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May 2022

## A citation analysis of scholarly communications of Universities in Karnataka

Kodandarama .

*PES College of Engineering, Mandya*

Chandrashekara M

*Professor, Department of Library and Information Science, University of Mysore, Manasagangotri, Mysuru*

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## **A citation analysis of scholarly communications of Universities in Karnataka**

### **Abstract**

**Purpose-**The study aims to analyse the resources used in the citations of 571 research publications of University of Mysore and Karnatak University in the field of physics and prepares the list of core journal, leading publishers and prolific authors. For any research and academic institutional libraries, books and journals are considered as key resources. As the resources are more and diverse, collection building is a tough task for librarians. Citation analysis is one of the best methods to list the most used resources by the users. The paper highlights the extent of use of different sources in the research publications of chemistry. Also the obsolescence of cited literature was examined in the study.

**Keywords:** Citation Analysis, Scientometrics, Bibliometrics, Scholarly Communications, Research Publications and Web of Science

**Methodology-** The main data source for this study is the references appended in the scholarly communications (only journal articles were taken in to consideration) of physics of University of Mysore and Kartnak University. Data consists of 17474 citations from 571 scholarly communications covered by Web of Science during 2009-2018. All these references were recorded on a specified data capturing sheet designed using MS Excel. Datasheet contained the reference data like bibliographical form, publication year, journal title, publisher and publication year of scholarly communications. Age of individual journal citations was ascertained by subtracting the year of publication of reference from the year of publication of citing article. The list of core journals was prepared on the basis of highly cited articles of journals in Physics.

**Findings-** study shows that multi-authored (83.38%) sources constitute highest number of citations and 89.57% citations were from journals followed by books 6.21%. The country-wise break up of citations uncovers that USA stands first in the rank list with 6846 (39.18%) citations. United Kingdom and Netherlands occupy second and third rank respectively.

**Originality/Value-** Information presented in the study provides insight in to the citation pattern of Physics literature. Data obtained in this study will help the libraries of University of Mysore and Karnatak University in collection building.

**Keywords: Citation Analysis, Scientometrics,**

## **1. Introduction**

With an advent of information and communication technologies, over the past three decades collections of library have significantly transitioned from print to digital media. One of the main consequences of this transition is fast and quick access of desired information. Today e-journals have become major resources for scholarly communications and it is subscribed by various libraries. But, unfortunately it is not possible for any library to subscribe to all journal literature that are being published in millions. Rising subscription cost of journals and budgetary problems are considered to be the major problems for libraries to acquire all journals demanded by library patrons. Hence, libraries started employing techniques like citation analysis to assess the information sources used by its patrons. This kind of investigation will help the library to take appropriate decisions about which journals to be continued or to be discontinued for subscription.

The present study analyzes the references of physics scholarly Communications of University of Mysore and Karnatak University. Physics is considered to be one the fundamental and oldest disciplines of the science. Ideas of physics are pursued by scientists of all disciplines, including chemists who study the structure of molecules, Physics involves several interdisciplinary areas of research for example biophysics and quantum chemistry, and the limitations of physics are not strictly defined. Departments of physics of University of Mysore and Karnatak University are keenly engaged in numerous research activities in the areas

like condensed matter physics, nuclear physics, atmospheric physics and theoretical physics and are publishing their research results in various scholarly communications like journals, books, conference proceedings and others.

## **2. Review of literature**

Various studies have been carried out on citation analysis, in the view of present topic, following studies were reviewed. Rahman & Bhattacharya (2013) in their study identified that 81.76% of cited literature were journal literature and the maximum number of citations were from USA (28.4%). Results also showed that collaborative-researches far outnumbered solo researches, accounting for 77.44% of the total cited papers. Similarly, Hadagali, Kumbar, Rajalaxmi & Hiremath (2014) discovered that most of the sources cited were journals followed by books. Kumar & Dora (2011) observed related result that journals found to be the highly cited form of literature. Bebi & Singh (2013) in their study, showed through form wise distribution of citations that books accounted for 67.23% followed by journals articles (22.020%). Results also revealed that the single authored papers (4786) were highest in number indicating less collaboration in social science researches. Further, study conducted by Fasae (2011) revealed that journals were cited extensively (31.66%) in the MTech theses. He also identified that 31% of cited sources were 20 years or more. Flynn (2020) analyzed resource type and citation age in the dissertation and theses from 2009-2019 in mathematics and statistics at University at Albany. Study found out that students highly cited journal literature which accounts for 57%. The average age of all citations was 19.9 years, with a minimum of zero years and a maximum of 115 years.

## **3. Objectives of the study**

The main purpose of this study is to identify and provide libraries of University of Mysore and Karnatak University core journals in the area of Physics. Major objectives of this study are to;

- Identify the principal form of literature used by the researchers.
- Study the country wise scattering of citations.
- Identify the leading publishers.

- Determine the obsolescence of journal literature.
- Study the authorship pattern of cited references.
- To recognize the prolific authors in Physics and
- Prepare the list of core journals

#### 4. Results and Discussions

##### 4.1 Bibliographical form

Table 1 shows the most cited bibliographic form was journal articles with 89.57% followed by books 6.21%. High usage of journal articles are in accordance with the findings of other studies of Singh (2016) and Sheshrao & Khaparde (2011). Software applications are the third most cited sources which account for 1.01%. Rest of the citations were scattered in other bibliographic forms. Among them, conference proceedings, reports and handbooks were cited more than other resources.

Table 1. Citations by bibliographic form

Source type	Number of citations	%
Journal articles	15651	89.57
Books	1085	6.21
Software	176	1.01
Conference Proceedings	156	0.89
Reports	102	0.58
Handbooks	88	0.50
Manuals	85	0.49
Websites	46	0.26
Standards	29	0.17

Patents	25	0.14
Theses	20	0.11
Abstracts	9	0.05
Dissertations	2	0.01
<b>Total</b>	<b>17474</b>	<b>100</b>

#### ***4.2 Country wise distribution of citations***

Country of publication of sources was the base for preparing the scattering of country-wise citations. Study identifies that 17474 citations originated from 57 countries. Among them, USA ranks first with 39.38% of overall citations followed by United Kingdom (25.35%) and Netherlands (17.87%). Germany ranked fourth with 3.39%. Publications from India received 2.66% of citations, with this India secured fifth rank in the list. Publications from these countries cover 88.55% of total citations and only 11.66% of citations were from remaining 53 countries.

Table 2. Country wise-scattering of citations.

<b>Country</b>	<b>Journal articles</b>	<b>Books</b>	<b>Others sources</b>	<b>Total citations</b>	<b>%</b>
USA	6020	602	224	6846	39.18
United Kingdom	4231	159	39	4429	25.35
Netherlands	3062	38	22	3122	17.87
Germany	486	65	24	575	3.29
India	404	41	20	465	2.66
Japan	362	0	21	383	2.19
Switzerland	161	1	4	166	0.95
France	69	1	7	77	0.44
Canada	56	0	2	58	0.33

Egypt	63	1	1	65	0.37
Others (47 countries)	515	57	76	648	3.71
Not available	222	120	298	640	3.66
<b>Total</b>	<b>15651</b>	<b>1085</b>	<b>738</b>	<b>17474</b>	<b>100.00</b>

### ***4.3 Authorship pattern of citations***

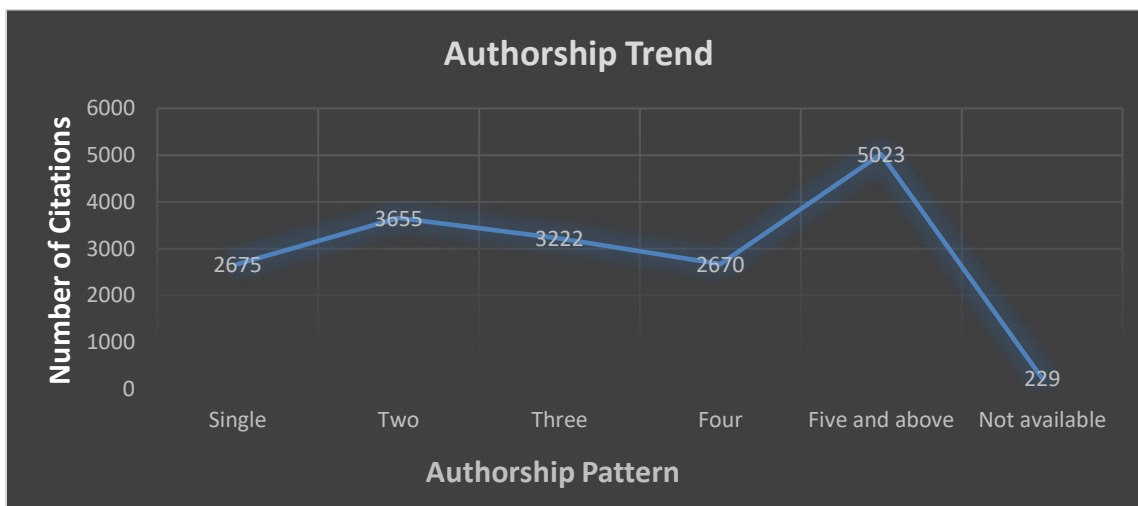
For the analysis of authorship pattern, bibliographic forms were categorized in to three broad groups namely journal articles, books and other forms. Category ‘other forms’ includes resources like conference proceedings, reports, theses/dissertations, handbooks, manuals and other. Analysis highlights that, 15.31 % of citations were authored by single authors and two authors’ contributions account for 20.92%. The study shows that majority of sources were published under joint authorship. This indicates that there is high collaboration in physics researches.

Though the maximum number of sources cited are two authored, there is a decreasing trend in the team researches as shown in figure 1.

Table 3. Authorship pattern.

<b>Authorship pattern</b>	<b>Journal articles</b>	<b>Books</b>	<b>Other forms</b>	<b>Total citations</b>	<b>%</b>
Single	1869	550	256	2675	15.31
Two	3268	282	105	3655	20.92
Three	2987	154	81	3222	18.44
Four	2604	35	31	2670	15.28
Five and above	4865	31	127	5023	28.75
Not available	58	33	138	229	1.31

Total	15651	1085	738	17474	100.00
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**Figure 1. Authorship trend graph of cited literature**

#### *4.4 Prolific authors*

Table 4. Top 10 prolific authors.

Name	Citations	H index	Affiliation	country
Badiger N. M.	209	18	Karnatak University	India
Singh V. P.	168	31	Banaras Hindu University	India
Ranganathaiah C.	160	20	University of Mysore	India
Somashekar R.	159	20	University of Mysore	India
Mulimani B. G.	115	19	Karnatak University	India
Van De Streek J.	115	23	Avant-garde Materials Simulation GmbH	Germany
Sheldrick G. M.	107	47	University of Gottingen	Germany



Nagappa	91	8	University of Mysore	India
Wang X.	87	13	Chinese academy of science	China
Jean Y. C.	85	22	Umm Al-Qura University	Saudi Arabia

Top 10 prolific authors were ascertained by the number of times their papers were cited. Table 4 highlights the h index of authors derived from Web of Science citation indexing database to project the impact of authors' contributions in the field of physics. It is observed from the above table that Badiger N. M. from Karnatak University tops the list with 209 citations. Singh V. P. from Banaras Hindu University secures second place with 168 citations. Ranganathaiah C. from University of Mysore ranks third in the list with 160 citations. The study witnessed majority of 6 authors listed in table 4 are from India. Thus, it can be inferred that researchers in the field of physics highly cited the scholarly communications written by Indian authors.

#### *4.5 Obsolescence of Journal literature*

Dyachronous obsolescence model proposed by Nakamoto (1988) was adopted to investigate the obsolescence of journal literature with an intent to help the librarians in deciding the documents that are to be kept or discarded in order to maintain the need-based collection in libraries. Ages of journal literature were divided in to 22 groups with 5 years of duration.

It is evident from the table 5 that 33.40 % of citations are less than 5 years old, 23.08 % citations fall under the age group of 6 to 10 years and 14.45 % of citations come under 11-15 years citation age. This indicates journal literature cited by researchers is current literature with a span of 15 years.

Table 5. Obsolescence of Journal Citations

<b>Age range</b>	<b>Citations</b>	<b>%</b>
< 5 years	5227	33.40
6 to 10 years	3612	23.08
11 to 15 years	2261	14.45

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16 to 20 years	1314	8.40
21 to 25 years	900	5.75
26 to 30 years	640	4.09
31 to 35 years	467	2.98
36 to 40 years	302	1.93
41 to 45 years	255	1.63
46 to 50years	156	1.00
51 to 55 years	124	0.79
56 to 60 years	141	0.90
61 to 65 years	102	0.65
66 to 70 years	38	0.24
71 to 75 years	15	0.10
76 to 80 years	18	0.12
81 to 85 years	13	0.08
86 to 90 years	9	0.06
91 to 95 years	4	0.03
96 to 100 years	4	0.03
>100 years	44	0.28
Not available	5	0.03
Total	15651	100

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#### 4.6 Ranked list of core journals in physics

Ranked list of core journals as reflected in the references is shown in table 6. This table also presents the details of impact factor and access type fetched from the respective journals' website. It is observed that researchers in physics have cited a total of 1722 journals. Of which only top 25 journals were listed on the basis of frequency of occurrences. Study identifies that Physical Review B ranks 1<sup>st</sup> with the highest attention of citations (3.90%). It is followed by Spectrochim Acta A with 311(1.99%) citations. it is known from the analysis that majority of journals cited (23) are paid/subscription based journals.

Table 6. Ranked list of core journals in physics

<b>Journals</b>	<b>Citations</b>	<b>Rank</b>	<b>Country</b>	<b>IF</b>	<b>Access Type</b>
Physical Review B	611	1	USA	3.73	Paid
Spectrochim Acta A	311	2	Netherlands	2.93	Paid
Journal of the American Chemical Society	266	3	USA	14.69	Paid
Journal of Applied Physics	260	4	USA	2.32	Paid
Radiation Physics and Chemistry	219	5	UK	2.22	Paid
Applied Physics Letters	212	6	UK	1.02	Paid
Molecular Crystals and Liquid Crystals	211	7	USA	0.54	Paid
Journal of Applied	201	8	UK	1.53	Paid

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Polymer Science					
Physical Review Letters	193	9	USA	9.22	Paid
Acta Crystallographica Section A	183	10	UK	1.96	Open
Journal of Applied Crystallography	176	11	Netherlands	0.48	Paid
The Journal of Chemical Physics	175	12	USA	2.99	Paid
Nuclear Instruments and Methods in Physics Research	170	13	USA	0.72	Paid
Polymer	169	14	Netherlands	3.16	Paid
Acta Crystallographica Section E	163	15	UK		Open
Journal of Physical Chemistry	159	16	USA	2.83	Paid
Journal of Physical Chemistry B	156	17	USA	2.92	Paid
IEEE Transactions on Nuclear Science	143	18	USA	1.57	Paid
Annals of Nuclear Energy	142	19	UK	1.02	Paid

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Chemical Physics	136	20	Netherlands	1.9	Paid
Letters					
European journal of medicinal chemistry	134	21	France	5.57	Paid
Journal of Molecular Structure	134	21	Netherlands	2.11	Paid
Physical Review A	131	22	USA	2.9	Paid
Bioorganic and Medicinal Chemistry Letters	130	23	UK	2.42	Paid
Macromolecules	116	24	USA	5.91	Paid
Journal of Physical Chemistry C	112	25	USA	4.3	Paid
Others (1697 journals)	10638				
<b>Total</b>	<b>15651</b>				

#### *4.7 Leading publishers*

Table 7. Ranked list of leading publishers

<b>Publishers</b>	<b>Citations</b>	<b>%</b>	<b>Rank</b>
Elsevier	4570	29.20	1
American Chemical Society	1726	11.03	2
Wiley	1608	10.27	3

American Physical Society	1156	7.39	4
American Institute of Physics	628	4.01	5
Royal Society of Chemistry	615	3.93	6
Institute of Physics Publishing	534	3.41	7
Taylor and Francis	477	3.05	8
Springer	432	2.76	9
Nature	255	1.63	10

Publishers-wise analysis of journal citations reveals that researchers in physics have cited 15561 journal articles published from more than 100 publishers. Table 7 listed only the top 10 publishers with 12001 citations. It is seen from the table that Elsevier ranked first with 4570 citations (29.20%) followed by American chemical society with 1726 citations (11.03%). It is followed by Wiley with 1608 (10.27%). All these three publishers together cover 50.50% of total citations.

## 5. Findings and Conclusion

On the basis of the above study on 17474 citations found in 571 scholarly publications of physics following findings were drawn

1. Journals literature contributed highest percentage of citations which accounts for 89.57% followed by books 6.21% and software 1.01%. So, it is concluded that researchers in physics relied more upon journal literature for their researches.
2. Country-wise analysis of citation reveals that literature published in western countries considerably preferred by researchers in physics. 39.8% of citations originated from USA. Literature published by United Kingdom and Netherlands received 25.35% and 17.87% of citations respectively.
3. Investigation on authorship pattern of citations reveals that the multi-authored citations are very high and it is 83.38% of overall citations. Which indicates the high collaboration in the field of physics.

4. Though the literature published in western countries were significantly preferred by researchers in physics, list of prolific authors shows that, majority of sources cited were by Indian authors. Singh V. P. from Banaras Hindu University ranks first with 168 citations followed by Ranganathaih C. from University of Mysore with 160 citations.
5. In the rank list of journals, Physical Review B occupies first rank with 611 citations followed by Spectrochim Acta A with 311 citations.
6. Analysis of obsolescence of journal literature results that, majority of journal literature cited accounting for 70.92% are current literature with a span of 15 years and the 29.08% of literature which were more than 15 years of age found to be less used in the study.

During the study varied format/style of references were observed. Some of citation formats/styles didn't have citation element like title of work and some had abbreviation of source rather than full title of source. Investigators of the study hope that ranking of journals will help the librarians for the selection of journals of greater importance in physics discipline. Investigators also feel that this kind of study will help the researchers in physics in selecting useful sources as there is explosion of information in the form of journals and books.

## References

Hadagali (G S), Kumbar (B D), Rajalaxmi (M G) and Hiremath (M R S). Citation analysis of ph. D. Theses in chemistry submitted to Karnatak University, Dharwad during 2002-2006: A study. *International Information Sources and Services*. 1, 2; 2014, p84-96.

Jadhav (V S) and Khaparde (V S). Citation Analysis of Ph.D. Theses on Physics Submitted to Dr. Babasaheb Ambedkar Marathwada University. *Collnet Journal of Scientometrics and Information Management*. 5, 1; 2011, p115-127.

Kumar (H A) and Dora (M). Citation analysis of doctoral dissertations at IIMA: A review of the local use of journals. *Library Collections, Acquisitions, and Technical Services*. 3, 1; 2011, p32-39.

Pillai (K G) Authorship patterns in physics literature: An informetric study on citations in doctoral theses of the Indian Institute of Science. *Annals of Library and Information Studies*. 54, 2007, p90-94.

Rahman (M Z) and Bhattacharya (U). Citation Analysis of Doctoral Theses in Physics Submitted to North Bengal University in West Bengal: An In-Depth Study. *Indian Journal of Library and Information Science*. 7, 2; 2013, p285.

Singh (G A). bibliometric study of literature on digital libraries. *The Electronic Library*. 25, 3; 2007, p 342–348.

Subramanyan (K). Bibliometric studies of research collaboration: a review. *Journal of Information Science*. 6, 1; 1983, p33-38.

Singh (K P) and Bebi. Citation Analysis of PhD Theses in Sociology Submitted to University of Delhi during 1995-2010. *DESIDOC Journal of Library & Information Technology*. 33, 6; 2013, p489-493

Kehinde (F J). Citation analysis of M.Tech theses submitted in the Department of Agricultural Economics and Extensio Federal University of Technology Akure, Nigeria. *Collection Building*. 30, 4; 2011, p179-183.

Flynn (K H). Citation Analysis of Mathematics and Statistics Dissertations and Theses from the University at Albany. *Science & Technology Libraries*, 1, 13; 2020, p1-13.

Nakamoto (H). Synchronous and dyachronous citation distributions. *Informetrics*. 87, 88; 1988, p157–163.