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Mapping of Global Research Trends in Financial Literacy: A Scientometric Approach

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Mapping of Global Research Trends in Financial Literacy: A Scientometric Approach

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Abstract

The main goal of this present study was to access the global research trends in financial literacy. The data obtained from the Scopus database, one of Elsevier's largest bibliographic databases. The various scientometric indicators have been applied in this study, such as year-wise growth pattern with Citation, Annual growth rate (AGR), Relative growth rate (RGR), Authorship pattern, degree of collaboration (DC), Correlation coefficient (CC), Most prolific authors, highly cited documents, most collaborative institutes, highly preferred sources, top funding agencies, Subject wise distribution and types of papers, etc. The study comprises a review of 2000 research documents published with 22229 citations from 2001 to 2020. The most productive year during the study was 2019. It is apparent that Lusardi, A. was the most prolific author, with 33 publications. The most highly cited document as financial literacy's Economic importance: Theory and evidence published in 2014. The leading institution in Financial Literacy was the University of Pennsylvania, with 25 publications. The top source was the Journal of consumer affairs from the USA. The most funding agency was the National Institute of Aging funding to 21 publications. The top subjects were economics, Econometrics, and finance. The VOSviewer software version 1.6.16 is used for network visualization. The present study revealed that there a continuous increase in financial literacy research productivity during the study period.

Keywords: Scientometric, Financial literacy, Financial education, Financial knowledge, Financial skills, Research trends, Annual Growth rate, Authorship pattern

Introduction

Financial literacy plays a significant role in an individual's financial well-being (Bedi et al.,2019). It is a set of knowledge and skills necessary for people to secure themselves financially (Tomasova et al., 2011). Nowadays, the market is being flooded with many advanced financial products (Bedi et al.,2019). Many of these products are complex and challenging to grasp, especially for financially unsophisticated investors (Lusardi et al., 2012). Without financial literacy, people cannot manage their financial function and decisions such as interest rates on loans, transaction charges, planning investment, etc. (Klapper et al., 2015). First, the term 'Financial literacy' began to appear in education journals and popular financial self-help books as early as the late 1990s (Bond, 1998; McMurtrie, 1999; Waneless, 1997; Faulkner, 2015). Financial literacy is the ability to make effective decisions regarding the use of money (Bhushan & Medury, 2013). It empowers people to craft their finances (Goyal & Kumar, 2020). It is an essential factor for making comprehensive financial decisions regarding financial issues (Lusardi, 2010). It equips an individual to effectively and efficiently utilize limited financial resources (Bedi et al., 2019).

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Worldwide research on financial literacy substantiates the problem's existence, just as it was ten centuries ago (De Beckker, De Witte, & Van Campenhout, 2019; Xiao & Porto, 2017; Goyal & Kumar, 2020). Financial literacy is essential in today's complicated economic world (Kiviat & Morduch, 2012). Financial literacy is a crucial variable influencing financial behavior (Ingale & Paluri, 2020). Increasing consumer financial literacy is a public policy objective to improve welfare through better decision making (U.S. House of Representatives, Financial Services Committee, 2009; Huston, 2010). Financial literacy's effects impel better financial inclusion, the benefits of which extend to the real economy (Grohmann et al., 2018; Goyal & Kumar, 2020). Financial literacy is also directly correlated with positive financial behaviour (Bhushan & Medury, 2013). Understanding financial literacy among young people is critical for policymakers in several areas (Lusardi, 2010). Thus, financial literacy is important for a nation's economic development (Bedi et al., 2019).

Further, scientometrics is a discipline that analyses scientific publications to explore the trend and growth of science. Scientometrics is defined as the quantitative study of science (Kim & Chen, 2015). The term "Scientometrics" was introduced by Nalimov & Mulchenko in 1969 (Mushtaq & Loan, 2019). The scientometric method has been widely used in many scientific disciplines to evaluate and examine research development and efforts of academicians, countries, and even journals in a specific research area (Konur, 2012; Zandi et al., 2019). A good number of scientometric studies have been carried out to explore the research trends and growths. A few of the scientometric reviews presented below:

Nguyen et al. (2020) examined the landscapes of scientific research regarding depressive disorders among university students and evaluated international collaboration effectiveness. The study found the number of scientific publications and international collaborations regarding depressive disorder among university students in China, Korea, and Japan. Zandi et al. (2019) conducted a scientometric study on membrane bioreactors (MBRs) to treat the effluents. This study identified novel technologies to make the MBRs most sustainable. Wu et al. (2020) analyzed smart city development and urban sustainability (SCDUS). They concluded a better understanding of current SCDUS research development Bolívar et al. (2016) characterized the contributions made by research in the field of e-government, identifying future areas of interest and potentially valuable methodologies and highlighting areas that should be addressed in future research.

Goyal and Kumar (2020) studied a systematic review of 502 articles published in peer-reviewed journals from 2000 to 2019 and employed to identify influential work, delineate the field's intellectual structure, and identify gaps. Bedi et al. (2019) reviewed the existing literature on financial literacy construct and presented the current state of the art of publications in financial literacy. Khairunnisa (2020) analyzed the efficiency of local government expenditure based on Islamic Human Development Index (I-HDI) in Local Government at the Indonesian Province using Data Envelopment Analysis (DEA). This study showed that the local government's average efficiency score at Indonesia's Province increased from 2015 until 2018. Huston (2010) explained

variation in financial outcomes and indicated that financial literacy is essential to understand the educational impact and barriers to effective financial choice.

However, the study aims to achieve the following specific objectives: To find out the year-wise growth pattern of research productivity of financial literacy; To find out the annual growth rate (AGR), relative growth rate (RGR), and doubling time (DT); To find out the degree of collaboration (DC) and Collaboration coefficient (CC); To identify the highly prolific authors and authorship pattern in research publications; To find out the most highly cited publications; To find out the Institutions wise collaboration and countries-wise collaboration; To find out the highly preferred sources for publications; to identify collaborative patterns.

The hypothesis was formulated for Citations based on documents

To signify a relationship between publications and citations following hypotheses were formulated.
H0: There is no relation between the number of publications and the citations of research publications. i.e., Ho: $\rho=0$

Methodology

The source of data for the present scientometric study is the Scopus, the largest abstract and citation database of Elsevier's peer-reviewed literature. The data was extracted from the Scopus database at (http://www.scopus.com/). The search keywords "Financial Literacy" was used in the search interface of the Scopus database. The search string used " TITLE-ABS-KEY (financial AND literacy) AND (LIMIT-TO (PUBYEAR, 2020) OR LIMIT-TO (PUBYEAR, 2001)) AND (LIMIT-TO (PUBSTAGE, "final"))" on October 30, 2020. A total of 2000 publications data were extracted from the Scopus database. Data were imported to Microsoft .csv file. All retrieved data were subsequently examined, observed, analyzed, and tabulated for making observations. For tabulations and graphical representations, researchers used google sheet. The various bibliometric measures have been applied in this study, such as year-wise growth pattern with citation, annual growth rate (AGR), relative citation impact (RCI), authorship pattern, degree of collaboration (DC), collaboration coefficient (CC), co-author index (CAI), most prolific authors, most collaborative institutes, highly preferred sources, top funding agencies, subject-wise distribution and types of papers, etc. The VOSviewer software version 1.6.16 is used for network visualization.

Results

1. Year-wise growth trends of documents with citations

The trends of annual publications and citations over two decades are presented in Figure 1. It is observed from table 1 and figures one that there is a smooth, progressive growth is found in both documents and citations counts. Upon analysing the data extracted, the publication's growth is continuously increasing till 2019 and slightly decreased in 2020. It is the reason may or may not be COVID-19 pandemic disease and lockdown. Among the total 2000 documents, the highest

number of publications occurred in 2019. The researchers saw 2000 publications in the last two decades during the entire study, 1318 (54.8%) documents published between the previous five years, i.e., 2016-2020. This is found to be unexpectedly enormous. Further, to all 2000 papers, a total of 22229 citations were received, with an average of 11.11 citations per document (ACPD). The highest, i.e., 3107 of authorities, appeared in 2011. Over the study period, research productivity of financial literacy is continuously increasing, whereas a fluctuating trend is found in citations.

Table 1 Year-wise growth trends of documents with citations

Year	TD	%	TC	CPD	Year	TD	%	TC	CPD
2001	2	0.10	67	33.50	2012	73	3.65	1704	23.34
2002	6	0.30	237	39.50	2013	107	5.35	1658	15.50
2003	2	0.10	14	7.00	2014	118	5.90	2554	21.64
2004	12	0.60	256	21.33	2015	146	7.30	1582	10.84
2005	16	0.80	611	38.19	2016	221	11.05	1377	6.23
2006	10	0.50	377	37.70	2017	221	11.05	1324	5.99
2007	18	0.90	1846	102.56	2018	271	13.55	816	3.01
2008	23	1.15	1027	44.65	2019	325	16.25	559	1.72
2009	35	1.75	1005	28.71	2020	280	14.00	166	0.59
2010	49	2.45	1942	39.63	**Total**	2000	100.00	22229	11.11
2011	65	3.25	3107	47.80					

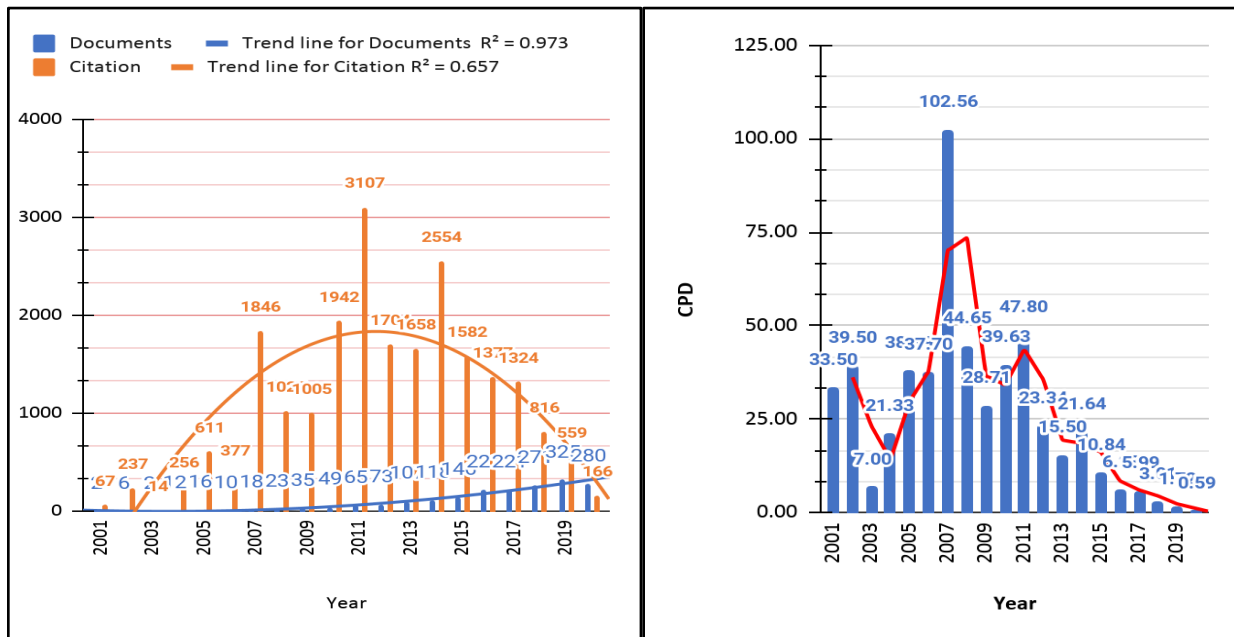Note: TD-Total documents, TC-Total Citations, CPD- Citations per document

Fig. 1. Year-wise growth trends of documents with citations and CPD with moving average line

2. AGR, RGR, and Dt.

Figure 2 shows the annual growth rate during the study. The AGR determined as per the formula:

$$AGR = \frac{End\ value - First\ value}{First\ value} \times 100$$

The researchers found in their entire study that the average annual growth rate was 54.46. The lowest yearly growth rate value was -66.67 in 2003, while the following year, 2004, the highest annual growth rate was 500. The annual growth rate value increased very suddenly in 2004, after that there was no uniformity seen. The Organization for Economic Co-operation and Development (OECD) started an inter-governmental project in 2003 to improve financial education and literacy standards by developing common financial literacy principles. The Financial Services Authority (FSA) in the U.K. started a national strategy on financial capability in 2003. The U.S. government established its Financial Literacy and Education Commission in 2003(Wikipedia, 2021). All above are providing a fruitful reason for AGR highest in 2004. Negative growth is witnessed in the years 2003, 2006, and 2020 whereas, for the rest of the years, the annual growth rate is positive with slight variations.
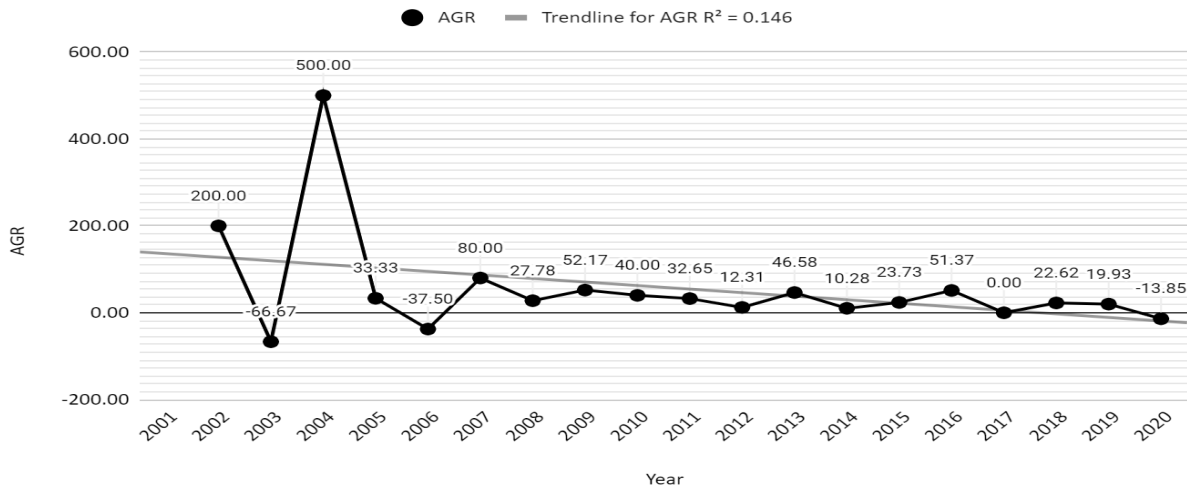

Fig. 2. Year-wise Annual Growth Rate (AGR)

Further, Relative Growth Rate (RGR) can be defined as increasing the number of articles or pages per unit of time. The RGR determines the growth in terms of a rate of increase in size per unit of measure (Hunt, 1990).

For calculating the mean relative growth rate (RGR) over the specific period of the interval, the formula:

$$RGR = (1 - 2^r) = \frac{Ln(W2) - Ln(W1)}{T2 - T1} \times 100$$

Table 2 indicates the highest relative growth rate with a value of 1.39 in 2002 and the lowest value of 0.15 in 2020. The average close growth rate in the study period was 0.36 during the study period. Whereas Doubling Time (Dt) indicates the period required for a quantity to double in size or value. The researchers applied the formula to know the doubling time:

$$Dt = \frac{0.693}{RGR}$$

During the study period, it was shown that the average doubling time was 0.50. However, the value of Doubling time increased steadily from 0.50 to 4.59 from 2002 to 2020.
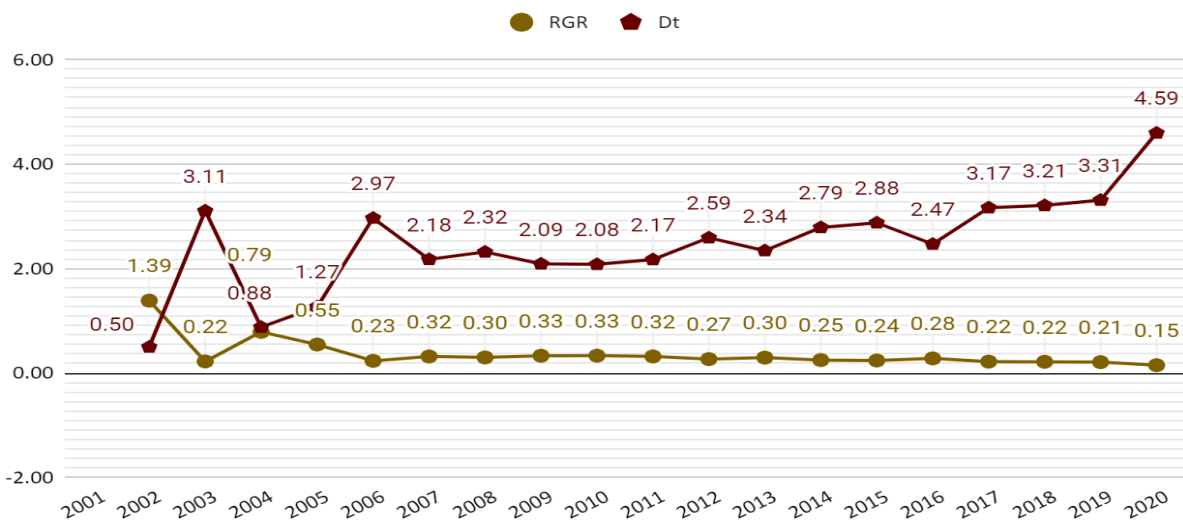
Fig. 3. Relative growth rate and doubling time

3. Correlation Coefficient between documents and citations

To identify the correlation between papers and citations, Karl Pearson's correlation coefficient was calculated for the articles and citations.

$$\rho_{X,Y} = \operatorname{corr}(X, Y) = \frac{\operatorname{cov}(X, Y)}{\sigma_X \sigma_Y} = \frac{\mathrm{E}[(X - \mu_X)(Y - \mu_Y)]}{\sigma_X \sigma_Y}$$

$$\rho_{X,Y} = \frac{\mathrm{E}(XY) - \mathrm{E}(X)\,\mathrm{E}(Y)}{\sqrt{\mathrm{E}(X^2) - \mathrm{E}(X)^2} \cdot \sqrt{\mathrm{E}(Y^2) - \mathrm{E}(Y)^2}}$$

6

Size of Correlation	Interpretation
.90 to 1.00 (−.90 to −1.00)	Very high positive (negative) correlation
.70 to .90 (−.70 to −.90)	High positive (negative) correlation
.50 to .70 (−.50 to −.70)	Moderate positive (negative) correlation
.30 to .50 (−.30 to −.50)	Low positive (negative) correlation
.00 to .30 (.00 to −.30)	negligible correlation

<div align="center">[SOURCE: Towards data science; https://towardsdatascience.com]</div>

The coefficient of correlation is, ρxy = 0.55, i.e., documents and citations are simultaneously moderate positive correlated.

However, to test whether this coefficient is significant or not, the T-test was applied, which is given by:

$$t = \frac{r * \sqrt{n-2}}{\sqrt{1-r^2}}$$

Ho: ρ=0 and Ha: ρ≠0 at α=0.05 p-value is 0.006 (from T Score Calculator, online source) is less than the significance level of α=0.05.

Decision: Reject the Null Hypothesis H0

Conclusion: There is sufficient evidence to conclude a significant linear relationship between the documents(x) and citations (y) because the correlation coefficient is significantly different from zero.

4. Most prolific Authors

A total of 1999 authors, including international authors, have contributed to the 2000 documents from 2001 to 2020. It is apparent that Lusardi, A. was the most prolific author during the study period with a complete publication of 33(16.58%) documents with an h-index 32 from the USA. Mitchell, O.S. published 23(11.56%) documents with an h-index 29 from the USA. It is very affirmative to see that authors are being honored by receiving many citations for their research publications. Figure 4. represents the details of high prolific authors with their percentage.

<div align="center">Table 3 Most Prolific Authors</div>

Author	Affiliation	TD	%	h-index	Country
Lusardi, A.	The George Washington University	33	16.58	32	USA
Mitchell, O.S.	Wharton School of the University of Pennsylvania	23	11.56	29	USA
Bennett, DA.	Rush Alzheimer's Disease Center	16	8.04	139	USA
Yu, L.	Rush Alzheimer's Disease Center	14	7.04	54	USA
Boyle, P.A.	The University of British Columbia	12	6.03	31	Canada

| Xiao, J.J.	University of Rhode Island	12	6.03	28	USA
Cwynar, A.	University of Economics and Innovation in Lublin	10	5.03	3	Poland
Chatterjee, S.	College of Family & Consumer Sciences	9	4.52	13	USA
Cude, B.J.	College of Family & Consumer Sciences	9	4.52	12	USA
Cwynar, W.	University of Economics and Innovation in Lublin	9	4.52	3	Poland
James, B.D.	Rush Alzheimer's Disease Center	9	4.52	29	USA
Munene, J.C.	Makerere University	9	4.52	14	Uganda
Sabri, M.F.	Universiti Putra Malaysia	9	4.52	8	Malaysia
Vieira, K.M.	Universidade Federal de Santa Maria	9	4.52	7	Brazil
Potrich, A.C.G.	Universidade Federal de Santa Catarina	8	4.02	6	Brazil
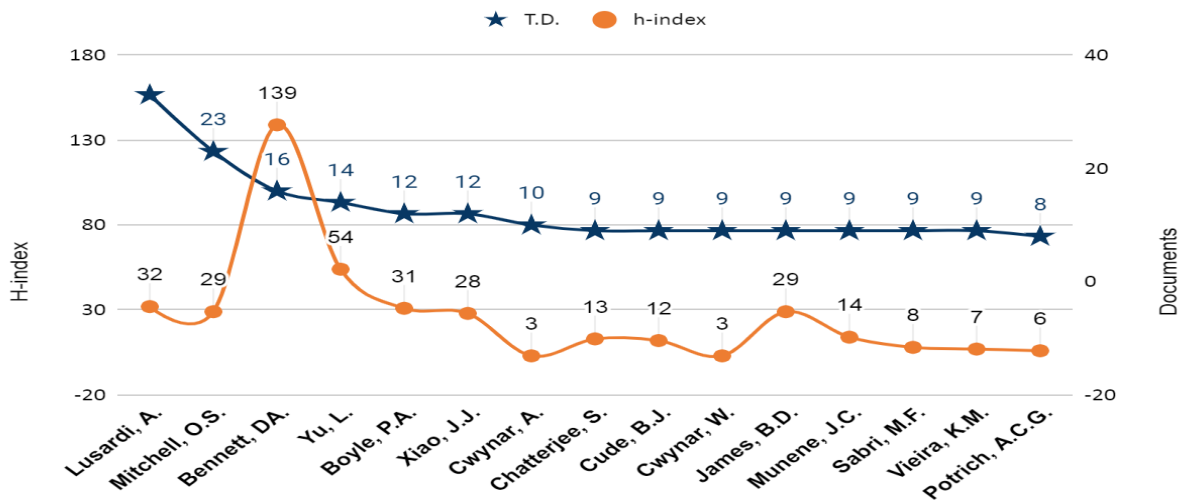
Fig. 4. Most Prolific Authors and Ratio (%)

5. Authorship pattern with DC and CC

Collaboration in research is an essential trigger for the growth of publications. By analysing 2000 documents of financial literacy research productivity, most 1550 papers were published under multiple authorship patterns. The single authorship pattern is less prominent than a multiple authorship pattern. The authorship collaboration in publications during a specific period can be calculated using Subramanyam's formula (1983).

It is expressed as Degree of Collaboration $(DC) = \dfrac{Nm}{Nm+Ns}$

Where: Nm= Number of multiple authors; Ns= Number of single authors.

The number of collaborative research papers to the total number of research papers in the discipline during a specific period is measured and varied from 0.42 to 1.00 in different years with an average (mean) degree of collaboration with a value of 0.78.
Collaborative Coefficient:

$$CC = 1 - \frac{\sum_{j=1}^{k} \left(\frac{1}{j}\right) f_j}{N}$$

Where: Fj= Number of jth authors; N= Total number of authors; j= 1,2,...

The researchers have measured financial literacy and found that the minimum collaboration coefficient of 0.21 was in 2004, while the maximum was 0.58 in 2001. The average Collaborative Coefficient is 0.48. The highest collaboration coefficient, 0.58, was calculated in 2001. It is clear from the study that the average collaboration coefficient is less prominent than 0.6, and hence it shows that financial literacy research collaboration is average.

Table 4 Authorship Pattern with DC, CC

Publication Year	Single Author	Two Authors	Three Authors	Four Authors	Five & More Authors	Total Authors	DC	CC
2001	0	1	1	0	0	2	1.00	0.58
2002	2	1	3	0	0	6	0.67	0.42
2003	1	1	0	0	0	2	0.50	0.25
2004	7	5	0	0	0	12	0.42	0.21
2005	6	2	1	6	1	16	0.63	0.44
2006	5	2	1	1	1	10	0.50	0.32
2007	4	5	5	3	0	17	0.76	0.48
2008	6	10	4	3	0	23	0.74	0.43
2009	14	15	4	1	1	35	0.60	0.33
2010	22	14	7	4	2	49	0.55	0.33
2011	15	20	21	5	4	65	0.77	0.48
2012	18	22	19	8	6	73	0.75	0.47
2013	32	33	26	11	5	107	0.70	0.43
2014	23	37	41	9	8	118	0.81	0.50
2015	39	53	34	13	7	146	0.73	0.44
2016	67	67	51	21	15	221	0.70	0.43
2017	43	70	62	24	22	221	0.81	0.51
2018	55	86	69	25	36	271	0.80	0.50
2019	43	123	85	39	35	325	0.87	0.54
2020	47	90	68	52	23	280	0.83	0.53
Grand Total	449	657	502	225	166	1999	0.78	0.48

6. Most highly cited documents

Table 5 shows the collection of the highly cited publications during the study period of financial literacy. The highest citation, 711, was received in the year 2014, while the lowest 188 was in the year 2006. The average citation per document of the total publications is 11.11. Among the top highly cited papers, the first three articles have received greater than 500 citations, i.e., The economic importance of financial literacy: Theory and evidence by Lusardi A. and Mitchell O.S.

published in Journal of Economic Literature (2014) & Financial literacy and stock market participation by Van Rooij M., Lusardi A. and Alessie R. published in Journal of Financial Economics (2011) and Baby Boomer retirement security: The roles of planning, financial literacy, and housing wealth by Lusardi A. and Mitchell O.S.(2007). As indicated in the table, the remaining publications have received average citations between the highest 183 to lowest 0.

Table 5 Highly cited documents

Authors	Title	Year	Source title	T.C.
Lusardi A., Mitchell O.S.	The economic importance of financial literacy: Theory and evidence	2014	Journal of Economic Literature	711
Van Rooij M., Lusardi A., Alessie R.	Financial literacy and stock market participation	2011	Journal of Financial Economics	693
Lusardi A., Mitchell O.S.	Baby Boomer retirement security: The roles of planning, financial literacy, and housing wealth	2007	Journal of Monetary Economics	690
Lusardi A., Mitchell O.	Financial literacy and retirement preparedness: Evidence and implications for financial education	2007	Business Economics	491
Fernandes D., Lynch Jr. J.G., Netemeyer R.G.	Financial literacy, financial education, and downstream financial behaviors	2014	Management Science	410
Huston S.J.	Measuring Financial Literacy	2010	Journal of Consumer Affairs	410
Lusardi A., Mitchell O.S., Curto V.	Financial literacy among the young	2010	Journal of Consumer Affairs	403
Lusardi A., Mitchell O.S.	Planning and financial literacy: How do women fare?	2008	American Economic Review	388
Lusardi A., Mitchell O.S.	Financial literacy around the world: An overview	2011	Journal of Pension Economics and Finance	356
Van Rooij M.C.J., Lusardi A., Alessie R.J.M.	Financial Literacy, Retirement Planning and Household Wealth	2012	Economic Journal	230
Mitchell O.S., Lusardi A.	Financial Literacy and Planning: Implications for Retirement Well-being	2011	Financial Literacy: Implications for Retirement Security and the Financial Marketplace	219
Joo S.-H., Grable J.E.	An exploratory framework of the determinants of financial satisfaction	2004	Journal of Family and Economic Issues	200
Lusardi A., Mitchell O.S.	Financial literacy and retirement planning in the United States	2011	Journal of Pension Economics and Finance	199
Remund D.L.	Financial literacy explicated: The case for a clearer definition in an increasingly complex economy	2010	Journal of Consumer Affairs	199
Norvilitis et al.	Personality factors, money attitudes, financial knowledge, and credit-card debt in college students	2006	Journal of Applied Social Psychology	189

7. Highly Productive Institutes

Figure 5 indicates the highly productive institutions that have involved collaborative research of financial literacy. The researchers observed from the table that out of 2000 publications, 25 publications were collaborated with the University of Pennsylvania, followed by 24 publications with the Ohio State University, Wharton School of the University of Pennsylvania, G.W. School of Business, 22 with Griffith University, 21 publications with National Bureau of Economic Research and 15 to 4 of publications have come from other collaborative institutions.
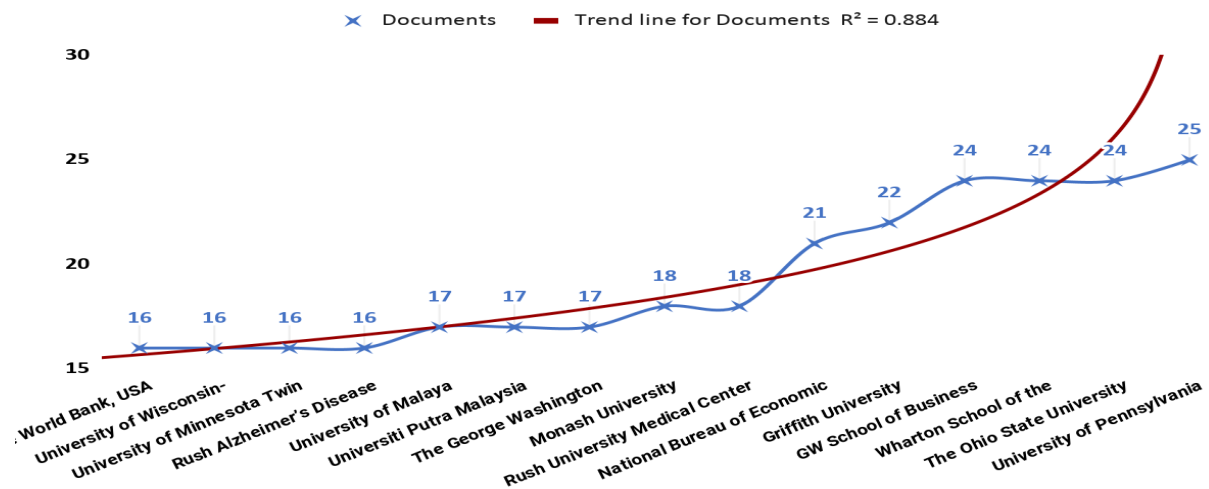
Fig. 5. Top Productive Institutions

8. Top highly collaborative countries network

At the international level of research, collaboration for financial literacy is identified and presented in table 7. It has observed the highest number of joint papers from the United States, 694(28.8%) with h-index 2386. India followed it with 132(5.5%) h-index 624, the United Kingdom with 127 (5.3%) with h-index 1487, Australia 116(4.8%) with h-index 1001, Germany 101(4.2%) with h-index 1298, Malaysia 94(3.9%) with h-index 323, etc., h-index calculated from Scimago Journal & Country Rankings. (Scimago Journal & Country Rankings, website: https://www.scimagojr.com/).

Fig. 6. Top most highly Collaborative Countries network

9. Highly Preferred Source
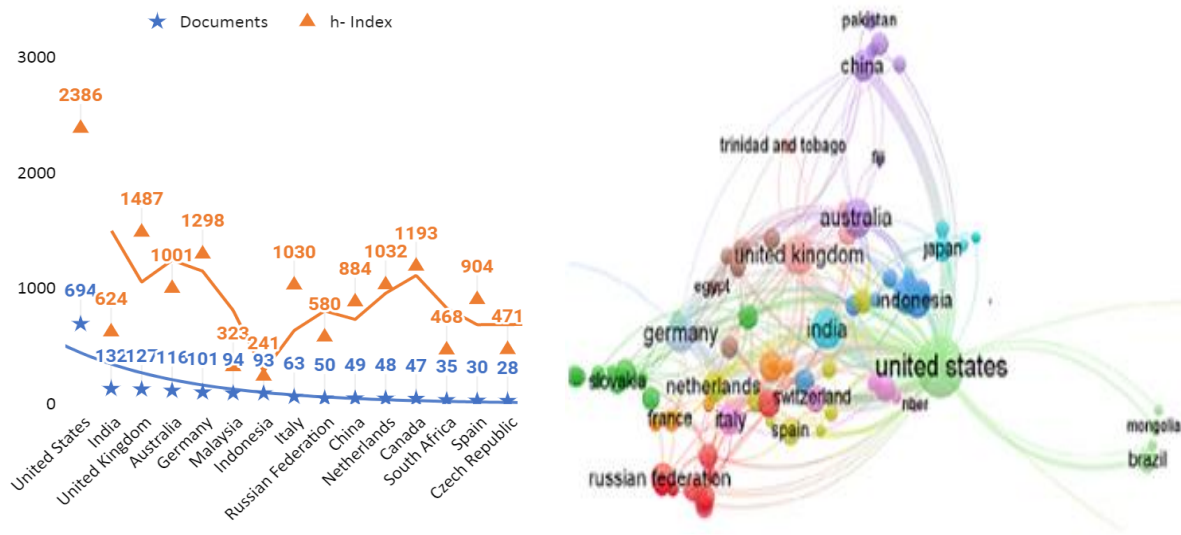
Table 8 offers the highly preferred sources that published most of the articles on financial literacy. The observation of a specific table, Journal of Consumer Affairs is the top-ranked selected source for 45 publications with 57 h-index. It lies in the first quartile with 0.73 SJR (2019) in the United States. Followed by the Journal of Financial Counseling and Planning with 42 publications with 38 h-index and lies in the third quartile with 0.31 SJR (2019) from the United States and International Handbook of Financial Literacy with 39 publications, International Journal of Consumer Studies with 38 publications with 64 h-index and lies in the second quartile with 0.68 SJR (2019) from the United Kingdom and stood in the fourth position.

Table 8 The most highly preferred source

Source title	TD	h-Index	Quartile	SJR(2019)	Country
Journal of Consumer Affairs	45	57	1	0.73	United States
Journal of Financial Counseling and Planning	42	38	3	0.31	United States
International Handbook of Financial Literacy	39	N.A.	NA	NA	NA
International Journal of Consumer Studies	38	64	2	0.68	United Kingdom
Journal of Pension Economics and Finance	32	26	2	0.72	United Kingdom
Journal of Family and Economic Issues	24	43	2	0.53	United States
International Journal of Bank Marketing	24	77	2	0.77	United Kingdom
Citizenship, Social and Economic Education	20	8	2	0.33	United Kingdom
Journal of Financial Services Marketing	19	17	3	0.24	United Kingdom
International Journal of Social Economics	16	37	2	0.28	United Kingdom
Journal of Banking and Finance	15	148	1	1.34	Netherlands
International Journal of Scientific and Technology Research	14	15	3	0.12	India
ACM International Conference Proceeding Series	13	109	NA	0.2	United States
Journal of Economic Behavior and Organization	13	108	1	1.48	Netherlands
Financial Literacy: Implications for Retirement Security and the Financial Marketplace	12	N.A.	NA	NA	NA

10. Top Funding Agencies

Figure 7 shows the rank of the top research funding agencies/institutions. It is inferred that the National Institute on Aging is the top funding agency by funding 21 publications. Economic and Social Research Council stood the second rank in the top funding agencies by funding 17 publications. The Australian Research Council stood in third place, funded for 15 publications. As listed in table 9, the remaining funding agencies support the authors/researchers/publications concerned with financial literacy to carry out research publications.
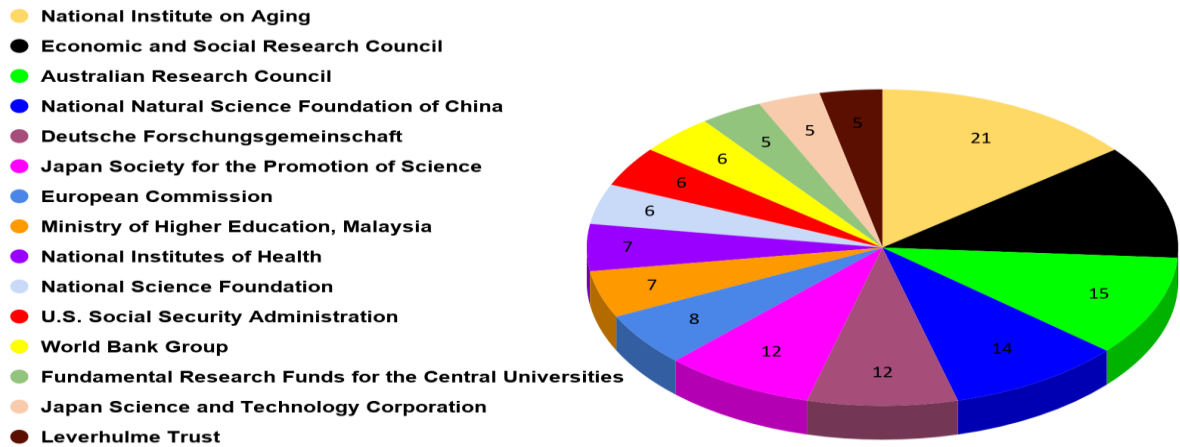
Fig. 7. Most Funding Agencies

11. Top Subjects area

The knowledge areas distribution of research output produced from 2001 to 2020 is shown in figure.8. This study helps to identify authors' interest and involvement in creating a publication on their specialization. It shows that most of the subjects are overlapped with each other. The study's findings reveal that the highest number of 945 (47.25%) of scholarly publications have come on the subject of Economics, Econometrics, and Finance, followed by Social Sciences (820, 41%), and Business, Management, and Accounting (706, 35.3%). The remaining subject areas have less than 10% publications.
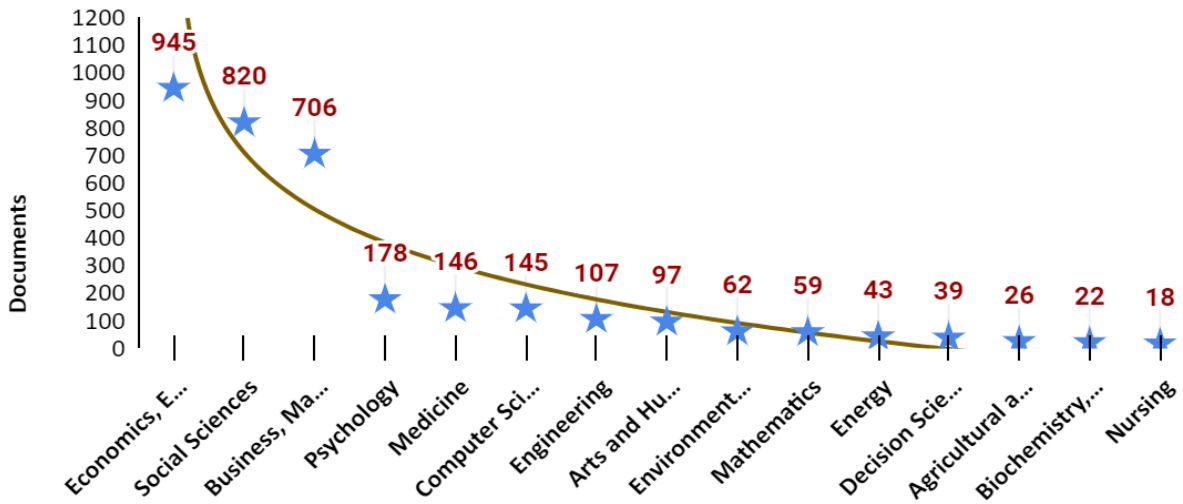
Fig. 8. Top most subject area

12. Types of Documents

Figure 9 shows the overview of the types of financial literacy research publications covered in the Scopus database. Of the total 2000 publications majority, i.e., 1577(78.85%), are research articles, while 148(7.4%) book chapters, conference proceedings 135(6.75%), review 76(3.80%), and books 28(1.4%), Further an ignorable percentage (less than 1%) of publications that have been published in the form of letters, note, editorial, data papers, short survey, and Erratum, etc.

Fig. 9. Types of documents

13 Top Keywords Analysis Network of publications

Keywords of an article indicate the core content of the topic. In the next step, attempts have been made to identify micro-level terms in the subject by analysing the published literature's keywords. According to the VOSviewer manual, "each link has a strength, represented by a positive numerical value. The higher this value is, the stronger the link will be. The total link strength indicates the number of publications in which two keywords occur together."
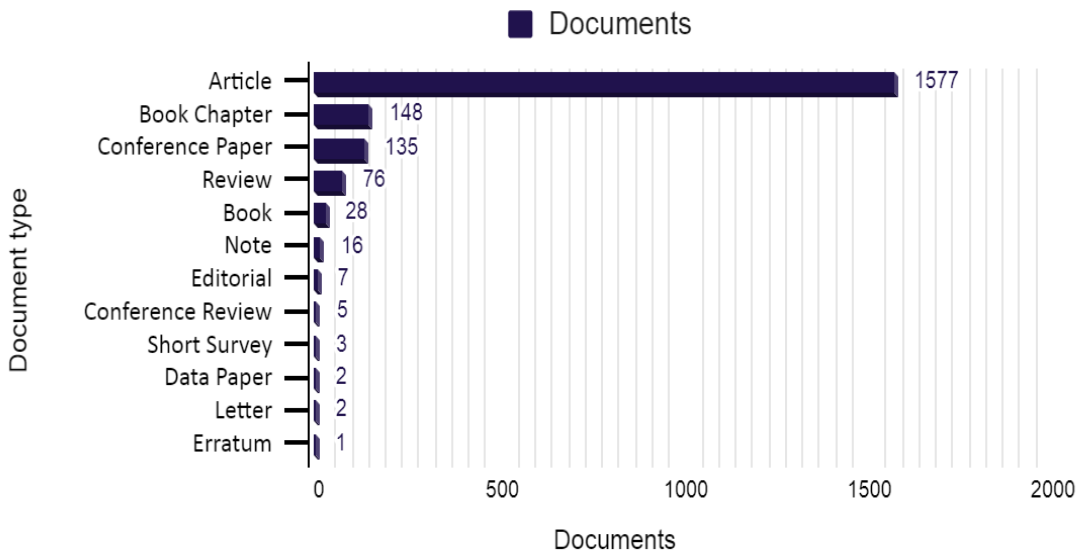
The keyword is one of the best indicators of sense full thought content of the researcher's writing materials. Therefore, if specific keywords are used frequently in the author's research writings, it refers to an ideology of the theme of research writings (Bhattacharyya, 2020).

The bibliographic data show that there are 5369 keywords available with the title of the publications. The co-occurrence threshold of keywords was set to 3, which led to getting 795 keywords in VOSviewer. As indicated in Figure 10, all the keywords are grouped into thirteen clusters: red, green, blue, yellow, and purple, and others for representing the subdomains of the concept' financial literacy'. It is to be noted here that the same color of terms in VOSviewer indicates the same cluster of terms related to each other. While Cluster 1 is represented by a red color that primarily deals with concepts like 'financial literacy' (722 links, 3740 total link strength, & 1070 occurrence), 'literacy' (449 links, 1812 total link strength, & 160 occurrences), financial inclusion (133 links, 271 total links strength & 68 occurrences) and others, Cluster 2 is represented by green colors that deals with the concepts like 'financial education' (261 links, 674 total link strength, & 182 occurrences), 'education' (360 links, 1068 total link strength, & 111 occurrences), 'students' (111 links, 281 total link strength, & 41 occurrence) and others. Cluster 3 is represented by blue color dealing with concepts like 'female' (362 links, 1935 total link strength, & 93 occurrences), 'income' (264 links, 689 total link strength, & 42 occurrences), 'controlled study' (242 links, 696 total link strength, & 30 occurrence) and others. Cluster 4 by yellow color represents concepts like 'humans' (359 links, 1968 total link strength, & 95 occurrences), 'financial management' (351 links, 1344 total link strength, & 79 occurrences), 'economics' (317 relations, 1070 total link strength, & 67 occurrences) and others. Cluster 5, indicated by the color purple, represents concepts like 'human' (405 links, 2538 total link strength, & 140 occurrences), 'retirement' (199 links, 522 total link strength, & 57 occurrences), 'human experiment' (184 links, 475 total link strength, & 26 occurrence) and others.
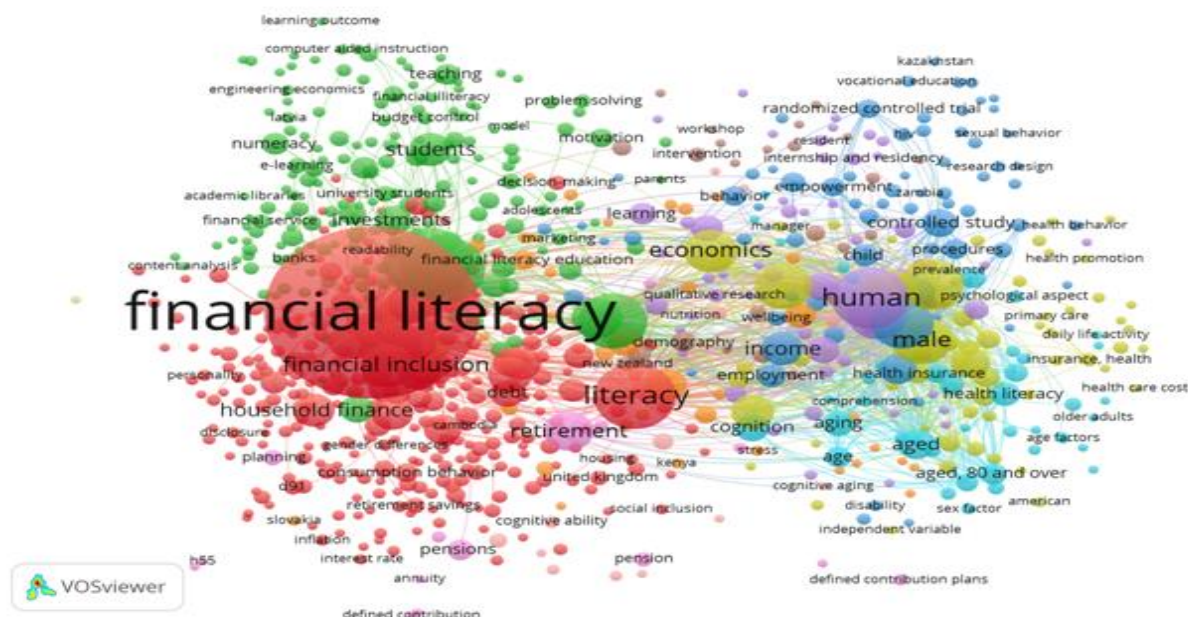
Fig. 10. Top most keywords network of publications

Major findings

- The analysis acknowledges that documents' growth rate continuously increases corresponding year with the highest 380 (2019) research documents. Further to all 2000 publications, 22229 citations were received, with an average of 11.11 citations per paper, and the highest citations were 3107 in 2011.

- The authorship patterns reveal that two authors have the highest contribution, with 657(32.87%) research papers during the study period, and multiple authorship patterns are more prominent for research productivity.

- The degree of collaboration and the collaborative coefficient is apparent, with a total of 0.78 and 0.48, respectively.

- It is apparent during the study period, Lusardi, A. was found to be the most productive author with 33(16.58%) documents and with 32 h-index.

- The correlation coefficient is 0.55, i.e., papers and citations are simultaneously moderate correlated, and the null hypothesis is rejected, which means the correlation coefficient is significant at a 5% level of significance.

- It is found that the total annual growth rate is 51.74 and relative 0.35 via the study period from 2001 to 2020. The DT has seen 2.35 with a periodical growth over the years from 0.50 to 4.59. "The economic importance of financial literacy: Theory and evidence" by Lusardi A. and Mitchell O.S., published in Journal of Economic Literature (2014), is the most cited (711) among the publications of financial literacy.

- In the top sources ranking list, the Journal of Consumer Affairs, whose subject area is Economics, Econometrics and Finance Economics, Econometrics and Finance (miscellaneous) and 57 h-index from the United States, is the top-ranked selected source for publication with 45 publications.

- The collaboration institution data analyzed above shows that the University of Pennsylvania is the top-ranked productive organization for research productivity of financial literacy with 25 research publications of financial literacy.
- The United States, with H- index =2386(Scimago Rankings), is the most producing country for economic research productivity with 287 research publications of financial literacy. The highest number, i.e., 945(47.25%) of publications, has appeared in the Economics, Econometrics, and Finance discipline.
- The most favorable keywords, whose occurrence is more than hundreds, are financial literacy (1070), financial education (182), finance (162), literacy (160), human (140), education (111).

Conclusion

The primary goal of this study was to access the global research trends in financial literacy. The study revealed rapid and strong optimistic growth in research and received many citations that demonstrated the research quality. The research collaboration with more than one author is found significantly high. The scientists preferred to publish their research papers in journals as sources of publications, mainly in international journals. A. Lusardi and O.S. Mitchell are the most prolific authors with h-index 32 & 29 respectively from the USA. The United States of America is at the top of the productive research countries for financial literacy publications. Further, the present study's implication would be facilitating various policy-making bodies and funding agencies such as UGC, NAAC, MHRD, etc. and other foreign bodies like NIA, ESRC, ARC, NIF, WBC, EC, etc. to take appropriate steps to boost researchers to be involved in research activities. The study results may act as an incentive for enhancing the interest of individual faculty in specific and the organization in general for strengthening their research activities. Overall, this study would help researchers conduct better research that turns into more publications in their field. Financial literacy is a significant discipline for the future sustainable development of the economy of any region.

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