# A BIBLIOMETRIC ANALYSIS OF EMERGING SUB-TOPICS IN FINANCIAL LITERACY RESEARCH

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## Article Info

## Abstract

This bibliometric analysis aimed to identify subtopics and trend topics in the field of financial literacy to inform future research. Financial literacy is defined as knowledge and understanding of financial concepts such as managing spending and savings, planning retirement and investments, and increasing wealth or returns on wealth. The study found that women, young, old, and less educated individuals face difficulties understanding financial concepts. Data retrieved from the Clarivate Analytics Web of Science database showed 787 articles published in 211 sources between 2001 and 2021. Descriptive and network analysis indicated the most active journals, authors, institutions, countries, and the most highly cited documents in the field of financial literacy. The findings showed that the Journal of Consumer Affairs, Journal of Pension Economics & Finance, and Journal of Banking & Finance were the top three scholarly impactful journals in terms of total citations and h-index.

Co-word analysis provided insight into potential subtopics in financial literacy, including financial behavior, financial capability, financial education, household finance, personal finance, financial knowledge, retirement planning, financial inclusion, and saving. The study also found that gender differences and financial literacy impact are gaining more importance and have been recognized as trend topics.

Furthermore, thematic analysis of keywords revealed that "financial literacy" is the important but not well-developed basic theme, "retirement" is the widely discussed core theme, "financial inclusion" and "pension" are emerging but declining themes, and "consumption" is a niche theme. "Financial well-being" and "gender" were identified as crucial themes that require further discussion.

Overall, this study provides a comprehensive review of research on financial literacy and identifies potential future areas of inquiry

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## INTRODUCTION

To reduce the increased complexities in financial markets and develop the ability to effectively and efficiently utilize limited financial resources, it is necessary to make individuals financially literate, as financial literacy improves their understanding of financial products, services, and concepts. Further, it empowers individuals to make wise and learned choices to avoid drawbacks, decide where to go for assistance, and take action to develop their present and long-term financial well-being (President's Advisory Council on Financial Literacy (PACFL), 2008). Further, financial literacy empowers people to craft their finances to manage their everyday expenses, maintain emergency funds, plan for children's education, and prepare for their swift post-retirement years (Goyal & Kumar, 2020). Financial literacy is a major construct in finance, business as and a social construct and has many important implications. As a financial construct, financial literacy helps individuals manage spending and savings (Afsar, Chaudhary, Iqbal, & Aamir, 2018; Ali, Rahman, & Bakar, 2015; Mahdzan & Tabiani, 2013; Xiao & Porto, 2017), plan retirement (Agnew, Bateman, & Thorp, 2013; Boisclair, Lusardi, & Michaud, 2017; Brown & Graf, 2013; Crossan, Feslier, & Hurnard, 2011; Klapper & Panos, 2011; Lusardi & Mitchell, 2007, 2008, 2011 & 2017;

Sekita, 2011; Van Rooij, Lusardi, & Alessie, 2012), plan investments (Almenberg & Dreber, 2015; Jariwala, 2013; Van

Rooij, Lusardi, & Alessie, 2011), make household decisions, and increase wealth or returns on wealth (Behrman, Mitchell, Soo, & Bravo, 2012; Grohmann & Schoofs 2021; Jappelli & Padula, 2013). As a social construct, it reduces stress, illness, financial disputes, abuse of children, and conflicts among families (Fox, Bartholomae, & Lee, 2005). According to Kim

(2007), financial literacy decreases emotional stress and anxiety among employees and develops harmonious relationships in the workplace. Furthermore, it plays a significant role in the financial well-being of an individual (Kamakia, Mwangi, & Mwangi, 2017) and is very important for the economic development of a nation.

Researchers define financial literacy differently. In simple words, "financial literacy is the ability to make effective decisions and make informed choices regarding the use and management of money" (Hung, Parker, & Yoong, 2009, p.5). As per Remund (2010, p. 284), financial literacy is a measure of the degree to which one understands key financial concepts and possesses the ability and confidence to manage personal finances through appropriate, short-term decision making and sound, long-range financial planning, mindful of life events, and changing economic conditions. According to the Reserve Bank of India (2013), "financial literacy is providing familiarity with and understanding of the financial market product, especially rewards and risk to make informed choices." As per OECD (2014), "financial literacy is defined as the knowledge and understanding of financial concepts and the skills, motivation, and confidence to apply such knowledge and understanding to make effective decisions across a range of financial contexts, to improve the financial well-being of individuals and society, and to enable participation in economic life."

According to the literature review, financial literacy is low worldwide (Lusardi & Mitchell, 2011, 2014). Women, young, old, and less educated face more difficulties in dealing with financial concepts (Lusardi & Mitchell, 2011). There is a substantial gender gap in financial literacy in both developing and developed countries (Atkinson & Messy, 2012; Bucherkoenen, Lusardi, Alessie & Van Rooij, 2017; Cupák, Fessler, Schneebaum, & Silgoner, 2018; Fonseca, Mullen, Zamarro, & Zissimopoulos, 2012; Hung, Yoong, & Brown, 2012; Klapper & Lusardi, 2020). The literature also show the influence of socio-demographic factors such as age, gender, education, income,

family members, occupation, and family communication pattern on financial literacy (Agarwalla, Barua, Jacob, & Varma, 2015; Atkinson & Messy, 2012; Bucherkoenen et al., 2017; Lusardi, Mitchell, & Curto, 2010; Lusardi & Mitchell, 2011; Potrich, Vieira, & Kirch, 2018). The literature also documents that most consumers are poorly informed about financial products and practices making them incapable of saving and investing (Lusardi & Mitchell, 2011). A financially literate individual can make more intellectual judgments and well-informed financial decisions (Lusardi & Mitchell, 2017). Financial literacy is a significant predictor of economic behavior and well-being in the developing world (Cole, Sampson, & Zia, 2009). It helps consumers detect fraud (Engels, Kumar, & Philip, 2020), manage finance at times of crisis (Yaman, 2019), and avoid transactions that are financially destructive in nature. By enhancing financial literacy, we can establish a stable financial system and achieve sustainable economic growth (Refera, Dhaliwal, & Kaur, 2016).

From the literature review, we found that in most of the research from the last decade, financial literacy was associated with many terms, such as financial education, household financing, savings, retirement planning, investment, money management, stock market participation, wealth and risk management, and gender etc. To find potential subtopics and trend topics in this field of financial literacy, we felt the need for bibliometric analysis. Bibliometric analysis is a technique for quantitative analysis that applies mathematical and statistical methods to the scientific literature to determine and investigate the principal data of a research subject and identify the main drivers of a field of research (Huang, Zhang, Guo, Zhu & Porter, 2014). To fulfil the purpose of this study, a bibliometric analysis was conducted with the help of a webbased application, Biblioshiny. This study helps widen the current knowledge on financial literacy by fulfilling the following objectives:

▪ To find the most active journals, authors, institutions, countries, and the most cited and popular documents in the field of financial literacy (descriptive analysis).

▪ To find potential sub-topics and trends in this field (co-word analysis).

▪ To understand the relationship between various documents and the level of collaboration among different authors, institutions, and countries in the financial literacy field (co-citation and collaboration Analysis).

▪ To find the gaps and directions for future research.

## RESEARCH METHODOLOGY

Data retrieved from the Clarivate Analytics Web of Science (WOS) database on October 20, 2021, were used in this study. The search term "Financial Literacy" was assessed using the title, abstract, keywords search with publication timespan "2001–2021," and Language "English" to compile a bibliography of all articles related to financial literacy. Of 1286 articles, 787 were selected for analysis after refining by WOS categories (economics, business finance, business, and management). These data sets were downloaded in plaintext format and imported to Biblioshiny for bibliometric analysis in R 4.1.1 (Figure 1).

Bibliometric is open-source software designed for comprehensive science mapping analysis in the R language which is capable of continuous upgradation and integration with other statistical R packages (Aria & Cuccurullo, 2017). It was first introduced by Pritchard and used for the quantitative and qualitative analysis of published academic literature and for tracking the development of a research field over a long period (Pritchard, 1969 & Small, 2003). Biblioshiny is Java software developed by Massimo Aria from the University of Naples Federico, which combines the functionality of the bibliometric package with the ease of use of web apps in the Shiny package environment (Aria & Cuccurullo, 2017; Aria & Corrado, 2020).
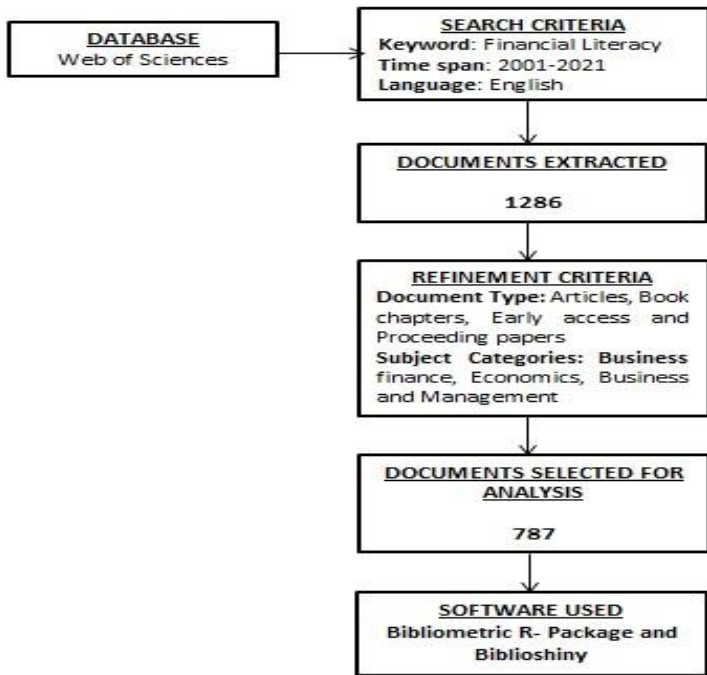
Figure 1. Flowchart showing Summary of Document Selection for Bibliometric Analysis

**ANALYSIS AND FINDINGS**

Data analysis in bibliometrics includes descriptive and network Analysis. Descriptive analysis provides basic information about the dataset and examines the fundamental characteristics of the bibliographic data through source analysis, author Analysis, and document Analysis. Network analysis explains the conceptual, intellectual, and social structure through coword analysis, co-citation analysis, and collaboration analysis.

**Descriptive Analysis**

*Dataset Information*

Table I provides detailed information about the dataset, which includes 787 documents exported from the WOS database after a systematic search. These documents include articles, book chapters, early access, and proceedings papers published in 211 sources between 2001 and 2021, with an average citation score of 19.79, references 25380, and an annual growth rate of 29.96%.

Table 1. Dataset Summary

| Description | Results |
|---|---|
| **Timespan** | 2001:2021 |
| **Sources (Journals, Books, etc.)** | 211 |
| **Documents** | 787 |
| **Average citations per documents** | 19.79 |
| **Average citations per year per doc** | 3.114 |
| **References** | 25380 |
| **Keywords Plus** | 1158 |
| **Author's Keywords** | 1676 |
| **Authors** | 1644 |
| **Authors of single-authored documents** | 94 |
| **Authors of multi-authored documents** | 1550 |

| | |
|---|---|
| **Single-authored documents** | 100 |
| **Documents per Author** | 0.479 |
| **Authors per Document** | 2.09 |

Figure 2 shows the tremendous growth in annual scientific production of publications related to financial literacy increased from one in 2001 to 131 in 2020. The average article citations per year also showed an increasing trend (Figure 3) in this field. Therefore, we conclude that this field is in the phase of constant growth.
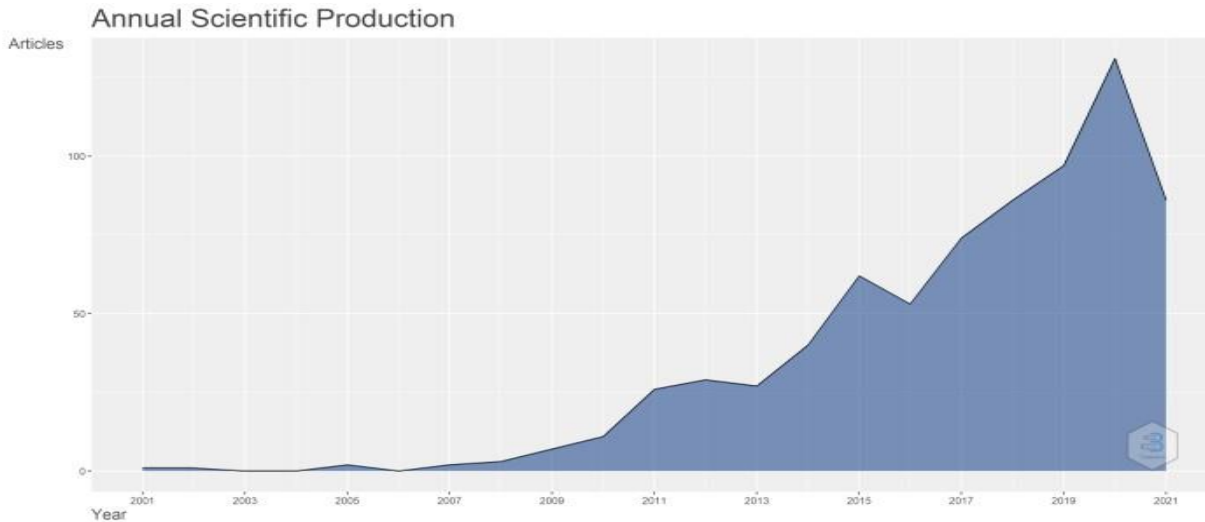


Figure 2. Annual Publication Trends on Financial Literacy from 2000 to 2021
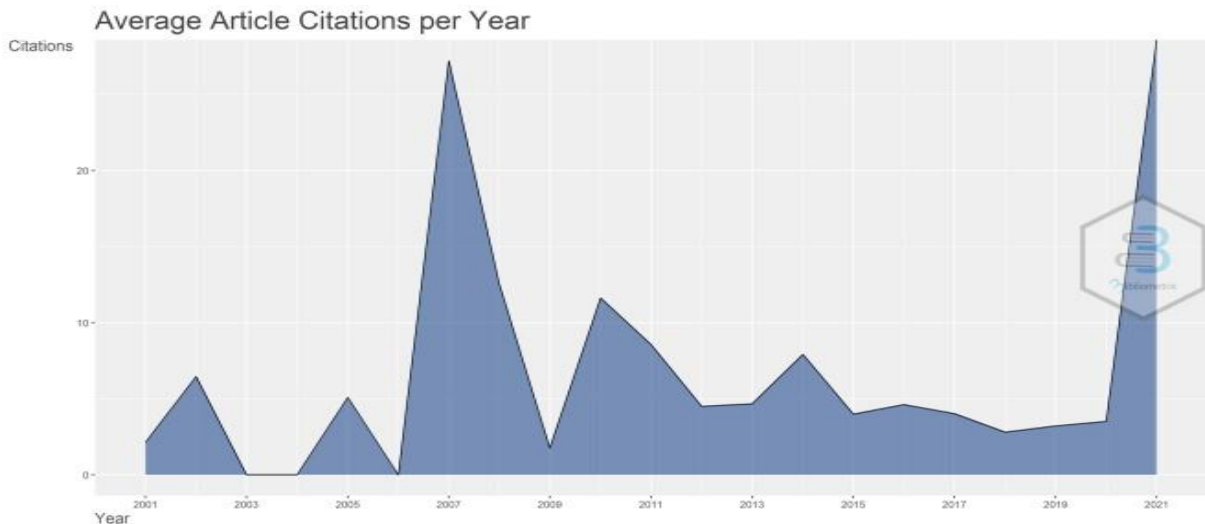


Figure 3. Average Article Citations per Year

*Active Journals*

After analyzing the sources, we found that the 787 articles included in the study were published in approximately 200 journals. The top 20 journals in terms of number of publications are shown in figure 4. The Journal of Consumer Affairs ranked as the most relevant journal with 55 publications, followed by the International Journal of Consumer Studies (45 publications), Journal of Pension Economics & Finance (40 publications), and International Journal of Bank Marketing (36 publications). In figure 5, the most cited sources were the American Economic Review, which was observed as the most cited source with 1321 citations, followed by the Journal of Finance (1101 citations) and the Journal of Consumer Affairs (1081 citations).
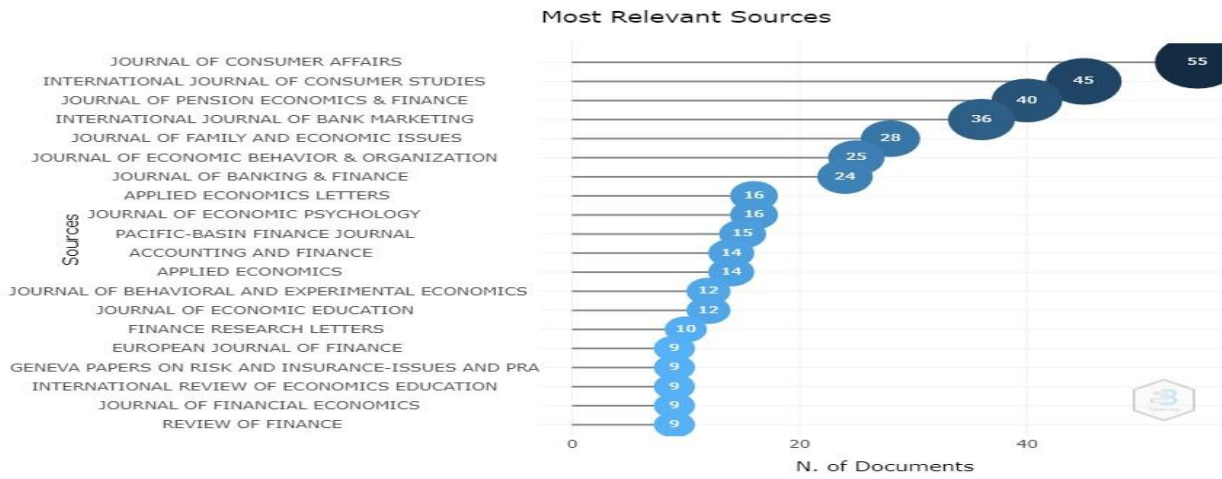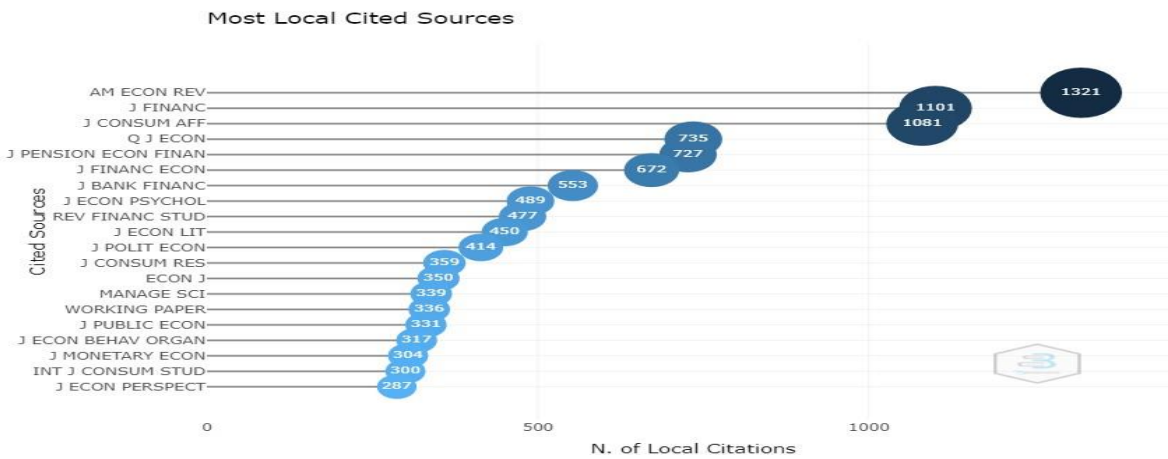
Figure 4. Most Relevant Sources
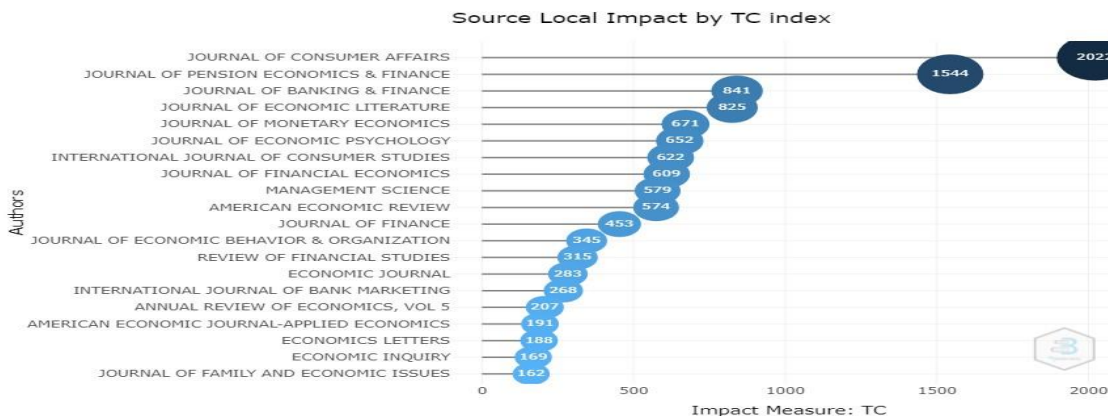


Figure 5. Most cited Sources



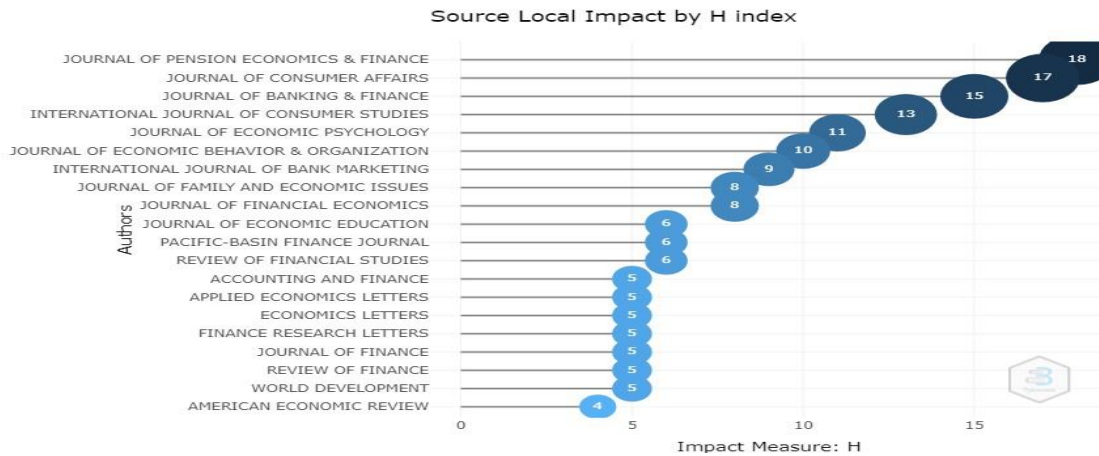Figure 6. Source Impact by Total Citation Index

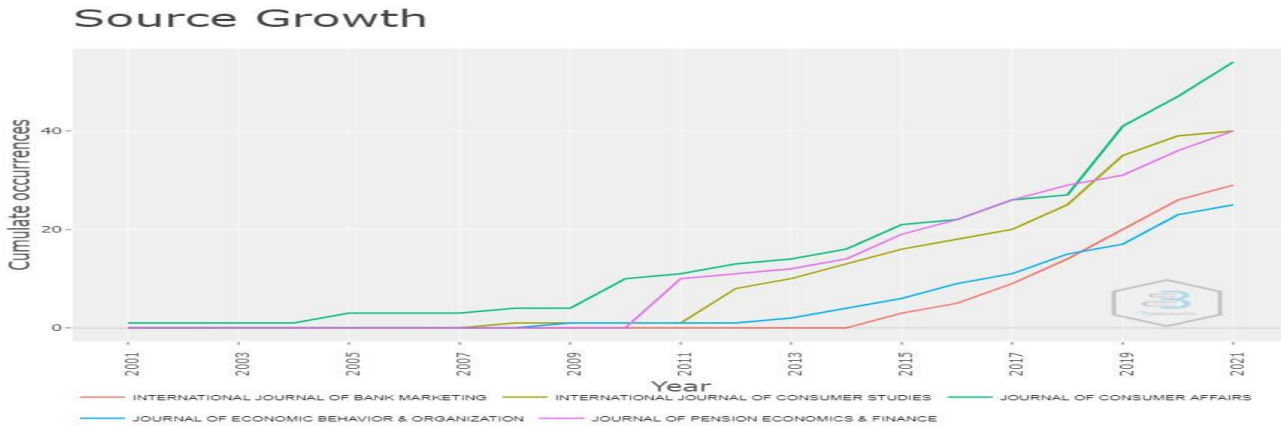Figure 7. Source Impact by H Index



Figure 8. Source Growth on Financial Literacy Research from 2001 to 2020

The Journal of Consumer Affairs, Journal of Pension Economics & Finance, and Journal of Banking & Finance were the top three scholarly impactful journals in terms of total citations and h-index. From this, we can conclude that these three journals are the most active in this field. Figure 6 & figure 7 show the 20 most impactful sources based on total citation index and h-index, respectively.

Figure 8 shows the Journal of Consumer Affairs, Journal of Pension Economics & Finance, and International Journal of Consumer Studies as the fastest-growing sources in this field. The figure shows rapid growth in the Journal of Consumer Affairs from 2009 onwards, the Journal of Pension Economics and Finance from 2010 onwards, and the International Journal of Consumer Studies from 2011 onwards.

*Active Authors*

A total of 1644 authors contributed to 787 documents. Figure 9 shows the top 20 most relevant authors. Lusardi A and

Mitchell OS were observed as the two most active authors in financial literacy, with 23 articles, followed by Xiao J.J and Gerrans P. with 13 and 10 articles, respectively. In terms of citations (Figure 10), Lusardi A. ranked first (1545 citations), followed by Mitchell OS (1148 citations), Van Rooij M (211citations), and Alessie (207 citations). The analysis by total citation index (Figure 11) as well as h-index (Figure 12) also showed Lusardi and Mitchell the most impactful authors, with maximum no. production during 2011, 2014, and 2017. As per the h-index, Lusardi and Mitchell were followed by Xiao and Zia as the most impactful authors while Lusardi and Mitchell were followed by Alessie, van Rooij, and Huston as per TC- index.
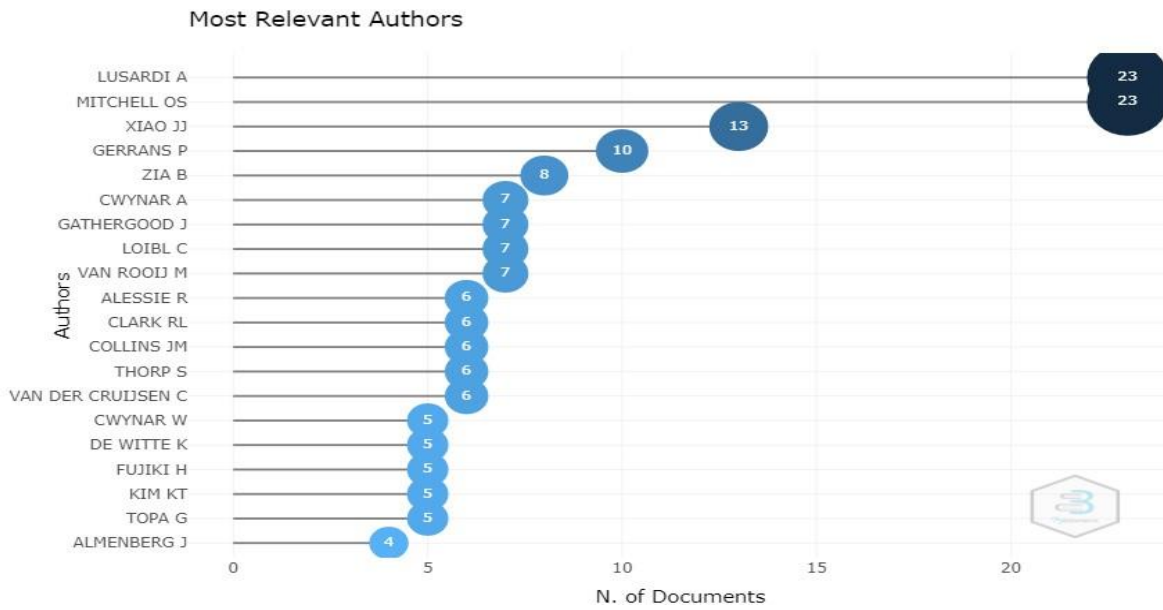
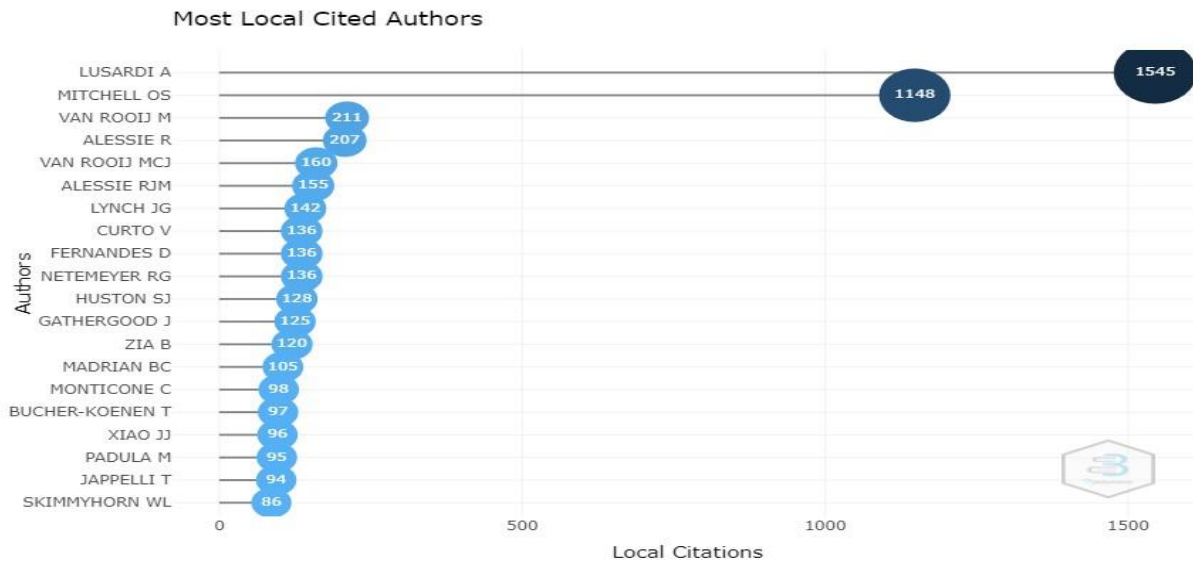Figure 9. Most Relevant Authors



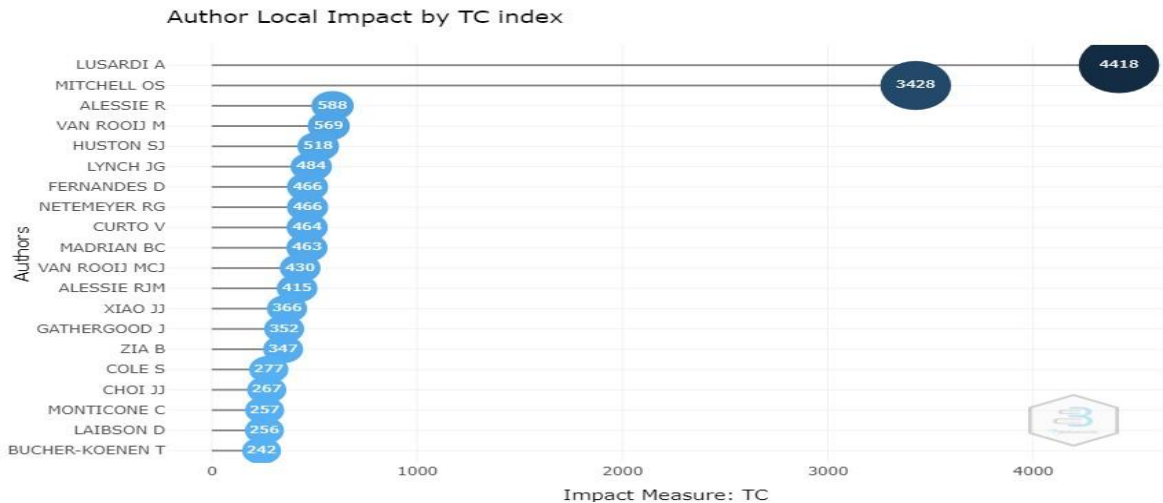Figure 10. Most Cited Authors


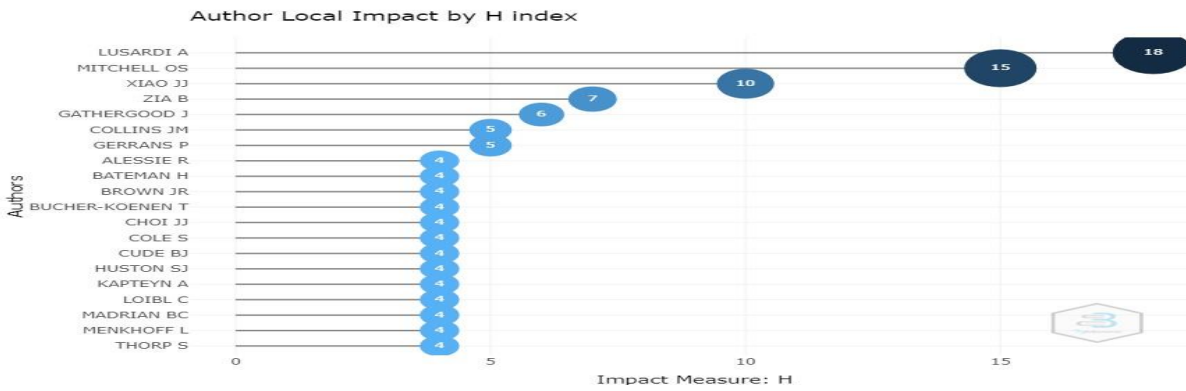
Figure 11. Author Impact by TC Index
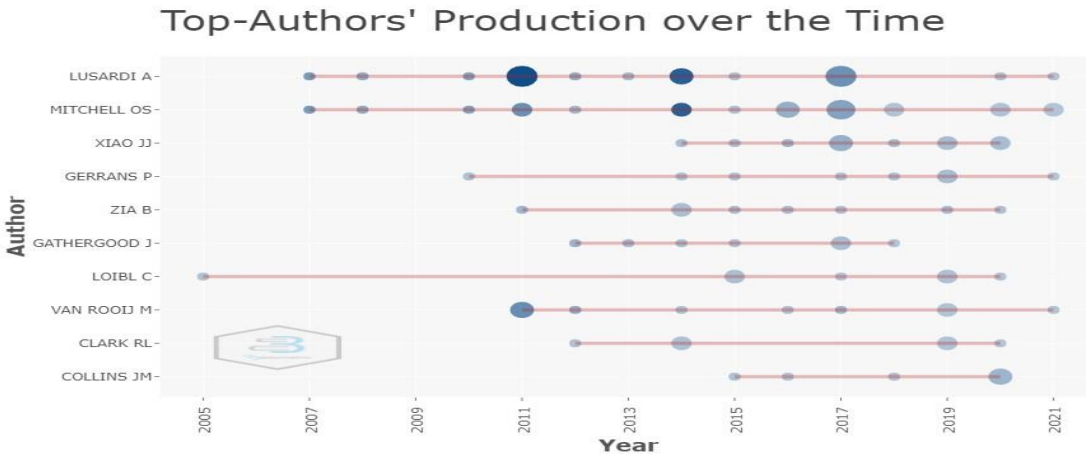
Figure 12. Author Impact by H Index



Figure 13. Top-Authors' Production from 2001 to 2021.

From this author's analysis, we can conclude that the work of Lusardi and Mitchell laid the foundation for research in this area of financial literacy. In addition, Figure 13 showing top author's production from 2001 to 2021 also demonstrated Lusardi A and Mitchell OS as the top authors, and most of the articles by these top authors had been published in the last decade; thus, we can conclude that the study in this area will continue to be a hot field.

*Active Institutions and Countries*

Based on the No. of articles published, the University of Penn (28 articles) ranked on 1st position among the most relevant affiliations, followed by the University of Wisconsin (20 articles), Ohio State University (19 articles), George Washington University and the University of Groningen (18 articles), as shown in figure 14. Among the countries, the USA ranked first, based on both the no. of the articles published (649)and no. of citations (8701) (figure 15 and Table II). Based on the number of publications, the United States was followed by Germany, China, Australia, Italy, the Netherland, and the United Kingdom.
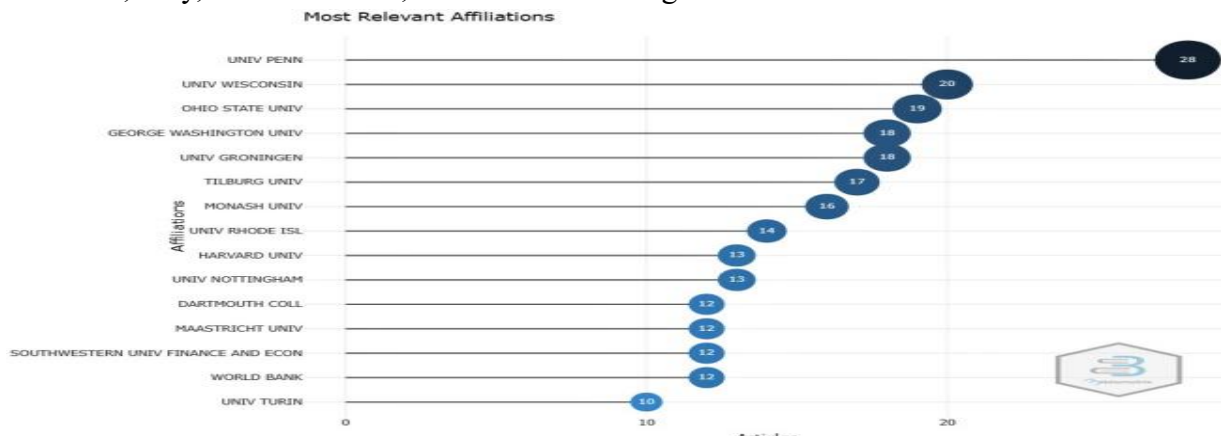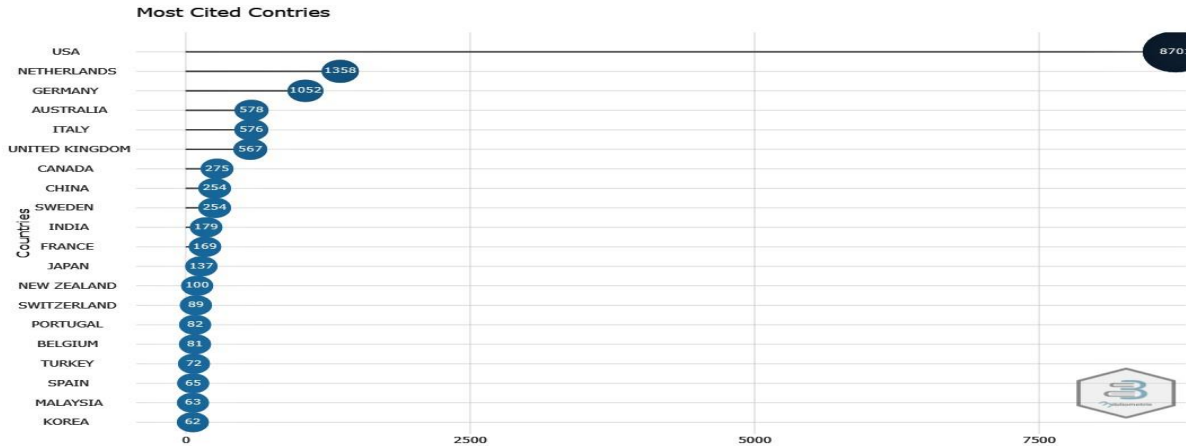
Figure 14. Most Relevant Affiliations



Figure 15. Most Cited Countries

Table 2. Country's Scientific Production

| Country | Frequency | Total Citations | Average Article Citations |
|---|---|---|---|
| **USA** | 649 | 8701 | 34.12 |
| **GERMANY** | 130 | 1052 | 19.13 |
| **CHINA** | 123 | 254 | 4.98 |
| **AUSTRALIA** | 121 | 578 | 9.63 |
| **ITALY** | 117 | 576 | 14.05 |
| **NETHERLANDS** | 115 | 1358 | 41.15 |
| **UK** | 110 | 567 | 15.75 |
| **SWEDEN** | 33 | 254 | 16.93 |
| **SPAIN** | 30 | 65 | 4.06 |
| **INDIA** | 28 | 179 | 10.53 |
| **JAPAN** | 26 | 137 | 9.79 |
| **FRANCE** | 25 | 169 | 18.78 |
| **SWITZERLAND** | 25 | 89 | 9.89 |
| **CANADA** | 24 | 275 | 25.00 |

All these countries have more than 100 publications. Based on the number of citations, the United States was followed by the Netherland, Germany, Australia, Italy, and the United Kingdom. Table II, representing the country's scientific production, shows that developed countries contributed more than developing and underdeveloped countries. India had only 28 publications in this field and was ranked 10th in the country's scientific production list as per no. of publications and as per the average article citations.

***Popular Documents***

The documents written by Lusardi and Mitchell, Van Rooij, Fernandes, and Huston were the most globally cited documents with more than 400 global citations (Figure 16).
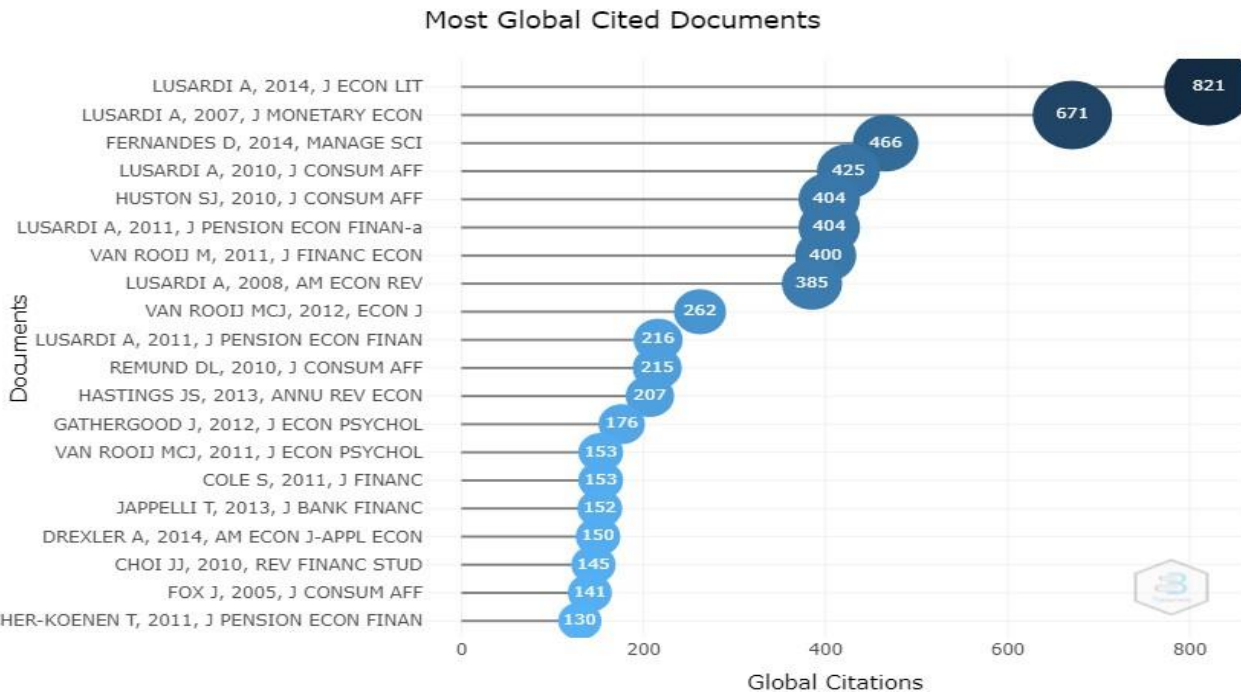
Figure 16. Most Cited Documents

All the documents presented in the figure have more than 100 global citations. The top two documents by Lusardi (2014, 2007) showed 821 and 671 citations, respectively, which are very significant figures. The same documents were also observed as the most referenced documents, with more than 200 local citations (Figure 17).
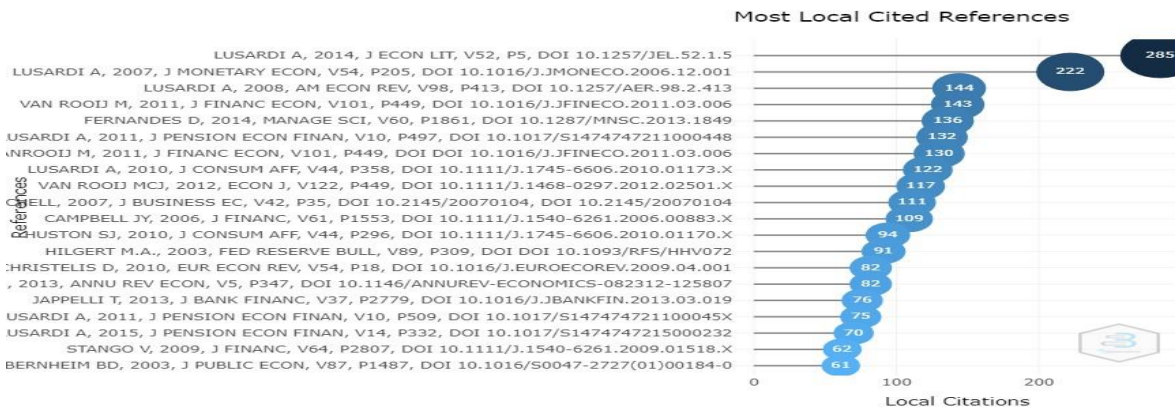


Figure 17. Most Cited References

**Network Analysis**

*Co-Word Analysis*

Co-word analysis helps to study the conceptual structure of a research field using the most important words or keywords in documents and word co-occurrence networks (Aria & Cuccurullo, 2017). The word analysis found "Financial Literacy" as the most relevant word that appeared 204 times followed by Education, Literacy, Behavior, Knowledge, Wealth, etc. (Figure 18). It was found to be associated with many other keywords such as household finance, financial education, retirement planning, gender, trust, financial advice, pension, behavior finance, numeracy and gender gap as per co-occurrence network analysis of the author's keywords (Figure 19).
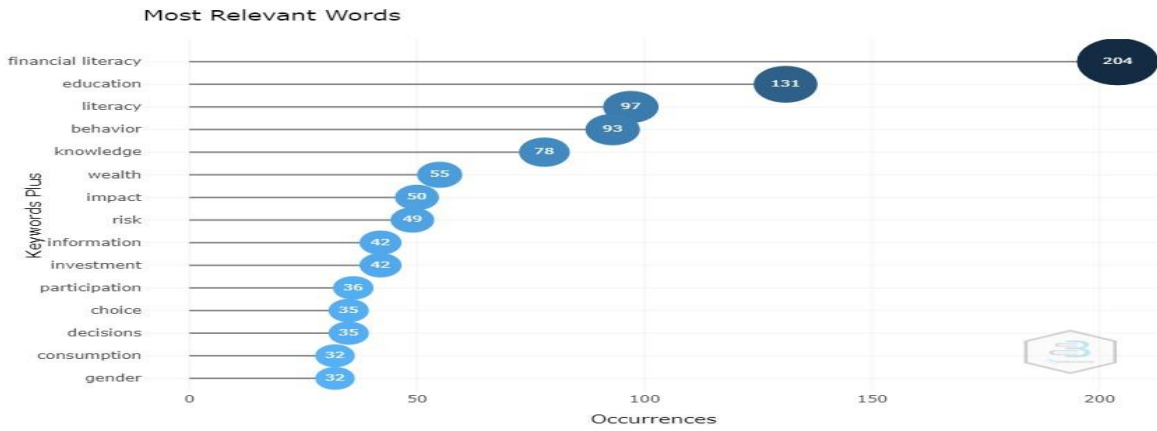
Figure 18. Most Relevant Words



Figure 19. Co-occurrence Network by Author's Keyword
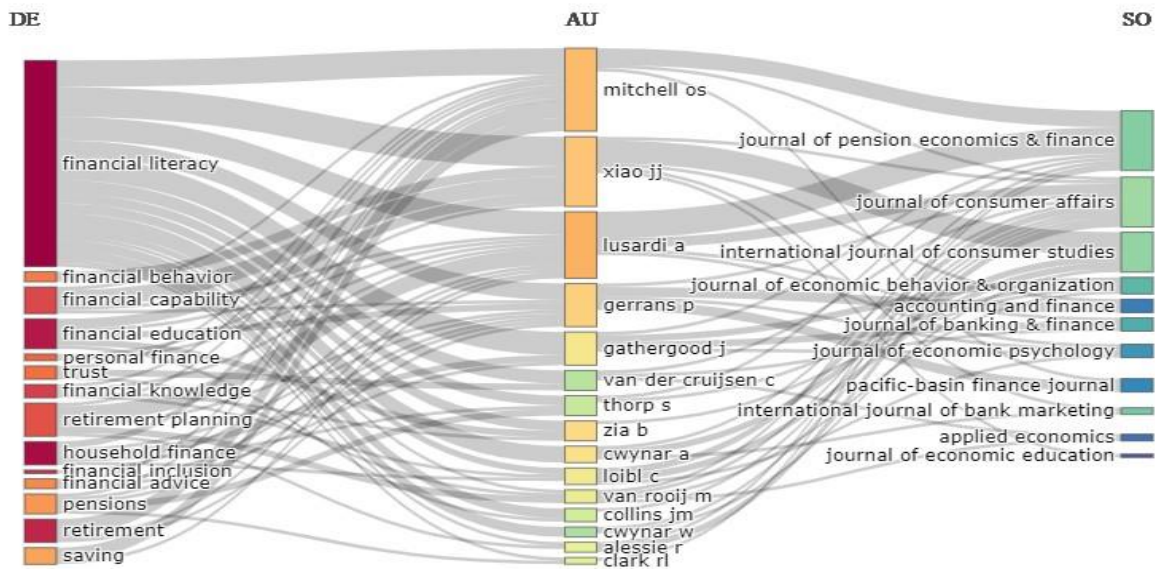


Figure 20. World-Cloud

Figure 21. Three-Field Plot between Keywords, Authors, and Sources

The word cloud shown in figure 20 provides more visual information about the keywords. Keywords with a higher volume and greater density are displayed in a large and prominent font. Further, to understand the crucial association of the keyword financial literacy with other key terms, a three-field plot (Figure 21) is drawn between the keywords, authors, and sources. It was found that all main authors and all major sources in this field have incorporated many key financial terms, such as financial behavior, financial capability, financial education, household finance, personal finance, financial knowledge, retirement planning, financial inclusion, and saving, with the keyword "financial literacy". These have emerged as potential subtopics in this field in the last decade.
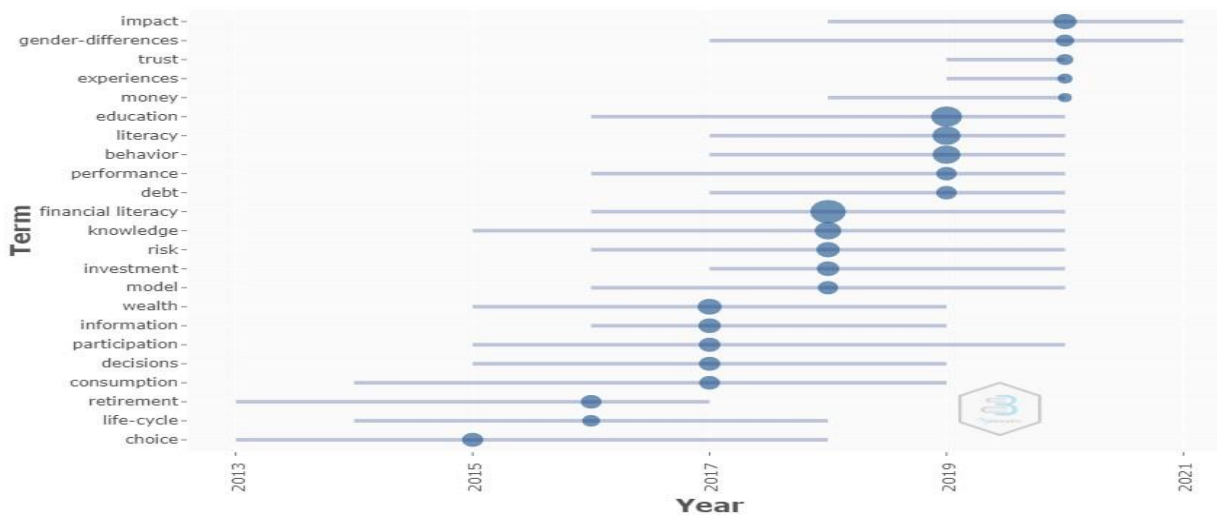


Figure 22. Trend Topics from 2001 to 2021

Studies related to gender differences and the studies related to financial literacy impact are gaining more importance in 2020-2021 and have been recognized as the trend topics in this field (Figure 22).

### Thematic Analysis of Keywords

The thematic map of keywords shown in figure 23 drawn using the author's keyword represented "Financial literacy" as the basic theme which is important but not well-developed, "retirement" as the motor theme which is

widely discussed and core theme, "Financial Inclusion" and "Pension" as the emerging but declining themes which are weakly developed and "Consumption" as a niche theme of marginal importance. From this figure "Financial well-being" and "gender" are also recognized as crucial themes on which furthermore discussion is required to include them in motor themes in context to financial literacy.



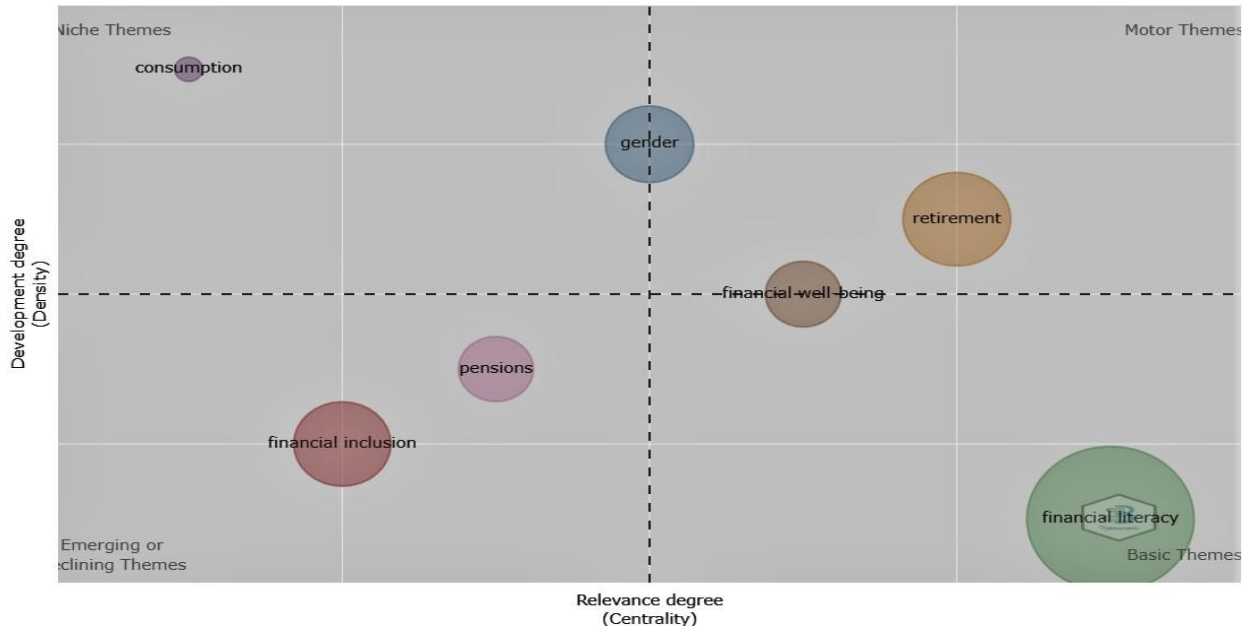Figure 23. Thematic Map

*Factorial Analysis of Keywords*

Factorial analysis examines the interdependence among a set of categorical variables to identify new latent variables using multiple correspondence analysis (MCA) to draw a conceptual structure.
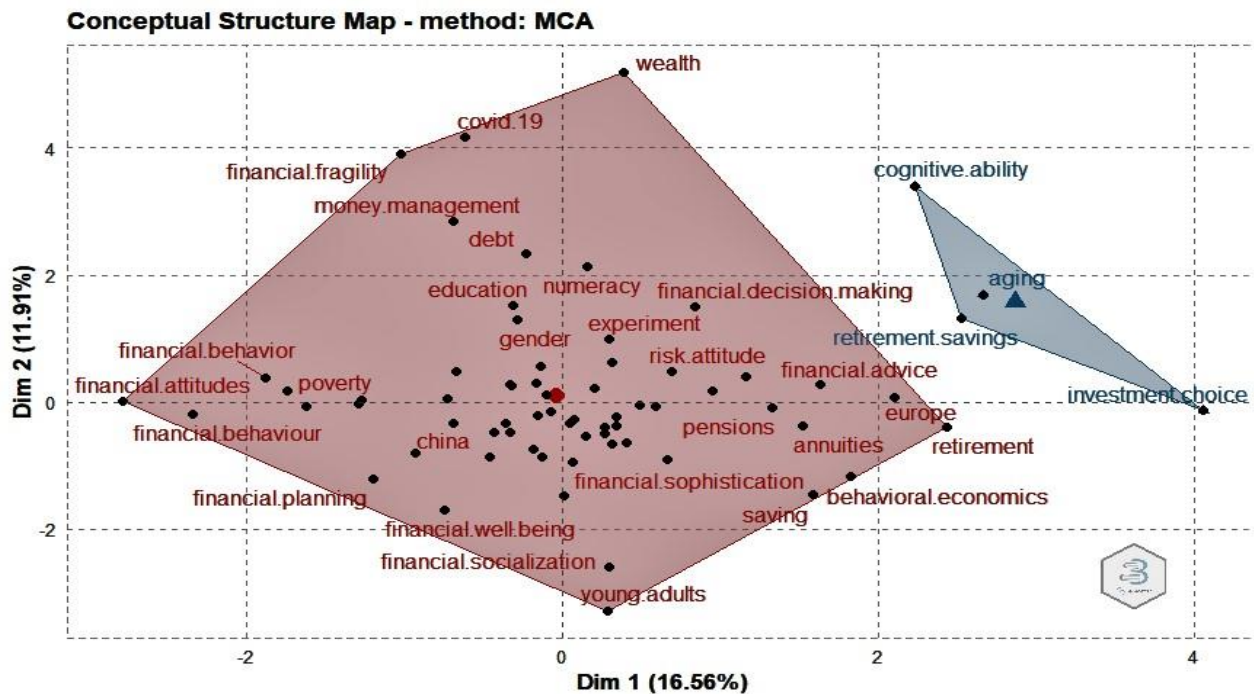


Figure 24. Conceptual Structure by MCA

MCA is an exploratory multivariate technique for the graphical and numerical analysis of multivariate categorical data (Greenacre and Blasius, 2006). The results were interpreted based on the relative positions of the points and their distribution along the dimensions; as words are more similar in distribution, the closer they are represented in the map (Cuccurullo, Aria and Sarto, 2016). The words were marked on a two-dimensional map. Figure 24 shows the major keywords connected to financial literacy publications.

*Co-citation Analysis*

To explore the intellectual structure of the most influential documents in the field of research, co-citation analysis was performed. Co-citation indicates how many times two articles are cited together by a third article. The co-citation analysis of papers with 50 nodes exposed three clusters, cluster 1 and cluster 2 included 21 papers co-cited together with "Lusardi A 2014" and "Lusardi A 2007" as the dominating article with highest betweenness centrality measures respectively whereas cluster 3 included 8 papers with Van Rooij 2012 as dominating article (Figure 25).
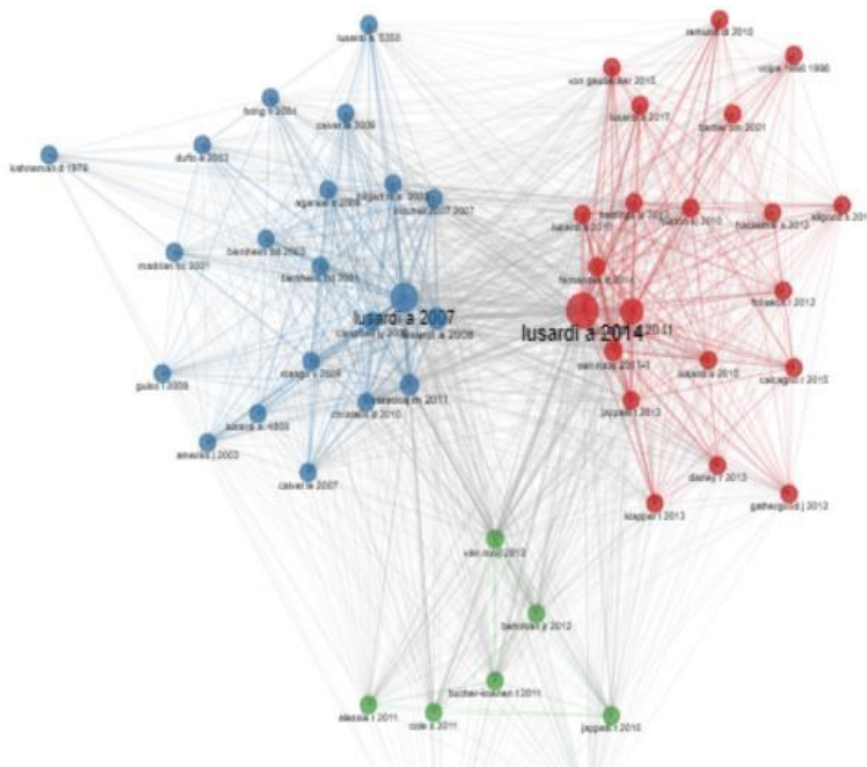


Figure 25. Co-citation network of papers

Co-citation analysis of authors, as the unit of analysis, also revealed three clusters. Agarwal S, Bernheim BD, and Lusardi A were the dominant authors in clusters 1, 2, and 3, respectively. With highest betweenness, Lusardi was considered the most influential author, followed by Bernheim, Agarwal, Campbell, Van Rooij, and Guiso (Figure 26). From this analysis, we can conclude that most of the documents written by these authors are of high quality and high relevance and appear together in the reference section of many documents, showing a strong relationship with each other.
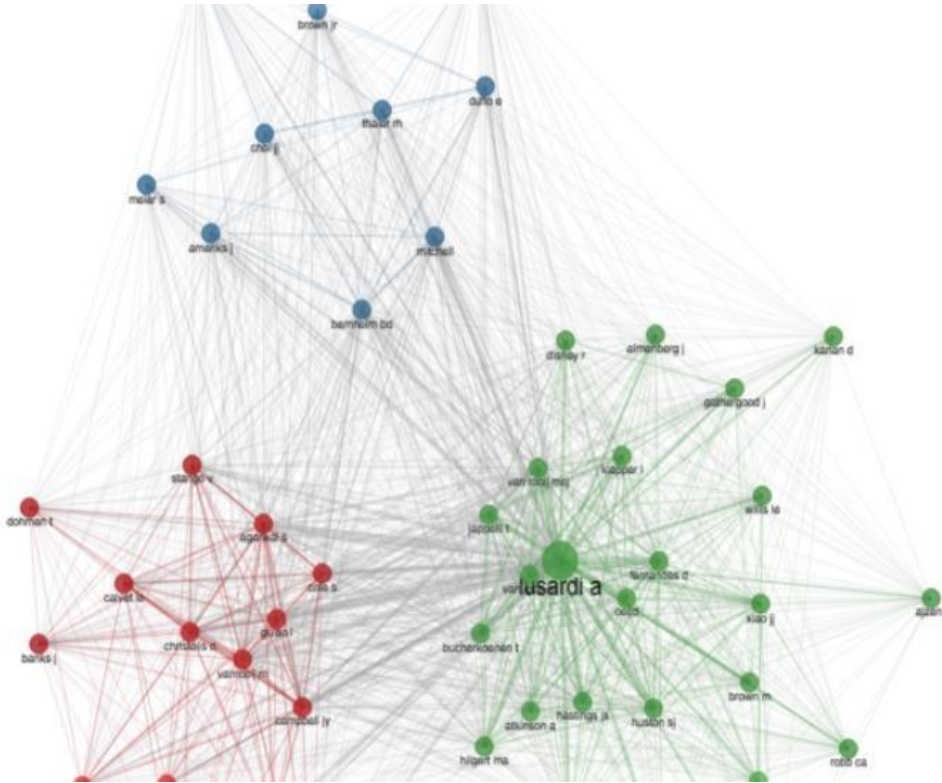
Figure 26. Co-citation network of authors

***Collaboration Analysis***

It explains the interrelationship and collaboration between various authors, institutions, and countries and help in explaining the social structure. This network consists of various sets of nodes showing the interrelationships between nodes, implying author/institution/country. Figure 27 shows the collaboration between various authors. In the cluster with red nodes, Lusardi A collaborated with Mitchell, Van Rooij, Alessie, Bucher-Koenen, Brown, and Kapteyn. Many other authors have also collaborated with each other, such as Jappelli and Padula, Walstad and Bosshardt, and Cole and Zia.
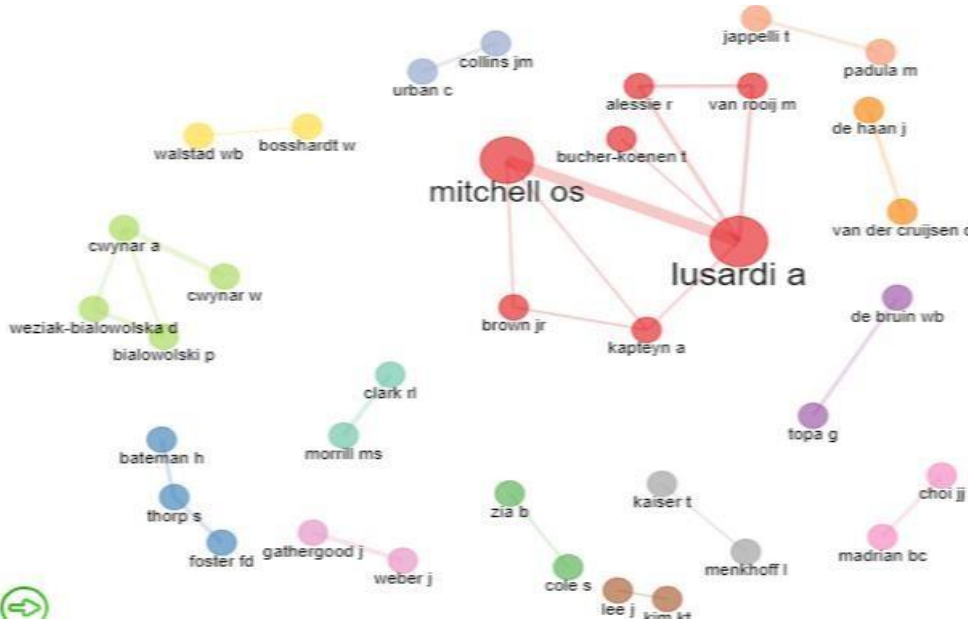


Figure 27. Author's Collaboration Network
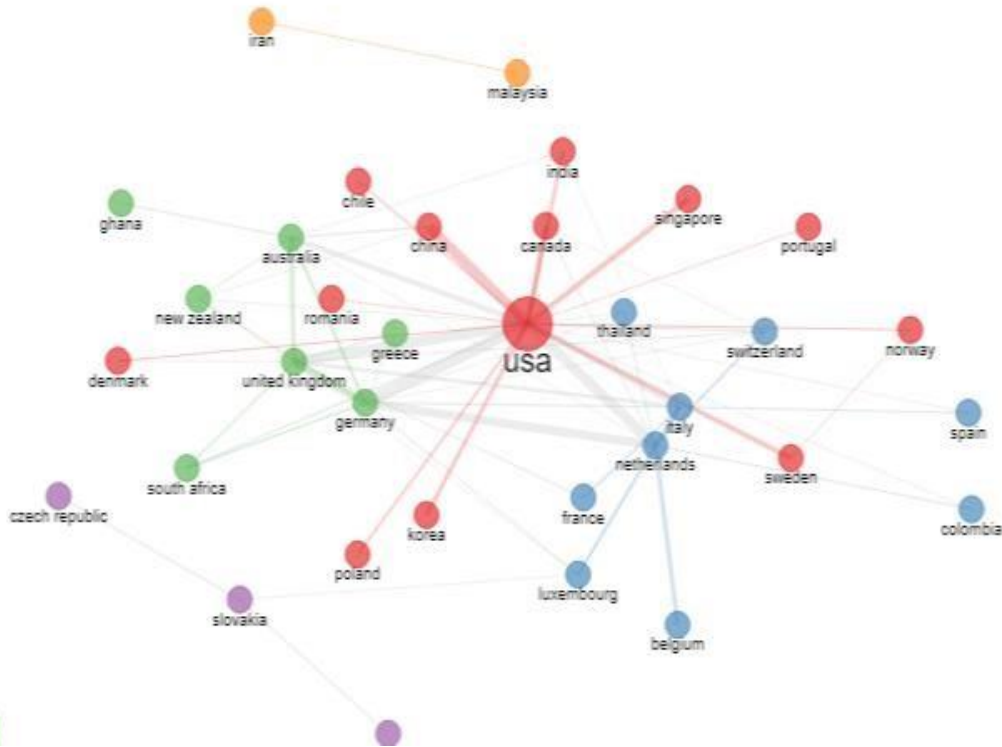
Figure 28. Country's Collaboration Network

Figure 28 explains the country's collaboration network. The USA collaborated with Canada, China, Singapore, Portugal, India, Korea, and Poland in one cluster. The Netherland collaborated with Italy, Switzerland, Thailand, France, Spain, Colombia, and Belgium in the second cluster. Similarly, the UK, Germany, New Zealand, Australia, Greece, Ghana, and South Africa found collaborated in the third cluster. The Institutional Collaboration network in figure 29 shows the dominance of the University of Penn in collaboration with Harvard University, University of Illinois, George Washington University, Dartmouth College and North Carolina State University. The University of Groningen worked in collaboration with De Nederland Bank and the University of Utrecht.
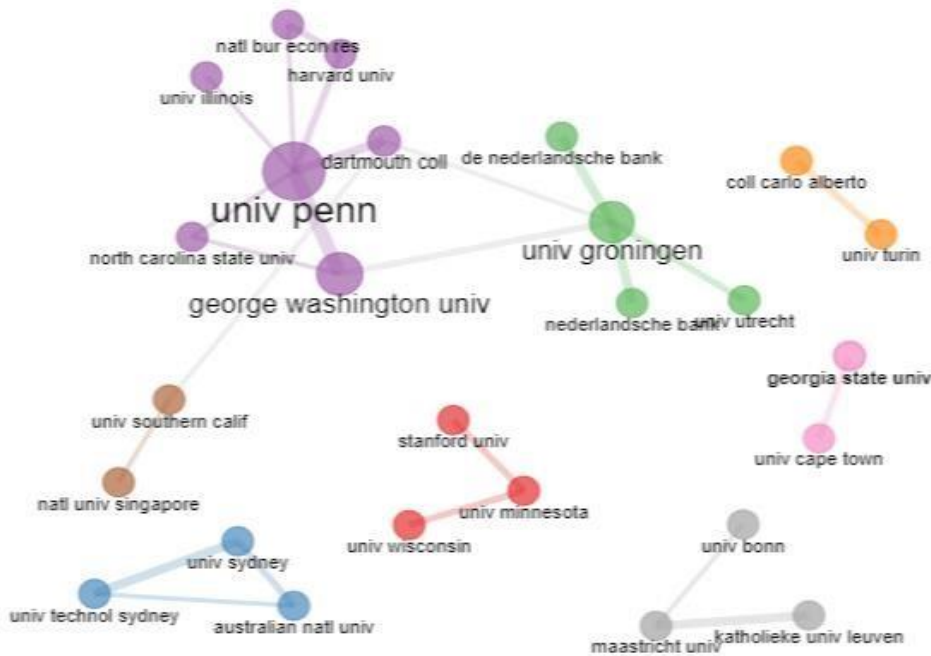
Figure 29. Institution's Collaboration Network

From this collaborative analysis, we conclude that no. of authors, institutions, and countries are working in collaboration to strengthen the social structure, and many new are still entering this research area to further expand the social structure.

## CONCLUSION

To determine trends in this field, we drew scientific maps of journals, authors, countries, institutions, documents, authors, and co-occurrence networks of keywords. We found that financial literacy has gained a high degree of attention in the academic community over the last two decades. The rapid increase in the number of publications and the growing trend in the number of average article citations have highlighted the fact of clearly growing interest of researchers in this field. With the steady growth in global publication trends, financial literacy has become a hot topic among scholars over the past 20 years. The Journal of Consumer Affairs and the Journal of Pension Economics and Finance were observed to be the most active journals. Lusardi A and Mitchell OS were the two most active authors, and the documents written by Lusardi and Mitchell, Van Rooij, Fernandes, and Huston were identified as the most popular documents. The country and institutions contributing the most to this field were the United States and University of Penn, respectively. The co-word analysis and factorial analysis found financial literacy to be crucially associated with many other keywords, such as financial behavior, financial capability, financial education, financial socialization, household finance, personal finance, retirement planning, financial inclusion, and gender, which have emerged as potential sub-topics in this field in the last decade. Studies related to gender differences in financial literacy and studies related to the impact of financial literacy have been recognized as important trend topics in 2020-2021. The co-citation analysis found that most of the documents written by the top authors, Lusardi A, Agarwal S, Bernheim BD, and Van Rooij M, are of high quality and high relevance and appear together in the reference section of many documents showing a strong relationship with each other. Collaboration analysis revealed that no. of authors, institutions, and countries are working in collaboration to strengthen the social structure, and many new are still entering this area to further expand the social structure.

From this study, we also found that even after so much growth in annual scientific production and global trends in financial literacy research, India had very little no. of the publications in this area. Furthermore, the research in the context of gender and the impact of financial literacy, which are the crucial topics in current scenario all around the world, is negligible in India. This has created a gap in the research field. Researchers in India should focus more on these topics and study financial literacy in the context of gender, as gender discrimination still exists in many parts of India. Further the good no. of average article citations (10.53 as per Table II) in India offers ample future scope for financial literacy research in India.

## Limitations

As no study is free of limitations, this study also has some limitations. This study focused only on articles published in economics, business finance, business, and management. In future research, it would be interesting to include articles in other categories, such as the social sciences and psychology, to extend the analysis. Further in this study data was retrieved by using a single search term i.e. "financial literacy." In the future, a different or complementary view can be drawn using more search terms in this area. This study is limited to only one database WOS; other databases such as Scopus, Ebsco, Proquest, and DOAJ, can also be used to retrieve more data.

## Practical and Social Implications

This study provides important insights into recent trends in financial literacy and has many practical and social implications. This study will help academicians and practitioners in developing policies and programs by

widening their knowledge base and will also help in exploring research prospects through analysis of patterns for publications in terms of authors, sources, documents, institutions, and countries.

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