

Scientometric Analysis of Forensic Science Research Literature

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Abstract

This study analyzed the Scientometrics of keyword research on “Forensic Science Research Literature” from 2018 to 2022, covering 2024 records worldwide. The data was collected from the Web of Science database. The study examined the year-wise distribution of contributions, authorship pattern, relative growth rate and doubling time, and document-wise distribution of records. The US ranked first in Forensic Science Research Literature with 914 (45.16%) records, followed by England (394) and Austrila (207). 33% of the total publications were contributed by single authors, while the rest of the 67% of research publications were contributed by multi-authors. The study found that relative growth rates (RGR) increased from 2019 (0.52) to 2022 (1.66) from 2018 to 2022, and doubling time (DT) rapidly decreased from 2019 (1.30) to 2022 (0.41)

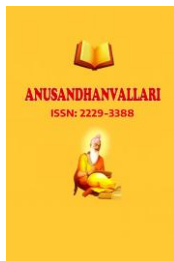
Keywords: Scientometrics, Relative Growth Rate, Doubling Time, Forensic Science Research Literature

Introduction to Scientometrics

The study of scientometrics involves analyzing publication patterns and authorship through statistical and mathematical methods. It aims to measure the impact of scientific findings on public policy and identify research trends and growth of information. Additionally, scientometrics is applied to estimate the comprehensiveness of secondary periodicals, identify authorship and trends in science documents, and identify users of different subjects. The term “Scientometrics” was coined by Nalimov and Mulchenko in 1969, who defined it as the application of quantitative methods to analyze sciences as an information process. Scientometrics is a vast field that encompasses various approaches within Science and Technology Studies (STS) and is often referred to as the “Science of Science”. The field of Forensic Science Research Literature behavior through a multidisciplinary lens that draws of principles from sociology, psychology, economics, statistics and anthropology. Forensic Science Research Literature analyze a wide range of related topics, including the characteristics of individuals who commit the crimes. The scope of Forensic Science Research Literature extends beyond the study of Forensic Science Research Literature activity itself and includes perspectives on the creation of laws. Their violation, and societal responses to lawbreaking. By exploring crime and deviance within the broader context of social issues like poverty, racism, and gender, Forensic Science Research Literature seeks to deepen our understanding of the complex dynamics that shape Forensic Science Research Literature behavior and its impact on society. Chindengwike, J. D. (2024)

Review of Literature

Kumbar, Prakash, Biradar and Nirmala(2015) have made the study on the research articles published on-line version of Web of Science in the field of forensic sciences during 2001-2015. The various bibliometric components of the 2108 research records published in the study period were studied. The study reveals the



various aspects of forensic sciences literature. Such as year wise distribution, geographical wise, organization wise, Language wise, form wise, most prolific authors and funding agency etc. The major findings of the study are: The year-wise Distribution of 2108 articles published from 2001-2015 Web of Science was seen. The highest number of articles published in the year of 2015 (302, 14.32%). The lowest number of research articles was reported in the year 2002 (66, 3.28%). The highest articles are published in English Language only (1910 - 99.61%) and less than 2 (0.09% records are in Italian language. Most of the Research output is being published in the form of research articles. USA and England are the highest Contributors to the field of Forensic sciences. Economic and Social Research Council ESRC and National Institute on Alcohol Abuse and Alcoholism are the major funding agencies in the field of Forensic sciences.

Objectives of the study

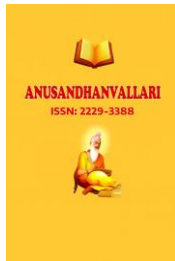
- To analyze year-wise publication of Forensic Science Research Literature
- To examine country-wise records
- To analyze the distribution of documents
- To study the authorship pattern
- To measure relative growth rate and doubling time
- To Identify the most productive keywords
- To conduct a time series analysis

Methodology: To conduct this study, we gathered data from the Web of Science database using the topic “Forensic Science Research Literature” and select the Web of Science core journals as the research field. We evaluated the literature output from 2018 to 2022, which included 2024 papers. Our analysis involved various methods such as Hiscite, Bibexcel, and Excel calculations. To visualize the bibliographic networks we utilized a VOS viewer. Our objective was to identify the most productive authors, analyze publications trends, study document distribution, and measure relative growth rate and doubling time. Additionally, we aimed to identify the most productive keywords and expand our knowledge in Forensic Science Research Literature through time series analysis. Hidayat, R. (2024)

Data Analysis and Interpretation

Table 1: Yearly Output

Year	Records	Percentage	Citing Articles	Times Cited	H-Index
2018	304	15.02	3372	3740	31
2019	435	21.49	3610	4281	29
2020	469	23.17	2861	3223	22
2021	433	21.39	1820	2000	15
2022	383	18.92	447	474	9
Total	2024	100.00	10227	13718	41



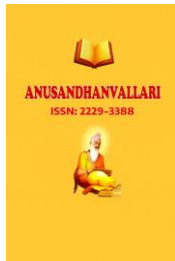
Between the years of 2018 and 2022, the field of Forensic Science Research Literature produced a total of 2024 research outputs worldwide. Notably, the highest record of 469 (23.17%) was attained in 2020. Conversely, the lowest record of 304 (15.02%) was recorded in 2018. The performance of research output remained below 20% in 2018 and. However, there was an improvement of over 20% between the years of 2019 and 2021.

Table 2: Document-wise Distribution

S. No	Document Type	Records	Percentage
1	Article	1,809	89.38%
2	Early Access	99	4.89%
3	Review Article	76	3.76%
4	Book Review	72	3.56%
5	Editorial Material	58	2.87%
6	Book Chapters	43	2.13%
7	Proceeding Paper	9	0.45%
8	Biographical-Item	3	0.15%
9	Correction	3	0.15%
10	Meeting Abstract	3	0.15%

The table above displays the various types of documentation related to Forensic Science Research Literature. It reveals that there are ten different types of documents available. Among these, Articles have the highest number of citing papers, with 1809 (89.38%) citations. Early Access comes in second with 99 (4.89%) citations, followed by Review Articles with 76 (3.76%), Book Reviews with 72 (3.56%), and Editorial Materials with 58 (2.87%). Other documents have less than 3% of citations.

Year	Records	Cumulative	W1	W2	W2-W1	Mean RGR	DT	Mean DT
2018	304	304	5.717	5.717	0	0.89		0.74
2019	435	739	6.075	6.605	0.529		1.307	
2020	469	1208	6.150	7.096	0.946		0.732	
2021	433	1641	6.070	7.403	1.332		0.520	
2022	383	2024	5.948	7.612	1.664		0.416	
Total	2024	5916	29.96	34.433	4.471	0.89	2.975	0.74



It has been analyze the growth of publication in Forensic Science Research Literature by Relative Growth (RGR) and Doubling Time (DT). During the period from 2018 and 2022 has represented 0.89 as the mean RGR. The doubling time of this study period is observed as 0.74 for this study period 2018-2022. RGR increased from the rate of 0.52 in 2019 to 1.66 in 2022. As the same time DT decreased from 20169 (1.30) to 2022 (0.41). Thus the RGR research publications was increased and doubling time was decreased.

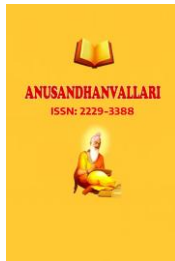
Table 4: Language-wise Distribution

Language	Records	Percentage
English	1,949	96.029%
German	21	1.04%
French	19	0.94%
Slovenian	10	0.49%
Portuguese	8	0.40%
Spanish	5	0.25%
Russian	3	0.15%
Czech	2	0.10%
Italian	2	0.10%
Norwegian	2	0.10%
Afrikaans	1	0.05%
Croatian	1	0.05%
Dutch	1	0.05%

According to the analysis, the majority of scholarly communication in Forensic Science Research Literature was in English with 96.29% of Articles written in this language. German followed with 1.04% of records with a other language had less than 1% of records.

Table 5: Countries wise Distributions (Top 10)

Language	Records	Percentage
USA	914	45.16
England	394	19.47
Australia	207	10.23
Canada	144	7.12
Peoples R China	72	3.56



Netherlands	62	3.06
Germany	61	3.01
Spain	51	2.52
Norway	48	2.37
Sweden	45	2.22

The table displays the publication output of various countries. USA has the highest number of records with 914, while Sweden has the lowest with 45. England comes in second with a publication outputs 394, which is 19.47% of the total. Australia is in third place with 207 records, accounting for 10.23%. Canada follows in fourth place with 144 publication outputs, representing 7.12% the total Netherlands, Germany, Spain, Norway, and Sweden take the fifth, sixth, and seventh positions respectively. India ranks 35th with only 7 research publication records.

Table 6: Authorship Pattern

Authorship Pattern	Records	Percentage
1 Author	699	34.535
2 Authors	595	29.397
3 Authors	368	18.181
4 Authors	173	8.547
5 Authors	86	4.249
6 Authors	51	2.5197
7 Authors	16	0.790
8 Authors	14	0.691
9 Authors	7	0.345
10 Authors	3	0.148
Above 10 Authors	12	0.592

The field of Forensic Science Research Literature research publications exhibits a diverse range of authorship patterns. Over the study period, there were publications with only one author and others with more than ten. Notably, the highest number records, 699, were published by single authors. Two-authored papers followed with 595 records, three-authored papers with 368 records, four-authored papers with 173 records, and papers with more than four authors had fewer than 100 publications.

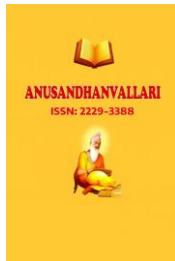


Table 7: Single vs Multi Authors

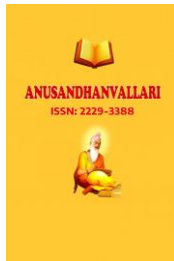
Authorship Pattern	Records	Percentage
Single Author	669	33%
Multi Authors	1355	67%
Total	2024	100%

According to the findings in table7, the study period between 2018 and 2022 saw a mix of single and multi-author publications in Forensic Science Research Literature research. Among the 2024 research outputs, a significant 1355 (67%) were the result of collaboration between multiples authors, while the remaining 669 (33%) were authored by a single individual.

Table 8: Most Prolific Authors

Author	Records	Percentage
Farrington DP	20	0.99%
Lynch MJ	15	0.74%
Sandberg S	15	0.74%
South N	13	0.64%
Brisman A	11	0.54%
Piquero AR	10	0.49%
Wyatt T	10	0.49%
Barnes JC	9	0.45%
Ceccato V	9	0.45%
Delisi M	9	0.45%

Table 8 showcases that “Farrington DP” has the highest number of publications, totaling 20. Lynch MJ and Sandberg S follow closely behind with 15 publications each, while South N and Brisman have 13and 11 publications, respectively. The remaining authors have contributed less than 10 publications each. After analyzing the time series formula and examining the separate results for 2035 and 2040, it has been discovers that the study of Forensic Science Research Literature research output is likely to experience an upward trend in growth in the future. This suggests that there is a positive global trend in Forensic Science Research Literature research output. In the field of Forensic Science Research Literature research, certain words were commonly used. To analyze this, the research focused on the top 10 words that appeared the most frequently. The word “Forensic Science Research Literature research” was used the most, with 412 occurrences by research scientists during the study period. “Forensic Science Research Literature research” was the second most commonly used word, appearing 355 times. “Violence” was the third most used word appearing 173 times.



Finding and Conclusion

The study analyzed the distribution of contributions over the years in Forensic Science Research Literature research and found that out of 2024 articles, the highest percentage (23.17%) of papers were published in 2020, while the lowest number of papers (15.02) were published in 2018. Among the types of documents, articles were found to be the most cited (1809) during the period of 2018-2022. The relative growth rate of publications showed an increasing trend, starting from 0.52 and reaching an average value of 0.89, with the highest value being 1.66. Similarly, the doubling time of publications showed a decreasing trend, starting from 1.30 and reaching an average value of 0.74, with the lowest value being 0.41. The distribution of Forensic Science Research Literature by language indicated that the majority of scholarly communication was in English, with 1949 (96.29%) articles.

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