

Financial Literacy: A Bibliometric Literature Review

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Abstract

This research analyzes the evolution of financial literacy literature. Specifically, the study performs bibliometric analysis to examine the descriptive, intellectual, and conceptual structure of financial literacy research. This bibliometric analysis covers the period between 1963 and 2021, and is based on 4 489 articles retrieved from two databases: Web of Science and Scopus. The findings illustrate certain keywords that emerged between the two periods, and reveal that financial literacy research has not yet reached maturity.

Keywords: Financial literacy, Bibliometric analysis, Intellectual structure, Conceptual structure, Web of Science, Scopus, R package, VOSviewer, Triangle inequality.

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1. Introduction

For example, Lusardi and Tufano (2015) define FL as “the ability to make simple decisions regarding debt contracts, in particular how one applies basic knowledge about interest compounding, measured in the context of everyday financial choices.” For Bhushan and Medury (2013), FL refers to the capacity to take adequate decisions about using money. In this research, we retain the definition proposed by the Organisation for Economic Co-operation and Development in 2014 and used by many scholars since (e.g., Goyal and Kumar, 2021), which states that the FL is “knowledge and understanding of financial concepts and risks, and the skills, motivation and confidence to apply such knowledge and understanding in order to make effective decisions across a range of financial contexts, to improve the financial wellbeing of individuals and society, and to enable participation in economic life.”

Despite the growing popularity of the FL concept and many reviews of this concept in the literature, as well as the work conducted by many countries, individual persons are still having difficulties in making the right financial decisions (Gallego-Losada et al., 2021). In this regard, in the recent survey made by the Canada Life Assurance Company, only 41% of the respondents argue that they have a high level of confidence in their financial knowledge.

To better understand the FL concept, certain scholars have realized systematic literature reviews (e.g., Huston, 2010; Remund, 2010) or they reviewed some consequences of FL (e.g., Fox et al., 2005; Hastings et al., 2013; Santini et al., 2019), as well as reviews of some antecedents of this concept (e.g., Van Campenhout, 2015; Montalto et al., 2019; Santini et al., 2019; Steinert et al., 2018). Except meta-analysis conducted by a limited number of authors (e.g., Miller et al., 2014; Santini et al., 2019) studying the impact of FL, reviews on this concept are qualitative and are based on the authors' views. Very few reviews focusing on the intellectual or/and conceptual structure evolution of the FL concept are quantitative and objective in the literature. Specifically, to the best of our knowledge, one study, Goyal and Kumar (2021), has used bibliometric analysis to explore the structure of knowledge (e.g., most influential authors), the conceptual structure, and the intellectual structure of FL. This research covered the 2000–2017 period, and retrieved 502 articles from Web of Science (WoS). The authors detected three main themes: 1) FL amongst distinct cohorts, 2) influence of FL on financial behavior and planning, and 3) the influence of financial education. They also identified some emerging themes like financial inclusion, financial capability, gender gap, tax and insurance literacy, and digital financial education. However, Bedi et al. (2019) analyze 2,096 papers from the Scopus database for the time period between 1964 and 2017 to explore only the structure of FL. The authors highlight that despite the increase of publication, the FL literature is still immature. In addition, some other scholars have recently employed bibliometric analysis regarding the FL field (e.g., Gallego-Losada et al., 2021; Ingale and Paluri, 2020; Abad-Segura and González-Zamar, 2019; Tomar et al., 2021).

The Goyal and Kumar (2021) study includes at least two limitations. First, the authors consider only articles in the WoS database. Second, the content analysis performed by the authors analyzes only ABCD-ranked journal articles between 2016 and 2019 (175 from 502 papers). The first limitation is important because prior scholars (e.g., Echchakoui, 2020; Escalona et al., 2010; Mongeon and Paul-Hus, 2016) have stated the importance of including the two databases. For example, Echchakoui (2020) showed that using only Scopus or WoS cannot give an adequate view of tendencies and knowledge in a specific field. The reason is that those databases are complementary even if they are correlated (Escalona et al., 2010). For this reason, Mongeon and Paul-Hus (2016) recommend that both the databases should be used in bibliometric analysis. The second limitation is also critical, because as we show in this paper, the research for FL began in 1963, so not considering articles between 1963 and 2016 will very probably not give a real picture of the evolution of FL.

To fill these gaps, this research conducts a bibliometric analysis to assess the evolution of the intellectual and the conceptual evolution of the FL concept in the literature. For bibliometric analysis, we assess 4,489 articles retrieved from WoS and Scopus. The main advantage of bibliometric analysis is that it is a quantitative and objective analysis, so it can eliminate the systematic review biases which can be induced by the researchers' subjective judgment. The fact that the bibliometric analysis may be simply replicated is another benefit of this method (Aria et al., 2020). Specifically, using this method, we assess the structure of knowledge by exploring the main authors, articles, journals, institutions, and countries that most influenced the FL literature. We also explore the intellectual structure of the FL concept by performing co-citation analysis with regards to the authors and journals. Finally, we assess the conceptual structure of the FL concept by exploring the thematic evolution of this concept and the co-occurrence network of the authors' keywords.

This research makes three main contributions. First, to the best of the authors' knowledge, this research is the first investigating the evolution state of FL by using bibliometric analysis of the two databases WoS and Scopus. The utilization of this latter is important because it covers a large number of papers (NP), so it can eliminate bias in the paper selection. Second, the objectivity of the bibliometric method reduces the systematic review biases which can be induced by the researchers' subjective judgment. Third, this research assesses the FL literature advance and show that this literature is not yet mature.

The rest of this paper is designed as follows. The first section presents the literature review of FL and bibliometric analysis. Methodology constitutes the second section, followed by results. The fourth section deals with the discussion. Finally, limitations and future research comprise the final section.

Table 1: FL review extended from Goyal and Kumar (2021)

Authors	Year	Journal	Title	TC	Keywords	Focus	Type
Fox J; Bartholomae S; Lee J	2005	Journal of Consumer Affairs	Building the Case for Financial Education	173		Financial education to improve financial literacy.	Review
Collins Jm; O'rourke Cm	2010	Journal of Consumer Affairs	Financial Education and Counseling - Still Holding Promise	80		Financial education and counseling for adults.	Review
Huston Sj	2010	Journal of Consumer Affairs	Measuring Financial Literacy	404		Financial literacy definitions and measures.	Review
Remund Dl	2010	Journal of Consumer Affairs	Financial Literacy Explicated the Case for A Clearer Definition in an Increasingly Complex Economy	255		Financial literacy definitions and measures.	Review
Vaihekoski M	2011	European Journal of Finance	History of Financial Research and Education in Finland	1	Dissertation; financial education; Finland; graduate school; history; professors; research	Finance research and education history in Finland.	Review
Hastings JS; Madrian BC; Skimmyhorn Wl	2013	Annual Review of Economics	Financial Literacy Financial Education and Economic Outcomes	207	Personal finance; household finance	Financial literacy, financial education, and consumer financial outcomes.	Review
Fernandes D; Lynch Jr. JG; Netemeyer RG	2014	Management Science	Financial Literacy Financial Education and Downstream Financial Behaviors	532	Behavioral economics; causal effects; consumer behavior; design of experiments; education systems; financial education; financial literacy; government programs; household finance; meta-analysis; public policy; statistics	Relationship of financial literacy and of financial education to financial behaviors architecture, and regulation as tools to help consumer financial behavior.	Meta-analysis

Drever Ai; Odders-White E; Kalish CW; Else-Quest NM; Hoagland EM; Nelms EN	2015	Journal Of Consumer Affairs	Foundations of Financial Well-Being: Insights into The Role of Executive Function, Financial Socialization, and Experience-Based Learning in Childhood and Youth	69		Approaches to improve financial education, from early childhood through young adulthood.	Review
Miller M; Reichelstein J; Salas C; Zia B	2014	World Bank Research Observer	Can You Help Someone Become Financially Capable a Meta-analysis of the Literature	75		Financial education to increase financial knowledge and behaviors of consumers.	Meta-analysis
Totenhagen C; Casper D; Faber K; Bosch L; Wiggs C; Borden L	2015	Journal of Family and economic Issues	Youth Financial Literacy A Review of Key Considerations and Promising Delivery Methods	22	Financial literacy; financial education; youth; best practices; comprehensive review	Financial literacy education to identify characteristics of an adequate financial education programs	Review
Van Campenhout G	2015	Journal of Consumer Affairs	Revaluating The Role of Parents as Financial Socialization Agents in Youth Financial Literacy Programs	52		Role of parents in young people's financial socialization process.	Review
Williams AJ; Oumlil B	2015	International Journal of Bank Marketing	College Student Financial Capability A Framework for Public Policy Research and Managerial Action for Financial Exclusion Prevention	8	Financial literacy; financial capability; financial exclusion; financial; inclusion; student credit card debt; student debt	Different financial literacy approaches to solve problems related to deficits in financial knowledge among college students.	
Kaiser T; Menkhoff L	2017	World Bank Economic Review	Does Financial Education Impact Financial Literacy and Financial Behavior and If So When	63		Relationship between financial behavior, financial education, and financial literacy.	Meta-analysis
Walstad W; Urban C; J. Asarta C; Breitbach E; Bosshardt W; Heath J; O'neill B; Wagner J; Xiao JJ	2017	Journal of Economic Education	Perspectives on Evaluation in Financial Education Landscape Issues and Studies	23	Financial education; financial literacy; program evaluation	Heterogeneity in the effectiveness of financial education programs.	Review

Burrus Bb; Krieger K; Rutledge R; Rabre A; Axelson S; Miller A; White C	2018	American Journal of Public Health	Building Bridges to a Brighter Tomorrow A Systematic Evidence Review of Interventions That Prepare Adolescents for Adulthood	5		Relationship between financial literacy, adolescent development healthy relationships, parent child communication, educational and career success, and healthy life skills.	Review
Peeters N; Rijk K; Soetens B; Storms B; Hermans K	2018	Journal of Consumer Affairs	A Systematic Literature Review to Identify Successful Elements for Financial Education and Counseling in Groups	13		Mixed financial education and counseling to help persons at risk for financial difficulties.	Review
Steinert Ji; Zenker J; Filipiak U; Movsisyan A; Cluver LD; Shenderovich Y	2018	World Development	Do Saving Promotion Interventions Increase Household Savings Consumption and Investments in Subsaharan Africa A Systematic Review and Metaanalysis	23	Financial inclusion; financial literacy; meta-analysis; savings; sub-Saharan Africa; systematic review	Relationship between saving promotion, consumption, and future-oriented investments in sub-Saharan Africa.	Meta-analysis
Abad-Segura E; Gonzalez-Zamar Md	2019	Education Sciences	Effects Of Financial Education and Financial Literacy on Creative Entrepreneurship a Worldwide Research	22	Financial education; bibliometric; business; creative entrepreneurship; scientific research	Impact of financial literacy and financial education with the creativity of individual entrepreneurship.	Bibliometric analysis
Bedi, H. S., Karn, A. K., Kaur, G. P., and Duggal, R.	2019	Our Heritage	Financial Literacy – A Bibliometric Analysis		Financial literacy; financial education, financial wisdom, financial environment, bibliometric analysis.	Financial literacy literature development	Bibliometric analysis
Montalto Cp; Phillips El; Mcdaniel AR	2019	Journal of Family and Economic Issues	College Student Financial Wellness Student Loans and Beyond	18	Financial capability; financial wellness; higher education; student; loans	Main facets of college student financial wellness and financial behavior.	Review
Santini FDO; Ladeira WJ; Mette FMB; Ponchio MC	2019	International Journal of Bank Marketing	The Antecedents and Consequences of Financial Literacy A Meta-analysis	6	Antecedents; consequents and moderators; financial literacy; meta-analysis	Antecedents and consequences of financial literacy.	Meta-analysis

Abad-Segura E; Gonzalez-Zamar MD	2021	3c Empresa	Implications Of Financial Education on Creative Entrepreneurship Research Trends	0	Financial education; financial literacy; economy; finance; entrepreneurship; research; business	Impact of financial literacy and education on individual training, as a tool of creative entrepreneurship.	Bibliometric analysis
Compen B; DE Witte K; Schelfhout W	2021	British Journal of Educational Technology	The Impact of Teacher Engagement in An Interactive Webinar Series on The Effectiveness of Financial Literacy Education	4	Online teacher professional development; randomised controlled trial; webinar; financial literacy	Effect of teacher engagement on students' effectiveness of Financial Literacy education.	Experiment
Gallego-Losada R; Montero-Navarro A; Rodriguez-Snchez JI; Gonzalez-Torres T	2021	Finance Research Letters	Retirement Planning and Financial Literacy at the crossroads a Bibliometric Analysis	1	Bibliometric analysis; financial literacy; research trends; retirement planning	Financial literacy literature development in the different phases of retirement financial planning.	Bibliometric analysis
Goyal K; Kumar S	2021	International Journal of Consumer Studies	Financial Literacy a Systematic Review and Bibliometric Analysis	36	Bibliometric analysis; consumer economics; financial education; financial knowledge; financial literacy; systematic literature review	Financial literacy literature development.	Bibliometric analysis
Stahl C; Karlsson EA; Sandqvist J; Hensing G; Brouwer S; Friberg E; Maceachen E	2021	Disability and Rehabilitation	Social Insurance Literacy a Scoping Review on How to Define and Measure It	2	Social insurance; literacy; sick leave; health; work disability; workers? Compensation; scoping review	Social insurance literacy concept's review.	Review
Tomar S; Kumar S; Sureka R	2021	Journal of Financial Counseling and Planning	Financial Planning for Retirement Bibliometric Analysis and Future Research Directions	0	Bibliographic coupling; bibliometric analysis; financial planning; retirement planning	Development of financial planning for retirement literature.	Bibliometric analysis

TC: Number of citations

2. Literature review

2.1 Financial literacy

Table 1, extended from Goyal and Kumar's (2021) research, illustrates the main review of FL.

This table shows that only two bibliometric studies focused on the evolution of FL literature. The first is conducted by Bedi et al. (2019) and analyzes 2,096 papers retrieved from the Scopus database. This study covers the period between 1964 and 2017. The authors find that 1) the first publication on the FL construct in the Scopus database dates back to 1964, 2) the years of 2016 (with 328 publications) and 2017 (with 330 publications) are considered as the years of the transition of FL research from the embryonic stage to maturity stage, 3) the FL literature is still immature, and 4) authors from the three following countries dominate the FL research: the United States, United Kingdom, and Australia. The second bibliometric research is published by Goyal and Kumar (2021). This study retrieved 502 papers from the WoS database between 2000 and 2019. The authors also map the FL literature trends only between 2016 and 2019. Goyal and Kumar (2021) detect three main themes: 1) FL among distinct cohorts, 2) the influence of FL on financial behavior and planning, and 3) the influence of financial education. They also identify some emerging themes such as financial inclusion, financial capability, gender gap, tax and insurance literacy, and digital financial education. In addition, the co-citation network outlined by the authors reveals three clusters. The first cluster contains 33 papers (mostly empirical research) focused mainly on the relationship between FL and financial planning. The second cluster includes 47 documents mostly on the conceptual definition and measure of FL, and interested more in the impact of FL and education on financial behavior, particularly of young people. Finally, the third cluster comprises 27 papers and deals with the levels, causes, and consequences of FL.

2.2 Bibliometric methods

According to Köseoglu et al. (2016), bibliometric analysis is a quantitative method that evaluates a field's progression in the literature. In recent years, bibliometric analysis has been used by multiple scholars and in various fields such as marketing (e.g., Martínez-López et al., 2018; Valenzuela-Fernandez et al., 2019), management (e.g., Zupic and Čater, 2015), entrepreneurship (e.g., Ruiz-Alba et al., 2021), and innovation (e.g., Mortazavi et al., 2021). For example, Mortazavi et al. (2021) employ co-citation analysis of 293 papers to map inclusive innovation literature.

In the literature, the bibliometric analysis is performed by two procedure approaches: 1) the evaluative approach and 2) relational approach (Abbie-Gayle and Ioanna, 2019). In the evaluative approach, scholars assess the knowledge structure of a field by exploring the main authors, articles, journals, institutions, and countries that have most influenced the field of literature. The relational approach uses social network analysis to explore the connection network between authors, documents, institutions, journals, and keywords to discover unveiling patterns (Köseoglu et al., 2016). Zupic and Čater (2015) classify bibliometric methods into three structures: 1) intellectual structure, 2) conceptual structure, and 3) social structure. The intellectual structure of a field is defined as the knowledge base and origins of this field (Zupic and Čater, 2015). This structure is assessed by conducting the co-citation analysis of authors, journals, and documents. The conceptual structure of a field refers to the most studied topics related to this field. This is established by analysis of the most frequently used keywords and the co-occurrence of keywords. Finally, the social structure assesses the collaboration between authors in a specific field. The common analysis used to perform this structure is co-authorship analysis.

3. Methodology

3.1 Data processing

In this study, we use the evaluative approach as well as the relational approach to assess the intellectual and the conceptual structures of the FL concept in the B2B market. The evaluative approach explores the most influential authors, papers, journals, institutions, and countries in the FL concept research. This study only uses the common analysis in a descriptive analysis of the database selected. As previously mentioned, we established the intellectual structure using co-citation analysis. This latter assesses the similarity between authors, journals, or articles (Zupic and Čater, 2015). For example, author co-citations refer to the occurrence in which two authors are cited jointly in one article. This study uses the author keywords frequency and the co-occurrence to assess the conceptual structure. The co-occurrence, also labeled co-word analysis, reveals the closest keywords or topics through clusters in a field (Köseoglu, 2016).

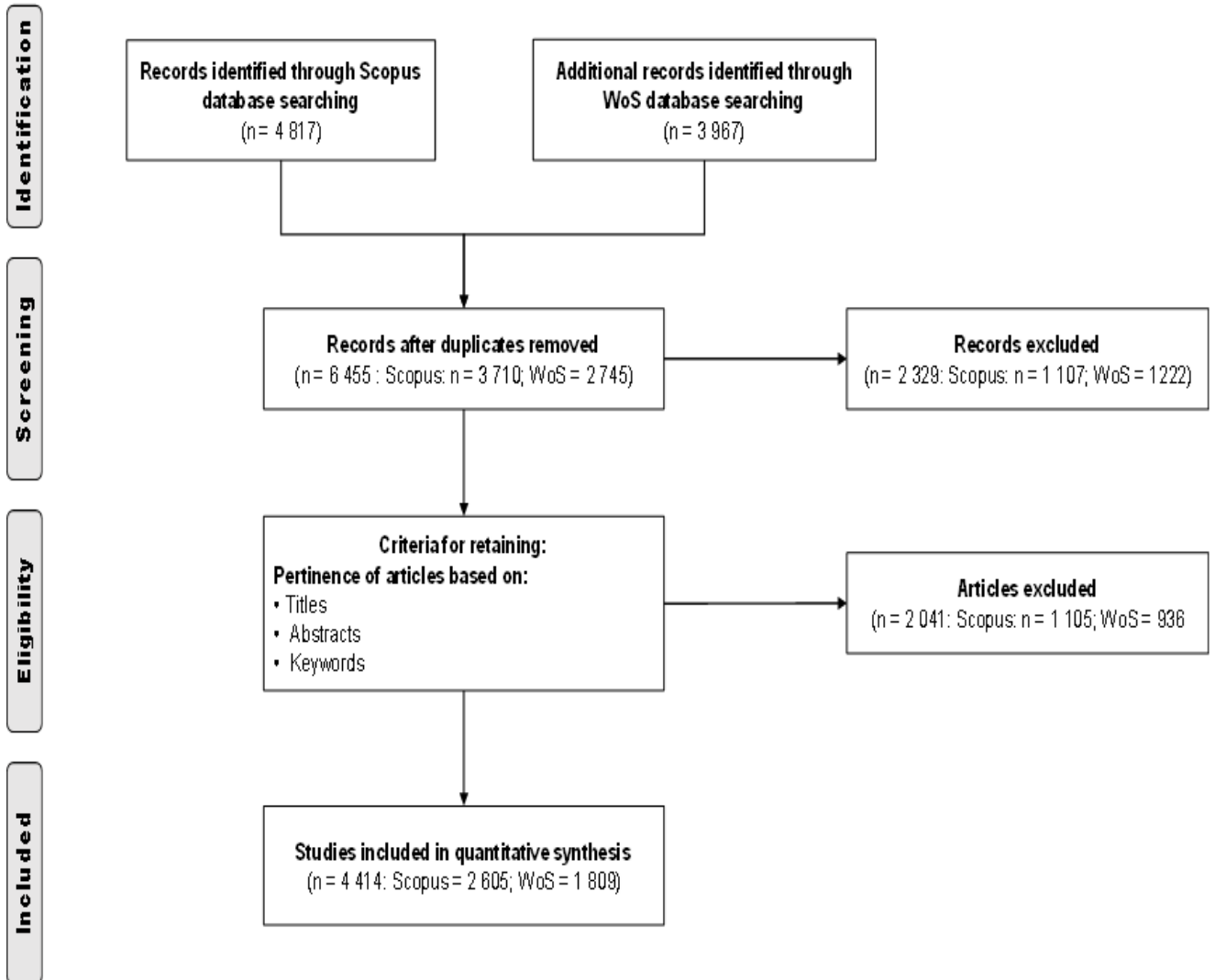


Figure 1: PRISMA model (Moher et al., 2009)

The authors collected the selected papers from two databases, WoS and Scopus, following the PRISMA method (see Figure 1). These are the main databases used in the bibliometric analysis in the literature. To retrieve the papers on the FL concept, we used the following query, used by Goyal and Kumar (2021): TITLE-ABS-KEY financ* literacy” OR “financ* knowledge” OR “financ* education” OR “financ* capability”. After this, we chose only English papers and peer reviewed papers (articles, proceedings, and reviews) in the following main areas: 1) social sciences, 2) psychology, 3) education, 4) business (e.g., finance and accounting) and management, and 5) economics and econometrics. This operation retrieved 8,784 articles, specifically 4,817 from Scopus and 3,967 from WoS. After duplication

elimination between WoS and Scopus, the corpus retained was 6,455 articles (3,710 articles from Scopus and 2,745 from WoS). The final step of screening was verifying if each article was within the scope of this study. We rejected 2,041 papers through this step, and finally 4,414 articles retained (1,809 from the WoS database and 2,605 articles from Scopus database).

3.2 Analysis procedure and software

To analyze and visualize our data, we use multiple methods and three software applications. The descriptive analysis including the most productive authors and other indicators was performed by using the Notepad ++ and the Bibliometrix package of R software (Aria and Cuccurullo, 2017). To accomplish the co-citation analysis, we used the VOSviewer software (Van Eck and Waltman, 2010). This popular software for network mapping is largely used in bibliometric analysis. To deeply analyze the conceptual structure of the FL concept in the B2B literature, we also performed multidimensional analysis in the Bibliometrix package of R software.

4. Results

We present our results in three different sections: 1) descriptive analysis, 2) conceptual structure, and 3) intellectual structure. To assess the evolution of the FL literature development, we divide the database into two periods: 1) before 2015 and 2) 2016–2021. This division is based on Bedi et al.'s (2019) results, in which they find that 2016 is the transition year of FL literature's maturation.

4.1 Descriptive analysis and trends

Table 2 illustrates the descriptive statistics conducted on the FL concept until December 31, 2021. Globally, the 4,414 papers published in this period include 3,646 articles, 117 conferences, 504 proceedings, and 147 reviews. The authors of these texts used 143,035 references and 7,646 keywords. The collaboration index was 2.1, and 8,170 authors contributed to this field.

Table 2 shows that the number of publications in the 2016–2021 (2,991 documents) period is more than double the publications in the 1963–2015 period (1,423 documents). The first publication began in 1963, which is consisted with Bedi et al.'s (2019) research in which they found the first publication on FL construct in Scopus database years back to 1964.

Figure 2 presents the research's production of FL output measured by the amount of publications per year. The annual production trend (see Figure 2) shows that the annual publication between 1963 and 2021 increased with an annual growth rate equal to 14.36%. Figure 2 also illustrates that the research grew and declined in some periods (e.g., 2006, 2008, 2012), but globally it has increased since 2012.

Table 2: Main information extracted from WoS and Scopus

Timespan	Global	Period 1	Period 2
	1963–2021	1963–2015	2016–2021
Sources (journals, books, etc.)	1,763	764	1,245
Documents	4,414	1,423	2,991
Average years of publication	5.94	12	3.05
Average citations per documents	11.01	24.26	4.71
Average citations per year per doc	1.35	2.03	1.03
References	143,035	44,299	103,748
Document types			
Article	3,646	1,150	2,496
Conference paper	113	41	72
Conference review	4		4
Proceedings paper	504	184	320
Review	147	48	99
Document contents			
Keywords Plus (ID)	4,580	1,906	3,592
Authors			
Authors	8,170	2,582	6,101
Author appearances	11,530	3,316	8,214
Authors of single-authored documents	769	343	446
Authors of multi-authored documents	7,401	2,239	5,655
Authors collaboration			
Single-authored documents	897	393	504
Documents per author	0.54	0.55	0.49
Authors per document	1.85	1.81	2.04
Co-authors per documents	2.61	2.33	2.75
Collaboration Index	2.1	2.17	2.27

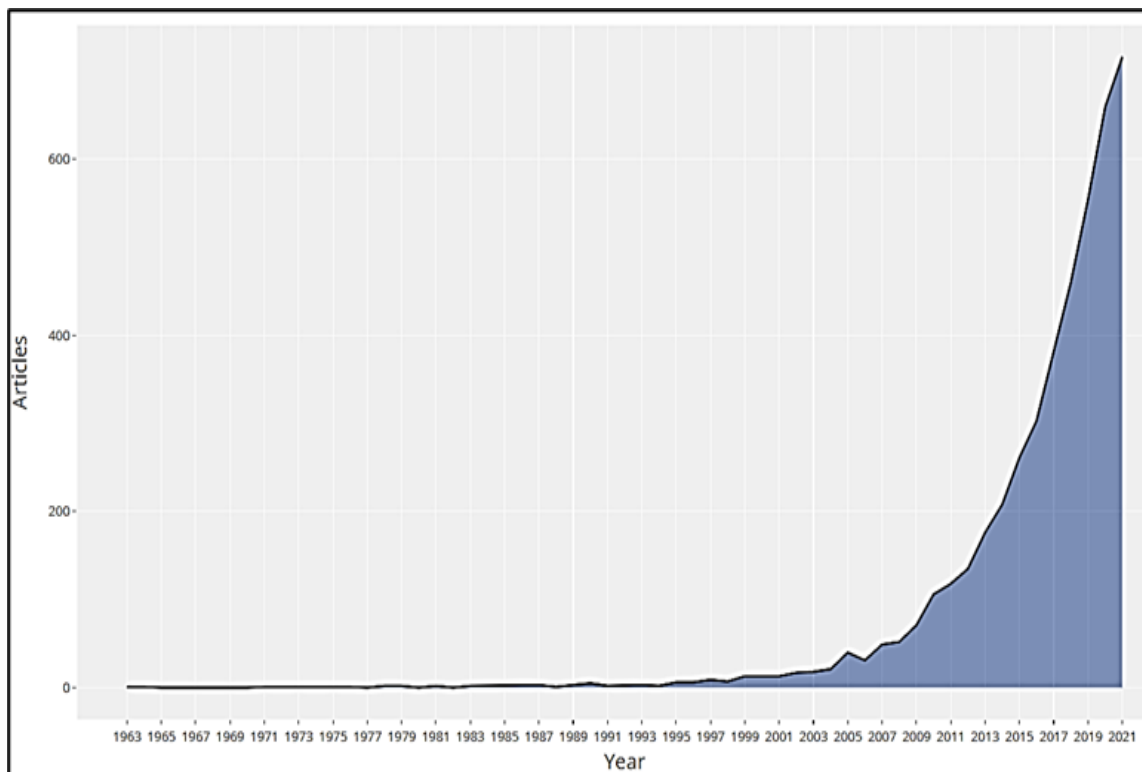


Figure 2: Annual publication of FL

4.1.1 Most influential authors, affiliations, and countries

Globally, during the whole period between 1963 and 2021, the three most influential authors are Lusardi, A., Xiao, J., and Mitchell O. (see Table 3). Lusardi, A. has an h_{index} equal to 24, which means at least 24 authors' papers are cited at least 24 times. Table 3 and Figure 3 show that Lusardi, A. ranked in the first place in Period 1 (1965–2015), but in second place ($h_{\text{index}} = 10$) in Period 2 (2016–2021) after Xiao, J. ($h_{\text{index}} = 11$). This latter was in eighth position in Period 1 with an h_{index} equal to 9, and 962 citations. As specifically illustrated by Figure 3, there are many changes in the most influential authors ranking between Period 1 and Period 2, and the global position of some authors (e.g., Mitchell, O.) comes from Period 1.

Table 3: Most influential authors in FL globally and over two periods

	Global			Period 1			Period 2		
	1963–2021			1963–2015			2016–2021		
Authors	h_index	TC	NP	h_index	TC	NP	h_index	TC	NP
Lusardi, A.	24	6100	36	19	5602	21	10	498	15
Mitchell, O.	16	3773	25	9	3419	9	8	354	16
Xiao, J.	16	1418	27	8	962	8	11	456	19
Serido, J.	11	927	22	10	841	10	6	86	12
Shim, S.	11	996	23	10	898	10	7	98	13
Danes, S.	9	488	10	7	454	7			
Grable, J.	9	785	13	9	776	11			
Joo, .S	9	613	11	9	613	11			
Sherraden, M.	9	694	29	9	624	12			
Zia, B.	9	468	11	5	314	5			
Collins, J.	8	332	15	7	296	8			
Kim, J.	8	334	10	7	314	8			
Tang, C.	8	390	10	7	362	7			
Alessie, R.	7	1156	7	5	1059	5			
Bennett, D.	7	226	12	5	167	5	5	59	7
Boyle, P.	7	226	12	5	167	5	5	59	7
Chatterjee, S.	7	175	12	4	119	4	5	56	8
Despard, M.	7	115	10	5	87	5			
Gerrans, P.	7	167	9	5	123	5			
Grinstein-Weiss, M.	7	160	10	7	155	9			

TC: Total citations; NP: Number of papers

In the global period (1963–2021), the University of Wisconsin was the most influential affiliation (76 papers), followed by Washington University (62 papers) and Ohio State University (57 papers). As demonstrated by Figure 3, the University of Wisconsin has the second position in Period 1 (22 papers) and the first position in Period 2 (54 papers). However, Washington University was in eighth place in Period 1 (18 papers) and in third position in Period 2 (44 papers). One of the affiliations whose ranking highly changed between the two periods is the University of Georgia (from eleventh position with 15 papers in Period 1 to second position with 46 papers in Period 2).

Figure 3 shows that the most influential country since the first period is the United States. Specifically, it has 23,263 citations globally, but respectively 18,858 in Period 1 and 4,405 in Period 2. Therefore, the number of United States citations dropped because the number of documents retrieved in Period 1 is less than Period 2 (1,423 vs. 2,991, see Table 2). The second most cited country is the United Kingdom (global: 2,847 citations; Period 1: 2,358 citations; Period 2: 495 citations). This is followed by Germany (global: 1,997 citations; Period 1: 954 citations; Period 2: 1,043 citations).

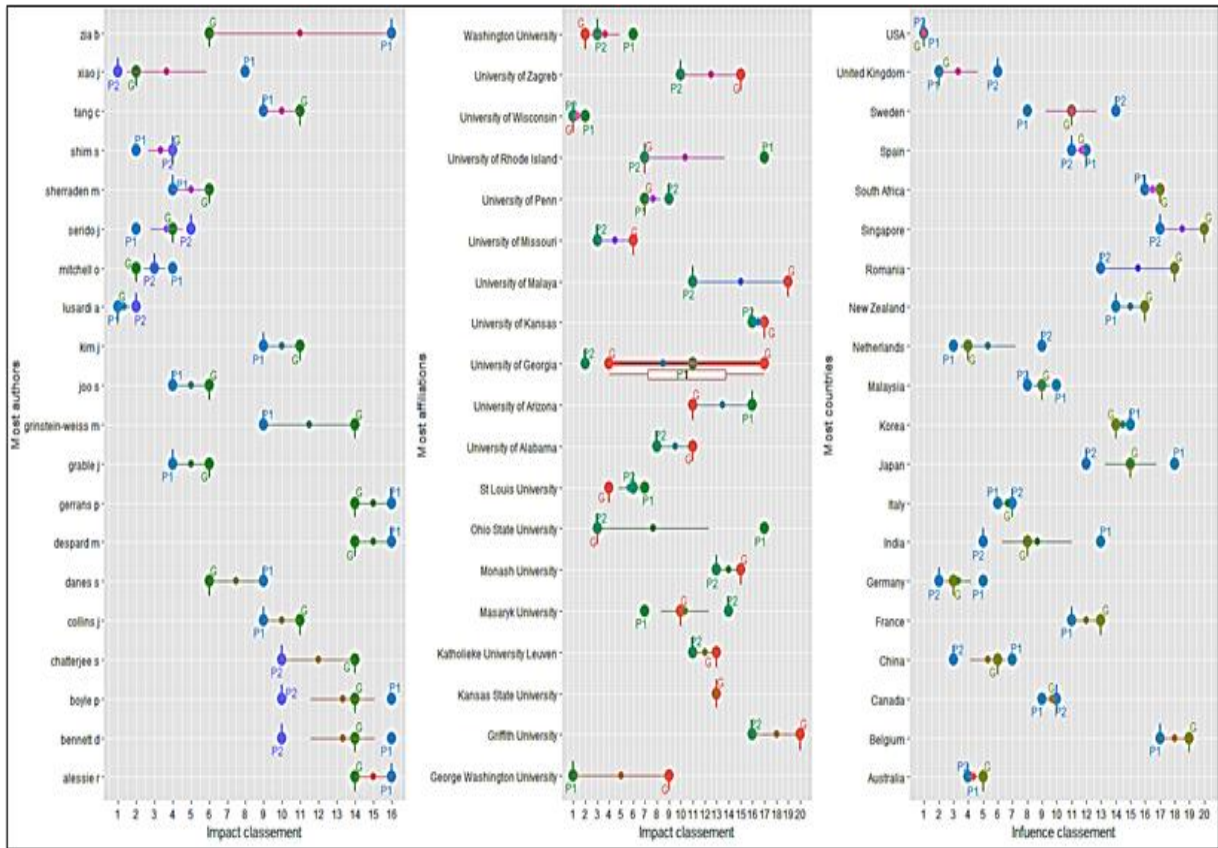


Figure 3: Most influential authors, affiliations, and countries in FL globally over two periods

4.1.2 Most relevant journals and documents

Table 4 demonstrates the three most influential journals in the 1963–2021 period are respectively the following: 1) Journal of Consumer Affairs (h_index = 30; TC = 3,786; NP = 110), 2) Journal of Financial Counseling and Planning (h_index = 26; TC = 2,470; NP = 108), and 3) Journal of Family and Economic Issues (h_index = 23; TC = 2,054; NP = 74). These journals are also the most influential journals in Period 1 (see Table 4). In addition, Figure 4 shows that these journals have the most growth rate in FL publication.

Table 4 shows that the most influential journal in Period 2 was the International Journal of Consumer Studies (h_Index = 12), followed equally by Journal of Family and Economic Issues (h_Index = 11) and International Journal of Bank Marketing (h_Index = 11). In addition, some journals (Social Indicators Research, World Development, International Review of Economics Education) were ranked low in Period 2, but they were considered as influential journals in the Period 1 and globally (see Table 4).

Table 4: Most influential journals globally and over two periods

Journal Name	Global 1963–2021			Period 1 1963–2015			Period 2 2016–2021		
	h_Index	TC	NP	h_Index	TC	NP	h_Index	TC	NP
Journal of Consumer Affairs	30	3786	110	30	3358	53	10	428	57
Journal of Financial Counseling and Planning	26	2470	108	26	2148	63	9	322	45
Journal of Family and Economic Issues	23	2054	76	20	1641	33	11	413	43
Journal of Pension Economics and Finance	20	2021	44	17	1795	23	9	226	21
International Journal of Consumer Studies	17	1028	59	12	579	28	12	449	31
Journal of Economic Psychology	17	1259	26	13	1033	16			
Journal of Banking and Finance	15	961	24	9	715	9	10	246	15
Journal of Economic Behavior and Organization	14	527	27	9	319	9	8	208	18
International Journal of Bank Marketing	12	517	47	8	120	9	11	397	38
Social Indicators Research	10	443	14	6	337	7			
World Development	10	404	12	6	269	7			
International Review of Economics Education	9	175	15	7	126	7			
Journal of Financial Economics	9	724	11				8	249	10
Sustainability (Switzerland)	9	236	30				9	236	30
Journal of Behavioral and Experimental Finance	8	173	24	4	49	4	7	124	20

TC: Total citations; NP: Number of papers.

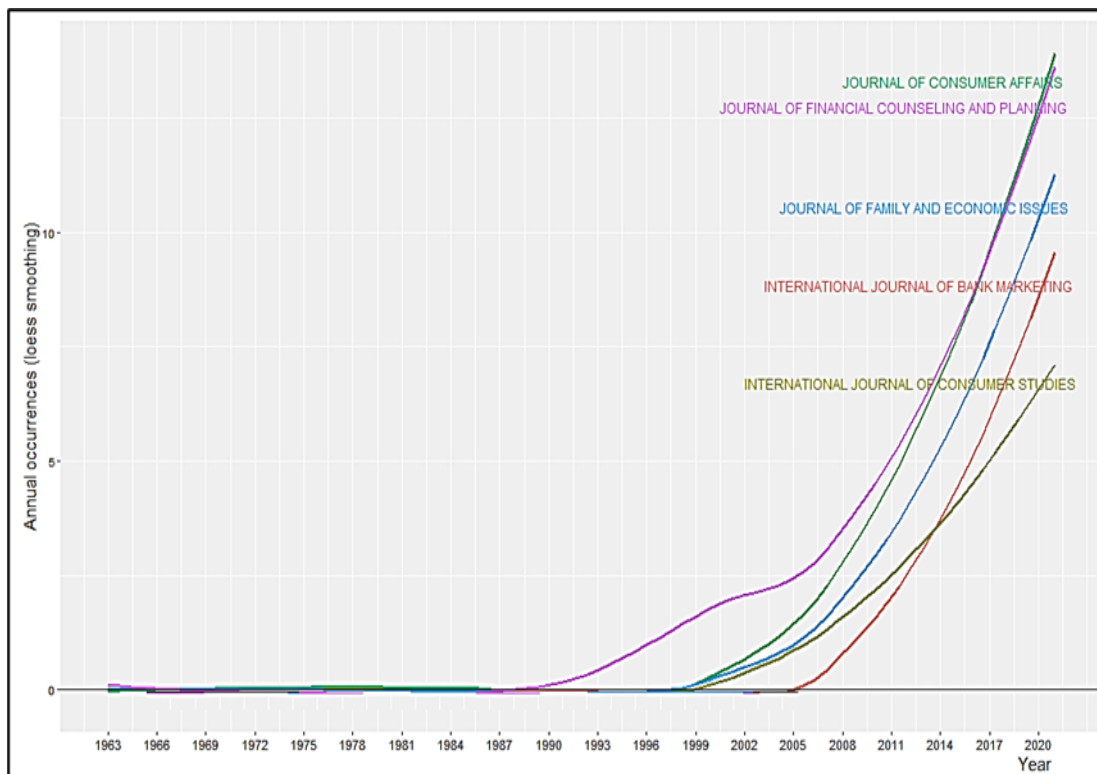


Figure 4: Trend of journal growth in FL

According to Table 5, globally the greatest number of document citations for a text (928) have been recorded by Lusardi, A. and Mitchell, O. in “The Economic Importance of Financial Literacy Theory and Evidence,” which was published in the *Journal of Economic Literature* in 2014. The second paper has 702 citations and is written by Lusardi, A. and Mitchell, O. S., entitled “Baby boomer retirement security the roles of planning FL and housing wealth” and published in the *Journal of Monetary Economics* in 2007. The third paper was also published by Lusardi, A. and Mitchell, O. S. (2007) in *Business Economics*, and its title was “Financial literacy and retirement preparedness evidence and implications for financial education.” Therefore, Lusardi, A. and Mitchell, O. S. have the three most influential documents in the 1963–2021 period. However, Table 5 illustrates that this predominance comes mostly from Period 1. Indeed, in Period 2 (2016–2021), the most cited paper (148 citations) is Hilton, J.’s (2016) “Open educational resources and college textbook choices: a review of research on efficacy and perceptions” in *Educational Technology Research and Development*.

Table 5: Most cited documents globally and over two periods

Paper	1963-2021: TC	Paper	1963-2015: TC	Paper	2016-2021
Lusardi, A., 2014, J Econ Lit	928	Lusardi, A., 2014, J Econ Lit	928	Hilton, J., 2016, Educ Tech Res Dev	148
Lusardi, A., 2007, J Monetary Econ	702	Lusardi, A., 2007, J Monetary Econ	702	Hertwig, R., 2017, Perspect Psychol Sci	138
Lusardi, A., 2007, Bus Econ	585	Lusardi, A., 2007, Bus Econ	585	Allgood, S., 2016, Econ Inq	134
Fernandes, D., 2014, Manage Sci	514	Fernandes, D., 2014, Manage Sci	514	Lusardi, A., 2017, J Polit Econ	127
Van, R. M., 2011, J Financ Econ	475	Van, R. M., 2011, J Financ Econ	475	Pasarelu, C., 2016, Cogn Behav Ther	104
Lusardi, A., 2010, J Consum Aff	472	Lusardi, A., 2010, J Consum Aff	472	Stolper, O., 2017, J Bus Econ	102
Huston, S., 2010, J Consum Aff	451	Huston, S., 2010, J Consum Aff	451	Farrell, L., 2016, J Econ Psychol	101
Lusardi, A., 2011, J Pension Econ Financ-A	450	Lusardi, A., 2011, J Pension Econ Financ-A	450	Xiao, J., 2016, Int J Consum Stud	99
Anderson, L., 2013, J Bus Res	429	Anderson, L., 2013, J Bus Res	429	Bucher-Koenen, T., 2017, J Consum Aff	90
Lusardi, A., 2008, Am Econ Rev	423	Lusardi, A., 2008, Am Econ Rev	423	Xiao, J., 2017, Int J Bank Mark	84
Van, R. M., 2012, Econ J	293	Van, R. M., 2012, Econ J	293	Dimmock, S., 2016, J Financ Econ	76
Joo, S., 2004, J Fam Econ Issues	258	Joo, S., 2004, J Fam Econ Issues	258	Grohmann, A., 2018, World Dev	73
Shim, S., 2010, J Youth Adolesc	254	Shim, S., 2010, J Youth Adolesc	254	Brown, M., 2016, Rev Financ Stud	72
Lusardi, A., 2011, J Pension Econ Financ	238	Lusardi, A., 2011, J Pension Econ Financ	238	Lusardi, A., 2019, Swiss J Econ Stat	67
Remund, D., 2010, J Consum Aff	233	Remund, D., 2010, J Consum Aff	233	Khan, S., 2019, Corp Soc Responsib Environ Manag	65

TC: Total citations

4.2.1 Highest keywords frequency

Figure 5 shows the keywords most frequently used by the authors in the FL research in the two periods. We can notice that in Period 1, financial capability was the highest frequency term (47 occurrences), followed respectively by financial behavior (44 occurrences), and financial knowledge (38 occurrences). In Period 2, the most frequent keywords were successively 1) financial education (276), 2) financial behavior (193), and 3) financial knowledge (162). In this period (2016–2021), some new keywords became important, namely financial inclusion (143 occurrences) and financial wellbeing (51 occurrences).

4.2.2 Thematic map

Figure 6 shows the thematic map of the three periods plotted in R into a two-dimensional form: 1) centrality (x axis), and 2) density (y axis). Centrality concerns the strength of the links from one research topic to others (Callon and Courtial, 1991). It assesses the importance of a theme (Callon and Courtial, 1991). Density refers to the internal emergence of keywords in a cluster (Callon and Courtial, 1991). It is a measure of a theme's development over time (He, 1999). We employed mean values of centrality and density to categorize the keywords thematically into four quadrants (see Figure 6). Quadrant I (upper-right quadrant), characterized by both high centrality and density, reveals the motor themes in a field. Quadrant II (upper-left quadrant), characterized by low centrality and high density, shows the developed but isolated themes in a field. Quadrant III (lower-left quadrant), characterized by both low centrality and density, indicates the emerging or declining themes in a field. Finally, Quadrant IV (lower-right quadrant), characterized by high centrality and low density, indicates the basic and transversal themes in a field.

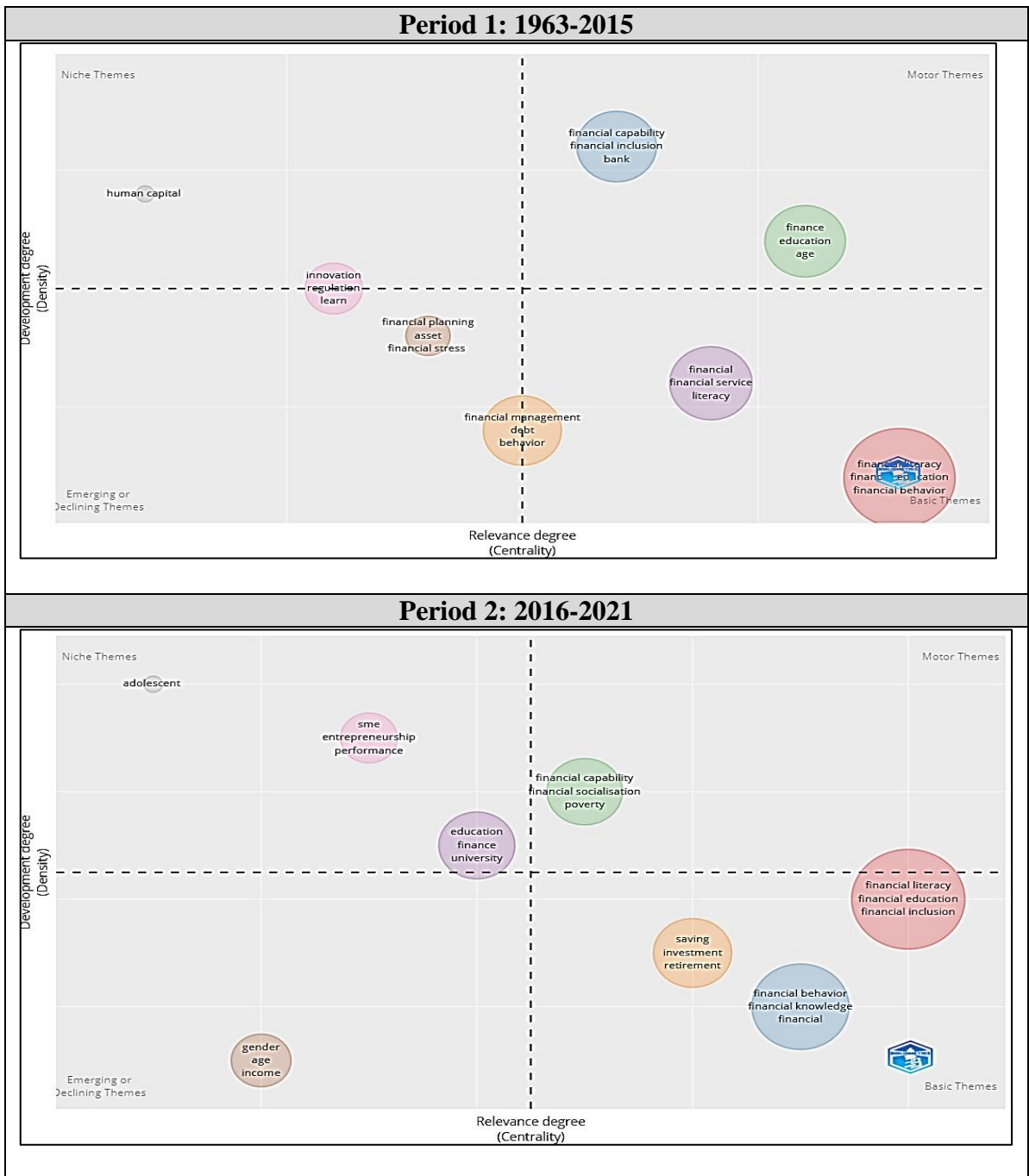


Figure 6: Thematic map in two periods

Figure 6 shows that compared to Period 1, Period 2 contains new motor themes: financial socialization and poverty. In addition, financial service literacy, considered as a basic them in Period 1, is not reported in Period 2. Likewise, there is a difference in niche themes between the two periods. Specifically, human capital is the niche theme in Period 1, while others (adolescent, SME, entrepreneurship, and performance) are prevalent in Period 2.

However, there are some similarities between the periods. For example, financial education and financial behavior are two basic themes in Period 1 and Period 2. One also notices that age migrated from an emerging theme in Period 1 to a motor theme in Period 2.

Therefore, drawing on the above remarks, we can argue that there was a change or evolution between Period 1 and Period 2.

4.2.3 Keyword occurrences

Figure 7 and Figure 8, performed with VOSviewer, show the keyword occurrences in the FL research in two periods (1963–2015 and 2016–2021). Each node or circle symbolizes a keyword and the circle's size shows its importance. The line thickness corresponds to the strength of links among keywords. The VOSviewer software divides these nodes into clusters, and each of them is represented by a unique color (Köseoglu et al., 2019). Table 6 and Table 7 illustrate the clusters and keywords of each cluster in the two periods.

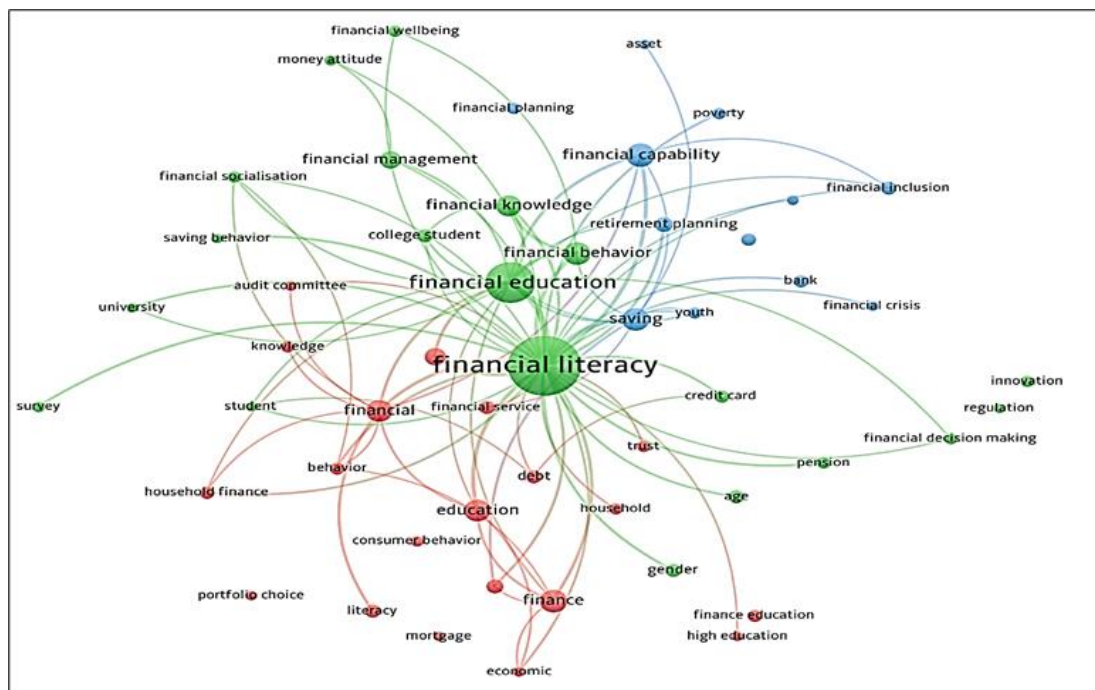


Figure 7: Keyword occurrences in Period 1 (1963–2015)

Table 6: Keyword occurrence clusters in Period 1 (1963–2015)

Cluster 1			Cluster 2			Cluster 3		
Keywords	Occurrences	Total link strength	Keywords	Occurrences	Total link strength	Keywords	Occurrences	Total link strength
Financial literacy	310	309	Finance	44	45	Financial capability	47	62
Financial education	141	172	Education	42	55	Saving	44	66
Financial behavior	44	73	Financial	41	77	Retirement planning	19	23
Financial knowledge	38	51	Personal finance	27	37	Financial inclusion	15	16
Financial management	27	35	Retirement	17	31	Bank	14	24
College student	16	23	Debt	16	20	Decision making	13	9
Gender	16	19	Financial service	15	22	Financial planning	12	14
Age	15	18	Literacy	15	21	Poverty	11	17
Credit card	14	21	Behavior	14	30	Youth	11	29
Pension	12	18	Finance education	14	5	Asset	9	9
Financial socialization	11	21	Household finance	13	20	Consumer credit	9	11
Financial wellbeing	11	18	Trust	12	21	Financial crisis	9	12
Innovation	11	5	Household	11	17			
Financial decision making	10	11	Knowledge	11	18			
Money attitude	10	15	Consumer behavior	10	14			
Survey	10	13	Audit committee	9	13			
Regulation	9	8	Economic	9	23			
Saving behavior	9	13	High education	9	10			
Student	9	17	Mortgage	9	11			
University	9	21	Portfolio choice	9	9			

Table 7: Keyword occurrence clusters in Period 2 (2016–2021)

Cluster 1			Cluster 2			Cluster 3		
Keywords	Occurrences	Total link strength	Keywords	Occurrences	Total link strength	Keywords	Occurrences	Total link strength
Financial literacy	1091	1052	Financial education	276	362	Financial inclusion	143	181
Saving	72	118	Financial behavior	191	362	Education	100	125
Personal finance	55	74	Financial knowledge	161	279	Gender	67	92
Household finance	50	74	Financial	151	338	Finance	56	77
Retirement planning	45	65	Financial capability	122	145	Knowledge	38	88
Financial advice	41	71	Literacy	58	105	University	35	76
Retirement	35	63	Financial attitude	57	151	Financial service	34	37
Investment	34	51	Financial wellbeing	51	87	SME	34	29
Financial planning	31	50	Financial socialization	37	64	Age	31	41
Risk	26	37	Poverty	35	40	Student	31	56
Trust	26	37	Overconfidence	34	55	Attitude	30	53
Pension	25	44	Young adult	30	55	Behavior	29	72
			Debt	28	33	Decision making	26	39
			Youth	28	40	Survey	26	33
			Financial satisfaction	26	49	Bank	24	24
			Wellbeing	26	54	Economic	24	34
			Financial decision	25	38	Entrepreneurship	24	23
			Indium	25	45	Microfinance	23	30

Comparison between the periods (see Figure 7, Figure 8, Table 6, and Table 7) show that 1) keywords are divided into three clusters in both periods; 2) FL's node is more important in Period 2 in terms of occurrences (1,091 vs. 310) and total link strength (1,052 vs. 309); 3) FL and financial education were in cluster 1 in Period 1, but in Period 2 FL is in cluster 1 and financial education is the biggest keyword in cluster 2; 4) financial inclusion constitutes a new keyword in a cluster of Period 2

(occurrences = 143; total link strength = 181); and 5) some new keywords appear in Period 2 such as entrepreneurship and microfinance. Consequently, we can argue that even if the two periods have the same number of clusters, there are many differences between the two periods in terms of keyword occurrence results.

4.3 Intellectual structure

Figure 9 and Figure 10, performed with VOSviewer, show the author co-citation analysis (ACA) for the FL concept research in two periods (Figure 9: 1963–2015; Figure 10: 2016–2021). These figures represent how authors are connected to the network in each of the two periods. Each node or circle symbolizes an author, and the circle's size shows the importance of the author.

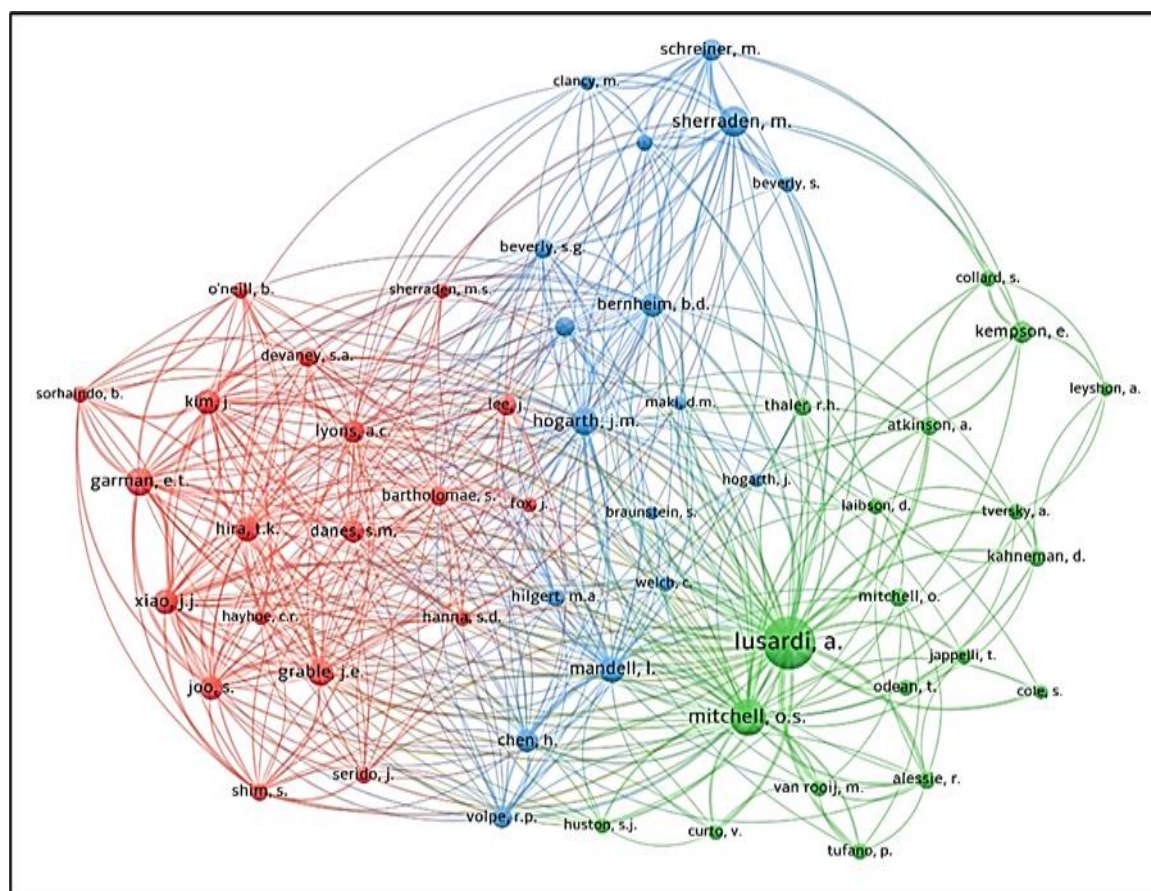


Figure 9: Author co-citation analysis in Period 1 (1963–2015)

In Period 1 (see Figure 9 and Table 7), ACA illustrates three author network clusters with dominant authors only in cluster 1 (green color). This latter contains interconnections between 19 authors, and the most prolific one is Lusardi, A. (502 occurrences and 7,611 total link strength), followed by Mitchell, O. S. (240 occurrences and 4,250 total link strength). The most dominant authors in cluster 2

(red color) and cluster 3 (color blue) are Garman, E. T. (148 occurrences and 2,942 total link strength) and Sherraden, M. (169 occurrences and 2,469 total link strength) respectively.

Table 7: Author co-citation analysis clusters in Period 1 (1963–2015)

Cluster 1			Cluster 2			Cluster 3		
Authors	Occurrences	Total link strength	Authors	Occurrences	Total link strength	Authors	Occurrences	Total link strength
Lusardi, A.	502	7611	Garman, E.T.	148	2942	Sherraden, M.	169	2469
Mitchell, O.S.	240	4250	Grable, J.E.	122	2307	Hogarth, J.M.	134	2634
Kempson, E.	84	775	Xiao, J.J.	115	2611	Mandell, L.	128	2251
Atkinson, A.	66	936	Kim, J.	114	2677	Bernheim, B.D.	108	2042
Mitchell, O.	66	856	Hira, T.K.	111	2163	Chen, H.	99	1600
Kahneman, D.	59	705	Joo, S.	106	2049	Schreiner, M.	83	1596
Alessie, R.	57	1140	Danes, S.M.	95	1629	Volpe, R.P.	78	1496
Thaler, R.H.	57	682	Lyons, A.C.	95	2056	Beverly, S.G.	67	1452
Van Rooij, M.	51	1046	Lee, J.	77	1274	Garrett, D.M.	67	1307
Odean, T.	50	290	Devaney, S.A.	71	1514	Hilgert, M.A.	62	1351
Collard, S.	49	588	Bartholomae, S.	65	1257	Zhan, M.	49	1128
Laibson, D.	49	829	Shim, S.	54	1301	Clancy, M.	45	1038
Tufano, P.	49	832	O'Neill, B.	52	879	Beverly, S.	43	843
Tversky, A.	49	677	Hanna, S.D.	51	1109	Welch, C.	41	785
Curto, V.	44	869	Serido, J.	51	1062	Braunstein, S.	40	752
Huston, S.J.	44	818	Hayhoe, C.R.	48	1060	Hogarth, J.	40	643
Jappelli, T.	43	571	Sorhaindo, B.	48	1276	Maki, D.M.	37	785
Cole, S.	38	519	Sherraden, M.S.	45	852			
Leyshon, A.	38	224	Fox, J.	43	782			

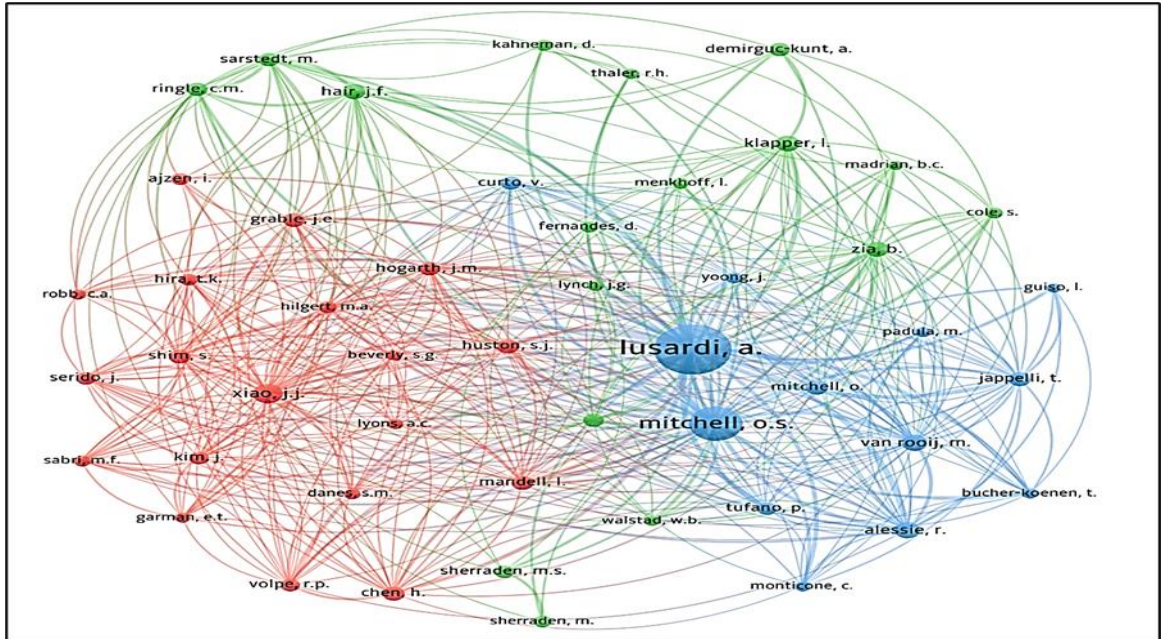


Figure 10: Author co-citation analysis in Period 2 (2016–2021)

In Period 2 (see Figure 10 and Table 8), ACA also illustrates three author network clusters with dominant authors only in cluster 1 (blue color). This latter contains interconnections between 13 authors, and the biggest nodes are also around Lusardi, A. (1,581 occurrences and 25,444 total link strength) and Mitchell, O. S. (766 occurrences and 14,789 total link strength). We notice that the number of occurrences and total link strength have both grown significantly in this period compared to Period 1. The most dominant authors in cluster 2 (red color) and cluster 3 (green color) are Xiao, J. J. (240 occurrences and 4,999 total link strength) and Klapper, L. (157 occurrences and 2,595 total link strength) respectively. Therefore, there is a change in cluster 2 and cluster 3 in Period 2 with respect to Period 1. In addition, the number of authors in cluster 1 decreased between the periods (from 19 in Period 1 to 13 in Period 2). In this regard, we notice that Cole, S. was in cluster 1 with Mitchell, O. S. in Period 1, but has moved to cluster 3 with Klapper, L in Period 2. Consequently, we can argue that the comparison between the ACA analyses in the two periods reveals that there are some similarities and differences.

Table 8: Author co-citation analysis clusters in Period 1 (2016–2021)

Cluster 1			Cluster 2			Cluster 3		
Authors	Occurrences	Total link strength	Authors	Occurrences	Total link strength	Authors	Occurrences	Total link strength
Lusardi, A.	1581	25444	Xiao, J.J.	240	4999	Klapper, L.	157	2595
Mitchell, O.S.	766	14789	Chen, H.	135	2472	Hair, J.F.	145	2529
Van Rooij, M.	176	4168	Mandell, L.	133	2601	Zia, B.	145	2686
Alessie, R.	171	4075	Huston, S.J.	132	2482	Atkinson, A.	121	2231
Mitchell, O.	126	2011	Grable, J.E.	130	2126	Demirguc-Kunt, A.	121	1082
Jappelli, T.	124	3191	Shim, S.	125	2860	Sarstedt, M.	113	2229
Curto, V.	112	2283	Hogarth, J.M.	119	2675	Ringle, C.M.	111	2157
Tufano, P.	105	2353	Serido, J.	105	2248	Sherraden, M.S.	109	1335
Yoong, J.	83	1890	Volpe, R.P.	104	2045	Sherraden, M.	90	846
Bucher-Koenen, T.	71	2117	Kim, J.	101	1886	Cole, S.	84	1580
Padula, M.	69	1790	Hira, T.K.	96	2001	Kahneman, D.	80	1035
Monticone, C.	64	1752	Ajzen, I.	92	960	Lynch, J.G.	78	1506
Guiso, L.	63	1393	Hilgert, M.A.	89	2209	Menkhoff, L.	76	1431
			Sabri, M.F.	83	1651	Fernandes, D.	75	1435
			Danes, S.M.	78	1745	Thaler, R.H.	70	1013
			Beverly, S.G.	69	1757	Walstad, W.B.	67	1673
			Garman, E.T.	67	1531	Madrian, B.C.	63	1542
			Robb, C.A.	67	1320			
			Lyons, A.C.	64	1547			

5. Discussion

To assess the progression of FL literature, the present research evaluates the structure of knowledge by exploring the main authors, articles, journals, institutions, and countries that have most influenced the FL literature. We also explore the intellectual structure of the FL concept by performing co-citation analysis with regards to the authors and journals. Finally, we assess the conceptual structure of the FL concept by exploring the thematic evolution of this concept and the co-occurrence network of the authors' keywords. Regarding the structure of knowledge, our findings show different interesting results. First, consistent with Bedi et al.'s (2019) result, our study finds that the first study in FL begins in 1963. In addition, Figure 1 shows that the FL literature really begins in 1995. This result is compatible with some scholars (e.g., McMurtrie, 1990) who highlight that the FL began to be popular in the 1990s. To be more specific, our results reveal that the FL literature has grown and declined since 1995, but has globally been increasing since 2012. Second, by comparing two periods, we show that the three most influential authors

in the first period (1963–2015) are Lusardi, A., Mitchell, O., and Xiao, J. (see Table 3) respectively, but in the second period (2016–2021) Lusardi, A. moves to the second position and Xiao, J. J. has the first position. This last result is consistent with Goyal and Kumar's (2021) research, in which they find the same influential authors. However, the most influential authors in Bedi et al.'s (2019) work were Lusardi, A., Mitchell, O. S., and Bennett, D. A. respectively. Third, the most influential affiliations in our research are the University of Wisconsin, Washington University, and Ohio State University respectively in the global period (1963–2021). Our result highlights that the dominance of the University of Wisconsin comes from Period 2, but it was in the third place in Period 1. This last result is consistent with the Goyal and Kumar (2021) study.

In regard to the conceptual structure, there is a significant change between the two periods (1963–2015 vs. 2016–2021). Indeed, the highest frequency words in Period 1 are financial education, financial capability, and financial behavior, but in Period 2 these are financial education, financial behavior, and financial knowledge. Furthermore, some new keywords appear in Period 2 namely financial inclusion and financial wellbeing. In addition, the thematic map (see Figure 6) illustrates that there are differences between Period 1 and Period 2 notably in new motor themes, niche themes, and emerging/declining themes. Finally, our results in the co-occurrence network show that despite there being three clusters in each period, the elements inside each cluster vary between these periods. These findings on the differences between Period 1 and Period 2 in terms of conceptual structure confirm the result of Bedi et al. (2019), who highlight that the FL research is still immature. Finally, the comparison of the intellectual structure between the two periods reveals that there are some similarities and differences. The results show three clusters in each period, but the number of authors and their names differ between the two periods. This finding supports the key finding that the FL research is still not mature.

6. Limitations and future research

As with any research, this study includes some limitations. First, we retrieved papers from two databases (WoS and Scopus), and second, the papers were written in the English language. Therefore, future research may consider other databases such as Google Scholar and ProQuest, as well as other languages. Third, our research scope is only the bibliometric analysis of FL literature. Therefore, it will be better in the future research to combine this methodology with content analysis to have a broad picture of the FL research development. Finally, we focus only on the maturity of the FL literature; in future studies, it would be better for scholars to study the maturity of the literature regarding the relation between FL and other concepts such as financial education, financial inclusion, financial behavior, and financial capability.

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