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Bibliometric Analysis: Financial Literacy and Financial Behavior

Sri Wahyuni[1], Refni Sukmadewi[2], Setiawati[3]
[12]STIE Persada Bunda
[1]peksosriau.sriwahyuni@gmail.com, [2]refni.dhewi@gmail.com, [3]setiawatieci@gmail.com

Abstract

Currently, there is no comprehensive scientific study of financial literacy and behavior. This is due to the presence of no trends in the field of research; instead, many exploratory, conceptual and empirical studies have been carried out. The current study intends to acquire trends by synthesizing different knowledge structures. A scientific search was performed to gather data for financial literacy and financial behavior. After searching Dimensions, a web-based software application created in the R language was used to gather information automatically. This software is part of a package called Bibliometrix, which also includes a web-based application called Biblioshiny. The two are used to find sources, countries, journals, authors, articles and themes. Analysis of social networks and joint quotations are also performed using automated workflows in the software. This study involved collecting data from 417 documents. Initially, this interdisciplinary field focused on the specific aspects of demographics and socio-economic status. However, as time progressed, it expanded to include behavioral aspects and even mental concepts that affected financial behavior. The study also outlines how the field's intellectual and social ideas combine. This study uses bibliometric analysis to study important subjects. Because of this, future researchers can use its limitations to shape their ideas. Studying the literature through a systematic review will help lead to a more solid understanding of the material. Due to Dimensions' larger scope than journals, current studies utilize the database for science mapping. This information provides important data regarding financial literacy and behaviors. It also highlights the most important issues currently being addressed in the field. This data helps lead to future research projects that focus on new areas. This paper reveals the social and intellectual foundations of a particular academic or scientific field. It also details the collaborations, contexts and key themes that emerge in this particular field. After reading this paper, other researchers can make informed decisions about financial education and financial literacy policies. A large amount of work from different fields have been done across the country. This includes work from psychology, finance, economics and other fields. The study pulls apart the current literature and unites it into one cohesive body. It also explores how behavior and financial literacy are connected

Keywords: Financial literacy, behavioral, Household finance, Bibliometrix, Mapping knowledge science

JEL CLASSIFICATION: G53, G4, G5

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[1]Coressponden: Sri Wahyuni. STIE Persada Bunda. Jl. Diponegoro No.42 Pekanbaru - Riau.peksosriau.sriwahyuni@gmail.com

KAUJIE CLASSIFICATION: H53, G5, H32

Introduction

Most financial theories follow the postulate of the behavioral theory. This states that during their life cycle, people maximize their utility functions. However, current surveys reveal that household finance isn't prioritized by many people. In fact, home equity and gold are still important to all income groups and households (*Economic Outlook for Southeast Asia, China and India 2019 (Summary in Arabic)*, 2018). A survey on financial inclusion in 140 countries by the World Bain 2017 (Demirguc-Kunt et al., 2018) showed concerns about financial inclusion in the international financial system through a survey that was performed in 140 countries. This includes the fact that approximately half of adults currently don't have a bank account, and 80% use their accounts. However, only 48% of the population knows 70% of the financial knowledge questions correctly. This is stated in the report by the World Bain 2017, which is an acronym for World Bank Annual. Three countries managed to score above average — China, Canada, and France — in terms of financial literacy. The composite score for financial literacy was determined by adding up 21 individual tests and dividing that total by the number of countries surveyed. Three other countries scored just above average: average financial literacy scores were 14 out of 21. These countries were Japan, Germany, and the United States. Japan reported higher scores due to involvement with personal credit contracts and mortgages. Germany scored high because they have a high level of investment in stocks. And the US received high results because many Americans hold formal products like pensions, life insurance contracts, and stocks. Despite this involvement, most financial services remain outside the purview of common households. Because these products require a high level of knowledge, competency and intermediation to evaluate, they're difficult to understand. Consumers hesitate to spend their discretionary money due to the recent COVID-19 pandemic coronavirus 2019 economic downturn. Consequently, they necessitate households to spend more on necessities. This was true in both 2000 and 2008 when the economy experienced recession. Additionally, this was true when policymakers and financial services realized the need to study financial behavior during other economic downturns like 2008 or 2000.

Behavior finance examines household financial decisions to improve overall financial health. It involves both the financial system and the government to provide easier access to financial services. People use their financial services, like paying bills or saving money, to better their financial situation. Additionally, sharing financial risks — like insuring a home against fire— makes financial health better (Demirguc-Kunt et al., 2018). financial education among the public; this led to greater financial management skills, eliminating many of their mistakes.. (CAMPBELL, 2006) found that families often made financial blunders by not understanding how to manage their money. When households need financial security, the world takes notice— it's an important part of people's overall happiness. This is because it affects their finances and life satisfaction (Brown & Gray, 2016). It has a bigger effect on organizations and communities than individuals.

Financial literacy and financial behavior

When striving to achieve financial well-being, a person needs to be content with his beliefs about the future state of his finances. This can be achieved only by engaging in financial activities that provide long-term security. Only when a person adopts this mindset can he hope to support himself financially. Thierer found evidence supporting a strong connection between financial literacy and the ability to save for retirement in different parts of the world. Different researchers have used the financial literacy concept in many different contexts without conflicting with each other. Their initiative highlights the combination of financial literacy and

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financial capability through which students study finances. This concept revolves around understanding finances and financial literacy, encouraging students to consider financial management outcomes such as loans, taxes and savings. It also shows how these decisions affect a person's credit score, pension security and overall financial well-being. (van Rooij et al., 2011), Studies in the United States and Netherlands showed that financial literacy predicted plans for retirement. (Sivaramakrishnan et al., 2017) A study that analyzed the needs for financial support among poor Indian families found that many people were unaware of their financial problems. This was because many families in this situation wouldn't participate in any investment plans. Some of the variables found to affect participation were age and race/ethnicity— with older families not wanting to contribute (Mitchell & Mukherjee, 2017). His study (Grohmann, 2018) Thailand's pension system needs to be developed and improved. A review of the country's system showed that few people can afford their financial needs later in life due to a lack of resources provided by the government. People need to save for retirement due to concerns about their financial knowledge. There's a need to learn more about investing and advanced financial products because they're easily available to everyone in Bangkok. This is because of the increasing longevity of the population, changes in public policy regarding retirement, and increased social arrangements. (Calcagno & Monticone, 2015) It's believed that greater financial literacy leads to the higher number of people seeking financial advice. Many financial services and products have been added to the financial markets since the 1970s. Practical financial management is encouraged by many governments as a way to ensure the financial well-being of the entire country. This is due to the fact that many countries recognize the need for increased financial literacy in order to increase the national labor force. These efforts continue today with the help of educational institutions and practitioners.

Numerous studies have explored the financial decisions households make. One significant result was the importance of financial literacy when studying consumer behavior. This was due to the fact that many of these studies connected household finances to psychology, economics, finance and other disciplines. In fact, many of these studies focused on the circular income sources used by households. These included money gained from employment, investments, pensions, and sales. Reviews that examine the construction and measurement of financial literacy are often narrative in nature. There are very few scientific studies regarding this area of knowledge, which is why some choose to focus on specific themes or theories. Any attempt at measuring the number of available literacies must be done in a specific context, such as one specific theory or worldview.

Bibliometric analysis involves analyzing the statistical data of published literature to discover trends. (Singh & Dhir, 2019). Studying literature data through bibliometric means led to maps and research in other fields. Some prior research focused on bibliometric analysis in finance focused on financial literacy. (Abad-Segura & González-Zamar, 2019); (Goyal & Kumar, 2021); (Bedi et al., 2019); consumer credit (Carlsson et al., 2017), accounting research (Merigó & Yang, 2017), green finance (Zhang et al., 2019), supply chain finance field (Xu et al., 2018), Takaful or Islamic insurance (Khan et al., 2020) and information and communication technology (ICT) and financial education (Valencia, 2018). Recently, (Santini et al., 2019) Financial literacy is an interdisciplinary field that has grown over time. Nowadays, understanding the antecedents and consequences of financial literacy are reliant on meta-analytic approaches. Because of this, the current state of the literature about financial literacy development is crucial to understanding the process. This bibliometric analysis seeks to understand the social, intellectual, and organizational structures of works that are broken down into multiple parts. This is accomplished by utilizing tools related to bibliometrics, such as analyzing trends in the overall concepts and ideas presented in each part.

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Research questions
1. Which financial literacy journals and authors are most influential?
2. The research community's intellectual structure is represented by the number 2.
3. What are financial counseling networks called?
4. New knowledge on financial literacy and financial behavior is constantly being developed and explored. What are the most discussed topics in recent academic research?

This paper's current research objectives come from the above research questions.
(1) To highlight trends and patterns in the development of financially related knowledge.
(2) To combine all knowledge for a more comprehensive understanding.
Following are the sections of this report. They include networking, analysis, and objectives. The final section presents the study's findings and conclusions. The next section discusses the methodology followed by the analysis of data. After that, the fourth section covers the study's results.

Methods
To gather data for this study, the search strategy must first be identified (Figure 1). Then, the database must be accessed.
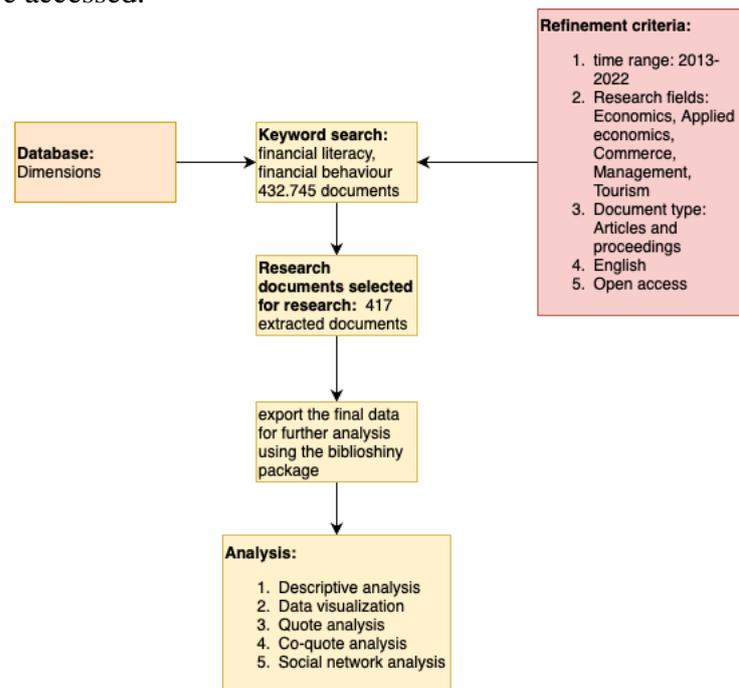

Figure 1. Flowchart for Document Selection for Bibliometric Analysis

After finding the right database, the necessary information is extracted by running a search query mixed with multiple appropriate keywords (Figure 1). This is followed by creating a data set through the proper inclusion and exclusion criteria analysis of critical analysis. After this, the data is analyzed using software to create the final result. Data is first studied via a process of analysis, which includes the examination of documents, sources and authors. Subsequent processing reduces the data, such as through multiple correspondence analysis and the creation of network maps and visualizations. These processes reveal the data's conceptual, intellectual and social structure (Aria & Cuccurullo, 2017). The management of green supply chains

represented in the work (Fahimnia et al., 2015) shares similarities with paper. This is because both require the stages below:

Database selection

Before data can be analyzed, a bibliometric study needs to have a structured description of the indexed article. This is because the Dimensions database requires Bibliometrix software to retrieve data. This is because the database uses journal classification, compatibility with the database, and scope of articles as criteria for retrieval.

Preparing data for analysis

This spreadsheet format supports the software's requirements by importing data from Dimensions in .csv format. This is done via a search filter that selects documents based on criteria.

(Ajzen, 1991) theory about planned behavior states that people's attitudes influence their intentions, which then turn into actions. Many research papers use the words "financial literacy" and "knowledge" interchangeably when brainstorming key words for a search. Keyword search was used to gather information on financial literacy and its effect on household finances. 417 documents were extracted after a specific set of keywords relating to financial literacy and finance was used. These keywords are "financial literacy" or "financial behavior" in any combination. This information can be seen below:

Search strategy.

Database	: Dimensions
Keywords	: "financial literacy" and "financial behaviour."
Time Range	: 2022 OR 2021 OR 2020 OR 2019 OR 2018 OR 2017 OR 2016 OR 2015 OR 2014 OR 2013
Publication Type	: Article OR Preprint OR Chapter OR Edited Book OR Monograph
Document Type	: All Open Access

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Table 1. Title and abstract search strategy on database dimensions

Keywords	Query description	The abundance of documents
"Financial literacy"	Keyword selection based on title, abstract and keyword search criteria	432.745 Publications
("financial literacy" and "financial behavior")		595 Publications
(("financial literacy" OR "financial knowledge") AND ("financial behavior" OR "financial attitude"))		916 Publications
(("financial literacy" OR "financial knowledge") AND ("financial behavior" OR "financial attitude")) Refined by: PUBLICATION YEAR: (2022 OR 2021 OR 2020 OR 2019 OR 2018 OR 2017 OR 2016 OR 2015 OR 2014 OR 2013)	Time range selection. With the core objective of detecting trends and perspectives in financial literacy concerning financial behavior, the data includes all publications from 2013 to 2022.	876 Publications
(("financial literacy" OR "financial knowledge") AND ("financial behavior" OR "financial attitude")) Refined by: PUBLICATION YEAR: (2022 OR 2021 OR 2020 OR 2019 OR 2018 OR 2017 OR 2016 OR 2015 OR 2014 OR 2013) AND PUBLICATION TYPE: (Article OR Preprint OR Chapter OR Edited Book OR Monograph)	Publication type selection. Articles, Preprints, Chapters, Edited Books and Monographs were used for further analysis.	840 Publications
(("financial literacy" OR "financial knowledge") AND ("financial behavior" OR "financial attitude")) Refined by: PUBLICATION YEAR: (2022 OR 2021 OR 2020 OR 2019 OR 2018 OR 2017 OR 2016 OR 2015 OR 2014 OR 2013) AND PUBLICATION TYPE: (Article OR Preprint OR Chapter OR Edited Book OR Monograph) AND OPEN ACCESS: (All OA)	Selection of Document type in the form of open access	540 Publications
(("financial literacy" OR "financial knowledge") AND ("financial behavior" OR "financial attitude")) Refined by: PUBLICATION YEAR: (2022 OR 2021 OR 2020 OR 2019 OR 2018 OR 2017 OR 2016 OR 2015 OR 2014 OR 2013) AND PUBLICATION TYPE: (Article OR Preprint OR Chapter OR Edited Book OR Monograph) AND OPEN ACCESS: (All OA) AND LANGUAGE: (ENGLISH)	The choice of language used is English to facilitate mapping and the number of articles in English	417 Publications

Bibliometric tool selection

In order to create a comprehensive map of science, this study utilized bibliometrix techniques. It uses statistical and mathematical analysis of the scientific literature performed in library and information science to improve the efficiency and effectiveness of libraries (Tella & Aisha Olabooye, 2014). Various software such as BibExcel, Publish or Perish, CiteSpace

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(Jayantha & Oladinrin, 2019), Histcite (Garfield, 2004) were used for bibliometric studies along with VOSviewer (Rialto et al., 2019) and Pajek and Gephi for data visualization. This study used the Bibliometrix R-package, a tool developed in the R language (Aria & Cuccurullo, 2017). This package includes advanced analysis and visualizations— without restrictions due to the licensing of the commercial software. Most academic bibliometric analysis isn't accessible to regular users due to the need for extensive training and knowledge in using the software

Bibliometrix is an open-source software package created for science mapping analysis. It integrates well with other R packages for continuous improvement and integration. It's very popular among users and helps people understand bibliometric analysis through both descriptive and network analysis. The study used Biblioshiny, a web-based application included in the Bibliometrix package. It's easy to use and doesn't require coding knowledge, making it a great option for non-coder users. It performs science mapping analysis using core features related to automated workflows from the Bibliometrix package.

Results

Data analysis includes two separate approaches: scientific mapping and descriptive analysis (see Figure 2).

(1) Descriptive analysis focuses on bibliometric data checking, which involves analyzing the number of journals, authors and documents included in the data set. This is often used to determine the accuracy of data collected.

(2) Scientific mapping involves obtaining data through themes, networks, and three-plot maps. It also uses visualizations such as graphic displays and network analysis
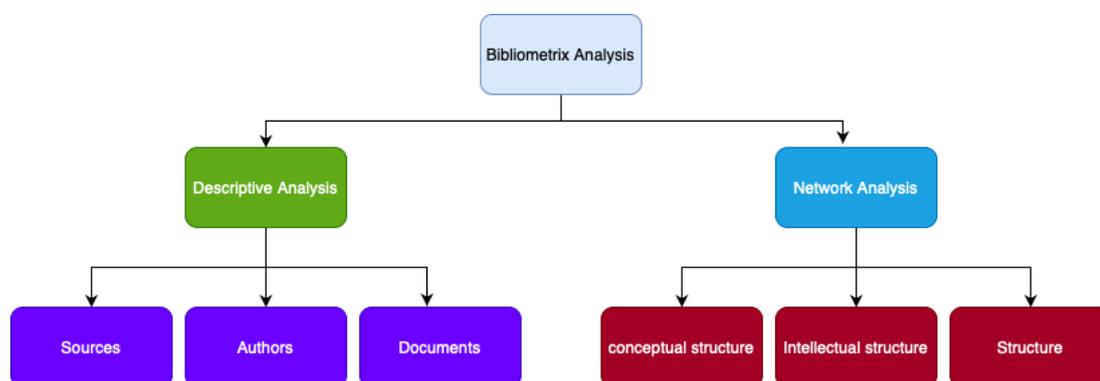

Figure 2. Bibliometrics Levels of Analysis

Descriptive analysis

Descriptive analysis explores a variety of dimensions by using analysis tools. This section of the text details these tools and their uses.

1. Data sets contain information. This table shows the bibliometric data of 596 unique documents that were thoroughly researched and analyzed through Dimensions' database. Each document was queried on 417 sources with an average score of 5.597 and a collaboration index of 2.53 This indicates significant past collaborations between multiple researchers.

2. (Riehmann et al. 2005) explain that there are three plot fields in the study, each with three plots. The Sankey Plot is used in all three, where the size of the part visually represents the value of a vertex. In the middle of the Sankey, Plot lists the keywords. On the right side, he

lists the authors and sources used in his analysis. Each of Plot's 10 items involves a keyword such as financial knowledge, financial capabilities, financial behavior, financial education and financial capabilities. Each one describes an author's work that facilitates financial literacy, financial education and more. The ten most influential journals in the financial field focus on teaching people financial literacy. They believe that this knowledge is crucial to how people think about finances and their behavior. Some of the journals' topics include pension, household finance, personal finance and financial capability.

Recent research productivity trends reveal an increase in productivity since 2013 up to 2022. This information is found in Figure 4, which includes data from 2013 to 2022. This data appears to indicate a dramatic spike in the number of papers published post-2022. This is likely due to studies analyzing the financial and consumer habits during the global financial crisis. Additionally, this time period showed an impressive increase in the average number of citations per year (see Figure 5). Despite a lack of progress, this field of study continues to increase in number of publications. The phases in which it grows are explained by the authors of Low andSiegel (2019). The earlier the stages, the more financial literacy was understood. This happened during the growth phase. More publications led to more financial knowledge bodies and an eventual consolidation phase. At this point, fewer financial articles were published until 2021.

Table 2. Main Information about data

Description	Results
MAIN INFORMATION ABOUT THE DATA	
Timespan	2013:2022
Sources (Journals, Books, Etc.)	290
Documents	417
Average years from publication	2,37
Average citations per document	5,597
Average citations per year per doc	1,163
References	1
DOCUMENT TYPES	
article	347
chapters	5
preprint	65
DOCUMENT CONTENTS	
Keywords Plus (ID)	55
Author's Keywords (DE)	55
AUTHORS	
Authors	930
Author Appearances	1125
Authors of single-authored documents	67
Authors of multi-authored documents	863
AUTHORS COLLABORATION	
Single-authored documents	76
Documents per Author	0,448
Authors per Document	2,23
Co-Authors per Documents	2,7
Collaboration Index	2,53

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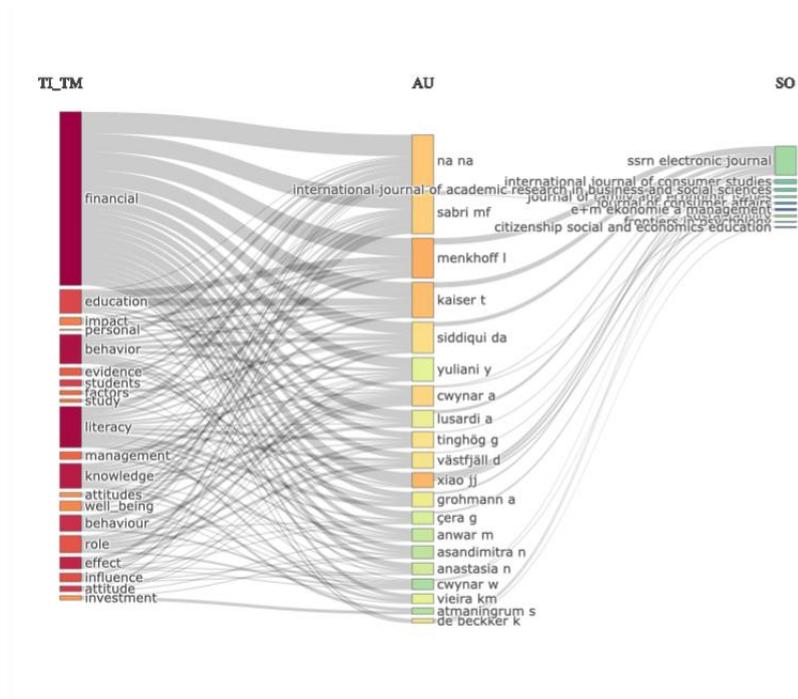

Figure 3. Three-Fields Plot
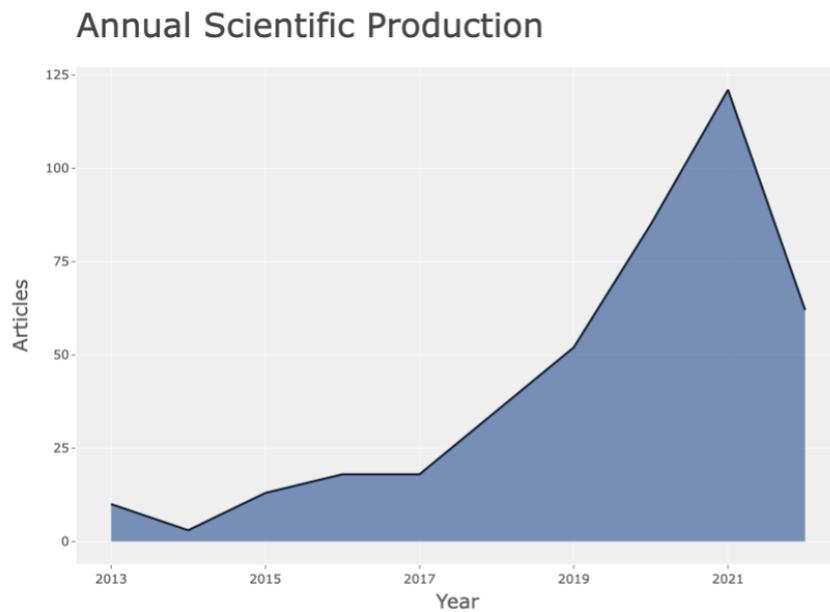

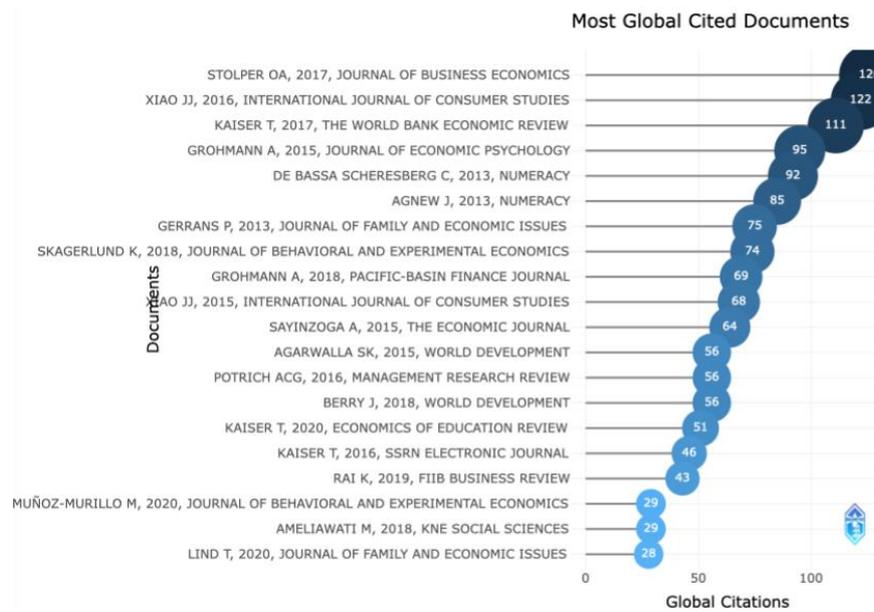Figure 4. Annual Scientific Production

Figure 5. Most Global Cited Documents

The Journal of Business Economics ranks as the most widely cited journal in the world. It ranks first when considering the overall impact of sources, as shown in Figure 6. The Journal of Consumer Studies ranks second on this list, and it shows the top 20 most influential journals (Figure 5). All these journals focus on business or consumer studies. Additionally, more literature about finance, family and consumer studies, social psychology and economics is found in these journals than any other subject matter.
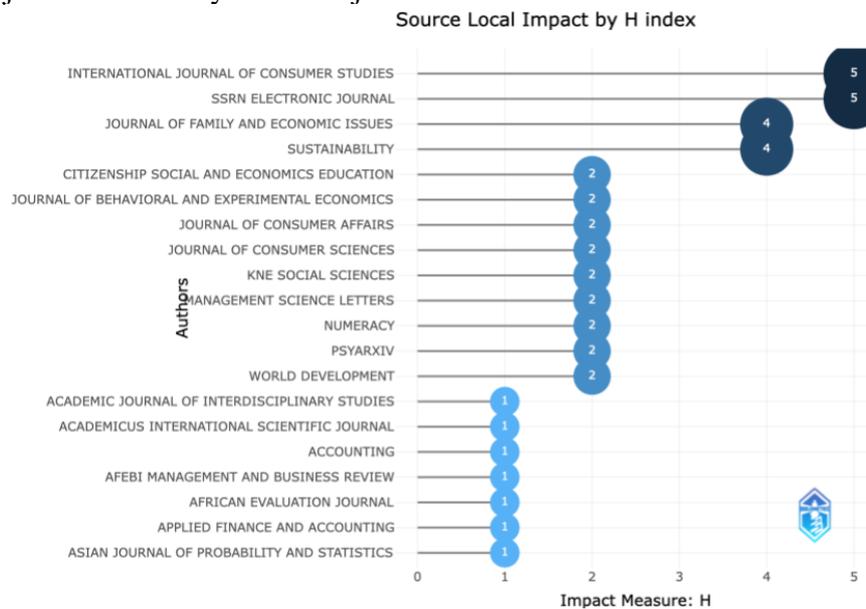

Figure 6. Source Local Impact by H Index

The figure 6 shows the 20 journals with the highest h-index. This number indicates the average quality of a journal based on the number of times it was referenced and how productive it is. The H-index is a measure of the number of journals someone publishes in that have the highest amount of articles or citations. People use it to gauge the quality and quantity of publications, as well as their impact. The H-index can indicate how many journals someone

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publishes in that have high quality or quantity, and doesn't just refer to journals that have been published a lot.
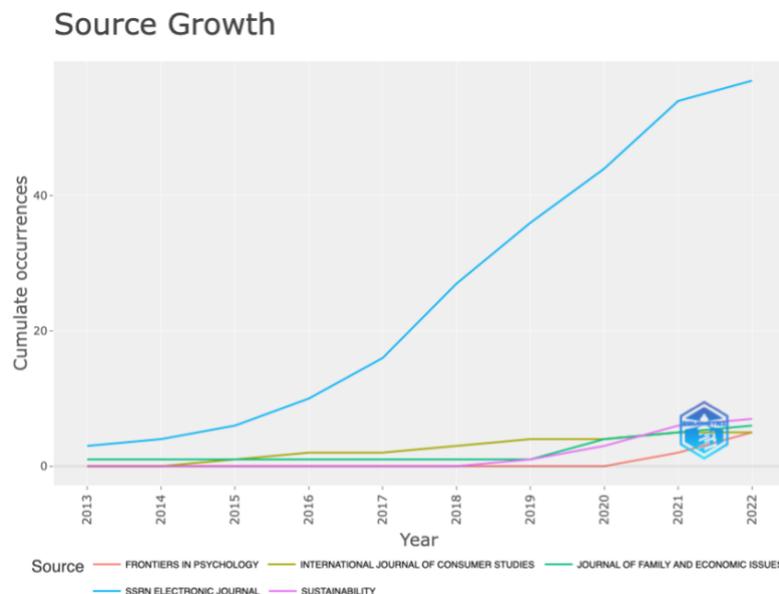

Figure 7. Source Growth

The data in Figure 7 indicates that new journals are appearing with increased frequency. One example is SSRN Electronic Journal, which saw a significant increase in publications starting in 2013. Several other journals recently increased their publication count, but not significantly. This suggests that interdisciplinary fields of research are gaining popularity and aren't being ignored anymore. Journals that focus on interdisciplinary consumer studies and marketing often appear in journals related to science — including economics, finance and other fields. Many of these journals also include journals that address topics outside of just marketing and consumer studies. This signifies the wide variety of research themes related to the field (Low & Siegel, 2019).
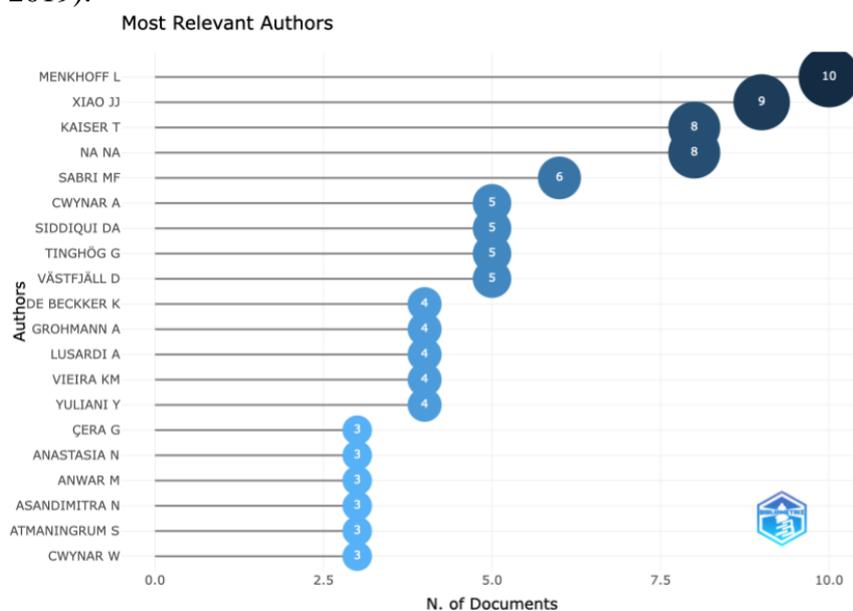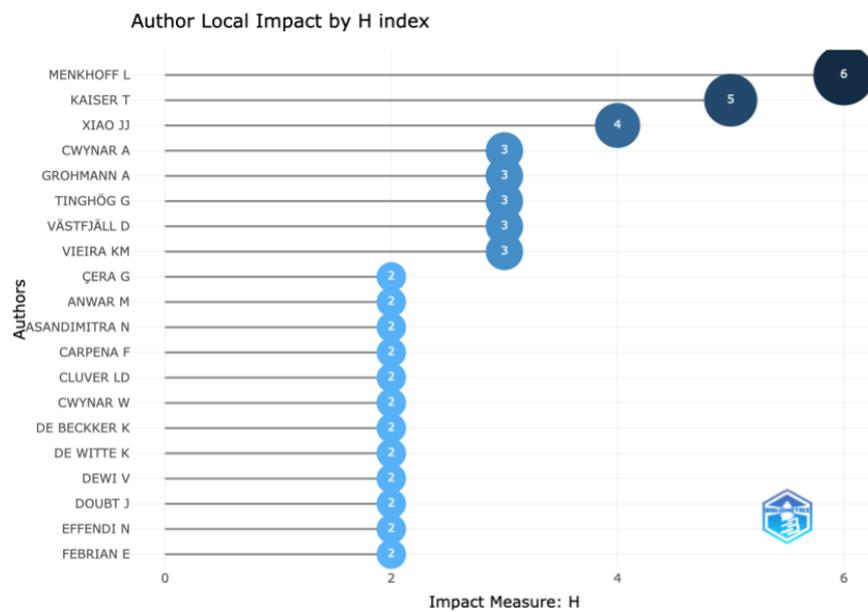

Figure 8. Most Relevant Authors

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Figure 9. Author Local Impact by H Index

Writers Menkhoff L, Xiao JJ, Kaiser T, Na Na and Sabri M.F. are the most prolific authors with maximum publicity in their field (Figure 8). The author's h-index analysis also showed that Menkhoff L and Xiao were the most impactful authors (Figure 9). These articles are essential from the perspective of future research in their field.
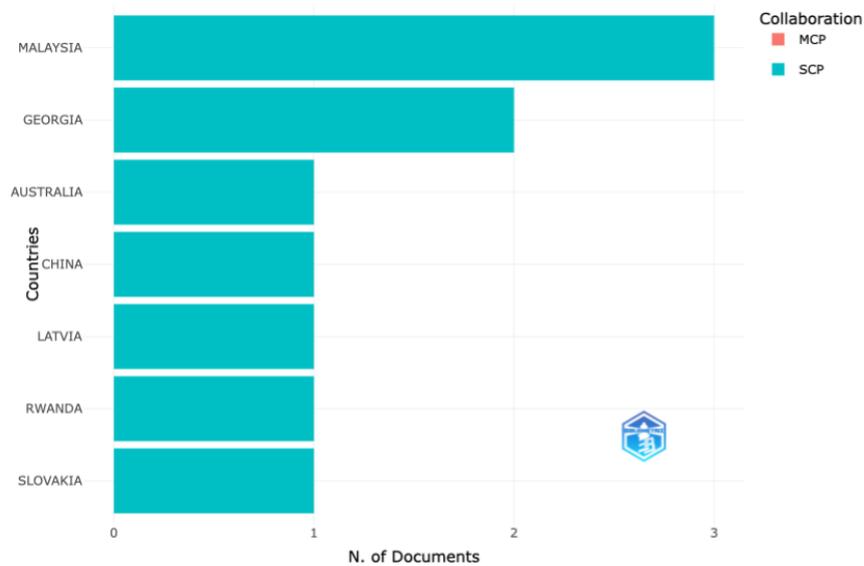

Figure 10. Corresponding Author's Country

Figure 10 lists contributions from various countries to academic research. Malaysia takes the top spot for state contributions by a large margin; second place goes to Georgia
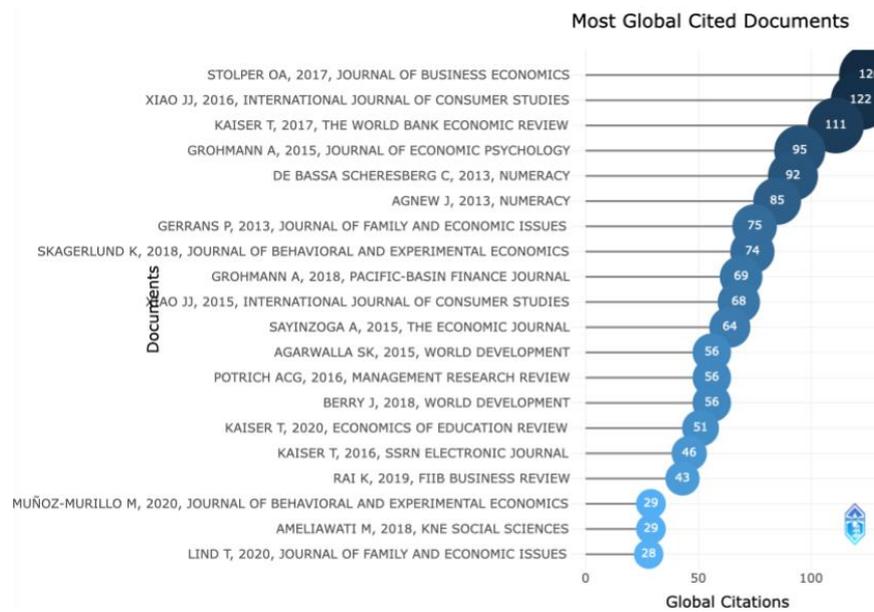
Figure 11. Most Global Cited Documents

The main reference article in the field of financial literacy is Stolper OA's Figure 11, which lists 20 most-cited documents. The second most-cited publication is Xiao JJ and Kaiser T's article on financial literacy, which also highlights its economic benefits to the public.

Figure 12. WordCloud

Keyword frequency reveals the phrase "financial literacy," which was used 1001 times in the article, is highly relevant to the document. It's followed by "financial behavior," "financial knowledge," "financial attitude," "financial education," "financial well-being," and "financial capability." Analysis of these terms shows that financial literacy appears much more frequently than financial capability. This can be seen in Figure 12, which displays a word cloud of how many words are used in a document. Financial literacy studies have increased in frequency starting in 2020. The high frequency of these studies is evident from a word cloud that explores various antecedents of financial literacy such as education and attitudes.

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Figure 13. Trend Topics

The two-dimensional Figure 13 shows the evolution of trending topics on a logarithmic scale with vertical frequency on the x-axis and the year of publication on the y-axis. Examining trends over the past 5 years reveals an interesting trend . In every year from 2013 to 2021, the main focus of the school-year calendar revolves around an area of study. This is because aptitude was the main topic in 2013, when the focus changed to immigration, veterinary care and educators in 2015. In 2019-2021, the calendar is centered on students, educators, behavior, attitude, knowledge, literacy, research and enterprise.

Figure 14. Co-occurrence Network

Data in Figure 14 reveals two clusters highlighted in blue, and red. Distant relationships indicate that the two groups interact with one another; the size of each node indicates the magnitude of an event and word shape indicates the focus of a study or behavior. Finance and literacy intersect in the red cluster, whereas blue emphasizes learning and behavioral patterns.
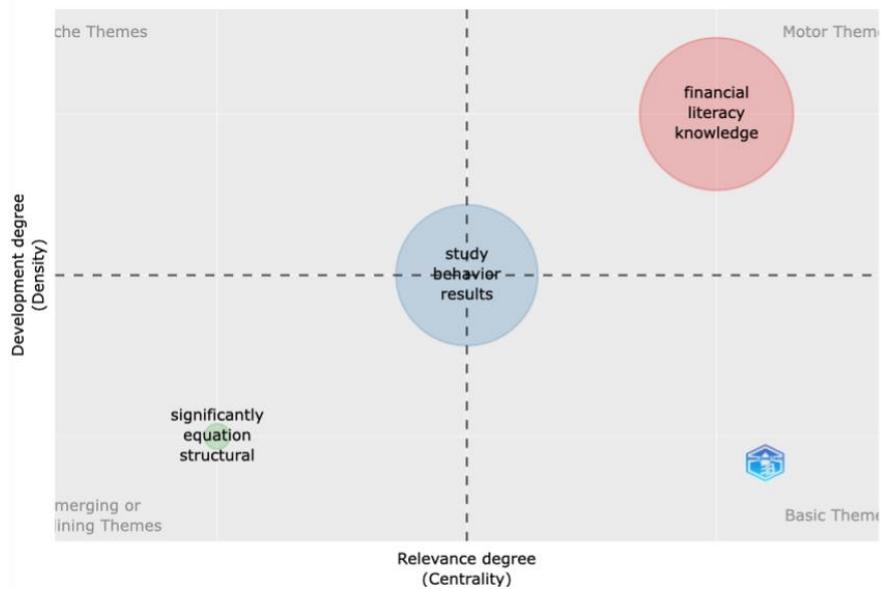
Figure 15. Thematic Map

On the graph, financial literacy knowledge and results of study behavior can be seen plotted as bubbles. These themes extend across the top right section of the graph, where financial literacy is the core subject matter and one of the most discussed topics. Results from studying behavior help determine what students learn and can be seen in the lower left section of the graph. The theme of "study behavior results" appears in the middle of the chart, indicating that behavioral research involving a specific area is important. The lower left corner indicates that the theme of "significantly equation structural" is underdeveloped and not critical.
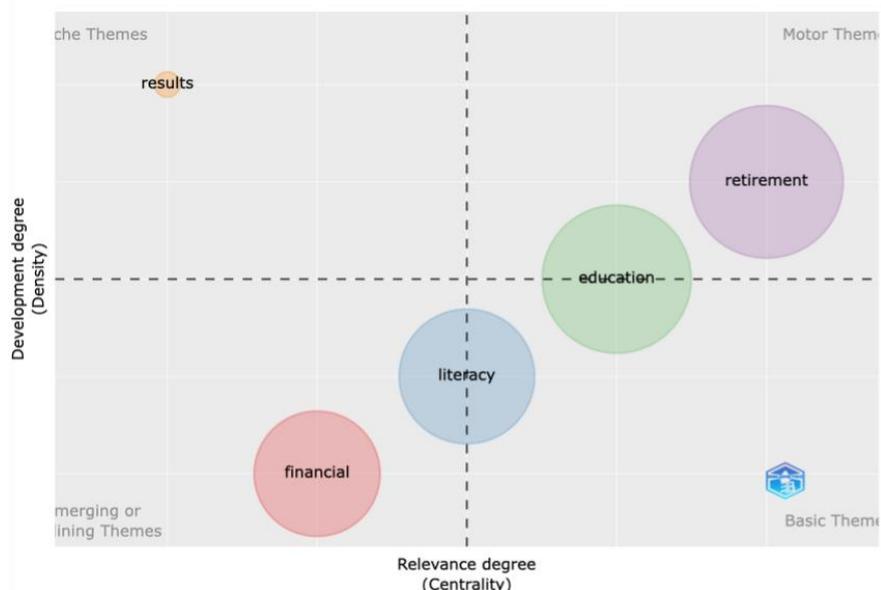

Figure 16. Thematic Map-Time Slice 1 (2013-2020)

The data analyzed determined that "Financial" was a basic motor theme. However, it was determined that "Education" and "Results" were emerging themes. The data also found that "Gender" was a niche theme that started to develop during the period of 2021 to 2020. This period was driven by the financial industry, which took center stage with the release of covid-19. Retirement soon became a major focus and eventually merged into the education theme. In

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2022, financials emerged as the primary theme being studied. They've since grown to be one of the most prominent themes in the field. The central focus of financial literacy is the merging of sub-topics. These include education, money, and retirement. There is a shift in how financial literacy is approached from simply studying finance to understanding behaviors that lead to financial knowledge. This approach combines several subtopics to create a cohesive whole.
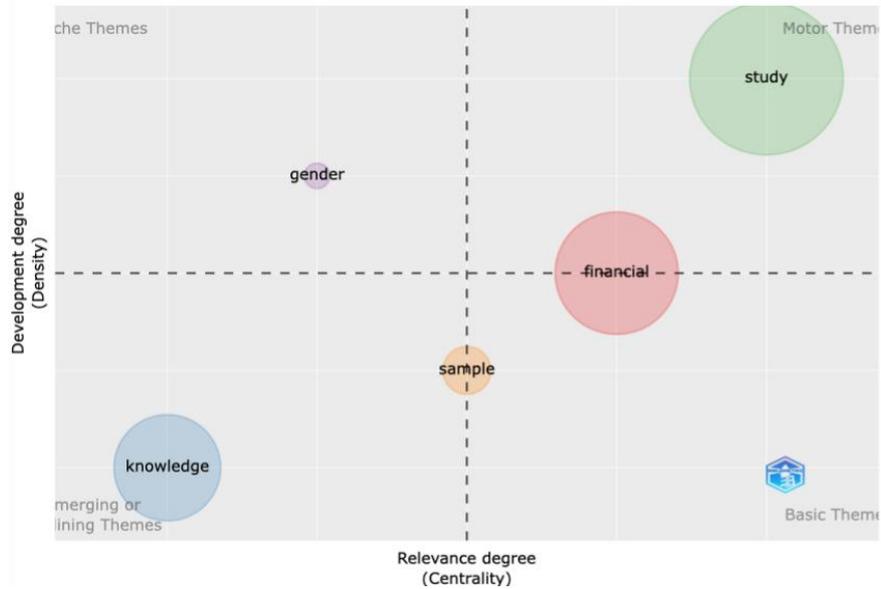

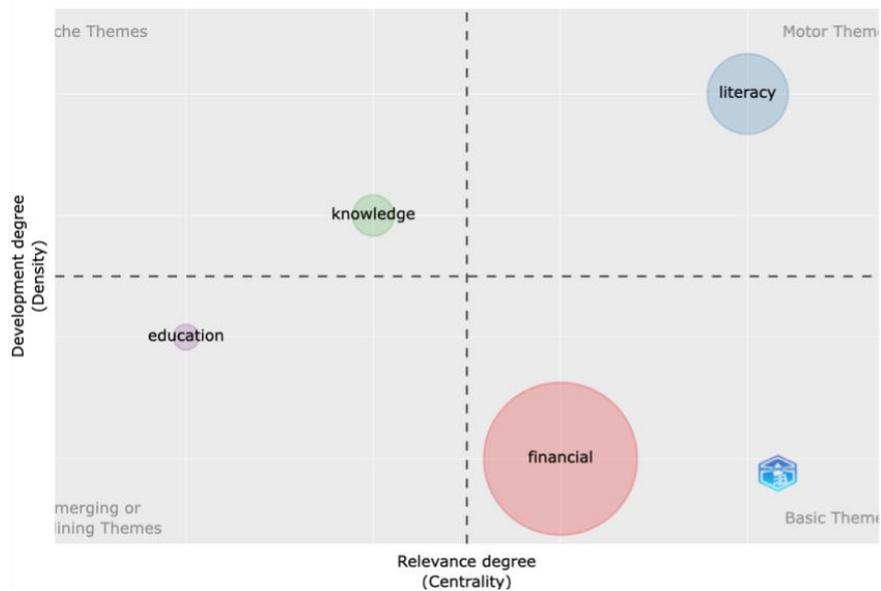Figure 17. Thematic Map-Time Slice 2 (2021-2021)

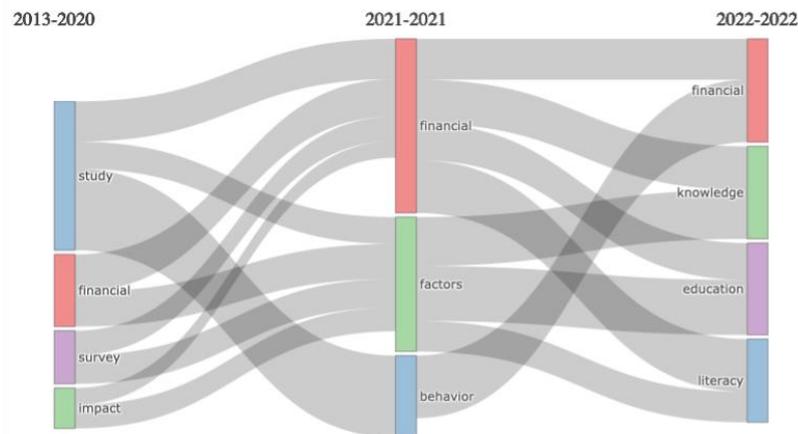Figure 18. Thematic Map-Time Slice 3 (2022-2022)

Figure 19. Thematic Evolution

Thematic evolution.

This scientific research method uses the themes of evolution to divide the time frame into individual slices. The specific time frames used in this method are 2010 and 2015, with a minimum cluster frequency of 5 and a plus keyword field containing at least 100 words (Chen et al., 2019). This method was used in a study by dividing 100 years into 3 slices, with 2010 being the smaller cut point and 2015 the larger one (Figure 16; 17 & 18). This method helps researchers better understand evolution by focusing on research areas based on the density and centrality of specific keywords and fields (Della Corte et al., 2019).

Intellectual Structure

Co-existing with the intellectual structure is a commentary on how various authors and research groups collaborate with the state. Both commentaries draw extensive attention to research fraternities and the institutions they associate with. This process is evident through the analysis of quotations and their development over time (Cobo et al., 2011); (Mendes et al., 2017).
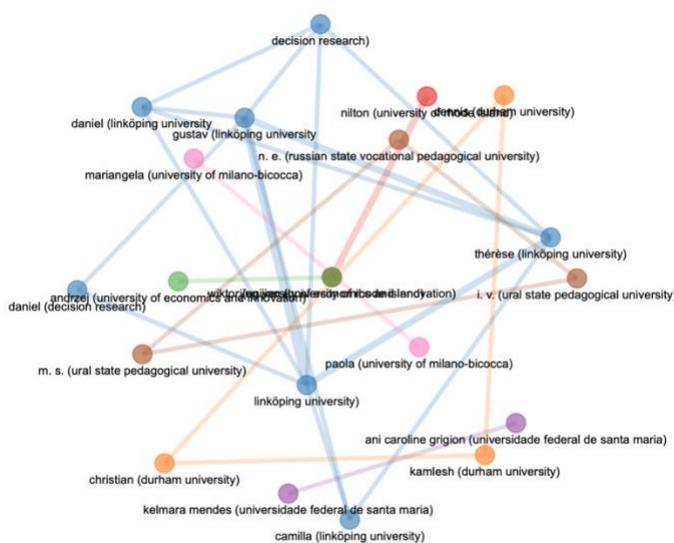
Figure 20. Co-citation network - papers

Social Networks Analysis is a way to get connections between different research topics. This process involves gathering nodes, which are sources such as institutions or authors, in a network. Once gathered, the network dynamics can be seen through bindings that connect these nodes together. Low & Siegel, 2019)

Figure 20's collaboration network shows Linkoping University leading the pack with the most inter-institutional cooperation.

Conclusion

This presentation details changes to the financial education and behavior areas from 2013 to 2022. It also examines the research topic's intellectual, social, and cultural foundations. The study's main achievement is a de-constructed list of notable sources, authors and documents in the financial field. The R-package Bibliometrics is a flexible and easy-to-use tool for bibliometrics. It was created thanks to its user-friendly features and adaptability. The Dimensions database, which houses quality research sources, was used to create the dataset for this study. The data shows that by 2022, financial focused themes had become very popular in the academic research world.

Understanding existing knowledge requires an interdisciplinary approach. Therefore academic and professional publications draw from many different domains. They include business, family and consumer studies, social psychology and economics. The study determines creative trends by analyzing the countries and sources of each author; their collaboration with the theme; and the number of publications, research and sources each author utilized. The insights gained from this analysis can be applied toward creating financial education programs, improving current policies, or even creating new policy policies. Understanding the issues facing these industries motivates professionals to improve their work. This includes financial advisors, bankers, and financial planners— as well as anyone else in related fields.

This paper promotes and builds on a growing body of research in its subject matter. It investigates how people understand and interact with financial literacy, as well as how financial behavior impacts other aspects of life. This information can help many groups with future studies regarding financial literacy, finance, or policy creation regarding the subject. These groups can include policymakers, experts, practitioners, and researchers who look to current literature for answers and inspiration.

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