Retirement schemes are critical components of social security systems globally, and understanding their development through scholarly research is essential for policy and academic purposes (Hassan et. al., 2016).

Bibliometric analysis offers a thorough overview of the evolution, trends, and key themes within the research on retirement schemes and how retirement schemes have evolved. Many studies recently have utilized bibliometric techniques to dissect the extensive body of literature on this topic, providing insightful analysis of its intellectual framework and future directions (Li et al., 2022; Qian & Feng, 2023).

Research on retirement schemes has increased tremendously over the past century. In 2023, Owusu, Onumah and Essel-Donkor analysed 6,661 papers published between 1910 and 2022. It highlighted 5 primary themes such as pension plans, retirement systems, pension schemes, demographic factors, and socio-economic determinants of retirement decisions. This thorough analysis showed that, in response to changes in economic situations, demographic trends and government new policies.

Additionally, a study conducted by Li et al. (2022) and Zheng et al. (2023) supported the finding which how retirement schemes have evolved in responding to changes in the global population and financial crises. These findings demonstrate how the aging population is affecting retirement schemes and the increased focus on better retirement schemes.

There are many important researchers and publications have contributed to the research on retirement schemes (Hashim, Shin & Lajis, 2024; Ponthiere, 2023; Qian & Feng, 2023). Key bibliometric indicators such as citation counts and h-indices help identify leading articles and authors. The works of authors such as Hansen (2001) and Becht et al. (2009) have been frequently cited, highlighting their substantial contributions to understanding the economic and policy dimensions of retirement schemes.

Although much research has been conducted in this area, several gaps remain. More longitudinal study is needed in this area to fully understand the long-term effects of different types of retirement schemes and the change in demographics. In addition, more research is needed on the emerging topic of how technological developments affect retirement management and retirement planning. Future studies should concentrate on the effects of changes in the global economy, such as the rise of the gig economy and how it affects conventional retirement schemes. More research is required to fully understand how digital tools fit into retirement schemes and how behavioral economics influences people's retirement savings habits (Owusu et al., 2023). Future research should also investigate on how automated savings tools and digital financial education programs might boost retirement readiness.

Research Objectives
The purpose of this study is to employ bibliometric analysis to identify the important themes, subjects, and research areas related to retirement plans. Hence, the research objectives are:

- To examine trends and patterns in the retirement scheme literature over time
- To identify the most influential publications, authors, and journals on the topic of retirement schemes using bibliometric markers
- To determine the degree of cross-disciplinary research, the categories of authors and institutions involved, and the level of collaboration and interdisciplinarity in the literature on retirement schemes.

3. Research Methodology

This study utilizes bibliometric analysis techniques to evaluate current trends in academic literature regarding retirement schemes. Using network visualization and bibliometric indicators, the study provides an extensive overview of its findings. The detailed summaries of this method are illustrated in Figure 1.

Figure 1: PRISMA Flow Diagram
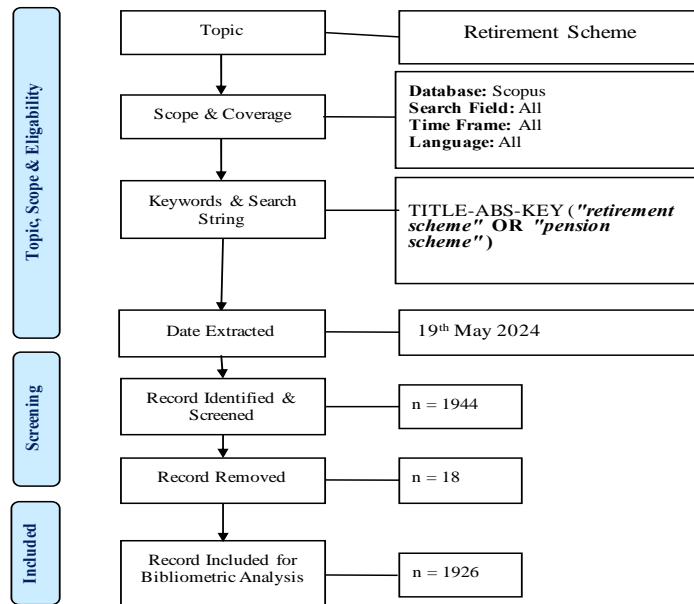
Source: Moher et al (2009).

Data Screening

Data screening in this study entailed the exclusion of publications written in languages other than English, encompassing Chinese, Czech, French, German, Italian, Spanish, and Ukrainian. Furthermore, a filter was employed to narrow down the focus exclusively to publications within defined research domains, such as Biochemistry, Genetics and Molecular Biology, Mathematics, Chemistry, Energy, Immunology and Microbiology, and Physics and Astronomy. After going through this screening process, the chosen data were carefully chosen to make sure they met the objectives of the study and strict quality and relevance criteria.

4. Results

Document and Source Types

Table 1 presents the dataset under investigation, which consists of a wide range of publications categorized according to the categories of documents they are. The table also shows the distribution of various categories of academic publications in a collection of 1,926 items. The majority, 1,457 publications, or 75.65%, are articles. The next most prevalent content type is book chapters, with 232 (12.05%), and reviews, with 98 (5.09%). 52 publications (2.70%) are conference papers, and 38 (1.97%) are books. The remaining small percentages are made up of notes, editorials, conference reviews, errata, and brief surveys; the last three categories each have only four publications (0.21%). In this collection, articles make up the majority of the publications.

Table 1: Document Type

Document Type	Total Publications (TP)	Percentage (%)
Article	1457	75.65
Book Chapter	232	12.05
Review	98	5.09
Conference Paper	52	2.70
Book	38	1.97
Note	32	1.66
Editorial	5	0.26
Conference Review	4	0.21
Erratum	4	0.21
Short Survey	4	0.21

Total	1926	100.00

Table 2 shows that most publications are in journals, with 1,566 out of 1,926, which is about 81%. Next up with 238 publications, or 12%, are books. There are 56 publications (3%), book series, and 34 (2%), conference proceedings. Two undefined sources, or less than 1%, and thirty publications (2%), respectively, are found in trade journals. This distribution makes clear that academic papers are primarily found in journals.

Table: Source Type

Source Type	Total Publications (TP)	Percentage (%)
Journal	1566	81.31
Book	238	12.36
Book Series	56	2.91
Conference Proceeding	34	1.77
Trade Journal	30	1.56
Undefined	2	0.10
Total	**1926**	**100.00**

Year of Publications/Evolution of Published Studies

Table 3 and Figure 2 show publication numbers over 20 years. There were 90 publications in 2023, representing 4.67% of the total. 2022 and 2021 accounted for 127 publications apiece or 6.59% of the total for those years. 96 publications (4.98%) were made in 2020, while 88 publications (4.57%) were made in 2019. There were 93 publications in 2018 and 92 in 2017, representing 4.83% and 4.78%, respectively. 95 publications, or 4.93% of the total, were published in 2016. With just 35 publications (1.82%), 2004 had the fewest. 369 publications, or 19.16% of the total, were published between 1895 and 2023. Overall, there were 1,103 publications in the 20 years.

Table 3: Year of Publications (20 years)

Year	Total Publications	Percentage (%)
2023	90	4.67
2022	127	6.59
2021	127	6.59
2020	96	4.98
2019	88	4.57
2018	93	4.83
2017	92	4.78
2016	95	4.93
2015	54	2.80
2014	77	4.00
2013	61	3.17
2012	77	4.00
2011	94	4.88
2010	60	3.12
2009	63	3.27
2008	51	2.65
2007	57	2.96
2006	68	3.53
2005	52	2.70
2004	35	1.82
1895-2023	369	19.16
Total	**1103**	**100.00**

Figure 2: Document by Year

Documents by year
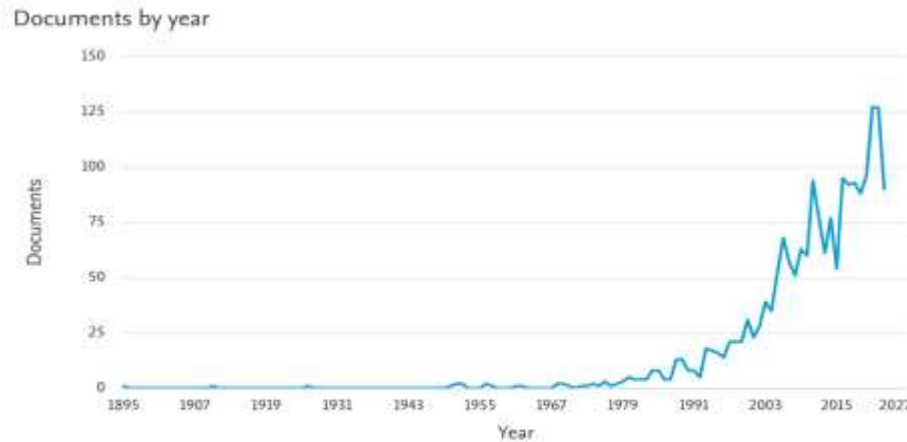
Languages of Documents
Table 4 provides an overview of the languages used for publications, with a focus on the dominance of English. The data reveals that all 1,926 publications were prepared in English, constituting 100% of the total. This shows that this dataset's exclusive language of publishing is English. Notably, even when one document was created in two languages, the total number and % show a preference for one language. As so, the information emphasizes how commonplace and unique English is in the distribution of academic research in this compilation.

Table 4: Languages Used for Publications

Language	Total Publications*	Percentage (%)
English	1926	100
Total	**1926**	**100.00**

*one document has been prepared in dual languages

Subject Area
Table 5 shows the distribution of publications across different subject areas. The largest category is Economics, Econometrics, and Finance, with 1,000 publications (29.8%). Social Sciences comes next with 829 publications (24.7%), followed by Business, Management, and Accounting with 527 publications (15.7%). Medicine and Mathematics each have 172 and 170 publications, respectively, both at 5.1%. Other fields like Decision Sciences, Arts and Humanities, and Environmental Science have smaller shares, ranging from 2.5% to 4.9%. The remaining subjects, including Engineering, Computer Science, and Psychology, each have fewer publications, with percentages ranging from 0.1% to 2.3%. There are also 6 publications classified as "Undefined," making up 0.2%. Overall, the data shows a strong focus on Economics and Social Sciences.

Table 5: Subject Area

Subject Area	Total Publications	Percentage (%)
Economics, Econometrics and Finance	1000	29.8
Social Sciences	829	24.7
Business, Management and Accounting	527	15.7
Medicine	172	5.1
Mathematics	170	5.1
Decision Sciences	165	4.9
Arts and Humanities	85	2.5
Environmental Science	85	2.5
Engineering	77	2.3
Computer Science	54	1.6

Psychology	51	1.5
Nursing	39	1.2
Agricultural and Biological Sciences	21	0.6
Energy	12	0.4
Biochemistry, Genetics and Molecular Biology	10	0.3
Chemical Engineering	9	0.3
Multidisciplinary	8	0.2
Earth and Planetary Sciences	6	0.2
Physics and Astronomy	6	0.2
Health Professions	5	0.1
Materials Science	5	0.1
Veterinary	4	0.1
Chemistry	3	0.1
Pharmacology, Toxicology and Pharmaceutics	3	0.1
Dentistry	2	0.1
Undefined	6	0.2

Most Active Source Titles

Table 6 shows the most active publication sources. Out of all the publications, the "International Social Security Review" has the most, with 123, or 11.3%. The next two journals are "Journal of Pension Economics and Finance" with 34 publications (3.1%) and "Insurance Mathematics and Economics" with 45 publications (4.2%). With 22 publications each, "Pensions" and "European Journal of Social Security" have a 2.0% overall. Additional resources include the 17 publications each from "Geneva Papers on Risk and Insurance Issues and Practice" and "Aging and Society" (1.6%). A few journals have 14 publications apiece, including the "Journal of the Economics of Ageing," "Applied Economics," "Good Governance for Pension Schemes," and the "Scandinavian Actuarial Journal" (1.3%). The journals "Annals of Actuarial Science" have 12 publications (1.1%), while "Fiscal Studies," "International Journal of Social Welfare," and "Journal of Population Economics" each have 13 publications (1.2%).

Table 6: Most Active Source Title

Source Title	Total Publications	Percentage (%)
International Social Security Review	123	11.3
Insurance Mathematics And Economics	45	4.2
Journal Of Pension Economics And Finance	34	3.1
Pensions	32	3.0
European Journal Of Social Security	22	2.0
Social Policy And Administration	22	2.0
Ageing And Society	17	1.6
Geneva Papers On Risk And Insurance Issues And Practice	17	1.6
Journal Of The Economics Of Ageing	16	1.5
Applied Economics	14	1.3
Good Governance For Pension Schemes	14	1.3
Scandinavian Actuarial Journal	14	1.3
Fiscal Studies	13	1.2
International Journal Of Social Welfare	13	1.2
Journal Of Population Economics	13	1.2
Annals Of Actuarial Science	12	1.1

Keywords Analysis

Table 7 shows the top 20 keywords used in publications. "Pension System" is the most common, found in 241 publications (4.92%). "Retirement" comes next with 196 mentions (4.00%), followed by "Pensions" with 189 mentions (3.86%). "Pension" appears in 148 publications (3.02%), and "Human" in 145 publications (2.96%). Other popular keywords include "Article" with 124 mentions (2.53%) and "Social Security" with 112 mentions (2.28%). "Humans" and "Pension Scheme" both have 104 mentions (2.12%). Keywords like "Female" (1.84%),

"Male" (1.71%), "China" (1.57%), and "United Kingdom" (1.51%) are also listed, along with "Aged" (1.47%) and "Adult" (1.35%). The table shows which topics are most frequently discussed in the publications. It can also be seen in Figure 3.

Table 7: Top 20 Keywords

Author Keywords	Total Publications	Percentage (%)
Pension System	241	4.92
Retirement	196	4.00
Pensions	189	3.86
Pension	148	3.02
Human	145	2.96
Article	124	2.53
Social Security	112	2.28
Humans	104	2.12
Pension Scheme	104	2.12
Female	90	1.84
Male	84	1.71
Social Policy	82	1.67
China	77	1.57
United Kingdom	74	1.51
Aged	72	1.47
Adult	66	1.35
Europe	63	1.29
Employment	61	1.24
Middle Aged	55	1.12

Figure 3: Network visualization map of the author keywords

Geographical Distribution of Publications - Most Influential Countries
Table 8 lists the top 20 countries by publication count. The United Kingdom has the most publications with 407 (17.38%). Germany and the United States follow with 159 (6.79%) and 155 (6.62%), respectively. The Netherlands has 127 publications (5.42%), and Italy and China have 114 (4.87%) and 112 (4.78%). Other countries with significant contributions include Australia (78 publications, 3.33%) and India (69 publications, 2.95%). France and Spain have 65 (2.78%) and 60 publications (2.56%), respectively. Belgium, Denmark, and Sweden have 51 (2.18%), 47 (2.01%), and 45 publications (1.92%). Canada, Malaysia, Switzerland, Finland, Poland, Japan, and South Korea also contribute, with numbers ranging from 33 to 27.

Table 8: Top 20 Countries contributed to the publications

| Country	Total Publications	Percentage (%)
United Kingdom	407	17.38
Germany	159	6.79
United States	155	6.62
Netherlands	127	5.42
Italy	114	4.87
China	112	4.78
Australia	78	3.33
India	69	2.95
France	65	2.78
Spain	60	2.56
Belgium	51	2.18
Denmark	47	2.01
Sweden	45	1.92
Canada	42	1.79
Malaysia	38	1.62
Switzerland	36	1.54
Finland	33	1.41
Poland	31	1.32
Japan	28	1.20

Authorship
Table 9 shows the most productive authors by the number of documents published. With 18 documents or 2.52% of the total, Haberman is the most active author. With 16 documents (2.24%), Devolder comes next of the documents, Blake has ten (1.40%), and Holzmann has eleven (1.54%). With nine documents (1.26%), Barrientos, Gough, Meijdam, Vigna, and Williamson are among the other noteworthy writers. Contributing 1.12% each, authors Sutcliffe, Tonks, Verbon, and Vidal-Meliá each have eight documents. In conclusion, the following individuals have the most documents such as Ayuso, Bravo, Ginn, and Pestieau have seven (0.98%), Alonso-García, Boado-Penas, and Bovenberg have six (0.84%). The top contributors in terms of publication production are shown in this table. The network visualization of co-authorship can be seen in Figure 4.

Table 9: Most Productive Authors

Author's Name	No. of Documents	Percentage (%)
Haberman, S.	18	2.52
Devolder, P.	16	2.24
Holzmann, R.	11	1.54
Blake, D.	10	1.40
Barrientos, A.	9	1.26
Gough, O.	9	1.26
Meijdam, L.	9	1.26
Vigna, E.	9	1.26
Williamson, J.B.	9	1.26
Sutcliffe, C.	8	1.12
Tonks, I.	8	1.12
Verbon, H.A.A.	8	1.12
Vidal-Meliá, C.	8	1.12
Ayuso, M.	7	0.98
Bravo, J.M.	7	0.98
Ginn, J.	7	0.98
Pestieau, P.	7	0.98
Alonso-García, J.	6	0.84
Boado-Penas, M.d.C.	6	0.84
Bovenberg, L.	6	0.84

Figure 4: Network visualization map of the co-authorship
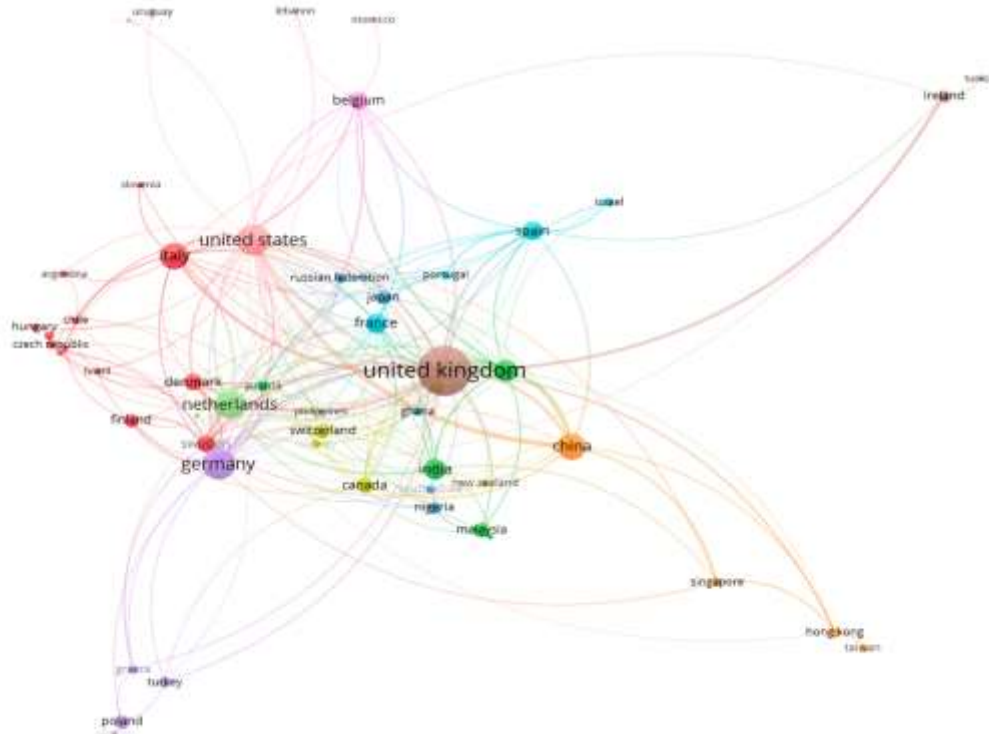
Unit of analysis = Countries
Counting method: Fractional counting
Minimum number of documents of a country = 3
Minimum number of citations of a country = 5

Most Influential Institutions
Table 10 shows the most influential institutions with at least ten publications. Tilburg University is the leading contributor with 41 publications (3.28%). Of the publications, the Network for Studies on Pensions, Aging and Retirement has 27, (2.16%), and City, University of London has 28, (2.24%). Each university has 24 publications (1.92%), including Université Catholique de Louvain and Universiteit van Amsterdam. A total of 21 articles (1.68%) are shared between UNSW Sydney and Bayes Business School. The London School of Economics, Heriot-Watt University, and the University of Oxford have as many publications as Universität Bremen (15) and Vrije Universiteit Amsterdam (1.20%), respectively. The global contribution to the topic is considerable, as seen by the 13 publications (1.04%) and the 11 or 10 publications of many more institutions.

Table 10: Most influential institutions with a minimum of ten publications

Institution	Total Publications	Percentage (%)
Tilburg University	41	3.28
City, University of London	28	2.24
Network for Studies on Pensions, Aging and Retirement	27	2.16
Université Catholique de Louvain	24	1.92
Universiteit van Amsterdam	24	1.92
Bayes Business School, City University of London	21	1.68
UNSW Sydney	21	1.68
Universität Bremen	16	1.28
Vrije Universiteit Amsterdam	15	1.20
The University of Edinburgh	15	1.20
London School of Economics and Political Science	14	1.12
Heriot-Watt University	14	1.12

University of Oxford	14	1.12
UNSW Business School	14	1.12
CNRS Centre National de la Recherche Scientifique	13	1.04
The Australian National University	13	1.04
L'Organisation de Coopération et de Développement Economiques	13	1.04
Universiteit Maastricht	13	1.04
Stockholms universitet	13	1.04
Aarhus Universitet	13	1.04
Universitat de Barcelona	12	0.96
The University of Sheffield	12	0.96
University of Westminster	11	0.88
The University of Manchester	11	0.88
University of Kent	11	0.88
Università degli Studi di Torino	11	0.88
Renmin University of China	11	0.88
Boston College	11	0.88
The World Bank, USA	11	0.88
University of Glasgow	10	0.80
Universitat de València	10	0.80
Universiteit Utrecht	10	0.80
University of Reading	10	0.80
CPB Netherlands Bureau for Economic Policy Analysis	10	0.80
Imperial College London	10	0.80
Università degli Studi di Napoli Federico II	10	0.80
University of Liverpool	10	0.80
University of Warwick	10	0.80
Erasmus Universiteit Rotterdam	10	0.80
Københavns Universitet	10	0.80

Citation Analysis

Table 12 provides citation metrics for publications from 1895 to 2023. 1,926 papers have received a total of 16,859 citations, averaging 130.69 citations per year. Each paper has an average of 8.75 citations. Each author has published 123.31 papers and received 10,200.26 citations on average. The g-index, which takes into consideration the number of citations in the most cited works, is 76, while the h-index, which gauges the productivity and influence of the author's publications, is 53. Table 13 shows the most cited articles. The top article, by Hansen, was published in 2001, with '18 citations (18.17 per year). The second most cited article, by Becht and others, discusses shareholder activism and has 220 citations (14.67 per year). Other highly cited articles include Taylor's 1994 study on ageing workers with 216 citations and Lynge's 1985 study on cancer with 138 citations. The table lists influential articles on topics like pension reforms and investment strategies, showing their significant impact. The citation by country can also be seen in Figure 5.

Table 12: Citations Metrics

Metrics	Data
Publication years	1895-2023
Citation years	129 (1895-2024)
Papers	1926
Citations	16859
Citations/year	130.69
Citations/paper	8.75
Citations/author	10200.26
Papers/author	123.31
h-index	53
g-index	76

Table 13: Highly cited articles

No.	Authors	Title	Year	Cites	Cites per Year
1	J. Hansen	Increased breast cancer risk among women who work predominantly at night	2001	418	18.17
2	M. Becht, J. Franks, C. Mayer, S. Rossi	Returns to Shareholder Activism: Evidence from a Clinical Study of the Hermes U.K. Focus Fund	2009	220	14.67
3	P.E. Taylor, A. Walker	The aging workforce: Employers' attitudes towards older people	1994	216	7.2
4	E. Lynge	A follow-up study of cancer incidence among workers in the manufacture of phenoxy herbicides in Denmark	1985	138	3.54
5	N. Barr, P. Diamond	Reforming pensions: Principles, analytical errors and policy directions	2009	118	7.87
6	M. Becht, J. Franks, C. Mayer, S. Rossi	Returns to shareholder activism: Evidence from a clinical study of the Hermes UK focus fund	2010	109	7.79
7	P. Langley	In the eye of the 'perfect Storm': The final salary pensions crisis and financialization of Anglo-American Capitalism	2004	106	5.3
8	M. Boldrin, A. Montes	The intergenerational state education and pensions	2005	105	5.53
9	S. Haberman, E. Vigna	Optimal investment strategies and risk measures in defined contribution pension schemes	2002	102	4.64
10	O.P. Attanasio, S. Rohwedder	Pension wealth and household saving: Evidence from pension reforms in the United Kingdom	2003	100	4.76
11	K. Hinrichs	Elephants on the move. Patterns of public pension reform in OECD countries	2000	98	4.08
12	M. Evandrou, K. Glaser	Combining work and family life: The pension penalty of caring	2003	96	4.57
13	L. Cheng, H. Liu, Y. Zhang, Z. Zhao	The health implications of social pensions: Evidence from China's new rural pension scheme	2018	95	15.83
14	R. Gerrard, S. Haberman, E. Vigna	Optimal investment choices post-retirement in a defined contribution pension scheme	2004	91	4.55
15	S. Vickerstaff, J. Cox	Retirement and risk: The Individualization of retirement experiences?	2005	91	4.79
16	E. Vigna, S. Haberman	Optimal investment strategy for defined contribution pension schemes	2001	89	3.87
17	T. Schils	Early retirement in Germany, the Netherlands, and the United Kingdom: A longitudinal analysis of individual factors and institutional regimes	2008	88	5.5
18	K. Hinrichs, O. Kangas	When is a change big enough to be a system shift? Small system-shifting changes in German and Finnish pension policies	2003	87	4.14
19	J. Hansen, O. Raaschou-Nielsen, J.H. Olsen	Increased risk of lung cancer among different types of professional drivers in Denmark	1998	85	3.27
20	M.A. Orenstein	Pension privatization in crisis: Death or rebirth of a global policy trend?	2011	83	6.38

Figure 5: Network visualization map of the citation by countries

Minimum number of documents of an author = 1
Minimum number of citations of an author = 5

5. Conclusion and Recommendations

This bibliometric study offers a comprehensive analysis of retirement scheme research from 1985 to 2023 using Scopus data. It assesses publication productivity and impact through citation metrics such as citation counts, h-index, and g-index, identifying key contributors, influential works, and emerging themes. The co-word occurrence analysis reveals both core research areas and notable gaps, providing a structured overview that minimizes the subjectivity inherent in traditional literature reviews.

The study highlights significant trends and patterns, showing the impact of leading researchers and seminal works on the field. It also uncovers underexplored areas, suggesting that while substantial research has been conducted, opportunities remain to delve deeper into specific aspects of retirement schemes. The findings emphasize the significance of interdisciplinary collaboration and wider geographic representation to address a variety of retirement scheme difficulties.

Future investigations should concentrate on the gaps and new trends found in the study, such as the impact of recent developments in technology and changes in the world economy. A more thorough understanding of retirement schemes can be obtained by fostering multidisciplinary collaboration and including viewpoints from the fields of economics, sociology, public health, and policy studies. Additionally, research is becoming more geographically diverse, which can also provide insights into how various cultural and economic circumstances influence retirement planning. It is recommended that researchers publish in high-impact journals to increase the impact and visibility of their research. The comprehension of research trends and theme advances will be improved by filling in the gaps in the literature and making use of cutting-edge bibliometric technologies. These actions will promote retirement planning techniques, contribute to policy creation, and expand on the body of current research.

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