



Visualization and bibliometric analysis on the research of financial well-being

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ABSTRACT

Financial well-being using a bibliometrics analytical approach to analyze the networks, clusters, and trends of scientific production is studied. This research uses a systematic literature review process, which is a step-by-step process-driven methodology, to find 327 articles published between 1978 and 2021 on the subject of financial well-being. This paper applies the bibliometrics method to investigate the research trends in the study of financial well-being, specifically analyzing the quality of the research by the citation status and the mutual influence of these articles. The results of the study provide an overview of citation trends on financial well-being such as the most cited papers and the network of these papers, the keyword distribution, the co-authorship status, bibliographic coupling analysis, and the most influential journals. This study tries to determine the trends and development of financial well-being research. This can help researchers attain a comprehensive understanding of this field and can be a reference for the application of financial well-being visualization approaches.

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1. Introduction

Financial well-being is a relatively new topic for research and has gained a lot of increasing attention in recent years. Financial well-being is a state that allows a person or entity to absorb financial shocks and have the financial freedom to make financial decisions to enjoy life. Financial well-being is an abstract concept being used to explain a financial situation. Initially, financial well-being is perceived as satisfaction or happiness towards financial situations (Kim et al., 2003). Past studies have demonstrated that financial well-being is determined by socioeconomic characteristics such as income, age, financial literacy, education, marital status, and financial management.

Financial well-being is the ability to meet the needs and responsibilities of a current lifestyle and to maintain it in the future (Brüggen et al., 2017). There are no generally accepted definitions of financial well-being, but recent studies support the simple and comprehensive definition developed by Brüggen et al. (2017). Financial well-being has a

large impact on the health of an individual's life. Therefore, an improved understanding of the causes of financial well-being is needed for increasing overall well-being. Financial well-being is one of the elements of well-being besides physical, career, community, and social well-being. Changes to a standard of living, diseases, uncertainty, the variety of commitments, and stress levels can impact an individual's financial well-being.

Financial well-being has always been an attractive and interesting topic for many researchers internationally, who use various research approaches. However, there has been no study using the bibliometrics method to analyze trends in financial well-being. This study aims to investigate the relationship between these research outputs and research trends in financial well-being over the period from 1978 to 2021 by analyzing networks and growth in related articles and journal citations, keyword distribution, and other bibliographic couplings. The paper presents some outstanding findings in regard to research trends in the financial well-being domain. These findings can propose ideas for subsequent research and create valuable references for financial well-being visualization methods.

2. Literature review

Various research topics have been studied in the financial well-being domain. Recent literature on

financial well-being includes, for example, the research of [Chavali et al. \(2021\)](#) using the FMBS (Financial Management Behaviour Scale) to measure financial well-being ([Dew et al., 2012](#)). The results of this study showed that factors such as savings, future security, investments, credit indiscipline, and financial consciousness had a significant impact on the financial well-being of individuals in India. [Soepding et al. \(2021\)](#) analyzed the role of social capital and risk management on the financial well-being of Nigerian retirees. The results showed that maintaining good social capital and individual risk management had a positive impact on promoting the financial well-being of retirees in Nigeria. [Nanda and Banerjee \(2021\)](#) analyzed data from 128 articles on the subject of financial well-being published between 1978 and 2020. This research used the SLR (Systematic Literature Review) process as methodology. The results indicated that factors affecting the consumer's financial well-being include: (i) macro-level factors; (ii) bank information transparency; (iii) consumer co-production behavior; (iv) consumer financial literacy; (v) financial inclusion; (vi) personality, and (vii) spending self-control.

Financial well-being has been widely analyzed from different perspectives, such as economics, psychology, financial counseling, or consumer behavior ([Brüggen et al., 2017](#)). However, the prior studies do not provide a unified definition of financial well-being; such studies have developed and used various measures of financial well-being without actually defining it ([Guo et al., 2013](#); [O'Neill et al., 2005](#); [Prawitz et al., 2006](#)). The prior studies measure financial well-being by using different objective characteristics such as income, financial situation, socio-demographic characteristics, and investment performance or their level of debt. People assess their financial well-being depending on their point of view or highly individualized benchmarks for comparison, such as socio-demographic characteristics, financial situation, and their life stage. People with similar financial well-being may have different sociodemographic characteristics ([Malone et al., 2010](#)).

In this study, financial well-being, which represents an individual's financial status, has been used to describe financial freedom and the ability to maintain current and anticipated living standards and life satisfaction overall. Financial well-being depends on each person's subjective perceptions.

Bibliometrics is the application of statistical methods to produce analysis and trend identification of scientific products such as books, articles, and other publications ([Diem and Wolter, 2013](#)). The Bibliometrics method has been widely applied in many fields. Bibliometric analysis is applied in this paper as a useful quantitative tool to map the trend of knowledge production.

The rest of this study is organized as follows: Section 3 illustrates the data sources and methods used in this study. Section 4 shows the results in detail, including the trends in citations and

publications on financial well-being, the keywords analysis, the co-citation analysis, the country co-authorship analysis, and bibliographic coupling. Section 5 summarizes the whole paper in a conclusion.

3. Research method and materials

In order to visualize and bibliometric analysis of financial well-being, this study uses science mapping and visualization techniques. In this paper, the data was retrieved from 327 articles from Scopus, which provides robust and inclusive source data. The research phrase "financial well-being" was employed and results were sought from 1978 to 2021. The topic "financial well-being" was refined by Scopus to the "Economics, Econometrics and Finance" and "Business, Management, and Accounting" categories, with English being the language employed and the document type being articles.

There is much software to facilitate bibliometric analysis such as VOS viewer, CiteSpace, and GraphPad Prism. VOS Viewer developed by the Centre for Science and Technology Studies, Leiden University, Netherlands, has many functions in terms of creating networks with data collected from Scopus, Web of Science, or Google Scholar such as co-authorship networks, citation-based networks, and co-occurrence networks ([Van Eck and Waltman, 2010](#)). VOS viewer also helps users to visualize the networks with many styles like density visualization, timeline view, or link-strength visualization. In this study, VOS viewer is used for constructing and visualizing bibliometric networks from the data collected with the "financial well-being" topic.

4. Results and discussion

This section presents the results and the discussion of this paper in detail. It is divided into five further sections: The status of citation trends and publications on financial well-being, keyword analysis, cocitation analysis, country co-authorship analysis, and bibliographic coupling on financial well-being.

4.1. The status of citation trends and publications on financial well-being

In this section, we discuss the trends in citations about "financial well-being" and the distribution of the related citation networks.

Citation quantity is an important element used to evaluate the quality of a paper. This study selects the top 15 papers with the most citations from a total of 327 collected articles to investigate the most influential articles on the topic of "financial well-being." [Table 1](#) shows the most productive and highly cited papers on the topic in terms of authors and publication year. From 2000 to 2010, there were four papers in this list and eleven papers between 2010 and 2021. These 15 articles were cited 3,064

times. The most cited article was written by [Carroll and Shabana \(2010\)](#); it has 1,401 citations, which account for 46% of the citations of these 15 articles. The paper of [Mead et al. \(2011\)](#) has the second-highest number of citations with 245 citations. The work of [Prawitz et al. \(2006\)](#), which occupies the third position with 201 citations.

Furthermore, cooperation among multiple authors has been becoming more popular. The most influential articles with the highest citation quantity were written by more than one author.

Table 1: Top 15 productive and highly cited scholars

Rank	Author	Citations
1	Carroll and Shabana (2010)	1401
2	Mead et al. (2011)	245
3	Prawitz et al. (2006)	201
4	Argenti and Druckenmiller (2004)	166
5	Barber and Odean (2013)	134
6	French et al. (2010)	129
7	Garðarsdóttir and Dittmar (2012)	112
8	Gutter and Copur (2011)	101
9	Brüggen et al. (2017)	99
10	Kim et al. (2003)	94
11	Netemeyer et al. (2018)	84
12	Meier and Sprenger (2013)	79
13	O'Neill et al. (2005)	75
14	Malone et al. (2010)	73
15	Donnelly et al. (2012)	71

Source: Scopus database accessed April 10, 2021

Additionally, the VOS view can create a visualization map that illustrates the networks and the popularity of the articles. [Fig. 1](#) illustrates the networks between the articles on the topic of “financial well-being.” In [Fig. 1](#), the size of the node and the word shows the weight and the importance of the item that it represents. The link between two nodes refers to the frequency of the citation; the space between two nodes represents the strength of their relationship and the node’s color represents the cluster to which that node belongs.

As can be seen from the map, the publications are divided into 13 clusters. [Nanda and Banerjee \(2021\)](#) have the most links to other articles, with 80 links. The study of [Prawitz et al., \(2006\)](#) stays in second place with 31 links, and [Gutter and Copur \(2011\)](#) stay in third position with 26 links. These are the three most popular articles in this research domain; the rest of the papers in this list have less than 20 links between them.

[Table 2](#) shows the most influential journals with the highest numbers of citations. The International Journal of Management Reviews is the most popular, with 1,401 citations. This is also the journal that published the most frequently cited articles such as those of [Carroll and Shabana \(2010\)](#).

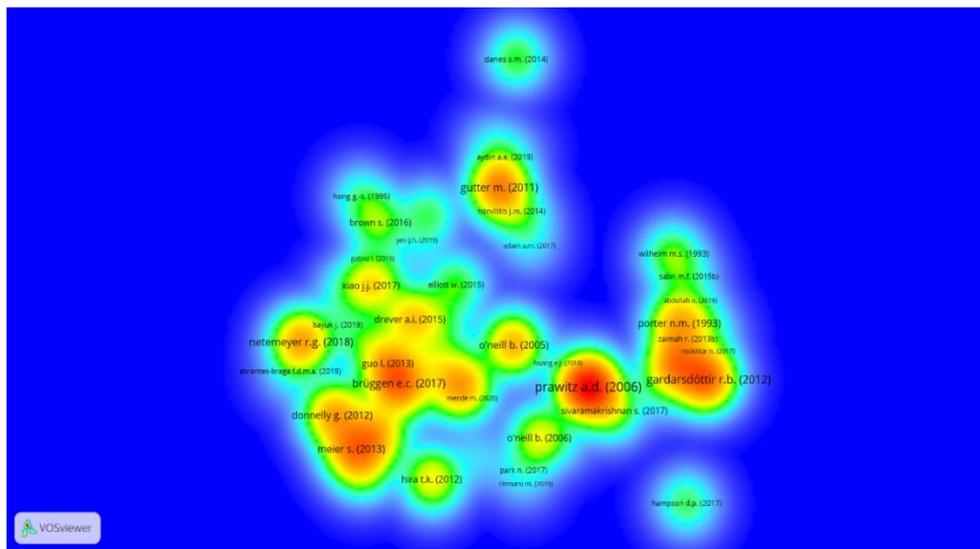


Fig. 1: Visualization map of citation network

Table 2: Top 10 journals with the highest number of citations

Rank	Source	Documents	Citations
1	International Journal of Management Reviews	1	1401
2	Journal of Financial Counseling And Planning	29	692
3	Journal of Consumer Research	3	381
4	Journal of Family And Economic Issues	14	280
5	Journal of Economic Psychology	6	255
6	Journal of Consumer Affairs	16	236
7	International Journal of Bank Marketing	16	192
8	Corporate Reputation Review	1	166
9	Journal of Service Research	5	147
10	International Journal of Consumer Studies	10	141

Source: Scopus database accessed April 10, 2021

4.2. The keywords analysis on the “financial well-being” topic

In this section, the citation trends and publications on “financial well-being” will be

analyzed based on the distribution of related keywords. Such distributions can illustrate the core idea of an academic paper ([Li et al., 2016](#)). VOS viewer is utilized to illustrate the co-occurrence

network map, the keywords density map, and the keywords timeline review.

Keyword co-occurrence analysis can draw an overall picture of the trends and relationships of

articles related to the topic of “financial well-being.” Fig. 2 illustrates the keyword co-occurrence network created from VOS viewer software. In Fig. 2, six separate colors illustrate six clusters of keywords.

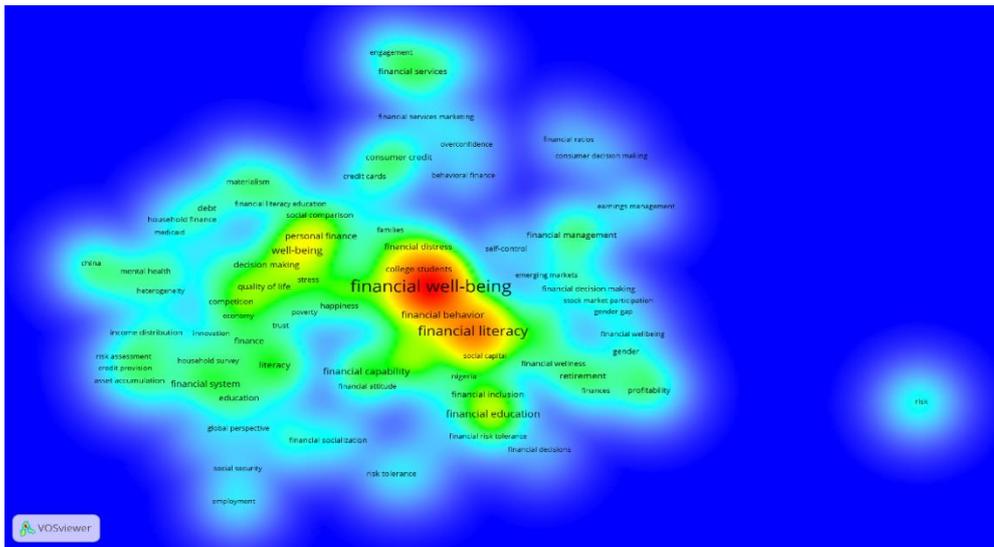


Fig. 2: Keywords co-occurrence network of financial well-being-related publications

Each node’s size represents its weight. The keywords “financial well-being,” “financial literacy,” “well-being,” “financial education” and “financial behavior” have the biggest nodes, showing that these are the most popular keywords. This can also be observed more clearly in Table 3, which shows the 20 most popular keywords in the “financial well-being” domain. The “financial well-being” keyword appeared 89 times in the total of 910 related keywords; “financial literacy,” “well-being,” “financial education,” and “financial behavior” appeared 49 times, 16 times, 14 times, and 11 times respectively. The node “financial well-being” has thicker and shorter lines connecting to “financial

literacy,” “financial education,” “financial behavior” and “financial knowledge,” which shows that the co-occurrence of these keywords is most frequent. Additionally, the total link strength of a node is the sum of the link strengths that the node has with all the other nodes. “Financial well-being” has the highest total link strength (165); this illustrates the most frequent co-occurrence with the other keywords. “Financial Literacy” is in second place with a total link strength of 108; the “well-being,” “financial education,” “financial behavior,” “financial capability” nodes all have total link strengths greater than 30.

Table 3: Top 20 keywords of the financial well-being-related publications

Rank	Keyword	Occurrences	Total link strength
1	Financial Well-Being	89	165
2	Financial Literacy	49	108
3	Well-Being	16	36
4	Financial Education	14	30
5	Financial Behavior	11	34
6	Financial Capability	10	37
7	Financial Knowledge	10	30
8	Personal Finance	9	16
9	Financial Planning	8	16
10	Financial Stress	8	25
11	Literacy	8	38
12	Financial System	7	41
13	Retirement	7	14
14	College Students	6	16
15	Financial Behaviour	6	23
16	Financial Counseling	6	16
17	Financial Management	6	12
18	Financial Satisfaction	6	12
19	Quality of Life	6	12
20	Consumer Credit	5	7

Source: Scopus database accessed April 10, 2021

Fig. 3 represents the keyword timeline review. It can be seen that before 2012, the research on the topic of “financial well-being” was limited and the keywords of that period concentrated on the words

“financial problems,” “financial planning” and “retirement.”

From 2016, the research in this domain evolved, with various keywords that concentrated more on

the globalization trend emerging at that time. Such words included “financial well-being,” “financial literacy,” “financial behavior,” “financial knowledge,” and “financial capability.” After 2018, the concentration on the research area decreased, with

fewer keywords appearing included “financial self-efficacy,” “consumer behavior,” “emerging markets,” “financial attitude,” “financial risk tolerance,” “policy approach,” and “South Africa.”

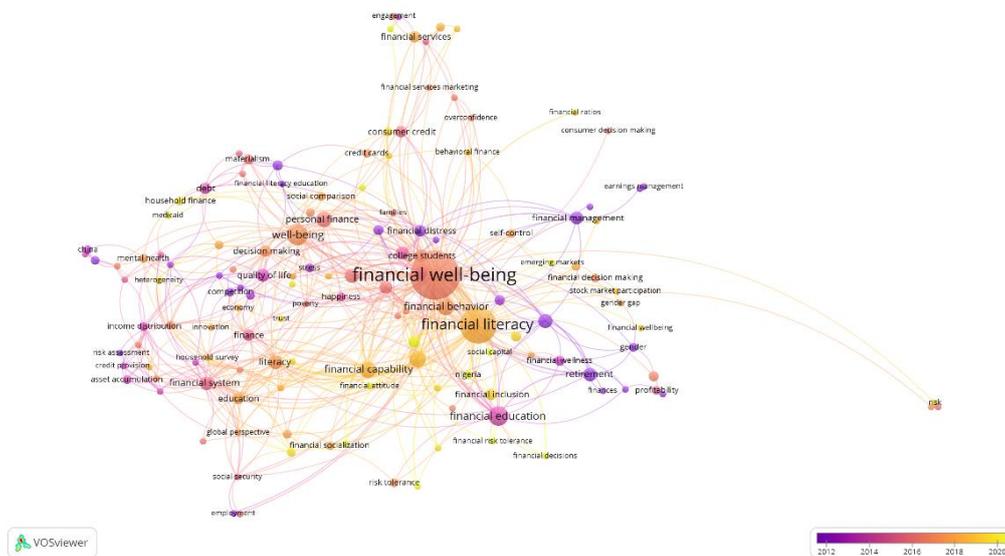


Fig. 3: The keywords timeline view of financial well-being-related publications

These statistical analyses imply the relationship between financial well-being and financial problems, financial knowledge, financial self-efficacy, financial attitude also shows the mutual impact of these factors in this research domain. Additionally, from 2018, the growth of paper publication has been significant and concentrated with more topics related to financial self-efficacy, emerging markets, financial attitude, financial risk tolerance, and South Africa.

4.3. The co-citation analysis of financial well-being-related publications

Co-citation is when two or more articles are cited in the same reference list of another article. When measuring the co-citation strength, we can investigate the degree of the relationship between the co-cited papers with regard to core content, research methods, results, and even authors in a specific domain.

Co-citation analysis was conducted on 1000 cited references with the highest citation numbers. The co-citation pattern and journal sources results are presented in Table 4 and Fig. 4.

The results show that the papers of Lusardi and Mitchell (2014), Shim et al. (2009) and Huston (2010) are the top articles with the highest total link strengths in co-citations with the other cited references.

In Fig. 4, the network is divided into five co-citation clusters which together demonstrate the trends in co-citation. The yellow cluster represents the co-citation network in financial well-being with marketing and business areas. The blue cluster also

illustrates the co-citation network in economic psychology for the effects of financial well-being on the financial market. The purple cluster shows the co-citation network in research on consumer behavior and financial well-being. The green cluster shows the co-citation trend in research on financial status and financial well-being. The largest and most central cluster, which is red, represents the co-citation network of external factors on financial well-being.

Table 4: Top 10 papers with the highest total link strengths in co-citations with other cited reference

Rank	Author	Citations	Total Link Strength
1	Lusardi and Mitchell (2014)	15	36
2	Shim et al. (2009)	15	28
3	Huston (2010)	12	27
4	Brüggen et al. (2017)	14	24
5	Fernandes et al. (2014)	10	24
6	Lusardi and Mitchell (2007)	14	22
7	Gutter and Copur (2011)	10	19
8	Gerrans et al. (2014)	11	18
9	Chen and Volpe (1998)	8	16
10	Lusardi et al. (2010)	8	16

Source: Scopus database accessed April 10, 2021

4.4. The country co-authorship analysis on financial well-being

In this section, co-authorship analysis is used to understand and assess scientific collaboration patterns by country on the subject of “financial well-being.”

Fig. 5 and Table 5 illustrate co-authorship in relation to 55 countries that are categorized within four clusters; the total link strength is 44,904.

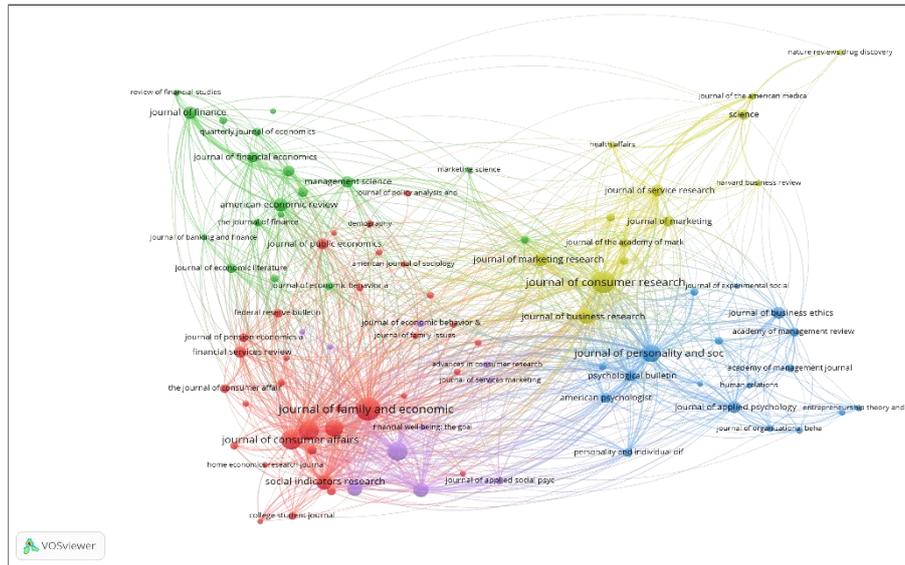


Fig. 4: Co-citation pattern and journal sources

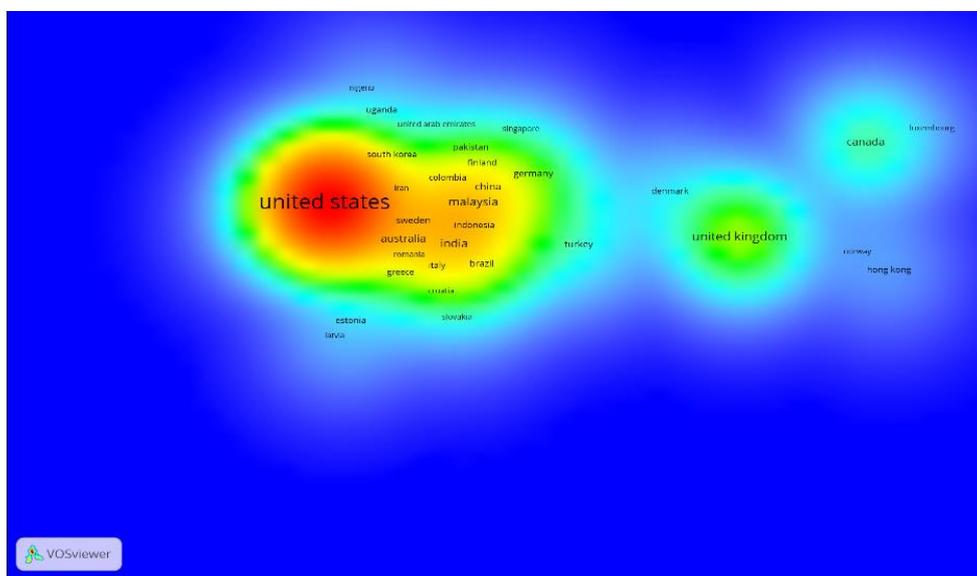


Fig. 5: Bibliographic coupling of co-authorship by country

The United States has the most productive output with 4,695 citations and 11,160 links, followed by the United Kingdom with 464 citations and

Netherlands with 451 citations. New Zealand has the fewest citations in studies of the “financial well-being” topic.

Table 5: Top 10 countries with the most publications on financial well-being

Rank	Country	Documents	Citations	Total Link Strength
1	United States	171	4695	11160
2	United Kingdom	27	464	1949
3	Netherlands	6	451	1952
4	Canada	13	326	1062
5	Sweden	6	177	1575
6	Turkey	7	152	1386
7	Iceland	2	116	351
8	Germany	7	114	1615
9	Australia	13	103	1450
10	Finland	2	100	1154

Source: Scopus database accessed April 10, 2021

4.5. Bibliographic coupling

Bibliographic coupling is a method that uses citation analysis (such as co-citation analysis) to examine a relationship between articles in a specific domain. Bibliographic coupling occurs when two studies cite the same third study in their

bibliographies, which indicates the possibility that the two studies have examined a related field (Martyn, 1964). In this section, the bibliographic coupling based on authors and the bibliographic coupling based on citations and total link strength will be shown. Fig. 6 and Table 6 show the density visualization of bibliographic coupling based on

authors. It shows the overall structure and the most important domains.

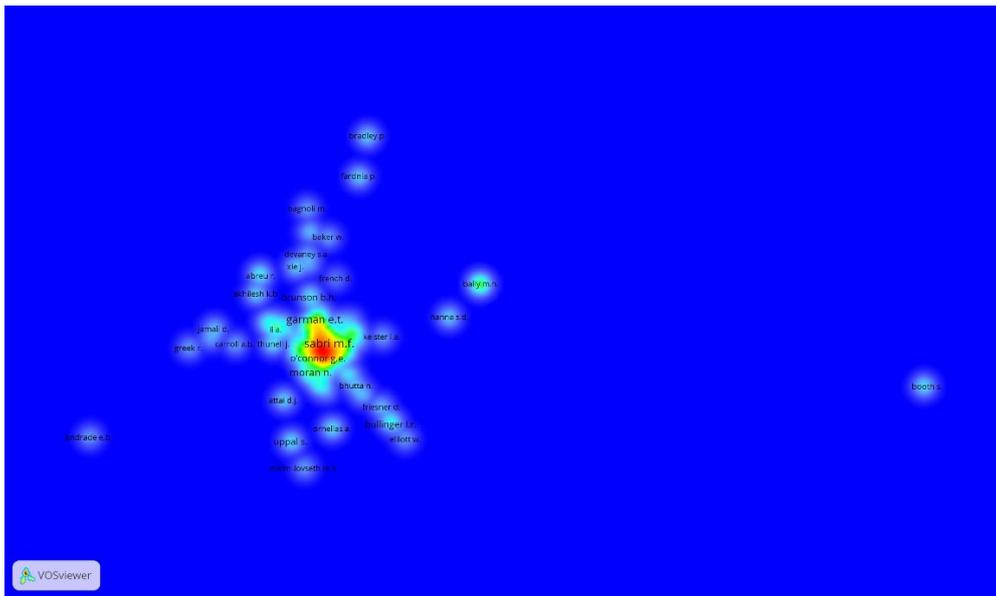


Fig. 6: Bibliographic coupling based on authors

The color of the node depends on the density of the articles that it represents. The most popular nodes appear in red and the least popular in green. It can be observed that the studies of Sabri M.F., Xiao

J.J., Mokhtar N., and O'Neill B. appear in the red area which indicates that they have the most frequent coupling. On the other hand, the papers in the green area are less frequently coupled.

Table 6: Top 10 authors with the most outputs of financial well-being-related publications in total link strength

Rank	Author	Documents	Citations	Total link strength
1	Sabri M.F.	5	42	3028
2	Xiao J.J.	5	150	2894
3	Mokhtar N.	3	20	2447
4	O'Neill B.	4	340	2377
5	Rahim H.A.	4	6	2227
6	Mendes-Da-Silva W.	3	22	2201
7	Sorhaindo B.	4	414	1916
8	Husniyah A.R.	3	20	1891
9	Banerjee R.	1	0	1881
10	Nanda A.P.	1	0	1881

Source: Scopus database accessed April 10, 2021

Table 7 shows the institutions and the strengths of the relationships between their outputs. Indiana University Kokomo, University of Georgia, Tilburg University, University of British Columbia, and Florida State University have the highest total citations in relationships with others. However,

Universiti Putra Malaysia, Virginia Polytechnic Institute and State University, University of Wisconsin-Madison, The Ohio State University, and the University of Rhode Island are the institutions with the most productive outputs (Table 8).

Table 7: Top 10 institutions with the most prominent outputs in citations

Rank	Organization	Documents	Citations
1	Indiana University Kokomo	1	1401
2	University Of Georgia	1	1401
3	Tilburg University	1	245
4	University of British Columbia	1	245
5	Florida State University	1	245
6	University of Minnesota	1	245
7	Southern Utah University	1	245
8	Incharge Education Foundation	1	201
9	Northern Illinois University	1	201
10	Personal Finance Employee Education Foundation, Inc.	1	201

Source: Scopus database accessed April 10, 2021

5. Conclusion

In this study, bibliometric analysis has been used as a useful quantitative tool to analyze the research trends of knowledge production on financial well-

being. 327 related papers were retrieved from Scopus from 1978 to 2021 and then inputted in VOSviewer to visualize the networks and distribution of the data they contained.

A number of findings were explored and discussed in this paper; they help us to draw some prominent conclusions.

Table 8: Top 15 affiliation with the most productive outputs

Rank	Affiliation	Documents
1	Universiti Putra Malaysia	14
2	Virginia Polytechnic Institute and State University	8
3	University of Wisconsin-Madison	7
4	The Ohio State University	6
5	University of Rhode Island	5
6	The University of Alabama	5
7	Fundacao Getulio Vargas	5
8	InCharge Education Foundation	4
9	Florida State University	4
10	Iowa State University	4

Source: Scopus database accessed April 10, 2021

Firstly, by analyzing the research citations and keywords, it can be concluded that there is a strong relationship between financial well-being and financial problems, financial literacy, financial knowledge, and financial self-efficacy. The main keywords that show the publication of future trends in financial well-being research used in research are “financial self-efficacy,” “consumer behavior,” “emerging markets,” “financial attitude,” “financial risk tolerance,” “policy approach,” and “South Africa.”

Secondly, in the co-citation analysis, we noted that there is a relationship between co-cited papers in five clusters with regard to core content, research methods, results, and authors. The relationship can be seen from the studies of external factors on financial well-being; the studies in economic psychology that are related to the effects of financial well-being; the research models and methods used in studies of financial well-being with marketing and business areas; and the studies in consumer behavior and financial well-being.

Thirdly, based on the results of the country co-authorship analysis, this paper can conclude that the trend in cooperation among multiple countries is especially noteworthy. Many top papers were conducted through cooperation between authors from more than one country. Such countries included the United States, United Kingdom, Netherlands, Canada, and Sweden. Additionally, the trend in cooperation among multiple authors in the field of financial well-being research has been becoming more widespread. The most highly cited papers had more than one author.

Although this paper has produced several interesting results through the bibliometric analysis of publications related to financial well-being, it has some drawbacks. All of the papers in the database that were retrieved from Scopus were written in English. Therefore, popular and influential papers in other languages have not been taken into account, which may mean that our conclusion about research trends is incomplete and somewhat misleading.

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Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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